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March 30, 2011

Mr. Rick Pylman
Pylman & Associates
P.O. Box 2338
Edwards, CO 81632

Re: Sketch Plan wildlife considerations for the Haymeadow Project, Town of Eagle, Colorado.

Dear Rick:

As part of the initial submittal to the Town of Eagle (Town) for approval of a PUD Zoning Plan, Subdivision Sketch Plan, and annexation of the Haymeadow property, this letter addresses wildlife issues of higher concern associated with the subject property and addresses recommendations that have been incorporated into the project's design to make it more compatible with wildlife. This assessment is based on existing wildlife mapping, wildlife surveys and development assessments for other projects in this portion of Brush Creek Valley (Thompson 1994, 1995, 1996a,b, 1998a,b, 2000, Schafer and Assoc. 1997, 2000, Wildlife Specialties 2008), wildlife surveys of the Haymeadow property and adjacent parcels to better identify site-specific issues, and conversations with the local Colorado Division of Wildlife (CDOW) District Wildlife Manager (DWM, C. Wescoatt) and a Town representative (B. Heicher). A Wildlife Mitigation and Enhancement Plan that proposes commitments of the developer to avoid, minimize, and mitigate impacts resulting from the proposed development will be developed for the Preliminary Plan phase of this project.

Project Setting and Status

The Haymeadow parcel is a 660 acre parcel near the mouth of the Brush Creek valley. A vicinity map is provided in the application to the Town. The parcel borders the Town of Eagle Ice Rink and Pool complex along its western end and extends east along the north side of Brush Creek Road, which represents generally the southern property boundary. Bureau of Land Management (BLM) lands form the northern boundary and the east end of the site adjoins Adams Rib property.

The Haymeadow property is currently outside of the Town of Eagle boundary, but is within the Town of Eagle Urban Growth Boundary as delineated in the Eagle Area Community Plan (EACP, Town of Eagle and Eagle County 2010). The Haymeadow parcel represents one of the last large development parcels that may be annexed into the Town of Eagle.

The Brush Creek valley was initially settled in the 1880's and native sagebrush stands on the relatively flat valley bottom were converted to flood irrigated agricultural uses. The Haymeadow property has

Habitats of higher value to wildlife on the Haymeadow property include (in decreasing acreage) hay meadow/ pasture, pinyon-juniper woodland, big sagebrush shrublands, gypsum hillsides, riparian/wetlands, and "Warm Creek." Each of these habitats is addressed below. Additional detail is provided in the vegetation report prepared for this project that is part of the project file.

Hay Meadow/ Pasture

Approximately 80% of the parcel is used year-round as a hay meadow/ pasture, flood-irrigated via the upper Love and White Ditch and lower Mathews Ditch. The irrigation season begins around April 1 and extends to mid-June, after which hay is cut. Irrigation continues in mid-July and extends as long as possible, or until mid-August, after which the second cutting occurs. After harvest and until the next irrigation season begins, cattle (cows and calves) graze the pastures overwinter. Vegetation is dominated by non-native alfalfa (*Medicago sativa*) and smooth brome (*Bromopsis inermis*), with local patches of Great Basin wildrye. Despite the seasonal irrigation, this habitat supports a healthy Wyoming ground squirrel (*Spermophilus richardsonii*) population that is important to some local predators. Otherwise, this agricultural habitat supports relatively low wildlife diversity values compared to adjacent native habitats. While big game seasonally forage in these pastures, the CDOW does not map such active, agricultural areas as important habitat. From a wildlife perspective, development should be concentrated in these artificial habitats and avoid undisturbed, native habitat.

Pinyon-Juniper Woodland

Pinyon-Juniper woodland occurs on ridgetops and hillsides that extend down into the northern side of the property where it is occasionally interspersed with sagebrush shrubland and gypsum barrens. Pinyon/juniper is a misnomer as Utah juniper (*Sabina osteosperma*) is far more common (approx. 80% of trees) than pinyon pine (*Pinus edulis*, approx. 20% of trees). Junipers range from seedlings to 15 foot tall trees, but most stands are decadent with virtually no regeneration because of cattle browsing. Towards the western end of the property, many of the trees have been cut down or their branches removed. Pinyon pines range from seedlings to 25 feet tall. Understories range from areas with mostly bare soils to low density sagebrush stands. Some common grasses include Indian ricegrass (*Oryzopsis hymenoides*), needle-and-thread grass (*Stipa comata*), Junegrass (*Koeleria macrantha*), Kentucky bluegrass, Sandberg's bluegrass (*Poa secunda*), Letterman's needlegrass (*Stipa lettermanii*), and bluebunch (*Pseudoroegneria spicata*), western (*Pascopyrum smithii*), and slender wheatgrasses (*Elymus trachycaulus*). Common forbs include Osterhout penstemon (*Penstemon osterhoutii*), mat penstemon (*P. caespitosus*), and wild buckwheat (*Eriogonum umbellatum*), Longs phlox (*Phlox longifolia*), and New Mexico prickly-pear (*Opuntia phaeacantha*). These woodlands provide important wildlife cover and add vertical structure to the landscape.

Big Sagebrush Shrublands

Big sagebrush shrublands occur along the northern side of the property, in deeper soil areas at the mouths of dry draws, and as an understory community in the pinyon-juniper woodlands. The same graminoid and forb associates found in the P-J woodlands also occur in the sagebrush communities, but at a higher density.

