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## Systematic layout plan for Baystate Benefit Services

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# **Systematic Layout Plan for Baystate Benefit Services**

**MIM U701 - 702**

**Technical Design Report**

**Systematic Layout Plan for Baystate Benefit  
Services**

**Final Report**

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**April 17, 2007**

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# **Systematic Layout Plan for Baystate Benefit Services**

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## **Abstract**

The problems facing a small and growing business are often self-inflicted. Lack of attention paid to facility planning and work flow design, as the company grows, is common. Baystate Benefit Services is such a company. Baystate began in 1993 as a two person operation and has grown to become one of the regions largest insurance brokerages.

As they became more successful, and the business grew, Baystate needed to add to their work force to accommodate the increase in business. The expansion happened in a piecemeal way, with no regard to work flow and location of resources. This project focuses on identifying the underlying causes of inefficiency; which, as seen by the company, are a lack of space for storage as well as necessary resources not being located near the primary user.

Systematic Layout Planning is employed to identify the work/information flow through the office. Using this information, design alternatives were created and a final design decided upon that will increase the productivity of the office in terms of claims processed by three and a half percent with the ability to bring on four new clients without other changes.

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Thanks to all of the employees of Baystate Benefit Services for their help and generosity. Without their help, we would not have been able to finish this project in the truncated time period we had.

## **COPYRIGHT**

“We the team members,

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# CHAPTER 1 Introduction

## 1. COMPANY BACKGROUND

Baystate Benefit Services (Baystate) is an employee benefit brokerage that was founded in 1993 with two employees. Over the past 14 years, Baystate has grown to become one of the regions best brokerages. The product that Baystate offers its' clients has two facets; a front end and a back end. The front end entails working with the client to determine their needs as far as offering employee benefits (medical, dental, etc.) and negotiating with the insurance carriers to provide these to the clients at the best price possible. Once these benefits have been set up, Baystate's focus shifts to the back end of their product and focuses on providing services to help the client in the administration of their benefit products. There are three main services that Baystate provides.

### *1.1 COBRA Services*

The Consolidated Omnibus Budget Reconciliation Act (COBRA) provides a mechanism by which employees that are benefit eligible within a company may maintain their benefits upon the loss of coverage. The loss of coverage usually occurs when an employee is terminated by their employer or through a reduction in hours worked per week. When the employee loses coverage, they must be notified of their change in status and be allowed to continue their coverage for a period of time by paying the premiums directly.

Baystate's service entails informing the clients' employees of their change in status and eligibility for COBRA coverage and then receiving the payments of the premiums and remitting them to the insurance carriers. They accomplish this by keeping the information of their clients' employees in their data management system and changing their status in the system when notified by the clients. Baystate's clients may also change the status of their employees online and Baystate is then notified of this through their data management system.

Once Baystate is notified of the employees COBRA eligibility, they send the employee the letter notifying them of their rights and which lines of coverage they may continue. Once they receive the letter back from the employee either electing to continue coverage or not to. Baystate then changes the employee's status in the system accordingly and, if coverage is elected, sends the employee a payment coupon book informing the employee of their payment requirements. When the employee sends their payment in, Baystate processes the payment through their data management system and deposits the payment into their dedicated bank account. Once a month, Baystate pays the various insurance providers the premiums collected from COBRA participants.

## ***1.2 FSA Services***

The second service that Baystate provides is the administration of Flexible Spending Accounts (FSA). FSAs are a means for client's employees to set aside pre-tax dollars from their paychecks to pay for predictable expenses for the year. These expenses include co-payments for medical office visits, prescriptions and eye glasses among many other things.

The FSA administration is negotiated with the clients while discussing their benefit options. When Baystate becomes the brokerage for a client, they hold an open enrollment for the employees where they decide what benefits to elect. At this time, employees are also able to sign up for an FSA and designate the amount of money they would like to set aside. This money is then deducted from their paycheck in equal amounts throughout the year.

Once an employee elects to create an FSA, their election form is sent to Baystate where an account is created for them in Baystate's data management system. The employees are then sent notices by Baystate notifying them of the amount of money they have remaining in their account. These notices are sent out twice a year unless an arrangement has been made with the client.

During the year, when the clients' employees purchase items that are FSA eligible, claims are then sent to Baystate. These claims arrive at the office either through the mail or via fax. They are then processed by the office and verified to check whether all items claimed are FSA eligible. They then check if the employee that submitted the claim has enough remaining funds in their account to pay for the claim. If both of these checks are positive, Baystate debits the total amount of the claim from the employees account and sends a reimbursement check to the employee. They maintain a record of the amount of money paid to each client's employees and bill the client monthly for the funds.

## ***1.3 Customer Service Requests***

Baystate fields calls with questions on both of their services, COBRA and FSA. They also answer questions that client's employees have regarding the benefits that the employer has set up for them. These calls come in either through email or over the phone.

## ***1.4 Employees***

Baystate has 12 employees working out of their office. Their job titles are: Broker, Office Manager, Account Manager, Administrative Assistant, Client Prospector, Client Materials Coordinator, COBRA Administrator, COBRA Claims Processor, FSA Administrator, FSA Claims Processor, Website Maintenance Coordinator and Customer Service Coordinator.

Four of the employees – the Broker, Account Manager, Administrative Assistant and Client Prospector – work on the front end processes. The Client Prospector sets appointments with possible new clients for the

Broker and Account Manager. The Administrative Assistant keeps the Broker's schedule and makes sure that he has all the materials that are needed for his meetings. The Client Materials Coordinator also helps with the front end by preparing marketing materials for the Broker's meetings. This employee, however, splits her time on some of the back end service products, specifically FSA claims processing.

The Office Manager oversees the efforts of all office employees throughout the day and provides a resource for them to go to with questions. In addition, she also handles customer service requests when the Customer Service Coordinator is either busy or unable to answer the question. The Customer Service Coordinator processes FSA claims when she has spare time in between service requests. The FSA Administrator handles the set up of new clients into the data management system's FSA module and serves as a liaison answering questions that the client may have regarding particular services. She also manages the sending of regular account updates. The FSA Claims Processor's sole function is to process FSA claims as they come in to the office. The Website Maintenance Coordinator sets up benefit information websites which clients use as a means of communicating benefits to their employees. When she does not have websites to work on, she processes FSA claims. The COBRA Administrator sets up new clients in the data management system's COBRA module and helps to teach the clients how to interact with the system to process qualifying employees. The COBRA Claims Processor sends eligible employees their payment coupon booklets and processes the payments that come in to the office. When she is not doing this, she is processing FSA claims.

The only full time employees at the office are the Broker, Office Manager, Account Manager, COBRA Administrator and FSA Administrator. All others are part time mostly working 19.5 hours per week.

## **2. PROBLEM STATEMENT**

### ***2.1 Work and Information Flow***

As Baystate grew into a successful company and more employees were required to handle the work load generated by the growing client list, they were brought on and cross-trained to perform various functions in the office. As the need for more floor space arose, more office space was rented in the building Baystate occupies and the new employees were moved in. They were put into offices in the order they arrived in with no regard to the job function they were being hired for. As a result, employees that perform similar functions, all the FSA claims processors for example, did not sit near each other. This created the need for employees to travel up and down the office to retrieve claims to process and to file completed claims.

Time was also spent going to one another to ask questions when a problem arose processing a claim that the employee was unsure how to handle. This problem is not unique to FSA processing, the same happens for Broker Support and COBRA processing. Identifying the work and information flow through Baystate was a necessary step in developing design layouts that provided maximum visibility and efficient execution of tasks.

