



ISM

# SUBMARINE DISMANTLING PROJECT

## Benefits Report

© Crown Copyright (2011)

Issue 1.1 – October 2011

This document has been released as background information to support the Submarine Dismantling Consultation (28 Oct 2011 – 17 Feb 2012). It has been redacted in order to protect personal information.

For further information about the Submarine Dismantling Project, please visit:  
[www.mod.uk/submarinedismantling](http://www.mod.uk/submarinedismantling)

For information about Freedom of Information requests, please visit:  
[www.mod.uk/defenceinternet/freedomofinformation](http://www.mod.uk/defenceinternet/freedomofinformation)

## Document Information

<b>Project Name:</b> Submarine Dismantling Project	
<b>Document Title:</b> Benefits Report	
<b>Issue Status:</b> Issue 1.1	<b>Deliverable Reference:</b>
<b>Produced By:</b> ISM Ash 1b Defence Equipment & Support MOD Abbey Wood Bristol BS34 8JH	<b>Level of Control:</b> This Document is controlled to Level 1/2/3/4 iaw SDP PMP Document Quality Management Procedure. At each level the Document must be Approved and Authorised.

## Document Authorisation

<b>Owner:</b> [REDACTED], SDP Project Manager	<b>Peer Reviewer</b>	If applicable
<b>Author:</b> [REDACTED], BMT	<b>Committee Endorsement:</b>	If applicable
<b>Editorial Checker:</b>	<b>Technical Checker:</b>	If applicable
<b>Document Approver:</b> [REDACTED], SDP Approvals	<b>Approver's Signature:</b>	
<b>Document Authoriser:</b> [REDACTED], SDP Project Manager	<b>Authoriser's Signature:</b>	

## Conditions of Use

The material in this document is subject to Crown copyright protection unless otherwise indicated. The Crown copyright protected material (other than the Royal Arms and departmental or agency logos) may be reproduced free of charge in any format or medium provided it is reproduced accurately and not used in a misleading context. Where any of the Crown copyright items in this document are being republished or copied to others, the source of the material must be identified and the copyright status acknowledged.

The permission to reproduce Crown protected material does not extend to any material in this document which is identified as being the copyright of a third party. Authorisation to reproduce such material must be obtained from the copyright holders concerned.

This document has been produced by the Submarine Dismantling Project (SDP) and is subject to standard Ministry of Defence conditions of use. Control of this document is to be in accordance with SDP PMP Document Quality Management Procedure. Proposed amendments and comments should be directed to the Document Owner at the address above.

## Amendment History

Issue	Date	Details of Amendment	DCCF
0.1	2 Feb 11	Initial Draft Report, based on Draft F of the Benefits Map and Supporting Working Paper	
1.0	31 Mar 11	Updated following comment and clarification	
1.1	13 Oct 11	Updated to reflect traceability to the URD	

## Distribution

SDP Project Board  
SDP Virtual Team  
Workshop Delegates (see 2.2)  
SDP Scrutiny Meeting Members

## Table of Contents

<b>1. INTRODUCTION .....</b>	<b>1</b>
1.1. Context	1
1.2. Place in the SDP Decision Making Process	1
1.3. Document Structure	1
<b>2. BENEFITS MAPPING .....</b>	<b>3</b>
2.1. Outcome of Benefits Mapping Workshop	3
2.2. Attendees	3
2.3. Analysis of Results	4
2.4. Division into OE, IA and OCF	4
2.5. Relationship to Wider Document Set	5
<b>A ANNEX A: BENEFITS MAP</b>	
<b>B ANNEX B: DIVISION OF BENEFITS MAP INTO IA, OE AND OCF</b>	
<b>C ANNEX C: TABLE OF BENEFITS AND DISADVANTAGES</b>	
<b>D ANNEX D: BENEFITS AND DISADVANTAGES RECORDED AT WORKSHOP OF 2 NOVEMBER 2010</b>	
<b>E ANNEX E: LINKAGE TO SEA</b>	
<b>F ANNEX F: ABBREVIATIONS</b>	
<b>G ANNEX G: REFERENCES</b>	

## 1. Introduction

### 1.1. Context

- 1.1.1. The aim of the Submarine Dismantling Project (SDP) is to deliver a safe, secure, environmentally responsible, timely and cost-effective solution for the dismantling of 27 of the UK's defueled nuclear powered submarines.
- 1.1.2. At the end of its Assessment Phase, SDP must submit recommendations in its Main Gate Business Case (MGBC) on options for:
  - The technical approach for removing radioactive materials from submarines (the 'initial dismantling' activity);
  - The site(s) to be used for the initial dismantling activity;
  - The type of site to be used for interim storage of Intermediate Level Waste (ILW) that is awaiting disposal in the UK's proposed Geological Disposal Facility.
- 1.1.3. Before developing its recommendations, the project is committed to public consultation on these options and its proposals to progress the project. The current assessment of these options is set out in an Operational Analysis Supporting Paper (OASP) which summarises the currently available evidence and underpins proposals for the most cost-effective approach to meeting the aims of the project.
- 1.1.4. This report is part of the document set which underpins the OASP. It sets out the potential benefits and disadvantages which may accrue from the implementation of SDP. These benefits and disadvantages have been used to underpin the options analysis process which culminated in the production of the OASP.

### 1.2. Place in the SDP Decision Making Process

- 1.2.1. This document serves to:
  - Characterise the impacts of SDP on the MOD, Government and communities.
  - Establish the foundations of the options analysis process.
  - Provide the starting point for benefits realisation during the subsequent execution of the project.
- 1.2.2. This report is fully consistent with the SDP User Requirements Document (URD), and provides traceability between the User Requirements (URs) and the criteria used in the OE analysis, which was conducted using Multi-Criteria Decision Analysis (MCDA), as described in the OE Report.
- 1.2.3. The benefits and disadvantages identified in this report were developed from a workshop held on 2 November 2010 with a number of Subject Matter Experts (SMEs) drawn from the SDP project and MOD stakeholders.

### 1.3. Document Structure

- 1.3.1. The document is structured as follows:

- Section 2 describes how the benefits and disadvantages were developed from the workshop held on 2 November 2010.
- Annex A contains the complete map of the benefits and disadvantages developed from the workshop.
- Annex B breaks the map of benefits and disadvantages into categories according to how their impact was evaluated, whether it be by Operational Effectiveness (OE) analysis, Investment Appraisal (IA) and the assessment of Other Contributory Factors (OCF).
- Annex C contains a full description of all the benefits and disadvantages, including traceability to the URD.
- Annex D relates the environmentally significant benefits and disadvantages to key characteristics in the Strategic Environment Assessment (SEA).
- Annex E lists the benefits, disadvantages and attributes originally identified at the workshop.
- Annex F contains a list of abbreviations.
- Annex G contains a list of references.

## 2. Benefits Mapping

### 2.1. Outcome of Benefits Mapping Workshop

- 2.1.1. A workshop was held on 2 November 2010 to capture the range of benefits and disadvantages potentially associated with SDP. It served to:
- Generate the raw data to create a map of connected benefits and disadvantages.
  - Ensure that the contents of the URD reflect the benefits and disadvantages associated with SDP.
  - Capture the high level benefits which will be monitored through benefits realisation once SDP passes through Main Gate (MG).
- 2.1.2. The workshop captured 53 benefits and 21 disadvantages, broadly grouped into 6 categories such as 'economic' or 'public perception'. It also captured 6 criteria which it was thought could be used to underpin the generation of values for benefits and disadvantages. The list of benefits and disadvantages identified at the workshop is shown at Annex D.
- 2.1.3. The impacts identified during the workshop were categorised into benefits and disadvantages. The convention was to assume that impacts represent potential benefits unless they are obviously disadvantages (such as *worker dose*). This convention reflects the aspiration for SDP to deliver a positive impact - such as *improving the relationship between MOD, site and community* - whilst accepting that some impacts are likely to be negative.

### 2.2. Attendees

- 2.2.1. The following attended the meeting; those marked in italics facilitated, recorded and analysed the results.

[REDACTED]	BMT – Decision Support
[REDACTED]	SSMG
[REDACTED]	Independent, SDP Advisory Group Observer
[REDACTED]	BMT – Decision Support
[REDACTED]	Nuvia – Technical Criteria
[REDACTED]	BMT - URD
[REDACTED]	DES ISM SDP App1a
[REDACTED]	DUWC – Project Sponsor
[REDACTED]	Defence Estates - SEA
[REDACTED]	Delloitte – Cost modelling
[REDACTED]	DES SM IS-SUSM-PGM LUSM
[REDACTED]	DES SM IS-SUSM-DPCM SUPPORT
[REDACTED]	Asst Hd Approvals, SDP
[REDACTED]	Defence Estates, DES SM F-DE2
[REDACTED]	Defence Estates, DES SM F-DE4

## **2.3. Analysis of Results**

2.3.1. The benefits and disadvantages captured at the workshop were analysed subsequently to:

- Remove or group any benefits or disadvantages considered to be duplicated or very similar (including, occasionally, rewording benefits as disadvantages and vice versa).
- Checking the benefits and disadvantages against the URD and SEA Scoping Report, generating additional impacts that were not developed at the workshop.
- Arranging the benefits and disadvantages into a logical hierarchy.
- Sending the proposed map for review and comment around the workshop attendees and a wider range of stakeholders.

2.3.2. The outcome of this analysis is the benefits map, which has 5 hierarchical levels (although most of the nodes do not extend across all the levels). These levels have no significance beyond organising the benefits and disadvantages. Each benefit is shown as a rectangular box, coloured green, and each disadvantage shown as a rectangular box coloured red.

2.3.3. The criteria were fed into the development of the OE analysis and the generation of Measures of Effectiveness (MoE).

2.3.4. The map is shown at Annex A. Due to limitations of space it is shown across 6 figures, with Figure A-1 showing the top two levels of the map. Figures A-2 to A-6 show each of the second level benefits broken out fully. The second level benefits are:

- Public confidence.
- Socio-economic impact.
- Reduction of impact on operations.
- Reduction in impact on Government and MOD.
- Reduction of environmental and safety impact.

2.3.5. Annex C includes a table which describes each of the benefits and disadvantages in more detail, and relates them to those captured in the workshop (to ensure traceability). This Annex also maps the benefits and disadvantages to the URs in the URD. Annex E specifically maps benefits and disadvantages to the list of Key Environmental Issues specified by the SEA, to demonstrate traceability.

