Wetland Mitigation Plan

Boulder Creek Commons Property

Boulder County, Colorado

prepared for:

BCC, LLC
1526 Spruce Street, Suite 260, Boulder, CO 80302

prepared by:

Western Ecological Resource, Inc.
711 Walnut Street, Boulder, CO 80302

December 2012

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1.0 Introduction

BCC, LLC has plans to develop the 21.8 acre Boulder Creek Commons (Hogan Pancost) property located in Boulder County, Colorado, southwest of the East Boulder Community Park (Figure 1). 55th Street bisects the property to create a 2.7 acre East Parcel and a 19.1 acre West Parcel. Specifically, the property is located in parts of Sections 3 and 4 of Township 1 North and Range 70 West in Boulder County (Figure 2).

The proposed project would impact City of Boulder (City) regulatory wetlands, create wetland mitigations and enhance existing wetlands. These creations and enhancements would augment the ecological value of the project site and increase the functions and values of the wetlands, especially the wildlife habitat and water quality functions. Details of the wetland impacts, mitigations, enhancements, and creations are discussed below.

Please note, Figures are located in Section 8.0 and Tables are in Section 9.0.

2.0 Environmental Setting

The project site lies at approximately 5,300 feet in elevation and is undeveloped except for several small sheds associated with an agricultural land use. Numerous barbed wire steel fences partition the property into various sized lots. Historically, the parcel has had an agricultural land use which likely extends back to the settlement era in the late 1800's.

There are several irrigation ditches and laterals within and adjacent to the property, which has been actively flood irrigated in the past. More specifically, Dry Creek Ditch #2 (Ditch) parallels the western boundary of the West Parcel, and the Howard Super-phosticle lateral bisects the East Parcel, the east end of the West Parcel, and the northwest corner of the West Parcel. The CD Bodam lateral occurs along the south boundary of the West Parcel. Today the project site receives seepage and occasional unintended overflows from the ditches.

The vegetation of the project site is characterized by an upland pasture, disturbed weedy areas, small flood irrigation-induced wetlands, and one small stand of plains cottonwood trees *(Populus deltoides)* on the east end of the East Parcel. The upland pasture areas are best developed in swales just north of the CD Bodam lateral where they have been historically flood irrigated and receive overflows from this lateral. These areas are characterized by introduced agricultural wetland and facultative plants such as meadow fescue *(Festuca pratensis)* and redtop *(Agrostis gigantea),* and numerous upland species, including timothy *(Phleum pratense),* Kentucky bluegrass *(Poa pratensis),* chicory *(Cichorum intybus),* narrow-leaf birds-foot trefoil *(Lotus tenuis),* curly dock *(Rumex crispus),* and red clover *(Trifolium pratense).* Also present are natives such as Baltic rush *(Juncus arcticus subsp. ater),* big bluestem *(Andropogon gerardii)*, Indian grass *(Sorghastrum nutans),* and western wheatgrass *(Pascopyrum smithii)*.

Weedy areas occur in the slightly higher elevations of the project site where prairie dogs have created disturbed landscapes. The weedy areas have significantly increased in size due to the termination of flood irrigation and the increased prairie dog activity. These areas have a low vegetation cover composed of a diversity of Colorado state listed noxious weeds and other introduced plants. The most abundant weeds in the West Parcel include Scotch thistle *(Onopordum acanthium),* diffuse knapweed *(Acosta diffusa),* Canada thistle *(Cirsium arvense),* mullein *(Verbascum thapsus),* chicory, and field bindweed *(Convolvulus arvensis).* The East Parcel has large stands of teasel *(Dipsacus fullonum)* intermixed with the wetland plants, as well as stands of Canada thistle and a few Russian olive *(Elaeagnus angustifolia)* trees.

A small stand of plains cottonwood trees occurs in the eastern end of the Ease Parcel. The understory is comprised of upland and facultative plants such as smooth brome *(Bromus inermis),*

meadow fescue *(Festuca pratensis),* Canada goldenrod *(Solidago canadensis),* and goldenbanner *(Thermopsis divaricarpa).* Table 1 provides a complete list of plant species observed on the project site.

Finally, the project site provides habitat for urban wildlife adapted species, including songbirds and small mammals. Prairie dogs occur on the site, and with termination of flood irrigation practices in 2008, the population has expanded and now occupies a greater portion of the West Parcel. The prairie dogs have enlarged the areas of disturbance and correspondingly increased the abundance of undesirable noxious weeds.

3.0 Existing Wetlands

Below is a brief summary of the wetlands on the project site. For a full description, see *City of Boulder Wetland Delineation Report, Boulder Creek Commons Property* (WER 2011).

3.1 Identification & Delineation

In 2011 a revised wetland delineation of the project site was conducted for and approved by the City of Boulder (WER, 2011). The wetland delineation was conducted in accordance with the U.S. Army Corps of Engineers Wetland Delineation Manual (1987) and the 2010 Great Plains Regional Supplement. Compared to the 2008 wetland study, the 2011 study shows an increase in the number and size of the wetlands on the West Parcel and a decrease in the size of the wetlands on the East Parcel. These changes were likely due to an increased use of irrigation waters on the CD Bodam property to the south of the West Parcel, and by higher 2011 seasonal precipitation levels. The decrease in size of the wetlands on the East Parcel was likely the result of the termination of most flood irrigation in the fall of 2008. Figure 3 illustrates the 2011 wetland boundaries.

3.2 Description

All of the wetlands on the project site appear to be supported by a flood irrigation-induced wetland hydrology associated with the unlined Dry Creek Ditch #2, from unintentional overflows from the CD Bodam lateral, and from the Howard Super-phosticle lateral. Precipitation also likely contributes to the hydrology of these wetlands, but plays a relatively minor role. The majority of these wetlands are herbaceous. Common plant species in the wetlands include redtop, Baltic rush, Nebraska sedge *(Carex nebrascensis)*, meadow fescue *(Festuca pratensis)*, Macoun's buttercup *(Ranunculus macounii),* and water smartweed *(Persicaria amphibia).* Some prairie cordgrass *(Spartina pectinata)* is present as well. Along the edges of the wetlands are both upland and wetland species, such as Indian grass, big bluestem, western wheatgrass, naked spike ragweed *(Ambrosia psilostachya)*, and white panicle aster *(Aster lanceolatus ssp. hesperius).* Numerous noxious weed species are present adjacent and within the wetlands including Canada thistle, Russian olive and teasel, the latter of which is abundant within wetlands on the East Parcel.

3.3 Function & Values Assessment

The Revised Wetland Delineation (WER 2011) included a functional assessment of the wetlands using City of Boulder criteria. All of the wetlands scored 25 or less, and hence are *Low Functioning*. Buffers from Low Functioning wetlands are 25 feet in width. See Tables 1 and 2.

3.4 Species of Concern

Federal, state and Boulder County species of concern were addressed for the Boulder Creek Commons property. Specifically, species and habitats of concern 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 water depletions in the South Platte 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 Platte River ecosystem. The proposed development will not create any water depletions. There is no habitat on the Boulder Creek Commons 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. " Robert Stoecker visited the project site on July 14, 2008, to update his 2003 report. He concluded, as before, that field trapping surveys are not needed as there is no appropriate habitat on the site.

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 known 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 2011 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 Boulder Creek Commons property.

4.0 Wetland Impacts

All of the proposed development would occur on the West Parcel and the East Parcel would become open space. As shown by Figure 4, the proposed project would permanently impact City regulatory Wetlands A through G (Table 3). The total City regulatory wetland impact is 0.942 acres which be mitigated at a 2:1 creation:impact ratio, or 1.884 acres. In addition, portions of Wetland B on the West Parcel and Wetland H and I on the East Parcel may be impacted during the enhancement of these areas. These impact areas total 0.791 acres and will be mitigated at a 1:1 ratio. Thus the total wetland mitigation and enhancement is 2.675 acres (1.884 + 0.791).

