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# Champions' Summer Defense: Manufacturing all-natural equine spray

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CHEMICAL AND LIFE SCIENCE



# Champions' Summer Defense

*Manufacturing all-natural equine spray*

CAPSTONE DESIGN EXPO 2016

## Product

During the warmer months, horses' coats are subjected to many irritations from the sun, weather, and insects. These irritations can cause sunburn in light colored horses, coat bleaching, dry coat, coat fungus, and sweet itch from insect bites.



Research was conducted in 2014 and 2015 for the development of Champions' Summer Defense, an all-natural product to protect horses from irritating and potentially harmful summer elements. This formulation provides sunscreen to protect the horses from sunburn and reduces coat bleaching. In addition, this spray acts as a conditioner and leaves the horse's coat shiny by fighting dry skin and moisturizing the coat. Champions' Summer Defense's unique formulation is naturally antimicrobial, eliminating the need for a preservative and allows the product to be 100% natural. The antimicrobial property will also help prevent skin irritations from insects and will keep the coat clean from bacteria and fungus growth.

## Market Analysis

### Research:

9.2 million domesticated horses in the United States  
2oz of summer spray per horse per application

### Assumptions:

Annually 6 months of active product use  
Horse is sprayed every other day, yielding one bottle of product per horse per month  
Reach 0.58% of horses in the U.S.

## Project Statement

Design a manufacturing process to produce 80,000 gallons of product per year, with maximum capacity flexible depending on increasing or decreasing percent uptime.

