WETLAND FINDING
TECHNICAL MEMORANDUM
STATE HIGHWAY 7 PROJECT

C&B PROJECT NO.: 070702.400.1.0001

Prepared for:

MULLER ENGINEERING

and

COLORADO DEPARTMENT OF TRANSPORTATION
REGION 4
GREELEY, COLORADO

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State Highway 7 Highway Improvement Project, Boulder, Colorado; prepared November 26, 2001; Revised November 29, 2005.

This Wetland Finding has been written in compliance with Executive Order 11990, "Protection of Wetlands," and is in accordance with 23 CFR 771, 23 CFR 777, and Technical Advisory T6640.8A.

Project Location and Description

The project is located east of Boulder, Colorado (Mile Post 54.9 to 57.0) on State Highway 7 (Arapahoe Road) between approximately Cherryvale Road and 75th Street at the boundaries between Sections 27 and 34 west ½, Sections 26 and 35, and Sections 25 and 36, T1N, R70W in Boulder County (Figure 1), and is located on the Niwot United States Geological Survey (USGS) Quad Map.

The Colorado Department of Transportation has proposed transportation improvements including highway capacity, level of service, and safety. Transportation improvements including the widening of SH 7 between Cherryvale Road and 75th Street to incorporate additional turn lanes, shoulders, and in some locations additional through lanes. Bike lanes and sidewalks are also included for the entire project. The project will require the replacement of the existing BNSF railroad bridge over SH7.

The primary purpose of improvements of SH 7 (Cherryvale Road to 75th Street) include reducing congestion and enhancing safety. The improvements are also intended to improve mobility for multiple modes of transportation.

Traffic accidents related to substandard roadway conditions are occurring within the study area. Approach grades to the hill in the middle of the project are steep and the sight distance over the hill is substandard. Existing paved shoulders are 2 to 3 feet in width. The roadway section provides little room to pass an incapacitated vehicle or to easily maneuver past a turning vehicle. Right and left turn lanes are substandard or non-existent.

Existing conditions in the study area reduce the desirability for multiple modes of transportation. Buses utilize the same lanes as general traffic and congestion along the corridor creates a reduced level of service for transit operation. Transit stops are on gravel shoulders or dirt areas adjacent to the highway. Sidewalk facilities exist along the north side of SH 7 between Cherryvale Road and 63rd Street. Within the project area, there are no other sidewalks or pedestrian facilities nor do bike lanes exist.

A wide range of alternatives were developed and evaluated during the EA process. The public and local, state and federal agencies were involved during the alternative development and evaluation. Alternatives evaluated included a wide range of roadway build options, multi-modal enhancements, intersection enhancements, and congestion management options. Alternatives were also evaluated for the Burlington Northern Santa Fe railroad alignment that crosses SH 7 since roadway build alternatives require the reconstruction of the BNSF railroad bridge over SH 7.

The alternatives evaluated in detail are the No-Action Alternative and two build alternatives (Alternative 2 – the Preferred Alternative and Alternative 2 – the Optional

Alternative). The No-Action alternative includes intersection improvements at the 75th Street intersection including four through lanes of traffic along SH 7 with on-street bike lanes and sidewalks. In addition, the City of Boulder has funding for intersection improvements for transit operations along SH 7 from Cherryvale Road to east of 63rd Street. The US 36 Environmental Impact Statement (EIS) is evaluating multi-modal transportation improvements between Denver and Boulder. As part of the US 36 study, improvements including commuter rail are being considered along the existing BNSF railroad corridor that crosses SH 7. In addition to possible commuter rail service, a potential park-n-Ride is being considered in the vicinity of the SH 7 and 63rd Street intersection.

The Preferred Alternative (Alternative 2) has two through lanes in each direction from Cherryvale Road to the Boulder Valley School District (BVSD) entrance. Westbound, from west of 75th Street to the BVSD, the preferred alternative has one through lane in each direction. Eastbound, from Westview Drive to 75th Street, there is also one lane in each direction. The proposed improvements feature curb and gutter with storm sewer for the west portion of the project and shoulders and roadside ditches for the east portion of the project.

The Optional Alternative (Alternative 3) has the same elements of the Preferred Alternative outlined above, with the exception of the number of through travel lanes for the ¾ mile segment between the BVSD intersection and west of 75th Street. The Optional Alternative provides two lanes in each direction to 75th Street with deceleration lanes at Westview Drive and Valtec Lanes.

Wetland Delineation Methods

The project area was surveyed for wetlands on June 12 and 15, 2001 by Laura Backus of Carter and Burgess. Wetland survey limits of the project area were:

- 60 meters (200 feet) west of Cherryvale Street to 600 meters (2000 feet) east of 75th Avenue, including 300 meters (1000 feet) north and south of SH 7 along 75th Avenue,
- 180 meters (600 feet) north and south along 63rd Avenue,
- the BNSF Railroad grade from 75th Avenue to north of Legion Park.

A wetland re-evaluation was conducted in February 2005 to determine if the location, size, and extent of previously mapped wetlands were still consistent of field work conducted in 2001. No changes to any of the previously identified wetland areas were observed during the 2005 re-evaluation.

Wetlands were delineated in accordance with the 1987 Corps of Engineers Wetlands Delineation Manual. Data were collected on wetland parameters of vegetation, hydrology, and soils. A wetland was determined to be present at a site if at least one positive indicator of each wetland parameter was observed.

Central Plains Wetland Indicator Status was assigned for each plant species from Porter et al., 1996:

- Obligate Wetland Plants (OBL) – species that almost always (>99% probability) occur in wetlands.
- Facultative Wetland Plants (FACW) – species that usually (67 to 99% probability) occur in wetlands.
- Facultative Plants (FAC) – species that are equally likely (33 to 67% probability) to occur in wetlands or uplands.
- Facultative Upland Plants (FACU) – species that usually (67 to 99% probability) occur in uplands.
- Not Listed (NL) – species with no designated wetland indicator status and assumed to be upland.
- No Indicator (NI) – species for which insufficient information was available to determine an indicator status, or species that were not considered by the review panel.
- * – tentative assignment based on limited information or conflicting review.

Wetlands were mapped using a Trimble ProXR Global Positioning System Receiver.

Wetland Descriptions

Emergent and scrub/shrub broad-leaved deciduous wetlands were present in and adjacent to irrigation ditches, roadside ditches, BNSF Railroad, and a constructed basin (Figure 2). All wetland areas were within unincorporated Boulder County. Total wetland area adjacent to anticipated SH 7 improvements is approximately 0.66 acre. Very small areas of wetland vegetation (fewer than 1.8 square meters [20 square feet]) which were not considered to function as wetlands were excluded from mapping (per Jeff Manuel, Colorado Department of Transportation, Region 4). Wetlands are grouped by wetland type (e.g., roadside ditch, irrigation ditch) and generally numbered from west to east. Wetland areas and US Corps of Engineers jurisdictional determination are presented in Table 1, located in the Project Impacts section of this report. Wetland delineation forms are in Appendix 1.

Wetland 1 - East Boulder Ditch

Wetland 1 is emergent wetland bands adjacent to East Boulder Ditch on the north side of SH 7 (Photograph 1, Map 1). Total wetland area is 0.004 acre. The ditch drains north to the Hillcrest portion of Valmont Reservoir and is jurisdictional. Dominant vegetation is a cow parsnip (*Heracleum sphondylium* subsp. *montanum*, FACW) with a vegetative sedge (probably *Carex emoryi*, OBL or *C. lanuginosa*, OBL) and minor smooth brome (*Bromopsis inermis*, FACU*). On the east side of the ditch, cow parsnip extends up the slope for approximately 1.5 meters (5 feet). Soils were too rocky to permit soil probe sampling. Wetland hydrology is supplied by ditch flows, two stormwater drain pipes, and probably by runoff from adjacent parking lots. Wetland functions include stormwater storage, bank stabilization, and sediment and pollutant trapping. Ditch bank vegetation on the south side of SH 7 did not meet wetland parameters.

Wetland 2 - SH 7, roadside drainage ditches, west of Hoover Hill

Wetlands 2a, 2b, 2c, and 2d are emergent wetland areas with patches of scrub-shrub wetland in the roadside drainage ditches adjacent to the south side of SH 7 from just east of 63rd Street to the east side of the Boulder Valley Arapahoe Campus Technical Education Center (Photograph 2, Map 1). Total combined wetland area is 0.286 acre. Wetlands 2a and 2b drain west to East Boulder Ditch. Wetlands 2c and 2d each drain in separate pipes under SH 7 to the north and outlet separately on the south side of the BNSF railroad. These wetlands are non-jurisdictional.

For Wetlands 2a and 2b, dominant vegetation is spikerush (*Eleocharis palustris*, OBL), threesquare bulrush (*Schoenoplectus pungens*, OBL), and quackgrass (*Elytrigia repens*, FAC) with clumps of smooth brome. Soils were light brownish gray (2.5YR 6/2) clay with common yellowish brown (10YR 6/8) and dark grayish brown (2.5YR 4/2) mottles and were saturated to the surface. Wetland hydrology is provided by runoff from parking lots to the south and from the highway. Wetlands 2a and 2b flow into a storm drain at the west end of 2a which appears to empty into East Boulder Ditch on the north side of SH 7.

For Wetlands 2c and 2d, dominant herbaceous species are broad-leaved cattail (*Typha latifolia*, OBL), spikerush, threesquare bulrush with areas of foxtail barley (*Critesium jubatum*, FACW), fescue (*Festuca pratensis*, FAC), redtop (*Agrostis stolonifera*, FACW), curly dock (*Rumex crispus*, FACW), scouring rush (*Hippochaete hymenalis*, FACW), Emory's sedge (*Carex emoryi*, OBL), and wooly sedge (*C. lanuginosa*, OBL). Small, intermittent patches of sandbar willow (*Salix exigua*, OBL) and seedling to sapling plains cottonwood (*Populus deltoides* subsp. *monilifera*, FAC) were present. Some areas were infested with Canada thistle (*Breea arvensis*, FACU) and a small stand of leafy spurge (*Tithymalus esula*, NL) was present near Boulder Valley Arapahoe Campus Technical Education Center. Hydric soils were assumed since the dominant species are OBL and FACW and the boundary is abrupt. Flowing water was present in 2c and 2d and enters a cross-drain under SH 7 north of the campus. Wetland hydrology is provided by runoff from the highway and areas of irrigated side slopes.

Wetland functions include stormwater storage, bank stabilization, and sediment and pollutant trapping. Wetlands 2c and 2d were higher quality wetlands with greater plant diversity. Wetlands 2a and 2b were in less distinctly defined roadside ditches and of lower function.

Additionally, a small non-jurisdictional north-south ditch (Wetland 2e, Map 1) is present east of the traffic light. Total area is 0.006 acre. Dominant vegetation is narrow-leaved cattail (*Typha angustifolia*, OBL) with fescue. Hydric soils were assumed since the dominant species is OBL and the boundary is abrupt. Wetland hydrology is probably provided by parking lot and road runoff. Water was flowing in the ditch at the time of the survey. Wetland functions include stormwater storage, bank stabilization, and sediment and pollutant trapping.

