E.J. GALLO WINERY
SPIRIT-MAKER FACILITY

By

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ABSTRACT

With growing demand for E.J. Gallo spirit brands, the cramped and cluttered facility allocated to the spirit-makers does not provide an adequate work environment to design and test new hard alcohols. E.J. Gallo winery want to relocate the spirit-makers to a new facility located near the brandy production floor for under 200,000 dollars. In order to do this, a revised systematic approach to facility design is used. In this process, the departments are first defined, then the relationships between these departments and the space requirements are documented. Once these planning steps are complete, alternative layouts are constructed and analyzed until a layout is chosen. Then, the costs of installation such as utilities are gathered and a cost analysis is formed to see if the final cost is less than the originally stated 200,000 dollars. If so, the installation of the facility is then simulated to check for potential issues when the complete structure is installed.

This revised systematic approach provides a fully analyzed facility design, taking into consideration the needs of the customer, the constraints of the company, and the total cost of the project. In addition, the material and personnel transportation cost savings are presented to show the monetary justification of the facility relocation. Once all the steps of the revised systematic approach are complete, the paperwork for the installation has to pass through numerous E.J. Gallo departments to eventually become a physical structure.
INTRODUCTION

The goal of this report is to present and analyze the process leading to the construction phase of a new spirit-makers facility at E.J. Gallo Winery. Due to growing E.J Gallo Winery spirit brands, the “spirit-makers” need to be relocated to a larger office and lab area. Currently, spirit-makers are cramped into an office-lab combo at the winery building instead of the spirits building. There is limited room for inventory, desk space, and testing. E.J. Gallo Winery would like to build a new 1200 ft\(^2\) to 1600 ft\(^2\) external office to incorporate seven cubicles and a lab that can be dually used as a conference room for under 200,000 dollars.

In order to present a quality facility design, four main techniques are used: CAD, facilities, time studies, and ergonomics. First, CAD layouts are made using the spirit-makers requirements, then facilities is used to analyze the flow of people through the offices. Time studies are used to analyze the justification for moving the facility to the brandy plant and ergonomics focuses on the development of user friendly lab workstations and comfortable cubicles. By combining these methods there are four deliverables that are outputted from the project. First, hard copies will be provided from all utility and specialized contractors. CAD layouts will be provided of both the location of the facility and the interior. In addition, a cost analysis of implementation will be provided. In order to complete this project, material from many classes must be used. These include Facilities Planning & Design, Human Factors Engineering, Work Design and Measurement.

The report will first go into the background of the project followed by the literature review. Next, the departments and space requirements will be analyzed in order to then
develop the layouts. Once developed, the alternative will be analyzed and one will be chosen. Next the utilities will be compiled and analyzed before looking at the cost analysis. The final layout and cost justification will then be summarized in the conclusion.

BACKGROUND

From the basement of the Modesto Public Library to the largest family-owned winery in the world, Ernest and Julio Gallo transformed a mere science project into the booming wine business it is today. In addition to wine, E.J. Gallo Winery has expanded and also produces gin, tequila, and brandy with the remains of the crushed wine grapes. These spirit brands are currently mixed, aged, and bottled at the Brandy Plant, a three line production facility on the Modesto Winery Campus. At a recent annual E.J. Gallo convention, management claimed their goal for 2010 is to double the spirit brand’s production and sales. With increased production comes the necessity for more spirit blends and testing. E.J Gallo currently employs five spirit-makers including two managers and three general employees who are cramped in a lab area with two small adjacent offices. With such ambitious sales and production goals, they will need to add two more spirit-makers to the team and no extra room in the area is currently available in which to fit them. In addition, the current spirit maker lab is located at the Winery instead of the Brandy Plant which forces lab samples to be transported back and forth. E.J. Gallo would like to design a new 1200 ft$^2$ to 1600 ft$^2$ external facility at the Brandy Plant to incorporate the spirit brand’s growth for under $200,000.
In order for a relocation to potentially be justified, first a qualitative analysis of the advantages and disadvantages must be performed. Currently, the Brandy Plant sends over three batches of samples a day to the spirit makers. Of these samples, about 50% of them are required to go to the Analytical Lab at the Winery. The analytical lab performs tests and sends the results electronically back to the spirit makers. The relocation to the Brandy Plant would result in only one necessary delivery to the Analytical Lab therefore cutting travel time by two thirds. In addition, at least one of the spirit makers currently makes a nine minute walk to the Brandy Plant for meetings at least two times in a day. By relocating, the spirit makers will no longer have to make this walk which will allow for more frequent communication between departments and less wasted travel time in the day. Next, the current lab is filled to capacity which causes new samples to be stored on counter tops and work spaces. This makes it more time-consuming for the spirit makers to find their testing or tasting samples. Due to tight space, they also do not have a designated tasting area to discuss blends with their coworkers. Productivity is decreased by these phenomena due to wasted potentially productive time, lack of team communication, and lack of group discussion. A new facility, with separate lab and office areas, allows the spirit makers to separate the team lab testing and individual projects. By making a larger lab with less clutter, the spirit makers can use the center island as a conference table, tasting table, and a testing surface unlike the current center island which is just used for storage. Also, they will be able to receive samples as they come off the line which allows for a more steady flow of work into the lab. In contrast, relocation will cost a considerable amount of money and could result in other undesirable outcomes as well. Because the Brandy Plant is
striving for double throughput, they are also trying to make improvements such as direct shipment within the next five years which could interfere with relocation of the new facility in the future. Also, a new facility could interfere with truck and forklift traffic. For example, the pavement is vastly uneven at the Brandy Plant so forklifts follow a specific path where the concrete is level. In comparing preliminary advantages and disadvantages, the relocation plan is a justified next step in moving the spirit maker’s lab to the Brandy Plant.

