

Reducing Cardboard Contamination Throughout the Veterans Health Care System of the Ozarks by Redesigning the Facility Layout

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Introduction

There have been recent studies to show that cardboard is a contaminant in hospital sterile areas. The receiving and breakdown process at the VHSO has cardboard cycling near sterile and non-sterile inventory storage areas, where cardboard is prohibited. Two facility layout alternatives have been evaluated under different budget constraints; one in the case that the VHSO receives funding for this project and one if they do not.

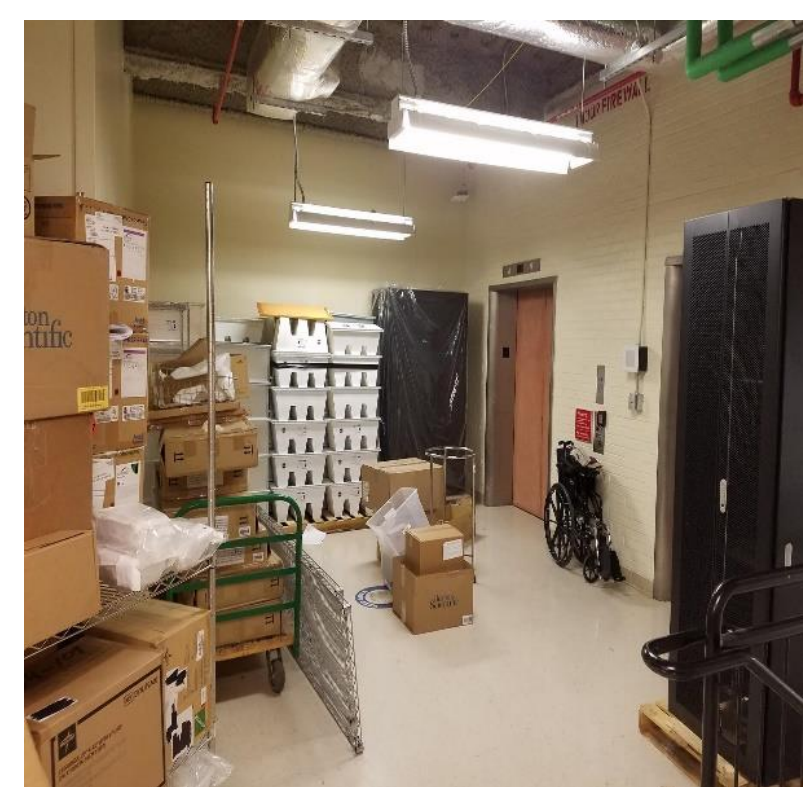
Goals & Objectives

- Primary Goal:**
The primary goals from these objectives are to improve patient health and safety for Veterans and their families. In addition, a decrease in cycle time for the receiving and breakdown process.
- Main Objectives:**
- Improving facility layout
 - Maximizing storage areas
 - Improving the receiving and breakdown and process
 - Find new material handling equipment for the receiving and breakdown process

