



Prospect Fire Department Apparatus Replacement

2023



Fire Department Apparatus Replacement Study Prospect, Connecticut





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Introduction

MissionCIT was contracted by the Prospect, CT Fire Department to conduct a fire apparatus study for the department. MissionCIT visited the department and reviewed its apparatus in early July 2023. MissionCIT also conducted research into the current state of the fire apparatus market and prior research into the fleets of fire departments across the country and replacement standards that are in place.

MissionCIT would like to thank the members of the Prospect Fire Department for their hospitality and information in this study. Particularly, Chief Guastaferrri and Assistant Chief Sloss should be commended for running an extremely professional organization and providing assistance to us.

Town Background Information

The Town of Prospect, Connecticut is approximately 14.3 square miles with a hilly landscape. It is a suburb of Waterbury, Connecticut. It is bordered by the towns of Waterbury, Cheshire, Bethany and Naugatuck. It has a population of 9,435 as of July 1, 2022. It has a population density of approximately 650 people/square mile. Since 2000, the towns' population has grown 8.4%. The town's population in 2033 is projected to be approximately 11,000, for a 16.6% increase over the next 10 years (Prospect Plan of Conservation and Development, 2014, Page 5).

Community Risks

The overall fire risk within the community is low to moderate. The largest construction component in the town is residential. There are several industrial and commercial areas as well.

Older residential construction (see below) is ranch style or split level in the range of 1,000 – 1,400 square feet.





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Newer residential construction (see below) is predominantly two story or split level between 2,400 to 2,600 square feet. Zoning regulations currently require 2-acre lot minimums for construction and for subdivisions the installation of water cisterns for firefighting in areas without water service.



There are only about 5 residential structures within the town that are three stories in height and current zoning regulations have a height limit of 35 feet. There are four multi-family complexes in the town, consisting of either condominiums or apartments.

There are approximately 30-35 industrial buildings in town ranging from small manufacturing to large warehouses with high fuel loads. Most buildings range from 5,000-10,000 square feet. One recent industrial building still under construction is approximately 30,000 square feet. It does have an automatic fire sprinkler system. There are approximately 100-150 occupancies in town consisting of small offices, restaurants to multi-use buildings. In the town there are two large schools, three churches and two assembly occupancies that host large public events. There are numerous local parks, open land areas, private recreation facilities and state parks within the town.

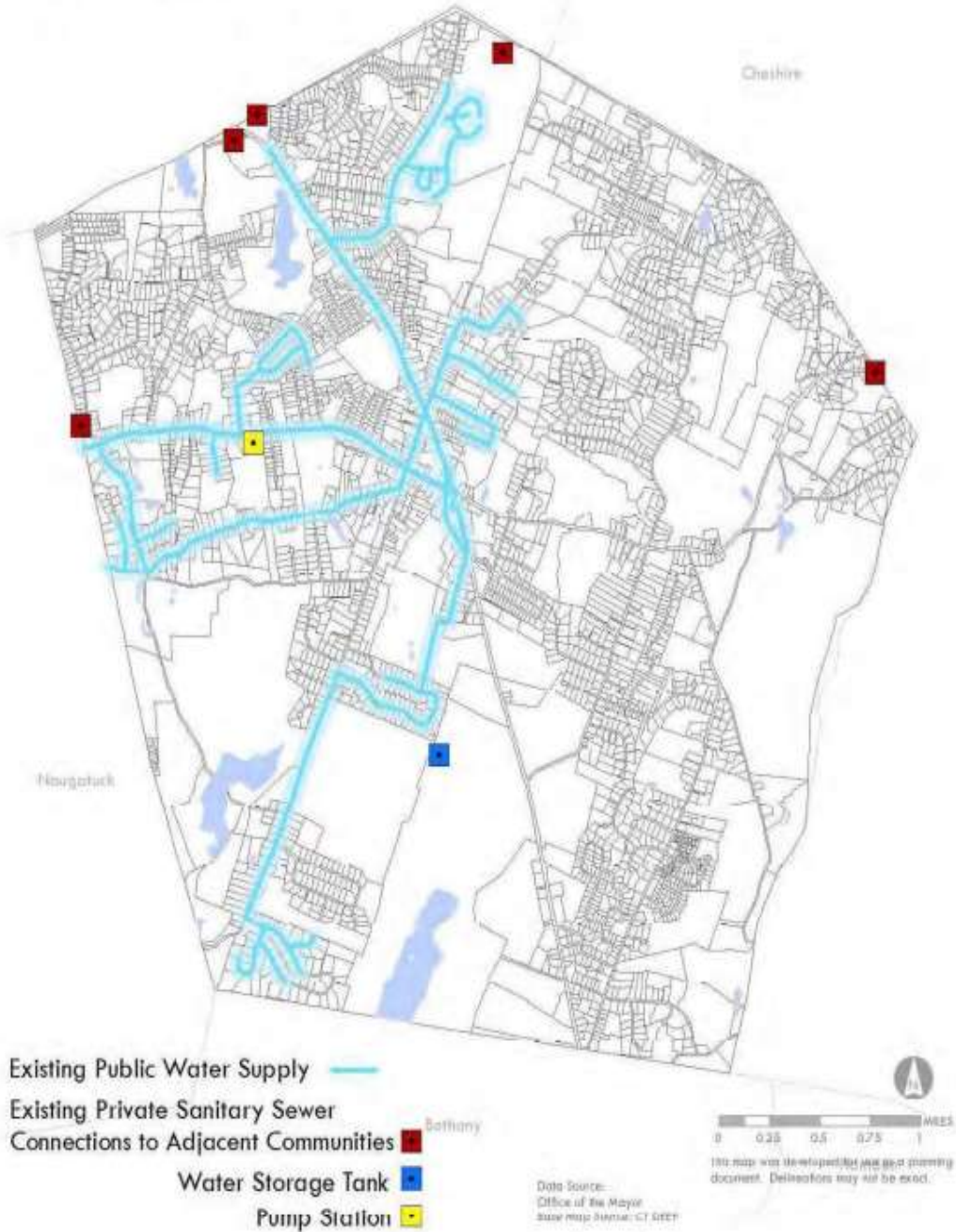
A portion of the town, predominantly in the western and northern part, has hydrants while the remainder, the largest portion, does not contain fire hydrants and requires water shuttles for supply. (Please see the water distribution map below from the 2014 Plan of Conservation and Development regarding the location of existing water and sewer lines in the Town.)



