

Re-directing 14,000 Hours of Work a Year”

Optimizing trades personnel at UC Davis through a partnership between Facilities, Supply Chain Management & The Office of Strategic Solutions

Presented by Hampton Sublett

The reason to continually push ourselves.

“We need to simplify processes because that’s our responsibility – every time we have an inefficient process, there’s a student or a parent who is taking on another job, delaying retirement, or taking out a second mortgage on their house. **They’re paying for our time, and they’re paying for our processes.**”

- Chief Business Officer
Public Research University

“Weniger, aber besser.”

- Dieter Rams

Designer/Innovator

“It takes a lot of hard work to make something simple.”

- Steve Jobs

*Entrepreneur/
Business Person*

“George Dawson, a slave's grandson...championed literacy after learning to read at the age of 98...”

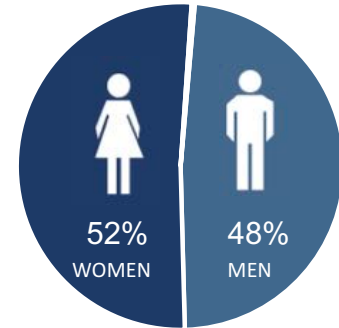
- Washington Post

Inspiration for book: “Life is so Good”

About UC Davis



38,369 enrolled students



1st in the world for veterinary medicine

Athletics name:

AGGIES

Intercollegiate sports:

24 varsity teams



\$783 million

Research funding for 2016-2017



UCDAVIS



UCDAVIS



Hampton Sublett

Director: Strategic Solutions

Work Experience

- 7 years: high-tech start-ups
- 14 years: in higher education, leading campus-wide strategic initiatives

