Introduction

- A road or rail authority has to manage a Structures Asset Portfolio
- This Asset Portfolio includes a number of Asset Classes
- Each Asset Class includes one or more Structure Types

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Asset Classes in the Structures Asset Portfolio

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Asset Class - Bridge

A road structure is classified as a bridge if one or more of the following criteria are satisfied:

- Any single span (as measured horizontally at the soffit along the road or rail centre line between the faces of its supports) is equal to or greater than 6 m; or
- The individual clear spans (as measured horizontally at the soffit along the road or rail centre line between the faces of its supports) exceed 1.5 m and the overall length measured between abutment faces exceeds 20 m; or
- The opening height, which is the maximum vertical distance measured from the streambed or structure floor at the inlet or from the top of any base, to the soffit of the superstructure, is equal to or greater than 6 m; or
- The total cross-sectional opening is equal to or larger than 36 m^2; or
- The structure is a road-over-rail, or rail-over-road structure, even if the span is less than 6 m.

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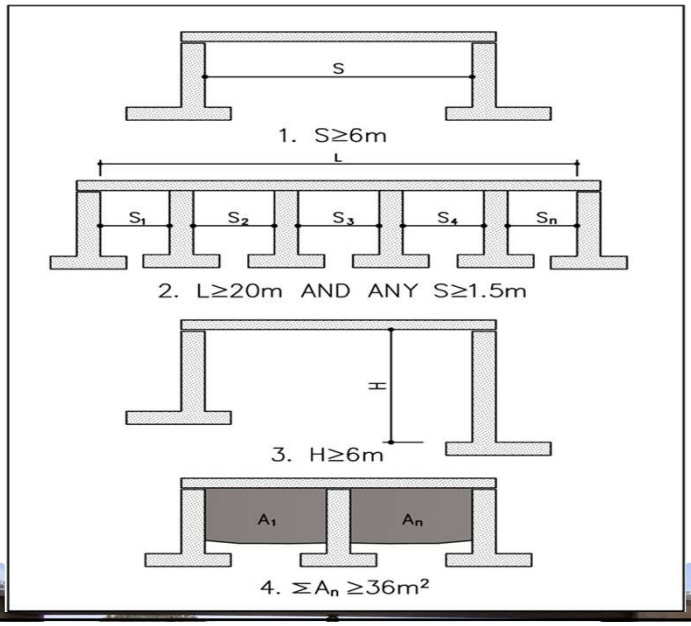
Asset Class - Bridge



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Bridge Types in the Asset Class - Bridge

Bridge (General)

- A structure consisting of separate and clearly identifiable elements such as deck slabs, deck expansion joints, abutments, piers and foundation footings, normally with a concrete deck as roadway.

Bridge (Arch)

- An arch bridge includes solid spandrel filled arches; open ribbed spandrel arches; and open spandrel arches.

Bridge (Cable)

- A cable bridge includes suspension bridges and cable stayed bridges.

Bridge (Cellular)

- A cellular bridge is a bridge consisting of “cellular” units. A cellular unit can typically be described as an “opening” where, in general, the overall cell length is greater than the cell width. Elements such as separate deck slabs, abutments/piers, foundations, etc. are not clearly identifiable while elements such as invert slabs, apron slabs, cut-off walls etc. are normally present.

