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FINAL TECHNICAL REPORT: VILLAGE OF SUFFERN - TEAM KROGEN

SE450: APPLIED SYSTEMS DESIGN AND DECISION MAKING

SECTION C2

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Table of Contents

1. Background.....	2
2. Literature review.....	3
3. Problem Definition.....	11
4. Methodology.....	22
5. Analysis and Results.....	24
6. Recommendations / Improvements / Future Work.....	26
7. References.....	29

Table of Contents - Figures

Figure 1: Spatial Arrangement for the Village of Suffern.....	11
Figure 2: Boundary Value Diagram.....	12
Figure 3: Functional Hierarchy.....	13
Figure 4: Qualitative Value Hierarchy.....	19
Figure 5: Quantitative Modeling.....	21
Figure 6: Total Value vs. Profit Graph.....	24
Figure 7: Sensitivity Analysis.....	26

Table of Contents - Tables

Table 1: Value Measures.....	20
Table 2: Alternatives.....	21
Table 3: Swing Weights.....	22
Table 4: Value Scoring.....	23

Appendices

Appendix A-E: Value Measures, Swing Weights, Value Scoring	31-35
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1.1 Background

The municipality structure of New York City creates a hierarchical organization of local government entities that aims to better provide public services for community members. The formation of municipalities and respective border specifications for local governance extend back to the 1920s, but demographics over the years change rapidly and policy procedures need to reflect the growth of urban sprawl. In the case of the Village of Suffern (founded in 1796), as the population mushroomed over time, more stringent regulations began to shape the village into new form. Many of the powers vested in the village of Suffern date back to Article IX of the State Constitution of New York which formally enacted a “Statute of Local Governments,” and since the rules of the law implicate the village of Suffern with the responsibility of providing for its community members, the local government officials as well as affected villagers have interest in pursuing different options that limit the financial crunch on revenue streams and better reflect the future needs of the community.

This report explores the possible approaches community leadership can take to help limit financial burdens as well as prepare the village of Suffern for future success. The approach to resolving the issues discussed in this study include changing municipality structure of the Village of Suffern as well as limiting community deficits through scrutinizing the budget and expenditure habits of the village. A notable challenge in working with municipalities stems from the inevitable political entanglement that largely shapes and influences the actions of local governments. Therefore, any proposed suggestion for the betterment of the Village of Suffern poses reasonable political action that can affect decision making. This study recognizes the potential difficulties and puts into consideration the political nature of the problem.

1.2 Initial Problem Statement

When first introduced to the Village of Suffern, the initial problem statement presented to team KROGEN is as follows:

Should the Village of Suffern remain a village or convert to a city?

The initial problem statement focuses on the municipality structure of the Village of Suffern. More importantly, the problem lends itself to considerations of feasibility and whether or not, the current foundations of the village warrant a transition to a city structure. To better illustrate and understand the proposed problem a study of munistructures, village finances, and public services helps to determine Suffern's courses of action in both the short and long-term. The following section highlights the relevant information pulled from each subject of interest.

Chapter 2 Literature Review

2.1 Introduction

Topics of research in this section involve a breakdown of the hierarchical nature of munistructures, an assessment of financial revenue streams as well as expenditures, and an overview of public services provided by the village. These specific fields of study are crucial in framing KROGEN's understanding of the initial problem and provided our team with pertinent information.

2.2 Budget, Finances, and Services to Promote Growth

The Village of Suffern operates, for the most part, separately from the Town of Ramapo. Utilizing resources within their governmental structure, the village maintains its own sewage and water, police force, and fire department among many other services. With this, Suffern has a complex financial budget that requires meticulous planning, monitoring, and coordination. Between taxation at the village and town level to the county and city level, Suffern struggles to maintain a proper budget. While much of their fiscal stress is self-inflicted, Suffern finds itself in a multi-million dollar budgetary deficit. As Suffern approaches a critical fiscal decision point, the understanding of previous financial moves, as well as specifics on revenue-producing services such as water and sewage, is vital to success moving forward.

2.2.1 Budget Deficit

Suffern scored the highest rating on Comptroller Thomas DiNapoli's fiscal-stress scale in 2014 as an 86.7%, which was nearly 16 percentage points higher than the next village of stress (Incalcaterra, 2014). According to the Mayor of Suffern, Mr. Ed Markunas, the annual taxes owed to the town of Ramapo hover around the \$1,500,000 mark (Markunas, 2016). This only scratches the surface. The Village of Suffern was operating at a \$6,477,987 deficit as of 2015, and while many improvements to reduce the deficit show promise, the fiscal deficit is still north of 4 million dollars as of 2016 (Davies, 2016). Additionally, the Suffern Budget ending in May of 2017 highlights the areas in which various funds produce deficits (expenditure exceeds revenue). According to data, nearly 35% of general fund appropriations go towards public safety, but such programs within public safety only account for 7% of estimated revenues. This literature clearly defines areas of concern and interest pertaining to newly defined revenue gathering (Genito, 2016). Additional literature reviews identify extension of police and fire department services to the villages of Sloatsburg, Hillburn, and Montebello in an effort to raise the revenue associated with the current public safety allocations for Suffern. Finally, governmental support makes up about 76% of the general fund estimated revenues each year, which forces the Village of Suffern to rely heavily upon higher levels of government (Genito, 2016). Their inability to produce self-aid drastically hinders their voice within government and restricts their ability to maneuver outside of the town of Ramapo and Rockland County. The literature on budget lays out the relevant areas of concern for Suffern and attempts to shed light on the services that need improvement to promote financial security. This literature never addresses potential solutions to the revenue and budget deficit problems. A majority of sources following village financial stress hover over the numbers, but rarely define avenues of approach to improve the budget.

2.2.2 Budgetary Review

Moreover, the most recent Suffern budgetary review disclosed that the newly adopted budget as of '15-'16 is reasonable, and relies on the components of a tax increase of 16% as well as a 5% increase in water and sewer rents due to insufficient revenue generation (Deyo, 2015).

This report does well to identify fund balances, which compare revenues and expenditures over time in an effort to help finance future fiscal budgetary operations and present cash flow diagrams (Deyo, 2015). Deyo identifies a deficit growth of \$844,647 for the general fund, \$64,000 for the water fund and \$182,877 for the sewer fund as early as the 2011-12 fiscal year. Further, he explains until the '15-'16 budget there were no actions taken to improve the budgetary deficit. This proves Suffern's self-inflicting fiscal harm. While the report highlights a \$94,000 increase in revenue of the water fund, the report fails to explain the reasoning behind changing the water rates (Deyo, 2015). The report identifies a continued deficit in sewage funding, but further research will help to indicate where, how and why water and sewage rates are changing, as well as resulting increases in revenue in comparison with individual taxpayer burden.

2.2.3 Sewage and Water Revenue Sources

While the previous reports identify the problems associated with a lack of revenue among two major village services, John Wilson explains the effects of controlling the water rates on village growth. He developed the concept of a service charge, which would add to the regular meter rates in an effort to regulate the department's income (Wilson, 1921). His analysis develops an accurate separation of burden between the village and the consumers within the village, citing that the village would pay around 60% of the annual water expenses, but leaves revenue of 40% to be paid for by the consumers (Wilson, 1921). This model shows just how vast the revenue gains can be from regulation of water rates. However, due to the antiquated analysis, there are far more measures of water to include. However, given his breakdown, a village should sustain a 60/40 ratio of responsibility. Water and sewage are the two primary services that Suffern provides its inhabitants, and taken a closer look at the rates of discharge and taxation will drastically alter revenue shares. As for sewage, New York adopted a sewage service charge, which led to a special charge within villages (Tatlock, 1950). As Suffern searches for alternative means of revenue generation, special charges for the use of the sewage system based on a rate schedule would allow for Suffern to increase its revenue production. Further, the creation of such a rate schedule would better differentiate between service charges and general taxation to give

taxpayers a better indication of what and why they are paying (Tatlock, 1950). While this journal article is also outdated, the article provides a key avenue of approach to go along with water rate changes that one might pursue through additional research. Most local governments have not given enough time to long-term adaptation of services, budget and taxation. However, more recent studies show that local governments that shift their focus to growth create long-term fiscal benefits and less stress.

2.2.4 Fiscal Stress Leads to Growth Management

The additional area of interest to improve fiscal stress is through growth management. Municipalities such as Suffern are trying to close their budgetary gap, but this provides only short term, temporary fixes to large scale, long-term problems (Diaz, 2001). Diaz, along with Gary Green highlight the use of growth management policy, while costly to begin with, as a necessary progression that moves away from restructure of revenue tools. With this, a direction towards land-use plans, zoning ordinance for commercial and residential development, and population growth allows for improved fiscal revenue (Diaz, 2001). This literature review provides much more recent reviews of the financial concerns of villages. The report adequately addresses the known fact that villages tend to concern themselves with immediate budget deficit issues. However, the journal article does well to incite the need for long-term change that will benefit villages for decades to come.

Moving forward, there is a need to address revenue based on taxation, water and sewage rates, and extension of services to other villages. However, these fixes are only temporary and the primary means of long-term financial security rests within growth management of the village. These sources identify areas of weakness in revenue gains within the sewage, water, and public safety departments. These areas of weakness may be the appropriate avenues of approach to stabilize the village before more drastic measures of government conversion or large-scale growth progress. The taxation and finance pieces of this project highlight much more specific course of action that Suffern may decide to take. While conversion to a city has many benefits, the first step is a rebalancing of the budget that Suffern has let slip into utter despair. The fixes,

while short-term in nature, are crucial to the sustained productivity of such an autonomous village.

