Preparing for Visual Inspections

- The road authority should have an orientation meeting with the inspectors to discuss specific requirements, including:
  - Inventory data that has to be captured during inspections
  - How to deal with non-compliance of elements with current standards e.g. parapets, handrails, guardrails, pier protection

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Preparing for Visual Inspections

- Inspectors should obtain and study as-built drawings and inventory data (if available) to understand the structure's behaviour:
- Types of bearings (including locations of fixity)
- Abutment and pier types
- Types of foundations and founding material

Carrying out the Visual Inspection

- Make sure you are at the correct structure
- Walk around on site to obtain general appreciation of the structure
- Be systematic – start from one end and work through the whole structure
- Cover all inspection items and ensure no items or sub-items are overlooked
- Identify all visible defects on each item/sub-item and rate the worst defect (defect with highest Relevancy)

Carrying out the Visual Inspection

- Record remedial work activities for all defects.
- At least one remedial work activity must be recorded for each inspection item with a D rating of 1 or more.
- In some case, more than one remedial activity would be required, such as:
  - Traffic accommodation
  - Scaffolding for access

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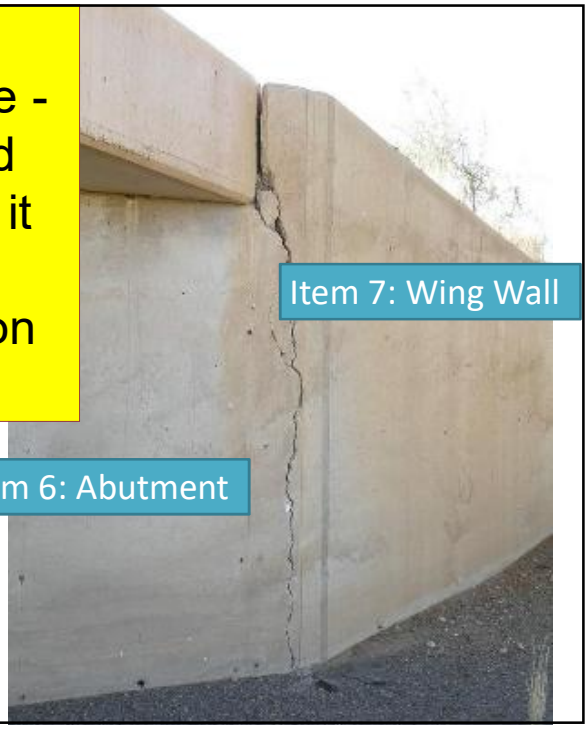
Carrying out the Visual Inspection

- Draw adequate diagrams of crack patterns and use the diagram when deciding what caused the defect
- For critical defects (collapse imminent or public safety risk is high), tick “Make Safe” and contact road authority as soon as possible (immediately)

Do not rate the same defect twice - If a defect is rated once, do not rate it again under a different inspection item



Completing the Inspection Form

- If an item has no defects, then fill in **D = 0** on the sheet; do not leave the row blank
- Record the photo number for each type of defect
- Before leaving site, ensure that the inspection sheet has been completed in full e.g. no D ratings left blank

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Completing the Inspection Form

- The list of required remedial activity on the bottom half of the sheet must tally fully with the defects found and rated on the top half of the sheet.
- Use pick lists for naming of locations and when specifying the required remedial activity.
- Use the pick list number as well as the pick list description for the remedial activity.

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Completing the Inspection Form

- Use the ad-hoc item when a suitable remedial activity cannot be found on the pick list of remedial activities.
- Describe the remedial work required under the Remarks column on the Inspection sheet (Remedial Activities section)

Activity No.	Description	Unit	Rate
xx.953	Ad-hoc item	No	R 1 000

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Cases when further inspections could be required

- If a structure is in a poor condition and access to all spans is limited (e.g. deep water or height), a boat or the UBIU may be required.
- If collapse of a structure appears to be imminent, diagnostic testing may be required to determine the severity of the structure condition.
- If the possible cause of serious defects are beyond the expertise of the inspector e.g. geotechnical problems.

