

Sellafield Ltd and LLW Repository Ltd Joint Waste Management Plan

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Sellafield Ltd and LLW Repository Ltd

Joint Waste Management Plan

2018/19 to 2022/23

Document Management

Rev.	Issue Date	Description	Prepared by	Checked by	Approved by
14	Sept 18	Scheduled update	A Sealby	C Mason	S Latham

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Change Log

This change log identifies the key changes to the JWMP from the previous iteration.

Page No.	Change	Reason for change
6 & 7	Text updated to update summary for completed transformation activities	Scheduled update
8 & 9	Benefit map updated in line	
Section 2.2 and section 3	Removal of transformational activities and Opportunities marked as Complete in JWMP14, and update in line with above	
15	Updated 5 year forecast	Aligned with new forecast and actuals year to date

Executive Summary

A Joint Waste Management Plan (JWMP) is a proactive management plan for the next 5 years that has been developed by the SLC in conjunction with LLW Repository Ltd. Its purpose is to demonstrate how the SLC is engaging with the National LLW Programme to improve their implementation of and compliance with the UK Low Level Waste (LLW) Strategy, through the delivery of the Programme Blueprint.

This JWMP provides an overview of the SLC's current arrangements (section 1) for managing their LLW arisings and identifies the transformational activities (section 2) that they are undertaking, either independently or in collaboration with LLW Repository Ltd and other organisations, to make a step change in their LLW management arrangements to deliver the National Programme Blueprint future state. Section 3 provides an opportunity to identify specific step change projects that are not within the current scope of work but which could be undertaken either if funding became available or if internal or collaborative resource could be identified to support the project. Appendix 1 contains the forecast of arisings by waste route for the next five years and Appendix 2 provides a summary of the benefits identified as a result of using the diversion routes.

This JWMP has been agreed by senior management as a commitment to the delivery of the activities listed within. Key transformational activities will be tracked within the National Programme governance arrangements to:

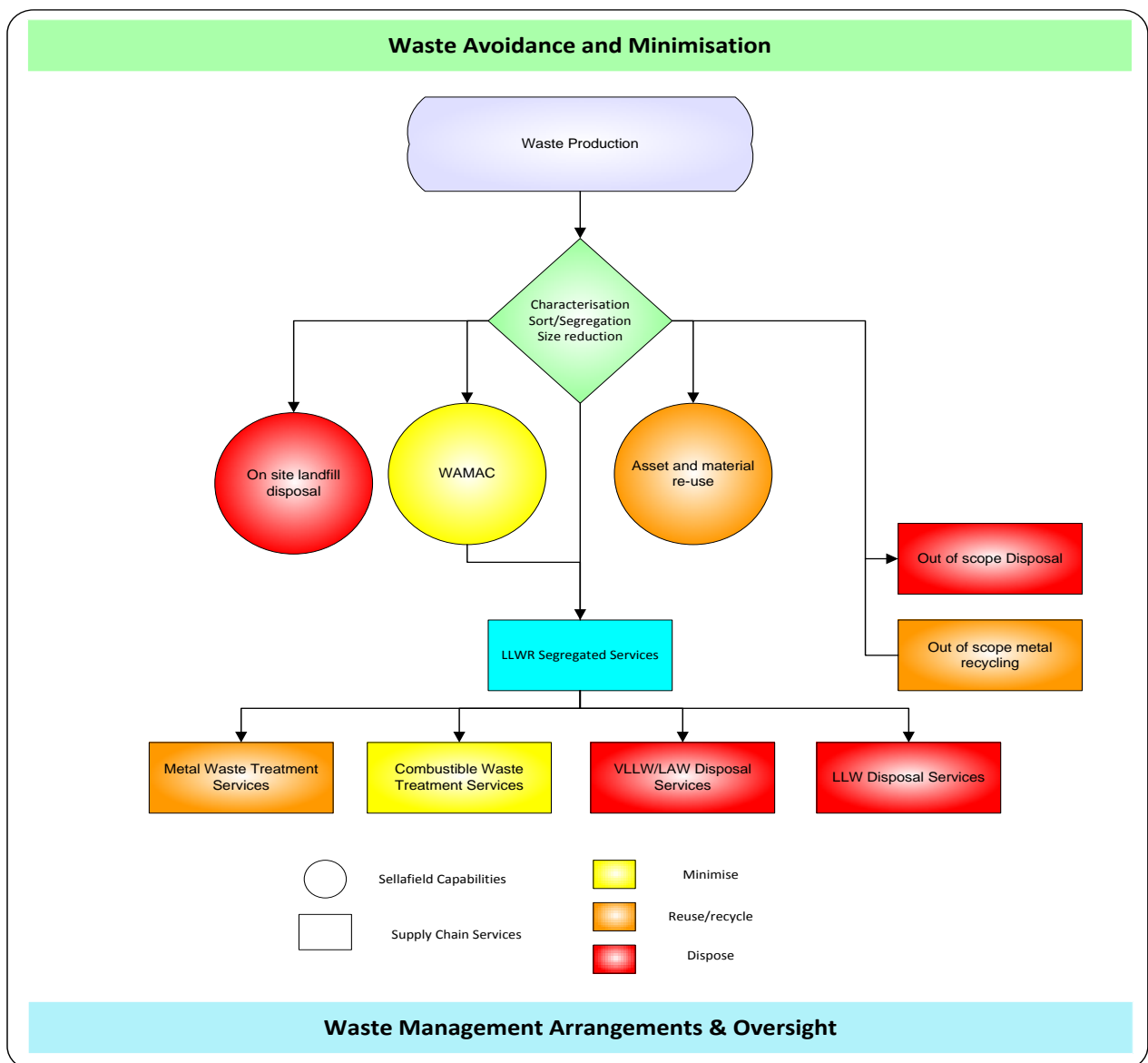
- Assess performance;
- Highlight success;
- Deliver an integrated approach to dealing with the UK's LLW.