Education

- M.B.A. from University of San Francisco
- B.S. from Boston University

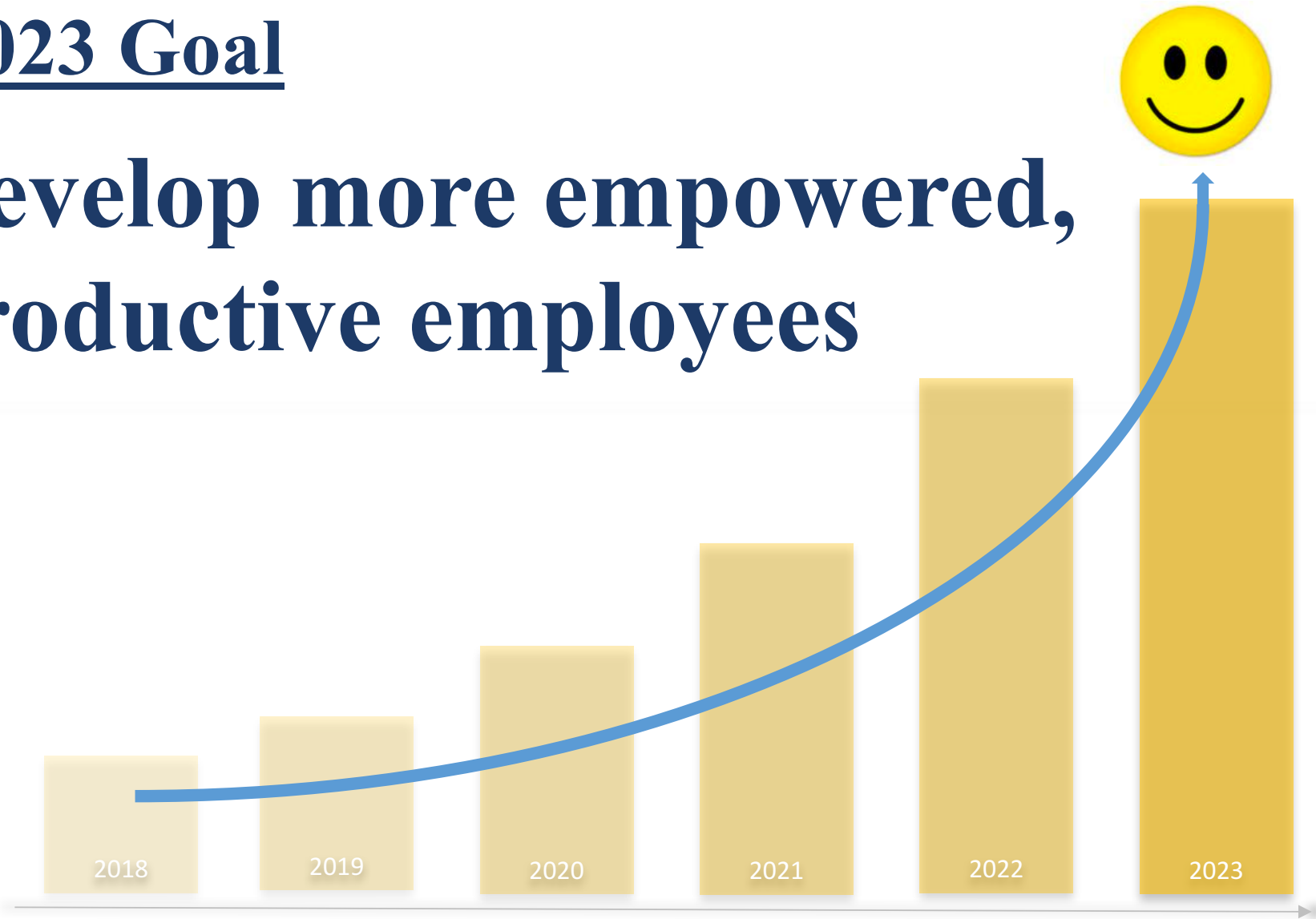
Certifications

- Lean Six Sigma Black Belt
- ITIL v.3
- Scrum Master

UCDAVIS

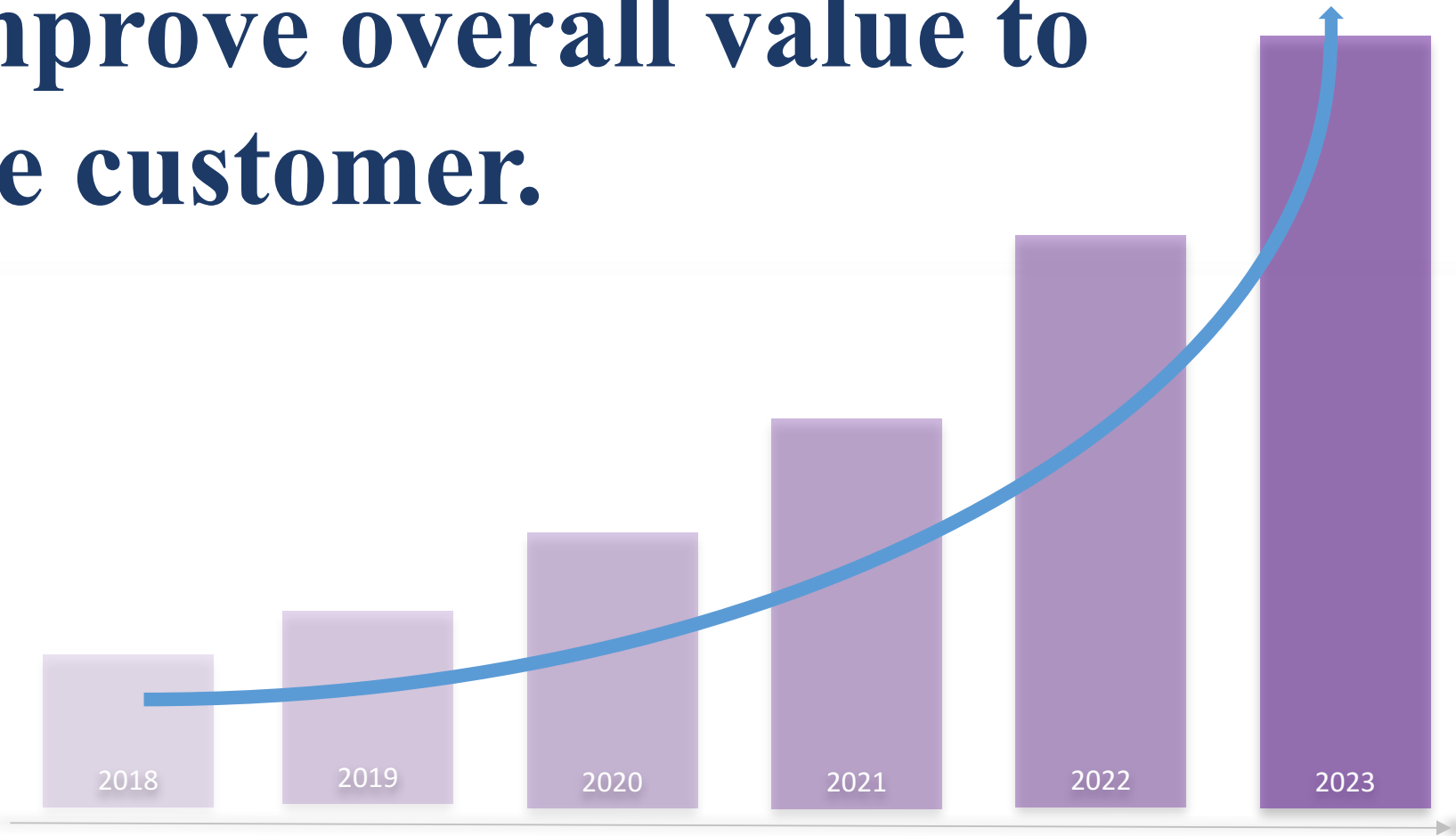
2023 Goal

**Develop more empowered,
productive employees**



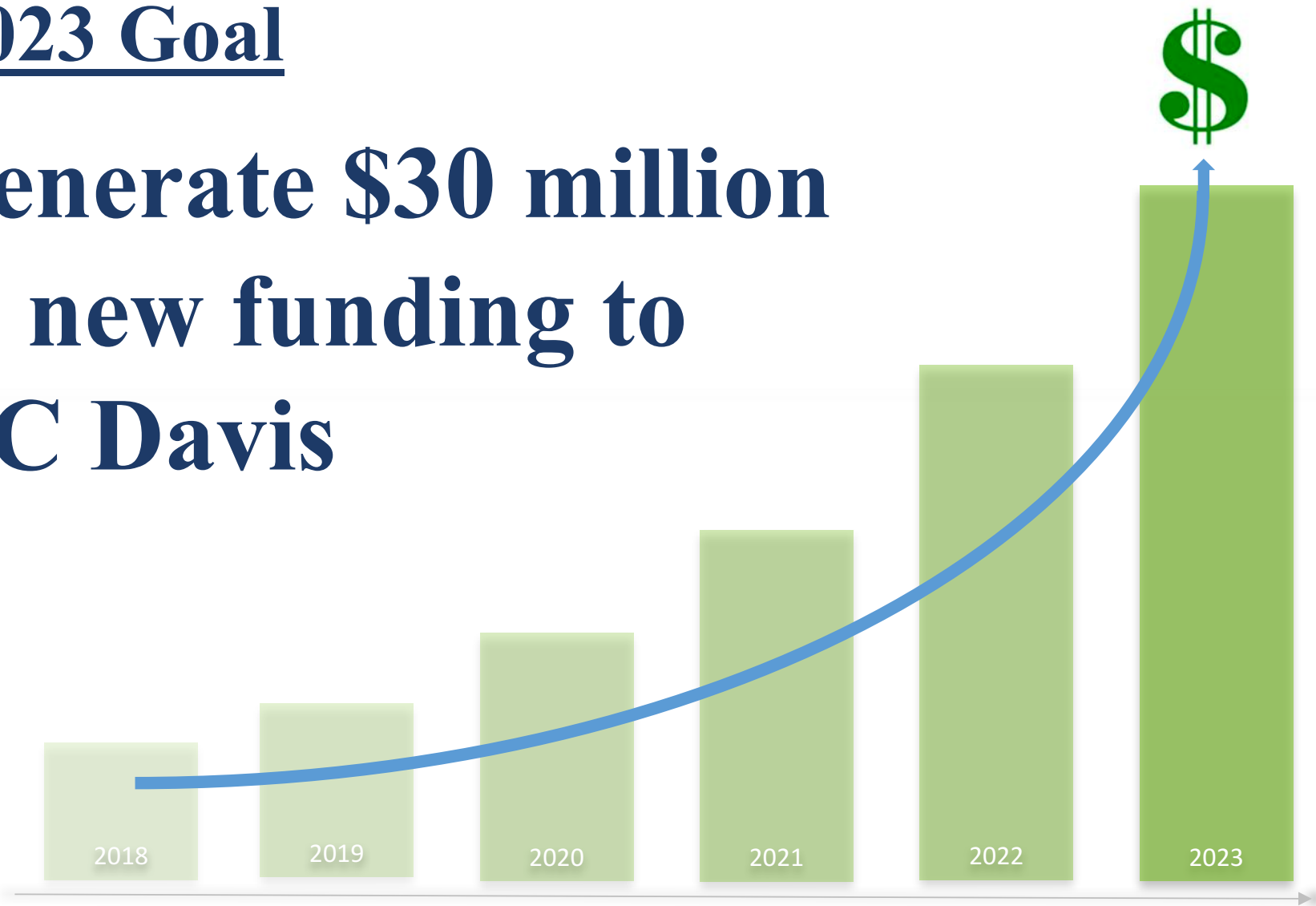
2023 Goal

Improve overall value to the customer.



