GRADE SEPARATION INSPECTION & RATING

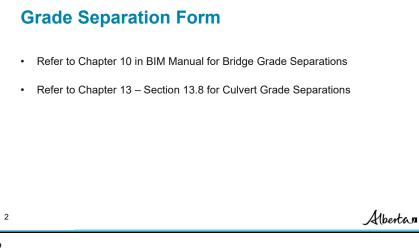
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Grade Separation Form

- For purpose of this presentation <u>does not</u> apply to road alignment above road alignment and other elements rated in Approach Road section
- Basic rule is alignment OVER is rated in Approach Road section and Alignment UNDER is rated in Grade Separation or Channel section
- · Applies to bridges with traffic going under and culverts going through
- · Applies to Animal, Pedestrian or Railway Underpass structures
- Replaces channel section
- · Has items specific to under/overpass rather than channels
- · Generated automatically
- Can be requested for blank forms (select GS instead of Channel)

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

Grade Separation - Road Alignment Under

- · The Grade Separation section is different for bridges and culverts
- Refers to H & V road alignment passing <u>under</u> Bridge Grade Separations or <u>through</u> Culvert Grade Separations
- · Includes road surface condition for bridge GS
- · Road surface given separate rating for culvert GS
- Does not refer to road above (rated in Approach Road section)

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4

4



Grade Separation - Bridge

- The grade separation section of the BIM inspection form replaces the channel section for structures that are not over streams.
- Grade Separation Section for a bridge:

		Last	Now	Explanation of Condition
Grade Separation				
Road Alignment		7	7	
Traffic Safety Features		8	8	HTCB at median.
Туре	Cable barrier			
Slope Protection		4	4	Minor scaling and delam at SE from deck drainage.
(Type : CONCRETE; CON	CRETE)			Gap at NE allowing drainage to undermine.
Bank Stability		8	7	
Drainage		7	7	
Grade Separation General	Rating	7	7	

6

Road Alignment - Rating

Inspection and rating considerations include:

- Evaluating Horizontal Vertical alignment for 1 km each direction, then summarized in a single Road Alignment rating
- vertical and horizontal alignment that may contribute to damage to the bridge
- · look for indications of reduced vertical clearance
- Bridge GS includes condition of road that may lead to damage of the bridge
- Railway, pedestrian / stock / animal passes and utilities alignments are rated "X"

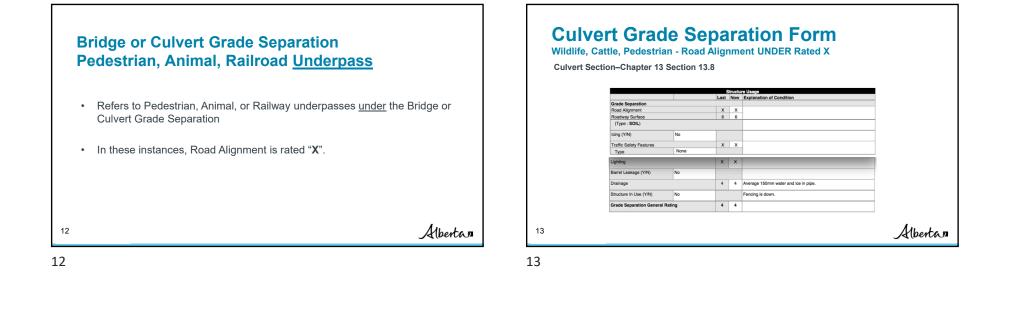
If alignment can be safely driven at legal or posted speed limit rate 5 or more.



