

*Prospectors and Developers Association of Canada – PDAC 2015 Conference  
Technical Session Panel: Managing the environmental footprint of mineral exploration - can mining be sustainable?*

# Environmental Impact Assessment: A force for good while saving time and money

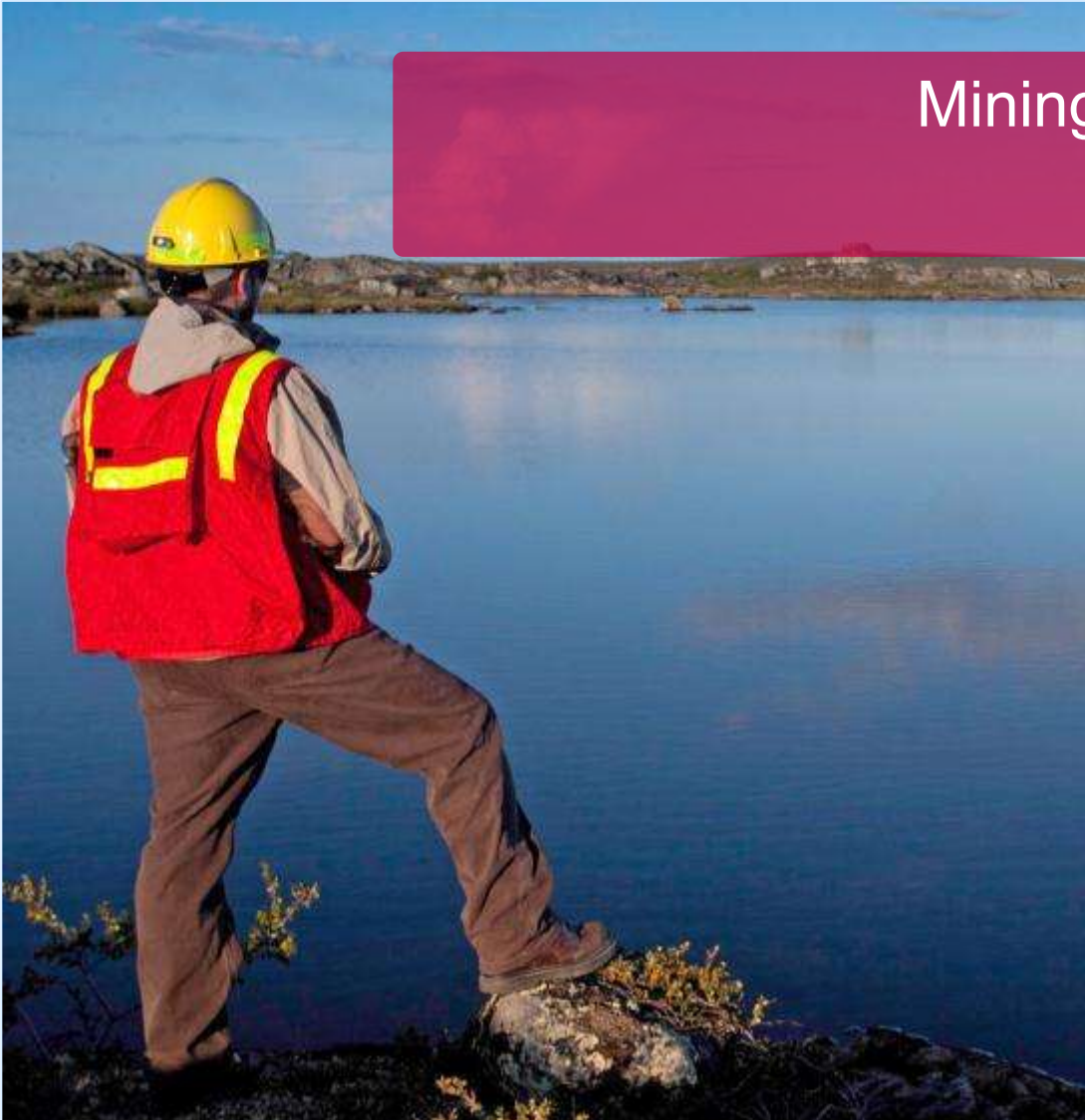


*The world's leading sustainability consultancy*

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# Premise



Mining can be a force for good, if it is well managed.

Discoveries can unlock wealth, and the mining-derived revenue can generate shared value for the community at large. It can transform economies and present nations, and even continents, with a different trajectory for their future.

On the other hand, the negative effects of mining can be felt far into the future if it is not well managed.

Mining is about the long game. However, what's the short-term top of mind thinking in the sector?

