



**KENNETT FIRE & EMS REGIONAL  
COMMISSION**

**FIRE APPARATUS FLEET REVIEW AND  
ASSESSMENT**

**KENNETT FIRE COMPANY  
LONGWOOD FIRE COMPANY  
PO-MAR-LIN FIRE COMPANY**

**BY  
EMERGENCY VEHICLE RESPONSE**

**OCTOBER 2021**

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## 1.0 Overview

The Kennett Fire and EMS Regional Commission, at the request of Chairman Cuyler Walker, engaged the services of Emergency Vehicle Response to analyze the fire apparatus fleet and maintenance provisions, to enable The Kennett Fire and EMS Regional Commission to adopt a comprehensive fleet replacement program. This study will review the fire department apparatus, equipment, and maintenance provisions for each unit. The overall goal is to provide The Kennett Fire and EMS Regional Commission with a long-range plan to develop replacement strategies, financial planning, and an improvement plan. This will ensure safe operations and deployment practices to enhance fire protection within the community.

The three fire companies Kennett Station 24, Longwood Station 25, and Po-Mar-Lin Station 36 have endeavored to provide a modern fleet of apparatus to operate as part of the, newly formed, Kennett Fire and EMS Regional Commission. The vehicle fleet, at this point, is comprised of a mix of both older and newer units with an average unit age of 11.87 years. The three fire departments acquired new apparatus resulting in three new major pieces of equipment acquired during 2016. There were only two new acquisitions purchase between 2017 to the present. The Commission will need to purchase a fire truck on odd years and re-chassis or buy a new ambulance in the even years. This will cause an apparatus purchasing acceleration in the short term. While the average age of the fleet has decreased slightly, several units are overweight or nearly overweight which will require adjustments, vehicle purchasing, and vehicle modifications to alleviate these conditions.

During August of 2021, the staff of Emergency Vehicle Response performed several days of field work to gather information and review available records on the apparatus and maintenance provisions of the apparatus in the Kennett Fire and EMS Regional Commission. Maintenance and testing records, the fire departments programs and policies, and response patterns to alarms for the past three years were assembled for review and analysis. Onsite inspections of each individual apparatus were conducted to gain information on the current status of each apparatus and future concerns. With the assistance of each of the three fire departments personnel and Chief Officers apparatus records including maintenance and testing documentation, apparatus responses, staffing levels and public water data were compiled for review and analysis.

Emergency Vehicle Response personnel also conducted an overall review of the land area, development, and structural conditions within the Kennett, Longwood, and Po-Mar-Lin Fire Departments response area with emphasis on target hazards within each community in order to identify the apparatus and equipment requirements that would be appropriate for the districts. Each piece of apparatus was thoroughly examined and evaluated with respect to operational capabilities, physical, and mechanical condition as well as maintenance and repair history. This information was utilized to evaluate the suitability of the present apparatus fleet for the missions that The Kennett Fire and EMS Regional Commission would be expected to perform during an emergency incident, within the community. With the new buildings under construction or in the

planning phase, this will undoubtedly increase the number of emergency incidents within this geographic area. This will place additional burdens on the fire departments current staffing model and will require changes in apparatus and deployment practices.

## 2.0 Executive Summary

From an overall perspective, The Kennett Fire and EMS Regional Commission maintains an adequate number of pieces of apparatus and equipment to adequately protect the community. When compared to the commercial properties along the Route 1 corridor, there is a large portion of the area that is residential in nature. Many of these properties have narrow access roads and driveways which would impact vehicle positioning, especially with any of the fire departments current rescue engine and ladder apparatus.

The current deployment model for the fire departments is a mostly volunteer fire department force, augmented with career personal at Longwood and Kennett during the day during the week. They also have 24/7/365 medic coverage for two medic units, one out of Longwood and one running out of Kennett. Longwood fire department employees three career personnel from 0700 to 1700 Monday to Friday and a career fire chief. During the summer months, Longwood also staffs Saturdays with career personnel. Kennett employees three personnel from 0700 to This staffing permits the on-duty force to handle a single minor fire or rescue incident at any one time. The fire department staffing model riding three personnel on each unit is inadequate. The NFPA Standard 1710 requires a minimum of four personnel on each piece of apparatus.

The departments two multi-purpose rescue engine apparatus each carry a wide assortment of fire, foam and rescue related equipment, however their operational effectiveness is limited by staffing, the physical size of each unit, and the lack of vehicle standardization which limits safe and efficient fire ground operations.

### 2.1 Key Observations

Several issues have been identified in this report which will require appropriate technical and financial planning by the fire department and the commission to ensure that the present level of emergency response capabilities will be maintained in the future.

Brush 24, Tanker 24, and Tanker 36 are all overweight when all seating positions are filled on the vehicles. The overweight conditions of Tanker 36 and Tanker 24, at this time, are confined to the front axle due to apparatus engineering and the body configuration. Brush 24 was significantly overweight and was removed from service during Emergency Vehicle Response field visit. Brush 24 should remain out of service and should be sold. While the NFPA 1901 Standard was modified with the 2009 edition to have each seating position capable of carrying

250 pounds, the fire departments current fleet has several vehicles with marginal axle capacities. Future engine and ladder apparatus seating arrangements should be designed according to the actual unit staffing rather than equipping each apparatus with seating for six personnel.

In the first due response area there are places where Tower 24 and Ladder 25 cannot gain clear access to all four sides of the structure, this increases the reliance on portable ground ladders to permit fire personnel to gain access to upper floors or to utilize as a means of escape in the event of deteriorating conditions inside of the building. Tower 24 is equipped with 199 feet of ground ladders. The ground ladder compliment on Tower 24 is exceptional and provides ground ladders to safely protect a typical large area residential home as well as the numerous town houses, row homes, and garden apartment complexes that are prevalent in the first due area. Ladder 25 was out of service for a rebuilding and restoration project but, they plan to carry 185 of ground ladders. This compliment, paired with Tower 24, is a great compliment of ladders. However, if Ladder 25 were to be the only truck company responding, this compliment would not be sufficient for a larger footprint building for all four sides.

The current rescue engine apparatus, Rescue 24 and Rescue 36, are too large and heavy to safely operate in some areas due to the vehicle wheelbase, overall length, and height of both cross-lay and rear body hose beds. The height of the cross-lays and the rear body hose beds make the apparatus a safety concern to work off of, as noted in the review of each apparatus in this report. Careful consideration needs to be made in specifying new engine apparatus to make sure they are safe to work off of and easier to drive and maneuver. When purchasing apparatus like this, careful consideration needs to be given as to who will drive the apparatus in the future. Few fire departments are fortunate to have more than one or two drivers who operate heavy trucks and are licensed with a commercial driver's license. These volunteers are being replaced by firefighters that are much more familiar with a computer mouse than a large heavy truck. This will be addressed in Section 8.0 of this report.

The three fire departments have spent almost \$335,982.00, on average, in the last five years in fire apparatus maintenance and repairs. These costs are excessive given the size of the fleet. The causative factors for this excess include but are not limited to deferred apparatus purchases, purchasing apparatus that does not fit the areas geography and topography, specifying apparatus that are simply too big for the first due area, purchasing some apparatus from less-than-ideal manufacturers, buying apparatus that had new untested technology, and specifying expensive components that are not needed and are known to fail.

The size of the fleet should be reduced by five units following the recommendations contained in this report. The overweight, 33-year-old, Brush 24 was taken out of service during the field visit and should be sold and not be replaced. Rescue 24 (second engine to respond from Station 24) only responded four times to building fires each year for the last two years. This unit has been expensive to maintain, there is a lack of staffing, and rescue services will be provided by Heavy Rescue 25. Rescue 24 should be removed from service and sold. Brush 25 was removed from

service prior to the field work due to the lack of activity. Tractor Trailer Tankers 25-2 and 25-3 should be removed from service as they are very expensive to maintain, and it is recommended that Longwood Fire Company cease operations to haul water as a source of financial funding. Also, there are very few people that are qualified to drive them. However, they were used on four occasions at structural fires in 2020 and it should be up to the Commission and the fire chief to determine the future of these vehicles. However, at the very least one of them needs to be removed from service as a fire suppression unit.

Po-Mar-Lin Engine 36 and Tanker 36, and the services they provide, are going to be combined into a single unit Engine/Tanker. Both units have been very expensive to maintain. This is especially true for Engine 36 which was equipped and purchased by the fire company, upon specification, with expensive components such as pump and roll capabilities and electronic valves that over time would increase the repair and maintenance costs for this vehicle. These components have cost additional money to maintain and created long periods of out of service time for repairs.

### 3.0 Kennett Fire & Rescue Regional Commission Demographics

The Kennett Fire & Rescue Regional Commission protects all areas within Pennsbury Township, Pocopson Township, Kennett Township, Kennett Borough, Newlin Township, and East Marlboro Township. See the *Population and Area Chart* below. All of these areas are located in the southern portion of Chester County, Pennsylvania south of the Borough of West Chester and borders the State of Delaware in several locations.

***Population and Area Chart:***

<b>Name</b>	<b>Population</b>	<b>Area</b>
Pennsbury Township	3,604	10 square miles
Pocopson Township	4,840	8.32 square miles
Kennett Township	8,305	15.48 square miles
East Marlboro Township	7,026	16 square miles
Kennett Borough	6,190	1.07 Square miles
Newlin Township	1,354	12.12 Square Miles

East Baltimore Pike, also known as US Route 1, is very heavily traveled by both commuter and commercial truck traffic at all times during the day and evening hours, with an estimated 83,000 vehicles per day. During the morning and evening commuting hour's, access to the Kennett and Longwood fire stations is particularly difficult for members responding to the station. Routes 52

and 926 are also heavily traveled by commuters at various times and can present some modest delays for apparatus responses.

The commercial development in the first due area is largely concentrated along Route 1 from Chandler Road to the east through the district to the split between Route 1 and the by-pass in Kennett Township. The Route one commercial corridor also extends through Kennett Borough known as the mushroom capital of the world, going south. Properties in this area consist of several strip mall shopping centers, a three-story hotel, and a Wal-Mart shopping center. There are several commercial and industrial properties in the northeastern portion of the district along Pocopson Road as well as an industrial park located in the area of Walnut Road south of Longwood Road. There are two large retirement complexes in the first due area including Crossland's Drive off of Route 926 and along Kendall Drive north of US Route 1. Both areas provide unique tactical challenges for the fire company with narrow roadways and limited points of access to position both engine and ladder company apparatus.

Throughout the first due response areas in all four townships there are several townhouse complexes, apartments, and large area single family residential structures each of which produce unique challenges for the responding first alarm company's due to a combination of factors including limited water supply, lightweight building construction materials and very narrow roadways and points of access to these structures. As several of the townhouse and apartment complexes are all located on privately owned properties the width of the access roadways, fire hydrant locations and points of egress for fire apparatus are not under municipal control and could severely impact fire department operations at these locations.

In comparison to other fire departments response areas, of comparable size, there a large number of target hazard, multiple occupancy, residential structures that would require significant personnel and apparatus resources to safely operate in these locations. Additional development continues to be built in the areas beyond protection from a recognized water supply with hydrants, which places increased emphasis upon strictly regulated and enforced building construction codes.

Much of the remaining area is comprised of single-family residential homes. Some of these homes have very difficult points of access due to either topography or barriers at the entrance to the driveway, which would hinder apparatus access. This is especially true for large portions of Po-Mar-Lin that have a traditional rural landscape. All roadways are generally well paved and in good condition however, many are narrow which makes apparatus positioning, particularly in the non-hydrant areas, more difficult. There are numerous traffic signal-controlled intersections throughout the area, all of which are covered by a signal pre-emption device that are employed on all fire company apparatus, support, and command vehicles.

The three fire companies cover a response area, approximately 63 square miles in size. The first due response area for the Longwood and Kennett Fire Companies consists of a mixture of two-

and three-story single family residential homes with severe exposures due to the building setbacks and proximity to adjacent buildings. In the first due response area, there is also a mix of commercial and industrial facilities. As referenced above, Po-Mar-Lin is mostly comprised of the traditional rural landscape.

## 4.0 Fire Apparatus Fleet Maintenance Costs and Response Analysis

The Kennett Fire and EMS Regional Commission operates a total of fourteen pieces of heavy fire/rescue apparatus, including four front line engines, two rescue engines, two in service aerial apparatus, five tankers, a heavy rescue. They also operate a number of support vehicles and trailers to include; five command vehicles, two brush trucks, eight support vehicles, 3 Utility Terrain Vehicles and trailers, and four boat trailers. This report will address each major piece of apparatus including, its design, frequency of use, mechanical condition, equipment, and hose deployment capabilities together with a recommended time frame when the unit should be replaced in the future.

All front-line engine, rescue engines, and ladder apparatus are equipped with four door enclosed cabs each capable of seating six personnel safely. Two out of the three tankers can only seat one safely due to the overweight condition on the front axles. The chief's cars can accommodate at least four and the utility units can accommodate two to five firefighters safely dependent on the design of the individual cab. Tanker 36, Tanker 24, and Brush 24 each have issues with their in-service weight due to a combination of body design and equipment carried. In addition, several units suffer from rust and corrosion of chassis frame, suspension components, battery boxes, and air reservoirs. These conditions are somewhat normal for the age of the vehicles however, corrosion repairs and rust mitigation will need to be conducted to achieve the necessary life cycle for each piece of apparatus.

Replacement strategies for fire apparatus can be based upon several factors including age, maintenance costs, need to change or update equipment, hose loads, the number of runs, and associated road mileage on each unit. Fire apparatus is generally replaced after fifteen (15) to twenty (20) years of first line service and may be utilized as a reserve or spare unit for an additional three to five years. This depends upon age, use, condition, and adaptability to the department's current operating procedures. The National Fire Protection Association, which is responsible for developing the standards for fire apparatus, revises and updates the 1901 Fire Apparatus Standard every five years to keep pace with technology and the component manufactures in these areas. Within the past decade, component technology has advanced dramatically in the areas of diesel engine emissions, fire pump components and instrumentation, and electronic stability controls all of which have had an impact on vehicle design and related costs of new apparatus.

Recent changes in engine exhaust emissions requirements by the federal Environmental Protection Agency during 2010 and 2016 have had dramatic impacts on the fire apparatus industry with respect to cab designs, engine cooling, and exhaust system components. Six vehicles within the three fire departments fleets are equipped with this emission component technology, requiring diesel exhaust fluid. Future EPA requirements planned to take effect in 2023, to further improve fuel economy, should have minor impacts on engine technology and cab designs. As a result of this electronic engine technology, the engineering overhead, and resources needed to design and test engine models the only diesel engine available to the fire service, in custom cab fire apparatus, is a Cummins model engine. Paccar MX 13 model engines are also available but, only from a single manufacturer. The result of this lower emission engine technology is slightly higher repair and maintenance costs. These mandated emission requirements paired with the changes in the NFPA 1901 Standard, increase the cost of the vehicle. Also, with material costs increasing there have been significant annual increases in the cost of all major types of fire apparatus. Current trends indicate that annual inflation costs are in the range of four to six percent.

There are several alternatives to replacement of each vehicle in the apparatus fleet which will be explored in Section 8.0 of this report. From a practical perspective, although you need to protect the response area, the overall needs of the organization must be considered with respect to being able to have the financial and operational resources to maintain and staff each piece of apparatus.

More importantly, the unit staffing for the engine and ladder apparatus needs to be considered when developing a needs assessment for the overall size of the vehicle fleet. Given the time lapse and distance considerations for automatic aid apparatus from neighboring jurisdictions to reported fires, each of the three Fire Departments should always endeavor to staff a minimum of one engine each, and one ladder company from Longwood with four personnel on each in accordance with NFPA 1710. A command car should be staffed with a minimum of one chief officer. As of now, with the career staffing in place, the area can be assured of a one engine and one ladder response with a chief under a single pull system.

