May 5, 2010

HOGAN-PANCOST PROPERTY

ENVIRONMENTAL AND ENGINEERING ASSESSMENT AND FEASIBILITY STUDY

INTRODUCTION TO EXECUTIVE SUMMARY

The Hogan Pancost property has been under study for several years. A petition for annexation of this property was submitted in December 2006. Over the course of time, there have been numerous meetings with the neighborhood and with the City of Boulder staff about the possible issues and impacts associated with the potential development of this property. Because of the complexities involved with some of the technical aspects of the consideration of development, the City of Boulder Planning Staff requested in the fall of 2007 that prior to a Concept Plan Submittal, the environmental and engineering factors pertaining to the site would be assessed and the findings submitted to the City. In response to this request, we submit this **Environmental and Engineering Assessment and Feasibility Study** that evaluates these technical issues in a logical and factual manner based on accepted science and engineering methodologies. The Concept Plan will be submitted to the City in the future and will include the normal requirements for Concept Plan, including but not necessarily limited to the site development concept drawing(s) and architectural sketches. This **Environmental and Engineering Assessment and Feasibility Study** becomes the factual basis to evaluate the feasibility of the property to support an appropriate level of development consistent with the BVCP. A team of environmental and engineering professional consultants, retained by the property owners, conducted the appropriate studies and provided these reports and exhibits documenting their findings. This team of professionals has a comprehensive understanding of the Hogan-Pancost property.

This Book 1 of **Environmental and Engineering Assessment and Feasibility Study** includes text and maps which summarize full reports contained in Books 2 through 4 of this submittal package. These reports identify and analyze the key environmental and engineering-related factors present on the 22.17-acre site known as the Hogan-Pancost Property. The site is located along 55th Street, adjoining Keewaydin Meadows neighborhood to the west, Greenbelt Meadows neighborhood to the south, the South Boulder Creek/open space corridor to the east, and the East Boulder Recreation/Senior Center to the north. The property is made up of two parcels. The legal address of Parcel 1 is 5697 South Boulder Road and the legal address of Parcel 2 is 5399 Kewanee Drive.

This site is classified as Area IIA on the Boulder Valley Comprehensive Plan (BVCP). The BVCP indicates the site as part of the "Framework for Annexation and Urban Service Provision", Policy 1.22, (p. 9) that "Departmental master plans project the provision of services to this area within the planning period…" and further defines Area IIA as "…the area of immediate focus within the first three years…", The property has been designated as Area IIA since the adoption of the BVCP in 1977. The site is also classified in the BVCP as being appropriate for Low Density Residential land use (2-6 units per acre) for the portion of the property situated west of 55th Street (referred to as West Parcel, here on), and as Environmental

Preservation for the portion situated east of 55th Street (referred to as East Parcel, here on). A portion of the property east of 55th Street also includes a Natural Systems overlay.

For this **Environmental and Engineering Assessment and Engineering Feasibility Study**, the following areas of focus and the specialists involved include:

Book 2 of 4

- **Conceptual Storm Water Management and Floodplain Mitigation –** Author: Drexel, Barrell, & Co.

Book 3 of 4

- **Groundwater Hydrology Monitoring and Wetland Delineation –** Author: Western Ecological Resource, Inc., assisted by David Steinman and ESCO Associates, Inc.
- **Groundwater Evaluation –** Author: Telesto Solutions, Inc.
- **Preliminary Subsurface Investigation –** Author: Western Soils, Inc.
- **Vegetation and Wildlife Habitat Existing Conditions –** Author: Western Ecological Resource, Inc.
- **Species of Concern –** Author: Western Ecological Resource, Inc, Stoecker Ecological Consultants, Ensight Technical Services, Inc., and William Jennings, Botanical Consultant
- **Wetland Mitigation/Enhancement & Prairie & Riparian Habitat Creations –** Author: Western Ecological Resource, Inc.

Book 4 of 4

- **Transportation Impact Feasibility Study** – Author: Drexel, Barrell & Co.

In addition to the documentation of existing conditions on the property, the consultant team has proposed a conceptual integrated mitigation plan incorporating Stormwater and Floodplain Mitigation, Wetland Mitigation and Enhancement, Prairie and Riparian Creation, and Transportation Impacts. In order to provide context for these mitigation strategies, it was necessary to develop a conceptual land use diagram indicating a potential organizational concept for the site. This conceptual land use diagram is used only for purposes of demonstrating how the findings of these reports and mitigation strategies might be applied. More detailed design and documentation will be provided in the future in Part B of the Concept Plan submittal.

