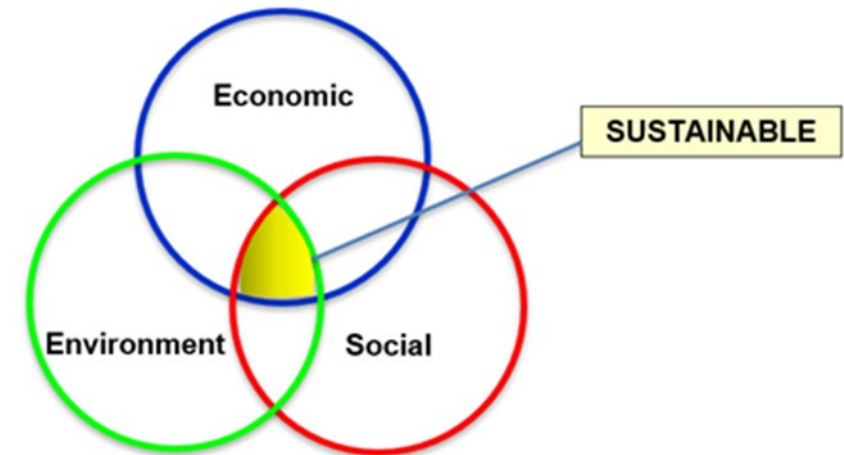


APPLICATION OF A REMEDIAL OPTIONS SUSTAINABILITY EVALUATION TOOL (ROSET) TO CASE STUDIES IN EUROPE

Richard Bewley & Åsa Fritioff

APPLICATION OF A REMEDIAL OPTIONS SUSTAINABILITY EVALUATION TOOL (ROSET) TO CASE STUDIES IN EUROPE

- Background to development of ROSET
- Application to three case studies:
 - Operational manufacturing site (Western Europe)
 - Former vehicle maintenance facility (UK)
 - Fire pond (Sweden)



GUIDANCE USED TO DEVELOP ROSET



BS ISO 18504:2017



Soil quality — Sustainable remediation



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SURF –UK GUIDANCE TO SUSTAINABILITY ASSESSMENT

- Underpins the basis of ROSET
- Advocates a Tiered approach to assessing sustainability of remedial options – 3 levels:
 - Tier 1 – Qualitative: (URS Spreadsheet publicly available on CL:AIRE)
 - Tier 2 – Semi –quantitative (ROSET)
 - Tier 3 - Quantitative
- Recommends that the level of assessment should be 'proportionate' :
".....decisions should be based on the simplest sustainability assessment approach, as long as the information it provides is seen as robust and acceptable by the various stakeholders involved in the decision-making process"
- Consistent with ISO 18504:2017(E) – which also identifies need for 'Project Framing'

ROSET DEVELOPED AS A TIER 2 MODEL DIRECTLY FROM THE TIER 1 SPREADSHEET AVAILABLE ON CL:AIRE WEBSITE



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Tier 1- Qualitative Assessment

Tier 1 "entry level" sustainability assessment is based on simple tables using qualitative categories. The SuRF-UK Brief Case provides a slide deck procedure to follow with a series of checklists to help ensure that the framing is adequate for the sustainability assessment required. It is recommended to read the Project Framing guidance before or in parallel with the Tier 1 Sustainability Assessment slide deck.

 [Download the SuRF UK Briefcase Tier 1 Final](#)

 [Download the SuRF-UK Tier 1 Briefcase Logbook v4](#)

A 'Project Framing and Tier 1 Sustainable Remediation Assessment Spreadsheet' has been developed by URS to be compatible with the SuRF-UK Assessment Framing and Tier 1 Briefcase documents. It is made freely available to others here. SuRF-UK are grateful to URS to providing this spreadsheet. Neither CL:AIRE, SuRF-UK nor URS offer any warrantee or technical support for this spreadsheet.

 [Download the Tier 1 Sustainability Assessment for SuRF UK](#)

RAMBOLL

<https://www.claire.co.uk/projects-and-initiatives/surf-uk/21-executing-sustainable-remediation/86-tier-1-qualitative-assessment>

SURF UK HEADLINE CATEGORIES OF INDICATORS

Emissions to air

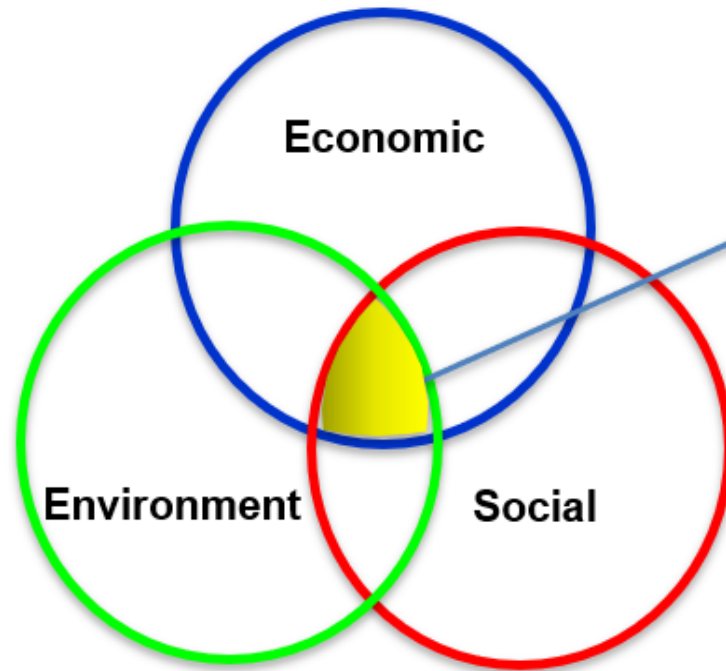
Soil and ground conditions

Groundwater & Surface Water

Ecology

Natural resources and waste

Direct economic costs and benefits
Indirect economic costs and benefits
Employment and employment capital
Induced economic costs and benefits
Project lifespan and flexibility



SUSTAINABLE

Human health and safety
Ethics and equality
Neighbourhoods and locality
Communities and community involvement
Uncertainty and evidence

ROSET - SUMMARY

- Pre-determined short-list of options (3 -6) for assessment
- Framing document – why, how, who, what?
- Can choose level of detail for the criteria used:
 - Level 1: Assessment based on 15 Headline Indicator categories established by SuRF UK: 5 Economic, 5 Environmental, 5 Social