In order to determine the work flows through Baystate, four main questions were asked:

1. What are the types of work that come in?
  - a. What are their characteristics?
2. Where is this work coming from?
  - a. Where is it delivered upon completion?
  - b. Where is it stored after processing?
  - c. Where can tasks be eliminated, combined, and simplified so as to reduce time spent on these tasks?
3. Where are the supplies needed?
4. How are the supplies being moved and stored?
  - a. How *should* they be moved and stored?
  - b. How big a supply inventory should be kept (both on an individual and organizational level)?[1]

Once these questions were answered, it became apparent how the departments should be set up, the size of each, and the resources that were required to be located in/near each department.

## ***2.2 Storage Concerns***

The main storage concern for Baystate was created by the requirements for them to maintain their FSA claims and COBRA records. Federal regulations stipulate that FSA records be kept for ten years and COBRA records for seven years and that these records are kept secure. To accomplish this, Baystate designated one of their offices downstairs from their main hallway to serve as file storage.

This room was never kept orderly and, as a result, no longer has the space required for Baystate to store the most recent years' records. An image of the initial state of the storage room is shown below in Figure1.



**Figure 1 – Initial State of Storage Room**

Due to the lack of new storage room, Baystate started to keep their 2006 files in the main hallway upstairs and in offices. This overflow of boxes intruded on the available space for employees to move about in their offices. An example of the storage of files in Baystate's offices is shown in Figure 2.



**Figure 2 – Example of Files Being Stored in Offices**

The secondary storage problem that Baystate faces is in their supply storage room. Again, this room was never set up functionally and appears to be at capacity. As a result, supplies are stored throughout the office wherever room was available. Figure 3 shows the initial state of the storage room at Baystate. Figure 4 shows the storage of supplies such as printer toner in the hallway of the office.



**Figure 3 - Initial State of Storage Room at Baystate**



**Figure 4 - Storage of Office Supplies in the Main Office**

These issues were resolved by analyzing the spatial utilization of the office and making improvements. This was not an easy task as many factors needed to be considered. Among these were the requirements for storing materials, equipment, and personnel. A layout was developed that “will maximize space utilization as well as the level of service provided.” [2]

### **3. GOALS & OBJECTIVES**

The objectives of this project were to improve the flow of information and work through Baystate, identify current office capacity for each process and identify ways of improving, address the growing storage problem and free up the space currently being overrun by the storage overflow. These goals were accomplished by developing functional departments in the office dedicated to the three main functions, Broker Support, FSA Processing and COBRA Processing. A new office layout was established that created these departments and met the objectives of the project.

# CHAPTER 2 Solutions

## 4. METHODOLOGY

In order to address the problems that were identified, a systematic approach was necessary. Once the problem was identified, the next step was to identify the interrelationships between each department and process. Space requirements for each department and process were then identified in terms of how many people belonged in the department and the resources that they required. Alternative designs were then created and analyzed for strengths and weaknesses and a final design was chosen.[3]

### *4.1 5S Implementation*

Before planning any layout designs, the 5S methodology was applied to the entire office.

This was necessary to get the office to a state where design changes could be made. Before this, there was an excessive amount of unnecessary materials in the office that would have obstructed the process. The 5S's are sort, set-in-order, shine, standardize and sustain.

#### **4.1.1 Sort**

Sort refers to clearing the area and organizing the workplace so that it becomes a more efficient place to work. At Baystate, the office staff was required to define what materials they needed and which were not required. After creating a list, items that were not needed were dispositioned to later determine a proper location. The goal of the Sort stage was to have only what was needed to complete the job in the work area.

#### **4.1.2 Set-in-order**

Set-in-order is about organization and orderliness. There should be a place for everything and everything should be in its place. Once the Sort stage was complete, the next step was to designate a specific location for everything. The office staff at Baystate designated locations for items ranging from office supplies in the storage room to items in their own personal workspace.

### **4.1.3 Shine**

The goal here was to clean the workplace, maintain its appearance and use preventative measures to keep it clean. Once everything in the workplace was cleaned, the office staff was left to maintain proper housekeeping.

### **4.1.4 Standardize**

The methodology for Sort, Set-in-order and Shine must all be standardized. Roles and responsibilities were given to the office staff and training and supporting documentation was created. This ensured that everybody would follow the same procedure and use the established practices.

### **4.1.5 Sustain**

Sustain is the most difficult phase of 5S because it is an ongoing process. It requires keeping the entire office staff involved and continually reinforcing why following 5S is significant. Keeping the office clean and in order is important and should involve everyone making a concerted effort towards a more efficient workplace.[4]

## ***4.2 Introduction to SLP***

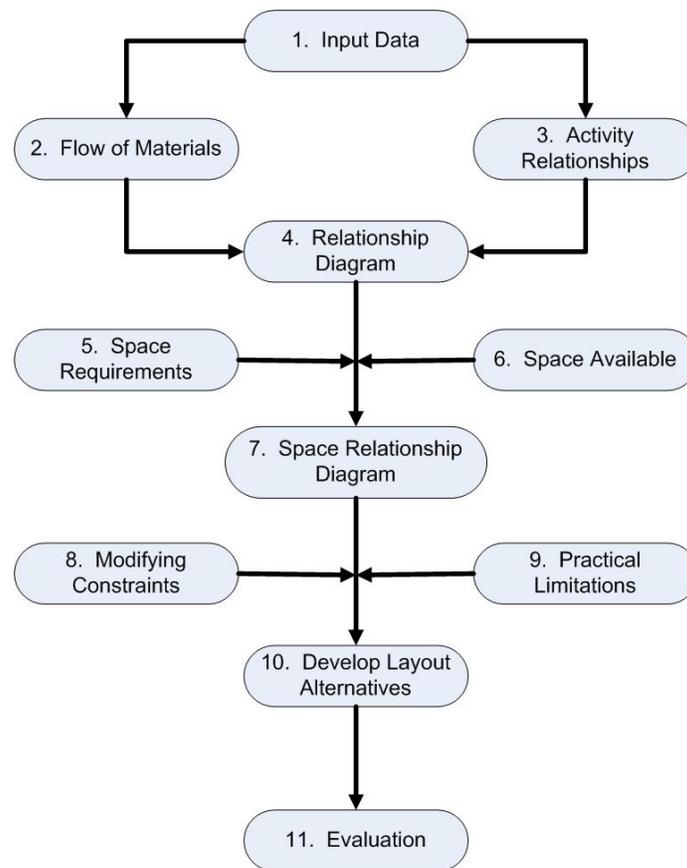
Systematic Layout Planning (SLP) was used to analyze the operations at Baystate and provide an improved layout design for the office. This approach provided the framework for completing the project and acted as a guide by providing a step by step procedure to follow.

The construction of an actual facility layout is a complex problem which requires careful planning and the use and development of a systematic methodology. Systematic Layout Planning (SLP) is a popular approach, developed by Richard Muther, which has proven to work well in many situations. SLP is tailored towards the manufacturing industry but possesses enough flexibility for use in this project. The challenge will be modifying the SLP to fit the project scope for Baystate.

Overall, there are eleven stages required to complete an SLP. Those stages are:

1. Gather input data
2. Identify flow of material/information
3. Identify relationships between activities and resources
4. Create a string diagram
5. Determine space requirements
6. Quantify space availability
7. Create a space relationship diagram
8. Identify modifying considerations
9. Apply practical limitations
10. Developing layout alternatives
11. Evaluation of final design

These steps are shown in Figure 5.



**Figure 5 - SLP Procedure[5]**

## 5. ANALYSIS

### 5.1 Input Data & Activities

The beginning of any Systematic Layout Plan requires gathering and analyzing data required for the project. This must occur before any planning of relationships, space or adjustments. The preliminary data-gathering-and-analysis step is termed as Input Data & Activities and follows the general sequence found below.

1. Identify specific elements of input data needed as design criteria for the project.
2. Project this data into the future. (This involves restructuring information supplied by others in the organization.)
3. Seek general approval and top-management endorsement of the input data.
4. Examine the data for distinctive dissimilarities to arrive at a basic layout.
5. Identify and define the activities to be used in subsequent planning.