The land owners believe the **Environmental and Engineering Assessment and Feasibility Study** that has been completed for the Hogan Pancost Property will result in a comprehensive understanding of the key environmental factors as they pertain to this site and their influence on appropriate land uses. A brief overview and supporting maps of the significant findings from the various studies follows in this Book 1 - Executive Summary. More detail concerning the issues, methodology of study, and each of the specialist's findings are incorporated in Books 2 through 4.

EXECUTIVE SUMMARY OF ENVIRONMENTAL AND ENGINEERING ASSESSMENT AND FEASIBILITY STUDY

In addition to the following study, summaries, supporting graphic maps are found later in this Book 1 document. The "Species of Concern" study does not require a supporting graphic.

CONCEPTUAL STORM WATER MANAGEMENT AND FLOODPLAIN MITIGATION REPORT

Author: Drexel, Barrell & Co.
Reference: Book 2 of 4

The "Conceptual Storm Water Management and Floodplain Mitigation Report" explores how the Hogan-Pancost property relates to the surrounding neighborhoods during a potential South Boulder Creek flood and during more frequent localized storm events. Storm water management and flood mitigation measures suitable to this site were designed to accommodate development of the Hogan-Pancost property.

Existing Local Storm Water Conditions

Upstream of the Hogan-Pancost property, the existing land developments do not detain storm flows to pre-development rates and provide no water quality treatment. Dry Creek Ditch No. 2 intercepts local storm flows, but is not sized to convey or accept these flows. Frequent localized flooding occurs along the Dry Creek Ditch No. 2 corridor, including the eastern end of Kewanee Drive, in large part due to this condition.

Existing South Boulder Creek Flood Conditions

The South Boulder Creek [SBC] floodplain mapping revisions were finalized and adopted by the City of Boulder in 2009. FEMA will adopt the revised mapping in 2011. The revised mapping defines areas that will be inundated when floodwaters spill into the SBC West Valley when South Boulder Road, US 36 and Foothills Parkway are breached. With the revised mapping, the floodplain delineation on the portion of the Hogan-Pancost property east of 55th Street (East Parcel) remains comparatively unchanged. The portion of the Hogan-Pancost located west of 55th Street (West Parcel) is located in the SBC West Valley and is now included in the SBC 100-year (Zone AE) floodplain. During the 100-year event, flooding on the West Parcel is relatively shallow and limited to Dry Creek Ditch No. 2 corridor. A High Hazard Zone is defined along the Dry Creek Ditch No. 2 corridor. During the SBC remapping project, City of Boulder staff determined that due to the small volume of floodwaters entering site, the Hogan-Pancost property is <u>not</u> a practical location for regional flood mitigation.

Methodology

The existing and proposed local storm conditions were calculated using the Rational Method as outlined in Section 7.05 Hydrology of the City of Boulder "Design and Construction Standards. Storm flows for 10-year and 100-year storms were modeled using accepted hydrograph routing techniques. The South Boulder Creek flood flows were provided by the City of Boulder and incorporated in the hydrograph routing models to simulate how the proposed storm water facilities respond to a flood event.

Stormwater Management and Flood Mitigation Strategies

The storm water management and flood mitigation design strategies were developed collaboratively with the groundwater, wetland design and planning professionals on the project team. Existing drainage patterns will be maintained in an environmentally sensitive manner using a bioswale that is designed to accommodate the variable operational conditions of Dry Creek Ditch No. 2. The bioswale conveys storm water and flood waters through the site and provides continuous water quality enhancement along its length. The storm flows will also be routed through sequential detention ponds within the bioswale and released at or below pre-development rates. The bioswale's low flow channel will be suitable for the development of a tall grass prairie. In the areas of the channel where the groundwater table is higher and sufficient to support wetland plants, the low flow channel will be designed to contain a stormwater quality constructed wetland. The amount and type of low flow channel vegetation will be adjusted in future phases of design to best suit the development. The physical dimensions of the bioswale were coordinated with the groundwater hydrologists on the team to ensure that existing groundwater recharge rates are maintained when impervious areas are constructed on the site. The physical alignment of the bioswale allows groundwater recharge to occur without adversely affecting the water table levels near adjacent homes.

