8.0 Current Baseline Service Level

A review of the current baseline service across the five fire districts within the Town of Bethlehem is critical to understanding the delivery of fire services in the town. Documenting the current service level is crucial to assuring that any recommended changes maintain or improve the level of service. Future growth and trends in service delivery will also pose challenges to maintain the current level of service, and future growth will also challenge the need to maintain the volunteer member base.

This study experienced a number of undesired limitations in data, which restricted our analysis. First, neither the Town of Bethlehem nor the Town of Guilderland communications centers were able to provide response times for individual units. That is, we had times for the alarm and for the first arriving unit, but we did not have sufficient detail to enable us to determine whether those first arriving units were chief officers or pieces of fire apparatus.[9] Also, we did not have the ability to determine exactly which pieces of apparatus responded on a given alarm, nor their response times.

We were able to use available data sources including departmental records to draw conclusions at a sufficient level of detail to enable making recommendations. We used data on member activity in general and our interviews to get an understanding of issues facing the fire districts.

Over the course of the study, Manitou, Inc. relied on a variety of sources and analysis to review the current baseline service across the five districts. This information is critical to understanding the current ability of the districts to meet the needs of the community and to identify where collaboration on a number of subjects can improve services. This analysis includes a wide range of topics that are covered throughout the study. This section addresses the district's current level of service and apparatus available.

8.1 Town-wide Considerations

In order to examine the current service level for each district, it is first important to look at broader topics that affect the delivery of services. The first is the overall level of service in the five districts and the second is the assembly of volunteers responding to their registered district.

8.1.1 Level of Service Overview

The five districts that serve in the Town of Bethlehem process over 1,500 calls per year (illustrated in Table 8.1), with the Elsmere and Delmar districts having the highest annual incident count. It is important to distinguish between **incidents**–which are calls for service from the public received via telephone or automatic alarm; and **responses**–which represent a fire company response to a reported emergency. A single incident can generate multiple responses. Note that North Bethlehem also responds to EMS incidents on a first-response basis, and these totals reflect those incidents.

[9] Several districts reported that they get dispatch times from the dispatch center and record these locally. Several districts indicate that their first-due times are for fire apparatus, and not chief's vehicles.

Table 8.1: Town of Bethlehem incident count for all responses by district (2006-2010)

District Name	2006	2007	2008	2009	2010	TOTAL
Delmar	322	494	274	282	349	1,721
Elsmere	308	446	492	376	360	1,982
North Bethlehem	374	539	425	627	640	2,605
Selkirk	303	347	302	282	269	1,503
Slingerlands	143	197	242	204	224	1,010
Total	1,450	2,023	1,735	1,771	1,202	8,181

Notes:
Source: National Fire Incident Reporting System (NFIRS) obtained through FOIL request.
The North Bethlehem (Elmwood Park) district was missing data for 2010 in the NFIRS report.

Incident responses in the Selkirk Fire District have dropped since the peak in 2007, whereas incident responses in the Slingerlands Fire District have seen an increase through 2008, followed by two up- and down-years. Taken individually, the number of incidents per district, and for two districts with multiple stations, is not considered overly busy for any one station.

The time of day for incidents is also of interest when considering the demand on the emergency response system. Fire services typically maintain the same numbers of staff on a 24-hour basis. In systems with limited staffing or demand for service, uniform staffing is a reasonable practice because serious fires are rare events which can be argued to occur at random. However, certain types of emergencies do not occur at a uniform rate, and are subject to systematic variation. Typical among these are emergency services. Private sector EMS providers often staff based on the historic demand for service.

Table 8.2 illustrates the number and type of incidents reported in the Town of Bethlehem over the past four years, by time of day.

Table 8.2: Town of Bethlehem fire reporting, number and type of incidents by time of day (2006-2010)

Incident Type	Day	Evening	Night	Total	% of day	% of Evening	% of Night
Fire	255	220	49	524	49%	42%	9%
Overpressure Rupture, Explosion, Overheat(no fire)	6	2	2	10	60%	20%	20%
Rescue & Emergency Medical Service Incident	938	522	177	1,637	57%	32%	11%
Hazardous Condition (No Fire)	758	584	112	1,454	52%	40%	8%
Service Call	569	305	59	933	61%	33%	6%
Good Intent Call	1,697	791	145	2,633	64%	30%	6%
False Alarm & False Call	544	294	90	928	59%	32%	10%
Severe Weather & Natural Disaster	9	10	10	29	31%	34%	34%
Special Incident Type	4	3	4	11	36%	27%	36%
Total	4,780	2,731	648	8,159	59%	33%	8%

Almost 60 percent of the incidents occur within the daytime hours of 8 am to 4 pm. The focus groups interviewed during this study have identified servicing enough staff during this time as an ongoing problem. A large portion of these calls are Good Intent Calls, which tax the services of the districts by engaging staff to review and determine if any course of action needs to be taken.

8.1.2. Response Time Analysis

This section will discuss the distribution of equipment and stations, and the patterns in demand for service as they relate to station locations. The current service will be discussed in each section and referenced in the maps in the appendix. "In evaluating a community's public fire protection, ISO (Insurance Service Office) considers the distribution of fire companies. Generally, ISO's criteria say that a built-upon area of a community should have a first-due engine company within 1.5 road miles of the protected properties and a ladder-service company within 2.5 road miles."[10]

The location of the stations within the Town of Bethlehem fire districts adequately cover the built-up areas in the Town. This analysis as seen in Figure 8.3 assumes that each district is within the ISO rating of 1.5 miles driving distance of an engine company, assuming that all companies are in service. (More detailed maps per district can be found in the Map Appendix).

NFPA 1720, known formally as *Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public*

[10] http://www.isomitigation.com/ppc/3000/ppc3015.html - accessed 9/25/10

by Volunteer Fire Departments (2010 Edition) is a deployment standard for volunteer fire services. After several years of not setting firm objectives for response time and staffing, NFPA has incorporated these requirements into its latest revision. Table 8.3 shows the requirements of the standard. NFPA standards do not carry the force of law, and must be adopted by an authority having jurisdiction (AHJ) before they would be applied to a particular agency or organization. Each fire district would essentially serve as an AHJ in this case. In Manitou, Inc.'s estimation, the Town would fall into the "suburban" and "rural" categories.

Table 8.3: NFPA 1720 Response Time Requirements

Demand Zone	Density	Minimum Staff	Response Time (minutes)(1)	Meets Objective (Percent of incidents)
Urban	Population density greater than 1000 people per square mile	15	9	90
Suburban	Population density between 500 and 1000 people per square mile	10	10	80
Rural	Population density <500 people per square mile	6	14	80

The response time summaries for all districts are shown in Tables 8.4 and 8.5, below. Table 8.4 also shows the 90th percentile response time for response time to all incidents. The 90th percentile can be interpreted as the amount of time it takes to reach 90 percent of incidents. The 90th percentile is higher than the average, but is less affected by extreme times, as often occur during extreme events such as snowstorms or other events where numerous calls may result in longer-than-normal response times. The times are close to eight minutes at the 80 percent level for Delmar, Selkirk, and Elmwood Park. Slingerlands and Elsmere have times closer to 10 minutes at the 80 percent level. While Elsmere has a large district served by a single station, Slingerlands's station is centrally located within its district.

Table 8.4: Town of Bethlehem fire districts' average response time for all calls (in minutes)

Department Name	2006	2007	2008	2009	2010	Average	80th Percentile
Elsmere	7.5	9.3	9.1	8.0	9.7	8.7	10
Delmar	7.0	4.9	6.0	7.3	6.6	6.4	<8
Selkirk	4.1	4.7	5.6	8.6	7.4	6.1	<8
Slingerlands	8.4	8.1	5.8	7.8	9.3	7.9	<10
Elmwood Park	6.3	6.2	5.9	5.4	N/A	6.0	<8

Table 8.5 shows the total response time from alarm time to arrival of the first unit for each district by year. This data was summarized from the NFIRS data provided by the state for each

district. We see the same data, this time for all incidents. The times are given in minutes. We can see that for all incidents, times are generally trending upward, though not consistently for all districts, nor consistently from year to year.

Table 8.4 illustrates the same analysis for only fire incidents. These represent incidents with an incident type from the NFIRS data starting with "1".

Table 8.5: Town of Bethlehem fire districts' average response time for fire incidents (in minutes)

Department Name	2006	2007	2008	2009	2010	Average
Elsmere	6.9	9.9	7.5	8.5	10.9	8.8
Delmar	7.2	7.3	6.1	9.2	6.7	7.3
Selkirk	3.4	4.7	5.1	9.1	7.6	6.0
Slingerlands	7.7	9.7	7.5	7.7	9.5	8.4
Elmwood Park	7.0	7.5	7.3	4.5	N/A	6.6

The times represented here include time from dispatch to arrival of the first piece of fire apparatus on the scene. The time for call processing may add an additional 1-2 minutes to these times – that is for the total time from when the caller speaks with a 9-1-1 operator until units arrive on the scene.

8.1.3. Apparatus and Personnel Utilization

To understand the utilization of apparatus and personnel in the fire districts, we analyzed district-level data on numbers of apparatus and personnel responding per incident. These data were drawn from both State fire incident reports and locally-held district records.

One of the key components of service delivery is the utilization of fire apparatus. In most cases, this bears a direct relationship to the number of members responding to each incident. Table 8.6 shows the number of major apparatus responding per incident by type for each district. As we would expect, the highest number of apparatus responding was generally for fires. Delmar had the highest average number of apparatus responding – 3.4 pieces, followed by Selkirk at 2.4, while Slingerlands had the least at 1.3. Interestingly, both Delmar and Selkirk responded to structure fires with an average of 3.7 apparatus. These numbers can be influenced by district policies and operational issues, but the number of stations and apparatus also have an effect. In some cases, these data are based on very limited numbers of incidents.

