Annexure – J
Technical Specifications

Data shall be collected based on below recommended process:

Description of Data	**Recommended Process**
Asset Inventory (Highway, Structures, Road Furniture, Facilities)	Network Survey Vehicle or ROMDAS or equivalent technology
Pavement Distress – (Cracking and other visual distress)	Network Survey Vehicle or ROMDAS or equivalent technology
Roughness Value (IRI), Rutting, Texture depth (Rigid Pavement)	Network Survey Vehicle (Laser Profilometer) or ROMDAS or equivalent technology
Deflection Value/Remaining Life	Falling Weight Deflectometer
Condition Survey of Structures	Visual Condition Survey and Thorough Inspection using Mobile Bridge Inspection Unit.
Condition Survey of Road Furniture, Facilities	Network Survey Vehicle or ROMDAS or equivalent technology
Axle Load Data	2-days Axle Load Survey with axle Pad
Test Pits	As per Standard Industrial practice
Skid Resistance	SCRIM (Sideway force Coefficient Routine Investigation Machine or equivalent) British Pendulum Tester
Reflectivity for Sign Boards and Road Markings	Thorough Inspection using Retro Reflectometer
NDT Test (Structure)* (* if required)	As per IRC SP 40 2019

The Bidder shall strictly adhere to the Project deliverables, Tolerance Criteria, tool/equipment and specification as mentioned in the table 1, table 2, table 3 and table 4 for Criteria and specification for Pavements, Rating criteria for Rigid Pavements, Criteria for Safety Related Items & Other Furniture Items and Criteria for Structures & Culverts respectively.

Table 1: Criteria and Specification for Pavements

Asset Type	Performance Parameter	Level of Service (LOS)		Tools/ Equipment	Standards and References for Inspection and Data Analysis	Maintenance specifications
		Desirable	Acceptable			
Flexible Pavement – (Pavement of MCW, Service Road, Approach of Grade structures, approaches of connecting roads, slip roads, lay byes etc. as applicable)	Potholes	Nil	<0.1% of area and subjected to limit of 10mm in depth	Network Survey vehicle (NSV) with all its modules such as Laser Profilometers, Transverse profile logger, Laser crack measurement system, Video logging modules, high resolution Odometer etc.	IRC 82: 2023 and Distress Identification Manual for Long Term Pavement Performance Program, FHWA 2003	MORT&H Specification 3004.2
	Cracking	Nil	<5% subject to limit of 0.5 sqm for any 50m length			MORT&H Specification 3004.3
	Corrugations and Shoving	Nil	0.1% of area			IRC 82: 2023
	Bleeding	Nil	<1% of area			MORT&H Specification 3004.2
	Raveling/ Stripping	Nil	<1% of area			IRC 82: 2023 read with IRC SP-81
	Edge Deformation / Breaking	Nil	<1m for any 100m section and/or width <0.1m at any Location restricted to 30cm from the edge.			IRC 82: 2023
Flexible Pavement – (Pavement of MCW, Service Road,	Roughness BI	2000 mm/km	2400 mm/km	Network Survey vehicle (NSV) with all its module such as Laser Profilometers,	ASTM E950 (98):2004 – Standard Test Method for measuring	IRC 82: 2023

Asset Type	Performance Parameter	Level of Service (LOS)		Tools/ Equipment	Standards and References for Inspection and Data Analysis	Maintenance specifications
		Desirable	Acceptable			
Approach of Grade structures, approaches of connecting roads, slip roads, lay byes etc. as applicable)	Rutting	<10mm for any 50 m section and/or, length of section <5m	<10mm for any 50 m section and/or, length of section <10m	Transverse profile logger, Laser crack measurement system, Video logging modules, high resolution Odometer etc.	Longitudinal Profile of Travelled Surfaces with Accelerometer Established Inertial Profiling Reference and ASTM E1656 - 94:2000- Standard Guide for Classification of Automatic Pavement Condition Survey Equipment	IRC 82: 2023
	Pavement rating based on distress per IRC 82:2023 / Pavement Condition Index as per ASTM 6433- 7					IRC 82: 2023/ ASTM D 6433-07
	Other Pavement Distresses					IRC 82: 2023
	Skid	60SN	50SN	SCRIM (Sideway force Coefficient Routine Investigation Machine or equivalent) British Pendulum Tester	IRC 82: 2023	BS:7941-1:2006, IRC 82: 2023/ ASTM 274