Please note, Dry Creek Ditch #2 and the Howard Super-phosticle lateral are not considered regulatory by the City, but are considered jurisdictional by the U.S. Army Corps of Engineers (Corps). In November 2008, a Wetland Permit Application was submitted to the Corps for the piping of Dry Creek Ditch #2. On December 12, 2008, the Corps issued Permit No. 1992-80-484 for the piping of the Ditch. This permit was recently updated (See Appendix A).

5.0 Wetland Mitigation & Enhancements

The 2.675 acres of wetlands to be created and enhanced occur on both the West Parcel and the East Parcel. Each of these areas is described below. Please note, each wetland mitigation contains creation areas and enhancement areas. Those wetlands created in upland areas are considered creations and while the existing wetland area that may be disturbed will be enhanced, and are considered restorations.

5.1 Mitigation Concept Plan

5.1.1 West Parcel Wetland Mitigation

Location & Land Ownership. The West Parcel Wetland Mitigation would be constructed in the southwest corner of the West Parcel east of the inlet for Dry Creek Ditch #2, which will be piped. The creation site borders the undisturbed portion of Wetland B. The site is bordered by a 50 foot wide natural area buffer on the east and north, by the Keewadin Meadows subdivision to the west, and by private land owned by CD Bodam to the south. The mitigation site is privately owned by East Boulder Properties LLC. See Figure 5.

Landform. Very little grading for the West Parcel Mitigation is anticipated as the majority of the site is dominated by an existing wetland and surrounded by a relatively flat topography only slightly higher in elevation. The landscape will be lowered slightly along the east boundary of the site in an upland area to create appropriate habitat for the growth of herbaceous wetlands. Similarly, the topography for the riparian forest wetland would be lowered to an elevation slightly higher than the existing wetland. The proposed grade will match the grade of the existing wetland. Please note, the proposed lot to the east of this wetland would lie approximately 6 feet higher than the West Wetland and the lot to the north would lie approximately three feet higher.

Hydrology. Water for the existing Wetland B is provided by seepage from the CD Bodam lateral and the general high groundwater table. These water sources may continue to contribute water for Wetland B and the proposed wetland creations surrounding Wetland B following project development. However, an auxiliary water source will be provided in the event that the water sources are inadequate or if the CD Bodam lateral were to be piped in the future. Specifically, water will be provided by a diversion from Dry Creek Ditch #2, of which the property owner has three shares.

Vegetation. The West Wetland would have herbaceous and forested wetland communities. Herbaceous wetlands would be created on the east side of Wetland B by salvaging wetland plants and topsoil from the wetland impact sites and by using native wetland seed and live plants. After the landscape is lowered for the proposed herbaceous wetlands, topsoil and salvaged wetland plants will be applied. Next, the site will be broadcast seeded with the seed mix of Table 4, which is characterized by seven grasses, nine sedges and rushes, and six forbs. All of these wetland plants are common to wetlands on the plains of eastern Colorado. The greenhouse grown shrubs, grasses, sedges/rushes, and forbs of Table 5 will be planted in appropriate habitats, depending on the success of the salvaged plant material and the seed mix.

A riparian forest wetland will be created in the northwest corner of the mitigation site. The understory will be seeded with the wetland seed mix of Table 4 and then native greenhouse grown plains cottonwood and peachleaf willow trees of Table 5 will be planted. The unimpacted portion of the existing Wetland B will be planted with native wetland trees and shrubs of Table 5 in small stands throughout the site to create structural diversity. Please note, all trees will be located at least ten feet from existing and proposed utility mains and services.

The 50 foot wide buffer area outside of the wetland mitigation on the project site would be seeded to the native shortgrass prairie seed mix of Table 6 and planted with the native prairie shrubs of Table 7 which will further enhance the ecological value of the West Wetland. Finally, an integrated weed management plan would be developed and implemented for the site.

Populations of noxious or otherwise undesirable plant species will be quickly and effectively eradicated in order to create a high quality and diverse wetland community.

5.1.2 East Parcel Wetland Mitigation

One of the goals of the project is to significantly enhance the ecological value of the East Parcel. This will be achieved by creating new wetlands in upland sites to compensate for wetland impacts on the West Parcel, enhancing existing wetlands with trees and shrubs to increase structural diversity, and expanding the size of the existing riparian forest. See Figure 6.

Location & Land Ownership. The East Parcel Wetland Mitigation would encompass the majority of the East Parcel, excluding the existing riparian cottonwood forest which would not be impacted. The site is bordered by 55th Street on the north and west and private land owned by JF and MB Kent to the south. City of Boulder open space and South Boulder Creek lie to the east. The mitigation site is privately owned by East Boulder Properties LLC.

Landform. Most of the existing wetlands on this parcel are infested with undesirable populations of weeds. Therefore, when the site is graded, the top 3-4 inches of soil in these wetlands will be removed and hauled off-site. Next, the landscape of the wetland creation site will be graded to create a topography that slopes and drains to the east and south. The area adjacent to the proposed irrigation ditch will have the lowest topography and provide habitat for the herbaceous community. Areas more distant from the ditch will be slightly higher in elevation and provide habitat for woody plant communities. A detailed grading plan will be developed prior to project commencement.

Hydrology. Water for the wetland creation site will come from the Dry Creek Ditch #2, of which the owner of the property has 3 shares. A portion of water rights of the property would be dedicated to the East Mitigation Site for use in wetland creation. Water from the Dry Creek Ditch will be directed into the CD Bodam Lateral and then into the East Parcel. The water will then be diverted to an irrigation ditch which will arch around the western and northern property boundary and extend across the Howard Super-phosticle lateral in a pipe to provide water to the area east of the lateral.

Vegetation. Herbaceous wetlands would be created by using native wetland seed and salvaged wetland plants from impact sites free of weeds. Live greenhouse grown herbaceous plants would be used if necessary. After the landscape is lowered, the salvaged wetlands would be added and the site would be seeded with the seed mix of Table 4. The greenhouse grown grasses, sedges, rushes, and forbs of Table 5 would be planted in appropriate habitats if germination from the seed mix and salvaged wetland plants are sparse.

Forested wetlands will be created by first seeding the area with the wetland seed mix of Table 4 and then planting greenhouse grown plains cottonwood and peachleaf willow trees on approximate 20 foot centers. Willow shrublands will be created by first seeding the site with the wetland seed mix of Table 4 and then sprigging native-collected sandbar willow sprigs in the designated areas. Sprigs will be planted in the spring prior to leaf emergence to maximize success.

Existing wetlands with native wetland plants and not infested with weeds will remain, but may be graded in some areas to enhance the hydrology. Existing wetlands infested with weeds will be removed and restored to a herbaceous community using wetland plants salvaged from the West Parcel and the wetland seed mix of Table 4.

5.2 Functions & Values

The East and West Wetland Mitigation sites will be High Functioning wetlands. Most ratings are medium (3) for each function, with the exception of wildlife habitat which has a rating of high (4).

The impacted wetlands had ratings of low (2) or none (1). The created wetlands have higher values than the impacted wetlands because they will be larger in size, will have enhanced structural diversity, and will have a greater plant species diversity. See Table 8 for detailed ratings for each of the wetland functions.

5.3 Cost & Probability of Success

The earthwork, herbaceous and woody plantings, and seeding will cost approximately $300,000. The probability for success of the restoration is high because the woody and herbaceous species specified are appropriate for the elevation, soil conditions and expected hydrology of the mitigation area, and the planted trees and shrubs will be watered until the roots become well developed and reach the water table. Furthermore, these species have been successful in similar habitat restorations within Boulder County and elsewhere in the plains of eastern Colorado.

5.4 Timetable for Construction & Monitoring

The earthwork, seeding and planting will likely occur in 2013, commensurate with the construction of the West Parcel. The monitoring of wetland establishment would be completed during the growing season and the Annual Monitoring Report would be submitted to the City before September 1 of each monitoring year.