OR, for more detail:

- Level 2: Assessment based on individual indicators within each of these 15 categories
- Weight these criteria in importance (1,3,5)
- Evaluate and score each option against these (1 – 5)
- Compare total weighted, normalised scores for Environmental, Economic, Social domains and Total Score

Tier 2 Sustainability Assessment

This spreadsheet is used to document progress through the remedial options sustainability assessment and is designed to enable assessments to be carried out systematically according to SuRF UK's guidance. It is based upon the Tier 1 sustainability assessment framing document available on the CLARIE web-site, but adapted for a Tier 2 (semi-quantitative) assessment. The process is divided into three categories:

1. Preparation - describing the project, the purpose of the assessment, the stakeholders, the constraints and the reporting/dialogue plan. Some of this may be omitted where not relevant to the project in question
2. Definition - defining the objectives, boundaries, scope, methodology and uncertainties
3. Execution - to be completed as part of the assessment itself

Document Guide

Introduction:

Info: This tab is used to record details of project reference and personnel performing this assessment

Preparation:

Phase 1: Preparation & Stakeholders/A: This tab sets out the function of the assessment and the stakeholders involved (OPTIONAL)

Phase 2: Justification/A: This tab summarises the project goals and the remedial options to be considered

Phase 3: Constraints/A: This tab sets out the constraints of the project

Phase 4: Reporting/Output/A: This tab sets out how the results will be reported (OPTIONAL)

Definition:

Level 1: Objectives/Boundaries/A: This tab summarises the details from the preparatory stages and establishes the boundaries of the sustainability assessment

Level 2: Scope/A: This tab sets out the scope of the assessment, the 15 criteria to be scored and whether this is to be done at Level 1 or at Level 2 based on the defined Uncertainty/A: This tab allows for any uncertainties to be recorded (OPTIONAL)

Execution (Level 1):

Level Step 1/W: This tab is used for recording the weighting given to each of the assessment criteria

Level Step 2/A: This tab lists the sub-criteria for each of the 15 criteria, to assist in deciding performance at level 1, or as the main determinants at level 2

Level Step 3/A: This tab is used for assessing the performance of each option against each of the criteria (LEVEL 1)

Level Step 3/A: This tab is used to score the Options based upon the arguments set out in Exec Step 2 and includes a summary of the justification (to push LEVEL 1)

Output (Level 1):

Level Output/A: This tab provides the output to the LEVEL 1 assessment, by automatically calculating the sustainability score for each option

Execution (Level 2):

Level Step 3/ECON SUB-CRITERIA: This tab is used for assessing the performance of each option against each of the Environmental sub-criteria (LEVEL 2 ONLY)

Level Step 3/ECON SUB-CRITERIA: This tab is used for assessing the performance of each option against each of the Economic sub-criteria (LEVEL 2 ONLY)

Level Step 3/SOC SUB-CRITERIA: This tab is used for assessing the performance of each option against each of the Social sub-criteria (LEVEL 2 ONLY)

This tab will provide the output to the LEVEL 2 assessment, by automatically calculating the sustainability score for each option (NOTE THAT THIS IS SHOWN FOR ILLUSTRATIVE PURPOSES IN THIS EXAMPLE AND HAS NOT YET BEEN LINKED IN THIS VERSION AS THE SUB-CRITERIA ARE SUBJECT TO REVISION)

Key:

Balance text for the use of this document is highlighted by green shading

Environmental, Economic, Social Assessment Criteria

This table provides specific information that provides the user for the decision making process, as based on the risk values performance according to the level criteria. Each information can be updated, amended or deleted to reflect the user's requirements. For the user's reference, the table is divided into 15 categories of the 15 criteria as they are assessed. The table is divided into 15 categories. IT IS IMPORTANT THAT THE USER IS AWARE OF THE USER'S REQUIREMENTS TO THE USER'S CRITERIA. THE USER'S CRITERIA ARE SUBJECT TO REVISION. THESE CRITERIA WILL BE SUBSTITUTED AS AVAILABLE.

Indicator	Assessment Criteria	Option 1	Option 2	Option 3	Option 4	Option 5
ENVIRONMENTAL	ENV1: Contaminated soil	Remediated soil, no further action	Remediated soil, no further action	Remediated soil, no further action	Remediated soil, no further action	Remediated soil, no further action
	ENV2: Tail and ground conditions	Minimal effort to remediate soil	Minimal effort to remediate soil	Minimal effort to remediate soil	Minimal effort to remediate soil	Minimal effort to remediate soil
	ENV3: Groundwater & Surface Water	Minimal effort to remediate soil	Minimal effort to remediate soil	Minimal effort to remediate soil	Minimal effort to remediate soil	Minimal effort to remediate soil
	ENV4: Ecology	Minimal effort to remediate soil	Minimal effort to remediate soil	Minimal effort to remediate soil	Minimal effort to remediate soil	Minimal effort to remediate soil
	ENV5: Natural resources and assets	Minimal effort to remediate soil	Minimal effort to remediate soil	Minimal effort to remediate soil	Minimal effort to remediate soil	Minimal effort to remediate soil
ECONOMIC	ECON1: Direct economic costs and benefits	Low cost remediation	Low cost remediation	Low cost remediation	Low cost remediation	Low cost remediation
	ECON2: Indirect economic costs and benefits	Low cost remediation	Low cost remediation	Low cost remediation	Low cost remediation	Low cost remediation
	ECON3: Employment and operational costs	Low cost remediation	Low cost remediation	Low cost remediation	Low cost remediation	Low cost remediation
	ECON4: Indirect economic costs and benefits	Low cost remediation	Low cost remediation	Low cost remediation	Low cost remediation	Low cost remediation
	ECON5: Project life span and flexibility	Low cost remediation	Low cost remediation	Low cost remediation	Low cost remediation	Low cost remediation
SOCIAL	SOC1: Health and safety	Low cost remediation	Low cost remediation	Low cost remediation	Low cost remediation	Low cost remediation
	SOC2: Ethical and equality	Low cost remediation	Low cost remediation	Low cost remediation	Low cost remediation	Low cost remediation
	SOC3: Neighbourhood and facilities	Low cost remediation	Low cost remediation	Low cost remediation	Low cost remediation	Low cost remediation
	SOC4: Community and resources	Low cost remediation	Low cost remediation	Low cost remediation	Low cost remediation	Low cost remediation
	SOC5: Governance and resilience	Low cost remediation	Low cost remediation	Low cost remediation	Low cost remediation	Low cost remediation