## **2.4. Division into OE, IA and OCF**

2.4.1. The Concept of Analysis (CoA) sets out the approach which will be used to analyse the different options for SDP, which comprises three key assessment streams:

- Analysis of Operational Effectiveness (OE).



- Investment Appraisal (IA).
  - Consideration of Other Contributory Factors (OCF).
- 2.4.2. The ability of different options to deliver benefits and disadvantages has been assessed through a combination of the above. The benefits map was divided into a number of 'zones' identifying which assessment streams were used to analyse the relative performance of each option at delivering benefits or mitigating disadvantages.
- 2.4.3. Benefits and disadvantages relating to public confidence or indirect socio-economic impact (which are not included in the Whole Life Cost (WLC) model underpinning the IA) were considered OCF, as they are not readily measurable.
- 2.4.4. Benefits and disadvantages with direct economic impact have been considered in the IA; all the others could in *principle* be treated in the OE. However, in terms of differentiating between options, it is sometimes more appropriate to use WLC alone to differentiate between the impact on benefits and disadvantages. For example, the benefit *operations conducted safely* assumes that each option will deliver the same standard of regulatory safety, giving the same level of OE performance, but the WLC will vary between them. Accordingly, the remainder of the benefits map has been divided into IA, OE and a combination of IA and OE. When there is a combination of IA and OE there is not 'double accounting': the IA determines the cost of delivering the necessary regulatory or legal standard and the OE any additional performance (such as minimising environmental impact beyond the minimal statutory level).
- 2.4.5. Those benefits and disadvantages falling into the OE categories were extracted and used as the basis of the Multi-Criteria Decision Analysis (MCDA) model which delivered the results of the OE analysis. MoE were generated which fed into the lower levels of the benefits map relevant to the OE to form the MCDA tree. The table in Annex C identifies the criteria used in the MCDA model and links them to the relevant benefits or disadvantages. The criteria are explained fully in the OE Report.
- 2.4.6. Annex B contains the benefits map with the different streams of assessment shown as shading. As with Annex A, this is divided across Figures B-1 to B-6 for ease of display.

## **2.5. Relationship to Wider Document Set**

- 2.5.1. The benefits map is consistent with, and related to, other documents as follows:
- Each UR in the URD is mapped to a benefit or disadvantage.
  - The MCDA model is based on those benefits and disadvantages related to the OE.
  - The MCDA model is based on MoE consistent with the URD.

## A Annex A: Benefits Map

Figure A-1: Top Levels of the Map

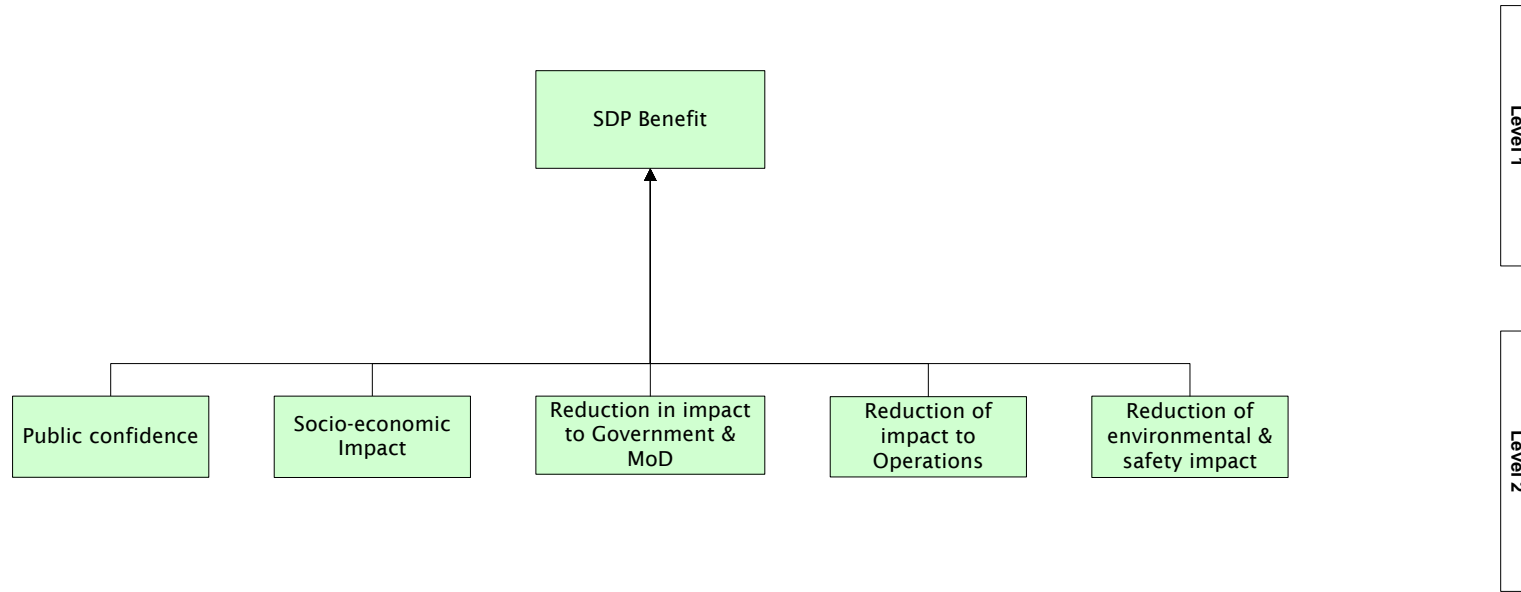


Figure A-2: Public Confidence

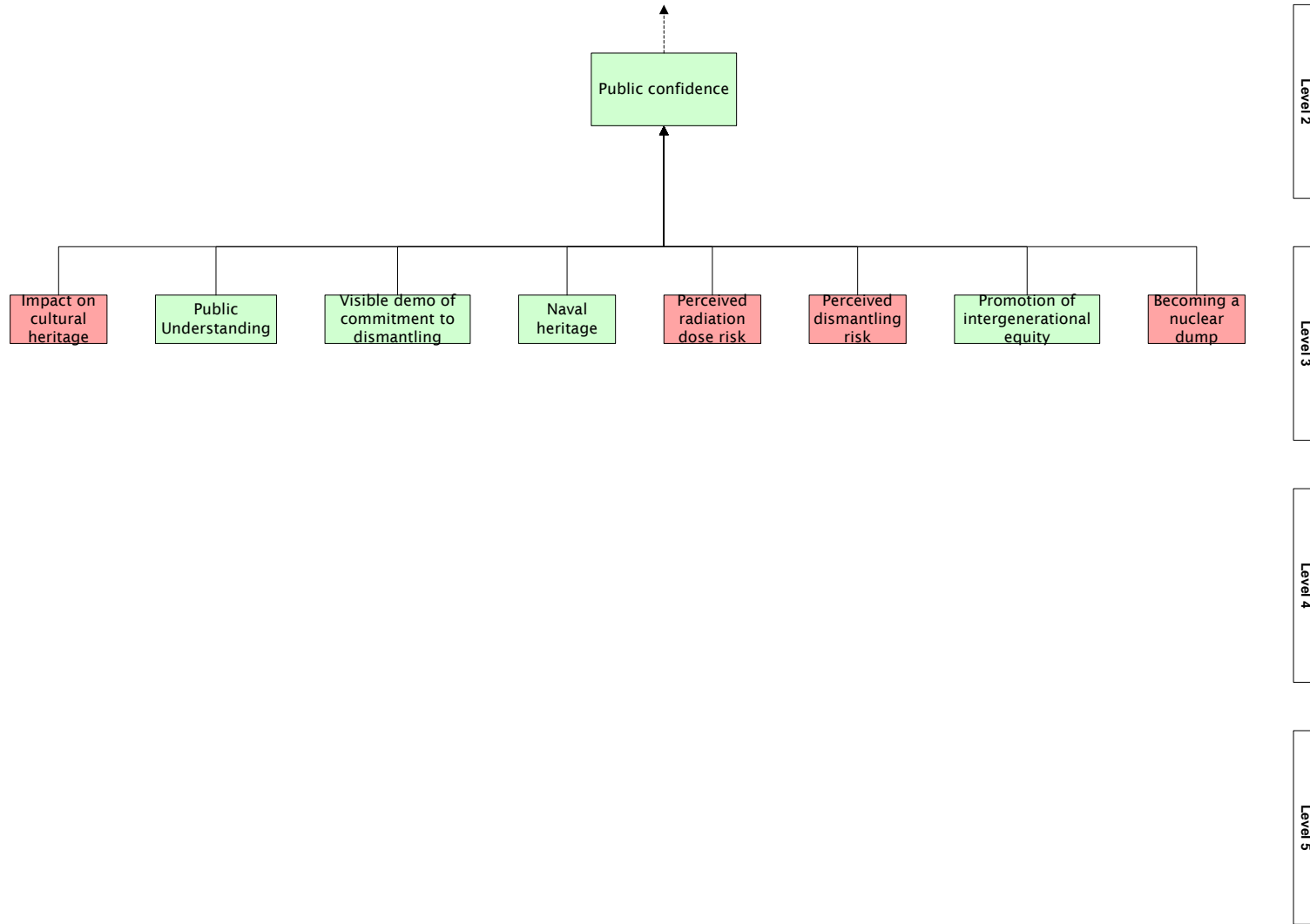
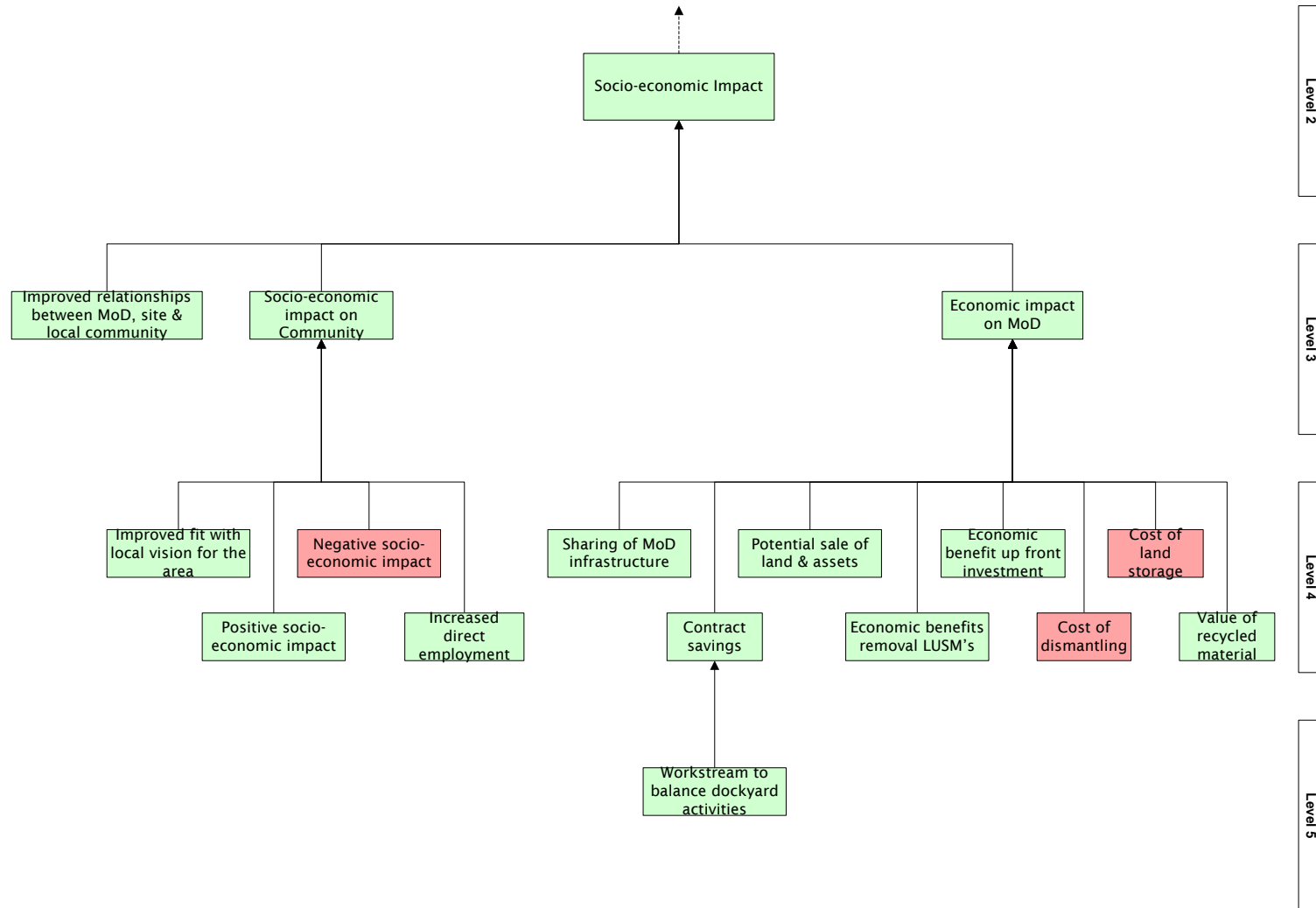