2023 Goal

**Generate \$30 million
in new funding to
UC Davis**



The 8 Wastes of Lean Six Sigma

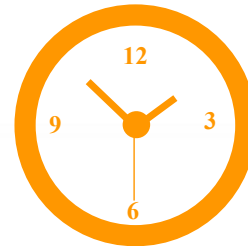
DOWNTIME



Defects



Overproduction



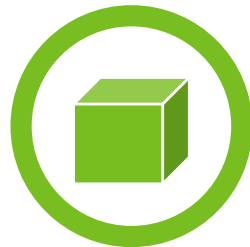
Waiting



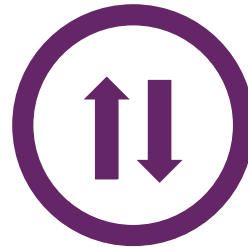
Non-Used Talent



Transportation



Inventory



Motion




Extra-Processing

Six Sigma Methodology

 **Define** the problem

 **Measure** & quantify the current state

 **Analyze** the process and identify the root cause

 **Improve** the process and validate results

 **Control** & sustain into the future

Glossary of Key Terms

- **Wrench Time:** The time a tradesperson spends performing their value-added work
- **Location 3:** UC Davis's on-site warehouse, used to store stock items
- **Stock:** Parts that are typically held in warehouse inventory
- **Non-Stock:** Parts that are not held in inventory and need to be ordered for a specific work order.
- **Silo'd culture:** Where business units function more as independent units than as part of the larger organization.
- **IPE:** Project Manager (Inspector, Planner, Estimator)
- **Pulling Parts:** Time spent in Location 3 warehouse gathering the parts needed for a given job.

 **Define**

 **Measure**

 **Analyze**

 **Improve**

 **Control**

Background Information

UC Davis's campus:

- 1,000 buildings
- 11.42 square miles
- Over \$1 Billion in Deferred Maintenance



Creating a project charter

Focus on goal & scope

Problem Statement

The campus is comprised of more than 1,000 buildings of varying ages and

Business Case & Benefits

Increasing electrician "Wrench time" in the field will result in lower costs to the customer and will likely increase the number of jobs completed across

Goal Statement

By January 25th, 2018, prove via a pilot program, that available "wrench time" for electricians can increase by 5%.

Room/Lab Renovations and Maintenance Orders

Out: Emergency Orders, Defects and Rush Orders

Team Member	Aaron Knapek	15%
Team Member	Eric Loveless	20%
Team Member	Doug Mains	20%
Team Member	Joe Burnis	20%
Team Member	Tony Vitone	20%

The Team



Team Ethos & Communications

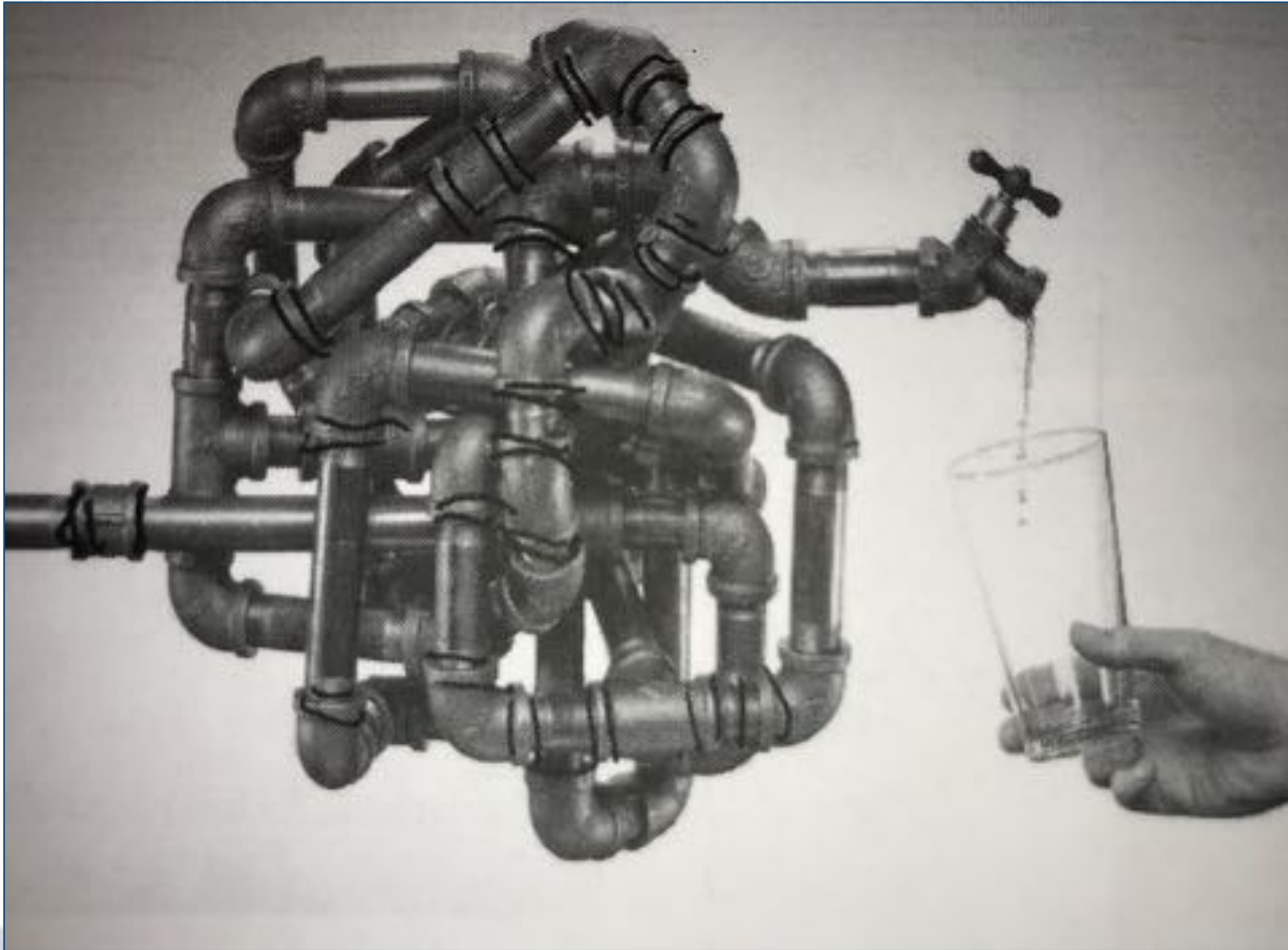
Team Ethos

- Open, Honest Communication
- Willingness to try new approaches
- Benefits must be for the organization, not one person

