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Estimating Tool for Brownfield Assessment, Remediation and Risk Assessment

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Agenda

1. Introduction
2. Tool Concept
3. Tool Components
4. Potential Uses
5. Modification/ Expansion Options
6. Conclusions

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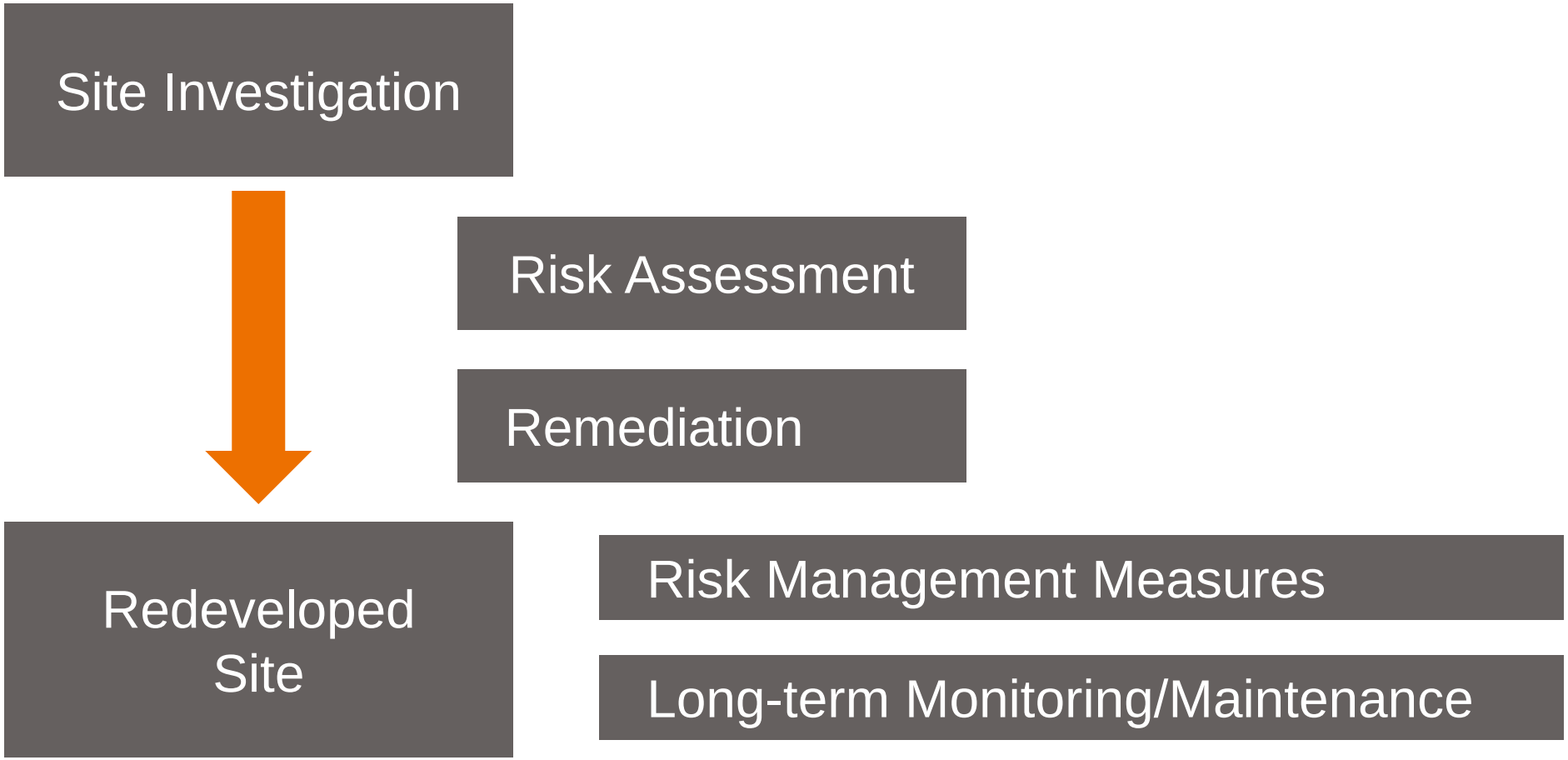
Section 1