# A Changing Economic Landscape



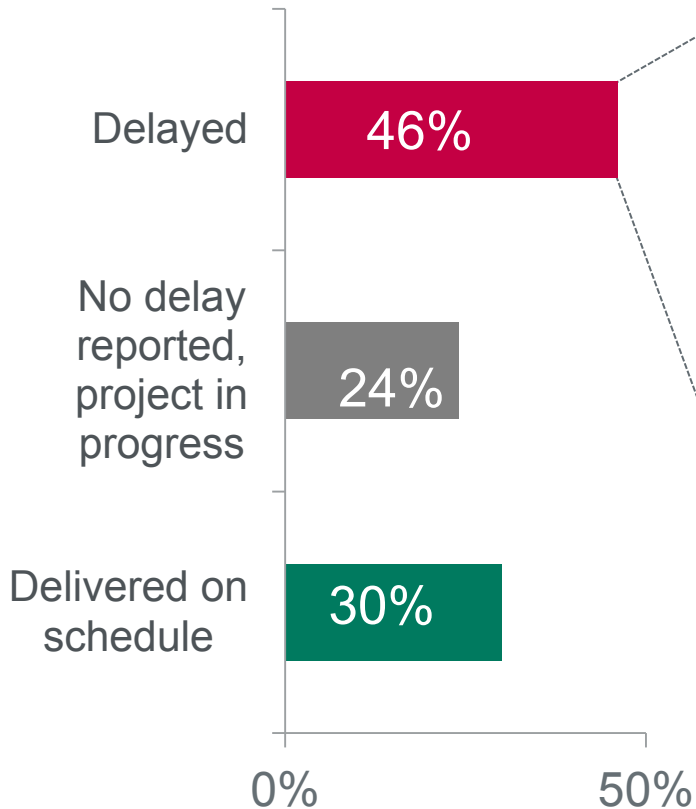
How are you adapting to the new 'normal' in mining?

The new 'normal' is an era of depressed commodity prices, asset impairment charges, fixing the balance sheet and cost optimization. In parallel, stakeholder expectations remain high.

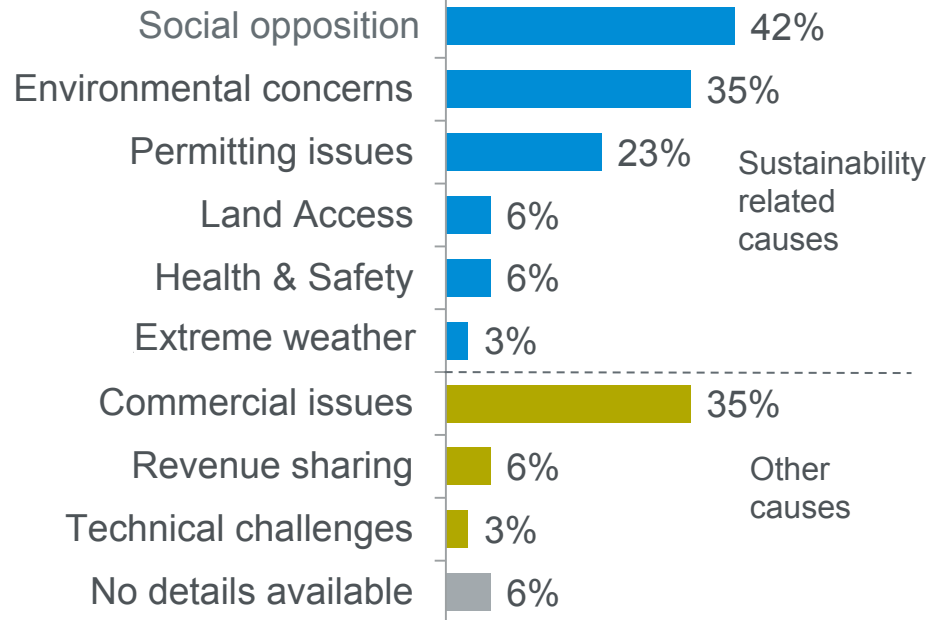
How are you adapting to the new 'normal' in mining? How do you demonstrate to senior management/Board that proactive management of Non-Technical Risks – environment, health, safety, social – can bring value by saving time and money in the long-term?

# 30% of Projects are Delivered on Schedule

## Mining project delays (2008 – 2012)



## Causes of delay\*



\*Does not total 100% due to multiple causes of delays

Sample size = 67 projects across 5 mining multinationals.  
Projects >\$500m CAPEX reported on between 2008-2012

Source: ERM Analysis

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# Mining Lifecycle Through a Sustainability Lens

When we look across the lifecycle of mining from a sustainability lens, what stands between your conceptual project definition and project approval is the Environmental Impact Assessment process.



## Capital Project Execution

Early risk identification, baseline fieldwork, options analysis, stakeholder engagement, **Environmental Impact Assessment**

## HSEC Operational Excellence

Operational excellence support, audit & assurance, construction permitting, EH&S management systems

## Asset Retirement

Environmental liability assessment, closure, community considerations

# Non-Technical Risk (NTR) in Project Design

## What is EIA?

Environmental  
Impact  
Assessment

Why is Environmental Impact Assessment (EIA) important?

