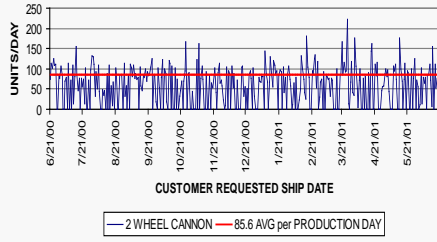
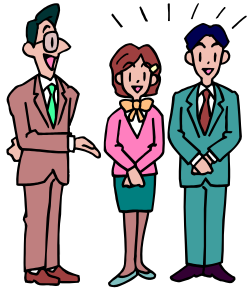




Lean Flow in the Green Industry

FlowVision[®]
The Lean Business & Supply Chain Consulting Group





$$\text{Kanban Qty} = \frac{\sum (\text{Cust Reqts} \times \text{POU Qty}) \times \text{Delivery Time}}{\text{Work Time/Day}}$$

$$\text{Takt} = \frac{\text{Work Time/Day}}{\text{Customer Requirements}}$$

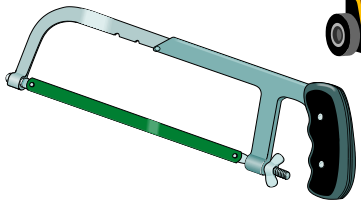
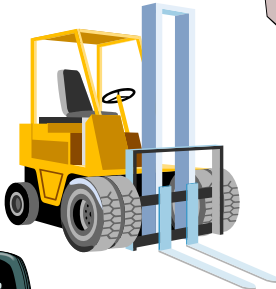
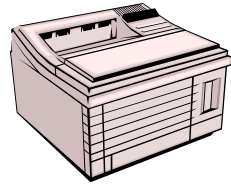
OPS =

$$\frac{HCc * AU}{ICCR * PC * (Kc * .75)}$$

$$\text{Std Wtd Time} = \frac{\sum (\text{Std Time} \times \text{Cust Reqts})}{\sum (\text{Customer Reqts})}$$



LeanFlow Business Strategy



Rapid time to value

LeanFlow in all Industries



TIMKEN



BallFloraPlant®
Innovative By Design
State-of-the-Art Breeding & Production of Vegetative Plants



Power Systems



Commercial Trucks

ISUZU TRUCK



Biosense Webster
a Johnson & Johnson company



Specialty Gases



Timberland



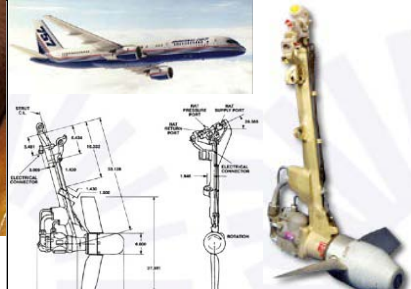
The United States Mint
U.S. Department of the Treasury



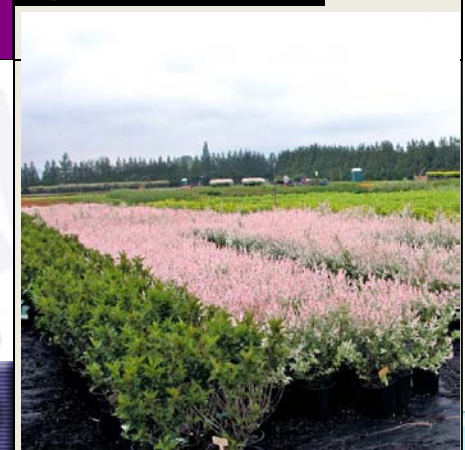
JOHN DEERE



Cudahy Tanning



Hamilton Sundstrand
A United Technologies Company



OUR GREEN EXPERIENCE

ivy Acres
Van de Wetering

Darwin Colombia

WESTERN CACTUS
Enterprises, Inc.

PLANT LIFE
FARMS

NEW ENGLAND
GROWS!



Jolly Farmer

Bali Flora Plant.

JN
Johnson Nursery Corporation

NEAL MAST & SON
GREENHOUSES

Costa Farms



McCorkle
NURSERIES, INC.



MAST
YOUNG PLANTS

WINDMILL
NURSERY

NorthCreek
NURSERIES

KAWAHARA
NURSERIES

IPPS
Production Knowledge Globally

Dickman Farms
GREENHOUSES & GARDEN CENTER

GEMMELL'S
GARDEN CENTRE

Olive Hill Greenhouses, Inc.
Pollution Fighting Live Plants for Healthier Home and Office Environments

Van de Wetering GREENHOUSES Inc.

Northwest Horticulture



THE LANDSCAPE SHOW

We Deliver Freshness
Delaware Valley
WHOLESALE FLORIST



BAILEY
NURSERIES

FlowVision
The Lean Business & Supply Chain Consulting Group

OUR GREEN EXPERIENCE



CLEAR RIDGE NURSERY, INC.
Supplier of Quality Native, Ornamental Plants + Supplies



YOU ARE A MANUFACTURING COMPANY



+



+



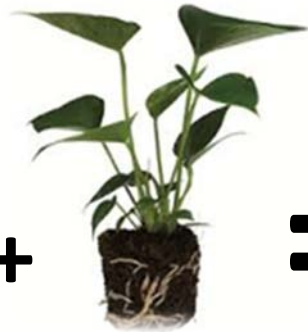
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FlowVision[®]