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Bridge (General)
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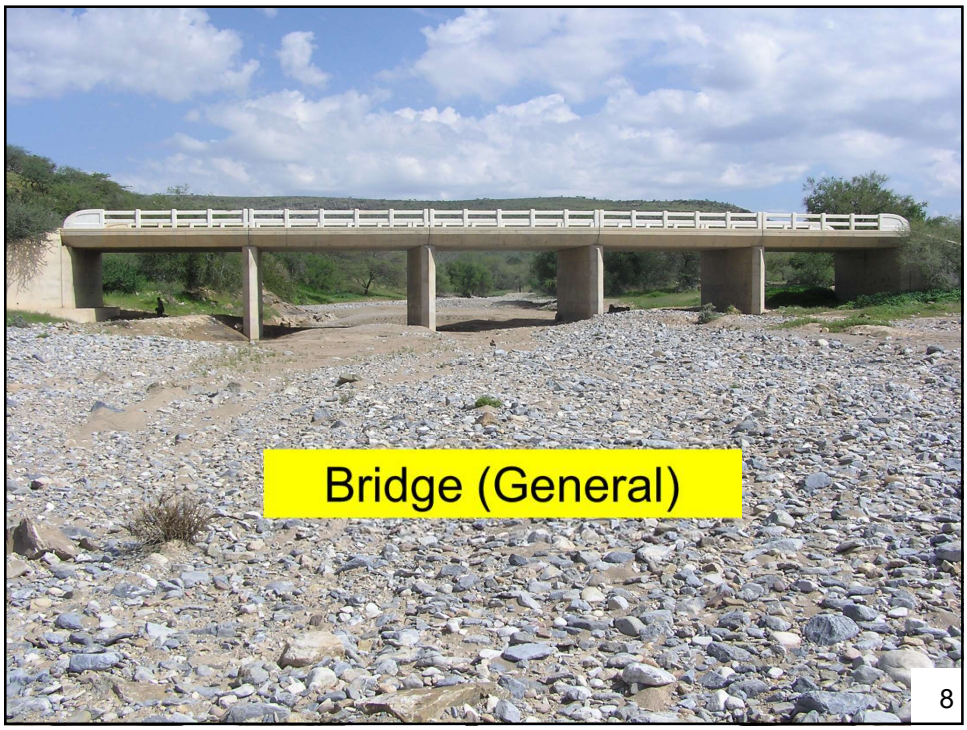
Bridge (General)
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Bridge (Arch)
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Bridge (Arch)
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Bridge (Arch)

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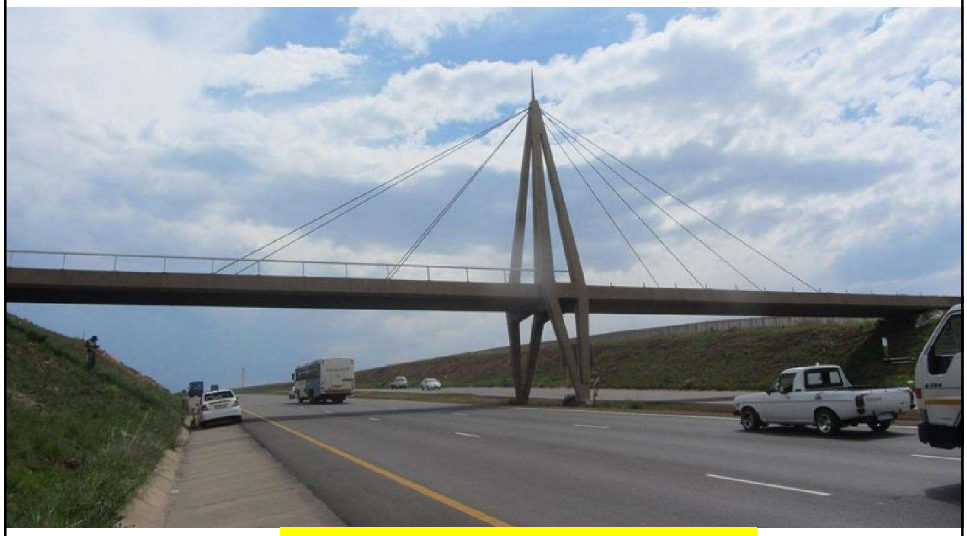
Bridge (Cable)