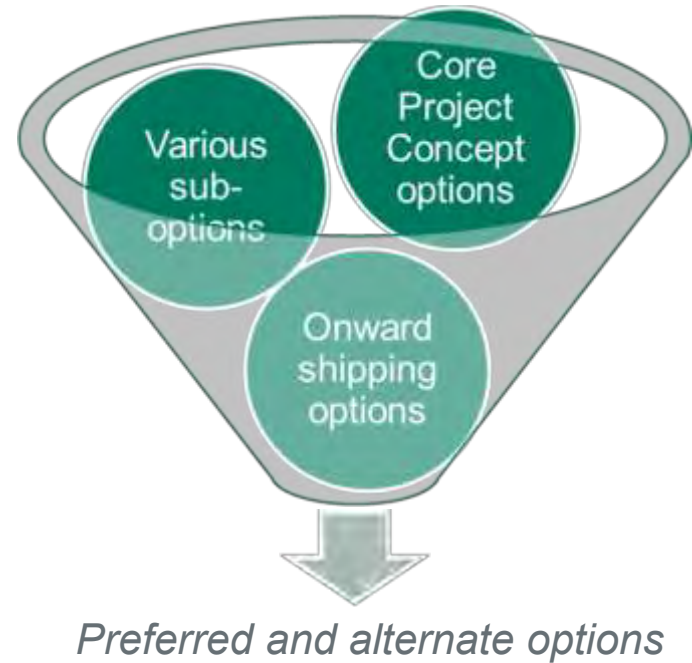
Have you considered that as you advance engineering design, the EIA regulatory process (as well as the social licence to operate) becomes your critical path and the longest duration of the project schedule?

Delays in the EIA, translate directly into impacts on the project economics.



# Case Study: Major Mining Company, Europe

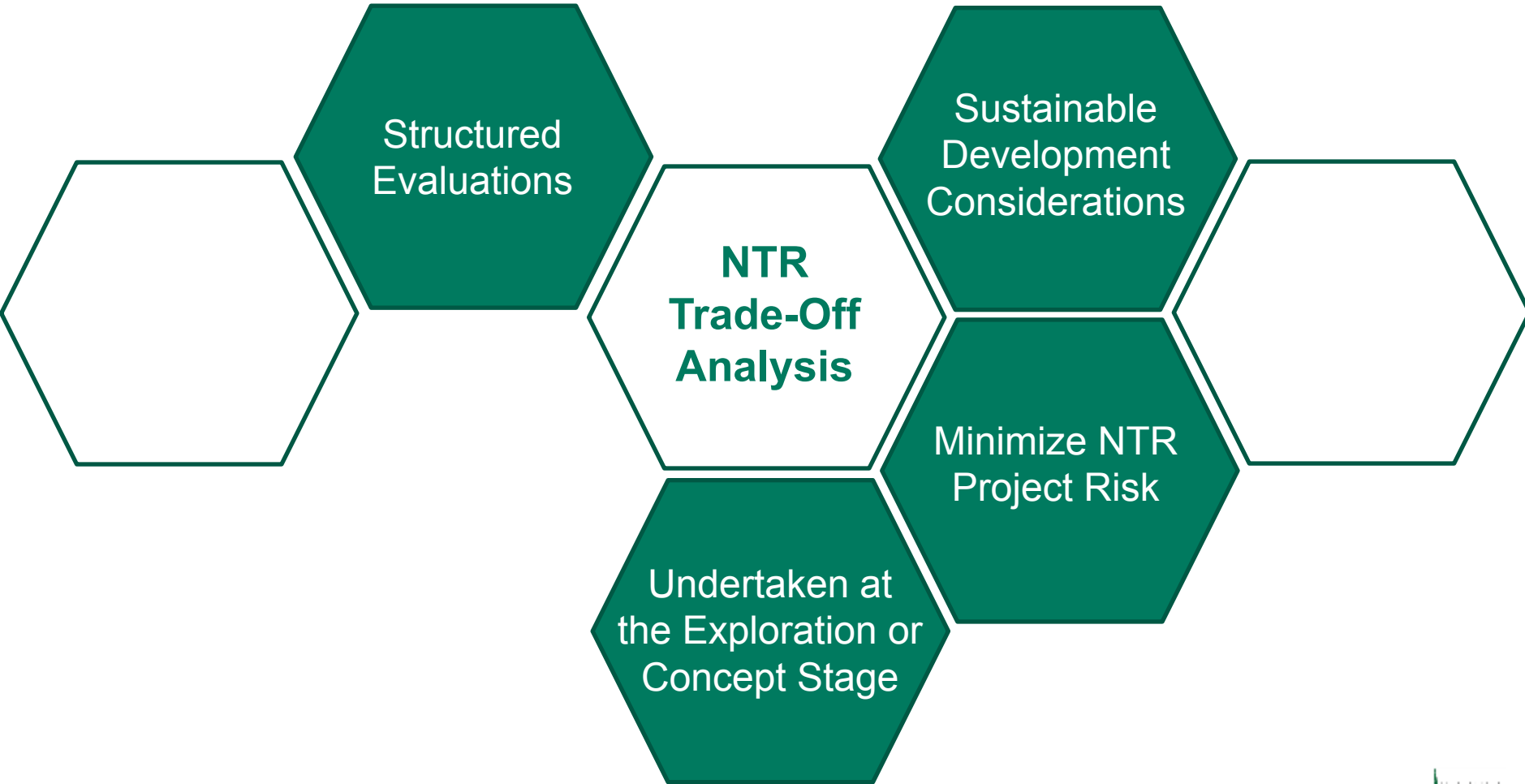
100+ inputs from engineering, economics, environmental and social elements



**The 'Optioneering' Approach:** A structured approach to include 100+ combinations to arrive at preferred and alternate options.