The Lean Business & Supply Chain Consulting Group

TWO APPROACHES TO LEAN FLOW

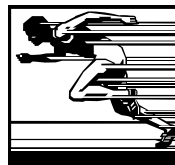
Traditional

← TIME TO VALUE →



Lean Flow Holistic Approach

||| WEEKS → Results

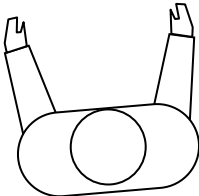


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FUNCTIONAL

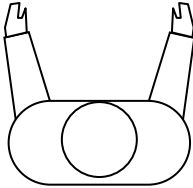
LABEL



Work Order 4
Qty. 75

50 Minutes

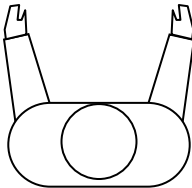
FLAT FILL



Work Order 3
Qty. 100

50 Minutes

SOW



Work Order 2
Qty. 50

50 Minutes

Work Order 1
Qty. 50

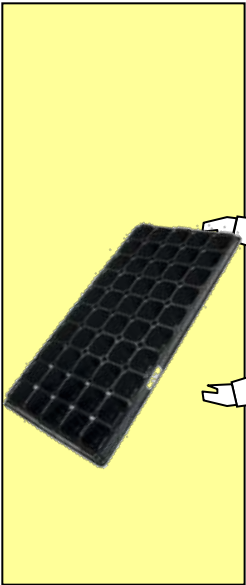
150 Minutes

FUNCTIONAL

LABEL

FLAT FILL

SOW



Work Order 8
Qty. 100

Work Order 7
Qty. 75

Work Order 6
Qty. 50

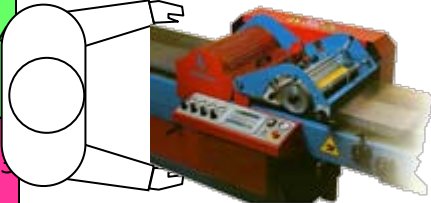
Work Order 5
Qty. 50



Work Order 4
Qty. 75

Work Order 3
Qty. 100

Work Order 2
Qty. 50



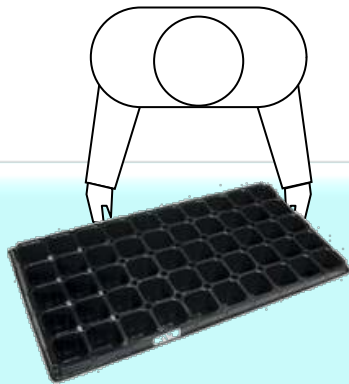
Work Order 9
Qty. 50

Work Order 1
Qty. 50

550 Minutes

LEAN FLOW

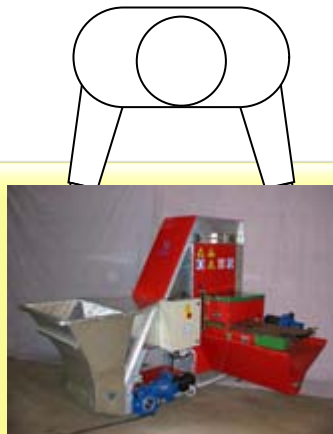
OP 10



IPK

1 Minute

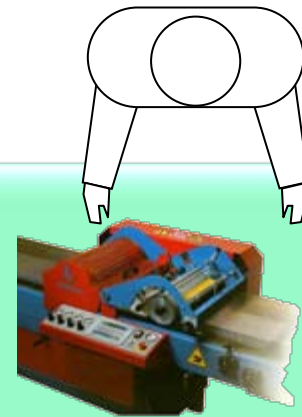
OP 20



IPK

1 Minute

OP 30



IPK

1 Minute

3 Minutes

LEAN LINE DESIGN

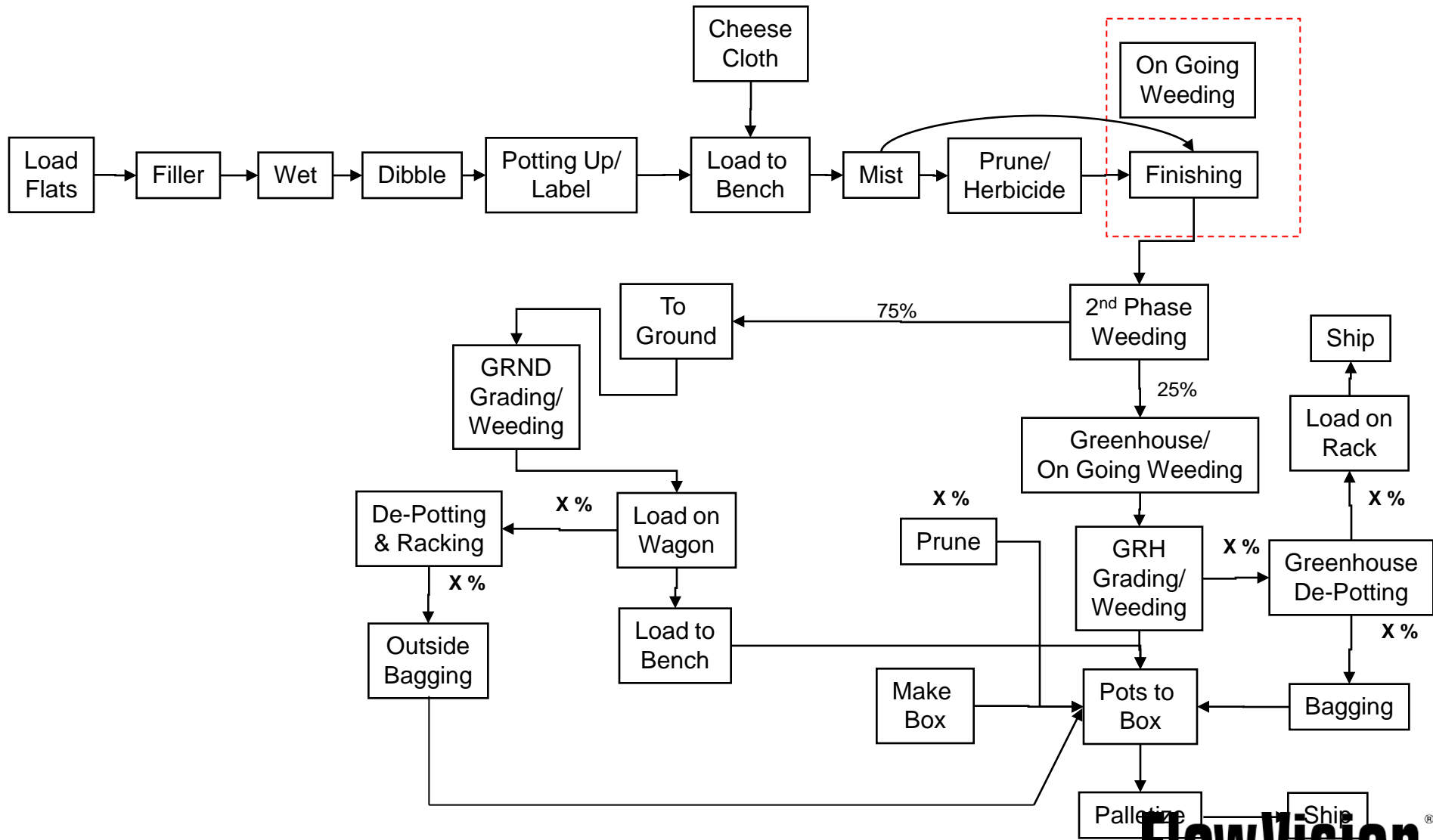
- Create Process Flow Charts
- Develop Standard Operation Worksheets
- Define Product/Process Matrices
- Create Multi-Product Process Flow Charts
- Calculate Takt
- Determine Resource Requirements
- Review Actual Requirements vs. Design
- Create a Block Diagram
- Develop Standard Operations
- Create the Facility Layout
- Define Cells

DATA

CALC.



LAYOUT

LINER PROCESS FLOW CHART



IMPROVE PRODUCTIVITY & QUALITY

Standard Operation Work Content Sheet										page	of
Process Name Packing					Product(s) New Guinea Impatiens 478						
Written by Mike K.					Checked by Oscar C.						
Work Sequence	Waste (X)	Work Content	Asset / Tool No.	Labor Time	Mach. Time	Elapsed Time	Tool Exch. Freq.	Critical Areas (right & wrong, safety and ease in operation)	Quality Check Freq.	Std. Oper. No.	
010		Apply box label		.08		.08		Ensure correct label			
020		Scan label		.08		0.16					
030		Insert packing list		.08		0.24		Ensure correct list			
040		Insert bag and scan		.08		0.32					
050	X	Aside empty Crate		.04		0.36					
060		Aside finished box		0.4		0.40					
10 Percent of Total is Waste			Totals	0.40		0.40					

1. 
2. WORK
3. 

