



Associated
Engineering



Bridge Structures Management for Public Private Partnerships in British Columbia (Canada) - An Operators Perspective

Tim Aucott P.Eng

April 26, 2017

Summary of Presentation

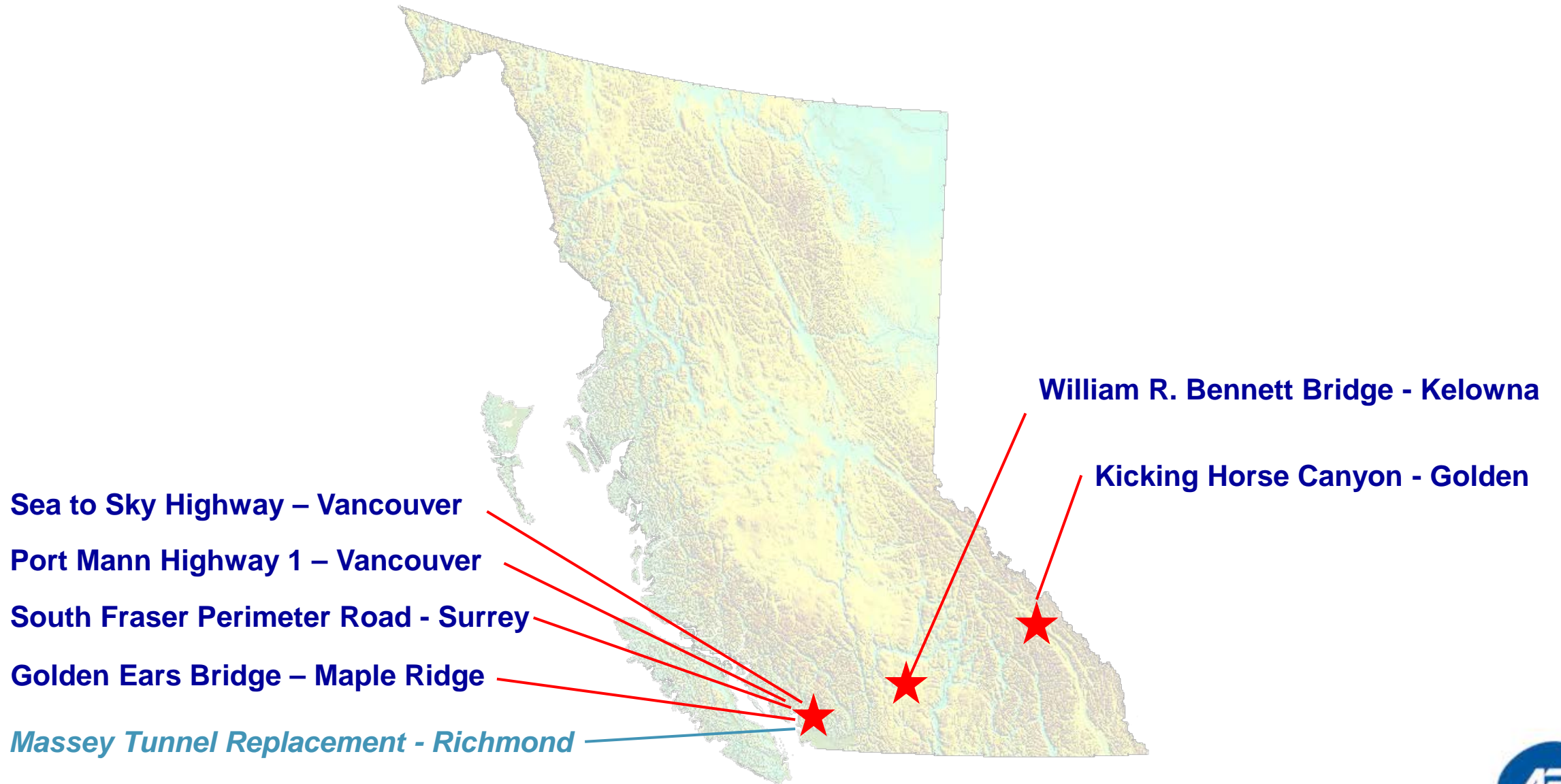
- Scope of concession highway projects in BC
- Typical concessionaire structure
- Typical requirements
- Our experience
- Conclusions