Communications

- Weekly meetings
 - What's working? What's not?
 - Collaborative improvement brainstorming
- Constant Communication
 - Group Email and Text Threads
 - Individual Comms only when necessary

“Current State” Swim Lane





Define



Measure



Analyze



Improve

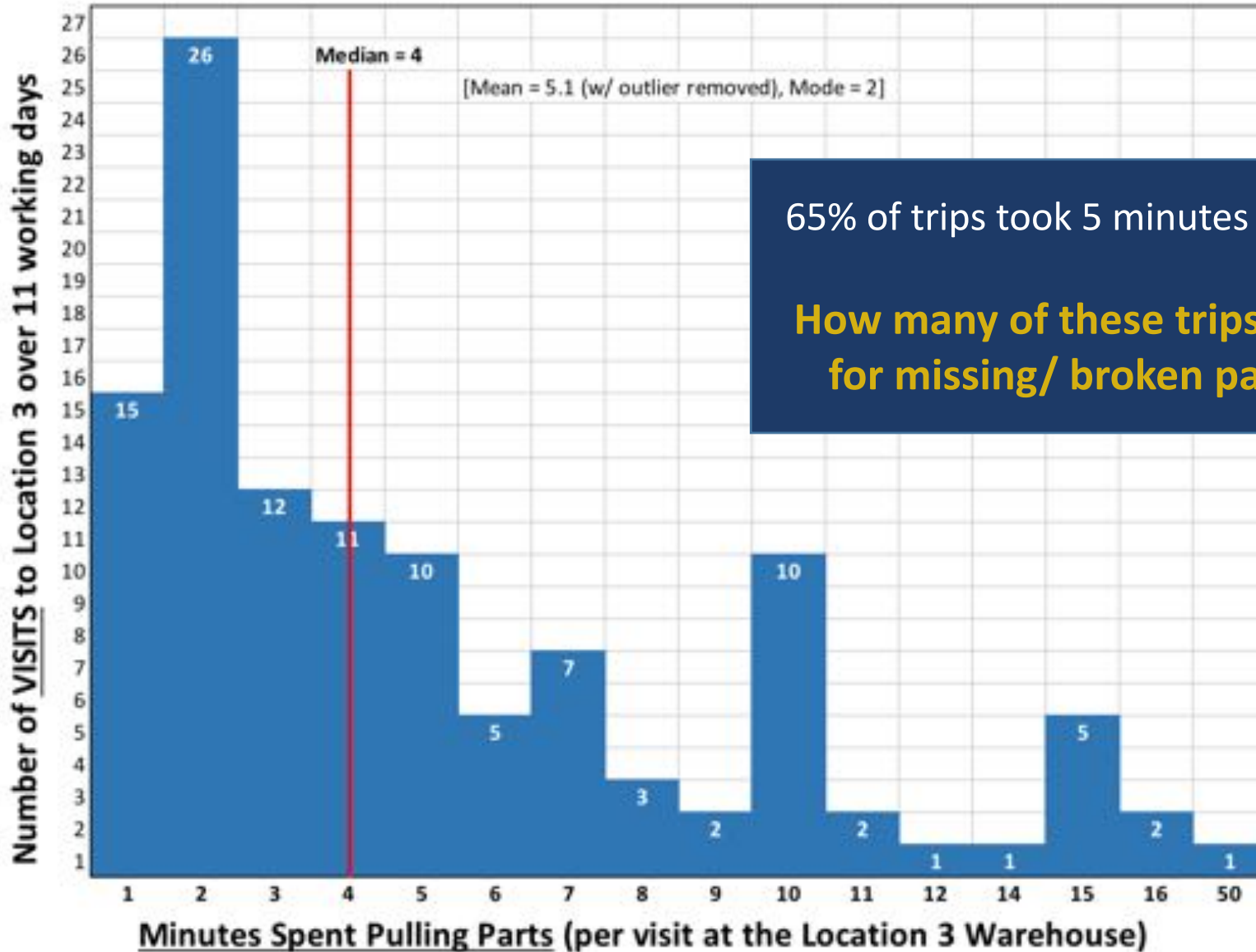


Control

Data Collection Plan

Measure	Data Type	Operational Definition	Stratification Factors	Sampling Notes	Who and How
Minutes	Continuous/ Variable	<u>Time Spent in transit</u> to and from Location 3 warehouse and IPE Office Location	Location 3 vs. IPE Office	Seeking to establish an average amount of time associated with Net Value Add (NVA)	IPE, Foreman, Electrician, and Location 3 Manager mapped out an “average/ typical” daily route for an electrician
Minutes	Continuous/ Variable	<u>Time spent pulling stock parts</u> in Location 3 warehouse	Day and time, trades, time spent pulling parts	Seeking to establish an average amount of time electricians spend pulling stock items or picking up non-stock items at Location 3	Supervisor; by tracking the data and time that trades personnel enter and exit the Location 3 warehouse