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Equipment and Material

- Clipboard, pencil and eraser
- Writing pad
- As-built drawings (if available)
- Torch
- Binoculars
- Digital camera (GPS enabled if required by road authority)
- Handheld GPS device (minimum of 5 m accuracy; WGS84 format)
- Access equipment, e.g. 6 m ladder
- Gumboots (for culvert inspections)
- Laser distance meter
- Crack width gauge
- Tape measure
- Measuring wheel
- High-visibility vest
- Non-skid shoes/boots
- Amber flashing light

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Occupational Health & Safety

- The safety of inspectors and travelling public must always be priority;
- Always wear a safety vest and light-coloured clothing
- Non-skid shoes are essential;
- Always keep office staff informed on a daily basis regarding which bridges will be inspected in case of an emergency;
- Ensure culverts are lit up when inspecting inside barrel;
- Closure of lanes is required when using the UBIU;
- Take necessary precautions with regards valuables;

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Occupational Health & Safety

- Always take an assistant with when doing inspections;
- Take care when inspecting culverts in areas prone to flash floods;
- No rope access may be used during inspections, unless the inspector has specifically been trained for this; and
- Ladders must be used in the correct and safe manner;
- Carry out inspections during daylight

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Occupational Health & Safety

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Required Photos

- Two groups of photographs are required:
- Inventory photographs
  - to show location and structural form of bridge or culvert
- Inspection photographs
  - to show the location and details of defects

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Inventory Photographs

- The number and type of inventory photographs to be taken per structure are prescribed:
  - Bridges: 16 inventory photos
  - Major Culverts: 9 inventory photos
- Can be more, depending on the structure
- Inventory photos must be recorded on record sheet for inventory photos