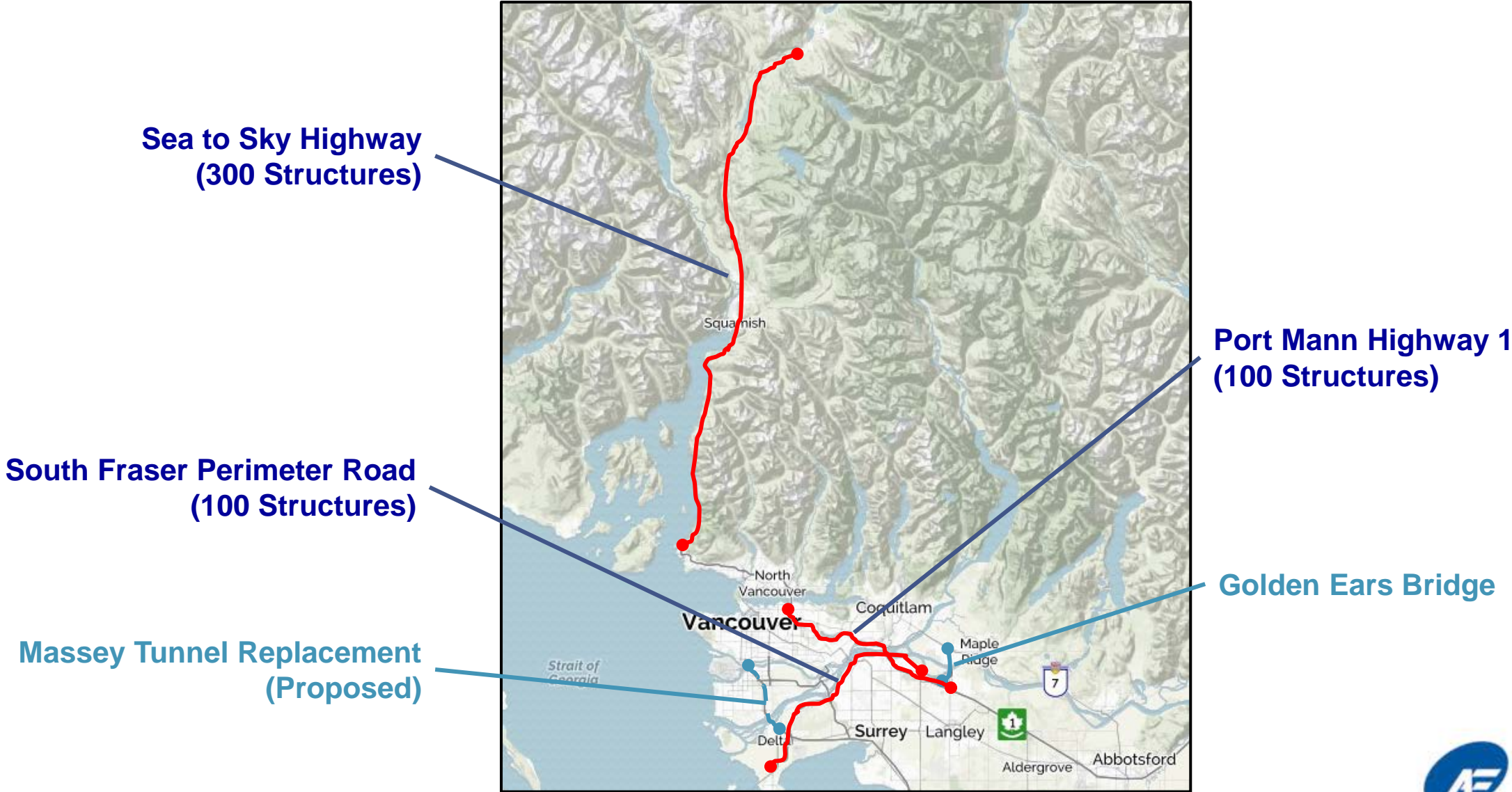
British Columbia



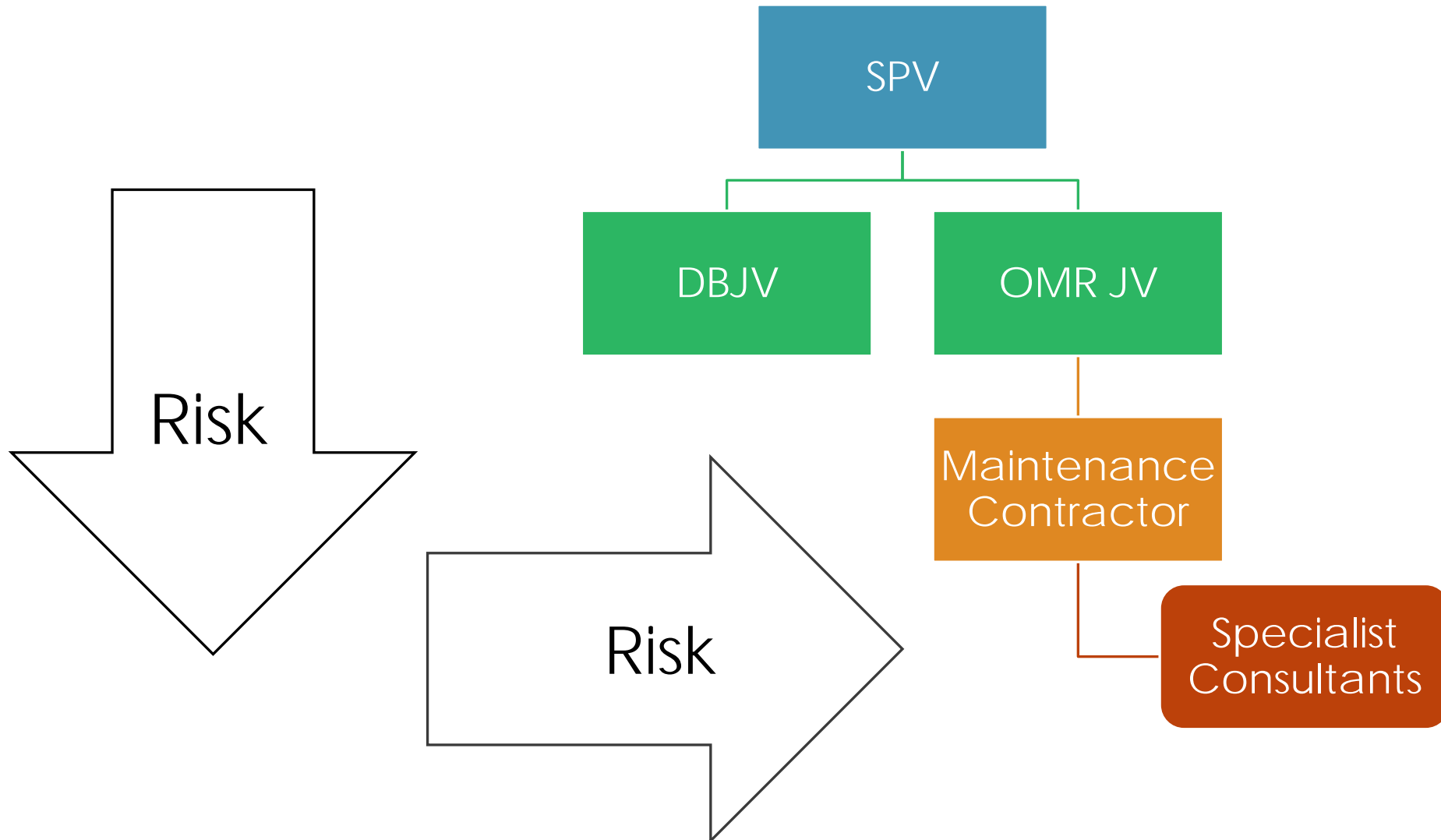
Concession Highway Projects in BC



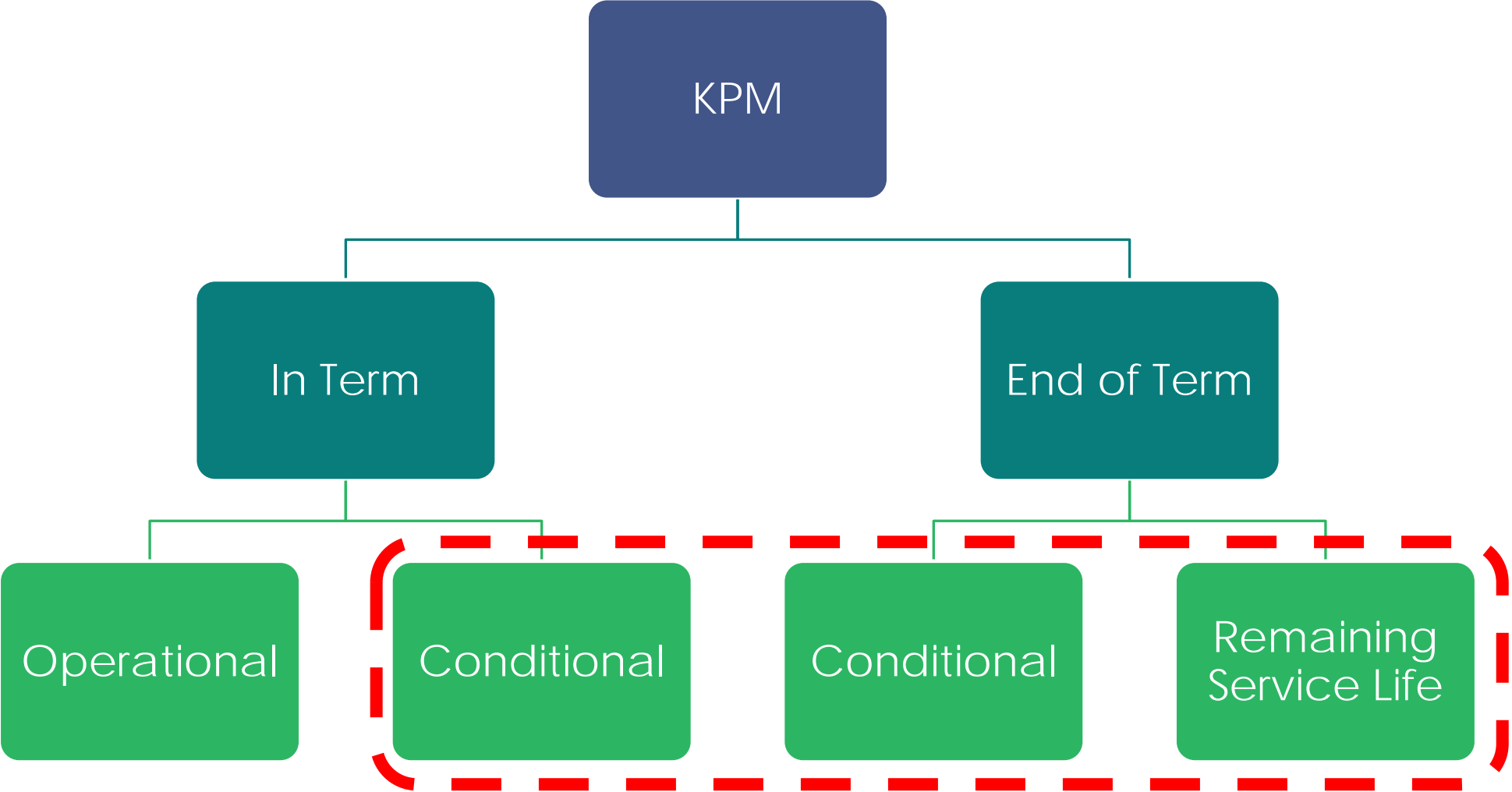
