1/22

TERM A

PROGRESS REPORT/FEASABILITY STUDY

Presented by:
WPI's Civil and Environmental Engineering Program

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Term A Summary of Activities

The MQP team under professional guidance at WPI provided scores for different feasible solutions for meeting Sterling's public safety needs. There were several alternative ideas that had been discussed during the initial steps of the project. Elimination of choices is due to the lack of information, or by recommendations of Sterling Officials, Department Heads or Professional Engineers. The following three choices are further explored because of the decisiveness of town officials regarding the details involved with each one:

- Renovating facility and integrating departments at present site
- Upgrading present facility and building a new police station
- Upgrading facility and moving police department to previous town hall

The following report details the explanation for each score. Based on this method, the most feasible solution would be to build a new police station at an alternative site, while renovating the fire department at the existing site.

Weights

Alternative Solutions

Performance Criteria	Building Needs Cmt.	Department Chiefs	Board of Selectmen	Average of Officials
				Weight
1) Location(s)	4.8	4.5	2	3.77
2) Space	4.4	5	3	4.13
3) Functionality	4.9	5	5	4.97
4) Operational Costs	3.9	4.5	4	4.13
5) Construction Costs	3.6	4	4.5	4.03
6) Construction Time	2.2	3	3.5	2.90
7) Town & Department Growth	4	4.5	4.5	4.33
8) Esthetics	3.3	4	3	3.43
9) Maximum Functionality level	3.9	5	3.5	4.13
10) Departmental Communication	2.1	1.5	3	2.20
11) Community Relations	4.1	4.5	4	4.20
12) Overall Safety	4.6	4.5	NA	4.50
13) Meeting Suggested Codes	4.3	3.5	5	4.33

Integrated Facility at Present Site		Police Dept. at Alternative Site		Police Dept. at Previous Town Hall		
Score	Value	Score	Value	Score	Value	
10	37.67	25	94.17	10	37.67	1
10	41.33	25	103.3	5	20.67	2
10	49.67	25	124.2	5	24.83	3
20	82.67	20	82.67	10	41.33	4
10	40.33	25	100.8	10	40.33	5
10	29.00	25	72.50	20	58.00	6
20	86.67	25	108.3	5	21.67	7
20	68.67	20	68.67	25	85.83	8
10	41.33	20	82.67	5	20.67	9
25	55.00	10	22.00	20	44.00	10
10	42.00	20	84.00	20	84.00	11
10	45.00	25	112.5	10	45.00	12
20	86.67	25	108.3	10	43.33	13

Summation of Values	706.00	1164.2	567.3

4/29

INTEGRATED FACILITY AT PRESENT SITE

LOCATION

The current site of the Sterling Fire and Police Departments satisfies the need to be centrally located. Currently there is a problem with traffic congestion, but with Sterling's projected growth it is a concern that will be magnified over the next thirty years. The questionable soil conditions on this site may pose a problem for new construction. The current septic system is unable to meet the needs of a future combined facility.

Land, probably from the park will have to be utilized for department operations, regardless of one or both facilities remaining. When the departments are requiring more space in thirty years the surrounding area may force one or both departments to relocate. A separate facility, housing the police department may eliminate future relocations by planning for additions during the design phase of this project. Thus the MQP team scored the location of the integrated facility a ten based on its inability to meet future town and departmental needs.

SPACE

Currently the space requirements are not being met in the facility. As the departments continue to grow they may have difficulty operating in the combined facility. Even if land is acquired and the combined facility remains, police and fire vehicles may not safely and readily be dispatched. As seen in past years this presents an issue of safety to department and public persons. The MQP team scored space criteria a ten, based on the dangers associated with public safety vehicles impairment to quickly and safely exit the site.

FUNCTIONALITY

The present site is already too small and outdated for the departments' operations. A new combined facility should be designed to meet department function for thirty years; thus it would be larger and require more parking than the current facility. It would be necessary to take land from the park and/or the banks adjoining the site. If necessary, the

land taken from the surrounding area will disrupt the private industry and residential life in area.

The combined facility must be able to meet future departmental needs. If more land is acquired, it will be possible to build a facility that meets this need. The departments will eventually outgrow whatever facility is designed. Consideration to this fact suggests that available land in the town center will even be less. Building in a different location will allow a design to incorporate a future need for expansion. The score for functionality is a ten.

