

SURE

by

RAMBOLL

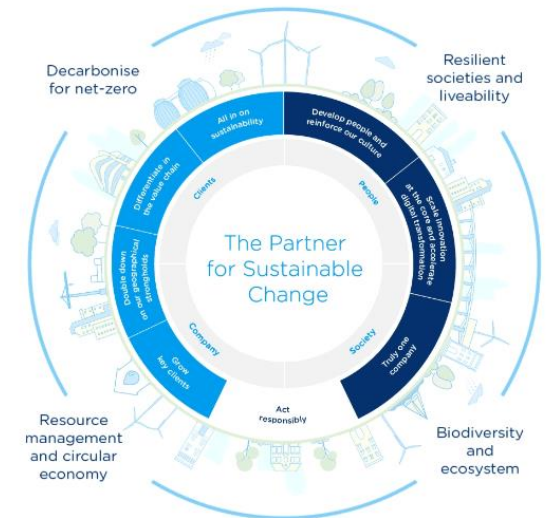
An Innovative Digital Tool For Embedding Sustainability in Remedial Options Appraisal

Climate Change and Sustainability: Impacts and Innovation in Contaminated Land, 21 October 2022, Bristol, UK

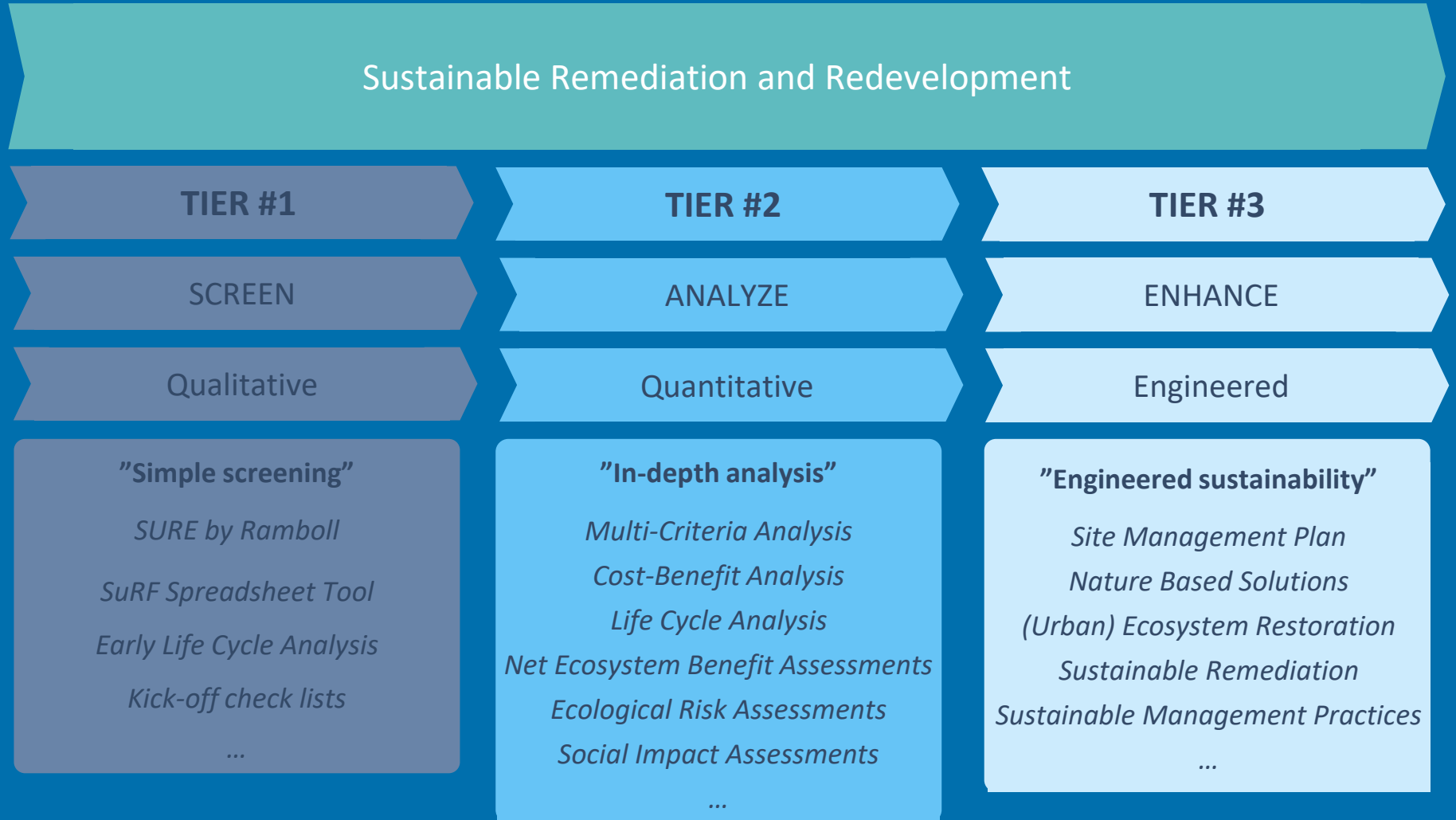
Liz Gray, Senior Managing Consultant

Why Is Sustainable Remediation So Important Today

- ✓ Whilst interest in Sustainable Remediation began over ten years ago, application of sustainable thinking in remediation option selection is in practice still very patchy across Europe, even within individual legislatures, and sustainability is often not well understood either by problem holders or regulators.
- ✓ There is now a greater urgency, arising from the climate emergency, the reduction in biodiversity and socioeconomic challenges originating from years of austerity (worsened by Covid) for sustainability to be embedded in decision making principles, when selecting the best option for contaminated land remediation.
- ✓ Whilst technical guidance on sustainability is plentiful, the process of selecting the most sustainable approach has to be simple, understandable and transparent to gain public acceptability.
- ✓ Ramboll has therefore developed SURE, a digital on-line tool, which draws on over 70 sustainability indicators and their contribution to 17 United Nations Sustainable Development Goals (UN SDGs) to enable the identification of the more sustainable and resilient remediation approach.



Sustainable Remediation Planning



How Does SURE Work?

Assess



Engage



Report

CREATE A SUSTAINABILITY ASSESSMENT

Create a project specific sustainability assessment by selecting relevant indicators from pre-populated alternatives. Evaluate the impacts to rank your options and generate your assessment.

