I-76 & Bridge Street INTERCHANGE

Wetland Finding

Technical Report

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List of acronyms and abbreviations

AA	Assessment Area
AOI	Area of interest
BMP	Best management practice
Brighton	City of Brighton
CDOT	Colorado Department of Transportation
EA	Environmental Assessment
FACWet	Functional Assessment of Colorado Wetlands
FHWA	Federal Highway Administration
GIS	Geographic Information Systems
GPS	Global positioning system
LOS	Level of service
OHWM	Ordinary high water mark
PEM	Palustrine emergent
ROW	Right of way
SWMP	Stormwater Management Plan
USACE	U.S. Army Corps of Engineers
WUS	Waters of the United States

1. Introduction

The I-76 and Bridge Street Interchange Environmental Assessment (EA) is a joint effort between the City of Brighton (Brighton), the Federal Highway Administration (FHWA), and the Colorado Department of Transportation (CDOT). This EA will identify potential impacts of the proposed interchange on the built and natural environment. Brighton proposes constructing a new interchange at Bridge Street and I-76 in eastern Brighton. The project is located in Adams County, Colorado, approximately 25 miles northeast of Denver. The wetlands study area is defined as the area surrounding the Bridge Street overpass over I-76, including the interstate, the frontage roads, and Bridge Street (Exhibit 1-1).

Exhibit 1-1. Project Area

The purpose of the project is to increase local and regional east-west connectivity, reduce the amount of travel delay through the future design year of 2035, and improve traffic flow and access in the project area. The need for the project results from the lack of local and regional connectivity, current and projected congestion and associated travel delay, and poor current and future traffic flow on the frontage roads.

The proposed interchange provides an opportunity to increase regional east-west connectivity, which will become increasingly important with future population growth and increased travel demand.

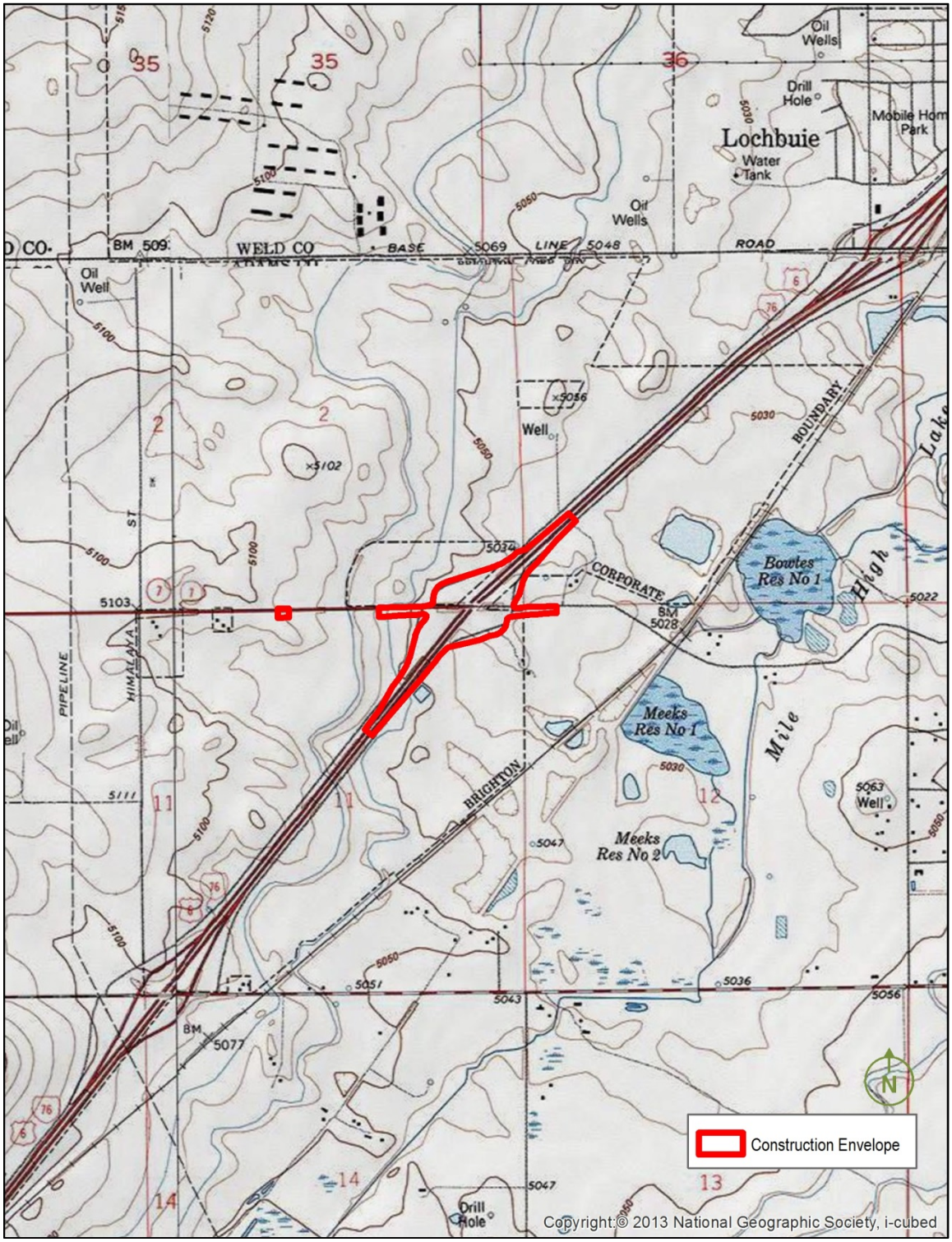
This report has been prepared as required by CDOT because permanent wetland impacts would exceed 500 square feet. The following is a Wetland Finding for the project and has been written in compliance with Executive Order 11990, “Protection of Wetlands,” and in accordance with 23 Code of Federal Regulations [CFR] 771, 23 CFR 777, and FHWA Technical Advisory T6640.8A (Federal Register, 1977).

1.1 Project Location

The proposed project is located at the I-76 and Bridge Street intersection within the City of Brighton, Colorado (see Exhibit 1-2). The approximate geographical location of the project is centered at decimal degree coordinates (North American Datum [NAD] 83) latitude 39.986913°, longitude -104.735925°. The

project is located in parts of Sections 2 and 11, Township 1 South, Range 65 West of the 6th Principal Meridian on the United States Geological Survey (USGS) Mile High Lakes, Colorado 7.5-Minute Quadrangle (USGS, 1994). The elevation of the site is approximately 5,060 feet above mean sea level (msl).

Exhibit 1-2. Site Location



1.2 Project Description and Alternatives

1.2.1 No-Action Alternative

The No-Action Alternative serves as the baseline against which Action Alternatives were compared. For the purposes of this study, the No-Action Alternative is defined as the existing facilities within the project area. Under the No-Action Alternative, no further improvements, aside from ongoing operations and maintenance, would be made to the Bridge Street overpass at I-76.

1.2.2 Preferred Alternative: Two-Roundabout Interchange Design

The Preferred Alternative is the Two-Roundabout Interchange. This alternative combines the frontage roads and ramp terminals to make one six-legged roundabout on both the east and west sides of I-76. This alternative meets the project Purpose and Need. It preserves the existing bridge, can be designed within the existing right of way (ROW), and avoids impacts to the Speer Canal to the northwest of the interchange. This alternative is expected to operate at level of service (LOS) B in the year 2035.

Each roundabout has an outside diameter of 200 feet, including a 12-foot truck apron for truck traffic. To develop approach angles as a traffic-calming technique and to lessen ROW impacts, both roundabouts have been placed off center of the existing Bridge Street center line. Splitter islands are included to slow traffic coming into the roundabouts. The roundabouts are designed with an 18-foot single lane for circulation and exclusive right turn bypasses for the ramp-to-frontage-road and frontage-road-to-ramp movements. This alternative has the least amount of access points among the Action Alternatives.

1.2.3 Alternative 2: Four-Roundabout Interchange Design

Alternative 2 is the Four-Roundabout Interchange, which creates two four-legged roundabouts on each side (east and west) of I-76. This alternative meets the project Purpose and Need. It preserves the existing bridge and has minor ROW impacts. This alternative is expected to operate at LOS B in the year 2035.

The two four-legged roundabouts on the east and west side of I-76 allow truck traffic to be separated from residential traffic. Each roundabout has an outside diameter of 110 feet, including a 12-foot truck apron for truck traffic. With each pairing on the west and east sides, the roundabouts have been placed slightly off center of the existing Bridge Street center line to develop approach angles as a traffic-calming technique and to lessen ROW impacts. Splitter islands are included to slow traffic coming into the roundabouts. The roundabouts are designed with an 18-foot single lane for circulation and exclusive right turn bypasses for the ramp-to-frontage-road and frontage-road-to-ramp movements.

1.2.4 Alternative 3: Three-Roundabout Interchange Design

This alternative consists of one large roundabout on the west side of I-76 and two smaller roundabouts on the east side of I-76. The West Frontage Road and I-76 westbound ramps are combined into one six-legged roundabout with an outside diameter of 200 feet, including a 12-foot truck apron. The east side combines the eastbound ramp terminal into one four-legged roundabout and the frontage roads into another four-legged roundabout. Each of the smaller roundabouts has an outside diameter of 150 feet, including a 12-foot truck apron. This alternative meets the project Purpose and Need. It preserves the existing bridge and has minor ROW impacts, primarily to the east. The two four-legged roundabouts on the east side of I-76 allow truck traffic to be separated from residential traffic. This alternative is expected to operate at LOS B in the year 2035.

For the pairing on the east side and the single roundabout on the west side, the roundabouts have been placed slightly off center of the existing Bridge Street center line to develop approach angles as a traffic-calming technique. Splitter islands are included to slow traffic coming into the roundabouts. The roundabouts are designed with an 18-foot single lane for circulation and exclusive right turn bypasses for the ramp-to-frontage-road and frontage-road-to-ramp movements.

2. Methods

Pinyon Environmental, Inc., biologist Tim DeMasters visited the site on September 12, 2013, to delineate waters of the United States (WUS), including wetlands and open waters, within the study area. While in the field, wetlands and boundaries of waterways (open waters) were recorded with a Trimble GeoXH6000 global positioning system (GPS) unit. The GPS data were downloaded and mapped in ArcGIS 10.1 mapping software. The delineated wetlands and the ordinary high water mark (OHWM) were flagged during the site visit. Photographs of wetland areas were taken while in the field (Appendix A).

The wetland delineation was completed in accordance with the 1987 United States Army Corps of Engineers (USACE) Wetland Delineation Manual (USACE, 1987), and the 2010 Regional Supplement to the Corps of Engineers Wetland Delineation; Great Plains Regional Supplement (USACE, 2010). Wetlands were defined by vegetative, hydrologic, and soil features, and the data were recorded onto field data forms (Appendix B). Sampling points were placed in representative locations, as shown on Exhibit 3-1. In addition, CDOT's Functional Assessment of Colorado Wetlands (FACWet) Method (Johnson, et al, 2013) also was completed.

2.1 Field Methodology

Vegetation was identified and documented within the strata-specific sampling radii recommended by the USACE (30 feet for trees, 15 feet for shrubs, five feet for herbs, and 15 feet for woody vines) (USACE, 2010). Additional plant species located outside of the sampling point, but within the sampled plant community, are noted on the data forms as needed to better describe the nearby vegetation. Wetland indicator status for plant species was referenced in the National Wetland Plant List Final Draft Ratings (USACE, 2012). Species were classified as OBL (obligate wetland species), FACW (facultative wetland species), FAC (facultative species), FACU (facultative upland), or UPL (upland species). Plant species classified as FAC, FACW, or OBL are considered hydrophytic plants, and are wetland indicators. Wetlands also were classified using the Cowardin classification system (Cowardin, et al., 1979). Classifications are further described in the results section.

Hydrology and soil data also were collected at the sampling points. Hydrology indicators may include topographic positions, presence of standing water and/or saturated soil, profile conditions, drainage patterns, water marks, sediment deposits, and/or oxidized root channels in the upper 18 inches of the soil profile. Wetland soil indicators may include the presence of color streaking (mottling), gleying (greyish coloration), reducing conditions, hydrogen sulfide odor, high organic content, and organic matter streaking in the surface layer of sandy soils. Soil pits were hand-excavated adjacent to potential wetlands to verify indicators of vegetation, wetland hydrology, and hydric soils.

2.2 FACWet Methodology

The Area of Interest (AOI) encompasses the area that could be directly or indirectly impacted by project activities, or the “Predicted Extent of Indirect Impacts.” Per the FACWet methodology, the AOI was defined to the predicted extent of indirect impacts. Within the AOI, areas of target habitat (wetlands) were defined as Assessment Areas (AAs). The FACWet data sheets for each AA are included as Appendix C.

3. Results

3.1 General Site Conditions

Once a largely agricultural community, land in the immediate vicinity of the I-76 and Bridge Street intersection is primarily undeveloped (Exhibit 3-1). West of I-76, there is residential development, and there is additional planned residential and commercial growth on both the east and west sides of the interstate. Future planned land uses include further industrial, employment, mixed-use, high-density residential, and agricultural development. A new, high-density neighborhood is being developed on the northwest corner of I-76 and Bridge Street.