Asset Type	Performance Parameter	Level of Service (LOS)		Tools/ Equipment	Standards and References for Inspection and Data Analysis	Maintenance specifications
		Desirable	Acceptable			
	Deflection/ Remaining Life			Falling Weight Deflectometer	IRC 115: 2014	IRC:115-2014
Rigid Pavement (Pavement of MCW, Service Road, Grade separated structure, approaches of connecting roads, slip roads, lay byes etc. as applicable.)	Roughness BI	<2200mm/km	<2400mm/km	Class I Profilometer Mounted on NSV	ASTM E950 (98) :2004 and ASTM E1656 -94: 2000	IRC: SP:83-2018
	Skid	Skid Resistance No. at different speeds of vehicles		SCRIM (Sideway force Coefficient Routine Investigation Machine or equivalent) British Pendulum Tester	IRC: SP:83-2018	IRC: SP:83-2018
		Minimum SN	Traffic Speed			
		36	50			
		33	65			
		32	80			
		31	95			
		31	100			
Embankment /Slope	Edge drops at shoulders	Nil	40mm	Network Survey vehicle (NSV)	IRC	MORT&H Specification
	Slope of camber/cross fall	Nil	<2% variation in prescribed slope of camber /cross fall			

Asset Type	Performance Parameter	Level of Service (LOS)		Tools/ Equipment	Standards and References for Inspection and Data Analysis	Maintenance specifications
		Desirable	Acceptable			
	Embankment Slopes	Nil	<15 % variation in prescribed side slope			
	Embankment Protection	Nil	Nil	NA		
	Rain Cuts/Gullies in slope			NA		
Cut Section/ Slope	Unstable Slopes	Nil	-	NA	IRC	MORT&H Specification

Table 2: Rating Criteria for Rigid Pavements

S. No	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	For the case d > D/2
1	CRACKING					
	Single Discrete Cracks Not intersecting with any joint	w = width of crack, L = length of crack, d = depth of crack, D = depth of slab	0	Nil not discernible	No Action	
			1	w < 0.2 mm. hair cracks		
			2	w = 0.2 - 0.5 mm, discernible from slow-moving car	Seal without delay	Full Depth Repair Dismantle and reconstruct affected portion - See Para 5.4
			3	w = 0.5 - 1.5 mm, discernible from fast-moving car		
			4	w = 1.5 - 3.0 mm	Seal and stitch if L > lm.	
			5	w > 3 mm.		
2	Single Transverse (or Diagonal) Crack intersecting with one or more joints	w = width of crack, L = length of crack, d = depth of crack, D = depth of slab	0	Nil, not discernible	No Action	
			1	w < 0.2 mm, hair cracks	Route and seal	Seal and Cross-stitch or Staple
			2	w = 0.2 - 0.5 mm, discernible from slow vehicle		
			3	w = 0.5 - 3.0 mm, discernible from fast vehicle	Seal and stitch, if L > lm.	Full Depth Repair Dismantle and reconstruct affected

S. No	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	For the case d > D/2
						portion - See Fig 5.5 & Refer Chapter 9
			4	w = 3.0 - 6.0 mm	Not Applicable	Staple or dowel bar retrofit
			5	w > 6 mm, usually associated with spalling, and/ or slab rocking under traffic	Not Applicable as it may be full depth crack	
3	Single Longitudinal Crack intersecting with one or more joints	w = width of crack, L = length of crack, d = depth of crack, D = depth of slab	0	Nil, not discernible	No Action	
			1	w < 0.5 mm, discernible from slow moving vehicle	Seal and stitch if L > lm	Seal and Cross-stitch or Staple
			2	w = 0.5 - 3.0 mm, discernible from fast vehicle		
			3	w = 3.0 - 6.0 mm	Seal and staple	Partial Depth Repair with or without dowel bar retrofit, or
			4	w = 6.0 - 12.0 mm	Not Applicable	
			5	w > 12 mm, usually associated with spalling, and/or slab rocking under traffic	Not Applicable (Rocking/ Spalling indicates Full depth crack)	Full Depth Repair Dismantle and reconstruct

