



Grade Separation Inspection & Ratings

## Grade Separation Inspection and Rating




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### Grade Separation Form

- Applies to structures which have traffic going over **and** under
- Applies to Wildlife/Cattlepass or Pedestrian Underpass structures
- Replaces channel section
- Has items specific to under/overpass rather than channels
- Generated automatically
- Can be requested for blank forms
- Refer to Chapter 10 in BIM Manual for Bridges
- Refer to Chapter 13 – section 13.8 for Culverts




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### Grade Separation Form

- Generated for following usage types:
  - **GS** - vehicle grade separation
  - **PS** - pedestrian grade separation
  - **SP** - stockpass or cattlepass
  - **RO** - railway overpass
  - **RU** - railway underpass
- All types above can be either bridge or culvert Grade Separation



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### Traffic Grade Separation - Bridge





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**Traffic Grade Separation - Culvert**



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**Bridge Grade Separation - Pedestrian**



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**Culvert Grade Separation - Pedestrian**



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**Grade Separation – Animal Underpass**




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## Grade Separation – Railroad Overpass







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## Grade Separation – Railroad Underpass





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## Bridge Grade Separation Form

Bridge Section – Chapter 10

	Structure Usage		Explanation of Condition
	Last	Now	
Grade Separation	7	7	
Road Alignment	4	4	1 damaged post at W.B median and wrong lap at NW.
Traffic Safety Features	4	4	1 Type : GUARDRAIL
Slope Protection (Type - CONCRETE, CONCRETE)	4	4	Broken around pier columns-200mm at North & 120 mm at South. Settled 100mm at North top sections. Sealed, in some areas, open gaps in others.
Bank Stability	5	5	
Drainage	5	4	Ponding water at west toe of headslope - not affecting driving lanes.
Grade Separation General Rating	4	4	



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## Culvert Grade Separation Form

Culvert Section—Chapter 13 Section 13.8

	Structure Usage		Explanation of Condition
	Last	Now	
Grade Separation	X	X	
Road Alignment	6	6	
Roadway Surface (Type : SOIL)			
long (Y/N)	No		
Traffic Safety Features	X	X	
Type	None		
Lighting	X	X	
Barrel Leakage (Y/N)	No		
Drainage	4	4	Average 150mm water and ice in pipe.
Structure In Use (Y/N)	No		Fencing is down.
Grade Separation General Rating	4	4	



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**Road Alignment**

- Refers to alignment up to and through the Bridge/Culvert including surface condition
- Look for:
  - Cracks, heaves & roughness
  - Super elevation & orientation
  - Accessibility for stock
  - Collision potential
- If alignment can be safely driven at legal or posted speed limit, rate 5 or more.
- For Railway, Pedestrian and Animal underpasses rate alignment "X".



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**Roadway Surface**

- Refers to Culvert Grade Separations and Animal/Pedestrian Underpasses
- Purpose is to provide a surface for traffic usage
  - Smooth surface
  - No holes, depressions or projections
  - Not slippery
- Record type of surface
  - Asphalt
  - Concrete
  - Gravel
  - Soil
- Look for defects that might affect high load vehicles
- Defects that create hazards to traffic or pedestrians
- Record the presence of icing on the roadway Y/N – comment if Yes. May affect Drainage rating.
  - If defects a problem for stock/traffic, rate 4 or less
  - If hazardous, rate 2 or less (holes, projections, icing on traffic or pedestrian surfaces)



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**Traffic Safety Features**

- Refers to curbs, medians, guardrails, advance warning signs, crash protection, etc.
- Not applicable for stock underpasses
- Indicate type and rate condition and functionality
- If not present record type as "None" and rate "X"



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**Slope Protection**

- Refers to protection system on headslopes
- Look for:
  - evidence of settlement
  - cracked, broken or bulging concrete protection
  - Deck drainage away from system
  - voids under concrete slabs
- Note graffiti
- Rate 4 or less for:
  - Significant settlement or moving downwards
    - Significant heaving or cracking of concrete slope protection
    - Voids under concrete slope protection



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### Bank Stability


- Refers to stability of bridge headslopes
- Look for:
  - damage or displacement
  - settlement at abutment and piers
  - bulging at toe of slope
  - loss of material at toe of slope

Rate 4 or less if:

- Settled and exposing underside of abutment seat
- Instability that affects the Substructure or Superstructure
- Instability requiring monitoring