Exhibit 3-1. General Site Conditions

3.1.1 Upland Vegetation

The proposed project generally would be located within existing roadway ROW. Given the presence of the roadway and bridge, it is likely that the natural vegetation, soils, and hydrology have been altered by filling, grading, and improvement activities in the past.

Upland habitat types within the study area include upland native or planted grasses intermixed with sporadic weedy roadside habitat, and landscaped areas. Dominant species along much of the upland habitats includes: smooth brome (*Bromus inermis*), crested wheatgrass (*Agropyron cristatum*), sand dropseed (*Sporobolus cryptandrus*), bulbous bluegrass (*Poa bulbosa*), witchgrass (*Panicum capillare*), sideoats grama (*Bouteloua curtipendula*), needle and thread grass (*Hesperostipa comata ssp. comata*), little bluestem (*Schizachyrium scoparium*), prairie sandreed (*Calamovilfa longifolia*) and sand bluestem (*Andropogon hallii*). Common herbaceous species were kochia (*Bassia scoparia*), curly dock (*Rumex crispus*), and alfalfa (*Medicago sativa*). Scattered shrubs and trees in these areas included rabbitbrush (*Chrysothamnus nauseous*), Siberian elms (*Ulmus pumila*), and plains cottonwoods (*Populus deltoides*).

3.1.2 Hydrology

The primary hydrologic feature within the project area is West Burlington Extension Ditch, which flows toward the north (Exhibit 3-1). The study area also receives stormwater runoff from the current I-76 and Bridge Street roadways.

3.1.3 General Soils

There are three main soil types mapped within the immediate study area (USDA, 2013a). These are:

- The **Vona sandy loam, 1- to 3-percent slopes**, soil series is classified as well drained, and consists of sandy loam and loamy sand. These soils are sandy eolian deposits, generally found in sandy plains, and comprise the majority of the soils in the northern portion of the study area.
- The **Ascalon sandy loam, 1- to 3-percent slopes**, soil series is classified as well drained, and consists of sandy loam and sandy clay loam. These soils are eolian deposits from mixed materials, generally found in sandy plains, and comprise the majority of the soils in the middle and southern portion of the study area.
- The **Vona sandy loam, 3- to 9-percent slopes**, soil series is classified as well drained, and consists of sandy loam and loamy sand. These soils are sandy eolian deposits, generally found in sandy plains, and are found in the very southern portion of the study area.

The soils observed within the sampling points in both the wetlands and upland areas were sands and silty sands (Appendix B).

3.2 Wetlands and Open Waters

Two wetland areas and two open water features were identified within the study area (Exhibit 1-1). The following sections discuss each wetland and open water feature.

3.2.1 Wetland-01

Wetland-01 (WL-01) is located on the southwest corner of the intersection of the East Frontage Road and Bridge Street, on the east side of I-76. WL-01 is a palustrine emergent (PEM) wetland dominated by narrowleaf cattails (*Typha angustifolia*), an obligate herbaceous wetland species (Cowardian, et al., 1979). The wetland hydrology indicators included surface water in some areas, saturated soils, and a hydrogen sulfide odor. The hydric soil indicator was a depleted matrix with some redox concentrations present. Sampling Point 4 (SP-4) was completed in WL-01, and the data sheet for this sampling point provides additional information on the wetland indicators observed within WL-01 (Appendix B).

3.2.2 Wetland-02

Wetland-02 (WL-02) was delineated south of Bridge Street, and west of I-76 and the West Frontage Road. WL-02 was a PEM wetland dominated by narrowleaf cattails, marsh muhly (*Muhlenbergia racemosa*), giant ragweed (*Ambrosia trifida*), and curly dock (Cowardian, et al., 1979). The wetland hydrology indicators

included surface water in some areas, saturated soils, and drainage patterns. The hydric soil indicator was sandy redox with some redox concentrations present. Sampling Point 2 (SP-2) was completed in WL-02, and the data sheet for this sampling point provides additional information on the wetland indicators observed within WL-02 (Appendix B).

3.2.3 Open Waters 01 and 02

Two open water areas (OW-01 and OW-02) were also identified in the study area (Exhibit 1-1). These areas appear to be associated with the West Burlington Extension Ditch. Water in the ditch was likely the result of heavy rains prior to the field survey.

3.3 FACWet

The wetland areas are grouped into AAs to analyze the functional capacity of the wetlands, per CDOT's FACWet methodology. AAs are typically based on hydrogeomorphic class, wetland type, and location within the AOI. The AOI included the I-76 and Bridge Street area (see Exhibit 3-3). There were two wetland areas within the AOI. The wetland areas have been grouped into a single AA (AA-1) based on hydrogeomorphic class, wetland type, and plant community. WL-01 and WL-02 are both PEM wetlands with similar hydrological sources.

FACWet scores were recorded as Functional Capacity Indices (FCI). FCI score values are interpreted as shown in Exhibit 3-2 below.

Exhibit 3-2 Functional Capacity Indices Descriptions

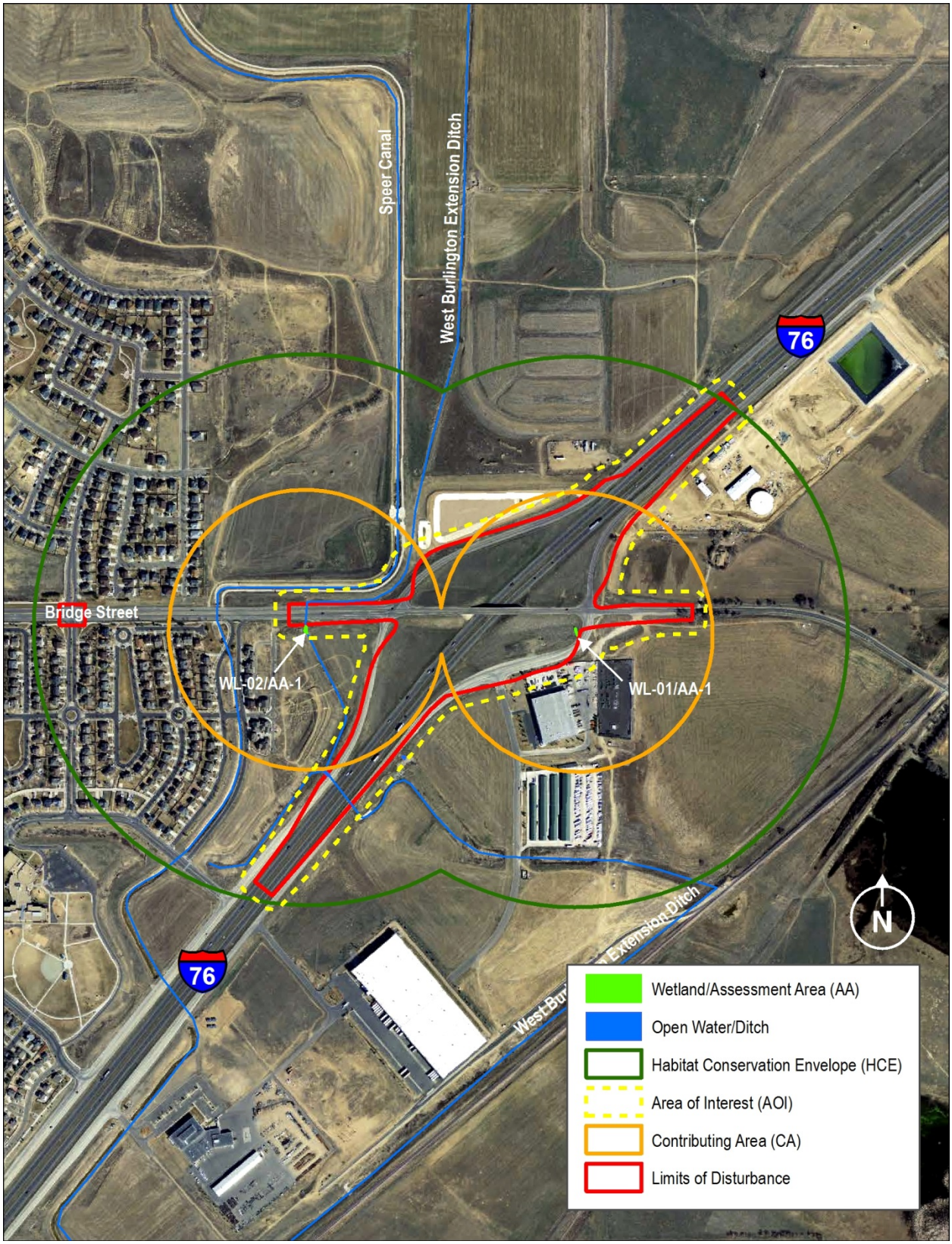
FCI Score	Functional Category	Interpretation
1.0–0.9	Reference Standard	AA is functioning at or near its Reference Standard capacity.
<0.9–0.8	Highly Functioning	AA retains all of its natural functions. While the capacity of some or all have been altered somewhat, the function of the wetland is still fundamentally sound.
<0.8–0.7	Functioning	The capacity of some or all of the AA's functions has been markedly altered, but the wetland still provides the types of functions associated with its habitat type.
<0.7–0.6	Functioning Impaired	The functioning of the wetland has been severely altered. Certain functions may be nearly extinguished or they may be grossly altered to be more representative of a different class of wetland (e.g., a fen converted to a depressional system). Despite the profound changes, the AA still supports wetland habitat.
<0.6	Non-functioning	The AA no longer possesses the basic criteria necessary to support wetland conditions.

The overall FACWet Functional Capacity Index for AA-1 was 0.67, meaning that there has been obvious alteration and degradation of the wetland, but that it still supports basic wetland functioning, but at an impaired level (Appendix C). There are three main stressors for AA-1:

1. The presence of the I-76 corridor and frontage roads
2. Nearby commercial, residential, and industrial development
3. The presence of weeds within the AOI and AA.

These three stressors contribute to a degradation of the functioning of migration and dispersal of organisms that use the wetland, the water source, distribution of water within the AA, the outflow of water from the AA, the geomorphology, and the chemical environment.

Exhibit 3-3. FACWet Wetlands Areas



4. Impacts

As previously described, wetlands were measured by collecting GPS data in the field. This information was post-processed and corrected by a Geographic Information Systems (GIS) specialist, then incorporated into the project plan set to evaluate the acreage affected by the project. There would be no direct or indirect impacts to wetlands under the No-Action Alternative. All three Action Alternatives would have the same impacts to wetlands; therefore, the impact discussion below is for all three Action Alternatives.

4.1 Direct Impacts

4.1.1 Wetland Impacts

All three Action Alternatives would result in the same permanent direct impacts to one wetland, WL-01 (see Exhibit 4-1). Impacts were avoided to the extent possible but the location of the I-76 northbound off-ramp and the turning radius required for trucks made the impact to WL-01 unavoidable. Most of the direct permanent wetland impacts would be due to construction of the roadway alignment. Because CDOT requires mitigation of all wetland impacts, regardless of whether they are jurisdictional, this report breaks out wetlands anticipated to be jurisdictional for the purposes of USACE permitting and also identifies the total amount of wetlands present.