Assessment criteria	Remediation Options for Assessment					Maximise	Justification of Scores (refer to 'Execution Supporting' Tab for more detail)	Uncertainties
	Option 1	Option 2	Option 3	Option 4	Option 5			
Environmental	Option 1	Option 2	Option 3	Option 4	Option 5	Maximise		
Emissions to air	20	10	10	10	20	20	Carbon driven by carbon footprint	Professional judgement only - comparability
Soil and ground conditions	3	3	3	3	3	3	Focus on remediation of contaminated soil	
Groundwater and surface water	3	3	3	3	3	3	Focus on remediation of contaminated water	
Ecology	3	3	3	3	3	3	Focus on remediation of contaminated land	
Natural resources and assets	3	3	3	3	3	3	Focus on remediation of contaminated land	
Total environmental score	30	30	30	30	30	30		Professional judgement only - comparability
Percentage score - Environmental	50%	50%	50%	50%	50%	50%		
Economic	Option 1	Option 2	Option 3	Option 4	Option 5	Maximise		
Direct economic costs and benefits	15	15	15	15	15	15	Costs versus degree of benefits through remediation & remediation reduction	Costs versus degree of benefits through remediation & remediation reduction
Indirect economic costs and benefits	4	4	4	4	4	4	Costs versus degree of benefits through remediation & remediation reduction	Costs versus degree of benefits through remediation & remediation reduction
Employment and operational costs	1	1	1	1	1	1	Costs versus degree of benefits through remediation & remediation reduction	Costs versus degree of benefits through remediation & remediation reduction
Project life span and flexibility	1	1	1	1	1	1	Costs versus degree of benefits through remediation & remediation reduction	Costs versus degree of benefits through remediation & remediation reduction
Total economic score	20	20	20	20	20	20		
Percentage score - Economic	40%	40%	40%	40%	40%	40%		
Social	Option 1	Option 2	Option 3	Option 4	Option 5	Maximise		
Health and safety	25	10	10	10	10	25	Costs versus degree of benefits through remediation & remediation reduction	Costs versus degree of benefits through remediation & remediation reduction
Ethical and equality	1	1	1	1	1	1	Costs versus degree of benefits through remediation & remediation reduction	Costs versus degree of benefits through remediation & remediation reduction
Neighbourhood and facilities	3	3	3	3	3	3	Costs versus degree of benefits through remediation & remediation reduction	Costs versus degree of benefits through remediation & remediation reduction
Community and community involvement	3	3	3	3	3	3	Costs versus degree of benefits through remediation & remediation reduction	Costs versus degree of benefits through remediation & remediation reduction
Uncertainty and resilience	6	6	6	6	6	6	Costs versus degree of benefits through remediation & remediation reduction	Costs versus degree of benefits through remediation & remediation reduction
Total social score	38	26	26	26	26	38		
Percentage score - Social	63%	43%	43%	43%	43%	63%		
Total sustainability score	58%	50%	50%	50%	50%	58%		



SUSTAINABILITY OF OPTIONS CAN BE ASSESSED AT TWO KEY STAGES

- Both NICOLE Road Map & SuRF identify key stages of decision making where sustainability assessments can apply
- SuRF UK Framework can be brought to bear at:
 - Stage A: The Planning Stage (Plan/Project Design)
 - Stage B: Remediation Implementation
- Manufacturing facility & Brownfield site represent Stage B
- Swedish pond is an example of using ROSET at Stage A