Table 8.6: Apparatus Utilization by District, 2006-2010

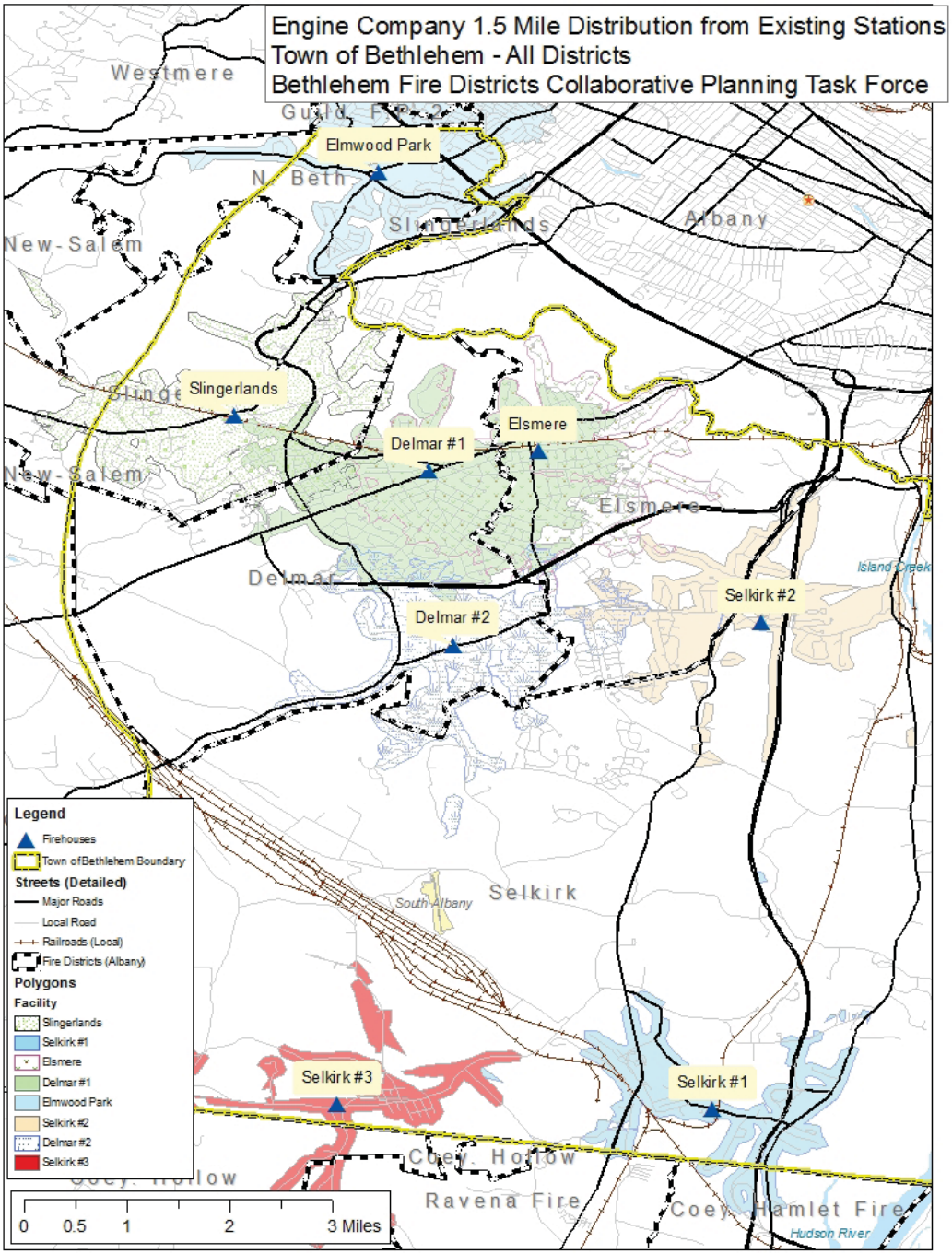
NFIRS Category	Count	Delmar	Elsmere	North Bethlehem	Selkirk	Slingerlands
Fire	485	3.7	2.2	2.9	3.7	1.5
Overpressure Rupture, Explosion, Overheat (no fire)	4			1.0	1.0	2.0
Rescue & Emergency Medical Service Incident	1,170		2.0	1.1	2.6	1.2
Hazardous Condition (no fire)	817	2.0	1.1	2.3	2.7	1.2
Service Call	742	3.2	1.3	1.5	2.0	1.1
Good Intent Call	1,111	1.0	1.0	1.7	2.7	1.0
False Alarm & False Call	496	7.0	1.1	1.6	3.0	1.1
Severe Weather & Natural Disaster	22			3.0	1.7	1.7
Special Incident Type	5				2.3	1.0
Average		**3.4**	**1.5**	**1.9**	**2.4**	**1.3**

We also conducted an analysis of a sample of hard-copy records for the Districts. These results generally supported the findings of the analysis reported above. Based on a combination of computerized District data and manual records, we estimated the number of personnel responding to incidents in 2010. Table 8.7 shows the average number of personnel responding per incident in 2010. Elmwood Park's data is shown for EMS calls and all calls – they respond to EMS assist calls with a subset of all their members.

Table 8.7: Personnel Responding per Incident by District, 2010

	Delmar	Elsmere	North Bethlehem (Elmwood Park)	Selkirk	Slingerlands
Average Number of Members	19	17.1	7.3/9.4*	21.3	12.6

Figure 8.1: The 1.5 mile driving distance, existing engine companies within the Town of Bethlehem



Manitou, Inc. examined the nature of the development within a fire district to allow for comparisons for alternatives and to support the analysis of apparatus and other staffing policies in the study area. The following analysis uses the location of the stations and reviews the travel time from those stations based on assumptions developed on speed limits and highway functional class, apparatus capabilities and Manitou,

Inc.'s historical review of travel speeds in various studies across the country.[11] As stated previously, all the five districts do not keep records of individual apparatus response time but only report on the initial first responder. This analysis uses an "engine speed" to calculate the drive time from the station. The difference between the Rand Corporation work and the Manitou, Inc. approach is that Manitou, Inc. will identify each road type with a different speed to assemble the analysis. (See Appendix for Road Setup)

Each district is examined below for the current limits of response for all existing stations. The graphics can be misleading depending on the development patterns in the district and the historical pattern of incidents. To develop recommendations for changes, Manitou, Inc. uses two processes to develop further analysis of the coverage and the implicit workload on the districts' equipment. The first process is a simple spatial query of point and small area locations to calculate the number of points reached by each minute of response time. The second process looks at Census Block level data to determine the area for each block covered by the response time and summarizes this information. Each district has a table to document the existing coverage statistics. The level of response (LOR) map is used to dissolve the results into each minute response. This layer is used to select by location for each minute. This analysis included parcels that were provided by the Town's Geographical Information System (GIS) department. In addition, the incidents geocoded from the NFIRS data were used to examine the structure fire incidents since 2006.

The population served by the station locations divides districts (Delmar and Selkirk) into First Due Areas. These areas are determined by a proximity analysis, which determines the proximity to the closest facility. The First Due Area is the most likely area that a station will likely respond. These areas are used to divide the population into the service areas.

[11] The ISO uses Rand Corporation studies on the speed and response time and have developed a general average of 35 mph. In addition the formula developed by the Rand Corporation included T = 0.65+1.7D where T = time in minutes to the nearest 1/10 of a minute; 0.65 = a vehicle-acceleration constant for the first 0.5 mile traveled; 1.7 = a vehicle-speed constant validated for response distances ranging from 0.5 miles to 8.0 miles and D = Distance. Manitou, Inc. uses lower speeds based on empirical studies done using actual fire incident data.

Table 8.8: Town of Bethlehem population/households served by each district/station

First Due Area	Population (2007)	Total (2000) Households
Delmar #1	6,718	2,548
Delmar #2	2,955	1,077
Elsmere	7,989	2,883
Slingerlands	4,455	1,577
Elmwood Park	2,624	1,127
Selkirk #1	2,410	772
Selkirk #2	4,377	1,346
Selkirk #3	2,056	765
TOTAL	33,583	12,095

When evaluating station locations, it is important to remember that in a volunteer fire department, not only is the apparatus important but so too is the members' ability to arrive quickly to the scene of a reported emergency. Because members respond from home or work directly to the scene of emergencies, this important component of response will not change. The next section examines volunteer drive time for all districts.

8.1.4 Volunteer Assembly

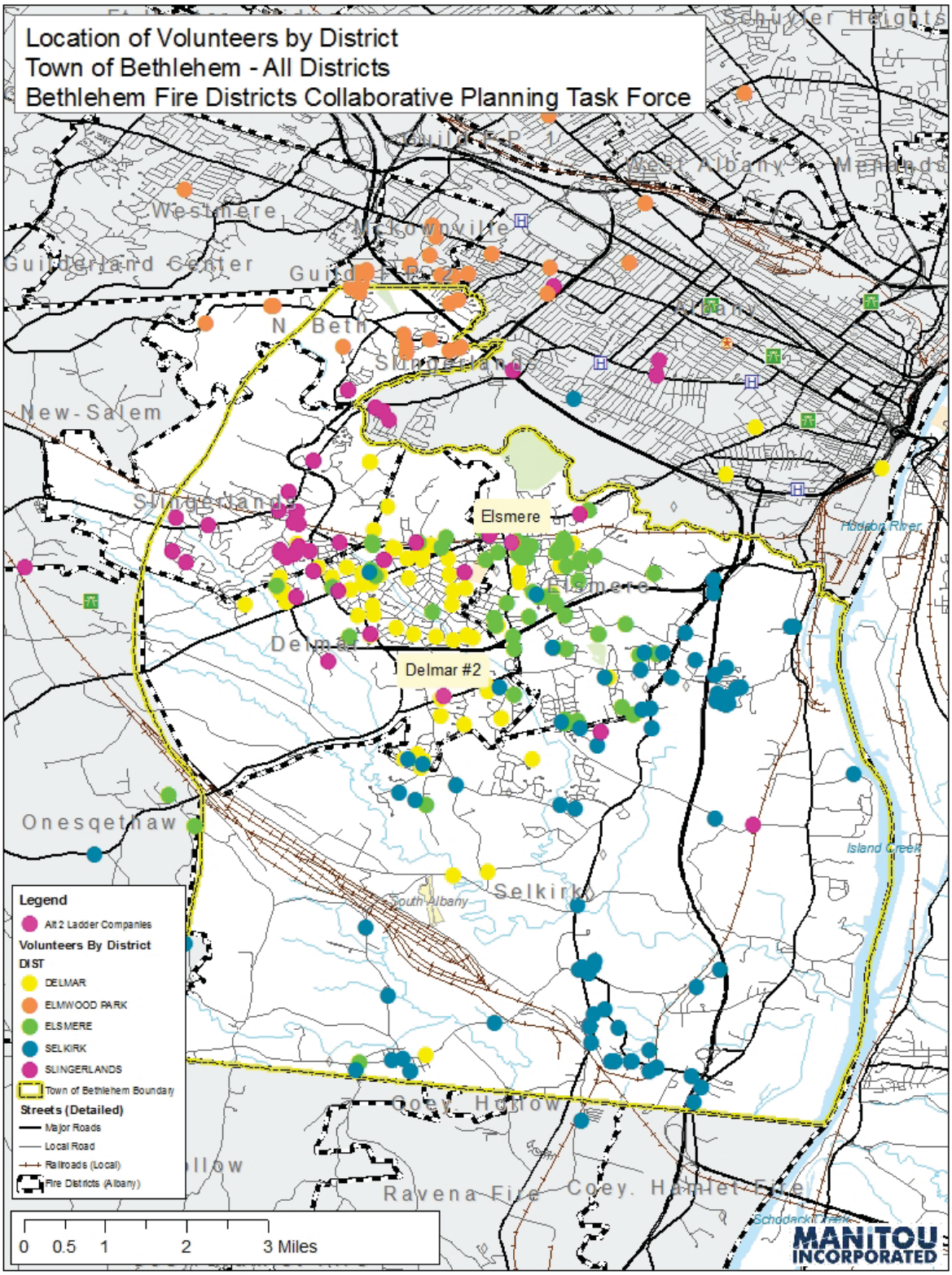
In order to understand the baseline of service level, it is important to understand how the volunteers are assembled to respond to incidents. Each district was asked to provide Manitou, Inc. the volunteer list to ascertain the age distribution of the volunteers, their resident location, activity logs by volunteer, and the years of service/experience. Manitou, Inc. geo-coded the supplied information into a map, in order to locate where each member lived in regards to their district served. The map on the following page lays out the four districts that provided data on the location of their volunteers. The map indicates that the majority of each districts' volunteers do in fact live in the district that they serve, but there is a percentage that do not live in their own district. An analysis was also done by address as well, but because the zip code boundaries are different than the districts' geography (including the zip code for Glenmont, which makes comparisons impossible) Manitou used the geocoded residence locations of volunteers.