#### 4.1 Summary of Incident Types from 2018-2020

*Summary of Kennett Station 24 responses to incidents for the past three years:*

<b><u>Type of Incident</u></b>	<b><u>2018</u></b>	<b><u>2019</u></b>	<b><u>2020</u></b>
Fires	48	39	42
Overpressure rupture, explosion, overheating	1	2	0
Rescue / EMS	46	88	111
Hazardous condition's	76	42	36
Service Calls	39	52	36
Good Intent Calls	30	30	24

False Alarms /Auto Alarms	76	111	98
Severe Weather & Natural Disaster	7	0	0
<u>Special Incident</u>	<u>6</u>	<u>0</u>	<u>12</u>
<b>TOTAL INCIDENT COUNT</b>	<b>329</b>	<b>364</b>	<b>359</b>

*Summary of Longwood Station 25 responses to incidents for the past three years:*

<b><u>Type of Incident</u></b>	<b><u>2018</u></b>	<b><u>2019</u></b>	<b><u>2020</u></b>
Fires	68	57	72
Overpressure rupture, explosion, overheating	3	2	4
Rescue / EMS	142	167	185
Hazardous condition's	60	61	93
Service Calls	46	38	35
Good Intent Calls	119	98	104
False Alarms /Auto Alarms	148	162	187
Severe Weather & Natural Disaster	6	6	5
<u>Special Incident</u>	<u>5</u>	<u>5</u>	<u>2</u>
<b>TOTAL INCIDENT COUNT</b>	<b>329</b>	<b>364</b>	<b>359</b>

*Summary of Po-Mar-Lin Station 36 responses to incidents for the past three years:*

<b><u>Type of Incident</u></b>	<b><u>2018</u></b>	<b><u>2019</u></b>	<b><u>2020</u></b>
Fires	45	43	50
Overpressure rupture, explosion, overheating	0	0	1
Rescue / EMS	65	81	71
Hazardous condition's	30	28	27
Service Calls	61	68	49
Good Intent Calls	25	10	10
False Alarms /Auto Alarms	93	71	93
Severe Weather & Natural Disaster	0	0	0
<u>Special Incident</u>	<u>4</u>	<u>1</u>	<u>2</u>
<b>TOTAL INCIDENT COUNT</b>	<b>323</b>	<b>302</b>	<b>303</b>

## 4.2 Apparatus Responses to Building Fires:

### Longwood apparatus and personnel response to reported building fires for 2019 and 2020

	<u>2019</u>		<u>2020</u>
Total Fire Calls	33	Total Fire Calls	44
Total Personnel	317	Total Personnel	416
Average Personnel Per Fire Call	9.6	Average Personnel Per Fire Call	9.45
Chief 25	13		7
Engine 251	16		13
Engine 252	14		31
Ladder 25	29		33
Rescue 25	9		15
Tanker 251	7		11
Tanker 252	0		1
Tanker 253	0		3

### Kennett apparatus and personnel response to reported building fires for 2019 and 2020

	<u>2019</u>		<u>2020</u>
Total Fire Calls	19	Total Fire Calls	29
Total Personnel	128	Total Personnel	236
Average Personnel Per Fire Call	6.7	Average Personnel Per Fire Call	8.1
Chief 24	4		9
Engine 24	17		25
Tower 24	12		16
Rescue 24	4		4
Tanker 24	4		7

### Po-Mar-Lin apparatus and personnel response to reported building fires for 2019 and 2020

	<u>2019</u>		<u>2020</u>
Total Fire Calls	23	Total Fire Calls	31
Total Personnel	102	Total Personnel	211
Average Personnel Per Fire Call	4.4	Average Personnel Per Fire Call	6.8 *
Chief 36	2		1
Engine 36	20		25
Rescue 36	7		20
Tanker 36	6		11
Brush 36	0		2

\*The increase in staffing is due to the pandemic and firefighters working from home.

Rescue Engine 24 and Rescue Engine 36 are perceived backup units to other engine companies within the fleet however, this is not practical as all the engine companies have varying degrees of large diameter hose loading and lack uniformity. Each engine company should be able to operate independently of other engine companies within the fleet. Some of the vehicles in the fleet do not seem to have a defined roll as it relates to any of the equipment on the apparatus. The three fire departments in the near future need to design an engine company apparatus that will be the benchmark for a standardized engine company in the apparatus fleet. The three fire departments need to establish their required fire flow and outfit each of the engines with the same hose loads, nozzles, and equipment to have identical engine company apparatus at each of the three stations.

#### 4.3 Maintenance Records

The age of the three fire departments current apparatus fleet is spaced out over a period of 33 years with the oldest unit, Brush 24, being constructed in 1988 and the newest, Rescue 36, was placed into service in 2020. With the average age of the sixteen major pieces of apparatus being 11.87 years, the current fleet is in good condition for its age. Several vehicles have rust and corrosion issues along with the overweight condition on the front axles of Tanker 24 and Tanker 36.

The National Fire Protection Association, in the printed pamphlet 1911 Standard for the Inspection, Maintenance, Testing and Retirement of In-Service Automotive Fire Apparatus, 2012 Edition, recommends that the Authority Having Jurisdiction (AHJ) of fire apparatus plan a 15 to 20-year front line service life and 3 to 5-year reserve use for each primary piece of fire-fighting apparatus. Annex D of the NFPA 1911 standard recommends that vehicles over 25 years old should be replaced. Brush 24 would fall into this category.

According to NFPA 1911 The Care and Maintenance Standard for fire apparatus section 7.3.4 Fire Apparatus Tires have a service life of seven years. The following Fire Apparatus need tires: Rescue 24 needs six new tires if it is going to be retained in the fleet. Numerous support trailers are in need of new tires and they are outlined in the support trailer recommendations.

The Maintenance costs and associated information provided was lacking or incomplete. One of the benchmarks that we try to ascertain is the cost of ownership of each individual apparatus. On average the cost of ownership of an engine should cost \$6,000 to \$8,000 per year and the cost of ownership for a ladder like Tower 24 should be \$12,000 TO \$15,000 per year.

The following is a summary of vehicle age, mileage, engine hours, and repair costs for the current vehicle fleet. Based upon maintenance records supplied by the fire department.

**Apparatus Maintenance Costs Summary Last 5 Years:**

Unit #	Age	Mileage	Engine Hours	Average Costs
Engine 24	2 years	8,372	727	\$6,730
Engine 252	6 years	25,974	2187	\$30,485
Engine 251	9 years	29,635	2522	\$29,300
Engine 36	12 years	19,103	2006	<b>\$54,525</b>
Tower 24	5 years	8,907	1025	\$29,095
Ladder 25	17 years	N/A	N/A	N/A
Rescue 25	5 years	10,751	1215	\$12,691
Rescue Engine 36	1-year	4,124	388	NEW
Rescue Engine 24	16 years	22,169	1986	<b>\$29,487</b>
Tanker 24	8 Years	11,565	1435	\$7,325
Tanker 251	16 Years	37,909	3662	<b>\$77,015</b>
Tanker 252	26 years	115,099	226	Missing 2020
Tanker 253	9 years	422,058	9476	\$19,641
Tanker 36	19 years	19,867	1573	<b>\$29,435</b>
Brush 36	5 years	4,659	N/A	\$7,001
Brush 24	33 years	23,658	N/A	\$3,252
<b>TOTAL SPENT</b>				<b>\$335,982</b>

**Those costs highlighted in red would be considered excessive and would be cause to remove these vehicles from the fire fleet as soon as practical.**

In the last five years, Engine 36 has cost Po-Mar-Lin almost \$11,000 per year, Tanker 36 has cost Po-Mar-Lin approximately \$5,887 per year over the same time period. Rescue 24 has cost \$29,435 in the last five years, averaging for missing data, which would be excessive yet predictable given that many components require constant repairs and are not required on a rescue/engine apparatus. The costs associated with this fleet management model are far above what a normal fire fleet would cost to operate and are not fiscally sustainable or prudent. Reduction of the fleet, will save on these higher-than-average fleet maintenance costs. It would be in the best interest of the Kennett Fire & Rescue Regional Commission, the three fire departments, and their taxpayers to carefully follow and fund the fleet replacement plan as outline in Section 8 of this report on time as written. Following EVR’s recommendations will result in two of the costliest apparatus to be cycled out of the fleet early and invest that money in new apparatus.

**Maintenance costs for the major apparatus in the fleet:**

Unit #	2015	2016	2017	2018	2019	2020
Engine 24	XXXX	XXXX	XXXX	XXXX	NEW	\$3,768
Engine 252	NEW	<b>\$20,066</b>	\$2,993	\$3,400	<b>\$1,306</b>	\$2,72
Engine 251		\$4,891	<b>\$8,507</b>	\$5,339	\$4,231	\$6,332
Engine 36	<b>\$15,152</b>	<b>\$12,861</b>	<b>\$15,592</b>	\$3,922	<b>\$1,782</b>	<b>\$16,123</b>
Tower 24	XXXX	NEW	<b>\$414</b>	\$14,587	\$14,094	
Ladder 25	XXXX	XXXX	XXXX	XXXX	XXXX	<b>REHAB</b>
Rescue 25	XXXX	\$2,017	\$1,651	\$1,919	\$4,906	\$2,138
Res. Eng. 36	XXXX	XXXX	XXXX	XXXX	NEW	\$2,290
Res. Eng. 24				<b>\$12,519</b>	\$2,536	\$2,638
Tanker 24				\$2,948	<b>\$259</b>	<b>\$525</b>
Tanker 251	<b>\$11,391</b>	\$3,504	<b>\$530</b>	<b>\$60,149</b>	\$1,441	
Tanker 252			<b>\$24,944</b>	\$7,107	<b>\$24,374</b>	
Tanker 253			\$1,062	<b>\$11,986</b>	\$5,752	<b>\$841</b>
Tanker 36	<b>\$15,648</b>	<b>\$556</b>	<b>\$5,437</b>	\$3,417		\$4,377
Brush 36	XXXX	NEW	\$2,599	\$3,845	<b>\$557</b>	
Brush 24		<b>\$369</b>		\$2884		

**AMOUNT SPENT IN 2020 \$41,752**

- Those numbers in **BLUE** seem artificially low or lacking sufficient data.
- Those spaces that are blank lack the data for those years.
- Those costs highlighted in **RED** are costs that would be considered excessive.

Each piece of apparatus operated by each of the three fire departments has been carefully analyzed for its condition and maintenance features, with projected replacement dates given for each unit. These dates reflect the year in which the replacement unit should be delivered and placed into service by each of the fire departments. Recognizing that most fire apparatus take approximately ten to fourteen months to produce, once the unit goes under contract, adequate research and planning must be provided to ensure that the apparatus is delivered and placed into service on time.

The Kennett Fire & EMS Regional Commission and the Fire Departments should adopt the fleet replacement program as outlined in Section 8.4 to ensure that apparatus is replaced on a regular, programmed basis. While the current fleet of apparatus is in mainly good condition for its age, future purchases will need to follow the developed plan with only minor deviations allowed for unanticipated repairs or accidents.

Where possible, fire apparatus purchases should be spaced out with two years in between each major suppression apparatus. That would mean that the Kennett Fire & EMS Regional

Commission would be buying fire trucks on the odd years and would be buying new ambulances, remounting ambulances on new chassis, or replacing chiefs' cars and utility vehicles as needed on the even years. With ten major pieces of fire apparatus remaining in the new reduced fleet a new fire truck should be entering service every two years based on a twenty-year replacement cycle.

## 5.0 Fleet Review and Evaluation

### 5.1 Engine Companies

#### **Engine 24:**

This apparatus is a Pierce Enforcer model four door cab pumper which was purchased new and placed in service in 2019. The stainless-steel body was built with a Hale Q-Max 2000 GPM, single stage fire pump and a 750-gallon water tank with a 30-gallon foam cell. This pumper is powered by a L-9 Cummins engine rated at 450 horsepower through an Allison 3000 EVS automatic transmission. This unit measures 30 feet 7 inches long and 9 feet 8 inches tall and has a 175.50-inch wheelbase.

At the time of the field inspection, Engine 24 had 8,372 road miles and 727 engine hours. The cab can carry seven personal and is equipped with a 19,500-pound front and a 27,000-pound rear axle. With 7 personnel on board, using the NFPA 1901 allowance of 250 pounds per seat, they weigh 1,750 pounds. The front axle, with personnel, weighs 18,600 pounds and the rear axle weighs 25,400 pounds.

This vehicle is designed with 8 compartments equipped with hinged doors. The exterior of the cab is in good condition and the underside is in like new condition, for its age. The chassis frame rails, battery boxes, and air reservoirs will need to be steam cleaned and treated with a rust preventative coating to prevent deterioration of these components from the effects of corrosion.

Engine 24 is equipped with a 150-foot-long preconnected 1.75-inch attack line on the front bumper with an automatic 70-200 gpm fog nozzle. There are two 200'-1.75 cross lays, one with a smooth bore nozzle and the other is equipped with a combination nozzle. Engine 24 has several preconnected attack lines located in the rear hose bed area. 400 feet of 1.75-inch attack line, 300 feet of 2.50-inch attack line, and 250 feet of 1.75-inch attack line. This engine carries 1500 feet of 5.00-inch rubber jacketed supply line with a TFT hydrant valve and 600 feet of 3.00-inch hose is dead loaded. This Short wheelbase engine is well designed and equipped. The apparatus has good attack line layout and carries a good complement of engine company equipment.

Engine 24 has cost \$6,730.00 in repairs in the last two years and had 191 responses in 2020.

This unit will be replaced and put into reserve status in accordance with the fleet replacement schedule in 2039 when the unit will be 20 years old.



**Steam clean chassis frame rails treat with POR 15 or equal and undercoat with Carwell or equal on an annual basis.**



**Extrication tools and FAST board on Engine 24**



**Rear hose bed arrangement on Engine 24**



**Underside corrosion needs to be mitigated.**

**Engine 24 Recommendations:**

The following items are recommended to be implemented on Engine 24 to improve the safety and operational capabilities of this apparatus:

1. The chassis frame rails, body substructure, and exposed fire pump components should be thoroughly steam cleaned with any exposed rust and corrosion removed. The chassis steam cleaning should be conducted on at least an annual basis to remove accumulated dirt, road debris, and surface rust from the chassis and other components.
2. Treat chassis frame rails with POR 15 or equal and undercoat with Carwell or equal on an annual basis.
3. The door seals and rubber molding on the compartment doors should be inspected and replaced as necessary to provide a positive, weatherproof seal to protect the tools and equipment carried on the apparatus.
4. Make sure that all equipment on the apparatus is secured in accordance with the NFPA Standard using 9-G rated brackets.
5. Standardize department wide on hose loads, deployment, and nozzles.

**Engine 252:**

Engine 252 is a 2015 Pierce Arrow XT four door cab pumper. This unit was built with a 2000-gpm Waterous CSU pump, a 750-gallon water tank and a 30-gallon foam cell. The apparatus is powered by a 500 horsepower DD-13 Detroit engine through an Allison 4000 EVS transmission. This unit was built with a 184.50" wheelbase, overall length of 30 feet 5 inches, and overall height of 116 inches. Engine 252 has an aluminum body, is equipped with a Vogel auto lube system, and has a generator.

At the time of the field inspection Engine 252 had 25,974 road miles and 2187 engine hours. The cab is designed to carry 6 personnel with 5 outfitted with SCBA. The apparatus is equipped with a 22,800-pound rated front axle and a 27,000-pound rated rear axle for a gross vehicle weight rating of 49,800 pounds. With personnel, the apparatus weighs 20,600 on the front axle and 24,900 on the rear axle with a combined vehicle weight of 45,500 pounds.

This engine was built with 7 body compartments with hinged styel doors. The exterior of the cab was noted to be in good condition. The chassis frame rails, battery boxes and air reservoirs will need to be steam cleaned and treated with a rust preventative coating to prevent further deterioration of these components. This engine carries a compliment of tools and equipment normally seen on most engine companies. Additionally, this engine carries an assortment of

extrication equipment and EMS equipment. A manual deck gun is mounted above the fire pump area, with stacked tips.

Engine 252 is equipped with a 150-foot long 1.75-inch preconnected front bumper line with 100' of one inch forestry hose. Also, the front bumper has a pre-connect front sleeve. Above the pump panel there are two 200 foot 1.75 pre-connected cross lays one equipped with a smooth bore nozzle and the other with a fog nozzle. The rear hose bed is outfitted with 1500 feet of rubber 5.00-inch supply hose, 600 feet of spare 3.00-inch hose. The rear hose bed also has 400 feet of 1.75-inch attack hose with a smooth bore nozzle, a 200-foot 1.75-inch attack hose with a fog nozzle, and a 250 foot 2.50-inch attack line with a smooth bore nozzle. Engine 252 is a short wheelbase, well designed and equipped engine. The company developed good pump charts, the apparatus has good attack line layout, and carries basic extrication equipment.