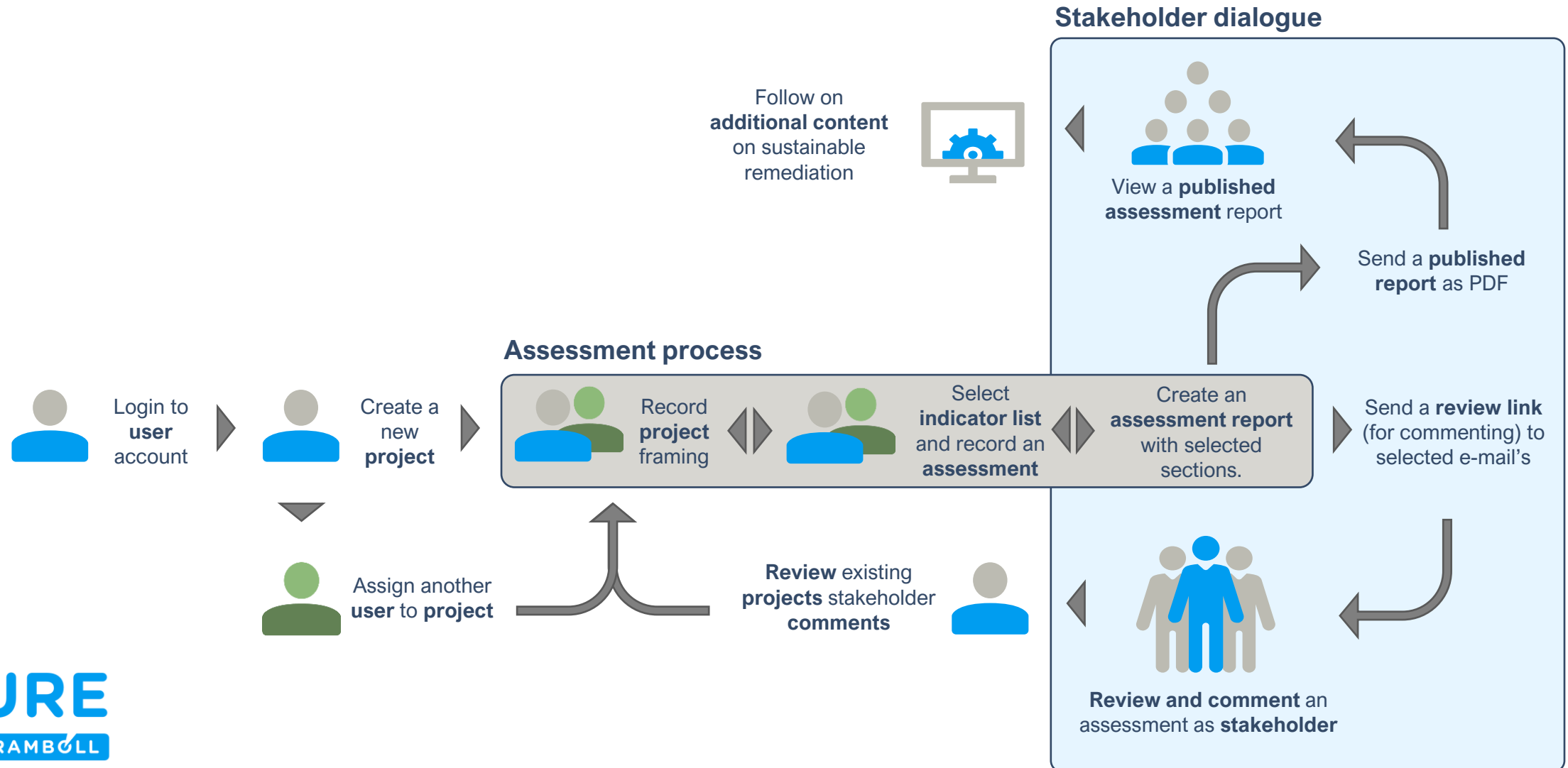
REVIEW RESULTS WITH STAKEHOLDERS

After completing your assessment, share the results with relevant shareholders to request their review and comments. Include and address comments to create a more resilient assessment.















CHOOSE THE SUSTAINABLE OPTION

Create a custom-made report of the assessment process and results. Highlight potential areas for improvement and identify contribution to fulfilling UN SDG's.

How Does SURE Work?



Example Sustainability Indicators

AIR	<ul style="list-style-type: none"> Greenhouse gas (CO₂, CH₄, N₂O) Criteria air pollutants (NO_x, SO_x, PM) Volatile Organic Compounds (VOCs) 	13 CLIMATE ACTION 
LAND	<ul style="list-style-type: none"> Surface soil consumption Land and soil quality Geotechnical properties 	2 ZERO HUNGER  12 RESPONSIBLE CONSUMPTION AND PRODUCTION  15 LIFE ON LAND 
ECOLOGY	<ul style="list-style-type: none"> Effects on biota Ecosystem changes Landscape effects 	2 ZERO HUNGER  6 CLEAN WATER AND SANITATION  14 LIFE BELOW WATER  15 LIFE ON LAND 
HEALTH & SOCIETY	<ul style="list-style-type: none"> Long term risk management performance Risks to site workers Risks and impacts to site users and public 	3 GOOD HEALTH AND WELL-BEING  9 INDUSTRY, INNOVATION AND INFRASTRUCTURE  11 SUSTAINABLE CITIES AND COMMUNITIES  16 PEACE, JUSTICE AND STRONG INSTITUTIONS 
COST & BENEFIT	<ul style="list-style-type: none"> Cost of remediation and associated works Other direct financial costs Changes in site / property values 	8 DECENT WORK AND ECONOMIC GROWTH 
FLEXIBILITY	<ul style="list-style-type: none"> Duration of remediation Ability to respond to changing circumstances Requirements for institutional controls 	9 INDUSTRY, INNOVATION AND INFRASTRUCTURE 

SUSTAINABLE DEVELOPMENT GOALS




Demonstration Case Study

- Client wishes to develop land formerly occupied by part of a tank farm – previous remedial work on the site attracted unfavorable publicity
- One area of contamination: heavily impacted soil in smear zone. Minimal LNAPL present but elevated TPH/BTEX in groundwater. Main receptor is a stream located a short distance from the site.
- Three Options selected for assessment:
 1. **Excavation and disposal ('Excavation')**: Excavation of the smear zone, pumping out the contaminated groundwater and backfilling with oxygen release compound for polishing
 - £350K – remedial targets easily achievable
 2. **In Situ Chemical Oxidation ('ISCO')**: 3 campaigns of sodium persulfate injection with biostimulation for polishing
 - £200K – remedial targets reasonably achievable though localized fine-grained material may present issues
 3. **Monitored Natural Attenuation ('MNA')**
 - £100K – long term monitoring from network of wells; achievability of target less certain

Demonstration Case Study: Stakeholders

- Client:
 - Cost important but also keen to see issue fully dealt with, verified and out of way. Corporate image important on sustainability (especially greenhouse gases). Have previously experienced issues with residents, want to do things right, preferably quickly.
- Local Residents (neighbors):
 - Previously aware of remediation of adjacent site with noise and odor issues a concern. Despite risk assessment indicating no significant human health risk (i.e., water-based issue), not entirely convinced. Want to see problem sorted and documentation signing off site as clean.
- Regulator:
 - Less interested in choice of specific option (and wider aspect of sustainability), but want a commitment to achieving remedial objective, backed up by appropriate verification protocol and underpinned by robust data.

SURE ASSESSMENT EXAMPLE



Welcome Back!

Enter User Id...

