FEASIBILITY OF ESTABLISHING A VINEYARD

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ABSTRACT

The purpose of this project was to determine whether it would be feasible for Cal Poly to expand their vineyard from fifteen acres to eighteen acres.

There are four major costs associated when establishing a vineyard: plant, vine, trellis system, and drip system. Two suppliers per major cost with the exception of labor were called to determine the best price. Once the costs were determined, they were entered into an Excel spreadsheet in the initial cost outlay of an Enterprise Budget.

It has been concluded that expanding Cal Poly's vineyard would be feasible. Both the lowest and highest bids of the major costs are within the $54,000 budget. The lowest bid was at $36,733.50 and the higher end bid come out at $42,691.14.

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Chapter 1

INTRODUCTION

Cal Poly launched the Wine and Viticulture program in 2004. Previously, Cal Poly was limited to one viticulture class. However, Cal Poly wanted to expand the viticulture class into a more substantial program. Between the Agricultural Business Department and the Crop Science department, the Wine and Viticulture program evolved.

As of 2009, Cal Poly has fifteen acres of commercial vineyard used for the Wine and Viticulture program. The grapes consist of syrah, tempranillo, Chardonnay, and pinot noir. There are three and a half acres of syrah; .88 acres of tempranillo; three and a half acres of Chardonnay; and seven acres of pinot noir, totaling 14.88 acres. The remaining .12 acre consists of approximately ten rows of different varietals, which are used for teaching and educational purposes. 2006 represented the first year of actual grape production going towards bottling Cal Poly's own wine. As a result, Cal Poly now has a contract with Courtside Cellars to buy their grapes.

The Crops Unit is located on Highland after entering Cal Poly. Across from the Cal Poly Crops Unit sits a small orchard of Valencia, Satsuma, and navel oranges, which equals about three acres. The Satsuma and navel oranges are often sold at the farmers market in San Luis Obispo. However, the Valencias are not sold at farmers markets. According to Mark Welch, Vineyard Manager at Cal Poly, Valencia oranges are used for juice, and currently there is not a market for them. Accordingly, the Horticultural Department would like to remove the three acres of oranges and replace it with a vineyard consisting of Chardonnay grapes. Cal Poly would like to know whether it would be cost effective to develop this three acre Chardonnay vineyard. This

report will focus on the materials needed and the costs associated with constructing a Chardonnay vineyard on the Cal Poly grounds. In addition, an Enterprise Budget will be developed, helping to outline the necessary budget for this speculative venture.

Problem Statement:

Is it feasible to develop a three acre Chardonnay vineyard at Cal Poly?

Hypothesis:

If Cal Poly develops a three acre Chardonnay vineyard, it will be feasible, but only if total cost is below $54,000 dollars.

Objectives:

- Gather information regarding costs to establish a three acre vineyard for such items as plants (grape vines), labor, drip irrigation, and trellis system.
- Create an Enterprise Budget for the establishment of costs.
- Determine if it is cost effective to develop a three acre vineyard.

Significance of Study

The purpose of determining whether it will be feasible will help Cal Poly to expand their vineyard. Currently, the fifteen acre vineyard is part of the Wine and Viticulture program at Cal Poly; by adding another three acres, it will increase wine production. Further, adding an additional three acres to the currently developed fifteen acres will help to increase the profitability of the program.

Developing a Chardonnay vineyard is also a learning experience for those who contribute to the development of the program. Cal Poly holds true to its mission statement “learn by doing.” The Wine and Viticulture program is designed for students to have this hands-on experience. Many students volunteer or have classes that are related to the development of the vineyards.

Expanding the vineyard will allow more students to take part in this educational process. For example, FRSC 210 called “viticulture practices” required students to go to the vineyard and help with cultural costs such as pruning, suckering, and, vine training. If the project is proven cost effective, the students will also help with the repairs and/or replacement of the drip irrigation system and trellis system.

Chapter 2

LITERATURE REVIEW

The literature review will consist of an overview of what it takes to establish a vineyard. The literature review also provides additional information about the California wine industry. Ultimately, the primary tool used for establishing a vineyard is an Enterprise Budget. In addition to the Enterprise Budget, this section contains information about the general concepts for developing a vineyard.

California Wine Industry

As of 2009, nearly every state in the United States has a winery. California, though, is the number one producer in the United States, and the fourth largest wine producer in the world. Wine is California's most valuable agricultural product. In the past ten years, the value of California's wine grape crop has increased 107%, exceeding that of all other crops produced in the state. (MKF 2004: 3).

California relies on the wine industry for economic stability. According to the Wine Institute, "the wine industry has an annual impact of $51.8 billion on California's economy." Additionally, the California wine industry creates 875,000 jobs (Wine Institute). Also, 74 percent of California's wine is sold in the other 49 states, which has a domino effect by creating other jobs and revenue for other states, such as restaurants and distributors. This has lead to an over all impact of $125.3 billion on the United States (Wine Institute).

California has many varietals to choose from. The seven main varietals to follow: Chardonnay, French Colombard, chenin blanc, sauvignon blanc, cabernet sauvignon, zinfandel,

and merlot. Chardonnay leads in total plantings, accounting for 48% of plantings in California as of 2002 (MKF 2004: 17).

California also represents the core of wine education in the United States. Actually, the state is a leader in wine education and research worldwide (MKF 2004: 33). The University of California, Davis, and California State University, Fresno, are amongst some of the more sought after schools because of the Viticulture and Enology programs offered. In the past five years, Cal Poly State University has designed a Wine and Viticulture program that allows students to receive an interactive learning experience. Cal Poly also has a continuing education program, offering a Wine Certificate.