Figure A-3: Socio-economic Impact



**Figure A-4: Reduction in impact to Government & MOD**

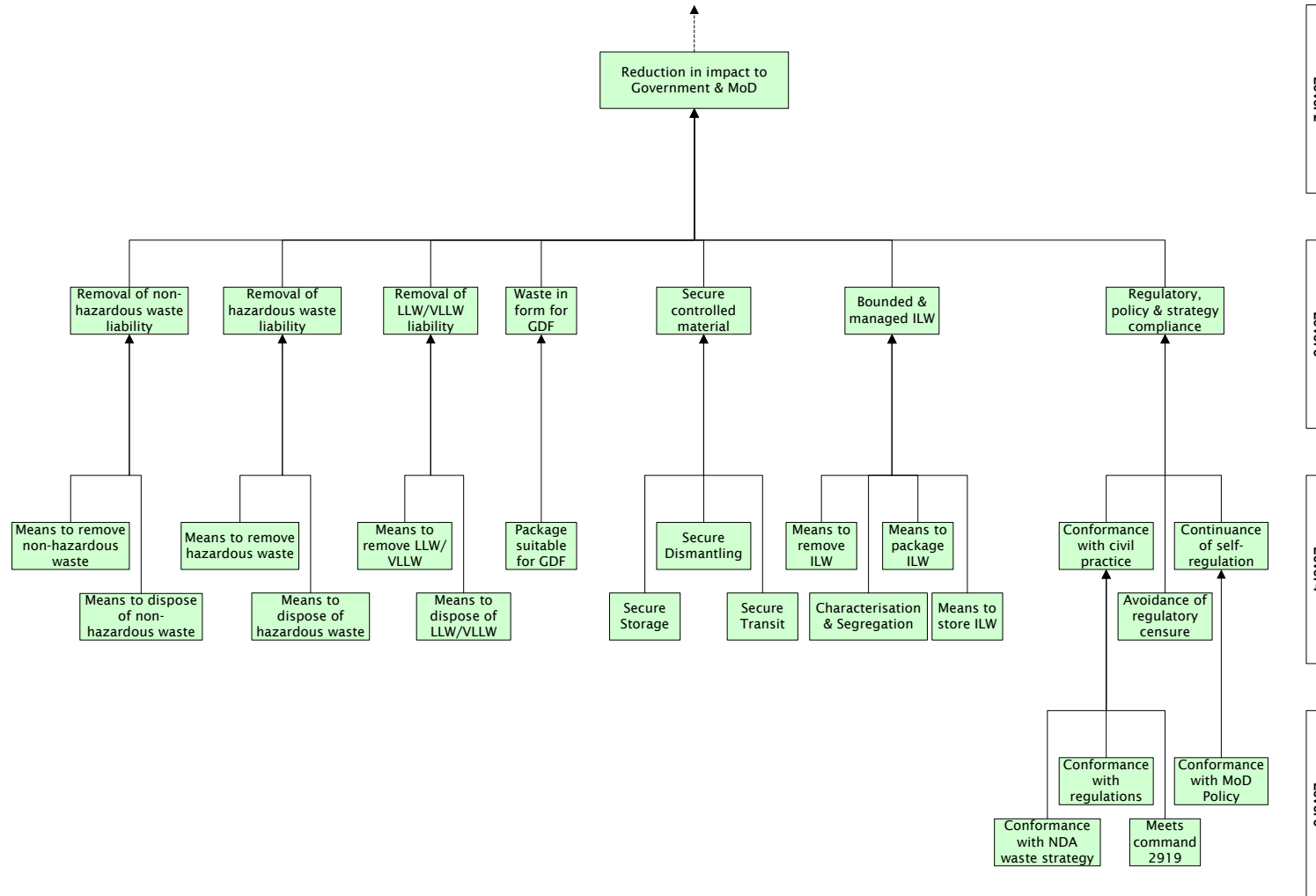


Figure A-5: Reduction of Impact to Operations

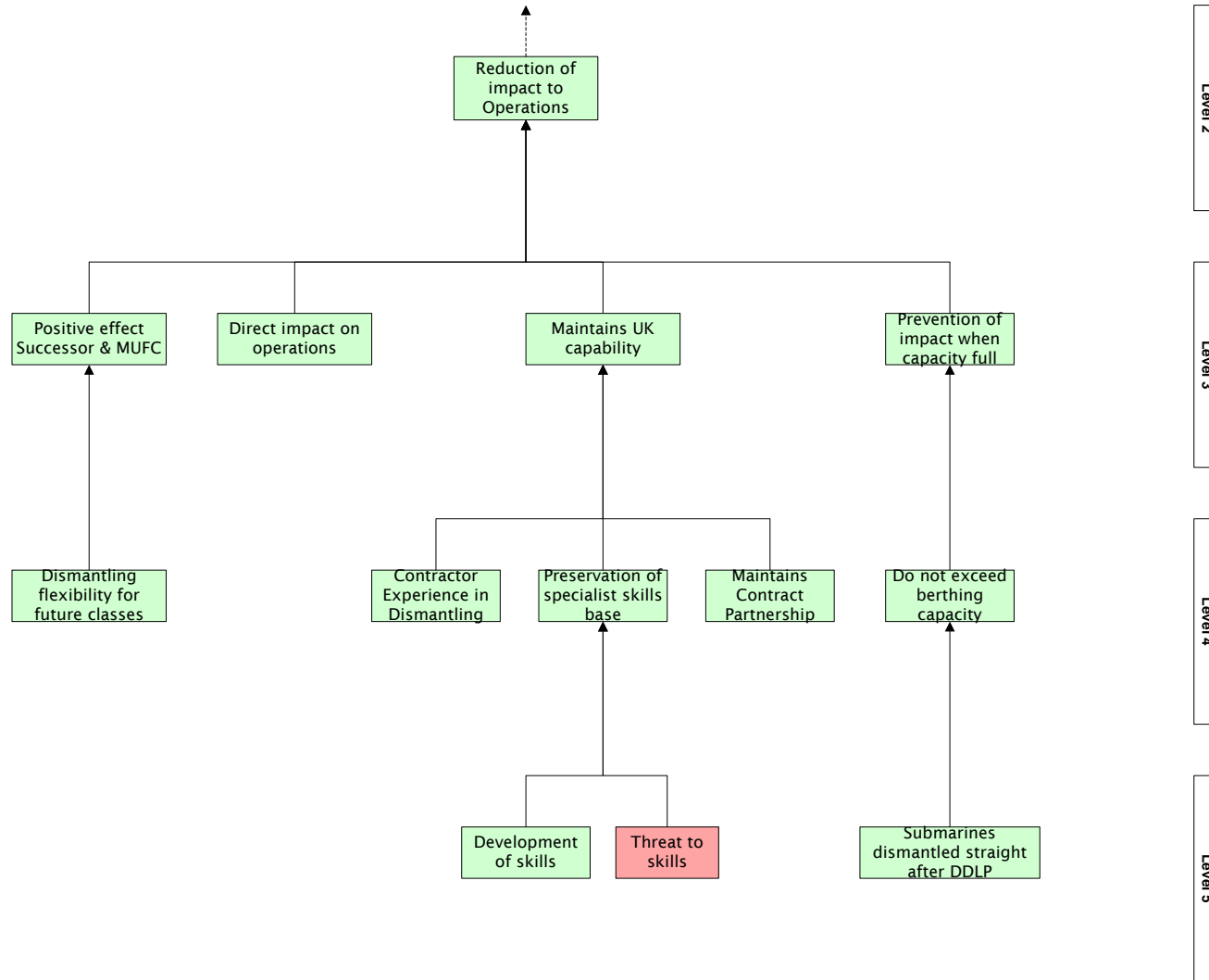
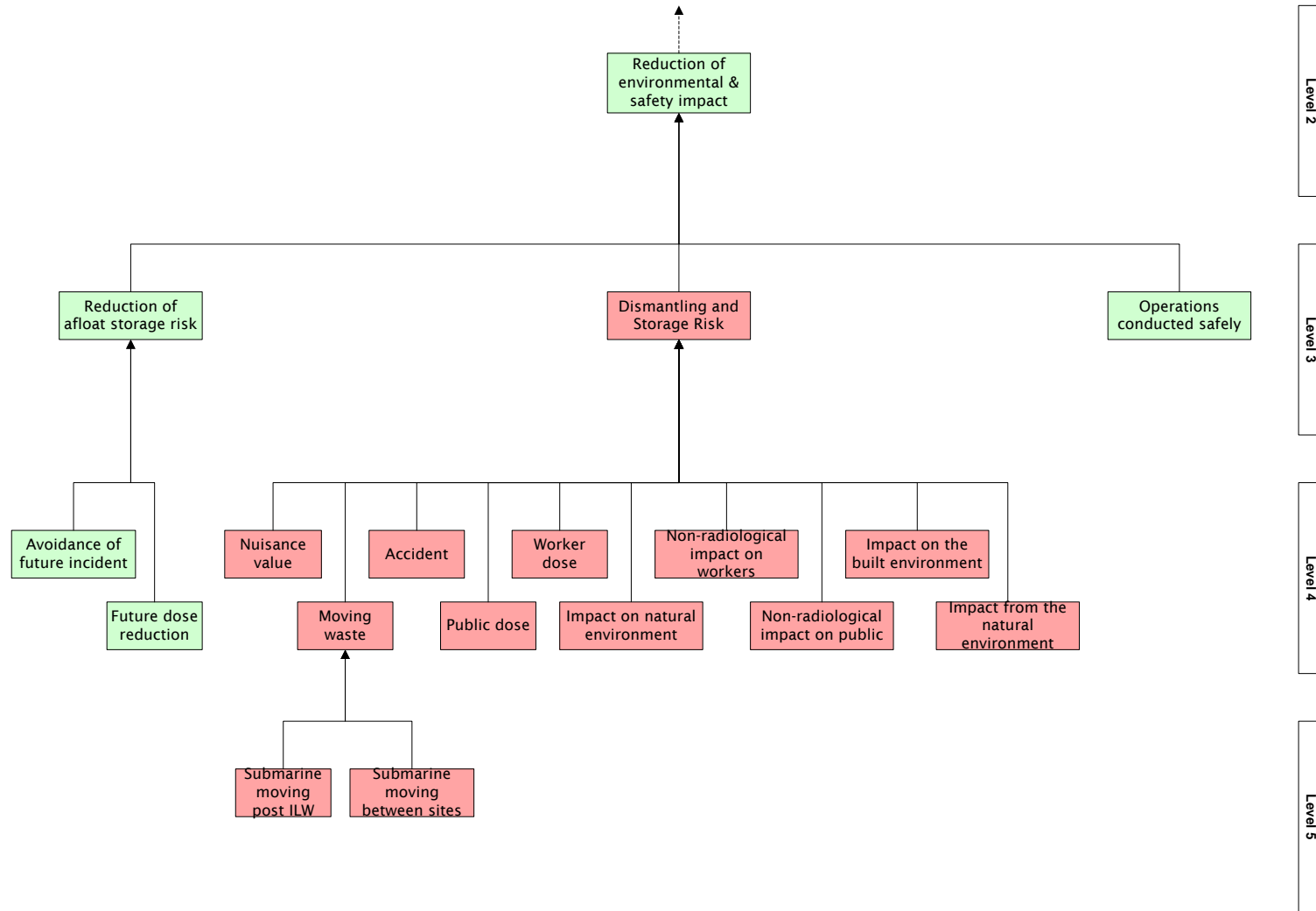