S. No	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	For the case d > D/2
						affected portion - see Fig 5.6 and Chapter 9
4	Multiple Cracks intersecting with one or more joints or cracks	w = width of crack	0	Nil, not discernible	No Action	
			1	w < 0.2 mm, hair cracks	Seal and stitch if L > 1m.	Dismantle and reconstruct whole slab
			2	w = 0.2 - 0.5 mm. discernible from slow vehicle		
			3	w = 0.5 - 3.0 mm, discernible from fast vehicle	Full depth repair	
			4	w = 3.0 - 6.0 mm panel broken into 2 or 3 pieces		
			5	w > 6 mm and/or panel broken into more than 4 pieces		Reinstate subbase, Reconstruct whole slab
5	Corner Break	w = width of crack, L = length of crack	0	Nil, not discernible	No Action	
			1	w < 0.5 mm; only 1 corner broken	Seal with low viscosity epoxy to secure broken parts	
			2	w < 1.5 mm; L < 0.6 m, only one corner broken		

S. No	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	For the case d > D/2
			3	w < 1.5 mm; L < 0.6 m, two corners broken	Partial Depth (See Fig 8.3)	Full depth repair
			4	w > 1.5 mm; L > 0.6 m or three corners broken		
			5	three or four corners broken		Reinstate sub-base and reconstruct the slab.
6	Punchout (Applicable to CRCP only)	w = width of crack, L = length (m/m2)	0	Nil, not discernible	No Action	No Action
			1	w < 0.5 mm; L < 3 m/m^2	Not Applicable (Punchout is a full depth distress)	Seal with low viscosity epoxy to secure broken parts
			2	either w > 0.5 mm or L < 3 m/m^2		
			3	w > 1.5 mm and L < 3 m/m^2		
			4	w > 3 mm, L < 3 m/m^2 and deformation		Full depth repair - Cut out and replace damaged area taking care not to damage reinforcement
			5	w > 3 mm, L > 3 m/m^2 and deformation		
7	SURFACE DEFECTS				SHORT TERM	LONG TERM
			0	Nil, not discernible	No action.	

S. No	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	For the case d > D/2
	Ravelling or Honeycomb type surface	r = area damaged surface / total surface of slab (%) h = maximum depth of damage	1	r < 2 %	Local repair of areas damaged and liable to damage	Not Applicable
			2	r = 2 - 10 %		
			3	r = 10-25%	Bonded Inlay if affecting 2 or 3 slabs	
			4	r = 25 - 50 %		
			5	r > 50% and h > 25 mm	Reconstruct slabs if affecting 4 or more slabs	
8	Scaling	r = damaged surface / total surface of slab (%) h = maximum depth of damage	0	Nil, not discernible	No action.	Not Applicable
			1	r < 2 %	Local repair of areas damaged and liable to damage	
			2	r = 2 - 10 %		
			3	r = 10 - 20%	Bonded Inlay	
			4	r = 20 - 30 %		
			5	r > 30 % and h > 25 mm	Reconstruct slab	
9	Polished Surface/ Glazing	t = texture depth, sand patch test	0		No action.	Not Applicable
			1	t > 1 mm		
			2	t = 1 - 0.6 mm	Monitor rate of deteriotion	
			3	t = 0.6 - 0.3 mm		
			4	t = 0.3 - 0.1 mm		
			5	t < 0.1 mm	Diamond Grinding if affecting 50% or more slabs in a continuous stretch of minimum 5 km	

S. No	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	For the case d > D/2
10	Popout (Small Hole), Pothole	n = number / m^2, d = diameter, h = maximum depth	0	d < 50 mm; h < 25 mm; n < 1 per 5 m^2	No action.	Not Applicable
			1	d = 50 - 100 mm: h < 50 mm; n < 1 per 5 m^2	Partial depth repair 65 mm deep	
			2	d = 50 - 100 mm; h > 50 mm; n < 1 per 5 m^2		
			3	d = 100 - 300 mm; h < 100 mm n < 1 per 5 m^2	Partial depth repair 110mm i.e 10 mm more than the depth of the hole	
			4	d = 100 - 300 mm; h > 100 mm; n < 1 per 5 m^2		
			5	d > 300 mm; h > 100 mm: n > 1 per 5 m^2	Full depth repair	
	JOINT DEFECTS				SHORT TERM	LONG TERM
11	Joint Seal Defects	loss or damage L = Length as % total joint length	0	Difficult to discern.	No action.	Not Applicable
			1	Discernible, L< 25% but of little immediate consequence with regard to ingress of water or trapping incompressible material.	Clean joint, inspect later.	

