



*Assisting Communities  
With Their ISO Rating*

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**A Report From**

**MIKE PIETSCH, P.E. CONSULTING SERVICES, INC.**

**To**

**ELLIS COUNTY ESD #2**

**Improving  
Ellis County ESD # 2's  
ISO Public Protection Classification  
(Areas Protected by Fire Hydrants)**

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### **What is Insurance Services Office, Inc. (ISO)?**

To help establish appropriate fire insurance premiums for residential and commercial properties, insurance companies need reliable, up-to-date information about a municipality's fire protection services. Insurance Services Office, Inc. (ISO) is the principal (and most precise) provider of this information through the Public Protection Classification (PPC) program.

### **What is the Public Protection Classification (PPC) Program?**

ISO collects information on a community's public fire protection and analyzes the data using their Fire Suppression Rating Schedule (FSRS). ISO then assigns a Public Protection Classification from 1 to 10. Class 1 represents the best public protection while Class 10 indicates less than the minimum recognized protection.

By classifying a community's ability to extinguish or control a structural fire, ISO assists communities in evaluating their public fire protection infrastructure. The program provides an objective, countrywide standard that assists communities in planning and budgeting for facilities, equipment, and training. By securing lower fire insurance premiums for communities with better public protection, the PPC program provides incentives and rewards for communities that choose to improve their firefighting services.

ISO has extensive information on more than 50,000 fire-response jurisdictions.

## **Explanation of the Fire Suppression Rating Schedule (FSRS)**

The Fire Suppression Rating Schedule is the manual ISO utilizes in reviewing the firefighting capabilities of individual communities. This schedule evaluates the three major items comprising a community's fire suppression infrastructure and develops a numerical grading called a Public Protection Classification (PPC). The items considered are Fire Alarm, Fire Department, and Water Supply.

### **Fire Alarms**

Ten percent of the grading point total is based on how efficiently calls for emergency service are received and dispatched. ISO Field Representatives will evaluate the communications center. They consider the number of operators at the center, the telephone service, including the number of telephone lines coming into the center, and the listing of emergency numbers in the principal telephone directory. Field Representatives will also evaluate the number of dispatch circuits and how the center notifies firefighters of an emergency.

### **Fire Department**

Fifty percent of the grading point total is based on the infrastructure of the fire department. ISO reviews the distribution of fire companies throughout the graded area and verifies apparatus response to structural alarms of fire. The ISO Field Representative will inventory each engine, ladder and service company, both in service and reserve, to verify the existence of nozzles, hose loads, breathing apparatus, and other major equipment. ISO also reviews the fire-company records to determine:

- Type and extent of training provided fire-company personnel
- Firefighter response to emergency calls for service
- Maintenance and testing of fire department's apparatus
- Engine, ladder and service companies availability for response to first alarm structural fires
- Location of companies to minimize response times to fire emergencies

### **Water Supply**

Forty percent of the grading point total is based on the community's water supply, distribution system, and proximity of fire hydrants to existing structures. This item focuses on the community's ability to provide sufficient water supply for fire suppression beyond maximum daily consumption. ISO surveys all components of the water supply system, including pumps, storage, and filtration. Field Representatives will observe fire-flow tests at representative locations in the community to determine the rate of flow provided by the distribution system. Last, they count the distribution of fire hydrants no more than 1,000 feet from the location of all needed fire flows (targeted structures).

## **Texas Addendum**

Unique to the State of Texas is a document titled the Texas Addendum (sometimes called the Texas Exception). This document analyzes the effectiveness of the Fire Marshal and Building Code Offices and assigns additional credit for compressed air foam systems on in-service engines. A second section of this document assigns credit to communities that allowed a certain percentage of their firefighters to attend Fireman's Training School and volunteer firefighters that have obtained at least the basic firefighter certification.

Mathematically, this section could add an additional 11.39 points to a grading point total. Normally 4 to 7 additional grading points are achieved via the Texas Addendum.

## **The Effect of PPC Code on Fire Insurance Premiums**

All insurance companies (whether they admit or not) utilize ISO's PPC classes in establishing premiums for both commercial and residential property policies. Here's how it works:

### **PPC and Commercial Fire Insurance Premiums**

Insurers determine insurance premiums for commercial properties after analyzing size, construction type, occupancy, protection (such as fire extinguishers and automatic sprinklers), and exposure to adjacent structures. For individual properties, either class rating or specific rating applies. In class rating, the insurer develops rates for similar types – or classes – of buildings, such as small churches, schools, or motels.

Specific rating includes an on-site survey and analysis of conditions at the particular property to determine the premium rate. Insurers use specific rating for buildings protected by automatic sprinklers, buildings with specific hazards or processes, or other properties that do not meet the criteria for class rating.

Both class rating and specific rating consider the Public Protection Classification at the property. Insurers develop their rating systems in order that the lower (better) the PPC at a given commercial property, the lower the insurance rate.

### **ISO's Methodology**

A community may request an ISO survey anytime they wish. At that time an ISO Field Representative will be assigned the survey. He will contact the community and set a time convenient to both the community and ISO. He will analyze the community's fire defenses as outlined under the "Explanation of the FSRS".

An extensive amount of support data will be required to verify answers to specific questions that are utilized to analyze the three major items that comprise a community's grading point total. When all the questions are answered and the support data is properly formatted the Field Representative will return to his office and complete the grading. When he completes the grading he submits it for review. After the review is complete the grading is then submitted to the community for their review. If the community feels all grading items were analyzed fairly the grading is sent to the State Fire Marshal's Office for their approval.

Once the State Fire Marshal's Office approves the grading the community is notified via a letter to the District Manager or Mayor of their new rating. This entire process normally takes around 1 year.

