Exhibit C

STANDARD FOR WATER SUPPLIES FOR RURAL FIRE FIGHTING

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NOTICE: An asterisk (*) following the number or letter designating a paragraph indicates explanatory material on that paragraph in Appendix A.

Section 1 Administration

1-1 Scope.
This standard defines the minimum requirements for fire protection water supplies necessary for the protection of property in rural areas of Douglas County. This standard applies to new parcels in rural areas in which adequate and reliable water supplies do not exist and shall apply to all portions of unincorporated Douglas County. Douglas County subdivision regulations may require greater amounts of water storage. Where, in any specific case, the amount of water storage for rural fire fighting conflicts with the International Fire Code for Group R- 3 occupancies, the requirements of this chapter shall govern.

1-2 Purpose.
This standard specifies minimum requirements for water supply for firefighting purposes to protect property from fire in areas where water must be transported from a river, lake, canal, stream, pond, cistern, or other similar source of water that is available as a suction supply for fire department use. A hydrant served by a water distribution system shall be permitted to be the source of supply for water that is transported to the rural fire area.

It is the intent of this standard to provide and maintain water supplies for firefighting purposes through the establishment of a cooperative working arrangement among the Douglas County Fire Districts, the developers of rural parcels, and the property owners.

1-3 Referenced Criteria.
The fire protection water requirements in this standard are based in part on NFPA 1142, NFPA 1144, ISO Fire Suppression Rating Schedule, and the International Fire Code. The information from these publications was evaluated and incorporated into this minimum standard in a manner which accounted for the actual fire flow and storage amounts, the ability of Douglas County Fire Districts to utilize the water, the need to account for increased and more effective operations as the fire districts strive to obtain the improved fire insurance ratings for their citizens, and the existing but sometimes unrecorded or undeveloped natural water sources within Douglas County.

1-4 Definitions.
Accessible. A condition that allows for fire department vehicles to approach and connect to a water supply. It shall be an all-weather road surface, capable of supporting a 20-ton fire apparatus, and it shall be maintained during all weather conditions to assure unimpeded vehicular access every day of the year.

Authority Having Jurisdiction (AHJ). The Douglas County Building Official shall be the "authority having jurisdiction".

Cistern. A water storage tank, usually underground and designed with positive pressure, designed to contain a designated volume of water and to permit the removal of water at no less than 1,000 gallons per minute.

Dry Barrel Hydrant. An outlet, for suction supply of fire protection water, connected to a cistern, which is designed with positive pressure and / or requires freeze protection. Dry barrel hydrants shall have a five (5) inch National Standard Thread (NST) outlet and be adapted for the

local fire district suction hose. Dry barrel hydrants shall meet the requirements of American Water Works Association (AWWA C502-85 Standard for Dry Barrel Hydrants).

Dry Hydrant. An outlet for suction supply of fire protection water connected to a natural body of water or cistern, which is designed without positive pressure or does not require freeze protection. Dry hydrants shall have a five (5) inch National Standard Thread (NST) outlet and be adapted for local fire district suction hose. Dry hydrants shall meet the requirements of the dry hydrant section of this standard and the Dry Hydrant Manual in Appendix B.

Fire Flow. The total amount of water expressed in volume at a prescribed rate (in gallons per minute) applied to suppress a fire and protect exposures.

ISO. The Insurance Service Office.

Natural Body of Water. A river, lake, canal, stream, or pond which, if upon evaluation is deemed acceptable during drought or freezing weather, could be utilized as a reliable and adequate source of water for fire protection.

Section 2 Rural Water Supply Standard for One and Two-Family Dwellings

2-1* General.

The standard requires a water supply system which is capable of providing two hundred fifty (250) gallons per minute (GPM) fire flow, with water storage sufficient to maintain the fire flow for a duration of two (2) hours. The water storage shall not be more than two (2) miles travel distance from the vehicular entrance to any parcel served by the water storage site. The water storage facility shall be funded and installed by the developer/owner prior to construction of any structure within the development.

2-1.1 Water Supply Evaluation Criteria.