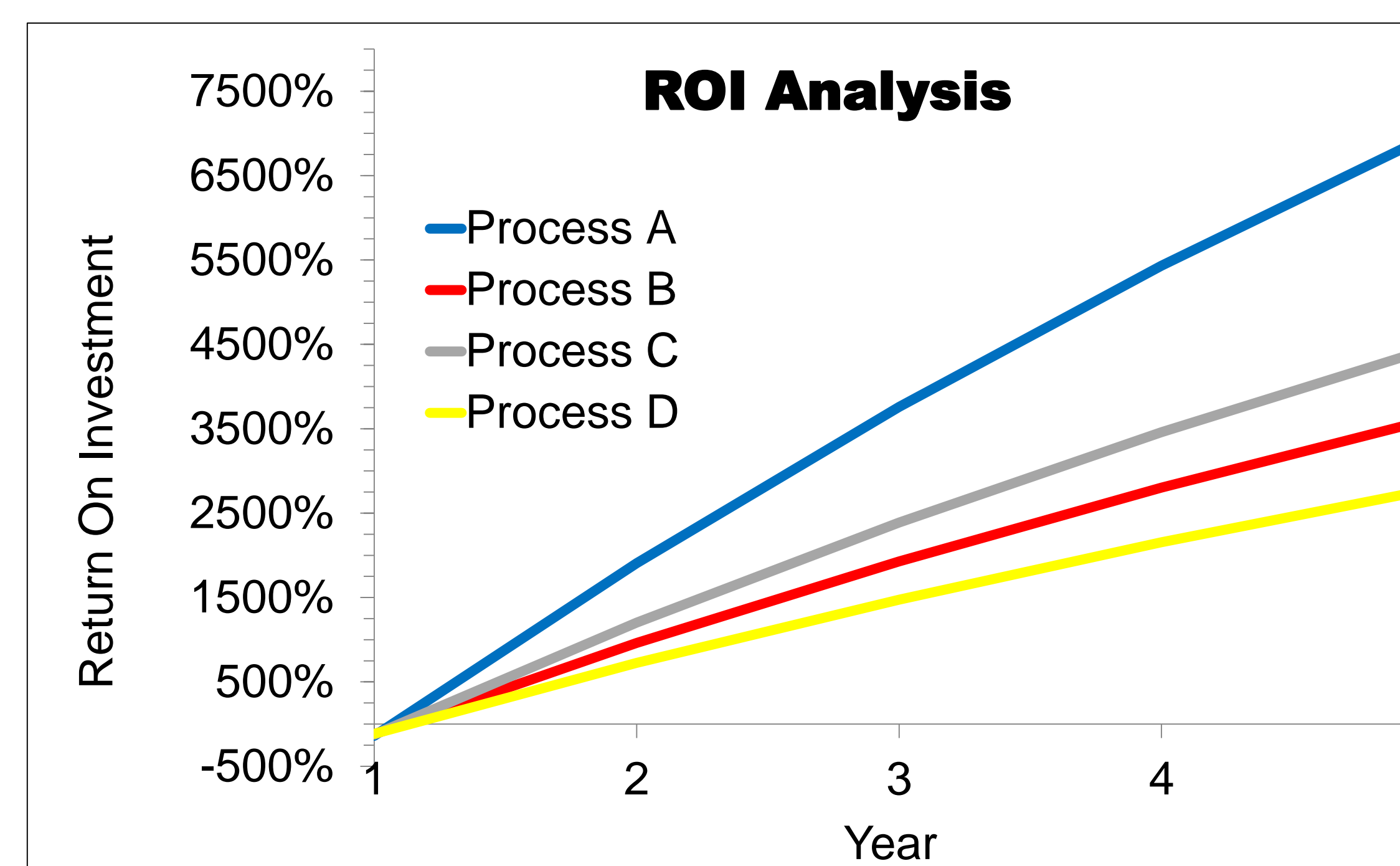
## Manufacturing

### Annual Costs Independent of Manufacturing Process

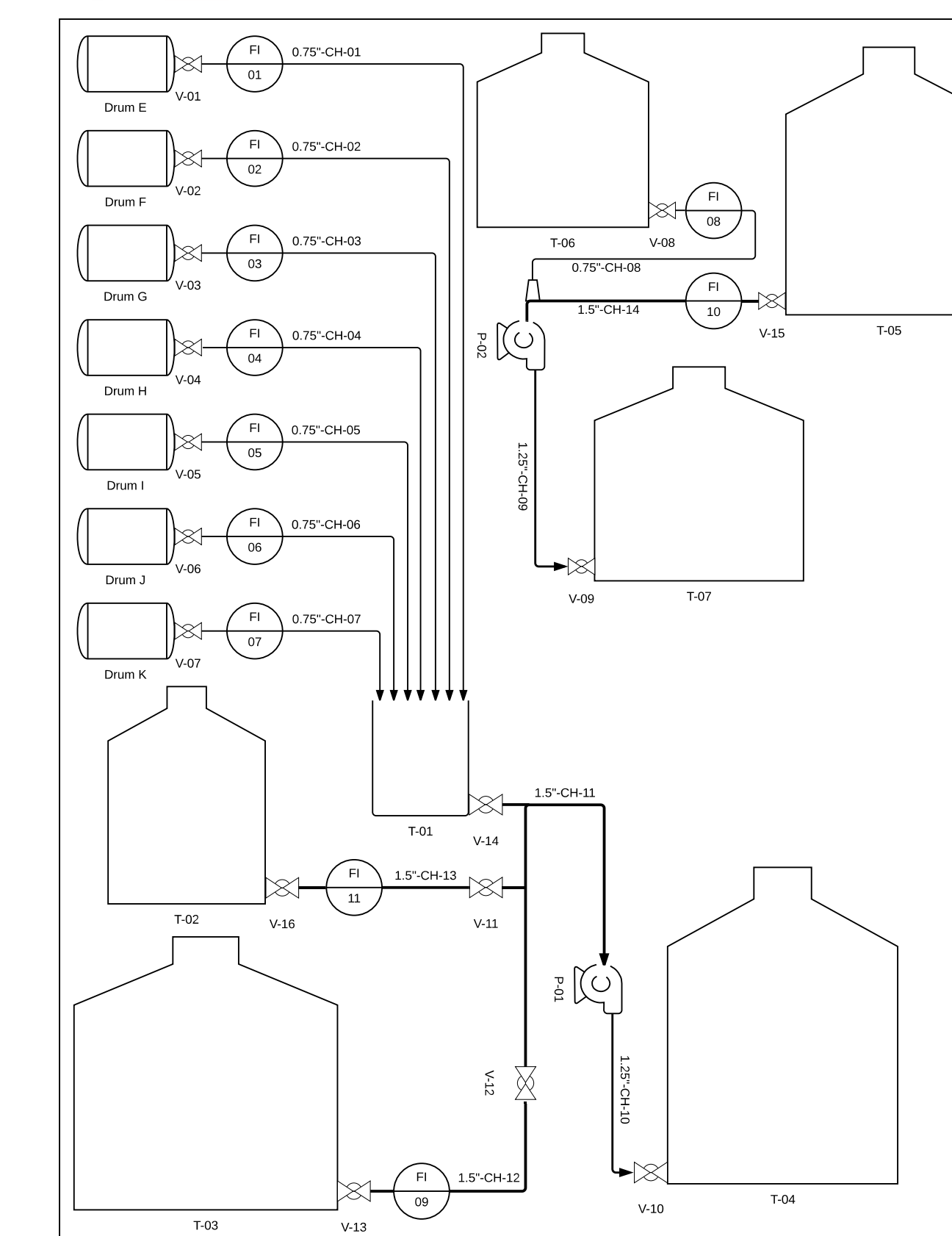
Rent	\$15,000
Bottles and Packaging Material	\$288,000
Raw Materials	\$1,690,000
Insurance	\$12,640
Utilities	\$13,100
<b>Annual Recurring Cost</b>	<b>\$2,018,740</b>

