DRY HYDRANT DESIGN

NAME _____

A. The depth from the normal water level to the inlet will be at least

The total of: Ice Depth 3 ft.
+Net annual evaporation (see EFH NE 2-4g)* _____
+Minimum fire use* _____
+Other consumptive use _____
*** not less than 2.0 feet** Total Depth of Intake = _____

B. Determine the difference in elevation (static head or SHL) between the intake strainer and the suction inlet of the pump. Check with the local fire department on the height of the suction inlets of their pumper units above the road surface.

Use SHL = _____

C. Determine the design capacity for the system. Check with the local fire department on their requirements.

Design for _____ gpm

D. Determine the intake strainer and standpipe losses (ISL). Use 1.2 for 250 gpm, 4.8 for 500 gpm, and 10.8 for 750 gpm.

ISL = _____

E. Determine the length of pipe needed from the standpipe to the intake strainer. Also determine the number of elbows and fittings required.

F. Determine the hydraulic head losses in the piping (PHL):

		Pipe diameter =	_____ inches
		Pipe length =	_____ feet
90 degree elbows -	_____	@ 20 feet =	_____ feet
30/45 degree elbows -	_____	@ 10 feet =	_____ feet
Reducers -	_____	@ 10 feet =	_____ feet
		L = Total equivalent pipe length =	_____ feet

Determine the pipe loss coefficient (k):

Pipe Diameter	Values of k for 100 feet of pipe		
	For 250 gpm	For 500 gpm	For 750 gpm
6 inch	0.5852	2.3408	5.267
8 inch	0.1257	0.5027	1.131
10 inch	0.0382	0.1530	0.344
12 inch	0.0145	0.0578	0.130

PHL = L x (k /100) = _____ x (_____ / 100) = _____

G. Determine the total hydraulic head of the system (H):

H = SHL + ISL + PHL = _____ + _____ + _____ = _____

The total head of the system (H) must not be more than 22 feet, the maximum hydraulically possible. It is recommended that this total head be less than 20 feet, 15 feet preferred.

If H is excessive, increase the size of the pipe and redesign.

H. See back for other design considerations.

A dry hydrant is a standpipe to which the local fire department can attach its pumper unit and provide a minimum of 250 gallons of water per minute. The dry hydrant connects to a water supply by underground piping. The dry hydrant must be located near an all-weather road, easily identified, and must be fitted with a standpipe connection compatible with the hose connections used by the local fire department. The water supply must be available when needed, whether during drought periods or freezing weather.

Do you have an adequate water source and supply? The body of water should maintain its water level all year round without excessive seepage or evaporation. In Nebraska, the lake or pond must be at least 9 feet deep (below normal water line, with at least 7 feet of water above (see NE-ENG-75) which provides an allowance for ice and evaporation. However, where net evaporation exceeds 24 inches per year (see EFH NE 2-4g), the additional evaporation must be accounted for. Also, if the permanent pool is used for other purposes (irrigation or livestock water), these consumptive uses must also be accounted for.

Where should the standpipe be located? The standpipe should be adjacent to an all-weather road/lane and accessible from an all-weather public road so that the standpipe is accessible to a pumper truck. The discharge of the standpipe should be 24 inches above the ground, but the elevation does not have to match the pump inlet pipe on the truck. It should project horizontally toward the road with a steamer nozzle matching the local fire department's hard suction hose size and thread types. A post and/or marker should be placed near the standpipe for easy identification under inclement weather conditions and as a protective measure.

Property near a dry hydrant may become eligible for fire ratings and insurance costs well below that for property more distant from a water supply for firefighting. Criteria used by the National Fire Protection Association (NFPA) for an acceptable water source are:

1. A water supply capable of supplying a minimum of 250 gallons per minute for 2 hours, or a minimum of 4,000 cubic feet.

2. A water supply at least 2 feet deep over the intake strainer and available during a 50-year frequency drought or freeze.

3. A maximum hydraulic lift, including losses due to the size and length of pipe required for installation, equal to 20 feet, 15 feet preferred.

Where should the intake strainer be located? The top of the intake strainer must be at least 7 feet below normal water line (or maximum drawdown for other uses if lower), and must be at least 2 feet below the usable water level. The bottom of the pond must be 2 feet or more below the bottom of the intake strainer, or a sump 2-feet deep should be created below it to limit clogging by sediment. A 12-inch minimum thickness of clean coarse gravel can be placed around the intake strainer to further limit the clogging potential and prevent damage to the strainer.

Where is the intake pipe placed? The intake pipe (the pipe between the intake strainer and the standpipe) should be as straight as possible with a minimum number of bends and elbows. All pipe below the pond normal water elevation must also be below the maximum soil frost penetration depth.