Standardize

Not how Fast, but how long

MATHEMATICALLY BASED

1) Calculate Takt

$$\frac{\text{Work time/day}}{\text{Customer Requirements}}$$

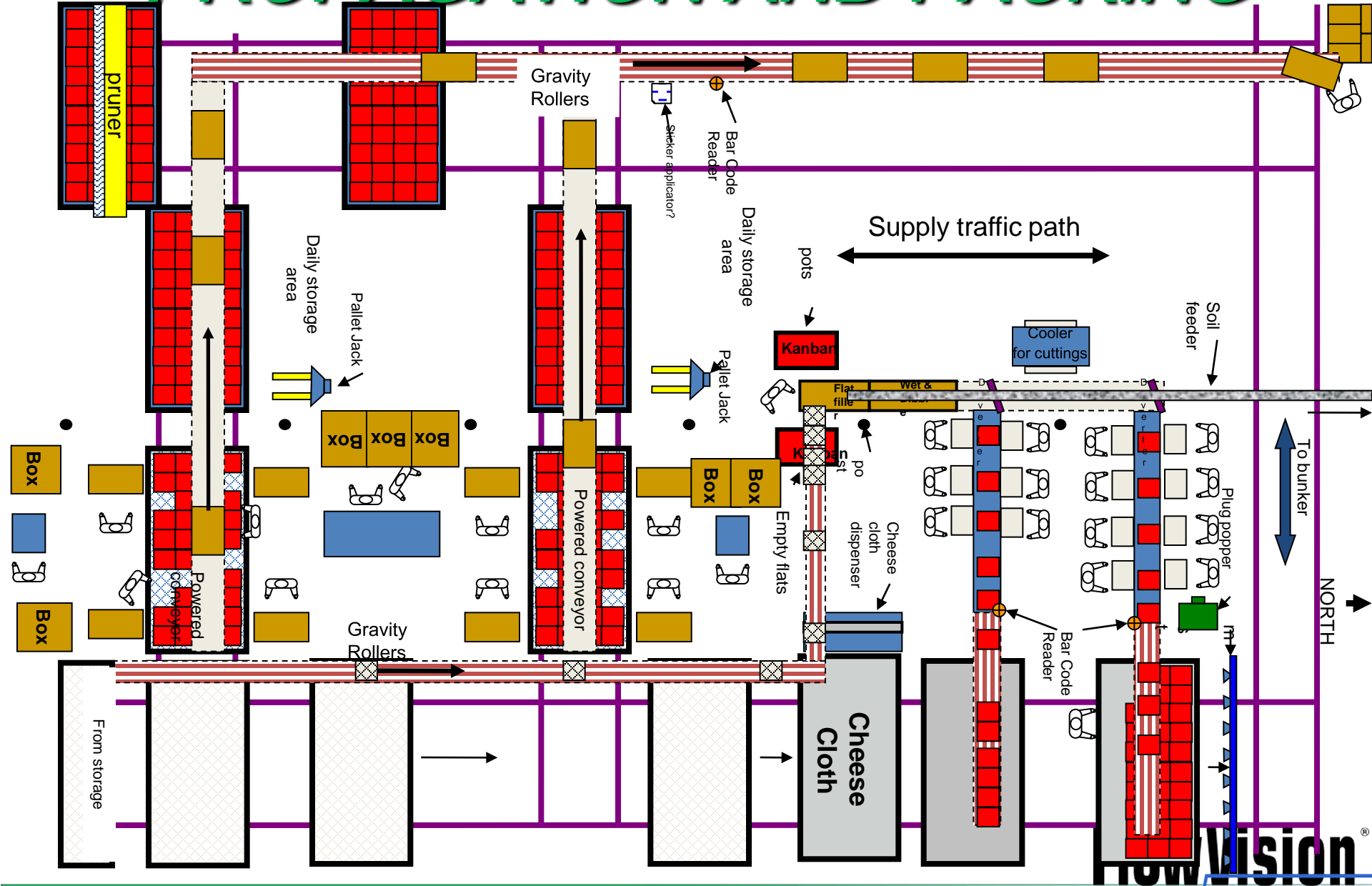
2) Calculate Standard
Weighted Time

$$\frac{\Sigma (\text{Std. Time X Req.})}{\Sigma (\text{Req.})}$$

3) Calculate People
& Machine design
requirements

$$\frac{\text{Std. Weighted Time}}{\text{Takt}}$$

PROPAGATION AND PACKING



PROGRESSIVE WORK UTILIZE MANUFACTURING PRINCIPLES



PROGRESSIVE STICKING/PLANTING