Exhibit 4-1. Wetland Impacts

Wetland ID	Wetland Location	Wetland Classification	Total Wetland Area	Action Alternative Permanent Impact[1]	No-Action Alternative Permanent Impact[1]	Jurisdictional Status[2]
WL-01	Southwest corner of the intersection of East Frontage Road and Bridge Street, on the east side of I-76	PEM	0.01 ac (585 sf)	0.01 ac (585 sf)	0 ac (0 sf)	Unlikely, but Assumed Jurisdictional
WL-02	South of Bridge Street, and west of I-76 and West Frontage Road	PEM	0.02 ac (872 sf)	0 ac (0 sf)	0 ac (0 sf)	Jurisdictional
Total Wetland Impacts			0.03 ac (1,457 sf)	0.01 (585 sf)	0 ac (0 sf)	—

[1] *Impact is the same for all Action Alternatives*
[2] *Assumed Jurisdictional status based on project review; however, only the USACE has final say in determination*
ac = acres
sf = square feet

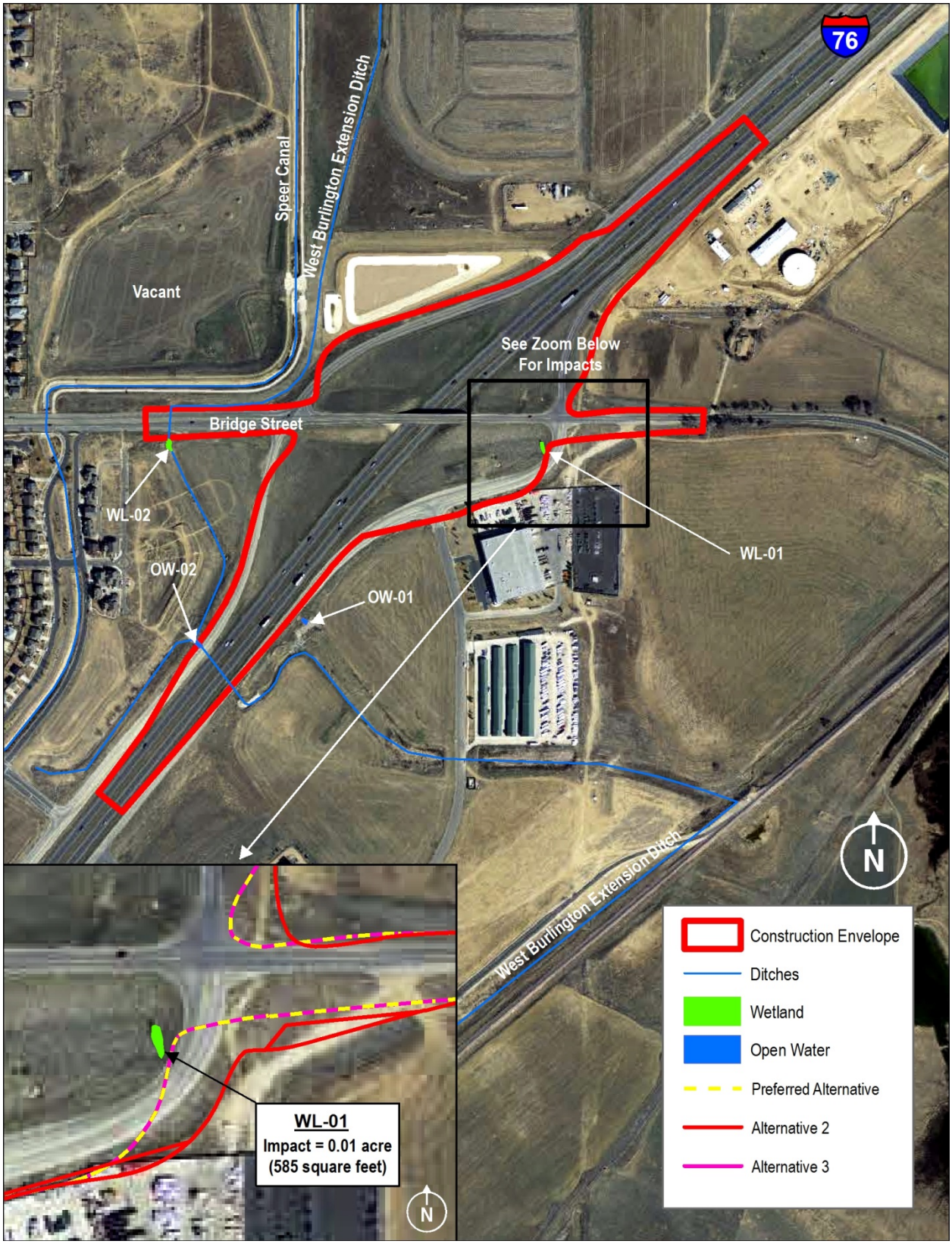
4.1.2 Open Waters Impacts

There would be no impacts to open waters in the project area.

4.2 Indirect Impacts

Indirect impacts could result from construction activities. These indirect impacts will be minimized by the implementation of a Stormwater Management Plan (SWMP). Construction activities disturb the ground, which increases the likelihood of noxious weeds becoming established. This will be minimized by re-seeding upland and wetland areas disturbed by construction with native species in accordance with Sections 207, 212, and 217 of the CDOT Standard Specifications, and for implementing the standard CDOT Best Management Practices (BMPs). This information is summarized in the project's Biological Resources Report, presented under separate cover.

Exhibit 4-2. Wetland Impacts



5. Mitigation

5.1 Mitigation of Permanent Wetland Impacts

Per Section 404 of the Clean Water Act, impacts to wetlands and other water features must be avoided, minimized, or mitigated (in order of preference). CDOT policy requires all wetland impacts to be mitigated, regardless of jurisdiction or magnitude. All mitigation for the wetlands within the study area also will be in accordance with CDOT policy.

The study area was evaluated for the potential for onsite mitigation for the 0.01 acre (585 square feet) of permanent impacts to wetlands. Because of insufficient natural hydrology and ROW requirements, the reestablishment of wetlands onsite would be difficult. Major drainage, hydrological, and slope changes would be needed for onsite mitigation. Onsite mitigation would result in a costly and time-consuming process, with no guarantee of the establishment of a successful wetland habitat. Therefore, the project may need to purchase credits from a wetland mitigation bank. Three USACE-approved banks are located within the same watershed as the project, including the Middle South Platte, Mile High, and Riverdale Wetland Mitigation Banks.

5.2 Mitigation of Indirect Wetland Impacts

As mentioned above, indirect impacts would be minimized through the implementation of a SWMP and CDOT BMPs.

5.3 Section 404 Permitting

Although the impacted wetland (WL-01) is isolated and not likely under the jurisdiction of the USACE, jurisdictional status is assumed because, due to the minimal impact to wetlands, this project would likely be covered under a Section 404 Nationwide Permit.

Since the Action Alternatives will discharge to a wetland, a PCN is required from the USACE; an official jurisdictional determination from the USACE is not recommended at this time.

6. Closing Statement

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 that may result from such use.

7. References

Cowardin et al, 1979. Cowardin, L.M., V. Carter V., F.C. Golet, E.T. LaRoe. *Classification of Wetlands and Deepwater Habitats of the United States*. U.S. Fish and Wildlife Service Report No. FWS/OBS/-79/31.Washington, D.C. 1979.

Federal Register, 1977. *The Provisions of Executive Order 11990 (Protection of Wetlands)*, 42 FR 26961, 3 CFR, 1977, page 121. The Federal Register, May 24, 1977.

Johnson, Brad, Mark Beardsley, and Jessica Doran, 2013. *Colorado Department of Transportation's Functional Assessment of Colorado Wetlands (FACWet) Method Version 3.0*. Colorado Department of Transportation, April 2013.

USACE, 1987. *U.S. Army Corps of Engineers Wetland Delineation Manual*, United States Army Corps of Engineers Wetland Training Institute, January 1987.

USACE, 2010. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual*: Great Plains Region (Version 2.0)," United States Army Corps of Engineers, March 2010.

USACE, 2012. *National Wetland Plant List Final Draft Ratings*, United States Army Corps of Engineers, 2012.

USDA, 2013. *Web Soil Survey*. Websoilsurvey.nrcs.usda.gov. United States Department of Agriculture, Natural Resources Conservation Service, website accessed October 2013.

USGS, 1994. *Mile High Lakes, Colorado 7.5 Minute Quadrangle*. United States Geological Service, 1966 (Revised 1994).

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Appendices

Appendix A: Photographic Log

Appendix B: USACE Data Forms

Appendix C:FACWet Data Forms

Photo 1.
Sampling Point 1
at Wetland 02.
Facing northeast.

Photo 2.
Sampling point 2
at Wetland 02.
Facing south.

Photo 3.
Sampling point 3
at Wetland 01.
Facing west.

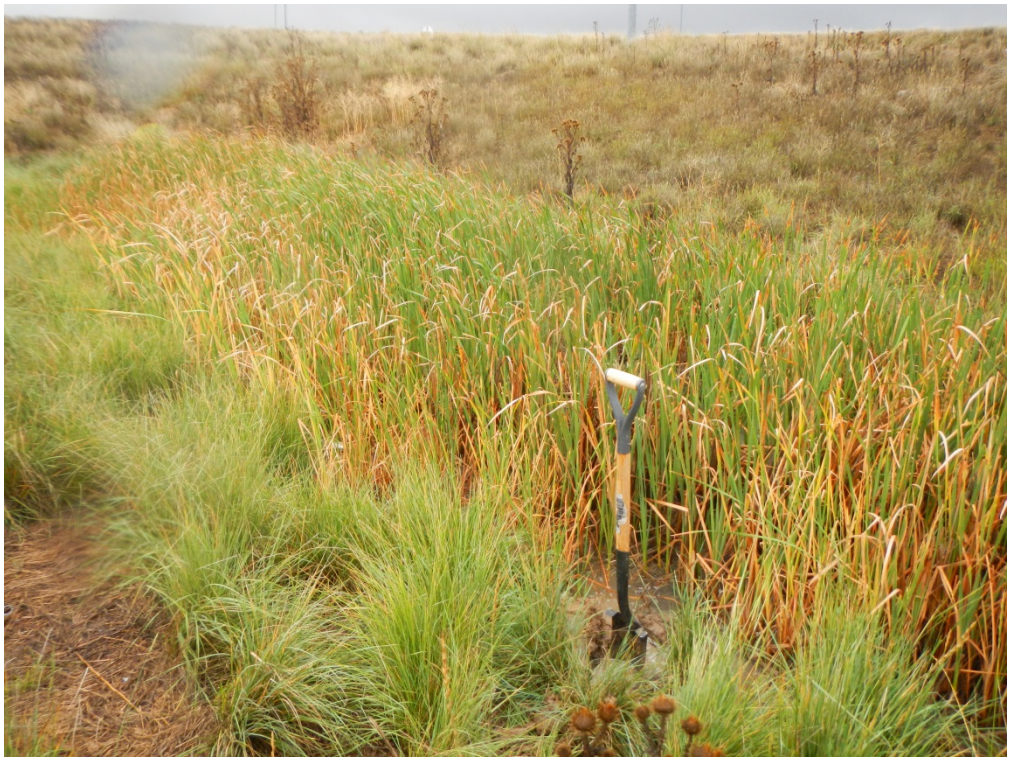

Photo 4.
Sampling point 4
at Wetland 01.
Facing northeast.

Appendix B

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: I-76 and Bridge Street City/County: Brighton / Adams Sampling Date: 9/12/2013

Applicant/Owner: CDOT State: CO Sampling Point: SP1

Investigator(s): TJD Section, Township, Range: Sec 11, T 1 S, R 66 W

Landform (hillslope, terrace, etc.): Drainage Area Local relief (concave, convex, none): Convex Slope (%): 1

Subregion (LRR): G -Western Great Plains Range and Irrigated Region Lat: 39.986695 Long: -104.740024 Datum: NAD 83

Soil Map Unit Name: Vona sandy loam, 1 to 3 percent slopes NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes _____ No X (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology X significantly disturbed? Are "Normal Circumstances" present? Yes _____ No X

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No X	**Is the Sampled Area within a Wetland?** Yes _____ No X
Hydric Soil Present?	Yes _____	No X	
Wetland Hydrology Present?	Yes _____	No X*	

Remarks:

Area is experiencing heavy rains and flooding. This site has some flowing water towards one side more than it normally would be.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 Ft radius)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15 Ft radius)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 5 Ft radius)			
1. Bomus inermis	95	Y	UPL
2. Rumex crispus	3	N	FAC
3. Convolvulus arvensis	2	N	UPL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: 15 Ft radius)			
1.			
2.			
	= Total Cover		
% Bare Ground in Herb Stratum _____	100 = Total Veg Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC−): 0 (A)

Total Number of Dominant Species Across All Strata: 0 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	0
FACW species		x 2 =	0
FAC species	3	x 3 =	9
FACU species		x 4 =	0
UPL species	97	x 5 =	485
Column Totals:	100 (A)		494.00 (B)

Prevalence Index = B/A = 4.94

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50% (All dominants are FACW and/or OBL.)

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes _____ No X

Remarks:

D5 - FAC Neutral Test for hydrology. Drop all FAC, cross examine all other dominants. If > 50% remaining are FACW to OBL, then YES to D5.