Wetland 3 – Detention Basin south of SH 7

An emergent wetland is present in a basin at Boulder Valley Arapahoe Campus Technical Education Center (Map 1). Total area is 0.075 acre. The wetland stormdrain connects to Wetland 2d, and the wetland is non-jurisdictional. Dominant vegetation is redtop and

fescue with cattail and foxtail barley. Soils were very dark gray (10YR 3/1) clay with common yellowish-brown (10YR 5/8) mottles. Soils were saturated and standing water in the wetland center was present at the time of the survey. Additionally, areas of cracked mud and 20 centimeter (8 inch) deep vehicle tracks were present. Wetland hydrology appears to be provided by runoff from adjacent parking lots and slopes. Wetland functions include stormwater storage, wildlife habitat, food chain support, and sediment and pollutant trapping.

Wetland 4 - Enterprise Ditch

The Enterprise Ditch is present in the project area adjacent to SH 7 on the west side of Hoover Hill and to the BNSF Railroad north of Legion Park. At both locations, narrow emergent and scrub-shrub wetland bands are present adjacent to the ditch (Maps 2 and 3). The ditch drains north to Valmont Reservoir, and is jurisdictional. Wetland functions include bank stabilization, wildlife habitat, food chain support, and sediment and pollutant trapping.

Wetland 4a is west of Hoover Hill (Photograph 3). Total wetland area adjacent to SH 7 is 0.025 acre. Dominant vegetation is Emory's sedge with scouring rush (*Hippochaete hymenalis*, FACW), a vegetative forb, showy milkweed (*Asclepias speciosa*, FAC), and virgin's creeper (*Parthenocissus inserta*, FAC). Adjacent to the wetland bands the upper banks are vegetated with plum (*Prunus americana*, UPL), Siberian elm (*Ulmus pumila*, UPL), and Wood's rose (*Rosa woodsii*, FACU). A minor infestation of Canada thistle is present. Soils approximately 1 meter (3 feet) from the edge of the ditch were very dark grayish brown (10YR 2/3) sandy clay loam with common yellowish brown (10YR 5/6) mottles. Wetland hydrology is supplied by ditch flows, and water was flowing in the ditch at the time of the survey.

Wetland 4b is north of SH 7 and west of the BNSF Railroad. Total area is 0.006 acre. Wetland bands in the area of ditch lined with metal are dominated by sandbar willow, wooly sedge, and arctic rush (*Juncus arcticus*, FACW) with curly dock and showy milkweed. Hydric soils were assumed since the dominant species is OBL and the boundary is abrupt. Wetland hydrology is provided by ditch flows.

Wetland 5 - Wetlands adjacent to BNSF Railroad embankment

A series of isolated, non-jurisdictional wetlands are present adjacent to both sides of the toe of the BNSF Railroad embankment (Map 2). Wetland functions include wildlife habitat, food chain support, and sediment and pollutant trapping.

Wetland 5a is an emergent wetland area north of the BNSF Railroad embankment (Photograph 4). Wetland area is 0.015 acre. Dominant vegetation is clustered field sedge (*Carex praegracilis*, FACW), arctic rush, and a vegetative sedge (probably *C. emoryi*, OBL). Soils are 10 YR 2/1 and were saturated to the surface. Wetland hydrology appears to be supplied by slope runoff.

South of the railroad, Wetland 5b is an emergent and scrub-shrub wetland area dominated by sandbar willow, vegetative sedges (probably *C. emoryi*), and fescue with a large-stemmed vegetative sedge and reed canarygrass (*Phalaroides arundinacea*, FACW). Total area is 0.012 acre. On the north side of the railroad (Wetland 5c),

dominant vegetation is emergent sedges, a vegetative forb that is probably swamp milkweed (*Asclepias incarnata*, OBL), and fescue with threesquare bulrush, showy milkweed, and Canada thistle. The wetland area within the fenceline is 0.015 acre. The wetland continues north of the fence. Soils on both sides of the railroad were mottled dark yellowish brown (10YR 4/4), and hydric soils were assumed based on the prevalence of OBL and FACW species and the boundary is abrupt. Wetland hydrology appears to be supplied by water steadily trickling out of a plastic pipe on the south slope. Soils were saturated in the vicinity of the pipe outlet.

Wetlands 5d and 5e are emergent and scrub-shrub wetlands are present in a shallow ditch on the south side of the railroad just west of the curve to SH 7 (Photograph 5). Total wetland area is 0.098 acre. Dominant vegetation is broad-leaved cattail, clustered field sedge, wooly sedge, and Emory's sedge with curly dock and Canada thistle. An area dominated by sandbar willow is present at the east end of the shallow ditch. Hydric soils were assumed since the dominant species are OBL and FACW and the boundary is abrupt. Wetland hydrology is potentially supplied by seepage from the Enterprise Ditch on the slope above and by runoff.

Wetland 6 – Cottonwood Ditch

The Cottonwood Ditch (also identified as Cottonwood Ditch #2 and Liner Cottonwood Ditch) is present in the project area adjacent to the BNSF Railroad south of the bridge over SH 7, SH 7 on the east side of Hoover Hill north of SH 7, and adjacent to the 75th Street right-of-way north of the intersection with SH 7. Narrow bands of emergent wetlands and minor areas of scrub-shrub wetlands are present adjacent to the ditch (Maps 3 and 4). Cottonwood Ditch drains north into Boulder Creek near Brownsville (per Robert Phearson, ditch company president), and Wetlands 6a, 6b, and 6d are jurisdictional. Wetland functions include bank stabilization, wildlife habitat, food chain support, and sediment and pollutant trapping.

Cottonwood Ditch side slope Wetlands 6a (Photograph 6) and 6b are present at the ditch intersection with BNSF Railroad south of the bridge over SH 7. Total wetland area is 0.023 acre. Wetland 6c is a network of non-jurisdictional feeder ditches with 0.024 acre within the BNSF Railroad right-of-way. Dominant ditch bank vegetation is wooly sedge, Emory's sedge, and reed canarygrass, with patches of sandbar willow. A minor infestation of Canada thistle is present. Hydric soils were assumed since dominant vegetation is OBL and FACW and the boundary is abrupt. Wetland hydrology is supplied by ditch flows, and water was flowing in the ditches at the time of the survey. Wetland bands appear to continue outside the right-of-way.

Wetland 6d is narrow wetland bands present adjacent to Cottonwood Ditch on the west side of 75th Street, north of the intersection with SH 7. Total wetland area adjacent to the road is 0.032 acre. Dominant ditch bank vegetation is sedges (probably *C. emoryi*), showy milkweed, and grasses.

Wetland 7 - SH 7, roadside drainage ditches, east of Hoover Hill

Wetlands 7a, 7b and 7c are emergent wetlands in SH 7 roadside drainage ditches east of the BNSF Railroad bridge (Photograph 7, Map 2). Total wetland area is 0.027 acre. Ditch flows are transferred by buried pipes to an irrigation water storage tank at the southeast

corner of SH 7 and 75th Street, and the wetlands are non-jurisdictional. Dominant species of Wetland 7a are spikerush and clustered field sedge with curly dock and threesquare bulrush. Hydric soils were assumed since the dominant species are OBL and FACW and the boundary is abrupt. Dominant species of Wetlands 7b and 7c are broad-leaved cattail, threesquare bulrush, spikerush, and redtop with foxtail barley, arctic rush, quackgrass, horsetail (*Equisetum arvense*, FAC), curly dock, vegetative ragweed (*Ambrosia* spp.), and prickly lettuce (*Lactuca serriola*, FAC). Hydric soils were assumed since the dominant species are OBL and FACW. Flowing and standing water were present in some areas of the ditch. Wetland hydrology is provided by runoff from the highway collected both east and west of the bridge and augmented at Wetland 7a and Wetland 7c from side slope seeps. The Wetland 7c seep is possibly supported by Cottonwood Ditch. Wetland functions include stormwater storage, bank stabilization, and sediment and pollutant trapping.

Ditch north of SH 7

The north-south ditch on the north side of SH 7 across from the traffic light at Boulder Valley Arapahoe Campus Technical Education Center did not support wetlands within the highway right-of-way. Right-of-entry was not available for the property north of the right-of-way. Ditch banks, as viewed from the property line, appeared to be vegetated with smooth brome and thus do not meet the parameter for wetland vegetation.

Alternatives

Alternative 2 (Preferred Alternative)

The Preferred Alternative has two thru lanes in each direction from Cherryvale Road to the Boulder Valley School District entrance. At Cherryvale Road, curb and gutter is added to the existing right turn deceleration lane for eastbound traffic. At 63rd Street, in the westbound direction, there is a continuous right turn acceleration/deceleration lane that also functions as a bus bypass lane from east of 63rd to Cherryvale Road. In the eastbound direction, there is a continuous right turn acceleration/deceleration lane between the business access west of the Boulder Valley School District to east of the BVSD signal. From the BVSD signal to Westview Drive there is one thru lane westbound and two thru lanes eastbound. The second eastbound thru lane is dropped as a right turn lane at Westview Drive. There is a right turn lane in the westbound direction at Valtec Lane. The two-lane section (one lane in each direction) continues past the Burlington Northern Santa Fe Railroad overpass where the roadway section widens to two lanes in each direction at the 75th Street intersection improvements.

Alternative 3 (Optional Alternative)

This alternative has all of the same elements of the Preferred Alternative outline above, with the exception of the number of through travel lanes for the ¾ mile segment between the BVSD intersection and west of 75th Street. The Optional Alternative retains two lanes in each direction to 75th Street with deceleration lanes at Westview Drive and Valtec Lanes.

Project Impacts

Wetland impacts were reduced as much as practicable during project design specifically by selection of an alternative that maintains the current alignment. Approximately 0.32

acre of wetland impacts are anticipated to occur during construction of the Preferred Alternative (Table 1). These impacts were unavoidable due to project purpose and need.

A Section 404 Permit will be obtained, as necessary, from the US Army Corps of Engineers prior to project construction.

Impacted wetland functions and values are anticipated to include bank stabilization, sediment/toxin retention, nutrient removal/transformation, food chain support, wildlife habitat, and visual quality.

Table 1. Wetland Jurisdictional Determination, Areas, and Permanent Impacts

Site ID	Acres w/in Study Area	USACE Jurisdictional?	Wetland Type*	Alternative 2 (Preferred) Permanent Impacts (Acres)	Alternative 3 (Optional) Permanent Impacts (Acres)
1	<0.01	Yes	Emergent	0.002	0.002
2 a, b, c, d	0.29	No	Emergent with Scrub Shrub	0.287	0.287
3	0.08	No	Emergent	0.0	0.0
4 a, b	0.03	Yes	Emergent with Scrub Shrub	0.011	0.011
5 a, b, c, d, e	0.14	No	Emergent with Scrub Shrub	0.0	0.0
6 a, b, c, d	0.08	Yes-a, b, d; No-c	Emergent with Scrub Shrub	0.0	0.0
7 a, b, c	0.03	No	Emergent	0.022	0.022
Total	**0.66**			**0.322**	**0.322**

*Cowardin, L.M. et al. 1979. Classification of Wetland and Deepwater Habitats of the United States. United States Fish and Wildlife Service, Biological Services Program; FWS/OBS-79/31

Wetland Impact Minimization and Best management Practices

The alternative designs include avoidance and minimization of impacts to most study area wetlands. Impacts to wetlands will be avoided and minimized as much as practical during the final design process. The design shall comply with the policy of Executive Order 11990 regarding impacts to wetlands. The following specific BMPs from the *Erosion Control and Storm Water Quality Guide*, CDOT, 2002, will be required during construction to reduce the potential for wetlands to be indirectly affected by sedimentation from accelerated erosion or by hazardous materials (e.g., fuel, equipment lubricants):

- All disturbed areas will be revegetated with native grass and forb species. Seed, mulch and mulch tackifier will be applied in phases throughout construction.