Password

Remember Me | [Forgot Password?](#)

Login

[Don't have an account? Sign Up](#)
[Read our Disclaimers, Terms of Use and Privacy Policy](#)

SURE BY RAMBOLL

Home Page

Quick Start Guide

SURE BY RAMBOLL IS A PLATFORM FOR ASSESSING, COMMUNICATING, AND REPORTING YOUR STRATEGY FOR ACHIEVING SUSTAINABLE REMEDIATION.

SURE
by Ramboll

The following Quick Start Guide will walk you through SURE by Ramboll.

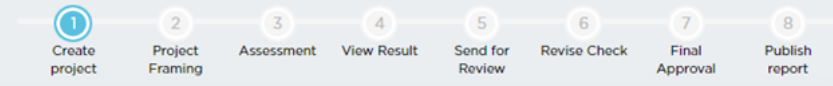
1. CREATE A SUSTAINABILITY ASSESSMENT

- Select Create Project (Step 1) from the menu to start a new sustainability assessment process
- Enter the required information in the Project Framing (Step 2) and Assessment (Step 3) steps
- View the results of the assessment (Step 4)

2. REVIEW RESULTS WITH OTHER USERS

- After completing the assessment, select Send for Review (Step 5) to assign other users as Stakeholder Reviewers
- Stakeholder Reviewers can access projects assigned to them by selecting Review Projects from menu

Create the Project



StandardUser

MOLD

- Home

ASSESSMENT

- Manage Projects
- Create project

ASSESSMENT

- Review Projects

Project Details

Project Title *

Reference Number

Site Address *

Select Country

Project Owner Company

Project Owner Address *

Select Country

Project Owner Representative

Lead Assessor

Email	User Name

Other Assessors

Email	User Name

Frame the Project

Project Framing

Briefly describe the project and present stage of the site assessment *

Development of former tank farm for retail. Phase II delineation & DQRA completed.

Briefly describe the project's remediation objectives, risk management goals, and other important goals

Mitigate impact of dissolved phase hydrocarbons in smear zone in soil and in nearby stream.

Briefly describe the decisions and actions that the sustainability assessment is intended to support *

Determine most sustainable option to enable planning permission for development.

Briefly describe any constraints or opportunities, that might limit achieving remediation goals or create additional benefits

Local residents very sensitive to noise and nuisance.

List and briefly describe the options to be compared in the assessment *

Excavation

Excavate smear zone, dewater and backfill with

ISCO

In-situ chemical oxidation with biostimulation

MNA

Monitored natural attenuation

Frame the Project

List project stakeholders and briefly describe their roles

Anne Smith	<u>Greenhome</u> Developments (client) 
Caroline Planning	Representing Anytown Council 

Select and describe the methodology by which options are going to be compared

Semi-quantitative: Relative score on a scale of 1 to 5 

Establish spatial boundary conditions for the assessment

Global

Establish temporal boundary conditions for the assessment

At least three generations or 100 years

Establish life cycle boundary conditions for the assessment

All elements of the remediation but excluding manufacturing of plant and equipment

Describe how uncertainties are identified and their potential effect on sustainability assessment outcomes reviewed *

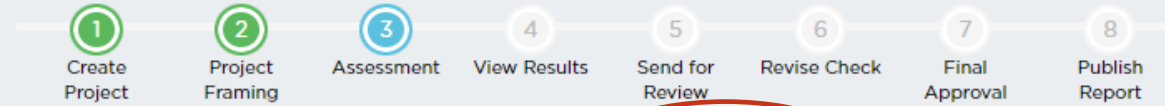
Make professional judgement & clearly identify for stakeholder review

Upload supporting documentation (e.g., maps, technical documents, regulator website, etc.)

No file chosen

Start the Assessment – Select Template

JMP1



Select Template Clear Assessment

Weight Excavation ISCO MNA

Environment 5

Society 5

Economy 5

Over 70 indicators are available for assessing the selected options, grouped into 5 categories within each of the domains of Environment, Society and Economy. Those of relevance to the project can be selected and weighted according to their relative importance on a 1 -5 scale.



Environment Indicators

1 Emissions to air

Greenhouse gases

Ozone depleting substances

Acid rain

Ground Air Quality

2 Soil and Ground Conditions

Soil functionality

Soil structure

Sites of special geological interest

Water properties

Subsurface structures

Soil erosion

Geotechnical properties

3 Groundwater and Surface Water

Water uses

Mobilisation of substances

Water movement

Legally binding objectives

Coastal waters

Water management synergies

Biological and chemical function

Water abstraction

Coastal management

4 Ecology

Flora, fauna and food chains

Equipment effects

Ecosystem changes

Disturbance

5 Natural Resources and Waste

Impacts/benefits for land re-use

Water use and disposal

Energy & fuels use/generation

Primary resources & waste

Society Indicators

1 Human Health and Safety

Long term risk management

Direct risks

Risk management performance

Human health impacts

2 Ethics and Equality

Upholding 'polluter pays principle'

Proportionality

Intergenerational equity

Business ethics

Ethical concerns

3 Neighbourhood and Locality

Nuisance impacts

Wider impacts

Built environment

Facilities/services improvement

4 Communities and Community Involvement

Community functions and services

Quality of communications

Local culture and vitality

Local policy compliance & good practice

5 Uncertainty and Evidence

Robustness & rigour

Degree of uncertainty

Validation/verification requirements

Remedial criteria robustness

Economy Indicators

1 Direct Economic Costs and Benefits

Direct costs/benefits

Other costs

Uplift in site value

Liability discharge / ease of divestment

2 Indirect Economic Costs and Benefits

Allocation of finances

Property values

Risk of damage

Corporate reputation

Local economy

Tax implications

3 Employment and Employment Capital

Job creation

Employment levels

Skill levels

Opportunities for education and training

4 Induced Economic Costs and Benefits

Inward investment

Benefits to technology provider

Innovation and new skills

5 Project Lifespan and Flexibility

Duration/timing of benefit

Chances of success

Flexibility to change in circumstances

Flexibility to change in regulation

Resilience to climate change

Economic resilience

Ongoing institutional controls

Score The Options

	Weight	Excavation	ISCO	MNA	
Environment 3	<input type="text" value="3.7"/>	<input type="text" value="2.3"/>	<input type="text" value="2.7"/>	<input type="text" value="3.7"/>	+ ^
Emissions to air 1	<input type="text" value="5.0"/>	<input type="text" value="1.0"/>	<input type="text" value="2.0"/>	<input type="text" value="5.0"/>	+ ^
1. Greenhouse gases ...	<input type="text" value="5"/> ? ⌨	<input type="text" value="1"/>	<input type="text" value="2"/>	<input type="text" value="5"/> ⌨	🗑
Groundwater and Surface Water 1	<input type="text" value="5.0"/>	<input type="text" value="5.0"/>	<input type="text" value="3.0"/>	<input type="text" value="1.0"/>	+ ^
1. Legally binding objectives ...	<input type="text" value="5"/> ?	<input type="text" value="5"/>	<input type="text" value="3"/>	<input type="text" value="1"/>	🗑
Natural Resources and Waste 1	<input type="text" value="1.0"/>	<input type="text" value="1.0"/>	<input type="text" value="3.0"/>	<input type="text" value="5.0"/>	+ ^
1. Primary resources & waste ...	<input type="text" value="1"/> ?	<input type="text" value="1"/>	<input type="text" value="3"/>	<input type="text" value="5"/>	🗑