It contains activities and waste forecasts for the 5 year period of 2018/19 to 2022/23.

Section 1 Sellafield LLW Management Delivery Activities

Sellafield is a large and complex site with a wide range of operational and decommissioning activities being undertaken. Under an overall site Integrated Waste Strategy the Sellafield Limited approach to manage LLW is founded on the UK LLW Strategy to effectively apply the waste management hierarchy to manage LLW, to make the best use of LLW management assets, and to develop fit for purpose waste management routes.

A schematic summary of the overall approach is provided below:



LLW Management is provided by the Remediation Business Unit. Detailed procedural arrangements provide 'How do I' guidance to waste generators, supported by a combined Waste Advisor/Characterisation team aligned with each Operating Unit / programme area.

Each Operating Unit also has a dedicated Plant Solid Waste Coordinator. The key roles are subjected to a detailed training and SQEP'ing programme with all site personnel provided with detailed low level waste management awareness training.

There is an overarching requirement to avoid and minimise waste arisings, where practicable. Waste that will arise is forecasted, classified, and appropriately segregated and controlled. It is then formally routed in accordance with the existing BAT approach for the waste.

Sellafield Limited operates a number of capabilities to re-use material, including an asset re-use function and the re-use of excavated soil/spoil. There are also a number of on-site LLW management capabilities to support recycling and onward waste management. These include:

- A characterisation capability
- Bagged waste monitoring facilities
- A Waste Monitoring and Compaction (WAMAC) facility providing supercompaction & volume reduction
- Management capability for non-compactable wastes
- Decontamination capability and facilities
- On site landfill disposal capability for lower activity wastes

In conjunction with LLWR, Sellafield has also undertaken extensive work to explore, trial, commission and implement a range of off-site capabilities to support optimising LLW management. These include:

- UK-based and overseas capabilities for recycling metal
- UK-based incineration capabilities to process oils, oil/water mixtures and solid wastes suitable for combustion
- UK-based VLLW and LAW disposal routes for lower activity wastes.