Figure A-6: Reduction of environmental & safety impact



## B Annex B: Division of Benefits Map into IA, OE and OCF

Figure B-1: Public Confidence

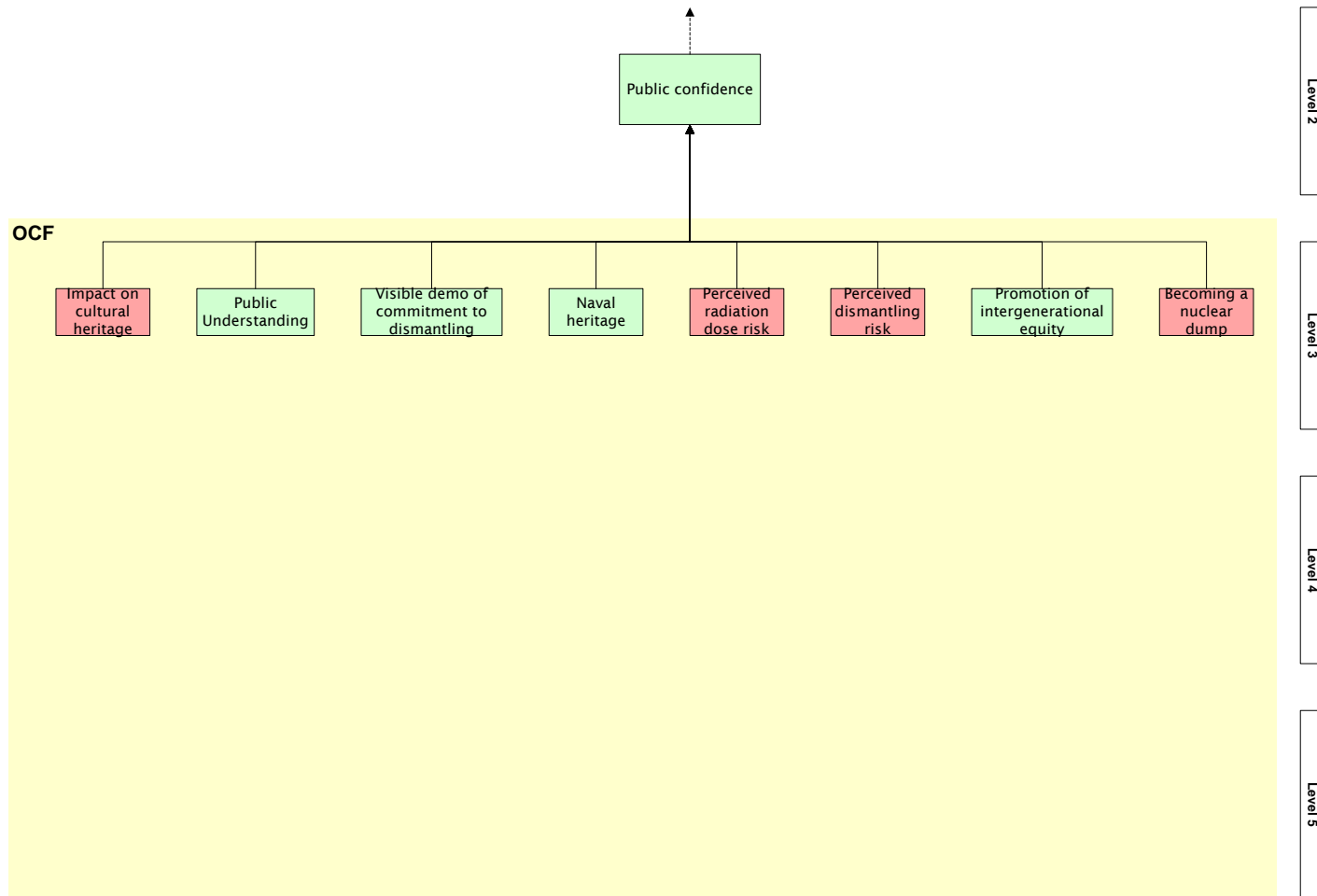




Figure B-2: Socio-economic impact