Engine 252 in the last five years has cost Longwood over \$30,485 dollars to operate and had 333 responses in 2020. This unit will be replaced and put into reserve status in accordance with the fleet replacement schedule in 2031 when the unit will be 19 years old.



**Water spots making the gauges and computer screen difficult to see.**



**The apparatus needs a good steam cleaning**



**Battery needs to be cleaned**



**All equipment should be removed from compartments and both compartments and equipment should be cleaned.**

#### **Engine 252 Recommendations:**

The following items are recommended to be implemented on Engine 252 to improve the safety and operational capabilities of this apparatus:

1. The chassis frame rails, body substructure, and exposed fire pump components should be thoroughly steam cleaned with all exposed rust and corrosion removed. The chassis steam cleaning should be conducted on at least an annual basis to remove accumulated dirt, road debris and surface rust from the chassis and other components.
2. The apparatus underside should be treated with POR 15 or equal and undercoated with Carwell or equal.
3. Clean and detail the rig, especially the interior of the body compartments and inside door box pans.
4. All loose equipment should be mounted in NFPA approved 9-G brackets.
5. At the time of the field visit the DEF was reading low on the digital dash however it was found to be a malfunctioning sensor.
6. Replace the strap on the map box with a longer strap. This will ensure all map books are secure in the event of a rollover accident.

**Engine 251:**

Engine 251 is a Pierce Arrow XT, four door, cab custom pumper purchased new and placed into service by the fire department in 2012. The aluminum body apparatus was built with a Waterous CSU 2000 gpm single stage fire pump and 750- gallon water tank. Engine251 is powered by a Detroit Diesel DD-13 engine rated at 500 horsepower through an Allison EVS-4000 automatic transmission. This unit was built with a 184.50- inch wheelbase, overall length of 30 feet, and 124.00 inches overall height.

At the time of the field inspection Engine 251 had 29,635 road miles and 2522 engine hours. The cab can carry 6 personnel and is equipped with a 22,800-pound rated front axle and a 27,000-pound rated rear axle. With 6 personnel the apparatus weighs 21,000 pounds on the front axle. The personnel weight is calculated in accordance with NFPA 1911 the care and maintenance of fire apparatus. The weight allowed for apparatus built before 2009 is 200 lbs. per seat and after 2009 is 250 lbs. per seat. The NFPA (National Fire Protection Association) is a consensus standards group for the fire service which governs most aspects of the fire service. The standards created have withstood the test of time and the courts. The rear axle had an in-service weight of 23,200 pounds which is well within acceptable limits.

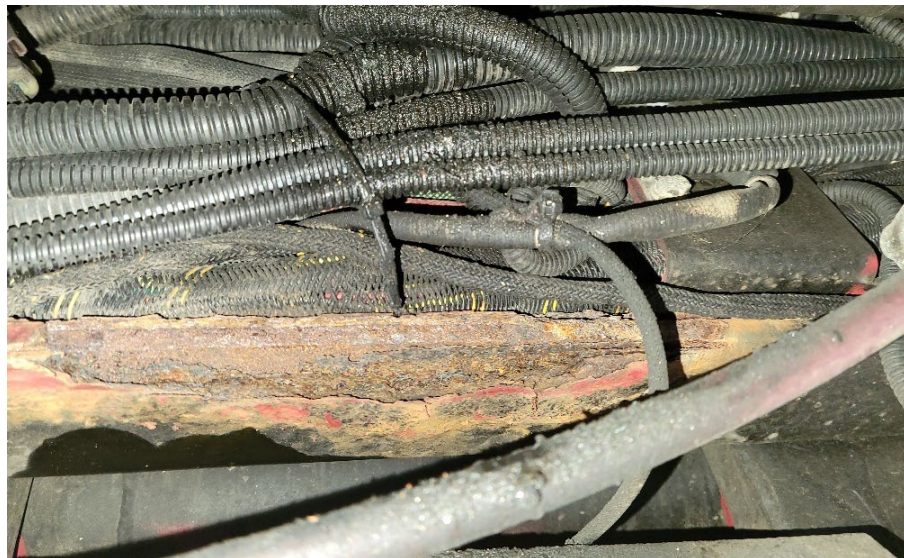
Engine 251 is equipped with a preconnected 150-foot long 1.75-inch front bumper attack line along with 100 feet of one-inch forestry hose. Above the pump panel are two cross lays each 200-feet of 1.75 hose one with a smooth bore nozzle the other with a fog. The rear hose bed is equipped with 1500 feet of 5.00-inch supply line and 600' of 3.00-inch. Two additional beds of preconnected 1.75 off the rear hose bed one of 400' and a smooth bore nozzle the other one is 200' with a fog nozzle. Also, there is one preconnected 2.50-inch hose 200 feet long with a smooth bore nozzle. A manual deck gun is mounted above the fire pump along with a set of stacked tips. Engine 251 is a short wheelbase, well designed and equipped engine. The company developed pump charts and created an apparatus with a good layout of attack lines.

The chassis frame rails, battery boxes, and air reservoirs will need to have the corrosion remediated and treated with a rust preventative coating such as Carwell or Krown to prevent further deterioration of these components. The apparatus battery boxes, air reservoir and diesel fuel tank should be replaced with stainless steel material which will be more resistant to corrosion from road salt and de-icing chemicals.

Engine 251 in the last five years has cost Longwood over \$29,300 dollars to operate and had 155 responses in 2020. This unit will be replaced and put into reserve status in accordance with the fleet replacement schedule in 2029 when the unit will be 17 years old.



**The frame rails are rusting and delaminating on Engine 251**



**Frame rail corrosion.**



**Air holding tank corrosion**



**Excessive moisture in the brake system**



Replace the reflective stripe on the officer's cab door

ENGINE 25-1

FRONT				PUMP PANEL				REAR			
<b>Bumper Line DP 110 PSI</b>				<b>CROSS LAY 1 DP 130 PSI</b>				<b>DRIVER SIDE REAR A DP 210 PSI</b>			
Size	Nozzle	GPM	Length	Size	Nozzle	GPM	Length	Size	Nozzle	GPM	Length
1 3/4 "	FOG 50 PSI	165	150 '	1 3/4 "	FOG 50 PSI	165	200 '	1 3/4 "	SB 50 PSI	165	400 '
<b>INTAKE</b>				<b>CROSS LAY 2 DP 130 PSI</b>				<b>DRIVER SIDE REAR B DP 65 PSI</b>			
Size	F.L.	GPM	Length	Size	Nozzle	GPM	Length	Size	Nozzle	GPM	Length
5" STORTZ			30'	1 3/4 "	SB 50 PSI	165	200 '	2 1/2 "	SB 50 PSI	250	200 '
<b>ENGINEER'S FORMULA</b>				<b>Deck Gun DP 80 PSI</b>				<b>PASS SIDE REAR DP 130 PSI</b>			
EP>DP=NP+FL+appl.+ Elevation				Size	Nozzle	GPM		Size	Nozzle	GPM	Length
2000 GPM at 150 PSI				1 1/4"	SB 80 PSI	400		1 3/4 "	FOG 50 PSI	165	200 '
750 GALLONS OF WATER				1 3/8"	SB 80 PSI	500					
30 GALLONS OF FOAM				1 1/2"	SB 80 PSI	600					
1500' 5 Inch				1 3/4"	SB 80 PSI	800					
600' 3 Inch											

Good example of a pumping chart and target fire flows.

### **Engine 251 Recommendations:**

The following items are recommended to be implemented on Engine 251 to improve the safety and operational capabilities of this apparatus:

1. The chassis frame rails, body substructure, and exposed fire pump components should be thoroughly steam cleaned with all exposed corrosion removed. Corrosion was noted on the chassis frame rails, battery boxes, air reservoirs, and mounting straps. There is severe corrosion on parts of the frame rails that needs to be addressed immediately. The chassis steam cleaning should be conducted on at least an annual basis to remove accumulated dirt, road debris, and surface rust from the chassis and other components.
2. The steel battery boxes, chassis air tank straps, and diesel fuel tank straps on the chassis frame should be replaced with stainless steel material and undercoated to prevent rust and corrosion on these components.
3. The door seals and rubber molding on the compartment doors should be replaced as necessary to provide a positive, weatherproof seal to protect the tools and equipment carried. Special attention should be given to the rear compartment door.
4. Strap on the map box needs to be replaced with a longer strap.
5. Clean inside of all door box pans, and stainless-steel mirror finishes.
6. Officers seat belt retractor needs adjustment.
7. Drain air holding tanks at least monthly, more often in freezing temperatures.
8. Repair the Chevron under the officer's seat on engine 251

### **Immediate Action Items for Engine 251:**

1. Start rust remediation immediately.
2. Excessive moisture in the air holding tanks. Air holding system needs to be checked by a certified mechanic.

### **Engine 36:**

Po-Mar-Lin Engine 36 is a 2009 Pierce Quantum, four door cab pumper. This aluminum body pumper has a 1000-gallon water tank and a 1500 gpm PUC style pump. This pumper is powered by a Cummins ISM 500 hp motor through an Allison EVS 4000 automatic transmission. This

unit measures 33 feet 8 inches long with a 190-inch wheelbase. This unit responds as the first due apparatus from the station for reported structural fires.

At the time of the field inspection Engine 36 had 19,103 road miles and 2005.7 engine hours. The cab can carry 8 personnel with 7 seats equipped with SCBA. The sightline for the driver is obscured by equipment mounted in the front of the cab. Engine 36 is equipped with a 22,800-pound, TAK4 front axle and a 31,000-pound rear axle. With 8 personnel on board, using the NFPA allowance of 250 pounds per seat, and loaded with equipment, the front axle weighs 20,250-pounds. The rear axle, while loaded with equipment, weighs 28,900-pounds.

Engine 36 has an aluminum body and was designed with 7 body compartments outfitted with Gortite roll up doors. Engine 36 is well equipped with an assortment of engine company tools and appliances. This unit is also outfitted to handle rescue related calls, including vehicle extrication. Engine 36 is equipped with a Harrison 10kw generator, Wilburt light tower, and Husky 12 foam system. These components significantly add to the cost of the apparatus when new and are responsible for the higher-than-average maintenance costs during the life cycle of the vehicle. Having every vehicle be multi-purpose may seem like a good idea; however, these components are not needed for an engine company. In addition, Engine 36 is equipped with “pump and roll” capability and has a bumper mounted turret, which are not needed on a structural fire engine. The exterior and underside of the engine are in good condition for its age but, the engine has a buildup of grease and grime. The underside and engine tunnel area needs to be steam cleaned and sprayed with corrosion preventative.

Engine 36 has 2 speedlays, each outfitted with 150’ of 1 ¾” hose. In the rear hose bed, Engine 36 has 1200’ of 5” supply line, 300’ of 3” with a gated wye, and 250’ of 2 ½” hose with a smooth bore nozzle. The rear hose bed also contains 2 – 300’ 1 ¾” lines, one has a fog nozzle and the other a smooth bore tip. This engine is also outfitted with a standpipe pack of 100’ of 1 ¾” hose and stacked tips. The attached tip is a ½” overhaul tip. This tip should be removed and stored in a bag so that it is not mistakenly used for initial firefighting operations.

Engine 36 has a rear hose bed height of 98.25” or 75” from the top of the back step. From the ground this equates to 8’2” or 6’2” from the back step. This hose bed height is too high and does not allow for safe and rapid deployment of hose lines. This presents a safety concern and should be addressed in future engine specifications. The mission of the vehicle needs to be determined prior to any new vehicle purchase. The addition of features and equipment, that are not needed, forced this engine to be too tall and long, which extended out its wheelbase. All these factors make this vehicle more difficult to drive and more expensive to maintain.

Engine 36 has cost an average of 10,905 dollars to maintain over the last 6 years, excluding 2021. In 2018 and 2019 the records show 5,704 dollars in repairs but the records do not appear to be complete. Items like preventative maintenance and required yearly pump testing are missing from the provided documents. Chief 36 was aware of this discrepancy and made

attempts to track down and locate the documentation. Removing 2018 and 2019, for lack of completeness, over 4 years the average rises to 14, 932 dollars on average for repairs. This is a large sum of money and is above the average cost to maintain an engine company. It is recommended this vehicle be cycled out of the fleet sooner than recommended by NFPA. This will save money now and down the road as more issues will arise as the vehicle ages.

Engine 36 in the last five years has cost the fire company over \$50,280 dollars to operate and had 151 responses in 2020. This unit will be replaced upon delivery of the new engine/tanker in 2023, when the unit will be 14 years old. This unit will be cycled out of the fleet and sold as part of the fleet replacement schedule.



**The MDC and mounted radio equipment block the drivers view while driving.**



**The standpipe pack has a “overhaul tip” on the nozzle.**



**The hose bed is too high off the ground and the hose bed cover prevents rapid, safe deployment of attack lines.**



**The engine compartment and frame rails show dirt buildup and needs to be steam cleaned.**

**Engine 36 recommendations:**

The following items are recommended to be implemented on Engine 36 to improve the safety and operational capabilities of this apparatus:

1. The chassis frame rails, body substructure, and exposed fire pump components should be thoroughly steam cleaned with all exposed rust and corrosion removed. The chassis steam cleaning should be conducted on at least an annual basis to remove accumulated dirt, road debris and surface rust from the chassis and other components.
2. Each apparatus should be subjected to an annual inspection to confirm the structural integrity of the chassis frame rails and components for corrosion with these areas protected with an undercoating system like Carwell or other nationally recognized system that is utilized on fire apparatus fleets to mitigate the impact of anti-icing road chemicals.
3. The door seals and rubber molding on the rollup doors should be inspected and replaced as necessary to provide a positive, weatherproof seal to protect the tools and equipment carried on the apparatus.
4. Define the mission of the vehicle. Then equip the vehicle for that mission, making sure that all equipment on the apparatus is secured in accordance with the NFPA Standard using 9-G rated brackets. Special attention should be given to the rear compartment, where there is a lack of tool mounting and equipment is stacked on top of other equipment.
5. All equipment stored in the cab area needs to be secured in NFPA 9G rated brackets. Loose equipment in the cab is a safety hazard and can become a projectile in a collision.
6. Speedlays should be adjusted to carry 200' of 1 3/4" hose.
7. 5" hose should be added so that it carries a minimum of 1500' of 5" supply hose.
8. Po-Mar-Lin should identify a fire flow requirement for their respective response area and outfit their engine companies with hose and nozzles to meet this fire flow requirement. Special attention should be given to ensuring that Po-Mar-Lin standardize their nozzles and hose across all attack lines on all apparatus in the fleet.
9. The rear hose bed design does not allow for safe and rapid deployment of attack lines. The rear hose bed cover needs to be altered so that firefighters do not need to climb the rear ladder to undo cords to release the hose bed cover.

## 5.2 Ladder/Tower Companies

### **Tower 24:**

Kennett Tower 24 is a 2016 Pierce Arrow XT, 95-foot mid-mounted aerial tower with an aluminum four door cab and bodywork. This apparatus is built on a 260-inch wheelbase with an overall length of 46 feet 1 inches and overall height of 131.50 inches. The tower is powered by a DD-13 Detroit Diesel engine rated at 525 horsepower through an Allison EVS-4500 automatic transmission. The apparatus is capable of seating six personnel in the cab and five seats are equipped with self-contained breathing apparatus.

The apparatus is equipped with front axle rating of 22,800 pounds with an in-service weight of 22,000 pounds with personnel. The rear axle is rated at 60,000 pounds with an in-service weight of 56,300 pounds.

At the time of the field survey, the apparatus had 8,907 road miles and 1,025 engine hours accumulated. Tower 24 is equipped with a Vogel lubrication system and TAK-4 independent front suspension. The apparatus body is outfitted with Thirteen enclosed compartments with a combination of rollup and hinged doors. The tower is outfitted with an assortment of truck company equipment such as: fans, rotary and chain saws, rope bags, and forcible entry tools. Tower 24 is also equipped with a 15 KW Harrison generator with two electric cable reels. The tower has a significant amount of truck company equipment.

A total of 299 feet of portable ground ladders are carried on the tower including; two 35-foot, two 28-foot, one 24-foot, one 20-foot roof, one 18-foot roof, one 16-foot roof ladder, two 14-foot roof, and several utility ladders. The total of 299 feet of ground ladders carried on the tower is impressive. The tower is equipped with a pre piped waterway and a single nozzle with stacked tips. The tower is in mainly good condition, in part due to the prepping, priming, and painting the underside of the apparatus including the chassis frame rails. However, even with the frame rails being painted they still need to be cleaned annually and treated with corrosion protectant.