SOIL

Sampling Point: SP1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-2	10 YR 4/2	100					Silty Sand	
2-18	10 YR 4/4	100					Silty Sand	Medium coarse grains
8-16	10 YR 4/3	100					Silty Sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1) (p42)
- ___ Histic Epipedon (A2) (p43)
- ___ Black Histic (A3) (p44)
- ___ Hydrogen Sulfide (A4) (p45)
- ___ Stratified Layers (A5) (**LRR F**) (p46)
- ___ 1 cm Muck (A9) (**LRR F, G, H**) (p47)
- ___ Depleted Below Dark Surface (A11) (p48)
- ___ Thick Dark Surface (A12) (p50)
- ___ Sandy Mucky Mineral (S1) (p51)
- ___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**) (52)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR F**) (p52)
- ___ Sandy Gleyed Matrix (S4) (p53)
- ___ Sandy Redox (S5) (p53)
- ___ Stripped Matrix (S6) (p54)
- ___ Loamy Mucky Mineral (F1) (p55)
- ___ Loamy Gleyed Matrix (F2) (p56)
- ___ Depleted Matrix (F3) (p57)
- ___ Redox Dark Surface (F6) (p58)
- ___ Depleted Dark Surface (F7) (p60)
- ___ Redox Depressions (F8) (p61)
- ___ High Plains Depressions (F16) (p62) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR I, J**) (p64)
- ___ Coast Prairie Redox (A16) (**LRR F, G, H**) (p64)
- ___ Dark Surface (S7) (**LRR G**) (p65)
- ___ High Plains Depressions (F16) (p65) (**LRR H outside of MLRA 72 & 73**)
- ___ Reduced Vertic (F18) (p66)
- ___ Red Parent Material (TF2) (p67)
- ___ Very Shallow Dark Surface (TF12) (p67)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1) (p73)
- ___ High Water Table (A2) (p74)
- X* Saturation (A3) (p76)
- ___ Water Marks (B1) (p77)
- ___ Sediment Deposits (B2) (p77)
- ___ Drift Deposits (B3) (p79)
- ___ Algal Mat or Crust (B4) (p79)
- ___ Iron Deposits (B5) (p81)
- ___ Inundation Visible on Aerial Imagery (B7) (p82)
- ___ Water-Stained Leaves (B9) (p82)
- ___ Salt Crust (B11) (p83)
- ___ Aquatic Invertebrates (B13) (p84)
- ___ Hydrogen Sulfide Odor (C1) (p88)
- ___ Dry-Season Water Table (C2) (p89)
- ___ Oxidized Rhizospheres on Living Roots (C3) (**where not tilled**) (p91)
- ___ Presence of Reduced Iron (C4) (p89)
- ___ Thin Muck Surface (C7) (p90)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6) (p86)
- ___ Sparsely Vegetated Concave Surface (B8) (p86)
- ___ Drainage Patterns (B10) (p87)
- ___ Oxidized Rhizospheres on Living Roots (C3) (p91) (**where tilled**)
- ___ Crayfish Burrows (C8) (p93)
- ___ Saturation Visible on Aerial Imagery (C9) (p94)
- ___ Geomorphic Position (D2) (p95)
- ___ FAC-Neutral Test (D5) (p95)
- ___ Frost-Heave Hummocks (D7) (**LRR F**) (p96)

Field Observations:

Surface Water Present? Yes _____ No _____ Depth (inches): _____

Water Table Present? Yes _____ No _____ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes X* No _____ Depth (inches): _____

Wetland Hydrology Present? Yes _____ No X*

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

*While saturation was present, the site investigation occurred during a heavy precip. event, and would not normally show saturation in the upper 12". The lack of other hydrologic indicators supports this at this sampling point.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: I-76 and Bridge Street City/County: Brighton / Adams Sampling Date: 9/12/2013

Applicant/Owner: CDOT State: CO Sampling Point: SP2

Investigator(s): TJD Section, Township, Range: Sec 11, T 1 S, R 66 W

Landform (hillslope, terrace, etc.): Drainage Area Local relief (concave, convex, none): Convex Slope (%): 2

Subregion (LRR): G -Western Great Plains Range and Irrigated Region Lat: 39.986612° Long: -104.739975° Datum: NAD 83

Soil Map Unit Name: Vona sandy loam, 1 to 3 percent slopes NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes _____ No X (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology X significantly disturbed? Are "Normal Circumstances" present? Yes _____ No X

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No _____	**Is the Sampled Area within a Wetland?** **Yes** X **No** _____
Hydric Soil Present?	Yes X No _____	
Wetland Hydrology Present?	Yes X No _____	

Remarks:

Area is experiencing heavy rains and flooding. This site has some flowing water towards one side more than it normally would be.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 30 Ft radius)			
1.			
2.			
3.			
4.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15 Ft radius)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 5 Ft radius)			
1. Typha angustifolia	10	Y	OBL
2. Rumex crispus	7	N	FAC
3. Ambrosia trifida	10	N	FAC
4. Muhlenbergia racemosa	40	Y	FACW
5.			
6.			
7.			
8.			
9.			
10.			
	67 = Total Cover		
Woody Vine Stratum (Plot size: 15 Ft radius)			
1.			
2.			
	_____ = Total Cover		
% Bare Ground in Herb Stratum _____	67 = Total Veg Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC−): 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	0
FACW species		x 2 =	0
FAC species		x 3 =	0
FACU species		x 4 =	0
UPL species		x 5 =	0
Column Totals:	0 (A)		0.00 (B)

Prevalence Index = B/A = NaN

Hydrophytic Vegetation Indicators:

X 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50% (All dominants are FACW and/or OBL.)

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** _____

Remarks:

D5 - FAC Neutral Test for hydrology. Drop all FAC, cross examine all other dominants. If > 50% remaining are FACW to OBL, then YES to D5.

SOIL

Sampling Point: SP2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-7	10 YR 4/2	90	10YR 4/6	10	C	M	Silty Sand	
7-18	10 YR 3/2	80	10 YR 4/6	20	C	M	Silty Sand	Medium coarse grains

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1) (p42)
- ___ Histic Epipedon (A2) (p43)
- ___ Black Histic (A3) (p44)
- ___ Hydrogen Sulfide (A4) (p45)
- ___ Stratified Layers (A5) (**LRR F**) (p46)
- ___ 1 cm Muck (A9) (**LRR F, G, H**) (p47)
- ___ Depleted Below Dark Surface (A11) (p48)
- ___ Thick Dark Surface (A12) (p50)
- ___ Sandy Mucky Mineral (S1) (p51)
- ___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**) (52)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR F**) (p52)
- ___ Sandy Gleyed Matrix (S4) (p53)
- X Sandy Redox (S5) (p53)
- ___ Stripped Matrix (S6) (p54)
- ___ Loamy Mucky Mineral (F1) (p55)
- ___ Loamy Gleyed Matrix (F2) (p56)
- ___ Depleted Matrix (F3) (p57)
- ___ Redox Dark Surface (F6) (p58)
- ___ Depleted Dark Surface (F7) (p60)
- ___ Redox Depressions (F8) (p61)
- ___ High Plains Depressions (F16) (p62) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR I, J**) (p64)
- ___ Coast Prairie Redox (A16) (**LRR F, G, H**) (p64)
- ___ Dark Surface (S7) (**LRR G**) (p65)
- ___ High Plains Depressions (F16) (p65) (**LRR H outside of MLRA 72 & 73**)
- ___ Reduced Vertic (F18) (p66)
- ___ Red Parent Material (TF2) (p67)
- ___ Very Shallow Dark Surface (TF12) (p67)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X **No** _____

Remarks:

Sandy Redox.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- X Surface Water (A1) (p73)
- ___ High Water Table (A2) (p74)
- X Saturation (A3) (p76)
- ___ Water Marks (B1) (p77)
- ___ Sediment Deposits (B2) (p77)
- ___ Drift Deposits (B3) (p79)
- ___ Algal Mat or Crust (B4) (p79)
- ___ Iron Deposits (B5) (p81)
- ___ Inundation Visible on Aerial Imagery (B7) (p82)
- ___ Water-Stained Leaves (B9) (p82)
- ___ Salt Crust (B11) (p83)
- ___ Aquatic Invertebrates (B13) (p84)
- ___ Hydrogen Sulfide Odor (C1) (p88)
- ___ Dry-Season Water Table (C2) (p89)
- ___ Oxidized Rhizospheres on Living Roots (C3) (**where not tilled**) (p91)
- ___ Presence of Reduced Iron (C4) (p89)
- ___ Thin Muck Surface (C7) (p90)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6) (p86)
- ___ Sparsely Vegetated Concave Surface (B8) (p86)
- X Drainage Patterns (B10) (p87)
- ___ Oxidized Rhizospheres on Living Roots (C3) (**where tilled**) (p91)
- ___ Crayfish Burrows (C8) (p93)
- ___ Saturation Visible on Aerial Imagery (C9) (p94)
- X Geomorphic Position (D2) (p95)
- X FAC-Neutral Test (D5) (p95)
- ___ Frost-Heave Hummocks (D7) (**LRR F**) (p96)

Field Observations:

Surface Water Present? Yes X No _____ Depth (inches): 1

Water Table Present? Yes X No _____ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes X No _____ Depth (inches): _____

Wetland Hydrology Present? Yes X **No** _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: I-76 and Bridge Street City/County: Brighton / Adams Sampling Date: 9/12/2013

Applicant/Owner: CDOT State: CO Sampling Point: SP3

Investigator(s): TJD Section, Township, Range: Sec 11, T 1 S, R 66 W

Landform (hillslope, terrace, etc.): Roadway intersection corner Local relief (concave, convex, none): Flat Slope (%): 1

Subregion (LRR): G -Western Great Plains Range and Irrigated Region Lat: 39.986566° Long: -104.734195° Datum: NAD 83

Soil Map Unit Name: Vona sandy loam, 1 to 3 percent slopes NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes _____ No X (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology X significantly disturbed? Are "Normal Circumstances" present? Yes _____ No X

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No X	**Is the Sampled Area within a Wetland?** Yes _____ No X
Hydric Soil Present?	Yes _____	No X	
Wetland Hydrology Present?	Yes _____	No X*	

Remarks:

Area is experiencing heavy rains and flooding. This site has some flowing water towards one side more than it normally would be.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 Ft radius)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 Ft radius)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: 5 Ft radius)			
1. Agropyron cristatum	15	Y	UPL
2. Bouteloua curtipendula	15	Y	UPL
3. Convolvulus arvensis	20	Y	UPL
4. Pascopyrum (Agropyron) smithii	15	Y	FACU
5.			
6.			
7.			
8.			
9.			
10.			
	65	= Total Cover	
Woody Vine Stratum (Plot size: 15 Ft radius)			
1.			
2.			
		= Total Cover	
% Bare Ground in Herb Stratum 20	65	= Total Veg Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC−): 0 (A)

Total Number of Dominant Species Across All Strata: 0 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	0
FACW species		x 2 =	0
FAC species		x 3 =	0
FACU species	15	x 4 =	60
UPL species	50	x 5 =	250
Column Totals:	65 (A)		310 (B)

Prevalence Index = B/A = 4.77

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50% (All dominants are FACW and/or OBL.)

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes _____ No X

Remarks:

D5 - FAC Neutral Test for hydrology. Drop all FAC, cross examine all other dominants. If > 50% remaining are FACW to OBL, then YES to D5.

SOIL

Sampling Point: SP3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-2	10 YR 4/3	100					Silty Sand	
2-18	10 YR 4/4	100					Silty Sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1) (p42)
- ___ Histic Epipedon (A2) (p43)
- ___ Black Histic (A3) (p44)
- ___ Hydrogen Sulfide (A4) (p45)
- ___ Stratified Layers (A5) (**LRR F**) (p46)
- ___ 1 cm Muck (A9) (**LRR F, G, H**) (p47)
- ___ Depleted Below Dark Surface (A11) (p48)
- ___ Thick Dark Surface (A12) (p50)
- ___ Sandy Mucky Mineral (S1) (p51)
- ___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**) (52)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR F**) (p52)
- ___ Sandy Gleyed Matrix (S4) (p53)
- ___ Sandy Redox (S5) (p53)
- ___ Stripped Matrix (S6) (p54)
- ___ Loamy Mucky Mineral (F1) (p55)
- ___ Loamy Gleyed Matrix (F2) (p56)
- ___ Depleted Matrix (F3) (p57)
- ___ Redox Dark Surface (F6) (p58)
- ___ Depleted Dark Surface (F7) (p60)
- ___ Redox Depressions (F8) (p61)
- ___ High Plains Depressions (F16) (p62) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR I, J**) (p64)
- ___ Coast Prairie Redox (A16) (**LRR F, G, H**) (p64)
- ___ Dark Surface (S7) (**LRR G**) (p65)
- ___ High Plains Depressions (F16) (p65) (**LRR H outside of MLRA 72 & 73**)
- ___ Reduced Vertic (F18) (p66)
- ___ Red Parent Material (TF2) (p67)
- ___ Very Shallow Dark Surface (TF12) (p67)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1) (p73)
- ___ High Water Table (A2) (p74)
- ___ Saturation (A3) (p76)
- ___ Water Marks (B1) (p77)
- ___ Sediment Deposits (B2) (p77)
- ___ Drift Deposits (B3) (p79)
- ___ Algal Mat or Crust (B4) (p79)
- ___ Iron Deposits (B5) (p81)
- ___ Inundation Visible on Aerial Imagery (B7) (p82)
- ___ Water-Stained Leaves (B9) (p82)
- ___ Salt Crust (B11) (p83)
- ___ Aquatic Invertebrates (B13) (p84)
- ___ Hydrogen Sulfide Odor (C1) (p88)
- ___ Dry-Season Water Table (C2) (p89)
- ___ Oxidized Rhizospheres on Living Roots (C3) (**where not tilled**) (p91)
- ___ Presence of Reduced Iron (C4) (p89)
- ___ Thin Muck Surface (C7) (p90)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6) (p86)
- ___ Sparsely Vegetated Concave Surface (B8) (p86)
- ___ Drainage Patterns (B10) (p87)
- ___ Oxidized Rhizospheres on Living Roots (C3) (**where tilled**) (p91)
- ___ Crayfish Burrows (C8) (p93)
- ___ Saturation Visible on Aerial Imagery (C9) (p94)
- ___ Geomorphic Position (D2) (p95)
- ___ FAC-Neutral Test (D5) (p95)
- ___ Frost-Heave Hummocks (D7) (**LRR F**) (p96)

Field Observations:

Surface Water Present? Yes _____ No _____ Depth (inches): _____

Water Table Present? Yes _____ No _____ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No _____ Depth (inches): _____

Wetland Hydrology Present? Yes _____ No X*

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No hydrologic features.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: I-76 and Bridge Street City/County: Brighton / Adams Sampling Date: 9/12/2013

Applicant/Owner: CDOT State: CO Sampling Point: SP4

Investigator(s): TJD Section, Township, Range: Sec 11, T 1 S, R 66 W

Landform (hillslope, terrace, etc.): Drainage Area Local relief (concave, convex, none): Convex Slope (%): 1

Subregion (LRR): G -Western Great Plains Range and Irrigated Region Lat: 39.986584° Long: -104.734130° Datum: NAD 83

Soil Map Unit Name: Vona sandy loam, 1 to 3 percent slopes NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes _____ No X (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology X significantly disturbed? Are "Normal Circumstances" present? Yes _____ No X

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No _____	**Is the Sampled Area within a Wetland?** Yes X No _____
Hydric Soil Present?	Yes X No _____	
Wetland Hydrology Present?	Yes X No _____	

Remarks:

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 30 Ft radius)			
1.			
2.			
3.			
4.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15 Ft radius)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 5 Ft radius)			
1. Typha angustifolia	100	Y	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: 15 Ft radius)			
1.			
2.			
	_____ = Total Cover		
% Bare Ground in Herb Stratum _____	100 = Total Veg Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC−): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = 0
FACW species _____	x 2 = 0
FAC species _____	x 3 = 0
FACU species _____	x 4 = 0
UPL species _____	x 5 = 0
Column Totals: 0 (A)	0.00 (B)

Prevalence Index = B/A = NaN

Hydrophytic Vegetation Indicators:

X 1 - Rapid Test for Hydrophytic Vegetation

All dominants are FACW and/or OBL.