Grade Separation - Culvert Grade Separation Section for a culvert carrying vehicles: Structure Usage Last Now Explanation of Condition Grade Separation Road Alignment Roadway Surface 5 5 7 7 6m road through structure one-way N/B. (Type : ACP) Icing (Y/N) No Traffic Safety Features 7 7 Parapet Type Lighting 4 4 1 light burnt out in mid barrel. Barrel Leakage (Y/N) No Drainage 7 7 Structure In Use (Y/N) Yes Grade Separation General Rating 4 4 Albertan 9















Bridge Grade Separation Form

Wildlife, Cattle, Pedestrian - Road Alignment UNDER Rated X

Bridge Section–Chapter 10

				re Usage Explanation of Condition
Grade Separation				
Road Alignment		x	х	Animal underpass
Traffic Safety Features		x	x	
Туре	None			
Slope Protection		7	7	Some Cl.1 and 2.
(Type : NATURAL; NA	TURAL)		÷	
Bank Stability		7	7	
Drainage		7	7	
Grade Separation Gene	eral Rating	7	7	





Bridge Grade Separation - RXR UNDER Rail Alignment UNDER Rated X Structure Usage Last Now Explanation of Condition **Grade Separation** Road Alignment X X Railroad. Traffic Safety Features X X Туре None 7 7 Slope Protection (Type : CONCRETE; CONCRETE) Bank Stability 7 7 Drainage 7 7 7 7 Grade Separation General Rating Albertan 21 21

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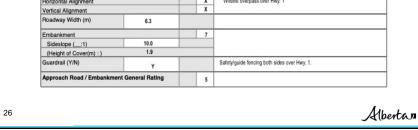


Bridge or Culvert Grade Separation Pedestrian, Animal, Railroad <u>Overpass</u>

- Refers to Pedestrian, Animal, Utility or RxR overpasses over top of roadway
- Road alignment <u>under</u> is rated in Grade Separation section
- Road alignment over is rated in Approach Road section
- In these instances, both Horizontal and Vertical Road Alignment is rated "X
- Results in General Rating of 5
- Refer to Sections 1.10.1 and 1.10.6



Approach Red / Embankentt Approach Red / Embankentt Move Explanation of Condition Horizontal & Vertical Alignment Rated X Bridge Section Chapter 10.3 Culvert Section Chapter 13 Section 13.8 Move Explanation of Condition Horizontal Alignment Wildle verpass over Hwg. 1





25

Bridge Grade Separation Form – RxR Overpass Rail Alignment OVER Rated X

Bridge Section Chapter 10.3 Culvert Section Chapter 13 Section 13.8

				ch Road Explanation of Condition
Horizontal Alignment			X	Railway crossing over top of Hwy. 3.
Vertical Alignment			X	
Roadway Width (m)	3.6			
Approach Bump			X	
Guardrail (Y/N)	Y	6		Steel tube posts and rail along both sides.
Guardrail			7	
Length (m)	33.0			
Current Standard (Y/N)	N			Sheet metal ballast sheilds 1m high along both sides to contain ballas
Termination Type	NONE			
Drainage			5	
Approach Road General Ra	ting		5	
Approach Road General Ra	ting		5	



Roadway Surface · Look for defects that might affect · Refers to Culvert Grade high-load vehicles Separations and • Defects that create hazards to Animal/Pedestrian Underpasses traffic or pedestrians · Purpose is to provide a surface for • Record the presence of icing on traffic usage the roadway or barrel Y/N - Smooth surface comment if Yes. May affect · No holes, depressions or Drainage rating. projections • If defects a problem for Not slippery stock/traffic, rate 4 or less Record type of surface If hazardous, rate 2 or less (holes, ٠ Asphalt projections, icing on traffic or Concrete pedestrian surfaces) Gravel Soil 30 Albertan

Traffic Safety Features

- Refers to curbs, medians, guardrails, attenuators, high tension cable barriers, advance warning signs, vertical clearance signs, crash protection/attenuators
- Inspect 20 m each direction of guardrails, barriers, HTCB
- Not applicable for stock underpasses
- · Indicate type and rate condition and functionality
- If not present record type as "None" and rate "X"

31

Traffic Safety Features

Inspection and rating considerations for safety features are as follows:

- do not rate standard of safety feature, rate functionality and condition as per original design
- · rating includes all components of the safety feature, including connections
- if elements are missing but there is evidence that they were previously there, then rate "4" or less
- use "explanation of condition" to further describe features or to indicate concerns, maintenance required, etc.