Cable Stayed

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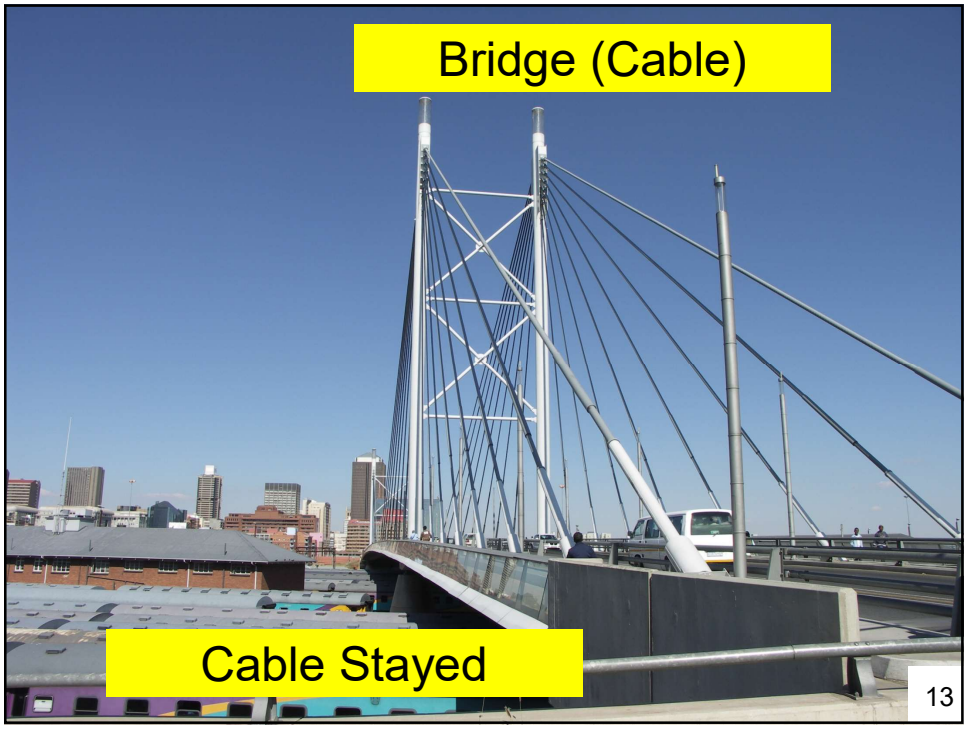
Bridge (Cable)
Cable Stayed
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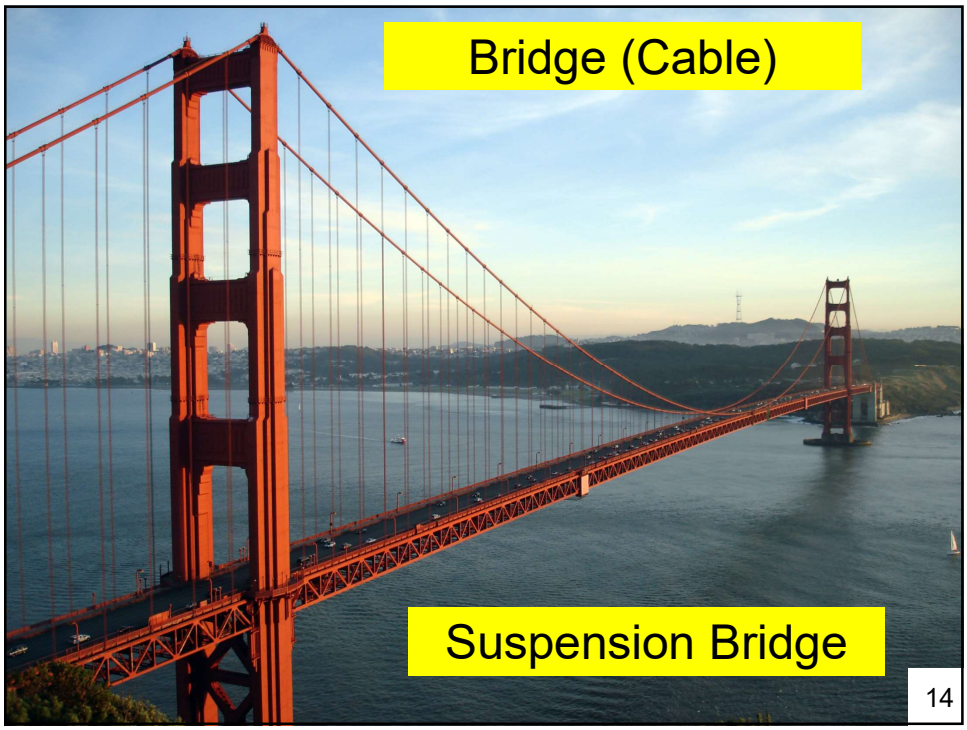
Bridge (Cable)
Suspension Bridge
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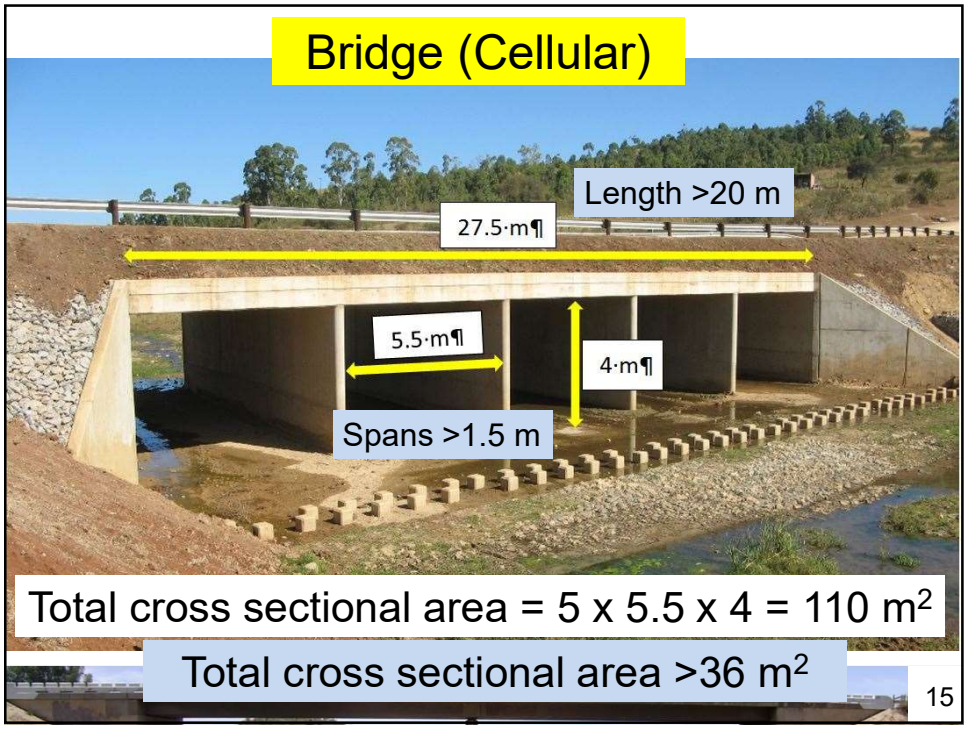