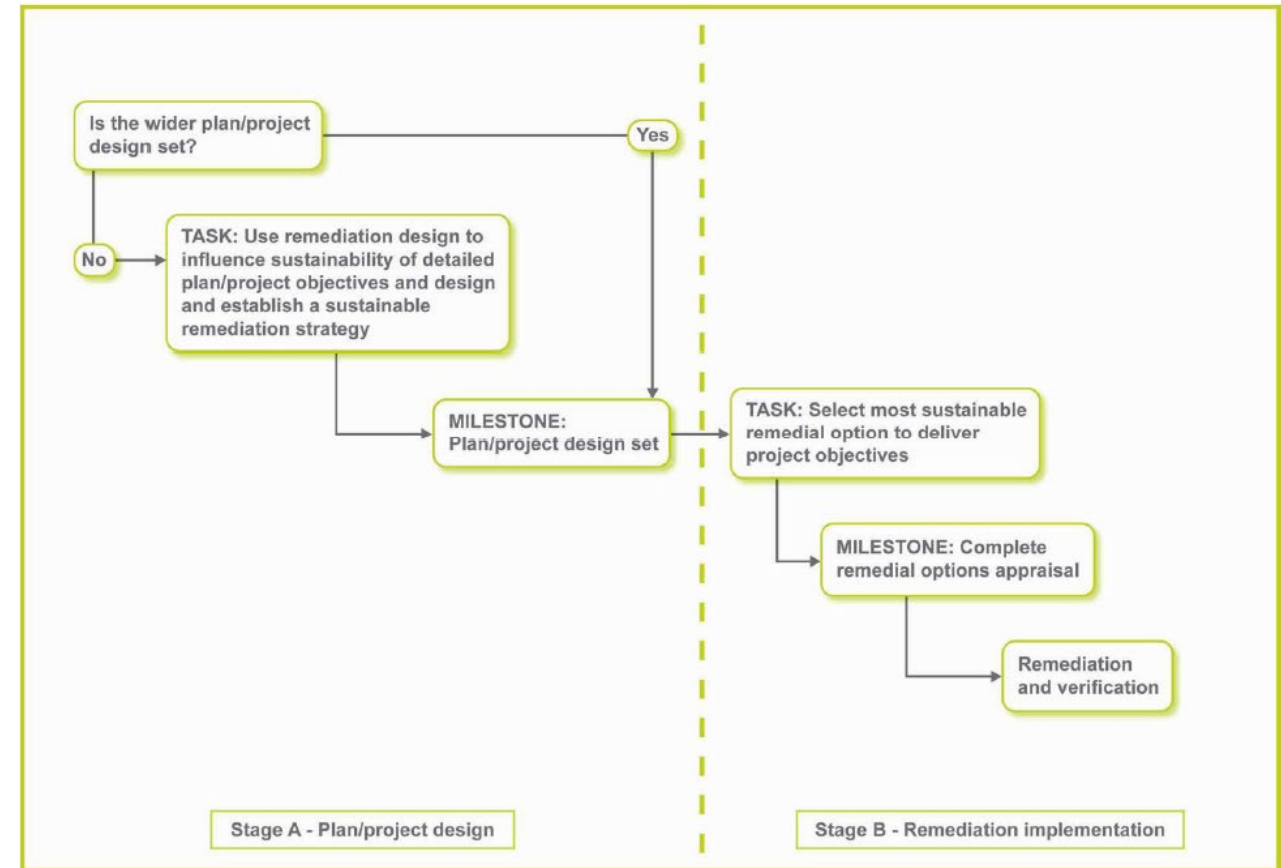


Figure 3.1: The SuRF-UK Framework.

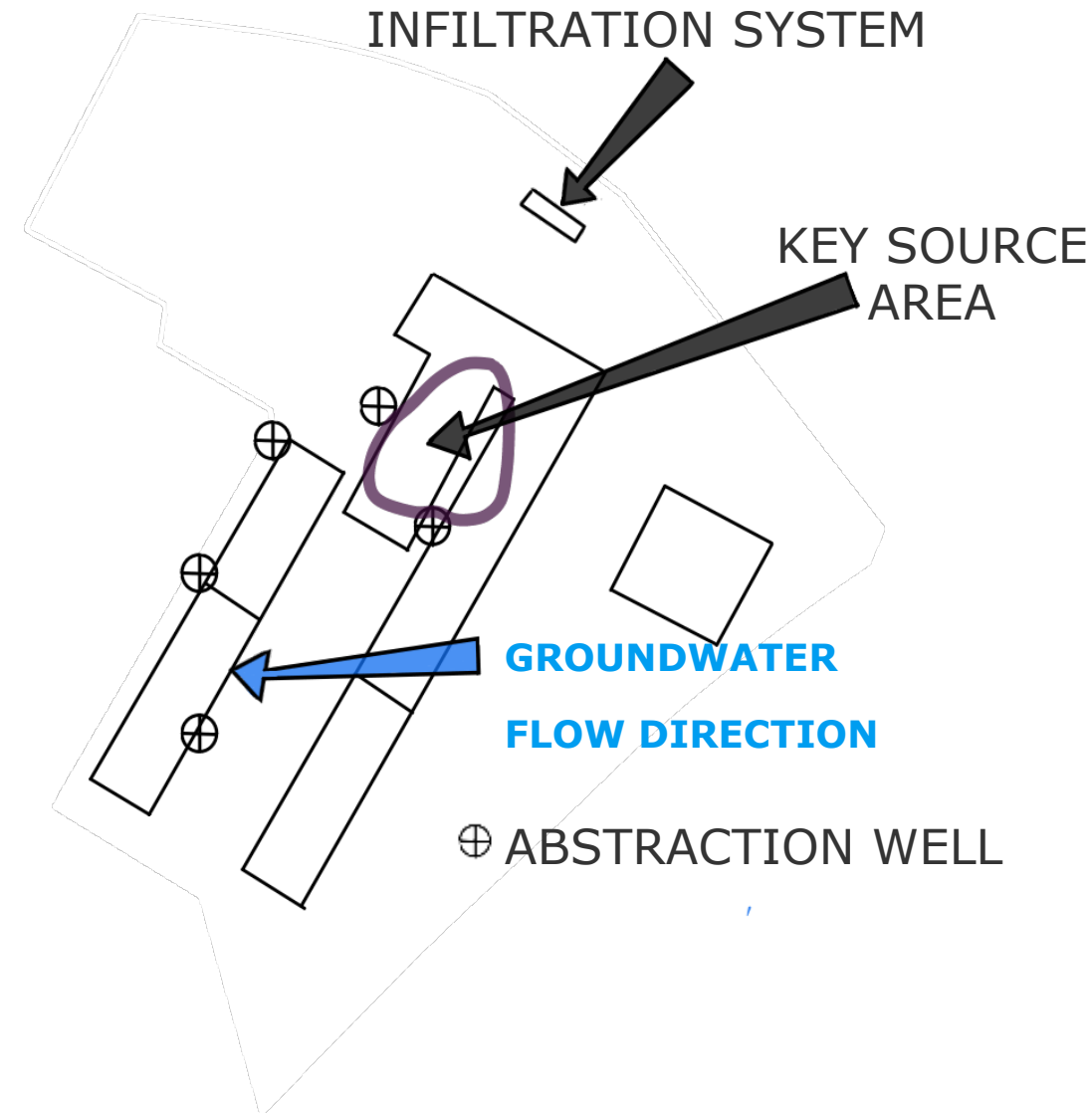
CASE STUDY 1:

**ACTIVE MANUFACTURING
SITE**

**APPLICATION OF ROSET
AT STAGE B**

1) OPERATIONAL MANUFACTURING FACILITY

- Operational manufacturing facility with historic chlorinated solvent (CHC) contamination, previously undergone remediation by SVE and hydraulic confinement (Pump & Treat)
- Residual CHC contamination within source area below water table – in operational area
- Source area characterised by less permeable geology - CHC adsorbed to silts & clays
- Hydraulic confinement scheme operated since 1996 – to achieve compliance at site boundary
- Sustainability assessment to evaluate short-listed options – continue with current scheme and/or consider alternatives?