OPERATIONAL COSTS

Operational costs will be minimized using one structure to house two departments. This can be attributed to the savings regarding personal and maintenance. Currently the police dispatcher also fulfills clerical duties for the fire department. In the future, increased workloads may limit the dispatcher's capability to handle responsibilities beyond dispatching. Eventually town offices and departments must consider hiring new persons regardless of public safety facility solution.

The MQP team believes that maintenance and other operational costs for a combined facility will remain smaller than separated department facilities, regardless of departmental growth. Heating, basic upkeep and communication requirements for the one structure will help to minimize fiscal budgets. Thus the MQP team scored the operational cost of a combined facility at the present site a twenty.

CONSTRUCTION COSTS

The cost of construction for renovating the station could be less than that of two separate stations due to shared resources. It can, however, be more expensive to remodel the existing structure than it would be to build a new one from the ground up. Questions have been raised as to the quality of the soil on the location. If the soil cannot support the new building than additional expenses could occur. The present septic system would need to be updated in order to serve a larger complex. The net return for renovating and

adding onto the structure may be less dollar for dollar when considering the lifetime of the departments' use of the structure. Due to these considerations the team gave a ten.

CONSTRUCTION TIME

Construction time for renovating and adding on to the existing structure may or may not take as much time as renovating the old town hall or building a new structure. The design phase of the project and decisive planning will greatly influence the construction time of any solution. A key point of interest is that public safety operations will be greatly effected due to the construction. Thus the score for construction time is ten based on impediment of departments' operations during the construction phase.

TOWN & DEPARTMENT GROWTH

A combined station must provide for departmental and town growth over the next thirty years. If the combined facility at some point at or beyond thirty years becomes too small for both departments to function, one department can be moved leaving the other with enough space to function for many more years. Town growth could be a problem for a station at this site. As the town of Sterling becomes more populated, traffic in the area of this site will probably become more congested. Consideration to departments' necessity to exit the site quickly and town traffic congestion produced a score of twenty.

AESTHETICS

The aesthetics of the area surrounding this site is very scenic. A combined police and fire department may look out of place no matter how the building was finished. It would also infringe on the park, which brings beauty to the center of Sterling. During the preliminary meeting with the Building Needs Committee proposals regarding the overall appearance of this solution addressed this issue, thus the score is a twenty.

MAXIMUM FUNCTIONALITY

The maximum functionality of this facility could only be achieved by taking land from around the site. Without more land, a facility would not be built that meets the functionality needs of the departments. Given the data on police and fire departments' space requirement it is highly unlikely that maximum functionality could be achieved on the present site. The score for the integrated facility to meet maximum functionality on the present site is ten.

DEPARTMENTAL COMMUNICATION

A combined facility provides excellent opportunities for departmental communications. They would both operate from the same location making it easier to coordinate joint operations. In addition a joint station would allow one dispatcher to serve both departments with greater efficiency. The score for departmental communication is twenty-five.

COMMUNITY RELATIONS

Taking land from the neighboring banks would upset both the banks themselves and their patrons. As with many smaller communities the downtown shopping district in Sterling has been lessened in recent years. For revitalization process to begin several considerations must be taken into account. The residents in Sterling must be able to quickly and easily drive through the downtown area. Traffic congestion will only rise over the next thirty years; thus public operations should be kept to a minimum in areas of concern. With an increasingly narrowed tax base, Sterling officials must be aware of acquiring land or property that will hurt town businesses. Taking land from the park would alter a town landmark and meet resistance from town residents who value the park. The score for community relations is a ten.

OVERALL SAFETY

The departments' ability to operate in a manner ensuring public safety is not deterred at all due to separate facilities. Police and fire vehicles are required to quickly

and readily deploy. With increased traffic in the town center, the possibility of accidents only will rise. As seen in recent years parking for volunteer fire personal is impaired due to minimal space. During an emergency the ability for fire personal and police to safely perform duties is lessened at the present site. A score of ten is assigned for the overall safety being met at the present site.

MEETING CODES

Any structure on this site would require additional space in order to meet both the town needs and the code requirements. If additional space is allotted, a station, which meets code requirements, is easily achieved. The score is twenty.

10/22

POLICE DEPARTMENT AT ALTERNATIVE SITE

LOCATION

Location was given a score of twenty-five. When the police station is looked at as a separate building, it must be realized that the station does not need to be in a centralized location because it's officers are always on duty, not volunteer as are the fire fighters. The MQP team suggests that the new location for the police station be along Route 12. The reason being, it is near the center of town, which is convenient for the public, and it is much less congested. Also, there is much more space for parking, as well space for building the structure, and expansion.