Bridge (Cellular)
Length >20 m
27.5·m¶
5.5·m¶
4·m¶
Spans >1.5 m
Total cross sectional area = 5 x 5.5 x 4 = 110 m2
Total cross sectional area >36 m2
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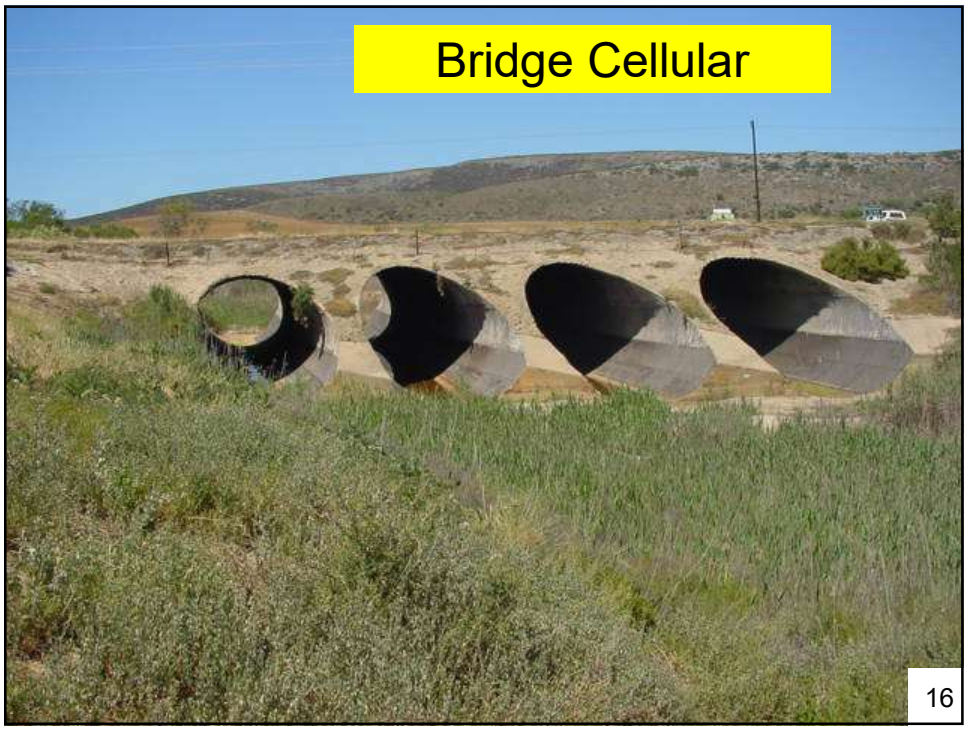
Bridge Cellular
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Description of a Culvert