**Literature Review**

In order to put together a successful relocation plan, an extensive analysis must be performed of the common techniques for facility design and implementation. When starting a facility design of any sort, it is beneficial to follow the facilities systematic approach shown in figure 1. (Bozer, 2003)

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Figure 1: Systematic Approach

Figure 2: Revised Systematic Approach
By using this step by step process, it is less likely that a vital aspect of designing the facility will be overlooked. The first step in defining the problem provides a powerful overview of the entire situation which makes it easier to achieve the desired goals. In defining departments, relationships between departments arise showing how each section of the company must relate to one other in the new facility. As well, during the defining departments stage for an office facility the employees should be interviewed to gather information about their wants and needs. It is only after the gathering information step that layouts are developed, evaluated, and selected. In the spirit-maker trailer relocation, multiple steps must be added for this model to be complete. Once a layout is decide upon, all necessary utilities need to be analyzed. There must be quotes for both monthly costs and installation costs in order to provide a full cost analysis and forecast for the project. This allows management to critique problem areas and add useful insight before the project is actually installed. Once all the costs are analyzed, the installation needs to be simulated to see the effects on external elements such as the forklifts at the Brandy Plant. This revised systematic approach shown in figure 2 provides a solid structure for designing and implementing a new facility. (Bozer, 2003)

In order to prove the value of relocating the trailer before installation, proactive time studies identify potential issues earlier in the design process (TIME-STUDY GUIDELINES). This type of time study has its advantages and disadvantages compared with a reactive time study which can only be used once the new facility is installed. Proactive time studies tend to be more abstract due to the limitations on using physical "clipboard and stopwatch" techniques which pose as an effective way to show improvements between
current and proposed layouts. Due to this fact, alternate techniques must be used to optimize the proposed layouts such as string and relationship diagrams. Although time studies cannot be used to design new layouts, they can be used to show the improvements between proposed locations. The change in locations from the winery to the brandy plant will lessen the frequency of material transportation as well as the distance traveled for material and spirit-makers. Although time studies cannot show layout improvements for the interior of the spirit-makers trailer, they provide vital information about the location of the trailer. (TIME-STUDY GUIDELINES)

When working in a lab or office area for an extended period of time, the ergonomics of the workspaces are imperative to productivity and overall comfort. “If a job does not fit a worker, the worker is more likely to be exposed to risk factors that may lead to musculoskeletal injury (Office Ergonomics Handbook).” In order to setup an ergonomic workstation there are certain risk factors that should be avoided. First, repetitive motion should be limited but if it is unavoidable the motion should be within a comfortable reaching distance. Also, technology and more ergonomically friendly instruments can be used to reduce the effects of repetitive motion. For example, if a worker has to constantly answer the phone, he or she should be equipped with an ear piece to avoid picking up and holding the phone for long periods of time. In addition to repetitive motions, awkward postures affect efficiency and quality of work. Awkward postures are any action that puts unnatural strain on the body, such as turning the neck to see the monitor or stretching to get the paper out of the printer. Although these movements cause strain on the body, it is equally stressful to sit in a static position for a prolonged period of time. For example, an
accountant has to sit at a computer for eight hours at a time which can cause body soreness and eventually more serious health issues. These three types of ergonomic risk factors are equally as important to the worker and the employer. By setting up ergonomic workstations, companies can save tremendous amounts of money in medical bills while keeping their employees happy, healthy, and productive.

The spirit-makers facility needs to incorporate both sitting workstations for offices and standing workstations for lab testing. For a sitting workstation, there are many aspects that need to be included to avoid the risk factors mentioned above. First, an ergonomic chair is one of the most important parts of a sitting workstation. Due to varying sizes of workers, a universal chair needs to be chosen that can incorporate a wide range of sizes and shapes. For employees that cannot fit in the standard size chair, the company should purchase a specially sized chair for each worker. The chair should have armrests, adjustable heights, tilting backrest, easy adjustments, and breathable fabric at a minimum (TIME-STUDY GUIDELINES). Other features such as lumbar support and a neck rest are useful for employees with ongoing musculoskeletal issues but may not be necessary to incorporate into each office chair. Next, a correctly sized or adjustable desk is a necessity for an ergonomic workstation. Employees need to be able to maintain correct posture while seated at the desk. When choosing the height of a non-adjustable desk, erring on the low side is more useful due to the fact that supports can be put under the legs to raise it to the correct height. Items on the desk should be arranged so commonly used items are within a comfortable arms reach. Other items can be put within a short walking distance to give the worker a 10 to 15 second moving break (TIME-STUDY GUIDELINES).
keyboard and mouse should have support under the wrist allowing it to straighten while in use. The monitor should be placed at an arm's length distance and a height at which the user's neck is comfortably vertical. As well, for typing a document holder should be used to keep all necessary information at eye level in turn avoiding unnecessary neck strain.

Lighting also plays a factor in the ergonomics of a workstation. If used incorrectly, lights can cause strain on the eyes and pressure the user to sit in awkward positions. Incorrect lighting can cause two different types of glare, indirect and direct. Indirect glare reflects off a surface such as a (Benjafaar, Heragu and Irani) computer screen whereas direct glare is caused from a light shining directly in one’s eyes. Both glares can be eliminated by providing a desk lamp that can be manually adjusted by the user. These guidelines and tips put together can form an effective ergonomic sitting workstation. (TIME-STUDY GUIDELINES)

Standing laboratory workstations require many of the same ergonomic standards as sitting workstations such as mouse, keyboard, and monitor placement but also include laboratory tool placement and standing techniques. Standing at a workstation puts a lot of strain on the feet and back which can be countered with a foot stand to shift weight or a floor pad to cushion the knees and lower back. Also, a height adjustable stool should be provided to allow the worker to sit down at regular intervals (Better Factories). Tools should be neat and organized in labeled drawers or should be hanging within reaching distance in a specified location on the wall or the ceiling. This allows workers to find the necessary tool on a consistent basis. Standing workstations should be set up carefully to minimize strain on the body.
Setting up an ergonomic workstation is only part of keeping employees productive and healthy. Employees should be briefed on techniques and suggestions on how to stay comfortable at work. For example, a person’s knees should be bent at approximately 90 degrees with enough space between the back of their knees and the chair to place their fist (TIME-STUDY GUIDELINES). A technique like this will minimize lower back pain and better overall posture. Posters with these suggestions are a useful to have hanging around the office to constantly remind workers to pay attention to ergonomics. In addition to supplying ergonomic techniques, workers should be encouraged to take “Micro-Breaks” that last 10 to 60 seconds every 10-15 minutes. During these breaks, employees can refocus their eyes on distant objects or get up to stretch. By allowing workers to take these breaks, they can stay focused for long periods of time and generally produce a higher quality work.

After studying and analyzing the different techniques necessary to complete the E.J. Gallo Winery spirit-maker facility, a full plan must be designed in order to implement a physical facility. The first step is to use the revised systematic approach to facility design to form the plans for the facility in the most efficient way possible.