Histogram of time spent pulling parts at Location 3

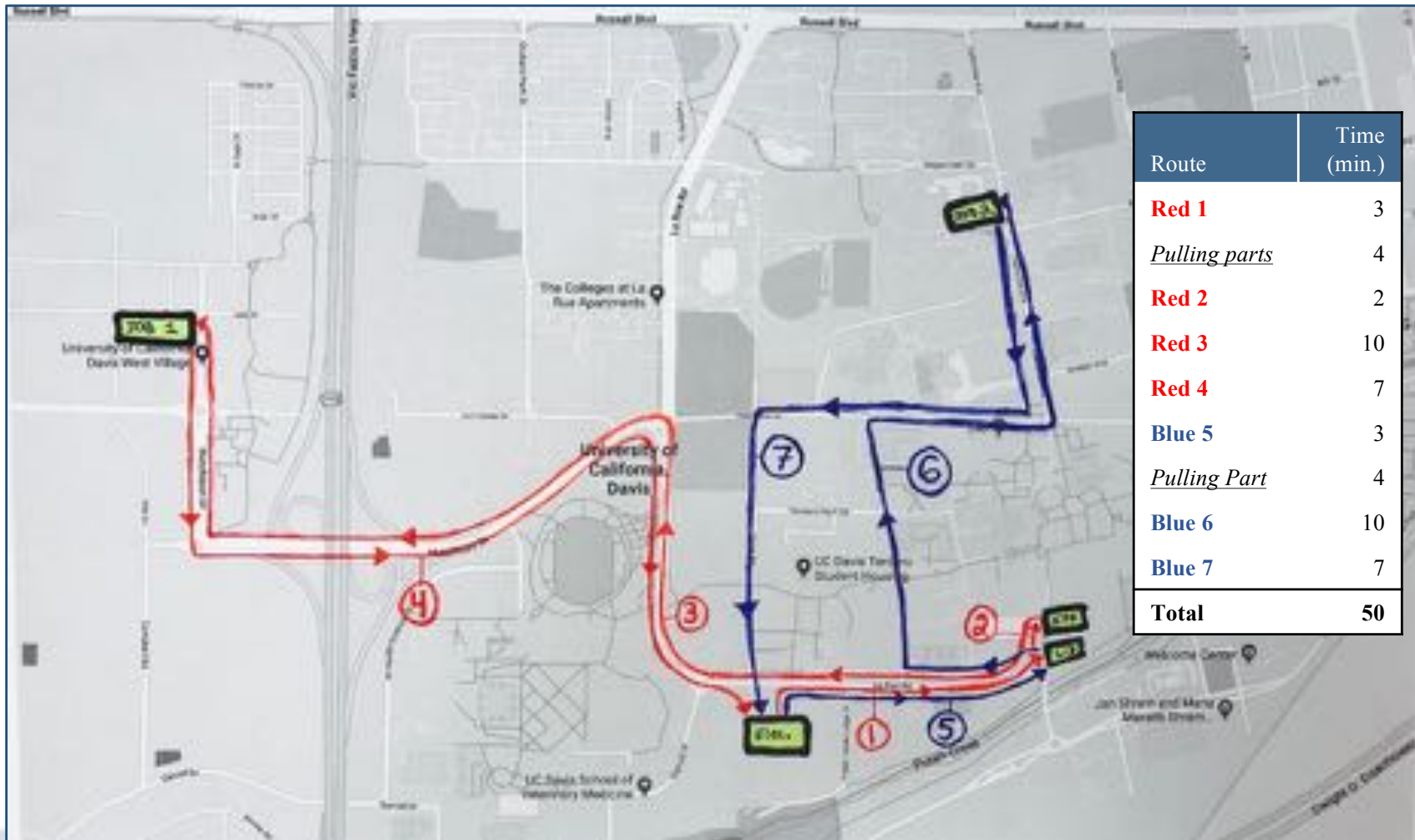


65% of trips took 5 minutes or less.

How many of these trips were for missing/ broken parts?

“Current State” Spaghetti Map

Revealed that extra trips were made for waste removal and additional return trips to Location 3