- A culvert is a structure (normally “buried” with road fill or road slabs on top) consisting of “cellular” units.
- A cellular unit can typically be described as an “opening” where, in general, the overall cell length is greater than the cell width.
- Elements such as separate deck slabs, abutments/piers, foundations, etc. are not clearly identifiable while elements such as invert slabs, apron slabs, cut-off walls etc. are normally present.

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Asset Class: Major Culvert

- A Major Culvert is a cellular structure with dimensions less than those defining a cellular bridge, but with any clear span length (as measured horizontally at the soffit perpendicular to the faces of its supports) equal to or larger than 2.1 m, or diameter equal to or larger than 2.1 m, or a culvert with a total cross-sectional opening equal to or larger than 5 m^2.
- A culvert smaller than that defined as a major culvert, is referred to as a lesser culvert
- Lesser culverts are usually managed as a component of the Road Asset Class and is not considered a separate asset class

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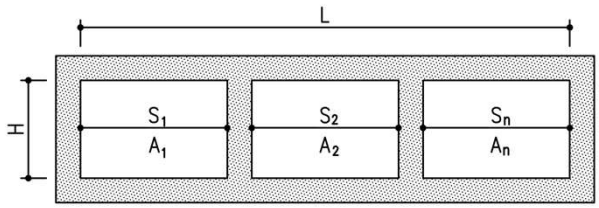
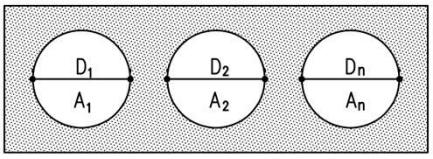
Asset Class: Major Culvert