## **Explanation of Ellis County ESD #2's Study**

This report will analyze the ISO PPC (Public Protection Classification) for Ellis County ESD #2 utilizing the 2 fire departments which serve Ellis County ESD #2 and develop a grading scenario that should result if an ISO survey was requested. Based on the grading scenario developed by this report a list of suggested improvements will be demonstrated, which if implemented will assist Ellis County ESD #2 in improving the ISO PPC for all areas within the boundary of Ellis County ESD #2 afforded fire hydrant protection. Areas void of fire hydrant protection (structures outside a 1000-foot hose lay distance of a creditable fire hydrant) are not considered within this report.

This scenario will require that the 2 fire departments responding by contract into Ellis County ESD #2 deploy 2 engine companies and 1 ladder/service (rescue) truck company to all first alarm structure fires to optimize the grading point total that develops the ISO PPC. However, the 2 fire departments serving Ellis County ESD #2, in combination, must have 3 engine companies and 3 ladder/service companies staffed and available to respond into Ellis County ESD #2.

Water supply must provide at least 3500-gpm for 3 hours while delivering a maximum daily consumption rate which has occurred during the last 3-years. Throughout the community the distribution system capacity and fire hydrant placement must meet the needed fire flow demand as determined by the ISO rating document.

The communications center will be analyzed based on NFPA 1221 as interpreted by ISO.

The Offices of the Fire Marshal and Chief Building Official will be reviewed based on the Texas Addendum. The Texas Addendum is a separate rating document developed by the Texas Department of Insurance and interpreted by the Texas State Fire Marshal. The Texas Addendum is not an ISO document.

The companion report prepared for the City of Ovilla along with the report prepared on April 6, 2008 for the City of Midlothian should be utilized in conjunction with this report for Ellis County ESD #2. The report for the City of Midlothian does not accompany the reports for Ellis County ESD #2 and the City of Ovilla. Chief David Schrodt of Midlothian has this report and can provide a copy to Ellis County ESD #2. If Chief Schrodt prefers he could send my company an e-mail giving us his consent to e-mail Midlothian's report to Ellis County ESD #2.

At the conclusion of this scenario a list of suggested improvements will be presented which, if implemented, will improve the ISO Public Protection Classification for Ellis County ESD #2.

## **Executive Summary**

The key item, from an ISO rating perspective, for a fire response area such as that served by Ellis County ESD #2, is to make sure all built-upon areas afforded fire hydrant protection are within 5-road miles of a fire station housing an engine company.

The reason the 5-road mile threshold is so critical: Any structure outside 5-road miles of a fire station housing creditable (by ISO requirements) apparatus is rated an ISO PPC 10 (no recognized fire protection) regardless of the water supply infrastructure. Currently many insurance companies will not renew policies for class 10 areas. Even properties (residential or commercial) within class 10 areas that can receive insurance pay the highest possible rate.

Based on information obtained during my recent survey of Ellis County ESD #2 the 2 fire departments serving Ellis County ESD #2, combining resources, will be required by the ISO Rating Document to respond a minimum of 2 engine companies and 1 ladder/service (rescue) truck company to first alarm structural fires within Ellis County ESD #2. However, 1 additional engine company and 2 additional ladder/service (rescue) truck companies must be in-service and available to respond to structural alarms of fire. Throughout this report the word "company" implies both apparatus and staffing. A reserve engine and a reserve ladder/service truck will also be required.

Tankers will not be addressed within the body of this report. Tankers do not receive a significant amount of ISO rate credit for class 8 or better if the area has a creditable water system with fire hydrant protection. Tankers are an integral part of an alternative water supply evaluation for areas outside a 1000-foot hose lay distance of a creditable fire hydrant.

At present the 2 fire departments serving Ellis County ESD #2 deploy sufficient apparatus into Ellis County ESD #2 to optimize the ISO rating for Ellis County ESD #2.

Each fire department will be required to have a reserve engine and a reserve ladder/service truck unless an agreement for reserve apparatus is available. Due to the fact that ISO's Rating Document places very little emphasis on reserve apparatus this will report will not suggest the purchase of additional apparatus to serve as reserve. However, if replacement apparatus is purchased it would be beneficial within the ISO Rating Document to retain the phased out apparatus as reserve.

Areas of significant deficiency within the *Fire Department* section are: Insufficient staffing for the in-service apparatus (by far the most significant deficiency within the entire process that develops the ISO grading point total for your community), an incomplete training program, an insufficient number of properly located fire

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stations, the fact that the hose is not tested in each fire department contracted by Ellis County ESD #2, an incomplete training program, and the lack of a full complement of equipment for the in-service and reserve apparatus.

The *Water Supply* section demonstrates a good level of compliance with the ISO Rating Document. Water supply, where fire hydrants are available, for fire protection ranges from fair to very good throughout Ellis County ESD #2 based on the fire demand. 2 items that demonstrate a deficiency are the lack of adequate distribution system capacities in some areas of the district and the lack of a complete hydrant inspection program.

*Fire Service Communications* demonstrated several significant areas of deficiency. These are: The lack of an adequate number of dispatchers on-duty at all times in communications center serving Ellis County ESD #2, the lack of a supervisor on duty at all times in the communications center building serving Ellis County ESD #2, monitoring for integrity status is not provided for the primary dispatch method, and the emergency power for the communications is not tested weekly for 1-hour under a load in the communications center serving Ellis County ESD #2.

*Fire Safety Control* demonstrated 2 very significant areas of deficiency. The most significant deficiency by far is not adopting at least the 2003 edition of the International Fire Code by ordinance and enforcing it throughout the district limits of Ellis County ESD #2. The second deficiency, within the fire safety control section of the ISO rating, is the lack of an adequate number of personnel assigned to the Office of the Fire Marshal (Ellis County). A fire inspector is required to enforce the presently adopted code and carry out the commercial building inspections.