The input variables for every SLP are *P*, *Q*, *R*, *S* and *T*. Product (*P*) is the material or service that will be processed. For Baystate, the products are the processing of the COBRA, FSA and Customer Request services. Quantity (*Q*) is the volume of each item to be processed. Routing (*R*) is the path an item travels to be processed. Services (*S*) refers to services required to complete the processing. Time (*T*) refers to the overall time required to complete processing.[6]

Collecting input data at Baystate Benefits Services required designing a survey that captured every individual's basic work day. The survey included questions about job responsibility, what resources were required to complete their job effectively, from where/whom they received their work and the destination upon completion, along with any constraints they came across while performing their job. Results of the interviews yielded specific details about the operations behind Baystate and will be discussed in their respective sections.

From Baystate's data management system, data regarding their FSA claims processing was gathered. The data was available for the 2006 year, prior to this Baystate had another system and information from this was unavailable. Based upon this data, it was determined that Baystate processes 9,468 FSA claims in the year. Using a working year of 240 days, it was determined that on average Baystate processed 39.44 claims per day as an office. This information is presented in Table 1 broken out by each employee that process claims and their averages based upon the number of hours worked per day.

**Table 1 - FSA Claims Processing Data**

<b>Employee</b>	<b>Claims Processed</b>	<b>Hours / Day</b>	<b>Hours / Year</b>	<b>Average / hour</b>	<b>Average / Day</b>
FSA Claims	3699	4	960	3.85	15.41
Materials Coord.	1833	7	1680	1.09	7.64
Service Coord.	1331	4	960	1.39	5.55
COBRA Claims	1117	4	960	1.16	4.65
Website Maint.	891	3	720	1.24	3.71
FSA Lead	595	40	9600	0.06	2.48
				<b>Office Total:</b>	39.44
				<b>Average/emp.:</b>	6.57

This information was not available for COBRA processing. Empirical data was available however. The COBRA Claims Processing employee identified that payments were processed in a single batch once per day and that each batch contained approximately 10 payments. She also stated that it took approximately 15 minutes to process a batch. Similarly, Baystate only recently began tracking their customer service requests through a data management system and no meaningful information was available. The only empirical data was provided by the Customer Service Coordinator who said that she spent most of her day working on requests and only had about an hour and a half a day to process claims on average.

## ***5.2 Flow of Materials***

The analysis of material flow involved determining the most effective sequence of work and material. An effective flow means that the materials move progressively through the process and should always advance forward without excessive detours. In traditional manufacturing applications, the flow is determined from either the product or the process. In Baystate's case, process flow was used to establish flow. Identifying the material and information flow required analyzing the interviews results. The primary goal behind interviewing was to gain a better understanding of which employees perform which functions, what their primary and secondary functions are, what resources are required to perform their job and any constraints that deter them from completing their job in an efficient manner. The interview questions asked were:

1. What are your jobs/functions on a normal day?
2. What resources do you need to perform your tasks?
3. Where do you get your inputs, where do outputs go?
4. Any constraints on your job?

The results of these interviews are attached in Appendix A.

Three main functions determined from analyzing the survey results were FSA processing, COBRA processing and Broker Support. The flow of each process through the office was unsystematic with staff filing their processed claims in other offices, staff performing identical functions not sitting close to one another and required resources not being located near the staff that uses them. After conducting and analyzing responses from the survey, a process flow chart was created to map out the path of each function performed. As each function was defined and added to the flow chart, it became apparent that the flow of materials and information was never formally planned. This flow is shown in Figure 6 on the next page. COBRA claims originate through fax or email and begin processing in office one. After initial processing, the materials are then moved down the hallway to the COBRA support personnel located in office three. When processing is complete, the paperwork is sent across the hall to office six for filing. FSA claims are also generated through fax and email. From the fax, they are taken to office three to begin processing by the FSA lead. Upon completion, the files are moved into storage in office five or into office four for the Office Manager to verify information and address questions. Broker Support material is generated from the Broker in office two and moves onto the primary account manager's desk in office five or to the prospector located in office six. Broker Support material also makes its way to the office manager in office four for verification on a case by case basis.