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### Drainage

- Refers to the ability to dispose of water at:
  - Toe of headslopes and transitions on bridges
  - Roadway surface from Culvert Grade Separations
  - Ends and barrel of Pedestrian or Animal underpasses
- Typ. water sources are deck and approach road drainage, ditch drainage, and weep holes.
- Some underpasses are also designed for water flow
  - See “Special Comments for Next Inspection”



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### Drainage


- On Bridge or Culvert Grade Separations handling vehicle traffic look for:
  - Ponding at toe of headslopes and transitions or inside culverts
  - Blockage of existing drainage systems
  - Damage to embankments
  - Record “Yes” if barrel leakage - comment

Ratings:

- If functioning and no damage to slope protection, embankments and no bank instability rate 5 or more
- If damage or slope instability rate 4 or less
- If drainage causes ponding or icing on travel lanes and potential traffic hazard rate 2 or less



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### Drainage


- On Pedestrian/Animal Underpasses look for:
  - Ponding in culvert barrel or at ends
  - Any condition contributing to icing
  - Damage to sideslopes or embankments
- Record “Yes” if barrel leakage and provide comment. Rating is not required but if “Yes” leakage may effect rating of Roadway surface and Drainage

Ratings:

- If functioning and no damage to sideslope or embankment rate 5 or more
- If poor drainage causes icing or ponding around animal underpasses rate 4 or less
- If drainage causes ponding or icing and potential hazard on pedestrian underpass 2 or less




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### Animal Underpass – Other Drainage Considerations

- Normally these are not applicable (rate “X”)
  - scour and scour protection at ends
  - fish passage in barrel
  - waterway adequacy in barrel
- If designed to also handle water flow
  - Note in “Special Comments for Next Inspection” (This culvert also handles drainage. 05/06/2016)
  - Inspect and provide ratings for:
    - scour and scour protection at ends
    - fish passage
    - waterway adequacy





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### Animal Underpass – Handles Drainage







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### Animal Underpass – Handles Drainage






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### Lighting

- Refers to lighting in culvert grade separations and pedestrian underpasses
- Not applicable for stock underpasses - rate X
- If lighting does not exist but in opinion of inspector is required rate X and provide comment and recommendation
- Minor damage that does not affect operation or functionality rate 5
- Defects affecting operation and functionality rate 4 or less




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### Structure In Use

- Refers to whether the Stock underpass is used for it's intended purpose
- Indicate "In Use" by Yes or No
- Provide comment/explanation if "No"




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### General Rating – Grade Separations

- Governing Elements – (refer to 1.10.5 and 10.7 (Bridges), 1.10.10 and 13.8.7 (Culverts)).
  - Road Alignment rating
  - Traffic Safety Features rating
  - Bank Stability rating
  - Drainage rating




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### Sample Completed Form - Grade Separation

Structure Usage			
	Last	Now	Explanation of Condition
<b>Grade Separation</b>			
Road Alignment	7	7	
Traffic Safety Features	4	4	1 damaged post at W.B median and wrong lap at NW.
Type	GUARDRAIL		
Slope Protection	4	4	Broken around pier columns-200mm at North & 120 mm at South. Settled 100mm at North top sections.
(Type - CONCRETE; CONCRETE)	Sealed, in some areas, open gaps in others.		
Bank Stability	5	5	
Drainage	5	4	Ponding water at west toe of headslope - not affecting driving lanes.
<b>Grade Separation General Rating</b>	<b>4</b>	<b>4</b>	




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### General Rating – Animal or Pedestrian Underpasses

- Governing Elements – (refer to 1.10.10 and 13.8.7)
  - Road Surface rating
  - Drainage rating




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## Sample Completed Form - Cattlepass

Structure Usage			
	Last	Now	Explanation of Condition
<b>Grade Separation</b>			
Road Alignment	X	X	
Roadway Surface (Type - SOIL)	6	6	
long (Y/N)	No		
Traffic Safety Features Type	X	X	
Lighting	X	X	
Barrel Leakage (Y/N)	No		
Drainage	4	4	Average 150mm water and ice in pipe.
Structure In Use (Y/N)	No		Fencing is down.
<b>Grade Separation General Rating</b>	<b>4</b>	<b>4</b>	




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[https://extranet.infra.gov.ab.ca/infra\\_login.html](https://extranet.infra.gov.ab.ca/infra_login.html)



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# Questions??



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