Introduction

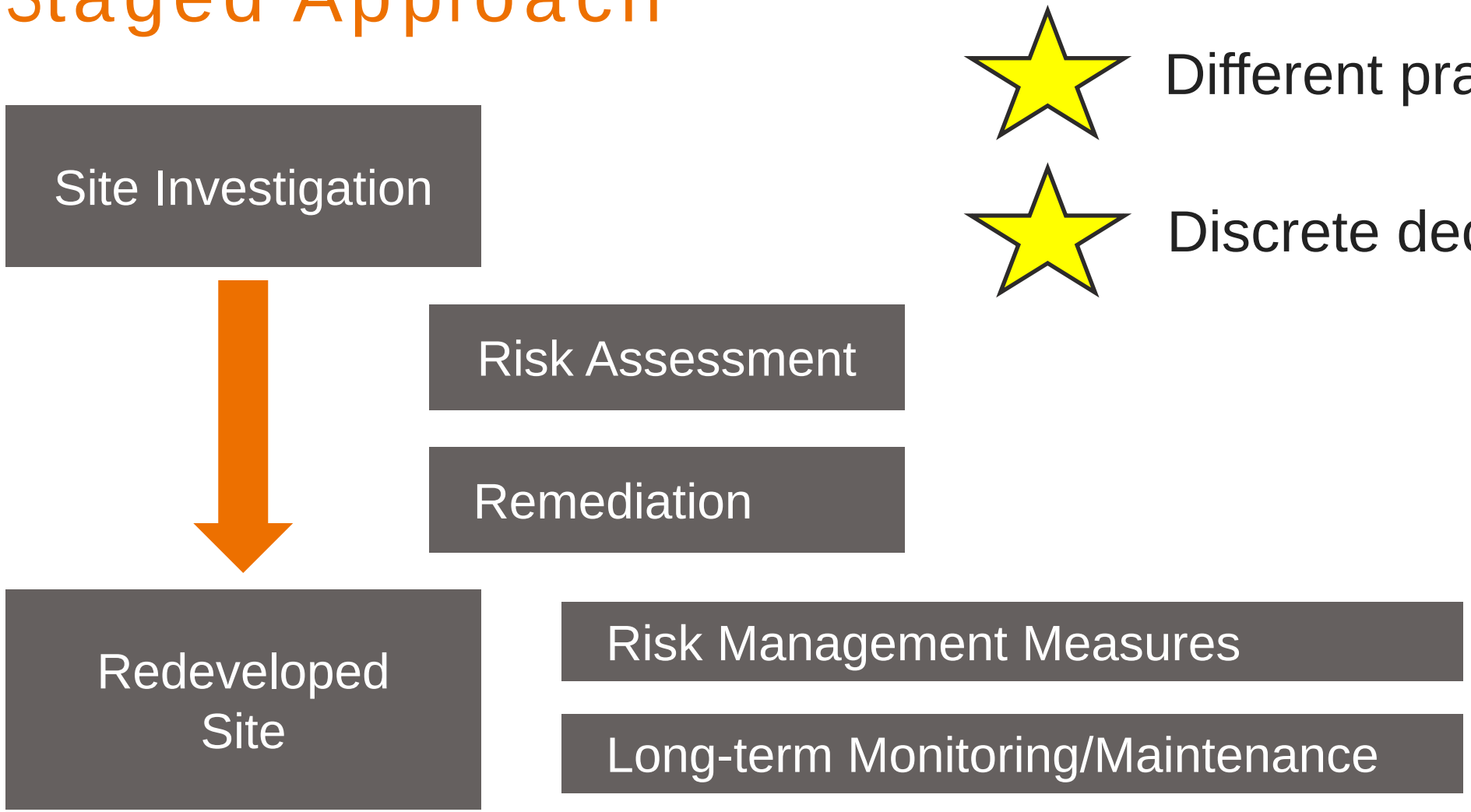
Brownfield Redevelopment Process

Staged Approach



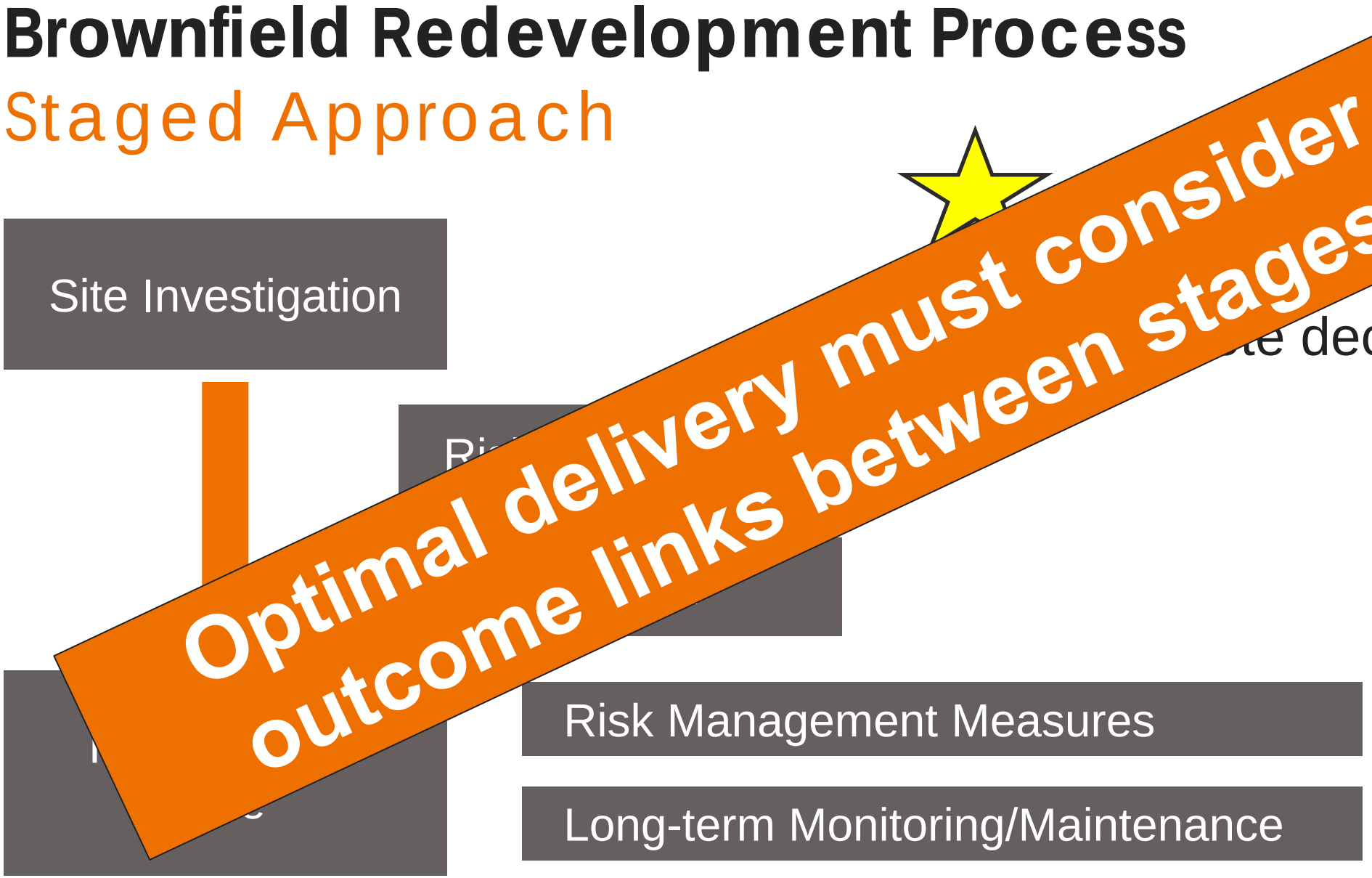
Brownfield Redevelopment Process

Staged Approach



Brownfield Redevelopment Process

Staged Approach



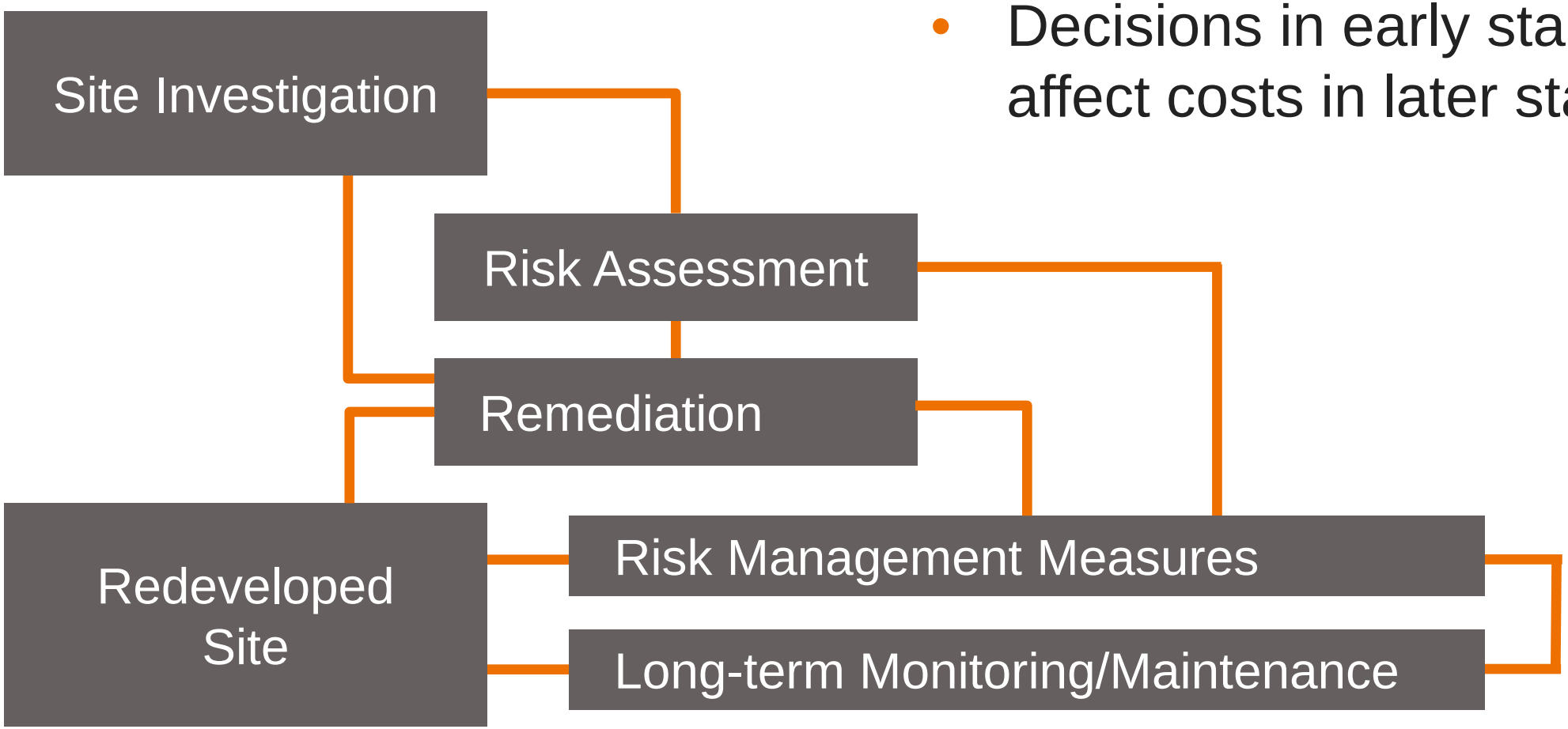
Section 2

Tool Concept

Optimized Delivery

Holistic Approach

- Outcomes are linked