Table 8.9: Town of Bethlehem fire districts' volunteers, by residence

District	Total Members	Less un-geocoded Members	Live Within District	Percent within District	Live Outside District	Percent Outside District
Delmar	77	2	47	61.0%	28	36.4%
Elmwood Park	51	1	25	49.0%	25	49.0%
Elsmere	74	1	53	71.6%	20	27.0%
Selkirk	90	6	62	68.9%	22	24.4%
Slingerlands	45	1	19	42.2%	25	55.6%
Notes: *Un-geocoded means that their address (mostly Post Office boxes) were not attributable to an address on the map*						

The Table 8.9 shows that the Elsmere District has the high percentage of volunteers living within their district (71%) whereas the Slingerlands District has the lowest percentage (42%) of volunteers actually living in the District. This finding is significant in that volunteers may not belong to the station closest their homes.

Figure 8.2: Volunteers' residence locations within the Town of Bethlehem



This analysis leads to the question assembly time for calls for service that are compounded by the time of day. With some exceptions, all districts have policies that require their members to report to the station to assemble and prepare the apparatus rather than move directly to the incident. This policy ensures that the truck is fully staffed and ready for the appropriate activity. This study provides a comparison analysis in order to review the drive times of volunteers by the district they report to and the closet facility to their residence. This analysis does not look at the place of work or time of day. Work addresses were not provided and the policies on who can leave work to attend an emergency vary. For this analysis, only the Selkirk Fire Department provided the actual company each volunteer reports to directly. Therefore, to simplify the analysis, this report only examines the closest facility for each district. For this analysis, the general vehicle speed was used as opposed to a fire apparatus speed because of the variety of vehicles used by volunteers.

If the drive time in seconds for each member is calculated to the nearest district station, the analysis in Table 8.10 shows the average drive time per station and the number of persons available based on the closest facility regardless of district. Table 8.7 also shows the average assembly time based on the member's District registration and then compares the two results.

Table 8.10: Average drive time to the closest facility, regardless of district membership

	Regardless of District		By District Membership		Difference	
Facility	**Count**	**Average Drive Time (Seconds)**	**Count**	**Average Drive Time (Seconds)**	**Count**	**Average Drive Time (Seconds)**
Delmar #1	58	76	56	130	-2	54
Delmar #2	31	136	19	149	-12	13
Elmwood Park	59	143	50	114	-9	-29
Elsmere	60	118	73	148	13	30
Selkirk #1	25	96	26	107	1	11
Selkirk #2	54	99	47	136	-7	37
Selkirk #3	12	124	11	170	-1	46
Slingerlands	32	105	44	177	12	72

Note:
The difference is calculated by subtracting the information, regardless of district from the district membership information.

The Delmar #1, the Selkirk #2, and the Slingerlands stations, which are the busiest stations in terms of incidents, all experience almost a minute longer assembly time based on average drive time based solely on membership. That is, if the closest volunteers responded, they would receive a faster time to assemble volunteers. Only Selkirk #1 is the same count and time, which could be based on the historical development growth of the Selkirk district over time, the physical configuration of the settlements, and the separation from the rest of the Town.

8.2 Individual District Data

The rest of this section will review each individual district and the response to current levels of service with the current apparatus.

8.2.1 Delmar Fire District

The Delmar Fire District stretches from the Albany city line in the north, to the town line in the west and Feura Bush Road and some streets below it in the south and a variety of streets to the west of Elsmere Avenue in the east. The district covers 8.39 square miles and has two stations that serve the community. The Hamlet of Delmar is the most populous portion of the Town of Bethlehem, and while not co-terminus with the Delmar district, the majority of population in the district is between Hudson Avenue to the north, Elm Avenue to the west, neighborhoods south of Feura Bush in the south, and the western boundary to the east. The Delmar district area is comprised of over 42 percent of residential parcels, mostly concentrated in the above described area (see Table 8.11).

There are portions of the Delmar Fire District that are not developed at this time. These include the area north of Hudson Avenue to the Albany city line, which is mostly zoned as residential single family parcels, and the area west of Elm Avenue to the town line. However, the western part of the district has several major streams through the area, which confines major changes to the development of the area. The road network through this area is limited because of the streams and the current agriculture zoning.

Table 8.11: Land use within the Delmar Fire District

General Zone	Parcels	Square feet	Square Miles	Percent of Parcels	Percent of Area
Agriculture	14	21,403,587	0.77	0.36%	9.15%
Residential	3,296	98,621,328	3.54	84.28%	42.17%
Undeveloped	257	35,135,705	1.26	6.57%	15.02%
Commercial/Retail	140	6,298,145	0.23	3.58%	2.69%
Recreation	10	2,594,830	0.09	0.26%	1.11%
Institution	31	13,421,594	0.48	0.79%	5.74%
Industrial	2	9,596,451	0.34	0.05%	4.10%
Utilities/Tran	26	9,698,414	0.35	0.66%	4.15%
Muny Park/Wildland	4	5,149,351	0.18	0.10%	2.20%
Unclassified	131	31,972,813	1.15	3.35%	13.67%
TOTAL	**3,911**	**233,892,219**	**8.39**	**100.00%**	**100.00%**

The distribution of the two stations within the district covers the more populous side of the district. As evident in both the ISO engine distribution map and the Limits of Response maps (see Map Appendix), the Delmar district covers most of the road network and the population in

the district. The review of response time by location of the incidents with respect to drive time from the existing stations is illustrated in Table 8.11. These summaries do not include responses outside of the district where the response may have been mutual aid given or automatic aid since the response to mutual aid is a decision made to augment services and the Delmar department would not be expected to be first to the scene. These summaries also do not include the complete response time that includes dispatch, turnout and drive time as a complete response time.

Table 8.12: Response times based on drive times from the station only, Delmar Fire District (2006-2010)

Within Fire District - *	All Incidents		Fire Incidents	
	Count	Cumulative Percent	Count	Cumulative Percent
Existing Engines - 1 Minute	492	44%	35	36%
Existing Engines - 2 Minutes	341	75%	28	65%
Existing Engines - 3 Minutes	184	92%	16	81%
Existing Engines - 4 Minutes	74	98%	12	94%
Existing Engines - 5 Minutes	8	99%	5	99%
Existing Engines - GT 5 Minutes	9	100%	1	100%
	1,108		97	

Notes:
Total includes responses geocoded to addresses within the district.
10% (172) of the geocoded incidents were matched to the zip code and not to an address.

A further analysis of the response times within the NFIRS data is necessary both for fire incidents and all incidents. Table 8.12 and Table 8.13 illustrates the average response time over all incidents (2006-10) by the type of aid provided in the Delmar district. Again, to compare incidents where the Delmar units would most likely be the first unit, the table examines all responses by time but only tallies those that have no aid given or received. Based on the mapping of incidents by aid (See Map Appendix) it is apparent that some incidents clearly outside the district were coded as "no aid" and were included in this table. The difference between Tables 8.10 and 8.11 as opposed to tables 8.12 and 8.13 is that the former only measures drive time while the latter describes the entire response from the NFIRS records.

While 92 percent of the historical incidents can be reached in under three minutes, the difference between alarm time and arrival time in the NFIRS records would indicate that only 32 percent of the incidents are reached in three minutes. For fire incidents, the drive time reports 81 percent in under three minutes, but only 20 percent of fire incidents are reached when looking at the entire response time.

Table 8.13: Response time count by aid type, all incidents, Delmar Fire District (2006-2010)

Seconds	Mutual Aid Recd.	Auto Aid Recd.	Mutual Aid Given	Auto Aid Given	Other Aid Given	None	Running Percent **	Total
No Response Time	6		11			90	10.7%	107
One Minute	7		7			32	14.5%	46
Two Minutes	14		11			69	22.7%	94
Three Minutes	19		16			80	32.2%	115
Four Minutes	20		23			90	42.9%	133
Five Minutes	16		23			108	55.8%	147
Six Minutes	14		18			89	66.3%	121
Seven Minutes	18		26			77	75.5%	121
Eight Minutes	7		19			55	82.0%	81
Nine Minutes	10		19			40	86.8%	69
Ten Minutes	5		17			29	90.2%	51
More than 10 Min	16		49			82	100.0%	147
TOTAL	**152**	**0**	**239**	**0**	**0**	**841**		**1,232**

Table 8.14: Response time count by aid type, fire incidents, Delmar Fire District (2006-2010)

Seconds	Mutual Aid Recd.	Auto Aid Recd.	Mutual Aid Given	Auto Aid Given	Other Aid Given	None	Running Percent **	Total
No Response Time							0.0%	-
One Minute			1			2	2.7%	3
Two Minutes			1			3	6.8%	4
Three Minutes	3		4			10	20.5%	17
Four Minutes	2		3			11	35.6%	16
Five Minutes	1		4			13	53.4%	18
Six Minutes	6		2			13	71.2%	21
Seven Minutes			2			10	84.9%	12
Eight Minutes	1		2			2	87.7%	5
Nine Minutes	2		2			5	94.5%	9
Ten Minutes	1		6			1	95.9%	8
More than 10 Min	4		15			3	100.0%	22
TOTAL	**20**	**0**	**42**	**0**	**0**	**73**		**135**

*Notes: * response time reflects alarm time to arrival time, in seconds*
*** Fire incidents include all NFIRS category starting with "1" in the first position*
**** File only includes incidents that have valid (greater than 0 times for both Alarm and Arrival)*

8.2.2 Elmwood Park Fire District

The Elmwood Park Fire District covers 5.5 square miles, encompassing portions of the Towns of Bethlehem, Guilderland and New Scotland. The population is approximately 3,200. The Elmwood Park Fire District is dispatched by the Town of Guilderland communications center and provides training through Guilderland as well. The district borders the City of Albany to the east and the Town of Guilderland to the north. Although there are two roads (Russell and Krumkill Roads) running under/over the highway, the district has no direct access to the New York State Thruway (I-87) cuts through the Elmwood Park Fire District. The district to the north of the Thruway, accessed by Krumkill Road, is mostly residential with a small undeveloped area in the southwestern corner near the Thruway.

