



Upcycle & Repurpose of Damaged Linen by Embroidery Methods to achieve Waste Reduction & Environmental Sustainability

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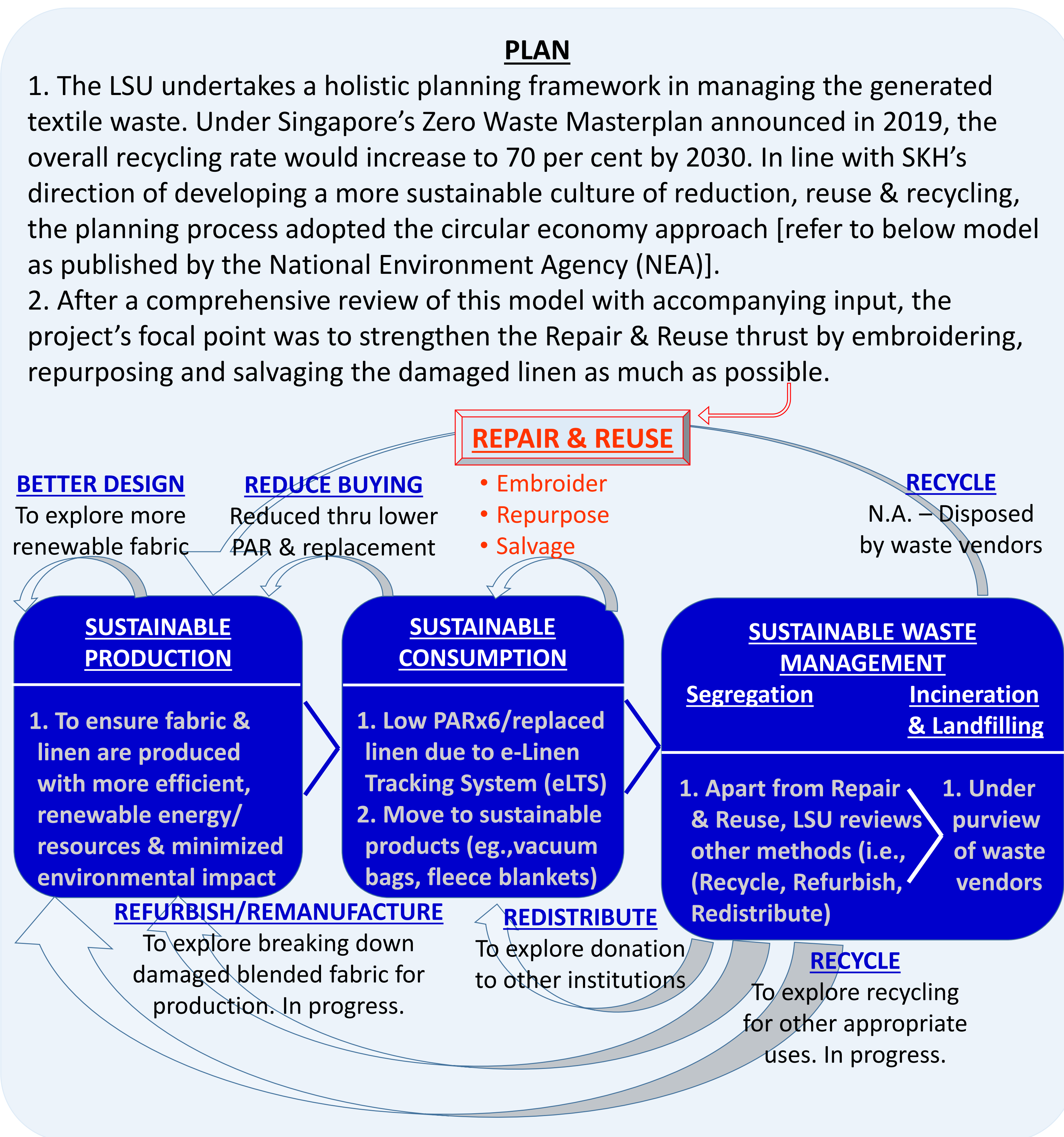
1. Introduction

Inspired by Sengkang General Hospital (SKH) being honoured with the Global Human Settlements Model Building Award in 2020 for excellent sustainability design, the Linen Supply Unit (LSU) under the Environmental Services Department aspires to be more than a highly effective, operational outfit but also an environmentally sustainable one.

Given that hospital linens are subject to heavy usage, misuse, staining as well as effect of strong disinfectants & high temperature during frequent washes, many are damaged via small tears and irremovable stains, which can translate to 6% of total linens in circulation. In 2021, there were about 12,778 pieces of damaged linen and many had been in use for less than 3 years of expected lifespan. These damaged linens would be condemned and disposed as general waste, weighing up to 3.58 tons.

3. Methodology

The project team adopted the PDSA model to facilitate the accomplishment of sustainability objectives.