2.3 Governmental Structure Convertibility and Public Services

The information in this portion of the literature review corresponds with their research by assessing the feasibility of converting to a different system of government and the political implications that are associated with the transformation of the village. Additionally, by providing services to the surrounding villages, Suffern's deficit would shrink and the village would benefit from an additional source of revenue.

2.3.1 Conversion to a Town

In the state of New York, there two classes of towns. The first class includes towns that have a population greater than 10,000 while the second class consists of towns with populations below 10,000 (Publications). To form a town, the village can propose a referendum and must receive permission from the governing town. However, the governing towns rely heavily on the taxation of villages and are thus less likely to allow villages to become separate entities. However, the structure of a town is similar to that of a village. A town must have "a supervisor, four councilmen...a town clerk, two town justices, a town superintendent of highways, one assessor, a receiver of taxes and assessments" (DiNapoli , 2015). To fulfill the additional requirements to become a town Suffern needs to add both a receiver of taxes and assessments and a superintendent of highways. To pay these additional employees Suffern will need allocate more funds that further complicate the financial situation. The additional costs of adopting the town government may incur more costs for the Village of Suffern.

2.3.2 Conversion to a City

As a village under the jurisdiction of the City of Ramapo, Suffern pays taxes not only to New York State, and Rockland County but also by Ramapo. To avoid the additional taxes at the city level, Suffern should establish itself as a town. The most recent village in New York to transition to a city was the village of Rye. In 1942, the Village of Rye transitioned and became a city through a city charter adopted by the city residents. New York State Legislature ratified the

charter and on January 1, 1942, Rye became a city (Publications). This was the last time a village transitioned to a city in New York State. The political process in forming a city from a village requires multiple approvals at various government levels. A special report, published by the State of New York, stated that “the transition from a village to a city form of government, it is equally clear that, as a practical matter, the State Legislature will not create a new city without clear evidence from the residents of a community of their desire for such an incorporation” (Baynes & Porter , 1987). Although the villages have the ability to start the city charters, the state ultimately has the power to determine if the village has a viable reason to make the transition to a city. The “home rule” further complicates the transition process, as some believe that the county and town also play a role in determining the need for a village to transition to a city (Baynes & Porter , 1987). As a village becomes a city and a separate entity, the territory diminished by the original town also represents a significantly reduced tax base. Ramapo, as the presiding town over Suffern, is unlikely to grant action that would significantly decrease their tax revenue. However, literature on the topic of transitioning to a city is limited and frequently unclear. Due to the last village that transitioned to a city, Rye, occurring in 1942, the process is still relatively unclear and unfamiliar to local governments (Publications).

In addition, to the obstacles presented by outside government entities, internally, the villages must make changes to adapt to fulfill the responsibilities of a city. This includes hiring additional staff members and reforming the local government to fit one of four formats: Strong Mayor-Council, Council-Manager, Weak Mayor-Council, and Commission. Each form of local government would require changes in the current structure of the Suffern local government (Publications).

2.3.3 Conversion to a Ward System

The ward system consists of a currently established town that adopts additional territory outside of the town’s limits and divides the entire region into four to six different wards. To form a ward system, towns can proceed with two different courses. In the first option, the town board would adopt a resolution to place a proposition on the next ballot to install the ward system. The second method stems from a petition from the town’s residents that leads to the creation of a

referendum that appears on the next ballot (Counsel). Only after the town elects to convert to a ward system, are the surrounding areas and town divided into four to six distinct ward entities. To ensure that each ward is relatively similar in size, towns use the boundary lines for the state election districts. The ward system benefits each ward equally by allowing one representative to sit on the Town Board. In New York State, 164 towns are eligible to adopt the ward system and 13 towns currently function under the ward system (DiNapoli , 2015). In 2014, voters narrowly turned down a referendum to adopt the ward system in Ramapo (Residents). Suffern, a proponent of the Ward system, would gain greater representation in the ward system over remaining a village entity, while Ramapo would lose governing influence over the surrounding villages (Residents). Unless Suffern converts to a town, the vote for the ward system must pass through Ramapo. The literature on the ward system fails to describe the shortcomings of this classification. Boundary lines are flexible and can affect the representation and influence of the various wards.

2.3.4 Conversion to a Coterminous Town-Village

A coterminous town-village is a form of local government where a town and village share the same geographical boundaries and function together as a single entity. The first option to create a coterminous town-village is through the creation of a new village that has the same boundary lines as the town (CGR, 2011). Another method allows “for an existing village to use the General Municipal Law, Article 17, to annex all of the adjacent territory in its town lying outside the village” (Counsel). This process requires cooperation between both the village and the town where the village resides. Furthermore, a new town can petition under Article 5 of Town Law calling for the division of an existing town into two separate towns (Counsel). Lastly, State Legislature has the ability to adopt a special act creating a new town-village entity (CGR, 2011). Due to the additional procedures and levels of bureaucracy, progressing through the State Legislature and the City of Ramapo add additional barriers that Suffern cannot control. However, proposing a referendum to the people of Suffern and other surrounding villages would be a manageable method that allows Suffern to change the government structure. Although this literature explains the processes of how a village can transition to a coterminous town-village, the strategic entities and possible explanations that could clarify, why villages will or will not be successful in transitioning

is not always available. The sources did not clarify other prerequisites and requirements that a village must meet to convert to a township.

2.3.5 Services

The Village of Suffern currently maintains a police force, fire department, and water treatment facility (Village, n.d.). To increase funds, Suffern may choose to offer their services to the surrounding villages to increase revenue. Based on the law, villages determine the number of government service employees necessary to maintain the safety of their jurisdiction (Codes, 2016). Thus, if the police and fire chiefs determine that there are sufficient employees to maintain order in Suffern; these services may provide additional income eliminating the debt crisis. However, due to diminishing marginal returns, additional government employees may not provide profit but rather further debt.

2.4 Municipalities

The municipality organization of New York poses obstacles for any local government system that wishes to unilaterally make a change to its current government system. Inconclusive laws and vague nomenclature concerning state statutes fail to clearly define the proper process to becoming a specific municipal. The antiquated system of rules are also not suitable for local governments to make intelligible decisions about the modern society (Hevesi). Aside from government laws impeding local governments from taking action, which is largely due to misinformation, there are varying degrees of local government responsibility and support when determining the cost and benefits of a village, town, coterminous town-village, and a city. The literature concerning New York municipal structures creates a hierarchy amongst local governments in which cities receive the most funding and benefits, while lower level governments must provide for the community independently of any effective governmental aid (Davies). The purpose of a municipal is to provide for a local area's population so that adequate public services are available within the community. While this seems like a reasonable conclusion, much of the proceedings concerning municipalities muddle the intent of local community organizations and make decisions for societal districts difficult and cumbersome, which in turn leads to the current stagnation of local government development.

3.1 System Thinking Concepts

Systems thinking plays a vital role in our ability to properly understand all the factors that make up and affect the Village of Suffern. The purpose of scrutinizing the Village of Suffern through the lens of systems thinking is to provide a holistic approach that unveils critical aspects of the village (Parnell 12). The systems thinking process dissects the system and targets factors for analysis, allowing the village of Suffern to become a more manageable problem. In order to start the system approach, a spatial arrangement constructs the Village of Suffern as a set of subsequent systems. The spatial arrangement directly emplaces the village of Suffern into a visual representation with other systems and elements. The Village of Suffern is the system in our problem and falls under the metasystem of the Town of Ramapo because the township holds jurisdiction over the village and has significant influence over the community. In addition to the Village of Suffern, neighboring villages serve as lateral systems that share many of the same needs and amenities with the Village of Suffern. The purpose of the spatial arrangement is to help organize the system and scope the problem so that all possible factors and interacting components are considered when making a decision (Parnell 54). Figure 1 is a representation of the village of Suffern in its current surroundings as well as a breakdown of the hierarchy control.

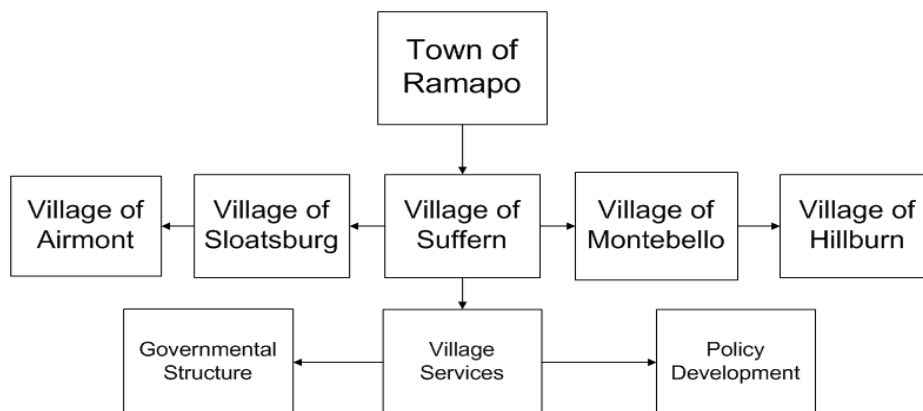


Figure 1: Spatial Arrangement

In order to ensure that Team KROGEN properly assess the current situation of The Village of Suffern, a Boundary diagram is applied to the system (Figure 2). The boundary diagram determines the scope of the Village of Suffern as a system (Parnell 36-37). As seen above, the throughput of the system correlates directly to economic revenue and expenditure. There are both external and internal monetary suppliers to this system. The village assesses taxes and generates revenue through its local services that provide Suffern with monetary satisfaction. Further, government aid comes externally to assist the village of Suffern's coverage of expenditures. The subsystems within Suffern include municipalities, services, and policy and budgeting development. Each of these subsystems affect that amount of revenue Suffern generates, as well as the amount of money Suffern expends. A revenue generation that far exceeds the expenditure is ideal. As a municipality changes, the taxation requirements change. Further, service expansion, inter-municipality agreements, and capital investments in services alter revenue generation and expenditure numbers. Finally, doctrine concerning salaries of public officials and budget building processes directly affect expenditure values.