SPACE

Space is a very essential aspect of the considerations and was given a score of twenty-five. In our discussions with various chiefs, officers, and different personnel, a continuing problem arose, which was space. In Westminster, for example, the new public safety facility there is adequate, but there is not enough space. Another example is in Sterling's police station. There is nearly not enough space at the existing site for all of their needs. It is also apparent that space is a vitally important part of the considerations for future developments. If the facility were separate from the fire department, and placed in an area such as Route 12, space would not be limited.

FUNCTIONALITY

Functionality is also a vital facet of future considerations and was given a score of twenty-five. It is necessary to ensure that the building is constructed in the most effective and efficient manner for both present and future considerations. If a building is not built with proper functionality in mind, or built solely for meeting the present needs, the building will soon be ineffective and will need to be once again updated. This obviously is not effective use of capital and poor future considerations.

OPERATIONAL COSTS

Operational costs received a score of twenty because in the long run, this is the area of the new facility that will cost the most money. A facility must be built in a manner that minimizes all electrical, heating, air conditioning, etc. costs. After a few years, a poorly constructed facility will be a larger burden to the tax payers than will the construction of the facility itself. If a new facility is designed, the most effective materials and methods can be utilized to minimize operational costs.

CONSTRUCTION COSTS

Construction costs received a score of twenty-five. The MQP team believes that building a police department at a new site may be more cost effective than expanding and renovating the new site, or the town hall. The existing sites are in such poor shape that a large portion of the construction cost will include demolition.

CONSTRUCTION TIME

The score of construction time will be twenty-five. Building a new facility would cut down on construction time because it will avoid time needed for demolition. Also, decisive construction planning for a new facility will not impede on the operations of the departments. Construction time can be kept to a minimum with accurate architectural details and proper construction management.

TOWN AND DEPARTMENT GROWTH

The town and department growth was given a score of twenty-five. As the town grows, the departments will grow accordingly. As has been seen in other cities in the surrounding area, this factor is very important. Buildings are, and must be designed for growth considerations. If they are not new buildings become obsolete and out of date very quickly. In order to meet the needs of the town effectively, the growth must effectively be planned for. Building a new police facility allows for these proper considerations to be

taken into account. If the department is established on Route 12, current needs assuredly will be met. Future needs can also be considered, evaluated, and met.

AESTHETICS

It was decided that the score of the aesthetic variable would be equal to twenty. The reason for this decision was that construction costs increase a substantial amount as aesthetics of the exterior of the police station are improved. For example, brick cost substantially more per square foot than aluminum siding. Furthermore, aluminum siding is much lighter than brick, which must be taken into consideration when designing the structural members of the building. For example, as columns support greater loads, the price of the column will increase. Consequently, building a new facility has to consider these variables. Furthermore, since the facility is removed from the town center, we are not as limited in architectural detailing.

MAXIMUM FUNCTIONALITY LEVEL

The score of the maximum functionality level of the police station is twenty. It is not economical to design a public safety facility building for the next thirty years. The reason being, Police Department growth is based on population growth. It should be noted that the population growth is merely an assumption, with no definite validity. It does not matter whether the assumption is made by the Town Clerk, or the Census bureau, it is still an assumption. Realistically, taxpayers will be reluctant to pay for a project without factual information to support the assumption. Therefore, the real objective would be to design a facility in such a way that makes expansion in the future extremely effortless and economical.

DEPARTMENTAL COMMUNICATION

The Departmental communication variable holds a score of ten. The belief is that daily face-to-face interaction between the Police and Fire departments is not crucial for the safety of the town. Both departments are headed by highly trained professionals who

understand the methods of response. If information needs to be communicated to the divisions, the chiefs could arrange for meeting times.

It is not essential that there be two dispatchers, one for each department. Traditionally, the dispatcher is located in the Police department. The reason being, since police cruisers are continuously traveling within Sterling, it is necessary to be able to have immediate contact with them. Furthermore, a greater amount of police activity exists, than fire activity.

COMMUNITY RELATIONS

The score of community relations will be twenty. It is important to maintain good relations between the police, fire, political figures and the community. As a result, community satisfaction for the facility is essential. Yet, it does not carry the largest weight because the entire community can never be satisfied due to the diverse beliefs, and economic classes. If complete community satisfaction is sought, the project may never occur.

OVERALL SAFETY

The overall safety of the police department is essential. Consequently, it is given the highest possible score of twenty five. When designing the structural integrity of buildings, engineers place the highest important factors on Essential Facilities, or facilities that must remain safe and usable for emergency purposes. Since a police department falls under this category, it should be given a high ranking. A new police department will provide a high overall safety because many variables will not be overlooked as they may be when modernizing the poorly constructed existing facility, or the town hall.