- Decisions in early stages affect costs in later stages



Recognize the Connections

Facilitate Strategic Investment

Tool purpose:

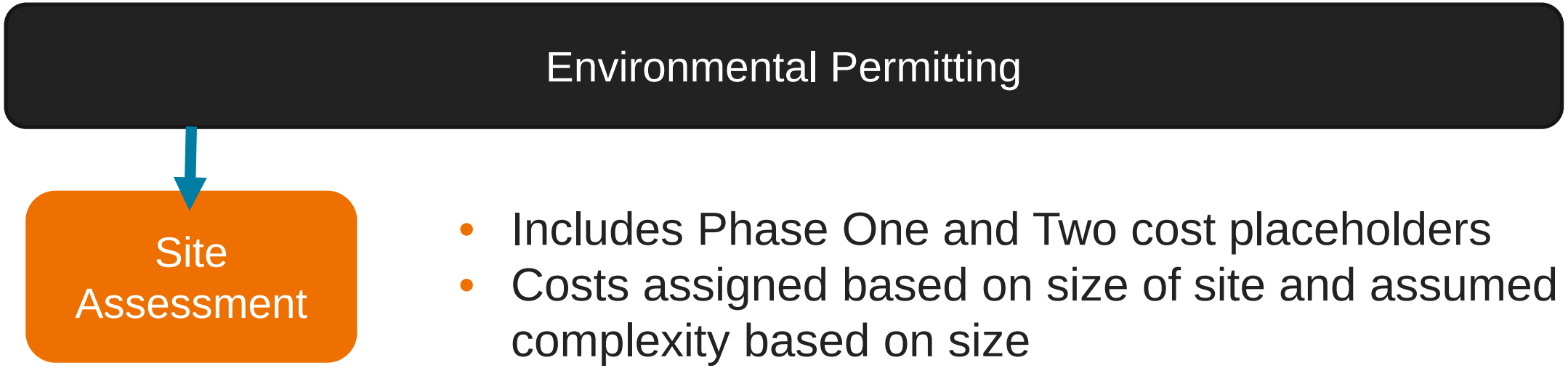
- Support effective, strategic site planning
- Provide insight into the financial links between stages of redevelopment
- Provide mechanism for assessing costs/benefits of options at different decision-points