SHORT-LISTED REMEDIAL OPTIONS

1. Continuation of existing hydraulic confinement scheme
2. Continuation of existing hydraulic confinement scheme & partial source treatment (where practicable)
3. Upgrade of existing hydraulic confinement system
4. Upgrade of existing hydraulic confinement scheme & partial source treatment (where practicable)

REJECTED (Low practicability & limited effectiveness):

5. Permeable Reactive Barrier

ROSET EXECUTION - STEP 1: CRITERIA WEIGHTING

Assessment criteria	Weighting (1 - 5)	Justification for weighting	Driving issues identifiable for site
<i>Environmental</i>			
Emissions to air	5	Global heating	
Soil and ground conditions	3	Wider issues of soil quality of moderate importance to site, given end use	
Groundwater and surface water	3	Wider issues of groundwater quality may be of significance but in longer term	Local water resources
Ecology	1	Industrial site, limited impact on local ecological systems	
Natural resources and waste	3	Potential importance in indirect issues related to global heating etc	Energy usage, waste generation not major issue
<i>Economic</i>			
Direct economic costs and benefits	5	Cost/benefit significant for corporate planning	Whether any source treatment is worth undertaking if containment system continues to run
Indirect economic costs and benefits	1	Less significant for subject site	
Employment and employment capital	1	Low significance for site	
Induced economic costs and benefits	1	Not significant for subject site	
Project lifespan and flexibility	3	Flexibility may be of significance	Change in end use through potential future divestment
<i>Social</i>			
Human health and safety	5	Significant issue from corporate standpoint & acceptability to site	Site management of importance
Ethics and equality	1	Not a major issue for subject site as scenario assumes continued operation	Intergenerational equity
Neighbourhoods and locality	3	Potential stakeholder concerns	AFEX
Communities and community involvement	3	Potential stakeholder concerns	
Uncertainty and evidence	3	Requirement for certainty in validation of significance	Ability to judge success of any source treatment

ROSET EXECUTION, STEP 2: ASSESSMENT

SuRF ref.	Assessment Criteria	Option 1.1	Option 1.2	Option 1.3	Option 1.4
		Hydraulic confinement (existing scheme)	Hydraulic confinement (existing scheme) and partial source treatment	Upgraded hydraulic confinement	Upgraded hydraulic confinement and partial source treatment
<i>Environmental</i>					
ENV1	Emissions to air	Small energy requirement annually: shorter term advantages may be of more significance in respect of global heating assuming switch to renewable energy in longer term	Small energy requirement annually but significant shorter term emissions associated with reagent production and injection requirements	Additional emissions by upgraded scheme through longer term operation though shorter term emissions may be of more significance in respect of global heating, assuming switch to renewable energy later	Additional emissions by upgraded scheme through longer term operation and significant shorter term emissions associated with reagent production and injection requirements
ENV2	Soil and ground conditions	Minimal effect on unsaturated zone	Inclusion of smear zone in source will result in some improvement re CHCs	Minimal effect on unsaturated zone	Inclusion of smear zone in source will result in some improvement re CHCs
ENV3	Groundwater & Surface Water	Offers least overall improvement	Through influencing geochemistry, will promote better quality through CHC reduction, but P&T will also remove excess carbonaceous substrate and other less desirable changes as a result of lower redox	Better improvement than Option 1	Offers best overall improvement: as for Option 2 but P&T will also remove excess carbonaceous substrate and less desirable changes as a result of lower redox
ENV4	Ecology	Minimal impact	May entail noise/disturbance during injections	Minimal impact	May entail noise/disturbance during injections
ENV5	Natural resources and waste	Small energy requirement annually: shorter term advantages may be of more significance in respect of global heating assuming switch to renewable energy in longer term. No comparatively high or low waste issues			
<i>Economic</i>					
ECON1	Direct economic costs and benefits	Intermediate cost (comparatively), though modest benefit			
ECON2	Indirect economic costs and benefits	Low annual cost outlay, good predictability			
ECON3	Employment and employment capital	Slightly less without specialist approach			
ECON4	Induced economic costs and benefits	No significant differences identifiable			
ECON5	Project lifespan and flexibility	Fixed approach, potentially vulnerable to changes in the very long term			
<i>Social</i>					
SOC1	Human health and safety	Limited Health & Safety issues			
SOC2	Ethics and equality	Significant intergenerational inequity			
SOC3	Neighbourhoods and locality	Least aggressive approach potentially less favourable with neighbours			
SOC4	Communities and community involvement	No significant differences identifiable			
SOC5	Uncertainty and evidence	Relatively well defined, validation straightforward			

SuRF ref.	Assessment Criteria	Option 1	Option 2
		Hydraulic confinement (existing scheme)	Hydraulic confinement (existing scheme) and partial source treatment
ENV1	Emissions to air	Small energy requirement annually: shorter term advantages may be of more significance in respect of global heating assuming switch to renewable energy in longer term	Small energy requirement annually but significant shorter term emissions associated with reagent production and injection requirements
ENV2	Soil and ground conditions	Minimal effect on unsaturated zone	Inclusion of smear zone in source will result in some improvement re CHCs
<i>Environmental</i>			
			Through influencing geochemistry,

ROSET EXECUTION, STEP 3 – SCORE AGAINST CRITERIA

Assessment criteria	Remediation Options for Assessment					Justification of Scores	Uncertainties
	1	2	3	4	Maximum		
	Hydraulic confinement (existing scheme)	Hydraulic confinement (existing scheme) and partial source treatment	Upgraded hydraulic confinement	Upgraded hydraulic confinement and partial source treatment			
<i>Environmental</i>							
Emissions to air	4	2	3	1	5	Largely driven by carbon footprint, especially in short term (assuming longer term shift to	Professional judgement only in
Soil and ground conditions	1	3	1	3	5	Effects on vadose zone (mostly marginal)	
Groundwater and surface water	1	4	3	5	5	Effects on CHC overall, but also extent of substrate additions and undesirable effects thereof	
Ecology	5	3	4	3	5	General noise and overall disturbance : relatively minimal overall	
Natural resources and waste	4	3	2	1	5	Mostly reflecting energy requirements, & waste production (e.g. spent GAC) in longer term	Professional judgement only in
<i>Economic</i>							
Direct economic costs and benefits	2	2	5	4	5	Costs versus degree of benefits through receptor protection & timescale reduction	Semi quantitative scoring used
Indirect economic costs and benefits	4	2	5	2	5	Ongoing capital outlay and short term expenditure in relation to benefits	
Employment and employment capital	1	2	1	2	5	Potential for more specialist approaches to be more favourable in wider sense	
Induced economic costs and benefits	1	1	1	1	5	No significant differences identifiable	
Project lifespan and flexibility	2	4	3	5	5	Potential vulnerability to changes in long term	Overall uncertainty
<i>Social</i>							
Human health and safety	5	2	4	2	5	Degree of intrusive work in, or in proximity to, operational areas	
Ethics and equality	1	2	1	2	5	Scale of intergenerational inequity (passing issue on to future generations)	
Neighbourhoods and locality	2	2	5	5	5	Focuses on degree of protection conferred to neighbour	Uncertainty as to whether any
Communities and community involvement	1	1	1	1	5	No significant differences identifiable	
Uncertainty and evidence	5	2	5	2	5	Straightforwardness of validation and degree of certainty of achieving outcome (e.g. mass	