Table 8.15: Land use within the Elmwood Park Fire District

General Zone	Count	Square Feet	Square Miles	Pct CT	Pct Area
Outside of Town of Bethlehem	3	33,007,426	1.18	0.28%	39.54%
Agriculture	3	4,855,484	0.17	0.28%	5.82%
Residential	652	11,860,599	0.43	60.82%	14.21%
Undeveloped	235	13,301,292	0.48	21.92%	15.93%
Commercial/Retail	35	2,613,292	0.09	3.26%	3.13%
Recreation	1	125,268	0.00	0.09%	0.15%
Institution	55	3,499,639	0.13	5.13%	4.19%
Utilities/Tran	2	169,377	0.01	0.19%	0.20%
Minicipal Park/Wildland	1	963,982	0.03	0.09%	1.15%
Unclassified	79	12,222,108	0.44	7.37%	14.64%
TOTAL	**1,072**	**83,479,155**	**2.99**	**100.00%**	**100.00%**

Almost 40 percent of the area of the Elmwood Park Fire District is located outside of the Town of Bethlehem geography. Of the remaining 60 percent, 14 percent of the area is zoned for residential. The assisted living locations along Krumkill at Beverwyck, which make up 4 percent of the area, are a reoccurring incident call. The remainder is zoned agriculture (5.8%), undeveloped (16%) and unclassified (15%). The area beyond the Town of Bethlehem did not develop as the area within Bethlehem did. Krumkill Road has very little side street development. Table 8.16 illustrates the Elmwood Park Fire District response times based on drive times.

Table 8.16: Response times based on drive times within the Elmwood Park Fire District (2006-2010)

Within Fire District - *	All Incidents		Fire Incidents	
	Count	Cumulative Percent	Count	Cumulative Percent
Existing Engines - 1 Minute	195	14%	1	10%
Existing Engines - 2 Minutes	1,121	97%	9	100%
Existing Engines - 3 Minutes	34	100%	0	100%
Existing Engines - 4 Minutes	1	100%	0	100%
Existing Engines - 5 Minutes	1	100%	0	100%
Existing Engines - GT 5 Minutes	-	100%	0	100%
	1,352		10	

Notes:
Total includes responses Geocoded to Addresses within the District

Further analysis of the response times within the NFIRS data is necessary both for fire incidents and all incidents. Tables 8.16 and 8.17 illustrates the Elmwood Park Fire District (North Bethlehem Fire Department) average response time over all incidents (2006-10) by the type of aid provided. Again, to compare incidents where the Elmwood Park units would most likely be the first unit, the tables look at all responses by time but only tallies those that have no aid given or received. Based on the mapping of incidents by aid (See Map Appendix) it is apparent that only a few incidents are responded to outside the district, but these were still coded as "no aid" and were included in this table. The difference between Tables 8.11 and 8.12 and Tables 8.13 and 8.14 is that the former tables only measure drive time while the latter tables describe the entire response from the NFIRS records.

While 100 percent of the located historical incidents can be reached in under three minutes, the difference between alarm time and arrival time in the NFIRS records indicate that only 26% of the incidents are reached in three minutes. For fire incidents, the drive time reports that 100% of incidents are reached in fewer than three minutes but only 20% are reached when looking at the entire response time.

Table 8.16: Response time count by aid type, all incidents, Elmwood Park Fire District (North Bethlehem Fire Department) (2006-2010)

Seconds	Mutual Aid Recd	Auto Aid Recd	Mutual Aid Given	Auto Aid Given	Other Aid Given	None	Running Percent **	Total
No Response Time	2	4	3	12		74	5.9%	95
One Minute	3	5	3	6		66	11.2%	83
Two Minutes	1	9		12		108	19.9%	130
Three Minutes	3	5	3	14		81	26.4%	106
Four Minutes	2	10		11		115	35.6%	138
Five Minutes	5	14		22		187	50.6%	228
Six Minutes	10	19	3	26		158	63.3%	216
Seven Minutes	6	16	2	32		163	76.4%	219
Eight Minutes	1	15		24		102	84.6%	142
Nine Minutes	1	10	2	22		51	88.7%	86
Ten Minutes	2	10	4	6		52	92.9%	74
More than 10 Min	1	10	12	17		89	100.0%	129
TOTAL	**37**	**127**	**32**	**204**	**0**	**1246**		**1646**

Table 8.17: Response time count by aid type, fire incidents, Elmwood Park Fire District (North Bethlehem Fire Department) (2006-2010)

Seconds	Mutual Aid Recd	Auto Aid Recd	Mutual Aid Given	Auto Aid Given	Other Aid Given	None	Running Percent **	Total
No Response Time	1					1	10.0%	2
One Minute							10.0%	-
Two Minutes						1	20.0%	1
Three Minutes	1	1					20.0%	2
Four Minutes		1					20.0%	1
Five Minutes		1				1	30.0%	2
Six Minutes				1		1	40.0%	2
Seven Minutes	2					3	70.0%	5
Eight Minutes		1		1		2	90.0%	4
Nine Minutes		1					90.0%	1
Ten Minutes	1	1		1			90.0%	3
More than 10 Min						1	100.0%	1
TOTAL	**5**	**6**	**0**	**3**	**0**	**10**		**24**

Notes: * - response time reflects alarm time to arrival time in seconds
** - Fire incidents include all NFIRS category starting with "1" in the first position
*** - File only includes incidents that have valid (greater than 0 times for both alarm and arrival)

8.2.3 Elsmere Fire District

Elsmere Fire District covers the hamlet of Elsmere and the northwestern part of the area known as Glenmont in the Town of Bethlehem. The district borders Delmar on the west with the border running on various streets to the west of NY-335 (Elsmere Ave) and north to the City of Albany and east to US 9W north of the Delmar Bypass, along 9W to Beacon Road, and then meets up with the southern tip of the Delmar Fire District. The Elsmere Fire District covers 5.48 square miles. The district is made up of almost 40 percent residential parcels with commercial/retail development comprising only about 8 percent of the district; these commercial areas are located primarily along Delaware Avenue and along the US 9W corridor. There is over 6 percent zoned as agriculture and another 10 percent that is zoned recreational. There are portions of the district that are undeveloped (13%) or unclassified (15%). These areas are mostly near the Normanskill and the railroad tracks south of Delaware and areas south of the Bypass.

Table 8.18 illustrates the types of land use found within the Elsmere Fire District.

Table 8.18: Land use within the Elsmere Fire District

General Zone	Count	Square Feet	Square Miles	Pct CT	Pct Area
Agriculture	20	10,112,358	0.36	0.58%	6.62%
Residential	2,909	60,415,968	2.17	84.69%	39.56%
Undeveloped	194	19,467,489	0.70	5.65%	12.75%
Comm/Retail	141	12,060,948	0.43	4.10%	7.90%
Recreation	16	15,533,591	0.56	0.47%	10.17%
Institution	22	6,379,708	0.23	0.64%	4.18%
Utilities/Tran	43	5,635,956	0.20	1.25%	3.69%
Unclassified	90	23,115,045	0.83	2.62%	15.14%
TOTAL	**3,435**	**152,721,063**	**5.48**	**100.00%**	**100.00%**

The Elsmere Fire District is served by the one station to the north and as such does not cover the entire district either by ISO standards (see map in appendix) or by drive time response (see appendix). The southern portion of the district is covered by both the Delmar Station #2 and the Selkirk Station #2 in terms of physical drive time (ISO). However, as the map below indicates, many of the incidents south of the Delmar Bypass are exceeding the eight minute standard response time.

Figure 8.3: Response times in southern Elsmere Fire District (Elsmere-only response)