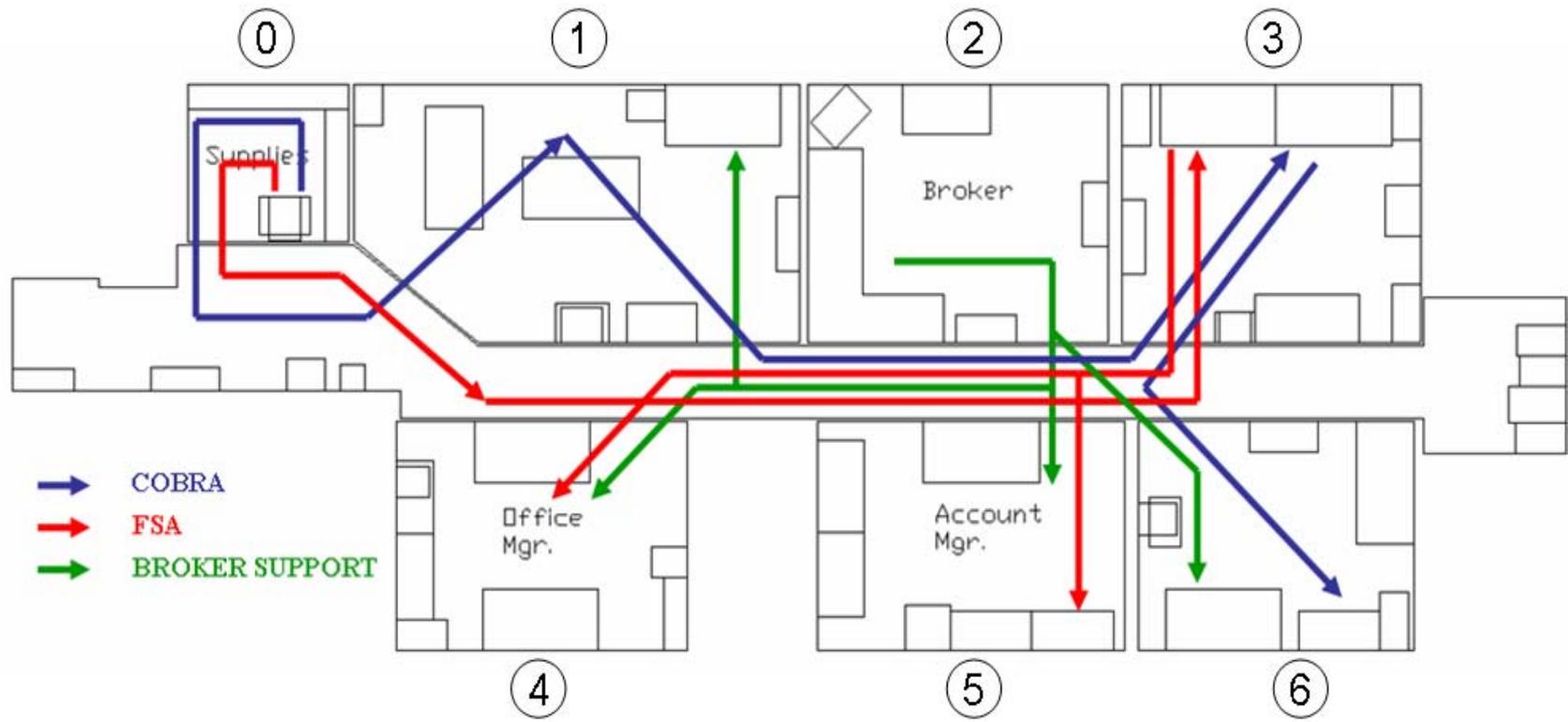


Figure 6 - Process Flows Through Initial Office Layout

### ***5.3 Activity Relationship Chart***

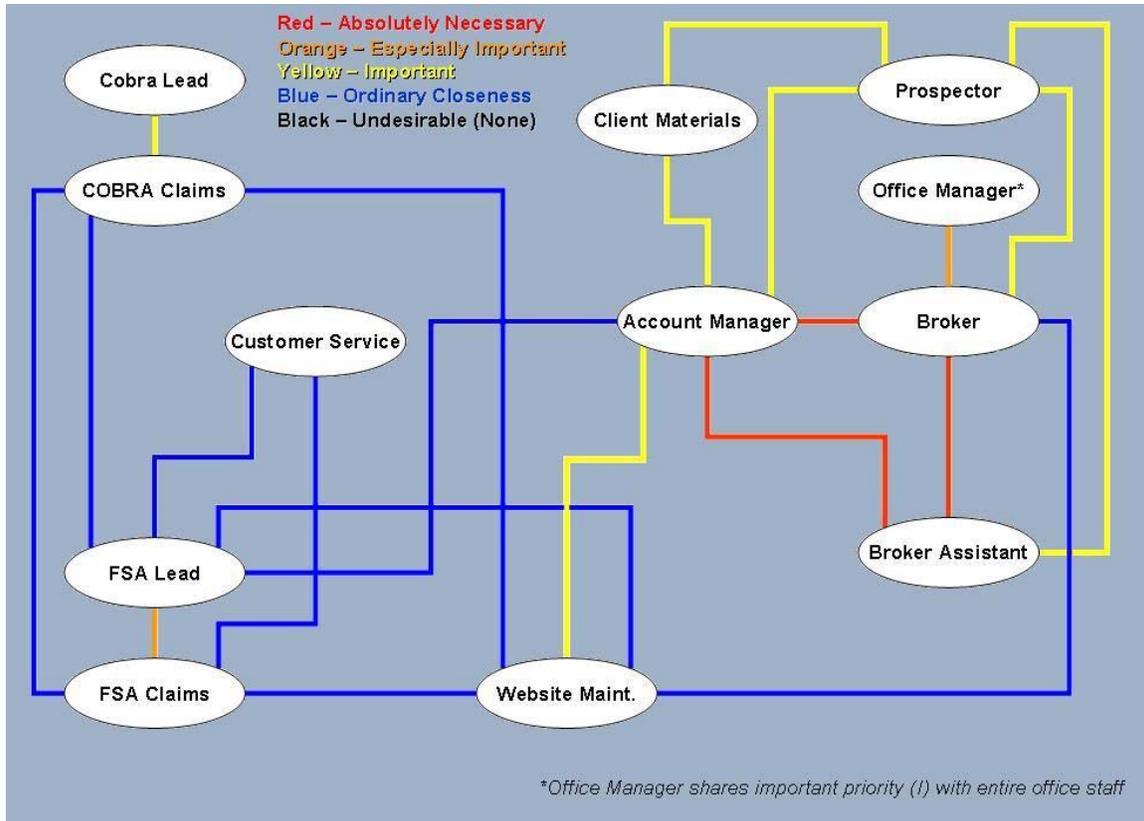
The next stage of SLP requires identification of the relationships between activities and resources. This information was also obtained from the interviews. Resources were defined as office staff (people), machines (printer, fax, etc) and filing cabinets (storage). In the survey, each employee was asked to identify where/who they receive their work from and the destination of their work after completion. The results of these surveys were compiled into an activity relationship chart. The relationship chart displays which entities are related to others and it also rates the importance of the closeness between them. These ratings make the relationship chart one of the most effective tools for layout planning and is the best way of planning the arrangement of an office or service area having little or no flow of materials.[6] The activity relationship chart itself is a record keeping tool to organize data into a usable form. With this data, an Activity Relationship Diagram was generated where proximity and relationships are visually evident; this is shown in Table 2.

Table 2 - Activity Relationship Chart for Baystate

		Office Mgr.	Broker	Account Mgr.	Administrative Asst.	Client Mat'ls Coord.	Prospector	COBRA Admin.	COBRA Claims	FSA Admin.	FSA Claims	Website Maint.	Cust. Service	Fax	Brochure Printer	B & W Printer	Color Printer	Copier	COBRA Files	FSA Files	MERP Files	Client Files	Stamp Machine	Scanner
<b>A:</b>	Absolutely Necessary																							
<b>E:</b>	Especially Important																							
<b>I:</b>	Important																							
<b>O:</b>	Ordinary																							
<b>U:</b>	Unimportant																							
<b>X:</b>	Undesirable																							
<b>ID</b>	<b>SPU Name</b>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	Office Mgr.																							
2	Broker	E																						
3	Account Mgr.	I	A																					
4	Administrative Asst.	I	A	A																				
5	Client Mat'ls Coord	I	E	I	U																			
6	Prospector	I	I	I	I	I																		
7	COBRA Admin.	I	U	U	U	U	U																	
8	COBRA Claims	I	U	U	U	U	U	E																
9	FSA Admin.	I	U	O	U	U	U	U	O															
10	FSA Claims	I	U	U	U	U	U	U	O	E														
11	Website Maint.	I	O	O	U	U	U	U	O	O	O													
12	Cust. Service	I	U	U	U	U	U	U	U	O	O	U												
13	Fax	O	U	O	I	E	O	E	E	E	E	U	I											
14	Brochure Printer	U	U	U	U	A	U	U	U	U	U	U	U	U										
15	B & W Printer	E	A	A	E	I	I	E	E	A	E	A	E	U	U									
16	Color Printer	U	I	I	A	E	O	O	O	U	U	U	U	U	U	U								
17	Copier	O	O	O	I	I	O	O	I	I	I	E	I	U	U	U	U							
18	COBRA Files	U	U	U	U	U	U	A	A	U	U	U	O	U	U	U	U	U						
19	FSA Files	U	U	U	U	I	U	U	I	I	A	E	I	U	U	U	U	U	U					
20	MERP Files	U	U	U	U	U	U	U	O	A	U	U	U	U	U	U	U	U	U	U				
21	Client Files	O	A	A	A	U	I	U	U	U	U	U	U	U	U	U	U	U	U	U	U			
22	Stamp Machine	I	O	O	O	I	O	E	E	E	E	I	I	U	U	U	U	U	U	U	U	U		
23	Scanner	U	U	I	E	O	U	O	O	U	U	I	U	U	U	U	U	U	U	U	U	U	U	
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23

## 5.4 Relationship Diagram

The Activity Relationship Diagram or string diagram is essentially a visual display of the activity relationship chart. Each entity on the chart is translated to a symbol to be placed on the diagram and then lines are connected to show the value of the relationship. The string diagram shows near optimal placement without consideration for space requirements and exposes possible clustering of departments. Figure 7 below shows the String Diagram for Baystate created from the Activity Relationship Chart.



**Figure 7 - String Diagram of Interpersonal Relationships**

Absolutely necessary relationships occur between the broker, the broker assistant and the account manager. Locating them close together is absolutely necessary and they make up the core of the broker function within Baystate Benefits Services. The prospector and the person who assembles client materials must be located close to the core group to provide supporting services. Website maintenance must be located close to the account manager due to the constant updating of client information that is provided through the website.

The two separate claims processing leads (COBRA, FSA) appear as prominent departments and must be located near their claims processing support staff. Relationships rated as ordinary closeness are not necessary for the advancement of the business but should be considered when developing the layout

because of shared secondary functions. Through analysis of the Activity Relationship Diagram, a better understanding of Baystate's processing functions emerged and must be applied to a layout of the physical building in a space relationship diagram.