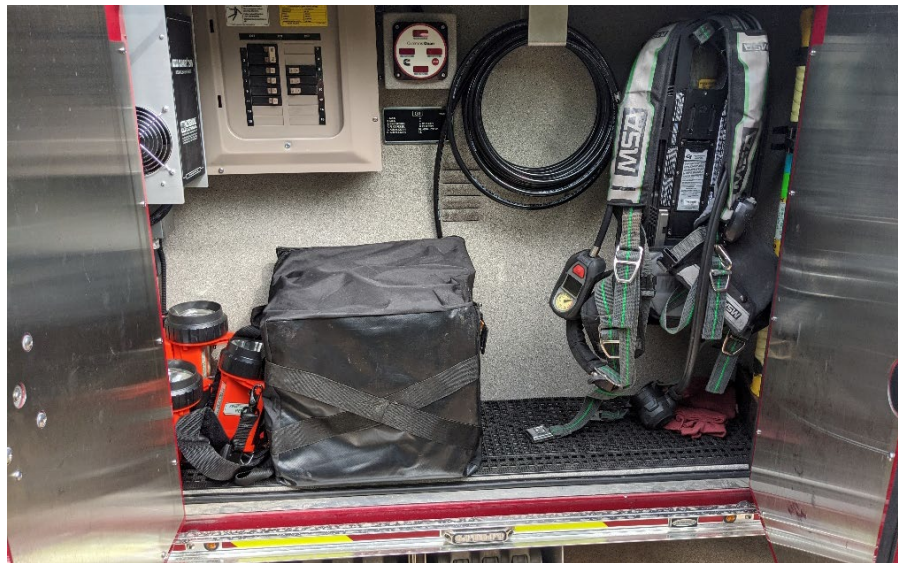
Tower 24 responded 56 times in the past year and repair costs over the past three years have totaled \$29,095. Much of these repair costs were due to accident damage. One of the accidents involved the collision avoidance that did not activate and contact was made between the boom and the side of the truck. The cost of this accident was covered by the manufacturer. Emergency Vehicle Response checked the collision avoidance system during the field inspection and found the system to be working properly. Tower 24 will be replaced in 2035 when the apparatus will be 19 years old, and the current Tower 24 will be cycled out of the fleet and sold.



**Tower 24 is a well-designed and equipped unit with excellent ground ladder compliment**



**Change aerial inlet gauge to 0-300 psi range**



**Portable lights need to be secured in NFPA 9-G rated brackets**



**Painting underside components helps protect them from corrosion**

**Tower 24 Recommendations:**

The following items are recommended to be implemented on Tower 24 to improve the safety and operational capabilities of this apparatus:

1. The chassis frame rails; and body substructure components should be thoroughly steam cleaned with all exposed rust and corrosion removed. The chassis steam cleaning should be conducted on at least an annual basis to remove accumulated dirt, road debris and surface rust from the chassis and other components. These areas once cleaned of all rust should be treated with a weather resistant undercoating like Krown (<https://www.krown.com/en/>) or Carwell (<http://www.carwell.com/>).
3. Secure loose hand lights in compartment L-1 in NFPA approved 9-G brackets.
4. Change aerial inlet gauge to 0-300 PSI range. The current gauge does not allow for accurate reading, due to the scale of the gauge.
5. Clean SCBA wheel well compartments.
6. Clean and detail the rig, especially the interior of the body compartments. All equipment should be removed from the compartments and the compartments should be thoroughly cleaned.

### **Ladder 25:**

Ladder 25 is a 2004 Seagrave rear-mounted 100-foot aerial ladder straight truck previously owned by Christiana, Delaware. The apparatus was purchased by Longwood in 2021 for \$80,000.00 and is currently at Glick undergoing a \$250,000.00 rebuild and was unavailable to Emergency Vehicle Response during the field visit. Once this unit enters service it will have to be retained for a period of time to get some of the money being spent out of the rig. Ladder 25 is scheduled to be replaced in 2027 with a tractor drawn aerial ladder and then will act as the departments reserve ladder.

### **Tractor Drawn Ladder:**

The Longwood Fire Company purchased a used tractor drawn aerial ladder from Hagerstown, Maryland at a cost of \$51,500.00 for the purpose of training driver / operators in anticipation of acquiring a new tractor drawn aerial ladder as outlined in the aerial needs assessment conducted by Emergency Vehicle Response in 2017. Due to the unit's odometer not functioning properly it is estimated that the mileage is 37,466 and the engine hours are approximately 9490. The TDA is a 1997 has a Duplex D-8400 tractor with a 105-foot Aerial Innovations aerial ladder and body work by Quality Manufacturing. The cost of maintenance and repairs since it was purchased in 2017 has been \$52,873.



## **5.3 Heavy Rescue Company**

### **Rescue 25:**

Rescue 25 is a 2016 Heavy Rescue built by Pierce Manufacturing on an Arrow XT chassis with. The cab and body are constructed of aluminum. This unit has 7 roll up doors but, had the rear roll up door replaced with a canvas tarp after delivery. The cab can carry 2 personnel safely and the rescue body can seat 6. The apparatus is powered by a DD-13 Detroit Diesel motor rated at 500 horsepower through an Allison EVS-4000 automatic transmission. This unit has a 219.50-inch wheelbase, with an overall length of 37 feet, and an overall height of 133 inches. At the time of the field survey Rescue 25 accumulated 10,751 road miles and 1215 engine hours.

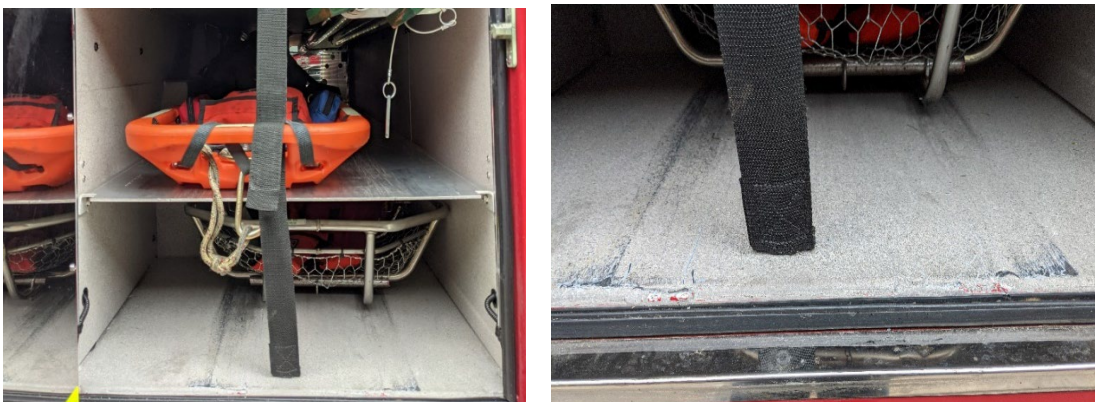
The front axle on rating on Rescue 25 is 22,800 pounds and the tandem rear axle is rated at 40,000 pounds. The current in-service weights for this unit are 20,200 pounds on the front axle and 29,200 pounds on the rear axle.

Rescue 25 is equipped with TAK-4 independent front suspension, Vogel lubrication system, Wilbert light tower, and a Harrison 30 KW generator. The apparatus is equipped with air reels, hydraulic reels, and electric reels. This is a well-designed and equipped Heavy Rescue.

Rescue 25 has averaged 2150 miles per year having responded to 146 calls in 2020 and the fire company has spent \$64,067 in the last five years including \$51,376 for the original up fit. Rescue 25 is due for replacement in 2037 with a new Heavy Rescue when the unit will be 21 years old. The current Rescue 25 will be cycled out of the fleet and sold.



**Tools on the front bumper need to be cleaned of rust and repainted.**



**Add poly material in transverse compartment under the stokes basket**



**Clean all compartments of dirt and debris**



**Repair the chaffing on the hose and the cab.**

### **Rescue 25 Recommendations:**

The following items are recommended to be implemented on Rescue 25 to improve the safety and operational characteristics of this apparatus until its planned replacement:

1. The chassis frame rails; body substructure should be thoroughly steam cleaned with all exposed rust and corrosion removed. The chassis steam cleaning should be conducted on at least an annual basis to remove accumulated dirt, road debris and surface rust from the chassis and other components.
2. Remove rust and corrosion from the chassis frame rails, treat with POR 15 or equal and undercoat with Carwell or equal.
3. Clean and detail the rig, especially the interior of the body compartments, floor area around slide trays and inside the rescue body. All equipment should be removed from the compartments and the compartments should be thoroughly cleaned.
4. All equipment shall be secured and mounted with NFPA 9-G rated brackets. Equipment in the rear compartment area is not secured in rated brackets and is not laid out to be safely and easily assessable.
5. Provide heavy poly slide material for the cab transverse compartment to make it easier to remove the RIT loaded stokes basket.
6. Clean rear step compartment of corrosion and dirt.
7. Adjust door stays to the L-2 and R-2 compartments to reduce damage to the doors due to the slide trays.
8. Clean rescue body windows.
9. Provide chaff guard on hoses rubbing at the right front corner of the chassis.
10. Replace the map book strap with a longer strap on the map book compartment.

## **5.4 Rescue Engines**

### **Rescue Engine 36:**

Po-Mar-Lin Rescue 36 is a 2020 Pierce Enforcer, four door cab, pumper. This aluminum body pumper has a 750-gallon water tank, 30-gallon class b foam tank, and a 1500 gpm PUC style pump. This pumper is powered by a DD-13 525 hp motor through an Allison EVS 4500 automatic transmission. This unit measures 34 feet 9 inches long with a 220-inch wheelbase.

Rescue 36 responds as the first due apparatus to reported motor vehicle accidents and second due, from the station, for reported structural fires in the hydrated portions of the response area.

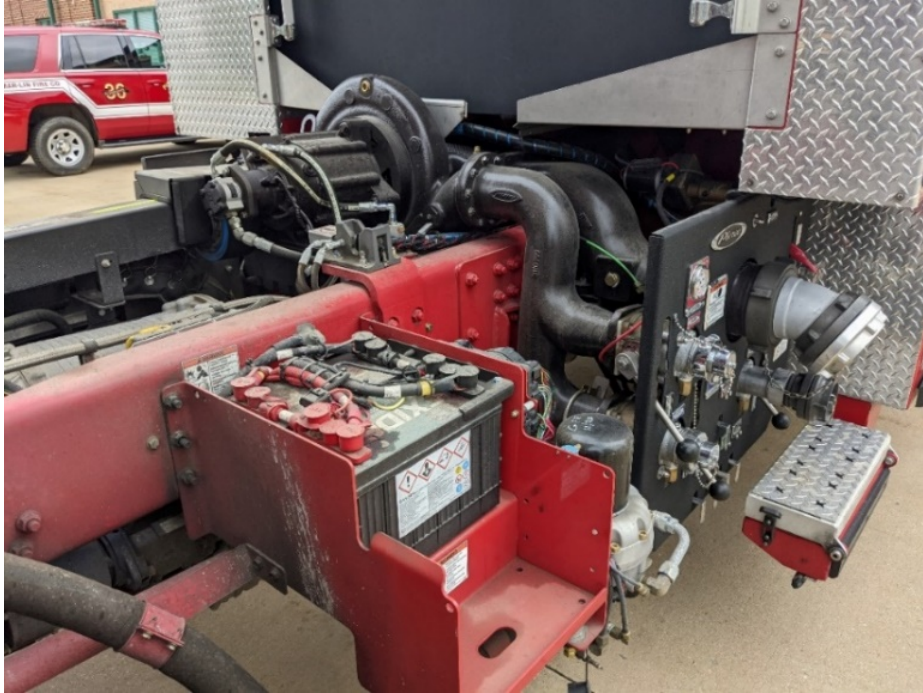
At the time of the field inspection, Rescue 36 had 4124 road miles and 388 engine hours. The cab can carry 6 personnel with 5 seats equipped with SCBA. Rescue 36 is equipped with a 22,800-pound, TAK4, front axle and a 31,000-pound rear axle. With 6 personnel on board, using the NFPA allowance of 250 pounds per seat, and loaded with equipment, the front axle weighs 21,000-pounds. The rear axle, while loaded with equipment, weighs 29,100-pounds.

Rescue 36 has an aluminum body and was designed with 11 body compartments outfitted with Amdor roll up doors. Rescue 36 is well equipped with an assortment of engine and rescue company tools. This unit is equipped with a Harrison 6kw generator, Wilburt light tower, pump and roll capabilities, and Husky foam system. These components significantly add to the cost of the apparatus when new and can be responsible for the higher-than-average maintenance costs during the life cycle of the vehicle. Rescue 36's "pump and roll" capability, is not needed on a structural fire engine and future engine apparatus should not be specified with this capability. The exterior and underside of the engine are in good condition for its age but are dirty and have grease and grime buildup. The underside and engine tunnel area need to be steam cleaned and sprayed with a corrosion preventative such as Carwell or an equal.

Rescue 36 has 2 speedlays, each outfitted with 150' of 1 3/4" hose. In the rear hose bed, Engine 36 has 1200' of 5" supply line, 300' of 3" with a gated wye, and 250' of 2 1/2" hose with a smooth bore nozzle. The rear hose bed also contains a 300' 1 3/4" line with a smooth bore tip. There is a 150' 1 3/4" line located in the front bumper. Rescue 36 has a rear hose bed height of 73.5" from the ground.

The mission of the vehicle needs to be determined prior to any new vehicle purchase. The additional features and equipment added onto this vehicle, forced this rescue engine to be too tall and long and extended out its wheelbase. All these factors make this vehicle more difficult to drive and more expensive to maintain.

Since Rescue 36 is relatively, new there is not enough data to track the maintenance cost of the vehicle. This vehicle, along with all the vehicles in the fleet, shall be monitored to ensure the cost of maintenance does not exceed the norm. This unit will be replaced in 2041 when the unit will be 21 years old with a water source engine for rural water supply. The current Rescue 36 would be cycled out of the fleet and sold. Rescue services will be supply by Rescue 25 for all the Kennett Fire & Rescue Regional Commission so there would be no reason for any individual fire company to have rescue equipment. This would reduce the duplication in equipment and cost and would use what little available staffing there is more affectively.



**Frame rails and battery box need to be steam cleaned.**



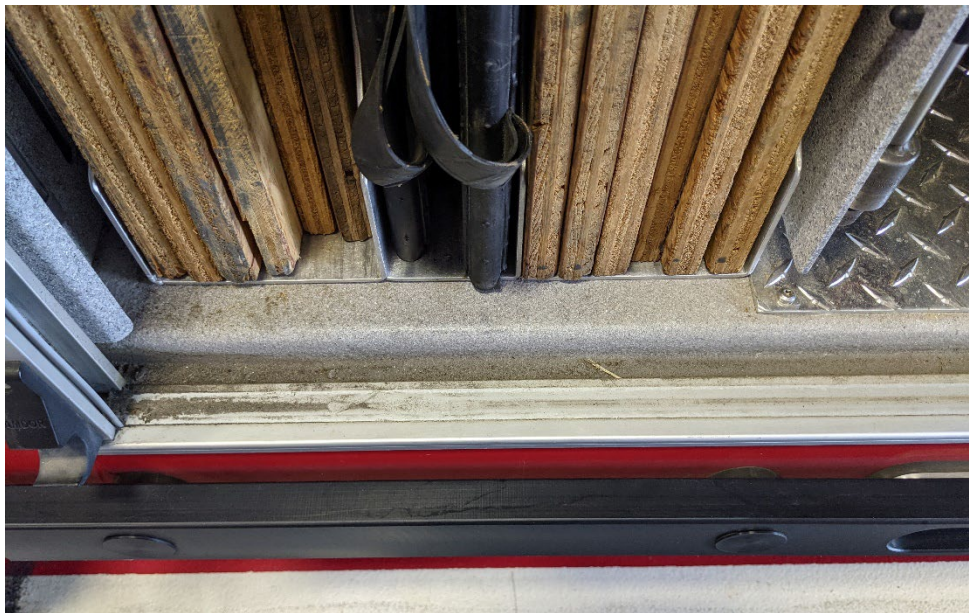
**Wheel well compartment showing signs of dirt intrusion. Compartment needs to be cleaned and gasket inspected and replaced.**



**Compartment with costly toolbox.**



**Contents of a drawer in toolbox**



**Dirt intrusion into the airbag compartment.  
Compartments need to be cleaned and rubber gaskets inspected and replaced.**

### **Rescue Engine 36 Recommendations:**

The following items are recommended to be implemented on Rescue 36 to improve the safety and operational capabilities of this apparatus:

1. The chassis frame rails, body substructure, and exposed fire pump components should be thoroughly steam cleaned with all exposed rust and corrosion removed. The chassis steam cleaning should be conducted on at least an annual basis to remove accumulated dirt, road debris and surface rust from the chassis and other components.
1. Each apparatus should be subjected to an annual inspection to confirm the structural integrity of the chassis frame rails and components for corrosion. These areas shall be protected with an undercoating system like Carwell or other nationally recognized system that is utilized on fire apparatus fleets to mitigate the impact of anti-icing road chemicals.
2. The door seals and rubber molding on the rollup doors should be inspected and replaced as necessary to provide a positive, weatherproof seal to protect the tools and equipment carried on the apparatus. Special attention should be given to the left and right side of the wheel well compartments.
3. Speedlays should be adjusted to carry 200' of 1.75-inch hose.
4. 5" hose should be added so that it carries a minimum of 1500' of 5-inch supply hose.
5. Po-Mar-Lin should identify a fire flow requirement for their respective response area and outfit their engine companies with hose and nozzles to meet this fire flow requirement. Special attention should be given to ensuring that Po-Mar-Lin standardize their nozzles and hose across all attack lines on all apparatus in the fleet.
6. Rescue type vehicles are not needed in the response district, with Recue 25 covering this service. Six units currently have extrication equipment in the response area. Future engines shall be specified not to carry extrication equipment. This will help ensure the vehicle remains on a smaller footprint with an easier driving profile. Po-Mar-Lin should focus on rural water supply with future apparatus purchases, as this is a specialty needed in the response area.