Gypsum Barrens

Gypsum barrens include those areas with poorly developed, or an absence of, plant cover. This habitat is most common on steep, south-facing hillsides and some ridgetops. Soils in these areas contain large amounts of gypsum and are locally covered by a cryptogrammic crust and salt evaporite. Such areas are highly erodible because of their soil character, slope, and the lack of anchoring vegetation, which also increases soil exposure to raindrop impact. Indian ricegrass is the dominant grass on these barrens. Other grasses include needlegrasses, Junegrass, orchardgrass, bluebunch wheatgrass, and western wheatgrass. Shrubs present include big sagebrush, rabbitbrush (*Chrysothamnus* spp.), snakeweed (*Gutierrezia sarothrae*), fringed sage (*Artemisia frigida*), and winterfat (*Krascheninnikova* [formerly *Ceratoides*] *lanata*). This community probably provides the lowest wildlife values of any habitat on-site. Solar aspect and exposed soils generally results in shallow snow accumulations and early snow melt on these communities, exposing what little forage may be available.

Riparian/ Wetlands/ "Warm Creek"

Some portions of irrigation ditches on the property support discontinuous stands of narrow-leaf cottonwoods (*Populus angustifolia*) and peach-leaf willows (*Salix amygdaloides*). Trees are generally medium-aged to mature and there is little reproduction as a result of cattle browsing. Wildlife (mostly birds) use the vertical structure associated with this habitat for nesting and foraging.

In the central portion of the property, a north-south, man-made channel connects the two irrigation ditches and directs flows towards Brush Creek Road. This channel enters a wetland complex and flows as a small creek west along the north side of Brush Creek Road. This wetland and creek receives additional delayed irrigation return flows from Haymeadow and other up-valley irrigation. These additional flows emerge at subsurface ground temperatures that raise the temperatures of winter channel/ creek flows. This provides open water habitat for fish, waterbirds, waterfowl, muskrats (*Ondatra zibethicus*), beaver (*Castor canadensis*), and water sources for a wide variety of other wildlife, although these values are best developed and expressed below and off the property. The lower channel of "Warm Creek" supports a dense population of water-cress (*Nasturtium officinale*) and a relatively broad, herbaceous and willow wetland just before leaving the property. After crossing under the road, "Warm Creek" is diverted into a series of man-made ponds adjacent to private residences, before continuing through a meandering, water-cress choked channel through Eagle Ranch open space and the Eagle Valley Land Trust (EVLT) parcel, before entering Brush Creek. On January 31, 1996, the water temperature in Brush Creek below the bridge on Eagle Ranch was 32 degrees F (0755 hrs., air temperature 25 degrees). At 0810 hours, the water temperature of "Warm Creek" on the Haymeadow property, just before it crosses Brush Creek Road, was 43 degrees F. The subsurface flows feeding "Warm Creek" appear to have additional widespread connections to Brush Creek, which helps to keep Brush Creek open in winter.

The open water and dense water-cress population in "Warm Creek", its attendant ponds, and the benevolence of local residents (who feed the waterfowl and provide duck houses) creates an unusual winter habitat for a wide variety of wildlife. Up to 108 ducks (mallards [*Anas platyrhynchos*], green-wing teal [*A. crecca*], gadwall [*A. strepera*], widgeon [*A. americana*], lesser scaup [*Aythya affinis*], and northern shoveler [*A. clypeata*]) were counted along "Warm Creek" during January 1996 surveys, along with Canada geese, domestic waterfowl, red-wing blackbirds (*Agelaius phoeniceus*), common snipe (*Gallinago gallinago*), killdeer (*Charadrius vociferous*), belted kingfishers (*Ceryle alcyon*), great blue herons, and other, non-migratory species. Warm Creek supports the highest wildlife diversity of any habitat on-site and is a unique habitat.

Wildlife Use of the Haymeadow Property

This report principally addresses significant wildlife use of the property. "Significant" refers to those wildlife species and issues that will be of higher biological and political interest as a result of the proposed Haymeadow development. Individual wildlife species, groups, and areas of concern not specifically addressed in this report are not necessarily insignificant, they either do not represent important constraints that need consideration at this stage of the planning process, or these species and their habitats would be minimally affected by the ultimate development proposal. Many of the life history requirements of these unmentioned species, and the protection of biodiversity values, would be accommodated through the designation of open space and the implementation and enforcement of protective covenants and the Wildlife Mitigation Agreement.

The Haymeadow property is currently under the planning jurisdiction of Eagle County, but is proposed for annexation into the Town. Although the Eagle Area Community Plan (Town of Eagle and Eagle County 2010) is the guiding document under which the Haymeadow project is being planned, broader Eagle County wildlife information and direction was also used to evaluate wildlife resources associated with the subject property. In 1995, the Eagle County Board of County Commissioners adopted updated CDOW Wildlife Resource Information System (WRIS) maps and compiled them on a Critical Wildlife Habitat Map for the County Master Plan (Alan Richman Planning Services and Design Studios West [ARPS and DSW] 1996). Those County wildlife maps depict seasonal wildlife ranges and habitats that the CDOW defined as being most critical to the survival of each species. The County Master Plan adopted a Wildlife Habitat Protection Overlay Zone District (WHPOZD) to protect critical wildlife habitat areas through development standards, mitigation, and habitat enhancement. An explanation of mapping Critical Wildlife Habitat in the Master Plan (Page 23) indicates:

> "It will be important for CDOW and the County to regularly update this [Critical Wildlife Habitat] map, because of the fluid, dynamic nature of the animals …CDOW and Eagle County anticipate that in the coming years a new set of wildlife maps will be prepared for Eagle County, which depict wildlife habitat in a more holistic, ecosystem manner, by mapping the suitability of vegetation throughout the County for wildlife habitat."

Furthermore, under the Master Plan's (Page 61) Implementing Action #1 for Environmental Quality:

> "Require applicants to conduct a site specific analysis of their land to identify the species which use the land, where they are located, their use patterns and the potential impacts of development on the critical habitat areas."