Section 3

Tool Components

Environmental Approvals Costs

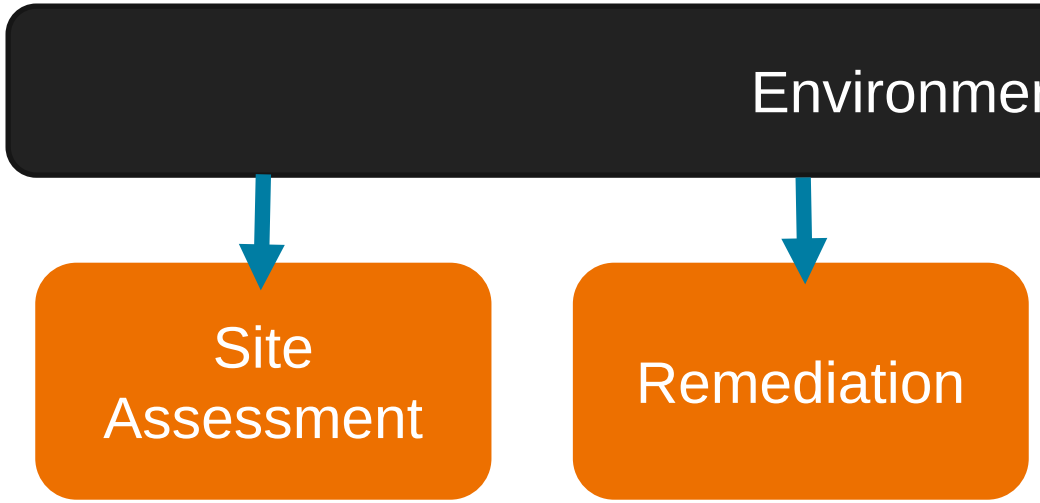
Jurisdiction Considerations



- Includes Phase One and Two cost placeholders
- Costs assigned based on size of site and assumed complexity based on size
- Placeholder for developing a Remedial Action Plan (if required) and Soil Management assessment and reporting (Ontario-specific)
- Considers potentially parceling of site

Environmental Approvals Costs

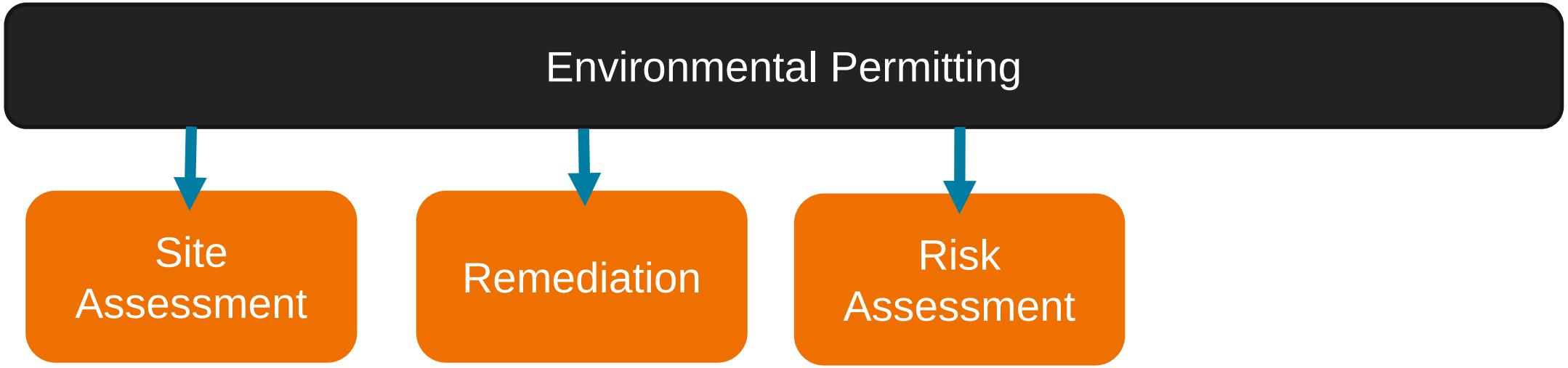
Jurisdiction Considerations



- Excavation and removal
- Dewatering
- Oversight and verification
- Restoration costs excluded