S. No	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	For the case d > D/2
			3	Notable. L > 25% insufficient protection against ingress of water and trapping incompressible material.	Clean and reapply sealant in selected locations	
			5	Severe; w > 3 mm negligible protection against ingress of water and trapping incompressible material.	Clean, widen and reseal the joint following strict procedures	
12	Spalling of Joints	w = width on either side of the joint, L = length of spalled portion (as % joint length)	0	Nil, not discernible	No action.	Not Applicable
			1	w < 10 mm	Apply low viscosity epoxy resin/ mortar in cracked portion	
			2	w = 10 - 20 mm, L < 25%		
			3	w = 20 - 40 mm, L > 25%	Partial Depth Repair 30 - 50 mm deep, h = w + 20% of w	
			4	w = 40 - 80 mm, L > 25%		
			5	w > 80 mm, and L > 25%	50 - 100 mm deep repair. H = w + 20% of w	
13	Faulting (or Stepping) in Cracks or Joints	f = difference of level	0	not discernible, < 1 mm	No action.	Not Applicable
			1	f < 3 mm		

S. No	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	For the case d > D/2
			2	f = 3 - 6 mm	Determine cause and observe take action for diamond grinding	
			3	f = 6 - 12 mm	Diamond Grinding	
			4	f= 12 - 18 mm	Raise sunken slab.	
			5	f> 18 mm	Strengthen subgrade and sub-base by grouting, raising sunken slab	
14	Blowup or Buckling	h = vertical displacement from normal profile	0	Nil, not discernible	No action.	Not Applicable
			1	h < 6 mm		
			2	h = 6 - 12 mm	Install Signs to Warn Traffic	
			3	h = 12 - 25 mm		
			4	h > 25 mm	Full Depth Repair	
			5	shattered slabs, ie 4 or more pieces	Replace broken slabs.	
15	Depression	h = negative vertical displacement from normal profile L =length	0	Not discernible, h < 5 mm	No action.	Not Applicable
			1	h = 5 - 15 mm		
			2	h = 15-30 mm, Nos <20% joints	Install Signs to Warn Traffic	
			3	h = 30 - 50 mm		
			4	h > 50 mm or > 20% joints	Strengthen subgrade, Reinstate pavement at normal level if L < 50 m.	
			5	h > 100 mm		

S. No	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	For the case d > D/2
16	Heave	h = positive vertical displacement from normal profile, L = length	0	Not discernible. h < 5 mm	No action.	scrabble
			1	h = 5 - 15 mm	Follow up.	
			2	h = 15 - 30 mm, Nos <20% joints	Install Signs to Warn Traffic	
			3	h = 30 - 50 mm		
			4	h > 50 mm or > 20% joints	Stabilise subgrade. Reinstate pavement at normal level if length < 20 m.	
			5	h > 100 mm		
17	Bump	h = vertical displacement from normal profile	0	h < 4 mm	No action.	
			1	h = 4 - 7 mm	Grind, in case of new construction	Construction Limit for New Construction
			3	h = 7 - 15 mm	Grind in case of ongoing maintenance	Replace in case of new construction
			5	h > 15 mm		
					SHORT TERM	LONG TERM
18	Lane to Shoulder Dropoff	f = difference of level	0	Nil, not discernible < 3mm	No action.	
			1	f = 3 - 10 mm	Spot repair of shoulder.	
			2	f = 10 - 25 mm		
			3	f = 25 - 50 mm	Fill up shoulder	

S. No	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	For the case d > D/2
			4	f = 50 - 75 mm		For any 100 m stretch
			5	f > 75 mm		Reconstruct shoulder, if affecting 25% or more of segment
19	DRAINAGE		0	not discernible	No Action	
	Pumping	quantity of fines and water expelled through open joints and cracks, Nos / 100 m stretch	1 to 2	slight/ occasional Nos < 10%	Repair cracks and joints without delay.	Inspect and repair subdrainage at distressed sections and upstream.
			3 to 4	appreciable / Frequent 10 - 25%	Lift or jack slab.	
			5	abundant, crack development > 25%	Repair distressed pavement sections. Strengthen subgrade and subbase. Replace slab.	
20	Ponding	Ponding on slabs due to blockage of drains	0-2	No discernible problem	No action.	
			3 to 4	Blockages observed in drains, but water flowing	Clean drains etc, follow up, deep grooving in transverse direction to remove water	Action required to stop water damaging foundation