### **Rescue Engine 24:**

This apparatus is Rosenbauer General Safety, with an HME-SLE cab, rescue pumper which was purchased new and placed in service in 2005. The aluminum body was built with a Rosenbauer 1000 GPM, three stage NH40 fire pump and a 1000-gallon water tank with a 30-gallon foam cell. This pumper is powered by a Cummins ISM engine rated at 500 horsepower through an

Allison 4000 EVS automatic transmission. This unit measures 33 feet 3 inches long and 10 feet 9 inches tall and has a 212.50-inch wheelbase.

At the time of the field inspection Rescue 24 had 22,169 road miles and 1,986 engine hours. The cab can carry seven personal and is equipped with a 21,500-pound front and a 31,000-pound rear axle. With 6 personnel on board, using the NFPA 1901 allowance of 200 pounds per seat, seat weight is 1,200 pounds. The front axle, with personnel, weighs 19,300 pounds and the rear axle weighs 29,300 pounds. The chassis frame rails, battery boxes and air reservoirs will need to be steam cleaned and treated with a rust preventative coating to prevent deterioration of these components from the effects of corrosion.

Rescue 24 is equipped with a roof mounted remote-controlled turret in the front, a remote-controlled rear body master stream expensive options that were costly and not needed on the apparatus. Also, the unit was equipped with pump and roll capability. That is expensive and not needed on a structural engine. The apparatus has all electric valves which historically been expensive to purchase and has resulted in greater repair costs and extended periods of out of service time.

This unit is equipped with two 200'-1.75 speed lays and one high pressure reel. This engine carries 1000 feet of 5.00-inch rubber jacketed supply line and 600 feet of 3.00-inch hose is dead loaded. Rescue 24 has a 19.8 KW generator and assorted rescue tools. However, like most combination Rescue Engines it carries a little engine company equipment and a little rescue equipment but is not functional enough to do either job very well. This Long wheelbase engine is poorly designed and over equipped. The apparatus has poor supply line layout as the hose lines are too far off the ground and makes working off the apparatus unsafe.

Rescue 24 has cost at least \$17,693.00 in repairs in the last three years with incomplete data and had 86 responses in 2020. This unit should be place out of service and disposed of and sold as it does not fit in the overall fleet strategy. No entity should expend any more money on this apparatus. Rescue services will be provided by Rescue 25. This will eliminate a duplication in service, equipment, and costs. Also, from the staffing numbers provided the unit cannot be properly staffed anyway.



**All hose loads on all engine company apparatus need to be standardized.**



**Poor vision out of the officer's side of the vehicle making it unsafe to drive.**



**Hose bed too high off the ground making this unit unsafe to work on.**



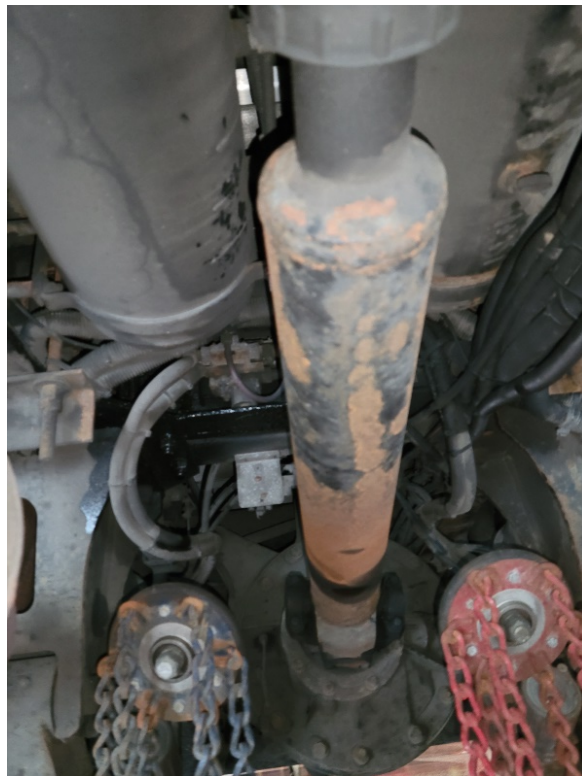
**Electronic pump panel was costly and not needed.**



**Rust, corrosion, and dirt accumulating on the frame rails.**



**Excessive moisture out of the air brake system holding tank.**



**Corrosion on the pump drive shaft.**

**Rescue Engine 24 Recommendations:**

Rescue 24 should be placed out of service, declared surplus and disposed of. Failure to follow this recommendation should lead to the following:

1. All six tires need to be replaced as they appear to have a 2014 date which would place all of them out of date in accordance with NFPA 1911 seven-year expiration.
2. Correct the unsafe vision condition in the cab.
3. The chassis frame rails, body substructure, and exposed fire pump components should be thoroughly steam cleaned with all exposed rust and corrosion removed. The chassis steam cleaning should be conducted on at least an annual basis to remove accumulated dirt, road debris and surface rust from the chassis and other components.
4. Each apparatus should be subjected to an annual inspection to confirm the structural integrity of the chassis frame rails and components for corrosion. These areas shall be protected with an undercoating system like Carwell or other nationally recognized system that is utilized on fire apparatus fleets to mitigate the impact of anti-icing road chemicals.
5. All equipment in the cab needs to be secured in NFPA 9-G brackets.
6. Excessive moisture in the brake system needs to be addressed by a mechanic.
7. Identify the target fire flow for the protection area and equip all units in the fleet with appropriate hose and nozzle packages. Standardize hose loads, deployment, and nozzles department wide.
8. Rescue type vehicles are not needed in the response district, with Rescue 25 covering this service. Six units currently have extrication equipment in the response area. Future engines shall be specified not to carry extrication equipment.

## 5.5 Tankers

**Tanker 24:**

This apparatus is a Kenworth T-800 tandem axle two door cab tanker purchased new and placed into service by the fire department in 2013. The aluminum body apparatus was built with a Hale 2000 gpm single stage fire pump and a 3000- gallon water tank. The apparatus is powered by a Cummins X-12 diesel engine rated at 500 horsepower through an Allison EVS 4000 automatic transmission. This unit was built with a 244.00- inch wheelbase and overall length of 33 feet 9 inches.

At the time of the field inspection, Tanker 24 had 11,565 road miles and 1435.0 engine hours. The cab can carry 2 personnel and is equipped with a 18,000-pound rated front axle and a 44,000-pound rated rear axle. With two personnel, the apparatus weighs 18,100 pounds on the front axle and 39,100 on the rear axle. The personnel weight is calculated in accordance with NFPA 1911 the care and maintenance of fire apparatus. The weight allowed for apparatus built before 2009 is 200 lbs. per seat and after 2009 is 250 lbs. per seat. Tanker 24, being built after 2009, is overweight on the front axle with two firefighters in the cab. This unit can only be operated by the driver, to ensure it does not become overweight. Signage should be put in the cab prohibiting two personnel in the cab at any time. This in the short term will eliminate the overweight condition.

The fire department has spent the nominal amount of \$4,395.00 over the last three years to maintain Tanker 24. Tanker 24 should be replaced in accordance with the fleet replacement schedule in 2033 when Tanker 24 will be 20 years old. The current Tanker 24 should be retained and enter the reserve fleet.



**Mount all loose equipment in NFPA approved 9-G Brackets**



**Remediate minor rust on the underside of the apparatus.**



**Space rub rails away from the body to protect the rollup door hardware and lift bar latch**



**Mount all loose equipment in NFPA approved 9-G Bracket.**

**Tanker 24 Recommendations:**

The following items are recommended to be implemented on Tanker 24 to improve the safety and operational capabilities of this apparatus:

2. All apparatus should be weighed annually in accordance with NFPA 1911.
3. The chassis frame rails; body substructure should be thoroughly steam cleaned with all exposed rust and corrosion removed. The chassis steam cleaning should be conducted on at least an annual basis to remove accumulated dirt, road debris, and surface rust from the chassis and other components.
4. Each apparatus should be subjected to an annual inspection to confirm the structural integrity of the chassis frame rails and components for corrosion. These areas shall be protected with an undercoating system like Carwell or other nationally recognized system that is utilized on fire apparatus fleets to mitigate the impact of anti-icing road chemicals.
5. Clean and detail the rig, especially the interior of the body compartments. All equipment should be removed from the compartments and the compartments should be thoroughly cleaned.
6. All equipment shall be secured and mounted with NFPA 9-G rated brackets. Equipment in compartments L-1 and R-1 area are not secured in rated brackets.
7. Shim rub rail away from body to protect rollup door handle as intended.
8. Identify the target fire flow for the protection area and equip all units in the fleet with appropriate hose and nozzle packages. Standardize hose loads, deployment, and nozzles department wide.

**Tanker 25-1:**

This apparatus is a Peterbilt 357 tandem axle two door cab tanker was purchased used, from a neighboring department in Lancaster County, at a cost of \$200,000 and placed into service by the fire department in 2015. The Pierce, aluminum body apparatus, was built in 2005 with a Hale 1500 gpm single stage fire pump and 3000- gallon water tank. The apparatus is powered by a Caterpillar C-13 diesel engine rated at 500 horsepower through an Allison EVS 4000 automatic transmission. This unit was built with a 236.00- inch wheelbase and overall length of 34 feet 4 inches.

At the time of the field inspection tanker 25-1 had 37,909 road miles and 3662.0 engine hours. The cab can carry 2 personnel and is equipped with a 20,000-pound rated front axle and a 48,000-pound rated rear axle. With two personnel the apparatus weighs 13,400 pounds on the front axle and 39,950 on the rear axle. The personnel weight is calculated in accordance with NFPA 1911 the care and maintenance of fire apparatus. The weight allowed for apparatus built before 2009 is 200 lbs. per seat and after 2009 is 250 lbs. per seat. Tanker 25 is well within the accepted weight for this unit.

The Longwood Fire Company spent \$77,015 in lighting upgrades, repairs, and maintenance in the last five years on Tanker 25-1. Although 8 years older than Kennett Tanker 24, the \$7325 spent in the same time period by Kennett Fire Company on Tanker 24 pales in comparison and gives a good argument for replacing Tanker 25-1 in 2025 when current Tanker 25-1 would be twenty years old.



**Remediate rust and corrosion on Tanker 25-1**



**Equipment and spare hose should be secured inside the body compartment**



**Carry spare hose in the open transverse beds and secure with heavy netting.**

### **Tanker 25-1 Recommendations:**

The following items are recommended to be implemented on Tanker 25-1 to improve the safety and operational capabilities of this apparatus:

1. The chassis frame rails and body substructure should be thoroughly steam cleaned with all exposed rust and corrosion removed. The chassis steam cleaning should be conducted on at least an annual basis to remove accumulated dirt, road debris, and surface rust from the chassis and other components.
2. Remove rust and corrosion from the chassis frame rails, treat with POR 15 or equal and undercoat with Carwell or equal.
3. Clean and detail the rig, especially the interior of the body compartments, floor area and inside the cab. All equipment should be removed from the compartments and the compartments should be thoroughly cleaned.
4. All equipment shall be secured and mounted with NFPA 9-G rated brackets. Equipment in compartments L-1 and R-1 area is not secured in rated brackets.
5. Seat belt retractor needs adjustment or replacement on both front seats.
6. The tanker should carry an assortment of 2.50 inch and large diameter hose adapters, mounted and secured in a body compartment.
7. Identify the target fire flow for the protection area and equip all units in the fleet with appropriate hose and nozzle packages. Standardize hose loads, deployment, and nozzles department wide.

### **Tanker 36:**

Po-Mar-Lin Tanker 36 is a 2002 Peterbilt chassis and Four Guys tank and body. This stainless-steel body tanker has a 3000-gallon water tank, 50-gallon foam cell, and a 1500 gpm pump. This tanker is powered by a Cat C-15 410 hp engine through an Allison HD-4000D automatic transmission. Tanker 36 measures 379 inches long with a 244-inch wheelbase. This unit responds second out for reported structure fires in the non-hydrated areas. This unit runs on average 35 calls a year with 10 being structure fire related calls (*based upon 2018-2020 statistics*).

At the time of the field inspection Tanker 36 had 19,867 road miles and 1572.6 engine hours. The commercial cab can carry 2 personnel. Tanker 36 is equipped with a 18,000-pound front axle and a 40,000-pound tandem rear axle. The front axle weighs 18,100 pounds with equipment and personnel on board. This loading puts the front axle and the vehicle in an overweight

condition. This unit should not respond with more than 1 person, to alleviate the overweight condition. The rear axle weighs 41,100 pounds with equipment.

Tanker 36 has a stainless-steel body with 5 body compartments outfitted with lap doors. This unit is well designed and equipped for a 19-year-old unit. Tanker 36 carries an assortment of equipment for water supply and drafting. This unit carries 2 – cross-lays of 200 feet of 1 ¾” hose, 200 feet of 2 ½” hose, and 400 feet of 3” hose. This assortment of hose allows for the deployment of attack lines off the tanker. This feature and more will be explored later in the recommendations section of the report.

This unit is showing its age on the underside with moderate corrosion on the frame rails and throughout the chassis. The stainless-steel body is in good condition, due to its construction. Although this unit would normally require corrosion remediation, it is not recommended due to the vehicles age and anticipated replacement in 2023. No major repairs or expenditures should be made on this vehicle, and it should be cycled out of the fleet. Tanker 36 responded to 44 calls and the fire company spent \$4,377 in 2020. The current Tanker 36 would be disposed of and sold once the new Engine / Tanker 24 enters service in 2023.



**Tanker 36 is well equipped for the mission.**



**The underside shows moderate to severe corrosion and would need to be repaired if the vehicle is not removed from the fleet.**

### **Tanker 36: Recommendations:**

The following items are recommended to be implemented on Tanker 36:

- This unit should be removed from the fleet and replaced with a pumper-tanker type vehicle in 2023 when the unit would be 20 years old. NFPA 1911 recommends that vehicles be cycled out of the fleet or placed into reserve status when they reach 20 years of life. Due to the corrosion, this vehicle should be removed from the fleet.

### **Tanker 25-2**



Tanker 25-2 is a 6000-gallon tractor trailer tanker which was purchased used from the Kimberton Fire Company. The 1995 tractor is a Peterbilt 379 powered with a Detroit Series 60 engine rated at 500 horsepower through a HD-4060 P Allison Transmission. The tractor has 115,099 road miles at the time of the field visit and 225.4 hours. The tractor pulls a 1995 Walker 6000-gallon trailer and is equipped with a 1000 gpm Deutz diesel engine driven pump.