Concession Highway Projects in BC



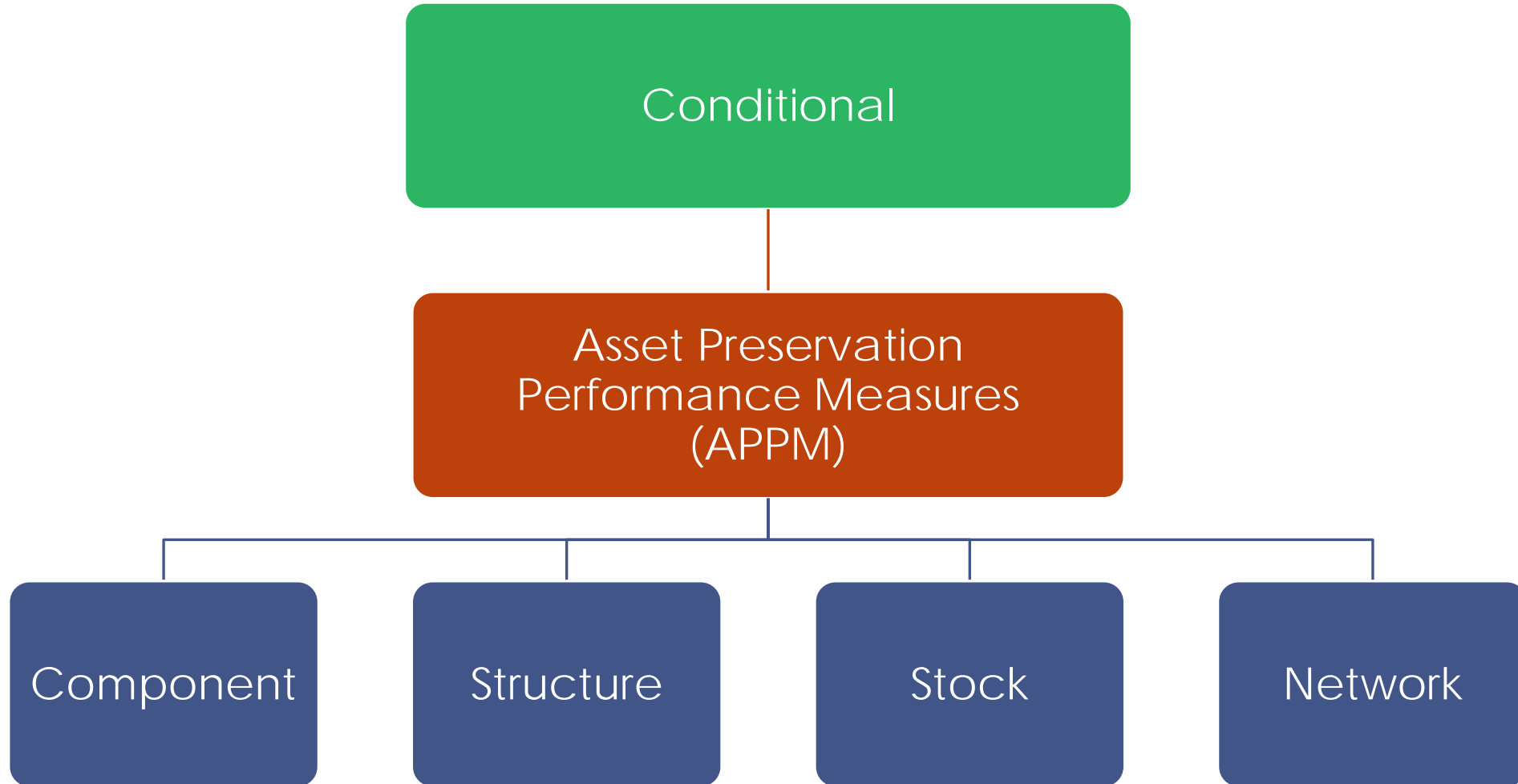
Typical Concessionaire Structure



General Contractual Requirements



Key Performance Measure Requirements



APPM - Inspection System

Associated Engineering
BRIDGE CONDITION INSPECTION
 Inspection Type: Routine
 Inspector(s): Mike Hanson, Mitch Koepke