Score The Options

	Weight	Excav
Environment ³	<input type="text" value="3.7"/>	<input type="text" value="2.3"/>
Emissions to air ¹	<input type="text" value="5.0"/>	<input type="text" value="1.0"/>
1. Greenhouse gases ...	<input type="text" value="5"/>	<input type="text" value="1"/>
Groundwater and Surface Water ¹	<input type="text" value="5.0"/>	<input type="text" value="5.0"/>
1. Legally binding objectives ...	<input type="text" value="5"/>	<input type="text" value="5"/>
Natural Resources and Waste ¹	<input type="text" value="1.0"/>	<input type="text" value="1.0"/>
1. Primary resources & waste ...	<input type="text" value="1"/>	<input type="text" value="1"/>

Indicator Description And Guidance



Indicator : Greenhouse gases

Description : Consider emissions of greenhouse gases (e.g., carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O) and certain synthetic chemicals) associated with each remedial option.

How to Compare : Compare remedial options in terms of relative energy intensity and/or likely carbon footprint, potential for carbon sequestration and/or production of renewable energy, potential avoidance of current and/or future GHG emissions. Depending on the boundary conditions designated in the project framing, consider also GHG emissions associated with the manufacture and use of materials for each remedial option. Generally, remedial options which result in higher levels of emissions should receive a lower score.

Links to SDG's



Send for Review

Assessment Information

	Weight	Excavation	ISCO	MNA	
Environment ³	3.7	2.3	2.7	3.7	⤴
Emissions to air ¹	5	1	2	5	⤴
1. Greenhouse gases...	5 	1	2	5 	
Groundwater and Surface Water ¹	5	5	3	1	⤵
Natural Resources and Waste ¹	1	1	3	5	⤵
Society ³	3.7	2.3	2.7	3.7	⤵
Economy ³	3.7	3	4.3	1.7	⤵

Comment (Assessment Information)



For greenhouse gas emissions, should ISCO perhaps have a higher score relative to excavation?

Please provide justification for weighting risks to human health as 3 not 5.

Please justify your score of 5 for Direct Economic Costs & Benefits for ISCO.

- The completed assessment can be sent electronically for stakeholders to review.
- Review comments are recorded, and the assessor can then update the assessment accordingly.

Reviewers Decisions

- Reviewer saves comments
- If no changes required: approves and message sent to assessor
- If any changes required: rejects and message sent to assessor

Save

Approve

Reject

Assessor Has Visibility of Reviewers Comments


Assessment Information

	Weight	Excavation	ISCO	MNA	
Environment ³	3.7	2.3	2.7	3.7	⤴
Emissions to air ¹	5	1	2	5	⤴
1. Greenhouse gases...	5	1	2	5	
Groundwater and Surface Water ¹	5	5	3	1	⤵
Natural Resources and Waste ¹	1	1	3	5	⤵
Society ³	3.7	2.3	2.7	3.7	⤵
Economy ³	3.7	3	4.3	1.7	⤵

Comment (Assessment Information)

Stakeholder Comment	Commented On
Johnfoster For greenhouse gas emissions, should	07 Jun 2021 03:40 PM
Johnfoster Please provide justification for	07 Jun 2021 03:40 PM
Johnfoster Please justify your score of 5 for Direct	07 Jun 2021 03:40 PM

Publish Results



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Final Approval : ACS1

1 Create Project 2 Project Framing 3 Assessment 4 View Results 5 Send for Review 6 Revise Check
7 Final Approval 8 Publish Report

Approval Status

Assigned To Johnfoster(rjfbewley@aol.com)	Approved Yes
---	------------------------

 Save  Proceed to Assessment Report Publish

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Option for Reporting

- Multiple reporting options are available including concise graphical output using histograms and pie charts.

SURE BY RAMBOLL

1 Create Project
2 Project Framing
3 Assessment
4 View Results
5 Send for Review
6 Revise Check
7 Final Approval
8 Publish Report

Report Details

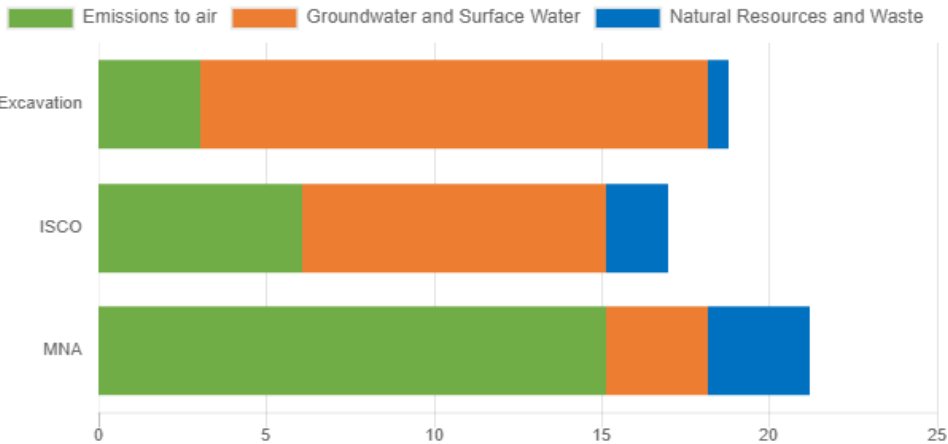
- Cover Page
- About Ramboll & Disclaimers
- Introduction
- Background
- Methodology
- Project framing
- Details of assessment
- Results Overview
- Assessment details
- Results for options
- Stakeholder comments
- Revision history