ROSET: SUSTAINABILITY ASSESSMENT OUTPUT FOR MANUFACTURING FACILITY

	Remediation Options for Assessment			
	1	2	3	4
	Hydraulic confinement (existing scheme)	Hydraulic confinement (existing scheme) & partial source treatment	Upgraded hydraulic confinement	Upgraded hydraulic confinement & partial source treatment
Percentage score - Environmental	57%	57%	49%	47%
Percentage score - Economic	40%	49%	75%	73%
Percentage score - Social	67%	36%	72%	48%
Total sustainability score	55%	47%	65%	56%

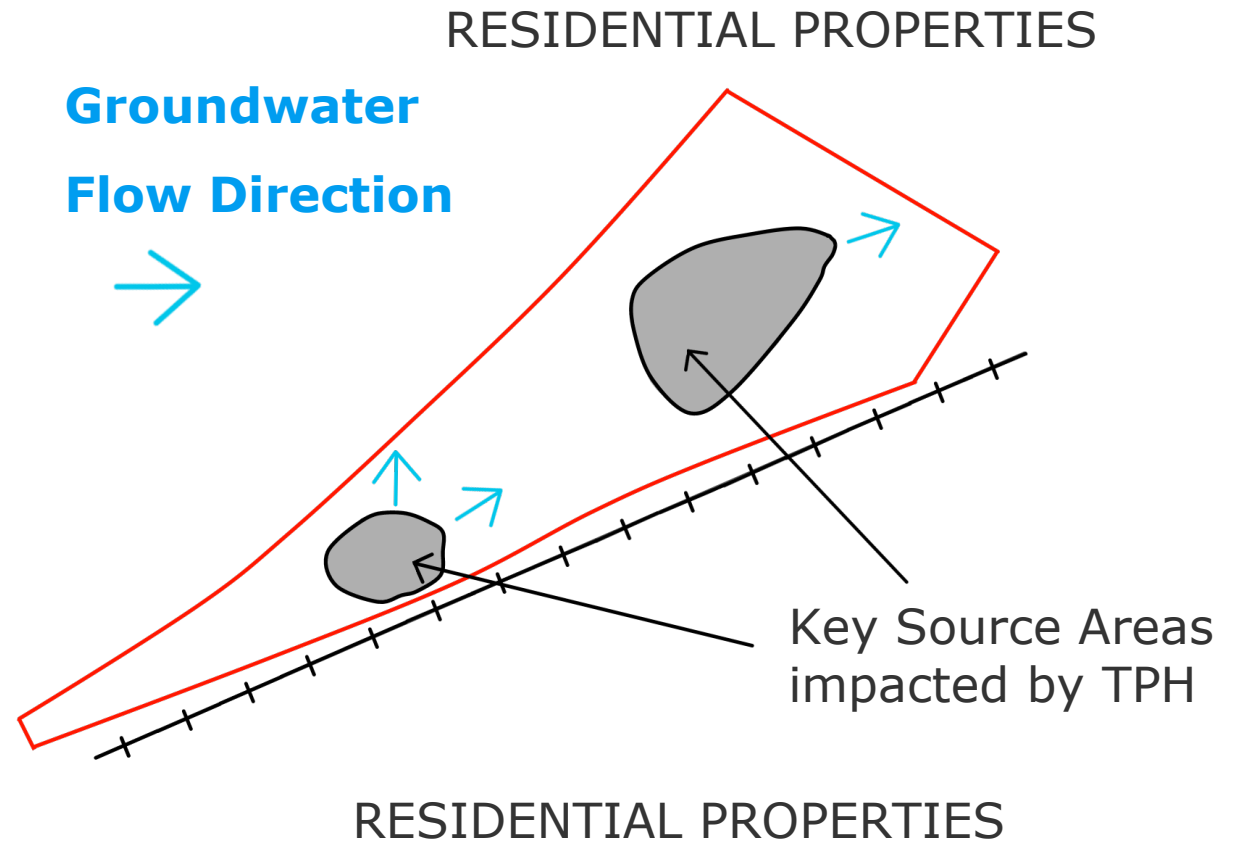
CASE STUDY 2:

BROWNFIELD SITE IN UK

**APPLICATION OF ROSET
AT STAGE B**

2) BROWNFIELD SITE (FORMER VEHICLE MAINTENANCE FACILITY), UK

- Former vehicle maintenance & car showroom to be developed for mixed use (school, housing, commercial)
- Historical contamination of soils & sand/gravel aquifer by TPH over 40 years.
- Made ground with TPH, PAH, heavy metals & asbestos
- Sustainability assessment required for remedial option selection to develop strategy



BROWNFIELD SITE: SHORTLISTED REMEDIAL OPTIONS

Matrix	Options				
	1	2	3	4	5
Made ground (asbestos & heavy metals)	Excavation & disposal	Containment	Excavation & disposal	Containment	Excavation & disposal
TPH impacted soil		Ex situ bio	Ex situ bio	In situ bio (proprietary-Gypsum & GAC)	In situ bio (proprietary-Gypsum & GAC)
LNAPL	Skimmer/absorbent	Skimmer/absorbent	Skimmer/absorbent		
Groundwater	In situ bio/chem	In situ bio/chem	In situ bio/chem		

BROWNFIELD SITE: SUSTAINABILITY ASSESSMENT OUTPUT

Remediation Options for Assessment					
Matrix	1	2	3	4	5
Made ground (asbestos & metals)	Excavation & disposal	Containm.	Excavation & disposal	Containm.	Excavation & disposal
Hydrocarbon impacted areas		Ex situ bio	Ex situ bio	In situ bio proprietary	In situ bio proprietary
LNAPL	Skim./ absorb.	Skim. / absorb.	Skim. / absorb.		
Groundwater	In situ bio/chem	In situ bio/chem	In situ bio/chem		
% score - Environmental	48%	76%	54%	75%	53%
% score - Economic	60%	67%	45%	40%	27%
% score - Social	41%	75%	53%	72%	49%
Total sustainability score	50%	73%	51%	62%	43%