**Revenue From Product Sales**      **\$3,840,000**

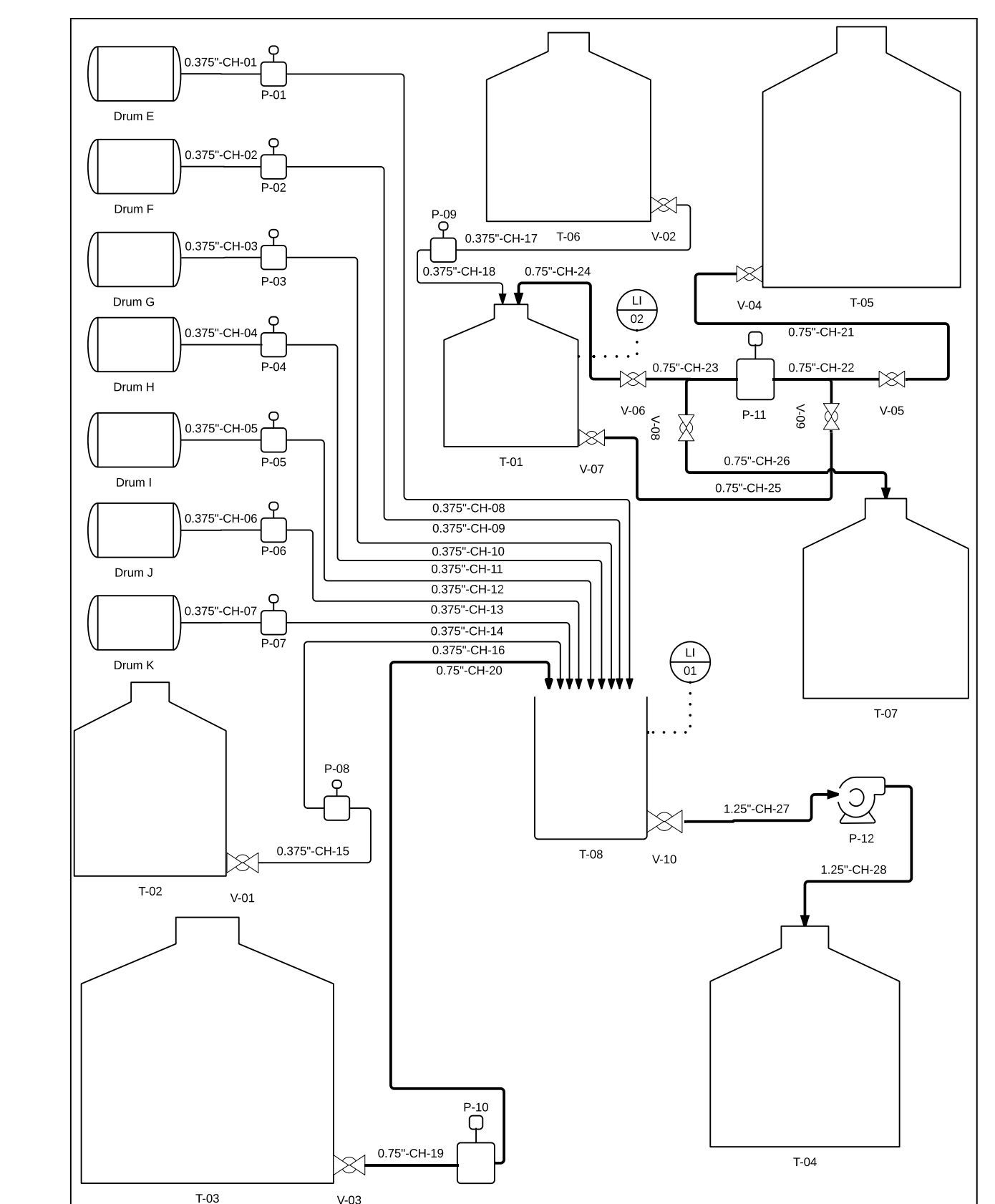
Overall Process	A	B	C	D
Mixing Process	1	2	1	2
Bottling Process	1	2	2	1
# Employees	5	2	2	5
Labor and Taxes	\$104,640	\$27,420	\$35,520	\$100,590
Installed Equipment Cost	\$75,320	\$149,032	\$120,978	\$183,864