At present, based on conversations with ISO, the developed areas afforded fire hydrant protection within Ellis County ESD #2 have an ISO PPC of 5 or 4 depending upon which of the 2 contracting fire departments are proximate to the area. Upon re-survey, based on ISO's updated graded area policy, Ellis County ESD #2 will be assigned a single rating (the area served by Ellis County ESD #2 will not "piggy back" off either community contracting with Ellis County ESD #2).

The grading scenario presented within this report demonstrates that the single rating will be an ISO PPC 4 with the existing fire defense infrastructure. However, with the implementation of several of the suggested improvements within this report an ISO PPC 3 is achievable. Please note that if either the City of Ovilla or the City of Midlothian requests an ISO survey Ellis County ESD #2 will be surveyed at that time and be assigned a single classification.

To demonstrate possible insurance premium reductions for both commercial and residential property owners a benchmark must be established. The benchmark will be an ISO PPC 5.

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If an ISO PPC of 4 were attained for the areas presently assigned an ISO PPC 5 the commercial property owners within 5 road-miles of a contracting fire station and 1000 feet of a fire hydrant would save a possible **4 per cent** (effect of lowering the PPC from a 5 to a 4) and the residential property owners within 5 road-miles of a contracting fire station and 1000 feet of a fire hydrant would save a possible **5 per cent** (effect of lowering the PPC from a 5 to a 4).

For the insurance reductions which follow areas presently rated an ISO PPC 5 should have 4 per cent added to the possible commercial savings and 5 percent added to the possible residential savings.

If a sufficient number of the suggested improvements were implemented in order that an ISO PPC of 3 were attained the commercial property owners within 5 road-miles of a contracting fire station and 1000 feet of a fire hydrant would save a possible **9 per cent** (effect of lowering the PPC from a 4 to a 3) and the residential property owners within 5 road-miles of a contracting fire station and 1000 feet of a fire hydrant would save a possible **2 per cent** (effect of lowering the PPC from a 4 to a 3).

If a sufficient number of the suggested improvements were implemented in order that an ISO PPC of 2 were attained the commercial property owners within 5 road-miles of a contracting fire station and 1000 feet of a fire hydrant would save a possible **11 per cent** (effect of lowering the PPC from a 4 to a 2) and the residential property owners within 5 road-miles of a contracting fire station and 1000 feet of a fire hydrant would save a possible **10 per cent** (effect of lowering the PPC from a 4 to a 2).

As pointed out in the above paragraphs an ISO PPC of 3 is critical to the commercial property owners and an ISO PPC of 2 is critical to the homeowners.

If a sufficient number of the suggested improvements were implemented in order that an ISO PPC of 1 were attained the commercial property owners within 5 road-miles of a contracting fire station and 1000 feet of a fire hydrant would save a possible **13 per cent** (effect of lowering the PPC from a 4 to a 1) and the residential property owners within 5 road-miles of a contracting fire station and 1000 feet of a fire hydrant would save a possible **11 per cent** (effect of lowering the PPC from a 4 to a 1). Even though a Class 1 does not receive an appreciable reduction in insurance premiums over an ISO PPC of 2 it has been shown to be a valuable economic development tool.

As an example of the effect of an improved ISO PPC: Assume a homeowner's premium is \$2,000 per year and the ISO PPC improves from a 5 to a 4 resulting in a 5% reduction in the ISO PPC (the 5% reduction applies to the entire premium in Texas; not just the fire portion as it does in other States). In this case the homeowner would see the entire \$100 reduction in annual premium if all

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endorsements (perils and property value) remained the same. This information is generated and updated by the Texas Department of Insurance and published by The Texas State Fire Marshal's Office; not ISO. Whereas \$100 per year does not seem like a significant amount of money; consider each home in Ellis County ESD #2 and extrapolate \$100 per year over the 20-year life span of an ISO PPC and that amount of money is significant to the citizens of your community.

*Since Ellis County ESD #2 has never been rated by ISO it is most likely that the district will be edited at ISO's Home Office in New York (much more severe edit) not ISO's Regional Office in Austin. I know this as fact; I edited these ratings for over 11 years. It has been my experience that any grading point total that develops an ISO PPC must move well into the new class in order to guarantee that the rating remains in that class after the review is complete.*

*I would not feel comfortable submitting a grading point total less than 73.00 to New York if the mission of Ellis County ESD #2 is to achieve a Public Protection Classification of 3. The grading point total would need to exceed 83.00 if an ISO PPC of 2 is to be achieved or 93.00 for an ISO PPC 1.*

## **Analysis of the Report**

This report will demonstrate a grading point total which develops an ISO rating that should result if an ISO Public Protection Survey was requested for the unincorporated areas within Ellis County ESD #2 afforded fire hydrant protection.

All of the suggestions are prioritized by their importance and tempered by their cost. The suggested improvements relate only to a fire insurance classification for the unincorporated areas within Ellis County ESD #2. They are not for property loss prevention or life safety purposes and no life safety or property loss prevention suggestions are made.