Enterprise Budget

An enterprise is a single crop or type of livestock production on a farm (Alimi 2002). According to Ronald Kay, "An Enterprise Budget is a forward-planning tool or way to estimate the profitability or feasibility of a plan, a proposed change in a plan, or an enterprise, before making and implementing it." In other words, Enterprise Budget provides an estimate of the potential revenue, expense, and profit for a single enterprise. An Enterprise Budget also helps to deciding whether to add new enterprises, eliminate, or change, existing enterprises (Smith 2009).

When setting up an Enterprise Budget, there are four main categories to consider: unit, quantity, price, and amount. A Unit is represented in pounds for fertilizers, hectares for a crop, or head for livestock. However, it depends on what the farm will be producing (Alimi 2000). Quantity depends on how many items are needed. Meanwhile, price is based on market values and productivity of enterprise resources such as land, labor, and equipment (Greaser 1994). Finally, the amount will result from multiplying price times quantity.

The next categories involved in the Enterprise Budget are revenue, variable, and fixed costs. The first item is revenue. Under revenue are variable costs, also known as "operating expenses" or "input costs." Beneath variable costs are fixed costs also known as "ownership expenses" or "output costs." The next item would then be "total cost," followed by "profit," which are presented in a vertical formatting (Kay 2002: 160). Variable and fixed costs can be broken down further. Variable costs are expenses that vary with output within a production period (Greaser 1994). A prime example is the cost of fertilizers and seeds used on crops or trellis materials. Fixed costs, on the other hand, will not vary with the level of output (Greaser 1994). For example, depreciation and taxes are fixed costs. The variable and fixed costs will vary depending on the enterprise.

In Addition, the short and long run profitability is important. In the short run, some of the inputs many change, while others cannot (Smith 2009). In the short run the producer can stay in business if revenue will at least cover variable costs. However, in the long run, if the fixed costs are not covered (land, equipment, and building) the producer will go out of business (Greaser 1994).

Once the variable and fixed costs have been determined, the total cost can be calculated. The result is formulated by adding the variable and fixed costs. If there was revenue that year, the total cost would be subtracted from the revenue to state a profit or loss.

Vineyard Development

When developing a vineyard, one must understand when a vineyard is actually producing (grapes for sale) and not just incurring cost. When the grapevines are actually producing grapes, it means they are yielding or saleable as wine grapes. According to the MKF report, "yields are a function of the specific vineyard's ability to support a given crop level while maintaining the

highest level of quality." To reach full production, yield usually takes three to four years (Bordelon). Usually a vineyard reaches maturity in the fifth year with a yield level high enough to begin producing income. However, this does not mean the costs from the previous years are paid off. It means that in the current year, there will be grapes for sale, and will possibly make a profit for that current year.

Climate reflects how grapes (berries) will be grown, which, in turns, affects the yield. Temperature and sunshine determine the length of the growing season (MKF 2004: 48). In regions with cool climates and short growing seasons, early-ripening varieties are necessary. On the other hand, hot climates with late-ripening varieties have enough time to achieve full maturation (Jones 2000). Richard Vine asserts the following with regards to climate: "the best site for grapes are those with full sun exposure, mild winter temperatures, freedom from frost, and good soil drainage."

Good soil, like Climate, is important with respect to yield. There are many soils that grape vines inhabit. When considering soil, a grower must consider the root development. Soil conditions favorable to root growth include the following: good aeration, loose texture, moderate fertility, good surface, and internal drainage (Vine 2002). Roots will grow to a depth of ten feet or more in well drained soil. However, if the soil is too saturated, then roots remain within the second foot of soil. If the soil is saturated the nutrients will be leached out; therefore, the importance of soil as a source of mineral nutrients is critical to the effects of ripening, which often results in lower yields (Hardie 1993).

The irrigation system also plays an integral role when setting up a vineyard. Drip irrigation is most commonly used for vines, allowing a low flow rate in which water drips onto the soil (Styles 1999). A drip irrigation system is more controlled; water is being applied to each

individual vine, allowing water to be applied daily or several times a week through the emission device (Styles 1999). This also permits fertilizers to be added to the water, providing a direct application.

When developing a vineyard, a trellis system must also be considered. A trellis system maximizes the leaf area to capture more sun energy and increase productivity (Greenspan 2006). Sunlight exposes the grapes increasing sugar concentrations, which lower levels of malic acid and potassium (Dokoozlian 1999). Additionally, there are many trellis systems available for use such as the High Wire Cordon, Geneva Double Curtain, and Vertical Shoot Positioning. The more common trellis system is the Vertical Shoot Position along the Central Coast. The Vertical Shoot Position trellis system allows rows to be closer together, increasing productivity per acre. The Vertical Shoot Position provides an optimal sunlight environment in grape clusters (Greenspan 2006). The increased sunlight allows for higher sugar concentration and sugar content, which then determines the prime time to harvest.

Finally, the cost of labor must be considered when developing a vineyard. Labor represents about 30% or more of the cost of a vineyard, depending on management skills and quality of the labor pool (Bordelon 2009). It is important to find laborers who are skilled to increase efficiency and minimize labor cost. Also, using skilled labor helps the quality of vineyard. When the time comes to prune or leaf pull, knowing when and how will have a large impact on the development of the vineyard and the quality of the grapes produced.

Chapter 3

METHODOLOGY

The project will determine if it is cost effective to develop and replace the small orchard of Valencia, Satsuma, and navel oranges with a three acre Chardonnay vineyard. The literature review provides an understanding of what must be considered when developing a vineyard. The next step is to determine the costs of establishing a vineyard. This section specifically describes where the information comes from and how it will be used.