S. No	Type of Distress	Measured Parameter	Degree of Severity	Assessment Rating	Repair Action	
					For the case d < D/2	For the case d > D/2
			5	Ponding, accumulation of water observed	Deep grooving in transverse direction to remove water- hydro planning	
* 5 level severity rating system : 0 - Not Discernible, 1 - Minor, 2 - Moderate, 3 - Major, 4 - Extreme and 5 - Unsafe /Unserviceable						

Table 3: Criteria for Safety Related Items and Other Furniture Items

Asset Type	Performance Parameter	Level of Service (LOS)			Testing Method	Specifications and Standards
		Design Speed (kmph)	Desirable Minimum Sight Distance	Safe Stopping Sight Distance		
Pavement Marking	Wear	<70% of marking remaining			Visual Assessment as per Annexure- F of IRC:35- 2015	IRC:35-2015
	Day time Visibility	During expected life Service Time • Cement Road - 130mcd/m2/lux • Bituminous Road - 100mcd/m2/lux			As per Annexure- D of IRC:35- 2015	IRC:35-2015
	Night Time Visibility	Initial and Minimum Performance for Dry Retro reflectivity during night time:			As per Annexure-E of IRC:35- 2015	IRC:35-2015
		Design Speed	(RL) Retro-Reflectivity (mcd/m²/lux)			
			Initial (7Days)	Minimum Threshold Level (TL) and warranty period required up to 2 years		
		Up to 65	200	80		
		65 - 100	250	120		
		above 100	350	150		
		Initial and Minimum Performance for Night Visibility under wet condition (Retro reflectivity): • Initial 7 days Retro reflectivity: 100 mcd/m2/lux • Minimum Threshold Level: 50 mcd/m2/lux				
Road Sign	Shape and Position	Shape and Position as per IRC:67- 2022. Signboard should be clearly visible for the design speed of the section			Network Survey Vehicle with video/image backup	IRC:67-2022
	Retro reflectivity	As per specifications in IRC:67-2022			Testing of each signboard using Retro	IRC:67-2022

Asset Type	Performance Parameter	Level of Service (LOS)			Testing Method	Specifications and Standards
		Design Speed (kmph)	Desirable Minimum Sight Distance	Safe Stopping Sight Distance		
					Reflectivity Measuring Device. In accordance with ASTM D 4956-09	
Kerb	Kerb Height	As per IRC 86:2018 depending upon type of Kerb			Network Survey Vehicle with video/image backup	IRC 86:2018
	Kerb Painting	Functionality: Functioning of Kerb painting as intended			Network Survey Vehicle with video/image backup	IRC 35:2015
Other Road Furniture	Reflective Pavement Markers (Road Studs)	Numbers and Functionality as per specifications in IRC: SP:84-2019 and IRC:35-2015			Network Survey Vehicle with video/image backup	IRC: SP:84- 2019 AND IRC: SP:87- 2019, IRC:35-2015
	Pedestrian Guardrail	Functionality: Functioning of guardrail as intended			Network Survey Vehicle with video/image backup	IRC: SP:84- 2019 AND IRC: SP:87- 2019
	Traffic Safety Barriers	Functionality: Functioning of Safety Barriers as intended			Network Survey Vehicle with video/image backup	IRC: SP:84-2019, IRC:119-2015
	End Treatment of Traffic Safety Barriers	Functionality: Functioning of End treatment as intended			Network Survey Vehicle with video/image backup	IRC: SP:84- 2019 AND IRC: SP:87- 2019, IRC:119-2015
	Attenuators	Functionality: Functioning of Attenuators as intended			Network Survey Vehicle with video/image backup	IRC: SP:84-2019, IRC:119-2015
	Guard Posts and Delineators	Functionality: Functioning of Guard Posts and Delineators as intended			Network Survey Vehicle with video/image backup	IRC:79-2019

Asset Type	Performance Parameter	Level of Service (LOS)			Testing Method	Specifications and Standards
		Design Speed (kmph)	Desirable Minimum Sight Distance	Safe Stopping Sight Distance		
	Overhead Sign Structure	Overhead sign structure shall be structurally adequate			Network Survey Vehicle with video/image backup	IRC:67-2022
	Traffic Blinkers	Functionality: Functioning of Traffic Blinkers as intended			Network Survey Vehicle with video/image backup	IRC: SP:84- 2019 AND IRC: SP:87- 2019
Other Project Facilities and Approach roads	Damage or deterioration in Approach Roads, pedestrian facilities, truck lay-bys, bus-bays, bus- shelters, cattle crossings, Traffic Aid Posts, Medical Aid Posts, and other works				Network Survey Vehicle with video/image backup	IRC: SP:84- 2019 AND IRC: SP:87- 2019