1. L<20m ALL S<6m, H<6m
ANY S≥2.1m **or** $\Sigma A_n \geq 5m^2$



2. ANY D≥2.1m **or** $\Sigma A_n \geq 5m^2$

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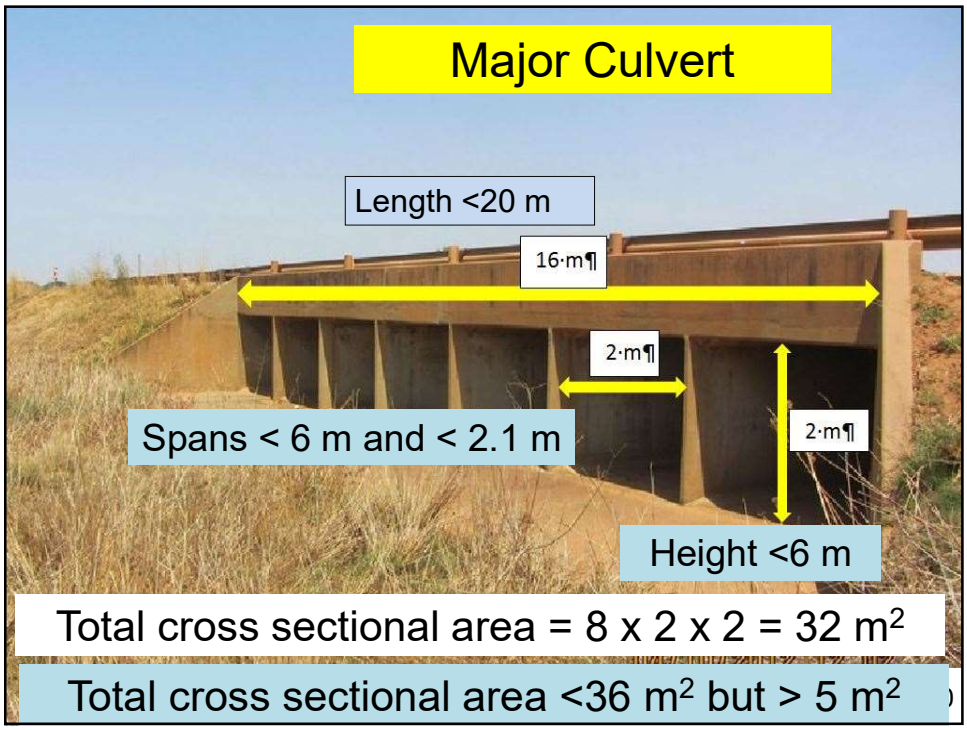

Major Culvert

Lesser Culvert
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Low-level River Crossings

- A low-level river crossing is a submersible road structure designed in such a way so as to experience no or limited damage when overtopped.
- This type of structure is appropriate when the inundation of a road for short periods is acceptable.
- Types of low-level river crossings:
  - Low-level bridges,
  - Causeways; and
  - Drifts.

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Low-level Bridges

- A low level bridge for crossing a river is either a Bridge (General) or the a Bridge (Cellular) type structure.
- This type of bridge normally has kerbs or guide blocks instead of handrails or parapets.

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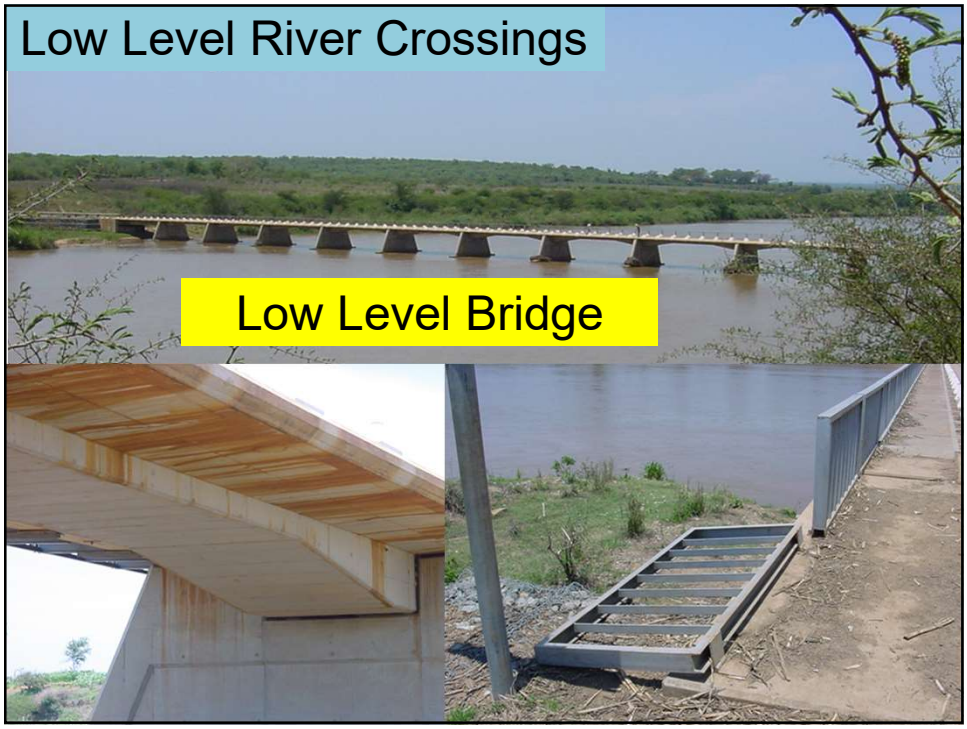