Procedure for Data Collection

Several steps must be taken to determine the costs associated with the establishment of a vineyard. Even though the site for the Chardonnay grapes on the Cal Poly Campus has been determined, it is important to understand the soil: soil dictates the rootstock chosen. Soil is one of the most important aspects of wine quality. The first step is to acquire information from the microfilm and map room at the Cal Poly library, which holds all the soils maps for San Luis Obispo County. The information in the library indicates that most of the soils in the coastal production areas are clay loam and clay type soils, which have good water and nutrient holding capacities (Williams). This is beneficial to the quality of grapes that will be produced, and one more reason why the Horticultural Department wants to establish a vineyard: Cal Poly has the ideal climate and soil.

The establishment of a vineyard has four major costs: the plants (vines), labor, drip system, and a trellis system. However, before addressing those major costs, it must be understood that this project has certain pre-determined aspects: vine spacing (8 X 5); varietal (Chardonnay); rootstock (101-14); type of trellis system (Vertical Shoot Position); and the drip

irrigation system. Furthermore, the water source is already in place, and is currently being used for the Valencias. Yet, before one moves forward with the establishment of a vineyard the cost of the plants (vines), labor, drip system, and trellis system still must be figured.

First, the planting costs of the vines must be determined. Mark Welch, Vineyard Manager at Cal Poly, chooses 101-14 rootstock because of the soil type at Cal Poly. To obtain pricing and costs, nurseries must be contacted. Cal Poly has been working with Sunridge Nursery, which is located in Bakersfield, CA. Additionally, Durtate Tree and Vines in Hughson will be contacted to obtain a secondary bid. A competitive bid process will be used. At least two bids will be elicited and the lowest bidder will be awarded the project.

The number of plants per acre must be determined before Sunridge Nursery and Durtate Tree and Vines are called. The vine spacing is 8 X 5, which represents eight rows spaced five feet apart. If the vine spacing is 8 X 5, then multiplying 8 X 5 equals 40, meaning there will one vine planted in every 40 sq ft. There are 43,560 feet in an acre. Take 43,560 sq ft, divide by 40, which equals 1,089 vines per acre. By calling Sunridge Nursery and Durtate Tree and Vines and asking how much it would cost to have 1,089 vines per acre for the three acre vineyard, the cost can be determined.

Once all the plant costs have been determined, then the cost of labor must be determined. Usually, a labor contractor is required (Welch). Cal Poly has been using Mesa Labor Contractor and for the purpose of this project Mesa will be used again. In addition, Mesa has been used not only for planting vines but also installing the trellis system and drip irrigation. This is why Mesa will be used.

The next cost figured is the trellis system. However, setting up a trellis system is not easy; this is why a trellis installation company must be called (Welch). Again, Vertical Shoot

Positioning trellis system (VPS) will be used. The vertical shoot position allows for air flow to pass through the canopy, which helps with disease control (Welch). For a Vertical Shoot Positioning trellis system, the following materials are needed: end posts, anchors, lines, posts (notched), line post (metal), cordon wire, wire to tie end post, catch wire, movable wire, clips, two inch staples, wire strainers, gripples, and crimps (2 per splice).

In the past, Cal Poly has used Vineyard Industry Products, based out of Paso Robles. Vineyard Industry Products will first be called, in addition to Central Valley Builders Supply. Central Valley Builders Supply was found on the Internet by researching different trellis system companies. Central Valley Builders Supply was one of the first found on the Internet that offers trellis systems. Moreover, by calling Vineyard Industry Products and Central Valley Builders Supply, the individual cost of the material is determined, and the one offering the best price will be chosen.

Lastly, the drip irrigation system must be calculated. Drip irrigation is commonly used for grapes, because it is an efficient use of water that applies water directly to each vine. The materials needed for drip irrigation consist of the following: a main pipe line; secondary pipe line; irrigation wire; irrigation tubing; plastic or metal hangers; clips; clamps; emitters; flush valves; air vents; drains; backflow and pressure regulation valve; and in-line fertilization system. Setting up an irrigation system can not be done without professional help (Welch). Cal West Rain has worked with Cal Poly before, but Cal-Coast Irrigation will also be called to compare the costs. Cal-Coast Irrigation was also discovered on the Internet when looking for different drip irrigation companies. Again they were chosen based upon being located in Santa Maria.

Overall, setting up a vineyard is costly and poses many unexpected costs. While the project has been focusing on the four major costs (plants, labor, trellis system, and drip irrigation

system), there are other costs: fertilizer, pest control, weed control, and equipment. To obtain these other costs, Mark Welch will supply past budgets that include the other costs. With the information provided by Welch and by figuring out the four major costs, and placing these costs into in an Enterprise Budget, the project can then be implemented.

Once all the individual costs (trellis system and drip system) have been figured, they are input into an Excel spreadsheet in the format of the Enterprise Budget. Each cost is then broken down into a variable or fixed cost. Variable costs are as follows: plant, fertilizers, pesticides, fuel, and labor. Fixed costs consist of the following: machinery depreciation, machinery interest, and land charge. Variable and fixed costs vary according to each enterprise. Lastly, by adding up the variable and fixed costs, the total cost is calculated. Appendix A illustrates how the Enterprise Budget is constructed.

The top of the Enterprise page in Excel shows "item," "unit," "quantity," and "price," with the amounts listed horizontally. Then the item category must be broken down (presented vertically) by starting with revenue[1], in this case zero. The next item is variable cost, which has sub categories: plant, for which the unit is vines; quantity, being how many plants are needed; and the price of the plant followed by the amount (quantity multiplied by price) which states the cost. The cost of the vines also is determined from the calls made to Sunridge Nursery and Durtate Tree and Vines.