**DESIGN**

The design phase of the E.J. Gallo facility incorporates the eleven steps of the revised systematic approach to efficiently and completely put together a facility that unites the wants and needs of the employees, managers, and overall company.
DEFINE PROBLEM

When starting a facility design or any general project, a clear, descriptive problem statement is vital in order to produce a useful finished product. The problem statement should define the broad goal for the facility design such as the use of the facility and the monetary constraints. In addition, the problems statement should present any upfront details which should be known before starting the project. For example, the desired square footage of the facility or the amount of inhabitants should be included in the problem statement if known prior. By including the necessary information in the problem statement without providing excess information, the project manager and overseers can understand the scope without becoming overwhelmed. When presented with the spirit-makers relocation project, the problem statement written as follows:

“Due to growing E.J Gallo Winery spirit brands, the “spirit-makers” need to be relocated to a larger office and lab area. Currently, spirit-makers are cramped into an office-lab combo at the winery building instead of the spirits building. There is limited room for inventory, desk space, and testing. E.J. Gallo Winery would like to build a new 1200 ft$^2$ to 1600 ft$^2$ external office to incorporate seven cubicles and a lab that can be dually used as a conference room for under 200,000 dollars.”

In order to understand the degree of space limitations and clutter, the pictures show in figure 3 and 4 were taken.
The entire lab area was cluttered with samples and papers to the point where the spirit makers did not have room to run their tests. The desk areas were located in the lab area so the inhabitants had minimal room to work and no privacy. In addition, the walkways were constantly blocked with boxes and other lab materials which violate the OSHA standard of 3 feet width. As well, there were safety hazards around the current lab as shown in figure 5.

The space heater is located directly next to the flammable substance sign causing a safety hazard that could potentially destroy the entire facility. The lab received samples from the brandy plant located ¾ of a mile away which had to be driven over by truck because the winery property and brandy plant property are not connected. E.J. Gallo Winery plans to double their spirit sales in 2010 and with such a limited area for
testing; they need to provide the spirit-makers with a new workspace.

**DEFINE DEPARTMENTS**

The defining departments step in the spirit-makers facility redesign is one of the most important stages in the revised systematic approach. In this step the departments which will move to the new facility should be agreed upon between management and the spirit-makers. Due to limited space at the brandy plant, differentiating the wants and needs of the spirit-makers becomes a key intermediate step in defining departments. To understand which departments are necessary in the new facility, the spirit-makers were given two sets of surveys. The first consisted of a written survey which can be seen in appendix A. This survey was created to gather information about which departments the spirit-makers view as necessary to complete their jobs and which departments they view as useful assets. In addition, the first survey provides information about the location of office equipment in relation to each employee’s cubicle. The second survey is a personal interview in which the spirit-makers can voice any concerns about physical or mental comfort. By combining the result of these two surveys as summarized in appendix I, the wants and needs of the spirit-maker in the new facility narrow greatly.

From the result of the surveys, the departments are narrowed from the eight departments shown in figure 6 to five departments shown in figure 7.
The three departments that were deemed not vital in relocating the spirit-makers are the analytical lab, conference room, and facility bathroom. The main analytical lab is located at the winery where they test pH, alcohol content, and perform other chemical tests. By putting a secondary analytical lab in the new facility, certain tests will be performed quicker but many tests will still have to be completed in the main analytical lab. Due to space constraint in the new facility, the analytical lab was labeled as “not necessary” because it would not eliminate transporting samples from the brandy plant to the winery.

The facility bathroom could increase productivity because workers would not have to put on safety equipment to enter production floor where the closest bathroom is located. In reality, the bathroom was seen by management as a desired addition but not necessary.

The conference room was seen as unnecessary because the brandy plant management trailer already encompasses two large conference rooms. Now that the unnecessary departments are set to the side, the next step of the systematic approach is to define relationships between the departments.
DEFINING RELATIONSHIPS

In order to increase efficiency in a facility, the relationships between departments should be defined carefully and correctly. Also, the relationship of the new facility to overall facility must be taken into consideration. From interviewing managers and employees the department relationships are documented. Starting with the internal department relationships, the two manager offices should be located near one another. The printer/copy desk should be located in a central area for ease of use. At least two cubicles should be located near the manager offices for ease of communication. The lab area should be located near a door to bring in and out material without disrupting the cubicles. Also, the large freezer should be located near the lab area for testing purposes. Since the new facility is fairly small, the amount of relationships is limited. A relationship matrix can be seen in appendix B showing the relationship strength between the various departments.

SPACE REQUIREMENTS

INTERIOR SPACE REQUIREMENTS

Now that the departments are established and the relationships between these departments are discovered, the space requirements for each department need to be gathered in order to develop a preliminary layout using Computer Aided Design or CAD. At E.J Gallo, the standards for cubicles, manager offices, bathrooms, walkways, and doorways are predefined. These standards are as follows:

- Manager Office → 10’ 6” by 8’ 2”
• Cubicles → 6' by 8' 1/2"
• Bathroom → 7’ 1” by 7’ 11”
• Walkways → minimum 3’
• Doorways → 3’

Many of these standards are derived from OSHA which provides regulations for a safer and more comfortable workplace. In addition to mandatory standards set for the five entities above, there are space requirements set by the spirit-makers for items such as the laboratory area. Also, there are space requirements for the freezer and printer areas due to size constraints on the physical machines. These space requirements are outlined below.

• Laboratory → 23’ 4” by 18’ 6”
  o Stainless Steel Rack (SS Rack) → 2’ 6” by 6’
  o Special Work Area → 2’ 6” by 7’ 4”
  o Dishwasher → 2’ by 2’ 2”
• Big Freezer → 2’6” by 7’
• Small Freezer → 2’ 8” by 2’ 8”
• Refrigerator → 3’ by 2’ 8”
• Printer → 4’ by 2’ 8”

After all the mandatory items and the spirit-maker items are defined, the bookshelves and storage areas can be defined. These items are not as important in a space requirement sense as the above items due to the fact that shelving and storage areas can adapt to an
Allotted amount of room and should not dictate the placement of the key items in the facility. The bookshelf and storage area space requirements are as follows:

- Overhead Cabinet without Glass (OH wo/G) → 1’ 2” by 4’
- Overhead Cabinet with Glass (OH w/G) → 1’ 2” by 4’
- Book Case (BC) → 1’ by 3’