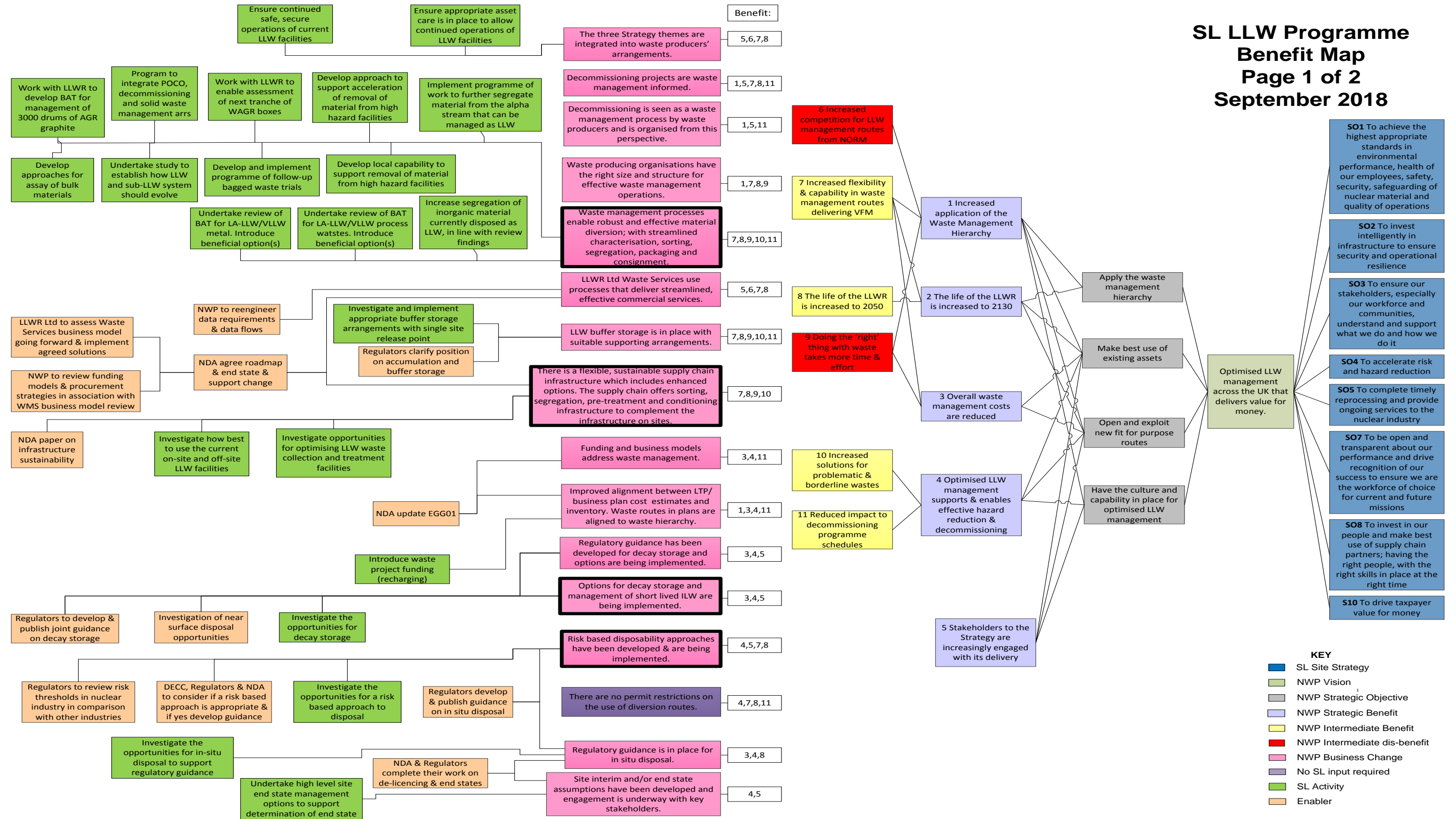
A routine interface is maintained with LLWR to facilitate ongoing operations, and with the wider NDA/non-NDA SLCs, through the National Waste Programme Office, to monitor and co-ordinate ongoing work and to share best practice and support issue resolution.

Transformation activities continue including further re-organising the decommissioning and waste management functions into a single Remediation business unit focussed on the efficient operation of the full decommissioning and waste management lifecycle. Step improvements in the arrangements for managing active and inactive excavated material, the segregation of bulk wood and plastic for incineration, and management of asbestos and asbestos contaminated material continue. Documented solid waste management arrangements, the process for managing the re-use of assets and the arrangements for transporting and packaging material further embedded. Good progress continues in the assessment of management options for a range of ILW/LLW boundary wastes.