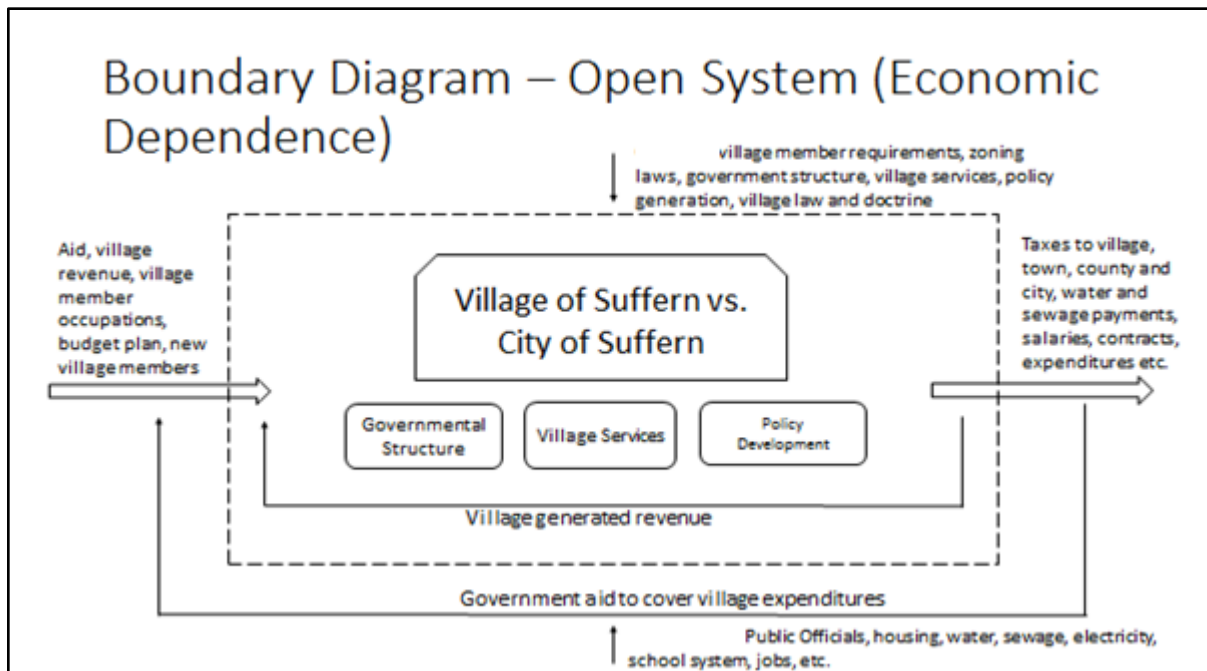


Figure 2: Boundary Diagram depicting the inputs and outputs of the system.

After scoping the Village of Suffern into critical components, our team began to construct the Value Hierarchy, in which measurable variables are pulled from the system in order to observe potential changes to the Village. The functional hierarchy helps to identify the potential actions the system should accomplish (Figure 3). As mentioned in the boundary value diagram, government structure, services, and public policy most significantly affect economies of scale in Suffern (Figure 2). For municipalities, the conversion from a village to a city, the creation of a new town, and a coterminous town village force structural changes in taxation and responsibilities of Suffern. Further, expansion of services and inter-municipality agreements will help to reduce expenses and increase revenue generation. Finally, taxation, contracts and salaries, and growth management develop both long and short term plans to satisfy Suffern’s budget deficit, fiscal stress, and future economic success or failure.

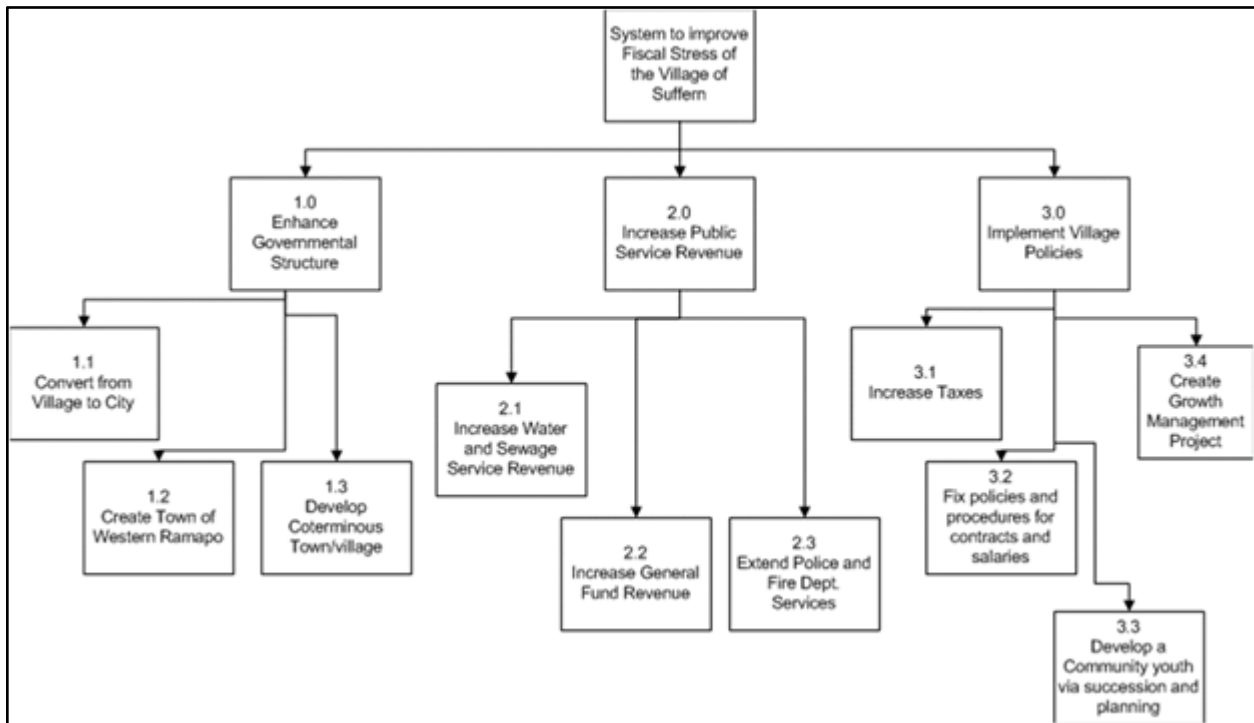


Figure 3: Functional Hierarchy Diagram

3.2 Stakeholder Analysis

To further support our research and systems approach, team KROGEN contacted several stakeholders in order to provide the best possible picture of the Village of Suffern. The

stakeholders in our research are considered to have a vested interest in the future of the Village of Suffern and are experts in their fields. All stakeholders provide a different perspective on the village of Suffern and help to further describe the narrative of the Village of Suffern which team KROGEN captures in the following sections.

3.2.1 Ed Markunas

Ed Markunas is the mayor of the village of suffern and the main point of contact for the entirety of the project. Mayor Markunas is also the main client for our research and analysis of the Village of Suffern. Mr. Markunas has a deep interest in independence from the town of Ramapo, and he is a leader within the community. Team KROGEN's ability to help accurately assess the current situation of the Village of Suffern will have a significant impact on the community. Ed Markunas concern for the village revolves mainly around the future stability of the village. He has expressed that the growing deficit of the village is a major concern, but is mainly focused on the community as a whole. Ed Markunas also provided our team with with additional contacts that played an instrumental role in the progression of our project and provided us with basic information for further inquiry.

3.2.2 Bob Morris

Bob Morris is the deputy Mayor of the Village of Suffern and operates on a similar level with the Mayor. Specifically, the Deputy Mayor gave insight into political entanglement that will most likely develop and potentially impede the village's ability to convert to another munistructure. Additionally, the Deputy Mayor supplied information concerning special districts that involve Transit Oriented Districts. The concept of Transit Oriented Districts is most suitable for the Village of Suffern given its proximity to the local train station as well as New York City. The Deputy Mayor expressed his primary interest in the potential tax advantages of constructing apartment style condominiums in the designated special districts to help spur population and economic growth.

3.2.3 Michael Genito

After speaking with the village treasurer, Mr. Michael Genito, he expressed most concern for the Village of Suffern's fiscal distress. Mr. Genito has worked in public office for multiple decades and worked as the treasurer for Suffern in the early 1980s before leaving for White Plains, NY. Mr. Genito explained that the budgetary mismanagement over the past two decades puts Suffern at a severe disadvantage with outdated budgetary protocol and antiquated policy and doctrine written in the 1980's. He expressed that the keys to rebuilding the fiscal structure of Suffern must come from a stricter budget, purchasing orders, tax increases, and a tightened spending process. Further, the development of a community youth and a succession plan will allow for future municipality changes. Also, the information technology of Suffern is deplorable. Triage is the necessary next step in the process in order to fix and stabilize the financial emergency that Suffern is facing. Finally, Mr. Genito expressed significant interest in growth management, to include two housing projects currently underway in Suffern. These growth projects are attempts to bring more middle class citizens into Suffern to generate more economic flow. Further, as New York City continues to grow and drive people out of the Manhattan area, villages such as Suffern with train access become viable living options for commuters.