5.5 Maintenance & Monitoring

5.5.1 Maintenance Activities

Several times during the growing season, a wetland ecologist will visit the wetland mitigation sites to note the hydrological functioning, evaluate the success of the seeding and planting and note any problems with erosion, weeds, or animal usage. If the seed mix has not germinated in some areas, these areas will be reseeded. If shrubs or trees have died, they will be replaced to comply with the Success Criteria. If weeds are a problem, they will be eradicated, and any temporary irrigation system will be maintained.

5.5.2 Qualitative Monitoring Activities

The East and West Wetlands will be qualitatively monitored throughout each growing season for five consecutive years, following seeding and planting, or until a self-sustaining community has been created and the success criteria are achieved. A list of all plants growing in mitigation will be compiled, their potential source (seed mixes, plantings, colonizer from surrounding area, residual to site) indicated, and their ecological role discussed. The vegetation will be qualitatively described with respect to species composition and dominance. A wetland ecologist will determine the general survivability and condition of woody plantings, indicate relative vigor, discuss damage due to human and animal usage, and assess reasons for any plant loss. The success of the wetland seed mix will be evaluated. A list of all weeds growing in the wetlands will be compiled and any large populations will be mapped and described as to density and extent. The hydrology will be also be monitored. Specifically, the duration and amount of irrigation supplied to the wetlands will be evaluated to determine if it is appropriate for the development of the specified wetland communities, and any erosion or areas of instability will be noted. Finally, recommendations will be provided in order to ensure the wetland mitigations meet the success criteria in a timely and effective manner.

5.5.3 Quantitative Vegetation Monitoring Method

Vegetation cover will be quantified along six permanently located transects within the mitigation sites. Each transect will be 50 meters in length and have permanent markers at each end. A photograph will be taken each monitoring year from fixed points at the ends of each transect.

Vegetation cover will be quantified using a point-intercept method (Mueller-Dombois and Ellenberg, 1974). One hundred points will be sampled at one meter intervals along the 50 meter transect. At each meter interval, one sample point will be recorded on each side of the transect.

The sample point will be perpendicular to and 0.50 meters from the transect. A tripod mounted ocular sighting instrument, with fine cross hairs for point definition and a magnification lens, will be used to record the cover data. The sighting instrument has an adjustable mirror to allow sampling of overstory vegetation. At each sample point, the tripod with the mounted sighting instrument is centered, and the adjustable arm oriented perpendicular to the transect, first on the right and then on the left. If overstory vegetation is present, the sighting device is directed upward to record any overstory vegetation and then directed downward to record vegetation in potential shrub and herbaceous canopies. Vegetation along the vertical profiles is recorded as first, second and third hits. If vegetation is not present along the vertical profile, litter, rock, or soil is recorded. All vegetation hits are recorded by species.

For each cover transect, the absolute percent cover of vegetation, litter, rock, and soil will be calculated using only first hit data. The relative cover of each species will be calculated using all hit data. The data for all six transects will be summed to describe the entire community. Data on species richness (diversity) will be collected by identifying all plant species present in the two meter wide quadrat centered along the 50 meter cover transect and an index of floristic quality (FQI) will be generated.

5.5.4 Success Criteria

The wetland mitigations will be considered successful when:

- 1.884 acres of wetlands have been created.
- 0.791 acres of wetlands have been enhanced.
- 80% of the planted trees and shrubs are alive after three years.
- It is dominated by plants of Table 4 Wetland Seed Mix, Table 5 Native Wetland Plantings, and desirable native colonizers.
- It has a vegetation cover of at least 80% as determined by a point-intercept quantitative cover method.
- No Colorado noxious weeds on List A are present.
- It does not have a noxious weed cover greater than 5% absolute cover, and has no areas 100 square feet or larger dominated by weeds.
- It has a plant species diversity of at least 15 desirable native plants.

5.5.6 Annual Reporting

Following the creation of the new wetlands and enhancement of the existing wetland areas, an As-Built Assessment Report will be prepared and sent to the City. The report will document details of the mitigation construction, including grading of the sites, wetland impact site salvage and application, the planting of all trees and shrubs, as well as the seeding of the two areas.

The years following completion of the As-Built Assessment Report, an Annual Monitoring Report will be submitted to the City each year to describe the progress of plant growth in the East and West Wetlands. The Annual Monitoring Report will document all maintenance activities completed, including any additional seedings and/or plantings, list the plant species in the sites, estimate total vegetation cover, describe the developing communities, discuss weeds and weed control, describe how the hydrology is functioning, and assess the success of the channel enhancement and buffer seeding. The report will also include the results and an analysis of the quantitative monitoring including photographs.

5.6 Fiscal, Administrative & Technical Competence

Western Ecological Resource, Inc. (WER) will work with the Applicant's earthmover, engineers and landscape architects to implement this mitigation plan. WER is an ecology consulting firm

which provides a full range of ecological services. WER has 34 years of professional experience and has 26 years of wetland experience including delineation, permitting, functional assessment mitigation design, creation, maintenance, and monitoring. WER has successfully created over 100 wetland mitigations. One of the projects, the Wernimont Ponds Regional Stormwater Detention Facility located in Loveland, Colorado, was recognized for excellence in drainage and flood control projects by the Colorado Chapter of the American Public Works Association. In addition, Ms. Margaret Langworthy of the Corps called the Wernimont Ponds project "the finest mitigation site I have seen in the State of Colorado." WER's website at www.WesternEco.com provides further details on their administrative and technical competence, as well as examples of successful wetland creations.