The ongoing, and newly identified, transformation activities involve enhancing the on-site LLW management capability, further assessment of options to manage ILW/LLW boundary wastes, reviews of the BATs for LA-LLW/VLLW metal and process wastes, analysis of the interface with the supply chain to obtain best value for LLW management, and development of a high-level site end state management options.

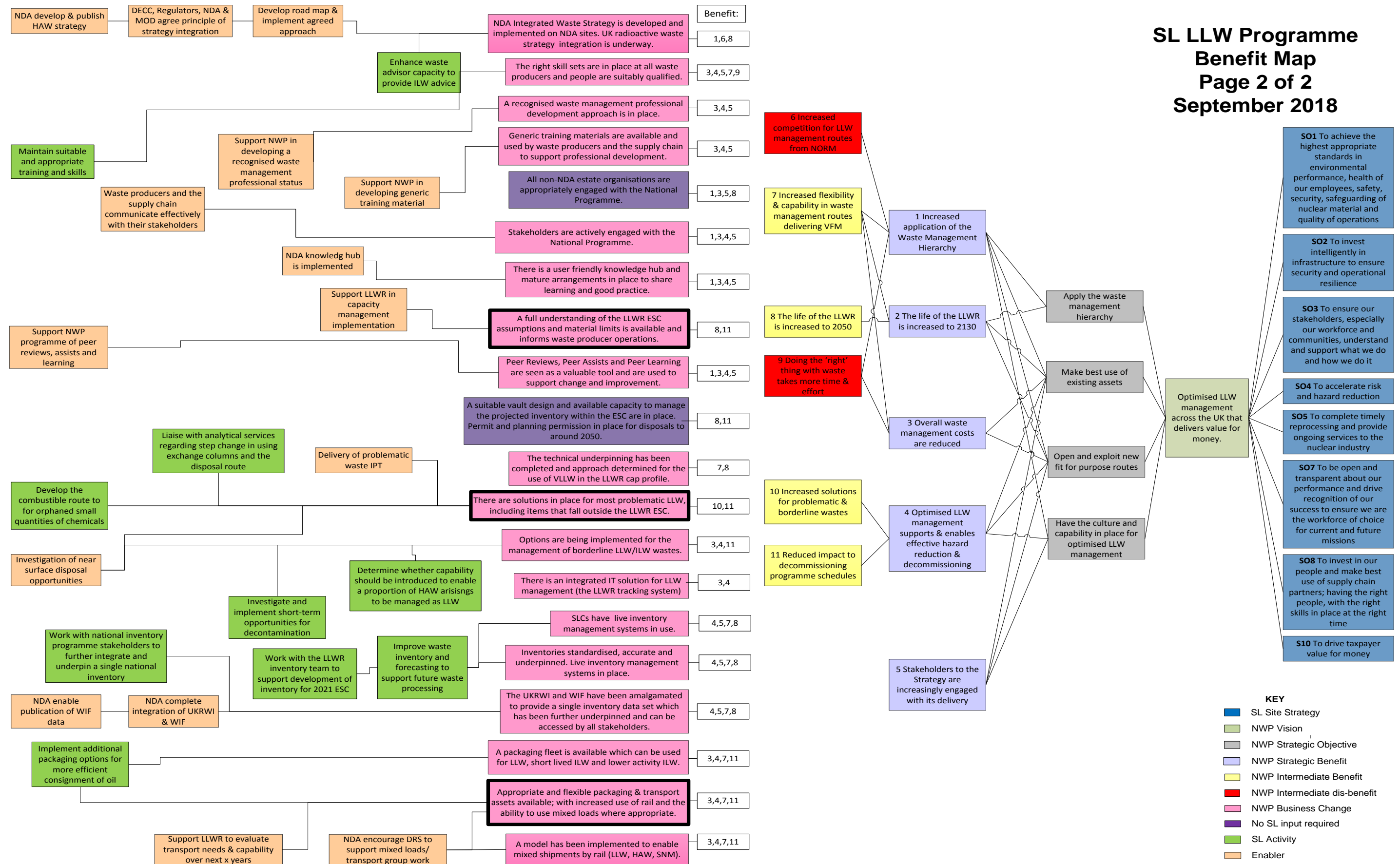
Section 2 - Sellafield Transformational Activities