- Where permanent seeding operations are not feasible because of seasonal constraints (e.g., summer and winter months), disturbed areas will have mulch and mulch tackifier applied to prevent erosion.

- Erosion control blankets will be used on slopes 3:1 or steeper, newly seeded slopes to control erosion and to promote the establishment of vegetation. Slopes should be roughened at all times.

- Temporary erosion control blankets will have flexible natural fibers.

- Erosion bales, erosion logs, silt fence or other sediment control device will be used as sediment barriers and filters adjacent to wetlands, surface waterways and at inlets where appropriate.

- To minimize the loss of sand from the road surface during winter sanding operations, sediment catch basins will be included during construction and put in place permanently with continual maintenance.

- Where appropriate, slope drains will be used to convey concentrated runoff from top to bottom of the disturbed slopes. Slope and cross-drain outlets will be constructed to trap sediment.

- Storm drain inlet protection will be used where appropriate to trap sediment before it enters the cross-drain.

- Check dams will be used where appropriate to slow the velocity of water through roadside ditches and in swales.

Additionally, the following BMPs to minimize additional wetland impacts during construction will be employed:

- All wetland areas and water bodies not impacted by the project will be protected from unnecessary encroachment by temporary fencing and will be seeded in phases throughout construction. Sediment control such as silt fence or erosion logs will also be used where needed to protect the area from sediment. Siltation control devices (e.g., fences) will be placed on the down-gradient side of construction areas to prevent soil from entering wetland areas.

- No staging of construction equipment, equipment refueling or storage of construction supplies will be allowed within 100 feet of a wetland or any water-related area.

- Standard erosion/sediment control measures will be observed and an erosion control plan will be developed prior to and for inclusion in the construction bid plans. All bare fill or cut slopes adjacent to streams or intermittent drainages will be stabilized as soon as practicable.

- No fertilizers, hydrofertilizers, or hydromulching will be allowed anywhere on the project.

- Work areas will be limited as much as possible to minimize construction impacts to wetlands.

Compensatory Mitigation

Wetlands as well as their associated functions permanently impacted by project construction will be mitigated at a 1:1 ratio by purchase of credits at one of the three wetland mitigation banks within the primary service area. Wetland impacts will be reduced as much as possible during final design.

Conclusion

"Based on the above considerations, it is determined that there is no practicable alternative to the proposed new construction in wetlands and that the proposed action includes all practicable measures to minimize harm to wetlands which may result from such use."

References

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Appendix 1

Wetland Delineation Forms

(1)

Routine Wetland Determination (1987 COE Wetlands Delineation Manual)

Project, City/County, State: SH 7, Boulder, CO

Applicant/Owner: CDOT - R4 Investigator: L. Backus

Site: East Boulder ditch south of SH 7 Date: 6-15-01

Disturbed - Wetland indicators altered/removed w/in last 5 years by human activities/catastrophic natural events? Yes (No)
Problem Area – Wetland indicators periodically lacking due to normal seasonal environmental variations? Yes (No)
Ecological setting: developed area on plains

Vegetation: Wetland vegetation present? Yes (No)

Dominant species	Layer	Status	Dominant species	Layer	Status
*Reynoutria japonica	H	FACU	East Taraxacum officinalis	H	FACU
Hemerocallis spp.	H	FACU			
Salix Fragilis - large mature	H	FAC			
Dactylis glomerata	H	FACU			
& Vinca	H	NL			
Vita spp.	H				

H – woody/non-wood <3.2': S – woody >3.2', <3.0" dbh, T – woody >3.0" dbh of any height, V – woody, climbing >3.2'
Dominant species – most abundant species that exceed 50% of total cover, plus additional species comprising over 20% of total cover.

Photo # 18 → 5 % of dominants = OBL, FACW, FAC None (Wetlands - 50% or greater of dominants = OBL, FACW, FAC)

Soils: Wetland soils present? Yes (No)

Map unit series and phase: Hydric soils list? Yes (No)

Depth	Horizon	Matrix color	Mottle color	Mottle abundance/contrast	Texture, concretions, structure
12"	—	10YR 3/2	None		

Mottle abundance: few = <2%, common = 2-20%, many = >20%
Mottles prominent/distinct: same hue – value varies by 3 units, chroma by 2; different hue – value and chroma vary by 1 unit

Non-sandy hydric soil indicators:
___Histosol
___Histic epipedon
___H2S odor
___Aquic moisture regime
___Fe/Mg recent concretions
___Reducing conditions (a-a-dipyridil)
___Gley
___Chroma = 2/less in mottled, 1 or less in unmottled

Sandy hydric soil indicators – add:
___Aquic moisture regime
___High organic content in surface layer
___Streaking of subsurface horizons by organic material
___Organic accretions (muck balls just below surface)
___Wet spodosol (dark red-br horizon beneath leached E horizon at water table depth)

___Assume soils when all dominant plants are OBL and/or FACW

Hydrology: Wetland hydrology present? Yes (No) flows in ditch

Depth of surface water — Depth to free water in pit — Depth to saturated soil not saturated

Water sources: ditch, runoff

Primary wetland hydrology indicators:
___Inundated
___Saturated in upper 12" > 12.5% of growing season
___Water marks
___drift lines
___Sediment deposits
___Drainage pattern in wetlands

Secondary indicators (need 2 or more):
___Oxidized root channels in upper 12"
___Water-stained leaves
___Local soil survey data
___Fac-neutral test (>50% dom = OBL, FACW+, FACW)
___Other:

Wetland Determination: Does this sampling point meet all 3 wetland criteria? Yes (No)

Routine Wetland Determination (1987 COE Wetlands Delineation Manual) (2) a+b

Project, City/County, State: SH 7, Boulder, CO

Applicant/Owner: CDOT - R4 Investigator: L. Backus

Site: ditches on south side SH 7, west of Hoover Hill Date: 6-12-01

Disturbed - Wetland indicators altered/removed w/in last 5 years by human activities/catastrophic natural events? Yes (No)
Problem Area – Wetland indicators periodically lacking due to normal seasonal environmental variations? Yes (No)
Ecological setting:

Vegetation: Wetland vegetation present? (Yes) No

Dominant species	Layer	Status	Dominant species	Layer	Status
*Schoenoplectus pungens	H	OBL			
*Eleocharis palustris	H	OBL			
*Elytrigia repens	H	FAC			
Bromopsis inermis ? mowed	H	FACU?			

H – woody/non-wood <3.2': S – woody >3.2', <3.0" dbh, T – woody >3.0" dbh of any height, V – woody, climbing >3.2'
Dominant species – most abundant species that exceed 50% of total cover, plus additional species comprising over 20% of total cover.

Photo # ____ % of dominants = OBL, FACW, FAC* 75% (Wetlands - 50% or greater of dominants = OBL, FACW, FAC)

mowed

Soils: Wetland soils present? (Yes) No

Map unit series and phase: ____ Hydric soils list? Yes No

Depth	Horizon	Matrix color	Mottle color	Mottle abundance/contrast	Texture, concretions, structure
12"		2.5YR6/2	10YR5/8	common	clay
		and	2.5YR4/2	common	

Mottle abundance: few = <2%, common = 2-20%, many = >20%
Mottles prominent/distinct: same hue – value varies by 3 units, chroma by 2; different hue – value and chroma vary by 1 unit

Non-sandy hydric soil indicators:
___Histosol
___Histic epipedon
___H2S odor
___Aquic moisture regime
___Fe/Mg recent concretions
___Reducing conditions (a-a-dipyridil)
___Gley
X Chroma = 2/less in mottled, 1 or less in unmottled
salt in soil sample

Sandy hydric soil indicators – add:
___Aquic moisture regime
___High organic content in surface layer
___Streaking of subsurface horizons by organic material
___Organic accretions (muck balls just below surface)
___Wet spodosol (dark red-br horizon beneath leached E horizon at water table depth)

___Assume soils when all dominant plants are OBL and/or FACW

Hydrology: Wetland hydrology present? (Yes) No Drain to west, appear to flow into SH7 cross drain emptying into East Boulder Ditch on north side of highway
Depth of surface water ____ Depth to free water in pit ____ Depth to saturated soil Surface

Water sources: runoff from highway and parking lots to south

Primary wetland hydrology indicators:
___Inundated
X Saturated in upper 12" > 12.5% of growing season
___Water marks
___drift lines
___Sediment deposits
___Drainage pattern in wetlands

Secondary indicators (need 2 or more):
___Oxidized root channels in upper 12"
___Water-stained leaves
___Local soil survey data
X Fac-neutral test (>50% dom = OBL, FACW+, FACW)
___Other:

Wetland Determination: Does this sampling point meet all 3 wetland criteria? (Yes) No

Routine Wetland Determination (1987 COE Wetlands Delineation Manual) (2) crd.

Project, City/County, State: SH 7, Boulder, CO

Applicant/Owner: _____ Investigator: L. Backus

Site: ditches on south side SH 7, west of Hoover Hill Date: 6-12-01

Disturbed - Wetland indicators altered/removed w/in last 5 years by human activities/catastrophic natural events? Yes (No) except mowing on west end
Problem Area – Wetland indicators periodically lacking due to normal seasonal environmental variations? Yes (No)
Ecological setting: developed area on plains

Vegetation: Wetland vegetation present? (Yes) No

Dominant species	Layer	Status	Dominant species	Layer	Status
Schoenoplectus lacustris	H	OBL	Salix exigua - patches	S	OBL
Typha latifolia	H	OBL	*Eleocharis palustris	H	OBL
Critesion jubatum	H	FACW	Populus deltoides subsp. monilifera	T	FAC
Festuca pratensis	H	FAC	Equisetum spp.	H	
Agrostis stolonifera	H	FACW	*Schoenoplectus pungens	H	OBL
Rumex crispus	H	FACW	Carex emoryi	H	OBL

H – woody/non-wood <3.2': S – woody >3.2', <3.0" dbh, T – woody >3.0" dbh of any height, V – woody, climbing >3.2'
Dominant species – most abundant species that exceed 50% of total cover, plus additional species comprising over 20% of total cover.