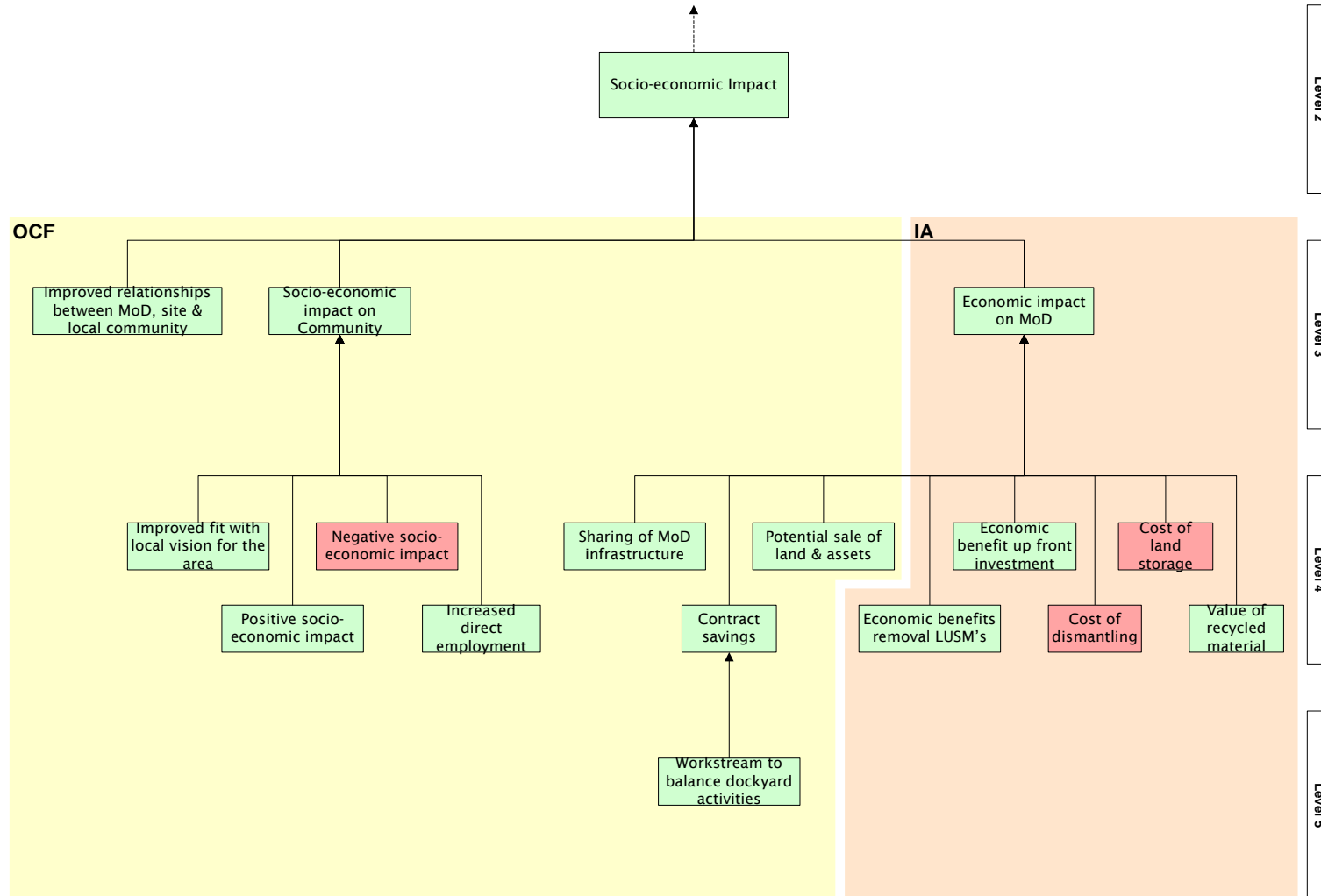


Figure B-3: Reduction in impact to Government & MOD

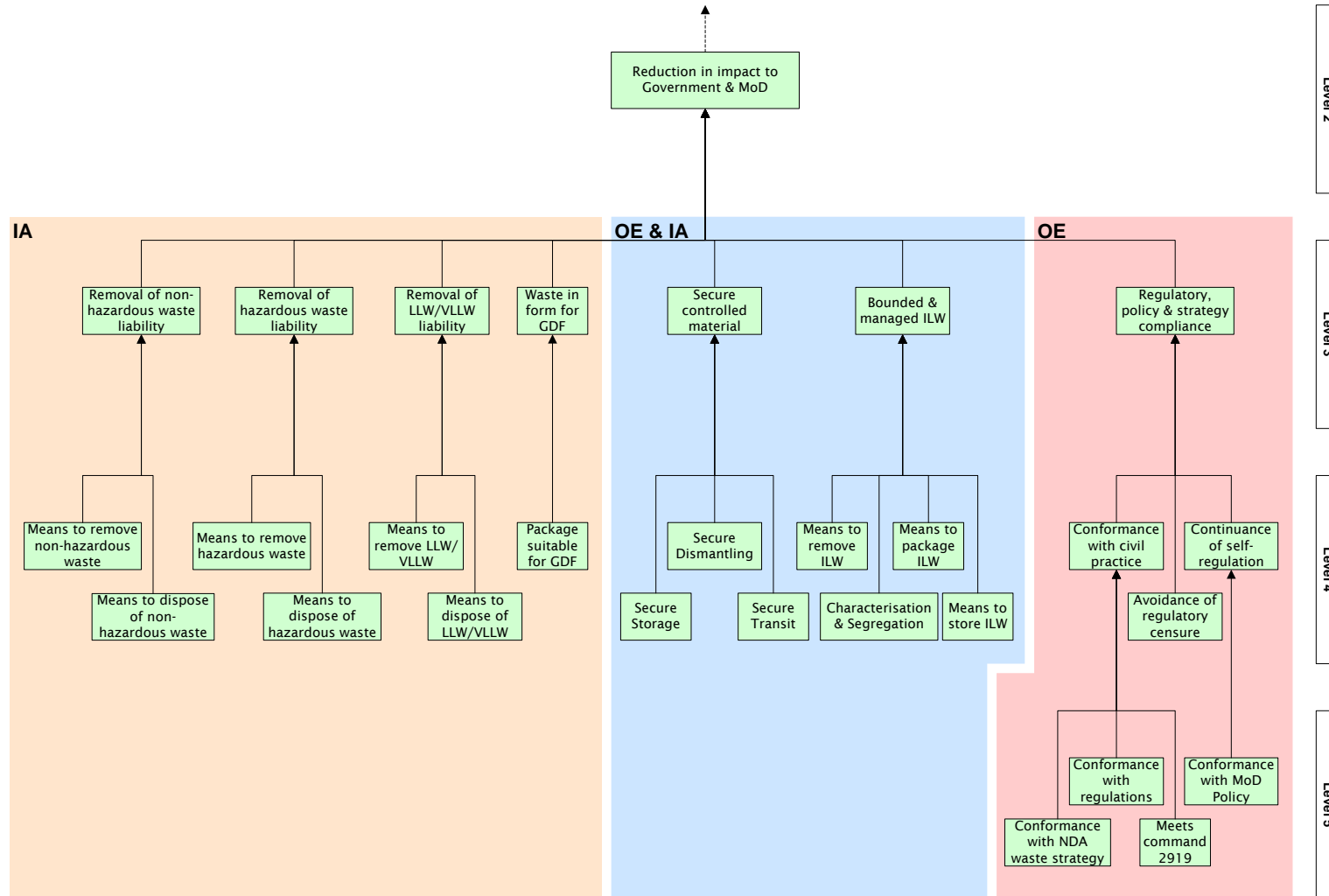


Figure B-4: Reduction of impact to Operations

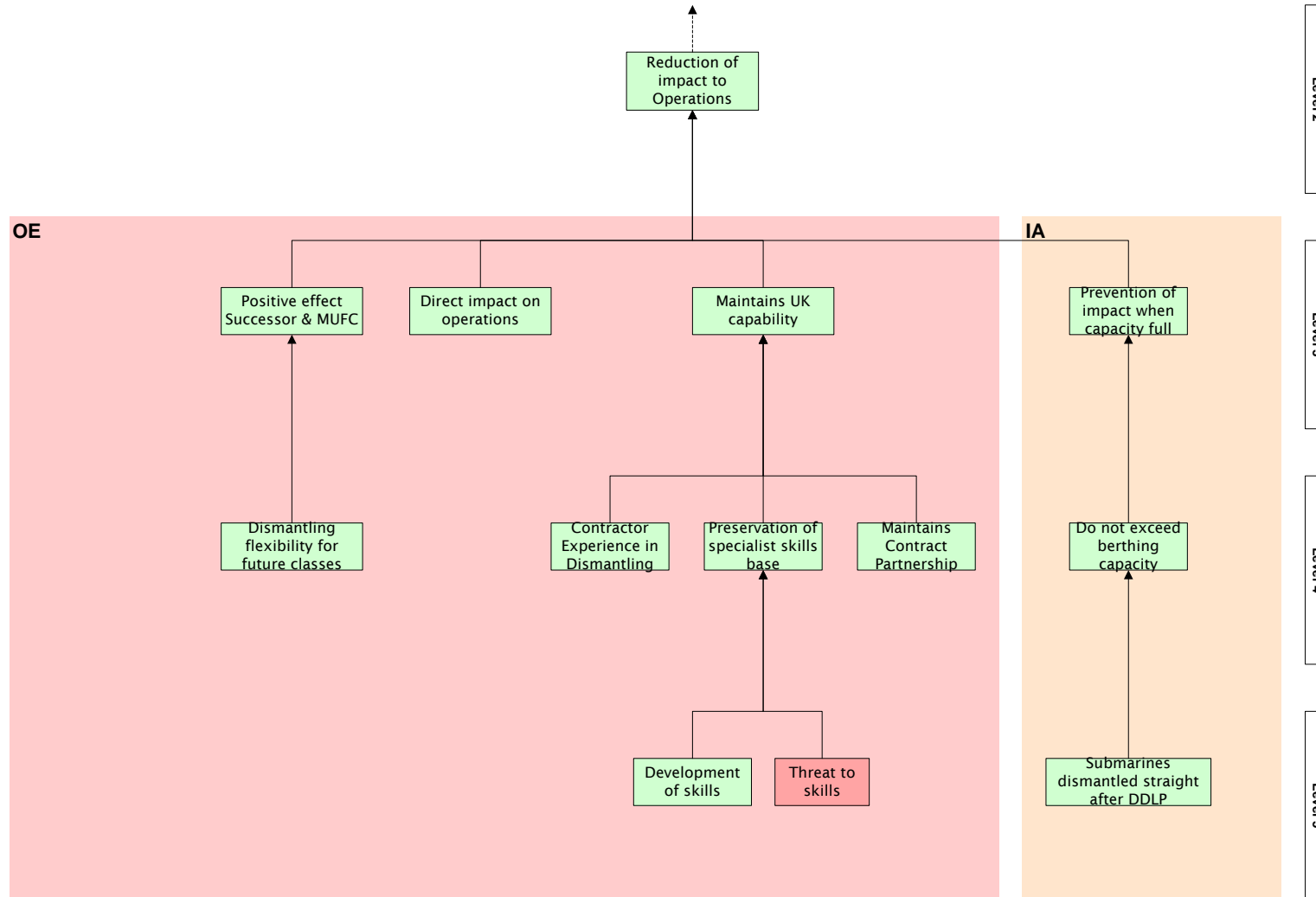
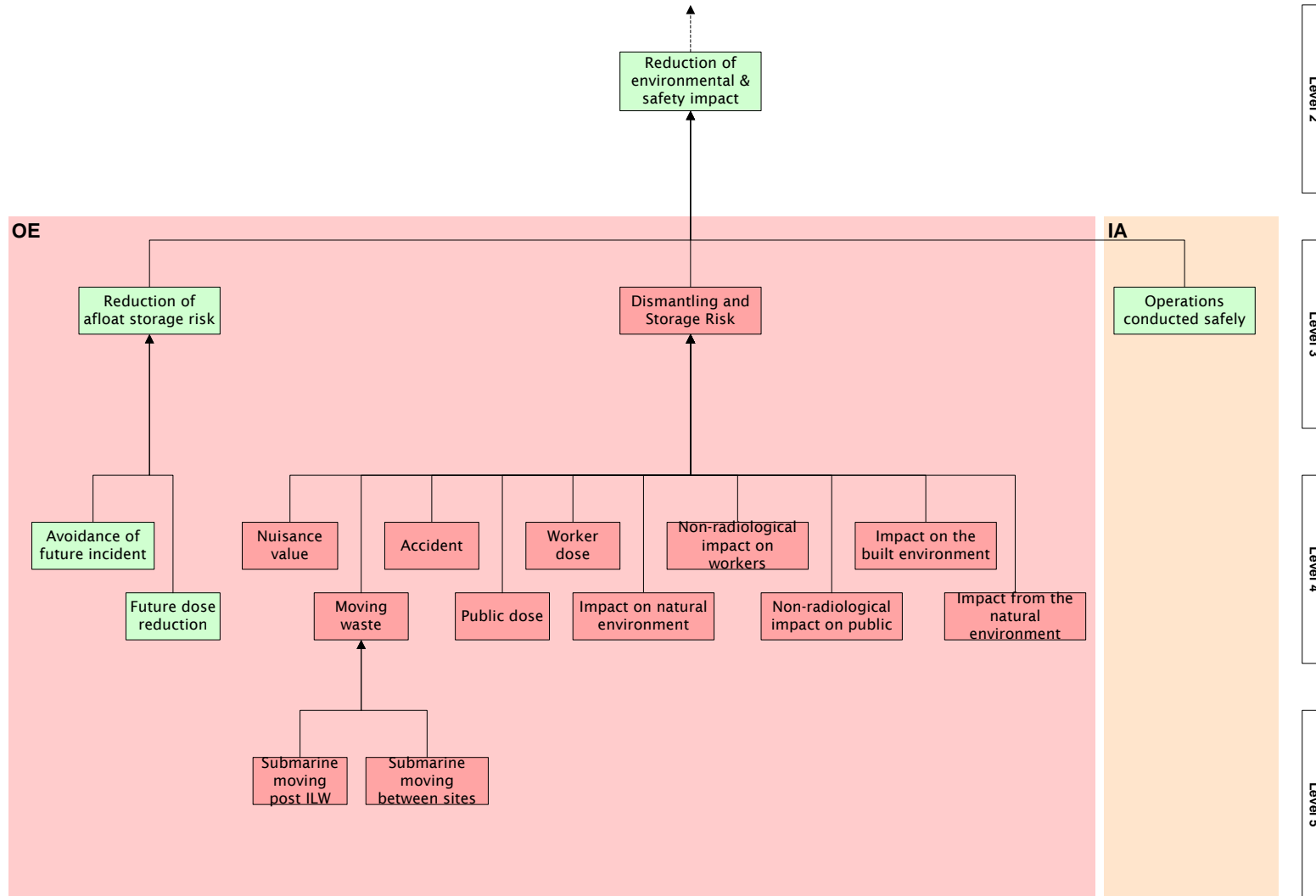