2.1 SLC Benefit Map



SL LLW Programme
 Benefit Map
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SL LLW Programme
Benefit Map
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2.2 Transformational Project List

Transformational projects are those activities that will be undertaken by the SLC which will make a step change in the management of LLW. They are discrete work package with defined start and end dates, which introduce improvements to work practices to deliver financial and non-financial benefits. Each transformational activity should be identified on the Benefit Map as a project.

(It is noted that many of the activities detailed below summarise multi-component programmes of work captured in the Sellafield Low Level Waste Management Development Programme).

Project Number	Activity	Contributes to the Delivery of which Business Change?	Start Date	End Date
J10_10	Work with national inventory programme stakeholders to further integrate and underpin a single national inventory	The UKRWI and WIF have been amalgamated to provide a single inventory data set which has been further underpinned and can be accessed by all stakeholders.	April 2015	September 2019
J10_25	Enhance waste advisor capacity to provide ILW advice	NDA Integrated Waste Strategy is developed and implemented on NDA sites. UK radioactive waste strategy integration is underway.	April 2016	March 2019
J11_01	Work with LLWR to investigate opportunities to manage boundary ILW waste streams as LLW	Options are being implemented for the management of borderline LLW/ILW wastes.	June 2016	December 2018
J12_02	Undertake a review of the SL BAT for LA-LLW/VLLW metal. Develop and implement a programme of work to introduce any option(s) deemed to provide a significant benefit.	Waste management processes enable robust and effective material diversion; with streamlined characterisation, sorting, segregation, packaging and consignment.	April 2017	March 2019
J12_03	Undertake a review of the SL BAT for LA-LLW/VLLW bagged process wastes. Develop and implement a programme of work to introduce any option(s) deemed to provide a significant benefit.	Waste management processes enable robust and effective material diversion; with streamlined characterisation, sorting, segregation, packaging and consignment.	April 2017	March 2019

J12_05	Develop programme of work to further integrate POCO, decommissioning and solid waste management arrangements under the planned change to the Site management System.	Waste management processes enable robust and effective material diversion; with streamlined characterisation, sorting, segregation, packaging and consignment.	April 2017	December 2019
J12_07	Undertake development of high level site end state management options to support the determination of appropriate end-states for the Sellafield site	Site interim and/or end state assumptions have been developed and engagement is underway with key stakeholders.	April 2017	December 2018
J12_08	Building on the successful implementation of the PCM to LLW segregation capability, implement a programme of work to further segregate material from the alpha stream that can be safely managed as LLW	Waste management processes enable robust and effective material diversion; with streamlined characterisation, sorting, segregation, packaging and consignment.	April 2017	September 2019
J12_09	Work with the LLWR Inventory team to support development of an appropriate inventory to support the 2021 LLWR Site Environmental Safety Case	Inventories standardised, accurate and underpinned. Live inventory management systems in place.	March 2017	June 2018
J13_01	Increase segregation and diversion of inorganic material currently disposed as LLW, in line with findings of completed review.	Waste management processes enable robust and effective material diversion; with streamlined characterisation, sorting, segregation, packaging and consignment.	August 2017	September 2018
J14_01	Work with LLWR to develop and implement the BAT approach for the management of 3000 drums of AGR graphite.	Waste management processes enable robust and effective material diversion; with streamlined characterisation, sorting, segregation, packaging and consignment.	April 2018	December 2019