Photo # 2 → E % of dominants = OBL, FACW, FAC 100 (Wetlands - 50% or greater of dominants = OBL, FACW, FAC)
east of edu center traffic light
ditch wetland becomes less defined at west side & vegetation is mowed
minor Bromus arvensis patches and Elaeagnus angustifolia at upper margins
small patch of Linaria vulgaris at east end

Soils: Wetland soils present? (Yes) No

Map unit series and phase: _____ Hydric soils list? (Yes) No

Depth	Horizon	Matrix color	Mottle color	Mottle abundance/contrast	Texture, concretions, structure
12"		10YR 3/2	mottled	common	
wetl arb					

Mottle abundance: few = <2%, common = 2-20%, many = >20%
Mottles prominent/distinct: same hue – value varies by 3 units, chroma by 2; different hue – value and chroma vary by 1 unit

Non-sandy hydric soil indicators:
___Histosol
___Histic epipedon
___H2S odor
___Aquic moisture regime
___Fe/Mg recent concretions
___Reducing conditions (a-a-dipyridil)
___Gley
___Chroma = 2/less in mottled, 1 or less in unmottled

Sandy hydric soil indicators – add:
___Aquic moisture regime
___High organic content in surface layer
___Streaking of subsurface horizons by organic material
___Organic accretions (muck balls just below surface)
___Wet spodosol (dark red-br horizon beneath leached E horizon at water table depth)

X Assume soils when all dominant plants are OBL and/or FACW

Hydrology: Wetland hydrology present? (Yes) No flows from near east end to cross-drain at storage lockers

Depth of surface water shallow flows Depth to free water in pit _____ Depth to saturated soil _____

Water sources: runoff, irrigated lawns

Primary wetland hydrology indicators:
___Inundated
___Saturated in upper 12" > 12.5% of growing season
___Water marks
___drift lines
___Sediment deposits
X Drainage pattern in wetlands

Secondary indicators (need 2 or more):
___Oxidized root channels in upper 12"
___Water-stained leaves
___Local soil survey data
X Fac-neutral test (>50% dom = OBL, FACW+, FACW)
___Other:

Wetland Determination: Does this sampling point meet all 3 wetland criteria? (Yes) No

Routine Wetland Determination (1987 COE Wetlands Delineation Manual)

(2e)

Project, County, State: SH 7, Boulder CO

Site: N S ditch N of road into Educ. Center Date: 6-12-01

Applicant/Owner: CDOT R4 Investigator: L. Backus

Disturbed - Wetland indicators altered/removed w/in last 5 years by human activities/catastrophic natural events? Yes (No)
Problem Area – Wetland indicators periodically lacking due to normal seasonal environmental variations? Yes (No)
Ecological setting:

Vegetation: Wetland vegetation present? (Yes) No

Dominant species	%	Layer	Status	Dominant species	%	Layer	Status
Typha angustifolia			OBL				
T. latifolia			OBL				

H – woody/non-wood <3.2': S – woody >3.2', <3.0" dbh, T – woody >3.0" dbh of any height, V – woody, climbing >3.2'
Dominant species – most abundant species that exceed 50% of total cover, plus additional species comprising over 20% of total cover.
% of dominants = OBL, FACW, FAC _____ (Wetlands - 50% or greater of dominants = OBL, FACW, FAC)

Soils: Wetland soils present? (Yes) No assume

Map unit series and phase: _____ Hydric soils list? Yes No

Depth	Horizon	Matrix color	Mottle color	Mottle abundance/contrast	Texture, concretions, structure

Mottle abundance: few = <2%, common = 2-20%, many = >20%
Mottles prominent/distinct: same hue – value varies by 3 units, chroma by 2; different hue – value and chroma vary by 1 unit

Non-sandy hydric soil indicators:
___Histosol
___Histic epipedon
___H2S odor
___Aquic moisture regime
___Reducing conditions (a-a-dipyridil)
___Gley
___Chroma = 2/less in mottled, 1 or less in unmottled
___Fe/Mg recent concretions

Sandy hydric soil indicators – add:
___Aquic moisture regime
___High organic content in surface layer
___Streaking of subsurface horizons by organic material
___Organic accretions (muck balls just below surface)
___Wet spodosol (dark red-br horizon beneath leached E horizon at water table depth)

Hydrology: Wetland hydrology present? (Yes) No Probably getting runoff from slopes to East also from parking lots to W

Depth of surface water ~~—~~ Depth to free water in pit ~~—~~ Depth to saturated soil ~~—~~

Water sources: _____

Primary wetland hydrology indicators:
___Inundated
X Saturated in upper 12" > 12.5% of growing season
___Water marks
___drift lines
___Sediment deposits
___Drainage pattern in wetlands ontens CMP at northern

Secondary indicators (need 2 or more):
___Oxidized root channels in upper 12"
___Water-stained leaves
___Local soil survey data
___Fac-neutral test (>50% dom = OBL, FACW+, FACW)
___Other:

Wetland Determination: Does this sampling point meet all 3 wetland criteria? (Yes) No

Routine Wetland Determination (1987 COE Wetlands Delineation Manual) (3)

Project, City/County, State: SH 7, Boulder CO

Applicant/Owner: CDOT R4 Investigator: L. Backus

Site: detention basin at VoTech Date: 6-12-01

Disturbed - Wetland indicators altered/removed w/in last 5 years by human activities/catastrophic natural events? Yes (No)
Problem Area – Wetland indicators periodically lacking due to normal seasonal environmental variations? Yes (No)
Ecological setting: developed area on plains

Vegetation: Wetland vegetation present? (Yes) No

Dominant species	Layer	Status	Dominant species	Layer	Status
+ Agrostis stolonifera	H	FACW			
Typha spp.	H	OBL			
Cirsium jubatum	H	FACW			
+ Festuca pratensis	H	FAC			

H – woody/non-wood <3.2': S – woody >3.2', <3.0" dbh, T – woody >3.0" dbh of any height, V – woody, climbing >3.2'
Dominant species – most abundant species that exceed 50% of total cover, plus additional species comprising over 20% of total cover.

Photo # 1 → W % of dominants = OBL, FACW, FAC 100% (Wetlands - 50% or greater of dominants = OBL, FACW, FAC)

mowed on west side

Bromus arvensis at eastern

Soils: Wetland soils present? (Yes) No

Map unit series and phase: Hydric soils list? Yes No

Depth	Horizon	Matrix color	Mottle color	Mottle abundance/contrast	Texture, concretions, structure
12"	—	10YR3/1	10YR 5/8	common	clay

Mottle abundance: few = <2%, common = 2-20%, many = >20%
Mottles prominent/distinct: same hue – value varies by 3 units, chroma by 2; different hue – value and chroma vary by 1 unit

Non-sandy hydric soil indicators:
___Histosol
___Histic epipedon
___H2S odor
___Aquic moisture regime
___Fe/Mg recent concretions
___Reducing conditions (a-a-dipyridil)
___Gley
X Chroma = 2/less in mottled, 1 or less in unmottled
areas of cracked, peeling mud
8" deep vehicle tracks

Sandy hydric soil indicators – add:
___Aquic moisture regime
___High organic content in surface layer
___Streaking of subsurface horizons by organic material
___Organic accretions (muck balls just below surface)
___Wet spodosol (dark red-br horizon beneath leached E horizon at water table depth)

___Assume soils when all dominant plants are OBL and/or FACW

Hydrology: Wetland hydrology present? (Yes) No

Depth of surface water standing water several inches deep in center Depth to free water in pit — Depth to saturated soil near surface

Water sources: runoff - probably mainly from parking lots above

Primary wetland hydrology indicators:
___Inundated
___Saturated in upper 12" > 12.5% of growing season
___Water marks
___drift lines
___Sediment deposits
X Drainage pattern in wetlands
storm drain outlets near NW end + E end

Secondary indicators (need 2 or more):
___Oxidized root channels in upper 12"
___Water-stained leaves
___Local soil survey data
X Fac-neutral test (>50% dom = OBL, FACW+, FACW)
___Other:

Wetland Determination: Does this sampling point meet all 3 wetland criteria? (Yes) No

Routine Wetland Determination (1987 COE Wetlands Delineation Manual) (4)a

Project, City/County, State: SH 7, Boulder, CO

Applicant/Owner: CDOT R4 Investigator: L. Backus

Site: Enterprise Ditch - west branch Date: 6-12-01

Disturbed - Wetland indicators altered/removed w/in last 5 years by human activities/catastrophic natural events? Yes (No)
Problem Area – Wetland indicators periodically lacking due to normal seasonal environmental variations? Yes (No)
Ecological setting: rolling plains

Vegetation: Wetland vegetation present? (Yes) No

Dominant species - west side	Layer	Status	Dominant species	Layer	Status
Carex emoryi	H	OBL			
Hippochaete hyemalis	H	FACW			
Asclepias speciosa	H	FAC			
Rosa woodsii	S	FACU			
Parthenocissus inserta	V	FAC			
Dactylis glomerata	H	FACU			

H – woody/non-wood <3.2': S – woody >3.2', <3.0" dbh, T – woody >3.0" dbh of any height, V – woody, climbing >3.2'
Dominant species – most abundant species that exceed 50% of total cover, plus additional species comprising over 20% of total cover.

Photo # 3 → SW % of dominants = OBL, FACW, FAC 75% (Wetlands - 50% or greater of dominants = OBL, FACW, FAC)
Minor Breea arvensis
Upper riparian band w/ Prunus americana, Ulmus pumila
East side private land appears similar

Soils: Wetland soils present? (Yes) No

Map unit series and phase: Hydric soils list? (Yes) No

Depth	Horizon	Matrix color	Mottle color	Mottle abundance/contrast	Texture, concretions, structure
12"	—	10YR 3/2	10YR 5/6	common	sandy clay loam
on upper, shrubby			wetland	margins	

Mottle abundance: few = <2%, common = 2-20%, many = >20%
Mottles prominent/distinct: same hue – value varies by 3 units, chroma by 2; different hue – value and chroma vary by 1 unit

Non-sandy hydric soil indicators:
___Histosol
___Histic epipedon
___H2S odor
___Aquic moisture regime
___Fe/Mg recent concretions
___Reducing conditions (a-a-dipyridil)
___Gley
X Chroma = 2/less in mottled, 1 or less in unmottled

Sandy hydric soil indicators – add:
___Aquic moisture regime
___High organic content in surface layer
___Streaking of subsurface horizons by organic material
___Organic accretions (muck balls just below surface)
___Wet spodosol (dark red-br horizon beneath leached E horizon at water table depth)

___Assume soils when all dominant plants are OBL and/or FACW

Hydrology: Wetland hydrology present? (Yes) No ditch flows

Depth of surface water — Depth to free water in pit — Depth to saturated soil damp

Water sources: Enterprise ditch, runoff

Primary wetland hydrology indicators:
___Inundated
X Saturated in upper 12" > 12.5% of growing season based on veg
___Water marks
___drift lines
___Sediment deposits
X Drainage pattern in wetlands

Secondary indicators (need 2 or more):
___Oxidized root channels in upper 12"
___Water-stained leaves
___Local soil survey data
X Fac-neutral test (>50% dom = OBL, FACW+, FACW)
___Other:

Wetland Determination: Does this sampling point meet all 3 wetland criteria? (Yes) No

Routine Wetland Determination (1987 COE Wetlands Delineation Manual) (4) b

Project, County, State: SH 7, Boulder, CO

Site: W. Enterprise Ditch at RR bend Date: 6-15-01

Applicant/Owner: CDOT R4 Investigator: L. Backus

Disturbed - Wetland indicators altered/removed w/in last 5 years by human activities/catastrophic natural events? Yes (No)
Problem Area – Wetland indicators periodically lacking due to normal seasonal environmental variations? Yes (No)
Ecological setting: rolling short gr prairie of Colo plains