Figure 1.1 Existing Water and Sewer Lines

MAP 13

Town of Prospect
Plan of Conservation & Development
Existing Water and Sewer
Waterbury





Here is an example of the current industrial occupancies within the town.



As of 2017, the land use within the town consisted of the following.

Table 1.1 Percentage of Land Usage

Land Use Type	Percentage
Commercial	3.3
Community Facility	1.6
Industrial	.4
Recreational – Open Space	26.9
Residential - Low Density	28.6
Residential – Medium-Low Density	11.9
Residential – Medium Density	3.2
Residential – High Density	0
Undeveloped	15.4
Other/Water	8.3

Source – “Naugatuck Valley Council of Governments”

See [Appendix B](#) for a current land use map of the Town.

A significant amount of the current open land in the town will never be developed as it is owned by CT Water and the Regional Water Authority. In addition, there is a lack of sewer lines within the Town. This will limit future growth within the town. Future growth in the town will be slow to moderate and consist of primarily residential construction and re-purposing of the existing older residential properties along Rt. 68 and 69 into commercial and industrial space. Small business occupancies and industrial buildings are also expected to increase in the future, but due to infrastructure limitations, there is no forecasted growth in large scale projects or additional multi-family occupancies. Over the last 5 years, there is an average of only 6 or less



new residential building permits issued, and one commercial and one industrial permit issued annually. (Source: Ms. Barton, Land Use Manager)

Regarding fire code enforcement, the town employs one part-time Fire Marshal and several part-time inspectors. There is no Town Fire Code as the Fire Marshal enforces the State of CT Fire Code. Per code, a sprinkler system is required for occupancies greater than 12,000 square feet or an occupancy greater than 300.

Fire Department Information

The Prospect Fire Department is an all-volunteer department consisting of one fire station. It has 77 total members, of which approximately 40 of them are active. The membership is broken down into 20 Fire certified only members, 13 EMS certified only members, 40 members certified as Fire/EMS members and 4 probationary members (No certifications). There are approximately 20-30 fire apparatus drivers within the department.

The department responded to 1,049 calls in 2022 and as of June 30, 2023, responded to 482 calls for service. As is typical for most fire departments who also respond to emergency medical services (EMS) incidents, approximately 74% of all of the department's calls are for EMS purposes. The department responded to 10 structure fires in 2022 and 5 as of June 30th, 2023. The percentage of the department's calls for fires, structure, brush, auto, etc. is approximately 2% of all calls. In 2022, the Town of Prospect experienced a total structure fire loss of \$262,800 and in 2023 as of June 30th, a \$20,000 total structure fire loss. The fire department's responses to motor vehicle accidents and rescue calls totaled 81 calls in 2022 or 7.7% of their total responses. In 2023 through June 30th, the total number of motor vehicle accidents and rescue calls was 39 for an 8% response percentage. In 2022 the department responded to 18 mutual aid calls outside of the Town. As of June 30th, the number of mutual aid calls outside of the Town is 15, or an approximate increase of 33% over 2022. Due to the low growth rate and potential of the town, there is no future consideration for additional fire station facilities.

The fire department enjoys a fairly robust response of volunteer personnel to incidents. The effective response force for the department during daytime hours is approximately 6 while at nighttime it is 12. These numbers meet those recommended by NFPA 1720 for suburban/rural areas. For specific call types, the department personnel response averages the following.

Table 1.2. Average Number of Personnel Response by Call Type

Call Types	Average Number of Personnel Response
MVA's	10
Structure Fires	15
Chimney Fires	15
CO Calls	5
Mutual Aid Engine Calls	5



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Mutual Aid Tanker Calls	2
Brush Fires	5
Haz Mat Calls	10

The fire department has automatic aid and mutual aid agreements with all surrounding departments to include Cheshire, Bethany, Naugatuck and Waterbury. All mutual aid stations to the Town of Prospect are approximately 10 minutes away. The typical automatic aid apparatus into the town is for tankers and/or engines. There are mutual aid ladder trucks available to the town from either Cheshire, Naugatuck or Bethany. From January – May 2023, the department’s mutual aid and automatic aid numbers include the following.

Table 1.3 Number of Calls by Aid Type

Type of Aid	Number of Calls
Mutual Aid Given	8
Automatic Aid Given	6
Mutual Aid Received	2
Automatic Aid Received	8

Resources for specialized incidents such as technical rescue or hazardous materials are provided by either the City of Waterbury or the Regional Task Force Group. Personnel within the Prospect Fire Department are certified only to the Operations Level for Hazardous Materials and the Awareness Level for Technical Rescue.

Emergency Medical Service calls within the Town are answered by the fire department and the contract EMS transport company of Trinity Ambulance. The department responds to EMS calls with two SUV vehicles that are equipped to provide Basic Life Support (BLS) care. Those responding fire department members are either Emergency Medical Responder (EMR) or Emergency Medical Technician (EMT) certified. The Trinity advanced life support (ALS) ambulance responds from Waterbury for advanced care and transport. If a Trinity Ambulance is not available, then AMR, Naugatuck or Bethany provides a back-up response ambulance. The use of the SUVs for EMS response greatly reduces the wear and tear on the heavy fire apparatus in the fleet.

The average annual responses per each unit in the department’s fleet over the last three years is the following;