J14_02	Work with LLWR to enable detailed assessment of the next tranche of WAGR boxes and implement the output of the analysis.	Waste management processes enable robust and effective material diversion; with streamlined characterisation, sorting, segregation, packaging and consignment.	April 2018	December 2018
J14_03	Develop and plan the implementation of additional capability to support the 25% acceleration of the removal and management of material from high hazard facilities	Waste management processes enable robust and effective material diversion; with streamlined characterisation, sorting, segregation, packaging and consignment.	April 2018	April 2019
J14_04	Work with LLWR, and other stakeholders as required, to develop and implement approaches to support the management of material removed from high hazard facilities	Waste management processes enable robust and effective material diversion; with streamlined characterisation, sorting, segregation, packaging and consignment.	April 2018	April 2019
J14_05	Develop and implement approaches for the bulk assay of excavated materials	Waste management processes enable robust and effective material diversion; with streamlined characterisation, sorting, segregation, packaging and consignment.	April 2018	April 2019
J14_06	Develop and implement a programme of follow-up bagged waste trials to take forward the enhanced combustible waste segregation learning from the bagged waste trial completed in Q4 2017. Identify and initiate implementation of recommended approach.	Waste management processes enable robust and effective material diversion; with streamlined characterisation, sorting, segregation, packaging and consignment.	April 2018	December 2019

Section 3 – Non-Resourced Opportunities

Opportunities are those specific step change projects that are not within the current scope of work but which could be undertaken either if funding became available or if internal or collaborative resource could be identified to support the project; and which would further optimise the management of LLW. These may be identified as enablers on the Benefit Map.

Opp. No.	Activity	Benefit	Duration	Resources Required	Status
Op10_02	Investigate opportunities for optimising LLW waste collection and treatment facilities	There is a flexible, sustainable supply chain infrastructure which includes enhanced options. The supply chain offers sorting, segregation, pre-treatment and conditioning infrastructure to complement the infrastructure on sites.			Deferred due to other priorities
Op10_03	Enhance routing of small volumes oil containers	Waste management processes enable robust and effective material diversion; with streamlined characterisation, sorting, segregation, packaging and consignment.			Deferred due to other priorities
Op10_04	Develop further off-site options for managing problematic asbestos and asbestos contaminated wastes	Waste management processes enable robust and effective material diversion; with streamlined characterisation, sorting, segregation, packaging and consignment.			Deferred due to other priorities

Op10_08	Implement additional packaging options for more efficient consignment of oil	<p>A packaging fleet is available which can be used for LLW, short lived ILW and lower activity ILW.</p> <p>Appropriate and flexible packaging & transport assets available; with increased use of rail and the ability to use mixed loads where appropriate.</p>			Deferred due to other priorities
J10_26	Liaise with analytical services regarding step change in using exchange columns and the disposal route	There are solutions in place for most problematic LLW, including items that fall outside the LLWR ESC.			Deferred due to other priorities