Generate Report

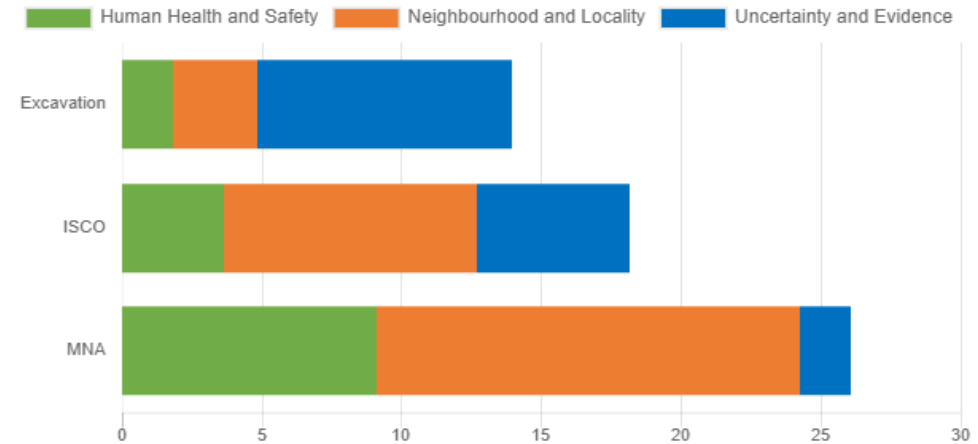
Outcomes by Indicator Categories

Assessment Results

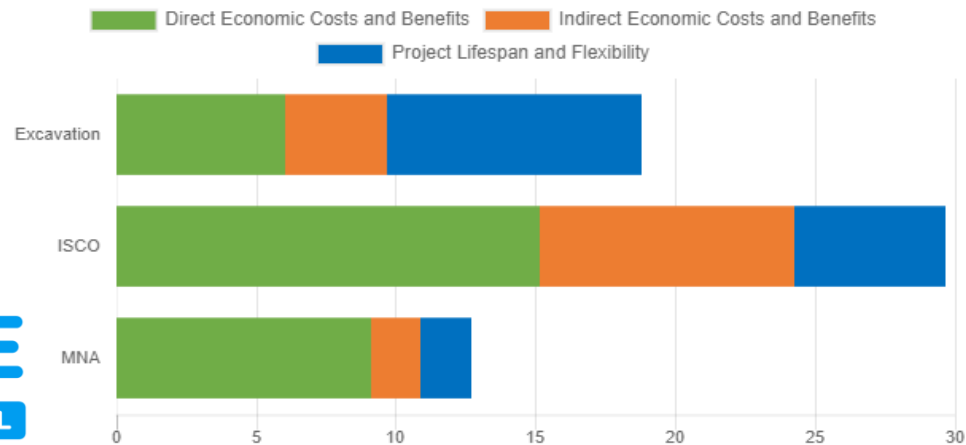
Environment Sustainability score



Society Sustainability score



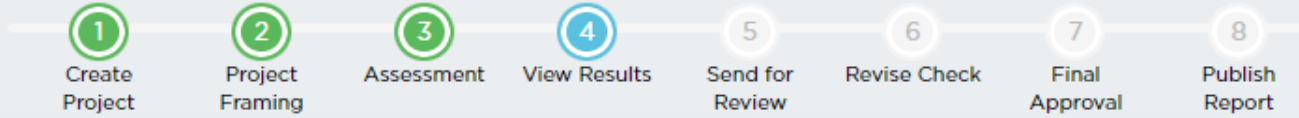
Economy Sustainability score



- For each option SURE calculates the total normalised weighted scores for each category of indicator and each domain, together with a final sustainability score (applying a linear-additive multi-criteria analysis method).
- Based on linkages between the selected indicators and the UN SDGs, SURE also evaluates the relative contribution of each option to each of the 17 SDGs (see next few slides).

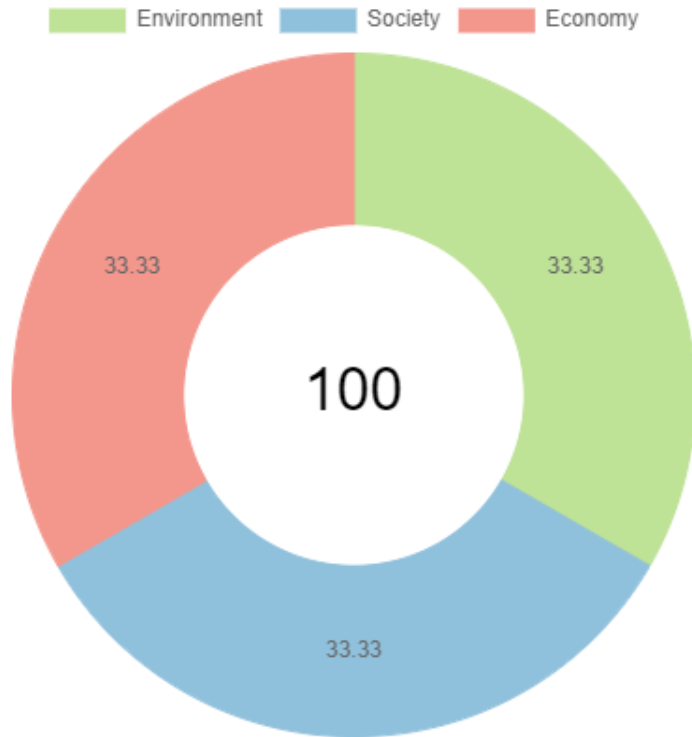
Overall Results

JMP1

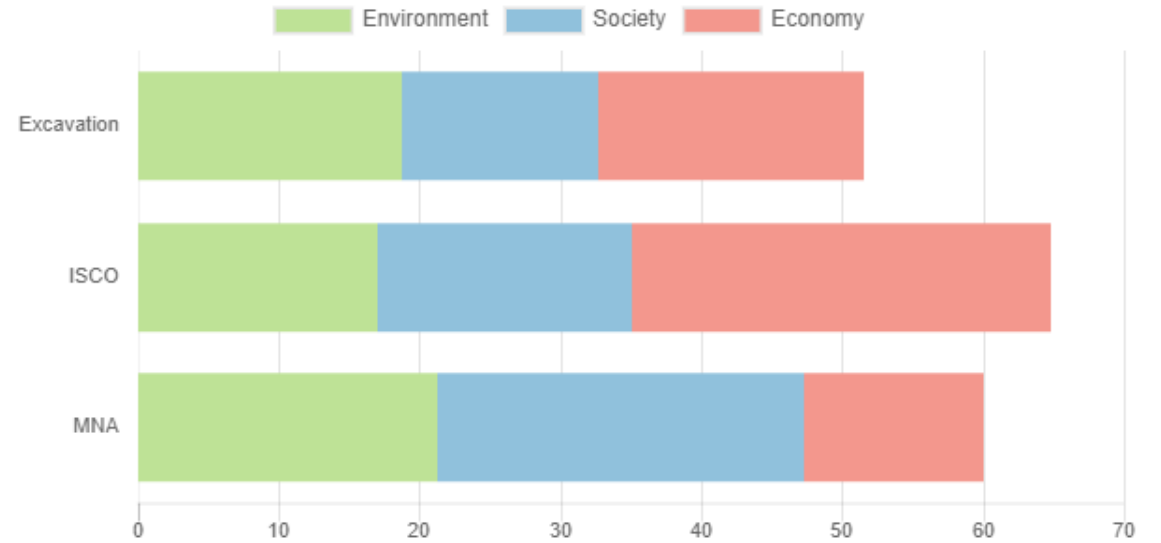


Distribution of Weights

Distribution of Weights



Total Assessment Sustainability Score



Extracts from Report

RESULTS FOR OPTION : Excavation

Total Sustainability Score



Distribution of Scores



Impact on UN SDGs



Description of option

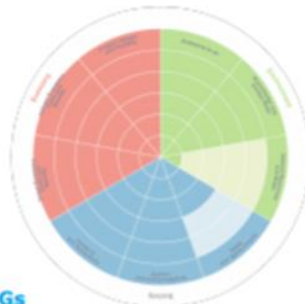
Excavate smear zone, dewater and dispose of contaminated soil & groundwater, include oxygen release compound