Locational Space Requirements

After defining the space requirements for all the departments and items in the facility, the space requirements for the possible types of facilities must be examined to determine the optimal location, size and type of facility. Due to future plans at the brandy plant, E.J. Gallo Winery management only wants a temporary facility in the form of either a double wide or triple wide stationary trailer. A double wide trailer requires 23’ 4” by 60’ and a triple wide trailer requires 35’ by 60’. With these two space requirement constraints in mind, a location for the trailer must be chosen that does not interfere with forklift traffic and complies with OSHA standards of safety.
In analyzing the brandy plant layout shown in figure 8, there is only one general area in which the trailer can be built. The red circle in the bottom right corner of the brandy plant layout represents a storage tank which requires a 75 foot safety radius marked by the red arc. Due to this constraint, the entire south side of the brandy plant is restricted. The area marked by a red box represents where the semi trucks park while waiting for their direct shipment which causes this entire area to be off limits. In order to still leave an area for semi trucks and forklifts to drive, the area marked in green becomes the only area left to
build. The only question left is between whether a double wide or triple wide trailer is more suitable. A triple wide trailer is about 12 feet wider than a double which causes truck to come within two feet of the corner. This causes a safety issue when employees exit the trailer. Also, when all the necessary departments and items are put in a double wide trailer, there is more than enough room which allows for an added bathroom. Taking into consideration these three dilemmas concerning a triple wide trailer, the clear choice for the size of the trailer is a double wide. With both the location and size decided upon, the layout can be prepared and analyzed.

**ALTERNATIVE LAYOUTS**

When developing alternative layouts for the spirit-makers trailer, the department relationships must be kept in mind. This means the cubicle and the offices should be located near one another to increase worker communication. In addition, the offices and cubicles should be located near the printing station to increase productivity. The large freezer should be near the lab area to limit material transportation distance. Department relationships are not the only thing that must be used during alternative layout production, the size of walkways and doorways must be adhered to. Also, when designing a facility, the flow of people and materials must be taken into consideration. For example, if the lab needs to receive large items then there should be a door nearby.
Alternative layout 1 shown in figure 9 stems from the idea of placing the five cubicles in a cluster similar to the trailer located next to the spirit-makers trailer. This style of cluster allows for better communication among employees due to low dividers between cubes. Also, the three cubicles in front of managers’ offices allow for increased communication between select employees and their bosses. The doors on alternative layout 1 are placed well throughout the facility. The door to the left allows the five employees on to enter directly in front of their workplaces and can be cut off to through traffic with a sign reading “Use other door.” The second door allows the other two employees to enter and move to their cubicles. Also, employees from the other brandy trailer can enter to use the bathroom by means of the second door which will only disturb two workers at most. The second door is also perfectly placed to bring materials into the
lab area without disrupting the cubicle area. The printing station entitled “computer desk” is centrally located allowing all inhabitants to print materials in a timely fashion.

**Alternative Layout 2**

![Figure 10: Alternative Layout 2](image)

Alternative layout 2 show in figure 10 changes the cubicle arrangement from a cluster to a line. This allows for increased privacy but decreased ease of communication. The proximity of the managers' offices to the cubicles allows for increased communication with all the cubicles especially the two directly in front of the offices. The freezer is located near the lab which allows the spirit-makers to get materials without disrupting their peers. The bathroom is located half way between both doors which will cause disruptions when others enter the facility to use the bathroom. The door to the right is located in good proximity to the lab which allows for a fluid flow of material in and out of the lab. Also, the lab, book case, and freezer areas are all located in one section of the trailer allowing a clear separation of personal workspace and lab workspace.
Alternative Layout 3

Figure 11: Alternative Layout 3

Alternative layout 3 as shown in figure 11 switches the location of the freezer area and the bathroom from alternative layout 2. The freezer moves farther away from the lab area which lengthens travel time with samples and may cause workers to disrupt their peers while working at the cubicles. The bathroom is moved to a more beneficial location in proximity to the laboratory door causing no distractions for the workers at their cubicles. In addition, the manager offices are located next to the cubicles allowing for increased communication. The printer station is centered in the trailer allowing easy access by all employees especially the employees with the cubicles furthest to the right.
Alternate layout 4 as shown in figure 12 is based on placing the bathroom by the left door to limit distractions when others use the bathroom. When others approach the trailer, the left door is the closest to the brandy production floor and the brandy trailer which remove the inconvenience of reminding others to use the secondary door. The printing desk is located near the offices and cubicles allowing for easy access to printed papers. The freezer is not in close proximity to the lab causing minor interruptions when frozen items are in need. The offices are close to the two right-most cubicles allowing for easy communication with a select two employees. In addition, there is a door placed near the lab to allow for an easy flow of materials into the laboratory.
EVALUATE ALTERNATIVES

EVALUATION METRICS

In order to analyze the four alternative layouts, the evaluation metrics must be developed to meet the needs of the spirit-makers. Once this is done, each metric is assigned a weight that corresponds to its importance in the overall facility gathered through a variety of methods including interviews with spirit-maker management and facility experts on the E.J. Gallo staff. In this case, the evaluation is split into five metrics. First, the proximity of the cubicles and the offices is weighted at 20 percent because ease of communication is important to the quality of the spirit-maker’s work. Next, the proximity of the lab and freezer area is weighted at five percent due to the fact that it would be convenient for these two location close but it is not necessary for them to be right next to one another. The bathroom placement is weighted at 35 percent because an estimated 15 to 20 workers from outside the facility will use the bathroom daily. This means the bathroom should be located in the section of the trailer which will lessen interruptions and is convenient to get to. The next metric is the proximity of a door to the laboratory area. This metric is weighted at 25 percent due to the amount of materials the spirit-makers have to bring in and out of the laboratory. Lastly, the printer proximity to the offices and cubicles is weighted at 15 percent because the spirit-makers have to print documents numerous times a day. A summary of the weights for each metric can be seen in appendix C.

Now that the weights of the evaluation metrics are assigned, each layout can be analyzed. Each layout will receive an attribute rating for each of the evaluation metrics.
The attribute rating will be on a scale of one to ten with ten being the best and are assigned relative to each of the layouts being analyzed.

**Alternative Layout 1 Evaluation**

Alternative layout 1 differs from the three other alternatives by arranging the cubicles in a cluster instead of a line. This causes three of the cubicles to be near the offices but the other two cubicles are out of visual and communication distance. Since this type of cubicle arrangement promotes communication between employees, the layout to receive a 7 out of 10 for cubicle-office proximity. The freezer is located in a optimal position so freezer-lab proximity recieves a 10. The bathroom is located in a position that could potentially disrupt two employees at their desk when outside workers use the bathroom. Due to this fact, the bathroom placement recieves a 6 out of 10. There is a door placed next to the lab so door-lab proximity recieves a 10. Since the printer is located in position which will interupt the spirit-makers the printer-cubicle/office proximity metric revieves a 7 out of 10.