Causeways

- A causeway consists of a suitable submersible surface layer over which vehicles may drive when crossing a river.
- The structure has openings under the roadway allowing the passage of “normal” river flow underneath.
- The openings may be circular, rectangular, arched, semi-circular or similar in shape.
- Also referred to as vented fords.

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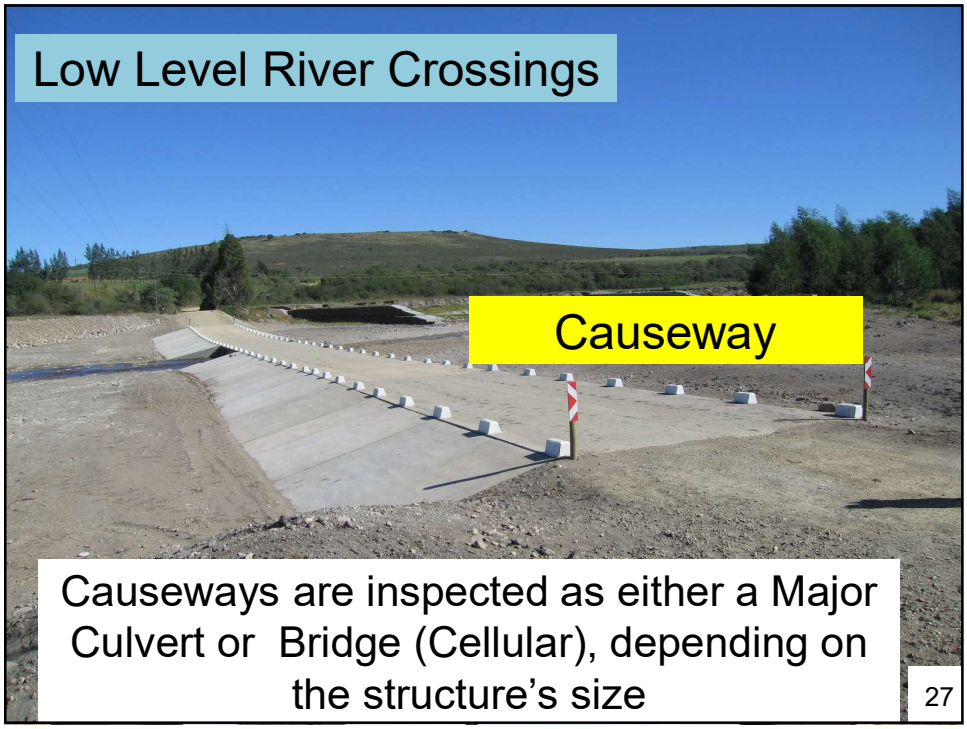
Low Level River Crossings
Causeway
Causeways are inspected as either a Major Culvert or Bridge (Cellular), depending on the structure's size
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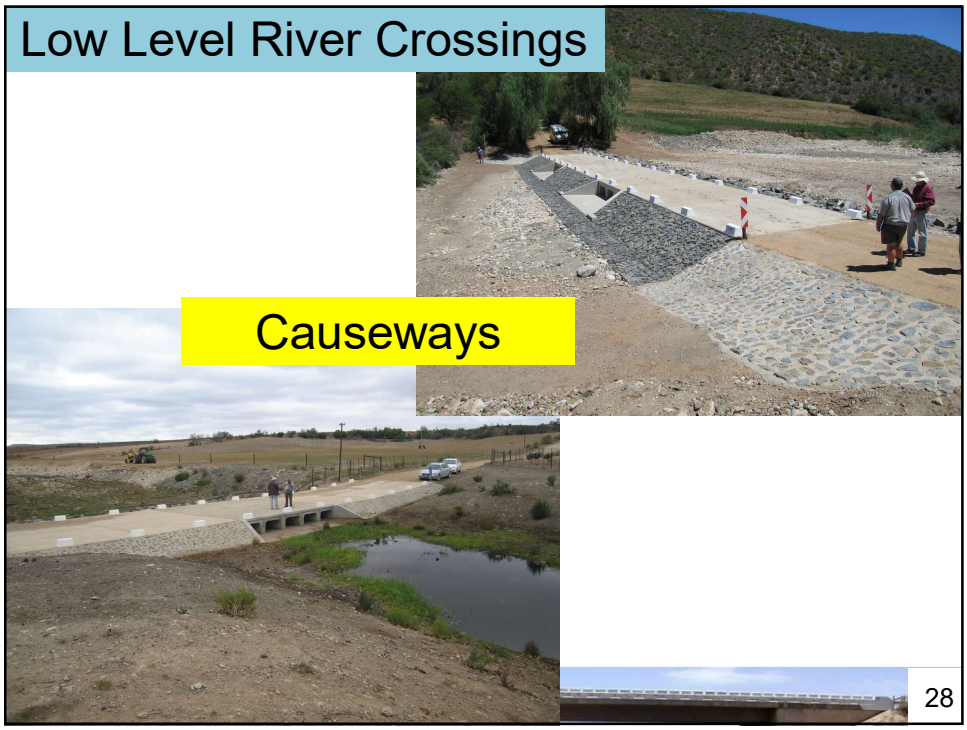
Low Level River Crossings
Causeways
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Drifts