6.0 Figures

BASE: Map Data Mapquest 2008 NAVETQ or TeleAtlas

FIGURE 1. Vicinity Map
Boulder Creek Commons

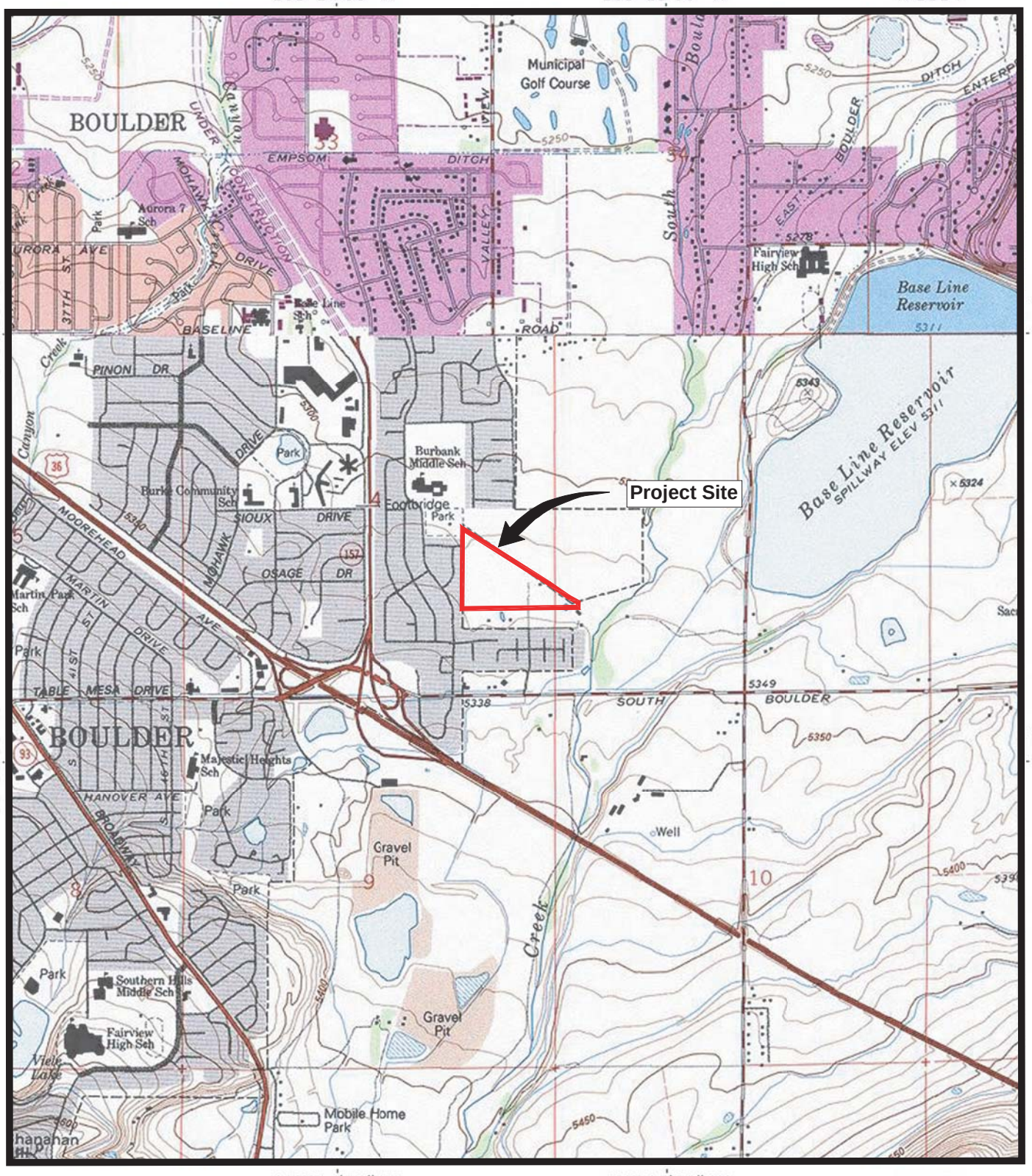
N

Scale 1" = 600'

WESTERN
ECOLOGICAL
RESOURCE, INC.
711 Walnut Street • Boulder, CO 80302

R 70 W

105°14'00" W 105°13'00" W WGS84



105°14'00" W 105°13'00" W WGS84

BASE: USGS 7.5 Minute Louisville, Colorado Quadrangle
Photorevised: 1990

FIGURE 2. Project Location Map
Hogan Pancost Property

WESTERN ECOLOGICAL RESOURCE, INC.
711 Walnut Street • Boulder, CO 80302

N

Scale 1" = 2000'
Contour Interval = 10'

West Parcel	Regulatory (acres)	Non-Regulatory (acres)	Functional Rating
Wetland A	0.123		17-LOW
Wetland B	0.737		17-LOW
Wetland C	0.065		17-LOW
Wetland D	0.159		17-LOW
Wetland E	0.003		17-LOW
Wetland F	0.228		17-LOW
Wetland G	0.027		17-LOW
Wetland J	0.035		23-LOW
Dry Creek Ditch #2		0.228	
Super-Phosticle Lateral		0.090	
Subtotal West Parcel	**1.377**	**0.318**	
East Parcel			
Wetland H	0.109		23-LOW
Wetland I	0.282		23-LOW
Super-Phosticle Lateral		0.077	
Subtotal East Parcel	**0.391**	**0.077**	
Total	**1.768**	**0.395**	**LOW**

Figure 3. 2011 Wetland Delineation Map
Boulder Creek Commons

COB Regulatory Wetlands

COB Regulatory Aquatic Habitat

COB Non-Regulatory Wetlands (Wetlands in Ditches & Laterals)

Pit 12 — 2011 Soil Pits

Property Boundary

Ditch/Lateral

COB = City of Boulder
Scale: 1 inch = 120 feet
Contour Interval = 1 foot
Date: June 2012

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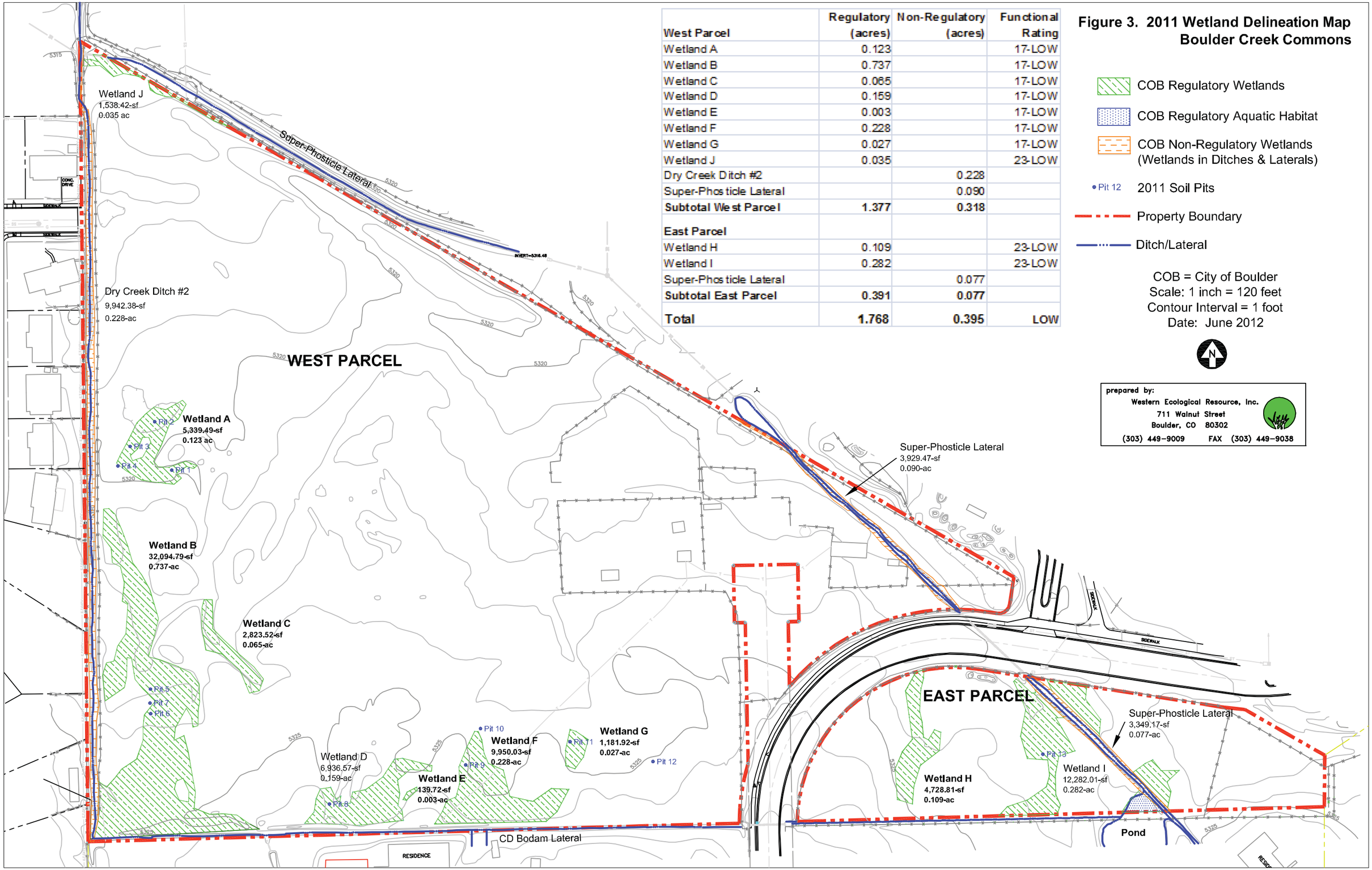