RESULTS FOR OPTION : ISCO

Total Sustainability Score



Distribution of Scores



Impact on UN SDGs

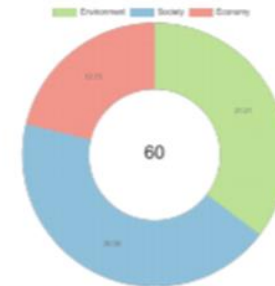


Description of option

In Situ Chemical Oxidation: Inject sodium persulphate into groundwater, allow with enhanced bioremediation as final 'polishing' phase

RESULTS FOR OPTION : MNA

Total Sustainability Score



Distribution of Scores



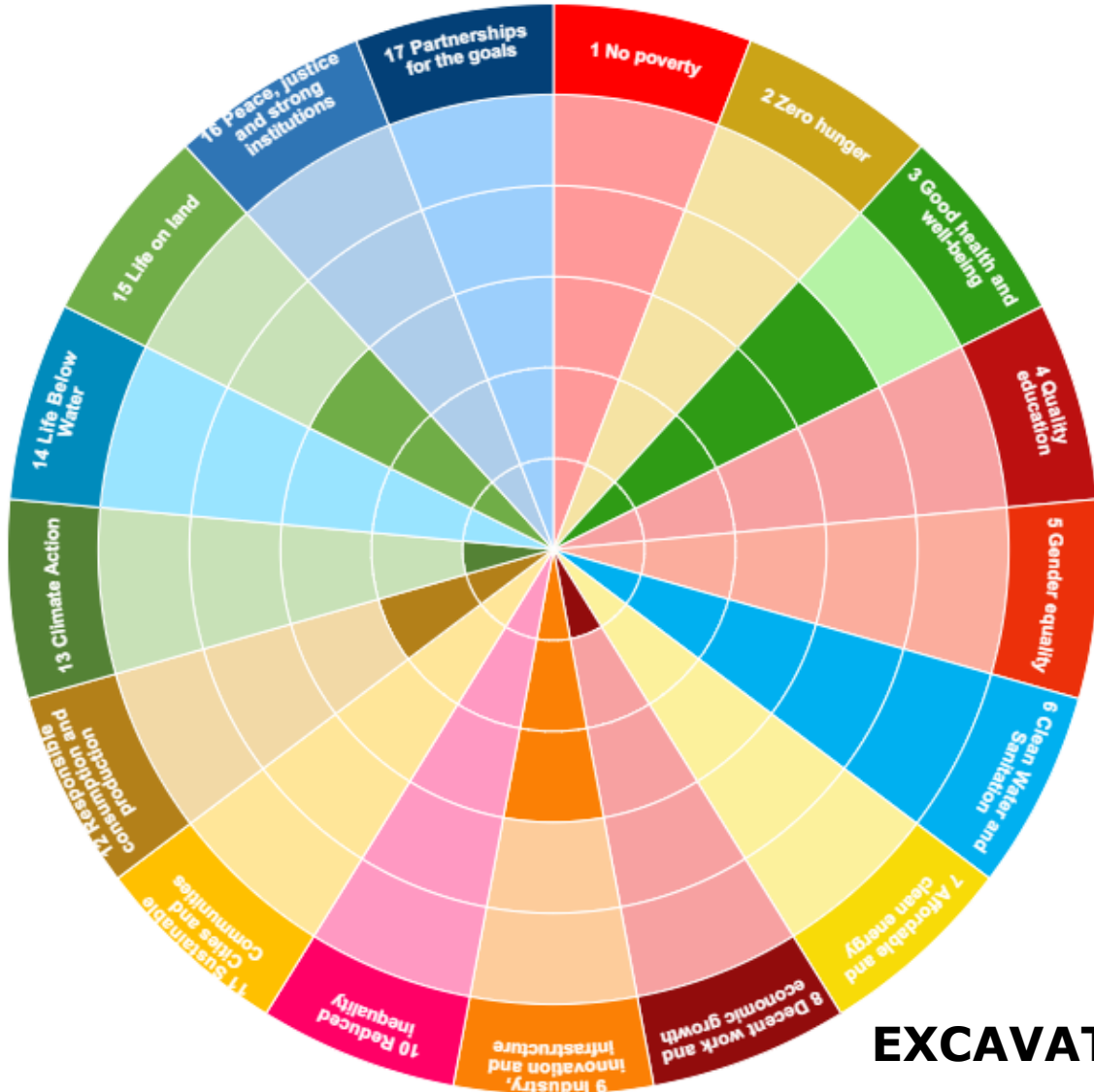
Impact on UN SDGs



Description of option

Monitored natural attenuation: Establish monitoring well network and monitor groundwater for several years to demonstrate no impact on stream