Labor costs must be also factored in. This is why under the plant item labor (labor: plant) must also be included, represented in hours (hr). The cost of labor will be determined from calling Mesa Labor Contractor.

[1] It should be noted that each item that will be presented is an individual sub category such as plant and labor: plant (cost of labor for planting). These individual sub categories have been demonstrated in the Enterprise Budget.

The next sub category is fertilizer. Fertilizer is presented in the same way as plants with unit, which will be in pounds (lbs), followed by quantity and price, which results in the amount. The next item under fertilizer is weed control, which is broken down by hours as the units, which results in total hours worked for weeding as the quantity. Next, price multiplied by quantity will provide the total amount. After weed control is pest control, which handles the possible diseases associated with a vineyard, such as phylloxera and powdery mildew. Pest control is classified by hours as the unit, and quantity is total hours worked. Fertilizer, weed control, and pest control prices will come from the budget provided by Mark Welch.

Next is the drip irrigation installation; this is broken down into each item that represents a part of the drip irrigation system. There, drip installment is the main item. Then, under drip installation will be main pipe line, secondary pipe line, and irrigation wire. These particular items are in units of feet (ft). The quantity represents how many feet are needed followed by the price. The rate, determined by calling Cal West Rain and Cal-Coast Irrigation, yields the total amount. All the prices will be from Cal West Rain and Cal-Coast Irrigation.

The next items to follow will be presented in acres as units: irrigation tubing; plastic or metal hangers; clips; clamps; emitters; flush valves; air vents; drains; backflow and pressure regulating valves; and in-line fertilization system. In addition, since this project is based on three acres, the quantity is three. The price will then be listed, followed by total amount (quantity multiplied by price).

The next line under the drip irrigation installment is the trellis system installation cost. Trellis systems are divided into all the parts needed for the trellis system. They are as follows: cordon wire; wire to tie end posts; catch wire; moveable wire; and irrigation tubing. These items are presented in units of feet (ft). The quantity is how many feet are needed for each item

followed by the price. The prices are concluded from Vineyard Industry Products or Central Valley Builders Supply. After this the total amount can be calculated.

The next items for the drip irrigation will use a different unit, acres. The quantity is three, which is based on the total three acres for installing the drip system. The items will consist of the following: plastic or metal hangers; clips; clamps; emitters; flush valves; air vents; drains; backflow and pressure regulation valve; and in-line fertilization system. The price is derived from the estimate by Vineyard Industry Products or Central Valley Builders Supply. Once a price for each unit is found, the total amount can then be figured.

Lastly, the fixed cost must be calculated. However, there is one more item: equipment. Equipment is presented with acre as the unit and three as the quantity followed by price. The price comes from a past budget provided by from Mark Welch. Once the price has been determined, the total amount is found. Also, under the fixed cost section, it is advised to leave two extra lines, in case of incurring another cost that was not anticipated.

Procedures for Data Analysis

The total is calculated once the information from planting, labor, drip irrigation installment, and trellis installment has been entered into the Enterprise Budget. Granted, there will be two sets of bids per cost, but the lowest bids for each cost will be selected. By taking the variable costs and the fixed costs and adding them together, the total cost will be found. If the total costs are below $54,000 dollars, the project is worth pursuing.

Assumptions

A few assumptions are utilized within this project. First, the water source is supplied by Cal Poly, and the costs are independent from this project. Secondly, the costs provided as specified by Mark Welch for the pest control, weed control, and equipment are based on actual

and accurate numbers. Also, the cost found for the four major costs (plants, labor, drip system, and trellis system) are accurate and current numbers. Thirdly, site preparation for the land is assumed. Lastly, opportunity costs have been thought about, such that there are not other opportunity costs. The Valencia's, which are currently planted, do not raise money for Cal Poly. This is one reason to plant to three acre Chardonnay vineyard; it will raise money.

Limitations

This project does have limitations. Since this pertains to the Cal Poly vineyard, there are specific requirements for this particular vineyard. For instance, this project is only dealing with Chardonnay from a specific rootstock, as well as vine spacing and the trellis system. Also, this vineyard setup was designed for three acres and not as a larger commercial development. Finally, the costs have been calculated using San Luis Obispo development costs, which are different from costs in other states, such as labor.

Chapter 4

DEVELOPMENT OF THE STUDY

Date Collection Problems

This project is comprehensive. Trying to call suppliers for plantings (vines), labor cost, trellis systems, and drip irrigation systems was difficult. Having thought of every material needed for each cost was not enough. When speaking with suppliers, the information for each cost was not sufficient in and of itself. More specific information about the vineyard was needed. For instance, calling Vineyard Products about the trellising was complicated. The initial materials list was not adequate. After speaking with Lee, the representative of Vineyard Products, it became evident that more specific information was needed before an accurate quote could be given. For example, more information about height of the posts, the thickness of wires, the height of wires, and so forth was needed to conclude the bid. The discussion that ensued over the materials led to the change of some of the materials for the trellis system. When speaking with Lee he thought it would be best to use steel end posts because they last longer and then there would be no need for anchors. However, steel posts are more expensive than other posts such as wood. Consequently, additional materials beyond what was on the original Enterprises Budget in Appendix A will be needed.

