Overview of Occupancy Type and Risk Category

Building codes group types of occupancies into discrete categories, and assign building responses to the occupancy types by the level of risk associated with that occupancy. Examples of occupancy types are various forms of Assembly, Business, Education, Mercantile, and Institutional (from child care through prisons). The more intensive the occupancy (Assembly is a good example), the more stringent the code requirements. An example is a greater need for sprinkler and fire alarm protection.

Further, specific Risk categories are established in the structural portions of the building code, ranging from Risk 1 assigned as agricultural and occasionally used storage, through Risk 4 assigned to life safety facilities, power stations, surgical centers and the like. Businesses generally fall into the Risk 2 category and assembly occupancies into the Risk 3 category.

Risk Category	**Nature of Occupancy**
Risk 1	Agricultural and occasionally used storage
Risk 2	Business
Risk 3	Assembly
Risk 4	Assigned to Life Safety facilities, power stations, surgical centers and the like.

The structural loads imposed on buildings are generally categorized as either dead loads, live loads, seismic loads, or environmental loads. Dead loads refer to loads that typically don't change over time, such as the weights of materials and components of the structure itself (the framing, the flooring material, roofing material, etc.), and the weights of fixed service equipment (plumbing, HVAC, etc.). Live loads refer to loads that do, or can, change over time, such as people walking around a building (occupancy) or movable objects such as a flower pot on a deck. Seismic loads refer to the assumed lateral load capacity of a structural system in any horizontal direction. Environmental loads are loads that are created naturally by the environment and include wind, snow, seismic, and lateral soil pressures.

Based upon WGM's Condition Report completed in 2014, the floors for the hay lofts fall below the lowest residential occupancy live load requirements with a calculated load based upon the sizes, spacing and specie of the framing lumber or 20 pounds per SF. The live load capacity of the loft floor will need to be addressed as a use is selected. The design approach to addressing the live load capacity is somewhat straightforward, replacing wood framing members with steel beams and adding adequate footing for new steel columns.

Additional considerations that need to be addressed with any change in use/occupancy include loads such as wind and shear, or seismic loads. Both are generally addressed by providing walls or cross bracing at strategic lines in long thin buildings, providing planes that are resistant to lateral or sidewise loads or pressure. Insertion of the cross walls or cross bracing would alter the interior character of the spaces to such an extent that the interiors would no longer be perceived as a barn structure, but instead as a series of discrete rooms or spaces. Alternatively, the use of rigid or moment connections in new steel framing can be used to develop the same stability, so long as the "loads are led" to points providing the proper bearing.