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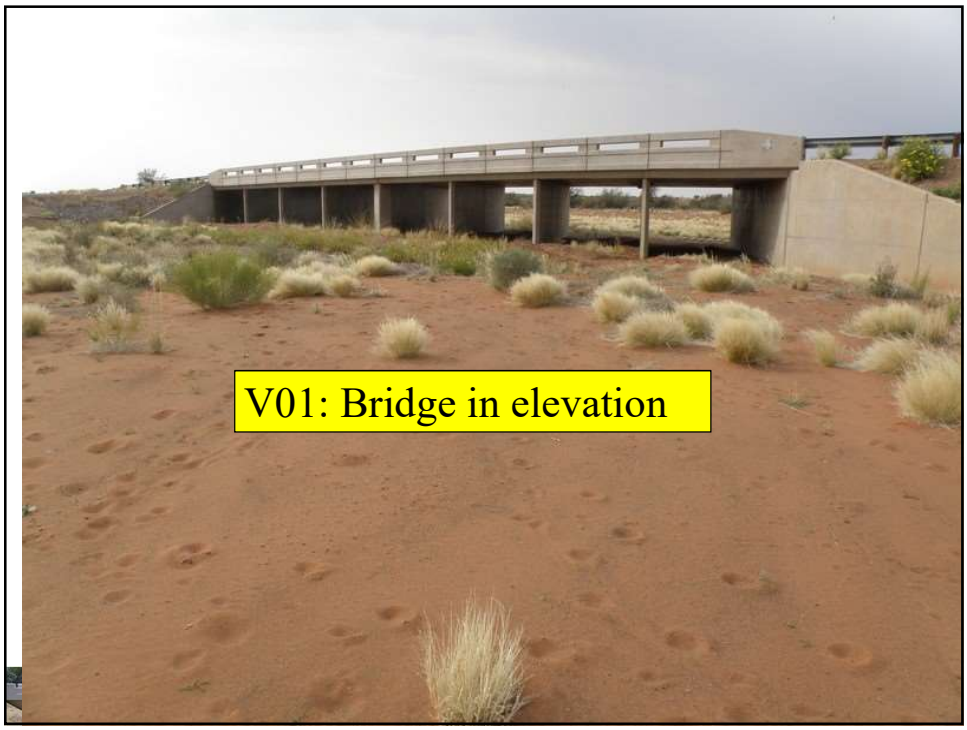
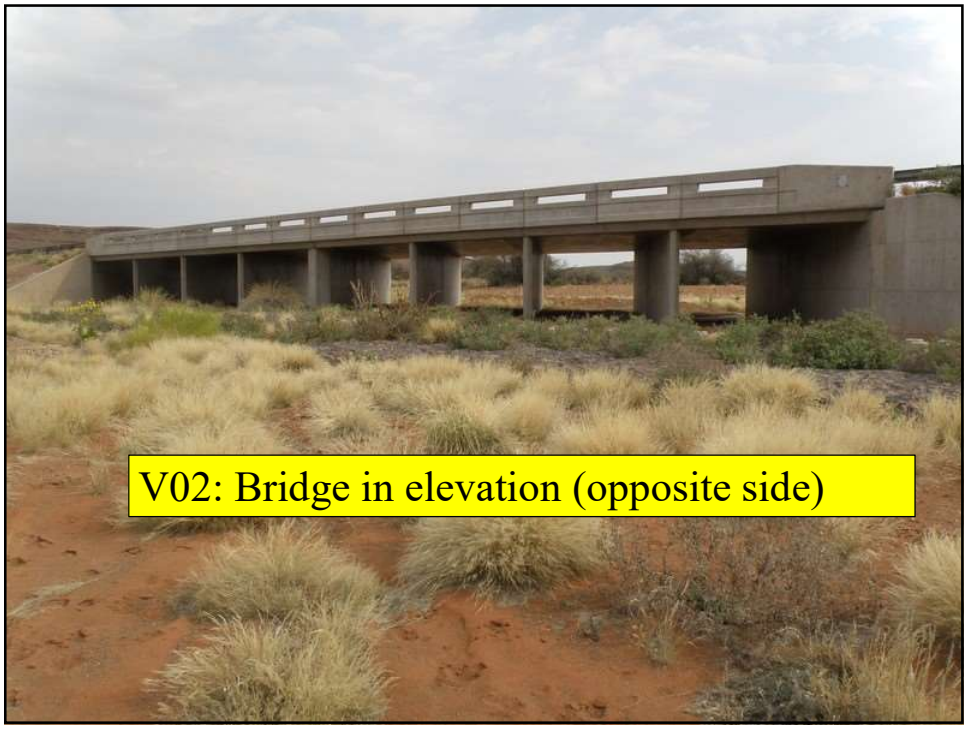
Inventory Photos: Bridges

View 1:	Bridge in elevation (must show total length of bridge, full pier heights and abutments. If necessary several photos can be taken and combined electronically.
View 2:	Bridge in elevation from opposite side.
View 3:	Bridge from upper approach (looking along centre line of road or as close as possible to centre line).
View 4:	Bridge from upper approach (opposite end).
View 5:	View taken from the top of the bridge of feature crossed (road, rail or upstream river view)
View 6:	View taken from the top of the bridge of feature crossed (road, rail or downstream river view).
View 7:	Deck edge to show profile of deck cantilever soffit.
View 8:	Opposite deck edge to show profile of deck cantilever soffit.