Structure Number: BR_01
 Structure Name: LOUGHEED HIGHWAY THROUGH TRUSS BRIDGE
 Inspection Date (mm/dd/yyyy): 9/4/2015

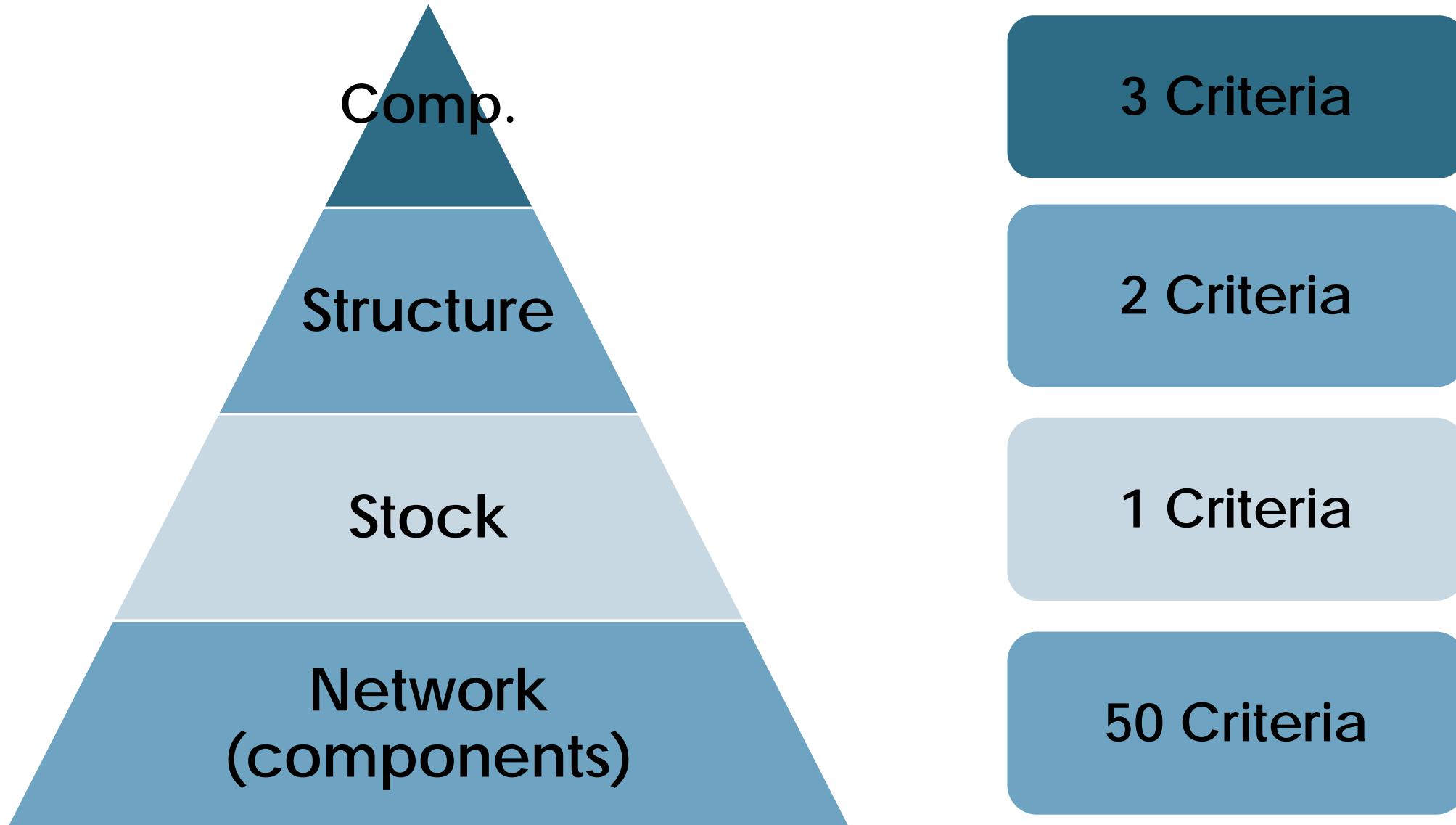


<u>SUBSTRUCTURE</u>	E	G	F	P	V	X
5 Found Movement	50		50			
6 Abutments	46		1	3	50	
7 Wing Retaining Walls	48			2	50	
8 Embankment	100					
9 Footings/Piling						100
10 Pier Columns/Walls/Cribs						
11 Bearings	50				50	
12 Caps						
13 Corbels						
14 Dolphins/Fenders						