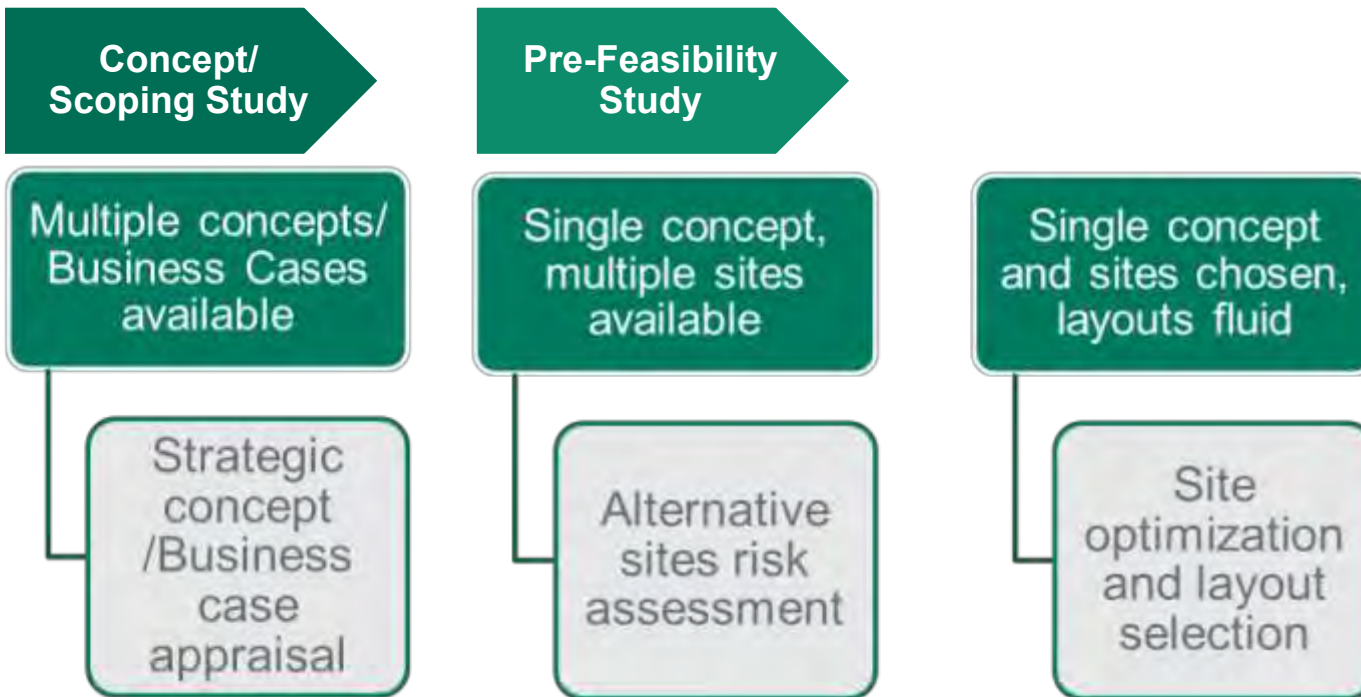
The outcome resulted in significant changes in project direction between initial and final concept. Benefits included reduced permitting risk and increased project economics.