Vegetation: Wetland vegetation present? (Yes) No

Dominant species	%	Layer	Status	Dominant species	%	Layer	Status
★Salix exigua		S	OBL				
★Carex langinuosa		H	OBL				
Rumex crispus		H	FACW				
★Juncus arcticus		H	FAC W				
Asclepius speciosa		H	FAC				

H – woody/non-wood <3.2': S – woody >3.2', <3.0" dbh, T – woody >3.0" dbh of any height, V – woody, climbing >3.2'
Dominant species – most abundant species that exceed 50% of total cover, plus additional species comprising over 20% of total cover.
% of dominants = OBL, FACW, FAC _____ (Wetlands - 50% or greater of dominants = OBL, FACW, FAC)

#10 → W
#11 → E
#9 → NW

Soils: Wetland soils present? (Yes) No Assumed - dominants are OBL + FACW

Map unit series and phase: _____ Hydric soils list? Yes No

Depth	Horizon	Matrix color	Mottle color	Mottle abundance/contrast	Texture, concretions, structure

Mottle abundance: few = <2%, common = 2-20%, many = >20%
Mottles prominent/distinct: same hue – value varies by 3 units, chroma by 2; different hue – value and chroma vary by 1 unit

Non-sandy hydric soil indicators:
___Histosol
___Histic epipedon
___H2S odor
___Aquic moisture regime
___Reducing conditions (a-a-dipyridil)
___Gley
___Chroma = 2/less in mottled, 1 or less in unmottled
___Fe/Mg recent concretions

Sandy hydric soil indicators – add:
___Aquic moisture regime
___High organic content in surface layer
___Streaking of subsurface horizons by organic material
___Organic accretions (muck balls just below surface)
___Wet spodosol (dark red-br horizon beneath leached E horizon at water table depth)

bands are present adjacent to natural linear portion of ditch just W of culvert inlet under tracks

Hydrology: Wetland hydrology present? (Yes) No water flowing in ditch

Depth of surface water _____ Depth to free water in pit _____ Depth to saturated soil _____

Water sources: _____

Primary wetland hydrology indicators:
___Inundated
X Saturated in upper 12" > 12.5% of growing season
___Water marks
___drift lines
___Sediment deposits
___Drainage pattern in wetlands

Secondary indicators (need 2 or more):
___Oxidized root channels in upper 12"
___Water-stained leaves
___Local soil survey data
___Fac-neutral test (>50% dom = OBL, FACW+, FACW)
___Other:

Wetland Determination: Does this sampling point meet all 3 wetland criteria? (Yes) No

Routine Wetland Determination (1987 COE Wetlands Delineation Manual) (5)a

Project, City/County, State: SH7, Boulder, CO

Applicant/Owner: CDOT R4 Investigator: L. Backus

Site: Railroad N of SH7, north of Tracks Date: 6-15-01

Disturbed - Wetland indicators altered/removed w/in last 5 years by human activities/catastrophic natural events? Yes (No)
Problem Area – Wetland indicators periodically lacking due to normal seasonal environmental variations? Yes (No)
Ecological setting: rolling plains of east CO

Vegetation: Wetland vegetation present? (Yes) No

Dominant species	Layer	Status	Dominant species	Layer	Status
t Carex praegracilis	H	FACW			
f Juncus arcticus	H	FACW			
t Carex emoryi ? vegetative	H	OBL			

H – woody/non-wood <3.2': S – woody >3.2', <3.0" dbh, T – woody >3.0" dbh of any height, V – woody, climbing >3.2'
Dominant species – most abundant species that exceed 50% of total cover, plus additional species comprising over 20% of total cover.

Photo # _____ % of dominants = OBL, FACW, FAC _____ (Wetlands - 50% or greater of dominants = OBL, FACW, FAC)
area at west end dominated by Brea arvensis was omitted
Bassia sieversiana is present at wetland margins

Soils: Wetland soils present? (Yes) No

Map unit series and phase: _____ Hydric soils list? Yes No

Depth	Horizon	Matrix color	Mottle color	Mottle abundance/contrast	Texture, concretions, structure
0-9	—	10YR 2/1	—		
9-12	—	10YR 5/4	black	many	

Mottle abundance: few = <2%, common = 2-20%, many = >20%
Mottles prominent/distinct: same hue – value varies by 3 units, chroma by 2; different hue – value and chroma vary by 1 unit

Non-sandy hydric soil indicators:
___Histosol
___Histic epipedon
___H2S odor
___Aquic moisture regime
___Fe/Mg recent concretions
___Reducing conditions (a-a-dipyridil)
___Gley
X Chroma = 2/less in mottled, 1 or less in unmottled
disturbed soils - part of RR grade

Sandy hydric soil indicators – add:
___Aquic moisture regime
___High organic content in surface layer
___Streaking of subsurface horizons by organic material
___Organic accretions (muck balls just below surface)
___Wet spodosol (dark red-br horizon beneath leached E horizon at water table depth)

___Assume soils when all dominant plants are OBL and/or FACW

Hydrology: Wetland hydrology present? (Yes) No

Depth of surface water — Depth to free water in pit — Depth to saturated soil 6"

Water sources: runoff

Primary wetland hydrology indicators:
___Inundated
X Saturated in upper 12" > 12.5% of growing season
___Water marks
___drift lines
___Sediment deposits
___Drainage pattern in wetlands

Secondary indicators (need 2 or more):
___Oxidized root channels in upper 12"
___Water-stained leaves
___Local soil survey data
X Fac-neutral test (>50% dom = OBL, FACW+, FACW)
___Other:

Wetland Determination: Does this sampling point meet all 3 wetland criteria? (Yes) No

Routine Wetland Determination (1987 COE Wetlands Delineation Manual)

Project, City/County, State: SH 7, Boulder, CO

Applicant/Owner: CDOT R4 Investigator: L. Backus

Site: RR North of SH 7, N of parked vehicles, S of tracks Date: 6-15-01

Disturbed - Wetland indicators altered/removed w/in last 5 years by human activities/catastrophic natural events? Yes (No)
Problem Area – Wetland indicators periodically lacking due to normal seasonal environmental variations? Yes (No)
Ecological setting: rolling plains of E CO

Vegetation: Wetland vegetation present? (Yes) No

Dominant species	Layer	Status	Dominant species	Layer	Status
4 Salix exigua including young	S	OBL			
4 Carex emoryi	H	OBL			
Vegetative Large carex / Scirpus	H	—			
4 Festuca pratensis	H	FAC			
Phalaroides arundinacea	H	FACW			

H – woody/non-wood <3.2': S – woody >3.2', <3.0" dbh, T – woody >3.0" dbh of any height, V – woody, climbing >3.2'
Dominant species – most abundant species that exceed 50% of total cover, plus additional species comprising over 20% of total cover.

Photo # 7 → SW % of dominants = OBL, FACW, FAC 100 % (Wetlands - 50% or greater of dominants = OBL, FACW, FAC)

Soils: Wetland soils present? (Yes) No

Map unit series and phase: Hydric soils list? Yes No

Depth	Horizon	Matrix color	Mottle color	Mottle abundance/contrast	Texture, concretions, structure
12"	—	10YR4/4	mottles	common	
east of		PVC outlet			

Mottle abundance: few = <2%, common = 2-20%, many = >20%
Mottles prominent/distinct: same hue – value varies by 3 units, chroma by 2; different hue – value and chroma vary by 1 unit

Non-sandy hydric soil indicators:
- ___Histosol
- ___Histic epipedon
- ___H2S odor
- X Aquic moisture regime
- ___Fe/Mg recent concretions
- ___Reducing conditions (a-a-dipyridil)
- ___Gley
- ___Chroma = 2/less in mottled, 1 or less in unmottled

disturbed soil area - RR cut

Sandy hydric soil indicators – add:
- ___Aquic moisture regime
- ___High organic content in surface layer
- ___Streaking of subsurface horizons by organic material
- ___Organic accretions (muck balls just below surface)
- ___Wet spodosol (dark red-br horizon beneath leached E horizon at water table depth)

___Assume soils when all dominant plants are OBL and/or FACW

Hydrology: Wetland hydrology present? (Yes) No

Depth of surface water — Depth to free water in pit — Depth to saturated soil Surface at PVC outlet

Water sources: Trickling flows from PVC pipe, runoff

Primary wetland hydrology indicators:
- ___Inundated
- X Saturated in upper 12" > 12.5% of growing season
- ___Water marks
- ___drift lines
- ___Sediment deposits
- ___Drainage pattern in wetlands

Secondary indicators (need 2 or more):
- ___Oxidized root channels in upper 12"
- ___Water-stained leaves
- ___Local soil survey data
- X Fac-neutral test (>50% dom = OBL, FACW+, FACW)
- ___Other:

Wetland Determination: Does this sampling point meet all 3 wetland criteria? (Yes) No

Routine Wetland Determination (1987 COE Wetlands Delineation Manual) (5) c

Project, City/County, State: SH 7, Boulder CO

Applicant/Owner: _____ Investigator: L. Backus

Site: RR north of SH 7, N of parked vehicle, N of tracks Date: 6-15-01

Disturbed - Wetland indicators altered/removed w/in last 5 years by human activities/catastrophic natural events? Yes (No)
Problem Area – Wetland indicators periodically lacking due to normal seasonal environmental variations? Yes (No)
Ecological setting: rolling plains of east CO

Vegetation: Wetland vegetation present? (Yes) No

Dominant species	Layer	Status	Dominant species	Layer	Status
Carex emoryi	H	OBL			
Asclepias incarnata? vegetative	H	OBL			
Asclepias speciosa	H	FAC			
vegetative tall grass	H	FAC?			
probably Festuca pratensis					
Schoenoplectus pungens	H	OBL			

H – woody/non-wood <3.2': S – woody >3.2', <3.0" dbh, T – woody >3.0" dbh of any height, V – woody, climbing >3.2'
Dominant species – most abundant species that exceed 50% of total cover, plus additional species comprising over 20% of total cover.

Photo # 6 → W % of dominants = OBL, FACW, FAC 100 % (Wetlands - 50% or greater of dominants = OBL, FACW, FAC)

Brcea arvensis invading
Elaeagnus angustifolia at margin

Soils: Wetland soils present? (Yes) No

Map unit series and phase: _____ Hydric soils list? Yes No

Depth	Horizon	Matrix color	Mottle color	Mottle abundance/contrast	Texture, concretions, structure
12"	—	10YR4/4	mottles	common	
	light colored thin sand layer at 6"				

Mottle abundance: few = <2%, common = 2-20%, many = >20%
Mottles prominent/distinct: same hue – value varies by 3 units, chroma by 2; different hue – value and chroma vary by 1 unit

Non-sandy hydric soil indicators:
___Histosol
___Histic epipedon
___H2S odor
___Aquic moisture regime
___Fe/Mg recent concretions
___Reducing conditions (a-a-dipyridil)
___Gley
___Chroma = 2/less in mottled, 1 or less in unmottled

disturbed soil area?

Sandy hydric soil indicators – add:
___Aquic moisture regime
___High organic content in surface layer
___Streaking of subsurface horizons by organic material
___Organic accretions (muck balls just below surface)
___Wet spodosol (dark red-br horizon beneath leached E horizon at water table depth)

___Assume soils when all dominant plants are OBL and/or FACW

Hydrology: Wetland hydrology present? (Yes) No

Depth of surface water — Depth to free water in pit — Depth to saturated soil —

Water sources: runoff, water seeping under tracks?