Table 4: Criteria for Structures and Culverts

Asset Type	Performance Parameter	Level of Service (LOS)	Testing Method	Recommended Remedial measures	Specifications and Standards
Pipe/box/slab culverts	Free waterway/ unobstructed flow section	85% of culvert normal flow area to available.	Inspection by Bridge Engineer as per IRC SP: 35- 1990 and recording of depth of silting and area of vegetation	Cleaning silt up soils and debris in culvert barrel after rainy season, removal of bushes and vegetation, U/s of barrel, under barrel and D/s of barrel before rainy season.	IRC 5-2015, IRC SP:40-2019 and IRC SP:13-2004
	Leak-proof expansion joints if any	No leakage through expansion joints	Physical inspection of expansion joints as per IRC SP: 35-2024 if any, for leakage strains on walls at joints.	Fixing with sealant suitably	IRC SP:40-2019 and IRC SP:69- 2011
	Structurally sound	Spalling of concrete not more than 0.25 sq.m.	Detailed inspection of all components of culvert as per IRC SP:35-1990 and recording the defects	Repairs to spalling, cracking, delamination, rusting shall be followed as per IRC: SP:40-2019	IRC SP 40-2019 and MORTH Specifications clause 2800
		Delamination of concrete not more than 0.25 sq.m.			
		Cracks wider than 0.3 mm not more than 1m aggregate length			

Asset Type	Performance Parameter	Level of Service (LOS)	Testing Method	Recommended Remedial measures	Specifications and Standards
	Protection works in good condition	Damaged of rough stone apron or bank revetment not more than 3 sq.m, damage to solid apron (concrete apron) not more than 1 sq.m	Condition survey as per IRC SP:35-1990		IRC: SP 40-2019 and IRC: SP:13- 2004.
Bridges including ROB"s, Flyover and Viaducts etc. as applicable	Riding quality or user comfort No pothole in wearing coat on	No pothole in wearing coats on bridge deck	Visual Inspection as per IRC SP:35-1990	Repairs to BC or wearing coat	MORT&H Specification 2811
Bridges including ROB's, Flyover and Viaducts etc. -Super Structure	Bumps	No bump at expansion joint	Visual inspection as per IRC SP:35-1990	Repairs to BC on either side of expansion joints, profile correction course on approach slab in case of settlement to approach embankment.	MORT&H Specification 3004.2 & 2811
	User safety (condition of crash barrier and guard rail)	No damaged or missing stretch of crash barrier or pedestrian hand railing	Visual inspection and detailed condition survey as per IRC SP: 35- 2024	Repairs and replacement of safety barriers as the case may be	IRC: 5-2015, IRC SP: 84-2019, IRC SP 87-2019 and IRC SP: 40- 2019
	Rusted reinforcement	Not more than 0.25 sq.m	Detailed condition survey as per IRC SP: 35-2024 using Mobile Bridge Inspection unit.	All the corroded reinforcement shall need to be thoroughly cleaned from rusting and applied with anti-corrosive coating before carrying out the	IRC SP: 40-2019 and MORTH Specification 1600 IRC SP: 40-2019 and MORTH Specification