### ***5.5 Space Requirements***

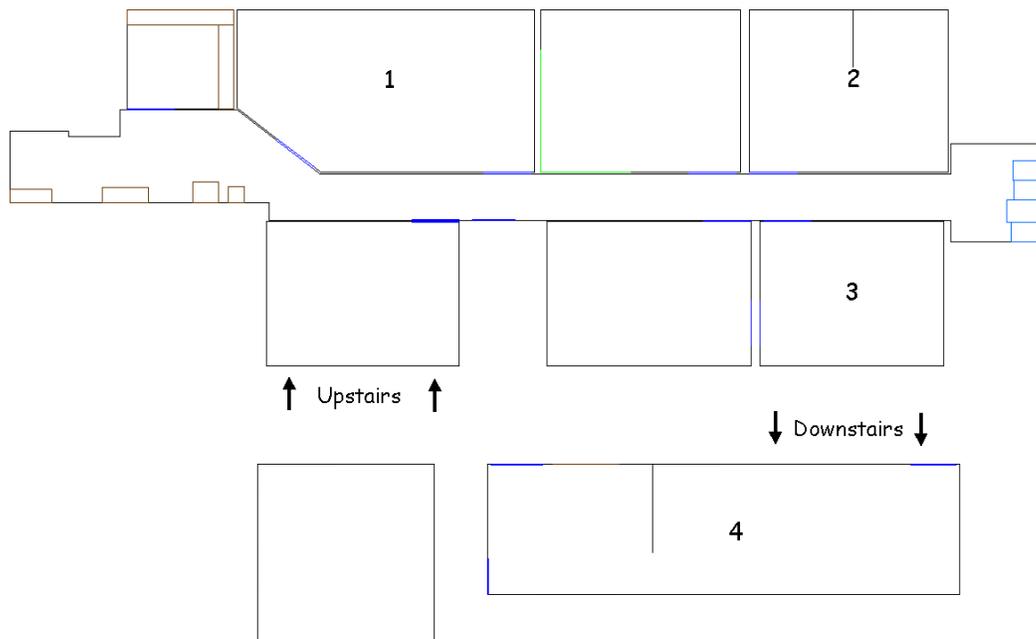
Defining relationships and interactions is necessary for creating alternative design layouts. Now that relationships have been identified special requirements must be analyzed and then applied to a spatial relationship diagram. In developing the space requirements for operations at Baystate, the converting method was used in combinations with adjustments of previous areas. The converting method requires the designer to account for what space currently exists and then design each area accordingly instead of planning for future requirements. The converting method is especially useful when the application is not a production facility where the flow of work is consistent and must meet standard production capacities. This model strongly corresponds to Baystate's operational situation because of the nature of the work flow and the unpredictable arrival rates of claims documents.

Developing proper spatial requirements involved examining and documenting each resource (room dimensions, furniture, filing and storage) required for proper placement in later design iterations. The first resources measured were filing cabinets. Each filing cabinet's floor length and width were documented – height was not an issue because stacking vertically is not prevalent. Filing cabinets were also measured while the drawers were open to insure that the contents could be filed and stored effectively. The printers and other electronic resources were also taken into account. Each printer was measured to determine a footprint required for placement in different layout alternatives. No printer was tall enough to be concerned with height; however, clearance room for maintenance was needed. Space must be available for each printer to be maintained and refilled with both paper and ink cartridges.

An important consideration for spatial planning is the end user and their workspace design. An average person's total arm length is thirty inches; therefore, the desks at Baystate fit this criterion. All of the existing office furniture meets this standard. Each employee requires at least twenty seven inches of space from the near edge of their desk. This is necessary for employees to access their space with relative ease. Due to the nature of Baystate's business, document storage is a primary concern. Legally, they are required to store documents for a certain number of years varying by the type of document. Therefore, Baystate must dedicate office space solely to storage. They have approximately one hundred and fifty boxes onsite containing current and historical documents. Historical documents usually date back ten years. However, they are only required to store current and past years' documents onsite.

## 5.6 Space Available

Baystate's office is a leased space and they are not able to make any physical changes to the building. This significantly limits the number of options when designing layout alternatives. The second floor of Baystate's property is a mix of closed and open offices. A closed office is one where permanent floor-to-ceiling walls are present. An open office is when there are no floor-to-ceiling walls or the existing walls are temporary and removable. The second floor as a whole is a closed office made up of multiple open offices. There are a few offices in which only one employee resides in and therefore remain closed; however, other offices exist where multiple people work in that is open. Open offices are more flexible with respect to developing layout designs. The existing floor plan is found below in Figure 8.



**Figure 8 - Initial Floor Plan**

Office one is larger than the rest and is found on the top left side of the floor plan. This office is ideal for creating a larger department because of the space availability. This office is also open with no temporary or permanent walls separating work spaces. There are also two fairly large rooms at the opposite end of the floor – rooms two and three (2 & 3) that could house multiple employees. These offices are also open. However, office two has temporary partition walls separating workspaces. Most importantly there is a large office located downstairs on the first floor which goes almost entirely unused – office number four. A temporary divider separates the room into thirds. The right side of this room, the largest section, has been designated as the storage location for archived documentation. With the acquisition of an off-site storage location, this room could be utilized in a more efficient manner. On the left side, taking up one third of the room is a desk that is infrequently used.

### 5.7 Space Relationship Diagram

At this point, the space requirements are applied to the space available. The purpose of the space relationship diagram is to combine established spatial constraints with the activity relationship diagram. This diagram of pre-determined levels of importance was applied to a blank facility layout design for use in the first phases of facility design. This was not done in the traditional method – where the space required is applied to a blank footprint – because redesigning the interior of the building was not an option. The space relationship diagram is shown in Figure 9. The data used in determining space relationships is attached in Appendix B.

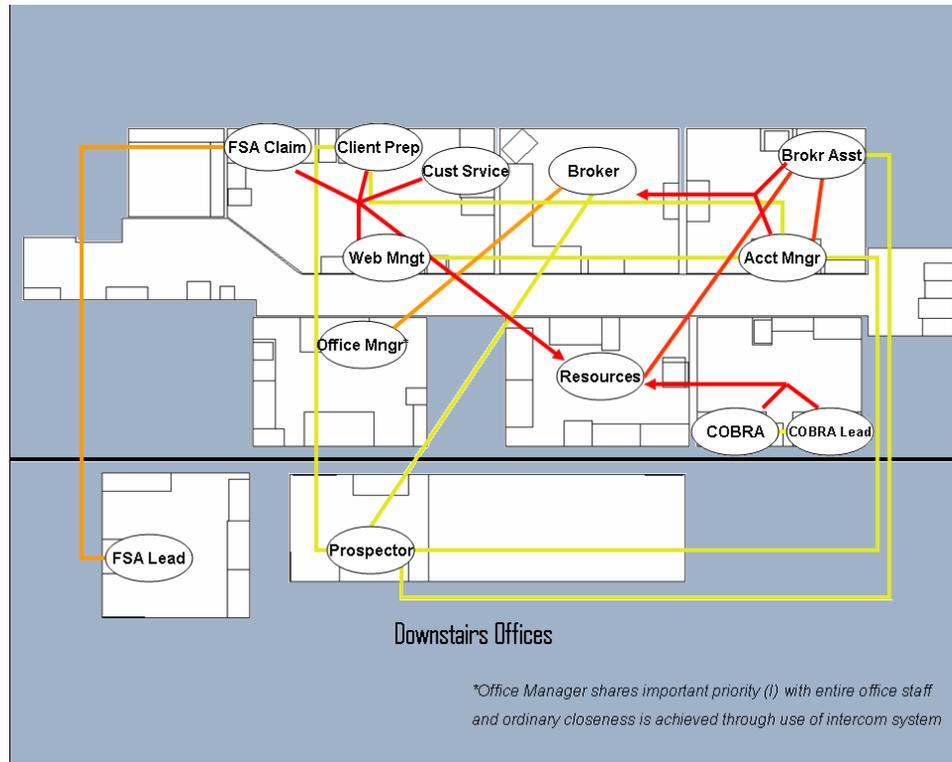


Figure 9 - Space Relationship Diagram

### 5.8 Modifying Constraints

For the initial design concepts, only three constraints were given by Baystate. These were that the office manager and the broker required their own offices for privacy reasons and that the file storage room must be a secure room that is capable of being locked.