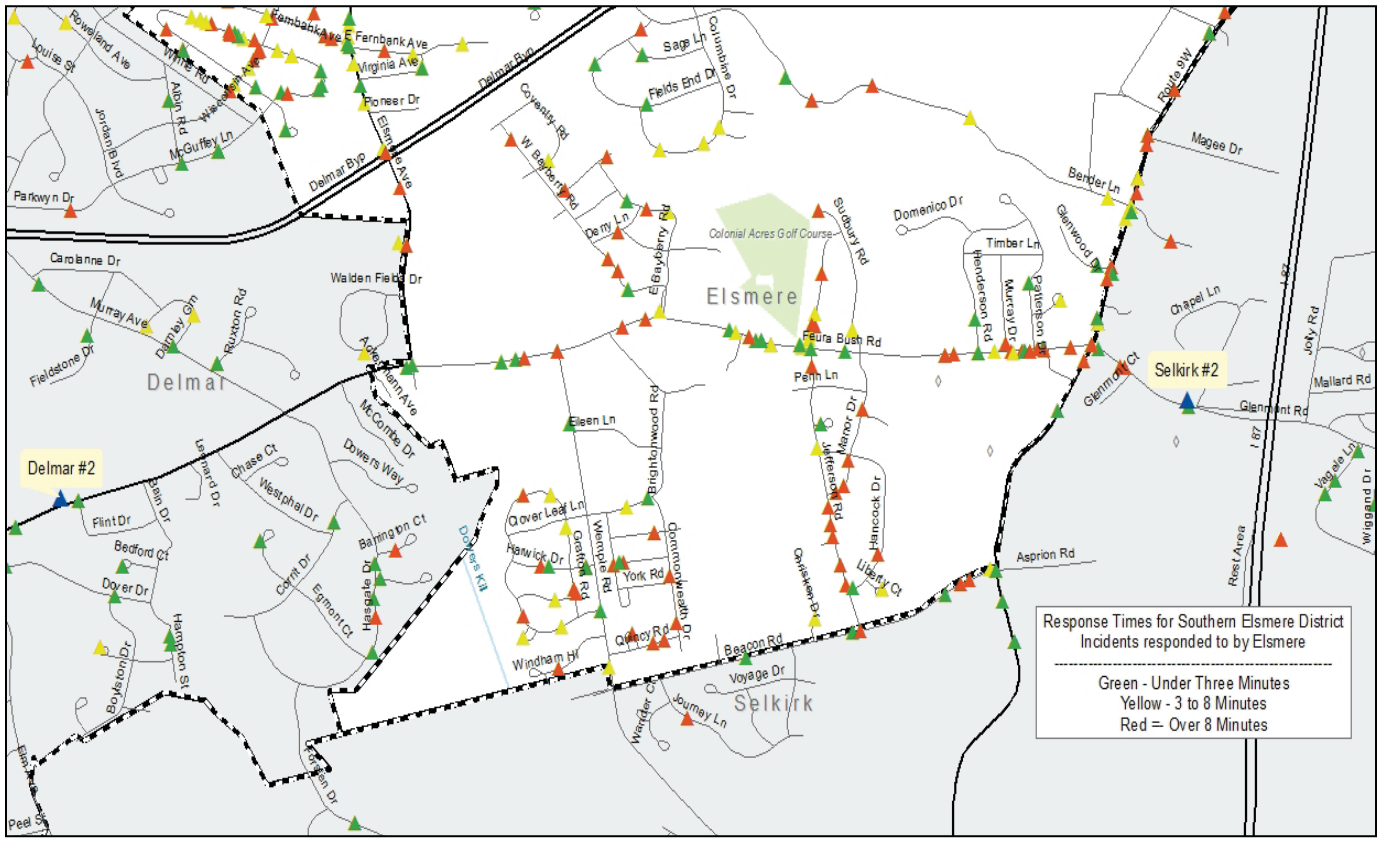


Table 8.19: Response times based on drive times within the Elsmere Fire District (2007-2010)

Within Fire District - *	All Incidents		Fire Incidents	
	Count	Cumulative Percent	Count	Cumulative Percent
Existing Engines - 1 Minute	235	22%	18	17%
Existing Engines - 2 Minutes	345	54%	35	51%
Existing Engines - 3 Minutes	238	77%	20	71%
Existing Engines - 4 Minutes	33	80%	2	73%
Existing Engines - 5 Minutes	160	95%	18	90%
Existing Engines - GT 5 Minutes	58	100%	10	100%
	1,069		103	

Notes:
Total includes responses geocoded to addresses within the district

Further analysis of the response times within the NFIRS data is necessary both for fire incidents and all incidents. Tables 8.17 and 8.18 shows for Elsmere Fire District the average response time over all incidents (2006-10) by the type of aid provided. Again, to compare incidents where the Elsmere unit would most likely be the first unit, the table examines all responses by time but only tallies those that have no aid given or received. Based on the mapping of incidents by aid (See Map Appendix) it is apparent that some incidents clearly outside the district were coded as "no aid" and were included in this table. The difference between Tables 8.15 and 8.16 and Tables 8.17 and 8.18 is that the former tables only measure drive time while the latter measures the entire response from the NFIRS records.

The distribution of incidents heavily favors the northern portion of the district, but only 77 percent of the incidents are reached within three minutes of driving time, while only 15 percent area is actually reached within three minutes. It takes almost ten minutes to reach 80 percent of the incidents. For fire incidents, only 71 percent of the fire incidents can be reached in under three minutes of drive time (see Table 8.20). For the NFIRS data reinforces that it takes ten minutes to reach 80 percent of the incidents.

Table 8.20: Response time count by aid type, all incidents, Elsmere Fire District (2006-2010)

Seconds	Mutual Aid Recd	Auto Aid Recd	Mutual Aid Given	Auto Aid Given	Other Aid Given	None	Running Percent **	Total
No Response Time	2		5			17	1.9%	24
One Minute	6		1			21	4.2%	28
Two Minutes	4		9			45	9.2%	58
Three Minutes	5		11			56	15.5%	72
Four Minutes	19		16			94	25.9%	129
Five Minutes	17		23			121	39.4%	161
Six Minutes	5		8			83	48.7%	96
Seven Minutes	16		13			105	60.4%	134
Eight Minutes	20		9			62	67.3%	91
Nine Minutes	20		10			60	73.9%	90
Ten Minutes	16		23			59	80.5%	98
More than 10 Min	27	1	104			175	100.0%	307
TOTAL	**157**	**1**	**232**	**0**	**0**	**898**		**1288**

Table 8.21: Response time count by aid type, fire incidents, Elsmere Fire District (2006-2010)

Seconds	Mutual Aid Recd	Auto Aid Recd	Mutual Aid Given	Auto Aid Given	Other Aid Given	None	Running Percent **	Total
No Response Time							0.0%	-
One Minute	1					1	1.0%	2
Two Minutes						4	4.9%	4
Three Minutes						2	6.8%	2
Four Minutes						9	15.5%	9
Five Minutes	2					11	26.2%	13
Six Minutes	1		3			19	44.7%	23
Seven Minutes			1			18	62.1%	19
Eight Minutes	6					5	67.0%	11
Nine Minutes	2		1			9	75.7%	12
Ten Minutes						8	83.5%	8
More than 10 Min	7		4			17	100.0%	28
TOTAL	**19**	**0**	**9**	**0**	**0**	**103**		**131**

Notes:
** - Response time reflects alarm time to arrival time in seconds*
*** - Fire incidents include all NFIRS category starting with "1" in the first position*
**** - File only includes incidents that have valid (greater than 0 times for both alarm and arrival)*

8.2.4 Selkirk Fire District

The Selkirk Fire District is the largest district in the Town of Bethlehem and covers the entire southern portion of the Town and the eastern portion east of the US 9W corridor. The Selkirk Fire District has three stations to address this geographic area, but the type of land use in the district requires further analysis because the land within the district has changed over time. The Selkirk district covers 29.85 square miles, which represents almost 60 percent of the Town of Bethlehem's area. The district runs from the town line in the south, west to NY Route 32, and east to the southern borders of the Delmar and Elsmere Fire Districts. It then takes in all the area east of 9W up to the Albany City line in the north and the Hudson River in the east.

The Selkirk Fire District is not predominantly residential, as the northern fire districts are. Only 25 percent of the district is zoned for residential use, and much of that is considered rural residential and not as developed as the rest of the town. Almost 14 percent of the land is still agricultural. With the Selkirk rail yards, the South Bethlehem Airport and the utility/transmission lines, the central part of the district is zoned industrial (5.5%), undeveloped (21%) or unclassified (18%). The variety of land use and the expansive geography of the district poses challenges to covering the distance adequately. The three existing fire stations are centered

around the residential portions of the district, with Station #2 in the north also responsible for the commercial area to the east of US 9W.

Table 8.22: Land use within the Selkirk Fire District

General Zone	Count	Square Feet	Square Miles	Pct CT	Pct Area
Agriculture	68	113,607,909	4.08	1.72%	13.65%
Residential	2,607	205,667,491	7.38	65.85%	24.72%
Undeveloped	728	176,902,900	6.35	18.39%	21.26%
Commercial/Retail	143	36,866,907	1.32	3.61%	4.43%
Recreation	4	2,865,460	0.10	0.10%	0.34%
Institution	39	29,788,826	1.07	0.99%	3.58%
Industrial	34	45,862,627	1.65	0.86%	5.51%
Utilities/Tran	64	58,293,221	2.09	1.62%	7.01%
Muny Park/Wildland	22	13,039,842	0.47	0.56%	1.57%
Unclassified	249	148,385,883	5.32	6.29%	17.83%
TOTAL	**3,959**	**832,074,754**	**29.85**	**100.00%**	**100.00%**

From an ISO standpoint (see Map Appendix), the Selkirk Fire District's coverage is below recommended standards, even with the three stations. The district fire stations leave major portions of the area to the northwest and the area along the Hudson with long response times. Owing to the rural nature of the district, this is unavoidable (See Map Appendix). Table 8.23 illustrates the response times based on drive times within the Selkirk Fire District.

Table 8.23: Response times based on drive times within the Selkirk Fire District (2006-2010)

Within Fire District - *	All Incidents		Fire Incidents	
	Count	Cumulative Percent	Count	Cumulative Percent
Existing Engines - 1 Minute	97	9%	18	17%
Existing Engines - 2 Minutes	234	32%	35	51%
Existing Engines - 3 Minutes	166	48%	20	71%
Existing Engines - 4 Minutes	239	71%	2	73%
Existing Engines - 5 Minutes	262	96%	18	90%
Existing Engines - GT 5 Minutes	40	100%	10	100%
	1,038		103	

Further analysis of the response times within the NFIRS data is necessary both for fire incidents and all incidents. Tables 8.24 and 8.25 shows the average response time over all incidents for Selkirk, by the type of aid provided. Again, to compare incidents where the Selkirk units would most likely be the first unit, the table examines all responses by time but only tallies those that have no aid given or received. Based on the mapping of incidents by aid (See Map Appendix) it is apparent that only a few incidents are responded to outside the district but were still coded as "no aid" and were included in this table. The difference between the two sets of tables is that the former tables only measure drive time while the latter tables measure the entire response from the NFIRS records.

While 48 percent of the located historical incidents can be reached in under three minutes, the difference between alarm time and arrival time in the NFIRS records would indicate that only 28 percent of the incidents are reached in three minutes. For fire incidents, the drive time reports that 71 percent of incidents are reached in fewer than three minutes, but only 29 percent of incidents are reached when looking at the entire response time.