**Alternative Layout 2 Evaluation**

The transition to a line of cubicles in alternative layout 2 causes the cubicle-office proximity metric to increase to 8 out of 10. This is mainly because the managers in the office can easily communicate with the three spirit-makers in the cubicles directly outside the offices while still able to interact with the other two cubicles with minimal effort. The freezer-lab proximity receives an 8 because the freezer is not directly next to the lab but is still within easy access. The bathroom is located equidistant from the two doors causing
unavoidable interruptions when outside workers use the bathroom. This causes the
bathroom placement to receive 4 out of 10. There is a door placed next to the lab so door-
lab proximity receives a 10. The printer is located in a centralized location allowing the
managers and the spirit-makers to use it with ease. Therefore, the printer-cubicle/office
proximity metric receives a 9 out of 10.

Alternative Layout 3 Evaluation

Alternative layout 3 receives 8 out of 10 for cubicle-office proximity due to easy
communication between managers and spirit-makers. Although not perfect, with the
limited amount of space in the trailer, placement of the office and cubicles proves to be the
most optimal. The freezer-lab proximity metric lowers to 6 out of 10 due to the freezer
being located in the middle of the cubicle area. This could cause potential interruptions for
three of the workers in the cubicles. Identical to alternative layout 1, the bathroom
placement receives a 8 out of 10 because it is located near the laboratory door causing
minimal interruptions when outside workers come into the trailer to use the bathroom.
Since the door is located right next to the laboratory, the door-lab proximity metric
receives a 10. The printer-cubicle/office proximity metric receives an 8 out of 10 because
the printer is located in a centrally but certain spirit-makers have to walk across half the
trailer.

Alternative Layout 4 Evaluation

Alternative layout 4 receives 7 out of 10 for cubicle-office proximity because the
manager offices are located near two of the cubicles. Since the freezer is located on the
opposite side of the laboratory, spirit-makers will have to cross three cubicles when getting materials from the freezer. As a result, freezer-lab proximity receives 4 out of 10. By locating the bathroom on the left side of the layout by the door, interruptions are minimized resulting in a bathroom placement rating of 10. The door-lab proximity receives a 9 out of 10 because the door is located next to the lab but with three book cases in the way. The printer-cubicle/office proximity gets an 8 because multiple spirit-makers will have to walk across the trailer to pick up printed sheets.

SELECT LAYOUT

In order to select the best layout for the spirit-makers trailer, a weighted index must be formed showing the layout with the highest rating. To do this, each metric score should be divided by the available amount of rating points, for example, a score of 8 is divided by 10 so the index for that metric is 0.8. Once all the individual indexes are found, they are multiplied by the corresponding weight to form a weighted index. The weighted index will show which of the layout is most beneficial in building the trailer. A summary of the ratings and indexes for each metric are shown in appendix D while the weighted indexes are shown in table 1 below.

Table 1: Weighted Indices

<table>
<thead>
<tr>
<th>Layout</th>
<th>Weighted Indices</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.76</td>
</tr>
<tr>
<td>2</td>
<td>0.73</td>
</tr>
<tr>
<td>3</td>
<td>0.84</td>
</tr>
<tr>
<td>4</td>
<td>0.86</td>
</tr>
</tbody>
</table>
The weighted indices show that alternative layout 4 is the best layout for the brandy plant trailer. Since layout 3 and 4 are within two hundredths of each other, the layouts were presented to management and layout 4 was agreed upon.

**Gather Utility Quotes**

Now that the layout is selected, the necessary utility quotes must be gathered and analyzed. First, an initial list was brainstormed in order to cover all the bases including what type of utility is needed, who to talk to, options on how to get the utility, spirit-maker needs, and managerial constraints. The following utilities were gathered to provide a full cost estimate for management.

- Electrical
- Water
- Phones and Data
- Plumbing
- Sewage
  - Holding Tank
  - Sewage Line
- Sprinklers
- Cabinet Work
  - New Cabinets
  - Modified Cabinets
- Security
- DI Water
  - DI water line
  - Culligan DI water System
  - Carry Buckets
- Cylinder Gases
- Wooden Stairs
- Dishwasher
  - DI water
  - Water Softener
In order to gather the quotes, vendors in each of the utility areas were contacted with the necessary parameters to provide a written quote. The areas outlined above, with multiple options, require analysis of each different option to determine which is most cost effective.

The first important decision to make has to do with whether to tear up the concrete to install a septic line or install two septic tanks in the trailer to remove sewage from the dishwasher, sinks, and bathroom. A cost analysis between these two options is shown in figures 13 and 14.

![Figure 13: Weekly Sewage Analysis](image1)

![Figure 14: Bi-weekly Sewage Analysis](image2)

The excel program shown in figures 13 and 14 changes the amount of times the holding tanks are cleaned per month in the red box and outputs which option is most cost effective.
effective depending on the amount of years the trailer is installed. When receiving the quotes for the holding tanks, the vendor expressed that the holding bathroom holding tank would be either emptied weekly or biweekly depending on the amount of outside users. In analyzing the outputs from of the excel program, the areas highlighted in blue at the tip of the arrow represent when the holding tanks are more cost effective. In this case, the only time a sewage line would be more cost effective is if the bathroom holding tank is clean biweekly and the trailer is installed for at least five years. In addition, management expressed concern with drilling into the pavement causing decreased productivity due to detours for forklifts and trucks. With all this taken into consideration, the holding tanks were chosen as the most viable option.

When installing heavy cabinets in the trailer, there is the option of either bringing the cabinets from the current lab over to the trailer and removing a foot of shelving in order for them to fit under the shorter ceiling or build new cabinet for an extra 1,317 dollars. The decision was made to buy new cabinets because if they are removed from the current lab, when a new group moves in they will need the storage for their materials.

The lab uses DI water for many of their experiments so their options are between running a DI 300 foot pipe to the existing DI waterline, making their own DI water, or hand carrying the DI water in buckets. Due to the amount of open space between the trailer and the existing DI water system, running piping is neither plausible nor cost effective. The DI water system costs roughly 2000 dollars for the first year and 1200 for each year after.
With a 200,000 dollar budget for the entire trailer, the spirit-makers decided they can carry buckets of DI water and decide later if they need a stand-alone system.

Since the glasses that the spirit-makers use for tasting cannot have watermarks, the dishwasher must either use DI water or a water softener. To determine which method was more cost effective, a cost analysis was performed as shown in figure 15.