%
Condition

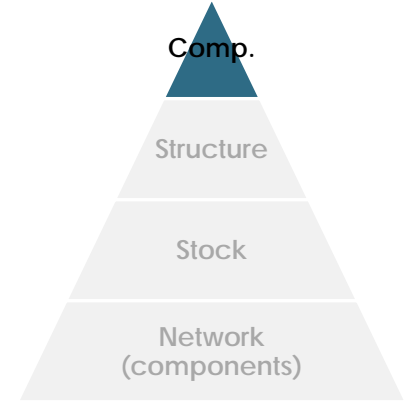


APPM - Performance Targets



APPM - Components

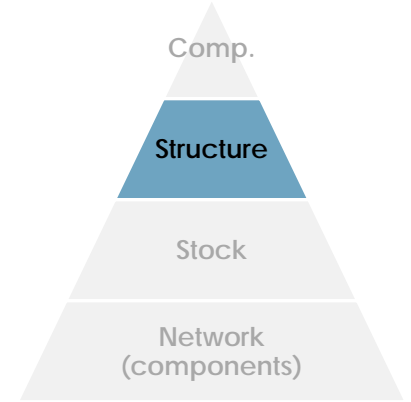
- All component
- Average condition of each component
- Three exceedance criteria (starting at “Fair” condition)



Fair Condition = “Performing well, some maintenance required”

APPM - Structures

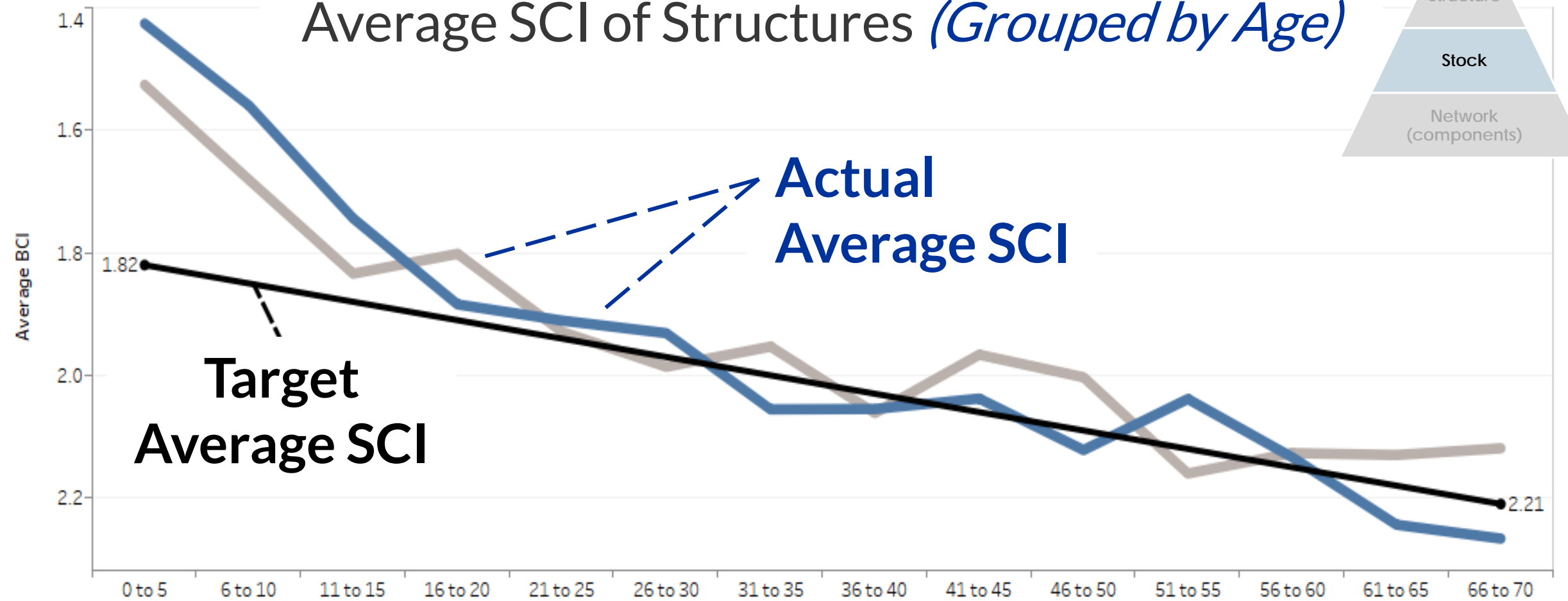
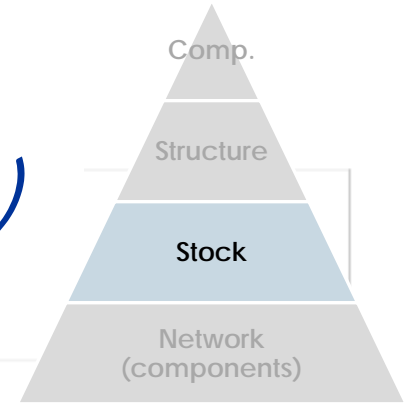
- All structures
- Structure Condition Index (SCI)
- Two exceedance criteria (2.6 and 2.9)



