

Deutz Bridge in Cologne



Kingston Bridge, Glasgow, Scotland



Highway 1-35w Bridge, Minneapolis, USA

## GIRDER BRIDGE

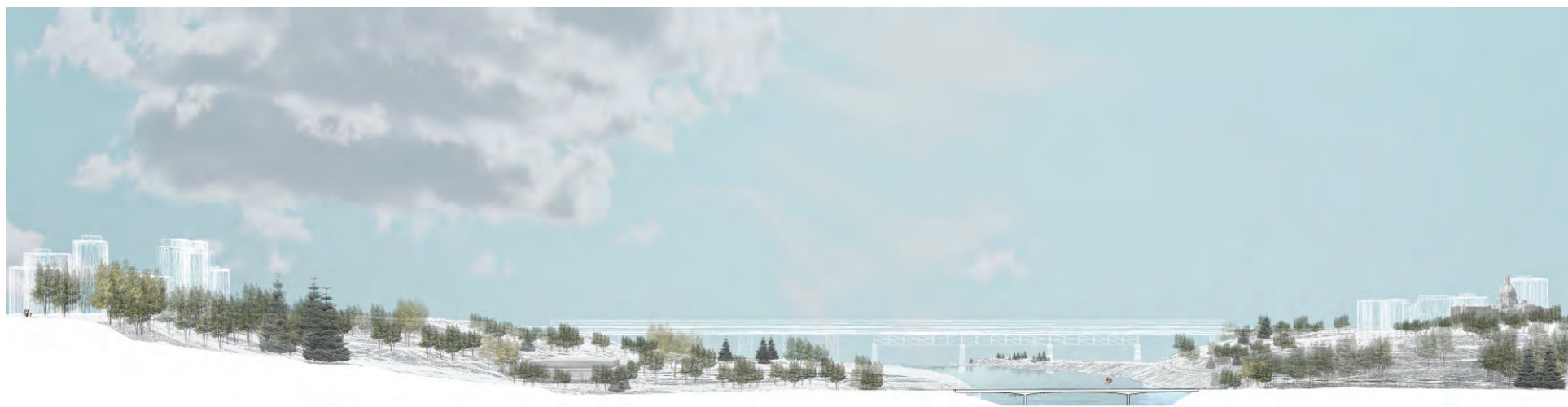
Gird•er [n] - A large beam made out of steel or concrete. A straight or slightly curved structure designed to act primarily in flexure (bending). Sometimes tensioned with internal cables.

## WALTERDALE BRIDGE REPLACEMENT

CONCEPT PLANNING STUDY | PHASE 1 SUMMARY REPORT | 2010.12.23



PRECEDENTS



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GIRDER ALTERNATIVE SECTION IN VALLEY



## EXTRADOSED BRIDGE

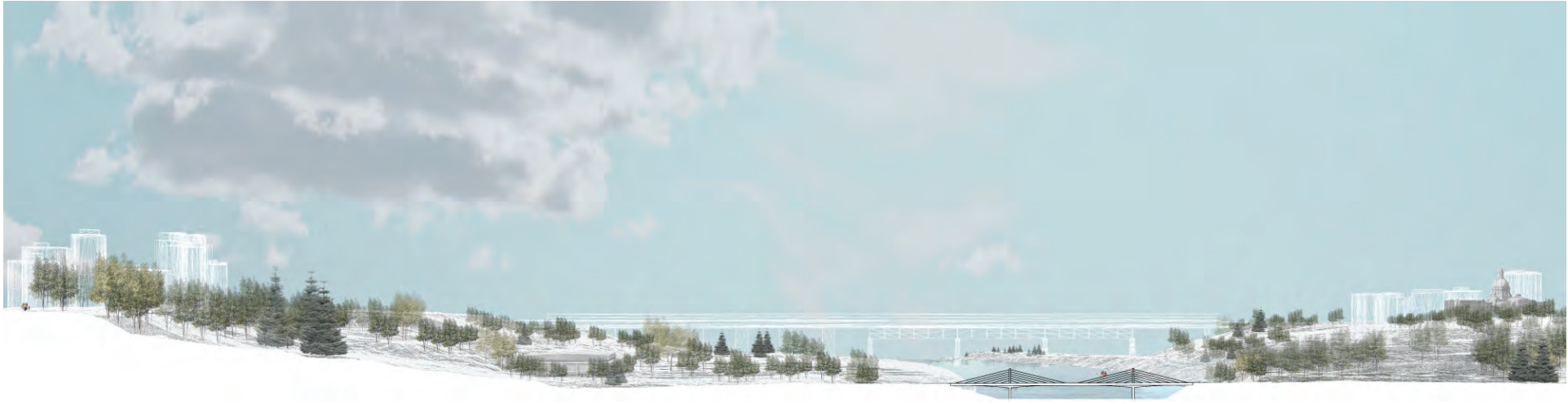
Ex•tra•dosed [n] - A girder bridge in which the tension cables are installed outside and above the main girder and deviated by short towers located at supports. A hybrid between girder and cable-stayed.