<table>
<thead>
<tr>
<th>Water Softener</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Initial Information</strong></td>
</tr>
<tr>
<td>Dishwasher Gallons per Load</td>
</tr>
<tr>
<td>Dishwasher Runs Per Week</td>
</tr>
<tr>
<td>Gallons per Day</td>
</tr>
<tr>
<td>Gallons Per DI Tank</td>
</tr>
<tr>
<td>Cost Per DI Tank</td>
</tr>
<tr>
<td>Softener Initial Cost</td>
</tr>
<tr>
<td>Softener Monthly Cost</td>
</tr>
</tbody>
</table>

| **With Water Softener** |
| DI Tank Cost/Month | $45.43 |
| Softener Monthly Cost | $19.99 |
| Softener Initial Cost | $99.00 |
| Tank Rental per month | $25.00 |
| DI Water Initial Cost | $769.00 |
| **Year Forecast** | $1,953.02 |

| **Without Water Softener** |
| DI Tank Cost/Month | $90.86 |
| Tank Rental per month | $25.00 |
| DI Water Initial Cost | $769.00 |
| **Year Forecast** | $2,159.29 |

Figure 15: Water Softener Cost Analysis
In comparing the yearly forecasts for a water softener versus using DI water for the dishwasher, it is about 200 dollars less per year to use a water softener. On top of that, if a DI system is not used in general, the cost will be cut down even more. With the given cost analysis, the decision was made to use a water softener for the dishwasher.

**Cost Analysis**

Now that the layout is chosen and the utilities are gathered, these costs are compiled to show the cost of installation and the yearly reoccurring costs. The original problem statement says the total installation should less than 200,000 dollars. With all the costs taken into consideration the installation for a rented trailer is 135,467 dollars as shown in the cost analysis in appendix E. The monthly costs come out to be 1,541 dollars with a 15 percent contingency totaling in 1,772 dollars per month. The initial installation costs roughly 65,000 dollars lower than the initial budget, so management asked to see the benefits of buying a trailer versus renting. When buying a trailer there are two options; either buy a new or used trailer. Buying the trailer cuts out the monthly cost along with many of the optional costs involved in renting a trailer. The cost of buying a new trailer is 238,620 dollars initially with a 401 dollar monthly cost shown in appendix F. Similarly, the cost of buying a used trailer is 221,555 dollars initially with a 401 dollar monthly cost shown in appendix G. With this taken into consideration, the most useful way to compare buying versus renting is the find the breakeven points between the three options. In order to find these breakeven points, the net present value is calculated for years one through five and plotted on a graph. Once, the equations of the three lines are gathered, two of the
equations are set equal to each other to find the number of years it takes to equal out. The graph of the net present values for each option is shown in figure 16.

Figure 16: Trailer Rent vs. Purchase

At year one, it is cheapest to rent the trailer but as 1.6 years approaches it becomes more beneficial to buy a new trailer. It is not until 6.5 years that it becomes more cost effective to buy a used trailer. Upon starting this project, the trailer was expected to be installed for three to five years leaving the option of buying a new trailer as the most cost effective option. Although, since the breakeven point for buying a used trailer and a rented trailer is 2.6 years, if management feels they will have the trailer for longer than 6.5 year then they should choose to buy a used trailer.
SIMULATE INSTALLATION

Now that costs are presented, the installation of the trailer must be simulated to see the effects of truck and forklift traffic. In order to do this, the decided upon location was blocked off with brandy pallets and tape to make a physical barrier to signify the trailer as shown in figure 17.

Figure 17: Simulated Trailer Location

As a result of the barrier, forklifts encountered rough areas when transporting pallets of brandy to the warehouses. Previously, the brandy plant repaved a strip of concrete for the forklifts to drive on which clears the corner of the simulated trailer by three feet. Once this problem was noted, the planned location was moved back six feet to avoid safety hazards.
in forklift traffic and when inhabitants leave the trailer. Overall, the simulation of the trailer installation provided valuable feedback before actual implementation.

**DEFINE/INSTALL/MAINTAIN**

Once the entire facility has been planned and documented, the necessary paperwork must be sent through a series of departments at E.J Gallo to receive approval before installation. Since the co-op ended before the installation stage, this step falls outside the scope of this senior project.

**PERFORMANCE IMPROVEMENT**

In order to show the improvements from the current facility to the proposed spirit-maker facility, time studies are used to present a financial savings basis. In this situation, no time studies can be performed to compare the interiors of the two facilities because the new facility has not yet been built. This leaves transportation savings from materials such as the samples transported from the brandy plant to the spirit-makers lab and transportation savings from personnel such as spirit-makers walking to the brandy plant for meetings.

Material transportation savings are split up into two sections including the cost of gas to drive samples from the brandy plant to the winery and the time of the worker designated to gathering and transporting the samples. First, certain assumptions must be made for each of these material transportation costs.

- 6 miles per gallon (tested)
• 10 miles per hour on average
• 3.15 dollars per gallon of gasoline
• 12 dollars per hour per worker
• 3 trips per day for current facility
• 1 trips per day for proposed facility

With these assumptions in place, the cost saving is calculated by subtracting the proposed costs from the current costs. The savings is broken down into weekly and yearly savings in table 2.

Table 2: Material Transportation Savings

<table>
<thead>
<tr>
<th>Breakdown</th>
<th>Material Savings</th>
<th>Gas</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Hourly Worker</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weekly</td>
<td>27.24</td>
<td>11.92</td>
<td>Dollars</td>
</tr>
<tr>
<td>Yearly</td>
<td>1416.48</td>
<td>619.71</td>
<td>Dollars</td>
</tr>
</tbody>
</table>

Personnel savings are calculated from a series of times studies consisting of the spirit-makers walking to common areas such as the conference rooms at the brandy plant or the brandy bottling floor. With the averaged times from the physical times studies, the cost saving can be calculated using the following assumptions:

• 25 dollars per hour per spirit-maker
• 3 trips per day
• 16 minutes per trip from current facility
• 3 minutes per trip from proposed facility
Using these assumptions, the cost saving is calculated as shown in table 3.

Table 3: Personnel Transportation Savings

<table>
<thead>
<tr>
<th>Personnel Savings Breakdown</th>
<th>Hourly Worker</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weekly</td>
<td>81.25</td>
<td>Dollars</td>
</tr>
<tr>
<td>Yearly</td>
<td>4225</td>
<td>Dollars</td>
</tr>
</tbody>
</table>

When both material and personnel transportation savings are combined together, the total yearly savings are estimated at 6,261. A breakdown of the cost saving can be seen in table 18 where the cost of the current and proposed are split into personnel and material costs. The current transportation costs are more than four times that of the proposed layout.