SCI of around 3.5 indicates that a structure is a candidate for replacement

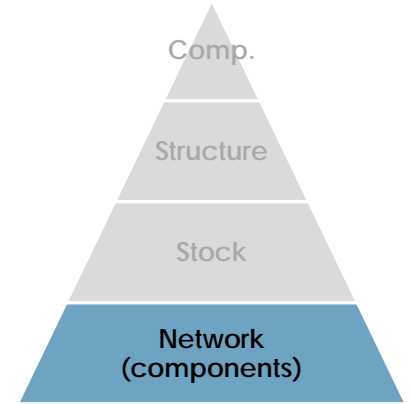
APPM - Stock

Average SCI of Structures *(Grouped by Age)*



APPM - Network (Components)

- Select key components
- % of network below condition 'X'
- Higher thresholds than component APPM



Example:

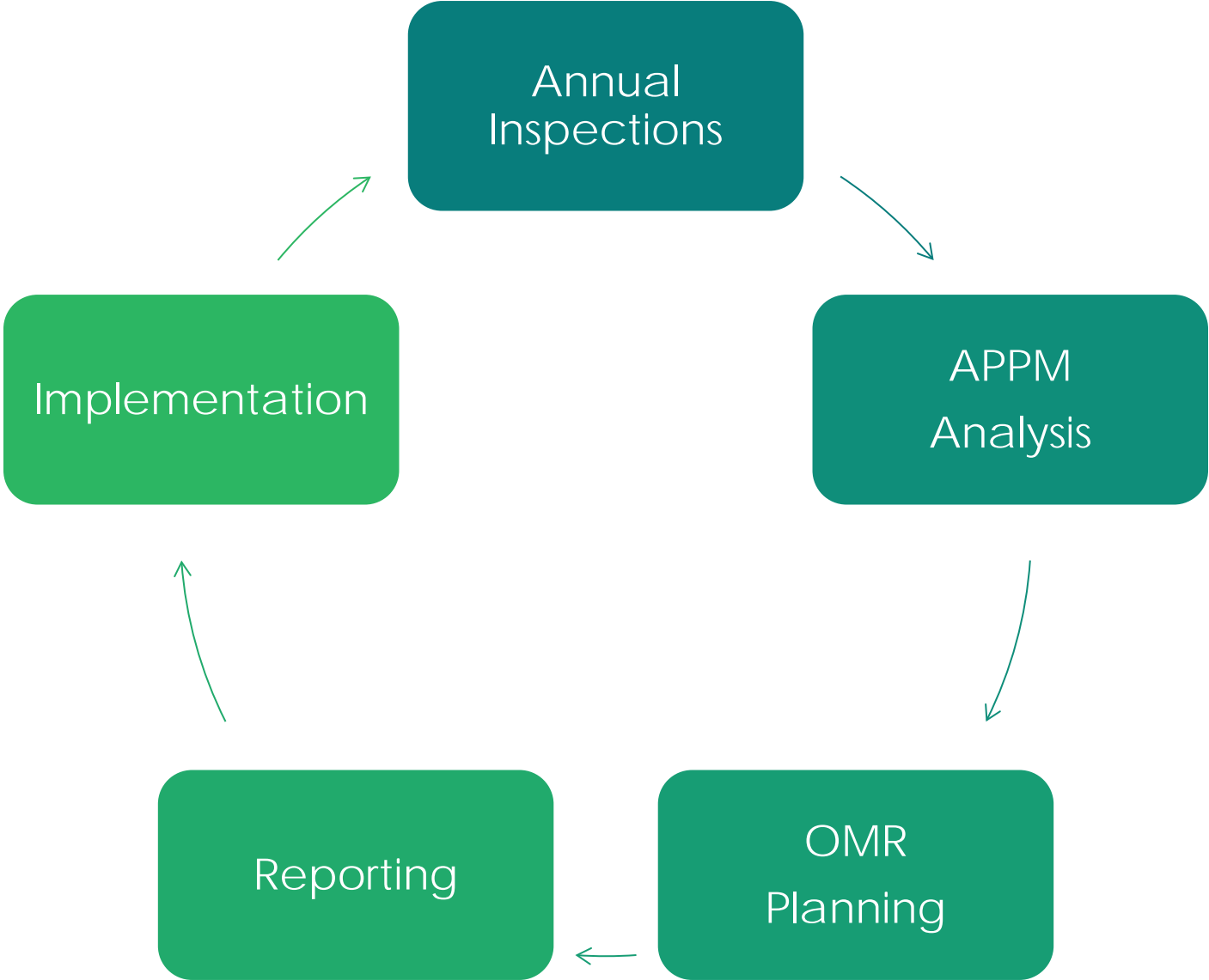
“No more than 10% of wearing surface in a condition state worse than Fair”