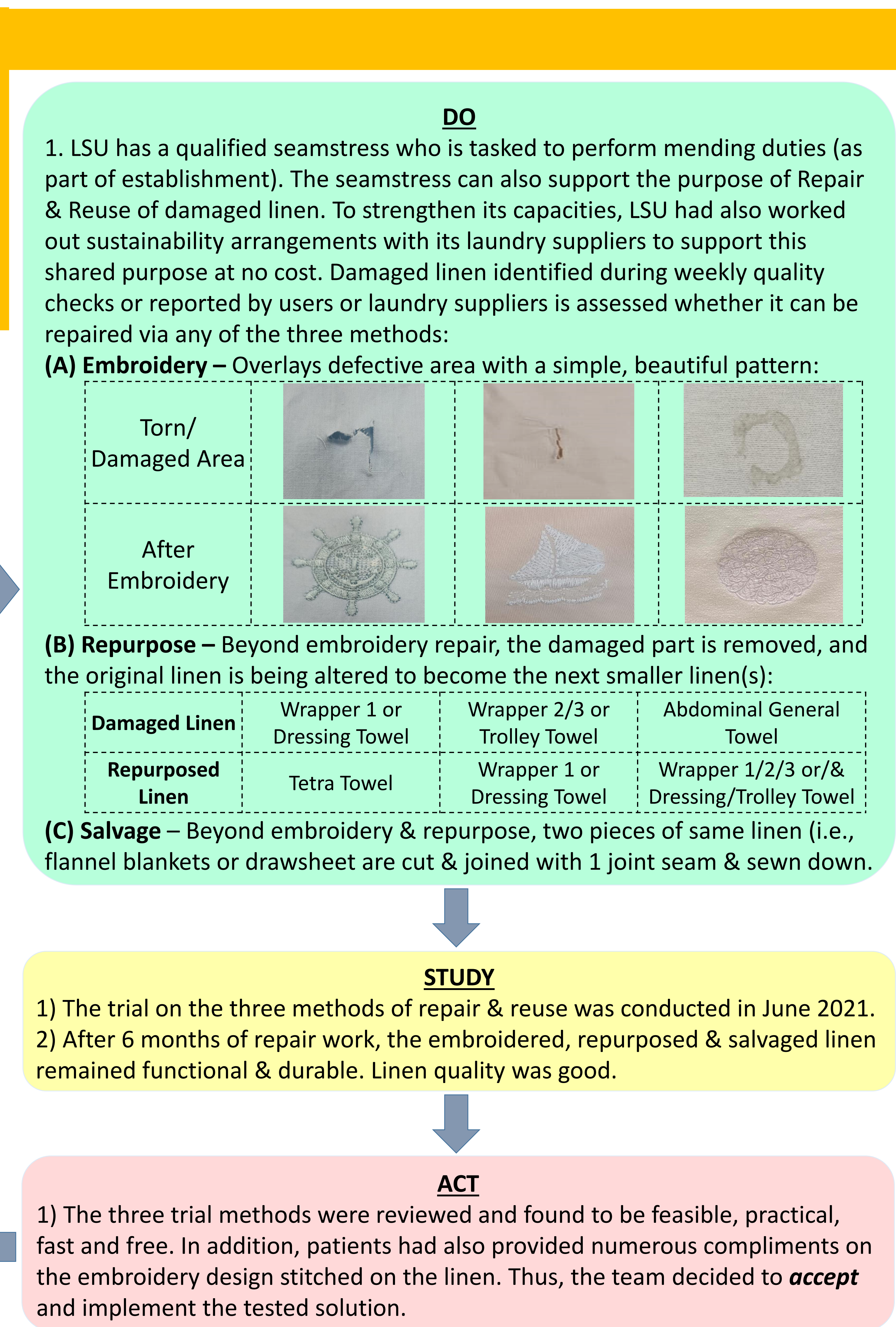
4. Results

	Pieces	Weight (tons)	Haul Cost (\$170/ton)	Replacement Cost	Total Cost
Total Damaged Linen (A)	12,778	3.58	\$680	\$31,990	\$32,670
Total Repaired Linen (B)	4,450	1.25	Est \$170	\$11,141	\$11,311
Net Damaged Linen	8,328	2.33	\$510	\$20,849	\$21,359
Percent Change (B/A)	34.8%	34.9%	25.0%	34.8%	34.6%

2. Aim & Objectives

The project aimed to drive sustainability goals and reduce the amount of textile waste. The objectives were:

- ♻️ Upcycle and repurpose 30% of damaged linen.
- ♻️ Extend the expected lifespan of damage linen beyond 3 years.
- ♻️ Reduce disposed damage linen by 30%.
- 💰 Generate significant cost savings from linen replacement.



5. Conclusion

The extensive embroidery, repurpose & salvage work managed to repair 34.8% of damaged linen, increase patient satisfaction with embroidered linen, extend the expected lifespan of repaired linen beyond 3 years, minimize operational disruption, reduce 34.9% of textile waste, and generate an annual cost savings of \$11,311 (equivalent to 34.6% of total replacement cost). These sustainability outcomes constitute an important milestone in achieving alignment with Singapore's Zero Waste Masterplan.

This project is scalable not only for other LSU and textile industry but also the entire community in repairing and reusing their damaged apparel. Future research can focus on the improvement areas identified in the circular economy model presented in the Methodology section.