## **Grading Scenario**

The Basic Fire Flow will be 1500-gpm. Based on the existing fire defense infrastructure of Ellis County ESD #2 the grading point total for the areas afforded fire hydrant protection is 62.62 (ISO PPC 4). Please see the grading summary at the conclusion of this report for a more detailed explanation. The grading point of 62.62 will be the benchmark for improving this ISO ratings to **73.00 (Class 3)**, **83.00 (Class 2)**, or **93.00 (Class 1)**. The suggestions which follow apply only to the areas within the district afforded fire hydrant protection:

### **General**

1. An excellent map exists which demonstrates the streets and fire hydrants within the district limits of Ellis County ESD #2. The major streets and thoroughfares must have their names legibly displayed on this map. This map should be on a single page (not a set of sectional maps). ISO cannot survey your district until this map is developed. Making sure each hydrant (public and private) available to the 2 fire departments serving Ellis County ESD #2 are plotted on this map is critical to improving the ISO Public Protection Classification of your district. This suggestion is an **absolute**. At present an excellent map exists of the district boundaries along with the streets, and fire hydrants. However, the scale of the map does not allow the names of the streets to be legibly displayed. In addition many streets are shown on this map without an associated name. All streets or roads that access areas that cannot be developed should be removed from all maps generated for ISO.
2. A second map must be developed that demonstrates the built-upon and non built-upon area with the desired graded boundary served by the 2 fire departments that contract with Ellis County ESD #2. This map must also demonstrate the areas within the district limits of Ellis County ESD #2 that cannot be built upon (flood plain, golf course, lake, etc.). This map should be on a single page (not a set of sectional maps). This suggestion is an **absolute**.
3. A third map must be developed that demonstrates the streets, fire hydrants, and the coverage area of each water supplier. All fire hydrants must be associated with a water supplier. This map should be on a single page (not a set of sectional maps). This suggestion is an **absolute**.
4. A fourth map (that presently exists in an excellent format) must be available that demonstrates the assigned boundary of the 2 fire departments serving Ellis County ESD #2. This suggestion is an **absolute**.

## **Fire Department**

For a community to provide a reasonable level of protection under the analysis system used, a fire department should have suitably located apparatus of proper types. In general, the maximum response distances for the first due engine company should not exceed 1.5-miles and for the first due ladder/service truck company should not exceed 2.5-miles. Any area (regardless of the water supply available) outside 5-road miles of a fire station housing an engine company is considered not protected (ISO PPC 10).

Critical to the timely extinguishment or control of a fire is the need for sufficient firefighters arriving with the first responding apparatus. A comprehensive training program for these firefighters is essential for effective fire ground operations.

The 2 fire departments (in combination) serving Ellis County ESD #2 are required by the ISO rating document to maintain 3 engine companies and 3 ladder/service (rescue) truck companies in-service, available to respond to structural alarms of fire, for areas afforded fire hydrant protection, within Ellis County ESD #2. However, only 2 engine companies and 1 ladder/service (rescue) truck company must respond to each structural alarms of fire. At present this apparatus and response deployment is available to Ellis County ESD #2.

The following suggestions are offered for your consideration:

1. To improve first due response distances and eliminate areas potentially rated an ISO PPC 10 at least 3 fire stations should be erected within Ellis County ESD #2 based on the areas afforded fire hydrant protection. Each proposed fire station should deploy an engine company and a ladder/service (rescue) truck company to optimize all available ISO rate credits. These additional fire stations could be simple 2-bay stations. All fire stations must be heated to be recognized by ISO. The fire stations are listed in their order of priority.
  - a. Proposed fire station #1 should be located in the vicinity of F.M. 664 and F.M. 1387. Providing this station along with the suggested apparatus will **add 2.79 points** to the grading point total.
  - b. Proposed fire station #2 should be located in the vicinity of Pleasantville Rd. and Shiloh Rd. Providing this station along with the suggested apparatus will **add 2.47 points** to the grading point total.
  - c. Proposed fire station #3 should be located in the vicinity of John T. Lane and Plainview Rd. Providing this station along with the suggested apparatus will **add 2.24 points** to the grading point total.

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2. It is highly desirable to test all hose within each fire department annually for 5-minutes. 1.50-inch to 3.00-inch hose should be tested at 250-psi. Large diameter hose should be tested at the manufacturers suggested pressure for 5-minutes. Records documenting the testing should be on file for review by ISO. Providing this level of hose testing along with the required documentation would **add 0.47 points** to the grading point total of Ellis County ESD #2.
3. This report will not suggest providing a reserve ladder/service (rescue) vehicle. However, a recent technical decision has been adopted by ISO that allows communities to share reserve apparatus. There is not a distance restriction on this sharing arrangement. If a community with a reserve ladder truck or rescue vehicle would enter into a sharing agreement with either fire department contracted with Ellis County ESD #2, whereas either fire department could utilize the reserve ladder truck or rescue vehicle if needed, full credit would be granted by ISO. If this sharing arrangement was documented **1.32 points** would be added to the grading point total of Ellis County ESD #2.
4. Provide the fire departments serving Ellis County ESD #2 with a centralized training facility consisting of a 4-story drill tower, a fire building, and a flammable liquids pit (substituting classroom training along with videos is acceptable when the EPA does not allow the burning of flammable liquids). The facility should be located on at least a 2-acre site with fire hydrants and adequate classroom space.

To maximize all ISO credits this facility must be utilized. As a minimum 8 drills of 3-hour duration should be accomplished for each firefighter (both paid and volunteer) on an annual basis. These drills must be at the training facility or a suitable off-site location. 4 of these drills must be multi-company; the remaining 4 drills can be single-company or multi-company. 2 of either type must be at night. Records must be maintained documenting the drills for full credit. If this training facility were developed and utilized to the extent the ISO Rating Document requires **3.19 points** would be added to the grading point total for Ellis County ESD #2.

5. Ellis County ESD #2 could receive additional credits allotted to the grading point via the Texas Addendum by allowing the firefighters (paid and volunteer) serving the fire departments contracted with the district to attend the annual weeklong Fireman's Training School. If volunteers achieve at least the basic volunteer certification (167-hours) or attend the weeklong session of Fireman's Training School (spring or summer session) 3.26 additional grading points are available to Ellis County ESD #2 via the Texas Addendum. Continued certification of the volunteer firefighters (to at least the basic level) and attendance at Fireman's

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Training School could be very important tools in improving the ISO PPC for all areas within Ellis County ESD #2. Paid firefighters can receive the same credit for attending the weeklong session of Fireman's Training School but do not have the certification credit available.