The Fire Districts within Douglas County shall perform a survey of all developed water supplies suitable for fire protection use within their respective jurisdictions. This information shall be compiled into a usable format and shall be kept in the office of the Building Official for Douglas County. All Fire Districts shall be responsible for providing updated information to the Building Official, to maintain a current County Water Supply Report.

When reviewing proposed developments, the Building Official shall consult with the Fire District for a joint review of existing water for fire protection, utilizing the County Water Supply Report. This review shall evaluate water supplies within the Fire District's jurisdiction as well as those located within the two (2) miles travel distance within neighboring jurisdictions. All currently recognized water supplies shall be credited when determining the need for and the placement of new water storage sites.

2-1.2 Application.
This standard shall apply to all new rural developments that contain or create four (4) or more residential parcels. Developments legally in existence at the time of the adoption of this standard, or new developments that contain or create less than four (4) residential parcels, and additions or modifications to existing homes, are not required to provide minimum water supplies or upgrade existing water supplies to meet this standard.

2-1.3 Design Approval.
One (1) set of installation drawings, manufacturer's installation instructions, and a site plan shall be submitted to the Building Official for approval, and all permits required by Douglas County shall be obtained. All water storage systems shall be installed according to manufacturer's installation instructions. The Fire District and the Building Official may inspect the installation at any time.

2-2* Cistern Design.

2-2.1 Tank Size.
The minimum tank capacity shall not be less than thirty thousand (30,000) gallons. Two smaller tanks may be utilized in areas which may present unique installation problems. If two smaller tanks are installed, they must be connected to allow proper filling as well as discharge, and the combined capacity of both tanks shall not be less than thirty thousand (30,000) gallons.

2-2.2 Tank Material.
All water supply tanks shall be constructed of steel, fiberglass, plastic, or engineered concrete and shall be approved by the manufacturer to be appropriate for non-potable water storage. Steel tanks shall be coated and shall be provided with cathodic protection. Fiberglass and plastic tanks shall be constructed in accordance with appropriate ASTM Standards. Tanks and associated piping and appurtenances shall be new and have been used for no other purpose.

2-2.3 Outlet Piping.
All discharge piping shall be a minimum of six (6) inch diameter PVC Schedule Forty (40). Drain, waste and vent (DWV) pipe and fittings are not acceptable.

2-2.4 Fittings.
All fittings shall be of the type and schedule to be compatible with the piping being used.

2-2.5 Tank Access.
Tanks shall have a manhole or other approved means of access for tank inspection and repair. This access shall be capable of being closed and secured for purposes of safety.

2-2.6 Tank Fill Valve.
A tank fill valve shall be installed on the supply line from the well and shall be controlled by an approved tank level sensor that will ensure that the tank remains full.

2-2.7 Suction Supply Outlet.
All water supply cisterns shall have a minimum of one outlet that meets the size and design requirements of the local fire district. Cisterns designed with positive pressure and systems with discharge pipes that require freeze protection shall have at least one Dry Barrel Hydrant. Cisterns designed without positive pressure shall have at least one Dry Hydrant.

2-2.8 Tank to Outlet Line Valve.
All water storage tanks designed with positive pressure shall have a valve between the tanks and the outlet pipe. This valve shall be capable of being manually operated from ground level.

2-2.9 Tank Installation.
Tanks shall be installed in accordance with manufacturer's recommendations. The tank shall be installed in a manner, which will prevent freezing and surface erosion.

2-2.10 Pipe Installation.
Piping shall be installed in accordance with manufacturer's recommendations. Piping shall be installed in a manner which will prevent freezing and surface erosion.

2-2.11 Water Supply Easement.
An easement shall be recorded to allow the Fire District to repair, use, and maintain the water storage facility.

2-2.12 Water Use Agreement.
An agreement shall be signed and recorded, encumbering the property, granting the Fire District the perpetual right to utilize the water for the fire protection needs of the property to be served.

2-2.13 Well.
A well, installed in accordance with the requirements of the Colorado Division of Water Resources shall be connected to a cistern to maintain the fill level. The well may be a low volume (15 GPM) and shall be connected to the tank in an appropriate manner.

2-3* Natural Bodies of Water.

2-3.1 Outlet Piping.
All discharge piping shall be a minimum of six (6) inch diameter PVC Schedule Forty (40). Drain, waste and vent (DWV) pipe and fittings are not acceptable.