The CDOW's WRIS mapping has evolved into an on-line database (http://ndis.nrel.colostate.edu/website/mapit; Natural Diversity Information Source [NDIS]) operated by Colorado State University and funded by the CDOW. While the disclaimer (and narrative information) associated with all WRIS maps has been lost from the NDIS site, it still applies to the underlying data:

> "Care should be taken in interpreting these maps. The activity areas portrayed here are graphic representations of phenomena that are difficult to reduce to two dimensions. Animal distribution is fluid, animal populations are dynamic, and either may vary considerably from
>
> what is shown here. Narrative information accompanies these maps and should be considered."

In addition, while the draft EACP (Design Workshop 2008) contained wildlife maps derived from the NDIS, the Town (T. Boni, Town of Eagle, July 30 conv. with R. Pylman, Pylman Assoc.) determined that the final EACP (Town of Eagle and Eagle County 2010) would not contain wildlife maps, because the maps are subject to periodic revision. The Town's direction is for land use applicants to use the most current NDIS mapping as part of a development proposal's wildlife assessment.

One purpose of the NDIS maps is to "red flag" areas where wildlife values may conflict with proposed development. Where such overlap occurs, it was intended and expected that site-specific field surveys and interaction with the CDOW would more accurately define habitat boundaries. As such, two points are relevant to the Haymeadow property. First, because of the original scale (at 1:50,000) and scope (statewide) of WRIS (now NDIS) mapping, specific non-use areas and other specific habitats within larger mapped polygons (e.g., deer winter range) are generally not excluded from mapping because of their relatively small size. As CDOW policy, agricultural habitats, such as the non-native irrigated hay meadows on the Haymeadow property, are not considered to be "critical habitat" by the CDOW (C. Wescoatt, District Wildlife Manager, Nov. 15, 2008, pers. comm.). Thus, according to the CDOW, the irrigated hay meadows on the Haymeadow property, mapped as mule deer (*Odocoileus hemionus*) and elk (*Cervus elaphus*) winter range, severe winter range, and winter concentration on current NDIS maps, should not be considered to be "critical habitat", as identified in the EACP (Design Workshop 2008). Second, the NDIS and EACP's mapping of deer and elk winter ranges is in error along the Haymeadow property's northern border because the WCA and SWR polygons extend into the property's irrigated hay meadows. A more accurate general boundary for these winter range subsets is along the Love and White Ditch. Site-specific field surveys and interaction with the CDOW have tentatively refined the mule deer and elk WCA and SWR polygons to the native habitat-hay meadow interface near Haymeadow's northern property boundary.

The most current NDIS mapping available was used in this report, accessed March 30, 2011. The following "significant" wildlife species have seasonal distributions in the vicinity of the project area.

Mule Deer

Current NDIS mapping (March 30, 2011) shows polygons of mule deer winter range (MDWR), severe winter range (MDSWR), winter concentration area (MDWCA), and summer range overlapping portions of the Haymeadow parcel. The entire parcel is summer range. Figure 1 shows the distribution of winter ranges. The extensive pinyon-juniper woodland and sagebrush hillsides extending north of the upper irrigation ditch on the parcel are correctly designated as MSWR, MDSWR, and MDWCA. The southern boundary of the MDWCA and MDSWR boundary is in error because it extends down into the irrigated hay meadows/ pasture. The southern boundary of that polygon should only extend to the native habitat-hay meadow interface, approximately along the Love and White Ditch, as described above. No other mule deer seasonal ranges, including, but not limited to migration corridors and highway crossings, overlap or closely approach the Haymeadow parcel.

Winter range consists of those areas in Eagle County, which because of slope, aspect, elevation, and vegetation are capable of providing mule deer sufficient food and cover (habitat) to survive average winters (five winters out of 10), from the first heavy snowfall to spring green-up, or during a site specific period defined for the Data Analysis Unit (DAU; CDOW 1993a, ARPS and DSW 1996). Winter ranges are essential to the survival of the present mule deer populations in Eagle County because these areas allow

mule deer to disperse over a wide range, which lessens overgrazing, predation, and disease. The project area is located in DAU D-14 and Game Management Unit 44 (CDOW 1988). The CDOW (1988) defined the winter range occupancy period for D-14 to extend from December 15 to April 15, dates inclusive.

Severe winter range (SWR) is a winter range subset. SWR consists of those areas that because of their physical characteristics (such as low elevation, minimum snowpack, or physical barriers [either natural or man-made]) provide mule deer sufficient food and cover during the most difficult months (when there is maximum snowpack or minimum temperatures) of the most severe winters (the worst 2 winters out of 10; ARPS and DSW 1996). The CDOW (1993a) defined SWR as that part of the range of a species where 90% of the individuals are located when the annul snowpack is at its maximum and/or temperatures are at a minimum in the worst two winters out of 10. The winters of 1983-84 and 1996-97 were good examples of severe winters. During the most recent severe winter (2008), Haymeadow gave the CDOW permission to feed starving deer on the property.

Winter concentration area (WCA) is another winter range subset that consists of those areas of winter range where densities are at least 200% greater than the surrounding winter range density during the same period used to define winter range (Dec. 15 to Apr. 15) in the average five winters out of ten.

The CDOW (1993a) defined mule deer summer range as that part of the range of a species where 90% of the individuals are located between spring green-up and the first heavy snowfall. This definition includes the migration and transitional range periods.

The above designations for mule deer habitats in the vicinity of the project area are valid and accurate. During their habitat delineations, the CDOW recognized that seasonal mule deer use, amounting virtually to year-round use, also extends down onto the agricultural habitats dominating the Brush Creek valley bottom that were historically cleared of their native habitats. However, while non-native pastures, hay fields, and other habitats on and adjacent to the Haymeadow property are used seasonally by deer, such habitats, when large enough to delineate, are not usually included in NDIS mapping by CDOW policy.

