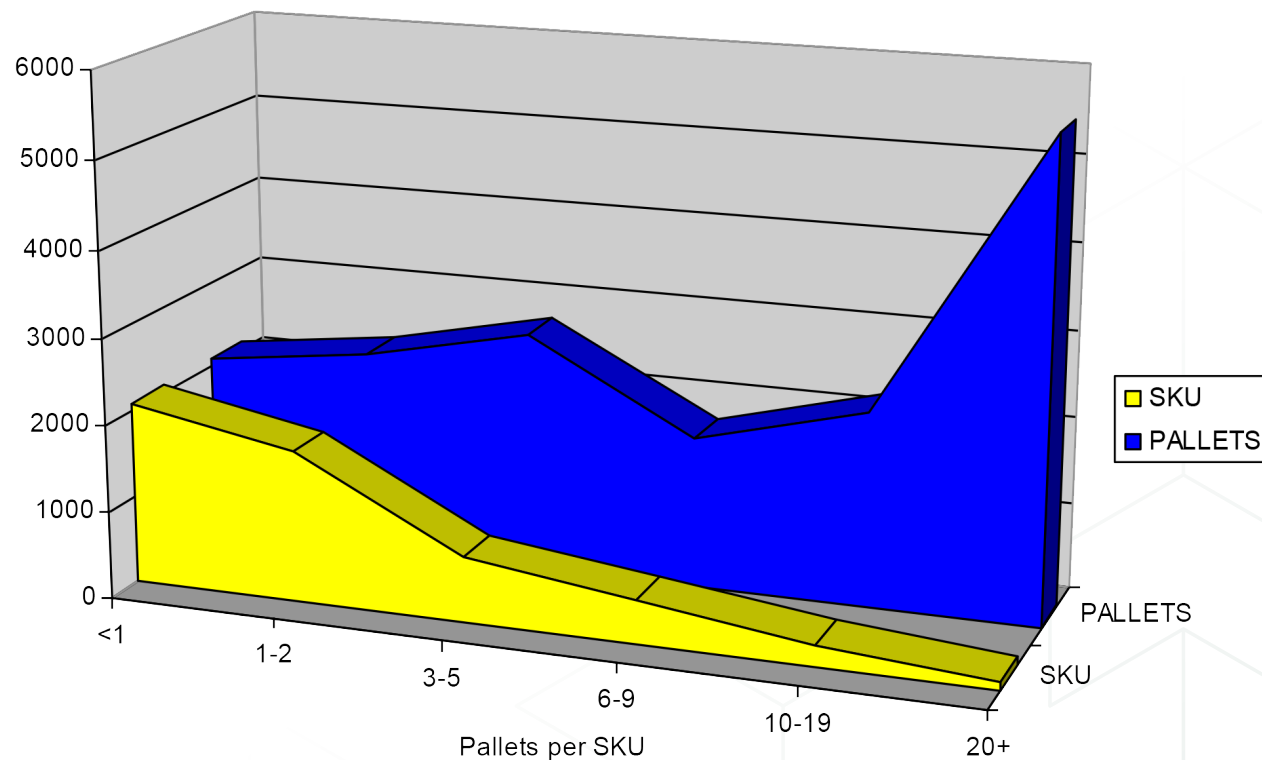JUSTIFICATION

JUSTIFICATION

When the average number of pallets per product (SKU) exceeds five, a pushback system is easily justified. The higher the number of pallets per SKU, the deeper lane depths are more feasible (usually three lanes per product minimum). These multiple lanes allow rotation of product so that you can achieve first-in first-out. Because of its high density, pushback systems can be configured to attain up to 100% more pallets stored than standard pallet racking, and equal or greater increases over poorly occupied drive-in or floor storage layouts.