Asset Type	Performance Parameter	Level of Service (LOS)	Testing Method	Recommended Remedial measures	Specifications and Standards
	Spalling of concrete	Not more than 0.50 sq.m		repairs to affected concrete portion with epoxy mortar/concrete.	
	Delamination	Not more than 0.50 sq.m			
	Cracks wider than 0.30 mm	Not more than 1m total length	Detailed condition survey as per IRC SP: 35-2024 using Mobile Bridge Inspection Unit.	Grouting with epoxy mortar, investigating causes for cracks or other defects development and carry out necessary rehabilitation.	IRC SP: 40-2019 and MORTH Specification2800
	Rainwater seepage through deck slab	Leakage - nil	Detailed condition survey as per IRC SP: 35-2024 using Mobile Bridge Inspection Unit.	Grouting of deck slab at leakage areas, waterproofing, repairs to drainage spouts	MORTH specifications 2600 & 2700.
	Deflection due to permanent loads and live loads	Within design limits.	Load test method	Carry out major rehabilitation works on bridge to retain original design loads capacity	IRC SP: 51-2015
	Vibrations in bridge deck due to moving trucks	Frequency of vibrations shall not be more than 5 Hz	Laser displacement sensors or laser vibro-meters	Strengthening of super structure	AASHTO, LRFD specifications
	Leakage in Expansion joints	No damage to elastomeric sealant compound in strip seal expansion joint, no leakage of rainwater through expansion joint in case of buried and asphalt plug and copper strip joint.	Detailed condition survey as per IRC SP:35-1990. using Mobile Bridge Inspection Unit.	Replacement of seal in expansion joint. Replacement of Sealing compound in case of leakage I copper strip type joint.	MORTH specifications 2600 and IRC SP: 40-2019.

Asset Type	Performance Parameter	Level of Service (LOS)	Testing Method	Recommended Remedial measures	Specifications and Standards
	Debris and dust in strip seal expansion joint	No dust or debris in expansion joint gap.	Detailed condition survey as per IRC SP: 35-2024. using Mobile Bridge Inspection Unit.	Cleaning of expansion joint gaps thoroughly	MORTH specifications 2600, IRC SP:40-2019 and IRC: SP:69-2011
	Drainage spouts	No down take Pipe missing/broken below soffit of the deck slab. No silt, debris, clogging of drainage spout collection chamber.	Detailed condition survey as per IRC SP: 35-2024. using Mobile Bridge Inspection Unit.	Cleaning of drainage spouts thoroughly. Replacement of missing/broken down take pipes with a minimum pipe extension of 500mm below soffit of slab. Providing sealant around the drainage spout if any leakages observed.	MORTH specification 2700
Bridges including ROB‟s, Flyover and Viaducts etc.- Bridge Substructure	Cracks/ spalling of concrete /rusted steel	No cracks, spalling of concrete and rusted steel	Detailed condition survey as per IRC SP: 35-2024 using Mobile Bridge Inspection unit.	All the corroded reinforcement shall need to be thoroughly cleaned from rusting and applied with anti-corrosive coating before carrying out repairs to substructure by grouting/guiniting and micro concreting depending on type of defect noticed	IRC SP: 40-2019 and MORTH specification 2800

Asset Type	Performance Parameter	Level of Service (LOS)	Testing Method	Recommended Remedial measures	Specifications and Standards
	Elastomeric Bearings	Delamination of bearing reinforcement not more than 5%, cracking or tearing of rubber not more than 2 locations per side, no rupture of reinforcement or rubber	Detailed condition survey as per IRC SP: 35-2024 using Mobile Bridge Inspection Unit.	In case of failure of even one bearing on any pier/abutment, all the bearings on that pier/abutment shall be replaced, in order to get uniform load transfer on to bearings.	MORTH Specification 2810, IRC SP: 40-2019 and IRC:83 (Part-II)-2018
	POT/PFFE and Spherical Bearings	No locking of movable and rotational parts, No Corrosion, Cleanliness	Detailed condition survey as per IRC SP: 35-2024 using Mobile Bridge Inspection unit.	Unlocking affected parts, Cleaning of Rust and repainting. General Cleaning of bearings.	IRC:83 (Part-III)- 2018, IRC:83 (Part-IV)-2014
Bridges including ROB's, Flyover and Viaducts etc.- Bridge Foundations	Scouring around Foundations	Scouring shall not be lower than maximum scour level for the bridge	Condition survey and visual inspection as per IRC SP:35-1990 using Mobile Bridge Inspection Unit. In case of doubt Underwater camera for Inspection of deep wells in Major rivers	Suitable protection works around pier/abutment	IRC SP: 40-2019, IRC: 89-2019, IRC:78-2014, MORTH Specification 2500
	Protection works in good condition	Damaged of rough stone apron or bank revetment not more than 3 sq.m, damage to solid apron (concrete apron) not more than 1 sq.m	Condition survey as per IRC SP:35-1990	Repairs to damaged Aprons and pitching	IRC: SP 40-2019, IRC: SP:13- 2004 and IRC:89-2019

Note:

1. IRC Codes indicated above shall be applicable as per year of publication in consonance with the start of assignment.