Environmental Approvals Costs

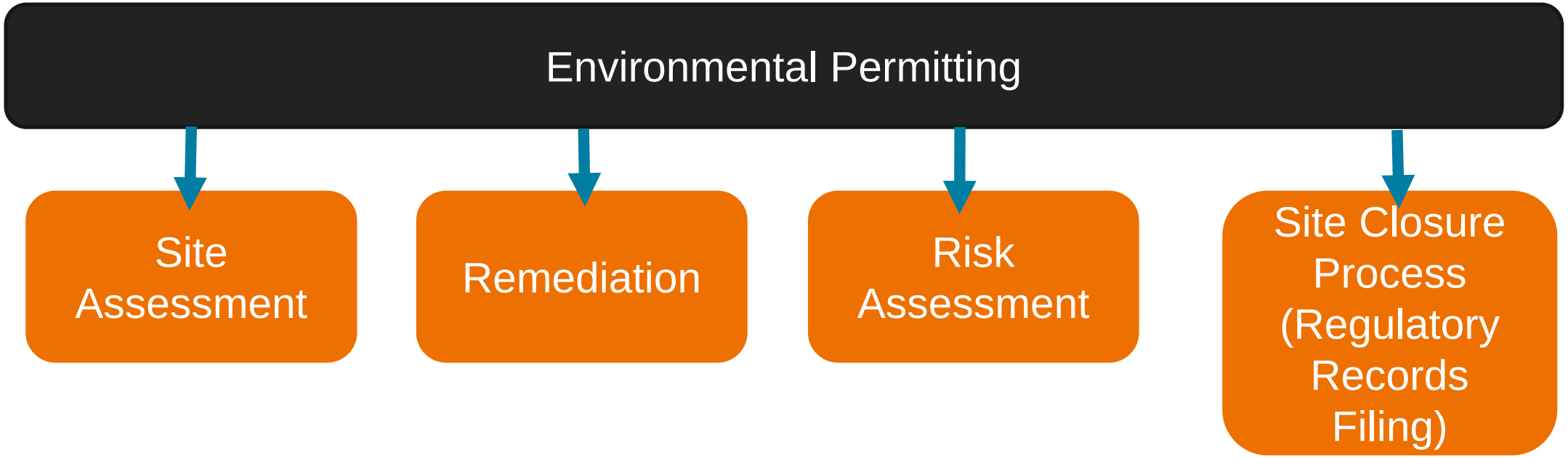
Jurisdiction Considerations



- Considers both Tier II and Tier III options
- Costs assigned based on anticipated complexity (e.g., number of COCs, presence of free phase, need for non-standard risk management measures, etc.)

Environmental Approvals Costs

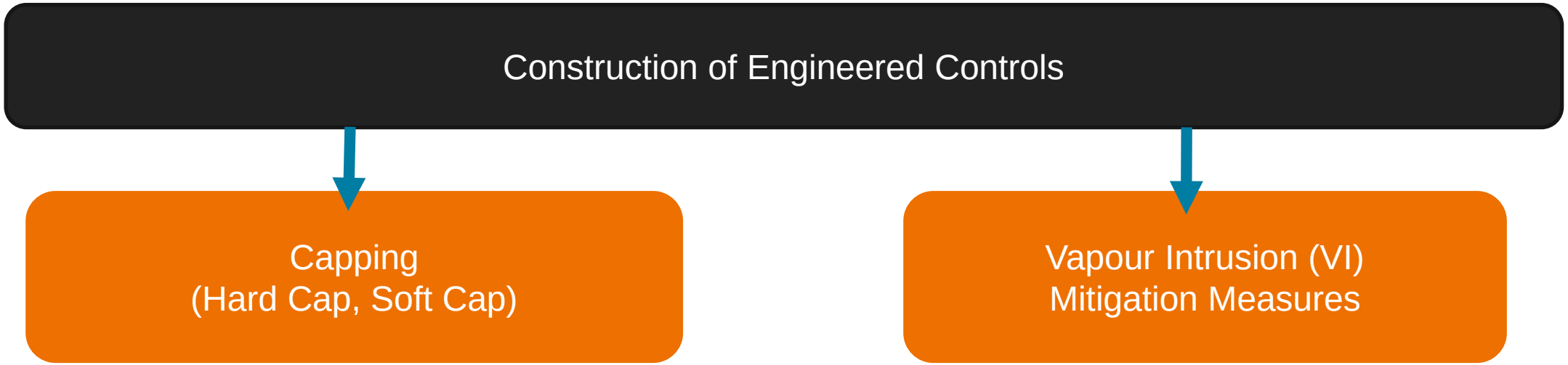
Jurisdiction Considerations



- Close out documentation (e.g., Records of Site Condition and Certificates of Property Use in Ontario)

Risk Management Measures (RMM) Costs

Site Development Assumptions

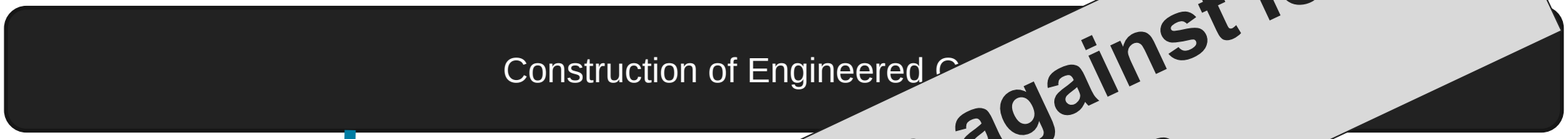


- % Site coverage by cap type
- Thickness of cap

- % Site coverage by building
- % Building requiring VI measures
- Barrier type (e.g. vapour barrier only, subslab depressurization system only, both)

Risk Management Measures (RMM) Costs

Site Development Assumptions



Capping
(Hard Cap, Soft C

- % Si
-

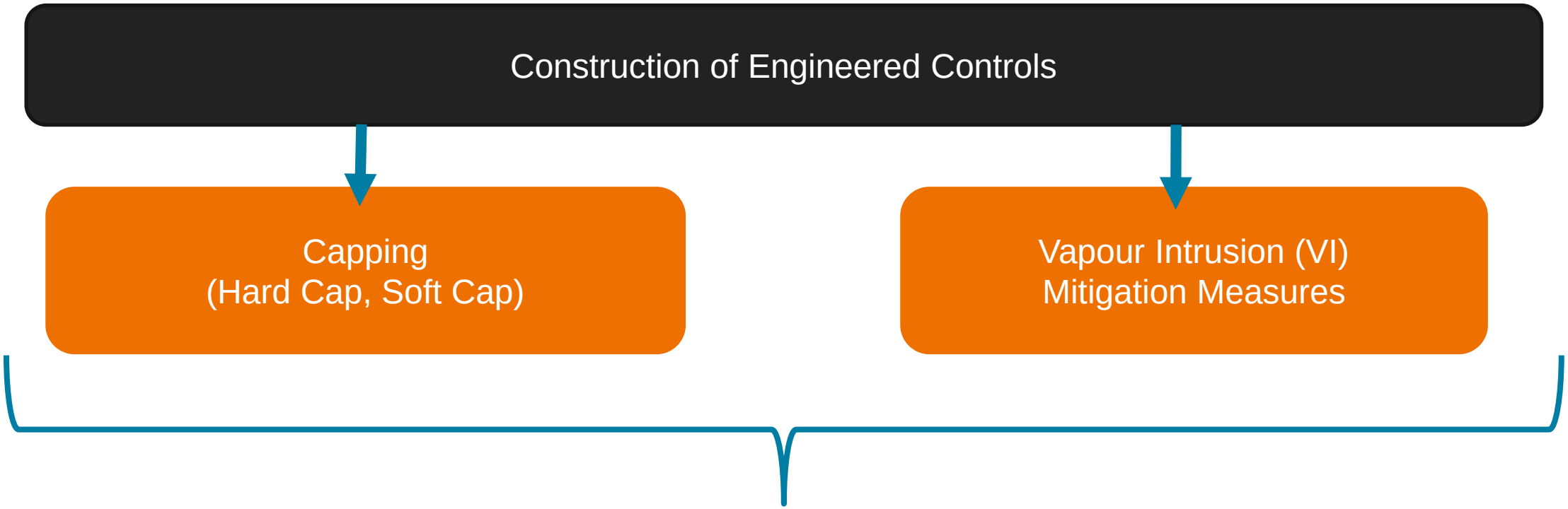
apour Intrusion (VI)
Mitigation Measures