Table 1.4 Average Annual Fleet Response

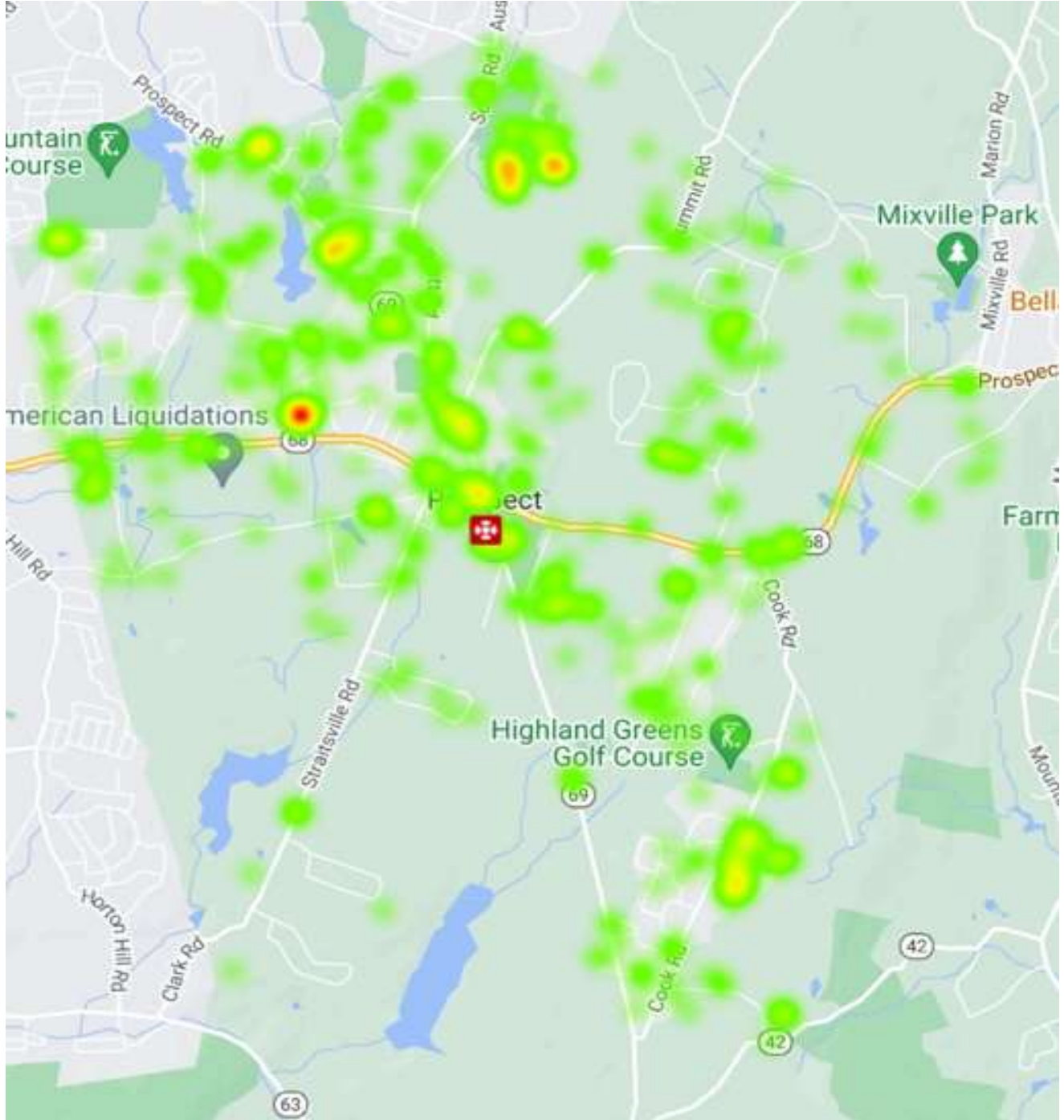
Apparatus Type	Number of Responses
Engine 1	110 responses
Engine 5	95 responses
Tanker 4	50 responses
Squad 3	120 responses
Rescue 6	113 responses



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The map below is a heat map showing the distribution of all calls from September 2022 until July 2023. The two only real hot spots are from a single EMS location for frequent calls and the 55+ age community in the northern part of the town.

Figure 1.2 Call Distribution 9/2022-7/2023





The department has a specific response matrix for apparatus deployment. Which includes the following.

Table 1.5 Apparatus Deployment by Call Type

Call Type	Prospect Fire Department Apparatus Response Order <i>(Does not include Mutual Aid or Automatic Aid Resources)</i>
Structure Fire	Engine 1, Engine 5, Rescue 6, Tanker 4
MVA	Squad 3, Rescue 6
Chimney Fire	Engine 1, Engine 5, Rescue 6
CO Call	Rescue 6
Haz Mat	Squad 3, Rescue 6, Brush 7
Brush Fire	Brush 7, Utility 1, Squad 3
Fuel Spills	Squad 3, Rescue 6
Wires Down	Utility 1, Brush 7
Mutual Aid - Engine	Squad 3
Mutual Aid - Tanker	Tanker 4

For a structure fire response, the department is bringing 7,000 gallons of water to the scene with a pump capacity of 3,750 GPM. This does not include any automatic aid/mutual aid tanker or engine response.

The department is also a member of a regional task force group for response to area structure and brush fires. There are pre-identified engine, tanker and brush unit task force configurations in place for any needed responses.

The Prospect Fire Department has a 2022/2023 budget of \$509,099 with a proposed 2023/2024 budget of \$509,033. The budget for apparatus repairs and maintenance is approximately \$69,250 or 14% of the total budget. Of that amount, approximately \$35,000 is for annual vehicle inspections, with the rest slated for repairs and maintenance. Payments for the newer fire apparatus in the fleet are made by the Town of Prospect through a bond or lease purchase process. Currently, the Town is committed to the following;

Engine 5	Lease Purchase	Annual Payments - \$74,022	Payoff in 2028
Squad 3	Bond Payment	Annual Payments - \$69,454	Payoff in 2033

Fire Department ISO Information

The Insurance Services Office (ISO) is a for-profit company that rates the ability of fire departments across the country to respond to and be able to handle the fire risks within their community. The Insurance Services Office rating of a fire department is based on four main areas. These include Emergency Communications, Water Supply, the Fire Department and Community Risk Reduction. Each component is graded on a point system after an evaluation



from an ISO representative. After the points are totaled, a divergence methodology, proprietary to ISO, is used to end up with the final score to determine the class that the fire department is awarded. Classes range between a Class 1, which represents the best scoring classification and Class 10, which indicates that no fire department is available.

Currently, the Prospect Fire Department is rated as a Class 4/4Y as of June 2015. This rating applies to any property located within 5 road miles of a recognized fire station. The 4Y rating applies to those properties located beyond 1,000 feet of a fire hydrant but within the 5 road miles of a fire station. (Source: ISO Public Protection Classification Document)

The ISO rating for Prospect Fire Department puts them, as of 2015, within almost the top 20% of all fire departments in the United States. The Water Supply area of their rating was 34.84 points out of a possible 40 points. The Fire Department area was 24.99 out of a possible 50 points. The basic fire flow requirement for the town is approximately 3,000 gallons per minute and requires 3 engines to accomplish this purpose. The town Fire Department meets this requirement. Eight fire hydrants were tested within the town and fire flows ranging from 920 to 2,510 gallons per minute.