National Waste Programme

Joint Waste Management Plan

Appendix 1 – 5 Year Forecast

LLW Repository Ltd		Year: 2018												Year: 2019												Year: 2020				
		Period 1	Period 2	Period 3	Period 4	Period 5	Period 6	Period 7	Period 8	Period 9	Period 10	Period 11	Period 12	Annual	Period 1	Period 2	Period 3	Period 4	Period 5	Period 6	Period 7	Period 8	Period 9	Period 10	Period 11	Period 12	Annual	2020	2021	2022
		01/04/2018 - 28/04/2018	29/04/2018 - 26/05/2018	27/05/2018 - 30/06/2018	01/07/2018 - 28/07/2018	29/07/2018 - 26/08/2018	28/08/2018 - 30/09/2018	30/09/2018 - 27/10/2018	28/10/2018 - 24/11/2018	25/11/2018 - 29/12/2018	30/12/2018 - 30/01/2019	31/01/2019 - 29/02/2019	29/02/2019 - 31/03/2019	31/03/2019 - 28/04/2019	01/04/2019 - 28/04/2019	29/04/2019 - 26/05/2019	27/05/2019 - 30/06/2019	01/07/2019 - 28/07/2019	29/07/2019 - 26/08/2019	28/08/2019 - 30/09/2019	30/09/2019 - 27/10/2019	28/10/2019 - 24/11/2019	25/11/2019 - 29/12/2019	30/12/2019 - 30/01/2020	31/01/2020 - 29/02/2020	29/02/2020 - 31/03/2020	31/03/2020 - 28/04/2020	Annual Total	Annual Total	Annual Total
Metallic Waste Treatment:																														
Raw Weight Treated Onsite (t)																														
Raw Weight Treated Offsite via LLWR Framework (t)																														
Raw Weight Treated Offsite via direct contracts (t)																														
Raw Weight Re-categorised as Out of Scope ¹ (t)																														
Combustible Waste Treatment:																														
Raw Volume Treated Onsite (m ³)																														
Raw Volume Treated Offsite via LLWR Framework (m ³)																														
Raw Volume Treated Offsite via direct contracts (m ³)																														
Raw Volume Re-categorised as Out of Scope ¹ (m ³)																														
LLW/LLLW Disposal:																														
LLW/LLLW Disposed Onsite (Packaged) (m ³)																														
LLW/LLLW Disposed to Landfill via LLWR Framework (Packaged) (m ³)																														
LLW/LLLW Disposed to Landfill via direct contracts (Packaged) (m ³)																														
Raw Volume Re-categorised as Out of Scope ¹ (m ³)																														
Supercompactable Waste Treatment:																														
FC19 - 2U Inc Drums (m ³)																														
FC25 - Trip Out Drums (m ³)																														
Other Container Types ² (m ³)																														
Low Level Waste Disposal:																														
FC01 - Half Height Container (No.)																														
FC03 - Three Height Container (No.)																														
FC08 - WAMAC Product ISO Container (No Rails) (No.)																														
Other Container Types ² (No.)																														
Out of Scope:																														
Out of Scope Waste Disposed Onsite (Packaged) ¹ (m ³)																														
Out of Scope Waste Disposed to Landfill via LLWR Framework (Packaged) ¹ (m ³)																														
Out of Scope Waste Disposed to Landfill via direct contracts (Packaged) ¹ (m ³)																														
Raw volume LLW re-categorised as LLW (m ³)																														
LLW Repository Ltd Packaging Services:																														
Container Purchase (Period in which LLW will receive Purchase Order)																														
FC01 - Half Height ISO Container (No.)																														
FC01 - MEIB Containers (No.)																														
FC03 - Three Height ISO Container (No.)																														
FC08 - WAMAC Product ISO Container (Rails) (No.)																														
FC08 - WAMAC Product ISO Container (No Rails) (No.)																														
FC14 - 2 Drums (No.)																														
FC19 - Drums (No.)																														
Container Collection (Period when container is required for use):																														
FC01 - Half Height ISO Container (No.)																														
FC03 - Three Height ISO Container (No.)																														
FC08 - WAMAC Product ISO Container (Rails) (No.)																														
FC08 - WAMAC Product ISO Container (No Rails) (No.)																														
FC14 - 2 Drums (No.)																														
FC19 - Drums (No.)																														
Container Hire:																														
FC02 - Re-usable Half Height ISO Container with full size (276) sillage (No.)																														
FC02 - Re-usable Half Height ISO Container with half size (166) sillage x2 (No.)																														
FC02 - Re-usable Half Height ISO Container with full size (146) sillage x2 (No.)																														
FC02 - Re-usable Half Height ISO Container with full size (146) drum sillage x2 (No.)																														
FC05 - Mesh Link ISO Stack Container (No.)																														
FC12 - FHSD (No.)																														
FC25 - ISO Flat rack (No.)																														
Other services:																														
DSSA Services (Including LLW) (No.)																														
Facility Services (No.)																														
Waste Load Planning Services (WLP) (No.)																														

Notes:
 1. This refers to waste which was previously assumed to be either activated or contaminated to LLW levels but through either assurance monitoring or further characterisation is likely to be Out of Scope.
 2. Please specify the proposed container type from the list of approved containers in the Waste Acceptance Criteria.