Comparing Against UN Goals: Excavation vs ISCO

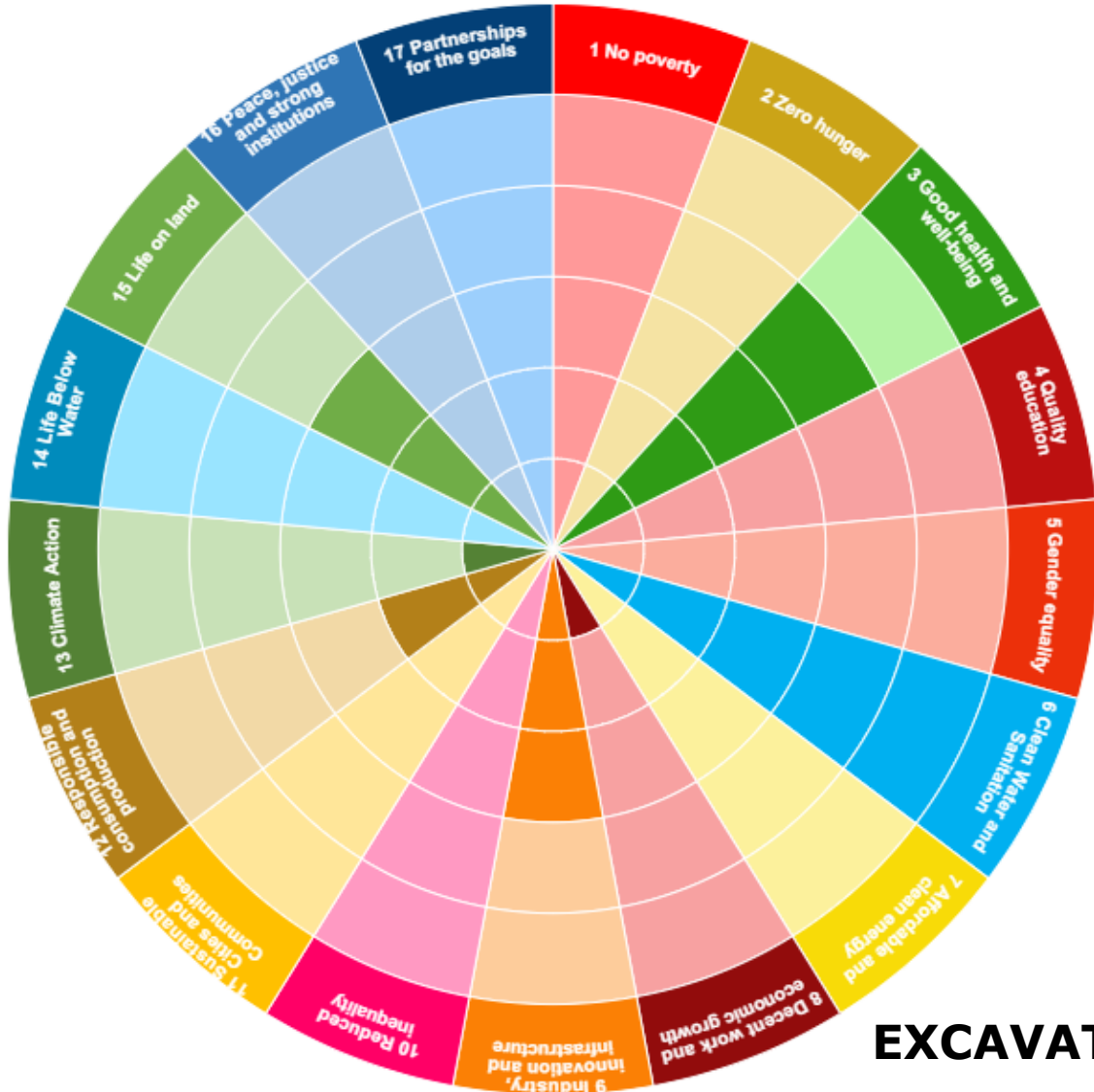


EXCAVATION

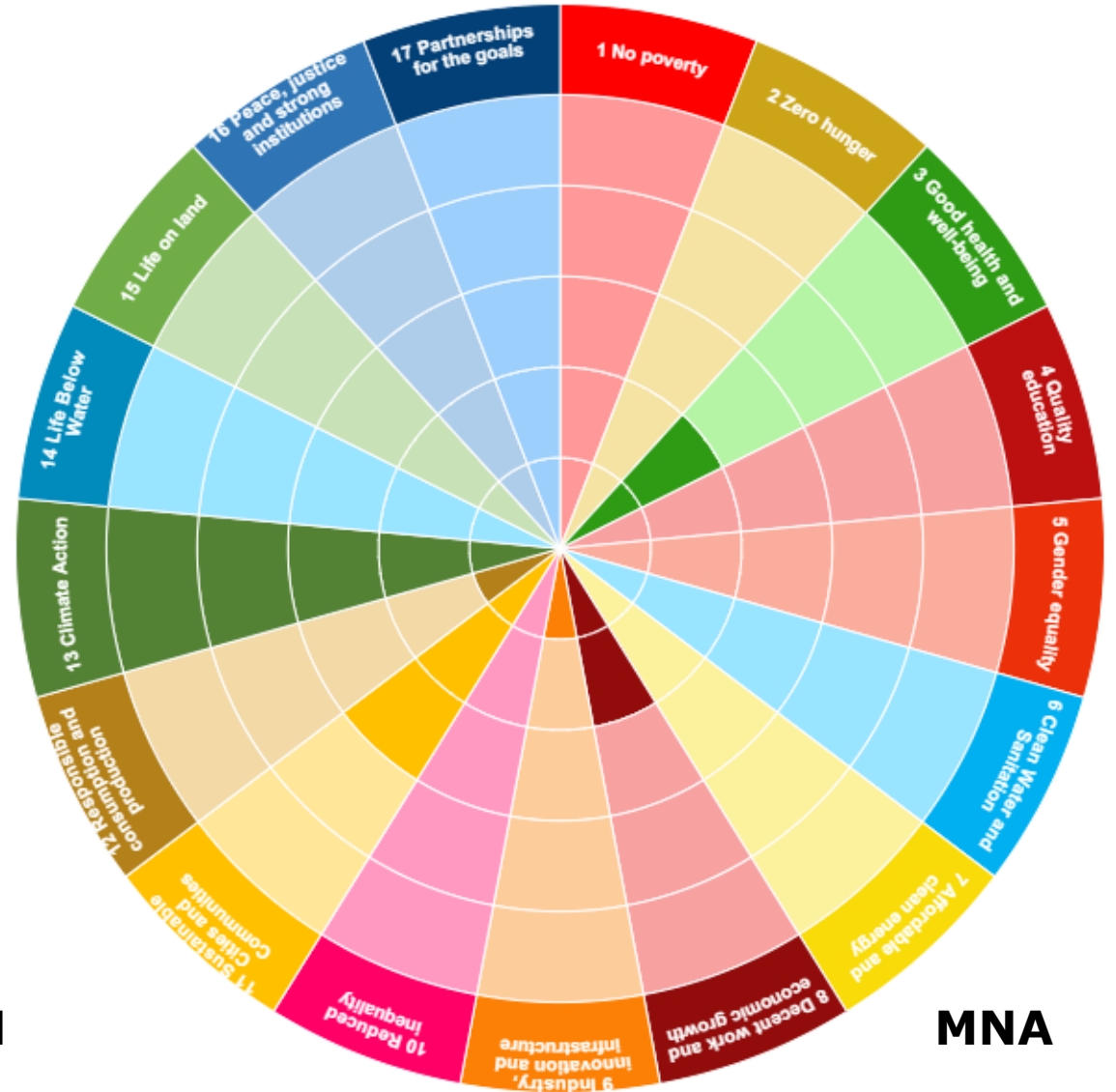


ISCO

Comparing Against UN Goals: Excavation vs MNA

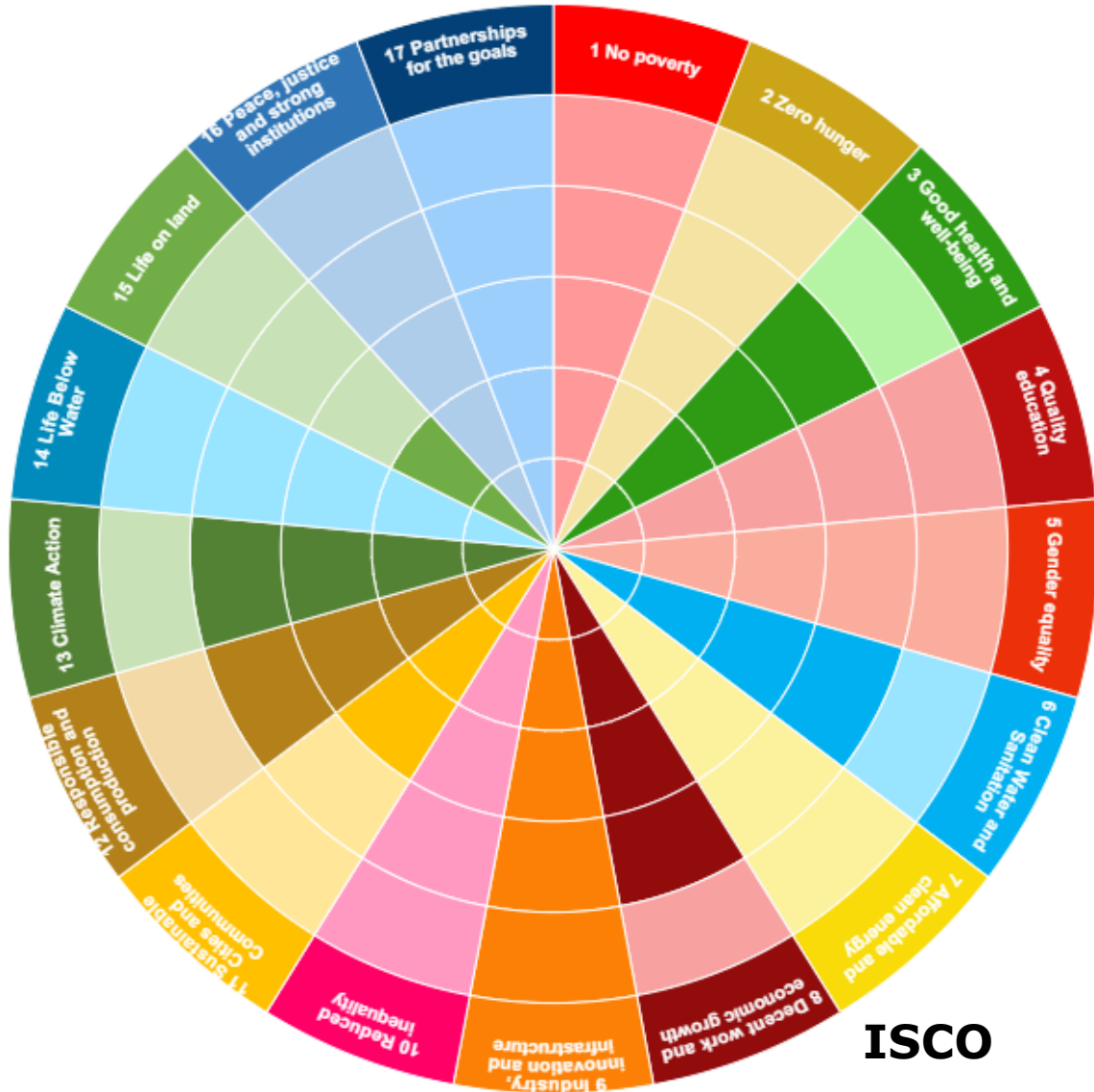


EXCAVATION

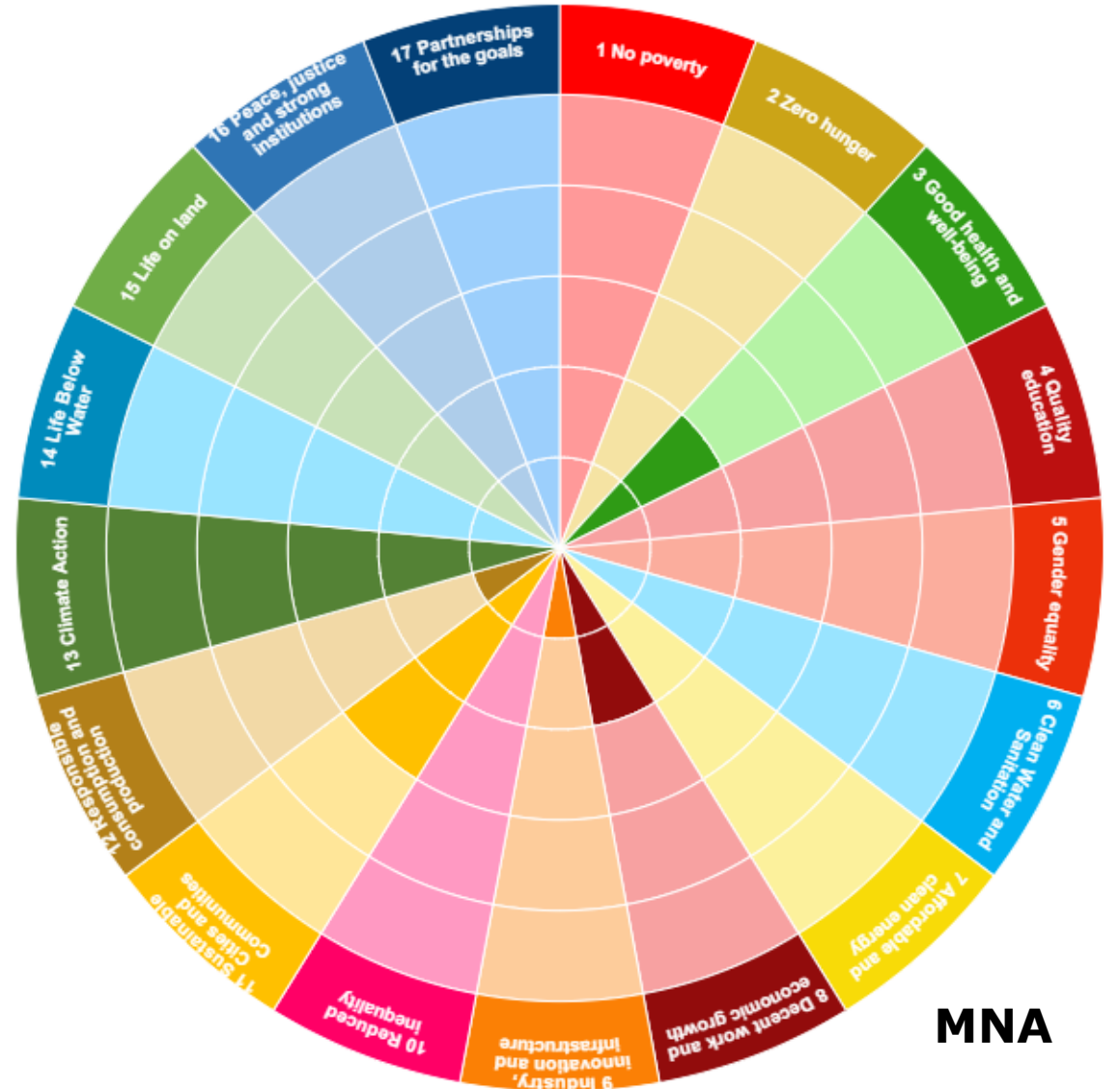


MNA

Comparing Against UN Goals: ISCO vs MNA



ISCO



MNA

SURE Tool Benefits



Supports global standards

ISO 18504:2017 and ASTM E2893-16 compliant, incorporating SuRF-UK indicator set & guidance (SR2).



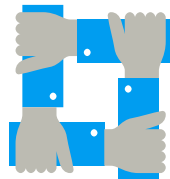
Compliance support

Records the overall remedial decision-making process.



Customizable

Allows users to modify assessment criteria to better suit their assessment



Increases communication

Supports collaboration and stakeholder communication throughout the process.



Provides education

Learn how to implement sustainable development principles at your project



Free for basic use

Sustainability belongs to all. You are free to use the tool for any types of projects.