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EXTRADOSED ALTERNATIVE SECTION IN VALLEY



Juscelino Kubitschek Bridge, Brasília



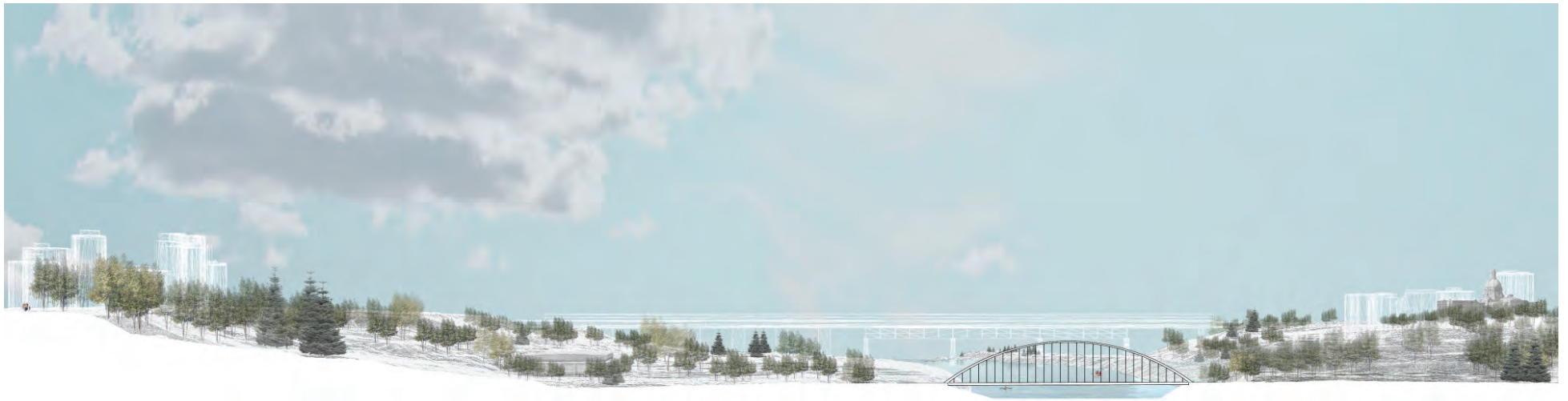
Highway Bridge, Palmas de Gran Canaria, Spain



Apollo Bridge, Slovakia

## ARCH BRIDGE

Arch [n] - A curved structure designed to act primarily in compression. Horizontal thrust reactions are resisted by a tension tie or embedment into the earth.



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ARCH ALTERNATIVE SECTION IN VALLEY



Alamillo Bridge, Seville, Spain



Lover's Bridge, DanShui, Taiwan



Erasmus Bridge, Rotterdam

## CABLE-STAYED BRIDGE

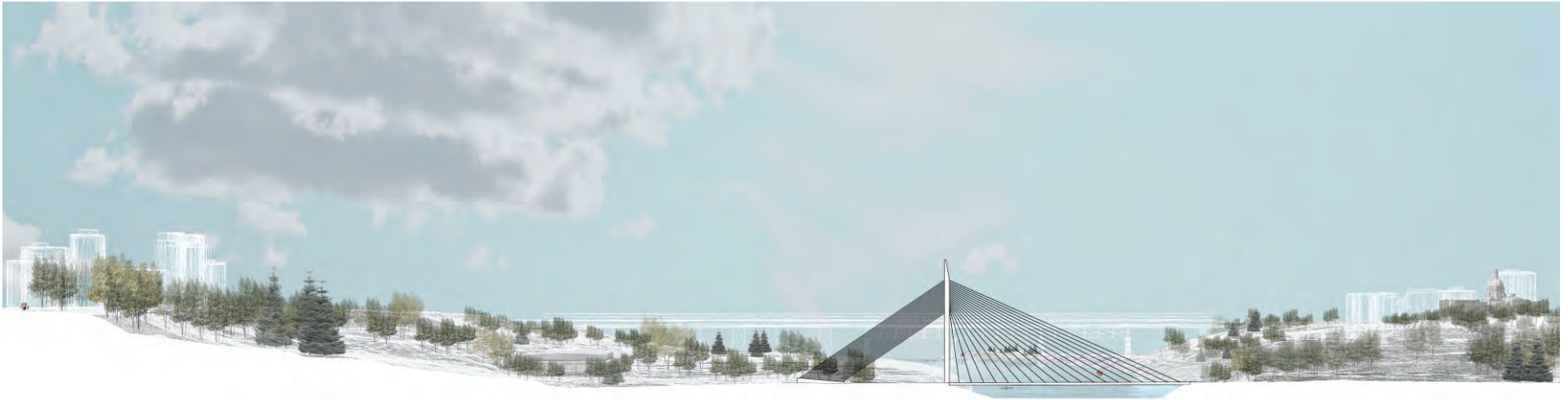
Cable-stayed [n] - A slender girder system cantilevered both ways from a central tower and supported by inclined cables attached to the tower.