The chart below shows a typical distribution center's inventory. The "80/20 rule" where 20% of the products (SKU) represent 80% of the volume is common to most customers. Pushback would be applicable for the following categories:

- 6 - 9 pallets/sku – 2 and 3 deep pushback
- 10 – 19 pallets/sku – 3 and 4 deep pushback
- 20+ pallets/sku – 4, 5 and 6 deep pushback

JUSTIFICATION

THE TRUE COST PER PALLET STORED INCLUDES ALL ELEMENTS WITHIN THE WAREHOUSE:

- **Capital costs**
  - land
  - buildings
  - mobile handling equipment (forklifts)
  - storage systems

- **Operating costs**
  - labour
  - transportation
  - product damage
  - maintenance/insurance/taxes

THE FOLLOWING SIMPLE EXAMPLES (SOLUTIONS A, B, C AND D) ARE FOUR DESIGNS THAT COMPARE THE COST OF FOUR RACKING LAYOUTS.

A. All standard selective rack

B. All pushback while holding the building the same size as solution A

C. All pushback and resizing the building to hold the same number of pallets as solution A

D. Mix of standard selective rack, pushback and floor storage, where the building size has been adjusted to hold the same number of pallets as solution A

The solutions just look at the cost of building and racking, no allowances have been made for operating costs or forklifts.
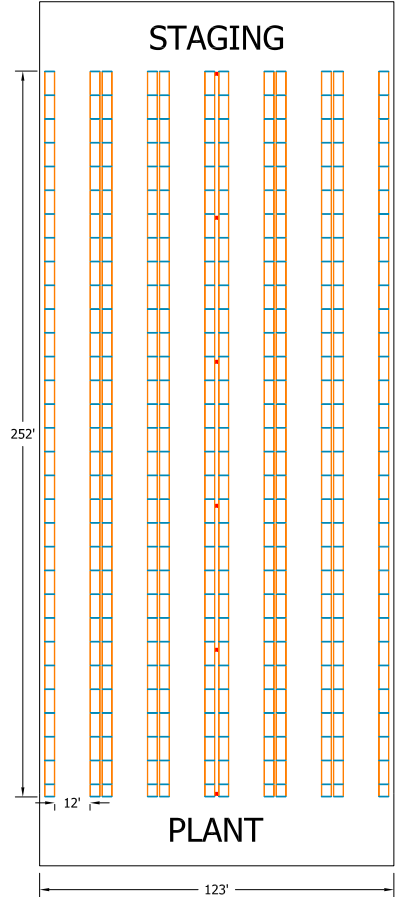
The lowest cost storage is the one that matches the proper storage type to the inventory. An inventory analysis usually reveals that a minimum of three or four types of storage will be required.
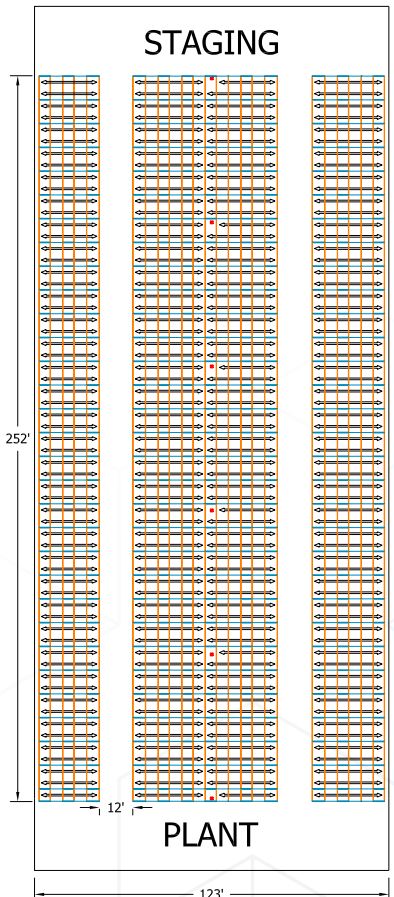
JUSTIFICATION

SOLUTION A
Standard Selective Rack
2,928 Pallets, 31,000 square feet

STAGING

252'

12'

PLANT

123'