In a review of the 2015 ISO rating of the Prospect Fire Department relative to the fire apparatus replacement plan, there are several areas of potential improvement that could afford them greater point totals in a future evaluation. A summary of these improvements includes the following;

Improvement in fire hydrant inspections and testing	Possible 4.6 points
Having a ladder company within the town	Possible .78 points
Having a reserve engine	Possible .16 points

At this point, MissionCIT does not recommend the purchase of a ladder company for the town or designating a reserve engine as the impact on a future ISO rating is less than one point. A review of the current fire hydrant inspection and testing program should be considered.

Apparatus Information

The Prospect Fire Department maintains a fleet of five heavy fire apparatus and four light vehicles. The heavy fire apparatus consists of two engines, one tanker, one squad and one rescue unit. The light apparatus consists of one brush unit, one utility vehicle, two EMS SUV's and two chief's response vehicles. The heavy fire apparatus is purchased and owned by the Town of Prospect, while the light apparatus is purchased and owned by the Prospect Volunteer Fire Department.

The apparatus inventory includes Engine 1, Engine 5, Tanker 4, Squad 3 and Rescue 6. Squad 3 was purchased as a Manufacturer Demo unit with 6,215 miles already on the unit. Engines 1, and 5 and Squad 3 all utilize Class A foam systems.



A detailed inventory of each piece of apparatus is outlined in [Appendix A](#).

Weekly apparatus maintenance is performed by the appointed Volunteer Apparatus Foreman, who reports to the Motor Engineer. There is a foreman for each heavy piece of fire apparatus. Minor repair work on the apparatus may be done by the Motor Engineer. Regular preventative maintenance, annual inspections, pump testing and other required repairs are conducted by an outside fire apparatus company. During the annual inspection, the company also provides an under-carriage treatment to protect against the effects of road salt. All of the contract vehicle technicians who conduct work on the heavy fire apparatus are certified Emergency Vehicle Technicians (EVTs).

Currently, the Fire Department utilizes the following replacement schedule for its heavy apparatus.

Table 1.6 Current Replacement Schedule

Type of Apparatus	Replacement Age	Current Age	Replacement Year
Engines	20 years	12 years old	2031
		4 years old	2039
Squad	20 years	2 years old	2041
Tanker	30 years	8 years old	2045
Rescue	30 years	30 years old	2023

The total number of riding positions for the fleet within Prospect is 37. This is well above any expected normal response from the department. Upon inspection, the fire department maintains a well-equipped, diverse fleet that is in excellent overall condition. The apparatus is clean, with no body issues and has been regularly maintained.

The repair costs (those costs beyond routine maintenance) experienced by the Prospect Fire Department for its apparatus over the last three years are very low. Some of this is due to the age of the majority of the fleet and some is due to the care shown the older vehicles over time. Over the last three years, the average annual repair costs and annual average miles traveled for the Prospect Fire Department fleet were the following;

Table 1.7 Repair Cost by Apparatus and Average of Miles Traveled

Type of Apparatus	Repair Cost	Average Miles Traveled
Engine 1	\$4,551	1,388
Engine 5	\$5,754	907
Tanker 4	\$5,296	780
Squad 3	\$2,000	1,500
Rescue 6	\$5,556	1,475



While at the site visit with the Prospect Fire Department, MissionCIT met with the volunteer company members to discuss the apparatus needs for the department and about the current apparatus fleet. **Notes from that meeting are included in [Appendix C](#).**

National Benchmark Apparatus Information

In addition to nationally recommended standards regarding fire apparatus replacement, there is currently baseline/benchmark information available on a national level regarding the status of fire apparatus fleets within fire departments. Several sources of this information include the following;

National Fire Protection Association (NFPA)

The NFPA conducts national assessments of fire departments across many components. “The Fifth Needs Assessment of the United States Fire Service” was completed in December 2021. Regarding the status of fire apparatus fleets in the United States, NFPA found the following;

- The average number of fire apparatus in service by population protected.
 - Populations of 5,000 to 9,999 had an average of 2.4 engines/pumpers, .5 aerial trucks, .9 tankers and 1.2 ambulances or other transport vehicles in their fleet
- The age of fire apparatus by population protected was varied, but found “that about half of engines/pumpers overall are 15 or more years old”. Specifically for populations of 5,000 to 9,999, they found the following.

Table 1.8 Apparatus Age and Percentage of Survey Department Fleets

Type of Apparatus	0 – 14 Years Old	15 – 19 Years Old	20-29 Years Old	Over 30 Years Old
Engine	52%	20%	24%	5%
Aerial	46%	21%	25%	7%
Tanker	52%	21%	20%	7%

- The average number of fire apparatus in reserve for populations of 5,000 to 9,999 were .3 engines, 0 ladders and tankers.
- The percentage of fire departments serving populations of 5,000 to 9,999 with an apparatus replacement plan and budget was 50%, while 31% had a plan only, and 19% had no plan or budget.

The two engines in Prospect are 4 and 12 years old respectfully. The tanker is 8 years old. These are well within the findings of the NFPA fire department assessment report. Squad and Rescue apparatus are not listed in the NFPA report, but in Prospect, these units are 2 years and 30 years old respectfully.



Fire Apparatus Manufacturers Association (FAMA)

In 2004, the Fire Apparatus Manufacturers Association (FAMA) published the “Fire Apparatus Duty Cycle White Paper”. The document was a review of current fire apparatus fleets in the United States and considerations for apparatus replacement. FAMA, (Pages 8-11) found the following.

Table 1.9 FAMA 2004 Fleet Findings

Unit Type	Geographic Area	Average Active Service	Average Reserve Status	Average Mileage (12 Months)	Engine Hours (12 Months)
Engine	Suburban	16 Years	11 Years	4,992 Miles	572 Hours
	Rural	18 Years	14 Years	3,054 Miles	496 Hours
Aerial	Suburban	19 Years	10 Years	3,492 Miles	403 Hours
	Rural	21 Years	13 Years	2,155 Miles	279 Hours
Rescue	Suburban	15 Years	7 Years	4,087 Miles	648 Hours
	Rural	16 Years	11 Years	3,946 Miles	745 Hours

In Prospect, the age of the engine apparatus is 4 and 12 years old and both are frontline units. The department does not maintain any reserve heavy apparatus. Their average mileage is 900-1,400 per year and their engine hours are 67-112 per year. The metrics for the engines is well within the averages found in the FAMA document. The metrics for the rescue unit is also within the ranges provided in the FAMA report at an average of under 1,500 miles/year and under 100 engine hours/year. The FAMA report does not include squad apparatus, but this unit is 2 years old. The average mileage and engine hours are approximately 1,500 miles annually with 219 annual engine hours. Again, these are both well within the usage averages found by FAMA for engines.