- % Site coverage by building
- % Building requiring VI measures
- Barrier type (e.g. vapour barrier only, subslab depressurization system only, both)

May need to confirm against local market conditions

Risk Management Measures Costs

Site Development Assumptions



Considers environmental management costs only.
General construction/demolition costs excluded from tool.

Long-term Management Costs

Administrative Controls

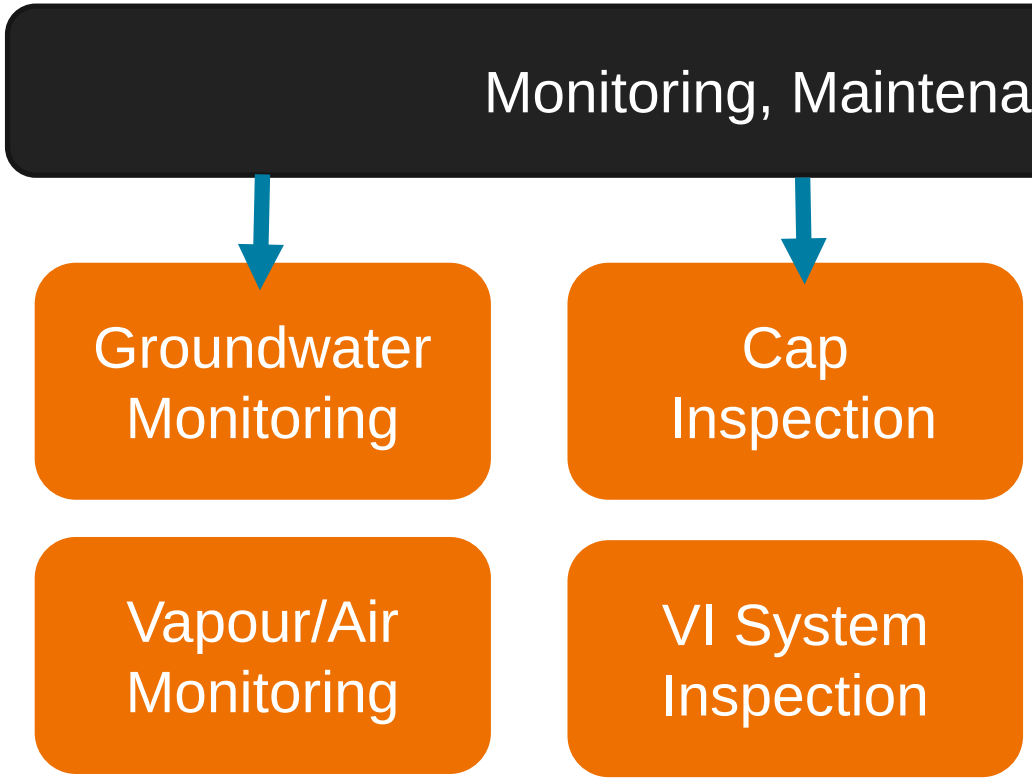
Monitoring, Maintenance and Record-keeping

- Groundwater Monitoring
- Vapour/Air Monitoring

- Installation of wells (groundwater)
- Number of years/sampling events
- Typically can remove requirement for sampling if results are consistent for two to three years, depending on site conditions