CASE STUDY 3:

FIRE POND IN SWEDEN

**APPLICATION OF ROSET
AT STAGE A**

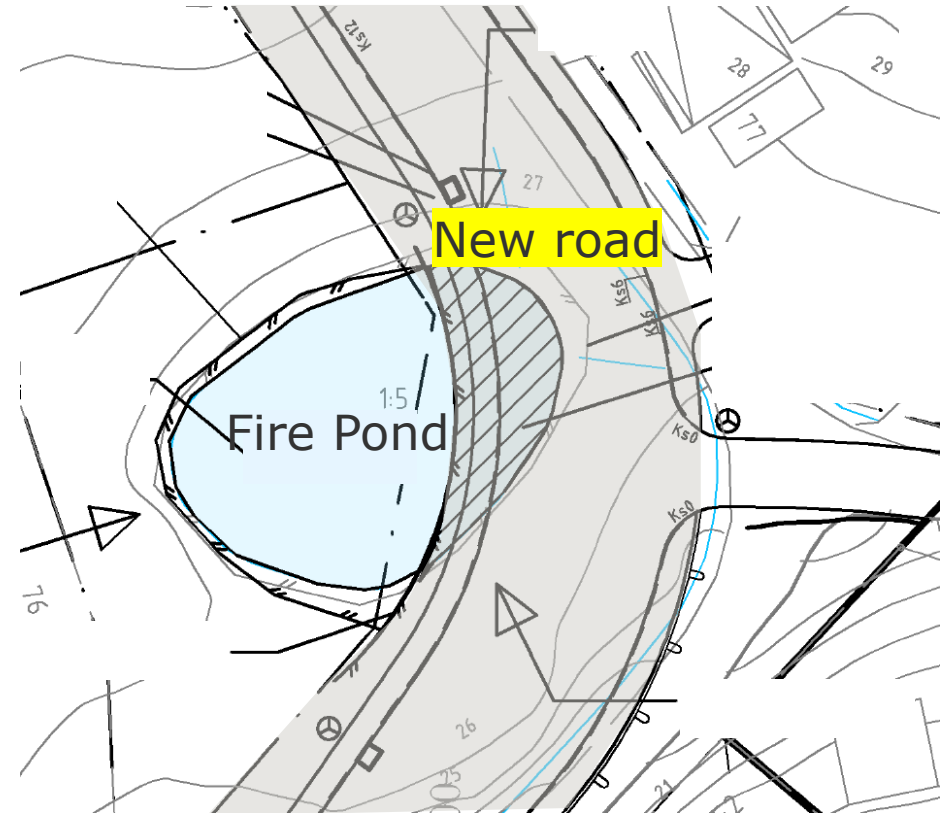
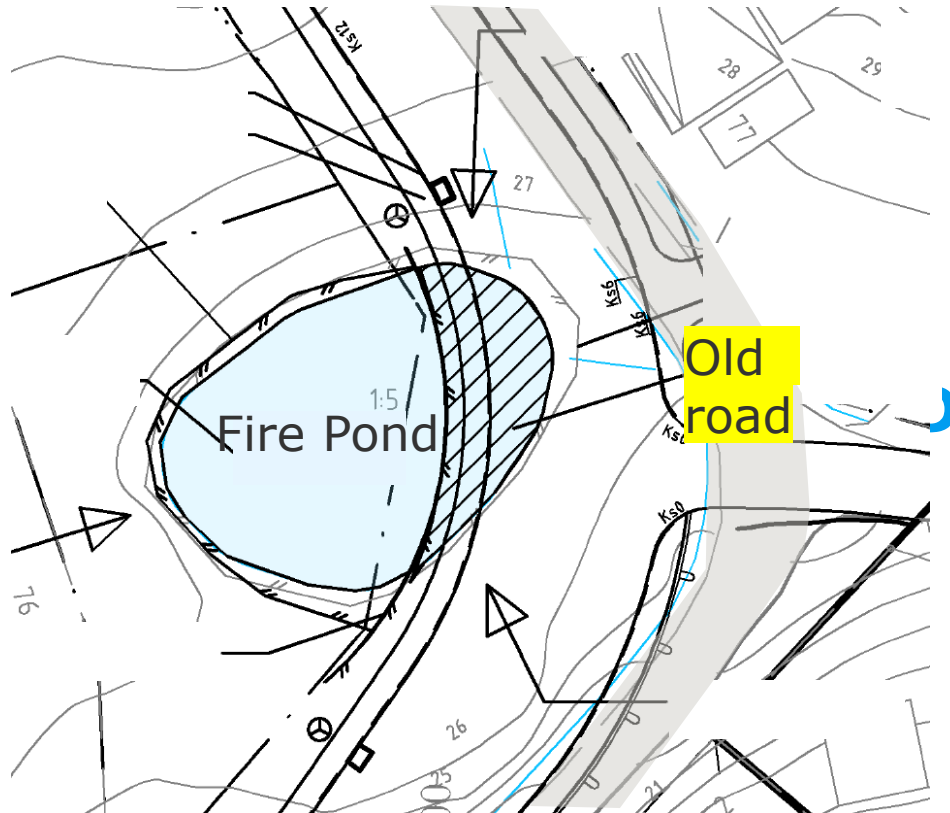
3) FIRE POND IN SWEDEN

- Site located in city of Nacka, (East of Stockholm)
- Sediment of pond contaminated with heavy metals (Zn, Pb & Cd) and PAHs



PLANNED CONSTRUCTION WORKS

Half of the pond area was planned to be used in the widening of a road for bus traffic