Apparatus Replacement Standards/Guidelines

National Fire Protection Association (NFPA)

The primary national standard regarding fire apparatus specifications, maintenance and replacement comes from the National Fire Protection Association (NFPA). NFPA is a national, consensus standards organization for fire and emergency services. Its standards are recommendations only, but are relied on by the fire service to guide it in its decision making and service delivery deployment.

The main apparatus standard regarding replacement is the new 2024 NFPA 1900. This is the “Standard for Aircraft Rescue and Firefighting Vehicles, Automotive Fire Apparatus, Wildland



Fire Apparatus, and Automotive Ambulances". This standard took the place of the former 2016 NFPA 1901 "Standard for Automotive Fire Apparatus".

In Appendix D of the NFPA 1900 Standard, NFPA recommends the following.

"It is recommended that apparatus more than 15 years old that have been properly maintained and are still in serviceable condition be placed in reserve status, be upgraded in accordance with this standard, and incorporate as many features as possible of the current fire apparatus standard".

It also recommends that,

"Apparatus that were not manufactured to the applicable NFPA fire apparatus standards or that are over 25 years old should be replaced".

There is also the 2024 NFPA 1910, "Standard for the Inspection, Maintenance, Refurbishment, Testing, and Retirement of In-Service Emergency Vehicles and Marine Firefighting Vessels". This standard is a compilation of the former NFPA 1911, 1912, 1925 and 1071 Standards and addresses the required preventative and routine maintenance for emergency vehicles.

Even with these national recognized standards, apparatus replacement can be based on several factors regarding the wear and tear of the apparatus and the availability of updated safety features on the apparatus. Some of these include:

- Local road conditions
- Travel distances, speeds of apparatus response and engine wear
- Department preventative maintenance programs
- Department workload
- Weather impacts, such as the use of road salt, etc.
- Crew compartment air bags, updated braking systems and updated emissions systems

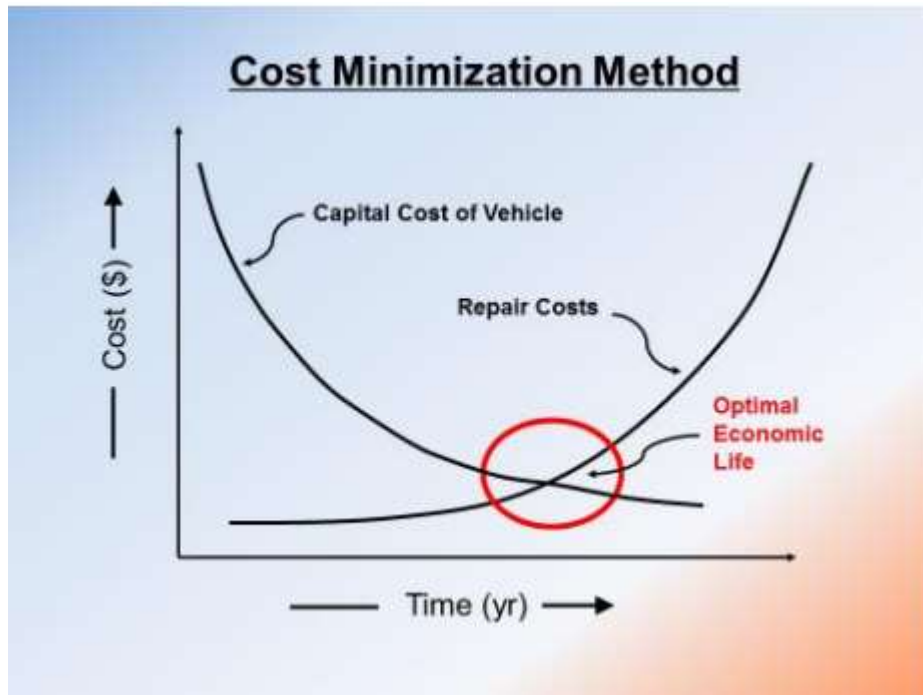
Based on these factors, there may be apparatus that exceed the NFPA 1900 15-year threshold for replacement but are still in relatively good shape. There may also be apparatus that are only 10 years old but are completely worn out and need immediate replacement.

Economic Theory

There is also an economic theory regarding apparatus replacement. Over time, a vehicle loses value (depreciates) from the original capital purchase price. However, over that same time frame, the maintenance/operating costs for that vehicle begin to rise. Economics point out that the vehicle should be considered for replacement, or at least placed into a reserve status, when the maintenance/operating costs begin to exceed the depreciated value of the apparatus.



Figure 1.3 Cost Minimization Method



“Fleet Replacement Evaluation Tool for the Town of Sherborn”

by Edward J. Collins Jr.

Center for Public Management

February 2017

From a Guidance Position Statement from the American Public Works Association, they state that:

“Retaining assets beyond this point leads to the following adverse conditions:

- *Increase in total operating cost*
- *Increase in turnaround time as the complexity of repairs increase*
- *Decrease in overall asset availability*
- *Increase in fleet asset failure—the older the fleet, the greater the opportunity a catastrophic failure will occur*
- *Decrease in salvage (residual) value as an asset ages*
- *Customer satisfaction with the fleet asset will dissipate*
- *Operator safety is compromised as vehicle components are subject to increased wear and tear; safety enhancements available on new assets are bypassed when fleet assets are not replaced*
- *Fleet creep occurs as customers seek to have more backup assets to fill the void created when fleet assets are in for service more often and for longer periods of time”*



Additional assessment information from the American Public Works Association provides guidelines for the replacement of fire engines based on a scoring system. It is outlined below.