Table 18: Yearly Transportation Costs Comparison
CONCLUSION

As E.J Gallo spirits grow in popularity, the brandy plant plans to double their sales for the year of 2010. This causes the need for an expanded spirit-maker department which is impossible due to space limitations at the current facility. The new facility described throughout the report decreases clutter, removes safety hazards, and increases worker efficiency. Spirit-makers will now have a separated office and lab area allowing for a more comfortable and effective work environment. The new facility will be located at the brandy plant instead of the winery eliminating a mile and a half round-trip commute. This will allow for more frequent sampling resulting in a more consistent and well-liked product. The installation of the new facility will avoid interfering with other processes such as forklifts and trucks.

The main goal of this projects was to provide the spirit-makers with a new office and lab area to design and test new hard alcohols for under 200,000 dollars. The final plan for renting a trailer as originally discussed came out to be 65,000 dollars less than the original constraint. This reduced initial cost opened doors to buying a new or used trailer which proved to be more cost effective than renting. In addition, transportation costs for material and personnel are cut down over 400 percent saving over 6200 dollars per year. This facility proves to be a necessary next step in the E.J Gallo brandy plant future. It greatly increases the utility of the spirit-makers and the success of overall company.
RELEVANT COURSEWORK

- **IME 443** - Facilities Planning and Design
- **IME 314** - Engineering Economics
- **IME 223** - Process Improvement Fundamentals
- **IME303** - Project Organization and Management
- **CAD** – Computer Aided Design

WORKS CITED


APPENDIX

APPENDIX A

Brandy Office Survey

Name: ____________________

Cubical Questions

1. Do you want a private or sharing environment?

2. Does your office need to be near any specific piece of equipment? If so, please elaborate.

3. Is there any specific equipment or items that need to be located in your office? If so, please elaborate.

4. Would you prefer a laptop or desktop computer?

Facility Questions

1. Which of the following are vital so you can do your job to the best of your ability? Circle as many that apply. Please explain anything that is vital to your job.

   Winemaking Lab  Analytical lab  Conference Room  Facility Bathroom

   __________________________________________________________

   __________________________________________________________

2. Which of the following are useful so you can do your job to the best of your ability? Circle as many that apply. Please explain anything that is useful to your job.

   Winemaking Lab  Analytical lab  Conference Room  Facility Bathroom

   __________________________________________________________

   __________________________________________________________
### APPENDIX B

<table>
<thead>
<tr>
<th>From \ To</th>
<th>Lab</th>
<th>Offices</th>
<th>Cubicles</th>
<th>Print</th>
<th>Fridge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lab</td>
<td>--</td>
<td>U</td>
<td>U</td>
<td>U</td>
<td>I</td>
</tr>
<tr>
<td>Offices</td>
<td>U</td>
<td>--</td>
<td>E</td>
<td>I</td>
<td>U</td>
</tr>
<tr>
<td>Cubicles</td>
<td>U</td>
<td>U</td>
<td>--</td>
<td>I</td>
<td>U</td>
</tr>
<tr>
<td>Print</td>
<td>U</td>
<td>U</td>
<td>U</td>
<td>--</td>
<td>U</td>
</tr>
<tr>
<td>Fridge</td>
<td>U</td>
<td>U</td>
<td>U</td>
<td>U</td>
<td>--</td>
</tr>
</tbody>
</table>

**Key:**
- Absolutely Necessary: A
- Especially Important: E
- Important: I
- Ordinary: O
- Unimportant: U

### APPENDIX C

<table>
<thead>
<tr>
<th>Item</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cubicle-Office Proximity</td>
<td>20%</td>
</tr>
<tr>
<td>Freezer-Lab Proximity</td>
<td>5%</td>
</tr>
<tr>
<td>Bathroom Placement</td>
<td>35%</td>
</tr>
<tr>
<td>Door-Lab Proximity</td>
<td>25%</td>
</tr>
<tr>
<td>Printer-Cubicle-Office Proximity</td>
<td>15%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
</tr>
</tbody>
</table>

### APPENDIX D

<table>
<thead>
<tr>
<th>Layout</th>
<th>Cubicle-Office Proximity</th>
<th>Freezer-Lab Proximity</th>
<th>Bathroom Placement</th>
<th>Door-Lab Proximity</th>
<th>Printer-Cubicle/Office Proximity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base</td>
<td>10.00</td>
<td>10.00</td>
<td>10.00</td>
<td>10.00</td>
<td>10.00</td>
</tr>
<tr>
<td>1</td>
<td>7.00</td>
<td>0.70</td>
<td>10.00</td>
<td>1.00</td>
<td>6.00</td>
</tr>
<tr>
<td>2</td>
<td>8.00</td>
<td>0.80</td>
<td>8.00</td>
<td>0.80</td>
<td>4.00</td>
</tr>
<tr>
<td>3</td>
<td>8.00</td>
<td>0.80</td>
<td>6.00</td>
<td>0.60</td>
<td>8.00</td>
</tr>
<tr>
<td>4</td>
<td>7.00</td>
<td>0.70</td>
<td>4.00</td>
<td>0.40</td>
<td>10.00</td>
</tr>
</tbody>
</table>

44 | P a g e
### Purchase New Trailer Costs

<table>
<thead>
<tr>
<th>Item</th>
<th>Company</th>
<th>Contact</th>
<th>Initial Cost</th>
<th>Monthly Cost</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>150' of piping</td>
<td>Pacific Mobile</td>
<td>Deann Smoke</td>
<td>$250</td>
<td>$282</td>
<td></td>
</tr>
<tr>
<td>4 small sinks</td>
<td>Pacific Mobile</td>
<td>Deann Smoke</td>
<td>$325</td>
<td>$282</td>
<td>15-20 gallons</td>
</tr>
<tr>
<td>5 faucets</td>
<td>Pacific Mobile</td>
<td>Deann Smoke</td>
<td>$325</td>
<td>$282</td>
<td></td>
</tr>
<tr>
<td>1 large sink</td>
<td>Pacific Mobile</td>
<td>Deann Smoke</td>
<td>$81</td>
<td>$282</td>
<td></td>
</tr>
<tr>
<td>Trailer Matching Skirting</td>
<td>Pacific Mobile</td>
<td>Deann Smoke</td>
<td>$2,016</td>
<td>$1,317</td>
<td></td>
</tr>
<tr>
<td>Install Sink, Fixtures, Dishwasher</td>
<td>Pacific Mobile</td>
<td>Deann Smoke</td>
<td>$1,097</td>
<td>$1,097</td>
<td></td>
</tr>
</tbody>
</table>