X 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No _____

Remarks:

D5 - FAC Neutral Test for hydrology. Drop all FAC, cross examine all other dominants. If > 50% remaining are FACW to OBL, then YES to D5.

SOIL

Sampling Point: SP4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-16	10 YR 3/1	100					Sandy Silt	Muck - covering redox

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1) (p42)
- ___ Histic Epipedon (A2) (p43)
- ___ Black Histic (A3) (p44)
- ___ Hydrogen Sulfide (A4) (p45)
- ___ Stratified Layers (A5) (**LRR F**) (p46)
- ___ 1 cm Muck (A9) (**LRR F, G, H**) (p47)
- ___ Depleted Below Dark Surface (A11) (p48)
- ___ Thick Dark Surface (A12) (p50)
- ___ Sandy Mucky Mineral (S1) (p51)
- ___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**) (52)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR F**) (p52)
- ___ Sandy Gleyed Matrix (S4) (p53)
- ___ Sandy Redox (S5) (p53)
- ___ Stripped Matrix (S6) (p54)
- ___ Loamy Mucky Mineral (F1) (p55)
- ___ Loamy Gleyed Matrix (F2) (p56)
- X Depleted Matrix (F3) (p57)
- ___ Redox Dark Surface (F6) (p58)
- ___ Depleted Dark Surface (F7) (p60)
- ___ Redox Depressions (F8) (p61)
- ___ High Plains Depressions (F16) (p62) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR I, J**) (p64)
- ___ Coast Prairie Redox (A16) (**LRR F, G, H**) (p64)
- ___ Dark Surface (S7) (**LRR G**) (p65)
- ___ High Plains Depressions (F16) (p65) (**LRR H outside of MLRA 72 & 73**)
- ___ Reduced Vertic (F18) (p66)
- ___ Red Parent Material (TF2) (p67)
- ___ Very Shallow Dark Surface (TF12) (p67)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X **No** _____

Remarks:

Almost gleyed depletions showing, however very dark throughout.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- X Surface Water (A1) (p73)
- ___ High Water Table (A2) (p74)
- X Saturation (A3) (p76)
- ___ Water Marks (B1) (p77)
- ___ Sediment Deposits (B2) (p77)
- ___ Drift Deposits (B3) (p79)
- ___ Algal Mat or Crust (B4) (p79)
- ___ Iron Deposits (B5) (p81)
- ___ Inundation Visible on Aerial Imagery (B7) (p82)
- ___ Water-Stained Leaves (B9) (p82)
- ___ Salt Crust (B11) (p83)
- ___ Aquatic Invertebrates (B13) (p84)
- X Hydrogen Sulfide Odor (C1) (p88)
- ___ Dry-Season Water Table (C2) (p89)
- ___ Oxidized Rhizospheres on Living Roots (C3) (**where not tilled**) (p91)
- ___ Presence of Reduced Iron (C4) (p89)
- ___ Thin Muck Surface (C7) (p90)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6) (p86)
- ___ Sparsely Vegetated Concave Surface (B8) (p86)
- ___ Drainage Patterns (B10) (p87)
- ___ Oxidized Rhizospheres on Living Roots (C3) (**where tilled**) (p91)
- ___ Crayfish Burrows (C8) (p93)
- X Saturation Visible on Aerial Imagery (C9) (p94)
- X Geomorphic Position (D2) (p95)
- X FAC-Neutral Test (D5) (p95)
- ___ Frost-Heave Hummocks (D7) (**LRR F**) (p96)

Field Observations:

Surface Water Present? Yes X No _____ Depth (inches): 2

Water Table Present? Yes X No _____ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes X No _____ Depth (inches): _____

Wetland Hydrology Present? Yes X **No** _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Appendix C

FACWet Version 3.0
April 2013

ADMINISTRATIVE CHARACTERIZATION

General Information			
		Date of Evaluation:	9/12/2013
Site Name or ID:	AA-1	Project Name:	I-76 and Bridge Street EA
404 or Other Permit Application #:	No 404. Likely covered under NWP 14	Applicant Name:	Colorado Department of Transportation
Evaluator Name(s):	Tim DeMasters	Evaluator's professional position and organization:	Biologist, Pinyon Environmental Inc.

Location Information:			
Site Coordinates (Decimal Degrees, e.g., 38.85, -104.96):	39.986913°, -104.735925°	Geographic Datum Used (NAD 83):	NAD 83
		Elevation	5,060 feet
Location Information:	Interstate 76 and Bridge Street Intersection Area.		
Associated stream/water body name:	none	Stream Order:	N/A
USGS Quadrangle Map:	Mile High Lakes	Map Scale: (Circle one)	1:24,000 1:100,000 Other 1:
Sub basin Name (8 digit HUC):	10190003	Wetland Ownership:	CDOT

Project Information:

This evaluation is being performed at: *(Check applicable box)*
- [x] *Project Wetland*
- [ ] *Mitigation Site*

Purpose of Evaluation (check all applicable):
- [x] *Potentially Impacted Wetlands*
- [ ] *Mitigation; Pre-construction*
- [ ] *Mitigation; Post-construction*
- [ ] *Monitoring*
- [ ] *Other (Describe)*

Intent of Project: *(Check all applicable)* ☐ Restoration ☐ Enhancement ☐ Creation

Total Size of Wetland Involved: (Record Area, Check and Describe Measurement Method Used)	0.03 ac.	[x]	Measured				
		[ ]	Estimated				
Assessment Area (AA) Size (Record Area, check appropriate box. Additional spaces are used to record acreage when more than one AA is included in a single assessment)	0.03 ac.	[X]	Measured	0.01 ac.	0.02 ac.	ac.	ac.
		[ ]	Estimated	ac.	ac.	ac.	ac.
Characteristics or Method used for AA boundary determination:	The AA boundaries were determined based on the projected impacts to wetlands.						

Notes:	There are only two small wetlands in the study area. Impacts are anticipated at only one of the wetland areas. Hydrology and vegetation are similar at both wetlands. Therefore, a single AA was used for both areas.

ECOLOGICAL DESCRIPTION 1

Special Concerns

Check all that apply

- ☐ Organic soils including Histosols or Histic Epipedons are present in the AA (i.e., AA includes core fen habitat).
- ☐ Project will directly impact organic soil portions of the AA including areas possessing either Histosol soils or histic epipedons.
- ☐ Organic soils are known to occur anywhere within the contiguous wetland of which the AA is part.
- ☐ The wetland is a habitat oasis in an otherwise dry or urbanized landscape?
- ☐ Federally threatened or endangered species are **KNOWN** to occur in the AA? List Below.

_____

_____

- ☐ Federally threatened or endangered species are **SUSPECTED** to possibly occur in the AA?

_____

_____

_____

_____

- ☐ Species of concern according to the Colorado Natural Heritage (CNHP) are known to occur in the AA?
- ☐ Other special concerns (please describe)
- ☐ Other special concerns (please describe)

HYDROGEOMORPHIC SETTING

- ☐ AA wetland maintains its fundamental natural hydrogeomorphic characteristics
- ☐ AA wetland has been subject to change in HGM classes as a result of anthropogenic modification
  If the above is checked, please describe the original wetland type if discernable using the table below.
- ☒ AA wetland was created from an upland setting.

Current Conditions

Describe the hydrogeomorphic setting of the wetland by circling all conditions that apply.

HGM Setting

Water source	(Surface flow)	Groundwater	(Precipitation)	Unknown	
Hydrodynamics	Unidirectional	Vertical	(Bi-directional)		
Wetland Gradient	(0 - 2%)	2-4%	4-10%	>10%	
# Surface Inlets	Over-bank	0	(1)	2	3 >3
# Surface Outlets		0	(1)	2	3 >3
Geomorphic Setting (Narrative Description. Include approx. stream order for riverine)					
HGM class	Riverine	Slope	(Depressional)	Lacustrine	

Historical Conditions

Previous wetland typology

Water source	Surface flow	Groundwater	Precipitation	Unknown
Hydrodynamics	Unidirectional	Vertical		
Geomorphic Setting (Narrative Description)				
Previous HGM Class	Riverine	Slope	Depressional	Lacustrine

Notes (include information on the AA's HGM subclass and regional subclass): NONE

ECOLOGICAL DESCRIPTION 2

Vegetation Habitat Description

US FWS habitat classification according as reported in Cowardin et al. (1979).

System	Subsystem	Class	Subclass	Water Regime	Other Modifiers	% AA
Palustrine	Palustrine	EM	Persistent	Y		100

Lacustrine	Littoral; Limnoral	Rock Bot. (RB) Uncon Bottom(UB) Aquatic Bed(AB) Rocky Shore(RS) Uncon Shore(US) Emergent(EM) Shrub-scrub(SS) Forested (FO)	Floating vascular; Rooted vascular; Algal; Persistent; Non-Persistent; Broad-leaved deciduous; Needle-leaved evergreen; Cobble - gravel; Sand; Mud; Organic	**Examples** Temporarily flooded(A); Saturated(B); Seasonally flooded(C); Seas.-flood./sat.(E); Semi-Perm. flooded(F); Intermittently exposed(G); Artificially flooded(K); Sat./semiperm./Seas. (Y); Int. exposed/permenant(Z)	Hypersaline(7) ; Eusaline(8); Mixosaline(9); Fresh(0); Acid(a); Circumneutral(c); Alkaline/calcareous(i); Organic(g); Mineral(n); Beaver(b); Partially Drained/ditched(d); Farmed(f); Diked/impounded(h); Artificial Substrate(r); Spoil(s); Excavated(x)	
Palustrine	Palustrine					
Riverine	Lower perennial; Upper perennial; Intermittent					

Site Map

Scale: 1 sq. =

Draw a sketch map of the site including relevant portions of the wetland, AA boundary, structures, habitat classes, and other significant features.

Please see Figures 1, 2 and 3

Variable 1: Habitat Connectivity

The Habitat Connectivity Variable is described by two sub-variables – Neighboring Wetland and Riparian Habitat Loss and Barriers to Migration and Dispersal. These sub-variables were treated as independent variables in FACWet Version 2.0. The merging of these variables makes their structure more consistent with that of other composite variables in FACWet. The new variable configuration also makes this landscape variable more accurately reflect the interactions amongst aquatic habitats in Colorado's agricultural and urbanized landscapes, which have a naturally low density of wetlands. The two Habitat Connectivity Sub-variables are scored in exactly the same manner as their FACWet 2.0 counterparts, as described below. The Habitat Connectivity Variable score is simply the arithmetic average of the two sub-variable scores which is entered on the second page of the Variable 1 data form. If there is little or no wetland or riparian habitat in the Habitat Connectivity Envelope (defined below), then Sub-variable 1.1 is not scored.

SV 1.1 - Neighboring Wetland and Riparian Habitat Loss

(Do not score if few or no wetlands naturally exist in the HCE)

This sub-variable is a measure of how isolated from other naturally-occurring wetlands or riparian habitat the AA has become as the result of habitat destruction. To score this sub-variable, estimate the percent of naturally-occurring wetland/riparian habitat that has been lost (by filling, draining, development, or whatever means) within the 500-meter-wide belt surrounding the AA. This zone is called the Habitat Connectivity Envelope (HCE). In most cases the evaluator must use best professional judgment to estimate the amount of natural wetland loss. Historical photographs, National Wetland Inventory (NWI) maps, hydric soil maps can be helpful in making these determinations. Floodplain maps are especially valuable in river-dominated regions, such as the Front Range urban corridor. Evaluation of landforms and habitat patterns in the context of perceivable land use change is used to steer estimates of the amount of wetland loss within the HCE.