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CABLE-STAYED ALTERNATIVE SECTION IN VALLEY

## Walterdale Bridge Style Comparison Matrix

		Bridge Type			
CRITERIA		GIRDER	EXTRADOSED	ARCH	CABLE STAYED
TECHNICAL CONSIDERATIONS	Profile in North Saskatchewan River Valley	<ul style="list-style-type: none"> <li>Low profile; you wouldn't know you were on a bridge.</li> </ul>	<ul style="list-style-type: none"> <li>Slightly higher profile than girder; deck more slender.</li> </ul>	<ul style="list-style-type: none"> <li>Deck very slender; arch quite prominent.</li> </ul>	<ul style="list-style-type: none"> <li>Deck very slender; tower about 3 times higher than High Level Bridge.</li> </ul>
	Impact on river	<ul style="list-style-type: none"> <li>Two piers in river; removal of existing piers.</li> </ul>	<ul style="list-style-type: none"> <li>Two piers in river; removal of existing piers.</li> </ul>	<ul style="list-style-type: none"> <li>No piers in river; removal of existing piers.</li> </ul>	<ul style="list-style-type: none"> <li>No piers in river; removal of existing piers.</li> </ul>
	Impact on south river bank	<ul style="list-style-type: none"> <li>New abutment, removal of existing abutment.</li> </ul>			<ul style="list-style-type: none"> <li>New abutment and pylon on south bank.</li> <li>New large tie-down block.</li> <li>Remove existing abutment.</li> </ul>
	Impact on north river bank	<ul style="list-style-type: none"> <li>New abutment, removal of existing abutment.</li> </ul>			
	Utilities integration	<ul style="list-style-type: none"> <li>Utilities should fit between girders.</li> </ul>		<ul style="list-style-type: none"> <li>Utilities may be carried in box between east walk and road barrier.</li> </ul>	
	Constructability	<ul style="list-style-type: none"> <li>Common bridge type. Space may be required to launch girders from bank.</li> </ul>	<ul style="list-style-type: none"> <li>Less common bridge type.</li> <li>Slightly more complex than girder.</li> </ul>	<ul style="list-style-type: none"> <li>Arch erection complex.</li> <li>Deck easy to erect.</li> </ul>	<ul style="list-style-type: none"> <li>Very tall tower.</li> <li>Deck easy to erect.</li> </ul>

		Bridge Type			
CRITERIA		GIRDER	EXTRADOSED	ARCH	CABLE STAYED
ACCESSIBILITY	Pedestrian experience and safety	<ul style="list-style-type: none"><li>Minimal separation between pedestrians and vehicles.</li><li>Higher above water unless pedestrian walkway is a separate element.</li></ul>	<ul style="list-style-type: none"><li>Enhanced buffer between roadway and pedestrians due to cable structure.</li><li>Higher above water.</li></ul>	<ul style="list-style-type: none"><li>Enhanced buffer between roadway and pedestrians due to cable structure.</li><li>Lower to water.</li></ul>	<ul style="list-style-type: none"><li>Enhanced buffer between roadway and pedestrians due to cable structure.</li><li>Lower to water.</li></ul>
	Bicycle experience and safety	<ul style="list-style-type: none"><li>Minimal separation between pedestrians and vehicles.</li><li>Higher above water unless pedestrian walkway is a separate element.</li></ul>	<ul style="list-style-type: none"><li>Enhanced buffer between roadway and bicycles due to cable structure.</li><li>Higher above water.</li></ul>	<ul style="list-style-type: none"><li>Enhanced buffer between roadway and bicycles due to cable structure.</li><li>Lower to water.</li></ul>	<ul style="list-style-type: none"><li>Enhanced buffer between roadway and bicycles due to cable structure.</li><li>Lower to water.</li></ul>
	Access to Kinsmen Sports Centre	<ul style="list-style-type: none"><li>Bridge type does not impact access.</li></ul>			
	Access to Rosedale Generating Station	<ul style="list-style-type: none"><li>Bridge type does not impact vehicular access.</li></ul>			
	Access/ integration with north multi-use trail system	<ul style="list-style-type: none"><li>Structural design allows higher elevation for trail and promenade (closer to existing elevation).</li><li>Structure has potential to be split to reduce impact of bridge widths on trails below.</li></ul>	<ul style="list-style-type: none"><li>Structural design allows higher elevation for trail and promenade (closer to existing elevation).</li></ul>	<ul style="list-style-type: none"><li>Structural design requires lower trail and promenade.</li></ul>	
	Access/ integration with south multi-use trial system	<ul style="list-style-type: none"><li>Bridge higher on south bank.</li><li>Rail system can be generous and fully integrated.</li></ul>		<ul style="list-style-type: none"><li>Bridge lower to river and will require a technical solution to incorporate trail below bridge.</li></ul>	<ul style="list-style-type: none"><li>Tower proximity to water's edge impacts trail.</li><li>Difficult to incorporate promenade under bridge unless bridge deck is raised.</li></ul>