Inventory Photos: Bridges

View 9:	Underside of deck (photo of each type if different deck types).
View 10:	Typical pier (photo of each type if different pier types).
View 11:	Typical abutment (photo of each type if different abutment types).
View 12:	Bridge number as seen from main route on which bridge is defined.
View 13:	Other bridge number adjacent to other road or rail.
View 14:	Typical parapet elevation.
View 15:	Typical roadway joint.
View 16:	Any other salient feature



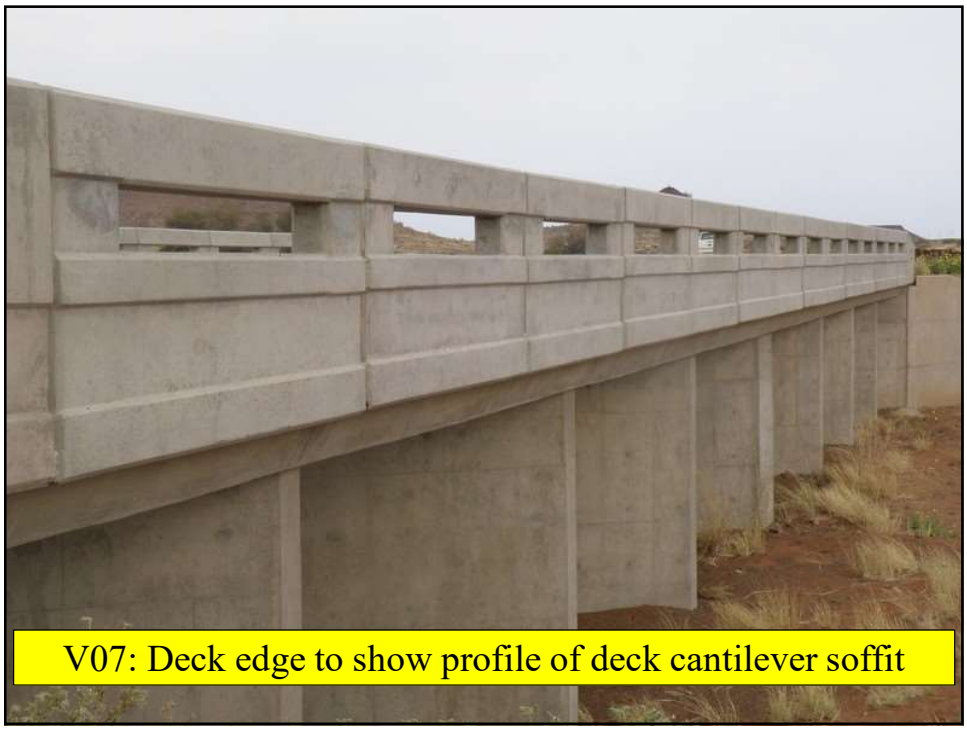

V02: Bridge in elevation (opposite side)

V03: Bridge from upper approach

V04: Bridge from upper approach (opposite side)

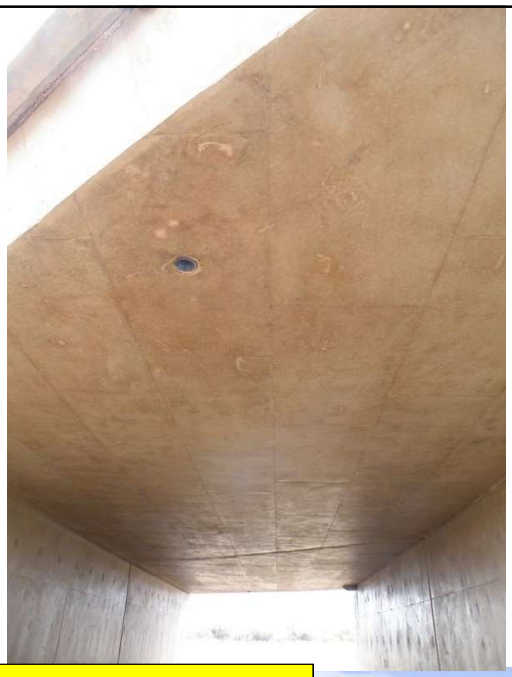
V05: View from the top of the bridge of feature crossed

V06: View from the top of the bridge of feature crossed (opposite side)



