APPENDIX 4: SURVEY STATISTICAL ANALYSIS METHODOLOGY

Percentage Scores
Percentage scores listed in Figure 1 are calculated from the answers of 35 respondents. It is calculated as a simple percentage to show what portion of respondents selected a given answer. Highlighting the highest category score aids in visualizing the most popular respondent answers on questions related to the skills. Comparing the percentage data to the skill ranking provides an alternative manner to view the data.

Figure 1:

<table>
<thead>
<tr>
<th>Answer Options</th>
<th>Excellent</th>
<th>Above Average</th>
<th>Average</th>
<th>Below Average</th>
<th>Poor</th>
<th>N/A</th>
<th>Skill Ranking</th>
<th>Response Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turnouts</td>
<td>43.33%</td>
<td>33.33%</td>
<td>33.33%</td>
<td>0.00%</td>
<td>3.33%</td>
<td>147</td>
<td>35</td>
<td></td>
</tr>
</tbody>
</table>

Skill Ranking
In developing a performance measure for the data set collected from the Rookie Survey, a “Skill Ranking” score was derived by assigning points to the possible answers. The Skill Ranking score provides a scalable performance measure that can used to compare all skills individually or by group. The ability to use this measure and graphically display the results gives a benchmark to measure the observations from the Rookie Survey.

Possible respondent answers include: “Excellent” (6pts), “Above Average” (5pts), “Average” (4pts), “Below Average” (3pts), “Poor” (2pts), and “N/A” (1pt). This created an ordinal data scale with a range of 30 points in each category. It is only intended to assign a value that measures greater than or less than among observations. Since there were 30 observations (in most categories), the minimum score of any skill is 30 and the maximum score is 180.

The scoring breaks down as follows:
30-59 Poor
60-89 Below Average
90-119 Average
120-149 Above Average
150-180 Excellent

The “N/A” category is not displayed on the graph due to its vagueness as a comparable answer in relation to the other possible answers. While it is unrepresented on the graph, it is represented in each Skill Ranking score. It represents the base of the “Poor” ranking. As a result, “N/A” responses are represented in the ranking scores of skills as reported by respondents. Those
questions which had less than or more than 30 respondents (2 skill groups), were mathematically adjusted for scale to provide an accurate and comparable ranking within the scale. This allows for a constant scoring system that is adjustable for any number of respondents.

**Skill Ranking by Group—“Skill Set Ranking”**

In order to visualize skill performance by skill set, rather than individual skill, the mean score of those aggregate Skill Rankings found in a particular skill set was developed (graphically illustrated in Figure 2). Generally speaking, each skill developed in the Fire Academy is part of a larger skill set. Each question addressed individual skills grouped by skill set or “Evolution”. It is reasonable to calculate the mean of Skill Ranking scores in a skill set to derive a “Skill Set Score” for each group of related skills (i.e., Emergency Vehicle Operations). This allows one to see performance measures by skills grouped together as reported by rookies.

The responses by rookie firefighters illustrate performance of Academy skill training from the perspective of the rookie who has recently graduated the academy (+/-1year post graduation). The measures are ordinal and are used as a way to rank skill sets among each other.

The skill set involving emergency vehicle operations scored the lowest by comparison to all other skill sets taught by Las Vegas Fire and Rescue Academy.

As seen below, Question 11 on Emergency Vehicle Operations involves the following skills and how they ranked:

- **CEVO/Driver’s Performance Development**
- **Rescue Bag**
- **Rescue Rodeo-Road Course**
- **Airbrake Certification** (ranked second lowest overall)

Skill Set Score: 96 (lowest scoring skill set)

Highest Skill Rank: **CEVO/Driver’s Performance Development**

Lowest Skill Rank: **Airbrake Certification**
The individual Skill Rank of “Hose Service Testing” dragged down the Skill Set Score for Question 9. If we remove “Hose Service Testing” as an outlier of the data set, the Question 9 Skill Set Score would have been 114. It still would have been the second lowest scoring skill set. It is notable that regarding “Hose Service Testing”, 30% of respondents selected N/A. This leads one to speculate whether the skill component was left out of academies attended by many respondents. “Hose Service Testing” was the single lowest Skill Ranking score observed in the survey.

Question 9
Skill Set Score: 108
Highest Skill Rank: Standpipe/Sprinkler
Lowest Skill Rank: Hose Service Testing

Question 7 was the third lowest Skill Set Score of the eight skill sets. Question 7 contains 13 skills. All skills in the Question 7 skill set were ranked “Average” or higher. The three lowest ranking skills in this skill set are: “Hydrant Testing and Servicing”, “Flammable Gas Cylinder”, and “Assisting Rescue Teams”.
Question 7
Skill Set Score: 118
Highest Skill Rank: Hydrant Connection
Lowest Skill Rank: Hydrant Testing and Servicing

Skill Components: The Best and the Worst
Above we can display the five highest and five lowest ranking skill components observed in the Rookie survey. Viewing them in this manner allows us to see at a glance the highest and lowest individual skill training that rookie firefighters felt they received.

Overall Academy Performance Measures
Academy Performance Score: 121
Degree of Overall Ability: 121

The "Academy Performance Score" is based on the reported rankings of the aggregate of all individual skill components. Descriptive statistics are used here to help summarize the scale of the Skill Rankings and to arrive at an overall Academy performance measure. We can see that there are 60 skill components rated by respondents. The lowest Skill Rank was "Hose Service Testing"-84, and the highest Skill Rank was "Turn-outs"-147. The range between the highest and lowest scores is 63. Note that the Mean, Median, and Mode scores are very close together. This helps support a conclusion that the Mean score is not significantly affected by outliers and will be appropriate for use as an overall Academy performance score. That score is 121.

Academy Performance Score Descriptive Statistics:
Mean 120.55
Median 118.5
Mode 122
Range 63
Minimum 84
Maximum 147
Count 60

Degree of Overall Ability
A second measure of overall academy performance can be observed in Question 12 of the survey instrument (seen above). It asks the respondents directly to assess the degree of overall ability resulting from LVFR Recruit Academy Training. Question 12 asks for “Degree of Overall Ability”. Respondents’ answers provided a Skill Rank for “Degree of Overall Ability” at 121.

With both measures of overall academy performance in agreement, it is safe to assume that from the perspective of the rookie responders, the LVFR Fire Academy has an overall performance score of 121. This score rates just within the category of “Above Average” (scores between 120-149).