MEETING CODES

These codes are legal authorities established for economical and safety purposes. For this reason, it is important to meet the minimum requirements. Any other codes besides the minimum are suggested codes only. The farther an engineer deviates from the

minimum, the safer the facility, yet the more expensive. A new facility will allow codes to be met with ease. As a result, the MQP team gave this variable a score of twenty-five.

16/22

POLICE DEPARTMENT AT PREVIOUS TOWN HALL

LOCATION

Although it may be apparent that the location of the structure will satisfy the Sterling Police Department's need to be centrally located, other considerations must be taken into account. The building is in an area where traffic congestion is a growing concern. Police mobile readiness is a necessity in any department. The readiness for police vehicles to quickly exit the grounds for emergency calls is greatly impaired by the traffic in many smaller cities and larger towns. Although the situation in Sterling center has not reached that point yet, a thirty-year life expectancy makes this an issue.

If Sterling center is to remain scenic, road widths must be kept to a minimum. Presently, there are unoccupied buildings to the North and South of the old town hall. As a result, consideration must be given to the need for town parking. If the all buildings were to be occupied, Sterling citizens may find road congestion in the town center to be a problem. This concern is magnified by Sterling's recent residential population boom. Many of the residents moving into Sterling are commuters whose needs include, quick and easy access to, and through the town center's small shopping district. As seen in many towns around the area, poor planning of town centers have driven out much of the traditional down town shopping into larger strip malls and supermarkets. The Sterling Police Department will inevitably contribute to a similar situation. As the town continues to expand, the severity of traffic congestion will only increase. Thus the MQP team gave a score of ten to moving the police department into the former Town Hall building.

SPACE

The space needed to run a modern police facility may be met if the Sterling Police Department occupies the old town hall. Space fulfillment is not completely met due to questions about the structural integrity of the building, particularly the second floor. The police department, unlike other town offices requires certain design criteria because of security needs. These design criteria involve reinforcements to walls and building entrances. These reinforcements are heavier and magnify the building's structural eligibility.

One of the growing needs of police departments is to garage police vehicles. Police vehicles in recent years have undergone many technological changes, making the need to house them a growing necessity. Presently, there is no area to house the vehicles

at the old town hall. On the East Side, or the back of the building, parking space is already limited. To add any housed parking area to the structure would only limit public parking. This would further increase Main St. parking and traffic congestion.

As a result of the Police Departments community role, a unique space requirement is needed. Security and office space must be met in a very specific method. The old town hall was designed to be a town hall, rather than a police station. Additional growth to the department in the following years may require a larger building than the town hall could possibly supply due to its location. The lack of surrounding area for expansion, the lack of functional space, and the unsure structural integrity of the building directed the MQP team to give the space requirement a five.

FUNCTIONALITY

As stated in the previously, a police department's unique community role makes the need for layout design to be specifically geared to police operations. This is met when a building is designed from beginning to end with police operations in mind. As seen with the present dilemma, additions and renovations to existing structures often fall short in meeting long term departmental needs. Sterling's growth rate and rapid infrastructure congestion is pushing the need for a more efficient police department in the following years. The efficiency of any department is often a measurement of their working area. These efficiency criteria will not be met in the old town hall with out vast amounts of renovations. Even with a large amount of fiscal figures and labor, the building may not proficiently meet the police department's needs. Consequently, the old town hall received a score of five in regards to functionality.

OPERATIONAL COSTS

Operational costs are highly indeterminate in many regards due to the amount of variables involved with renovating and departmental needs. There are many areas where certain assumptions can be made, and various conclusions derived. For instance, with any solution where departments will be operated in separate buildings there will be inevitable operational cost increases. These increases of cost can be attributed to the standard costs of maintenance, heating, electric, and other base costs when occupying any

structure. The need for increased numbers of personnel to replace positions presently shared by both departments is also an area where cost increases will occur.

If the Town Hall were occupied by the Sterling Police Department, it would have to be modernized not only to meet departmental needs, but also to be economically affordable to maintain. This includes renovations to areas such as heat loss, which can be kept to a minimum. Departmental needs also attribute to increases in operational costs. If the functionality of the town hall does not meet the police department needs, wasted labor increases may result. For instance, the need for more personnel and/or longer hours of work within the department. The operational costs due to uncertainties received a score of ten.