The information that was shown in Appendix A had to be simplified more for the irrigation costs. For instance, the irrigation from Cal West Rain and Cal-Coast Irrigation was broken down by every piece of materials needed. See Appendices E and F. Appendix E is a materials list that came from a previous bid obtained from Mark Welch. When Cal West Rain was contacted, the representative sent a bid that was created in March for a seven acre

development Mark Welch was working on. The representative stated those would be the materials used for the three acre expansion. Total cost was calculated using simple division, taking the cost for the seven acres and dividing it by seven, yielding the per acre cost, which then is multiplied by three to come up with the total cost for the three acres.

Analysis

After contacting all suppliers, the information was then entered into an Excel spreadsheet. The results were distributed into two different Excel spreadsheets: one for the lower costs, which is shown in Appendix B and one with higher costs shown in Appendix C. The suppliers for the low bid were: Sunridge Nursery, Central Valley Builders Supply, and Cal-Coast irrigation. The high bid suppliers were: Durtate Tree and Vine, Vineyard Products, and Cal West Rain. The low bid spreadsheet for total cost for vines, labor, fertilizers, pest control, weed control, trellis system, drip system, and equipment totaled $36,733.50. The high bid resulted in a total cost of $42,691.14. Sunridge Nursery donated 1,100 plants totaling a cost savings of $3,685, resulting in the lowest bid amongst all suppliers.

There was a sensitivity analysis applied to all bids, see Appendix D. The reason for this would be to see what would happen if costs were to increase by ten or twenty percent, to make sure it would be within the budget. For the low bid a ten percent increase would result with a total cost of $40,406.80. A twenty percent increase would result with a total cost of $44,080.20, which is still well within the budget of the $54,000. However, with the 20 percent increase, the lower bid costs are now higher than the high bid by $3,673.40. Additionally, the high end bid, with a ten percent increase resulted in $ 46,960.24 and twenty percent increase resulted in $51,229.37. However, with the 20 percent increase, the lower bid costs are now higher than the high bid by $3,673.40. At that point, it becomes a numbers game.

When considering this project, there is one last variable that should be taken into account. While the lower bid is the bid Cal Poly should probably go with, the reputations of the various suppliers also needs to be considered. If the supplier provides his goods and services on time but maybe costs a little more, it may be worth using the higher bid to save on aggravation and missed deadlines. The suppliers reputations should also be taken into account. What at first, seems less costly could cost more in the end if the deliveries are not made on time, or the orders are filled incorrectly with the wrong items, or the orders are partially filled and Cal Poly will have to wait for the rest of the items at some date in the future. Delays or unprofessional conduct by suppliers can result in increased costs to the project.

Chapter 5

SUMMARY

Establishing a vineyard is a difficult task. The first step of this project was determining the major costs of establishing a vineyard, which are vines, labor, trellising, and drip systems. Then the materials needed for each cost was determined. Once the materials were determined they were entered in an Excel spreadsheet. Next, the suppliers, which were two per major cost with the exception of labor, were called to figure the exact cost. Meaning that there are two Excel spreadsheets; one for the low bids and one for the high bids.

The total cost was then calculated by adding up all the costs. The lower end cost was $36,733.50. The higher end total cost was $42,691.14.

CONCLUSION

To conclude, both the lower end and higher end costs are still within the budget of $54,000. This means Cal Poly can expand their vineyard by adding the three acres of Chardonnay. Even with a twenty percent increase bringing the total to $44,080.20 it would still within the budget.

RECOMMENDATION

Given the following information gathered, the feasibility of developing a three acre vineyard should be carried forward.

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Appendix A
Bid Template for Enterprise Spreadsheet

Item	Unit	Year Zero Quantity	Price	Amount
Revenue				
Variable cost:				
Plants	Vines			
Labor: plants	hr			
Fertilizers	lb			
Pest control	hr			
Weed control	hr			
Trellis installment:				
Lines	ft			
Cordon wire	ft			
Wire to tie end post	ft			
Catch wire	ft			
Moveable wire	ft			
End posts	acre			
Anchors	acre			
Posts (notched)	acre			
Line post (metal)	acre			
Clips 2 inch staples	acre			
Wire strainers	acre			
Gripples	acre			
Crimps	acre			
Drip Irrigation installment				
Main pipe line	ft			
Secondary pipe line	ft			
Irrigation wire	ft			
Irrigation tubing	ft			
Plastic or metal hangers	acre			
Clips	acre			
Clamps	acre			
Emitters	acre			
Flush valves	acre			
Air Vents	acre			
Drains	acre			
Backflow and pressure regulating valves	acre			
In-line fertigation system	acre			
Fixed cost				
Equipment	acre			

Appendix B
Low End Bid

Item	Unit	Year Zero Quantity	Price	Amount
Variable cost:				
Plants Sunridge Nursery* Donated 1,100 vines	Vines/ 2 acre	2167	$3.35	$7259.45
Labor- Mesa	acre	3	3000	9000
*Fertilizers	acre	3	208	625
*Pest control	acre	3	45	135
*Weed control	acre	3	180	540
Trellis installment: Central Valley Builders Supply				
Cordon wire	ft	5445	0.02	108.9
Wire to tie end post	ft	247	0.02	4.94
Catch wire	ft	5445	0.02	108.9
Moveable wire	ft	38280	0.02	765.6
End posts- wood	each	363	13.5	4900.5
Anchors	each	363	6.5	2359.5
Posts (notched)	each	227	4.5	1021.5
Line post (metal)	each	454	4.5	2043
Clips 2 inch staples	each	1300	0.02	26
Gripples	each	136	1.05	142.8
Crimps	each	100	0.19	19
Drip Irrigation installment -Cal Coast Irrigation	acre	3	2490.79	7472.38
Fixed cost				
*Equipment	acre	3	67	201
Total Cost				36733.5
Per Acre				12244.5

*Fertilizers, pest control, weed control, and equipment should be noted such that are not a major cost, but should be considers in the process. They typically are not part of the establishment costs.