Attendees (paid or volunteer) at the weeklong school may be either students or instructors. Personnel attending the Fire Marshal's section during the weeklong school also receive this additional credit.

Volunteers receiving additional certifications above the basic level will receive additional credits within the training section of the ISO Rating Document.

Please refer the companion report for the City of Ovilla and the report for the City of Midlothian for the exact point total improvement.

6. Increase the company training in and around the fire station to 20 hours per member per month for all firefighters assigned to the fire departments contracting with Ellis County ESD #2. These drills should be a minimum of 1-hour in duration. This will **add 0.48 points** to the grading point total. At present each member of the Ovilla and Midlothian Fire Departments (when averaged between the paid and volunteer firefighters and then prorated based on each departments staffing level) receives the ISO equivalent of approximately 14-hours of company level drills per month.
7. Properly preplan all commercial structures within the boundaries of the Ellis County ESD #2 and update them semi-annually. Providing this level of preplanning would **add 2.03 points** to the grading point total. At present a preplanning program does not exist for the commercial structures within the district limits of Ellis County ESD #2. To receive the entire 2.03 available points all preplans must be documented with sketches and written explanations of the hazards involved.
8. The following equipment is required for each engine and ladder/service (rescue) truck. The equipment that is the most heavily weighted within the ISO Rating Document is denoted by an asterisk.
  - a. Engines in-service and reserve:
    1. 1000-feet of 5-inch hose (reserve engines require only 800-feet of 2, 2.5 or 3-inch hose in lieu of the 1000-feet of 5-inch)\*.
    2. 400-feet of 2, 2.5, or 3-inch hose\*.
    3. 300-gallon or larger booster tank.
    4. 200-feet of booster (redline) hose or 200-feet of pre-connected 1.5-inch or 1.75-inch hose.
    5. 400-feet of 1.5 or 1.75-inch hose\*.

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6. 200-feet of spare 1.5 or 1.75-inch hose (may be on the apparatus or in the fire station).
7. 200-feet of spare 2.5 or 3-inch hose (may be on the apparatus or in the fire station).
8. A heavy stream device (monitor – ground or portable) capable of delivering 1000-gpm\*.
9. A large spray nozzle for the heavy stream device (may be carried on the engine, ladder or ladder/service vehicle for full credit)\*.
10. A distributing, piercing or cellar nozzle.
11. Foam eductor or a built-in foam pro-portioning system.
12. 10-gallons of foam concentrate via a built-in tank or in 5-gallon containers.
13. 15-gallons of foam concentrate in reserve. This can be on the apparatus or in the fire station.
14. 2, 2.5-inch shut-off straight stream nozzles attached to a play pipe capable of delivering at least 250-gallons per minute\*.
15. 2, 1.5 or 1.75-inch combination nozzles\*.
16. 2, 2.5-inch combination nozzles\*.
17. 4 self contained breathing apparatus (minimum of 30-minute capacity\*).
18. 4 spare cylinders (minimum capacity of 30-minutes).
19. 2, 12 x 14-foot salvage covers.
20. 2 hand lights (flashlights are not creditable).
21. 1, 2.5 or 5-inch hose clamp.
22. 1 hydrant hose gate (2.5-inch). A gated wye (2.5-inch x 1.5-inch x 1.5-inch) is creditable.
23. Gated wye (2.5-inch x 1.5-inch x 1.5-inch).
24. Mounted radio\*.
25. Portable radio\*.
26. 24-foot extension ladder\*.
27. 12 or 14-foot roof ladder.

### **b. Ladder/Service (Rescue) Trucks:**

1. Large spray nozzle (500-gpm minimum - may be carried on engine)\*.
2. 6 self-contained breathing apparatus (minimum of 30-minute capacity)\*.
3. 6 spare cylinders (minimum capacity of 30-minutes).
4. 10, 12 x 18-foot salvage covers.
5. Electric generator (minimum of 2.5-kw)\*.
6. 3 portable flood lights.
7. 1 smoke ejector or positive ventilation fan\*.

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8. 1 oxy-acetylene cutting unit (a thermal imaging camera, plasma cutting unit or chain saw with a carbide tip will substitute)\*.
9. 1 power saw\*.
10. 4 hand lights (flashlights are not creditable).
11. A hose hoist or hose roller.
12. 6 pike poles (2 @ 6-feet, 2 @ 8-feet, 2 @ 12-feet).
13. Mounted Radio\*.
14. Portable radio\*.
15. 1, 14-foot extension ladder.
16. 1, 10-foot collapsible (attic) ladder.

Substitutions exist for some of the above required equipment. Please contact my company for assistance as part of the contract for this report. If each of the in-service and reserve apparatus were fully equipped as outlined above **1.16 points** would be added to the grading point total.

9. The single most deficient item within the entire rating process for the communities (fire departments) contracting with Ellis County ESD #2 is the lack of firefighters responding to structural alarms of fire. The ISO Rating Document requires that 6 firefighters per company be on-duty with each of the existing engine and ladder trucks. A ladder/service truck (rescue vehicle) requires 3 on-duty firefighters for full credit. This level of staffing is needed at the fire site for optimum utilization of the apparatus, and when the staffing level drops below 4 firefighters per company, the ability to utilize the apparatus effectively is seriously impaired.

I would deem this report incomplete unless I point out that no fire department in Texas maintains 6 firefighters per company on-duty (paid staffing) with each of the first due apparatus. However, many communities strive to maintain a minimum of 4 firefighters, on-duty with each of the existing engine and ladder truck companies and 2 firefighters on-duty with each of the existing ladder/service trucks.