## ***5.9 Practical Limitations***

Systematic Layout Planning is best employed when creating a brand new facility and the design of the facility is not yet finalized. In Baystate's case, their facility was established and there was no ability to expand the physical dimensions of the office. Also, due to the fact that Baystate rents their office space from a property manager means that any changes to the existing layout are not possible, therefore any changes made to the layout must fit within the current confines of the office.

One of the most heavily used resources in the office is the fax machine. Each department receives work input from the fax and some use it as a source of output. Additionally, the fax machine is used for general office use outside of the main processes. One solution to this problem would be to install a new fax machine that was set aside for the department that has the highest requirement of it, FSA claims. While this solution sounds feasible, there is little excess room in the office and a new fax machine would serve to take up that room. Also, there is the logistical problem of notifying all current clients of the new fax number for the FSA department and it is very likely that claims would continue to come in to the old number for some time. There is also the new cost associated with the fax machine that would simply add cost to the office without much appreciable gain. It is much more feasible to simply create the FSA department closer to the fax machine.

## ***5.10 Develop Layout Alternatives***

Three initial designs were created using the requirements and constraints described before. These three designs were then brought to the management at Baystate for further input and comments. In all designs, bookshelves were kept in each office to act as a storage location for on hand inventory of paper, labels and other frequently used office supplies to reduce the need to travel to the storage closet to retrieve supplies.

### **5.10.1 Design 1**

The first design, shown below in Figure 10, keeps the Office Manager, Broker and FSA Administrator in their current offices and was made using the assumption that the Account Manager did not require his own office. This design created three functional departments within the office: FSA processing, COBRA administration and processing, and Broker Support.

The Broker Support department has two employees in it, the Administrative Assistant and Account Manager and is located in the office next to the Broker's office. In creating this department, the client case files that were located in with the Office Manager, were moved in to be with the Administrative Assistant who uses them exclusively.

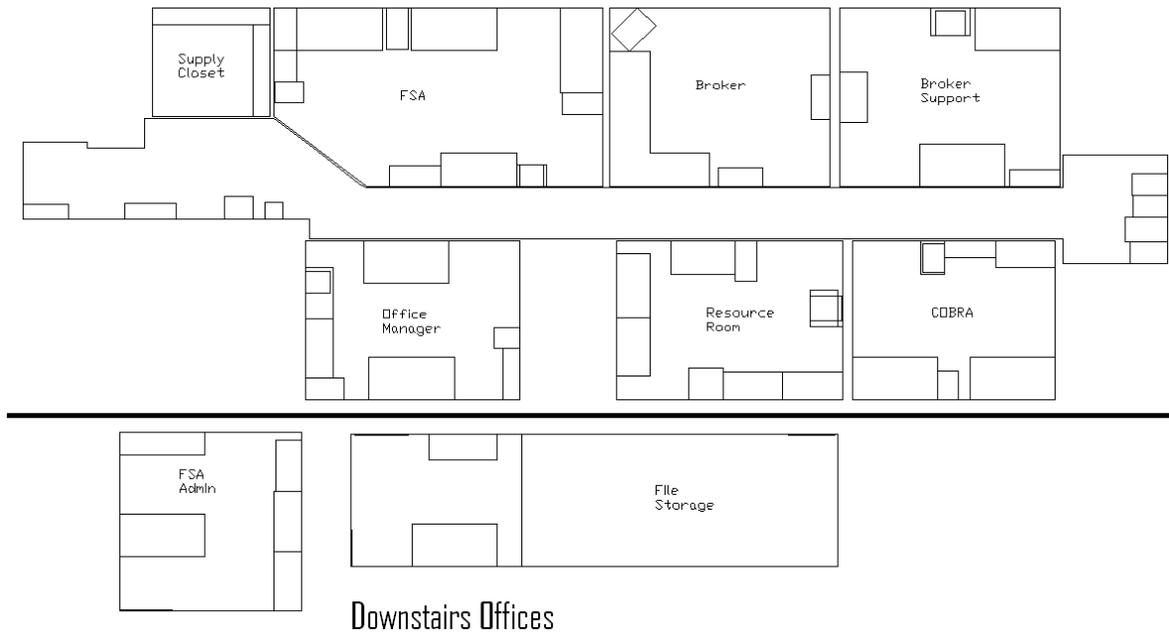
The office that belonged to the Account Manager was transformed into a resource room that would contain the spare PC that had been in the Broker's office, fax machine, scanner, brochure printer and FSA files. Moving the fax machine to this office gave it a centralized location for use by all employees. The creation

of a resource room also allows for the other broker's of the company to visit and have a private place to work while in the office. This does not happen frequently but Baystate has an additional computer set aside for this purpose. The resource room was placed where it is because that office doubles as Baystate's server room. This room is warmer and has much more background noise than the other offices due to all the computers constantly running.

In the front large office, the FSA processing department was created to house four employees; the FSA Claims Processor, Customer Service Coordinator, Client Materials Coordinator and Website Maintenance employee all share the office. Aside from the FSA Claims Processor, the other three employees in the office process the most claims in the office. Four employees was also the maximum capacity for the office when all necessary resources were included.

The COBRA administration and processing office was placed in the back of the hallway with room for two employees; the COBRA Administrator and COBRA processor. The COBRA files were also moved to this room so that these employees would no longer have to travel to other offices to file their paper work.

This design had three major problems with it. First, the FSA file location was not moved and is still not in the FSA department maintaining the need for employees to travel there to file FSA claims. This office, however, is no longer permanently occupied, drastically reducing the number of times it will be closed cutting off access to the files. Second, the brochure printer was not moved and is still down the hall from the Client Materials Coordinator, who uses it exclusively. Third, in this design, the Client Prospector was moved downstairs into the office next to the file storage area. Moving this employee there violates a relationship identified as important in the Activity Relationship Diagram.



**Figure 10 - First Design Concept**

### **5.10.2 Design 2**

The second design, below in Figure 11, has the same functional departments as design one. Design two, however, was created with the assumption that the account manager required his own office along with the office manager and the broker. The client prospecting employee has moved in to the Broker Support office along with the administrative assistant. This maintains the important relationship that had been violated in design one. The scanner was kept in the office giving the Administrative Assistant access to it that was identified as an especially important relationship.

The FSA department was moved downstairs across from the FSA administrator. The same four employees are in the FSA department; however, the brochure printer was moved downstairs so it was close to the broker prep employee who uses it exclusively.

By moving the FSA department downstairs, the file storage room needed to be moved upstairs into the office next to the Account Manager. Doing this satisfied the requirement that the room be secure and lockable. This also moved the FSA department across the hall from the FSA Administrator giving them better access to each other for delegation of work and questions.

The COBRA department was created in the front large office with the two COBRA employees along with the spare PC. The COBRA files were moved into this office to give the employees the direct access they require daily.

The disadvantage of this design is that it effectively uses all of the available space in the office and future expansion to more employees would not be possible without first reorganizing the layout once again.