Mule deer winter range, MDSWR, and MDWCA are considered to be critical habitats in Eagle County, which are those areas that the CDOW defines as being most critical to the survival of each species (ARPS and DSW 1996). However, as CDOW policy, agricultural habitats, such as the non-native irrigated hay meadows on the Haymeadow property, are not considered to be "critical habitat" by the CDOW (C. Wescoatt, District Wildlife Manager, Nov. 15, 2008, pers. comm.). Thus, according to the CDOW, the irrigated hay meadows on the Haymeadow property, mapped as deer winter range, severe winter range, and winter concentration area on NDIS maps, should not be considered to be "critical habitat."

Elk

Current NDIS mapping (Fig. 2) shows polygons of elk winter range (EWR), severe winter range (ESWR), and winter concentration area (EWCA) overlapping the extensive native habitats north of the Haymeadow parcel. As described above for deer, native habitats extend down onto the Haymeadow parcel, terminating in the non-native hayfields extending across the flat Brush Creek valley bottom. The southern ESWR and EWCA boundaries overlapping the Haymeadow property are in error because those polygons extend into the property's irrigated hay meadows. A more accurate general

boundary for these winter range subsets is approximately along the Love and White Ditch..

Within the last year (i.e., since a July 29, 2010 NDIS mapping exercise), he hayfields on the Haymeadow parcel and other non-native and developed habitats extending across the flat valley bottom (including all of Eagle Ranch, lower portions of Adam's Rib parcels, the EVLT parcel, and other smaller private holdings along lower Brush Creek Road) have been reclassified (from no designated elk winter range use) to EWR and EWCA (Fig. 2). Elk use of these polygons may be valid, but these designations do not reflect the underlying land uses for project planning purposes. The elk highway crossing extending for about two miles along Brush Creek Road, starting at the ice rink road and bordering the length of the Haymeadow parcel, has also been retained. No other elk seasonal ranges, including, but not limited to migration corridors, overlap or closely approach the Haymeadow parcel:

Elk winter range, ESWR, and EWCA definitions follow those provided above for mule deer. The project area is located in DAU E-16 and Game Management Unit 44 (CDOW 1993c). The CDOW (1993b) defined the winter range occupancy period for E-16 to extend from December 15 to April 1, dates inclusive.

During their habitat delineations, the CDOW recognized that winter elk use extends down onto the agricultural habitats, dominating the Brush Creek valley bottom, that were historically cleared of their native habitats. However, while non-native pastures, hay fields, and other habitats on and adjacent to the Haymeadow property may be used by elk, such habitats, when large enough to delineate, are not usually included in NDIS mapping by CDOW policy.

The CDOW (1993c) defined highway crossings as "those areas where elk movements traditionally cross roads, presenting potential conflicts between vehicles and motorists." Former CDOW WRIS maps that were adopted for the Eagle County Master Plan WHPOZD (ARPS and DSW 1996) did not identify any elk highway crossing or migration corridor across lower Brush Creek Road where the highway crossing is now designated. In the mid- and late 1990's, the broad, open valley bottom was rarely used for cross-valley movements (Thompson 1996b, 1998b, Schafer and Assoc. 1997, 2000). Indeed, during the conceptual design of Eagle Ranch, the CDOW determined that an east-west movement corridor to conduct potential future elk (and other wildlife) movements across the broad, lower, Brush Creek Valley was not needed. More recently, however, wintering elk have been making longer nightly forays out into undeveloped and developed portions of the lower valley bottom from both sides of Brush Creek Valley (2006 field surveys, C. Wescoatt, CDOW, pers. comm., June 7, 2006), some of which extend into cross-valley movements. These are generally not migratory movements. These are mostly, daily movements between mostly nighttime foraging areas and daytime bedding areas when elk are resident on their winter range.

Many of these nocturnal and crepuscular cross-valley movements occur off the eastern gypsum hillsides, around the ice rink, south of (and through) residential areas east of Brush Creek Road, through the EVLT parcel, and through undeveloped open space, golf course terrain, and undeveloped and developed portions of Eagle Ranch. These movements are mostly leisurely, as animals slowly walk along, foraging under cover of darkness, when outdoor human activity has ebbed. Movements may become concerted when elk find themselves in the middle of developments at sunrise, when outdoor human activity associated with the morning commute reaches a peak level. However, the corridors now used on Eagle Ranch were not designed to conduct elk movements. These corridors will become non-viable and cease to be used by elk (i.e., as a result of increasingly traumatic confrontations with humans, retained in the group memory by the lead cows) as that property continues to build out.

The designated elk highway crossing along Brush Creek Road does not meet strictly the CDOW's definition because these movements are not traditional and have only recently started. Furthermore, this designated elk highway crossing does not fit the quantitative highway crossing definition used for deer (i.e., "more than six highway mortalities per mile of highway or railroad per year is a guide that may be used to indicate highway crossings"; CDOW 1993a) and occasionally applied to elk. However, that elk movements are now occasionally occurring across Brush Creek Road is not in dispute and this use was likely added to the NDIS maps to identify the potential conflict.

Elk severe winter range and EWCA are considered to be critical habitats in Eagle County, which are those areas that the CDOW defines as being most critical to the survival of each species (ARPS and DSW 1996).

Bald Eagle

Approximately 600-800 bald eagles (*Haliaeetos leucocephalus*) annually winter in Colorado. These eagles generally arrive by November 15 and depart around March 15. Wintering eagles are generally associated with river systems and reservoirs, particularly early in winters before freeze-up. Fish and waterfowl represent a majority of the early winter diet. Big game, rabbits and hares, and road-killed and hunter-killed wildlife may become increasingly important in late winter.