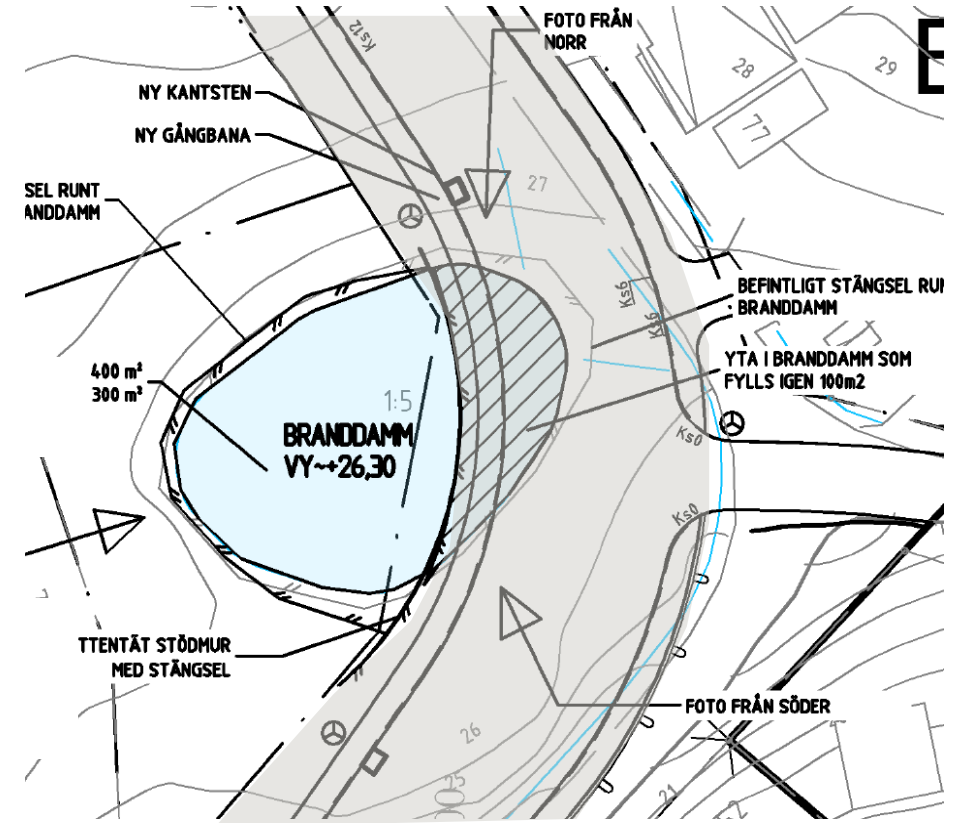
OPTIONS FOR SEDIMENT & ALTERNATIVE STRATEGIES

- Dredging and disposal was the only practicable option if sediment remediation was to be carried out.
- As such three strategies were evaluated using **ROSET**:
 1. 'the zero alternative' - no remedial action, no road
 2. no remedial action, with road
 3. remedial action, with road

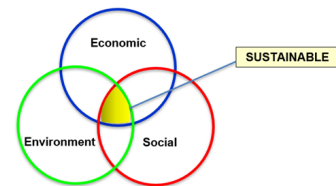


MOST SUSTAINABLE STRATEGY....

Actions	Remediation Options for Assessment		
	1	2	3
Road construction	No	Yes	Yes
Sediment remediation	No	No	Yes
% score - Environmental	71%	64%	70%
% score - Economic	47%	58%	66%
% score - Social	68%	81%	79%
Total sustainability score	62%	67%	72%



Option 3: Remedial action, with the road scored high overall.



Key drivers are the environmental benefit of clean sediment in the pond, the social benefit of the road and the increased property value when cleaned up

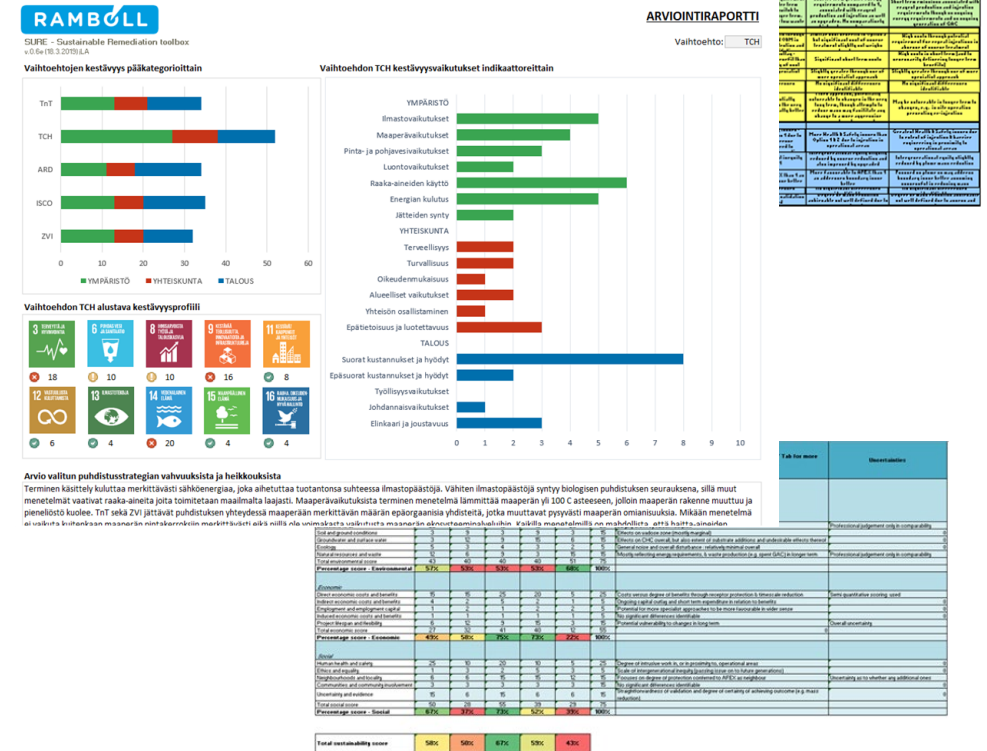
ROSET – SUMMARY OF BENEFITS

- Directly developed from the Tier 1 spreadsheet available from SuRF
- Tool acts as a framing document so justification and rationale for all evaluations made can be recorded to provide transparency to stakeholders especially regulators
- Sensitivity analyses straightforward – what are the factors driving the decision-making process?
- Simplicity and conciseness of approach enables cost savings for client
- Avoidance of complex models makes process easy to understand by layperson

FUTURE DEVELOPMENTS

- Ramboll developed similar Tool 'SURE', previously used in Scandinavia
- Combining both into single entity
- To incorporate the 'framing aspects' of ROSET within a more versatile SURE model applicable to any market / region
- Flexible, digital, decision-making tool
- Work in progress!

Phase	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6
Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7
Phase 7	Phase 8	Phase 9	Phase 10	Phase 11	Phase 12	Phase 13



Bright ideas. Sustainable change.