		Bridge Type			
CRITERIA		GIRDER	EXTRADOSED	ARCH	CABLE STAYED
CONSTRAINTS	Legislative	Commentary to form part of final report.			
	Regulatory	Commentary to form part of final report.			
	Geotechnical	Commentary to form part of final report.			
	Archaeological	Commentary to form part of final report.			
	Environmental	Commentary to form part of final report.			

	Bridge Type			
	CRITERIA	GIRDER	EXTRADOSED	ARCH CABLE STAYED
ADJACENT PROJECTS/INITIATIVES	Kinsmen Sports Centre	<ul style="list-style-type: none"> <li>Bridge design has no apparent impact.</li> </ul>		
	Burial Grounds	<ul style="list-style-type: none"> <li>Bridge profile has little visual impact.</li> </ul>	<ul style="list-style-type: none"> <li>Lower profile of towers has low visual impact.</li> </ul>	<ul style="list-style-type: none"> <li>Height of arch has strong visual impact. May reduce visual presence of burial grounds.</li> <li>Height of tower and cable system has strong vertical presence. May reduce visual presence of burial grounds.</li> </ul>
	Interpretive Display	<ul style="list-style-type: none"> <li>Bridge design has no apparent impact.</li> <li>Road alignment may require a re-location of Interpretive Display.</li> </ul>		
	West Rosedale Urban Design Plan	<ul style="list-style-type: none"> <li>Good opportunity to complement strong public realm design and enhanced relationship to water's edge.</li> </ul>		<ul style="list-style-type: none"> <li>Higher degree of visual presence as to potential to reduce importance of public realm.</li> </ul>
	Impact on repurposing of Rosedale Generating Station including Pumphouse 1 & 2	<ul style="list-style-type: none"> <li>Low visual profile provides opportunity to open views to and from the site, and create a strong presence for the Power Station.</li> </ul>	<ul style="list-style-type: none"> <li>Superstructure design potentially diminishes the presence of the Power Station and obscures views to and from the site.</li> </ul>	
	Impact on/relationship to Legislature Grounds	<ul style="list-style-type: none"> <li>Low visual profile provides opportunity to open views to site.</li> </ul>	<ul style="list-style-type: none"> <li>Superstructure is below south lawn but obscures sustained views to Legislature.</li> </ul>	<ul style="list-style-type: none"> <li>Superstructure is above south lawn of Legislature.</li> <li>Obscures sustained view to Legislature.</li> </ul>

		Bridge Type			
CRITERIA		GIRDER	EXTRADOSED	ARCH	CABLE STAYED
OPPORTUNITIES	Watercraft use of river	<ul style="list-style-type: none"><li>Piers in water may impact watercraft.</li></ul>		<ul style="list-style-type: none"><li>No piers in water will enhance use of river by watercraft.</li></ul>	
	Wildlife passage	<ul style="list-style-type: none"><li>Bridge type choice has no impact.</li></ul>			
	Functional Signature Opportunity - point of pride	<ul style="list-style-type: none"><li>Simple structural design creates opportunity for unique, innovative approach to signature focused on public realm and integration into valley.</li></ul>	<ul style="list-style-type: none"><li>Stronger visual statement inherent with tower and cables.</li><li>Some opportunity for enhanced public realm and integration into valley.</li></ul>	<ul style="list-style-type: none"><li>Very strong visual impact of bridge type will be signature in and of itself.</li><li>Public realm somewhat diminished in importance.</li></ul>	
COST	Capital cost	<ul style="list-style-type: none"><li>Lowest.</li></ul>	<ul style="list-style-type: none"><li>Medium.</li></ul>	<ul style="list-style-type: none"><li>Highest.</li></ul>	<ul style="list-style-type: none"><li>Medium.</li></ul>
	Operating & maintenance costs	Commentary to form part of final report.			
	Life cycle cost	Commentary to form part of final report.			