Figure B-5: Reduction of environmental & safety impact



## C Annex C: Table of Benefits and Disadvantages

Level 2 Benefit	Level 3 Benefit	Level 4 Benefit	Level 5 Benefit	Description	Match to Benefit/Disadvantage Captured at Workshop	Link to OCF, IA and/or OE (specific MCDA Criteria)	Link to URD
Public confidence	N/A	N/A	N/A	The benefit or disadvantage of public perception associated with submarine dismantling and waste storage, and its impact on Government and MOD	Public perception of transient dismantling activities	OCF-01 Public Confidence	N/A (OCF)
	Impact on cultural heritage	N/A	N/A	The impact on cultural heritage arising from dismantling and storage	Added from URD	OCF-01 Public Confidence	N/A (OCF)
	Public understanding	N/A	N/A	The opportunity to educate the public about the submarine enterprise and nuclear safety	Educational opportunity	OCF-01 Public Confidence	N/A (OCF)
	Visible demonstration of commitment to dismantling	N/A	N/A	The benefit of the public seeing action being taken to remove an indefinite liability	Seeing dismantling happening	OCF-01 Public Confidence	N/A (OCF)
	Naval heritage	N/A	N/A	The opportunity to preserve naval heritage	Preservation of naval heritage	OCF-01 Public Confidence	N/A (OCF)
	Perceived radiation dose risk	N/A	N/A	The public perception of the risk posed by radiation	Perceived dose threat to the public	OCF-01 Public Confidence	N/A (OCF)
	Perceived dismantling risk	N/A	N/A	The public perception of the risk posed by the physical exercise of submarine dismantling	Public perception of dismantling risk	OCF-01 Public Confidence	N/A (OCF)
	Promotion of intergenerational equity	N/A	N/A	The reduction of an unbounded and indefinite intergenerational liability associated with afloat storage	Reduction of intergenerational equity	OCF-01 Public Confidence	N/A (OCF)
	Perception of "Becoming a nuclear dump"	N/A	N/A	The public perception that the storage site and/or dismantling facilities amount to the local area becoming a nuclear "dumping ground"	"Becoming a nuclear dump"	OCF-01 Public Confidence	N/A (OCF)

Level 2 Benefit	Level 3 Benefit	Level 4 Benefit	Level 5 Benefit	Description	Match to Benefit/ Disadvantage Captured at Workshop	Link to OCF, IA and/or OE (specific MCDA Criteria)	Link to URD	
Socio-economic Impact	N/A	N/A	N/A	Economic benefit (or potential disadvantage) arising from submarine dismantling, across the MOD and the wider community	Added	Mix of OCF-01, OCF-02, OCF-06 & WLC	N/A (OCF)	
	Improved relationships between MOD, site and local community	N/A	N/A	Improving relationships between the MOD, commercial site owner and the local community through greater understanding	Added	OCF-01 Public Confidence	N/A (OCF)	
	Socio-economic impact on community	N/A	N/A	N/A	Overall financial benefit (or disadvantage) to the community, focused on people local to submarine storage, dismantling and subsequent ILW storage	Added	OCF-02 Socio-Economic Impacts	N/A (OCF)
		Improved fit with local vision for the area	N/A	N/A	Achieving a closer fit with the vision for the future of a locality	Added	OCF-01 Public Confidence	N/A (OCF)
		Positive socio-economic impact	N/A	N/A	Benefit associated with the increase in economic activity, or wider negative economic impact on the community, through the presence of submarine dismantling and storage (through increase in indirect employment, infrastructure construction, etc)	Increased socio-economic impact	OCF-02 Socio-Economic Impacts	N/A (OCF)
		Negative socio-economic impact	N/A	N/A	Disadvantage associated with the reduction in economic activity, or wider negative economic impact on the community, through the presence of submarine dismantling and storage (eg. through potential impact on tourism or house prices, etc)	Negative socio-economic – (eg. potential impact on tourism or house prices etc)	OCF-02 Socio-Economic Impacts	N/A (OCF)
		Increased direct employment	N/A	N/A	Increase in direct employment associated with submarine dismantling and storage	Increased local employment	OCF-02 Socio-Economic Impacts	N/A (OCF)

Level 2 Benefit	Level 3 Benefit	Level 4 Benefit	Level 5 Benefit	Description	Match to Benefit/ Disadvantage Captured at Workshop	Link to OCF, IA and/or OE (specific MCDA Criteria)	Link to URD
	Economic impact on MOD	N/A	N/A	Specific economic benefit (or potential disadvantage) to the MOD from submarine dismantling	<i>Added</i>	Mix of OCF-06 & WLC	N/A (OCF)
		Sharing of MOD infrastructure	N/A	Savings achieved by the MOD by sharing facilities between dismantling and/or storage and other operations (potentially includes MOD and Government infrastructure)	Sharing of infrastructure	OCF-06 Commercial Considerations	N/A (OCF)
		Contract savings	N/A	Improvements in price to MOD for services from contractors on the basis of greater workload and more consistent stream of work	Stream of work for ship breakers + Submarine declared free for ship breaking	OCF-06 Commercial Considerations	N/A (OCF)
			Workstream to balance dockyard activities	Enables contractors to spread operations and the workforce across a wider range of activities, flattening out troughs and peaks in demand and increasing cost-effectiveness	Workstream to balance operations + Minimal release of manpower	OCF-06 Commercial Considerations	N/A (OCF)
		Potential sale of land & assets	N/A	Land and other assets may be saleable once the number of submarines stored afloat is reduced	Allows sale of land and assets	OCF-06 Commercial Considerations	N/A (OCF)
		Economic benefits remove LUSM's	N/A	Reductions or removal in cost achieved by having a smaller number of submarines in afloat storage and requiring regular monitoring and support work	Removes increasing maintenance liability	WLC	UR1.1.1
		Economic benefits up front investment	N/A	Reductions in cost for the MOD by reducing the number or scale of basins required for afloat storage; this does not remove the maintenance liability for the basins but could reduce the associated costs	Removes liability of maintaining basin	WLC	UR1.1.1
		<i>Cost of dismantling</i>	<i>N/A</i>	<i>Costs associated with submarine dismantling (including the infrastructure and all stages associated with dismantling)</i>	<i>Added</i>	WLC	UR1.1.1

Level 2 Benefit	Level 3 Benefit	Level 4 Benefit	Level 5 Benefit	Description	Match to Benefit/ Disadvantage Captured at Workshop	Link to OCF, IA and/or OE (specific MCDA Criteria)	Link to URD
		Cost of land storage	N/A	Costs associated with storing either submarines afloat, or the waste generated (and not recycled or disposed of) as a consequence	<i>Added</i>	WLC	UR1.1.1
		Value of recycled material	N/A	Recycling valuable material from the submarines once the ILW and other liabilities have been removed	Recycling value + Release 'recyclable' asset (metal etc)	WLC	UR1.1.2
Reduction in impact to Government & MOD	N/A	N/A	N/A	Reduction in the risk that the Government and MOD will be required to spend money or devote time to managing the consequences of indefinite afloat storage	Demonstration of ability to deal with problem & technology; reduction in risk	Mix of WLC & 1-POL, 2-POL, 4-POL, 5-POL	UR2.1.1, UR2.2.1, UR2.3.1, UR2.4.1, UR2.5.1, UR2.5.2, UR2.5.3, UR2.6.1, UR2.6.2
	Removal of non-hazardous waste liability	N/A	N/A	The removal of non-hazardous waste liability from submarines, including material suitable for recycling	<i>Added from URD</i>	WLC	UR2.1.1
		Means to remove non-hazardous waste	N/A	The development and implementation of appropriate submarine-specific means of removing non-hazardous waste	<i>Added from URD</i>	WLC	UR2.1.1
		Means to dispose of non-hazardous waste	N/A	The development and implementation of appropriate means of disposing of non-hazardous waste	<i>Added from URD</i>	WLC	UR2.1.1
	Removal of hazardous waste liability	N/A	N/A	The removal of a hazardous waste liability associated with submarines stored afloat	Remove hazardous waste liability	WLC	UR2.2.1
		Means to remove hazardous waste	N/A	The development and implementation of appropriate submarine-specific means of removing hazardous waste	<i>Added from URD</i>	WLC	UR2.2.1
		Means to dispose of hazardous waste	N/A	The development and implementation of appropriate means of disposing of hazardous waste	<i>Added from URD</i>	WLC	UR2.2.1