### **Tanker 25-2 Recommendations:**

The Longwood Fire Company should no longer be in the water hauling business. With a higher call volume, lack of qualified drivers, and an expanding fire department to run there is neither time nor personnel to continue to haul water. Also, this unit has cost the Longwood Fire Company \$56,425 in the last four years and responded 2 times in 2020. It is recommended that the water hauling business be dissolved and that Tanker 25-2 be sold.

### **Tanker 25-3:**



Tanker 25-3 is a 7800-gallon tractor trailer tanker which was purchased used. The 2012 tractor is a Peterbilt 388 powered by a Cummins ISX-15 rated at 500 horsepower through an Eaton Manual Transmission. The tractor had 422,058 road miles at the time of the field visit and 9476 engine hours. The tractor pulls a 1995 Heil 8800-gallon trailer that was rebuilt in 2005 as a 7800-gallon trailer and is equipped with a 1000 gpm pump.

### **Tanker 25-3 Recommendations:**

The Longwood Fire Company should no longer be in the water hauling business. With a higher call volume, lack of qualified drivers, and an expanding fire department to run there is neither time nor personnel to continue to haul water. Also, this unit has cost the Longwood Fire Company \$19,641 in the last four years and responded 5 times in 2020. It is recommended that the water hauling business be dissolved and that Tanker 25-3 be sold.

## **5.6 Brush Trucks**

### **Brush 36:**



Brush 36 is a 2016 Ford F-550 4X4 Extended Cab with a Firematic body and converted to single wheel drive (SWD). It is powered by a 6.7-liter Power stroke Diesel motor with approximately 300 HP and an automatic 6 speed transmission. At the time of the field inspection, the mileage was 4,659 miles. The Serial Number is B11130PML, and the Chassis Number is 73188. Brush 36 has an overall actual length (OAL) of 24 feet and a gross vehicle weight rating (GVWR) of 19,500 lbs. The front axle rating is 7,000 lbs. and the rear axle rating is 14,706 lbs. The maximum seating is 2 personnel (driver and passenger).

Brush 36 is equipped with a midship 1,000 GPM Hale pump and a secondary gas fueled 250 GPM Darley pump which is utilized for “pump and roll” operations. The water tank size is 250 gallons. Brush 36 has two (2) preconnected 200 feet of 1.75-inch crosslays, several hundred feet of 1” forestry hose, 400 feet of 3-inch hose flat laid on the rear hose bed. In addition, there are several smaller “pony” lengths of 3-inch, 5 inches, and 6-inch hose. The front bumper has a mounted turret gun nozzle that can be operated remotely. Brush 36 contains multiple

forestry/brush hand tools, hooks, axes, rakes, shovels etc. There is also a compartment with multiple chain saws and other related equipment.



**Tools carried on Brush 36.**

Brush 36's in service weight at the time of the field inspection was 14,708 lbs. The chart below details axle ratings, gross vehicle ratings, and NFPA 1911 Load Calculations.

	<b>Axle Rating (lbs.)</b>	<b>In Service Weight (lbs.)</b>
Front	7,000	6,500
Rear	14,706	11,000
GVWR	19,500	18,000
NFPA 1911 Live Load Weight Calculation	-	18,500

Regarding the referenced NFPA weight calculation – all seating positions with a seat restraint are calculated with a loaded condition. This calculation follows NFPA 1911 A.16.2.4 (3). Units built before 2009 are calculated with 200 pounds per firefighter and apparatus constructed on or after 2009 are calculated at 250 pounds per firefighter in accordance with NFPA 1901.

Brush 36 responded 41 times in 2020 and the fire company has expended \$7,001 since Brush 36 was put into service in 2016. Brush 36 should be replaced at some point in the future at the discretion of the fire chief. The criteria for replacement should be based on need, cost of repairs, responses, and age. Brush 36 should be replaced in an even year in an ambulance purchasing year to keep capital expenditures as level as you can.

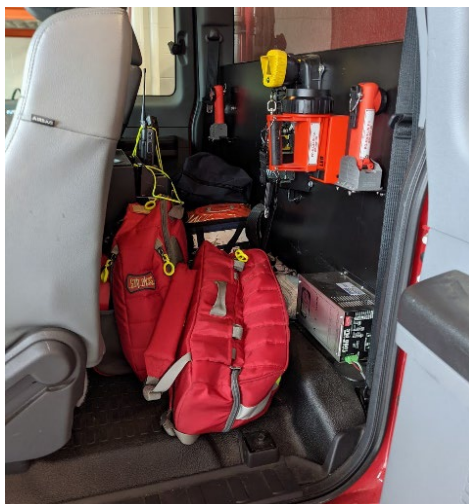
**Brush 36 Recommendations:**

- It is recommended that Brush 36 be utilized as a water supply unit in addition to operating as a brush unit. This will complement the fleet and greatly assist in the water supply hurdles throughout the response area. To be an effective water supply unit Brush 36 should carry a minimum of 800 feet of 5-inch supply hose and 300 to 400 feet of 3-inch hose.



**Rear hose bed of Brush 36**

- In addition to the supply hose, some of the equipment being carried should be modified to support water supply operations. Equipment such as an LDH manifold, Siamese fittings, etc.
- Secure all loose equipment that is present in the cab with a NFPA compliant 9G rated non-marring brackets.



**Loose equipment in the cab of Brush 36 needs to be secured in NFPA 9-G brackets**

- Ensure the overall GVW and axle weights are not over their ratings especially after adding, removing, or relocating equipment throughout Brush 36. The vehicle should be reweighed once all modifications are completed.

**Brush 24:**

Kennett's brush truck is a 1988 Ford pickup with a skid unit in the bed. The brush unit was responsible for an average of 3 calls a year for the last 3 years of call data. This unit is overweight. The GVWR is 9,200 pounds and the Actual weight is 10,700. Brush 24 is 1500 pounds overweight. The vehicle is 33 years old and has reached the end of its life cycle. This unit should be removed from the fleet and not be replaced. Calls for brush fires should be covered by the brush truck from Po-Mar-Lin and other mutual aid brush units. Kennett will maintain the UTV which also has brush capabilities. If the need for a brush truck were to arise, when the squad or utility is replaced, the new vehicle could be equipped with a skid unit. Careful consideration shall be given to the size of skid unit and the weight capacity of the chosen vehicle to ensure the skid unit does not exceed the vehicles weight capacity.

**Brush 24 Recommendations:**

Remove Kennett's Brush truck from the fleet. The age alone makes this vehicle obsolete and does not adhere to the current NFPA 1901 standards. This unit averaged 3 calls a year for the last 3 years. This lack of activity does not support a replacement vehicle.



**Kennett Brush 24**

**Brush 25:** The former Longwood brush unit was retired prior to the field visit but, the vehicle was kept in the fleet as a tow vehicle. This vehicle should be replaced with a command vehicle.

**5.7 EMS:****MICU's:**

Longwood Fire Department provides the ambulance transport service to the area. They operate two advanced life support (ALS) transport units, one located in Longwoods firehouse and the other located in Kennett's firehouse. These units are staffed 24/7 by career personnel. As the population continues to grow and the response area is further developed, there will be a need to staff an additional ALS transport unit. The current call volume does not support a third transport

unit but, the numbers are getting closer to the threshold and are not far from necessitating another staffed unit. Currently Longwood has 4 ambulances in their fleet. The two “unstaffed” units serve as reserve and events units. Events of 5,000 or greater require an EMS unit to be on standby. The current fleet is sufficient, but consideration should be given to increasing the units to five in the near future and, if warranted, six farther out to support the growth and community events. The growth to 5 has been accounted for in the apparatus replacement plan as a new 25-5 should enter service in 2025.

### **MICU Recommendations:**

The EMS transport units are the workhorses of the fleet and with 24/7 career staff they will see the most milage and use. This means there is a need to replace these units on a more regular basis. To help offset the cost of a new ambulance many departments have explored re-mounting the ambulance’s box onto a new chassis. The cost avoidance would save the Commission \$100,000 or more compared to a new vehicle. Ambulances shall be purchased and undergo one remount before removal from the feet. EVR does not recommend more than one remount for an ambulance. Not every ambulance is a good candidate for a remount and new units should be designed with the thoughts of remounting in mind. Remounting does not always save a department money and when a unit is up for remount, prices should be obtained for both a remount and a full replacement for comparison. Longwood Ambulance 25-1 and 25-2 are designed well and are perfect candidates for re-mounts.

## **5.8 Support Vehicles and Trailers:**

Support vehicles and trailers are a needed resource in any fire department as they transport members and equipment to both emergency and non-emergency events. Support vehicles and trailers include chiefs’ vehicles, utility vehicles, squads, traffic units, boat trailers, and UTV trailers. Currently there are 14 support vehicles and 8 support trailers in the fleet.

### **Command Vehicles:**

There are five command vehicles in the fleet. Kennett and Po-Mar-Lin each operate one chief’s vehicle. Since Longwood has a paid fire chief and a paid Assistant Chief of EMS, they require additional chiefs’ vehicles. As the department continues to grow, the need to hire additional chiefs will become more urgent. The vehicles currently used by volunteer chiefs should be shifted to accommodate the additional career command staff. There should continue to be one vehicle assigned to volunteer command staff to cover calls and conduct business for the volunteer company. The same is true for both Po-Mar-Lin and Kennett. Each company shall have a chief’s car to conduct volunteer business and for command officers to run calls. The vehicle that once served Longwood as the brush truck, should be retired out of the fleet and replaced with a command vehicle. This will serve as the Assistant Chief of EMS’s vehicle. Once

there is an addition of an operations deputy or assistant, on a full-time basis, one of the current Longwood volunteer command vehicles shall be assigned to that chief.

### **Command Vehicle Recommendations:**

Replace brush truck with command type vehicle for the Assistant Chief of EMS in Longwood. When an additional, full time, operations chief is hired one of the volunteer command vehicles shall be reassigned to this chief. This will prevent from additional vehicles having to be added to the fleet and still provides Longwood with a command vehicle for its chief officers.

The current allotment of one volunteer command vehicle per station should continue and be monitored with an understanding that this program may need to be expanded or be discontinued. This should be evaluated, and thresholds put in place for both instances now, to allow for future fleet planning purposes.

### **Other Support Vehicles:**

There are three squads, three utilities, and one traffic unit in the fleet. Consideration should be given to appropriately naming these support vehicles and creating a standard specification across the fleet. This will help standardize the vehicles equipment cache and capability. As an example, a squad can be equipped for ALS calls, or be outfitted for traffic control. Longwoods squad is used as an EMS chase vehicle and is equipped for ALS emergencies. This vehicle shall remain available for this mission and when replaced, consideration should be given to getting a vehicle that can tow one or more of the support trailers. Longwood has one utility and one traffic unit. The utility is mainly used as a tow vehicle for the support trailers and the traffic unit is primarily used by the fire police for traffic control. The traffic control vehicle can also be used as a tow vehicle. Future call volume and use of the traffic unit shall be monitored to ensure a vehicle of this type is needed when it is replaced. Po-Mar-Lin and Kennett each have one utility and one squad. Both vehicles in both companies are used to tow support trailers. Po-Mar-Lin operates one utility and one squad company. The utility is responsible for towing the UTV and has a small skid unit in the back to act as another brush vehicle if needed. The squad is equipped more to handle traffic control and if that is the intended use, it should be identified as such.

Consideration should be given to adding a water rescue vehicle to the fleet to carry water rescue equipment and be able to tow a boat trailer. This vehicle shall be able to carry one or two boats and be able to respond to water rescue emergencies on its own or bring the trailer with additional equipment. See example pictured below. The trailer shall have a second set of water rescue equipment that can be towed by a separate vehicle if two water rescue teams are needed. The anticipated development and river recreation in the area will only lead to additional water rescue calls. The need to have vehicles designated for quick response with trained personnel for these emergency types are critical.



**Example of a water rescue vehicle with a trailer.**

### **Other Support Vehicles Recommendations:**

- Support vehicles shall have a defined mission and shall be given a vehicle designation based upon that mission. This shall be standardized across the three departments and the response area. A squad in one station has extrication equipment, another stations squad has traffic control equipment, and the last is equipped for ALS response. All vehicles should be equipped to fit their defined mission and identified as such.
- The fleet of support vehicles shall be evaluated to identify which support trailers they can tow, regardless of assigned company. This will ensure that support trailers have adequate backups in the event of a tow vehicle being out of service. Coordination and notification shall be made to ensure proper coverage of all tow vehicles.
- With the exception of a brush truck or tow vehicle towing a UTV to a brush fire, support vehicles should not be the first or main response for any fire related emergency. Chief officers shall respond on fire related emergencies but, should not be the only vehicle to respond without calling for adequate fire apparatus to backfill the assignment. Policies shall be put in place to eliminate support vehicles responding out of any firehouse prior to the first heavy fire apparatus.
- Utility 25 has moderate corrosion on the underside of the chassis and on the passengers and drivers step brackets. The underside should be thoroughly steamed cleaned, and the rust remediated.



**Rust remediation needed on Utility 25 pictured drivers step bracket.**

### **Boats and Support Trailers:**

There are eight support trailers in the fleet. Po-Mar-Lin operates an open bed trailer used to transport the UTV and a regional large animal rescue trailer. The animal rescue trailer has tires that are out of date and need to be replaced. Although Po-Mar-Lin is not responsible for maintenance, the trailer needs new tires since this is a safety concern. Kennett operates an open bed trailer for their UTV, an open bed boat trailer, and an enclosed water rescue trailer. The open boat trailer needs two new tires, as the current tires are out of date. The enclosed boat trailer needs four new tires since they are out of date it also needs rust remediation for the underside of the frame structure. Longwood operates an enclosed trailer for its UTV, an enclosed trailer for water rescue, and an open boat trailer. The enclosed water rescue trailer needs four new tires.

### **Boats and Support Trailer Recommendations:**

- The following support trailers need new tires due to their age: Po-Mar-Lin Large Animal Rescue Trailer, Longwood enclosed Water Rescue trailer, Kennett boat trailer, Kennett Water Rescue Trailer.
- Support trailers should be replaced on an as needed basis. When trailers are replaced, consideration should be given to the size and weight of the trailer. Specifying trailers that are too large and heavy limit the vehicles in the fleet that can tow them. See above recommendation about a Water Rescue vehicle.
- The underside of Kennett's enclosed Water Rescue Trailer shall be steam cleaned and have any rust remediated. This will help ensure the trailers longevity as part of the fleet.



**Kennett's enclosed trailer needs four new tires and rust remediation.**

## 6.0 Apparatus and Equipment Maintenance Evaluation:

The fire departments maintenance program should be coordinated and executed by a full time Emergency Vehicle Technician. Currently, each Fire Chief is responsible for the coordination of repairs and maintenance on their respective fire companies' apparatus fleet. Apparatus maintenance checks are conducted by personnel on a regular basis with work requests submitted, when needed. Each piece of apparatus is subject to annual preventative maintenance conducted by outside local vendors including Glick Fire Equipment Company with shop facilities in Bird-in-Hand, Pennsylvania. A program of annual pump and chassis maintenance needs to continue and to be funded. All fire companies shall conduct annual pumper service tests, portable ladder testing, annual aerial ladder certification inspections, annual hose testing, and nozzle testing. Each fire department should continue this NFPA required testing keeping complete records of all testing reports and subsequent repair work. The annual hose testing is conducted in house, with records maintained on this inspection work.

The Kennett Fire & EMS Regional Commission should, in conjunction with Chief McCarthy, continue to pursue the property located at 510 South Walnut Street, Kennett Square, to act as a maintenance and repair facility for the Kennett Fire & EMS Regional Commission's fleet of fire apparatus. As part of this initiative, a certified Emergency Vehicle Technician should be hired to oversee this facility and all repairs and maintenance of the fleet. An administrative assistant should be hired to complete data entry on fleet repairs, ordering parts and overseeing parts inventory. The administrative assistant should schedule all vehicle and equipment testing in conjunction with the EVT and the administrative assistant should keep all the records on all testing.



**The exterior of the proposed Kennett Fire and EMS Regional repair and maintenance shop.**



**The interior of the proposed Kennett Fire and EMS Regional repair and maintenance shop.**

While the overall condition of the fleet is mainly good, considering the average age of 11.87 years, several units including Engine 251, Tanker 251 and Tanker 24 are showing signs of significant deterioration due to rust and corrosion of the chassis frame components. In addition, Tanker 24, Tanker 36, and Brush 24 are overweight and require corrective action. The entire fleet needs to be weighed annually as outlined in NFPA 1911. This in combination with the aging fleet, will have an impact on the overall cost of ownership.