**SIMPLE AND EASY NO NEED FOR NEW OR FANCY
EQUIPMENT**

PROGRESSIVE WORK



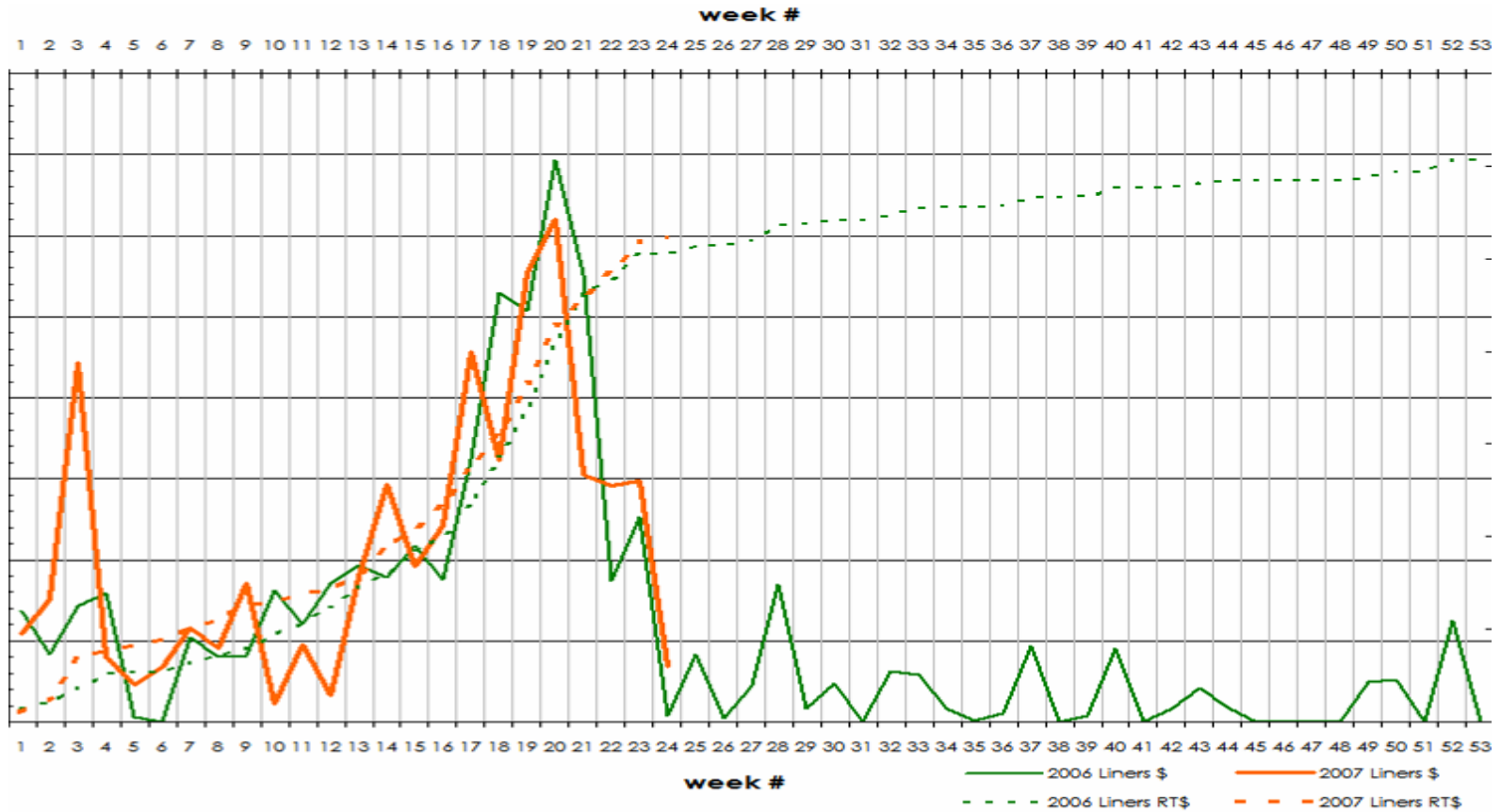
I LOVE LUCY IN CHOCOLATE FACTORY

- *It's not how fast they can work, but how long it takes to do the Job correctly*
- *Fewer starts and stops (interruptions) is the focus*

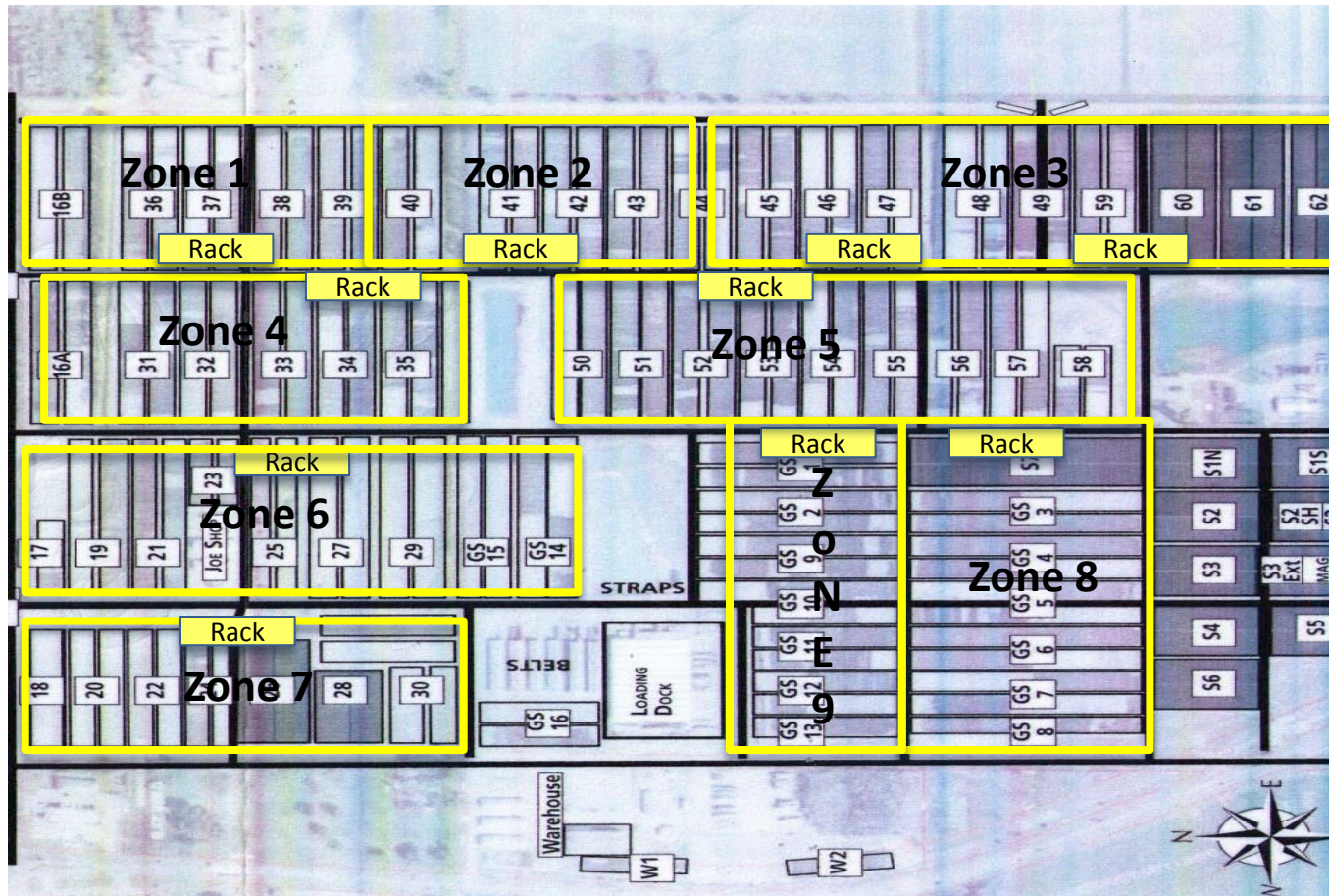


INVENTORY & VARIATION

PRODUCT SHIPPED BY WEEK



PULLING PRODUCTS



- The number of zones and pullers assigned to the zones is calculated
- The number of drivers is also calculated