2-3.2 Fittings.
All fittings shall be of the type and schedule to be compatible with the piping being used.

2-3.3 Suction Supply Outlet.
All natural bodies of water utilized for fire protection water supplies shall have a minimum of one outlet that meets the size and design requirements of the local fire district. Natural bodies of water designed with positive pressure and systems with discharge pipes which required freeze

protection shall have a minimum of one Dry Barrel Hydrant. Natural bodies of water with suction outlets designed without positive pressure shall have at least one Dry Hydrant.

2-3.4 Pipe Installation.
Piping shall be installed in accordance with manufacturer's recommendations. Piping shall be installed in a manner, which will prevent freezing and surface erosion.

2-3.5 Water Supply Easement.
An easement shall be recorded to allow the Fire District to repair, use, and maintain the water supply facility.

2-3.6 Water Use Agreement.
An agreement shall be signed and recorded, encumbering the property, granting the Fire District the perpetual right to utilize the water for the fire protection needs of the property to be served.

2-4* Water Supply Access.
The water supply site shall be accessible from a public or private roadway.
A fire apparatus pullout shall be connected to the roadway and constructed to permit fire apparatus to position for water removal and to permit tenders to be filled and turned around. The pullout shall be designed as a forty-five (45) foot radius or twenty (20) foot by sixty (60) foot rectangular area with the water supply hydrant outlet located at the apex of the radius or the centerline of a rectangle. The outlet shall be located not more than eight (8) feet or less than six (6) feet from the edge of the all-weather surface. Two steel posts (bollards) shall be placed at the edge of the all-weather surface to protect the hydrant.

2-5* Testing and Maintenance.

2-5.1 Testing.
Acceptance testing shall be performed jointly by the Building Official and the Fire District whenever possible, prior to the construction of any structures within the development served by the water storage facility. Acceptance testing shall include vacuum test of draft piping, pressure testing at fifty (50) pounds per square inch for pipes in those systems designed with head pressure, and a flow test.

After acceptance, each water storage location shall be checked periodically, and reports kept by the Fire District. Fire Districts should establish a program for testing and maintenance of water supply facilities within their jurisdiction.

2-5.2 Maintenance.
The Fire District shall be responsible to ensure the operational readiness of the water supply facility. The Fire District may choose to delegate the cost and responsibility of the water system maintenance to an organization other than the Fire District. In such case the Fire District shall stipulate to a maintenance agreement, which must be reviewed and approved by Douglas County, that ensures the operational readiness and continued maintenance of each water supply facility.

Section 3 Rural Water Supply Standard for Buildings Other Than One and Two-Family Dwellings

3-1 General.
The required fire flow for buildings other than one and two-family dwellings shall be in accordance with the International Fire Code as amended.

3-2 Application.
Fire flow requirements may be modified when agreed upon by the fire code official and the building official. The Douglas County Standard for Water Supplies for Rural Fire Fighting, NFPA 1141, NFPA 1142, ISO Fire Suppression Rating Schedule or other approved method may be utilized to determine fire flow requirements.

APPENDIX "A"

A-2-1 General.
The application of this standard will, over a period of time, ensure adequate fire suppression water supplies for a large portion of Douglas County. The standard uses a systems approach to fire protection water supply requirements by encouraging a uniform application of these requirements. The installation of standard water supplies, in developed areas of the county, enhances the operation of mutual and auto aide companies in routine and conflagration fires. The use of a uniform standard by all fire districts can diminish the review problems encountered by fire personnel, planners, and developers.

Fire Flow.
The minimum fire flow requirement is two hundred fifty (250) GPM based on the Fire Districts ability to transport water using their equipment. The ability to increase the fire flow from two hundred fifty (250) GPM to five hundred (500) GPM or more can be accomplished by utilizing auto aid or additions of tenders by the Fire District.

The two hundred fifty (250) GPM is recognized by ISO as the minimum fire flow necessary for credit as a protected property (Class 9) and a strong argument can be made for all Douglas County Fire Districts ability to apply the available fire flow to the fire. An analysis of response times for arriving engines and tankers can demonstrate the initial ability to utilize a fire flow of two hundred fifty (250) GPM. As other apparatus arrives from more distant locations, including auto aide water hauling tenders, increases in fire flow can be expected and utilized.