3.2.4 Wade Beltramo

Mr. Beltramo is the NY State General Council, and he coordinates New York's legislative advocacy efforts, manages municipal finances, state aid, local tax issues, telecommunications, insurance and compensation alliances. Mr. Beltramo spoke more specifically on municipalities. Mr. Beltramo explained that Suffern is an urban center with approximately 5,100 people per square mile, while the town of Ramapo has 2,000 people per square mile. However, he highlighted Ramapo's 133,000 people to Suffern's 10,723. Clearly, Suffern is a small minority, but Suffern should monitor the town budget more closely. The local municipalities are not about efficiency, but about fairness and democracy. The most significant issue to Suffern is that state laws create a conflict in that villages are forced to pay town taxes whether or not the village receives benefits from the town. In Suffern's case, they provide most, if not all, of their necessary services. Mr. Beltramo explained further that the movement from a

village to a city, while eliminating the town's grip on Suffern, is highly unlikely. Most town boundaries, for the last 200 years remain unchanged, and the transition to a city requires a charter from the state. The charter combined with a home-rule request from the Town of Ramapo and needs approval and a majority vote from the legislature, which is unlikely to occur. Nonetheless, villages must respond to the needs of the community. Many increases in expenses are out of the control of the local government such as pensions and health care. There are also very few tools other than tax exemptions for local municipalities to utilize to reduce budget deficits. However, inter-municipality agreements alleviate fiscal stress and achieve economies of scale for villages. This concept allows villages to share the cost burden of various services in order to reduce spending. Additionally, an annexation or redrawing of local government boundaries consolidates various villages to allow for changes in revenue source. Finally, Mr. Beltramo expressed the need for Suffern to grow the tax base. This forces more dense development projects, but the key to a more dense population is one that is a healthier, more economically adept tax base.

3.2.5 Charles Sawicki

Mr. Sawicki is the head official of Suffern's public works and oversees the operation of water and wastewater treatment plants, as well as the street services and refuse operations. Eight to ten years ago Suffern tried to sell its surplus water to SUEZ Water Company. However, legality issues caused the deal to deteriorate. Mr. Sawicki expressed serious concern for the water and sewage treatment facilities of Suffern. He explained that both facilities have deficits from decades of poor maintenance and minimal investment of capital in new equipment for the public works department. For example, the Street and Refuse Departments, which have nearly 20 employees all together, have not received a new truck in over six years. Further, the sewage fund has spent over 4 million dollars over the past five years on prior violations of requirements as deemed by NY State. Further, infrastructure requirement changes require more capital investment to meet standards. Mr. Sawicki proposed upfront costs of 1.5 to 3.5 million dollars in order to put the infrastructure in place to run more efficient treatment facilities. He suggested providing water to Hillburn or Sloatsburg in bulk, but political officials in Suffern do not have the capital to invest in such an endeavor. Further, he explained that water and sewage service

rates are lower than county and state rates. The water rate in particular is currently at almost 1/3 of SUEZ's water rates. These water rates determine the profitability of the water treatment facility. However, an increase in the water rates must come from the village politicians, and political officials fear a damaged reputation with an increase in service rates. Any and all increases in rates, while promising for a reduction in deficits, cause severe stress on the village population. Mr. Sawicki expressed interest in a huge monetary investment in these treatment facilities. If the deficits do not decrease and funds appropriated for long term projects, Suffern may deteriorate and lose its service production abilities due to failing water and sewage treatment facilities.

3.2.6 Chief Clark Osborn

Chief Osborn, the chief of police since 2005, explained that the Suffern Police Department is currently operating with only 21 officers, which is significantly lower than 28 officers that made up the 2012 force. Due to the lower number of officers, expanding the force is necessary to serve surrounding villages and areas of unincorporated Rockland County. Crime rates continue to decrease in Rockland County causing the decline of officers on the force. However, after our conversation with Chief Osborn, he expressed his concern for expanding the area of operations for the Suffern Police Department without increasing the number of officers on staff. If Suffern solicits their services elsewhere, then the police force would need additional officers and equipment to include vehicles. Additionally, the Suffern Police Department would compete against both the Police Department of Ramapo and other village police departments for contracts with the surrounding villages. The Ramapo Police department currently serves the Villages of Sloatsburg, Hillburn, and Montebello. Part of the Village tax paid to the Town of Ramapo includes the price for police services. Should these villages chose to use the Suffern Police Department; they would continue to pay taxes to the Town of Ramapo in addition to paying Suffern. Realistically, Suffern should look to expanding the village limits to include more of the unincorporated county to increase the population serviced by the police force.

3.2.7 Chief Michael Stark

The Suffern Fire Chief, Chief Stark, reported on the status of the fire department and their current activity. Chief Stark explained that the force is a voluntary force consisting of over 120 volunteers. Although the force comprises of strictly volunteers, Chief Stark expressed their enthusiasm for fighting fires and their desire to increase involvement in other sectors. The department currently has the equipment necessary to increase the area of service and in recent years purchased a new engine. Despite the fire department's excitement to work many of the surrounding villages, these villages also have similar volunteer forces. These volunteer forces often work together in cases of bigger fires. The villages of Hillburn and Montebello have their own fire departments. Chief Stark emphasized on expanding into the areas of unincorporated Rockland County. The department has the equipment required to serve additional residents. To expand the services of the fire department Suffern needs to establish contracts with the areas of unincorporated Rockland County or expand the village limits to include these residents into the Village of Suffern. The Suffern Park area is a great example of an area of unincorporated Rockland County that the Tollman Fire Department services. Suffern must establish contracts with the surrounding unincorporated areas to increase the revenue from their services they provide.

3.3 Value Modeling

The Value Model is a crucial component in which team KROGEN is able to marry the current situation of the village of Suffern with our clients' specific directives. In order to provide the best representation for what our client's want and what is necessary for the village of Suffern, the Value model is broken down into two segments: the Qualitative value Model and the Quantitative value Model. The Qualitative Value model inputs the clients' perspective on the decision and the Quantitative Model inlays the factual evidence on how the village is currently running. Together, both models guide the final decision process and will eventually provide different courses of action the client may take in order to help resolve the current issues within the Village of Suffern (Parnell 326).

Once the system has been scoped and potential courses of actions have been identified, a Qualitative Value Model is created. The Qualitative Value Model shown includes the values measures which will score each of the alternative solutions using value models. The values measures include measuring the revenue from the Village of Suffern, the tax rate year to year, the profitability of the services in the village, the number of persons using the services and the number of towns served, yearly expenditures, and lastly the population increase year to year (Figure 4). The best solution will either maximize or minimize the measurements to understand the government structure that is best suited for the Village of Suffern. In conjunction with the Qualitative Value Model our team has provided a definition chart to better explain the value measures we are analyzing when determining the future prospects of the Village of Suffern.

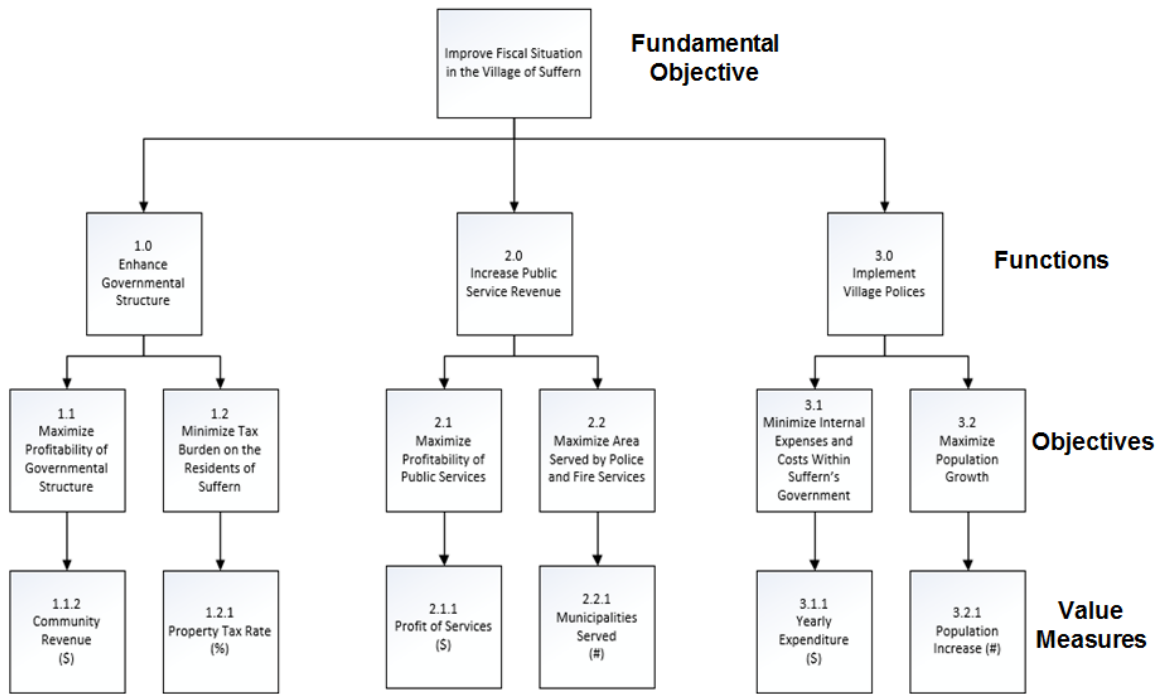


Figure 4: The Qualitative Value Model of the system

The specific values that will be assessed through this study are shown below:

Identifier	Value Measures	Definition	Measure
1.1.2	Community Revenue	The amount of money generated via all revenue sources	Dollars (\$) Minimum - Must meet expenditure
1.2.1	Property Tax Rate	Annual property tax rate	Percentage (%) Minimum - 7.5%
2.1.1	Profit from Services	The amount of internally generated revenue from public services	Dollars (\$)
2.2.1	Municipalities Served	The number of communities provided for	Number (#) Ideal - 4
3.1.1	Yearly Expenditure	Total yearly expense	Dollars (\$) Maximum - no larger than revenue
3.2.1	Population Increase	Yearly increase in population	Number (#) Minimum - 10,907

Table 1: Value Measure Definitions

Table 1 defines the value measures from the Qualitative Value Model. The definitions of value measures explain what the measures consist of and stand as the criterion used going forward to evaluate each candidate solution. Further analysis will rank order the following value measures to create an order of importance for each.