For a volunteer fire department the maximum credit than can be attained is the equivalent of 4 career firefighters on duty. The volunteer equivalent of 4 career firefighters is 12 volunteers responding to structural alarms of fire with each engine or ladder truck and 6 volunteers responding with each ladder/service (rescue) truck. For the 2 fire departments serving Ellis County ESD #2 to meet this requirement an average of 30 volunteers should respond to all structural alarms of fire. This level of volunteer response normally is associated with a volunteer roster of approximately 70 to 80 firefighters. It is unrealistic to believe either fire department independently within Ellis County ESD #2 could attract this level of volunteer participation based on their present population. Therefore, improvement in staffing levels should be developed via paid firefighters

## ***Fire Suppression Rating Study for Ellis County ESD #2***

An alternative method to improve staffing credits within the ISO Rating Document is to develop duty crews. The duty crew is a group of volunteers that are on-duty at a specified fire station during certain hours of the day. A duty crewmember receives the identical credit as a paid firefighter. The hours a duty crewmember is on-duty at the fire station is prorated. For example 6 duty crewmembers on-duty 28 hours per-week is the equivalent of 1 paid firefighter on-duty at all times. ISO will require documentation demonstrating the hours that a duty crewmember is on-duty at the fire station.

A second method to improve the level of fire department staffing is increasing volunteer response to first alarm structural fires. This normally requires increasing the base of volunteers in order that more volunteer firefighters are available to respond. Normally 30 to 60% of the volunteer base responds to first alarm structural fires. Most likely this is not a viable option for the fire departments contracting with Ellis County ESD #2.

A third method of improved fire department staffing levels is the provision of additional paid firefighters. The paid firefighters can be on-duty 24/7 or certain hours of the day when volunteer response is normally at a low level. Paid firefighters on-duty a certain number of hours per day are prorated. For example: 2 paid firefighters on duty 12-hours per day, 7 days per week is the equivalent of 1 paid firefighter on-duty. These additional paid firefighters could perform maintenance duties, prepare the preplans, and assist with the Fire Marshal's building inspections as available. This would take most of the maintenance, preplanning, and building inspection responsibilities away from the volunteer firefighters and allow the volunteer members of the fire departments contracting with Ellis County ESD #2 more time at work or home. In most situations this increases the number of volunteers willing to join the fire department.

Each paid firefighter or duty-crew member on-duty 24/7 would **add 0.78 points** to the grading point total.

Each additional volunteer firefighter captured on the incident reports as responding to structural alarms of fire would **add 0.26 points** to the grading point total.

Please note that there exists a possible 15 points available for staffing. Ellis County ESD #2 received only 4.44 of these 15 available points.

## **Receiving and Handling Alarms of Fire**

In order to assure a timely response to fire emergencies a communications center must have adequate telephone facilities (emergency and business circuits) for the public to report emergencies, sufficient operators on duty, and the facilities to dispatch fire department companies without interruption.

The following suggestions are offered for your consideration:

1. Provide additional personnel for the communications center in order that 2 dispatchers and 1 supervisor are maintained on-duty at all times. These must be 3 separate individuals to optimize the ISO rate credit. A supervisor cannot be an on-duty dispatcher and receive dual credit as a dispatcher and a supervisor (1 person on-duty counting as 2). The dispatchers must be in the communications center while the supervisor must be in the communications center building to be credited by ISO as on-duty. Based on the annual call volume of approximately 8,900 calls for service (Fire and Law Enforcement) NFPA 1221 and the ISO Rating Document require this level of staffing. At present the ISO equivalent of 1.75 dispatchers and 0.27 supervisors are on-duty at all times in the communications center. If these additional personnel were assigned to the communications center **0.99 points** would be added to the grading point total. This item can be prorated therefore each additional dispatcher or supervisor provided will increase the grading point total.
2. Test the emergency power source at the communications center weekly for 1-hour under a load. If this level of testing was performed **0.25 points** would be added to the grading point total.
3. Properly list the emergency and business number for the fire departments serving Ellis County ESD #2 in the business white pages or government pages of the primary phone directory under the title "Ellis County ESD #2" and in the white pages of the primary phone directory under the title of "Fire" or "Fire Department". If these listings were provided **0.20 points** would be added to the grading point total.
4. Provide the primary fire department dispatch circuit in the communications center serving the fire departments contracting with Ellis County ESD #2 with monitoring for integrity. This requires a visual and audible alert be activated if a principal component of the dispatch circuit is rendered inoperable. To receive credit under the ISO Rating Document the following must be satisfied: Please note that any requirement followed by an N/C results in *no credit* for this monitoring even though all other items are provided. The items without an N/C must be available for full credit. Pro-rated credit is available for the items without an N/C.

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- a. A list of the principal components of the primary dispatch circuit that are monitored must be provided: **N/C**
- b. All portions of the circuit and all components must be identified for integrity status/failure condition. In addition all circuit components must be monitored for power supply and emergency power integrity/failure with both visual and audible trouble signals: **N/C**
- c. Power supply and emergency power integrity/failure condition must be monitored for the circuit and all components at all locations including remote radio transmitter/receiver antenna sites. **N/C**
- d. All portions of the circuit and all components must be identified for integrity status/fault condition and all circuit components must be monitored for power supply and emergency power integrity/failure with visual and audible trouble signals. **N/C**
- e. Verification of visual signal activation with test circuit failure feature as specified in NFPA Standard 1221 must be provided.
- f. Verification of audible signal activation with test circuit failure feature as specified in NFPA Standard 1221 must be provided. The audible trouble signal can be an intermittent or continuous tone or buzzer.
- g. Verification of reactivation of audible trouble signal when an additional fault condition occurs while previous silenced fault condition remains active as specified in NFPA Standard 1221 must be provided.
- h. Trouble signals routed to a dedicated display screen or panel not used for routine dispatching activities as specified in NFPA Standard 1221 must be provided.
- i. Trouble signals must be displayed at a location where personnel are in constant attendance and are responsible to respond to a trouble signal as specified in NFPA Standard 1221. **N/C**
- j. For radio circuits duplicate transmitters must be provided for the primary dispatch circuit as specified in NFPA Standard 1221. **N/C**

Providing this level of monitoring has **added 1.50 points** to the grading point total.