Appendix C
High End Bid

Year Zero

Item	Unit	Quantity	Price	Amount
Variable cost:				
Plants-Durtate tree and vine	Vines/ 3 acre	3267	$3.30	$10,781.10
Labor: all Mesa	acre	3	3,000.00	9,000.00
Fertilizers	acre	3	208.00	625.00
Pest control	acre	3	45.00	135.00
Weed control	acre	3	180.00	540.00
Trellis installment: Vineyard Products				
#1000 foot roles 1/2 in 14 gauge	ft	3	60.00	180.00
Cordon wire-fruit 100 foot wire 12guage	ft	5	60.00	300.00
Pencil wire	ft	2200	0.30	660.00
End post-9 foot pipe notch stake	each	360	20.50	7,380.00
Line post (metal) hwy post	each	1089	4.75	5,172.75
Clips 2 inch staples	each	4400	0.03	132.00
Gripples	each	400	0.20	80.00
Drip Irrigation installment- Cal West Rain		3	2,501.43	7,504.29
Fixed cost				
Equipment	acre	3	67.00	201.00
Total Cost				42,691.14

Appendix D

Sensitivity Analysis

Total cost of low end bid	$	36,733.50
10 % increase	$	40,406.85
20 % increase	$	44,080.20
Total cost of high end bid	$	42,691.14
10 % increase	$	46,960.25
20 % increase	$	51,229.37

Appendix E

JOB DESC: Cal Poly - 7 Ac. Vyd Delv, March 2009

DATE: 3/4/09 ENTERED BY: WBB

MATERIAL DESCRIPTION		TOTAL	UNIT
ABOVE GROUND			
.620" x .710" Blank Tubing	42000	*42000*	/M Ft.
Hose Coupler (PSI 31-HC600)	50	*50*	Each
Hose Hanger (PSI 31-A18H)	18000	*18000*	Each
Figure 8 (Aquarius 700-AP8)	250	*250*	Each
		0	
1/2 gph Emitter (Netafim WPC-02)	10000	*10000*	Each
Hole Punch	5	*5*	Each
		0	
MANIFOLD DRIP RISERS		*0*	
Swivel Tee (PSI 31-HT66S)	130	*130*	Each
3/4" Ball Valve, HT (PSI 31-VHT75)	130	*130*	Each
1/2" Male Hose Adapter, HT (Aquarius 1/2-MHA)	130	*130*	Each
1/2" Flex PVC (Aquarius 1/2-IPS-200)	600	*600*	Each
		0	
MANIFOLD		*0*	
1 1/4" CL200 PVC Pipe, SW	1100	*1100*	/ Ft
1 1/4" x 1/2" Slip Red Tee, S40 (Spears D401-166)	130	*130*	Each
1 1/4" 90 deg Slip Ell, S40 (Spears 406-012)	10	*10*	Each
		0	
MANIFOLD FLUSH OUT		*0*	
1 1/4" Sch40 PVC Pipe, SW	20	*20*	/ Ft
1 1/4" x 1" Slip Red Tee, S40 (Spears 401-168)	4	*4*	Each
1 1/4" Spig x 1" FIPT Bushing, S40 (Spears 438-168)	4	*4*	Each
1" Vent, Non-Cont. (Netafim 61ARIA100)	4	*4*	Each
1" Threaded Ball Valve, Utility (Spears 2621-010)	4	*4*	Each
		0	
MANIFOLD HYDRAULIC VALVES		*0*	
2" Sch40 PVC Pipe, SW	40	*40*	/ Ft
2" x 1" Slip Red Tee, S40 (Spears 401-249)	8	*8*	Each
2" Spig x 1" FIPT Bushing, S40 (Spears 438-249)	8	*8*	Each
1" Vent, Non- Cont. (Netafim 65ARIA100)	4	*4*	Each
1" Vent, Combo (Netafim 65ARIB1)	4	*4*	Each
1" TOE Nipple, S80 (Spears 1884-030)	8	*8*	Each
1" Dorot Valve (Netafim 61-PR1B-LP-G)	4	*4*	Each
2" 90 deg Slip Ell, S40 (Spears 406-020)	4	*4*	Each
2" x 1 1/4" Slip Red Bushing, S40 (Spears 437-250)	4	*4*	Each
		0	
2" TOE Nipple, S80 (Spears 1887-040)	4	*4*	Each
2" Thrd Ball Valve, Utility (Spears 2621-020)	4	*4*	Each
2" Male Adapter, S40 (Spears 436-020)	4	*4*	Each

PG1 TOTAL:

SUBTOTAL:

TTL MAT COST:

Contact Name:

Phone #:

Appendix E

MATERIAL DESCRIPTION	P.L. QTY.	TOTAL	UNIT
SUB MAIN ASSEMBLY "A"			
4" x 3" Slip Red Tee, S40 (Spears 401-422)	1	1	Each
3" x 2" Slip Red Tee, S40 (Spears 401-338)	1	1	Each
4" Telescoping Coupler (Spears 917-40)	1	1	Each
2" 90 deg Slip Ell, S40 (Spears 406-020)	2	2	Each
		0	
SUB MAIN ASSEMBLY "B"		0	
4" Slip Tee, S40 (Spears 401-040)	1	1	Each
4" x 3" Slip Red Tee, S40 (Spears 401-422)	1	1	Each
3" Slip Tee, S40 (Spears 401-030)	1	1	Each
4" Telescoping Coupler (Spears 0117-40)	1	1	Each
4" x 3" Slip Red Bushing, S40 (Spears 437-422)	1	1	Each
3" x 2" Slip Red Bushing, S40 (Spears 437-338)	1	1	Each
2" 90 deg Slip Ell, S40 (Spears 406-020)	2	2	Each
		0	
SUB MAIN ASSEMBLY "C"		0	
4" Slip Tee, S40 (Spears 401-040)	1	1	Each
4" Telescoping Coupler (Spears 0117-40)	1	1	Each
4" x 2" Slip Red Tee, S40 (Spears 401-420)	1	1	Each
2" 90 deg Slip Ell, S40 (Spears 406-020)	2	2	Each
4" x 3" Slip Red Bushing, S40 (Spears 437-422)	1	1	Each
		0	
SUB MAIN ASSEMBLY "D"		0	
3" x 2" Slip Red Tee, S40 (Spears 401-338)	2	2	Each
2" 90 deg Slip Ell, S40 (Spears 406-020)	2	2	Each
		0	
MISC INSTALLATION EQUIPMENT		0	
Glue 2717 - Gallon	2	2	Each
Glue 2717 - Quart	2	2	Each
Glue 2795 - Quart	1	1	Each
Primer P-70 - Gallon	1	1	Each
Primer P-70 - Quart	2	2	Each
Empty Can - Gallon	1	1	Each
Swab - Gallon	2	2	Each
Teflon Paste - Quart	1	1	Each
Teflon Tape - 3/4"	2	2	Each
Hose Cutter	1	1	Each
Saw, Small	2	2	Each
		0	
		0	
			PG2 TOTAL:

Appendix E

MATERIAL DESCRIPTION		P.L. QTY.	TOTAL	UNIT
SPRINKLER RISER				
Weather Tec 10-10 Wedge Dr. Spk w/ 1.8 FCN	225		225	Each
1/2" Deep Female Adapter, S40 (Spears D435-005)	225		225	Each
1/2" Sch40 PVC Pipe, SW	1500		1500	/ Ft
1/2" Deep Slip Coupler, S40 (Spears 429-005D)	225		225	Each
1/2" Flex PVC	800		800	Each
1 1/2" x 1/2" Deep Slip Red Tee, S40 (Spears D401-209)	225		225	Each
			0	
SPRINKLER LATERAL FLUSH OUT			0	
1 1/2" 45 deg Slip Ell, S40 (Spears 417-015)	46		46	Each
1 1/2" Male Adapter, S40 (Spears 436-015)	23		23	Each
1 1/2" Thrd Cap, S40 (Spears 448-015)	23		23	Each
SPRINKLER LATERAL			0	
1 1/2" CL200 PVC Pipe, SW	8300		8300	/ Ft
SPRINKLER LATERAL VALVE			0	
2" Sch40 PVC Pipe, SW	240		240	/ Ft
2" Slip x Spig 90 deg Ell, S40 (Spears 409-020)	46		46	Each
2" Slip Ball Valve (PSI 32-401-020S)	23		23	Each
2" 90 deg Slip Ell, S40 (Spears 406-020)	23		23	Each
2" Slip Tee, S40 (Spears 401-020)	15		15	Each
2" 90 deg Slip Ell, S40 (Spears 406-020)	15		15	Each
2" x 1 1/2" Slip Red Bushing, S40 (Spears 437-251)	30		30	Each
SPRINKLER SUB MAIN PIPE			0	
3" CL125 PVC Pipe, SW	1000		1000	/ Ft
2" CL125 PVC Pipe, SW	700		700	/ Ft
SPRINKLER SUB MAIN FITTINGS			0	
3" x 2" Slip Red Bushing, S40 (Spears 437-338)	4		4	Each
3" x 2" Slip Red Tee, S40 (Spears 401-338)	12		12	Each
2" Slip Tee, S40 (Spears 401-020)	11		11	Each
SPRINKLER SUB MAIN FLUSH OUT			0	
2" Sch40 PVC Pipe, SW	20		20	/ Ft
2" 90 deg Slip Ell, S40 (Spears 406-020)	4		4	Each
2" x 1 1/2" Slip Red Tee, S40 (Spears 401-251)	4		4	Each
2" TOE Nipple, S80 (Spears 1887-040)	4		4	Each
2" Vent, Non-Cont (Netafim 65ARIA2)	4		4	Each
1 1/2" TOE Nipple, S80 (Spears 1886-030)	4		4	Each
1 1/2" Thrd Ball Valve (PSI 32-401-015T)	4		4	Each
SPRINKLER SUB MAIN ISO VALVE			0	
3" Male Adapter, S40 (Spears 436-030)	8		8	Each
3" Gate Valve, Brass	4		4	Each
6" Pipe Sleeve	10		10	Each
6" Slip Cap, S40 (Spears 447-060)	4		4	Each
			0	
				PG3 TOTAL:

Appendix E

MATERIAL DESCRIPTION		P.L. QTY.	TOTAL	UNIT
MAIN LINE				
3" Sch40 PVC Pipe, SW	500		500	/ Ft
			0	
MAIN LINE FLUSH OUT			0	
2" Slip Tee, S40 (Spears 401-020)	1		1	Each
2" TOE Nipple, S80 (Spears 1887-040)	2		2	Each
2" Vent, Non-Cont. (Netafim 65ARIA2)	1		1	Each
2" Thrd Ball Valve (PSI 32-401-020T)	1		1	Each
			0	
			0	
INSTALLATION EQUIPMENT			0	
Glue 2717 - Gallon	3		3	Each
Glue 2717 - Quart	2		2	Each
Glue 2795 - Quart	2		2	Each
Primer P-70 - Gallon	2		2	Each
Primer P-70 - Quart	1		1	Each
Empty Can - Gallon	1		1	Each
Swab - Gallon	2		2	Each
Teflon Paste - Quart	1		1	Each
Teflon Tape - 3/4"	2		2	Each
Hose Cutter	1		1	Each
Saw, Small	2		2	Each
			0	
Wire Ties	500		500	Each
			0	
			0	
			0	
			0	
			0	
			0	
			0	
			0	
			0	
			0	
			0	
			0	
			0	
			0	
				PG4 TOTAL:

Appendix F

Cal-Coast Irrigation, Inc.