Rules for Scoring:

1. On the aerial photo, create a 500 m perimeter around the AA.
2. The area within this perimeter is the **Habitat Connectivity Envelope (HCE)**.
3. Within the HCE, outline the current extent of naturally occurring wetland and riparian habitat. Do not include habitats such as excavated ponds or reservoir induced fringe wetlands.
4. Outline the historical extent of wetland and riparian habitats (i.e., existing natural wetlands plus those that have been destroyed).

- Use your knowledge of the history of the area and evident land use change to identify where habitat losses have occurred. Additional research can be utilized to increase the accuracy of this estimate including consideration of floodplain maps, historical aerial photographs, soil maps, etc.

5. Calculate the area of existing and historical wetlands. Divide the area of existing wetland by the total amount of existing and historical wetland and riparian habitat, and determine the variable score using the guidelines below. Enter sub-variable score at the bottom of p.2 of the Habitat Connectivity data form.

Variable Score	Condition Grade	Scoring Guidelines
1.0 - 0.9	***A*** *Reference Standard*	Wetland losses are absent or negligible or there is no evidence to suggest the native landscape within the HCE historically contained other wetland habitats
<0.9 - 0.8	***B*** *Highly Functioning*	More than 80% of historical wetland habitat area within the HCE is still present (less than 20% of habitat area lost).
<0.8 - 0.7	***C*** *Functioning*	80 to 60% of historical wetland habitat area within the HCE is still present (20% to 40% of habitat area lost).
<0.7 - 0.6	***D*** *Functioning Impaired*	Less than 60 to 25% of historical wetland habitat area within the HCE is still present (more than 40 to 75% of habitat area lost).
<0.6	***F*** *Non-functioning*	Less than 25% of the historical wetland habitat area within the HCE still in existence (more than 70% of habitat lost).

Notes: Few natural wetlands exist in HCE.

Variable 1: Habitat Connectivity p. 2

SV 1.2: Migration/Dispersal Barriers

This sub-variable is intended to rate the degree to which the AA has become isolated from existing neighboring wetland and riparian habitat by artificial barriers that inhibit migration or dispersal of organisms. On the aerial photograph, identify the man-made barriers within the HCE that intercede between the AA and surrounding wetlands and riparian areas, and identify them by type on the stressor list. Score this variable based on the barriers' impermeability to migration and dispersal and the amount of surrounding wetland/riparian habitat they affect.

Rules for Scoring:

1. On the aerial photo, outline **all** existing wetland and riparian habitat areas within the HCE. This includes naturally occurring habitats, as well as those purposefully created or induced by land use change.

2. Identify artificial barriers to dispersal and migration of organisms within the HCE that intercede between the AA and surrounding habitats. Mark the stressors present with a check in the first column and describe the general nature, severity and extent of each. List additional stressors in empty rows at the bottom of the table and explain.

3. Considering the composite effect of all of identified barriers to migration and dispersal (i.e., stressors), assign an overall variable score using the scoring guidelines.

Stressors = artificial barriers	✔	Stressors	Comments/description
	x	Major Highway	I-76 runs through the project area.
	x	Secondary Highway	Bridge Street intersectst with I-76 in the project area.
		Tertiary Roadway	
		Railroad	
		Bike Path	
	x	Urban Development	Residential development to west, some commercial to east.
		Agricultural Development	
		Artificial Water Body	
		Fence	
		Ditch or Aqueduct	
		Aquatic Organism Barriers	

Variable Score	Condition Grade	Scoring Guidelines
1.0 - 0.9	***A*** *Reference Standard*	No appreciable barriers exist between the AA and other wetland and riparian habitats in the HCE; or there are no other wetland and riparian areas in the HCE.
<0.9 - 0.8	***B*** *Highly Functioning*	Barriers impeding migration/dispersal between the AA and up to 33% of surrounding wetland/riparian habitat highly permeable and easily passed by most organisms. Examples could include gravel roads, minor levees, ditches or barbed-wire fences. More significant barriers (see "functioning category below) could affect migration to up to 10% of surrounding wetland/riparian habitat.
<0.8 - 0.7	***C*** *Functioning*	Barriers to migration and dispersal retard the ability of many organisms/propagules to pass between the AA and up to 66% of wetland/riparian habitat. Passage of organisms and propagules through such barriers is still possible, but it may be constrained to certain times of day, be slow, dangerous or require additional travel. Busy two-lane roads, culverted areas, small to medium artificial water bodies or small earthen dams would commonly rate a score in this range. More significant barriers (see "functioning impaired" category below) could affect migration to up to 10% of surrounding wetland/riparian habitat.
<0.7 - 0.6	***D*** *Functioning Impaired*	Barriers to migration and dispersal preclude the passage of some types of organisms/propagules between the AA and up to 66% of surrounding wetland/riparian habitat. Travel of those animals which can potential negotiate the barrier are strongly restricted and may include a high chance of mortality. Up to 33% of surrounding wetland/riparian habitat could be functionally isolated from the AA.
<0.6	***F*** *Non-functioning*	AA is essentially isolated from surrounding wetland/riparian habitat by impermeable migration and dispersal barriers. An interstate highway or concrete-lined water conveyance canal are examples of barriers which would generally create functional isolation between the AA and wetland/riparian habitat in the HCE.

SV 1.1 Score	0.65
SV 1.2 Score	0.65

Add SV 1.1 and 1.2 scores and divide by two to calculate variable score

Variable 1 Score 0.65

Variable 2: Contributing Area

The AA's Contributing Area is defined as the 250-meter-wide zone surrounding the perimeter of the AA. This variable is a measure of the capacity of that area to support characteristic functions of high quality wetland habitat. Depending on its condition, the contributing area can help maintain wetland condition or it can degrade it. Contributing Area condition is evaluated by considering the AA's Buffer and its Surrounding Land Use. Buffers are strips or patches of more-or-less natural upland and/or wetland habitat more than 5m wide. Buffers are contiguous with the AA boundary and they intercede between it and more intensively used lands. The AA Buffer is characterized with three sub-variables: Buffer Condition, Buffer Extent, and Average Buffer Width. The Surrounding Land Use Sub-variable considers changes within the Contributing Area that limit its capacity to support characteristic wetland functions. Many of the acute, on-site effects of land use change in the Contributing Area are specifically captured by Variables 3 - 8.

Rules for Scoring:

1. Delimit the Contributing Area on an aerial photograph as the zone within 250 meters of the outer boundary of the AA.
2. Evaluate and then rate the Buffer Condition sub-variable using the scoring guidelines. Record the score in the cell provided on the datasheet.
3. Indicate on the aerial photograph zones surrounding the AA which have ≥5m of buffer vegetation and those which do not.
4. Calculate the percentage of the AA which has a Buffer and record the value where indicated on the data sheet.
5. Rate the *Buffer Extent* Sub-variable using the scoring guidelines.
6. Determine the average Buffer width by drawing a line perpendicularly from the AA boundary to the outer extent of the buffer habitat. Measure line length and record its value on the data sheet. Repeat this process until a total of 8 lines have been sampled.
7. Calculate the average buffer width and record value on the data form. Then determine the sub-variable score using the scoring guidelines.
8. Score the Surrounding Land Use sub-variable by recording land use changes on the stressor list that affect the capacity of the landscape to support characteristic wetland functioning.
9. Enter the **lowest** of the three Buffer sub-variable scores along with the Surrounding Land Use Sub-variable score in the Contributing Area Variable scoring formula at the bottom of p. 2 of the data form. The Contributing Area Variable is the aver of the two sub-variable scores.

SV 2.1 - Buffer Condition

0.7 ***SV 2.1 - Buffer Condition Score***

Subvariable Score	Condition Grade	Buffer Condition Scoring Guidelines
1.0 - 0.9	*Reference Standard*	Buffer vegetation is predominately native vegetation, human-caused disturbance of the substrate is not evident, and human visitation is minimal. Common examples: Wilderness areas, undeveloped forest and range lands.
<0.9 - 0.8	*Highly Functioning*	Buffer vegetation may have a mixed native-nonnative composition, but characteristic structure and complexity remain. Soils are mostly undisturbed or have recovered from past human disturbance. Little or only low-impact human visitation. Buffers with higher levels of substrate disturbance may be included here if the buffer is still able to maintain predominately native vegetation. Common examples: Dispursed camping areas in national forests, common in wildland parks (e.g. State Parks) and open spaces.
<0.8 - 0.7	*Functioning*	Buffer vegetation is substantially composed of non-native species. Vegetation structure may be somewhat altered, such as by brush clearing. Moderate substrate distrbance and compaction occurs, and small pockets of greater disturbance may exist. Common examples: City natural areas, mountain hay meadows.
<0.7 - 0.6	*Functioning Impaired*	Buffer vegetation is substantially composed of non-native species and vegetation structure has been strongly altered by the complete removal of one or more strata. Soil disturbance and the intensity of human visitation are generally high. Common examples: Open lands around resource extraction sites (e.g., gravel mines), clear cut logging areas, ski slopes.
<0.6	*Non-functioning*	Buffer is nearly or entirely absent.

SV 2.2 - Buffer Extent

15 Percent of AA with Buffer

0.65 ***SV 2.2 - Buffer Extent***

Subvariable Score	Condition Class	% Buffer Scoring Guidelines
1.0 - 0.9	*Reference Standard*	90 - 100% of AA with Buffer
<0.9 - 0.8	*Highly Functioning*	70-90% of AA with Buffer
<0.8 - 0.7	*Functioning*	51-69% of AA with Buffer
<0.7 - 0.6	*Functioning Impaired*	26-50% of AA with Buffer
<0.6	*Non-functioning*	0-25% of AA with Buffer

Variable 2: Contributing Area (p. 2)

SV 2.3 - Average Buffer Width

Record measured buffer widths in the spaces below and average.

Buffer Width (m)	*10*	*5*	*5*	*5*	*0*	*0*	*0*	*0*	3
Line #	1	2	3	4	5	6	7	8	**Avg. Buffer Width (m)**

0.6 ***SV 2.3 - Average Buffer Width Score***

Subvariable Score	Condition Grade	Buffer Width Scoring Guidelines
1.0 - 0.9	*Reference Standard*	Average Buffer width is 190-250m
<0.9 - 0.8	*Highly Functioning*	Average Buffer width is 101-189m
<0.8 - 0.7	*Functioning*	Average Buffer width is 31-100m
<0.7 - 0.6	*Functioning Impaired*	Average Buffer width is 6-30m
<0.6	*Non-functioning*	Average Buffer width is 0-5m

SV 2.4 - Surrounding Land Use

0.65 ***SV 2.4 - Surrounding Land Use Score***

Catalog and characterize land use changes in the surrounding landscape and score.

Stressors = Land Use Changes

✓	Stressors	Comments/description
x	Industrial/commercial	
	Urban	
x	Residential	Residential development to west, some commercial to east.
x	Rural	Some rural areas exist
	Dryland Farming	
	Intensive Agriculture	
	Orchards or Nurseries	
	Livestock Grazing	
x	Transportation Corridor	I-76, Bridge St, and Frontage Road
	Urban Parklands	
	Dams/impoundments	
	Artificial Water body	
	Physical Resource Extraction	
	Biological Resource Extraction	

Variable Score	Condition Grade	Scoring Guidelines
1.0 - 0.9	***A*** *Reference Standard*	No appreciable land use change has been imposed Surrounding Landscape.
<0.9 - 0.8	***B*** *Highly Functioning*	Some land use change has occurred in the Surrounding Landscape, but changes have minimal effect on the the landscape's capacity to support characteristic aquatic functioning, either because land use is not intensive, for example haying, light grazing, or low intensity silviculture, or more substantial changes occur in approximately less than 10% of the area.
<0.8 - 0.7	***C*** *Functioning*	Surrounding Landscape has been subjected to a marked shift in land use, however, the land retains much of its capacity to support natural wetland function and it is not an overt source of pollutants or sediment. Moderate-intensity land uses such as dry-land farming, urban "green" corridors, or moderate cattle grazing would commonly be placed within this scoring range.
<0.7 - 0.6	***D*** *Functioning Impaired*	Land use changes within the Surrounding Landscape has been substantial including the a moderate to high coverage (up to 50%) of impermeable surfaces, bare soil, or other artificial surfaces; considerable in-flow urban runoff or fertilizer-rich waters common. Supportive capacity of the land has been greatly diminished but not totally extinguished. Intensively logged areas, low-density urban developments, some urban parklands and many cropping situations would commonly rate a score within this range.
<0.6	***F*** *Non-functioning*	The Surrounding Landscape is essentially comletely developed or is otherwise a cause of severe ecological stress on wetland habitats. Commercial developments or highly urban landscapes generally rate a score of less than 0.6.