## **Water Supply**

For a water supply works to be considered adequate under the analysis system used, it should be able to deliver the basic fire flow (3500-gpm) for a 3-hour period and during that period provide consumption demands at the maximum daily rate.

The arterial mains and secondary feeder mains should be of sufficient capacity to deliver the needed fire flows throughout the community. The arterial mains should extend to all areas of the community; they should be looped for mutual support and spaced at approximately 3000-foot intervals or less. The minimum size distribution main should be 6-inches (8-inches is preferred) in diameter and this size used only in widely spaced residential areas when the gridiron is such that there is not over 600-feet between connections to other mains. A 6-inch dead-end main is not considered satisfactory for supplying fire hydrants. A minimum size of 8-inch pipe (10-inch is preferred) should be used in commercial and high-density residential areas and this size pipe should be limited to areas with an excellent gridiron. This will help insure meeting the corresponding fire demand throughout the community.

Before the water supply available can be fully utilized by the fire department, there must be sufficient fire hydrants in the vicinity of the subject buildings. The number of hydrants required varies with the fire flow demand but when the spacing is not over 300-feet in commercial, industrial, and institutional areas and not over 600-feet in one and two family dwelling areas, sufficient hydrants normally will be available. Hydrants should conform to the American Water Works Association Standards. The connection from the distribution main to the hydrant should be not less than 6-inches in diameter. Hydrants attached to water mains less than 4-inches in diameter are not credited within ISO's Rating Document. All hydrants should be inspected twice per year with a pressure test (a pressure test is **not** a flow test); complete records should be kept of all inspections.

The following suggestions are offered for your consideration:

1. Improving arterial looping, distribution system gridirons, and hydrant distribution will help improve the water supply item of the grading (35 points are assigned to this grading item). There exist a possible **11.67 available points** within this grading item. This is the most heavily weighted item within the development of the grading point total. The results based on a flow-testing program throughout the district limits of Ellis County ESD #2 will be the single most critical item within the entire grading process for fire departments serving Ellis County ESD #2. A quantitative method does not exist to analyze prospective improvements in this aspect of the grading until such improvements are implemented; therefore, no additional point total will be shown.

***Fire Suppression Rating Study for Ellis County ESD #2***

2. Fire hydrants should be inspected semi-annually with proper records maintained throughout the district limits of Ellis County ESD #2. Each hydrant should be pressure tested semi-annually (a pressure test is **not** a flow test) as part of the hydrant inspection process. If the suggested level of hydrant inspection and maintenance were provided **0.76 points** would be added to the grading point total. At present the hydrants were credited as inspected annually with a pressure test.

## **Fire Safety Control**

The consistent, systematic application of fire safety control regulations combined with a good public education program in fire prevention can be an important factor in reducing the overall incidence of fire and the consequent fire losses. Successful execution of such programs necessitates that a sufficient number of properly trained personnel be provided. A nationally recognized body of model fire prevention, building and safety codes represent the combined knowledge of many experts in this field and, when adopted with little or no modifications, afford a community the opportunity for reasonable control of hazardous materials and building construction.

The following suggestions are offered for your consideration:

1. Ellis County ESD #2 (actually all of Ellis County) should adopt at least the 2003 edition (2006 edition is preferred) of the International Fire Code and enforce it throughout the district limits of Ellis County ESD #2. Adopting the 2006 edition of this body of codes will improve the grading point total but having at least the 2003 edition is critical. Providing the suggested International Fire Code and enforcing it throughout Ellis County ESD #2 will **add 0.59 points** to the grading point total via the Texas Addendum. Far more important is the impact on the water supply item within ISO's Rating Document.
2. Make sure all TEXFIRS/NFIRS reports are submitted to State Fire Marshal's Office. Providing these reports to the State Fire Marshal will **add 0.15 points** to the grading point total.
3. Provide a full-time inspector to the Office of the Ellis County Fire Marshal. Based on the Texas Addendum rating document this level of staffing is required to provide building inspections and enforce the adopted fire code. Providing an inspector to the Office of the Ellis County Fire Marshal will **add 0.91 points** to the grading point total.

An alternative to this suggestion is adopting at least the 2003 edition of the International Fire Code (2006 or 2009 is preferred) specific to Ellis County ESD #2 and having the adopted code enforced by establishing the Office of Fire Marshal whose authority is district wide (Ellis County ESD #2). Based on the Texas Addendum rating document a Fire Marshal certified in inspections and arson would meet the intent of the Texas Addendum for Ellis County ESD #2. Providing this alternative would **add 1.50 points** to the grading point total.

## **Summary of Suggested Improvements**

The most immediate concern, from an ISO rating standpoint, for Ellis County ESD #2 is to provide fire stations within the district to improve first due response distances to areas afforded fire hydrant protection as suggested within this report.

When the suggested improvements, which are referred to as absolutes, and the additional suggestions, within the budget constraints of Ellis County ESD #2, are implemented a future ISO survey should be requested.

