

**MASTER PLAN REPORT
FOR
FIRE SUPPRESSION DISTRIBUTION SYSTEM
AT
SPANISH SPRINGS BUSINESS CENTER**



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WASHOE COUNTY, NEVADA

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INTRODUCTION

This report describes the master plan for the fire suppression distribution system at the Spanish Springs Business Center located in Washoe County, Nevada. The Spanish Springs Business Center is a 411 acre master-planned commercial-industrial park located west of Pyramid Highway, north of West Calle de la Plata, and south of Pebble Creek Subdivision (see Figure 1 - Site Location Map). The existing buildings in the business center include the Leviton Western Distribution Center, Valley Building Supply, Spanish Springs Professional Center, and the Hawco Office Buildings I and II.

In late 1999, with the start of construction of the initial phase of the business center, a portion of the ESFR (Early Suppression Fast Response) fire suppression system was also under construction. Desert Fire Protection of Reno designed the Hawco Industrial Park Private Fire Protection Infrastructure Plan, dated October 8, 1999, which includes a fire pump house, two diesel driven pumps, double check detector assemblies, meters, pressure reducing valves, and a distribution system. In the fall/winter of 2000 – spring of 2001, Valley Building Supply constructed their site and building. The fire suppression system for Valley Building Supply connects to Washoe County's 14 inch diameter high pressure transmission main that extends through Isidor Court. When the Valley Building Supply site was constructed there was no other source sufficient to provide fire protection for the building; therefore, Washoe County Department of Water Resources allowed the connection to the transmission main. Subsequently, Washoe County will not allow any further connections for business center parcels to be made to the transmission main, thus requiring the need for the private fire protection infrastructure to be extended.

In 2002, Hawco constructed their first office building on the corner of West Calle de la Plata and Isidor Court. The fire hydrants and fire service for the Hawco Office Building are connected to the distribution system designed by Desert Fire. In 2003, Hawco constructed portions of phase II of the business center, Ingenuity Avenue and Digital Court, and the Hawco Office Building II. The fire suppression system was extended north from the Isidor Court area to phase II of the business center. Another main that provides fire suppression

service to Hawco Office Building II was also extended adjacent to the rear lot lines of the Hawco Office Buildings all the way northeast along the rear lot line of the Valley Building Supply parcel. In 2004, Inventor's Place and the Spanish Springs Professional Center and associated fire suppression mains were constructed. Lastly, by the spring of 2005, the fire suppression system should be extended adjacent to Distribution Drive, Circuit Court, Clayton Place, Icon Court and the extension of Isidor Court. In addition to the master planned fire suppression distribution system, this report includes an evaluation of the fire suppression infrastructure as it should be constructed by the spring of 2005. It is also the intent of this report to provide calculated available pressures and fire flows at several nodes located on the distribution system throughout the business center. Please refer to the *Spanish Springs Business Center Infrastructure Design Guidelines* for information and requirements on extending the ESFR fire suppression system within parcels at the business center.

EXISTING FIRE SUPPRESSION SYSTEM

The fire pump system was designed by Desert Fire Protection and is located immediately north of West Calle de la Plata approximately 2,900 feet west of Pyramid Highway. The pumps inside the pump house are the two diesel driven pumps rated at 85 psi (pounds-per-square inch) when flowing at 2000 gpm (gallons per minute) as indicated on the Desert Fire Protection plans. From the pumps a 12 inch diameter class 200 PVC water main branches off in two directions, one to the northeast to serve Leviton's warehouse, and the other to the east running adjacent to the north right-of-way line of West Calle de la Plata thence crossing under Isidor Court. Additional 12 inch diameter pipe was installed with Desert Fire's system. The pipe runs adjacent to the Pyramid Highway right-of-way crossing through the haul road easement and through Leviton's property. The pipe then turns west from Pyramid Highway running through the utility easement adjacent to Leviton's southerly boundary. At the direction of Hawco Corporation, C & M Engineering provided a design and layout of a 12 inch diameter pipe fire suppression distribution system extending off of the existing Desert Fire system. Hawco then directed their contractor to construct portions of the system in order to provide fire service to parcels currently sold in the business center. Refer to Figure 2. for the existing distribution system layout.

EXISTING FIRE SUPPRESSION SYSTEM HYDRAULICS

On Desert Fire Protection's plans are calculations that predict the fire flow and pressure that can be supplied to the Leviton site which are as follows:

Flow and pressure using bypass only (no pumps running) -

3282 gpm at 53 psi;

Flow and pressure with pumps running -

4329 gpm at 93 psi;

Fixed flow and pressure with pumps running -

2000 gpm at 150 psi.

These flows and pressures are based in part on the water supply provided to the bypass and/or pumps from the county's 16" water transmission main that is connected to Desert Springs Tank 3A (with 960,000 gal. for fire suppression). In the fall of 1999 the county had computed the water supply to the pump house at a residual pressure of 71 psi flowing at 4000 gpm during maximum day demand (static pressure is at 141 psi). The residual pressure of 71 psi flowing at 4000 gpm for 4 hours has been verified as still valid through an August 2004 e-mail from the Washoe County Department of Water Resources. As development in the area increases over time there will be changes to the county's water system which may change the water supply and pressures available to the fire suppression pump house; therefore, it is essential that updated fire pump calculations from Desert Fire be provided if significant variations in the county's water system occurs. A model using Haestad Methods WaterCAD (v6.5) software has been created in order to mimic the flow computations made by Desert Fire Protection for Leviton's site (see appendix for computations). This model that simulates Desert Fire's system has then been expanded up to proposed full build-out conditions so that flows and pressures for the rest of the fire protection infrastructure can be approximated. Field tests should be performed in order to determine exact pressures and available fire flow.