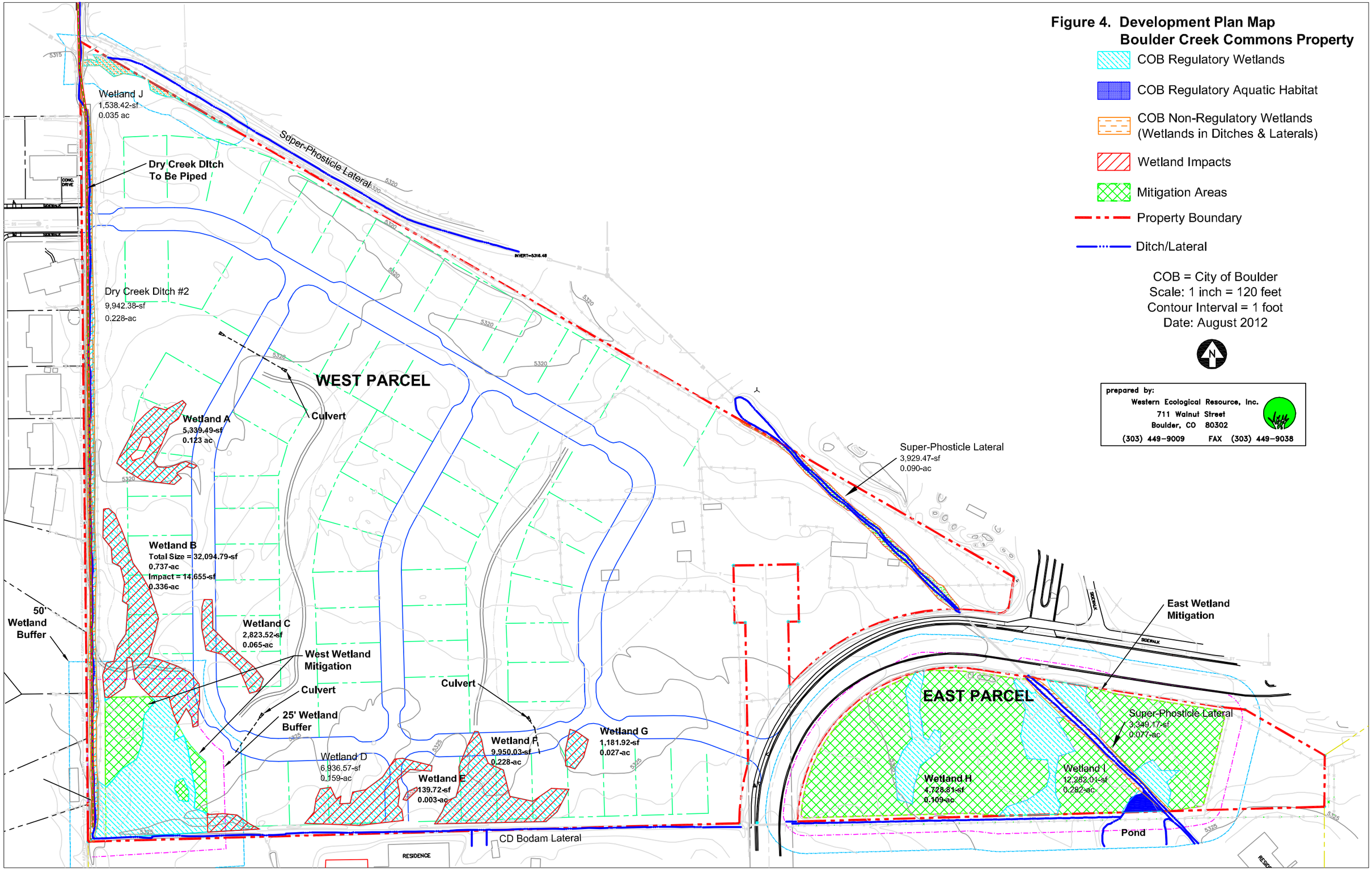
Figure 4. Development Plan Map
Boulder Creek Commons Property
COB Regulatory Wetlands
COB Regulatory Aquatic Habitat
COB Non-Regulatory Wetlands (Wetlands in Ditches & Laterals)
Wetland Impacts
Mitigation Areas
Property Boundary
Ditch/Lateral
COB = City of Boulder
Scale: 1 inch = 120 feet
Contour Interval = 1 foot
Date: August 2012
prepared by:
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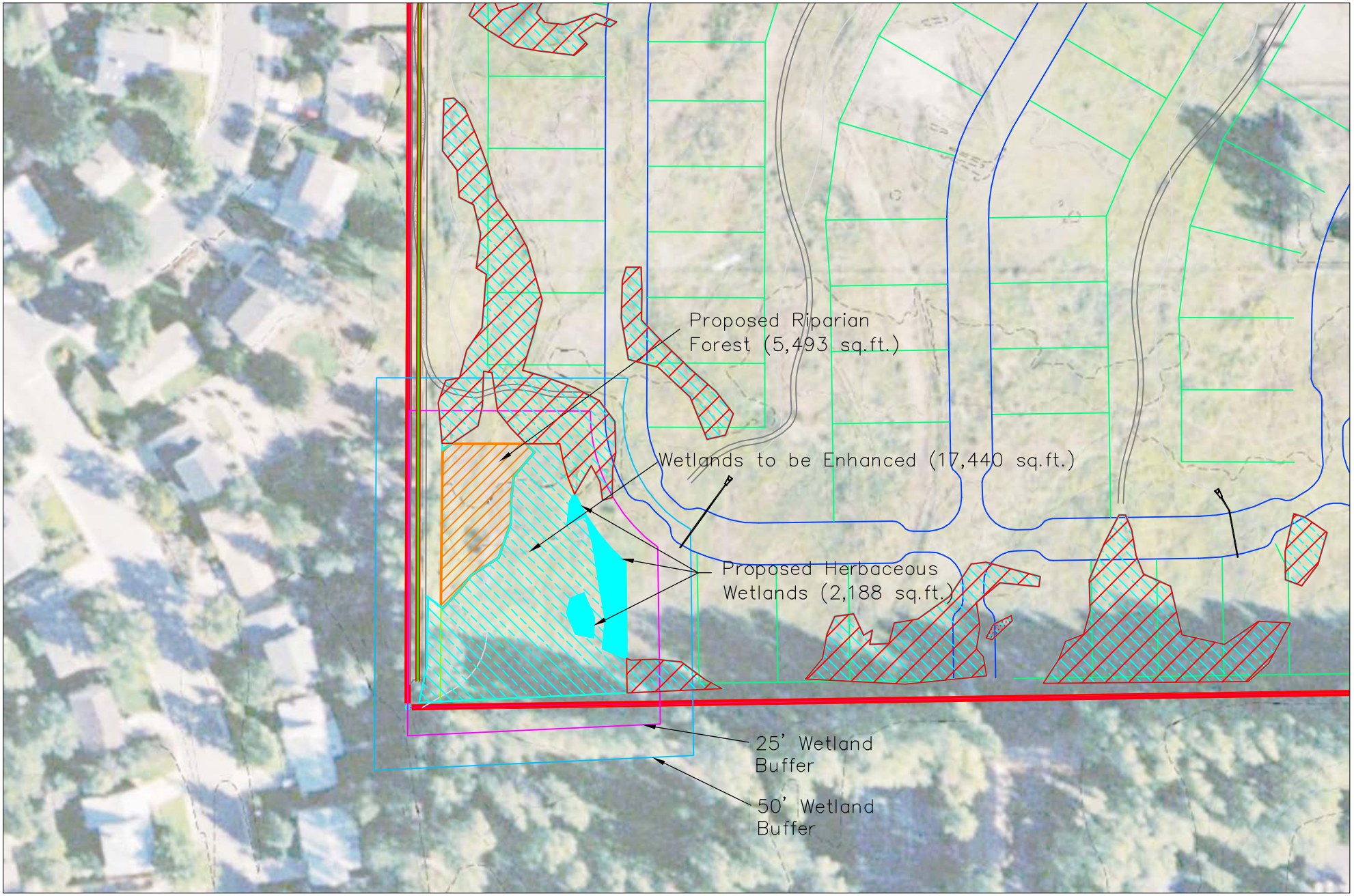
Wetland J
1,538.42-sf
0.035 ac
Dry Creek Ditch To Be Piped
Super-Phosticle Lateral
Dry Creek Ditch #2
9,942.38-sf
0.228-ac
WEST PARCEL
Culvert
Wetland A
5,339.49-sf
0.123 ac
Super-Phosticle Lateral
3,929.47-sf
0.090-ac
Wetland B
Total Size = 32,094.79-sf
0.737-ac
Impact = 14,655-sf
0.336-ac
50' Wetland Buffer
Wetland C
2,823.52-sf
0.065-ac
West Wetland Mitigation
Culvert
25' Wetland Buffer
Culvert
East Wetland Mitigation
EAST PARCEL
Super-Phosticle Lateral
3,349.17-sf
0.077-ac
Wetland G
1,181.92-sf
0.027-ac
Wetland F
9,950.03-sf
0.228-ac
Wetland D
6,936.57-sf
0.159-ac
Wetland E
139.72-sf
0.003-ac
Wetland H
4,728.81-sf
0.109-ac
Wetland I
12,282.01-sf
0.282-ac
Pond
CD Bodam Lateral
RESIDENCE
SIDEWALK