No known bald eagle nests or communal roosts are known to occur in the vicinity of the Haymeadow property. In recent years an increasing number of wintering eagles have found conditions suitable for nesting and have remained to breed. Fourteen pairs nested in the state in 1993 (G. Craig, CDOW, pers. comm.). Nesting birds are thought to be members of the northern subspecies which wintered here and found conditions suitable for reproduction. These nesting birds tend to become year-round residents. The closest known active nest sites are west of Glenwood Springs and south of Carbondale. Approximately 23 years ago, a bald eagle nest was reported from between Wolcott and State Bridge, however, a nest search failed to locate any eagle nest (G. Craig, CDOW, pers. comm.). More recently, Bill Heicher (Aug. 30, 1995, pers. comm.) observed a pair of wintering bald eagles in the Eagle Valley courting as late as late April before they were thought to have migrated back north.

Current NDIS mapping (Fig. 3) shows bald eagle winter range extending along the Eagle River and up Brush Creek to Sylvan Lake, whose outlet remains open and is used by ducks for varying portions of winters. The CDOW (1993) provides the following definition of bald eagle winter range:

> "Those areas where bald eagles have been observed between November 15 and March 15."

This winter range delineation overlaps all of the Haymeadow property and most of the lower and mid-elevations of the lower Brush Creek Valley. Based on field survey results, wintering eagles hunt open, upland big game winter ranges for hunter- and winter-killed ungulates. Bald eagles also occasionally use the open tips of gypsum hillsides on the property as hunting perches.

County and NDIS maps identify a bald eagle roost site associated with the formerly larger number of cottonwood snags on the EVLT parcel. Other prominent trees in the area are also identified as roost sites on NDIS maps (Fig. 4). As explained in Thompson (1996), following CDOW (1993d) definitions, those "roost sites" are actually hunting perches, not night roosts.

While the vast majority of the Haymeadow property is largely of value to wintering eagles only for scavenging big game carcasses that might occasionally occur in the pasture, the lower portion of "Warm Creek" on and below the property offers hunting habitat. As described in the Habitat section, above, "Warm Creek" and the series of man-made ponds along the creek south of Brush Creek Road remain open during most winters, concentrating waterfowl and providing limited fishing opportunities (off the Haymeadow property). This waterfowl population, in an area where ducks would normally be excluded during winter by a lack of open water, represents a predictable prey concentration capable of supporting a low number of bald eagles. The two most commonly used hunting perches during 1995/96 to 2006 field surveys were cottonwood trees just east of the duck ponds south of Brush Creek Road (off the Haymeadow property) although some use of cottonwoods along "Warm Creek" on the property also occurred. Eagles would sit in these trees virtually all day long and make occasional passes at the waterfowl below. Most waterfowl would leave the area (i.e., Brush Creek Valley) after the first pass. However, during most days, waterfowl were constantly coming and going between "Warm" and Brush Creeks and the Eagle River. The dead cottonwood trees on the EVLT parcel remain a frequently used hunting perch. Hunting from these perches may also be focused on waterfowl, however, the pools and large trout in adjacent reaches of Brush and "Warm Creeks" provide alternate prey. Bald eagles continue to use these and other perches along Brush Creek even with partial to full build out of Eagle Ranch and other subdivisions north of Brush Creek Road. Buffer zones were incorporated into the design of Eagle Ranch to facilitate continued eagle use of the EVLT perches until they all eventually fall down (Thompson 1996, 1998b).

Great Blue Heron

Wildlife maps show a great blue heron (*Ardea herodias*) heronry (nesting area) along Brush Creek, south of Brush Creek Road and opposite the Haymeadow property. This heronry was active in the 1990's but no nests were present in 2006. Great blue herons occasionally hunt areas along Brush and "Warm Creeks" on and adjacent to Eagle Ranch. Most great blue herons in Colorado are migratory, however, some appear to overwinter in the Brush Creek Valley because of suitable foraging habitat along Brush and "Warm Creeks".

Sage-grouse

Until recently, sage grouse (*Centrocercus urophasianus*) have been a relatively common game bird in the western United States, with Colorado in the southeastern periphery of the species' distribution. The species is closely associated with sagebrush (*Seriphidium* sp.), especially big sagebrush.

Former (ca. 1996) wildlife maps showed the entire Haymeadow parcel to be within a broad band of overall sage grouse habitat that extended along the Eagle River and up to five to six miles south of the river covering the Brush and Gypsum Creek valley bottoms. Overall range is defined as an area which encompasses all mapped seasonal activity areas within the observed range of a population of sage grouse (CDOW 1993e). Maps also showed a broad band of brood habitat associated with pinyon-juniper and sagebrush habitat north of the Haymeadow property that extended onto the property down to the agricultural fields. Brood habitat is defined (CDOW 1993e) as those areas supporting sage grouse broods and summer range for sage grouse without broods. This includes wet areas (i.e., meadows, springs, ponds, streams and their drainages), which are important brood rearing sites and a 200 m (0.124 miles) buffer zone around the edges of such wet sites in some locations. However, current NDIS mapping (Fig. 5) identifies only historic sage grouse habitat in the vicinity of the Brush Creek Valley, reflecting the

absence of local grouse.