Appendix 2 – Benefits

RSF 3.08.02_01B Issue 8 - Joint Waste Management Plans Appendix 2 Benefits Realisation Spreadsheet

Issue 10A

Jan-18

Summary of JWMP Benefits										
	Project no.	Project Description	units (te, m3)	What (M, C, V, O)	Year					Total
					2018/19 Year 1	2019/20 Year 2	2020/21 Year 3	2021/22 Year 4	2022/23 Year 5	
Delivery	M	Metals diversion (onsite, offsite)	units	te	2800	2800	2800	2800	2800	14000
	C	Combustible diversion (on site, off site)	m3	m3	1800	1800	1800	1800	1800	9000
	V	VLLW diversion (onsite, offsite)	m3	m3	4200	4200	4200	4200	4200	21000
	O	Problematic wastes treated	m3	m3	5	0	0	0	0	5
Savings	Metals	Quantity	(te)	te	2800	2800	2800	2800	2800	14000
		Treatment Cost Norm	(£/te)	(£/te)	£3,500	£3,500	£3,500	£3,500	£3,500	£3,500
		Total Cost of Treatment	(£)	(£)	£12,870,156	£12,901,417	£12,933,771	£12,967,258	£12,967,258	£64,639,861
		HHISO Equivalent Quantity	(HHISOs)	(HHISOs)	280	280	280	280	280	1120
	Disposal Cost Norm	(£/HHISO)	(£/HHISO)	£75,797	£78,030	£80,341	£82,733	£85,208	£85,208	
	Total Cost of Disposal	(£)	(£)	£23,729,127	£24,354,337	£25,001,428	£25,671,168	£26,364,349	£125,120,410	
	Metallic - Saving from Diversion	(£)	(£)	£10,858,971	£11,452,920	£12,067,657	£12,703,910	£13,397,091	£60,480,548	
	Combustible	Quantity	(m ³)	(m ³)	1800	1800	1800	1800	1800	9000
		Treatment Cost Norm	(£/m ³)	(£/m ³)	£1,350	£1,350	£1,350	£1,350	£1,350	£1,350
		Total Cost of Treatment	(£)	(£)	£2,910,000	£2,910,000	£2,910,000	£2,910,000	£2,910,000	£14,550,000
		210l Drum Equivalent Quantity	(Drums)	(Drums)	9000	9000	9000	9000	9000	45000
	Supercompaction Treatment Cost Norm	(£/Drum)	(£/Drum)	£854	£877	£901	£925	£951	£951	
	Total Cost of Disposal	(£)	(£)	£8,087,943	£8,294,056	£8,507,383	£8,728,176	£8,956,698	£42,574,256	
	Combustible - Saving from Diversion	(£)	(£)	£5,177,943	£5,384,056	£5,597,383	£5,818,176	£6,046,698	£28,024,256	
VLLW	Quantity	(m ³)	(m ³)	4200	4200	4200	4200	4200	21000	
	VLLW Disposal Cost Norm	(£/m ³)	(£/m ³)	£500	£500	£500	£500	£500	£500	
	Total Cost of VLLW Disposal to Landfill	(£)	(£)	£3,318,000	£3,318,000	£3,318,000	£3,318,000	£3,318,000	£16,590,000	
	HHISO Equivalent Quantity	(HHISOs)	(HHISOs)	420	420	420	420	420	2100	
Disposal Cost Norm	(£/HHISO)	(£/HHISO)	£64,997	£67,230	£69,541	£71,933	£74,408	£74,408		
Total Cost of Disposal	(£)	(£)	£30,931,691	£31,869,505	£32,840,142	£33,844,752	£34,884,524	£164,370,614		
Saving from Diversion	(£)	(£)	£27,613,691	£28,551,505	£29,522,142	£30,526,752	£31,566,524	£147,780,614		
Benefits	Benefits				2018/19 Year 1	2019/20 Year 2	2020/21 Year 3	2021/22 Year 4	2022/23 Year 5	5 Year Total
	NWPB1	NWP Benefit 1 - Repository Years Extension	years	years	0.192	0.192	0.192	0.192	0.192	0.960
	NWPB2	NWP Benefit 2 - Cost Saving	(£)	(£)	£43,650,604	£45,388,481	£47,187,182	£49,048,839	£51,010,312	£236,285,418
	NWPB3	NWP Benefit 3 - CO ₂ Saving	Te CO ₂	Te CO ₂	13492	13492	13492	13492	13492	67460
	NWPB3	NWP Benefit 3 - Problematic Waste Reduction	m ³	m ³	5	0	0	0	0	5
	NWPB4	NWP Benefit 4 - Public Recognition	-	-	N/A					