V07: Deck edge to show profile of deck cantilever soffit

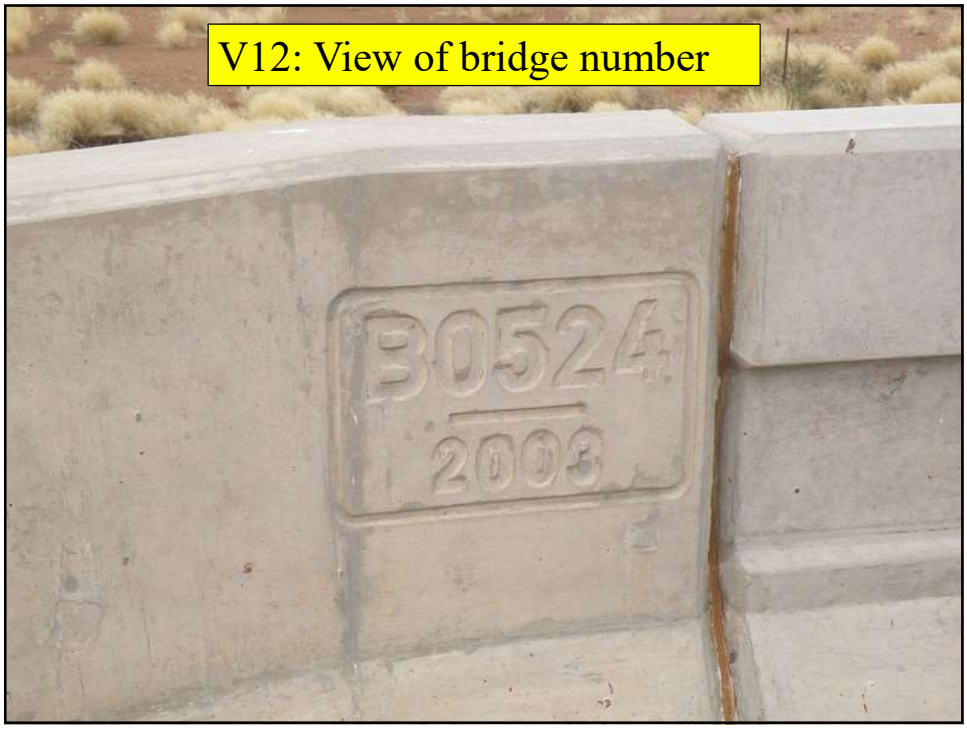
V08: Opposite deck edge to show profile of deck cantilever soffit