The CDOW (B. Heicher, Oct. 25, 1995, pers. comm.) indicated that most sage grouse use of delineated habitats in the vicinity of the Haymeadow parcel is historic because of the conversion of sagebrush habitat into agricultural fields. The CDOW added that only two local sage grouse areas exist in the vicinity south of I-70, "Love Mesa, south of Eagle Ranch where only a few birds may persist, and an area to the east on Bellyache Ridge (Fig. 5). Neither of these areas contained identified leks (traditional spring display and breeding areas) on the ca 1996 CDOW WRIS maps. This was indicative of (1) the low level of sage grouse use, including brood use, in the Brush Creek Valley, because the majority of sage grouse nesting occurs within 3.2 km of active leks (Gill 1965, Klebenow 1969, Martin 1970, Wallestad and Pyrah 1974, Autenrieth [unpubl. as cited in Braun et al. 1977]), and/or (2) the breeding behavior of Gunnison sage grouse. The closest mapped, active sage grouse leks are northwest of Gypsum and north of Wolcott, both north of I-70. Chicks are incapable of moving considerable distances from nesting areas until they can fly. No sage grouse have been seen in the Brush Creek Valley since 1989. Bill Heicher (CDOW, pers. comm. June 11, 1997) found some grouse pellets on Love Mesa in spring 1997, and the author located fresh grouse pellets in that area (on the south side of Mayer Gulch) on July 28, 1998. However, no birds have been recently observed despite intensive spring 1998 breeding surveys by the CDOW.

Regarding the Brush Creek Valley population, the CDOW previously thought that any sage grouse remaining in the Eagle area would be Gunnison sage-grouse (*C. minimus*). Birds from the Wolcott and Gypsum leks (display grounds used in spring where males strut and all breeding takes place) are northern sage-grouse (*C. urophasianus*). Birds from the Glenwood Springs and Spring Creek (near Carbondale) leks are Gunnison's. However, current NDIS maps only show northern sage-grouse as present in Eagle County.

The CDOW (B. Heicher, pers. comm. June 11, 1997) thought that the local Brush Creek Valley population had been reduced to extremely low numbers of birds, if any birds were still present. Historic agricultural activities, particularly the widespread conversion of sagebrush to hay meadows and pastures, significantly reduced available habitat, especially winter range, the most critical seasonal habitat component. These activities additionally fragmented and isolated remnant habitat blocks, such as the sagebrush stands at the mouths of draws on the north side of the Haymeadow parcel and the BLM lands beyond. According to the CDOW, the coup de grace for the local population was the considerable habitat loss associated with the expansion of Eagle County Airport. Subsequent commercial developments surrounding the airport exacerbated the situation.

Sagebrush stands on the Haymeadow parcel and on other surrounding private lands in the lower Brush Creek Valley are not ideal sage grouse habitat. The expansion of pinyon-juniper trees into the sagebrush, resulting from fire suppression, provides raptor perches. Some raptors, such as golden eagles (*Aquila chrysaetos*), are sage grouse predators. Fence posts throughout the area also provide predator perches. Although eagles don't need perches to successfully hunt sage grouse, perches are thought to increase predation rates. In any event, grouse avoid such areas. Grouse habitat values on the Haymeadow parcel are also degraded by deeply incised drainages and small habitat patch size. Cattle grazing in sagebrush stands may also be incompatible with grouse use (Braun et al. 1977). Only limited fall grazing is thought to be relatively compatible with grouse. The irrigated hay meadows could provide brood-rearing habitat, but are likely unused without any nearby leks.

The Brush Creek sage-grouse population has declined to where it is either extinct or at such a low level that it could not recover by itself (C. Braun, CDOW, pers. comm. Apr. 29, 1998). The remaining habitat in the valley is non-viable as a portion of a recovery area, even with augmentation/ reintroduction. According to the CDOW, the Brush Creek Valley is not identified as a recovery area in the local conservation plan (C. Braun, CDOW, Apr. 29, 1998, J. Toolen, CDOW, Nov. 2, 1998, pers. comm.).

Raptors

A modest variety of raptors seasonally hunt portions of the Haymeadow parcel. Residents include golden eagles, red-tailed hawks (*Buteo jamaicensis*), American kestrels (*Falco sparverius*), great horned owls (*Bubo virginianus*), and northern pygmy owls (*Glaucidium gnoma*). Sharp-shinned (*Accipiter striatus*) and Cooper's hawks (*A. cooperii*) and prairie falcons (*Falco mexicanus*) are occasionally present during summer. Bald eagles and rough-legged hawks (*B. lagopus*) are present during winter. All habitats on and around the Haymeadow parcel are used to some extent by these birds, including the harvested pastures. The Haymeadow parcel composes at least portions of the generally large, seasonal hunting territories of each of the above species.

Two active (2006) red-tailed hawk nests are present on the Haymeadow parcel and a third active nest is present across Brush Creek Road. This represents an unusually high nest density (3 nests, within 4,000 to 4,800 ft. of each other) and is largely due to the abundant Wyoming ground squirrel population. One nest on the property occurs in a cottonwood along "Warm Creek"/ Brush Creek Road and the other occurs in a cottonwood along the Love and White Ditch, adjacent to the caretaker's residence. All three pairs are habituated to existing levels of pedestrian and motorized human activities and have selected their nests sites in consideration of these activities. The hunting territories of these birds overlap and include the Haymeadow parcel as well as surrounding private and public lands.

Fisheries

Brush Creek and portions of the short reach of "Warm Creek" (downstream of [i.e., off] the property) support a sport fishery. Fish present included mottled sculpin (*Cottus bairdi*) and brown (*Salmo trutta*) and rainbow trout (*S. gairdneri*). Brown trout represent approximately 70% of the trout population, although this seasonally varies (B. Heicher, Feb. 14, 1996, pers. comm.). Rainbows are most common in spring-summer when they move up out of the Eagle River and browns are most abundant during late summer-fall. Trout habitat in the lower Brush Creek Valley has been degraded by livestock trampling, bank erosion, eutrophication, removal of overhanging and woody vegetation by domestic livestock, and water diversions. It is possible that some Eagle River fish may move up "Warm Creek" onto the Haymeadow property.