Primary wetland hydrology indicators:
___Inundated
___Saturated in upper 12" > 12.5% of growing season
___Water marks
___drift lines
___Sediment deposits
X Drainage pattern in wetlands

Secondary indicators (need 2 or more):
___Oxidized root channels in upper 12"
___Water-stained leaves
___Local soil survey data
X Fac-neutral test (>50% dom = OBL, FACW+, FACW)
___Other:

Wetland Determination: Does this sampling point meet all 3 wetland criteria? (Yes) No

Routine Wetland Determination (1987 COE Wetlands Delineation Manual) (5)d

Project, City/County, State: SH7, Boulder CO

Applicant/Owner: CDOT R-4 Investigator: L. Backus

Site: RR north of SH7, inside curve, ditch Date: 6-15-01

Disturbed - Wetland indicators altered/removed w/in last 5 years by human activities/catastrophic natural events? Yes (No)
Problem Area – Wetland indicators periodically lacking due to normal seasonal environmental variations? Yes (No)
Ecological setting: rolling plains of east CO

Vegetation: Wetland vegetation present? (Yes) No

Dominant species	Layer	Status	Dominant species	Layer	Status
+ Carex praegracilis	H	FACW			
* Carex emoryi	H	OBL			
Rumex crispus	H	FACW			

H – woody/non-wood <3.2': S – woody >3.2', <3.0" dbh, T – woody >3.0" dbh of any height, V – woody, climbing >3.2'
Dominant species – most abundant species that exceed 50% of total cover, plus additional species comprising over 20% of total cover.

Photo # ___ % of dominants = OBL, FACW, FAC 100% (Wetlands - 50% or greater of dominants = OBL, FACW, FAC)

Vegetation is somewhat patchy

Soils: Wetland soils present? (Yes) No

Map unit series and phase: ___ Hydric soils list? Yes No

Depth	Horizon	Matrix color	Mottle color	Mottle abundance/contrast	Texture, concretions, structure

Mottle abundance: few = <2%, common = 2-20%, many = >20%
Mottles prominent/distinct: same hue -- value varies by 3 units, chroma by 2; different hue – value and chroma vary by 1 unit

Non-sandy hydric soil indicators:
___Histosol
___Histic epipedon
___H2S odor
___Aquic moisture regime
___Fe/Mg recent concretions
___Reducing conditions (a-a-dipyridil)
___Gley
___Chroma = 2/less in mottled, 1 or less in unmottled

Sandy hydric soil indicators – add:
___Aquic moisture regime
___High organic content in surface layer
___Streaking of subsurface horizons by organic material
___Organic accretions (muck balls just below surface)
___Wet spodosol (dark red-br horizon beneath leached E horizon at water table depth)

X Assume soils when all dominant plants are OBL and/or FACW

Hydrology: Wetland hydrology present? (Yes) No

Depth of surface water ___ Depth to free water in pit ___ Depth to saturated soil surface

Water sources: runoff, deep?

Primary wetland hydrology indicators:
___Inundated
X Saturated in upper 12" > 12.5% of growing season
___Water marks
___drift lines
___Sediment deposits
___Drainage pattern in wetlands

Secondary indicators (need 2 or more):
___Oxidized root channels in upper 12"
___Water-stained leaves
___Local soil survey data
X Fac-neutral test (>50% dom = OBL, FACW+, FACW)
___Other:

Wetland Determination: Does this sampling point meet all 3 wetland criteria? (Yes) No

(5)e

Routine Wetland Determination (1987 COE Wetlands Delineation Manual)

Project, City/County, State: SH 7 Boulder CO

Applicant/Owner: CDOT R-4 Investigator: L. Backus

Site: RR north of SH 7, inside curve, ditch Date: 6-15-01

Disturbed - Wetland indicators altered/removed w/in last 5 years by human activities/catastrophic natural events? Yes (No)
Problem Area – Wetland indicators periodically lacking due to normal seasonal environmental variations? Yes (No)
Ecological setting: rolling plains of east CO

Vegetation: Wetland vegetation present? (Yes) No

Dominant species	Layer	Status	Dominant species	Layer	Status
Carex emoryi	H	OBL			
Typha latifolia	H	OBL			
Carex lanuginosa	H	OBL			
C. nebrascensis ? vegetative	H	OBL			
Salix exigua - patch at E end	S	OBL			

H – woody/non-wood <3.2': S – woody >3.2', <3.0" dbh, T – woody >3.0" dbh of any height, V – woody, climbing >3.2'
Dominant species – most abundant species that exceed 50% of total cover, plus additional species comprising over 20% of total cover.

Photo # 6→E % of dominants = OBL, FACW, FAC 100% (Wetlands - 50% or greater of dominants = OBL, FACW, FAC)
~6x10 disturbed area north of blue building - gravel washing into wetl veg.

Soils: Wetland soils present? (Yes) No

Map unit series and phase: Hydric soils list? Yes No

Depth	Horizon	Matrix color	Mottle color	Mottle abundance/contrast	Texture, concretions, structure

Mottle abundance: few = <2%, common = 2-20%, many = >20%
Mottles prominent/distinct: same hue – value varies by 3 units, chroma by 2; different hue – value and chroma vary by 1 unit

Non-sandy hydric soil indicators:
___Histosol
___Histic epipedon
___H2S odor
___Aquic moisture regime
___Fe/Mg recent concretions
___Reducing conditions (a-a-dipyridil)
___Gley
___Chroma = 2/less in mottled, 1 or less in unmottled

Sandy hydric soil indicators – add:
___Aquic moisture regime
___High organic content in surface layer
___Streaking of subsurface horizons by organic material
___Organic accretions (muck balls just below surface)
___Wet spodosol (dark red-br horizon beneath leached E horizon at water table depth)

X Assume soils when all dominant plants are OBL and/or FACW

Hydrology: Wetland hydrology present? (Yes) No

Depth of surface water 3-4" Depth to free water in pit ___ Depth to saturated soil Surface

Water sources: runoff, seep? extends up bank on south side

Primary wetland hydrology indicators:
___Inundated
X Saturated in upper 12" > 12.5% of growing season
___Water marks
___drift lines
___Sediment deposits
___Drainage pattern in wetlands

Secondary indicators (need 2 or more):
___Oxidized root channels in upper 12"
___Water-stained leaves
___Local soil survey data
___Fac-neutral test (>50% dom = OBL, FACW+, FACW)
___Other:

Wetland Determination: Does this sampling point meet all 3 wetland criteria? (Yes) No

Routine Wetland Determination (1987 COE Wetlands Delineation Manual)

(6) a-b

Project, City/County, State: SH 7, Boulder, CO

Applicant/Owner: CDOT Investigator: L. Backus

Site: Enterprise Ditch - west branch, S. of SH 7 and adjacent secondary ditch w. of tracks Date: 6-15-01

Disturbed - Wetland indicators altered/removed w/in last 5 years by human activities/catastrophic natural events? Yes (No)

Problem Area – Wetland indicators periodically lacking due to normal seasonal environmental variations? Yes (No)

Ecological setting: rolling plains of east CO

Vegetation: Wetland vegetation present? (Yes) No

Dominant species	Layer	Status	Dominant species	Layer	Status
Phalaroides arundinacea	H	FACW			
+ Carex lanuginosa	H	OBL			
+ C. emoryi	H	OBL			
Salix exigua	H	OBL			

H – woody/non-wood <3.2': S – woody >3.2', <3.0" dbh, T – woody >3.0" dbh of any height, V – woody, climbing >3.2'

Dominant species – most abundant species that exceed 50% of total cover, plus additional species comprising over 20% of total cover.

Photo # 18→NC, 19→SW, 22→SW, 24→S % of dominants = OBL, FACW, FAC _____ (Wetlands - 50% or greater of dominants = OBL, FACW, FAC)

Brcea arvensis at upper margins

Soils: Wetland soils present? (Yes) No

Map unit series and phase: _____ Hydric soils list? Yes No

Depth	Horizon	Matrix color	Mottle color	Mottle abundance/contrast	Texture, concretions, structure

Mottle abundance: few = <2%, common = 2-20%, many = >20%

Mottles prominent/distinct: same hue – value varies by 3 units, chroma by 2; different hue – value and chroma vary by 1 unit

Non-sandy hydric soil indicators:
- ___Histosol
- ___Histic epipedon
- ___H2S odor
- ___Aquic moisture regime
- ___Fe/Mg recent concretions
- ___Reducing conditions (a-a-dipyridil)
- ___Gley
- ___Chroma = 2/less in mottled, 1 or less in unmottled

Sandy hydric soil indicators – add:
- ___Aquic moisture regime
- ___High organic content in surface layer
- ___Streaking of subsurface horizons by organic material
- ___Organic accretions (muck balls just below surface)
- ___Wet spodosol (dark red-br horizon beneath leached E horizon at water table depth)

- X Assume soils when all dominant plants are OBL and/or FACW

Hydrology: Wetland hydrology present? (Yes) No

Depth of surface water 6-8" flows Depth to free water in pit ____ Depth to saturated soil ____

Water sources: ditch flows

Primary wetland hydrology indicators:
- ___Inundated
- X Saturated in upper 12" > 12.5% of growing season
- ___Water marks
- ___drift lines
- ___Sediment deposits
- X Drainage pattern in wetlands

Secondary indicators (need 2 or more):
- ___Oxidized root channels in upper 12"
- ___Water-stained leaves
- ___Local soil survey data
- X Fac-neutral test (>50% dom = OBL, FACW+, FACW)
- ___Other:

Wetland Determination: Does this sampling point meet all 3 wetland criteria? (Yes) No

Routine Wetland Determination (1987 COE Wetlands Delineation Manual) (6) c

Project, City/County, State: SH 7, Boulder CO

Applicant/Owner: CDOT Investigator: L. Backus

Site: Enterprise Ditch - West branch, secondary ditch E side of RR tracks Date: 6-15-01

Disturbed - Wetland indicators altered/removed w/in last 5 years by human activities/catastrophic natural events? Yes (No)

Problem Area – Wetland indicators periodically lacking due to normal seasonal environmental variations? Yes (No)

Ecological setting: rolling plains of east CO

Vegetation: Wetland vegetation present? (Yes) No

Dominant species	Layer	Status	Dominant species	Layer	Status
* Carex emoryi	H	OBL			
* Phalaroides arundinacea	H	FACW			

H – woody/non-wood <3.2': S – woody >3.2', <3.0" dbh, T – woody >3.0" dbh of any height, V – woody, climbing >3.2'

Dominant species – most abundant species that exceed 50% of total cover, plus additional species comprising over 20% of total cover.