The stormwater management measures proposed for the Hogan-Pancost site development will provide the following additional benefits to the neighboring properties:

- Water quality enhancement of untreated storm flows entering the Hogan-Pancost site from existing developments.
- Elimination of frequent localized flooding along western property line and at the east end of Kewanee Drive.

Flood mitigation measures include diverting floodwaters away from existing homes through the bioswale and sequential detention ponds. The floodplain mitigation proposed for the Hogan-Pancost site development will provide the following benefits:

- Elimination of the High Hazard Zone along the Dry Creek Ditch No. 2 corridor within the Hogan-Pancost property
- Elimination of the Zone AE flood zone from the south property line to Kewanee Drive.

Findings

Storm water management facilities designed to support the development of the Hogan-Pancost, will not adversely affect, and in some cases may improve, conditions on the surrounding properties, irrigation facilities, existing storm drainage system, and South Boulder Creek.

GROUND WATER HYDROLOGY MONITORING & WETLAND DELINEATION REPORT

Author: Western Ecological Resource, Inc.

Reference: Book 3 of 4

The 22.17 acre Hogan-Pancost property, divided into two parcels by 55th Street, includes the 19.44 acre West Parcel and the 2.73 acre East Parcel. A Groundwater Hydrology Monitoring Study and Wetland Delineation were completed on both parcels in 2008 per the methodology of

the 1987 U.S. Army Corps of Engineers (Corps) Wetland Delineation Manual[1] and the Technical Standards for Water-Table Monitoring of Potential Wetland Sites[2]. Please note, the 1987 Corps Manual is also the official Manual used by the City of Boulder to delineate wetlands within the City. The Corps visited the Hogan-Pancost project site to review the results of the groundwater hydrology monitoring study and the wetland delineation and officially approved the wetland delineation and the jurisdictional status of the wetlands via a letter on December 12, 2008.

First, it should be noted that all wetlands on both the West and East parcels evolved due to alterations of the natural hydrology, specifically the introduction of irrigation ditches to upland habitats. The only jurisdictional, or regulated, wetlands on the West Parcel are segments of two active irrigation ditches which have a narrow band of wetland and upland plants along the margins of the flowing water. The aquatic habitat (or the un-vegetated dry ditch bottom during periods when water is not flowing) of these ditches and the narrow fringe of wetland and upland plants have a total area of 0.335 acres. It should also be noted that the large volume of water used to historically flood irrigate the West Parcel and the seepage of water from unlined ditches and laterals has created an additional 0.465 acres of wetland vegetation. However, the Corps does not take jurisdiction over these temporal man-induced areas of wetland vegetation because they lack a natural wetland hydrology, as conclusively demonstrated by the 2008 Groundwater Hydrology Study. These areas will revert to their former upland condition when the flood irrigation is permanently terminated and when the ditches and laterals are permanently lined and piped. Please see the Existing Conditions Wetland Map.

The East Parcel has 1.622 acres of wetlands due to the continuous overflow of water from the irrigation ditch which traverses the parcel and the flood irrigation of a large portion of the property from a lateral. All of the wetlands on the East Parcel were considered jurisdictional by the Corps. However, if flood irrigation of the East Parcel had been terminated during the 2008 Groundwater Hydrology Monitoring Study and if the irrigation ditch had not been filled to over-capacity, a significant portion of the area dominated by wetland plants would not have a natural wetland hydrology and hence would be classified as non-jurisdictional by the Corps.

The irrigation ditch wetlands on the West and East Parcels, the only wetlands regulated by the Corps, have hydrology (groundwater recharge, flood storage & shoreline stabilization), water quality (sedimentation & nutrient retention & removal) and wildlife habitat functions. The irrigation ditches are unlined and therefore the loss of irrigation water or the groundwater recharge function is high and the food storage, shoreline stabilization, water quality, and wildlife habitat functions are generally low to very low. Please note all of the wetlands are on private property and have no recreation functions. It should also be noted that the basic function of these ditches is to convey irrigation water and correspondingly they are regularly cleaned out to maintain the conveyance capacity of the ditch. Finally, the non-jurisdictional wetlands on the West Parcel have no hydrology or water quality functions and the value of the wildlife habitat is low and there are no recreation functions.

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[1] Environmental Laboratory. 1987. Corps of Engineers Wetlands Delineation Manual. Technical Report Y-87-1. U.S. Army Engineer Waterways Experiment Station. Vicksburg, MS. On-line edition.