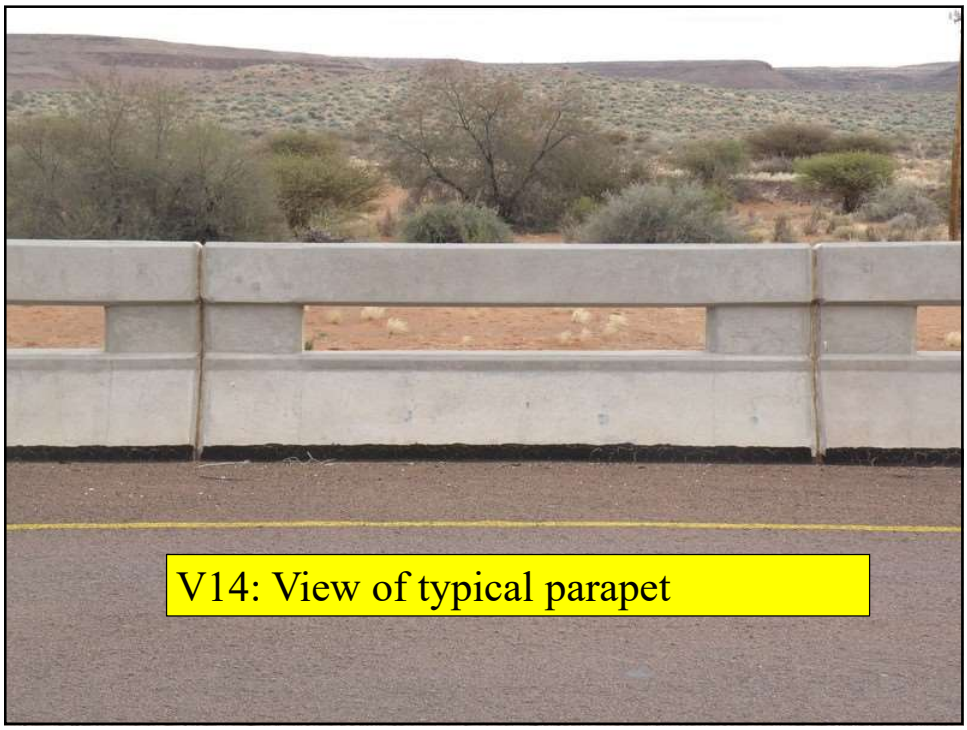
V09: View of underside of deck

V10: View of typical pier

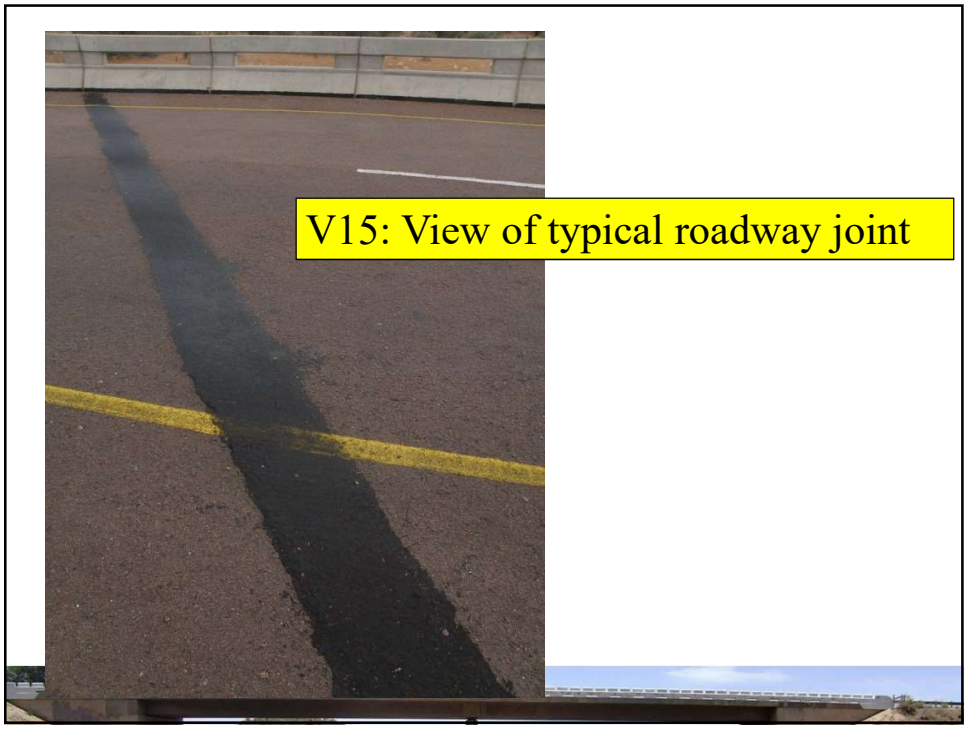
V11: View of typical abutment



V12: View of bridge number



V14: View of typical parapet


V15: View of typical roadway joint

V16: Any other salient feature
NAKOP

Bridge Inventory Photos Record Sheet

ROAD AUTHORITY	STRUCTURE TYPE	STRUCTURE NUMBER	CSIR STRUMAN SYSTEM
	BRIDGE		
		STRUCTURE NAME	

INFORMATION			INVENTORY PHOTO RECORD SHEET
Inspector / Capturer Name	Firm	Date (dd/mm/yyyy)	