Photo # 20 → 5E 23 → 5E % of dominants = OBL, FACW, FAC 100% (Wetlands - 50% or greater of dominants = OBL, FACW, FAC)

Soils: Wetland soils present? (Yes) No

Map unit series and phase: Hydric soils list? (Yes) No

Depth	Horizon	Matrix color	Mottle color	Mottle abundance/contrast	Texture, concretions, structure

Mottle abundance: few = <2%, common = 2-20%, many = >20%

Mottles prominent/distinct: same hue – value varies by 3 units, chroma by 2; different hue – value and chroma vary by 1 unit

Non-sandy hydric soil indicators:
- ___Histosol
- ___Histic epipedon
- ___H2S odor
- ___Aquic moisture regime
- ___Fe/Mg recent concretions
- ___Reducing conditions (a-a-dipyridil)
- ___Gley
- ___Chroma = 2/less in mottled, 1 or less in unmottled

Sandy hydric soil indicators – add:
- ___Aquic moisture regime
- ___High organic content in surface layer
- ___Streaking of subsurface horizons by organic material
- ___Organic accretions (muck balls just below surface)
- ___Wet spodosol (dark red-br horizon beneath leached E horizon at water table depth)

- X Assume soils when all dominant plants are OBL and/or FACW

Hydrology: Wetland hydrology present? (Yes) No

Depth of surface water — Depth to free water in pit — Depth to saturated soil —

Water sources: ditch flows

Primary wetland hydrology indicators:
- ___Inundated
- X Saturated in upper 12" > 12.5% of growing season
- ___Water marks
- ___drift lines
- ___Sediment deposits
- X Drainage pattern in wetlands

Secondary indicators (need 2 or more):
- ___Oxidized root channels in upper 12"
- ___Water-stained leaves
- ___Local soil survey data
- X Fac-neutral test (>50% dom = OBL, FACW+, FACW)
- ___Other:

Wetland Determination: Does this sampling point meet all 3 wetland criteria? (Yes) No

Routine Wetland Determination (1987 COE Wetlands Delineation Manual) (7) a

Project, City/County, State: SH 7, Boulder, CO

Applicant/Owner: CDOT R4 Investigator: L. Backus

Site: ditch northside SH 7, E of RR bridge Date: 6-12-01

Disturbed - Wetland indicators altered/removed w/in last 5 years by human activities/catastrophic natural events? Yes (No)

Problem Area – Wetland indicators periodically lacking due to normal seasonal environmental variations? Yes (No)

Ecological setting: rolling plains of east CO

Vegetation: Wetland vegetation present? (Yes) No

Dominant species	Layer	Status	Dominant species	Layer	Status
4 Eleocharis palustris	H	OBL			
4 Carex praegracilis	H	FACW			
Rumex crispus	H	FACW			
Schoenoplectus pungens	H	OBL			

H – woody/non-wood <3.2': S – woody >3.2', <3.0" dbh, T – woody >3.0" dbh of any height, V – woody, climbing >3.2'

Dominant species – most abundant species that exceed 50% of total cover, plus additional species comprising over 20% of total cover.

Photo # 1 → NE #16 → NE % of dominants = OBL, FACW, FAC* 100% (Wetlands - 50% or greater of dominants = OBL, FACW, FAC)

Soils: Wetland soils present? (Yes) No

Map unit series and phase: Hydric soils list? Yes No

Depth	Horizon	Matrix color	Mottle color	Mottle abundance/contrast	Texture, concretions, structure

Mottle abundance: few = <2%, common = 2-20%, many = >20%

Mottles prominent/distinct: same hue – value varies by 3 units, chroma by 2; different hue – value and chroma vary by 1 unit

Non-sandy hydric soil indicators:
- ___Histosol
- ___Histic epipedon
- ___H2S odor
- ___Aquic moisture regime
- ___Fe/Mg recent concretions
- ___Reducing conditions (a-a-dipyridil)
- ___Gley
- ___Chroma = 2/less in mottled, 1 or less in unmottled

Sandy hydric soil indicators – add:
- ___Aquic moisture regime
- ___High organic content in surface layer
- ___Streaking of subsurface horizons by organic material
- ___Organic accretions (muck balls just below surface)
- ___Wet spodosol (dark red-br horizon beneath leached E horizon at water table depth)
- X Assume soils when all dominant plants are OBL and/or FACW

Hydrology: Wetland hydrology present? (Yes) No

Depth of surface water ___ Depth to free water in pit ___ Depth to saturated soil ___

Water sources: runoff

Primary wetland hydrology indicators:
- ___Inundated
- X Saturated in upper 12" > 12.5% of growing season
- ___Water marks
- ___drift lines
- ___Sediment deposits
- X Drainage pattern in wetlands

Secondary indicators (need 2 or more):
- ___Oxidized root channels in upper 12"
- ___Water-stained leaves
- ___Local soil survey data
- X Fac-neutral test (>50% dom = OBL, FACW+, FACW)
- ___Other:

Wetland Determination: Does this sampling point meet all 3 wetland criteria? (Yes) No

Routine Wetland Determination (1987 COE Wetlands Delineation Manual) (7) b+c

Project, City/County, State: SH 7, Boulder, CO

Applicant/Owner: CDOT R-4 Investigator: L. Backus

Site: ditch south side SH 7, E of RR bridge Date: 6-12-01

Disturbed - Wetland indicators altered/removed w/in last 5 years by human activities/catastrophic natural events? Yes (No)
Problem Area – Wetland indicators periodically lacking due to normal seasonal environmental variations? Yes (No)
Ecological setting: rolling plains of east CO

Vegetation: Wetland vegetation present? (Yes) No

Dominant species	Layer	Status	Dominant species	Layer	Status
*Typha latifolia	H	OBL	Juncus arcticus	H	FACW
T. angustifolia	H	OBL	Critesium jubatum	H	FACW
Ambrosia spp.	H	—	Rumex crispus	H	FACW
Lactuca serriola	H	FAC			
*Eleocharis palustris	H	OBL			
*Agrostis stolonifera	H	FACW			

H – woody/non-wood <3.2': S – woody >3.2', <3.0" dbh, T – woody >3.0" dbh of any height, V – woody, climbing >3.2'
Dominant species – most abundant species that exceed 50% of total cover, plus additional species comprising over 20% of total cover.

Photo # 16 → NE % of dominants = OBL, FACW, FAC 100% (Wetlands - 50% or greater of dominants = OBL, FACW, FAC)

Soils: Wetland soils present? (Yes) No

Map unit series and phase: Hydric soils list? Yes No

Depth	Horizon	Matrix color	Mottle color	Mottle abundance/contrast	Texture, concretions, structure

Mottle abundance: few = <2%, common = 2-20%, many = >20%
Mottles prominent/distinct: same hue – value varies by 3 units, chroma by 2; different hue – value and chroma vary by 1 unit

Non-sandy hydric soil indicators:
___Histosol
___Histic epipedon
___H2S odor
___Aquic moisture regime
___Fe/Mg recent concretions
___Reducing conditions (a-a-dipyridil)
___Gley
___Chroma = 2/less in mottled, 1 or less in unmottled

Sandy hydric soil indicators – add:
___Aquic moisture regime
___High organic content in surface layer
___Streaking of subsurface horizons by organic material
___Organic accretions (muck balls just below surface)
___Wet spodosol (dark red-br horizon beneath leached E horizon at water table depth)

X Assume soils when all dominant plants are OBL and/or FACW

Hydrology: Wetland hydrology present? (Yes) No standing water at west concrete storm drain and ~100' east of swale rail pool ~20' long below Enterprise Ditch

Depth of surface water ~4" Depth to free water in pit ___ Depth to saturated soil surface

Water sources: runoff

Primary wetland hydrology indicators:
___Inundated
X Saturated in upper 12" > 12.5% of growing season
___Water marks
___drift lines
___Sediment deposits
X Drainage pattern in wetlands

Secondary indicators (need 2 or more):
___Oxidized root channels in upper 12"
___Water-stained leaves
___Local soil survey data
X Fac-neutral test (>50% dom = OBL, FACW+, FACW)
___Other:

Wetland Determination: Does this sampling point meet all 3 wetland criteria? (Yes) No

Routine Wetland Determination (1987 COE Wetlands Delineation Manual) (O) a+b

Project, City/County, State: SH 7, Boulder, CO

Applicant/Owner: CDOT R4 Investigator: L. Backus

Site: ditches west side 75th St, north of RR bridge Date: 6-12-01

Disturbed - Wetland indicators altered/removed w/in last 5 years by human activities/catastrophic natural events? Yes (No)
Problem Area – Wetland indicators periodically lacking due to normal seasonal environmental variations? Yes (No)
Ecological setting: rolling plains of east CO

Vegetation: Wetland vegetation present? (Yes) No

Dominant species	Layer	Status	Dominant species	Layer	Status
1 Salix exigua	H	OBL			
2 Cirsium julbatum	H	FACW			
3 Carex emoryi	H	OBL			
Festuca pratensis	H	FAC			
Juncus spp.	H	—			
Populus deltoides saplings	H	FAC			

H – woody/non-wood <3.2': S – woody >3.2', <3.0" dbh, T – woody >3.0" dbh of any height, V – woody, climbing >3.2'
Dominant species – most abundant species that exceed 50% of total cover, plus additional species comprising over 20% of total cover.

Photo #_____ % of dominants = OBL, FACW, FAC* 100% (Wetlands - 50% or greater of dominants = OBL, FACW, FAC)

Soils: Wetland soils present? (Yes) No

Map unit series and phase:_____ Hydric soils list? Yes No

Depth	Horizon	Matrix color	Mottle color	Mottle abundance/contrast	Texture, concretions, structure

Mottle abundance: few = <2%, common = 2-20%, many = >20%
Mottles prominent/distinct: same hue – value varies by 3 units, chroma by 2; different hue – value and chroma vary by 1 unit

Non-sandy hydric soil indicators:
___Histosol
___Histic epipedon
___H2S odor
___Aquic moisture regime
___Fe/Mg recent concretions
___Reducing conditions (a-a-dipyridil)
___Gley
___Chroma = 2/less in mottled, 1 or less in unmottled

Sandy hydric soil indicators – add:
___Aquic moisture regime
___High organic content in surface layer
___Streaking of subsurface horizons by organic material
___Organic accretions (muck balls just below surface)
___Wet spodosol (dark red-br horizon beneath leached E horizon at water table depth)

X Assume soils when all dominant plants are OBL and/or FACW

Hydrology: Wetland hydrology present? (Yes) No

Depth of surface water — Depth to free water in pit — Depth to saturated soil —

Water sources: runoff

Primary wetland hydrology indicators:
___Inundated
___Saturated in upper 12" > 12.5% of growing season
___Water marks
___drift lines
___Sediment deposits
X Drainage pattern in wetlands

Secondary indicators (need 2 or more):
___Oxidized root channels in upper 12"
___Water-stained leaves
___Local soil survey data
X Fac-neutral test (>50% dom = OBL, FACW+, FACW)
___Other:

Wetland Determination: Does this sampling point meet all 3 wetland criteria? (Yes) No

Routine Wetland Determination (1987 COE Wetlands Delineation Manual) (8) c

Project, City/County, State: SH 7, Boulder, CO

Applicant/Owner: CDOT R-4 Investigator: L. Backus

Site: ditch west side 75th ST, south of RR bridge Date: 6-12-01

Disturbed - Wetland indicators altered/removed w/in last 5 years by human activities/catastrophic natural events? Yes (No)
Problem Area – Wetland indicators periodically lacking due to normal seasonal environmental variations? Yes (No)
Ecological setting: rolling plains of east CO

Vegetation: Wetland vegetation present? (Yes) No

Dominant species	Layer	Status	Dominant species	Layer	Status
1 Typha latifolia	H	OBL			
Eleocharis palustris	H	OBL			
Schoenoplectus pungens	H	OBL			

H – woody/non-wood <3.2': S – woody >3.2', <3.0" dbh, T – woody >3.0" dbh of any height, V – woody, climbing >3.2'
Dominant species – most abundant species that exceed 50% of total cover, plus additional species comprising over 20% of total cover.