# Embedding Non-Technical Risk (NTR) in Trade-Off Analysis

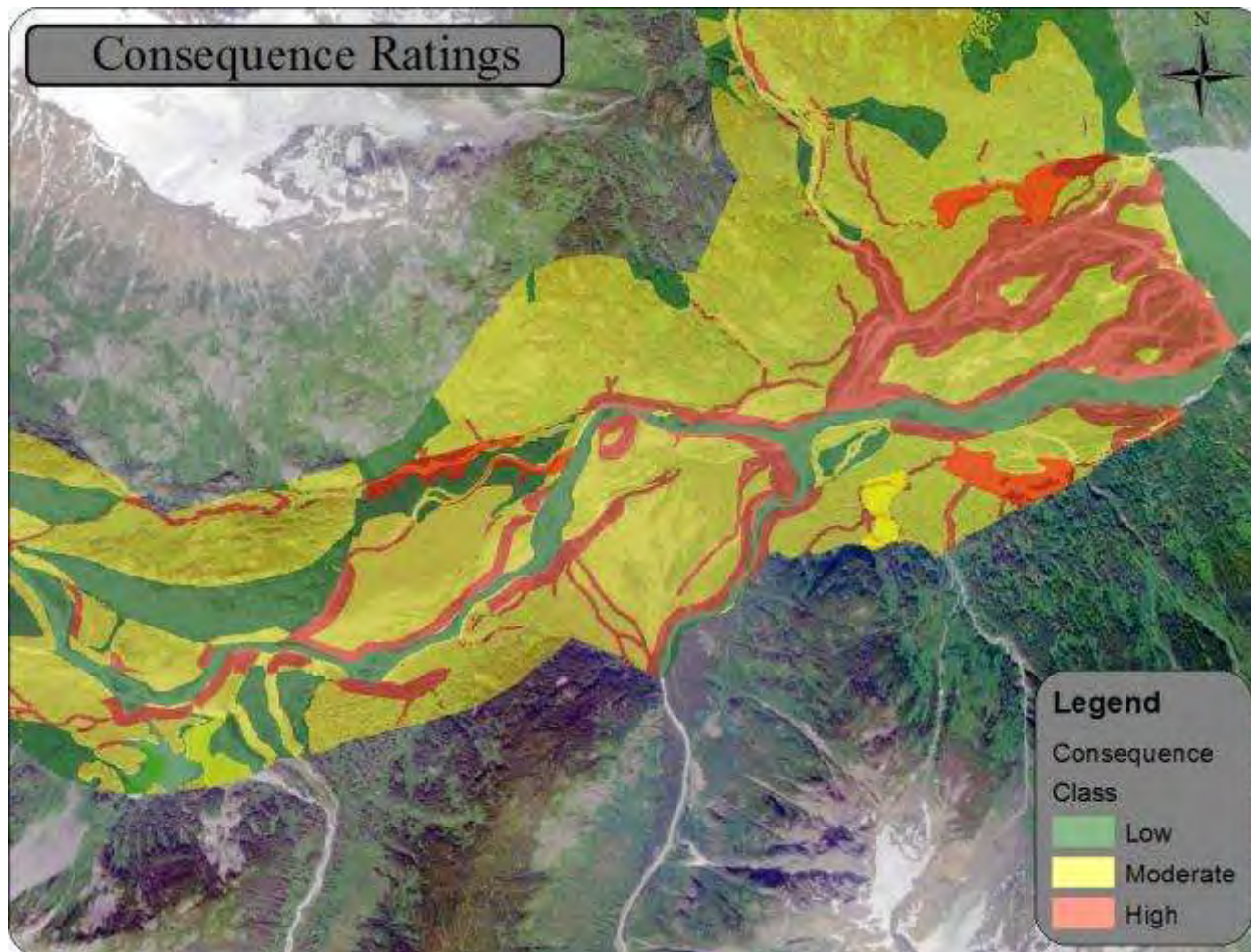




# An Approach that is Flexible and Scalable



# Analyzing Potential Project Consequences



## Case study

Junior mining company,  
Canadian project location

## Issue

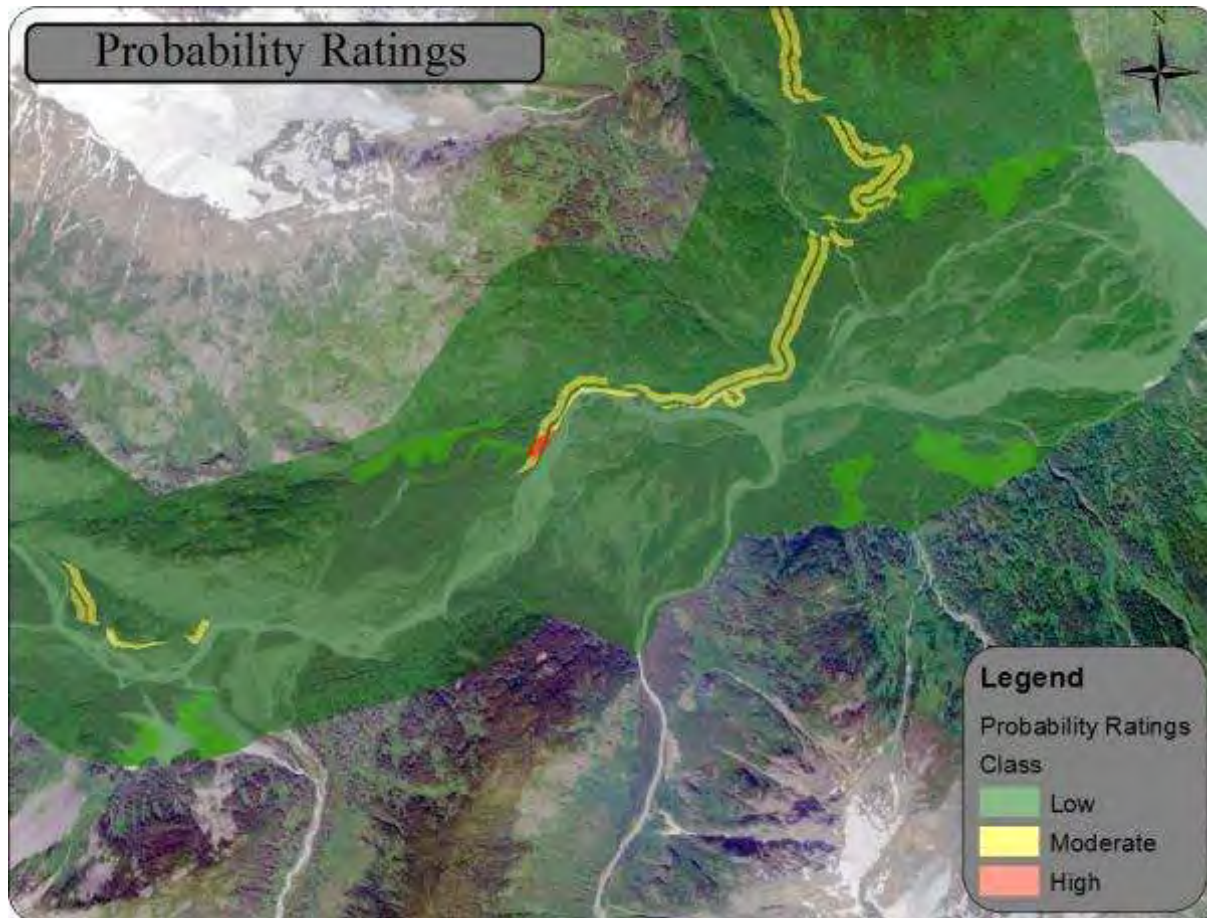
When taking a landscape approach, where should one site a linear facility i.e. access road or transmission line to avoid areas of highest risk (while also factoring in constructability, economics, Aboriginal values)?