Table 8.24: Response time count by aid type, all incidents, Selkirk Fire District

Seconds	Mutual Aid Recd	Auto Aid Recd	Mutual Aid Given	Auto Aid Given	Other Aid Given	None	Running Percent **	Total
No Response Time	2		4	2		20	2.8%	28
One Minute	1		7	2		46	9.2%	56
Two Minutes	5	3	3	3	1	67	18.5%	82
Three Minutes	5	1	4	3	1	66	27.6%	80
Four Minutes	6	9	10	1	1	88	39.9%	115
Five Minutes	9	7	14	1	1	103	54.2%	135
Six Minutes	9	6	8	1	1	60	62.5%	85
Seven Minutes	10	1	4	1	1	54	70.0%	71
Eight Minutes	14	1	10			108	85.0%	133
Nine Minutes	8		5	1		67	94.3%	81
Ten Minutes	4	2	8			18	96.8%	32
More than 10 Min	1		12			23	100.0%	36
TOTAL	**74**	**30**	**89**	**15**	**6**	**720**		**934**

Table 8.25: Response time count by aid type, fire incidents, Selkirk Fire District

Seconds	Mutual Aid Recd	Auto Aid Recd	Mutual Aid Given	Auto Aid Given	Other Aid Given	None	Running Percent **	Total
No Response Time	2		2			1	0.9%	5
One Minute	1		2	1		4	4.3%	8
Two Minutes	1	2	2	1		12	14.5%	18
Three Minutes	2		1			16	28.2%	19
Four Minutes	4	4	4	1	1	12	38.5%	26
Five Minutes	4	3	3		1	15	51.3%	26
Six Minutes	3	5	4	1	1	12	61.5%	26
Seven Minutes	4		1			10	70.1%	15
Eight Minutes	3	1	1			11	79.5%	16
Nine Minutes	4		3			15	92.3%	22
Ten Minutes	3	1	3			5	96.6%	12
More than 10 Min			2			4	100.0%	6
TOTAL	31	16	28	4	3	117		199

Notes:
** - Response time reflects alarm time to arrival time in seconds*
*** - Fire incidents include all NFIRS category starting with "1" in the first position*
**** - File only includes incidents that have valid (greater than 0 times for both alarm and arrival)*

8.2.5 Slingerlands Fire District

The Slingerlands Fire District straddles the Towns of Bethlehem and New Scotland. The district is situated to the west of Delmar and to the South of Elmwood Park/North Bethlehem. The Slingerlands Fire District contains the NY Route 85 corridor, the Cherry Avenue Extension (NY Route 140), and New Scotland Avenue heading west out of the City of Albany.

Almost 30 percent of the Fire District is located within the Town of New Scotland. The total area of the district is 5.89 square miles. Of the remaining area within the Town of Bethlehem, over 32 percent of the area is residential with a major portion already developed into single-family homes. There is relatively a small portion (1.2%) of the town classified as commercial while the majority of the remainder of the District in Bethlehem is either classified as undeveloped (17%) or unclassified (18%). As discussed in the overall summary, the area west and north of the new Slingerlands Bypass that meets with Cherry Avenue at New Scotland is undeveloped; however, due to the completion of the highway, this area may be further developed.[12]

[12] New York State Department of Transportation, Press Release dated 14 December 2009, "NYSDOT, Creighton Manning Engineering Receive Award (Region One): Slingerlands Bypass Job Cited by Bentley Systems for

Table 8.26: Land use within the Slingerlands Fire District

General Zone	ount	Square Feet	Square Miles	Pct CT	Pct Area
Outside of Bethlehem	1	46,000,000	1.65	0.05%	28.02%
Agriculture	1	2,000,000	0.07	0.05%	1.22%
Residential	1,438	53,864,589	1.93	74.05%	32.82%
Undeveloped	102	27,749,960	1.00	5.25%	16.91%
Commercial/Retail	132	2,060,398	0.07	6.80%	1.26%
Recreation	9	1,109,027	0.04	0.46%	0.68%
Institution	10	2,319,760	0.08	0.51%	1.41%
Utilities/Tran	2	43,673	0.00	0.10%	0.03%
Unclassified	247	28,997,079	1.04	12.72%	17.67%
TOTAL	**1,942**	**164,144,485**	**5.89**	**100.00%**	**100.00%**

The Slingerlands Fire District is served by one station located on New Scotland Road, south of the major intersection described above. This station is centrally located and in terms of physical coverage of the district the location, it serves the district well (See Map Appendix). The Response time along the mostly residential area in the district is also relatively stable. Table 8.27 shows the number of incidents from 2006-2010 that occurred within the limits of response shown on the LOR map in the appendix. This is not the complete response time but illustrates that most incidents that the Slingerlands Fire District responds to within their district are reached within three minutes. These times are for the arrival of the first piece of fire apparatus.

Excellence in Design." https://www.nysdot.gov/portal/page/portal/news/press-releases/2009/2009-12-14. (13 August 2011)

Table 8.27: Response times based on drive times within the Slingerlands Fire District (2006-2010)

Within Fire District - *	All Incidents		Fire Incidents	
	Count	Cumulative Percent	Count	Cumulative Percent
Existing Engines - 1 Minute	144	24%	4	15%
Existing Engines - 2 Minutes	278	71%	16	77%
Existing Engines - 3 Minutes	144	95%	6	100%
Existing Engines - 4 Minutes	23	99%	0	100%
Existing Engines - 5 Minutes	4	100%	0	100%
Existing Engines - GT 5 Minutes	-	100%	0	100%
	593		26	

Further analysis of the response times within the NFIRS data is necessary both for fire incidents and all incidents. Tables 8.28 and 8.29 shows for the Slingerlands Fire Department the average response time over all incidents (2006-10) by the type of aid provided. Again, to compare incidents where the Slingerlands unit would most likely be the first unit, the table looks at all responses by time but only tallies those that have no aid given or received. The difference between the tables is that the former table only measures drive time while the latter tables describe the entire response from the NFIRS records.

While 95 percent of the historical incidents can be reached in under three minutes, the difference between alarm time and arrival time in the NFIRS records would indicate that only 34 percent of the incidents are reached in three minutes. For fire incidents, the drive time reports 100 percent of incidents are reached in under three minutes, but only 24 percent of incidents are reached when looking at the entire response time.

Table 8.28: Response time count by aid type, all incidents, Slingerlands Fire District

Seconds	Mutual Aid Recd	Auto Aid Recd	Mutual Aid Given	Auto Aid Given	Other Aid Given	None	Running Percent **	Total
No Response Time		3	9	3	1	59	13.7%	75
One Minute	7	4	2	2		31	20.8%	46
Two Minutes	8	4	5	3	1	29	27.5%	50
Three Minutes	12	12	8	1		29	34.3%	62
Four Minutes	8	9	8	5	1	38	43.1%	69
Five Minutes	2	8	9	6		33	50.7%	58
Six Minutes	2	4	7	4		22	55.8%	39
Seven Minutes	3	6	7	2	1	28	62.3%	47
Eight Minutes	2	1	12	5		34	70.1%	54
Nine Minutes	8	4	13	4		22	75.2%	51
Ten Minutes	6	8	8	7		30	82.2%	59
More than 10 Min	9	11	78	35	1	77	100.0%	211
TOTAL	**67**	**74**	**166**	**77**	**5**	**432**		**821**

Table 8.29: Response time count by aid type, fire incidents, Slingerlands Fire District

Seconds	Mutual Aid Recd	Auto Aid Recd	Mutual Aid Given	Auto Aid Given	Other Aid Given	None	Running Percent **	Total
No Response Time							0.0%	-
One Minute	1					2	9.5%	3
Two Minutes	1						9.5%	1
Three Minutes						3	23.8%	3
Four Minutes							23.8%	-
Five Minutes							23.8%	-
Six Minutes						2	33.3%	2
Seven Minutes						3	47.6%	3
Eight Minutes						2	57.1%	2
Nine Minutes	2	1	1			3	71.4%	7
Ten Minutes	1		1			2	81.0%	4
More than 10 Min			5			4	100.0%	9
TOTAL	**5**	**1**	**7**	**0**	**0**	**21**		**34**

Notes:
** - Response time reflects alarm time to arrival time in seconds*
*** - Fire incidents include all NFIRS category starting with "1" in the first position*
**** - File only includes incidents that have valid (greater than 0 times for both alarm and arrival)*
Source: NFIRS reporting data (2006 - 2010) supplied by New York State

8.3 Commentary on Deployment

Thus far, this report has examined the deployment of personnel and response times from the perspective of individual districts. This section of the report will offer commentary on aspects of station location and response time that are of interest to the long-range plan for the five districts.

Figure 8.4 shows the coverage from the existing stations within the Town of Bethlehem. In this map, units are allowed to cover their maximum area without regard for district boundaries. This map, in effect, shows what a closest station response might look like. This map also illustrates that most of the heavily-populated parts of the Town of Bethlehem can be reached within four minutes of driving time.[13]

Interestingly, both Selkirk Station #2 and Delmar Station #2 can cover the southern part of Elsmere's Fire District better than Elsmere's main station can. Similarly, Delmar Station #2 covers the north central part of Selkirk's Fire District more quickly than any of its own stations. Also, Delmar Station #1 and Elsmere's station are roughly two minutes' drive from each other, with Elsmere being located closer to the boundary between the two districts.

Figure 8.5 illustrates ladder coverage for the Town of Bethlehem. Three ladder companies currently exist at Delmar Station #1, Elsmere, and Selkirk Station #2.Again, the proximity of ladders at Delmar and Elsmere limits the area they can cover efficiently. That is, a well-defined service area should extend at least 3-4 minutes before meeting another station's coverage area. These districts are geographically closer to each other for this coverage situation to be ideal.

One alternative Manitou, Inc. examined for ladder companies was to move Delmar Fire Department's ladder to Station #2. This facility would need to be modified to accommodate a ladder company. Figure 8.6 shows the coverage from a two-ladder company configuration. As we can see, the efficiency of coverage increases, but even with this move the Glenmont area has a driving time for a ladder company of six minutes or more, which is higher than the ISO recommended average.

The purpose of this analysis was not to make specific recommendations for improvements to the coverage areas, but to show how existing locations have limits. District boundaries constrain the service areas of apparatus as currently deployed and managed. Further information and recommendations on deployment are contained in Chapter 16.

Figure 8.4: "Natural" first due areas, Town of Bethlehem's district engine companies

13 Total response time includes call processing time at the dispatch center, plus turnout time for volunteers to travel to the station, plus drive time form the station to the scene of the emergency.