MASTER PULL

Master Pull report

Master Pull #	2
Farm:	FV
Zone:	A
Load Date:	9/1/2017

Location	Item Number	Description	ContainerID	Height ID	Qty To Ship	Rack Req	Rack Seq	Comments
A01	100020	2.25-GAL ALMOND FLOWERING	3G	H07	270	4.23	1,2,3,4,5	
A03	100125	2.25-GAL EUONYMUS BRNING BUSH	3G	H05	10	0.11	5	
A05	100151	SYRINGA LILAC 3G ASST BFN	3G	H04	10	0.08	5	
A04	100112	2.25-GAL FORSYTHIA ASSORTED	3G	H06	160	2.12	6,7,8	
A06	100051	2.25-GAL PUSSYWILLOW ASSORTED	3G	H11	180	4.55	9,10,11,12,13	
A09	100021	2.25-GAL BOXWOOD WINTERGREEN	3G	H04	360	3.04	14,15,16,17	
A08	100097	2.25-GAL QUINCE ASSORTED	3G	H03	20	0.12	17	
A11	100022	2.50-QT NANDINA FIREPOWER DWAR	1G	H04	224	0.59	17	
A10	100126	2.50-QT BOXWOOD WINTERGREEN	1G	H04	128	0.34	18	
A13	100024	2.25-GAL YEW UPRIGHT	3G	H05	270	2.93	19,20,21	
A12	100023	2.25-GAL YEW SPREADING	3G	H04	100	0.84	22	
A15	100052	2.50-QT SPRUCE COLORADO BLUE	1G	H04	160	0.42	23	
A17	100025	2.5 QT ARBORVITAE EMERALD GREE	1G	H03	352	0.66	24	
A16	100053	2.5 QT SPRUCE ALBERTA DWARF	1G	H03	160	0.30	24	
A18	100026	2.50-QT BOXWOOD WINTERGEM	1G	H04	672	1.77	25,26	
A21	100055	3.25-GAL BOXWOOD GREEN MOUNTAI	5G	H07	160	3.13	27,28,29,30	
A20	100054	2.50-QT JUNIPER OLD GOLD	1G	H02	224	0.25	30	
A23	100002	ILEX DWF BURFORD HOLLY 3G PRO	3G	H06	310	8.22	31,32,33,34,35,36,37,38,39	
A22	100001	ILEX DWF YAUPON HOLLY 3G PRO	3G	H04	100	0.84	40	
A25	100056	2.25-GAL VIBURNUM ASSORTED	3G	H04	80	0.67	41	
A24	100027	2.25-GAL PHOTINIA RED TIP	3G	H06	10	0.13	41	
A24	51169018	BOX GRN VELVET	18" BB	H06	6	0.00	41	
A24	65300036	EUONYMUS ALATUS COMP	36" BB	H06	6	0.00	41	
A26	100174	ALTHEA APHRODITE PK N03	3G	H05	10	0.11	41	
A27	100028	2.50-QT LILAC ASSORTED	1G	H02	23	0.03	41	
A28	100057	2.25-GAL BOXWOOD WINTERGEM	3G	H04	80	0.67	42	
A30	100029	2.5 QT JUNIPER BLUE STAR	1G	H02	864	0.98	43	
A32	100058	2.50-QT EUONYMUS GOLDEN	1G	H03	64	0.12	44	
A50	100002	ILEX DWF BURFORD HOLLY 3G PRO	3G	H06	30	0.80	44	

Thursday, September 14, 2017

Page 1 of 7

SHIPPING DOCK SUPERMARKET

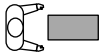
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7	6	5	4	3	2	1	0	9	8	7	6	5	4	3	2	1	0	9	8
7	7	7	7	7	8	8	8	8	8	8	8	8	8	8	9	9	9	9	9
5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4



1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1
8	7	6	5	4	3	2	1	0	9	8	7	6	5	4	3	2	1	0	9
9	9	9	9	9	9	9	9	1	1	1	1	1	1	1	1	1	1	1	1
3	4	5	6	7	8	9	0	0	0	0	0	0	0	0	0	0	0	0	0



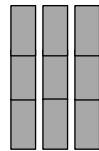
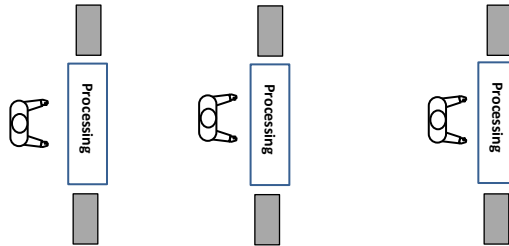
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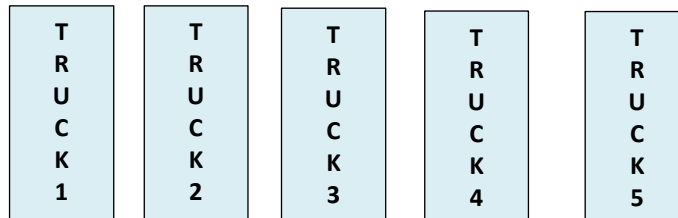
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2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3
0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9



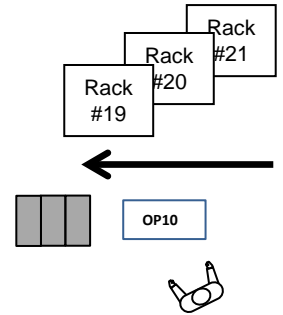
Order Picking



Loading Dock




Rack Prep







RACK SHEET

Load # 916719	Lowes - Store #2	Order # 820599
Load Sequence 3 of 40	Store_2	Seq on Order 3 of 6
Drop # 5	Rack Type CC	# of Shelves 4



820599 - 3

Supermarket Rack	Shelf #	Product #	Description	Qty	Height	UPC	Retail Price	Comments
25	4	100010	JUNIPERUS TOPIARY 7G ASST BFN	6	18	 7.64677E+11	\$59.98	
28	3	100014	TOPIARY CONIFER ASST SG BFN	8	22	 7.64677E+11	\$59.98	
26	2	100011	JUNIPERUS TOPIARY 7G ASST BFN	6	22	 7.64677E+11	\$59.98	
24	1	100008	TOPIARY CONIFER ASST SG BFN	8	22	 7.64677E+11	\$59.98	



Thursday, September 14, 2017

DOCK SUPERMARKET



DOCK SUPERMARKET



Load

Pick



LOADING DOCK

4	4	4
3	4	5
4	4	4
0	1	2
3	3	3
7	8	9

4	4	4
3	4	5
4	4	4
0	1	2
3	3	3
7	8	9

4	4	4
3	4	5
4	4	4
0	1	2
3	3	3
7	8	9

4	4	4
3	4	5
4	4	4
0	1	2
3	3	3
7	8	9

3	3	3
4	5	6
3	3	3
1	2	3
2	2	3
8	9	0

3	3	3
4	5	6
3	3	3
1	2	3
2	2	3
8	9	0

3	3	3
4	5	6
3	3	3
1	2	3
2	2	3
8	9	0

3	3	3
4	5	6
3	3	3
1	2	3
2	2	3
8	9	0

2	2	2
5	6	7
2	2	2
2	3	4
1	2	2
9	0	1

2	2	2
5	6	7
2	2	2
2	3	4
1	2	2
9	0	1

2	2	2
5	6	7
2	2	2
2	3	4
1	2	2
9	0	1

2	2	2
5	6	7
2	2	2
2	3	4
1	2	2
9	0	1

1	1	1
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0	1	2

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3	4	5
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0	1	2

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6	7	8
1	1	1
3	4	5
1	1	1
0	1	2