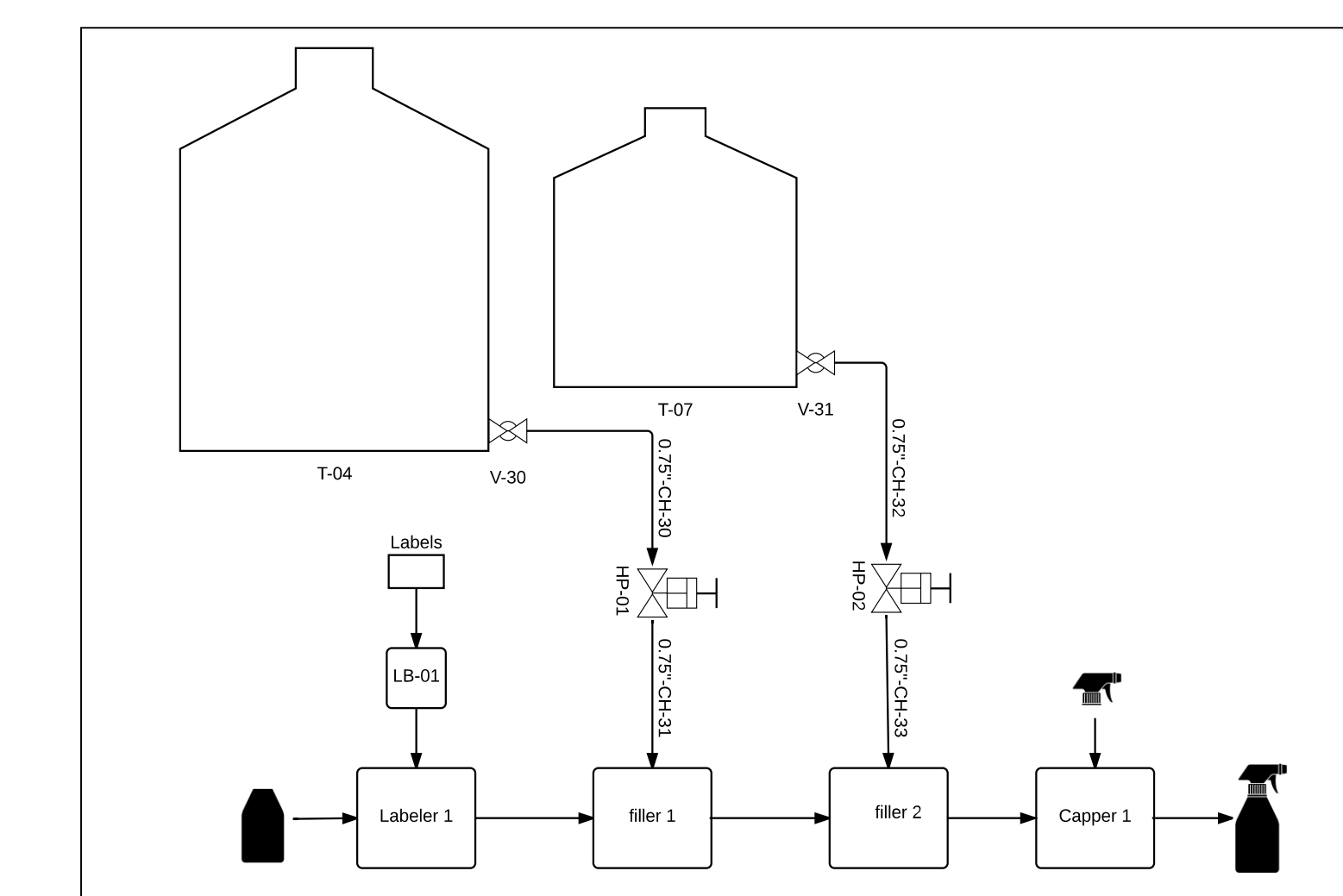
## Design



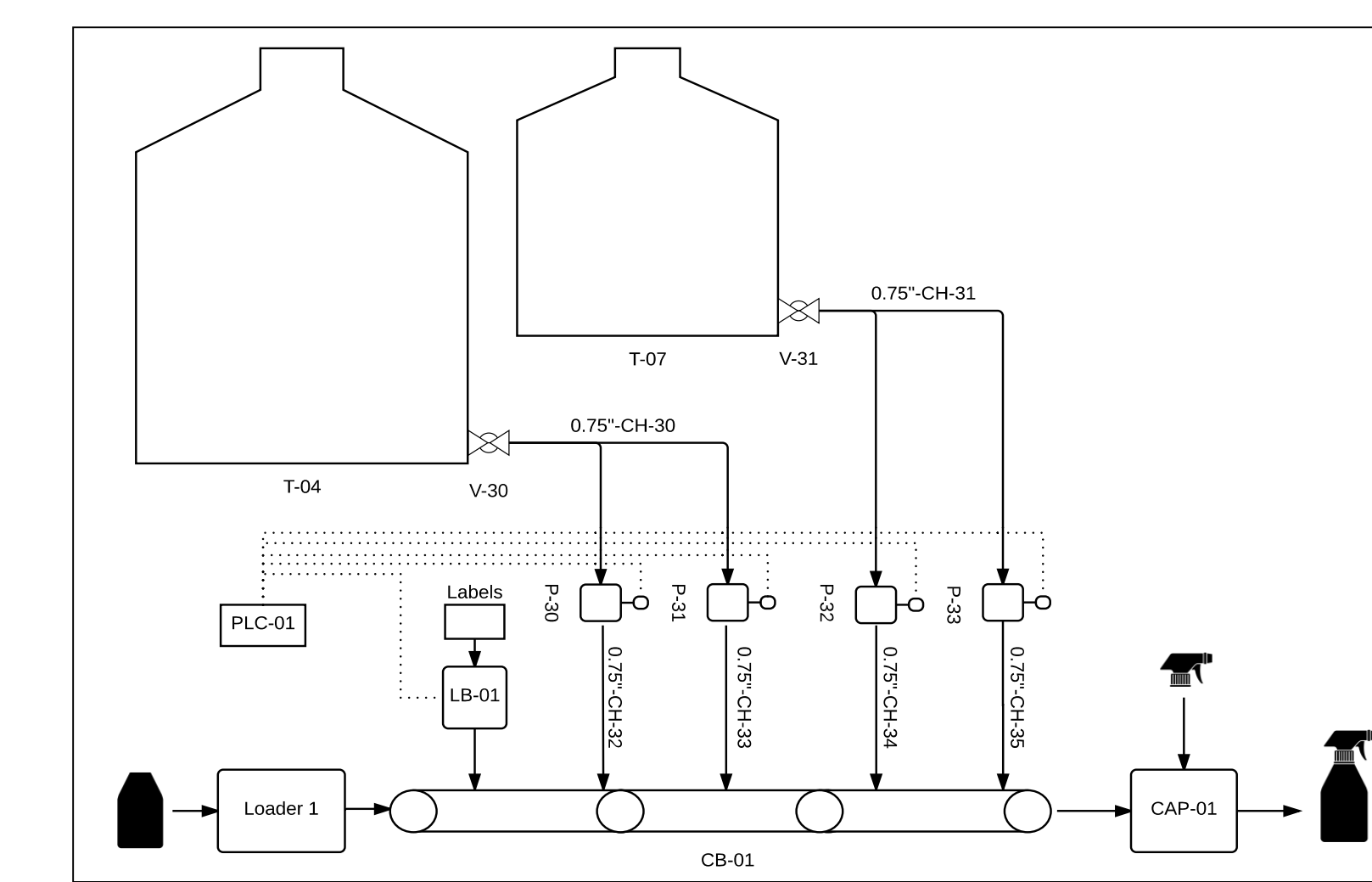
Blending Process 1



Blending Process 2



Bottling Process 1



Bottling Process 2

## Path Forward

A business analysis needs to be conducted to develop a budget for marketing, sales team, business managers, and research and development for further products. These costs can then be used to update the ROI analysis.