[2] US Army Corps of Engineers. June 2005. Technical Standard for Water-Table Monitoring of Potential Wetland Sites. Wetlands Regulatory Assistance Program. ERDC TN-WRAP-05-2.

It is important to note that the East Parcel is designated as an Environmental Preservation Area in the BVCP, and will be retained and enhanced as a natural area within the Plan. Specifically, the 1.622 acres of jurisdictional wetlands on this parcel will be preserved and enhanced with wetland shrubs and trees to increase the wildlife habitat function. In addition, 0.228 acres of the jurisdictional and 0.238 acres of the non-jurisdictional wetland impact on the West Parcel will be mitigated on the East Parcel with wetlands of a high quality, and the adjacent upland area will be converted from an agricultural community to riparian habitats and native prairies. Please note, 0.227 acres of non-jurisdictional wetland will be restored on the West Parcel. The preserved wetlands and the proposed wetland mitigations and enhancements, which total 2.422 acres, will significantly increase the ecological value of the wetlands on the West and East Parcels. Please see the Conceptual Condition Wetland Map and the Vegetation & Wildlife Habitat Diversity graphic.

GROUND WATER EVALUATION
Author: Telesto Solutions, Inc.
Reference: Book 3 of 4

Issue
The depth to ground water beneath the project area is relatively shallow and fluctuates seasonally. In the winter months, ground water is deeper and in the summer months, ground water is closer to the ground surface. This rise in ground water elevation in the summer results in pumping of sump pumps from some adjacent home owners. Concerns were raised by neighbors that the proposed Hogan-Pancost property development would negatively impact their required pumping from basement sump pumps.

Approach
Telesto Solutions, Inc. (Telesto) addressed the high ground water elevation issue through scientific and engineering methods related to ground water. Telesto collected scientific information related to the site and surrounding areas, and built a detailed conceptualization model of the ground water flow system. From this conceptualization model, Telesto developed a tool using standard, approved software by the United States Geological Survey (MODFLOW) that allowed testing of the ground water system conceptualization. Using the information gathered, calculations, and the tool, Telesto described the general characteristics of the current ground water flow system, and predicted the changes in the characteristics after the project would be fully developed.

Conclusion
Telesto showed that the main influence on ground water levels near the project area is net recharge (water penetrating the ground surface and being added to the ground water system). In the current condition, the main contributors to net recharge are irrigation of pasture and nearby residential lawns and shrubs, seepage from unlined irrigation ditches when the ditches are flowing, and perennial recharge from South Boulder Creek. Development of the project area will decrease the overall recharge to ground water by eliminating pasture irrigation and ditch leakage by properly sealing or piping the ditch, resulting in a lowering of ground water elevation. The current pattern of recharge will be reduced and the groundwater table will return to more natural levels, particularly in proximity to and either side of the ditches. Although the project

development will reduce net recharge, Telesto's analysis shows that the current basement sump pumping will not be decreased dramatically because other contributors to the rise in ground water elevation cannot be eliminated by the project.

PRELIMINARY SUBSURFACE INVESTIGATION
Author: Western Soils, Inc.
Reference: Book 3 of 4

Preliminary subsurface investigation was completed through the excavation of 13 test holes. The soil profiles were carefully logged by the project engineer. Hand driven samples were taken at selected intervals through out the test pits and returned to the engineer's lab for testing.

Generally, a thin layer of topsoil was encountered at the surface underlain by a relatively thin deposit of clayey, sandy silt, or silty sandy clay. These soils continued down approximately 1 to 3 feet below the existing ground surface and were underlain by a deposit of sand and gravel soil intermixed with cobbles. The sand and gravel soils continued to the maximum depth of the test holes, 8 feet beneath the existing ground surface.

Ground water seepage was encountered in the test pits at approximately 8 inches to 6 feet beneath the existing ground surface. The groundwater level will fluctuate through out the year depending upon the season, the amount of precipitation and runoff and the application of irrigation water. The two seasonal irrigation ditches present along the south and west sides of the property typically recharge the naturally occurring ground water level on this property when they are flowing full of water. According to Telesto Solutions, the environmental consulting firm that analyzed the ground water hydrology, the recharge of ground water from the leaking ditches will be reduced when the ditches are properly lined or piped.