Level 2 Benefit	Level 3 Benefit	Level 4 Benefit	Level 5 Benefit	Description	Match to Benefit/ Disadvantage Captured at Workshop	Link to OCF, IA and/or OE (specific MCDA Criteria)	Link to URD
	Removal of LLW/VLLW liability	N/A	N/A	The removal of a LLW/VLLW liability associated with submarines stored afloat	<i>Added</i>	WLC	UR2.3.1
		Means to remove LLW/VLLW	N/A	The development and implementation of appropriate submarine-specific means of removing LLW/VLLW	Remove LLW liability	WLC	UR2.3.1
		Means to dispose of LLW/VLLW	N/A	The development and implementation of appropriate means of disposing of LLW/VLLW	<i>Added from URD</i>	WLC	UR2.3.2
	Waste in form for GDF	N/A	N/A	The ability to generate waste in a form suitable for storage in the GDF	Waste in form for GDF	WLC	UR2.5.2
		Package suitable for GDF	N/A	The potential benefit from having an ILW package appropriate for storage in the GDF	<i>Risk that the package not acceptable to GDF</i>	WLC	UR2.5.2
	Secure controlled material	N/A	N/A	Ensuring that all material and information associated with SDP is adequately secure	<i>Added from URD</i>	WLC to reach legislative minimum + 4-POL	UR2.4.1
		Secure storage	N/A	Ensuring security in relation to storage	<i>Classification of non-shape destroyed enduring material (split into three)</i>	WLC to reach legislative minimum + 4-POL	UR2.4.1
		Secure dismantling	N/A	Ensuring security in relation to dismantling	<i>Classification of non-shape destroyed enduring material (split into three)</i>	WLC to reach legislative minimum + 4-POL	UR2.4.1
		Secure transit	N/A	Ensuring security in relation to transit	<i>Classification of non-shape destroyed enduring material (split into three)</i>	WLC to reach legislative minimum + 4-POL	UR2.4.1

Level 2 Benefit	Level 3 Benefit	Level 4 Benefit	Level 5 Benefit	Description	Match to Benefit/ Disadvantage Captured at Workshop	Link to OCF, IA and/or OE (specific MCDA Criteria)	Link to URD
	Bounded and managed ILW	N/A	N/A	The creation of an ILW liability that is bounded in terms of its amount, classification, storage requirements and future treatment	ILW quantities will be bounded	WLC to deliver objective of bounded and managed ILW + 1-POL	UR2.5.1, UR2.5.2, UR2.5.3
		Means to remove ILW	N/A	The development and implementation of means to remove ILW	<i>Added</i>	WLC to deliver objective of bounded and managed ILW + 1-POL	UR2.5.1
		Characterisation & segregation	N/A	The benefit of characterising and segregating waste into ILW, LLW and VLLW	Declassification of waste is a opportunity	WLC to deliver objective of bounded and managed ILW + 1-POL	UR2.5.1
		Means to package ILW	N/A	The development and implementation of means to package ILW	Place ILW liability in more manageable form + greater control of ILW storage env. (split into two)	WLC to deliver objective of bounded and managed ILW + 1-POL	UR2.5.2
		Means to store ILW	N/A	The development and implementation of means to store ILW	Place ILW liability in more manageable form + greater control of ILW storage env. (split into two)	WLC to deliver objective of bounded and managed ILW + 1-POL	UR2.5.3
	Regulatory, policy & strategy compliance	N/A	N/A	Demonstration that the MOD is a responsible nuclear operator, leading to an enhanced reputation	MOD responsible nuclear operator	Mix of 2-POL & 5-POL	UR2.6.1, UR2.6.2
		Conformance with civil practice	N/A	Demonstrating conformance with civil practice, providing potential cost savings and demonstrating 'joined up' Government	Synergy with ILW policy	5-POL	UR2.6.1, UR2.6.2

Level 2 Benefit	Level 3 Benefit	Level 4 Benefit	Level 5 Benefit	Description	Match to Benefit/ Disadvantage Captured at Workshop	Link to OCF, IA and/or OE (specific MCDA Criteria)	Link to URD
			Alignment with NDA waste strategy	Demonstrating alignment with the proposed NDA waste strategy, providing potential cost savings and demonstrating Government coherence	Tie into NDA strategy	5-POL	UR2.6.2
			Conformance with regulations	Conforming to regulatory policy to demonstrate good practice	Conformance regulatory policy – methodology + conformance regulatory policy – impacts + conformance with waste hierarchy management	5-POL	UR2.6.2
			Meets Command 2919	Demonstrating, as a matter of reputation, that the MOD meets Government Command 2919	Policy meets Command 2919	5-POL	UR2.6.2
		Avoidance of regulatory censure	N/A	Avoiding the risk of costs imposed by regulatory censure on MOD processes	Avoidance of regulatory censure	2-POL	UR2.6.1
		Continuance of self-regulation	N/A	Ensuring continued MOD self-regulation of nuclear matters	Continuance of MOD self regulation	2-POL	UR2.6.1
			Conformance with MOD Policy	Demonstrating good practice to enhance the reputation of the MOD and the submarine enterprise	Demonstration of good practice	2-POL	UR2.6.2
Reduction of impact to operations	N/A	N/A	N/A	Reduction of risk to current and future operations by removing the liability attached to out of service nuclear submarines	Provides valid way forward for future operations	Mix of 1-OP, 2-OP, 3-OP, 4-OP	UR3.2.2
	Positive effect Successor & MUFC	N/A	N/A	Supporting the Business Cases for Successor and MUFC by demonstrating that the liability attached to out of service submarines is being removed	Supports Business Case for MUFC and Successor	1-OP	UR3.1.2

Level 2 Benefit	Level 3 Benefit	Level 4 Benefit	Level 5 Benefit	Description	Match to Benefit/ Disadvantage Captured at Workshop	Link to OCF, IA and/or OE (specific MCDA Criteria)	Link to URD
		Dismantling flexibility for future classes	N/A	Ensuring that the dismantling and storage facilities have the flexibility to accommodate Astute class and SSBN(F)	<i>Added from URD</i>	2-OP	UR3.1.1
	Direct impact on operations	N/A	N/A	The direct effect on operations of submarine dismantling, such as the requirement of escort vessels for the transport of submarines to a breaking yard, or of large components such as RC's	<i>Added</i>	1-OP	UR3.2.1
	Maintains UK capability	N/A	N/A	Maintenance of the UK submarine enterprise, including military capability and the UK industrial base; includes leverage of dismantling expertise for bilateral discussions with US or France	Maintaining UK capability + Information exchange with US/France	4-OP	UR3.1.2
		Contractor experience in dismantling	N/A	Provides contractors with potentially world leading dismantling skills and knowledge for transfer to allies	Contractor experience in dismantling	4-OP	UR3.3.2
		Preservation of specialist skills base	N/A	Preservation of nuclear skills associated with the submarine enterprise	Preservation of skills base	4-OP	UR3.3.2
			Development of skills	Supports the development of skills, including (low level) nuclear skills	Development of (lower level) nuclear skills	4-OP	UR3.3.2
			<b>Threat to skills</b>	<b>Creates a threat to existing skills (including nuclear skills) by spreading them more thinly across a wider range of activities</b>	<b>Dangers of skill loss</b>	3-OP	UR3.3.1
		Maintains contract partnership	N/A	Supports the ongoing existence of UK capability by providing contracts to industry	Maintaining contract partnership to utilise shipyard	1-OP	UR3.3.3

Level 2 Benefit	Level 3 Benefit	Level 4 Benefit	Level 5 Benefit	Description	Match to Benefit/ Disadvantage Captured at Workshop	Link to OCF, IA and/or OE (specific MCDA Criteria)	Link to URD
	Prevention of impact when capacity full	N/A	N/A	Keeps available afloat storage berthing (as when full additional space will be required to store out of service submarines, which would adversely affect operations)	To prevent operational impact when capacity full	WLC	UR3.4.1
		Do not exceed berthing capacity	N/A	Prevention of afloat storage berthing being exceeded, which would drive cost upwards to provide additional space	Do not exceed berthing capability + release mooring space	WLC	UR3.4.1
			Submarines dismantled straight after DDLP	The ability to dismantle submarines straight after DDLP will deliver flexibility to the dismantling and storage process	Added from URD	WLC	UR3.4.2
Reduction of environmental & safety risk	N/A	N/A	N/A	Reduction in the likelihood and severity of environmental impact arising from submarine dismantling and waste storage; and minimising the risk to safety	Avoidance of increased environmental liability + Increased 'passive' safety	Mix of WLC +3-POL, 1-H&S, 2-H&S, 3-H&S, 4-H&S, 5-H&S, 1-ENV, 2-ENV, 3-ENV, 4-ENV, 5-ENV, 6-ENV	UR4.1.1, UR4.1.2, UR4.1.3, UR4.2.1, UR4.2.2, UR4.3.1
	Reduction of afloat storage risk	N/A	N/A	Reduction in the risk of a future event creating a costly and damaging impact on the environment	Reduction in risk + Reduction in risk - public	Mix of WLC + 1-H&S, 2-H&S, 3-H&S, 4-H&S, 5-H&S	UR4.2.1
		Avoidance of future incident	N/A	Avoiding a specific incident arising through indefinite afloat storage as the submarines age	Avoidance of potential environmental incident + Removes afloat storage liability	WLC to deliver objective of bounded and managed ILW + 3-H&S, 4-H&S, 5-H&S	UR4.2.1
		Future dose reduction	N/A	Reduction in dose from submarines if they are left in storage	Dose reduction over time	WLC to deliver objective of bounded and managed ILW + 1-H&S, 2-H&S	UR4.2.1