Cal-Coast

Cal-Coast Irrigation, Inc.

Cal-Coast Irrigation, Inc.
1480 W. Stowell Road
Santa Maria, CA 93458
Ph: 805/922-8406 Fax: 805/739-1100

Sales Quote

Page # 1

Quote # 119305

Customer: 1
Start Date/Time: 10/15/09 5:00 PM
Delivery Type: N/A
Salesperson: Santa Maria

Customer: (1)	**Requester:** (1)	
SANTA MARIA CASH SALES	CAL POLY	
, CA	CA	
Phone: Fax:	Phone: Fax:	

PO Number: 3 AC VINEYARD

Qty	Description	Tax	Unit Cost	Extended
400	2 SCH 40 SW PVC PIPE	Y	0.65	260.00
6	2 S 90 ELBOW	Y	2.26	13.56
2	2 MA	Y	1.45	2.90
1	2 PRESS RELIEF VALVE	Y	102.00	102.00
2	2 S PVC BALL VALVE	Y	8.24	16.48
4	2 S TEE	Y	2.80	11.20
3	2 FA	Y	1.49	4.47
2	2 GUARDIAN AIRVENT	Y	30.87	61.74
2	2 C/A AIRVENT NETAFIM POLY	Y	110.25	220.50
47	2 X 1/2 S TEE	Y	2.99	140.53
47	1/2 X 48 IPS HOSE	Y	2.29	107.63
47	M64P 3/4 MHT X 1/2 SLIP	Y	0.95	44.65
47	710 CST 3/4 FHT X 1/2 TEE	Y	1.00	47.00
3300	1 GPH NETAFIM WPC EMITER	Y	0.22	726.00
17	1/2 X 1000' POLY TUBING	Y	72.00	1224.00
7000	K CURL 3" (1/2" TUBING)	Y	0.04	280.00
20	710 CC 1/2 DRIP COUPLER	Y	0.49	9.80
1	4 X 2 S TEE	Y	21.89	21.89
1	4 SLIP FIX	Y	38.27	38.27
20	4 CLASS 200 SW PVC PIPE	Y	1.79	35.80
400	3 CLASS 200 SW PVC PIPE	Y	1.07	428.00
3200	1 1/4 CLASS 200 SW PVC PIPE	Y	0.24	768.00
1	4 BR BALL VALVE #752	Y	222.46	222.46
2	4 MA	Y	8.00	16.00
2	4 S TEE	Y	21.89	43.78
1	4 X 2 ST BUSHING	Y	8.93	8.93
5	4 S 90 ELBOW	Y	14.75	73.75
1	4 S TEE	Y	21.89	21.89
2	4 X 3 S BUSHING	Y	8.94	17.88
9	3 X 1 1/4 S TEE	Y	13.16	118.44
2	3 S 90 ELBOW	Y	8.24	16.48
2	3 ST 90 ELBOW	Y	17.94	35.88
2	3 X 3 NIPPLE S80	Y	8.54	17.08

Appendix F

Cal-Coast Irrigation, Inc.

Cal-Coast

Cal-Coast Irrigation, Inc.

Cal-Coast Irrigation, Inc.
1480 W. Stowell Road
Santa Maria, CA 93458
Ph: 805/922-8406 Fax: 805/739-1100

Sales Quote

Quote # 119305

Customer: 1
Start Date/Time: 10/15/09 5:00 PM
Delivery Type: N/A
Salesperson: Santa Maria

Customer: (1)	**Requester:** (1)
SANTA MARIA CASH SALES	CAL POLY
, CA	CA
Phone: Fax:	Phone: Fax:

Qty	Description	Tax	Unit Cost	Extended
2	3 BR GATE VALVE	Y	84.09	168.18
18	1 1/4 S 45 DEG ELBOW	Y	1.61	28.98
18	1 1/4 MA	Y	0.82	14.76
18	1 1/4 T CAP	Y	1.49	26.82
81	1 1/4 X 1 S TEE	Y	1.73	140.13
81	1/2 X 24 IPS HOSE	Y	1.14	92.34
81	1/2 S COUPLER DEEP SOCKET	Y	0.49	39.69
81	1/2 X 72 SCH 40 RISER	Y	1.25	101.25
81	1/2 FA DEEP SOCKET	Y	0.61	49.41
81	NELSON R2000 SPRINKLER W/2.0 FCN	Y	10.50	850.50
162	6 WIRE TIE 18 GA EACH	Y	0.02	3.24
2	GAL 2711 GLUE	Y	64.80	129.60
1	GAL P70 PRIMER	Y	50.59	50.59
1	QT 2795 GLUE	Y	18.67	18.67
			Taxable Charges	6871.15
			Nontaxable Charges	0.00
		Tax (8.75%)		601.23
Contract Identifier			Total	7472.38

Accepted By_____ Date_____

Thank you for this opportunity to quote your irrigation needs._____