Define



Measure



Analyze



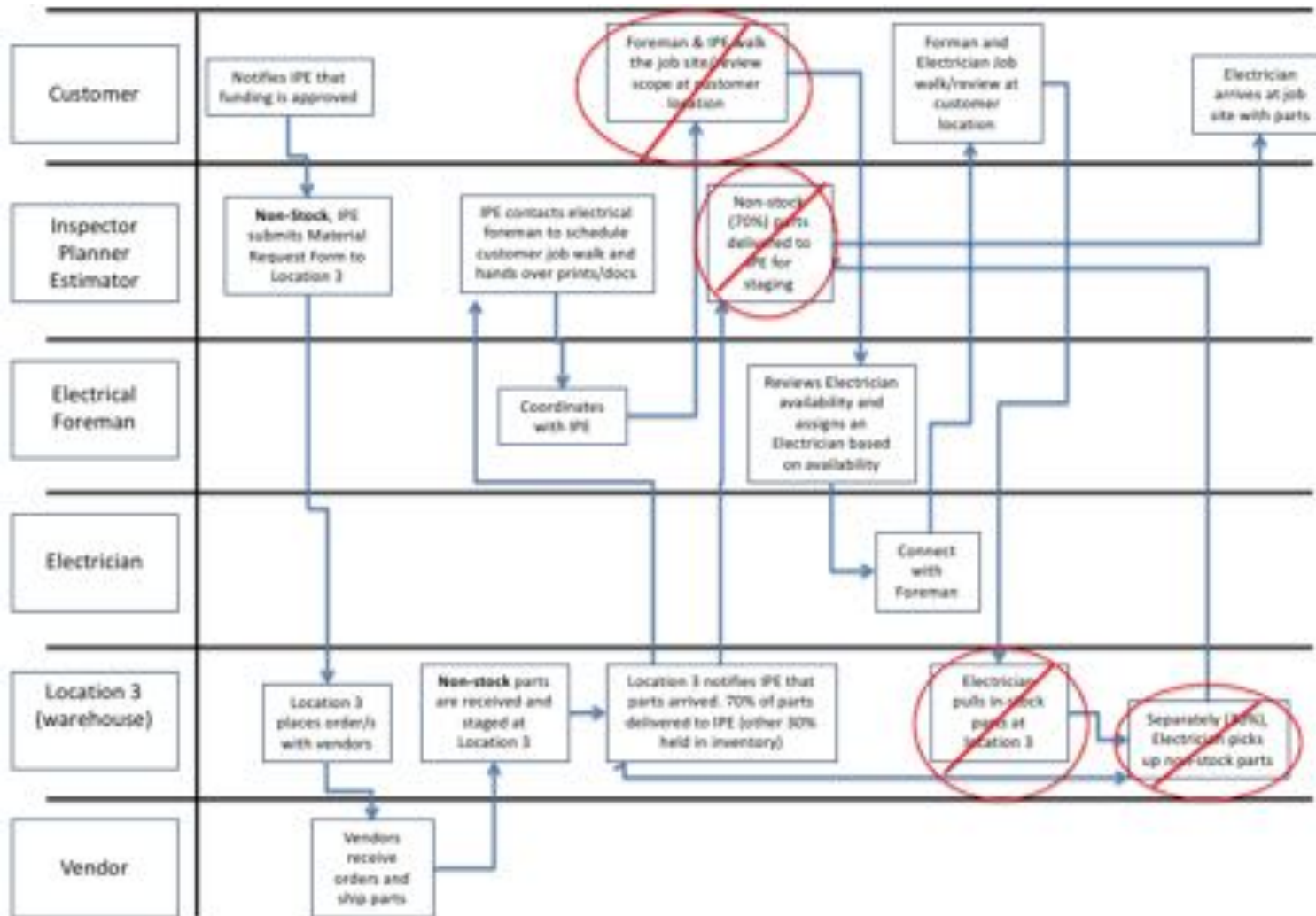
Improve



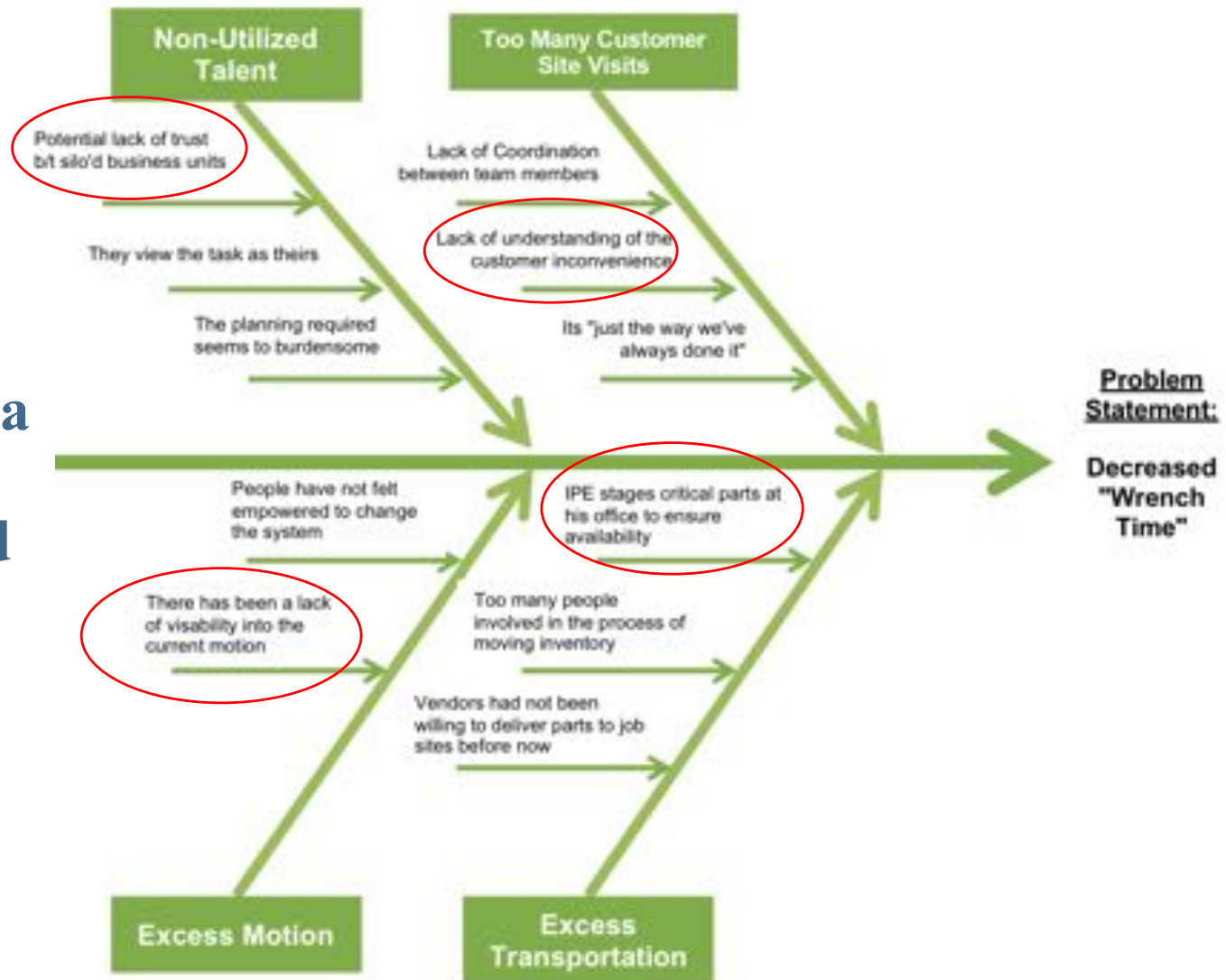
Control

Swim Lane: Wait time & Non-utilized Talent

Shown that the customer is impacted multiple times for site visits



Fishbone Diagram



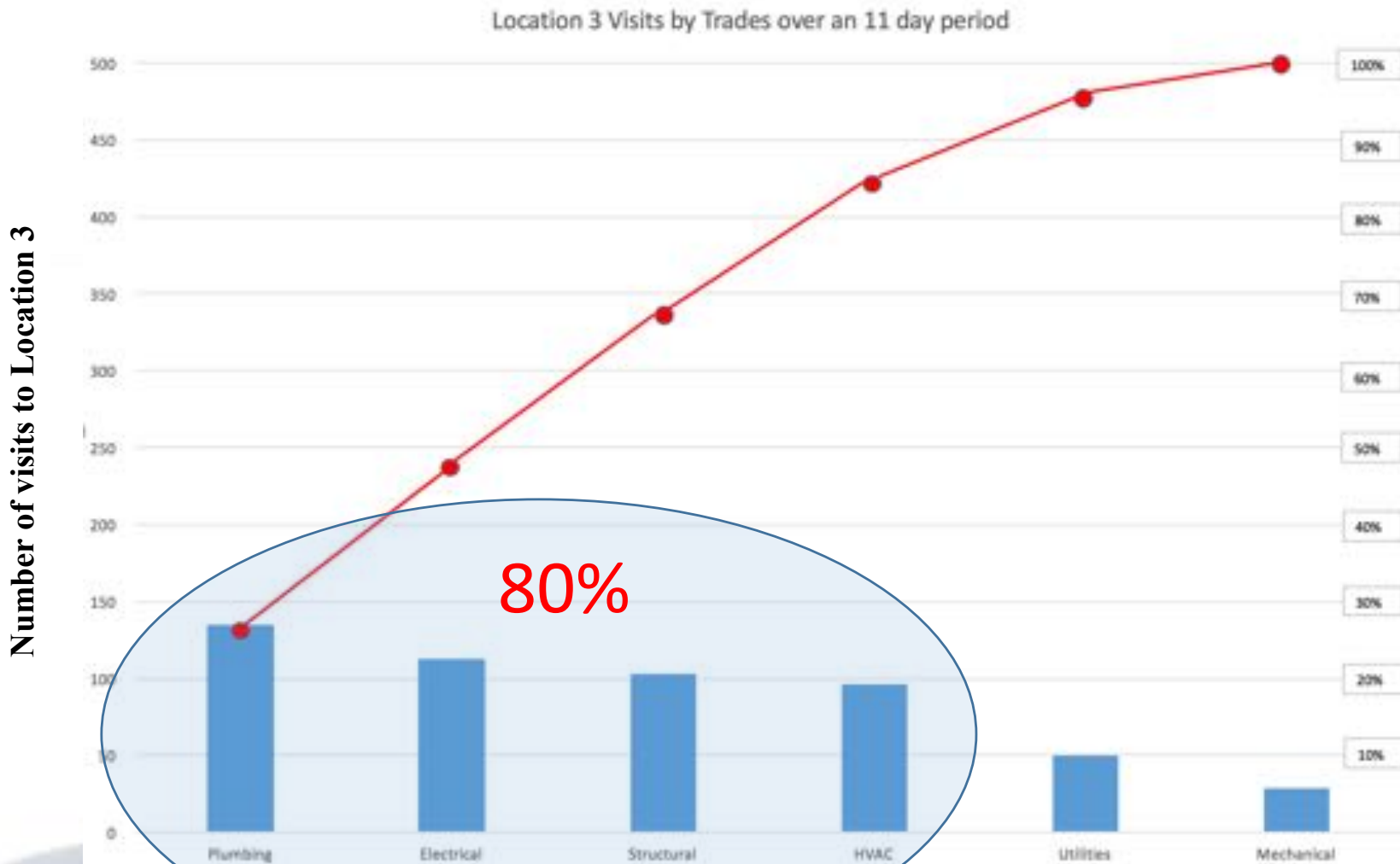
Identified a lack of end-to-end process visibility