After the construction of the Qualitative Model, Team KROGEN presented our clients with a survey of the variables and potential recommendations. The survey asked our stakeholders to rank the value measures in terms of importance. By ranking the variables, Team KROGEN could assess, which variables should be weights more heavily than others and whether the client’s degree of importance for a specific variable changes if more or less of a particular variable is put into the system or taken out. This particular process of assessing our client's needs based on a level of importance for specific variables is known as a Swing Weight. The Swing weights, a result from the input of our clients, determine the weights that each variable receives and shows the importance of the variable in comparison to other variables. While team KROGEN awaited our clients’ responses we began to focus in on the Quantitative side of value modeling and stated to attribute a certain numerical value to our data. For example, one of the

value measures that we focused on was the number of Municipalities that the Village of Suffern served (Figure 5). Based on the idea that providing for more municipal structures would generate more revenue for the Village of Suffern, the following bar chart was created:

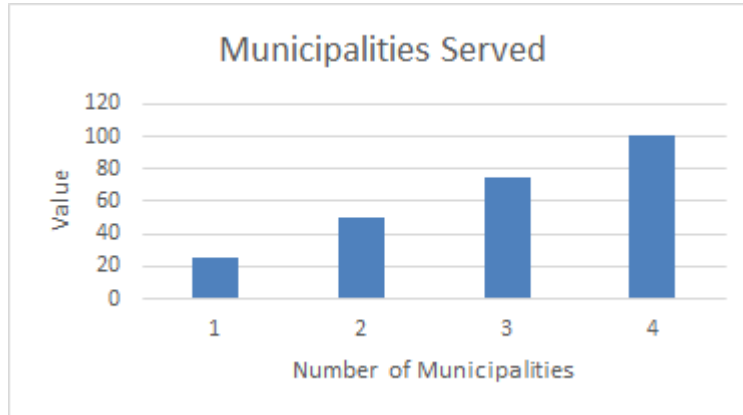


Figure 5: Quantitative Modeling

The above bar chart shows that by serving an additional Municipality, the Village of Suffern will accumulate greater value. The vertical axis refers to the value given to each added Municipal structure and the horizontal axis denotes the number of Municipalities served. A similar assessment was made on the other value measures in order to provide a platform to convert raw data into a comparable value (Appendix A and Appendix B). Once the raw data was converted into a value measure, the swing weights that were generated from the survey were applied to the value measures to weight the importance of each particular variable (Table 2). The below chart details the breakdown of the different weights:

WEIGHTS						
	Village Revenue (\$)	Property Tax (%)	Profit from Services (\$)	Municipalities Served (#)	Yearly Expenditures (\$)	Population (#)
Swing WT	95	70	55	40	100	50
Measure WT	0.23	0.17	0.13	0.10	0.24	0.12

Table 2: Swing Weights

The value measures with the greater the swing weight also have a larger measure weight. The measure weights are calculated by adding the swing weights together and dividing by the

number of variables. The Swing weights and the Measure describe the client perceived importance of each one of the listed variables, the greater the swing weight associated to the variable the greater the pull that specific measure has on the final recommendation (Parnell 335).

3.4 Redefined Problem Statement

Understanding our client’s complete problem by taking into consideration systems thinking concepts, research, and stakeholder analysis ultimately leads team KROGEN with the following redefined problem:

What approaches can the Village of Suffern take to reduce fiscal stress and ensure all community member needs are met in order to create a stable foundation for the future prosperity and growth of the Village of Suffern?

Chapter 4 Methodology

4.1 Alternative Generation

After redefining Suffern’s most pressing problem, fiscal stress became the focus. The below alternatives focus on both short and long-term economic improvements that allow Suffern to cut their budget deficit and/or generate additional revenue within the village (Table 3).

Alternatives	Key Points
Increase Tax Rate	Move the real property tax rate from 7.5 to 10%
Extend village services	Enter into intermunicipal agreements with Hillburn, Sloatsburg, and Montebello to extend Suffern’s services and generate added revenue.
New construction project	Construct an additional 92-unit apartment complex that targets singles/newly-wed middle to upper class people
Capital Investment	Invest capital for public works department to fix and add to the existing wastewater treatment facility to allow for increased service rates and revenue generation.
Maintain Suffern as it is now	No major changes (suggest a focus on budgeting and reducing future revenue generation prediction in the budget)

Table 3: Alternatives Generated for Value Scoring

4.2 Total Value Scoring

Total value scoring converts the raw data and information collected throughout the project and creates value scores. Each value score describes the relative effect of implementing a certain course of action over another. The below graph shows the individual value scores for each recommendation as well as for the entire system.

TOTAL VALUE SCORES							
	Village Revenue (\$)	Property Tax (%)	Profit from Services (\$)	Municipalities Served (#)	Yearly Expenditures (\$)	Population (#)	Total Score
Increase Tax Rate	6.62	9.49	0.00	2.44	15.51	0.00	34.06
Extend Services	5.77	0.00	11.77	9.76	12.47	11.58	51.35
New Apartment Complex	0.41	0.00	0.27	2.44	15.14	0.27	18.53
Sewage Capital Investment	0.15	0.00	0.31	2.44	10.55	0.00	13.45
Current	0.00	0.00	0.00	2.44	15.51	0.00	17.95

Table 4: Value Scoring

Each value measure and recommendation is paired with a value to show where the Village of Suffern can improve the most as a municipality. Each one of the specific values are generated by multiplying the value associated with each raw data point and multiplying it by the measure weight or swing weight. For example, in the current scenario under number of municipalities served, there is a baseline value of 2.44. This value is generated by comparing the raw data to the quantitative value for a single municipal (Table 4). The value associated with a single municipality is 25 points, but this value is bounded by how much emphasis our clients place on expanding services to other municipalities. Based on the measure weight of .10, our clients do not view extending services to other municipalities as important as some other observable variables. Consequently, when the quantitative value is multiplied by the measure weight, the value that is generated is equal to 2.44. This same process is used throughout all variables and recommendations to provide a total score and help our client make the best decision based on the given inputs (Appendix E). Once all of the value measures are calculated

and added for each specific recommendation, a final scoring is created. The final scoring in this specific study places Extending Services as the number one recommendation for the client to consider implementing as it has the highest value score (Table 4). It is important to note that some recommendations and variables generate a value score of zero. This is largely due to the fact that implementing some courses of action will not necessarily mean that a specific value measure will be affected. For example, if the village of Suffern were to increase its property tax rates, that specific recommendation would generate zero value for population and profit from services because increasing property taxes is an independent function of population and profit from services.