Emergency Vehicle Response's recommendations for new apparatus will emphasize a back-to-basics approach to provide the needed apparatus while incorporating proven technology to minimize the rust and corrosion issues that have surfaced on the current units. While one may expect to observe corrosion and metal deterioration on older vehicles, the present condition of chassis and body components on several pieces of apparatus will require corrosion mitigation along with the use of annual undercoating process to achieve the desired life cycle. With the increased use of road de-icing chemicals, each fire department must address the corrosion issues on the current units to be able to provide at least fifteen to twenty years of reliable front-line service for the engine and ladder apparatus. The goal of the maintenance program would be to provide the needed repairs on a timely basis and to enable future apparatus acquisitions to be spaced out, without having to purchase two major pieces of apparatus at the same time.

### **6.1 Apparatus Maintenance Recommendations:**

Each piece of apparatus is generally well outfitted with tools and equipment to perform the needed functions at incidents. The following are some recommendations that should be adopted and implemented by the fire departments and the Commission to ensure the safe condition and readiness of all apparatus.

1. The annual pumper service tests, aerial ladder certification, ground ladder, and hose testing programs should be conducted with complete records kept for each apparatus and the associated required repairs by the administrative assistant.
2. All apparatus preventative maintenance and records should be conducted in accordance with National Fire Protection Association Standard 1911. Complete records shall be kept on all repairs, testing and maintenance work. A hard copy logbook or a digital logbook should be provided for each piece of apparatus where all maintenance, testing and inspection work will be documented. An annual summary of the cost of repairs and all maintenance should be completed by the repairs and maintenance facility to enable tracking of all related repairs and cost of ownership of each vehicle.
3. In accordance with NFPA 1911 Standard on the Inspection, Maintenance, Testing and Retirement of In-Service Automotive Fire Apparatus, section 16.2 each apparatus in the departments fleet should be weighed annually on the front and rear axles individually as

well as the entire apparatus to ensure that the unit is within the vehicle weight ratings as supplied by the manufacturer. Each piece of apparatus including engines, aerial, tower, rescue, rescue / engines, tankers, and support units should continue to be weighed annually on each axle and the overall vehicle, keeping the total vehicle weight and axle weight in accordance with NFPA 1911. The vehicle weight shall be posted inside of each apparatus cab and records kept by the maintenance and repair facility administrative assistant.

4. Each piece of apparatus should at least annually be removed from service to have the chassis frame rails steam cleaned, minor paint and corrosion issues repaired, and all tools and equipment cleaned, painted, and maintained. This can be done in conjunction with any required outside vendor repairs and preventative maintenance work to ensure continued reliable front-line service. Aftermarket anti-corrosion treatments such as Krown (<https://www.krown.com/en/>) or Carwell (<http://www.carwell.com/>) should be incorporated into the fire departments overall maintenance program. This work should be under the auspices of the EVT.
5. The fleet maintenance facility should incorporate a periodic inspection of the underside of the apparatus including the chassis frame, fire pump and associated vehicle components. The tank to pump valve on all engine apparatus along with other manually and electrically controlled valves should be exercised periodically to ensure their safe and proper operation under all conditions.
6. All future apparatus specifications should require finish painted chassis frame rails, cross members, and components to minimize the impact of road deicing chemicals. Where possible, any steel components that can be treated with a plating process to reduce rust and corrosion in these areas or using stainless steel components where available will help ensure the safe and reliable front-line service of the apparatus.
7. Given the number of annual responses and actual utilization of the apparatus at training and Incidents, the three fire departments expend large amounts of financial resources to provide repairs and maintenance on the apparatus. The Commission should consider hiring an additional day time, during the week Firefighter / Certified EVT (Emergency Vehicle Technician) to do preventative maintenance and minor vehicle repairs. This position could be funded with monies now spent with outside vendors to repair, test, and provide preventive maintenance on the fire apparatus fleet. The Firefighter / EVT position would enable the Commission and the fire departments to track repairs, cost of repairs, cost of ownership and would result in a more efficient way to provide a better fleet maintenance and management program. Also, the Firefighter / EVT could provide much needed staffing during the critical, during the day, during the week time period. This would be provided at reduced or no cost to the Commission depending on how

much each of the fire departments spent for apparatus testing, vehicle repairs and preventive maintenance.

## 7.0 Equipment Review:

From an overall perspective all front-line apparatus operated by each of the three fire departments are generally well equipped and supplied with an assortment of hand, power, and hydraulic tools for use at most fire and rescue related incidents. As reviewed with the ladder company section, future aerial devices need to accommodate an enhanced complement of ground ladders to ensure that the first arriving ladder company has multiple 28- and 35-foot ladders, along with other roof and utility ladders of varying lengths.

The fire department should take the equipment off of each apparatus, clean the compartment, clean the equipment, and assign a number from one to five with one denoting that piece of equipment comes off of the apparatus frequently and five denoting it rarely if at all comes off of the apparatus. This exercise will help define needed equipment that is lacking and reduce little used or obsolete equipment.

The fire department should standardize the attack lines and nozzles on all preconnected lines to meet the requirements of the departments target GPM fire flow and pressure. Where possible, based upon fire pump plumbing, standard pump pressures can be established for the front bumper, cross-lay and rear hose bed attack lines on all engine apparatus.

Tool and equipment inventories should be recorded, carried on each piece of apparatus, and updated frequently as the equipment cache is updated or changed. A copy of the equipment inventory should be recorded as part of the record keeping by the administrative assistant.

The equipment weight and payload on each apparatus should be determined at some point prior to any new replacement apparatus being acquired. Starting with Engine 36 and Tanker 36, due to the scheduled replacement in 2023, they should be stripped of all loose tools and equipment and then weighed on certified scales. The empty weight of each unit with a full tank of water and all fluids can then be compared to the fully equipped in service weight to accurately determine the equipment payload on each unit. This information will be required when designing new apparatus to reduce the possibility of operating overweight vehicles.

The remaining appliances, tools, and equipment that are not mounted and secured inside of the body compartments on the front-line vehicles should be permanently secured with NFPA compliant 9G rated, non-marring brackets in standard locations approved by each individual fire department.

## 8.0 Apparatus Fleet Replacement:

Based upon a review of most all built upon areas within the response area, the three Fire Departments maintain an adequate number of fire apparatus to safely protect the response area. With a total combined pump capacity of 7500 gpm with five engines, this capacity is adequate to meet the needs of the response area.

Of somewhat larger concern, is the age and condition of the current fleet and the long periods of time with no apparatus purchasing at all. The Commission is now faced with catching up yet still spacing out vehicle purchases to permit a well-developed replacement program to address these concerns. Yet the Commission and the fire departments need to resist the urge to purchase and equip two vehicles at the same point in time, as this not practical, nor desired.

For this reason, Emergency Vehicle Response usually recommends that major apparatus acquisitions be spaced out with a minimum of three years between each purchase. However, given the size of your fleet, long periods of time without purchasing apparatus, and the average age of the fleet at 11.87 years most apparatus would be replaced at two-year intervals. This will still Give the lead time required to design and develop specification requirements, award contracts, conduct pre-construction meetings, and review in-process vehicle production reports. Each of the planned new apparatus, depending upon the replacement order, will require a significant amount of time and planned financial resources to fund the overall fleet replacement plan.

While the average age of the front-line vehicles is 11.87 years, several units have corrosion and overweight issues. Emergency Vehicle Response usually provides several options to space out future apparatus purchases however, with the size of the fleet and the amount of money being spent on repairs, this simply is not an option. The preferred sequence of vehicle replacement would be to replace Engine 36 and Tanker 36 with an engine / tanker. The Kennett Fire & Rescue Regional Commission should consider hiring an experienced outside third party to help the fire departments in any purchasing process. This would help reduce the cost of any new acquisition by eliminating needless components that will lead to an increase in costs and reduce out of service time. Once the new engine / tanker is delivered and placed in service the current Engine 36 and Tanker 36 will be cycled out of the fleet and sold. The next unit to be replaced would be Tanker 25 which has a significant amount of corrosion and has cost a significant amount of money to repair and maintain. The third apparatus to be purchased would be a tractor drawn aerial to replace Ladder 25 which could act as a back up to Rescue 25 by designing a ladder company with rescue capabilities. The tractor drawn aerial will increase equipment carrying capability including much needed portable ladders. The apparatus will be able to safely negotiate and be driven on most of the streets in the response area. The new Ladder 25, tractor drawn aerial, should incorporate as many of the bullet points as outlined in section 8.2 of this report. Once the new TDA is put into service, the current Ladder 25 would be put into the reserve fleet.

## 8.1 Custom Engine Tanker Design Criteria:

Emergency Vehicle Response recommends that the following criteria and components should be incorporated into the overall design of the new engine/tanker apparatus:

- Four door custom cab with flat roof and seating for four (4) to six (6) personnel
- Wheelbase between 210 inches and 225 inches
- Overall length between 35 and 37 feet
- Overall height between 124 and 128 inches
- 500 Horsepower diesel engine with Jacob's auxiliary brake
- Five speed automatic transmission
- Disc brakes, 17-inch on front and rear axles
- 340-amp Niehoff alternator
- 1500 gpm single stage fire pump with side mount pump controls
- Pump panel to match color coding of existing units
- Apparatus to have minimum of two (2) 2.50" rear discharges, no electric valves
- 2,000 – 2,500-gallon low profile water tank with poly construction
- Minimum of six (6) pre-connected attack lines including:
  - One (1) 100 to 150 foot 1.75" trash line on front bumper
  - Two (2) 1.75" attack lines, one (1) 200 foot, one (1) 300 foot
  - One (1) 200 foot 2.50" attack line with a smooth bore nozzle
  - One (1) 200 to 250 foot 2.5" leader line with lightweight gated wye
- Hose bed to accommodate a minimum of 1000 feet of 5.00" supply line
- Hose bed to be not more than 70.00 inches from the ground
- Tailboard mounted portable master stream device and mounted remote-control monitor
- Minimum of two 10-inch side and rear body power operated dump valves
- Two (2) rear body direct tank fills outfitted with LDH adapters
- Apparatus body to be constructed of stainless steel or aluminum with similar substructure
- Apparatus body to have full height compartments on left and right side
- Ground ladders to be mounted on beam in ladder compartment on the right side of the body with a 35-foot extension ladder, 14-foot roof and 10-foot folding ladders or match existing units
- Provide for six 12-volt LED scene light to include a cab brow light, two mid body lights on each side and one rear body light
- All body compartments to be equipped with appropriate trays, shelves and tool boards
  - with all hand tools mounted inside the compartments in a standard location
- LED lighting should be utilized for all running and emergency lights
- All sides of the apparatus to have high visibility reflective graphics
- Front suction inlet with power operated intake valve and manual override
- Full width steel reinforcement channel mounted behind front bumper
- Drive shaft safety guards on each section of the driveline

- Six Group 31 batteries on stainless steel trays with minimum of 340-amp Niehoff alternator
- Back up camera system with both right side and rear cameras
- Front windshield down view mirror
- Air operated pump primer
- Electronic stability control
- Stainless steel straps on diesel fuel tank and all air reservoirs
- Stainless steel pull cables for each air reservoir with remote mounted drain valves
- IMMI Reach Ready orange color seat belts with extended female stalks
- Finish painted chassis frame rails, cross member, body sub-frame and components
- Chassis frame rails, cross members, body sub-frame and components should be treated with any available rust and corrosion coating to inhibit frame damage.
- Cab Roll over protection /full airbag system including steering wheel, side curtain and knee



A new engine tanker apparatus as outlined above would cost in the range of \$850,000 to \$925,000 dollars in current day costs, without equipment and would provide for improved fire flow delivery, enhanced safety for the operating members. The new apparatus should be designed to be a short and maneuverable as possible and should incorporate as many of the

above listed bullet points as the basis for the initial design. The new engine/tanker apparatus would be ordered to replace Engine 36 and Tanker 36 during 2023 in accordance with the fleet replacement schedule.

## 8.2 New Tractor Drawn Aerial Ladder Design Criteria:

Emergency Vehicle Response recommends the following criteria and components that should be incorporated into the overall design of any new tractor drawn aerial ladder:

- Four door flat roof cab with seating for six (6) personnel
- Tractor Drawn Aerial Ladder with minimum vertical reach of 100-110 ft.
- Tractor Drawn Aerial Ladder with minimum horizontal reach of 92-100ft
- Wheelbase between 145 inches and 162 inches
- Overall length between 58 feet and 62 feet
- Minimum of 500 horsepower engine
- Allison five speed automatic transmission
- Jacobs engine brake
- Vogel chassis and aerial lubrication system
- 17.00-inch disc brakes on front and rear axles
- Reinforced steel front bumper with angled corners
- 340-amp Niehoff alternator
- Six (6) group 31 batteries with stainless steel trays
- Minimum 65-gallon fuel tank with stainless steel straps
- Drive shaft drop guards for each section of the drive line
- Front windshield down view mirror
- Rear back up camera with right side camera
- Unit to have aluminum body or similar with similar sub-structure
- Aerial device, chassis, and body to be built by one manufacturer
- Aerial Ladder to have a minimum tip load capacity of 500 pounds
- Outrigger system to be capable of short jack operations
- Aerial Ladder to have a single monitor equipped with smooth bore tips
- Ground ladder compliment at a minimum should include the following:
  - One (1) 45-foot two section extension ladder
  - Two (2) 35-foot two section extension ladders
  - Two (2) 28-foot two section extension ladders
  - One (1) 20-foot roof ladder
  - One (1) 18-foot roof ladder
  - One (1) 16-foot roof ladder
  - One (1) 14-foot roof ladder carried in fly section of aerial
  - One (1) 10-foot folding ladder
  - One (1) 17-foot Little Giant ladder

- 15 Kw Onan or Harrison hydraulic generator
- Two (2) electric rewind cable reels equipped with 200 feet of 10/3 cable
- Seven (7) cab and body mounted 12-volt LED style scene lights
- All cab, body and aerial running and warning lights to be LED style
- All body compartments to be equipped with appropriate trays, shelves, and tool boards

In addition to the above items the following safety and reduced maintenance components should be incorporated into the final vehicle specifications.

- Finish painted chassis frame rails, cross members, body sub-frame and components
- Electronic stability control
- Stainless steel straps on diesel fuel tank and all air reservoirs
- Stainless steel pull cables for each air reservoir with remote mounted drain valves
- IMMI Reach Ready orange color seat belts with extended female stalks
- Chassis frame rails, cross members, body sub-frame and components should be treated with any available rust and corrosion coating to inhibit frame damage.
- Frontal and Side Roll protection.

A tractor drawn aerial ladder apparatus as outlined above would cost in the range of \$1.4 to \$1.6 million dollars in current day costs and would provide for improved reliability, added ground ladder capabilities and enhanced safety for the operating members. The new apparatus should be designed to be as maneuverable as possible and should incorporate as many of the above listed bullet points as the basis for the design of the vehicle. Depending upon Fire Departments planning and resources the apparatus should be placed on order during 2026 with the anticipated delivery in 2027.

Emergency Vehicle Response strongly recommends a tractor drawn aerial ladder with sufficient ground ladders which would enable personnel too safely and effectively ladder three or four sides of a large residential building or any one of the multiple occupancy dwelling units that are beyond the reach of the apparatus. The new tractor drawn aerial ladder would provide good maneuverability and turning radius within the response area.

The concept is to keep the focus on truck company tools and rescue equipment, ground ladders, jacking stance and overall vehicle size to maximize the compartment space without having to sacrifice areas of the body for engine company related assets which can be provided by any one of the remaining in-service engine units in the fleet. The Longwood Fire Company is fortunate that the neighboring fire departments operate other types of aerial apparatus. Aerial towers whether mid-mount or rear mount perform different fire ground functions better than aerial ladders. For areas where multiple ground ladders are required, the tractor drawn ladder has no equal, as ladders can be located inside of the trailer as well as on each side of the trailer body.



**Example of a Tractor Drawn Aerial Ladder that would fit the needs of the Longwood Fire Company. The overall length is 61'3" and the overall height is 136" which would fit in the current fire station.**



**This tractor drawn aerial is equipped with 463' of ground ladders**

### **8.3 Engine Design Criteria:**

Engine 251 should be replaced during 2029 when the apparatus would be 17 years old. The concept with the new engine apparatus design, is to provide a short wheelbase engine that is equipped with multiple attack lines of various sizes and lengths along with a compliment of standard engine company equipment. The engines should be designed with direct piped low cross-lays and a rear hose bed to permit personnel to stretch and advance attack and leader lines without having to climb onto the vehicle.