Water Storage.
Water for fire protection can utilize either stored water in an underground tank (cistern) or by access to a natural body of water. The minimum amount of water storage is thirty thousand (30,000) gallons, which translates into two (2) hours of the minimum fire flow.

The storage of two (2) hours of fire flow is an accepted fire service standard (IFC Appendix B) and is substantiated by the minimum requirements of the insurance standard. The resulting cistern size of thirty thousand (30,000) gallons works well in a system approach to suppression water. Natural Bodies of Water offer an excellent source for fire protection.

The initial use of the closest water source to develop two hundred fifty (250) GPM may be supplemented by more distant sources by auto aid water hauling tenders. The use of more water storage sites may become a necessary requirement to relieve congestion at a single water storage site used to fill tenders at a set rate.

Travel Distance.
The maximum travel distance shall be two (2) miles from the water source (cistern or natural body of water) to each parcel. The travel distance is computed using ISO formulas for time and distance based on average speed of thirty-five (35) miles per hour. Since rural operations often involve standard operations, which account for long driveways, the driveways are not included. The maximum travel distance of two miles limits the total travel to four miles round trip and places the thirty thousand (30,000) gallon cisterns every four miles. The limit of four travel miles, round trip, encourages developers to ensure an effective roadway network with connections that maximizes the effectiveness of each water storage site.

A-2-2 Cistern Design.
Cisterns shall be built to hold thirty thousand (30,000) gallons and installed with a low volume well, less than fifteen (15) gallons per minute to maintain the water level once the cistern is full. An all-weather road shall accommodate access to engines and tenders and provide a hydrant (wet or dry) with standardized NST connections installed with head pressure whenever possible. The well can be utilized for domestic water supply to a building site, which is encouraged. The daily use of the well helps to ensure it's in service operation and does not compromise the ability to maintain the water level in the cistern. The developer must grant an easement on the building site, which best serves, the area as the cistern location. An agreement for reimbursement of cost to operate the well for large usage can be arranged with the homeowner, while incidental "topping off" is paid for by the daily user of the well.

A-2-3 Natural Bodies of Water.
The use of natural bodies of water requires a field survey which:

- Measures the potential for fire protection water availability every date of the year
- Measures the useful depth of the water as a function of draftable height to the pump intake
- Studies flow characteristics during each of the annual weather seasons for a stream or river source
- Addresses the ability to install an accessible hydrant

The Dry Hydrant Manual referenced in Appendix B provides detailed checklists for the field survey and the draftable limits in feet as function of elevation as designated by the Colorado State Forest Service.

A-2-4 Water Supply Access.
The access specified in Section 2-4 can be accomplished by utilizing different designs provided that the design accommodates an unobstructed area, located outside of the traffic lanes, and permits fire engine connection to the outlet and clearance to accommodate tender approach hose connection, and turn around. See examples in Figures 1 through 3.

A-2-5 Testing and Maintenance.
It is important for the Fire District not only to require the proper placement and design of water storage facilities, but also to ensure the continued operational effectiveness. As additional water supplies are installed, the Fire District must formulate a plan to address the future maintenance of the facilities. The standard allows the Fire District many options to meet this end. For example, the Fire District may choose to allow the well serving a facility to be utilized for the domestic needs of the parcel on which the storage facility is located. By doing so, the Fire District has ensured the continued daily function of the well at no cost to the Fire District and has provided an economic incentive to the developer and/or property owner. The balance of the water supply system should be relatively cost effective as little or no maintenance is required on a properly designed and installed system. The standard will allow and encourage creative and individual methods for Fire Districts to address the maintenance requirements of a growing number of water supply facilities located within their jurisdiction.

APPENDIX "B"

Dry Hydrant Manual, A Guide for Developing Alternative Water Sources for Rural Fire Protection; Chestatee-Chattahoochee Resource Conservation & Development Council of Gainesville, Georgia. Copies are available by contacting the Franktown District of the Colorado State Forest Service; P.O. Box 485; Franktown, Colorado 80116. Telephone (303) 660-9625. Copies are also available at the Douglas County Building Division.