Chapter 5 Analysis and Results

5.1 Results

5.2 Total Value vs. Total Profit

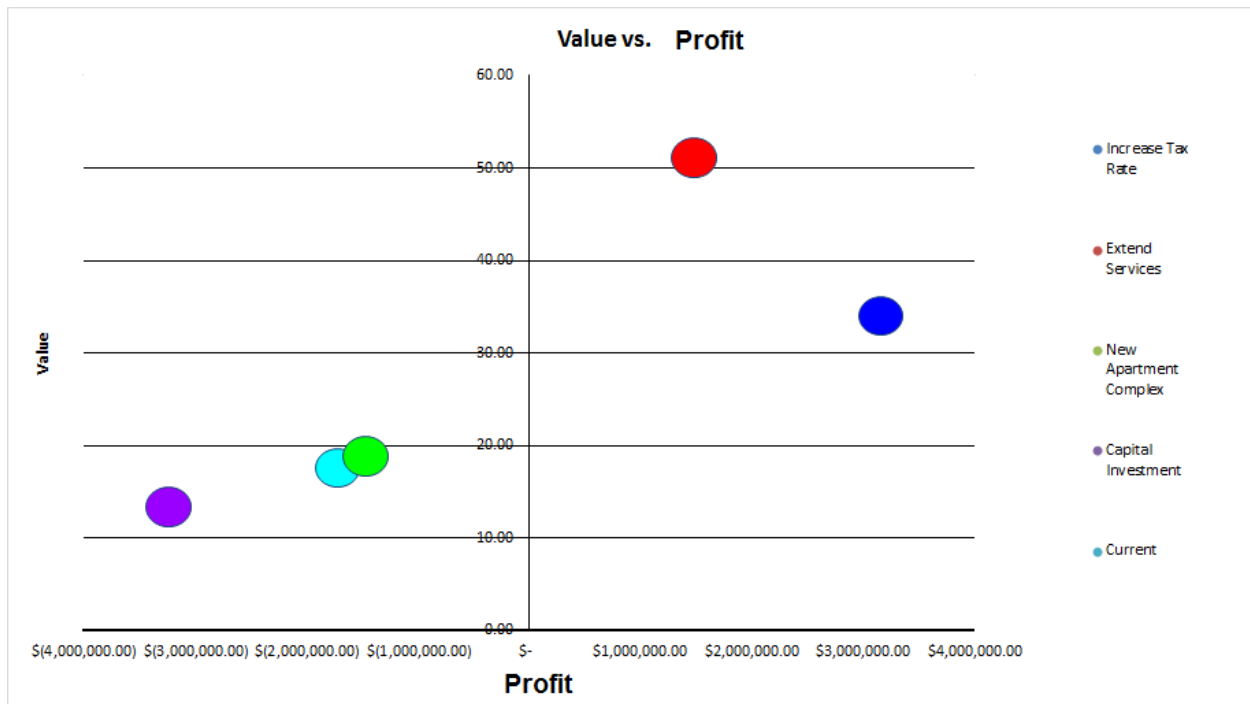


Figure 6: Value vs. Profit Graphic

The value vs. profit graph above denotes total value given to each alternative in the y direction and total profit generated in the x direction. The graph depicts each of the alternatives generated as well as the current or baseline construction. As is evident in the graph, the extension of services through inter-municipal agreements generates the highest total value while producing nearly \$1,500,000 in profit. The increased tax rate alternative, although very profitable, has limited value due to its extensive burden on the taxpayer. Finally, as is true with the baseline, apartment complex, and capital investment courses of action, they produce a far lower value score and operate at a loss, in which total expenditure exceeds total revenue. Although this value vs. profit graph only depicts short term success, it is a strong indicator that the extension of services is a dominant alternative and the recommended alternative.

5.3 Sensitivity Analysis

Sensitivity Analysis helps to determine whether or not the final recommendation proposed to a client will change if the client emphasized different value measures as more important than originally specified. Do to the fact that swing weights are a product of our client's personal preference, it is likely for the swing weights to change and consequently affect the final result (Parnell 335). In order to determine whether or not a particular swing weight may alter the final outcome, team KROGEN created visual representations of potential changes in the swing weight and their resulting effect on the final outcome. After conducting a sensitivity analysis on every value measure, our team has determined that extending Services remains the best possible regardless of our clients emphasis on different swing weight values. The below graph is an example of a sensitivity analysis conducted on yearly Expenditure. No matter the change in swing weight for yearly expenditure, the recommendation for extending services still remains the best possible option (Appendix C and Appendix D). Nonetheless, there is evidence that by altering swing weights, a recommendation for investing in sewage capital investment will not provide as much value to the village of Suffern if a greater emphasis is placed on the particular measure. When there are lines that crossover one another as indicated in the below graph, this is a sign that altering swing weights does have an effect on the final recommendation.

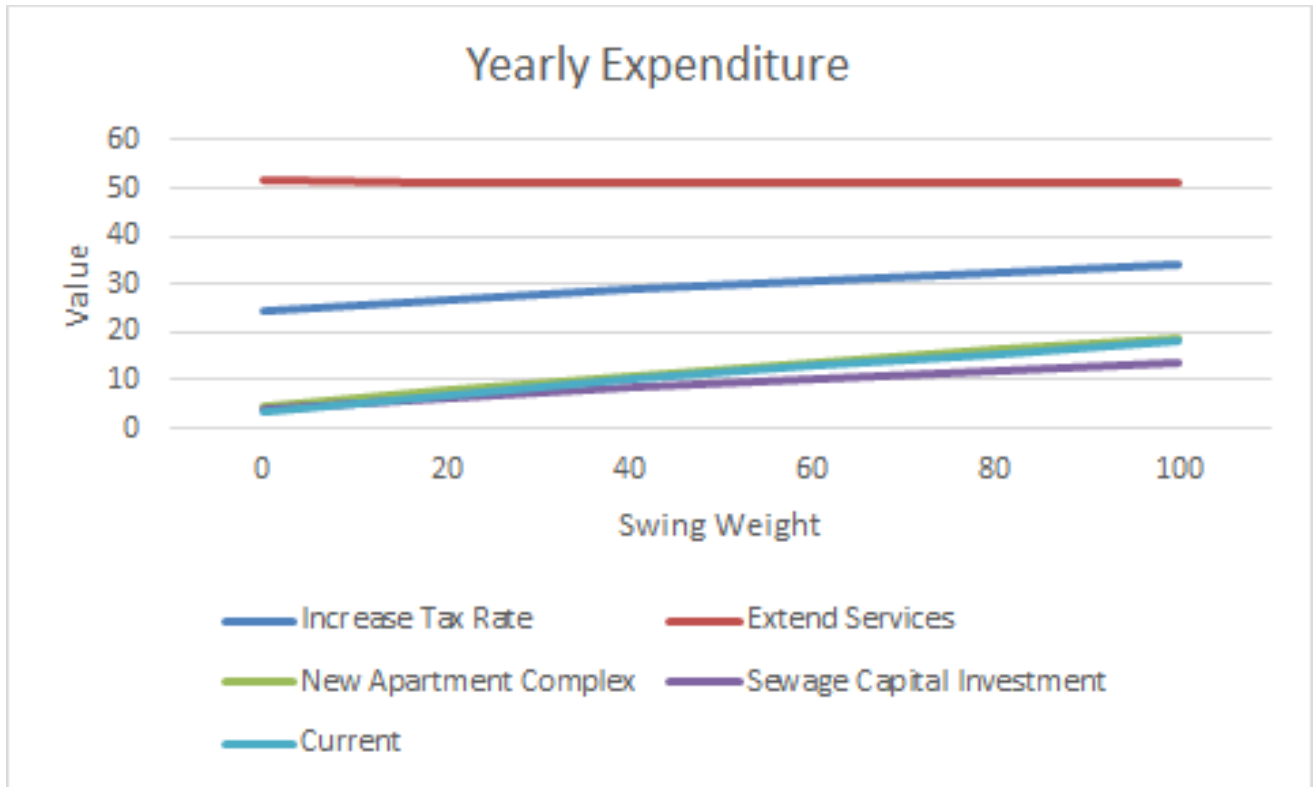


Figure 7: Sensitivity Analysis

Chapter 6
Recommendation / Improvements / Future Work

6.1 Recommendations

Following total value scoring and value vs. profit analysis, extension of services through inter-municipal agreements demonstrates the highest value while operating at or around 1.5 million dollars in profit. The extension of services includes not only police and fire department extension, but also extension of public works and various minute services included in the service charge for all members of the Village of Suffern. The extension of this service charge, in whatever capacity, to the members of the Villages of Sloatsburg, Montebello, Hillburn, and Airmont will allow Suffern to generate additional revenue for their services at a minimal added expenditure cost. Suffern, with a population of over 10,000 people, has the capacity to greatly extend and improve its services to neighboring municipalities. Further, Suffern would do well to identify areas in which inter-municipal contracts for water, winter road-salt, waste-water

treatment, etc. minimize cost and increase revenue. Additionally, Suffern could simultaneously increase the tax rate. While this would decrease some value, a minimal increase in the real property tax rate would generate an additional one million dollars in revenue for less than a 1% increase in taxes. The increased tax rate would allow Suffern to fund additional capital projects, which leads to the tertiary recommendation of growth management. Basic budgeting restrictions (to include heavily scrutinized future revenue prediction bonds), extension of services and inter-municipal contracts, as well as a tax increase improve Suffern's short term fiscal and economic stress. However, as Suffern begins to patch its budget deficit and consistently generate revenue, it will need to direct attention to long term economic prosperity. A growth management plan that targets middle and upper-class newlyweds and younger singles in the workforce will bring more revenue into Suffern in the decades to come. Adding powerful consumers in Suffern would bring considerable revenue and business to a Village that can utilize its location and transit system to and from NYC to bolster its internal economy.

6.2 Future Work

This project scratched the surface of the problem at hand and opened up further opportunities to investigate the Village of Suffern and potential solutions to reduce the financial stresses. This project investigated four different courses of action to include increasing the property tax rate, extending public services to other communities, constructing a new apartment complex, and investing in the sewage waste management facilities. Further research of potential costs and revenues for each of the courses of action will allow for more accurate models to ensure that Suffern chooses the most efficient alternative. Creating more alternatives that consist of a combination of the four alternatives presented in this project may find a solution that has a greater value than the alternatives presented thus far. Furthermore, there are additional services that the Village of Suffern has yet to implement. First, many houses are currently situated in a floodplain and risk losing their homes due to government regulations. By creating levies, these at risk houses and individuals would remain in their current residencies and potential construction in areas threatened by hazardous flooding. This project would maintain the current residents in Suffern and possibly attract additional residents increasing the population and tax revenue.

Lastly, continued research in changing the village to a different municipality structure is necessary to form a viable long-term plan for the future of Suffern. Although Mr. Beltramo explained that the likelihood of a municipality change is very low, additional research through the town of Ramapo may reveal that other avenues to change to a different municipality to reduce costs. Further research into the changing of the municipality in Suffern may reduce the tax burden decreasing the yearly expenditures in the village. This project has endless opportunities to investigate further ways Suffern can ensure a healthy financial community.