Based on the soil conditions encountered in the test holes, it is the opinion of the Soils Engineer that buildings constructed on the site can be supported on spread footings, either continuous spread footings or isolated pad footings.

VEGETATION & WILDLIFE EXISTING CONDITIONS
Author: Western Ecological Resource, Inc.
Reference: Book 3 of 4

The historical agricultural land use of the West and East Parcels of the Hogan-Pancost property eliminated the native prairie when agricultural seedings were introduced along with an extensive flood irrigation system. Today, the 19.44 acre West Parcel is dominated by 9.899 acres (44.65%) of a degraded agricultural pastureland and 8.260 acres (37.26%) of weeds (many of which are classified as Colorado noxious weeds) in disturbed areas created by black-tailed prairie dogs. Less abundant mapping units include jurisdictional (0.335 acres or 1.51%) and non-jurisdictional (0.465 acres) wetlands, structures (0.058 acres) and an unvegetated graveled area (0.421 acres). The 2.73 acre East Parcel is characterized by 1.622 acres of jurisdictional wetlands, 0.324 acres of a cottonwood forest, 0.689 acres of pastureland, and 0.095 acres of weeds. Please see the Vegetation & Wildlife Habitat Existing Conditions Map.

The pasturelands on the West Parcel have been severely degraded in recent years due to the rapid increase in the prairie dog population, which creates disturbed areas for the colonization and perpetuation of populations of weeds. If current trends continue, most of the West Parcel may be dominated by dense stands of noxious and other weeds in the near future. The pastureland, wetlands and the small cottonwood forest on the East Parcel are all degraded by populations of noxious and other weeds. If the prairie dog population expands to the East Parcel there will be a further expansion in the population of weeds.

Wildlife supported by the agricultural and weedy vegetation of the Hogan-Pancost property, located in an urban setting, is limited to habitat generalists capable of existing in highly modified landscapes close to human habitation. The most common wildlife species present include rodents, small mammals and songbirds. The most abundant birds include non-native and undesirable species such as the European starling, English sparrow and rock pigeons. Raptors may use the property for hunting; however no raptor nests are present on the property or adjacent areas.

The Boulder County Comprehensive Plan's Natural Communities, Rare Plants, Riparian Corridors, and Critical Wildlife Habitats Map does not identify any significant natural communities, significant riparian corridors, rare plants, or critical wildlife habitat to be present on the Hogan-Pancost property or on adjacent areas.

As discussed in the Wetland Mitigation/Enhancement & Prairie & Riparian Habitat Creation summary section, 4.250 acres of wetland, riparian and prairie habitat would be created on the West Parcel in the stormwater drainage channel referred to as the bioswale. Proposed East Parcel habitat creations include 0.784 acres of wetlands, riparian and prairie habitat, plus woody plant enhancements to 0.252 acres of existing wetlands. Thus, 5.034 acres of new high quality habitat would be created, and combined with the 2.053 acres of preserved wetland and riparian habitat, the development would have 7.087 acres (32%) of high quality habitat. Weeds in the wetland and upland habitats of the East Parcel would be eradicated to enhance the quality of the habitat. Please see the Vegetation & Wildlife Habitat Conceptual Conditions Map and the Vegetation & Wildlife Habitat Diversity graphic.

SPECIES OF CONCERN
Author: Western Ecological Resource, Inc.
Reference: Book 3 of 4

Federal, state and Boulder County species of concern were addressed for the Hogan-Pancost property. Specifically, species and habitats of concern evaluated included federal threatened, endangered and candidate species, Colorado Division of Wildlife identified threatened and endangered species, and species and habitats identified and mapped by the Boulder County Comprehensive Plan's Natural Communities, Rare Plants, Riparian Corridors and Critical Wildlife Habitats Map.