**Figure 11 - Second Design Concept**

### **5.10.3 Design 3**

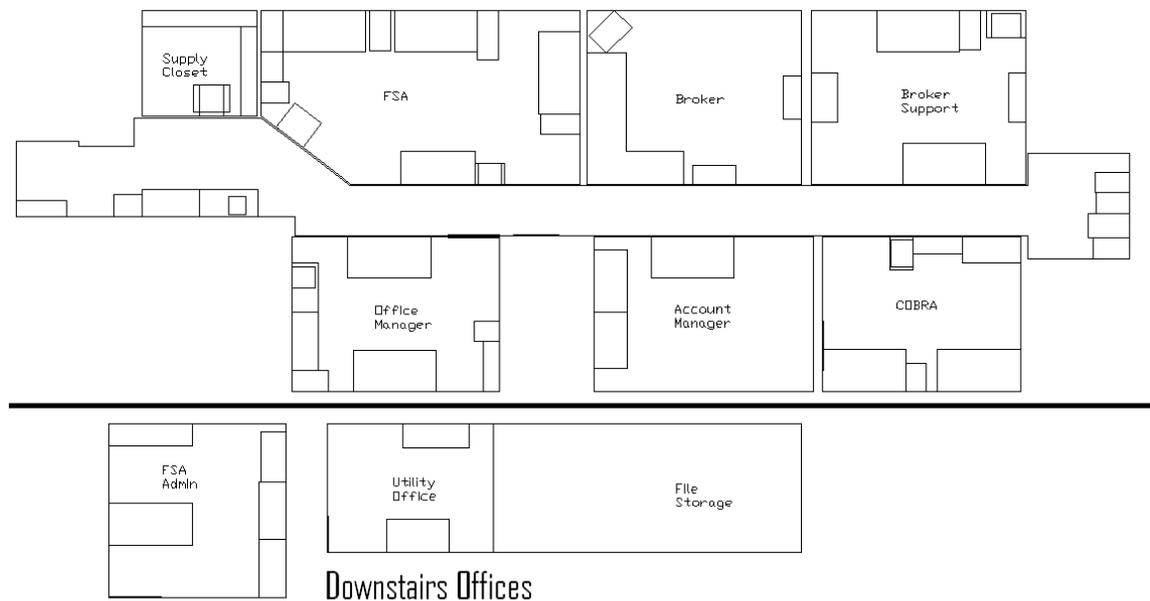
Design three, shown in Figure 12, placed the functional departments back where they were in design one, thereby maintaining the majority of the employees on the same floor of the office.

The FSA department was moved back into the front large office with the same four employees. The desks were rearranged from design one to allow for the brochure printer to be added in the room near the Client Materials Coordinator. Also, the FSA files were relocated outside of the FSA office in the hall.

The COBRA department is back in the rear of the hallway with the two COBRA employees. The COBRA files were kept in this office to provide accessibility for the employees.

The Broker Support office again seats the Administrative Assistant and Client Prospector. The scanner is located next to the Administrative Assistant's desk since she uses it most frequently. The color laser printer was also moved to this office for the Administrative Assistant's use in making meeting presentations for the broker. The client case files were also moved into this office providing constant access for the Administrative Assistant.

There are two disadvantages to this design. First, locating the scanner next to the Administrative Assistant means that the Website Maintenance Coordinator now needs to travel down the hall to scan documents occasionally. Most of the documents that this employee scans are brought to her by either the Account Manager or the Broker and are for Broker Support. Moving the scanner into the Broker Support department would therefore eliminate much of the need for this employee to use the scanner. Second,

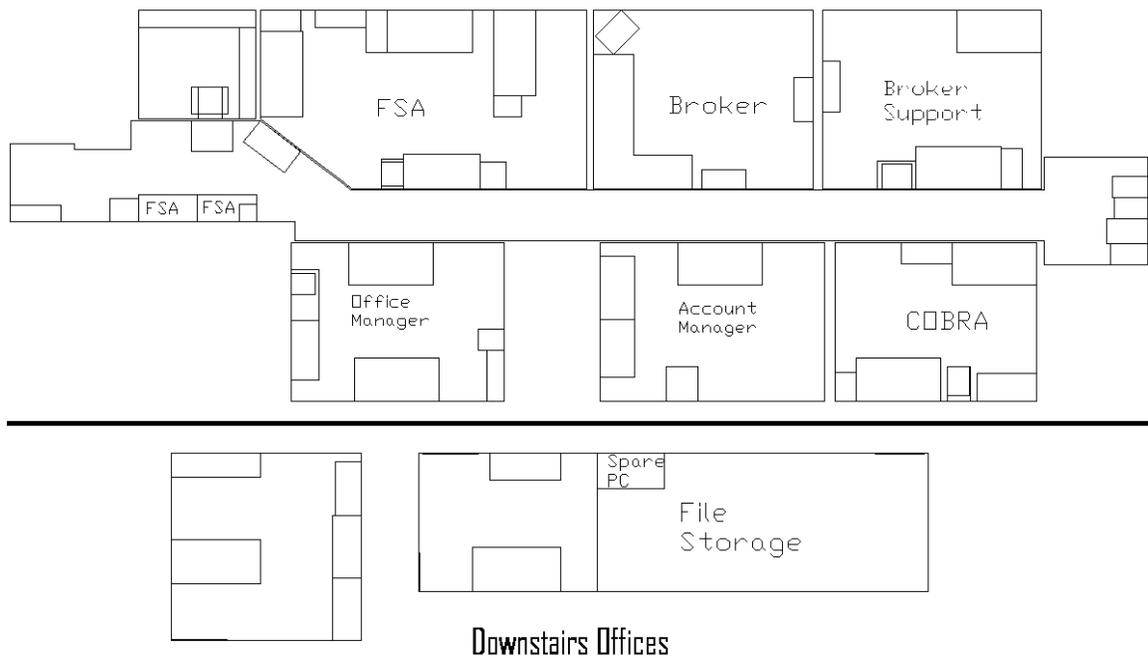


**Figure 12 - Third Design Concept**

### **5.10.4 Company Feedback and Final Design**

The three designs were brought to Baystate for their review and input. The Office Manager chose design three with some additional input.

The arrangement of desks in the FSA department needed to be changed. A door between the FSA office and the Broker's office is blocked by the arrangement of the desks. Freeing up the door would allow the Broker to speak with the Client Materials Coordinator easily. This was accomplished by changing the arrangements of the desk. Seating the Client Materials Coordinator in the desk nearest the door will allow for this communications without interfering with the other employees in the office. Based on this input, the final design, shown below in Figure 13, was created.



**Figure 13 - Final Design Concept**

## ***5.11 Evaluation***

### **5.11.1 Work and Information Flow Improvements**

The process flows through the final design are shown in Figure 14. All processes are now self contained and require much less traveling between offices for information. The one process that still appears branched is Broker Support. This is due to the constraint that the Broker, Office Manager and Account Manager each maintained their own offices. Branches have been eliminated from this process by seating the Administrative Assistant and the Client Prospector together.

It was not possible to locate the FSA files in the FSA office. They were moved out of the Account Manager's office and placed in the hall outside for closer, unrestricted access. The COBRA Claims Processor was not placed in this office due to the majority of her time being dedicated to COBRA matters.

When processing FSA claims, she will still need to travel down the hall to retrieve work and file. This was unavoidable but is not important enough to change the design due to the amount of time she spends processing claims.