7.1 References

(n.d.). Retrieved from <http://codes.findlaw.com/ny/town-law/twn-sect-20.html>

Baynes , P. A., & Porter , J. B. (1987). *From Village to City: A Guide to a New City Incorporation*. Albany : New York State Conference of Mayors .

CGR. (2011). *Coterminous Town-Villages in New York State*. Malone Study Committee .

Codes, N. Y. (2016). *New York Town Law*. Retrieved from Find Law :
<http://codes.findlaw.com/ny/town-law/twn-sect-20.html>

Counsel, O. o. (n.d.). *What is a Coterminous Town-Village?* New York : Department of State.

Davies, Mark. "Article 18 of New York's General Municipal Law: The State Conflicts of Interest Law for Municipal Officials." Albany: Albany Law Review, 1996.

Davies, O. (2016, February 18). Financial Statements and Supplementary Information: Village of Suffern, New York. Harrison, NY, USA.

Deyo, G. F. (2015, May 22). Office of the State Comptroller. Albany, NY, USA.

Diaz, D. (2001). Fiscal Stress and Growth Management Effort in Wisconsin Cities, Villages, and Towns. *State and Local Government Review*, 7-22.

DiNapoli , T. P. (2015, December). *Information for Town Officials*. Retrieved from State of

General, N. Y. (n.d.). *The Ward Subcommittee* . Retrieved from Town of Bethlehem :
<http://www.townofbethlehem.org/DocumentCenter/View/3847>

Genito, M. A. (2016, March 18). 2016-2017 Budget Message. Village of Suffern, NY, USA.

Hevesi, Alan G. *Outdated Municipal Structures*. Government, Albany: New York State Comptroller's Office, 2006.

Incalcaterra, L. (2014, February 07). "*Comptroller Names Suffern 'Most Fiscally Stressed' Village in New York*". Retrieved from Lohud: The Journal News:
<http://www.lohud.com/story/news/local/westchester/2014/02/07/comptroller-names-suffern-most-fiscally-stressed-village-in-new-york/5279365/>

Markunas, E. (2016, September 06). Mayor of Suffern. (J. Seloff, Interviewer)

New York Controller : <http://www.osc.state.ny.us/localgov/pubs/townoff/ito.pdf>

Parnell et al. 2nd ed. *Decision Making in Systems Engineering and Management*. 2011.

Publications, K. (n.d.). *The History of the City of Rye, New York*. Retrieved from The City of

Residents, R. (n.d.). *A ward is a district within a town that elects its own Town Council member* .
Retrieved from Vote 6 Wards : <http://www.vote6wards.org/what-is-a-ward-system/>

Rye : <http://www.ryeny.gov/history.cfm>

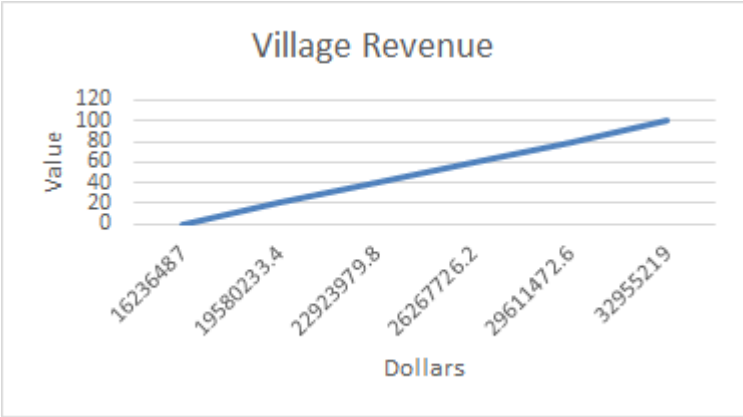
Tatlock, M. W. (1950). Sewage and Industrial Waste. *Water Environment Federation*, 1536-1542.

Village, S. (n.d.). *The Village of Suffern Online* . Retrieved from The Village of Suffern :
<http://www.suffernvillage.com/>

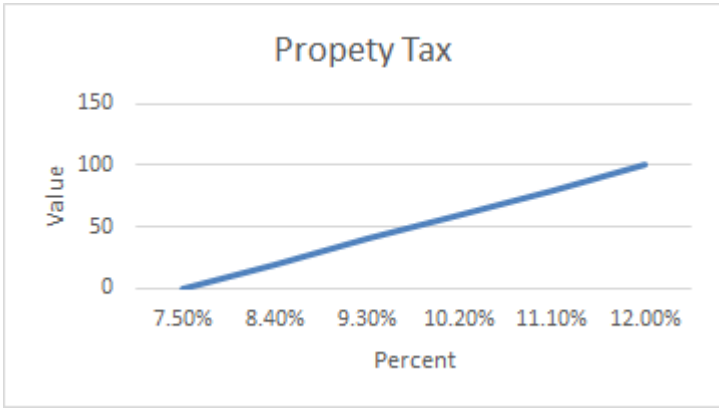
Wilson, J. (1921). Water Rates in Small Cities and Villages. *American Water Works Association*, 38-47.

**Appendix A
Value Functions**

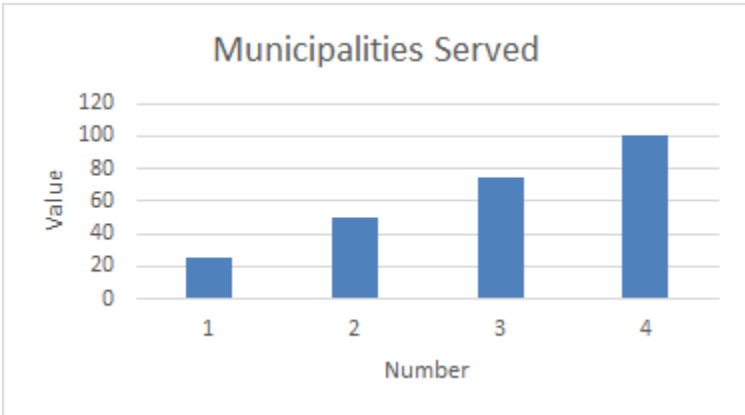
Village Revenue (\$)	
X	Value (Y)
16236487	0
19580233.4	20
22923979.8	40
26267726.2	60
29611472.6	80
32955219	100



Property Tax (%)	
X	Value (Y)
0.075	0
0.084	20
0.093	40
0.102	60
0.111	80
0.12	100

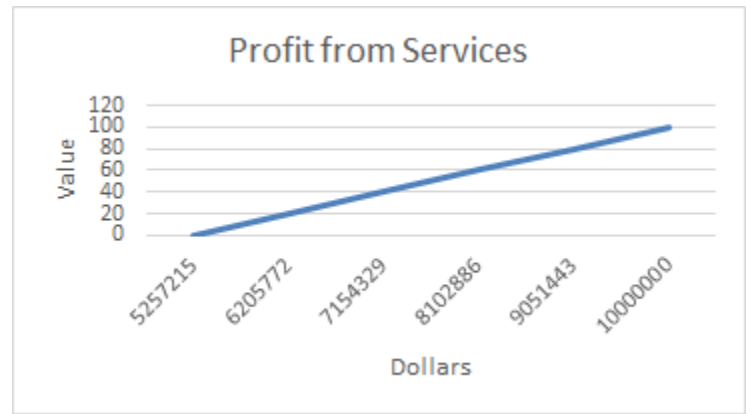


Municipalities Served (#)	
X	Value (Y)
1	25
2	50
3	75
4	100

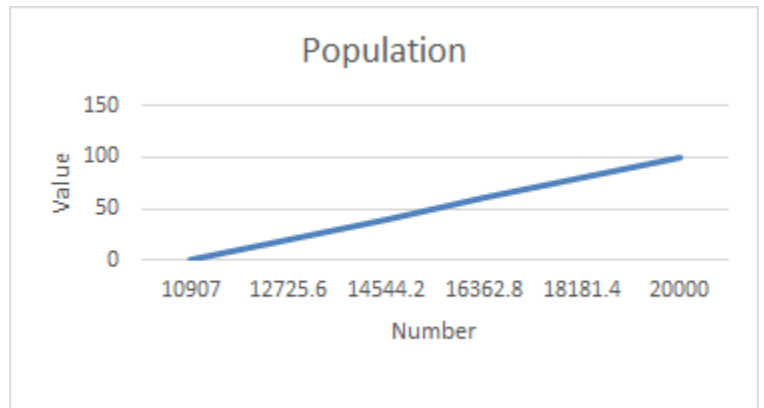


Appendix B Value Functions Continued

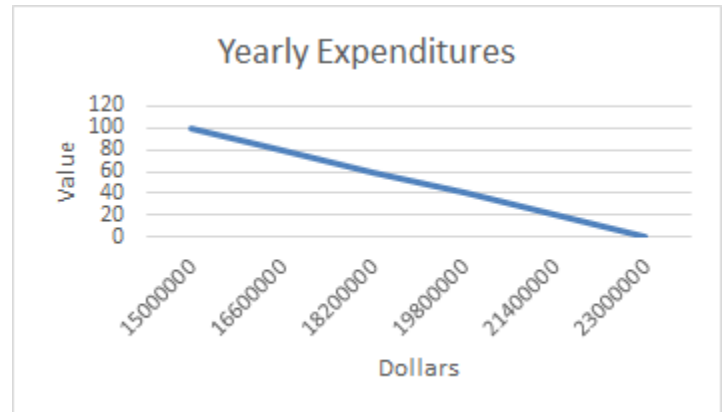
Profit from Services (\$)	
X	Value (Y)
5257215	0
6205772	20
7154329	40
8102886	60
9051443	80
10000000	100