The U.S. Fish and Wildlife Service (2010) identified two fish, four birds, two mammals, and three plants with potential habitat in Boulder County or that may be impacted by projects that create new water depletions in the South Platt River. Five of 11 species including the pallid

sturgeon, piping plover, whooping crane, least tern, and the western prairie fringed orchid are only impacted by projects that create water depletions in the South Platter River ecosystem, and the proposed development will not create any water depletions. There is no habitat on the Hogan-Pancost property for the green cutthroat trout, Mexican spotted owl, Canada lynx, or the Colorado butterfly plant. Numerous Habitat Assessments have been conducted for the Ute Ladies' tresses orchid and the Preble's meadow jumping mouse. No individuals or populations of the Ute Ladies' tresses orchid were identified by William Jennings, a botanical consultant, during his six habitat surveys and assessments of the property from 1994 to 2008. Similarly, numerous habitat assessments for Preble's meadow jumping mouse were conducted by Dr. Robert Stoecker from 2003 through 2008. His first study in 2003 concluded that "the site is unlikely to support a population of Preble's meadow jumping mice or to function as a movement corridor and therefore should be excluded from further considerations." His report was submitted to Susan Linner of the U.S. Fish and Wildlife Service, who responded in an August 25, 2003 letter which stated that "the Service finds the report acceptable and agrees that a population of Preble's is not likely present within the subject area".

The Colorado Division of Wildlife has identified 74 species as being threatened, endangered or of a special concern in the state. However, only 34 of these species have potential habitat in Boulder County. These include two amphibians, thirteen birds, ten fish, six mammals, one reptile, and two mollusks or shellfish. Of the 34 species on the list, only the black-tailed prairie dog is know to occur on the property. In addition, four species could potentially occur although their presence has not been documented. These include the burrowing owl, ferruginous hawk, bald eagle, and the common garter snake. Although ferruginous hawks and bald eagles may forage on the property, there are no raptor nests on-site or in the immediate vicinity. Furthermore, no burrowing owls were present during the 2008 growing season and the common garter snake has not been observed.

Finally, there are no natural communities, rare plants, riparian corridors, or critical wildlife habitat as identified by the Boulder County Comprehensive Plan on the Hogan-Pancost property.

WETLAND MITIGATION/ENHANCEMENT & PRAIRIE & RIPARIAN HABITAT CREATIONS
Author: Western Ecological Resource, Inc.
Reference: Book 3 of 4

The proposed Boulder Creek Commons development would preserve wetland and riparian habitat, and impact pastureland, populations of weeds, jurisdictional wetlands (legal & regulated) and non-jurisdictional wetlands. Existing un-impacted jurisdictional wetlands would be preserved, protected and enhanced to create wetlands with higher qualities and functions. Impacts to jurisdictional and non-jurisdictional wetlands would be mitigated by creating new wetlands on the West and East Parcels. Furthermore, new prairie and riparian habitat would be created on both the West and East Parcels to enhance the ecological value of the open space and provide water quality enhancement and wildlife habitat functions.

[1] U.S. Fish & Wildlife Service. 2010. Colorado Field Office County List. Updated March 2010. Available at http://www.fws.gov/mountain-prairie/endspp/countylists/colorado.pdf.

As verified by the U.S. Army Corps of Engineers, the Hogan-Pancost property has jurisdictional wetlands on the West (0.335 acres) and East Parcels (1.622 acres). The proposed development will impact 0.228 acres, or 11.7 % of the total acreage of jurisdictional wetlands, when Dry Creek Ditch #2 on the West Parcel is piped. Please note, this is the only development impact to jurisdictional wetlands. The Dry Creek Ditch #2 Wetland is characterized by a narrow band of wetland and upland plants along the edge of the flowing irrigation water. Portions of the remaining un-impacted jurisdictional wetlands (1.729 acres) would be enhanced with 0.094 acres of native tree and 0.158 acres of shrub plantings, and weeds throughout the preserved wetlands would be eradicated. Furthermore, the 0.324 acre cottonwood forest on the eastern end of the East Parcel would be preserved. Impacts to jurisdictional (0.228 acres) and non-jurisdictional (0.465 acres) wetlands will be mitigated on the West (0.227 acres) and East Parcels (0.466 acres). Specifically, a wetland with native herbaceous plants will be created in the southwest corner of the West Parcel and herbaceous wetlands with native shrubs will be created in three upland inclusions amid the wetlands on the East Parcel. The new wetland creations will have a high diversity of native herbaceous and woody plants, and correspondingly have a significantly higher ecological value than the existing degraded wetlands. Please see the Wetland Map Conceptual Condition.

Prairie and riparian enhancements are proposed for both the West and East Parcels. The stormwater drainage channel on the West Parcel, referred to as the bioswale, will have a 1.102 acre tall grass prairie on the bottom of the channel and 2.921 acres of short grass prairie with riparian trees and upland riparian shrubs on the terrace and side slopes of the channel. East Parcel enhancements include replacement of the pastureland vegetation by expanding the cottonwood forest by 0.125 acres, creating 0.090 acres of a peach-leaf willow forest and by creating 0.103 acres of tall grass prairie.