SOLUTION B
5 and 6 Deep Pushback
5,588 Pallets, 31,000 square feet

STAGING
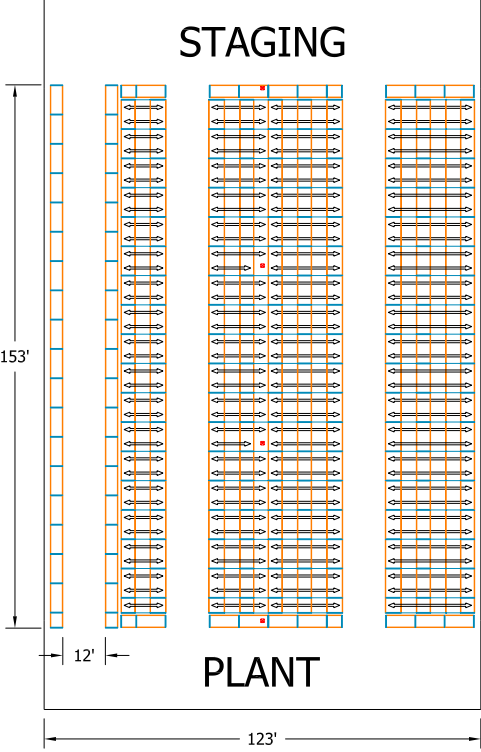
252'

12'

PLANT

123'

JUSTIFICATION

SOLUTION C
5 and 6 Deep Pushback
2,932 Pallets, 16,300 square feet
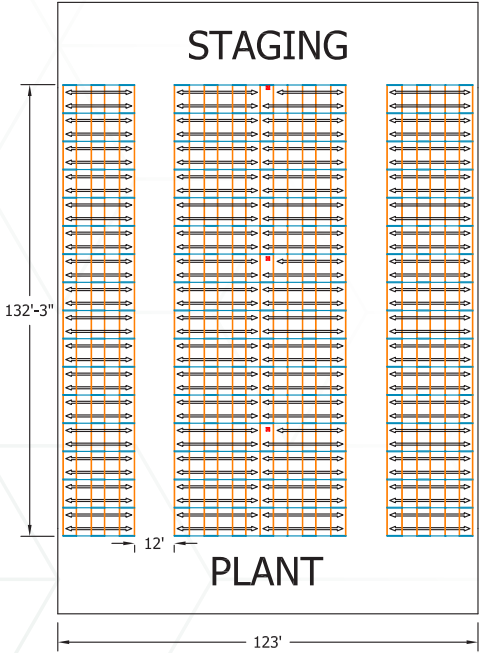
SOLUTION D
Standard Selective Rack, 3, 4, 5 & 6 Deep Pushback above floor Storage
2,944 Pallets, 18,900 square feet

JUSTIFICATION
COST COMPARISON

STANDARD AMBIENT WAREHOUSE

$50 US per square foot

Solution A – 31,000 SQ. FT. in total

2,928 pallet positions of standard selective rack

Solution B – 31,000 SQ. FT. in total

5,588 pallet positions of 5 & 6 deep pushback rack

Solution C – 16,300 SQ. FT. in total

2,932 pallet positions of 5 & 6 deep pushback rack

Solution D – 18,900 SQ. FT. in total

2,944 pallet positions total, 432 in standard selective rack, 1256 in pushback and 1256 in floor storage.

	SOLUTION A	SOLUTION B	SOLUTION C	SOLUTION D
■ RACKING	$292,800	$1,257,300	$659,700	$357,200
■ BUILDING	$1,550,000	$1,550,000	$815,000	$945,000