1	1	1
6	7	8
1	1	1
3	4	5
1	1	1
0	1	2

7	8	9
4	5	6
1	2	3

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4	5	6
1	2	3

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4	5	6
1	2	3

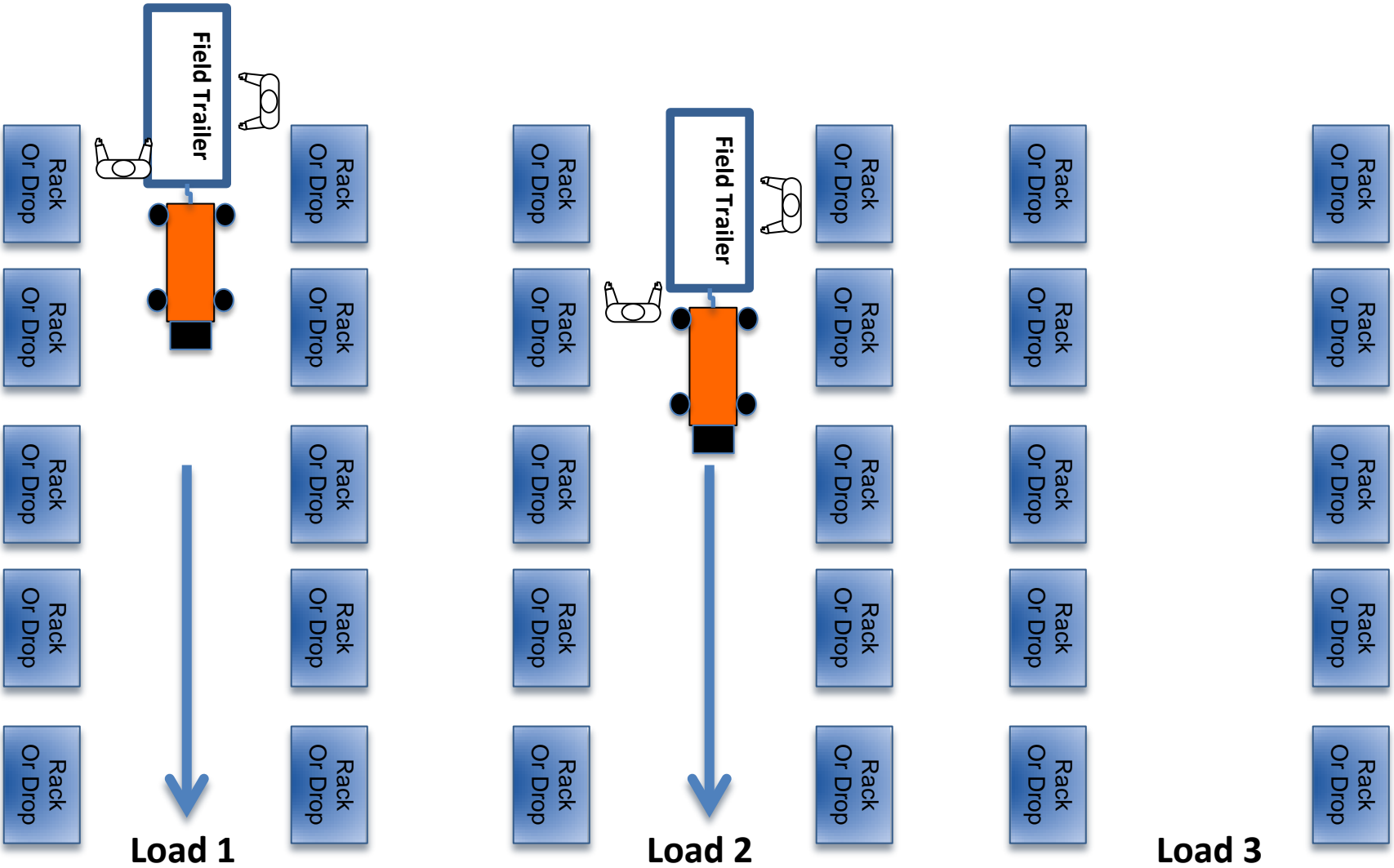
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3**

**T
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C
K
4**

PRE STAGE



PRE STAGE MASTER PULL

Master Pull report							
Master Pull # <input type="text" value="3"/>							
Farm: <input type="text" value="FV"/>							
Zone: <input type="text" value="A"/>							
Location	Container ID	Description	Qty To Ship	Load Number	Rack Sequence	Shelf	Height ID
A04	#2	JUN GOLD LACE	20	Total Required			
	#2	JUN GOLD LACE	2	213737	17	1	H03
	#2	JUN GOLD LACE	18	213737	17	6	H03
A04	#2	ARB FIRE CHIEF	6	Total Required			
	#2	ARB FIRE CHIEF	6	213737	17	3	H03
A06	3G	2.25-GAL PUSSYWILLOW ASSORTED	10	Total Required			
	3G	2.25-GAL PUSSYWILLOW ASSORTED	10	213737	13	2	H11
A11	#2	RASPBERRY SHORTCAKE	6	Total Required			
	#2	RASPBERRY SHORTCAKE	6	213737	18	1	H03
A13	3G	2.25-GAL YEW UPRIGHT	10	Total Required			
	3G	2.25-GAL YEW UPRIGHT	10	213737	14	3	H05
A14	#2 BALL	HYD M LA DREAMIN	6	Total Required			
	#2 BALL	HYD M LA DREAMIN	6	213737	17	2	H05
A17	1G	2.5 QT ARBORVITAE EMERALD GREE	32	Total Required			
	1G	2.5 QT ARBORVITAE EMERALD GREE	32	213737	15	4	H03
A21	5G	3.25-GAL BOXWOOD GREEN MOUNTAI	8	Total Required			
	5G	3.25-GAL BOXWOOD GREEN MOUNTAI	8	213737	14	2	H07
A22	3G	ILEX DWF YAUPON HOLLY 3G PRO	30	Total Required			
	3G	ILEX DWF YAUPON HOLLY 3G PRO	10	213737	11	1	H04
	3G	ILEX DWF YAUPON HOLLY 3G PRO	10	213737	11	2	H04
	3G	ILEX DWF YAUPON HOLLY 3G PRO	10	213737	11	3	H04
A23	3G	ILEX DWF BURFORD HOLLY 3G PRO	30	Total Required			
	3G	ILEX DWF BURFORD HOLLY 3G PRO	5	213737	7	3	H06
	3G	ILEX DWF BURFORD HOLLY 3G PRO	5	213737	7	4	H06
	3G	ILEX DWF BURFORD HOLLY 3G PRO	5	213737	8	1	H06
	3G	ILEX DWF BURFORD HOLLY 3G PRO	5	213737	8	2	H06

THE RESULTS

Typical savings seen in Lean Flow implementations:

- Productivity improvements 20 – 40%
- Floor Space savings of up to 30%
 - As high as 4 times the volume in the same floor space
- Reduced Shrink of up to 50%
- Reduced Credits/Claims
- Increased capacity in greenhouses of up to 100%
 - From 1 turn to 2 in one season
- Controlled environment
 - No more chaos during peak periods
 - Easier to manage
- Doesn't matter how small or large you are percentage wise the savings are same

MANAGEMENT COMMITTMENT



Hardest part of implementing Lean is getting people to change

CHANGE IS HARD



“Don’t play in my sandbox”



THE PETER ORUM NURSERIES®

MIDWEST
GROUNDCOVERS
LLC

*Midwest Groundcovers'
Lean Flow Journey with
FlowVision*



MIDWEST
GROUNDCOVERS
LLC

FlowVision
The Lean Business & Supply
Chain Consulting Group

Why Midwest Groundcovers Implemented Lean Flow Processes

- Decreased labor availability
- Increased labor costs
- To increase shipping capacity with our current infrastructure
- To improve quality and order fulfillment
- To maximize transportation capacity
- To eliminate waste & non-value added work
 - Movement
 - Product spoilage
 - Time
 - Fuel
- To improve profitability