Long-term Management Costs

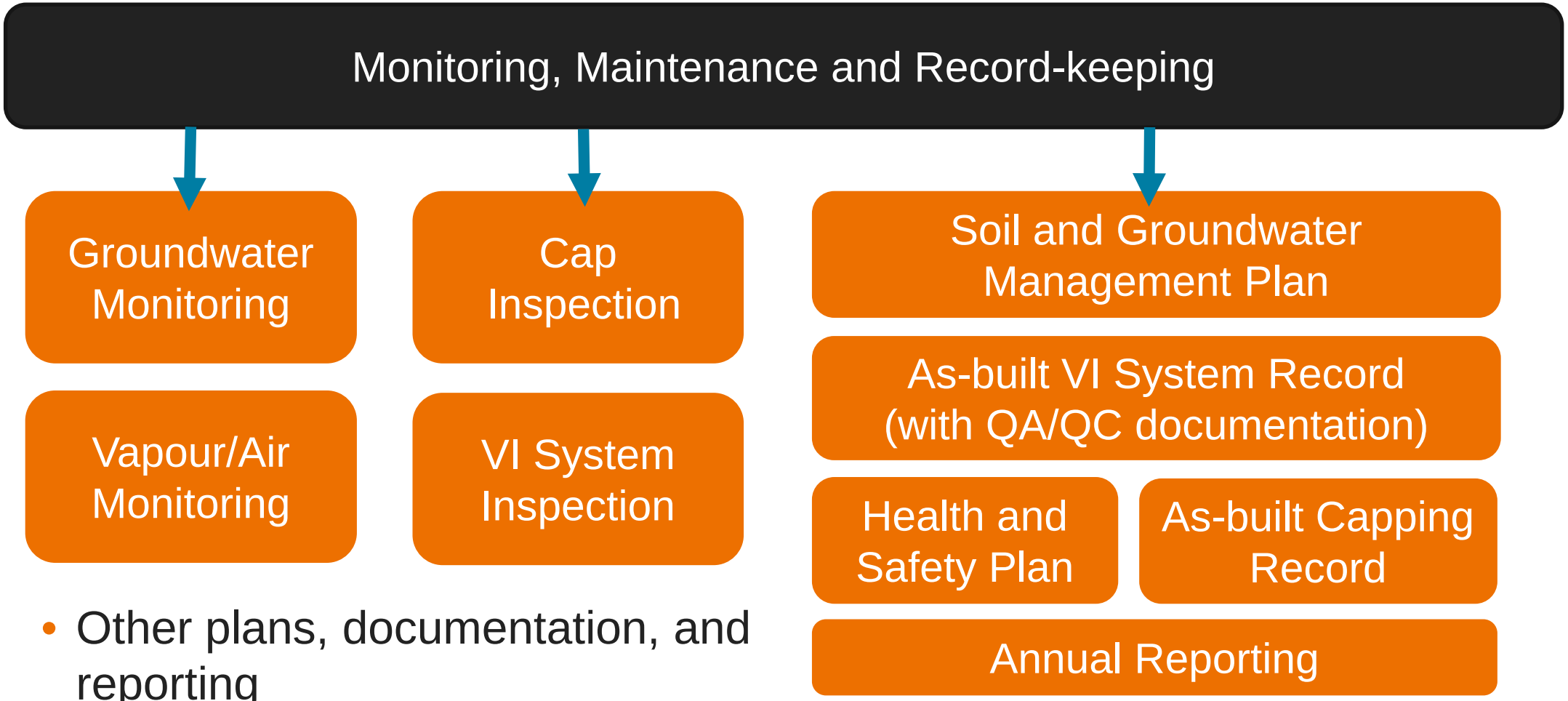
Administrative Controls



- Required in perpetuity, but tool accounts for # of years specified
- Maintenance costs excluded; assume no maintenance work in short-term

Long-term Management Costs

Administrative Controls



- Other plans, documentation, and reporting

Tool Output

Accuracy and Uncertainty

- Results reflect a combination of unit rates and professional judgement
- Interpreted as a Class 5 estimate (accuracy L -20% to -50%, H +30% to +100%)
- Rates do need review year over year, and based on local market conditions
- Only as good as assumptions applied (e.g., assumptions regarding site development, complexity, etc.)

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Brownfield Costing Tool

5.0 Cost Summary

Phase		Cost
1.0 Environmental Assessment	$	73,000.00
2.0 Remediation	$	2,576,143.82
3.0 Risk Assessment and Record of Site Condition	$	42,500.00
4.0 Risk Management Measures	$	609,500.00
Total Cost	**$**	**3,301,143.82**

Section 4

Potential Uses

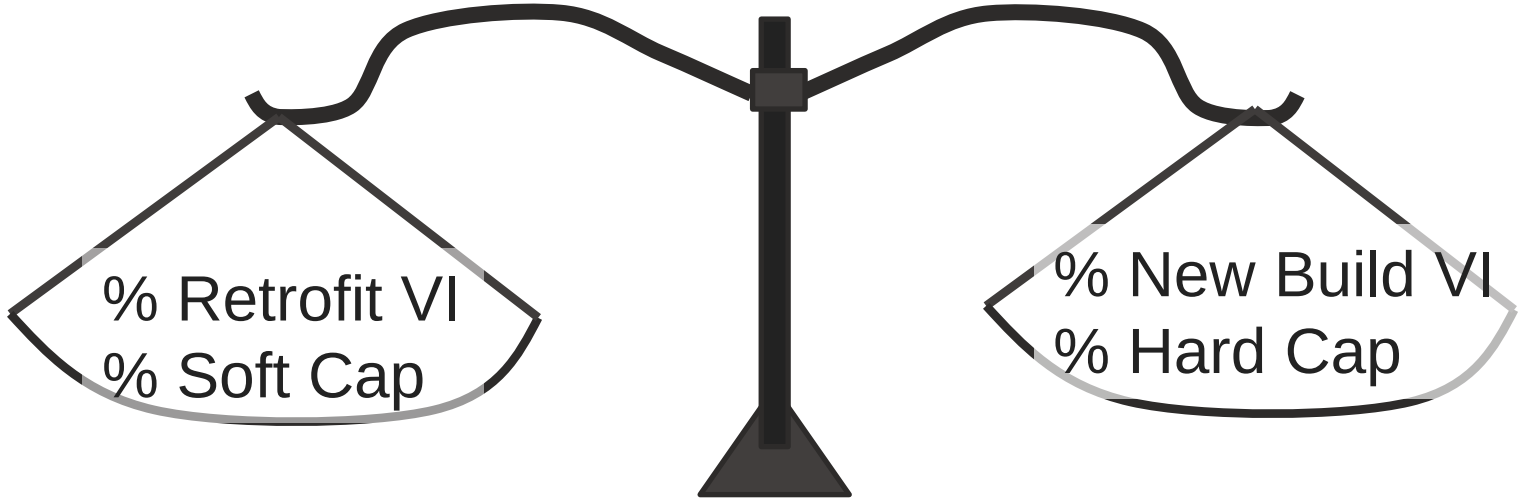
Portfolio/Asset Management

Strategic Investment/Divestment

- ✓ Property Ranking
  - Prioritize sale/redevelopment
- ✓ Environmental Liabilities Assessment
  - Property Value, Accounting
- ✓ Budget Planning
  - Align funds to projects