Root Cause Hypotheses (True/ False)

No.	Possible Root Cause	Operational Definition	Theory (True or False)	Verification (How did you prove or disprove theory)
1.	Non-Utilized Talent (IPE)	Electricians are pulling parts at Location 3 instead of having them included in the initial bulk order	TRUE	Tracked the amount of time spent pulling parts
2.	Motion (Electricians to Location 3) & Transportation of inventory	Electricians are spending too much time driving back and forth to Location 3 and IPE Office	TRUE	Spaghetti diagram'd the electricians drive routes during typical days
3.	Too many Customer Site Visits	No one has been tasked with looking at the process from the customer perspective	TRUE	Verified with customers but deemed out of scope for this project

Pareto – Location 3 warehouse visits

Detected that plumbing, structural, and HVAC should be queued up





Define



Measure



Analyze



Improve



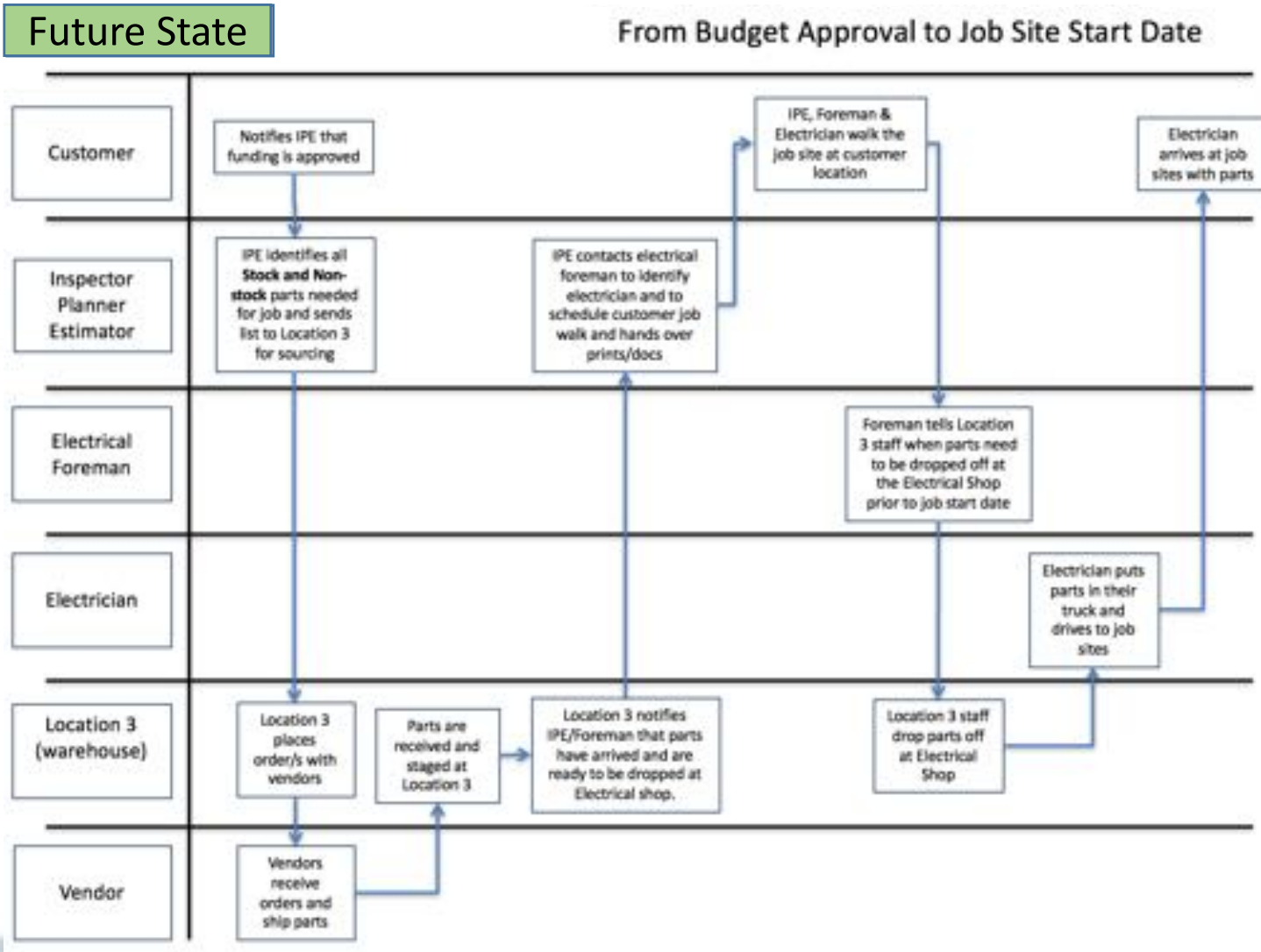
Control

Selected Solutions

Potential Solutions	Very Low (less good)		Moderate		Very High (best)	Total Score	Implement? Yes/No
	1	2	3	4	5		
Weighted Criteria	10	9	8	7	5		
Utilize "Location 3" warehouse staff to deliver electrical parts to Electrician's Shop	4	5	3	5	3	159	Yes
IPE places order for Non-stock and Stock parts, thus eliminating the need for Electricians to shop for Stock parts at Location 3 warehouse	4	2	4	4	3	133	Yes
During a project, if an electrician needs a part, utilize a Location 3 warehouse staff to deliver it	4	5	3	5	3	159	Future Improvement
Implement Vendor-provided vending machines across campus for frequently used parts	5	3	5	2	1	136	Future Improvement
After a job, utilize custodial staff to clean up a job site, instead of higher paid electrician	4	5	3	3	1	135	Future Improvement
Reduce customer site visits before "breaking ground"	1	5	4	3	3	123	Future Improvement
After a job, drop all unused parts off at Location 3 for re-stocking	2	2	3	4	2	100	Future Improvement

O U T o f S C O P E

Swim Lanes



Spaghetti Map



Improvements: Time Savings

Reclaimed 30 minutes of time per Electrician per work day by eliminating non-value-added work

- 10+ minutes/ day pulling parts at Location 3
- 19 minutes/ day drive time around campus

Total Time Savings

Per	Time saved per day per electrician
Day	30 mins

Per	Time saved per year per electrician
Year	130 hrs (30 mins x 260 work days)

X's	20 electricians in the Shop
20	2,600 hrs (130 hours x 20 electricians)

If **50%** of the remaining trades join in....