LEGEND

- Existing Wetlands to be Impacted
- Existing Wetlands not Impacted, but Enhanced
- Proposed Riparian Forest Wetland
- Proposed Herbaceous Wetlands

Date: August 2012
Scale: 1" = 100'

Figure 5. West Parcel Enhancements and Creations

prepared by:
Western Ecological Resource, Inc.
711 Walnut Street
Boulder, CO 80302
(303) 449-9009 FAX (303) 449-9038

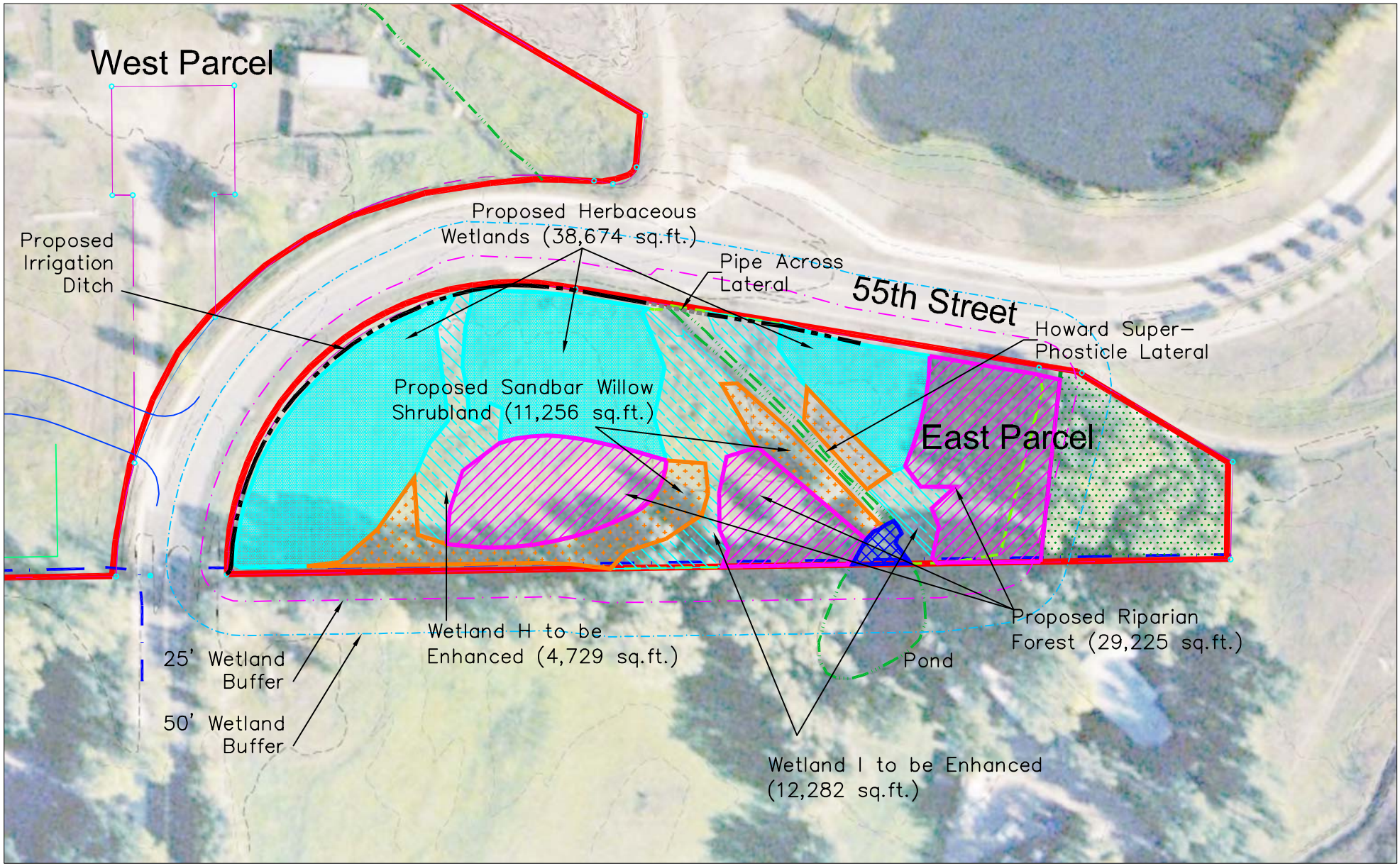


Figure 6. East Parcel Wetland Mitigations

Legend:

Existing Features

- Existing Wetlands (to be Enhanced)
- Cottonwood Forest
- Pond

Proposed Wetland Mitigation

- Herbaceous Community
- Sandbar Willow Shrubland
- Riparian Forest

N

Date:August 2012
Scale: 1" = 100'

prepared by:
Western Ecological Resource, Inc.
711 Walnut Street
Boulder, CO 80302
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7.0 Tables

Table 1. Functions & Values Assessment. Wetlands A - H			
Function	Rating	Confidence of Rating	Comments
Groundwater Recharge	2	b	All wetlands are in swales allowing precipitation and surficial runoff to pond and supplement soil moisture, and may recharge groundwater levels.
Groundwater Discharge	1	a	No springs or seeps are present.
Flood Storage/Flow Alteration	2	b	None of the wetlands are located along a stream or other water course. Minor storage of on-site stormwater runoff may occur.
Shoreline Anchor/Stabilization	1	a	Not Applicable. None of the wetlands are located along a stream, pond or lake.
Sediment Trapping/Retention	1	a	Very limited input and no outlets are present.
Nutrient Retention (Long term)	1	a	Very limited input and no outlets are present.
Nutrient Retention (Short term)	1	a	Very limited input and no outlets are present.
Food Chain Support (Export)	1	a	No outlets are present.
Food Chain Support (Within basin)	1	a	No streams to produce seasonal flushing.
Fish Habitat/Aquatic Diversity	1	a	No permanent water and limited seasonal ponding occurs.
Wildlife Habitat	2	b	Low structural and habitat diversity in a relatively urban setting lower the wildlife values.
Active Recreation#	1	a	No active recreation occurs on this private property.
Passive Recreation/Heritage Value#	2	a	Adjacent private property owners enjoy the aesthetics of open space and may watch wildlife & birds. No heritage resources are present.
TOTAL	17		LOW FUNCTIONING

= not included in total

Rating: 5 = Very High; 4 = High; 3 = Medium; 2 = Low; 1 = None

Confidence in Rating: a = High; b = Medium; c = Low.

High Functioning: The additive value of all adopted functioning value ratings, excluding recreation, equals twenty-six or more; or at least one function, excluding recreation, is rated high or very high.

Low Functioning: The additive value of all adopted functioning value ratings, excluding recreation, equals twenty-five or below.