CONSTRUCTION COSTS

Construction Costs for renovating the old town hall into a police department may be exceedingly high for what the town will be getting in exchange for their money. Renovations of any structure, particularly older ones are labor intensive. New construction involves less unforeseen problems and assures long term goals are met. Renovating structures also means large amounts of demolition before new construction can begin. This situation is eliminated during a new construction project. The magnitude of this is further increased when taking into account that a police department requires greater amounts of specifications and detailing to be functional. Greater amount of dead loads (i.e. Prisoner holding areas) demand greater structural assurances. The combination of the building being very old and the amount of needs for a police department set the construction cost score at ten. This score was derived as a result of researching the town's ability to receive a valuable asset for the amount of money spent rather than just a flat cost estimation. In other words, it may cost less than building a new building but will prove that the money will not be spent wisely if other criteria are not met sufficiently.

CONSTRUCTION TIME

The MQP team feels that construction time may be kept to a minimal time frame if architectural detailing and project management is of high quality. The key point of note is that greater amounts of research will have to occur before construction begins in

order to keep construction time on schedule. The building's history and all police needs must be established before feasible solutions can be derived. At this point the client will work with the architect and construction company to establish final detailing to assure all wants and needs are met. Assuming that this is carried out properly the building may be renovated in a timely manner, and therefore the MQP team scored construction time with a twenty.

TOWN & DEPARTMENT GROWTH

As stated in previous paragraphs, the old town hall is in a location where traffic is increasingly more congested. Land restraints will always limit future building expansion to the existing structure. Uncertainties in Sterling's growth may require that the police department's ability to function efficiently in the old town hall will be limited to less than thirty years. If this is the case the town will be reviewing new alternatives before they intended. Moving the police department to areas where expansion can be assured will prove in the best interest of citizens and police officials. The old town hall's ability to meet the town growth and department expansion scored a five.

AESTHETICS

Aesthetically, the structure being reviewed meets the town's wants and needs. Considering it was built in a time determining much of how the town would come to look, it meets with the Building Needs Committee's request for a traditional looking structure to blend in with the community and function as a police station. The structure is representative of what Sterling needs to preserve its scenic appeal, and received a twenty five in regards to this criteria.

MAXIMUM FUNCTIONALITY

Maximum functionality levels of the police department in any facility location may be limited until Sterling has a broader tax base. Considerations of meeting the maximum functionality are an economic concern as well as a structural concern. Size and location will always limit the old town hall. Moving the police department to a new area, or leaving it in the present site with future plans already foreseen, may some day

allow maximum functionality be achieved. However, moving the police department to the old town hall will already be limiting its comfort and levels of serviceability. Future growth further diminishes a maximum functionality from being achieved. The maximum functionality level at the old town hall receives a score of five.

DEPARTMENTAL COMMUNICATION

The ability of departments to communicate readily is not limited by moving the police department into the old town hall. Although this criteria was not considered as important by the three groups questioned, the departments' ability to communicate at the present site is very high. The score for departmental communication is a twenty.

COMMUNITY RELATIONS

The community relation in regards to the town's solution to the public safety facility is based highly on speculation as discussed with the building needs committee. The MQP team felt that the initial response to the police department occupying the old town hall would be good for community relations. To the person unfamiliar to the construction industry, renovating the town hall for public service would seemingly be an economically wise decision. It would provide a needed department with a centralized location. The fire department's community relation would also remain high because the taking of land and property for their renovations would also be limited to a minimum. A note of point is community relations may be strained as the department rapidly outgrows the town hall and traffic congestion in the down town area increases. The score regarding community relations received a twenty.

OVERALL SAFETY

Overall safety requirements for the fire department will rise, with the police department's operation moved to a separate location. Likewise police needs to readily be mobile will also be unimpaired by fire department personnel. However, as traffic and pedestrian movement is heavy in the Main St. area where the previous town hall structure is located, police officers' ability to quickly exit the facility may be slowed down. Handling of prisoners also may not be conducted in the best methods if the department is

denied a secured prisoner carport for entering the facility. Overall safety scored a ten due to the restrained police movement, location, and lack of space of the town hall structure and facility.

MEETING CODES

The previous town hall will not be able to meet and exceed all applicable standards based on the preliminary interviews with department heads. Space restraints will require that critical spaces are used for duel purposes and an overflow of prisoners will have to be handled by other towns. In the near future, Sterling will find that meeting just the minimum code requirements is a mistake. Sterling should focus on finding a method where requirements will be met in the future if they are not met now. The old town hall will always be limited because of the space and land restraints previously discussed.