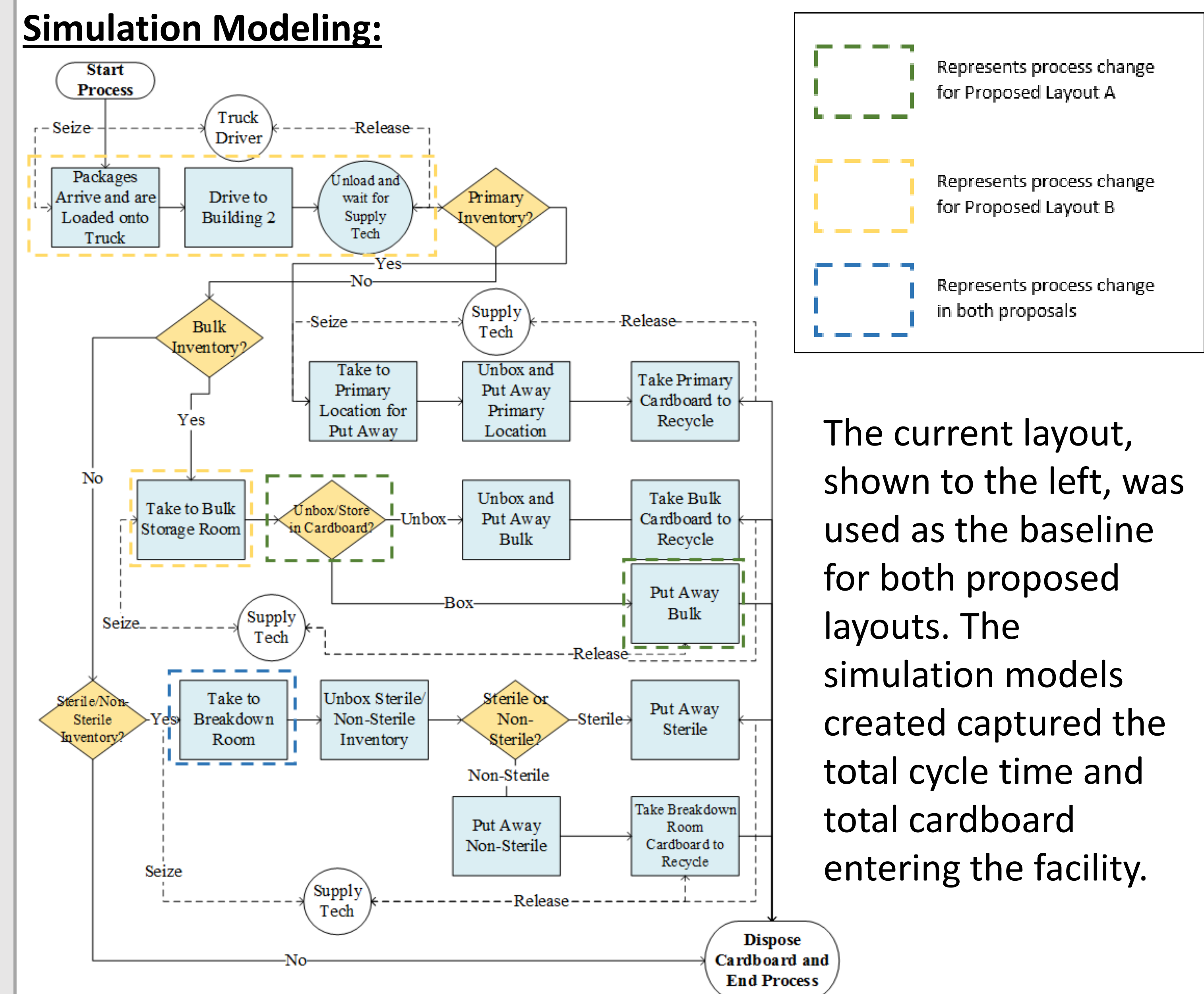
Background Information

Problems in Receiving and Breakdown:

- Space around bulk room being used for miscellaneous storage
 - Not an efficient use of space
 - Items can be easily damaged or stolen
- Bulk items stored in their original cardboard boxes
 - Difficult to find items
 - Corrugated cardboard shelves are not in compliance with directives
 - Corrugated cardboard cannot be in this room in the future state
- Inventory is received in cardboard upstairs next to sterile and non-sterile storage
 - Inventory is kept in unsecured area waiting to be unboxed
 - Cardboard could contaminate sterile and non-sterile inventory



Engineering Analysis



The current layout, shown to the left, was used as the baseline for both proposed layouts. The simulation models created captured the total cycle time and total cardboard entering the facility.

Proposal Layout A:



Proposal Layout B:

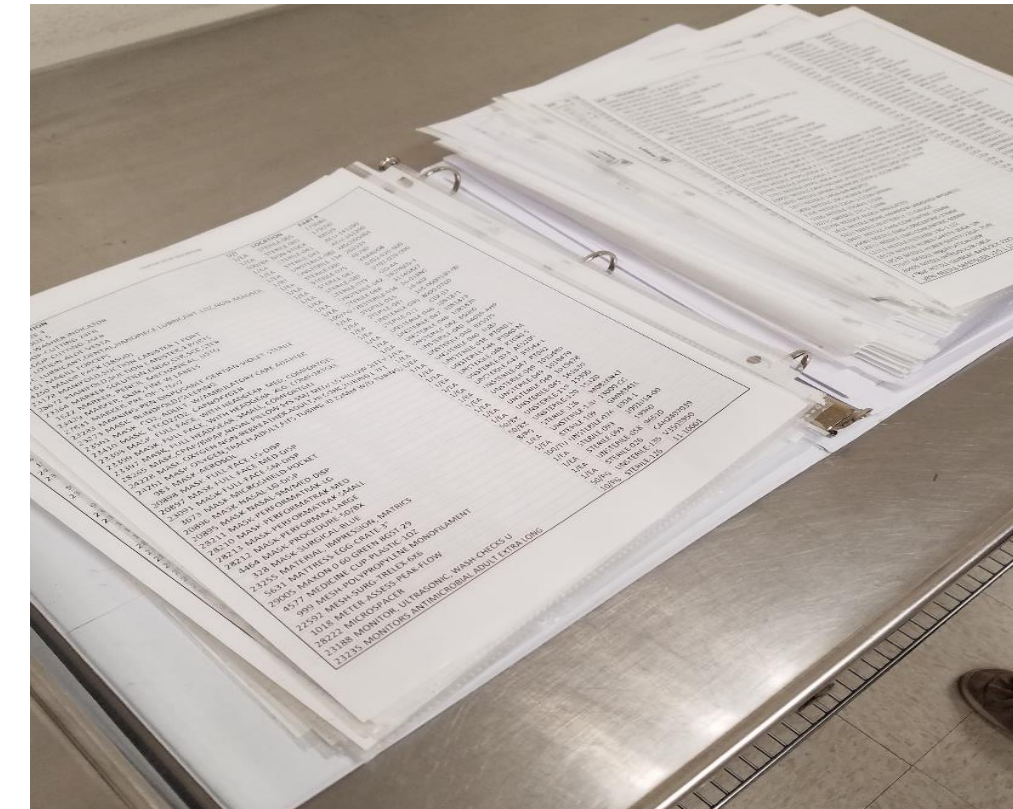


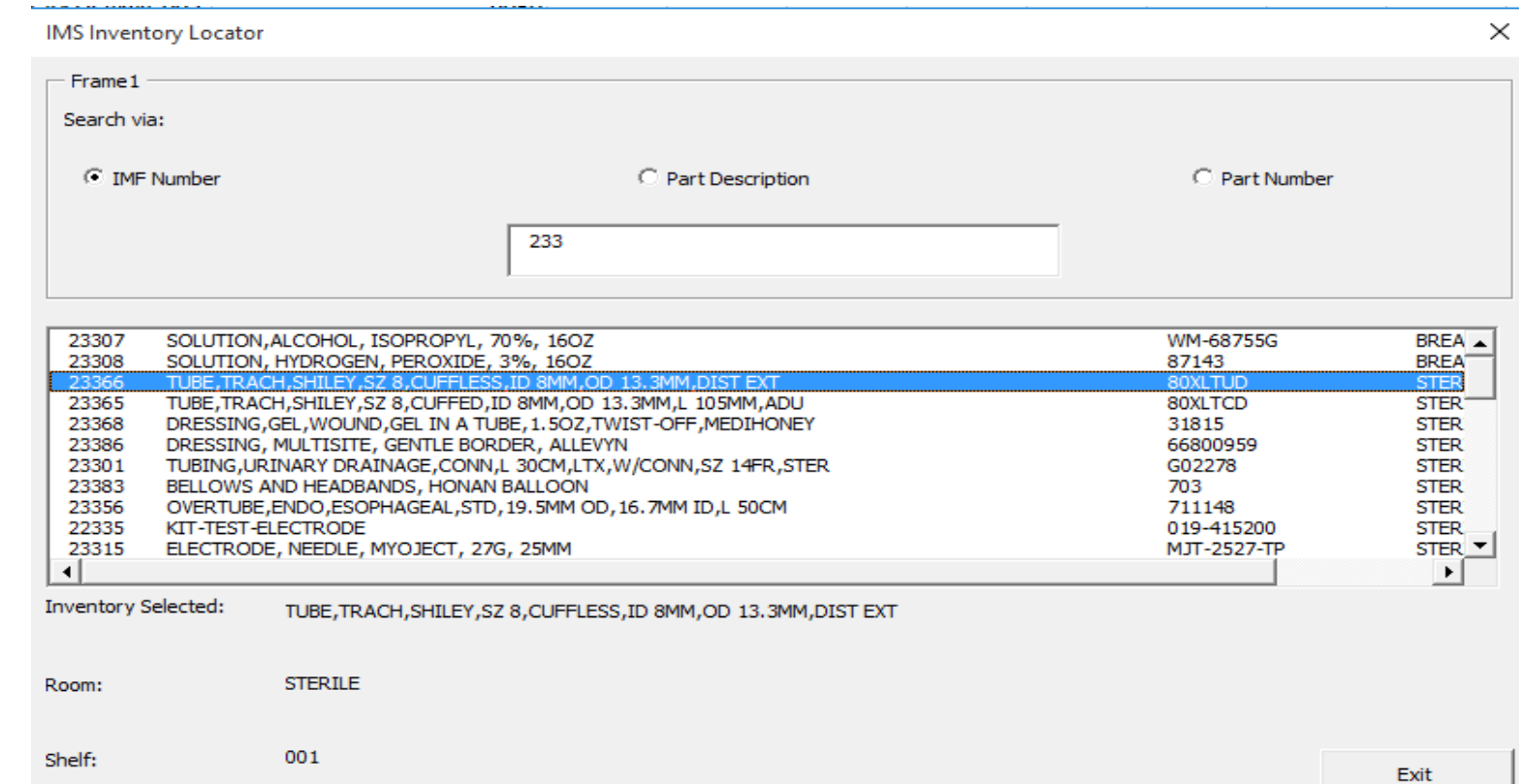
Both proposed layouts were developed and evaluated using the relationship chart below.