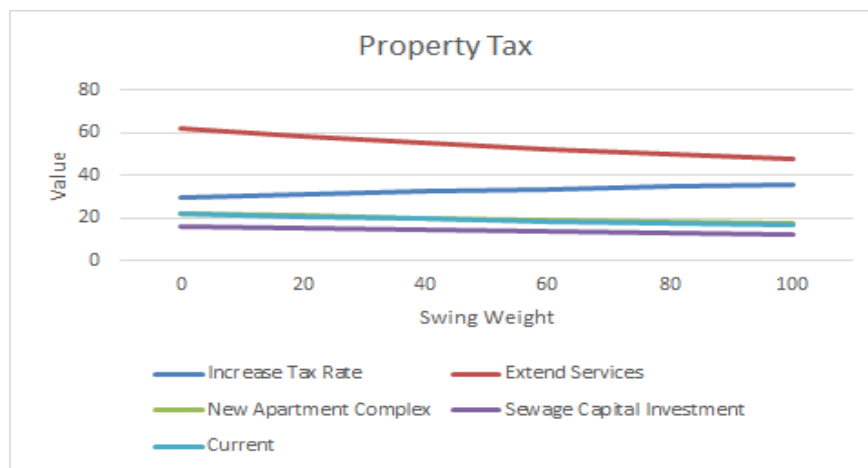
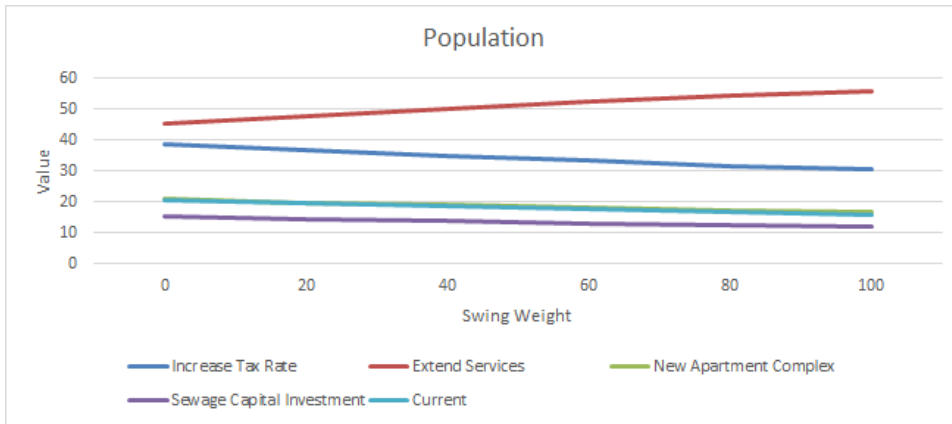
Population (#)	
X	Value (Y)
10907	0
12725.6	20
14544.2	40
16362.8	60
18181.4	80
20000	100



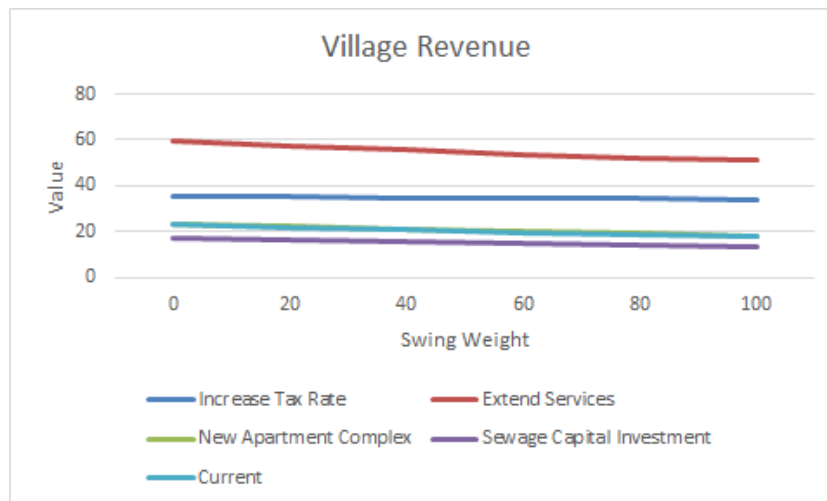
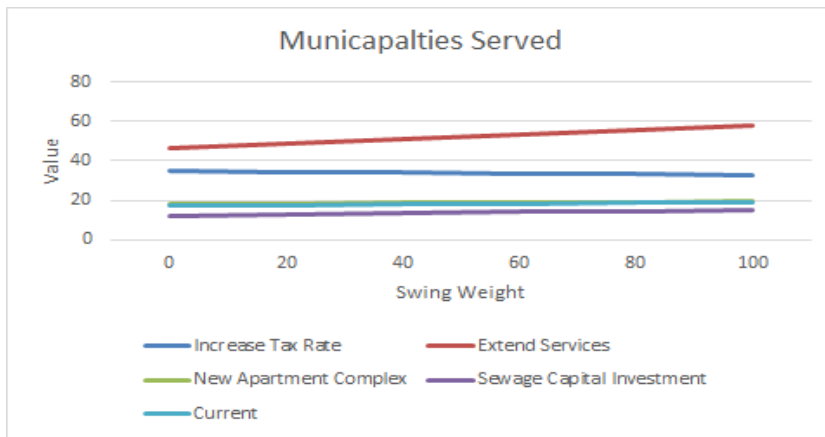
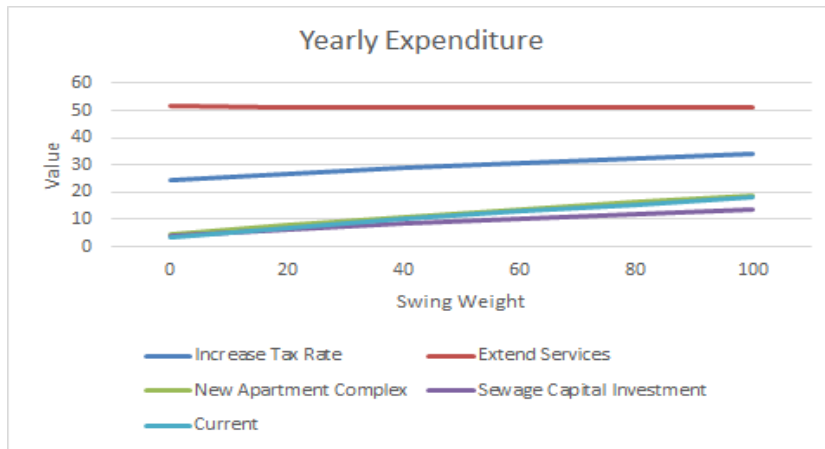
Yearly Expenditures (\$)	
X	Value (Y)
15000000	100
16600000	80
18200000	60
19800000	40
21400000	20
23000000	0



Appendix C Swing weights



Appendix D Swing Weights Continued



Appendix E Raw Data Analysis

RAW DATA MATRIX							
	Village Revenue (\$)	Property Tax (%)	Profit from Services (\$)	Capilities Serve	Yearly Expenditures (\$)	Population (#)	
Increase Tax Rate	21015012	0.1	5257215	1	17911198	10907	
Extend Services	20398998	0.075	9419726	4	18911198	19543	
New Apartment Complex	16534846	0.075	5353574	1	18034055	11107	
Sewage Capital Investment	16345557	0.075	5366285	1	19540798	10907	
Current	16236487	0.075	5257215	1	17911198	10907	
Ideal	32955219	0.12	10000000	4	15000000	20000	
VALUE MATRIX							
	Village Revenue (\$)	Property Tax (%)	Profit from Services (\$)	Capilities Serve	Yearly Expenditures (\$)	Population (#)	
Increase Tax Rate	28.58	55.56	0	25	63.61	0	
Extend Services	24.90	0	87.77	100	51.11	94.97	
New Apartment Complex	1.78	0	2.03	25	62.07	2.20	
Sewage Capital Investment	0.65	0	2.30	25	43.24	0	
Current	0	0	0	25	63.61	0	
Ideal	100	100	100	100	100	100	
WEIGHTS							
	Village Revenue (\$)	Property Tax (%)	Profit from Services (\$)	Capilities Serve	Yearly Expenditures (\$)	Population (#)	Total
Swing WT	95	70	55	40	100	50	410
Measure WT	0.23	0.17	0.13	0.10	0.24	0.12	1.00
TOTAL VALUE SCORES							
	Village Revenue (\$)	Property Tax (%)	Profit from Services (\$)	Capilities Serve	Yearly Expenditures (\$)	Population (#)	Total Score
Increase Tax Rate	6.62	9.49	0.00	2.44	15.51	0.00	34.06
Extend Services	5.77	0.00	11.77	9.76	12.47	11.58	51.35
New Apartment Complex	0.41	0.00	0.27	2.44	15.14	0.27	18.53
Sewage Capital Investment	0.15	0.00	0.31	2.44	10.55	0.00	13.45
Current	0.00	0.00	0.00	2.44	15.51	0.00	17.95
Ideal	23.17	17.07	13.41	9.76	24.39	12.20	100.00