Site Design Strategy

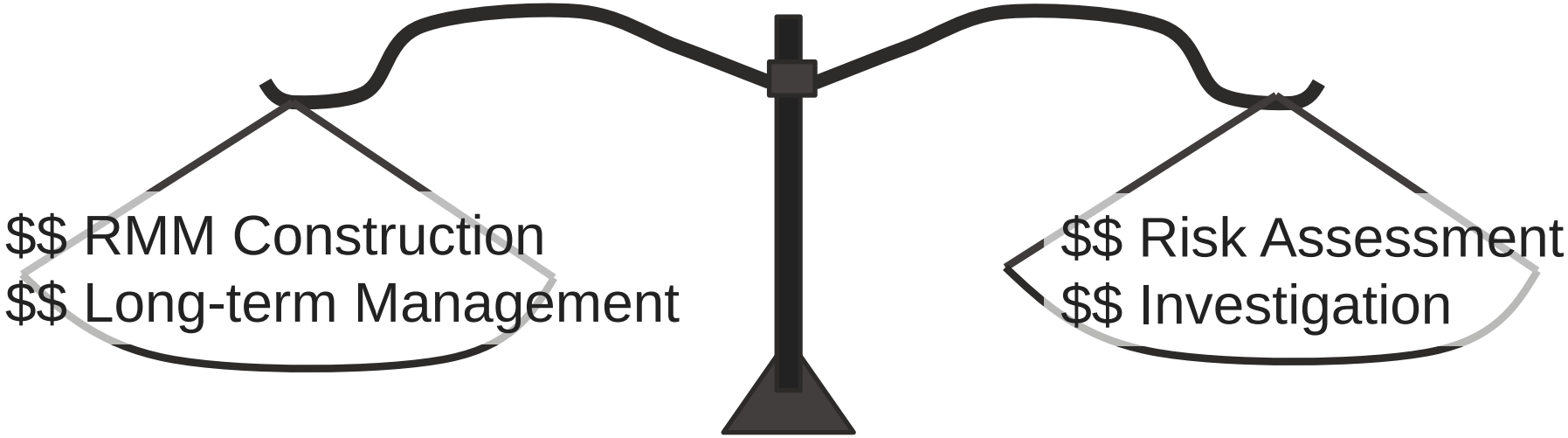
Built Form vs Environmental Obligations



- Intended parking or hard surfacing areas have decreased “environmental” costs
- Subgrade parking may decrease VI mitigation costs
- Strategic landscaping (e.g., berms) may reduce soil removal/capping costs

Redevelopment Approach Options

Cost Comparison

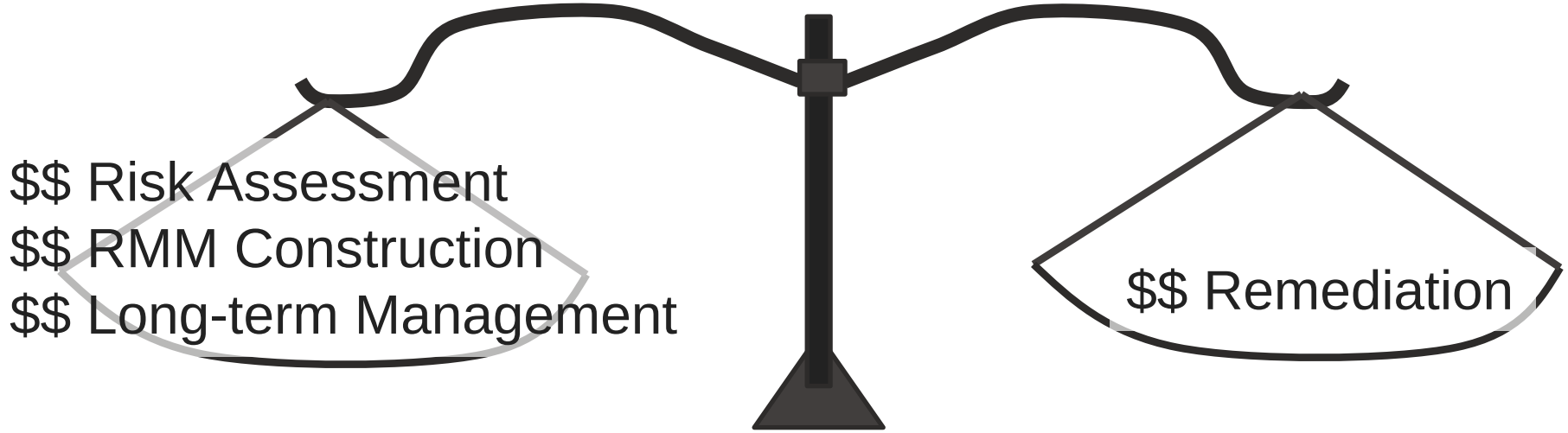


Scenario: Limited volatile impacts at site

- Confirm VI mitigation not required via investment at investigation and risk assessment stage
- Significant savings potential

Redevelopment Approach Options

Cost Comparison



Scenario: Soil impacts observed at site

- Assess cost/benefit of removing contaminants vs managing in place
- Review both short- and long-term costs

Section 5

Modification/ Expansion Options

Regulatory Regime
Local Market

- Modifications required to meet specific regulatory requirements in various jurisdictions
- Costs may require modification based on local contractor rates
- Client requirements may vary, and drive tool modifications

Additional Considerations

Tool Expansion

- Site-specific sampling plan to determine site assessment costs
- Site-specific risk assessment level of effort evaluation
- Inclusion of additional remediation and restoration options
- Expand consideration of RMM options (e.g., achieving “capping” via soil removal; long-term costs for barrier maintenance, etc.)
- Unit and currency conversion

Section 6

Conclusions

Tool Benefits

Brownfield Site Management

- Facilitates strategic decision-making at contaminated sites
- Includes holistic consideration of financial links between redevelopment stages
- Generic in form, but can be modified to account for different regulatory regimes, markets, and client needs

Questions?

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