Wildlife-related Development Recommendations

The following large-scale recommendations were incorporated into the conceptual Sketch Plan phase of the proposed Haymeadow development. Additional, more detailed recommendations related to occupancy and habitation of the development (e.g., dog and pet controls, seasonal use restrictions [on- and off-site], bears and trash disposal, fencing, landscaping, wildlife mortality on local roads, mountain lions, feeding wildlife, weed management, wildlife corridor management, resident education,

enforcement, water quality, etc.) will be developed as part of the Preliminary Plan submittal (or as requested) when a comprehensive Wildlife Mitigation and Enhancement Plan is prepared with further input from the CDOW, Town, and developers.

1. Development has been located and configured to avoid (physical habitat modifications) and buffer (see below) native habitats on and adjacent to the Haymeadow property, particularly those sagebrush and pinyon-juniper stands along the northern property line, tree corridors along irrigation ditches and "Warm Creek", and the wetland along the southwestern end of the property. This was one of the two principal development design requests of the CDOW (C. Wescoatt, DWM, pers. comm., June 9, 2006). Development has also been located and clustered in non-native habitats. Development pods have also been pulled back from adjacent BLM lands by a minimum of approximately 200 feet.

2. On single family lots adjacent to native habitats (i.e., the sagebrush and pinyon-juniper stands) along the northern property line, building envelopes (including wildfire protection zones) will be established outside of native habitat such that no structural development or habitat disturbances extend into the native habitats. Prior to any ground disturbance on single family lots adjacent to native habitats, those areas of native vegetation designated for protection shall be delineated by snow fencing or sediment fencing to contain and limit ground disturbance. No vegetative manipulation should extend into native habitat and/or the open space easement, except where manipulation is required as part of a valid winter range enhancement program, as may be required to revegetate those areas disturbed by limited construction (e.g., utility easements, etc.) and/or for weed control. The objective of these measures is to avoid any native habitat loss and maintain existing vegetation that buffers visual and acoustic disturbances from adjacent wildlife habitats. All residents should be educated to appreciate and maintain the native and high value vegetative communities, which provide important wildlife cover and forage values and that allows wildlife to be more visible to residents from their homes. Residents should also be educated to recognize that they have moved into wildlife habitat, that some wildlife will have strong compulsions to eat landscaping, and that the CDOW will not be liable for any wildlife damage.

3. Native and high value habitats will be protected as designated, common open space. No part of any lot is proposed to extend into native habitat. Non-native habitats outside of building envelopes on single-family lots that back up to open space could be restored to native habitat (e.g., sagebrush) to provide additional habitat, increase buffers zones, and resolve long-term weed infestation issues associated with the abandonment of previously irrigated hayfields. This concept will be refined as part of the project's overall Landscape Management Plan (to be developed). Common fencing that would restrict wildlife movements may be established along back lot lines bordering the elk and open space corridors to contain and buffer development and human activities from extending into the corridors.

4. The purpose of buffer zones between development areas and more valuable wildlife habitats along and north of the northern property line is to facilitate continued wildlife use and the effectiveness of those habitats. From a buffering perspective, the sagebrush and pinyon juniper habitats extending along the north property line (and extensive BLM lands to the north) are generally the most sensitive habitats on-site because of their winter use by elk and deer, which have broad flight distances (the distance between animals and humans before animals move in response to human presence/ activity). The buffer distance is somewhat arbitrary. Distances of 50-100 feet have been used between native habitats and residences in other subdivisions. These relatively narrow distances are effective

because animals use those areas under cover of darkness after human activities ebb for the day. For the Haymeadow project, development pods have been pulled back from adjacent BLM lands by a minimum of approximately 200 feet. Establishing screening vegetation can further reduce the widths and/or increase the effectiveness of buffer zones.

5. Wildlife (elk and deer) use of native habitats along and especially north of the northern property line would be better maintained if a seasonal closure to all human activity was implemented and enforced from December 15 to April 15, dates inclusive, corresponding to the period of deer and elk winter range occupancy. This same seasonal closure would also minimize human-induced erosion of sensitive soils associated with the gypsum hillsides. To that end, the BLM, CDOW, Town, and Applicant should consult on such a seasonal closure and any trails system extending from the Haymeadow property onto BLM lands.

6. The CDOW (C. Wescoatt, DWM, pers. comm., June 9, 2006) also requested the establishment of a wildlife movement corridor through the Haymeadow property to conduct future elk and deer movements across the lower Brush Creek Valley bottom. Background on this issue is presented above under Wildlife Use of the Haymeadow Property, Elk. The rationale is that as existing approved, but unbuilt developments, currently proposed developments (such as Haymeadow), and future developments result in additional winter range losses throughout the Eagle Valley, deer and elk will continue to adjust their use of remaining winter range blocks. Effective use of remaining habitats will necessitate movements between habitats blocks. Without such a corridor, big game (first elk, then deer) would initially be exposed to increased risk factors (e.g., dogs, inadvertent human harassment, and vehicle collisions) and eventually stop moving across the lower Brush Creek Valley, in favor of longer movements south around inadequately permeable developments dominating the valley bottom.

   The CDOW proposed locating one-half of a 1,000 foot wide corridor along the Haymeadow parcel's eastern property line. This is not because there are existing wildlife movements occurring in this area. This proposed location is the most northerly location in the lower Brush Creek Valley for a 1,000 foot wide corridor that extends between BLM lands all the way across the valley while avoiding existing structural development. The recommendation is also a practical one because a representative of the contiguous Adam's Rib Ranch previously indicated the possibility of sharing such a corridor. Positive aspects of locating such a corridor in this area is that no single landowner would bear the burden of providing a full 1,000 foot wide corridor through their respective property and the corridor would connect to a large block of BLM land on the north. Negative aspects of such are corridor include (1) the burden of providing a 500 foot wide corridor through each of two properties (amounting to approx. 47 ac. on the Haymeadow parcel), (2) most of the corridor north of Brush Creek Road going through presently open pasture (vs. a native habitat that also had foraging values), (3) the need to manage the corridor to facilitate movements, (4) the need to restrict incompatible land uses from the corridor during the winter range and migratory periods (November 15 to April 30, dates inclusive), and (5) the burden of imposing a 1,000 foot wide corridor on unsuspecting landowner(s) south of Brush Creek Road to continue the corridor to adjacent BLM lands.