	Buffer Score (Lowest score)		**Surrounding Land Use**				
(	0.6	**+**	0.65	**) ÷**	2	= **Variable 2 Score**	0.63

Variable 3: Water Source

*This variable is concerned with **up-gradient** hydrologic connectivity. It is a measure of impacts to the AA's water source, including the quantity and timing of water delivery, and the ability of source water to perform work such as sediment transport, erosion, soil pore flushing, etc. To score this variable, identify stressors that alter the source of water to the AA, and record their presence on the stressor list. Stressors can impact water source by depletion, augmentation, or alteration of inflow timing or hydrodynamics. This variable is designed to assess water quantity, power and timing, not water quality. Water quality will be evaluated in Variable 7.*

Scoring rules:

1. Use the stressor list and knowledge of the watershed to catalog type-specific impairments of the AA's water source. Mark the stressors present with a check in the first column and describe the general nature, severity and extent of each. List additional stressors in empty rows at the bottom of the table and explain.

2. Considering the composite effect of stressors on the water source, rate the condition of this variable with the aid of the scoring guidelines.

✔	Stressors	Comments/description
	Ditches or Drains (tile, etc.)	
	Dams	
	Diversions	
	Groundwater pumping	
	Draw-downs	
×	Culverts or Constrictions	Both AA s are sourced by culverts.
	Point Source (urban, ind., ag.)	
	Non-point Source	
	Increased Drainage Area	
	Storm Drain/Urban Runoff	
×	Impermeable Surface Runoff	I-76, Bridge Street, and Frontage Road
	Irrigation Return Flows	
	Mining/Natural Gas Extraction	
	Transbasin Diversion	
	Actively Managed Hydrology	

Variable Score	Condition Grade	Depletion	Augmentation
1.0 - 0.9	***A*** *Reference Standard*	Unnatural drawdown events minor, rare or non-existent, very slight uniform depletion, or trivial alteration of hydrodynamics.	Unnatural high-water events minor, rare or non-existent, slight uniform increase in amount of inflow, or trivial alteration of hydrodynamics.
<0.9 - 0.8	***B*** *Highly Functioning*	Unnatural drawdown events occasional, short duration and/or mild; or uniform depletion up to 20%; or mild to moderate reduction of peak flows or capacity of water to perform work.	Occasional unnatural high-water events, short in duration and/or mild in intensity; or uniform augmentation up to 20%; or mild to moderate increase of peak flows or capacity of water to perform work.
<0.8 - 0.7	***C*** *Functioning*	Unnatural drawdown events common and of mild to moderate intensity and/or duration; or uniform depletion up to 50%; or moderate to substantial reduction of peak flows or capacity of water to perform work.	Common occurrence of unnatural high-water events, of a mild to moderate intensity and/or duration; or uniform augmentation up to 50%; or moderate to substantial increase of peak flows or capacity of water to perform work.
<0.7 - 0.6	***D*** *Functioning Impaired*	Unnatural drawdown events occur frequently with a moderate to high intensity and/or duration; or uniform depletion up to 75%; or substantial reduction of peak flows or capacity of water to perform work. **Wetlands with actively managed or wholly artificial hydrology will usually score in this range or lower.**	Common occurrence of unnatural high-water events, some of which may be severe in nature or exist for a substantial portion of the growing season; or uniform augmentation more than 50% or capacity of water to perform work. **Wetlands with actively managed or wholly artificial hydrology will usually score in this range or lower.**
<0.6	***F*** *Non-functioning*	Water source diminished enough to threaten or extinguish wetland hydrology in the AA.	Frequency, duration or magnitude of unnaturally high-water great enough to change the fundamental characteristics of the wetland.

Variable 3 Score 0.6

Variable 4: Water Distribution

This variable is concerned with hydrologic connectivity ***within*** *the AA. It is a measure of alteration to the spatial distribution of surface and groundwater within the AA. These alterations are manifested as local changes to the hydrograph and generally result from geomorphic modifications within the AA. To score this variable, identify stressors within the AA that alter flow patterns and impact the hydrograph of the AA, including localized increases or decreases to the depth or duration of the water table or surface water.*

Because the wetland's ability to distribute water in a characteristic fashion is fundamentally dependent on the condition of its water source, ***in most cases the Water Source variable score will define the upper limit Water Distribution score****. For example, if the Water Source variable is rated at 0.85, the Water Distribution score will usually have the potential to attain a maximum score of 0.85. Additional stressors within or outside the lower end of the AA effecting water distribution (e.g., ditches and levees) will reduce the score from the maximum value.*

Scoring rules:

1. Identify impacts to the natural distribution of water throughout the AA and catalog them in the stressor table.

2. Considering all of the stressors identified, assign an overall variable score using the scoring guidelines. In most cases, the Water Source variable score will set the upper limit for the Water Distribution score.

✓	Stressors	Comments/description
	Alteration of Water Source	
	Ditches	
	Ponding/Impoundment	
	Culverts	
	Road Grades	
	Channel Incision/Entrenchment	
	Hardened/Engineered Channel	
	Enlarged Channel	
	Artificial Banks/Shoreline	
	Weirs	
	Dikes/Levees/Berms	
	Diversions	
×	Sediment/Fill Accumulation	Both wetlands show signs of sediment accumulation

Variable Score	Condition Grade	Non-riverine	Riverine
1.0 - 0.9	***A*** *Reference Standard*	Little or no alteration has been made to the way in which water is distributed throughout the wetland. AA maintains a natural hydrologic regime.	Natural active floodplain areas flood on a normal recurrence interval. No evidence of alteration of flooding and subirrigation duration and intensity.
<0.9 - 0.8	***B*** *Highly Functioning*	Less than 10% of the AA is affected by *in situ* hydrologic alteration; or more widespread impacts result in less than a 2 in. (5 cm) change in mean growing season water table elevation.	Channel-adjacent areas have occasional unnatural periods of drying or flooding; or uniform shift in the hydrograph less than typical root depth.
<0.8 - 0.7	***C*** *Functioning*	Between 10 and 33% of the AA is affected by *in situ* hydrologic alteration; or more widespread impacts result in a 4 in. (5 cm) or less change in mean growing season water table elevation.	In channel-adjacent area, periods of drying or flooding are common; or uniform shift in the hydrograph near root depth.
<0.7 - 0.6	***D*** *Functioning Impaired*	33 to 66% of the AA is affected by *in situ* hydrologic alteration; or more widespread impacts result in a 6 in. (15 cm) or less change in mean growing season water table elevation. Water table behavior must still meet jurisdictional criteria to merit this rating.	Adjacent to the channel, unnatural periods of drying or flooding are the norm; or uniform shift in the hydrograph greater than root depth.
<0.6	***F*** *Non-functioning*	More than 66% of the AA is affected by hydrologic alteration which changes the fundamental functioning of the wetland system, generally exhibited as a conversion to upland or deep water habitat.	Historical active floodplain areas are almost never wetted from overbank flooding, and/or groundwater infiltration is effectively cut off.

Variable 4 Score 0.7

Variable 5: Water Outflow

This variable is concerned with ***down-gradient*** *hydrologic connectivity and the flow of water and water-borne materials and energy out of the AA. In particular it illustrates the degree to which the AA can support the functioning of down-gradient habitats. It is a measure of impacts that affect the hydrologic outflow of water including the passage of water through its normal low- and high-flow surface outlets, infiltration/groundwater recharge, and the energetic characteristics of water delivered to dependent habitats. In some cases, alteration of evapotranspiration rates may be significant enough of a factor to consider in scoring. Score this variable by identifying stressors that impact the means by which water is exported from the AA. To evaluate this variable focus on how water, energy and associated materials are exported out of the AA and their ability it support down-gradient habitats in a manner consistent with their HGM (regional) subclass.*

Because the wetland's ability to export water and materials in a characteristic fashion is to a very large degree dependent the condition of its water source, as with the Water Distribution variable, ***in most cases the Water Source variable score will define the upper limit Water Outflow score****.*

Scoring rules:

1. Identify impacts to the natural outflow of water from the AA and catalog them in the stressor table.

2.Considering all of the stressors identified, assign an overall variable score using the scoring guidelines. Take in to account the cumulative effect of stressors on the wetland's ability to export water and water-borne materials. In most cases the Water Source variable will set the upper limit for the Water Outflow score.

✔	Stressors	Comments/description
	Alteration of Water Source	
	Ditches	
	Dikes/Levees	
×	Road Grades	Wetland 1 is affected more by road grades.
	Culverts	
	Diversions	
×	Constrictions	Both wetlands are constricted
	Channel Incision/Entrenchment	
	Hardened/Engineered Channel	
	Artificial Stream Banks	
	Weirs	
	Confined Bridge Openings	

Variable Score	Condition Grade	Scoring Guidelines
1.0 - 0.9	***A*** *Reference Standard*	Stressors have little to no effect on the magnitude, timing or hydrodynamics of the AA water outflow regime.
<0.9 - 0.8	***B*** *Highly Functioning*	High- or low-water outflows are mildly to moderately affected, but at intermediate ("normal") levels flow continues essentially unaltered in quantity or character.
<0.8 - 0.7	***C*** *Functioning*	High- or low-water outflows are moderately affected, mild alteration of intermediate level outflow occurs; or hydrodynamics moderately affected.
<0.7 - 0.6	***D*** *Functioning Impaired*	Outflow at all stages is moderately to highly impaired resulting in persistent flooding of portions of the AA or unnatural drainage; or outflow hydrodynamics severely disrupted.
<0.6	***F*** *Non-functioning*	The natural outflow regime is profoundly impaired. Down-gradient hydrologic connection severed or nearly so. Alterations may cause widespread unnatural persistent flooding or dewatering of the wetland system.

Variable 5 Score 0.7

Variable 6: Geomorphology

This variable is a measure of the degree to which the geomorphic setting has been altered within the AA. Changes to the surface configuration and natural topography constitute stressors. Such stressors may be observed in the form of fill, excavation, dikes, sedimentation due to absence of flushing floods, etc. In riverine systems, geomorphic changes to the stream channel should be considered if the channel is within the AA (i.e, small is size). Alterations may involve the bed and bank (substrate embeddedness or morphological changes), stream instability, and stream channel reconfiguration. Geomorphic changes are usually ultimately manifested as changes to wetland surface hydrology and water relations with vegetation. Geomorphic alterations can also directly affect soil properties, such as near-surface texture, and the wetland chemical environment such as the redox state or nutrient composition in the rooting zone. In rating this variable, ***do not*** *include these resultant effects of geomorphic change; rather focus on the physical impacts* ***within the footprint*** *of the alteration* ***within the AA*** *– For example, the width and depth of a ditch or the size of a levee* ***within the AA*** *would describe the extent of the stressors. The secondary effects of geomorphic change are addressed by other variables. All alterations to geomorphology should be evaluated including small-scale impacts such as pugging, hoof sheer, and sedimentation which can be significant but not immediately obvious.*

Scoring Rules:

1. Identify impacts to geomorphological setting and topography within the AA and record them on the stressor checklist.

2.Considering all of the stressors identified, assign an overall variable score using the scoring guidelines.

✓		Stressors	Comments
	General	Dredging/Excavation/Mining	
		Fill, including dikes, road grades, etc.	
		Grading	
		Compaction	
		Plowing/Disking	
×		Excessive Sedimentation	Both Wetlands 1 and 2 show signs of heavy sediment accumulation
		Dumping	
		Hoof Shear/Pugging	
		Aggregate or Mineral Mining	
		Sand Accumulation	
	Channels Only	Channel Instability/Over Widening	
		Excessive Bank Erosion	
		Channelization	
		Reconfigured Stream Channels	
		Artificial Banks/Shoreline	
		Beaver Dam Removal	
		Substrate Embeddedness	
		Lack or Excess of Woody Debris	

Variable Score	Condition Grade	Scoring Guidelines
1.0 - 0.9	***A*** *Reference Standard*	Topography essentially unaltered from the natural state, or alterations appear to have a minimal effect on wetland functioning and condition. Patch or microtopographic complexity may be slightly altered, but native plant communities are still supported.
<0.9 - 0.8	***B*** *Highly Functioning*	Alterations to topography result in small but detectable changes to habitat conditions in some or all of the AA; or more severe impacts exist but affect less than 10% of the AA.
<0.8 - 0.7	***C*** *Functioning*	Changes to AA topography may be pervasive but generally mild to moderate in severity. May include patches of more significant habitat alteration; or more severe alterations affect up to 20 % of the AA.
<0.7 - 0.6	***D*** *Functioning Impaired*	At least one important surface type or landform has been eliminated or created; microtopography has been strongly impacted throughout most or all of the AA; or more severe alterations affect up to 50% of the AA. Evidence that widespread diminishment or alteration of native plant community exist due to physical habitat alterations. Most incidentally created wetland habitat such as that created by roadside ditches and the like would score in this range or lower.
<0.6	***F*** *Non-functioning*	Pervasive geomorphic alterations have caused a fundamental change in site character and functioning, commonly resulting in a conversion to upland or deepwater habitat.

Variable 6 Score 0.75

Variable 7: Water and Soil Chemical Environment

This variable concerns the chemical environment of the soil and water media within the AA, including pollutants, water and soil characteristics. The origin of pollutants may be within or outside the AA. Score this variable by listing indicators of chemical stress in the AA. Consider point source and non-point sources of pollution, as well as mechanical or hydrologic changes that alter the chemical environment. Because water quality frequently cannot be inferred directly, the presence of stressors is often identified by the presence of indirect indicators. Five sub-variables are used to describe the Water and Soil Chemical Environment: Nutrient Enrichment/Eutrophication/Oxygen; Sedimentation/Turbidity; Toxic Contamination/pH; Temperature; and Soil Chemistry and Redox Potential. Utilization of web-based data mining tools is highly recommended to help inform and support variable scores.