APPM

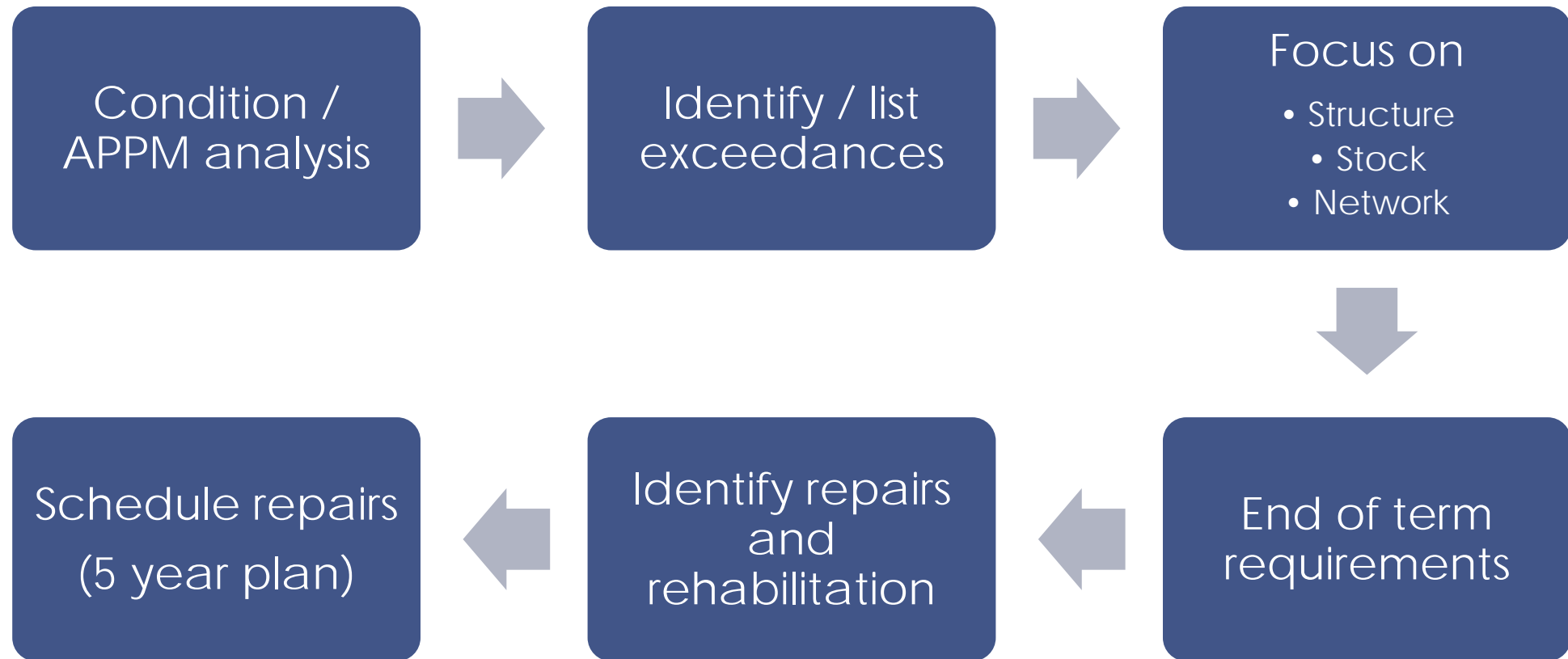
APPM are structured to prevent the Concessionaire from maintaining all components at just above a 'Fair' condition.



Annual Management Cycle



Rehabilitation Program Process





Our Experience

- Design & construction specs. are less stringent than APPM requirements, resulting in APPM Exceedances before handover:
 - Bearings - loss of contact
 - Approach fill settlements
 - Hydrology - skew piers





Our Experience

- Repairs undertaken to address exceedances that would not be undertaken otherwise:
 - Deck soffits - transverse cracks
 - Bearings - loss of contact





Our Experience

- At times the inspection system does not adequately capture safety related risks (*condition vs extents*):
 - We modified the inspection criteria to capture safety related risks



Our Experience

- Timeframe to discharge APPM is typically 12 months which does not facilitate effective management practices:
 - Social impacts
 - Financial impacts

Conclusion

- Structures maintained in better than average condition
- Equity partners now involved on all sides, resulting in better sharing of risk
- End of Term?
 - Reliant on concessionaires proving remaining service life in older components using observed condition and theoretical deterioration models





Questions?

Tim Aucott P.Eng, email: aucottt@ae.ca