Table 1.10 American Public Works Association Fire Engine Replacement Guideline

Fire Engine Replacement Guidelines			
Factor		Points	
Age		One point for every year of chronological age, based on in-service date	
Miles/Hours		One point for each 10,000 miles or 1,000 engine hours of use	
Type of Service		1, 3 or 5 points are assigned based on the type of service unit receives. For instance, fire pumpers would be given a 5 because it is classified as severe duty service. In contrast, an administrative sedan would be given a 1.	
Reliability		Points are assigned as 1, 3 or 5 depending on the frequency that a vehicle is in the shop for repair. A 5 would be assigned to a vehicle in the shop two or more times per month on average, while a one would be assigned to a vehicle in the shop an average of once every 3 months or less.	
M & R Costs		1 to 5 points are assigned based on total life M&R costs (not including repair of accident damage). A 5 is assigned to a vehicle with life M&R costs equal to or greater than the vehicle's original purchase price, while a 1 is given to a vehicle with life M&R costs equal to 20% or less of its original purchase cost.	
Condition		This category takes into consideration body condition, rust, interior condition, accident history, anticipated repairs, etc. A scale of 1 to 5 points is used with 5 being poor condition.	
Point Ranges	Under 18 Points 18 to 22 Points 23 to 27 Points 28 Points and Above	Condition I Condition II Condition III Condition IV	Excellent Good Qualified for Replacement Needs Immediate Consideration

Source – “APWA Vehicle Replacement Guide”

Current National Fire Apparatus Replacement Landscape

During the onset of the Covid pandemic in 2020, fire apparatus manufacturers, like most all other manufacturing businesses, began to experience significant delays in obtaining materials and parts for fire apparatus construction. They also experienced significant worker shortages due to illness, early retirements, and people leaving the workforce, or particular professions. These issues have improved slightly since then, but remain a large part of the fire apparatus manufacturing system. From these issues, the availability of some repair parts has diminished



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and the assembly line timeframes for construction of new apparatus has increased greatly. These issues should be taken into consideration with the decision for purchasing new fire apparatus within the Town of Prospect. These changes have greatly increased the cost of replacement fire apparatus.

In a discussion with Mr. Jeff Horn from FireMatic on July 10, 2023, he provided the following general information regarding the Pierce Fire Apparatus build wait times and costs as of the market conditions today. This information is general in nature only, particular to Pierce Manufacturing, and subject to change based on the actual unit and specifications ordered and additional changes from Pierce Manufacturing.

He did indicate that the increases in build times and pricing have stabilized somewhat over the last year and that the increases are not as dramatic. As a note, the approximate apparatus build times below are based on receipt of the order to Pierce Manufacturing. The times do not take into account the design and specification time that the department would take before placing an order. He also indicated that Pierce Manufacturing has closed its only apparatus refurb center in order to convert it to new apparatus production. Therefore, having any of the Prospect Fire Department apparatus refurbished is not a practical alternative at the moment.

Table 1.11 Approximate Cost and Timeframes to Build Apparatus

Type of Apparatus	Approximate Build Time (After receipt of order)	Approximate Cost (No equipment)	Projected Apparatus Costs in 3 Years based on Current Pierce price increase plan of 1.5% Quarterly
Custom Pumper	40 – 43 Months	\$900k to \$1.1 million	\$1.3 million
Stock Pumper	31 – 33 Months	\$830k to \$900k	\$1.07 million
Heavy Rescue	31 -34 Months	\$1 million to \$1.2 million	\$1.43 million
Quint PUC – 107'	31 -43 Months	\$1.7 million	\$2.02 million



Prospect Fire Department Apparatus Assessment

Using the American Public Works Association Guidelines for Fire Engine Replacement, the apparatus for the Prospect Fire Department was scored as the following.

Table 1.12 Prospect’s Replacement Scoring Based On the American Public Works Association

APWA Fire Engine Replacement Scoring	Engine 1	Engine 5	Squad 3	Tanker 4	Rescue 6
Factor					
Age	12 points	4 points	2 points	8 points	30 points
Miles/Hours	1.4 points	.3 points	.4 points	.4 points	2.9 points
Type of Service	5 points	5 points	5 points	5 points	5 points
Reliability	1 point	1 point	1 point	1 point	3 points
M & R Costs	1 point	1 point	1 point	1 point	3 points
Total Points	20.4	11.3	9.4	15.4	43.9
Condition	Good	Excellent	Excellent	Excellent	Needs Immediate Consideration

The assessment of the heavy vehicle fleet for Prospect Fire Department across the APWA and NFPA fire apparatus replacement criteria outlined above, found the following current status of their fire apparatus fleet.

Table 1.13 Prospect’s Current Fleet Status

Unit	NFPA 1900 Standard (Front line replacement at 15 Years)	APWA Guidelines
Engine 1	12 Years Old	Good
Engine 5	4 Years Old	Excellent
Squad 3	2 Years Old	Excellent
Tanker 4	8 Years Old	Excellent
Rescue 6	30 Years Old	Needs Immediate Consideration

Funding Options

Currently, there are three main methods to fund the purchase of new fire apparatus today by local governments. These methods include;

- Cash purchase – The jurisdiction pays the total purchase price amount for the apparatus at the time of order or delivery of the unit. This process may still require internal debt through bonding by the jurisdiction.



- Lease purchase – The jurisdiction provides annual lease payments to the apparatus company and at the end of a defined lease purchase period, they own the piece of fire apparatus
- Outright lease – The jurisdiction provides annual lease payments to the apparatus company for a defined period of time. At the end of the time period, the apparatus company obtains possession of the fire apparatus for re-sale, etc.

Apparatus Replacement Recommendations

Upon assessment of the heavy vehicle fire apparatus fleet for the Town of Prospect, CT, the following observations were made.

- The fleet is effectively diverse to handle the community risks within the Town
- The fleet is well maintained by the volunteer personnel and the contract company
- The wear and tear on the fire fleet is minimal due to the response matrix, the use of EMS SUVs and the distance and road network within the Town

After reviewing all facets of the fire department, the town and the fire fleet, MissionCIT makes the following recommendations regarding fire apparatus for the Town of Prospect. These recommendations are in no priority order.

1. **The Fire Department should continue with its current apparatus replacement schedule of 20 years for Engines/Squad and 30 years for the Tanker and Rescue.** With the current, and minimal future workload increases, the maintenance system in place, the response matrix, and the use of EMS SUVs, the department should continue to realize great service life from its apparatus. This schedule may have to be re-examined if a particular unit begins to experience greater than normal maintenance and repair issues.
2. **The department should continue with its company level preventative maintenance process and the use of a contract vendor for annual servicing and repairs.** This combination has appeared to provide the fire department with well maintained and serviced fire apparatus. The Motor Engineer should; however, perform regular quality control checks on the automated maintenance tracking system used by the assigned Apparatus Foreman.
3. **The department should continue to use the regional Automatic Aid and Mutual Aid process and resources as much as possible to augment its resources for firefighting within the Town.**
4. **The process to replace Rescue 6 with another rescue unit should begin immediately. However, the department should look to purchase a smaller, medium duty rescue unit.** This would save on costs and help them to consolidate tools and equipment that



Prospect Fire Department Apparatus Replacement Plan - 2023

are currently not being utilized on the existing Rescue 6 or that could be combined with equipment on Squad 3. Rescue 6 is currently 30 years old and has met its service expectations. It currently lacks important and updated safety items such as air bags, updated braking systems and new emissions equipment.