Initial Assessment in June of 2015

Identified 5 General Areas for Lean Flow Redesigns

- Distribution & shipping
 - Pulling
 - Truck loading
- Customer Pick-up
- Propagation
- Lean Materials Strategies
- RIO rack optimizer



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Midwest Groundcovers' 5 Locations



- St. Charles - Corporate headquarters, distribution facility & groundcover production
- Virgil – Woody plant & greenhouse production
- Natural Garden – Native plant production
- Fennville – Perennial plant production
- South Propagation - Propagation



Distribution & Shipping Implementation With Cart Optimization

- All locations equally impacted
- All departments & employees equally involved
- Most standardized process
- Largest impact to our customers
- Largest limitation on growth
- Less employee stress
- Quickest return on investment
- Most difficult to implement



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Order Pulling Process For Shipped Orders Before Lean Flow

- Ship all items to St. Charles Nursery
- Stock of all items held in a holding area part of the nursery
- Holding area replenished based on predetermined minimum and maximum inventory set points
- All inventory moved from the dock to the holding area
- Each order was individually picked and brought back to the dock for processing & shipping

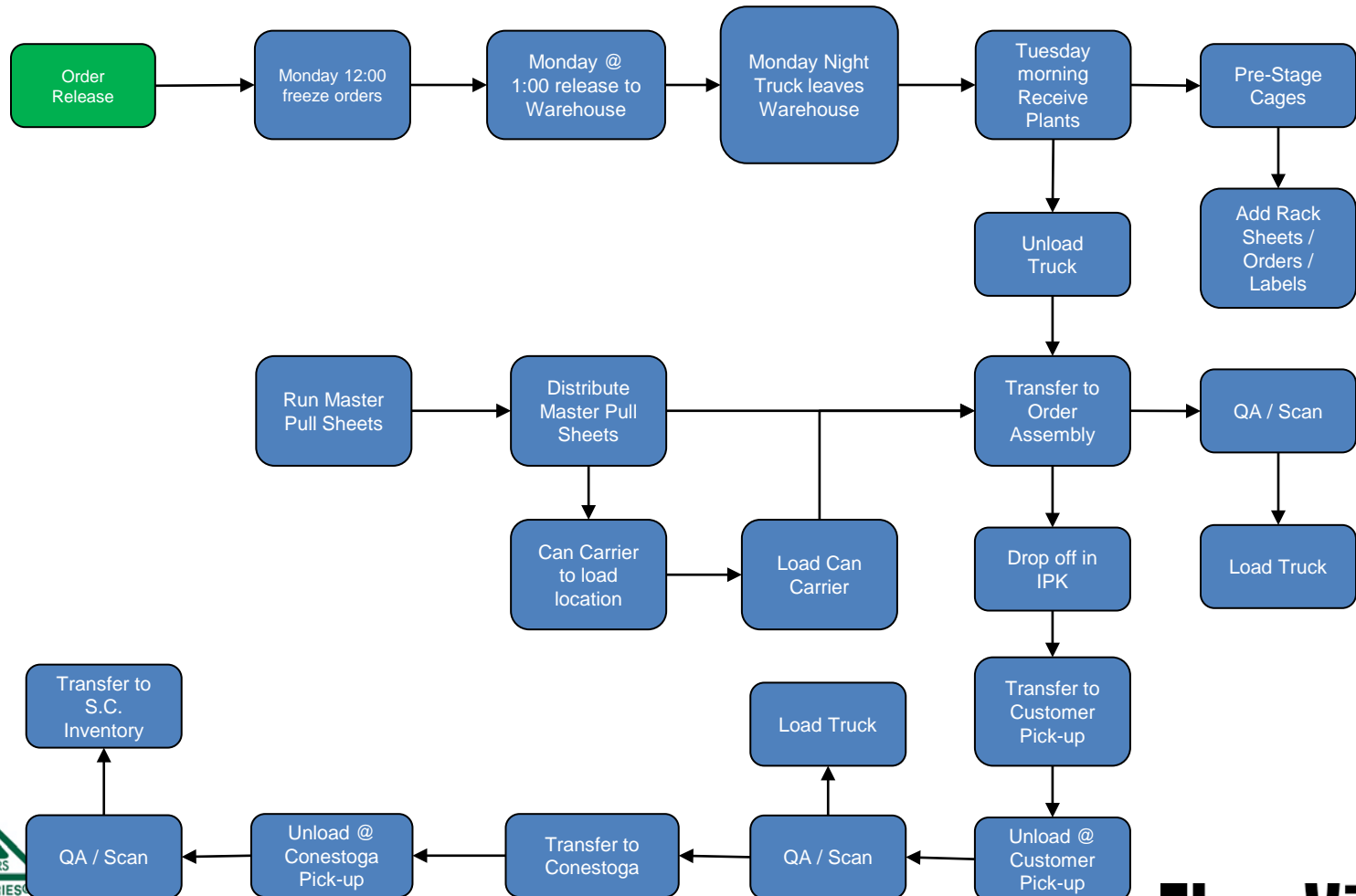




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Midwest Groundcovers Lean Flow Process



Implemented Moving Supermarket

- Plants are bulk pulled
- All material for ship orders stays on the dock
- Carts are in predetermined locations, organized by load
- Paperwork shows employees how to load the carts – they do not have to “figure it out”
- Order pullers do not have to wait to be given their orders
- Work & product is now balanced