## Approach

Use a risk assessment approach to develop a landscape constraint map model.

A spatial view of areas shows high - low consequence severity-related ecological values.

# Analyzing Risk Probabilities



## Approach continued...

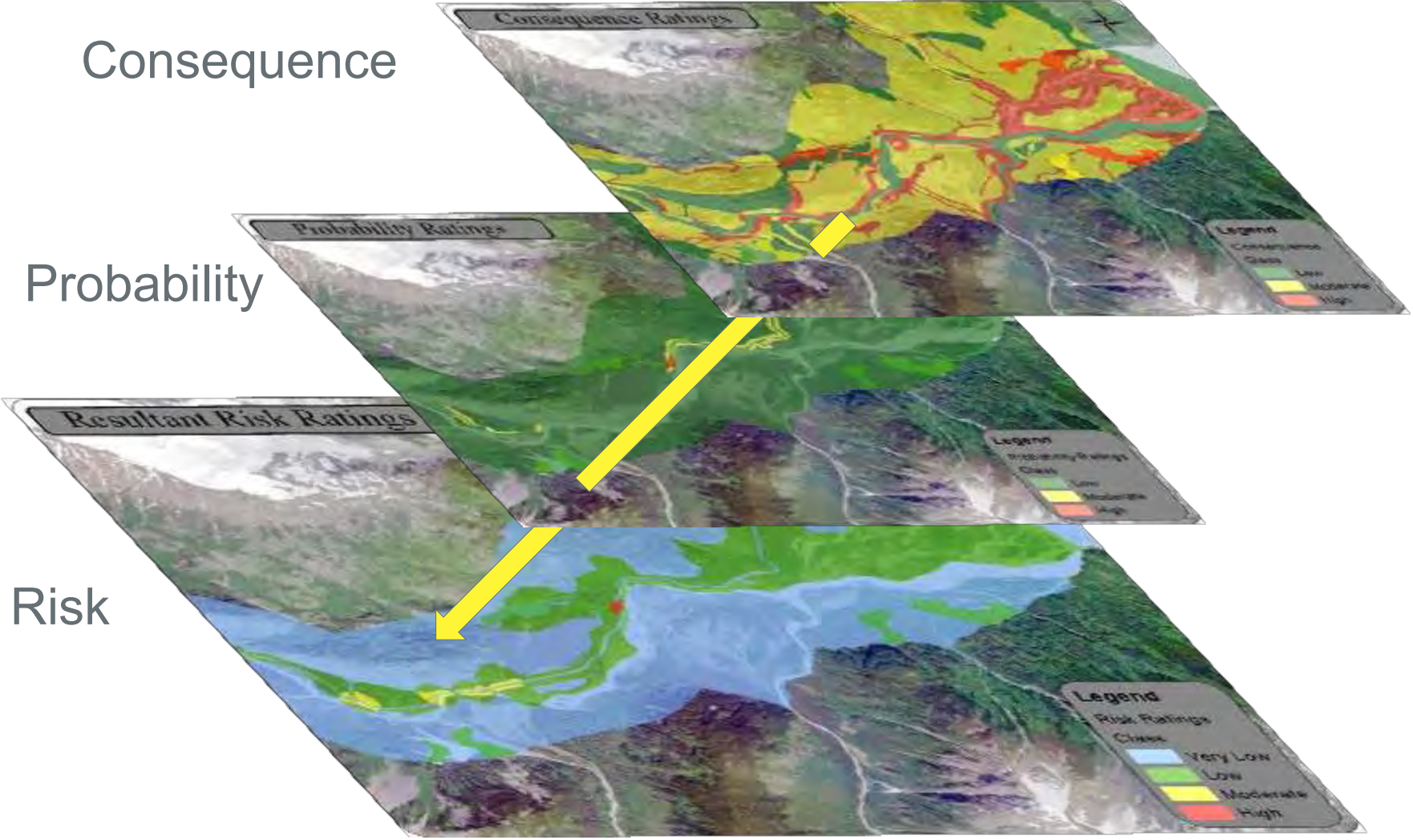
Overlay with the spatial view of the project infrastructure likely interacting with the environment.

In this simplified example, yellow represents the linear access road corridor (but applicable to any linear type facility).