Due to the low level of community risk within the Town, the need for a Rescue unit is greater than that of an aerial device. There are sufficient aerial devices from mutual aid towns to provide such services when there is a need. Several disincentives for purchasing an aerial are the current unit costs, the increased maintenance and the need for developing additional driver qualifications. The purchase of a medium duty rescue unit would reduce purchase costs and provide for better handling by the driver/operators.

Several examples of medium duty rescue units and their purchase costs are below for consideration.



Cumberland, MD

2022 Pierce Rescue

\$728,817



Rolling Meadows, ILL

2023 Pierce Rescue

**\$585,000 – Locked in price
from 2021 pre-order**



Olcott, NY

2014 Emergency One Rescue

\$432,000



5. **Developing an apparatus replacement schedule after consideration for Rescue 6 and Engine 1 is not feasible at this time by MissionCIT due to the significant lengths of time remaining on the service life of the rest of the fire department fleet.** After the consideration of replacement for Engine 1 in 8 years, the remaining time of serviceable life for the fire department fleet is 16, 22 and 28 years respectfully. During those years much can and will change in the fire apparatus manufacturing market that will impact the timing and specification process for replacement apparatus.
6. **Future apparatus specification committees should be put into place approximately 4 years before the replacement year for that particular piece of apparatus.** This would allow for a one-year process to develop the specifications and a three-year build time for the unit.
7. **After the replacement of Rescue 6, the fire department should consider the establishment of an apparatus specification committee to replace Engine 1 around 2027 with an intended order placed in 2028.** This would keep the apparatus schedule on pace to replace Engine 1 in 2031.
8. **Recommendations 6 and 7 should be re-examined if the apparatus manufacturing market changes, for the better or worse, regarding apparatus build times in the future.**
9. **To reduce the apparatus build time or costs for future apparatus purchases, the fire department should consider the purchase of demo and/or stock units.** If the department stays with Pierce apparatus, they should consider using the "Build My Pierce" (BMP) program to lessen the wait times and costs through a stock option build.
10. **The Town of Prospect should continue with its purchase of fire apparatus through its internal bonding process or through lease purchase.** This helps to spread out the purchase costs of fire apparatus over several years and gives the town consistency in its budget process.
11. **In the purchase of future, known apparatus, such as Rescue 6 or Engine 1, the Town should consider setting aside funds annually in its capital budget during the specification and build process.** If the town has the capacity in its budget process to do this, this pre-delivery savings plan could help reduce the actual bonding or lease purchase costs that the Town would encounter upon delivery of the unit.
12. **The Fire Department should consider applying for Federal Assistance to Fire Grants (AFG) for the future replacement of Engine 1.** Typically, unless there is an urgent need,



specialized apparatus does not receive the same level of scoring as front-line fire suppression apparatus.

13. The Fire Department should review its current fleet configuration to see if it could reduce equipment or equipment consolidated on apparatus to reduce the need for the fleet as it currently is configured. Consideration could be given in the future to the purchase of multi-functional apparatus, as was done with Squad 3 or in the design of Rescue 6. This may reduce the need for having separate engines, squad and rescue. This may allow the total size of the fleet to be reduced. As an example, the department could work to utilize Rescue Engines to reduce the need for a squad and a rescue unit. The fleet could then be reduced by one. An example of the fleet configuration might be:

- 1 Engine/Tanker
- 2 Rescue Engines
- 1 Tanker

The amount of water transported to the scene may be slightly reduced, but the need for a separate squad and rescue could be eliminated.

14. The Fire Department should work to include an aerial unit response on identified high-risk occupancies within the Town through the Automatic Aid process instead of relying solely on the Mutual Aid process. Having an aerial unit automatically dispatched to provide specialized service to high-risk occupancies will improve service deployment and potentially improved scoring from ISO.

15. The Fire Department should consider multiple fire apparatus vendors in its purchasing process. The department has predominantly dealt with and purchased with one vendor. There may be some cost savings and build time reductions with other vendors. This decision must be weighed against driver/operator knowledge, fleet compatibility and maintenance vendor qualifications for a unit from another company.

16. With the recommendation for the department to stay with its current replacement timeline of 20 and 30 years respectfully, strong consideration should be given at some point, by the department, during the apparatus lifespan, to upgrade/update safety equipment on the apparatus to enhance the protection of personnel. This will have to be a decision based on practicality, costs and remaining life of the particular vehicle.



Appendix A Fire Apparatus Inventory

Engine 1



Unit Number/Designation	Engine 1
Year	2011
Make/Model	Pierce Arrow/XT
Type of Apparatus	Engine
Pump Size	1,250 GPM
Tank Size	1,000 Gallons
Current Number of Engine Hours	1,338 Hours
Current Vehicle Mileage	16,662 Miles
Number of Riding Positions	6
Overall General Condition	Excellent
Major Repair History – Last 3 Years	None



Engine 5



Photo by Mike Quinn

www.firenews.org

Unit Number/Designation	Engine 5
Year	2019
Make/Model	Pierce Velocity
Type of Apparatus	Engine/Tanker
Pump Size	1,250 GPM
Tank Size	3,000 Gallons
Current Number of Engine Hours	268 Hours
Current Vehicle Mileage	3,630 Miles
Number of Riding Positions	6
Overall General Condition	Excellent
Major Repair History – Last 3 Years	None



Squad 3



Photo by Zack Bowden

www.firenews.org

Unit Number/Designation	Squad 3
Year	2021
Make/Model	Pierce Enforcer
Type of Apparatus	Squad
Pump Size	1,500 GPM
Tank Size	1,000 Gallons
Current Number of Engine Hours	438 Hours
Current Vehicle Mileage	8,302 Miles* (* Unit purchased as a demo unit with 6,215 miles)
Number of Riding Positions	6
Overall General Condition	Excellent
Major Repair History – Last 3 Years	None