JUSTIFICATION
COST COMPARISON

FREEZER WAREHOUSE
$100 US per square foot

Solution A – 31,000 SQ. FT. in total
2,928 pallet positions of standard selective rack
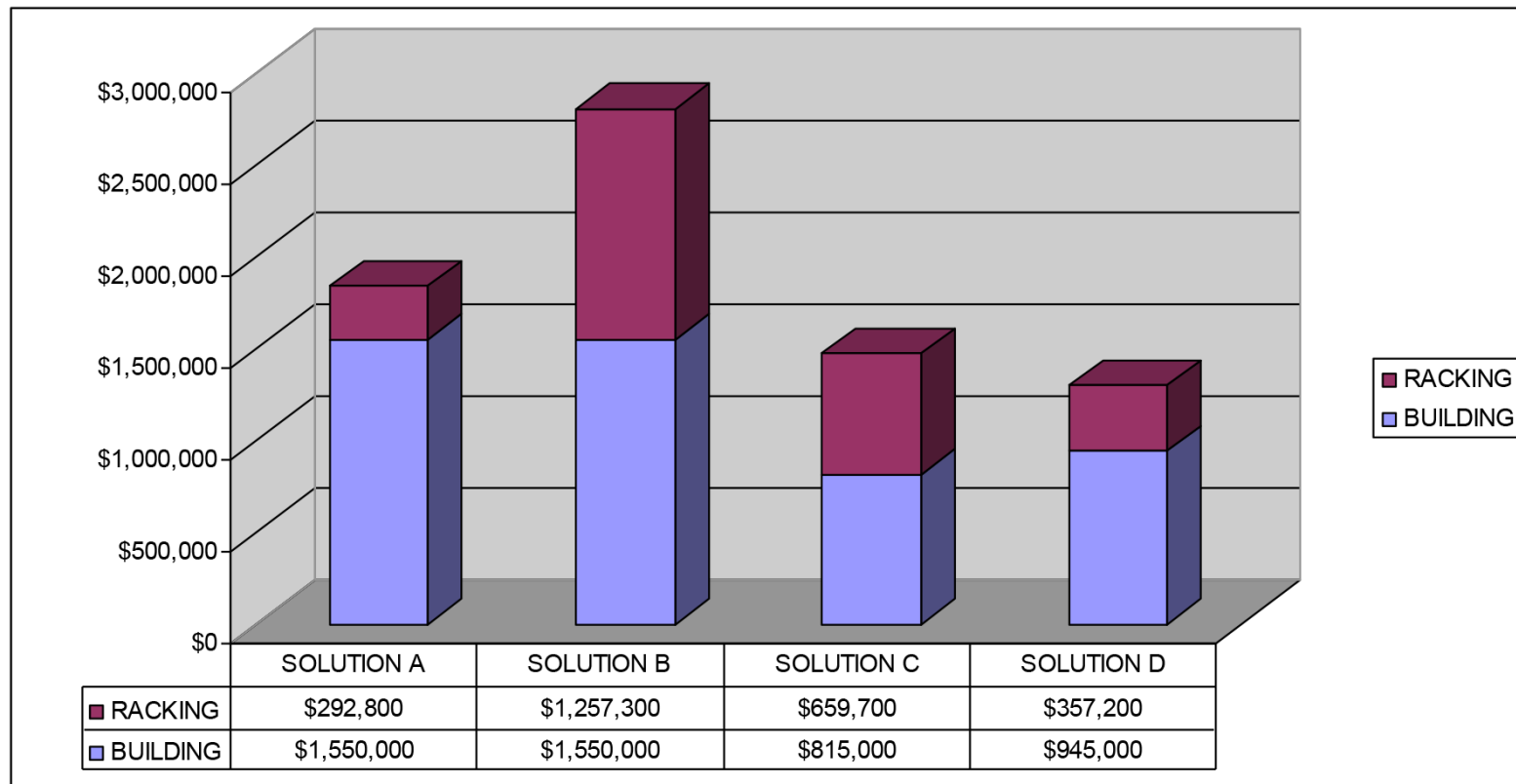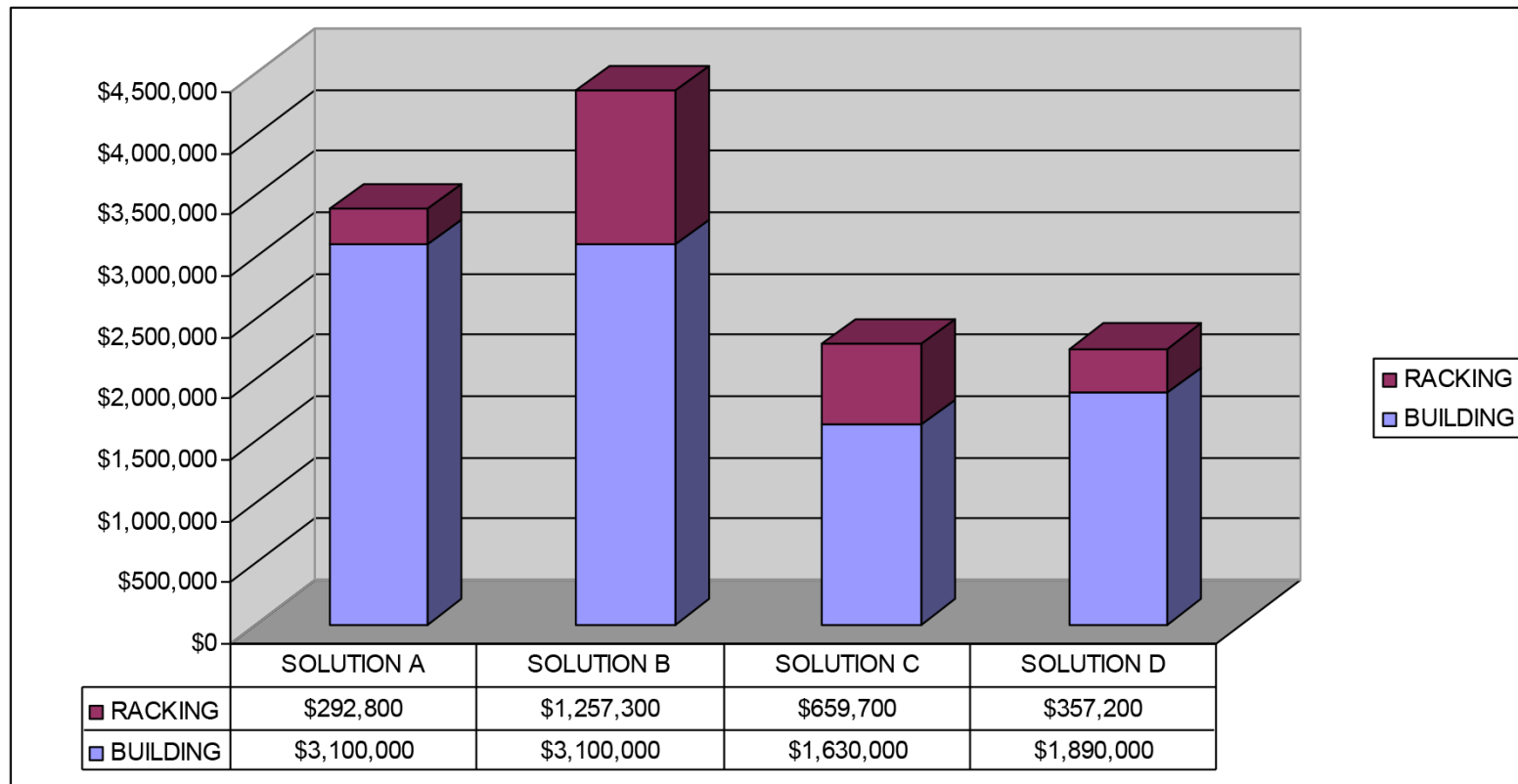
Solution B – 31,000 SQ. FT. in total
5,588 pallet positions of 5 & 6 deep pushback rack