   The current Haymeadow proposal incorporates the requested big game movement corridor across the eastern end of the property, contiguous with undeveloped pasture on the Adam's Rib property

(Fig. 6). The corridor has minimum widths of 520-850 feet 4east of Neighborhood D, with wider "funnels" on the northeast (approx. 2,025 ft.) and southeast (approx. 2,480 ft.) corners of the parcel. On the extreme southwestern corner of the property, the corridor contains approximately 1,200 feet of open pasture between the water tank and Adam's Rib western property line. This proposed corridor should be effective at directing big game movements from the north, off of the sagebrush hillsides on and north of the Haymeadow property, and out of the mouths of Road Gulch and an unnamed gulch to the west on and north of the Adam's Rib property. At present, it is uncertain how the vegetation in this big game corridor will be managed. Tentatively, the elk corridor (and other open space corridors on the parcel) would be maintained as existing flood- or sprinkler-irrigated pasture. Regardless, the corridor's management will have the paramount goal of facilitating big game movements across this portion of the valley.

Three other multi-use corridors have been incorporated into the Haymeadow design. These corridors range in width from approximately 350-500 feet wide (Fig. 6). The broadest western corridor incorporates the iconic line of peach-leaved willow trees along the irrigation ditch and the broad wetland complex running along the north side of Brush Creek Road. The other two corridors are narrower and not continuous at their full widths through the proposed development. Intermittent creeks will be developed through these corridors flanked by multi-layered plantings that will provide wildlife habitat and facilitate year-round wildlife use into the heart of the development. While deer and elk may use these corridors, they were designed primarily for use by non-game species, facilitating non-game wildlife movements between sagebrush and pinyon-juniper stands on the north and the Brush Creek riparian corridor on the south.

7. The two active red-tailed hawk nests on site would be incorporated into open space corridors. The southern nest along Brush Creek Road would be incorporated into a broad wetland open space area where the effectiveness of that nest site per se could be maintained. The northern nest site would not be adequately buffered to maintain nest site viability. However, regardless of whether the viability of these nest sites are maintained, it is unlikely that either nest would continue to be used at full build out because the prey base supporting these hawks (Wyoming ground squirrels) would be largely eliminated by the subdivision. The timing of development activities adjacent to nest sites and the extent of the prey base lost relative to the nesting period would determine the extent of any reduced or lost recruitment.

8. Bald eagles occasionally use cottonwood trees along lower "Warm Creek" as hunting perches during winter. These trees, which also include the southern red-tail nest tree, would be incorporated into a wetland open space area. These hunting perches are used even though they are adjacent to Brush Creek Road and existing private residences lining the south side of the road because the birds have adapted to the current volume of traffic and the occasional outside human activity associated with the residences. However, with proposed Haymeadow development, those perches, and adjacent perches associated with private residences to the south, would be closely surrounded by development, exposed to greater traffic volumes along Brush Creek Road, and exposed to more outside human activity. As a result, it is likely that bald eagle hunting perch use of trees overlooking "Warm Creek" and man-made ponds on private lands above Eagle Ranch open space and the EVLT parcel will decline. Eagles would likely continue hunting "Warm Creek" from the decadent snags on the EVLT parcel (until they all fall down), although with reduced effectiveness.

9. It is uncertain how reduced agricultural irrigation and foundations on the Haymeadow property will affect surface and subsurface flows in "Warm Creek." The Landscape Management Plan (to be developed) will require sufficient water to maintain the peach-leaved willow (*Salix amygdaloides*) trees along the irrigation ditch, the wetland complex running along the north side of Brush Creek Road, as well as riparian corridors through the two other multi-use corridors on the property. This will likely occur via an extensive non-potable irrigation system for all common areas, open space, and parks that will eventually flow into and through the existing wetlands.

10. A comprehensive Wildlife Mitigation and Enhancement Plan will be developed that proposes the Applicant's commitments to avoid, minimize, and mitigate impacts resulting from the proposed Haymeadow development as part of the Preliminary Plan submittal, or as otherwise requested. Such a plan addressing the design, development, and occupancy of the project would address avoiding and mitigating impacts to big game winter range, seasonal use restrictions [on- and off-site], fencing, dog and pet controls, bears and trash disposal, landscaping, wildlife mortality on local roads, mountain lions, feeding wildlife, weed management, education, enforcement, water quality, etc. Such a plan would be refined with the evolution of the development proposal and further input from the CDOW, BLM, Town, and community.

Please call me if you or the other parties considered herein have any questions.

Sincerely,

Rick Thompson

Richard W. Thompson
Certified Wildlife Biologist
Western Ecosystems, Inc.

RWT/s

Attached NDIS figures:

1. Important mule deer seasonal ranges in the vicinity of the Haymeadow parcel.
2. Important elk seasonal ranges in the vicinity of the Haymeadow parcel.
3. Bald eagle winter habitat in the vicinity of the Haymeadow parcel.
4. Bald eagle winter roosts (hunting perches) in the vicinity of the Haymeadow parcel.
5. Historic sage grouse habitat in the vicinity of the Haymeadow parcel.
6. Dimensions of the elk and open space corridors on the Haymeadow parcel.

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