Table 2. Functions & Values Assessment. Wetlands I & J			
Function	Rating	Confidence of Rating	Comments
Groundwater Recharge	3	b	Excess water from ditch, flood irrigation and surficial runoff ponds in portions of this wetland and recharges groundwater levels.
Groundwater Discharge	1	a	No springs or seeps present.
Flood Storage/Flow Alteration	2	a	Minor flooding may occur when ditch carries flood event flows.
Shoreline Anchor/ Stabilization	2	b	Irrigation ditch is stable and anchored by stands of perennial herbaceous plants, however no willows with their deep binding root masses are present.
Sediment Trapping/Retention	2	b	Portions of this wetland trap and retain sediments. However, sediments are periodically removed from the irrigation ditch to facilitate the flow of water.
Nutrient Retention (Long term)	2	b	Portions of this wetland trap and retain nutrients.
Nutrient Retention (Short term)	2	b	Portions of this wetland trap and retain nutrients.
Food Chain Support (Export)	2	b	The irrigation ditch could potentially export nutrients, however there is very little over-hanging vegetation overall.
Food Chain Support (Within basin)	2	b	Although herbaceous vegetative cover is high, there is little structural diversity.
Fish Habitat/Aquatic Diversity	2	b	Ditch and pond have water year round. No fish present, but macro-invertebrates are potentially present.
Wildlife Habitat	3	b	Wetlands have low structural and habitat diversity but are surrounded by stands of trees and there is water.
Active Recreation#	1	a	No active recreation occurs on this property.
Passive Recreation/Heritage Value#	2	a	Adjacent private property owners enjoy the aesthetics of open space and may watch wildlife & birds. No heritage resources are present.
TOTAL	23		LOW FUNCTIONING

= not included in total

Rating: 5 = Very High; 4 = High; 3 = Medium; 2 = Low; 1 = None

Confidence in Rating: a = High; b = Medium; c = Low.

High Functioning: The additive value of all adopted functioning value ratings, excluding recreation, equals twenty-six or more; or at least one function, excluding recreation, is rated high or very high.

Low Functioning: The additive value of all adopted functioning value ratings, excluding recreation, equals twenty-five or below.

Table 3. Wetland Impacts & Mitigation Requirement				
Wetland Name	Permanent Wetland Impact (2:1 creation to impact ratio)		Wetland Enhancement Impact (1:1 creation to impact ratio)	
	sq. ft.	acres	sq. ft.	acres
Wetland A	5,339	0.123		
Wetland B	14,655	0.336	17,440	0.400
Wetland C	2,824	0.065		
Wetland D	6,937	0.159		
Wetland E	140	0.003		
Wetland F	9,950	0.228		
Wetland G	1,182	0.027		
Wetland H			4,729	0.109
Wetland I			12,282	0.282
Wetland J				
TOTAL IMPACT	41,026	0.942	34,451	0.791
Multiplier		x 2		x 1
MITIGATION REQUIREMENT		1.884		0.791
GRAND TOTAL		2.675 acres		

Table 4. Native Wetland Seed Mix			
Scientific Name	Common Name	Wetland Status*	Seeding Rate PLS lbs./acre
Grasses			
Andropogon gerardii	Big bluestem	FAC	1
Glyceria grandis	American mannagrass	OBL	4
Poa palustris	Fowl bluegrass	FACW	¼
Puccinellia airoides	Nuttall alkaligrass	OBL	¼
Sorghastrum nutans	Indiangrass	FACU	1
Spartina pectinata	Prairie cordgrass	FACW	4
Sporobolous airoides	Alkali sacaton	FAC	½
		Total Grasses	11
Sedges & Rushes			
Carex lanuginosa	Wooly sedge	OBL	2
Carex nebrascensis	Nebraska sedge	OBL	2
Carex praegracilis	Clustered field sedge	FACW	¾
Eleocharis palustris	Creeping spikerush	OBL	1
Juncus arcticus ssp. ater	Baltic rush	FACW	1/8
Juncus torreyi	Torrey's rush	FACW	1/8
Scirpus acutus	Hardstem bulrush	OBL	2
Scirpus paludosus	Alkali bulrush	OBL	2
Scirpus pungens	Threesquare bulrush	OBL	3
		Total Sedges & Rushes	13
Forbs			
Asclepias incarnata	Swamp milkweed	FACW	1
Helenium autumnale	Sneezeweed	FACW	¼
Helianthus nuttallii	Marsh sunflower	FAC	2
Polygonum pensylvanica	Giant smartweed	OBL	2
Saggitaria latifolia	Arrowhead	OBL	2
Solidago canadensis	Canada goldenrod	FACU	1/8
		Total Forbs	7 3/8
		GRAND TOTAL	31 3/8

* Wetland Status (2012 Great Plains List)
OBL = Obligate Wetland
FACW = Facultative Wetland
FAC = Facultative
FACU = Facultative Upland
UPL = Obligate Upland
NI = No Indicator (insufficient information)

Table 5. Native Wetland Plantings		
Scientific Name	Common Name	Wetland Status*
Trees		
Populus deltoides	Plains cottonwood	FAC
Salix amygdaloides	Peachleaf willow	FACW
Shrubs		
Alnus tenuifolia	Thinleaf alder	FACW
Betula occidentalis	River birch	FACW
Crataegus erythropoda	Red haw	FAC
Prunus virginiana ssp. melanocarpa	Chokecherry	FACU
Ribes aureum	Golden currant	FACU
Salix exigua #	Sandbar willow	FACW
Salix irrorata	Bluestem willow	FACW
Grasses		
Beckmannia syzigachne	Sloughgrass	OBL
Glyceria grandis	American mannagrass	OBL
Poa palustris	Fowl bluegrass	FACW
Sedges & Rushes		
Carex nebrascensis	Nebraska sedge	OBL
Eleocharis palustris	Creeping spikerush	OBL
Juncus torreyi	Torrey's rush	FACW
Scirpus acutus	Hardstem bulrush	OBL
Scirpus americanus	Threesquare bulrush	OBL
Scirpus paludosus	Alkali bulrush	OBL
Forbs		
Acorus calamus	Sweetflag	OBL
Iris missouriensis	Rocky Mountain iris	FACW
Ranunculus macounii	Macoun's buttercup	OBL
Sagittaria latifolia	Arrowhead	OBL
Sparganium eurycarpum	Burreed	OBL

Sandbar willows to be started from cuttings

* Wetland Status(2012 Great Plains List)
OBL = Obligate Wetland
FACW = Facultative Wetland
FAC = Facultative
FACU = Facultative Upland
UPL = Obligate Upland
NI = No Indicator (insufficient information)

Table 6. Shortgrass Prairie Seed Mix		
Scientific Name	Common Name	Seeding Rate PLS lbs./acre*
Grasses		
Aristida purpurea	Red threeawn	2
Buchloe dactyloides	Buffalograss	4
Chondrosum gracile	Blue grama	3
Elymus elymoides	Squirreltail	1
Pascopyrum smithii	Western wheatgrass	3½
Poa secunda	Sandberg bluegrass	½
Stipa comata	Needle and thread	2½
	Total Grasses	16½
Forbs		
Artemisia frigida	Fringed sage	1/16
Erysimum asperum	Plains wallflower	1/16
Gaillardia aristata	Blanket flower	1/4
Liatris punctata	Gayfeather	1/4
Ratibida columnifera	Prairie coneflower	1/4
Rudbeckia hirta	Gloriosa daisy	1/16
Sphaeralcea coccinea	Scarlet globemallow	1/16
	Total Forbs	1
	Grand Total	17½

* Drill seed rate. Double application for broadcast methods.