Photo # 11-7A % of dominants = OBL, FACW, FAC 100% (Wetlands - 50% or greater of dominants = OBL, FACW, FAC)

Soils: Wetland soils present? (Yes) No

Map unit series and phase: Hydric soils list? Yes No

Depth	Horizon	Matrix color	Mottle color	Mottle abundance/contrast	Texture, concretions, structure

Mottle abundance: few = <2%, common = 2-20%, many = >20%
Mottles prominent/distinct: same hue – value varies by 3 units, chroma by 2; different hue – value and chroma vary by 1 unit

Non-sandy hydric soil indicators:
___Histosol
___Histic epipedon
___H2S odor
___Aquic moisture regime
___Fe/Mg recent concretions
___Reducing conditions (a-a-dipyridil)
___Gley
___Chroma = 2/less in mottled, 1 or less in unmottled

Sandy hydric soil indicators – add:
___Aquic moisture regime
___High organic content in surface layer
___Streaking of subsurface horizons by organic material
___Organic accretions (muck balls just below surface)
___Wet spodosol (dark red-br horizon beneath leached E horizon at water table depth)

X Assume soils when all dominant plants are OBL and/or FACW

Hydrology: Wetland hydrology present? (Yes) No

Depth of surface water — Depth to free water in pit — Depth to saturated soil surface

Water sources:

Primary wetland hydrology indicators:
___Inundated
X Saturated in upper 12" > 12.5% of growing season
___Water marks
___drift lines
___Sediment deposits
X Drainage pattern in wetlands

Secondary indicators (need 2 or more):
___Oxidized root channels in upper 12"
___Water-stained leaves
___Local soil survey data
X Fac-neutral test (>50% dom = OBL, FACW+, FACW)
___Other:

Wetland Determination: Does this sampling point meet all 3 wetland criteria? (Yes) No

Routine Wetland Determination (1987 COE Wetlands Delineation Manual) (Yard)

Project, City/County, State: SH7, Boulder, CO

Applicant/Owner: CDOT R4 Investigator: L. Backus

Site: East side 75th st., North of RR bridge Date: 6-12-01

Disturbed - Wetland indicators altered/removed w/in last 5 years by human activities/catastrophic natural events? Yes (No)
Problem Area – Wetland indicators periodically lacking due to normal seasonal environmental variations? Yes (No)
Ecological setting: rolling plains of east CO

Vegetation: Wetland vegetation present? (Yes) No

Dominant species	Layer	Status	Dominant species	Layer	Status
t Schoenoplectus pungens	H	OBL			
t Carex praegracilis	H	FACW			
Critesium jubatum	H	FACW			
Eleocharis palustris	H	FAC			

H – woody/non-wood <3.2': S – woody >3.2', <3.0" dbh, T – woody >3.0" dbh of any height, V – woody, climbing >3.2'
Dominant species – most abundant species that exceed 50% of total cover, plus additional species comprising over 20% of total cover.

Photo # 14-16 →SE % of dominants = OBL, FACW, FAC* 100% (Wetlands - 50% or greater of dominants = OBL, FACW, FAC)
appears to continue east to Dry Creek, band of Salix exigua at toe of RR embankment
one wetland a+b and area west of fence

Soils: Wetland soils present? (Yes) No

Map unit series and phase: Hydric soils list? Yes No

Depth	Horizon	Matrix color	Mottle color	Mottle abundance/contrast	Texture, concretions, structure

Mottle abundance: few = <2%, common = 2-20%, many = >20%
Mottles prominent/distinct: same hue – value varies by 3 units, chroma by 2; different hue – value and chroma vary by 1 unit

Non-sandy hydric soil indicators:
___Histosol
___Histic epipedon
___H2S odor
___Aquic moisture regime
___Fe/Mg recent concretions
___Reducing conditions (a-a-dipyridil)
___Gley
___Chroma = 2/less in mottled, 1 or less in unmottled

Sandy hydric soil indicators – add:
___Aquic moisture regime
___High organic content in surface layer
___Streaking of subsurface horizons by organic material
___Organic accretions (muck balls just below surface)
___Wet spodosol (dark red-br horizon beneath leached E horizon at water table depth)

X Assume soils when all dominant plants are OBL and/or FACW

Hydrology: Wetland hydrology present? (Yes) No standing water at crossdrain

Depth of surface water ___ Depth to free water in pit ___ Depth to saturated soil ___

Water sources:

Primary wetland hydrology indicators:
___Inundated
___Saturated in upper 12" > 12.5% of growing season
___Water marks
___drift lines
___Sediment deposits
X Drainage pattern in wetlands

Secondary indicators (need 2 or more):
___Oxidized root channels in upper 12"
___Water-stained leaves
___Local soil survey data
X Fac-neutral test (>50% dom = OBL, FACW+, FACW)
___Other:

Wetland Determination: Does this sampling point meet all 3 wetland criteria? (Yes) No

Routine Wetland Determination (1987 COE Wetlands Delineation Manual) (9) c

Project, City/County, State: SH 7, Boulder CO

Applicant/Owner: CDOT R4 Investigator: L. Rackus

Site: City Open Space, east side 75th ST, south of RR bridge Date: 6-12-01

Disturbed - Wetland indicators altered/removed w/in last 5 years by human activities/catastrophic natural events? Yes (No)
Problem Area – Wetland indicators periodically lacking due to normal seasonal environmental variations? Yes (No)
Ecological setting: rolling plains of east CO

Vegetation: Wetland vegetation present? (Yes) No

Dominant species	Layer	Status	Dominant species	Layer	Status
Typha latifolia	H	OBL	Eleocharis palustris	H	OBL
Schoenoplectus pungens	H	OBL	Salix exigua	H	OBL
Phalaroides arundinacea	H	FACW			
Agrostis stolonifera	H	FACW			
Juncus spp.	H	–			
Eleocharis palustris	H	OBL			

H – woody/non-wood <3.2': S – woody >3.2', <3.0" dbh, T – woody >3.0" dbh of any height, V – woody, climbing >3.2'
Dominant species – most abundant species that exceed 50% of total cover, plus additional species comprising over 20% of total cover.

Photo # 12 → SE, 13 → E, 25 → SE % of dominants = OBL, FACW, FAC* 100% (Wetlands - 50% or greater of dominants = OBL, FACW, FAC)
extends south to Dry Creek
includes small ditch at NE end -9d

Soils: Wetland soils present? (Yes) No

Map unit series and phase: _____ Hydric soils list? Yes No

Depth	Horizon	Matrix color	Mottle color	Mottle abundance/contrast	Texture, concretions, structure

Mottle abundance: few = <2%, common = 2-20%, many = >20%
Mottles prominent/distinct: same hue – value varies by 3 units, chroma by 2; different hue – value and chroma vary by 1 unit

Non-sandy hydric soil indicators:
___Histosol
___Histic epipedon
___H2S odor
___Aquic moisture regime
___Fe/Mg recent concretions
___Reducing conditions (a-a-dipyridil)
___Gley
___Chroma = 2/less in mottled, 1 or less in unmottled

Sandy hydric soil indicators – add:
___Aquic moisture regime
___High organic content in surface layer
___Streaking of subsurface horizons by organic material
___Organic accretions (muck balls just below surface)
___Wet spodosol (dark red-br horizon beneath leached E horizon at water table depth)

X Assume soils when all dominant plants are OBL and/or FACW

Hydrology: Wetland hydrology present? (Yes) No

Depth of surface water — Depth to free water in pit — Depth to saturated soil surface in montane

Water sources: runoff, high groundwater table?

Primary wetland hydrology indicators:
___Inundated
X Saturated in upper 12" > 12.5% of growing season
___Water marks
___drift lines
___Sediment deposits
X Drainage pattern in wetlands

Secondary indicators (need 2 or more):
___Oxidized root channels in upper 12"
___Water-stained leaves
___Local soil survey data
X Fac-neutral test (>50% dom = OBL, FACW+, FACW)
___Other:

Wetland Determination: Does this sampling point meet all 3 wetland criteria? (Yes) No

Wetland Mitigation Site Selection Form
Colorado Department of Transportation
Attachment to Wetland Finding

Project Name/No. SH 7 Cherryvale Road to 75th Street, STA 0072 -013 Subaccount _____
Region 4 Author Laura Backus Firm Carter & Burgess Date 4-18-2006

Mitigation Options	(1) Mitigation bank available? Yes	
	(2) Project impacts in 1º, 2º service area? Yes	(3) HUC units NA – ditch wetlands
	(4) On-site mitigation available? No	
	(5) Off-site mitigation available? No	
	(6) In-lieu fee arrangement? In-lieu fee sponsor? No	
	(7) Mitigation ratio(s) other than 1:1 involved? No	Ratio(s) NA

		Impact Site	**Mitigation Site**
Site Characteristics	(8) Geographic location	R70W, T1N, S 25, 26, 27, 34, 35, 36	Wetland mitigation bank (in primary service area of 3 banks)
	(9) Wetland community type, pct.	Emergent – 80% Scrub/shrub – 20%	Varies
	(10) Functions, values	GW-L, SS-M; SR-M, WH-L	Varies
	(11) Size of impacts, pct. of total area?	0.32 acre, 50% of wetlands in narrow study area	NA
Wildlife/Habitat	(12) T&E species/habitat present?	No	Corps of Engineers approved bank
	(13) Species? Status?	NA	"
	(14) Migratory Bird Treaty Act?	No	"
	(15) Other wildlife issues	No	"
	(16) Status of aquatic resource?	NA	"
	(17) Special aquatic site?	Wetlands	"
	(18) Unique? Quality? Ranking?	No, L-M, none	"
	(19) Watershed, ecosystem issues?	No	"
Other	(20) Likelihood of success?	NA	Bank
	(21) Interagency agreement?	NA	No
	(22) Project logistics, size/scope?	NA	Ditch wetlands
	(23) Cost considerations?	NA	Ditch wetlands
	(24) Buffer used:	NA	Bank

Water Issues	(25) Individual 404 permit condition?	No
	(26) 404(b)(1) Guidelines?	No
	(27) NWP gen., reg. conditions?	No
	(28) Regulatory letters?	No
	(29) S.B. 40?	No
	(30) Water rights issues?	No

NEPA Issues	(31) Cumulative impact issues?	No
	(32) Agency policy, input?	No
	(33) Public involvement?	No

(34) **Basis for Decision**

[Describe those factors from the front side that are instrumental in the selection of the chosen mitigation decision.]

SH 7 project impacts 0.32 acre of irrigation ditch and roadside ditch wetlands.
The Transportation Equity Act for the 21st Century establishes a preference for mitigation banks, and the project site is within the primary service area of three Corps of Engineers approved wetland mitigation banks.
No suitable sites for wetland mitigation such as natural drainages or wetland sites are present in the project area.

(35) **Decision**

Mitigation at a Wetland Mitigation Bank

(36) **Contingency Plans**

The project is within the primary service area of three wetland mitigation banks.