Description	Bulk Room	Breakdown Room	Elevators	Sterile Room	Non-Sterile Room	Warehouse	Receiving Dock	Cardboard Cage	Ideal Layout	Current Layout	Proposal A	Proposal B
Bulk Room		8	4	0	0	8	8	4	32	16	24	8
Breakdown Room			4	0	-8	8	8	4	16	-8	16	16
Elevators				2	2	0	0	0	4	0	0	0
Sterile Room					8	2	0	0	10	8	8	8
Non-Sterile Room						2	0	0	2	0	0	0
Warehouse							4	0	4	0	0	0
Receiving Dock								2	2	2	2	2
Cardboard Cage												
Total:									70	18	50	34
Calculated Efficiency:									100.00%	25.71%	71.43%	48.57%

Legend:
 - Green: Improvements in Proposal A
 - Yellow: Improvements in Proposal B
 - Blue: Improvements in Proposal A & B

Decision Support Tool

Current Inventory Locator: 

Future Inventory Locator: 

 Increase in Cycle Time
 Not Well Maintained
 User Friendly
 Reduction in Cycle Time
 Adaptable
 Assist with Onboarding

Proposal Evaluation

Layout	Cost	Efficiency	Cycle Time	Cardboard Reduction
Layout A	\$27,033 This includes all Construction & Labor Cost (\$17,950), Storage Material Cost (\$8,484) and Additional Resource Cost (\$599)	71% Layout Efficiency Using a relationship chart and identifying key relationships between rooms, this efficiency was calculated.	39 Minutes Through simulation modeling and statistical analysis this cycle time was derived for this proposed layout.	=19,700 Cardboard Boxes Reduced Annually Cardboard reduction was estimated using data analysis of inventory received annually.
Layout B	\$11,833 This includes all Construction & Labor Cost (\$17,950), Storage Material Cost (\$8,484) and Additional Resource Cost (\$599)	49% Layout Efficiency Using a relationship chart and identifying key relationships between rooms, this efficiency was calculated.	58 Minutes Through simulation modeling and statistical analysis this cycle time was derived for this proposed layout.	=19,700 Cardboard Boxes Reduced Annually Cardboard reduction was estimated using data analysis of inventory received annually.

Material Handling Equipment

- Analysis was completed to determine the size and quantity of plastic storage bins and adjustable wire shelving racks for inside storage room
- Plastic covers will be used on each shelf to protect items not in plastic storage bins
- Metal carts will be used to transport sterile and non-sterile items upstairs



Recommendation

After analysis of both proposals, the recommended layout for the receiving and breakdown process is Proposal A, the expansion of the bulk storage room. This is due to the decrease in cycle time, improved efficiency, cardboard reduction, and being in compliance with directives. Layout B meets all of these requirements in the case that the VHSO does not receive funding.