Table 7. Prairie Shrub Planting	
Scientific Name	Common Name
Shrubs	
Chrysothamnus nauseosus	Rubber rabbitbrush
Prunus americanus	American plum
Prunus virginiana	Chokecherry
Rhus trilobata	Sumac
Ribes aureum	Yellow currant
Ribes cereum	Wax currant
Rosa woodsii	Woods' rose
Symphoricarpos occidentalis	Snowberry
Yucca glauca	Soapweed

Table 8. Functions & Values Assessment – East & West Wetland Mitigations			
Function	**Rating**	**Confidence**	**Comments**
Groundwater Recharge	3	b	The wetland mitigations would be created in depressions and swales allowing precipitation and surficial runoff to pond and recharge groundwater levels. In addition, a greater acreage of wetlands will be created than impacted allowing for more recharge.
Groundwater Discharge	1	a	No springs or seeps are present.
Flood Storage/Flow Alteration	3	b	The East Wetland is located along an irrigation ditch that could cause flooding events. The new wetland will have greater flood storage capacity due to its increased size.
Shoreline Anchor/ Stabilization	3	b	Willows will be planted along the irrigation ditch which will create enhanced stabilization functions.
Sediment Trapping/ Retention	3	b	The value of this function is increased as the wetlands will be larger in size and the West Wetland will be in a basin (with an outlet) and able to trap and retain sediments in a greater capacity.
Nutrient Retention (Long term)	3	b	The value of this function is increased as the wetlands will be larger in size and able to trap and retain nutrients in a greater capacity.
Nutrient Retention (Short term)	3	b	The value of this function is increased as the wetlands will be larger in size and able to trap and retain nutrients in a greater capacity.
Food Chain Support (Export)	3	b	There will be increased structural diversity in the wetlands leading to greater value for this function.
Food Chain Support (Within basin)	3	b	There will be increased structural diversity in the wetlands leading to greater value for this function.
Fish Habitat/Aquatic Diversity	2	b	Howard ditch and pond have water year round. No fish present, but macro-invertebrates are potentially present.
Wildlife Habitat	4	b	New wetlands will have high structural diversity and will be larger in size.
Active Recreation#	1	a	No fishing or boating will occur in the wetlands.
Passive Recreation/Heritage Value#	2	a	Adjacent private property owners enjoy the aesthetics of open space and may watch wildlife & birds. No heritage resources are present.
TOTAL	**31**		**HIGH FUNCTIONING**

= not included in total

Rating: 5 = Very High; 4 = High; 3 = Medium; 2 = Low; 1 = None Confidence in Rating: a = High; b = Medium; c = Low. High Functioning: The additive value of all adopted functioning value ratings, excluding recreation, equals twenty-six or more; or at least one function, excluding recreation, is rated high or very high. Low Functioning: The additive value of all adopted functioning value ratings, excluding recreation, equals twenty-five or below.

Appendix A. Wetland Permit for Piping Dry Creek Ditch #2

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, OMAHA DISTRICT
DENVER REGULATORY OFFICE, 9307 SOUTH WADSWORTH BOULEVARD
LITTLETON, COLORADO 80128-6901

December 12, 2008

Mr. David Johnson
Western Ecological Resource, Inc.
711 Walnut Street
Boulder, CO 80302

RE: Piping and Realignment of the Dry Creek Ditch #2 on the Hogan Pancost Property and Jurisdictional Determinations
Nationwide Permit No. 29, Corps File No. 199280484

Dear Mr. Johnson:

Reference is made to the above-mentioned project on behalf of MacKenzie House, LLC. This project will result in the loss of 0.261 acre of the Dry Creek Ditch #2 wetlands located in the SW ¼ of Section 4, T1S, R70W, Boulder County, Colorado.

Based on the information provided, this office has determined that the work within Colorado is authorized by the **Department of the Army Nationwide Permit No. 29**, found in the March 12, 2007, Federal Register. Enclosed is a fact sheet, which fully describes this Nationwide Permit and lists the General Conditions, Section 404 Only Conditions, and Colorado Regional Conditions, which must be adhered to for this authorization to remain valid.

Permit No. 29 (Corps File No. 199280484) Special Condition:

The permittee will purchase 0.261 acre of mitigation credit from the Middle South Platte River Wetland Mitigation Bank, which has been approved by the Corps of Engineers. The credits must be purchased prior to impacts occurring to wetlands authorized by this permit. Written proof of the mitigation credit purchase shall be provided to the Denver Regulatory Office. Upon receipt of such proof, all liabilities for the success, monitoring, and long-term management of the mitigation bank wetlands covered by this authorization will become the responsibility of the mitigation bank sponsor. Once this office receives the proof of purchase for the required mitigation credits the permittee will have satisfied all mitigation requirements for this permit.

Although an Individual Department of the Army permit will not be required for this work, this does not eliminate the requirement that any other applicable Federal, state, tribal or local permits be obtained as required. Please be advised that deviations from the original plans and specifications of this project could require additional authorization from this office.

The applicant is responsible for all work accomplished in accordance with the terms and conditions of the nationwide permit. If a contractor or other authorized representative will be accomplishing the work authorized by the nationwide permit on behalf of the applicant, it is strongly recommended that they be provided

a copy of this letter and the attached conditions so that they are aware of the limitations of the applicable nationwide permit. Any activity which fails to comply with all the terms and conditions of the nationwide permit will be considered unauthorized and subject to appropriate enforcement action.

This verification will be valid until December 12, 2010. In compliance with General Condition 26, the attached "Certification of Completed Work" form (blue) must be signed and returned to this office upon completion of the authorized work and any required mitigation.

The U.S. Fish and Wildlife Service has listed the **Preble's meadow jumping mouse (*Zapus hudsonius preblei*)** as a Federal threatened species under the Endangered Species Act of 1973. However, it has been determined that the proposed activity will not affect the mouse or its designated critical habitat. Also, this proposed activity would not affect the **Ute ladies' tresses orchid (*Spiranthes* diluvialis)** or its proposed critical habitat. Should anyone at any time become aware that either an endangered and/or threatened species or its critical habitat exists within the project area, this office must be notified immediately.

Approved jurisdictional determinations (JDs) have been completed for the Dry Creek Ditch #2 and CD Bodam Lateral; the Howard Super-phosticle Ditch and abutting East Wetland. The JDs are attached. Dry Creek Ditch #2 and CD Bodam Lateral; the Howard Super-phosticle Ditch and Abutting East Wetland were determined to be jurisdictional and are known as "Waters of the United States." They are regulated under Section 404 of the Clean Water Act. If you are not in agreement with the JD decisions, you may request an administrative appeal under regulation 33 CFR 331, by using the attached Appeal Form and Administrative Appeal Process form. The request for appeal must be received within 60 days from the date of this letter. If you would like more information on the jurisdictional appeal process, contact this office. It is not necessary to submit a Request for Appeal if you do not object to the JDs. These JDs are valid for a period of five years from the date of this letter, unless new information warrants revisions of the JDs before the expiration date, or unless the Corps has identified, after a possible public notice and comment, that specific geographic areas with rapidly changing environmental conditions merit re-verification on a more frequent basis.

Wetlands A, B, C, the two Diversion Ditches and the Feeder Ditch are not waters of the U.S. These are artificially irrigated areas which would revert to upland if the irrigation ceased and irrigation ditches constructed on dry land. These waters and their general consideration as nonWOUS can be found in the Preamble of the Federal Register pertaining to the USACE Clean Water Act Regulatory Program, 33 CFR Parts 320 through 332, under Section 328.3: Definitions.

A Department of the Army (DA) Permit will not be required for work in wetlands A, B, C, the two Diversion Ditches and the Feeder Ditch. Although a DA Permit will not be required for work in these wetlands and ditches, this does not eliminate the requirement that other applicable federal, state, and local permits be obtained as needed.

If there are any questions call **Mr. Terry McKee** of my office at **(303) 979-4120** and reference **Corps File No. 199280484**.

Sincerely,

Timothy T. Carey
Chief, Denver Regulatory Office