88 trades people in the Shop
11,440 hrs (130 hours x 88 trades people)

Total Hrs reallocated = 14,000/yr



Define



Measure



Analyze



Improve



Control

Project Closure

Lessons Learned

Do's and Don'ts for Future Efforts

- Remember to **stay agile** during the IMPROVE Phase, your plans may need to be adjusted once they meet with reality
- Continuously **reiterate the purpose** of the project to the team, throughout the project.
- **Protect the scope** of the project to ensure it remains manageable and achievable.
- Set expectations up front that the project is a team effort and that **open, honest communication is vital**.

Customer Impact

Positive Impacts on External Customer

- Trades people are able to complete jobs in **less time and at less cost**.

Final Calculations of Savings or Gains

Hard Savings/Profit Increase

This project did not seek to achieve hard savings or profits.

However, several solutions which were deemed out of scope for this project still have the potential to create ongoing and impactful hard savings (product cost reduction, more efficient product utilization, longer vehicle replacement time lines, less fuel used, etc)

Soft Savings - Cost or Time

- **6% increase** in "available wrench time" for electricians which amounts to **2,600 hours annually (goal was 5%)**. This means the backlog of pending jobs and deferred maintenance can be addressed more quickly.
- If deployed to 50% of the remaining technicians, an **additional** annual savings of 11,440 hrs or **(14,040 hrs total)** is possible

Process Owner Hand-off

Has been informed of process changes:

Yes / No

Agrees to continued monitoring of new process:

Yes / No

Has received new process documentation:

Yes / No

Sign-off From Project Sponsor

Sponsor was thrilled at the result and looks to expand the program to include other solutions that were initially documented as OUT of SCOPE, potentially unlocking considerably more savings.

Project Closure

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LSS Belt Certifications

White Belt

- ~2 hrs: No experience needed
- Target Audience: Executives, Project Sponsors or those wanting to progress toward other belts

Yellow Belt (Blue and Gold Belt)

- ~8 hrs: No experience needed
- Target Audience: Executives, Project Sponsors or those wanting to progress toward other belts

Green Belt

- ~48 hrs of lecture, plus a project that saves \$40K/yr
- Ideally should have had White or Yellow Belt, but not necessary
- Target Audience: Managers, Project Managers or those wanting to progress toward other belts

Black Belt

- ~96 hours of lecture, plus a project that saves \$100k/yr
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The reason to continually push ourselves.

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Executive Summary

Do you want to just summarize the picture on this slide so it's easier read?

Business Case

Included in the cost of facility improvements on campus, are the costs associated with **highly skilled electricians** performing necessary, but **lower level, auxiliary tasks**.

Increasing electrician "Wrench time" in the field will result in lower costs to the customers and will likely increase the number of jobs completed across campus each year.

Root Cause Analysis

1. **Silo'd culture** does not encourage employees to collaborate outside of their immediate teams
2. End to End work flow analysis had not been performed and thus the **problem was not obvious**.
3. No one wants to be perceived as asking a colleague to do more work to save themselves time

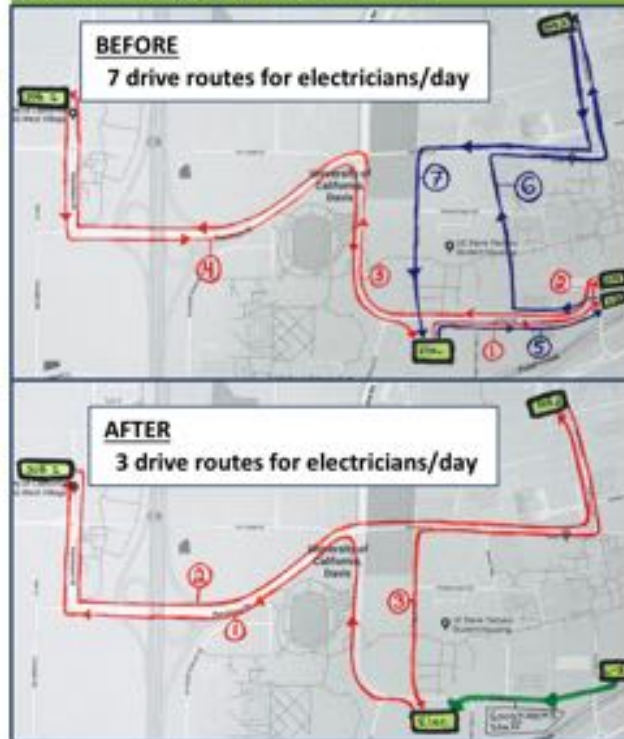
Solutions Implemented

1. **Reduced the waste** of unnecessary **motion** by Electricians and **transportation** of parts by leveraging "Location 3" warehouse staff to deliver all electrical parts directly to the Electrical Shop, ready to be loaded on the electricians' truck at the start their work day.
2. By tapping **non-utilized talent** from the Inspector/Planner/Estimators (IPE), we eliminated the need for Electricians to pull parts at the Location 3 warehouse, instead having the IPE order all parts needed for each job.

Project Results

CONSERVATIVE estimates show an annual soft savings of \$134K, by reducing NON-Value-Add work for Electricians by 30 minutes/day (2,600 hours saved/year). An improvement of more than 6% (original goal = 5%).

Graphical Display of Improvement



Appendix: Areas for Addt'l Benefits

1. **Before Job, Ideally have Fastenal kit the parts themselves and deliver direct to the job site or Electrician Shop (reducing the need for Location 3 to stage/kit/drive)**
2. **Vending Machines from vendor stocked all around campus**
3. **During Work Jobs**
 1. **If a part is missed or broken on the job site, have a Location 3 runner, run a part out to them**
 1. **Using electric carts that are better for campus and can be driving during “between class no-driving” times on campus**
4. **Extra Parts at the end of a job should be put back in inventory (Have a Location 3 tech) grab and restock**
5. **Job clean up, Location 3 or Custodian comes out and cleans up job site so Customer is not charged a Tech's rate to clean up.**
6. **Reducing customer site-visits**