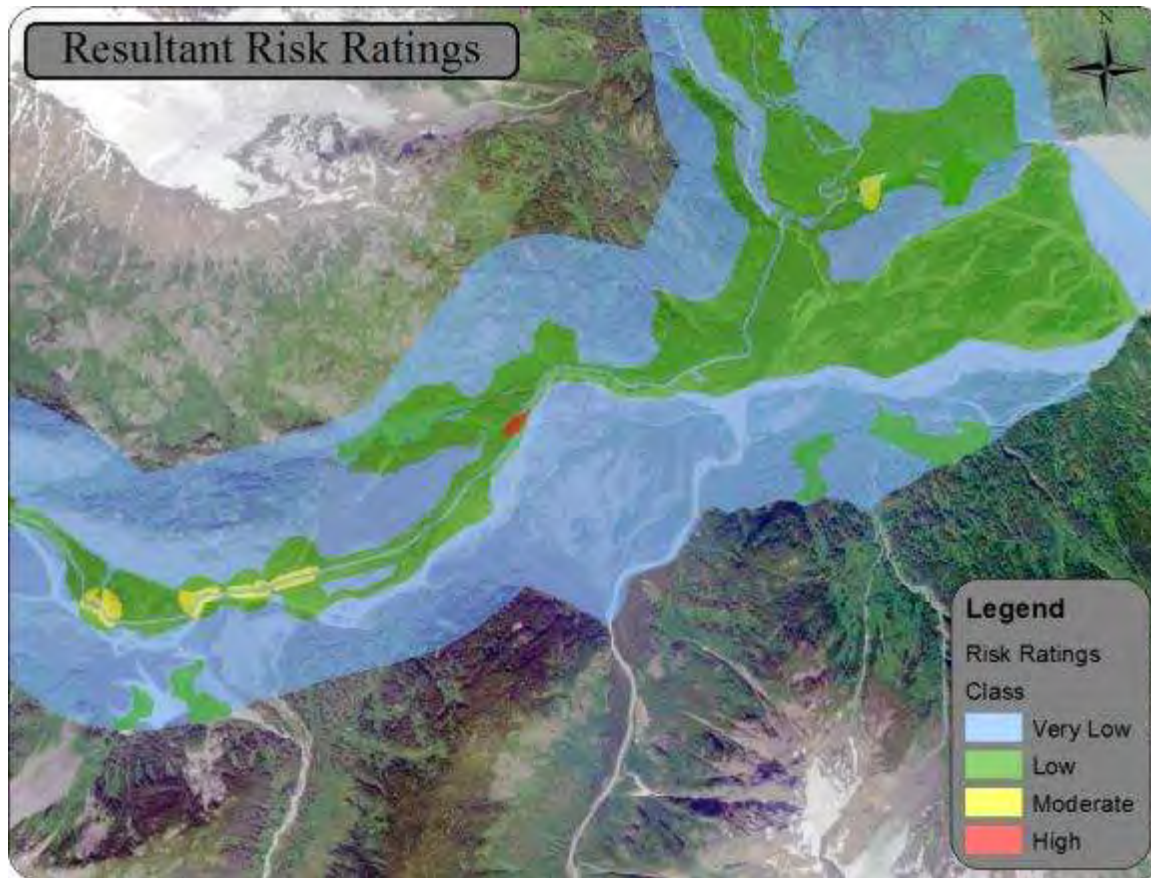
Red area indicates the ore body, future mine site, which is fixed in place.

The model can analyze infinite combinations for siting the location of the access road to avoid sensitive areas on the landscape.