Level 2 Benefit	Level 3 Benefit	Level 4 Benefit	Level 5 Benefit	Description	Match to Benefit/ Disadvantage Captured at Workshop	Link to OCF, IA and/or OE (specific MCDA Criteria)	Link to URD
	Dismantling and storage risk	N/A	N/A	The potential increase in the probability or impact of an environmental incident through undertaking dismantling	Interim increase in environmental impact + Transient risks with dismantling	Mix of 3-POL, 3-H&S, 4-H&S, 5-H&S, 1-ENV, 2-ENV, 3-ENV, 4-ENV, 5-ENV, 6-ENV	UR4.1.1, UR4.1.2, UR4.1.3, UR4.2.1, UR4.2.2
		Nuisance value	N/A	The nuisance associated with dismantling and/or ILW storage activities; primarily the impact of noise and vibration to the public	Nuisance value of transitory risk	3-ENV	UR4.2.2
		Moving waste	N/A	The risks associated with moving waste (and particularly ILW) from the submarines to the storage location	Moving waste	3-POL	UR4.1.1
			Submarine moving post ILW	The risks associated with moving a submarine once radiological dismantling has occurred and the ILW, LLW/VLLW and hazardous waste is removed	Moving subs post ILW extraction	3-POL	UR4.1.2
			Submarine moving between sites	The movement of submarines between sites in the instance of dual site dismantling, if different processes are used at different sites	Moving submarines to dismantling sites	3-POL	UR4.1.3
		Accident	N/A	The probability of an accident occurring through dismantling, transportation and/or storage	Added	3-H&S, 4-H&S, 5-H&S	UR4.2.1
		Public dose	N/A	The radiation dosage to which the public will be exposed through the dismantling and subsequent storage process	Dose to public	1-ENV	UR4.2.1
		Worker dose	N/A	The radiation dosage to which workers will be exposed through the dismantling and subsequent storage process	Worker dose	1-H&S	UR4.2.1
		Impact on natural environment	N/A	The impact on the natural environment arising from dismantling and storage	Added from URD	2-ENV, 4-ENV	UR4.2.1

Level 2 Benefit	Level 3 Benefit	Level 4 Benefit	Level 5 Benefit	Description	Match to Benefit/ Disadvantage Captured at Workshop	Link to OCF, IA and/or OE (specific MCDA Criteria)	Link to URD
		Non-radiological impact on workers	N/A	The impact on workers from hazardous waste and other non-radiological hazards arising from dismantling	Added from SEA	2-ENV	UR4.2.1
		Non-radiological impact on public	N/A	The impact on the public from hazardous waste and other non-radiological hazards arising from dismantling; this includes psychological impact	Added from SEA	3-ENV	UR4.2.1
		Impact on the built environment	N/A	The impact on the townscape arising from dismantling, including visual impact, affect of access roads, etc	Added from SEA	5-ENV	UR4.2.2
		Impact from the natural environment	N/A	The potential impact of flooding and other natural effects on the dismantling enterprise, particularly in terms of the impact of climate change	Added from SEA	6-ENV	UR4.2.2
	Operations conducted safely	N/A	N/A	Ensuring that all dismantling and storage operations are conducted as safely as possible	Added from URD	WLC	UR4.3.1
REMOVED				Too general – covered in other benefits	Sustainability – reducing future liability	N/A	N/A
REMOVED				Minor issue which was strongly debated at the workshop	Lessons learned can be fed into operations	N/A	N/A
REMOVED				Removed as it considered covered in the costs associated with dismantling and storage operations	Impact on HMNB, NDA. MOD	N/A	N/A
REMOVED				SDP will result in creation of waste from 'liability' but likely to happen even if subs stay afloat. Therefore this disadvantage has been removed.	Creation of waste from liability	N/A	N/A
REMOVED				Technical factors which will form attributes –	Project risk	N/A	N/A

Level 2 Benefit	Level 3 Benefit	Level 4 Benefit	Level 5 Benefit	Description	Match to Benefit/ Disadvantage Captured at Workshop	Link to OCF, IA and/or OE (specific MCDA Criteria)	Link to URD
				now superseded by detailed work on MoE	Uncertainty in technical approach	N/A	N/A
					Proving technical approach	N/A	N/A
					Investment in new infrastructure	N/A	N/A
				Timing issues which will be handled by risk management in the IA	Need for New licensed or authorised sites	N/A	N/A
					Confidence in obtaining planning permission	N/A	N/A



## D Annex D: Benefits and Disadvantages Recorded at Workshop of 2 November 2010

The table below lists all of the benefits (black), disadvantages (red) and attributes/criteria (italics) developed at the workshop of 2 November 2010.

<p><b>Liability/ Technical</b>            Demonstration of ability to deal with problem            Remove LLW liability            Remove hazardous waste liability            Release recyclable assets (metals etc)            Reduction in risk            Increased 'passive' safety            ILW quantities will be bounded            Place ILS in more manageable form            Greater control of ILW storage            Waste in form for GDF  <i>Risk that the package is not acceptable to GDF</i>  <i>Creation of waste from 'liability'</i>            Declassification of waste is an opportunity  <i>Classification of non-shape destroyed material</i>  <i>Moving submarines to dismantling point</i>  <i>Moving waste</i>  <i>Transient risks with dismantling</i>  <i>Moving submarines post-ILW extraction</i></p> <p><b>Economic &amp; Commercial</b>            Work stream to balance operations            Minimal release of manpower            Preservation of skills base  <i>Dangers of skill loss</i>  <i>Confidence in obtaining planning consent</i>            Stream of work for ship breaker            Submarine declared free for ship breaking            Recycling value            Maintaining UK capability  <i>Negative socio-economic effects (house prices etc)</i>            Maintaining contract partnership to utilise shipyards            Increased socio-economic impact            Increased local employment            Contractor experience in dismantling            Development of (lower level) nuclear skills            Sharing of infrastructure</p> <p><b>Operational</b>            Do not exceed berthing capability            To prevent operational impact when capacity full            Release mooring space            Allows sale of land and assets            Removes increasing maintenance liability            Removes liability of maintaining basin            Removes afloat storage liability            Lessons can be fed into operations            Provides valid way forward for future operations            Supports business case for Successor and MUFC</p>	<p><b>Public Perception</b>            Seeing dismantling happening            Reduction of intergenerational equity            Preservation of naval heritage            Educational opportunity  <i>"Becoming a nuclear dump"</i>  <i>Public perception of dismantling risks</i>  <i>Public perception of transient dismantling activities</i>  <i>Nuisance value of transient risk</i>  <i>Perceived dose threat to public</i></p> <p><b>Attributes/ Criteria</b>  <i>Availability of commercial partner</i>  <i>Commercial uncertainty – MOD contracts</i>  <i>Project risk</i>  <i>Uncertainty in technical approach</i>  <i>Proving technical approach</i>  <i>Investment in new infrastructure</i></p> <p><b>Policy and Regulation</b>            MOD responsible nuclear operator            Demonstration of good practice  <i>Impact on HMNB, NDA or MOD sites</i>            Avoidance of regulatory censure            Sustainability – reducing future liabilities            Continuance of MOD self-regulation            Information exchange with US and/or France            Policy meeting Command 2919            Synergy with ILW policy            Conformance to regulatory policy – methodology            Conformance to regulatory policy – impacts            Tie into NDA waste strategy            Conformance with waste hierarchy management</p> <p><b>Safety &amp; Environment</b>            Avoidance of increased environmental liability  <i>Interim increase in environmental impact</i>  <i>Worker dose</i>  <i>Need for new licensed or authorised sites</i>            Dose reduction over time            Avoidance of potential future environmental incident  <i>Reduction in risk - public</i>  <i>Dose to public</i></p>
---	---

## E Annex E: Linkage to SEA

The key environmental issues listed below are taken from Table 2 in the SEA Stage 'A' Scoping Report (Non-technical Summary), dated December 2010. The appropriate chief benefits and disadvantages are mapped against each of them.

Key Environmental Issues for SDP	Benefits/ disadvantages	Relevant Level 2 Benefit
Biodiversity and Nature Conservation	Impact on Natural Environment (Level 4)	Reduction of environmental & safety impact
Population	Socio-economic impact on Community (Level 3)	Socio-economic impact
Human Health and Wellbeing	Public Dose (Level 4) Worker Dose (Level 4) Non-radiological impact on public (Level 4) Non-radiological impact on workers (Level 4) Future dose reduction (Level 4)	Reduction of environmental & safety impact
Health (Noise and Vibration)	Nuisance Value (Level 4)	
Soil and Geology	Impact on natural environment (Level 4)	
Water	Impact on natural environment (Level 4)	
Air	Impact on natural environment (Level 4)	
Climate Change and Energy Use	Impact on natural environment (Level 4)	
Coastal Change and Flood Risk	Impact from the natural environment (Level 4)	
Material Assets (Transport)	Moving waste (Level 4)	
Material Assets (Waste Management)	Removal of non-hazardous waste liability (Level 3) Removal of hazardous waste liability (Level 3) Removal of LLW/VLLW liability (Level 3) Removal of ILW liability (Level 3)	
Material Assets (Materials and Land Use)	Impact on the built environment (Level 4) Impact on natural environment (Level 4)	
Cultural Heritage	Impact on cultural heritage (Level 4) Naval heritage (Level 4)	Public confidence
Landscape and Townscape	Impact on the built environment (Level 4)	Reduction of environmental & safety impact

## F Annex F: Abbreviations

Abbreviation	Meaning
AG	Advisory Group
BC	Business Case
CoA	Concept of Analysis
COEIA	Combined Operational Effectiveness and Investment Appraisal
DDLDP	De-fuel, De-equip and Lay-Up Preparation
DE&S	Defence Equipment and Support
FOC	Full Operating Capability
GDF	Geological Disposal Facility
IA	Investment Appraisal
IAC	Investment Approvals Committee
ILW	Intermediate Level Waste
ISM	In Service Submarines
IOC	Initial Operating Capability
LLW	Low Level Waste
MCDA	Multi-Criteria Decision Analysis
MG	Main Gate
MGBC	Main Gate Business Case
MOD	Ministry of Defence
MoE	Measure of Effectiveness
NDA	Nuclear Decommissioning Authority
OASP	Operational Analysis Supporting Paper
OCF	Other Contributory Factors
OE	Operational Effectiveness
RC	Reactor Compartment
RPV	Reactor Pressure Vessel
SDP	Submarine Dismantling Project
SEA	Strategic Environmental Assessment
SME	Subject Matter Expert
UR	User Requirement
URD	User Requirement Document
VLLW	Very Low Level Waste

## **G Annex G: References**

<b>Title</b>	<b>Originator</b>	<b>Issue</b>	<b>Date</b>
SDP Concept of Analysis (CoA)	ISM	Issue 1.1	March 2011
SDP Investment Appraisal (IA)	ISM	Issue 1.0	October 2011
SDP Other Contributory Factors (OCF) Report	ISM	Issue 1.0	October 2011
SDP Operational Effectiveness (OE) Report	ISM	Issue 1.0	October 2011
SDP Project Management Plan (PMP)	ISM	Issue 9.0	August 2011
SDP User Requirements Document	ISM	Issue 5.0	October 2011