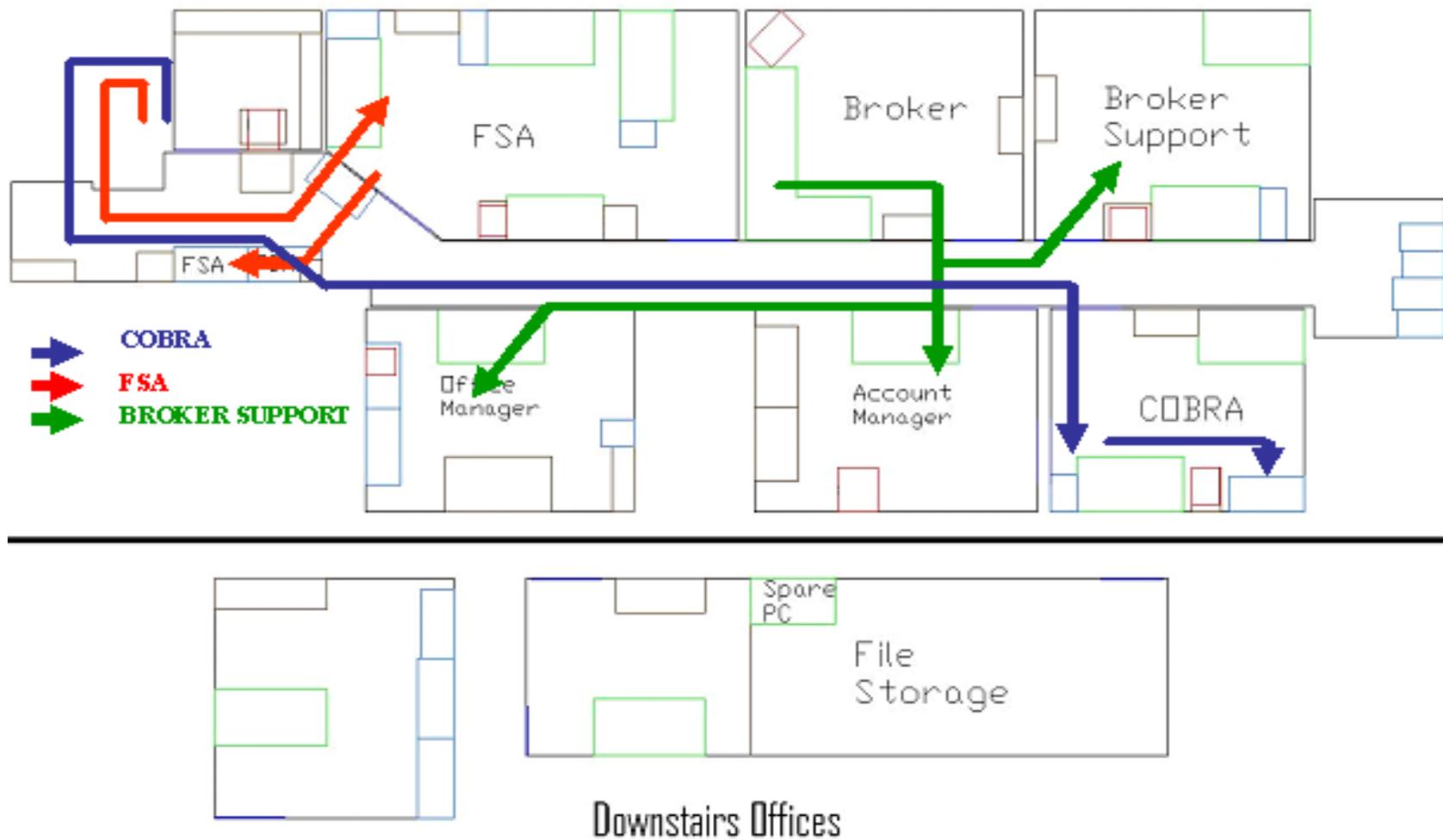


Figure 14 - Process Flows Through the Final Design

**5.11.2 Capacity Information**

In order to gauge the effectiveness of the newly designed system, calculations on time saved – with respect to claims processed – were calculated. The only data previously supplied by Baystate detailed FSA claims; therefore, the calculations could only reflect changes in that department. The first step was to gather the data on distance traveled from each employee’s desk to each location, including: fax machine, Office Manager, and filing cabinets. Along with this information we had hoped to use from-to data to determine average trips taken per day to these locations. Unfortunately, not every employee recorded this information. Consequently the data on trips per day was gathered through empirical comments from both the employees and the Office Manager.

Once the number of trips taken and distance to each location was determined, the total distance traveled per day was calculated. These calculations were then duplicated; however, this time using the distances measured using the new setup. With these two data points, travel distance saved was then calculated. Using distance saved, and an average walking speed of a meter per second, we estimated total time saved per day by implementing the new layout – which equaled approximately fifteen (14.77) minutes per day across the entire office. These calculations are shown in Table 3.

**Table 3 - Time Savings Data**

Employee	To/From Fax			To/From Office Manager			To/From File Cabinet			
	Trips/day	Dist (old)	Dist (new)	Trips/day	Dist (old)	Dist (new)	Trips/day	Dist (old)	Dist (new)	
FSA Claims	4	51	18	12	30.5	15	2	21	15	
Service Coord.	4	51	18	7	30.5	15	2	26	15	
Website Maint.	4	51	18	8	30.5	15	2	21	15	
Materials Coord.							2	42	15	
COBRA Claims							2	21	50	
<b>Dist. Diff (ft):</b>		1188		<b>Dist. Diff (ft):</b>		1255.5		<b>Dist. Diff (ft):</b>		210
<b>Time Saved (min):</b>		6.6		<b>Time Saved (min):</b>		7		<b>Time Saved (min):</b>		1.17
								<b>Total Time Saved (min):</b>		14.77

Using the available data on FSA claims, it was determined that the office processes almost forty (39.44) claims per day. This equates to around six (5.64) claims per hour, which breaks down further to 0.0939 claims per minute. Combining this data with that calculated concerning time saved, it was determined that the office could then process an additional 1.39 claims per day. Based on a standard two hundred and forty (240) work days per year, an additional three hundred and thirty three (332.81) claims per year could be

processed by the office. This represents a change in number of claims processed from 9,468 to 9,800 or an increase of 3.5% simply by reducing non value added time. On average, each client submits about eighty three (83.05) claims per year. Baystate could therefore take on four (4.01) clients without increasing the workforce or dedicating more time to processing FSA claims from the other employees.

Naturally, the above observation assumes that all additional time created is used on FSA claims. However, the time reduction was saved in the FSA process, therefore it is reasonable to allocate this time to the process.

### **5.11.3 Storage Improvements**

It was determined that the files that are kept are rarely accessed and that the only ones that were ever accessed were from the most recent year. Because of this it was possible to move all other documents offsite. An offsite storage location was acquired by Baystate to store all files older than the most recent year. The offsite storage is located three miles away in Weymouth, MA. Moving all files older than the most recent year freed up substantial space in Baystate's file storage room and allowed all files that had been in offices and the hallway to move downstairs and be stored appropriately.

The other storage concern had been the overflow of office supplies into the hallway. This was dealt with during the 5S process by identifying many items that were being kept in the supply closet that were no longer needed or should be stored elsewhere. Once this was complete, all office supplies fit into the supply closet and one bookcase outside in the hall.

# CHAPTER 3 Conclusions

## 6. RECOMMENDATIONS & CONCLUSIONS

### *6.1 Recommendations*

The FSA department places the heaviest use on the fax machine and therefore dictated its final location. Acquiring a new fax dedicated to FSA use would free up the existing fax to be moved to a more central location for the rest of the office. This would require informing all clients of the change and would take time to introduce.

Eventually, Baystate could add new clients to the point that they reach their processing capacity. One method of coping with this would be to add a full time employee to the FSA claims processing function. One employee, working seven hour days would be able to generate 9,466 claims per year doubling the capacity of the process.

To add employees to the existing staff, more space in the offices would have to be freed. Moving to a paperless office environment would accomplish this task by eliminating the need for physical storage of files. There are companies, such as eFact Paperless Office, that specialize in providing means for insurance companies to go paperless through scanning. Information was not available on pricing without a registering for a trial. It is reasonable to assume that this would be an expensive investment, however, were Baystate to reach the point that this was a necessary step; the increase in revenue would most likely cover the cost of this new process.

### *6.2 Conclusions*

Systematic Layout Planning provided relatively simple changes to an existing process that generated rather important improvements. The capacity of the office was identified and improved to provide the business with the backing to grow without having to introduce new employees and incur that cost.

This exercise highlights the importance of proper planning from the outset of a layout as well as the room for improvement that exists within an existing layout.

With better input data, especially regarding the COBRA and customer services processes, a more substantial look at the overall improvements could be made. Without this data, only empirical observations can be made as far as the number of places a person now has to go to get a single task done or to provide information for a functional group. Future consideration should be given to the tracking of metrics in these processes so that an accurate picture of trend and capacity could be generated. This data would further serve to give Baystate a good look of how their business is running and growing.

## 7. REFERENCES

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## **APPENDIX A – Interview Results**

## **APPENDIX B – Space Relationship Date**