**Grand Total:** $1,317
<table>
<thead>
<tr>
<th>Item</th>
<th>Company</th>
<th>Contact</th>
<th>Initial Cost</th>
<th>Monthly Cost</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transformer</td>
<td>Willie Electric</td>
<td>Bert Machado</td>
<td>$1,753</td>
<td>$0</td>
<td>ACME TP-53020-3S 50KVA Dist Transformer</td>
</tr>
<tr>
<td>Water Line Plumbing</td>
<td>Solecon</td>
<td>Bob Stamy</td>
<td>$1,600</td>
<td>$0</td>
<td>40' of piping</td>
</tr>
<tr>
<td>Electrical</td>
<td>IEC</td>
<td>Chuck Musso</td>
<td>$4,800</td>
<td>$0</td>
<td></td>
</tr>
<tr>
<td>Holding Tank</td>
<td>A&amp;A Portables</td>
<td>Dan Markkula</td>
<td>$0</td>
<td>$323</td>
<td>Plastic tank to visually see if it is full</td>
</tr>
<tr>
<td>Plumbing Manifold</td>
<td>Pacific Mobile</td>
<td>Deann Smoke</td>
<td>$1,800</td>
<td>$0</td>
<td>2 plumbing manifolds (bathroom and lab)</td>
</tr>
<tr>
<td>Install Sink, Fixtures, Dishwasher</td>
<td>Pacific Mobile</td>
<td>Deann Smoke</td>
<td>$1,097</td>
<td>$0</td>
<td>Frigidaire - 24&quot; Tall Tub Built-In Dishwasher - White</td>
</tr>
<tr>
<td>Trailer</td>
<td>Pacific Mobile</td>
<td>Deann Smoke</td>
<td>$79,578</td>
<td>$0</td>
<td>Floor Layout 5; 36-60 month Lease</td>
</tr>
<tr>
<td>Water Heater</td>
<td>Pacific Mobile</td>
<td>Deann Smoke</td>
<td>$150</td>
<td>$0</td>
<td>15-20 gallons</td>
</tr>
<tr>
<td>Small Sinks</td>
<td>Pacific Mobile</td>
<td>Deann Smoke</td>
<td>$282</td>
<td>$0</td>
<td>4 small sinks</td>
</tr>
<tr>
<td>Faucets</td>
<td>Pacific Mobile</td>
<td>Deann Smoke</td>
<td>$325</td>
<td>$0</td>
<td>5 faucets</td>
</tr>
<tr>
<td>Large Sink</td>
<td>Pacific Mobile</td>
<td>Deann Smoke</td>
<td>$81</td>
<td>$0</td>
<td>1 large sinks</td>
</tr>
<tr>
<td>Cabinets</td>
<td>Acosta</td>
<td>Gary Acosta</td>
<td>$29,216</td>
<td>$0</td>
<td>*See 'Cost Breakdown' sheet; Tax added</td>
</tr>
<tr>
<td>New Upper Casework</td>
<td>Acosta</td>
<td>Gary Acosta</td>
<td>$38,163</td>
<td>$0</td>
<td>*See 'Cost Breakdown' sheet; Tax added</td>
</tr>
<tr>
<td>Phones and Data</td>
<td>Telecom</td>
<td>JP (James) Smith</td>
<td>$3,360</td>
<td>$0</td>
<td>$240/drop with 14 drops</td>
</tr>
<tr>
<td>Wooden Stairs</td>
<td>EJ Gallo</td>
<td>Roger Kinzie</td>
<td>$2,500</td>
<td>$0</td>
<td>2 wooden stair cases</td>
</tr>
<tr>
<td>Water Softener</td>
<td>Culligan</td>
<td>Vince Cheek</td>
<td>$99</td>
<td>$19</td>
<td>Maybe more for installation; 15 to 20 gallons</td>
</tr>
<tr>
<td>Sprinklers</td>
<td>Solecon</td>
<td>Will Grover</td>
<td>$25,600</td>
<td>$0</td>
<td></td>
</tr>
<tr>
<td>Dishwasher</td>
<td>Best Buy</td>
<td>XXXXXX</td>
<td>$271</td>
<td>$0</td>
<td>Frigidaire - 24&quot; Tall Tub Built-In Dishwasher - White</td>
</tr>
<tr>
<td>Nitrogen Cylinders</td>
<td>Praxair</td>
<td>Todd Dalrymple</td>
<td>$304</td>
<td>$8</td>
<td>4 brackets; 1 regulator</td>
</tr>
<tr>
<td>Center Tasting Table</td>
<td>Cresco Restaurant Supply</td>
<td>XXXXX</td>
<td>XXXXXX</td>
<td>XXXX</td>
<td>5 x 10 foot table w/ galvanized bottom shelf</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td>$192,656</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15% Contingency</td>
<td></td>
<td></td>
<td>$28,898</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Monthly Costs Sub-Total</td>
<td></td>
<td></td>
<td>$349</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15% Contingency</td>
<td></td>
<td></td>
<td>$52</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grand Total</td>
<td></td>
<td></td>
<td>$221,555</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Item</td>
<td>Company</td>
<td>Contact</td>
<td>Initial Cost</td>
<td>Monthly Cost</td>
<td>Notes</td>
</tr>
<tr>
<td>------------</td>
<td>-----------------</td>
<td>-----------------</td>
<td>--------------</td>
<td>--------------</td>
<td>--------------------------------------------</td>
</tr>
<tr>
<td>Foundation Engineering</td>
<td>Pacific Mobile</td>
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<td>$495</td>
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<td>Handicap Ramp</td>
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<td>350 Gallon 1 Day per Week</td>
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<td>New Book Cases</td>
<td>Acosta</td>
<td>Gary Acosta</td>
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<td>DI Water</td>
<td>Culligan</td>
<td>Vince Cheek</td>
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<td>$105</td>
<td>$159.00 per exchange of the tank ($79.50/month) + $25 tank rental</td>
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**Trailer Optional Items**
APPENDIX I

Survey Summary

What are you looking for in a new building?

Private work area

Do you have any body issues such as a sore back?

Something more comfortable and ergonomically friendly

What office equipment do you use most?

Printers, filing cabinets (Need full storage), need inbox for folders, mail drop-off

What lab equipment do you use most?

Glassware, cylinders, lab stills, glass racks, dishwasher

Who do you interact with most?
Everyone (Scott near Brian and Carl)
Non-vital Departments?
Analytical Lab, Bathroom, Conference Room