Additional Squad 3 Photo





Tanker 4



Unit Number/Designation	Tanker 4
Year	2015
Make/Model	Kenworth/Pierce
Type of Apparatus	Tanker
Pump Size	1,250 GPM
Tank Size	3,000 Gallons
Current Number of Engine Hours	444.1 Hours
Current Vehicle Mileage	6,243 Miles
Number of Riding Positions	2
Overall General Condition	Excellent
Major Repair History – Last 3 Years	None



Rescue 6



Unit Number/Designation	Rescue 6
Year	1993
Make/Model	Pierce Lance
Type of Apparatus	Heavy Rescue/Command Center
Pump Size	N/A
Tank Size	N/A
Current Number of Engine Hours	2,933 Hours
Current Vehicle Mileage	44,237 Miles
Number of Riding Positions	17
Overall General Condition	Average
Major Repair History – Last 3 Years	<ul style="list-style-type: none"> - Worn out springs, rear step replacement, transfer case leak - \$3,982.15 - Brake chambers, various lights - \$3,000 - Onspot chains replaced, lights replaced – Pending quote

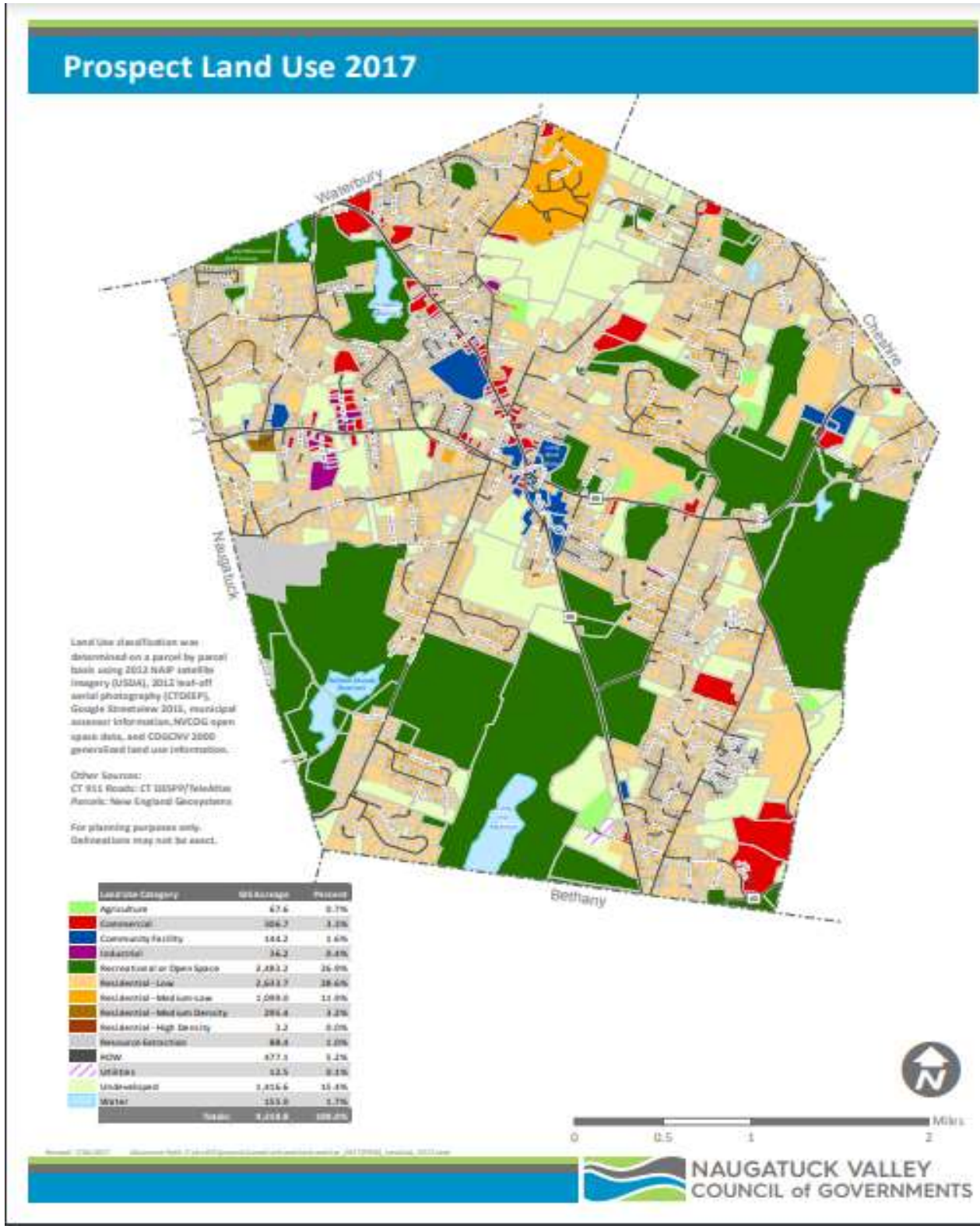


Additional Rescue 6 Photo





Appendix B Town of Prospect Current Land Use





Appendix C Meeting with Company Personnel

On July 13, 2023, the MissionCIT consultant met with the volunteer fire company during their monthly meeting. The intent was to gain perspective from the membership as to the apparatus conditions, needs and desires. The responses to directed questions is below.

1. What apparatus currently needs replacing in the company?
 - Rescue 6
 - Engine 5
2. Why?
 - Rescue 6 – Old, Repair costs, Next unit to replace per the replacement plan
 - Engine 5 – Too big, Difficult to drive
3. What is that unit's use/purpose?
 - Rescue 6 – Heavy Extrication, Haz Mat calls, CO calls
 - Engine 5 – Water source, Provide ladders
4. Who gets to participate in the apparatus design process?
 - Officers, Driver/Operators, Young and Seasoned Members
5. What is the best unit in the department?
 - Engine 1
 - Squad 3
6. Why?
 - Engine 1 – Wheelbase, Water supply
 - Squad 3 – Versatility, Organization of the Unit, Multi-Functional
7. If you were the Chief, and had unlimited funds, what would the fleet of the department look like?
 - 2 Engines
 - Squad
 - Tanker
 - Quint/Ladder
 - ATV's
 - Drones
 - Squad
 - Engine
 - Ladder
 - Medium Rescue
 - Tanker
 - Ladder with a Pump and Tank