# Probability x Consequence = Risk Assessment Rating



# Final Non-Technical Risk Rating to Support Decisions



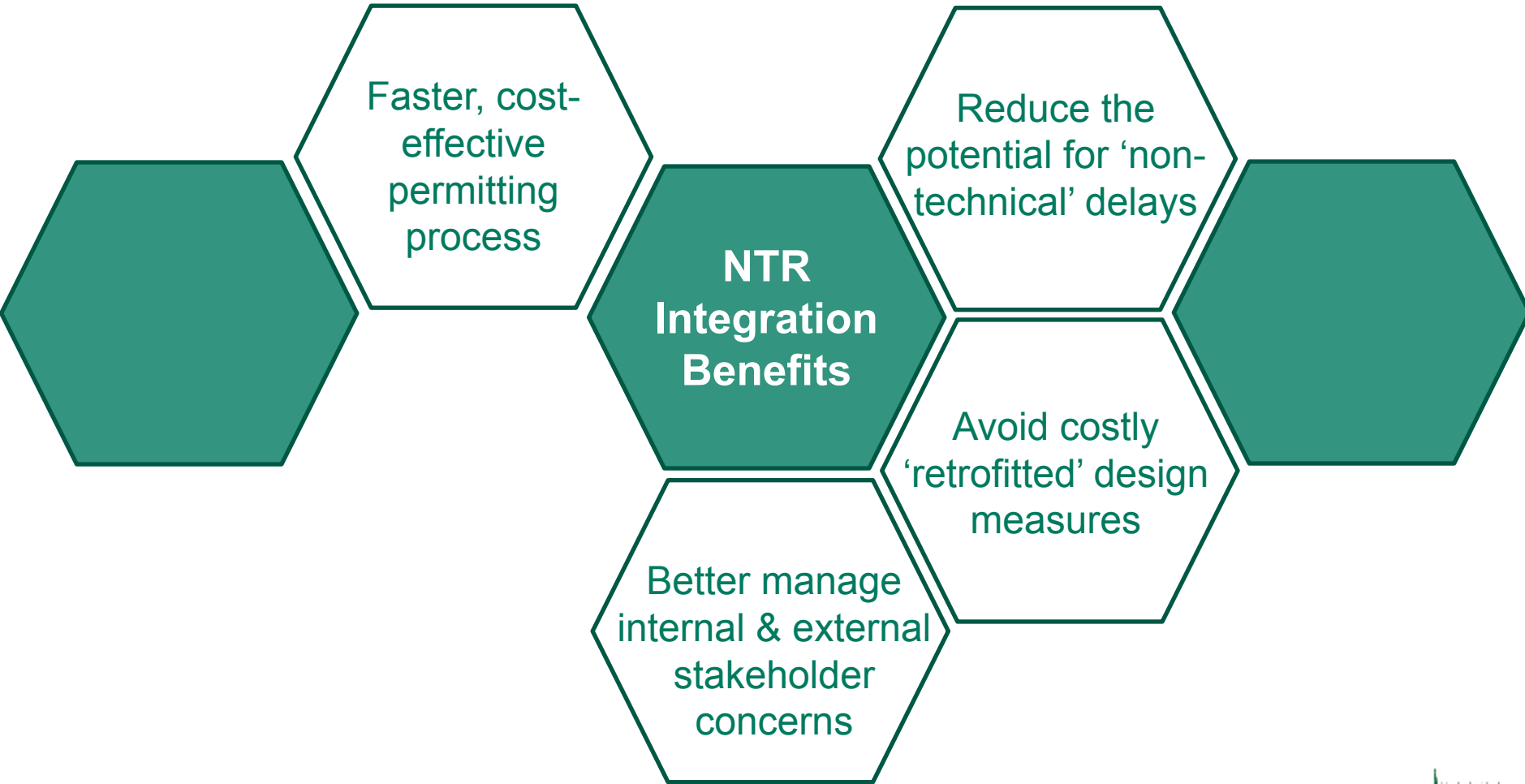
## Findings

The output is a scientifically defensible way to show how the project and related infrastructure has been thoughtfully designed to take technical, economic, environmental and social aspects into consideration.

The spatial output effectively communicates to internal and external stakeholders (i.e. senior management, Board, regulators, communities).

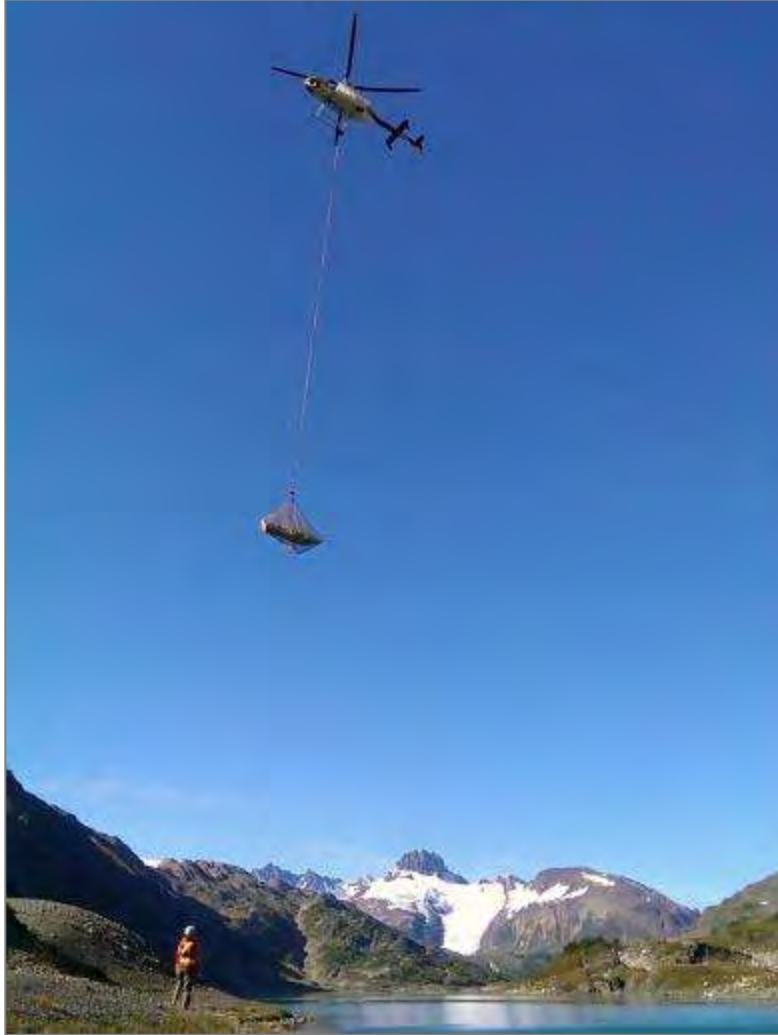
By avoiding red areas and minimizing risk, this saves time and money for a 'consentable' project.

# Benefits of Embedding Non-Technical Risks in Design



# The Takeaway Messages

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## Aspirational Premise

Even in this new ‘normal’ of mining, managing **Non-Technical Risks** is a business imperative, not just an environmental consideration.

## Technical Premise

Time and cost – these are real examples of embedding Non-Technical Risk considerations in project planning to reduce risk to delays and save costs.

# Thank You

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