The following design criteria should be adopted by the fire department for any new engine company units:

- Four door custom cab with seating for six (6) personnel
- Overall length between 29 and 30 feet, 6 inches
- Overall height between 120 and 126 inches
- Wheelbase between 174 inches and 185 inches
- 500 Horsepower diesel engine with Jacob's engine brake
- Five speed automatic transmission
- Disc brakes, 17-inch on front and rear axles
- 1500 gpm single stage fire pump with side mount pump controls
- Apparatus to have minimum of three (3) 2.50" rear discharges
- 500-gallon to 750-gallon low profile water tank with poly construction
- Minimum of six (6) preconnected attack lines including:
  - One (1) 100 to 150-foot 1.75-inch trash line on front bumper
  - Three (3) 1.75-inch attack lines, two (2) 200 foot, one (1) 300 foot
  - One (1) 200-foot 2.50-inch attack line with a smooth bore nozzle
  - One (1) 200 to 250-foot 3.00 leader line with lightweight gated wye
  - One (1) 150 to 200-foot 3.00 line with a Blitz Fire monitor
- Hose bed to accommodate a minimum of 1000 feet of 5.00" supply line
- Hose bed to accommodate a minimum of 300-500 feet of 3.00" hose
- Hose bed and cross-lays to be not more than 66.00 inches from the ground
- All pump panel valves to be manually controlled
- Apparatus body to be constructed of aluminum or stainless steel with similar substructure
- Apparatus body to have full height compartments on left side, low side on right side
- Ground ladders to be mounted on the right side of the body with a 24-foot extension ladder, 14-foot roof and 10-foot folding ladders
- Provide for six 12-volt LED scene light to include a cab brow light, two mid body lights on each side and one rear body light
- All body compartments to be equipped with appropriate trays, shelves and tool boards with all hand tools mounted inside the compartments in a standard location
- LED lighting should be utilized for all running and emergency lights
- All sides of the apparatus to have high visibility reflective graphics
- Front suction inlet and one side inlet with power operated intake valve and manual override
- Full width steel reinforcement channel mounted behind front bumper
- Drive shaft safety guards on each section of the driveline
- Six Group 31 batteries on stainless steel trays with minimum of 340-amp Niehoff alternator
- Back up camera system with both right side and rear cameras
- Front windshield down view mirror
- Air operated pump primer
- Electronic stability control, Frontal air bags and side roll protection

- Stainless steel straps on diesel fuel tank and all air reservoirs
- Stainless steel pull cables for each air reservoir with remote mounted drain valves
- Stainless steel trays and hardware for the battery boxes
- IMMI Reach Ready orange color seat belts with extended female stalks
- Finish painted chassis frame rails, cross member, body sub-frame and components
- Chassis frame rails, cross members, body sub-frame and components should be treated with any available rust and corrosion coating to inhibit frame damage.
- Provide an extended two-year bumper to bumper warranty.
- Frontal air bags and rollover protection.

An engine apparatus, as outlined above, would cost in the range of \$775,000 to \$875,000 dollars in current day costs and would provide for improved fire flow delivery, enhanced safety for the operating members, and would be used as the basis for standardized engine company apparatus in the future. The new apparatus should be designed to be as short and maneuverable as possible and should incorporate as many of the above listed bullet points as the basis for the initial design. The first new engine apparatus would be ordered to replace Engine 251 in 2028 and placed in service the next year.



**Example of short wheelbase engine with 500-gallon water tank**



**Example of low rear hose bed with 750-gallon water tank**

#### 8.4 Fleet Replacement Schedule:

Under this recommendation, Engine 36 and Tanker 36 would be the first units replaced in 2023 followed by the replacement for Tanker 25 in 2025. Engine 251 and Tanker 24 would each have to have rust remediation work done for them to provide the required years of front-line service. This rebuilding and corrosion treatment needs to commence as soon as practical, with only one vehicle taken out of service at any one time. Preferably engine 251 should be the first unit completed to address rust abatement and other maintenance concerns. Tanker 24 should be the second vehicle sent out for repairs to address the rear frame corrosion and conduct any necessary upgrades. Under the fleet replace plan Tanker 24 will be the reserve tanker once it is replaced.

From a practical perspective, there will be some ongoing mechanical, corrosion, and vehicle upgrades constantly taking place over the next few years. The Kennett Fire & EMS Regional Commission and the Fire Departments should hire an Emergency Vehicle Technician / Firefighter to bolster daytime staffing, providing preventive maintenance, provide NFPA required annual apparatus testing, and light repairs in house. This keeps money paid to outside vendors in house, to fund this position.

#### Fleet Replacement by Vehicle:

Engine 24: Replace Engine 24 in 2039 when Engine 24 will be 21 years old and current Engine 24 to the reserve fleet.

Engine 251: Replace Engine 251 in 2029 while the current Engine 251 would go to the reserve fleet after serving 17 years in front line service.

Engine 252: Replace Engine 252 in 2031 when the current Engine 252 would be 16 years old. Current Engine 252 would go to the reserve fleet cycling out current reserve Engine 251 which would be sold.

Engine 36: This unit would be replaced in 2023 with an Engine / Tanker. The current Engine 36 should be deposited and sold.

Tower 24: Replace Tower 24 in 2035 when the current tower will be 19 years old. Current tower 24 would be cycled out of the fleet and sold.

Ladder 25: Replace current Ladder 25 with a Tractor Drawn Aerial Ladder in 2027 than current Ladder 25 would be the reserve ladder.

Spare Training Ladder: Could be retained for more driver training but ultimately would be sold in 2027 once the new TDA is placed into service. Or if the fire chief feels it has served its driver training mission it can be deposited of and sold immediately. `

Rescue 24: Current Rescue 24 would be removed from service.

Rescue 36: Would be replaced in 2041 after 21 years of service. The replacement vehicle should be a 4WD source engine. Current Rescue 36 would be cycled out of the fleet and sold.

Tanker 24: Should be replaced in 2033 with a new tanker when the current Tanker 24 would be 20 years old. Current Tanker 24 would be retained and enter the reserve fleet.

Tanker 251: Will be replaced in 2025 when the current tanker would be 20 years old. The current tanker 251 would be cycled out of the fleet and sold.

Tanker 252: Current Tanker 252 would be removed from service.

Tanker 253: Current Tanker 253 would be removed from service, unless the fire chief feels a need to retain the apparatus for firefighting or another perceived need.

Tanker 36: Would be replaced in 2023 with an engine / tanker when the current Tanker 36 would be 21 years old. Current Tanker 36 would be sold upon the new engine / tanker being placed in service.

Brush 24: Brush 24 should be removed from service.

Brush 36: Should be replaced with a similar apparatus at the fire chiefs degression.

Ambulance 25-1: Remount box on a new chassis in 2028 after 11 years of service.

Ambulance 25-2: Remount box on a new chassis in 2026 after 9 years of service.

Ambulance 25-3: Replace with a new unit in 2022 after 15 years of service cycle current 25-3 out of the fleet, to be sold

Ambulance 25-4: Replace with a new unit in 2024 when the box would be 20 years old, and the chassis would be 9 years old. Current 25-4 would be cycled out of the fleet and sold.

Ambulance 25-5: Add fifth ambulance to the fleet in 2025.

Support vehicles: the chief's vehicles, staff vehicles, and fire department utility vehicles, should be replaced as needed in years that do not have major fire apparatus purchases occurring.

### Fleet Replacement by Year:

- 2022 Replace Longwood 25-3 with a New Ambulance dispose of current 25-3
- 2023 New Engine / Tanker Po-Mar-Lin Dispose of Engine 36 and Tanker 36
- 2024 Replace Longwood 25-4 with a New Ambulance dispose of current 25-4
- 2025 Replace Longwood Tanker 251 with new Tanker 251 Dispose of current Tanker 251 after 20 years of service
- 2025 New Longwood Ambulance 25-5
- 2026 Remount Longwood Ambulance 25-2 on a new chassis
- 2027 Longwood New Tractor Drawn Aerial Ladder current Seagrave RM to Reserve Fleet
- 2028 Remount Longwood Ambulance 25-1 on a new chassis
- 2029 Replace Longwood Engine 251 with New Engine 251 current 251 to Reserve Fleet
- 2030 Remount Longwood Ambulance 25-3 on a new chassis
- 2031 Replace Longwood Engine 252 new Engine 252 current 252 to Reserve Fleet reserve 251 is to be Disposed of after 19 years of service
- 2032 Remount Longwood Ambulance 25-4 on a new chassis
- 2033 Replace Kennett Tanker 24 with a new Tanker 24 current Tanker 24 to the Reserve Fleet
- 2034 Remount Longwood Ambulance 25-5 on a new chassis
- 2035 Replace Kennett Tower 24 with a new Tower 24 Dispose of current Tower 24 after 19 years of service
- 2036 Replace Longwood Ambulance 25-2 with a new Ambulance dispose of current 25-2
- 2037 Replace Longwood Rescue 25 with a new Rescue 25 Dispose of the current Rescue 25 when this unit would be 21 years old
- 2038 Replace Longwood Ambulance 25-1 with a new Ambulance dispose of current 25-1

- 2039 Replace Kennett Engine 24 with a new Engine 24 current Engine 24 to the reserve fleet dispose of reserve Engine 252 when this unit would be 24 years old
- 2040 Replace Longwood Ambulance 25-3 with a new Ambulance dispose of the current 25-3
- 2040 Replace Longwood Tractor Drawn Aerial with a new TDA current TDA to rehab then to Reserve Fleet current Seagrave Remount is to be disposed of after 36 years of service.
- 2041 Replace Po-Mar-Lin Rescue 36 with a new water supply source Engine Dispose of Rescue 36 as it will be 21 years old
- 2042 Replace Longwood Ambulance 25-4 with a new Ambulance dispose of the current 25-4
- 2042 Replace Longwood Tanker 251 with a new Tanker 251 current Tanker 251 to the Reserve Fleet current Reserve Tanker 24 to be disposed of after 30 years of service
- 2043 Replace Po-Mar-Lin Engine / Tanker 36 with a new Engine / Tanker 36 dispose of the current Engine / Tanker 36 after 21 years of service
- 2044 Replace Longwood Ambulance 25-5 with a new 25-5 dispose of current 25-5
- 2045 Replace Longwood Engine 251 with new Engine 251 current Engine 251 to the Reserve Fleet dispose of Reserve Engine 24 when it would be 26 years old
- 2046 Remount Longwood 25-2 on a new chassis
- 2047 Replace Longwood Engine 252 with new Engine 252 current Engine 252 to the Reserve Fleet current Reserve 251 to be disposed of when the unit would be 18 years old
- 2048 Remount Longwood 25-1 on a new chassis
- 2049 Replace Kennett Tower 24 with a New Tower 24 current Tower 24 to be disposed of after 14 years of service
- 2050 Remount Longwood 25-3 on a new chassis
- 2051 Replace Kennett Tanker 24 with a New Tanker 24 current Tanker 24 to the Reserve Fleet current Reserve Tanker 251 disposed of after 26 years of service.
- 2052 Remount Longwood 25-4 on a new chassis

All Chiefs Vehicles, Utility Vehicles, Brush Trucks, Boats and Trailers should be replaced as needed and as funding allows.

This replacement schedule would provide the following benefits for the fire departments and the Kennett Fire & EMS Regional Commission with future planning for major capital expenditures:

- This would combine the service of Po-Mar-Lin Engine 36 and Tanker 36 into an Engine/Tanker with these two units being the most expensive to maintain in the fleet this would cut costs reducing the fleet by one unit. It would also maximize 2023 budget dollars as this would represent one of the most expensive trucks to purchase in the fleet. This is accomplished as the apparatus would be less expensive as fire apparatus traditionally goes up in price between three percent and five percent per year. By replacing these two units it would require only one driver and would get both engine capabilities and a good supply of water on the road for an initial response.
- In purchasing an Engine/Tanker for Po-Mar-Lin reducing the fleet buy one. Then Longwood abandoning the water hauling business will result in disposing of the two tractor trailers that were very expensive to maintain and would result in reducing the fleet further by two more. Finally with Kennett Fire Company disposing of the overweight brush truck and the no longer needed Rescue 24 will further reduce the size of fleet by an additional two units. This will result in a total fleet reduction of 5 apparatus that will save the Commission an estimated \$152,729.00 in annual maintenance costs. Not to mention the Acquisition cost, insurance, maintenance, and fuel for five vehicles.
- In this plan the Commission would be purchasing a new vehicle or re-chassis an ambulance every year. This would spread these large capital expenditures out overtime. However, the costs per year are not going to be equal as fire trucks do cost more than ambulances. However, from a budgetary perspective the Commission will have a good idea what these capital expenditures are going to be for several years into the future.
- Provides enhanced ground ladder capability and body compartments to carry desired tools and rescue equipment without chassis weight and axle limitations.
- Following the plan purchasing an Engine/Tanker in 2023 and a tractor drawn aerial in 2027 would represent purchasing two out of the four most expensive apparatus earlier on also representing a cost savings.

New apparatus should be acquired when needed in accordance with the recommendations made in Sections 8.1, 8.2 and 8.3 of this report. Particular attention should be made to acquiring apparatus that will meet the needs of the response area while maintaining a level of cost effectiveness with respect to option content on the vehicles and the inclusion of rarely used components that increase the cost of operation and maintenance over the life cycle of the unit. This would also increase down time or time out of service.

## 8.5 Fleet Replacement Summary:

The Kennett, Longwood, and Po-Mar-Lin Fire Departments operate a modern fleet of apparatus that has been equipped with the latest tools and equipment for each vehicle. The goal of the fleet replacement plan is to have a defined schedule for new replacement apparatus supported by available funding. While new apparatus can be acquired, equipped, and operated by the officers and members, the corrosion and overweight issues must be corrected and addressed if the life cycle of the apparatus is to successfully meet the established goals and time frames as outlined. The proposed fleet replacement options and recommendations will assist the fire department in providing apparatus to meet the current and future needs of the first due response area.

Fleet planning and replacement requires a prudent and programmed approach to future fire apparatus and equipment purchases which will be designed to meet the needs of the response area with enhanced maintenance capabilities. While there can always be a desire to want to have new vehicles in every fire station there must be a logical approach to the long-term investments made by the fire departments and the Kennett Fire & EMS Regional Commission to best meet and serve the needs of the community. The recommendations put forth in this report should assist the Kennett Fire & EMS Regional Commission and the three Fire Departments in meeting that goal.

## 9.0 Summary

We gratefully acknowledge the cooperation and assistance of the Chiefs of Departments, firefighters and officers who provided information on the apparatus, response policies and procedures, fire incident responses and other records that were made available for review by the staff of Emergency Vehicle Response.

The summary, findings and recommendations as developed in this report are solely those of Emergency Vehicle Response and have not been influenced by any representatives of the three-fire department or any outside parties. The information and statistics cited within the report were gained from fire department records and information supplied for our review.

The staff of Emergency Vehicle Response looks forward to meeting with the three Fire Departments, chief officers, and Kennett Fire & EMS Regional Commission officials to review and discuss the findings and recommendations included in this report.

Respectfully submitted,

Tom W. Shand  
Nicholas Wilbur  
Michael Wilbur

## 10.0 Appendix:

Fire Apparatus Manufacturer's Association: FAMA.org

NFPA 414 Standard for Aircraft Rescue and Fire-Fighting Vehicles, 2012 Edition and 2016 Edition

National Fire Protection Association, 1 Batterymarch Park, Quincy MA 02169

NFPA 1901 Standard for Automotive Fire Apparatus, 2009 Edition and 2016 Edition

National Fire Protection Association, 1 Batterymarch Park, Quincy MA 02169

NFPA 1906 Standard for Wildland Fire Apparatus, 2012 Edition

National Fire Protection Association, 1 Batterymarch Park, Quincy MA 02169

NFPA 1911 Standard for the Inspection, Maintenance, Testing and Retirement of In-Service Automotive Fire Apparatus, 2012 Edition

National Fire Protection Association, 1 Batterymarch Park, Quincy MA 02169

NFPA 1917 Standard for Automotive Ambulances, 2013 Edition

National Fire Protection Association, 1 Batterymarch Park, Quincy MA 02169