## **Plan of Action**

**Action Plan # 1: Request an ISO survey and improve the ISO rating for the areas afforded fire hydrant protection presently rated an ISO PPC 5 within 1 year: Improving the ISO PPC for these areas would reduce both the homeowners and the commercial property owners annual insurance premium. The actual savings would be based on how much improvement was attained. Approximate savings are demonstrated within the executive summary of this report.**

1. Implement the suggested improvements that require very little resources such as: Improved documentation, additional training at the company level, pump and hose testing, preplanning, etc.
2. Request a survey from ISO. Once a Field Representative is assigned to Ellis County ESD #2 the district should initiate a request for a pre-survey packet. This packet is extremely time consuming and tedious to complete. I know as I designed this packet in 1997 for all Field Representatives throughout the United States. My assistance would save District Officials a considerable amount of time in filling out this packet. In addition the ISO Field Representative will have the extensive amount of required support data properly formatted to maximize Ellis County ESD #2's ISO rating.
3. Set a mutually convenient time for Ellis County ESD #2 and the ISO Field Representative to complete the ISO rate survey for Ellis County ESD #2. The information transfer would proceed effortlessly if I assisted Ellis County ESD #2 throughout the survey process. This will save your District Officials, Fire Chiefs, and Support Staff a great deal of time and allow them to continue their normal daily activities. My assistance assures the ISO Field Representative will have the exact information he requires.

**Action Plan # 2: Improve (lower) the ISO PPC for all areas afforded fire hydrant protection served by the 2 fire departments contracting with Ellis County ESD #2 within 5 years: This would again reduce the cost of commercial property and homeowner's insurance. The actual savings would be based on how much improvement was attained. Approximate savings are demonstrated within the executive summary of this report.**

1. Complete the suggested improvements that are economically feasible within the budget constraints of the Ellis County ESD #2. These would include: Erecting fire stations, improved staffing levels, and providing additional fire hydrants.
2. Request a survey from ISO. Once a Field Representative is assigned to Ellis County ESD #2 the district should initiate a request for a pre-survey packet. This packet is extremely time consuming and tedious to complete. I know as I designed this packet in 1997 for all Field Representatives throughout the United States. My assistance would save District Officials a considerable amount of time in filling out this packet. In addition the ISO Field Representative will have the extensive amount of required support data properly formatted to maximize Ellis County ESD #2's ISO rating.
3. Set a mutually convenient time for Ellis County ESD #2 and the ISO Field Representative to complete the ISO rating survey for Ellis County ESD #2. The information transfer would proceed effortlessly if I assisted Ellis County ESD #2 throughout the survey process. This will save your District Officials, Fire Chiefs, and Support Staff a great deal of time and allow them to continue their normal daily activities. My assistance assures the ISO Field Representative will have the exact information he requires.

## **Conclusion**

Implement Action Plan #1 and establish an improved ISO PPC for the areas afforded fire hydrant protection within Ellis County ESD #2 presently assigned an ISO PPC 5.

When the new ISO rating becomes effective accomplish as many improvements as possible that will have a significant impact on the emergency response and the ISO Rating for Ellis County ESD #2 (Action Plan 2). When these are implemented, request a future ISO survey to further improve the ISO rating for all areas afforded fire hydrant protection within Ellis County ESD #2.

I appreciate the opportunity afforded me by Ellis County ESD #2 and the cooperation given me by Mr. Tom Manning of Ellis County ESD #2, Mr. Donnie Pickard representing the City of Ovilla, and Mr. David Schrodt representing the City of Midlothian.

I very much look forward to assisting Ellis County ESD #2 in the future.

Sincerely,

W. Michael Pietsch, P.E.  
Civil Engineer

WMP/sp

**Grading Summary Sheet**

**ELLIS COUNTY ESD #2**

**Classification 4 – 62.62**

I.	Receiving & Handling Fire Alarms:		<b><u>Total 7.06, Maximum = 10</u></b>
	a.	Item 414 - 1.80	2
	b.	Item 422 - 2.01	3
	c.	Item 432 - 3.25	5
II.	Fire Department		<b><u>Total 28.52, Maximum = 50</u></b>
	a.	Item 513 - 9.17	10
	b.	Item 523 - 0.87	1
	c.	Item 532 - 5.00	5
	d.	Item 549 - 3.74	5
	e.	Item 553 - 0.56	1
	f.	Item 561 - 0.00	4
	g.	Item 571 - 4.44	15
	h.	Item 581 - 4.50 + 0.24 (CTT)	9
III.	Water Supply		<b><u>Total 27.57, Maximum = 40</u></b>
	a.	Item 616 - 23.33	35
	b.	Item 621 - 2.00	2
	c.	Item 631 - 2.24	3
IV.	Divergence*	-2.38	
V.	Addendum	<u>Total 1.85</u>	<b>Maximum = 6.50</b>
<b><u>Ellis County ESD #2's Total: 62.62</u></b>			<b><u>Maximum = 106.50</u></b>

ELLIS COUNTY ESD #2 GRADING SUMMARY

**Fire Suppression Rating Study for Ellis County ESD #2**

VI.	<b><u>Total:</u></b>		<b><u>Maximum Credit:</u></b>
	Fire Alarm	7.06	10.00
	Fire Department	28.52	50.00
	Water Supply	27.57	40.00
	Divergence*	-2.38	
	Addendum Credit	<u>1.85</u>	<u>6.50</u>
	<b>Ellis County ESD #2's Total</b>	<b>62.62</b>	<b>106.50</b>

**Class 4**

<b><u>Credit</u></b>	<b><u>Relative Classification</u></b>
90.00 - 100.00	1
80.00 - 89.99	2
70.00 - 79.99	3
<b>60.00- 69.99</b>	<b>4</b>
50.00 - 59.99	5
40.00 - 49.99	6
30.00 - 39.99	7
20.00 - 29.99	8
10.00 - 19.99	9
00.00 - 9.99	10

\*Divergence is a reduction in credit to reflect a difference in the relative credits for Fire Department and Water Supply.

**ELLIS COUNTY ESD #2 GRADING SUMMARY**