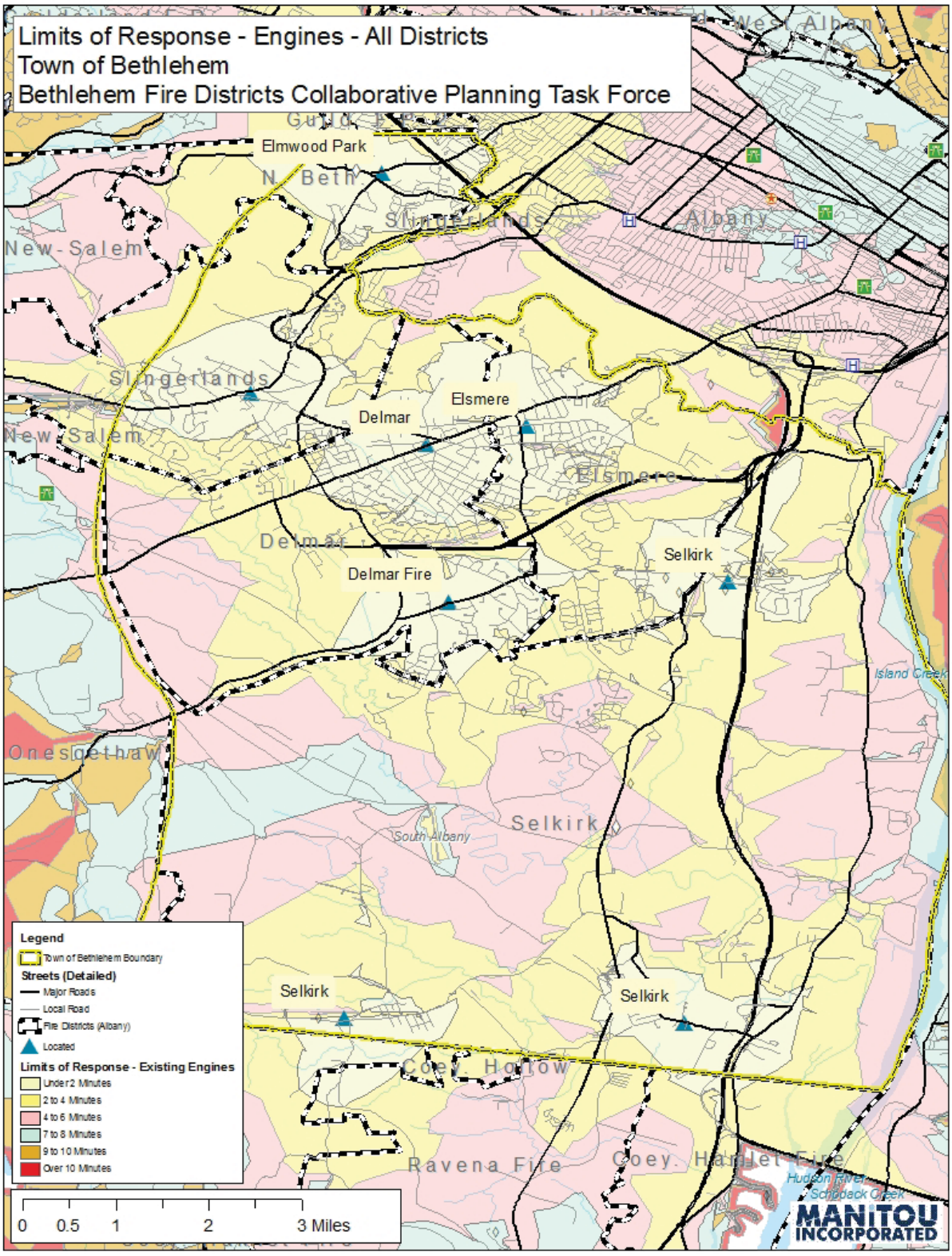

Limits of Response - Engines - All Districts
Town of Bethlehem
Bethlehem Fire Districts Collaborative Planning Task Force
Elmwood Park
N. Beth
Slingerlands
New Salem
Albany
Delmar
Elsmere
Delmar Fire
Selkirk
Island Creek
Onesquethaw
South Albany
Coeymans Hollow
Ravena Fire
Coeymans Hollow Fire
Legend
Town of Bethlehem Boundary
Streets (Detailed)
Major Roads
Local Road
Fire Districts (Albany)
Located
Limits of Response - Existing Engines
Under 2 Minutes
2 to 4 Minutes
4 to 6 Minutes
7 to 8 Minutes
9 to 10 Minutes
Over 10 Minutes
0 0.5 1 2 3 Miles
MANITOU INCORPORATED

Figure 8.5: Existing coverage areas from Town of Bethlehem's district ladder companies

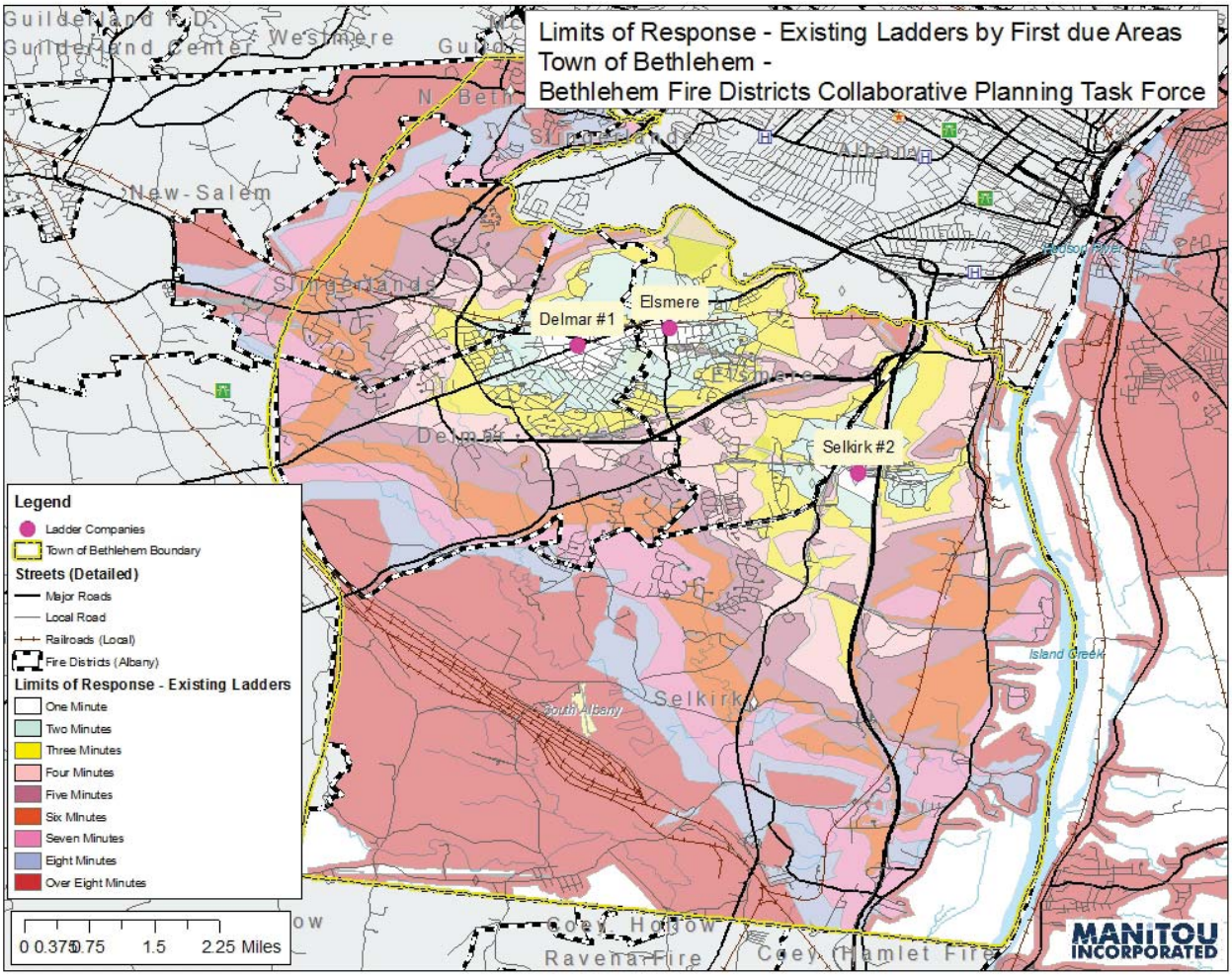
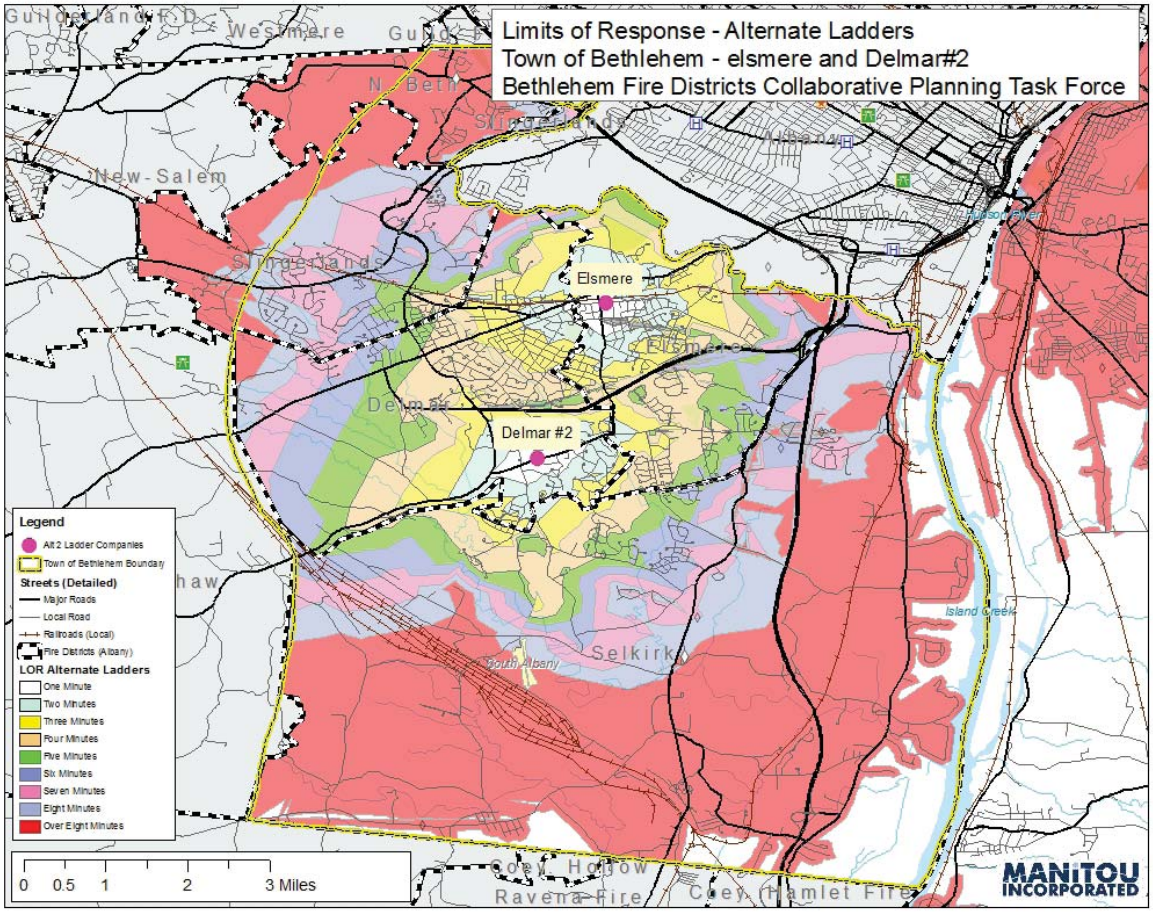