The Moving Supermarket

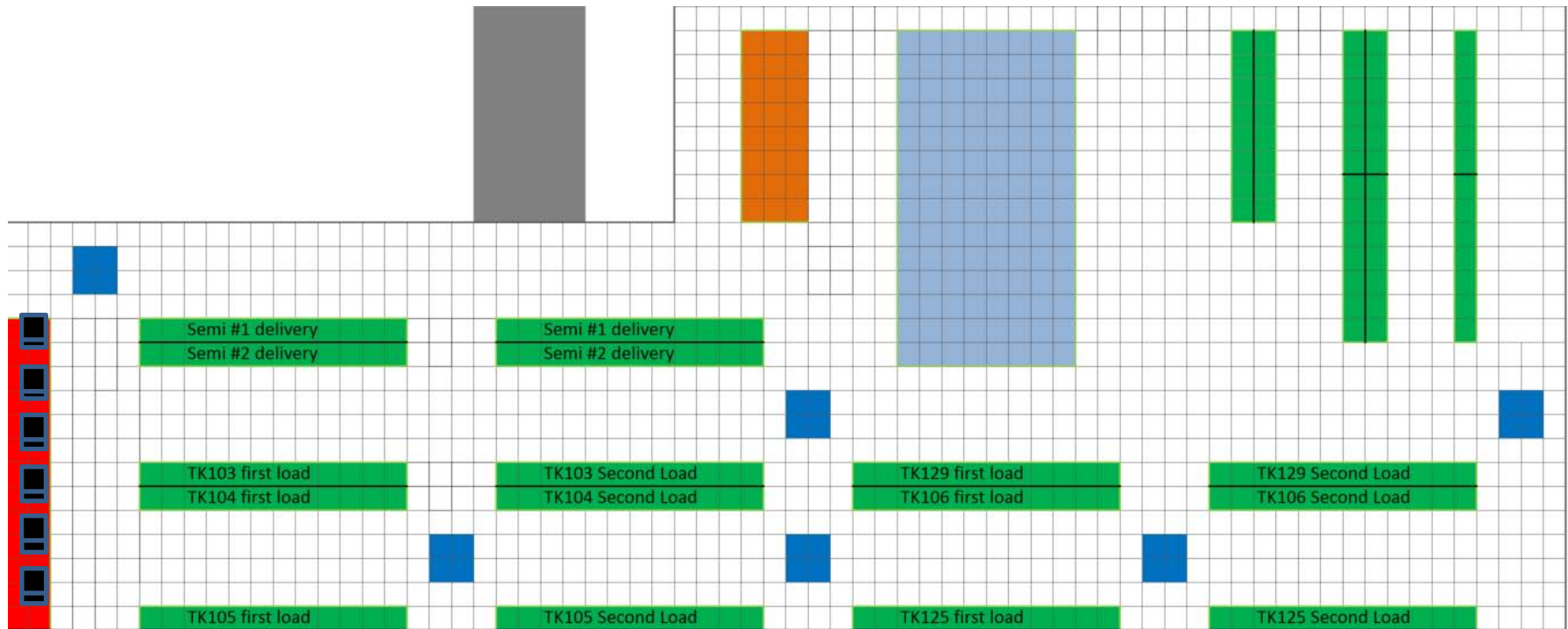


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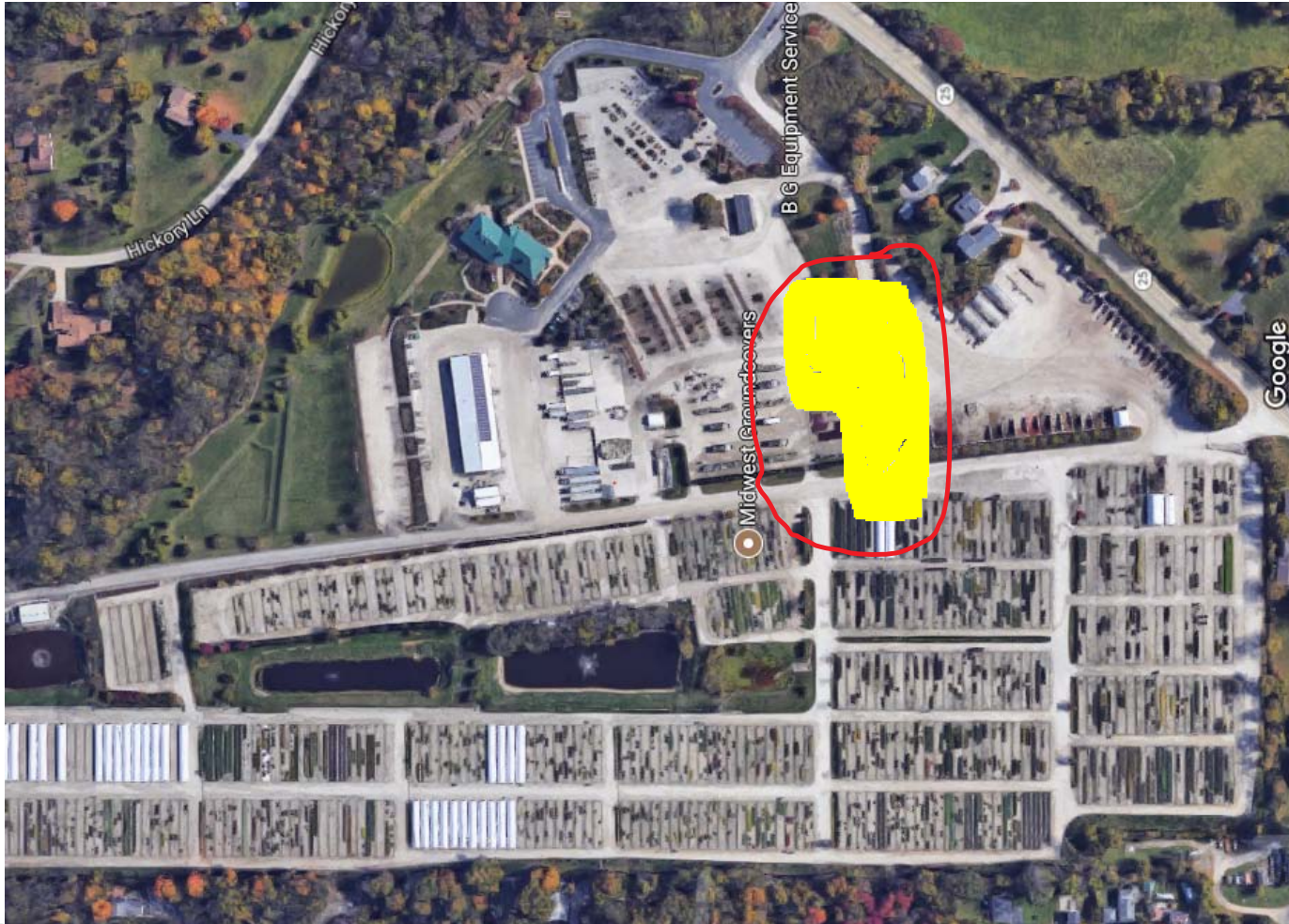
The Moving Supermarket



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Remote Nursery Changes

- Programing to change paperwork
 - Was in alpha order, now in geographic order
- Employees are shown how to prepare carts
- Maximizing trailer capacity for internal distribution
- Inventory department must make sure that plants heights are accurate to make the rack optimizer work properly



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Lean Flow forced Midwest to Evaluate Plant Labeling

- All plants are labeled with an adhesive ID label when pulled
- Customer label options have been streamlined from 6 options down to 2
- An initial savings of 62% on label stock and toner
- Less labor is needed to prepare and label plants



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Benefits Seen by Midwest Groundcovers

- Capacity of order processing and shipping thresholds have increased by 30%
- Decreased holding area by 33% in size and converted the space to production space
- Cross docking of material has increased by 40%
- Improved product quality & decreased damage due to order pulling and transport



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Cart Optimization at Midwest

- Inventory department keeps accurate height measurements of all items
- Carts are marked in 8" increments to guide employees how to assemble the carts
- Midwest's ERP system calculates the maximum amount of plants that can fit on a cart



Lean Flow Implementation Difficulties at Midwest Groundcovers

- Change is difficult
- Complicated computer programming to our ERP system & not getting it all finished for our implementation
- Going live on April 20th
- Getting all employees involved
- Getting Lean to be part of the culture of Midwest Groundcovers
- Servicing our pickup customers with our old system
- Managing employees and redistribution of resources



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Lean is our New Company Culture

- New way of life
- Constantly improving
- Constant reviewing
- Department leaders

It's a Journey not a Destination



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Lean is our part of our Midwest Groundcovers Company Culture

- New way of working
- We are constantly improving methods
- Constant reviewing results
- We have implemented Lean Flow Department Leaders around the company
- Celebrate accomplishments



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QUESTIONS?



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