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32

32



- Refers to protection system on headslopes of bridges to prevent erosion
- Look for:
 - · evidence of settlement
 - cracked, broken or bulging concrete protection
 - Deck drainage away from system
 - voids under concrete slabs

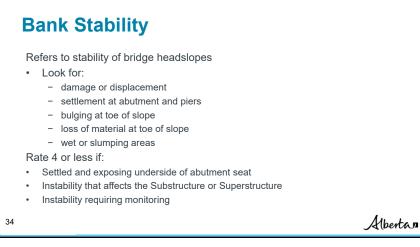
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Note graffiti

- Rate 4 or less for:
 - Significant settlement or moving downwards
 - Significant heaving or cracking of concrete slope protection
 - Voids under concrete slope
 protection
 - Any maintenance required

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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"
- 35

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34

Drainage – Bridge or Culvert GS

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
- Drainage causing ponding, icing on travel lanes & potential hazard rate 2 or less
- Abutment scour/erosion and pier scour rated X on Bridge Grade Separations

36







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Bridge Grade Separation – Poor Drainage



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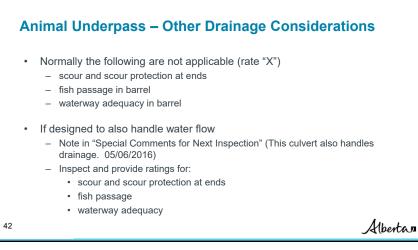
Bridge Grade Separation – Poor Drainage



40

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Drainage – Ped/Animal
UnderpassRatings:On Pedestrian/Animal
Underpasses look for:• Functioning,
sideslope or
or more• Ponding in culvert barrel or at ends• Any condition contributing to icing
• Damage to sideslopes or
embankments• If poor drain
ponding arou
underpassesRecord "Yes" if barrel leakage and
provide comment. Rating is not
required but if "Yes" leakage may
effect rating of Roadway surface• If drainage of
pedestrian up

41

41

and Drainage

- Functioning, 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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Lighting

- Refers to lighting in culvert grade separations and pedestrian underpasses •
- Not applicable for stock underpasses rate X ٠
- 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 •

44

44

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Sample Completed Form Grade Separation – Road Under

Structure In Use

• Indicate "In Use" by Yes or No

(e.g. guide fence is down)

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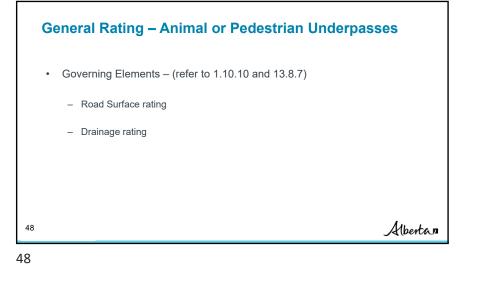
Last Now Explanation of Condition Grade Separation Fail Fail Fail Road Alignment 7 7 7 Traffic Safety Features 4 1 damaged post at W.B median and wrong lap at NW. Type GUARDRAIL Fail 4 Stope Protection 4 4 Broken around pier columns-200mm
Road Alignment 7 7 Traffic Safety Features 4 4 Type GUARDRAIL 1 damaged post at W.B median and wrong lap at NW.
Traffic Safety Features 4 4 1 damaged post at W.B median and wrong lap at NW. Type GUARDRAIL
Type GUARDRAIL
Slope Protection 4 4 Broken around pier columns-200mm
(Type : CONCRETE; CONCRETE) 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 land
Grade Separation General Rating 4 4

Refers to whether the Stock underpass is used for it's intended purpose

• If there is evidence the structure is no longer in service, then circle "N" and make a note in the "explanation of condition" regarding the circumstances

Provide comment/explanation if "No" (e.g. guide fencing is down)





Sample Completed Form **Animal Under Pass**