Photo No	Description		Direction of Photo	Camera Photo No
V01	View 1	Bridge in Elevation (Must show total length of bridge, full pier heights and abutments. If necessary take several photos and combine electronically. For multi-level interchanges more than one bridge may be in photo. Please identify bridge and also describe other bridges in the photo.)		
V02	View 2	Bridge in Elevation from opposite side. (A & B bridges might have to take other bridge elevation or else skew elevation from gap between)		
V03	View 3	Bridge from upper approach (preferably looking along centre line of road or as close as possible to centre line)		
V04	View 4	Bridge from upper approach (opposite end).		
V05	View 5	View taken from the top of the bridge of feature crossed (road, rail or upstream river view)		
V06	View 6	View taken from the top of the bridge of feature crossed (road, rail or downstream river view)		
V07	View 7	Deck edge to show profile of deck cantilever soffit (not top of parapet – must see outside edge of deck)		
V08	View 8	Opposite deck edge to show profile of deck cantilever soffit (not top of parapet – must see outside edge of deck)		

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Inventory Photos – Major Culverts

Photo No.	Description
V01	Culvert Inlet in Elevation
V02	Culvert Outlet in Elevation
V03	Culvert from upper approach
V04	Culvert from opposite end of approach
V05	View taken from the top of fill of feature crossed
V06	View taken from the top of fill of feature crossed (other direction)
V07	View of inside of culvert barrel showing roof walls & floor
V08	Culvert Number
V09	Any other salient feature

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Inventory Photos – Major Culverts

Photo No.	Description
V01	Culvert Inlet in Elevation
V02	Culvert Outlet in Elevation
V03	Culvert from upper approach
V04	Culvert from opposite end of approach
V05	View taken from the top of fill of feature crossed
V06	View taken from the top of fill of feature crossed (other direction)
V07	View of inside of culvert barrel showing roof walls & floor
V08	Culvert Number
V09	Any other salient feature

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Inspection Photos

- Inspection photos have no set form and are based on discretion
- At least one photo of each type of defect on an inspection item is required
- In many cases more than one photo of a defect would be required to illustrate the defect adequately
- Inspection photos must be recorded using a photo record sheet per structure

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Bridge Inspection Photos Record Sheet

STRUMAN: Bridge and Structures Management System		Version: 3.0 (20101104)
	No	B00193
	Name	Fish River
BRIDGE INSPECTION PHOTOGRAPHS RECORD SHEET	Date	15/06/2010

Photo No	Description		Direction of Photo	Camera photo no
S01	Defect 1	Crack in Pier 1	E	B001254
S02	Defect 2	Spall on Pier 3	W	B001255
S03	Defect 2	Close up of spall on Pier 3	W	B001256
S04	Defect 3	Guardrail not attached to endblock	E	B001257

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Inspection Photos

- The camera photo numbers are the only link between the structure and it's photos
  - Cameras that have "GPS tagging" functionality will allow for the identification of which photos belong to which structure but cannot assist in describing the photo
- The camera number and relevant photo details must be entered on the photo record sheet as the photos are taken

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Camera and Image Requirements

- Digital camera with an optical zoom capability is required
- File size per image should be between 100 KB and 500 KB
- Picture size of 800 px x 600 px is adequate

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General guidelines on photo-taking

- Where access is a problem use the optical zoom function of the camera to take photos of defects
- Zoomed images of defects, e.g. cracks, must be in focus
- Rather take more photos than is required
- When photographing defects, take a close up view and another view in relation to the overall structure or element
- When taking photos of cracks, it is useful to outline the cracks with chalk or to place the crack meter over the crack

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Examples of good photos of defects

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View showing location of defect relative to the structure

View showing location of defect on element

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More examples of photos showing defects

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Not so good photos

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09/10/2012 08:30

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