In summary, the development would preserve and enhance 1.729 acres of jurisdictional wetlands, preserve 0.324 acres of cottonwood forest, impact 0.228 acres of jurisdictional and 0.465 acres of non-jurisdictional wetlands, and create 0.693 acres of wetlands and 4.341 acres of prairie and riparian shrub and tree habitat. Thus, the development would have 7.087 acres of preserved, enhanced and created habitat of a high quality. This represents 32.0 % of the total area of the development. Please see the Vegetation and Wildlife Habitat Conceptual Conditions Map, Vegetation and Wildlife Habitat East Parcel Detail Conceptual Conditions Map, and the Vegetation & Wildlife Habitat Diversity graphic.

TRANSPORTATION IMPACT FEASIBILITY STUDY
Author: Drexel, Barrell & Co.
Reference: Book 4 of 4

The “Transportation Impact Feasibility Study” examines the potential project-generated traffic impacts on the surrounding roadway system in the vicinity of the proposed Hogan-Pancost Property residential development. The study incorporates the projected transportation impacts of the potential development of the Hogan-Pancost Property along with the projected overall regional growth in demand anticipated as part of the City of Boulder transportation model (background traffic volumes). The analysis includes impacts for the projected build-out year - Year 2012 – and long-range planning year - Year 2025.

Methodology
This study was conducted in accordance with the scope outlined by the City of Boulder Transportation staff and includes Level of Service analyses for the following intersections in the vicinity of the Hogan-Pancost Property:

- South Boulder Road/Manhattan Drive
- South Boulder Road/55th Street
- Baseline Road/Manhattan Drive
- Baseline Road/55th Street
- Kewanee Drive/Manhattan Drive
- Proposed Street Connection to 55th Street

In addition, 24 hour volume and speed counts were prepared for Manhattan Drive and 55th Street.

The traffic to be generated as a result of this project has been estimated based upon trip generation rates contained in the 7th Edition Trip Generation Manual, published by the Institute of Transportation Engineers, 2003. At the direction of City of Boulder Transportation staff; the analyses were prepared with and without an access to the existing Kewanee Drive.

Findings
The study identifies certain intersections in need of modifications. The contributions of the Hogan-Pancost Property are relatively limited as peak hour conditions due to projected background traffic growth independent of the impacts of development of this property suggest that the modifications be made. Modifications to the southbound approach of South Boulder Road and 55th Street intersection are recommended to accommodate a separate 50 foot left turn lane and associated taper. With these modifications, this stop-controlled approach as a whole should remain acceptable through Year 2025.

With the Kewanee Drive access, modifications to the intersection of South Boulder Road and Manhattan Drive are recommended and include re-striping to accommodate an exclusive southbound left-turn lane and a shared through/right-turn lane. Analysis indicates that a 75-foot left turn bay and associated taper should be adequate to accommodate Year 2025 volumes.

If these recommendations are followed, the transportation network in the vicinity of the Hogan-Pancost Property development can accommodate the addition of project generated traffic.

PROPOSED CONCEPTUAL LAND USE DIAGRAM

In order to provide context for the mitigation strategies outlined in the summaries above and detailed in Books 2-4, it was necessary to develop a conceptual land use diagram indicating a potential organizational concept for the site. This conceptual land use diagram is used only for purposes of demonstrating how the findings of these reports and mitigation strategies might be applied. More detailed design and documentation will be provided in the Concept Plan submittal.

The conceptual land use diagram for the property was used to address a variety of natural factors, notably 100-year floodplain and storm drainage issues, wetlands mitigation, existing and proposed vegetation and preservation of natural areas, open space trails and connectivity of the

property with adjoining trail networks. This conceptual land use diagram incorporates an integrated network of “bio-swales”, and stormwater detention and incorporate prairie and riparian habitats to provide an environmentally sensitive solution to the most effective long-term utilization of the site. The proposal also identifies and delineates the areas on the property where wetlands can best be sustained and enhanced in a high-quality environment that creates the greatest value to the community.

The objective of the conceptual land use diagram is to document and recognize the existing environmental conditions and features characterizing the site, and to offer an approach which results in improved future environmental conditions as part of the integrated plan.