REGULATORY AND OTHER REQUIREMENTS

Exact fire flow requirements and duration for individual parcels in the business center will be established when a usage is determined for each parcel. Many of the fire flow and construction requirements for the fire suppression system are found in the *Reno Fire Department Policy for Construction, Design and Installation of Fire Protection and Life-Safety Systems*, the *Uniform Fire Code*, latest editions, and *National Fire Protection Association* pamphlets. Typically the fire flow requirements for each developed parcel will range from 2000 to 4000 gpm, dependant upon use, with a minimum residual pressure of 20 psi in the fire suppression distribution system. It should be noted; however, that 20 psi may be insufficient pressure for users desiring an ESFR sprinkler system. For example, if warehousing facilities are constructed that will contain highly combustible materials or materials stacked high, an ESFR sprinkler system may require pressures up to 75 psi (see manufacturer's recommendations). When fire hydrants are required for a parcel being developed, fire hydrants shall comply with all regulatory requirements for construction and shall be installed off of the fire suppression distribution system by individual parcel developers. The fire hydrants are to be located within a parcel as determined by the Reno Fire Department. Designers should refer to the *Spanish Springs Business Center Infrastructure Design Guidelines* for information and requirements on extending the fire suppression system within parcels at the business center.

PROPOSED FIRE SUPPRESSION SYSTEM

As previously mentioned above, a model using Haestad Methods WaterCAD (v6.5) software has been created in order to mimic the flow computations made by Desert Fire Protection for the existing Leviton site. The model has been expanded into a couple different water system models in order to compute fire flows and pressures at several nodes for the fire suppression distribution system. The first model covers areas of the distribution system that are currently installed and other areas that will be built by the spring of 2005. This "as-built" model will continue as a work in progress, receiving updates to the model as additional pipe is installed to further expand the distribution system. This model provides calculated flows and pressures in the "as-built"

condition and will serve to locate areas that may need looping of the distribution system in order to provide sufficient fire flows to the business center parcels. Please refer to Figure 3. for the spring 2005 distribution system layout schematic. The second model is setup to compute flows and pressures at an anticipated full build-out for the business center. The “full build-out” model consists of the existing fire suppression distribution system as of December 2004, the distribution system that will be built by the spring of 2005, and the anticipated distribution system by the time all business center parcels are sold. The “full build-out” model; however, only provides a preliminary concept of what can be constructed in the business center in order to provide fire flows of up to 4000 gpm with minimum residual pressures of 75 psi, when the pumps are running, to any potential business center parcel, except within the area of Phase 4. Phase 4 of the business center is designated as the NC/I zoned land surrounded by Eagle Canyon III subdivision, BLM administered land and Rocky Acres gravel pit, located in the upper elevations of the business park. Pressures and flows produced at the fire pump house, elevation 4525, may be insufficient for parcels located in phase 4 with existing elevations in the range of 4560 to 4640. Currently the required fire flow for phase 4 is unknown and until the flow is determined, the infrastructure needed to provide fire suppression in that area is also unknown. The infrastructure to provide fire suppression in phase 4 may include larger main sizes or even a booster pump as further studies will determine. The “full build-out” model will be updated in the future to match the configuration of proposed streets and parcels. Please refer to Figure 4. for the full build-out distribution system layout schematic. The appendix also contains tables of pipe sizes and other data for the two models.

PROPOSED FIRE SUPPRESSION SYSTEM HYDRAULIC RESULTS

Both the “as-built” and “full build-out” models have been run to determine available pressure at each node (junction) when 4000 gpm is flowing at an individual node. The models have been run for both conditions of the pump running and when the pumps are shut off and only the bypass is providing flow. The results of the calculations are seen in the tables on the ensuing pages. As noted in the tables, some locations in the “as-built” (spring of 2005) distribution system may not supply sufficient pressures with 4000 gpm

flowing. Only when the system is looped at build-out will the higher pressures and flows be available. The lower flows and pressures are currently more prevalent in the area of phase 2, north of the haul road. Parcel developers should consult with the Spanish Springs Business Center owners to ensure that the necessary infrastructure will be in place in order to provide sufficient fire flows for their planned development. Also to be noted is that pressures may exceed 150 psi during low flow demands with the pumps running thus requiring a minimum 200 pound pressure class pipe.

RECOMMENDATIONS

The ESFR fire suppression distribution system will need to continue to expand with the future development of the business center. Exact fire main sizes and locations will be determined during the design of future infrastructure for the business park. Looping of the system will be necessary in many areas in order to provide sufficient pressure and flow. The model for the ESFR system should be updated as needed to match all new construction. All applicable codes must be complied with when designing and constructing the fire suppression distribution system. 200 pound pressure class pipe shall be used when connected to the ESFR distribution system.

APPENDIX

CALCULATIONS