Figure 8.6: A two-ladder scenario, Delmar Station #2 and Elsmere Fire Department



9.0 Town-wide Development Summary

The future growth of the Town of Bethlehem is important to understand because future growth influences the demand for service for fire and emergency services. The Town of Bethlehem has considerable undeveloped and agricultural land that can eventually be subject to more intensive development. The Town has completed a comprehensive plan that is described as:

> In August 2005, the Town Board adopted the Bethlehem's first Comprehensive Plan. This plan was intended to achieve a broad consensus about development and investment over a ten to fifteen year period. Given the varying land uses and interests in the Town, the Comprehensive Plan was crafted with the goal of achieving balance – balance between urban, suburban, and rural perspectives; between the desire for economic growth and tax base expansion and diversification, and for stewardship of finite land and environmental resources; and balance between the short-term and long-term health, safety, and welfare of the community.[14]

The balance sought by the comprehensive plan is evident in the measured growth across all types of land use; The Town of Bethlehem has evolved from a mostly agrarian town into one of the most dynamic towns in Albany County. The Town of Bethlehem has been a growth area of Albany County for many years. Slingerlands, Delmar and Elsmere were the first outer ring suburbs to the City of Albany, as residents of the city moved out with the expansion of the automobile. The nature of the Town of Bethlehem's development has been largely residential, and commercial/retail districts along Delaware Avenue and US Route 9W have grown with the population. The types of development are in contrast to suburbs to the north of the City of Albany, like Colonie and Latham which have higher density retail development and commercial activity.

The distribution of the types of land use overall in the town is detailed in Table 9.1. The major type of parcel in the Town is driven by single-family dwellings which constitute over 72 percent of the total parcels. In contrast only about 4 percent of the parcels are made up of Multi-family or Multi-unit facilities. The remainder of the residential parcels consists of rural residential parcels which generally are larger. Despite the overwhelming number of parcels, the residential parcels only make up roughly half of the Town's square miles.

Agriculture still makes up almost 10 percent of the land in the Town of Bethlehem; another 7 percent of land is vacant and another 13 percent of the land is unclassified or undeveloped. This 30 percent of the total land area makes the land use planning decisions made over the next 10 years crucial, and adjacent fire districts must be able to flex their services to meet future demands. Fire districts will need to re-examine their apparatus and station locations as the development changes over time. The collaborative effort in this study should continue in order to look at these development decisions to ensure that fire services are not an afterthought.

[14] Town of Bethlehem. *10-Year Capital Plan - Interim Status Report 2010.* http://www.townofbethlehem.org/uploads/pub_158420091223CapitalPlan2010InterimStatusReport.pdf. (20 July 2011).

Table 9.1: Summary of parcel type and size (Town of Bethlehem)

General Legend	Count	Square Feet	Square Miles	Count Pct of Total *	Sq Miles Pct of Total *
Commercial/Bus/Inst	332	147,009,383	5.27	2.4%	11.4%
Transportation/Utility Total	133	76,902,449	2.76	0.9%	5.9%
Recreation Total	55	34,634,901	1.24	0.4%	2.7%
Agriculture Total	73	123,617,190	4.43	0.5%	9.6%
Residential Total	12,322	642,405,177	23.04	88.8%	49.9%
Vacant Land Total	123	91,359,329	3.28	0.9%	7.1%
Other Total	834	169,030,482	6.06	6.0%	13.1%
TOTALS	**13,872**	**1,284,958,911**	**46.09**	**100.0%**	**100.0%**

Notes:
*- *Sum may not equal total, due to rounding.*
Source: GIS parcel layer from Town of Bethlehem GIS Unit

Over the last fifteen years, the Town of Bethlehem has experienced significant growth in single-family homes. From 1997 until 2004, the Town had over 100 permits for new single-family homes each year. This peaked in 2000 when the Town had 60 permits per 10,000 residents, which is five times the New York State average for that year. From 2004 to 2007, the Town experienced smaller growth in single-family construction, but a number that was still significantly higher than the New York State average. However the average price of the homes has been increasing at a much higher rate than inflation.[15] This would indicate that of the single-family homes being built, they are large, high-end homes.

The balance sought in the comprehensive plan is evidenced in the pressures of new development along the Route 9W corridor that have surfaced over the last ten years. The commercial activity south from the Thruway exit along Route 9W and the Delmar Bypass down to Glenmont Road has been significant. This increase in commercial activity has introduced traffic concerns. This activity is part of the Linkages Study that the Town participated in along with the Capital District Transportation Committee (CDTC).[16]
The transportation plan that gives the Route 9W corridor a transportation system that works well for all users, is supportive of the Town of Bethlehem's economic development goals and respects and strengthens residential neighborhoods along the corridor. In order to improve safety and quality of life for residents who live along that route, the NYSDOT identified two alternative truck bypass options for NYS Route 396.[17] In addition to the growth in commercial and retail

[15] City-Data.com. http://www.city-data.com/city/Bethlehem-New-York.html. (4 August 2011).
[16] Capital District Transportation Committee. Final Linkage Reports. http://www.cdtcmpo.org/linkage/reports/bethlehem.htm. (25 September 2011).
[17] Capital District Transportation Committee. Bethlehem Route 9W Corridor Study. http://www.cdtcmpo.org/linkage/studies/112005013.pdf . (11 August 2011).

activity, there has also been growth in the demand for multi-unit housing that would allow residents who no longer need the larger single family homes but still seek to live in the town. This is readily evident in an article in the Times Union, the local daily newspaper:

> The massive residential and retail complex that could soon be built at the corner of Route 9W and Wemple Road may be rezoned to accommodate senior housing and other features. The 95-acre "Wemple Corners" is designed to be a sort of hamlet within Glenmont, with shops, work spaces and restaurants within walking distance of homes. There would be 526 residential units, mostly apartments, and 145,000 square feet of office and retail space.[18]

The increase in multi-unit structures would have an impact on the number of incidents in areas where these structures would be developed. The increases in activity and traffic certainly have an effect on the movement of automobiles, the number of motor vehicle accidents, and the need for advanced-life support activity. The geographic area that borders on the Delmar, Elsmere and Selkirk Fire Districts also continues to be an area that development would have an effect on the level of service. Currently, this potential growth area area is the least serviced by the three districts; any increase in development that would accompany the Wemple Road activity would have to be considered as the fire districts plan for the future.

As this is happening along the Route 9W corridor, the completion of the State Route 85 bypass to the west of New Scotland Avenue in the Slingerlands Fire District will also be a concern. The undeveloped land to the west of the new State Route 85 bypass (Mahar Road and Lagrange Road) can either be developed as large parcel single-family homes or as more multi-family and multi-unit developments. Both would have easy access to the limited access roads (SR 85) and the main Thruway as well as the commercial activity along New Scotland Avenue. The direction of the growth could have an impact on the Slingerlands Fire District's level of service and need for mutual aid in an area that has not been a concern in the past.

There are other areas where the Town of Bethlehem is looking to understand the growth in demand and work to achieve the balance that the Comprehensive Plan outlines. One of the areas is along the waterfront, which is largely covered by the Selkirk Fire District and is east of the Thruway. As the Bethlehem Local Waterfront Revitalization program and Harbor Management Plan states:

> The Bethlehem Local Waterfront Revitalization Program (LWRP) and Harbor Management Plan (HMP) have been developed to guide the future of Bethlehem's riverfront areas. With the recent adoption and implementation of the Comprehensive Plan, along with the Route 9W Linkage Study currently underway, the time is appropriate to fashion a new approach to the integration of Bethlehem's waterfront for the next generation of development. With a study area

[18] Lee, Stephanie. "'Wemple Corners' may be rezoned: New designation would allow for senior housing at retail, residential site." TimesUnion.Com. Updated 09:34 p.m., Thursday, April 28, 2011.

> generally stretching from the Hudson River westward to the Thruway, the LWRP seeks to establish a vision and policies to appropriately guide future investments and development, both public and private.[19]

Incorporating any development along this corridor will have an impact on the type of services that the fire districts can provide because the Thruway is a natural divider with limited access to the area. Because all three of Selkirk's fire stations are located west of the Thruway, the type of development that occurs will have to be studied to ensure adequate coverage.

The industrial area in the central part of the Town of Bethlehem in the Selkirk Fire District is also an identified growth area. The Selkirk Train Yard remains an important economic hub of activity, and the local roads are mostly county roads that access this facility. The bridge over the yard (CR 53) is currently closed[20] and forces all responses that would need to either come from the north (from Selkirk Station #2) or from the south (from Station #3) to traverse Bridge Street at the lower end of the yards. This currently limits the response to major industrial incidents as well as other incidents. Due to the bridge closure, the trip is five miles out of the way for services trying to reach the southern area of the district.[21]

---

[19] Saratoga Associates. *Town of Bethlehem Local Waterfront Revitalization Program and Harbor Management Plan.* Bethlehem, New York. July 2008. http://www.townofbethlehem.org/images/pageImages/LWRP%20Waterfront/LWRP%20-%20DRAFT%20Submitted%20to%20DOS%202008--09-03.pdf. (24 July 2011).

[20] Wikipedia. List of County Routes in Albany County. http://en.wikipedia.org/wiki/List_of_county_routes_in_Albany_County,_New_York#Routes_1.E2.80.93100 (11 August 2011).

[21] Yusko, Dennis. "Ben's Bridge in Bethlehem won't be replaced." Times Union. Published 12 September 2010. Online at: http://www.timesunion.com/local/article/Ben-s-Bridge-in-Bethlehem-won-t-be-replaced-654601.php#ixzz1Um5iNys3 . (11 August 2011).