Solution C – 16,300 SQ. FT. in total
2,932 pallet positions of 5 & 6 deep pushback rack

Solution D – 18,900 SQ. FT. in total
2,928 pallet positions total, 432 in standard selective rack, 1256 in pushback and 1256 in floor storage.

	SOLUTION A	SOLUTION B	SOLUTION C	SOLUTION D
■ RACKING	$292,800	$1,257,300	$659,700	$357,200
■ BUILDING	$3,100,000	$3,100,000	$1,630,000	$1,890,000

Legend: ■ RACKING ■ BUILDING

JUSTIFICATION
STORAGE TYPE RULE OF THUMB

Average Pallets per Product	Standard Rack	Drive-In	Pushback	Flowrack
1 to 5	1 Deep	N/R	N/R	N/R
6 to 8	2 Deep	N/R	2 Deep	N/R
9 to 11	N/R	N/R	2/3 Deep	N/R
12 to 14	N/R	N/R	3 Deep	N/R
15 to 23	N/R	N/R	3/4 Deep	N/R
24 to 35	N/R	2 Deep	4/5 Deep	8 Deep
36 to 47	N/R	3 Deep	4/5/6 Deep	12 Deep
48 to 59	N/R	4 Deep	5/6 Deep	16 Deep
60 to 71	N/R	5 Deep	5/6 Deep	20 Deep
72 to 83	N/R	6 Deep	6 Deep	24 Deep

Chart assumes 4 levels high.
Floor storage would use the same spatial constraints as drive-in.
N/R – not recommended

JUSTIFICATION

SOME COMMON METHODS FOR CHOOSING STORAGE SYSTEMS

"We have always stored our product this way"

"Our building layout and truck requirements dictate this layout"

"We laid out the rack in the same format as we used to store in bulk storage"

"Our drive-in storage gave us the largest number of pallet locations"

"Rack or high density storage was just too expensive, so we bulk stack"

"If we need more space we expand"

CURRENT WAREHOUSING TRENDS

An ever increasing number of products (SKU) versus the number of pallets to be stored

Increasing pressure to lower inventories in total even though sales volume is growing

Packaging is becoming lighter and weaker resulting in increased product damage and reduced pallet stack heights due to safety concerns

Increased enforcement (Government and marketing) of first-in first-out (FIFO)

Corporate desire to maintain use of current warehouse rather than build or lease more space

JUSTIFICATION
STORAGE TYPE CHARACTERISTICS

BULK FLOOR STACKING
- High theoretical pallet count
- Lowest average occupancy, as a result of honeycombing
- Poor height utilization
- Vertical and horizontal product unity required
- Stock rotation is difficult
- Highest level of product damage
- Safety risk in high, unstable piles
- **Best use:** large number of pallets per SKU and slow turnover

STANDARD SELECTIVE RACKING
- Lowest theoretical pallet count / density
- Highest average occupancy
- Good height utilization
- **Best use:** high number of SKU and low quantities of pallets per SKU (1-5)

DRIVE-IN & DRIVE-THROUGH RACK
- High theoretical pallet count / density
- Low average occupancy
- Good height utilization
- Vertical and horizontal product unity required
- Some forktruck and pallet limitations
- Stock rotation can be difficult if poorly configured
- **Best use:** large number of pallets per SKU, averaging 3+ tunnels storage per product, low turnover

DOUBLE DEEP RACK
- Medium theoretical pallet count / density
- Medium average occupancy
- Good height utilization
- Handling is slow
- Special forktrucks required
- **Best use:** large new facilities with large number of products averaging 5 to 10 pallets per SKU, slow turnover

PALLET FLOW RACKING
- High theoretical pallet count / density
- Good average occupancy
- Height utilization ranges from good to poor dependent on length of lane and slope required
- Horizontal product unity only
- "Automatic" stock rotation, reduced handling
- Reduced product damage, shrinkage
- **Best use:** manufacturing environment, high number of pallets and a low number of SKU, high turnover

PUSHBACK RACKING
- Good theoretical pallet count / density
- Good average occupancy
- Good height utilization
- Horizontal product unity only
- **Best use:** medium to high number of pallets per SKU, high turnover