- A drift or a ford is defined as a specially prepared surface for vehicles to drive over when crossing a river.
- A drift **does not contain any constructed openings** underneath the riding surface for the passage of water.

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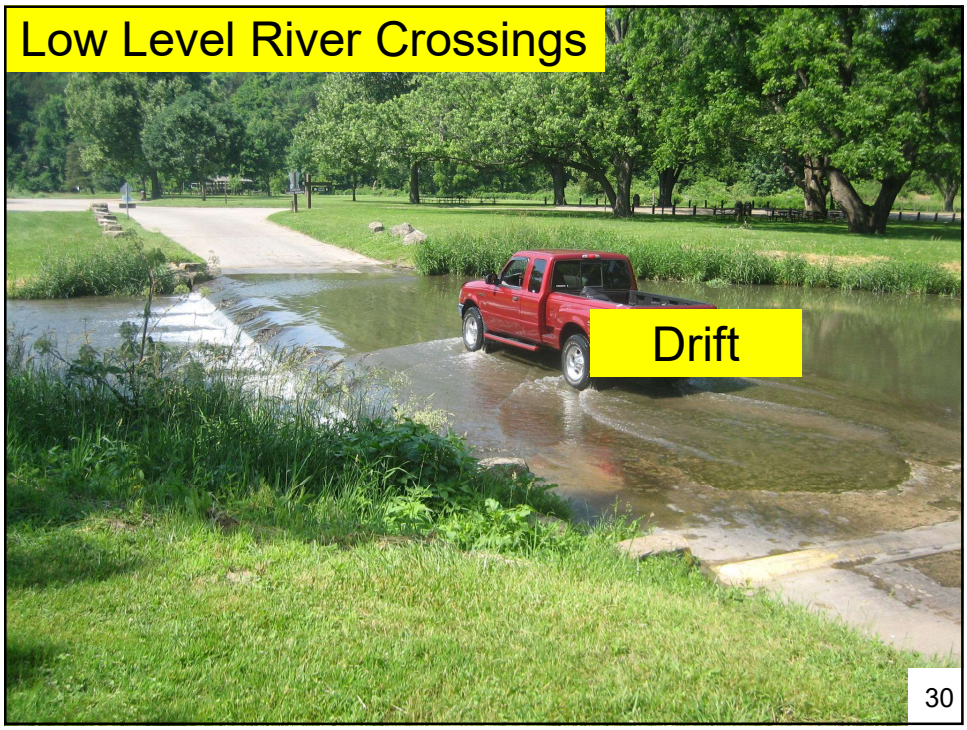

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