Scoring rules:

1. Stressors are grouped into sub-variables which have a similar signature or set of causes.
2. Use the indicator list to identify each stressor impacting the chemical environment of the AA.
3. For each sub-variable, determine its score using the scoring guideline table provided on the second page of the scoring sheet. Scoring sub-variables is carried out in exactly the same way as normal variable scoring.
   -If the AA is part of a water body that is recognized as impaired or recommended for TMDL development for one of the factors, then score that sub-variable 0.65 or lower.
4. Transcribe sub-variable scores to the following variable scoring page and compute the sum.
5. The lowest sub-variable score sets the letter grade range. The composite of sub-variables influences the score within that range.

Sub-variable	Stressor Indicator	✔	Comments	Sub-variable Score
SV 7.1 Nutrient Enrichment/ Eutrophication/ Oxygen (D.O.)	Livestock			0.80
	Agricultural Runoff			
	Septic/Sewage			
	Excessive Algae or Aquatic Veg.			
	Cumulative Watershed NPS			
	CDPHE Impairment/TMDL List			
SV 7.2 Sedimentation/ Turbidity	Excessive Erosion	x		0.70
	Excessive Deposition	x		
	Fine Sediment Plumes			
	Agricultural Runoff			
	Excessive Turbidity			
	Nearby Construction Site			
	Cumulative Watershed NPS			
	CDPHE Impairment/TMDL List			
SV 7.3 Toxic contamination/ pH	Recent Chemical Spills			0.70
	Nearby Industrial Sites	x	Commercial sites nearby	
	Road Drainage/Runoff			
	Livestock			
	Agricultural Runoff			
	Storm Water Runoff	x	Storm water runoff	
	Fish/Wildlife Impacts			
	Vegetation Impacts			
	Cumulative Watershed NPS			
	Acid Mine Drainage			
	Point Source Discharge			
	CDPHE Impairment/TMDL List			
	Metal staining on rocks and veg.			
SV 7.4 Temperature	Excessive Temperature Regime	x	No overstory at either AA	0.65
	Lack of Shading	x	No overstory at either AA	
	Reservoir/Power Plant Discharge			
	Industrial Discharge			
	Cumulative Watershed NPS			
	CDPHE Impairment/TMDL List			
SV 7.5 Soil chemistry/ Redox potential	Unnatural Saturation/Desaturation	x	Both likely subject to flucuations	0.65
	Mechanical Soil Disturbance			
	Dumping/introduced Soil			
	CDPHE Impairment/TMDL List			

Variable 7: Water and Soil Chemical Environment p.2

Sub-variable Scoring Guidelines

Variable Score	Condition Class	Scoring Guidelines
1.0 - 0.9	***A*** *Reference Standard*	Stress indicators not present or trivial.
<0.9 - 0.8	***B*** *Highly Functioning*	Stress indicators scarcely present and mild, or otherwise not occurring in more than 10% of the AA.
<0.8 - 0.7	***C*** *Functioning*	Stress indicators present at mild to moderate levels, or otherwise not occurring in more than 33% of the AA.
<0.7 - 0.6	***D*** *Functioning Impaired*	Stress indicators present at moderate to high levels, or otherwise not occurring in more than 66% of the AA
<0.6	***F*** *Non-functioning*	Stress indicators strongly evident throughout the AA at levels which apparently alter the fundamental chemical environment of the wetland system

Input each sub-variable score from p. 1 of the V7 data form and calculate the sum.

Nutrient enrichment/ Eutrophication/ Oxygen (D.O.)		Sedimentation/ Turbidity		Toxic contamination/ pH		Temperature		Soil chemistry/ Redox potential		Sum of Sub-variable Scores
0.80	+	0.70	+	0.70	+	0.65	+	0.65	=	3.50

Use the table to score the Chemical Environment Variable circling the applicable scoring rules.

Variable Score	Condition Grade	Scoring Rules		
		Single Factor		**Composite Score**
1.0 - 0.9	***A*** *Reference Standard*	No single factor scores < 0.9		The factor scores sum > 4.5
<0.9 - 0.8	***B*** *Highly Functioning*	Any single factor scores ≥ 0.8 but < 0.9		The factor scores sum >4.0 but ≤4.5
<0.8 - 0.7	***C*** *Functioning*	Any single factor scores ≥ 7.0 but < 0.8		The factor scores sum >3.5 but ≤ 4.0
<0.7 - 0.6	***D*** *Functioning Impaired*	Any single factor scores ≥ 0.6 but <0.7		The factor scores sum >3.0 but ≤3.5
< 0.6	***F*** *Non-functioning*	Any single factor scores < 0.6		The factor scores sum < 3.0

Variable 7 Score 0.65

Variable 8: Vegetation Structure and Complexity

This variable is a measure of the condition of the wetland's vegetation relative to its native state. It particularly focuses on the wetland's ability to perform higher-order functions such as support of wildlife populations, and influence primary functions such as flood-flow attenuation, channel stabilization and sediment retention. Score this variable by listing stressors that have affected the structure, diversity, composition and cover of each vegetation stratum that would normally be present in the HGM (regional) subclass being assessed. For this variable, stressor severity is a measure of how much each vegetation stratum differs functionally from its natural condition or from the natural range of variability exhibited the HGM subclass or regional subclass. This variable has four sub-variables, each corresponding to a stratum of vegetation: Tree Canopy; Shrub Layer; Herbaceous Layer; and Aquatics.

Rules for Scoring:

1. Determine the number and types of vegetation layers present within the AA. Make a judgment as to whether additional layers were historically present using direct evidence such as stumps, root wads or historical photographs. Indirect evidence such as local knowledge and expert opinion can also be used in this determination.

2. Do not score vegetation layers that would not normally be present in the wetland type being assessed.

3. Estimate and record the current coverage of each vegetation layer at the top of the table.

4. Record the Reference Standard or expected percent coverage of each vegetation layer to create the sub-variable weigh factor. The condition of predominant vegetation layers has a greater influence on the variable score than do minor components.

5. Enter the percent cover values as decimals in the row of the stressor table labeled " Reference/expected Percent Cover of Layer". Note, percentages will often sum to more than 100% (1.0).

6. Determine the severity of stressors acting on each individual canopy layers, indicating their presence with checks in the appropriate boxes of the stressor table. The difference between the expected and observed stratum coverages is one measure of stratum alteration.

7. Determine the sub-variable score for each valid vegetation layer using the scoring guidelines on the second page of the scoring sheet. Enter each sub-variable score in the appropriate cell of the row labeled "Veg. Layer Sub-variable Score". If a stratum has been wholly removed score it as 0.5.

8. Multiply each layer's *Reference Percent Cover of Layer* score by its Veg. Layer Sub-variable scores and enter the products in the labled cells. These are the weighted sub-variable scores. Individually sum the *Reference Percent Cover of Layer* and *Weighted Sub-variables scores.*

9. Divide the sum of "Veg. Layer Sub-variable Scores" by the total coverage of all layers scored. This product is the Variable 8 score. Enter this number in the labeled box at the bottom of this page.

	Vegetation Layers				
Current % Coverage of Layer	0	0	100	0	
Stressor	**Tree**	**Shrub**	**Herb**	**Aquatic**	**Comments**
Brush Cutting/Shrub Removal	x	x			
Dewatering					
Excessive Herbivory					
Exotic/Invasive spp.					
Herbicide					
Livestock Grazing					
Loss of Zonation/Homogenization					
Mowing/Haying	x	x	x		
Noxious Weeds	x				Weeds present at Wetland 2
Over Saturation					
Tree Harvest					
DIFFERENCE BETWEEN CURRENT COVERAGE AND REFERENCE/EXPECTED					

Reference/Expected % Cover of Layer	15	+	10	+	100	+	0	=	125
	x		x		x		x		
Veg. Layer Sub-variable Score	0.65		0.65		0.65		0.65	÷	**See sub-variable scoring guidelines on following page**
	=		=		=		=		
Weighted Sub-variable Score	9.75	+	6.50	+	65.00	+	0.00	=	81.25

Variable 8 Score 0.65

Variable 8: Vegetation Structure and Complexity p. 2

Sub-variable 8 Scoring Guidelines:

Based on the list of stressors identified above, rate the severity of their cumulative effect on vegetation structure and complexity for each vegetation layer.

Variable Score	Condition Grade	Scoring Guidelines
1.0 - 0.9	***A*** *Reference Standard*	Stressors not present or with an intensity low enough as to not detectably affect the structure, diversity or composition of the vegetation layer.
<0.9 - 0.8	***B*** *Highly Functioning*	Stressors present at intensity levels sufficient to cause detectable, but minor, changes in layer composition. Stress related change should generally be less than 10% for any given attribute (e.g., 10% cover of invasive, 10% reduction in richness or cover) if the stressor is evenly distributed throughout the wetland. Stress related change could be as high as 33% for a given attribute if stressors are confined to patches comprising less than 10% of the wetland.
<0.8 - 0.7	***C*** *Functioning*	Stressors present with enough intensity to cause significant changes in the character of vegetation, including alteration of layer coverage, structural complexity and species composition. The vegetation layer retains its essential character though. AA's with a high proportion of non-native grasses will commonly fall in this class. Stress related change should generally be less than 33% for any given attribute (e.g., 33% cover of invasive, 33% reduction in richness or cover) if the stressor is evenly distributed throughout the wetland. Stress related change could be as much as 66% for a given attribute if stressors are confined to patches comprising less than 25% of the wetland.
<0.7 - 0.6	***D*** *Functioning Impaired*	Stressor intensity severe enough to cause profound changes to the fundamental character of the vegetation layer. Stress-related change should generally be less than 66% for any given attribute (e.g., 66% cover of invasive, 66% reduction in richness or cover) if the stressor is evenly distributed throughout the wetland. Stress related change could be as much as 80% of a given attribute if stressors are confined to patches comprising less than 50% of the wetland.
<0.6	***F*** *Non-functioning*	Vegetation layer has been completely removed or altered to the extent that is no longer comparable to the natural structure, diversity and composition.

FACWet Score Card

Scoring Procedure:

1. Transcribe variable scores from each variable data sheet to the corresponding cell in the variable score table.
2. In each Functional Capacity Index (FCI) equation, enter the corresponding variable scores in the equation cells. Do not enter values in the crossed cells lacking labels.
3. Add the variable scores to calculate the total functional points achieved for each function.
4. Divide the total functional points achieved by the functional points possible. The typical number of total points possible is provided, however, if a variable is added or subtracted to FCI equation the total possible points must be adjusted.
5. Calculate the Composite FCI, by adding the FCI scores and dividing by the total number of functions scored (usually 7).
6. If scoring is done directly in the Excel spreadsheet, all values will be transferred and calculated automatically.

VARIABLE SCORE TABLE

Buffer & Landscape Context	**Variable 1:**	**Habitat Connectivity (Connect)**	0.65
	Variable 2:	**Contributing Area (CA)**	0.63
Hydrology	**Variable 3:**	**Water Source (Source)**	0.60
	Variable 4:	**Water Distribution (Dist)**	0.70
	Variable 5:	**Water Outflow (Outflow)**	0.70
Abiotic and Biotic Habitat	**Variable 6:**	**Geomorphology (Geom)**	0.75
	Variable 7:	**Chemical Environment (Chem)**	0.65
	Variable 8:	**Vegetation Structure and Complexity (Veg)**	0.65

Functional Capacity Indices

Function 1 -- Support of Characteristic Wildlife Habitat

$V1_{connect}$	+	$V2_{CA}$	+	$(2 \times V8_{veg})$						Total Functional Points		FCI
0.65	+	0.63	+	1.30	+		+		=	2.58	÷ 4	= 0.64

Function 2 -- Support of Characteristic Fish/aquatic Habitat

$(3 \times V3_{source})$	+	$(2 \times V4_{dist})$	+	$(2 \times V5_{outflow})$	+	$V6_{geom}$	+	$V7_{chem}$						
1.80	+	1.40	+	1.40	+	0.75	+	0.65	+		=	6.00	÷ 9	= 0.67

Function 3 -- Flood Attenuation

$V2_{CA}$	+	$(2 \times V3_{source})$	+	$(2 \times V4_{dist})$	+	$(2 \times V5_{outflow})$	+	$V6_{geom}$	+	$V8_{veg}$				
0.63	+	1.20	+	1.40	+	1.40	+	0.75	+	0.65	=	6.03	÷ 9	= 0.67

Function 4 -- Short- and Long-term Water Storage

$V3_{source}$	+	$(2 \times V4_{dist})$	+	$(2 \times V5_{outflow})$		$V6_{geom}$								
0.60	+	1.40	+	1.40	+	0.75	+		+		=	4.15	÷ 6	= 0.69

Function 5 -- Nutrient/Toxicant Removal

$(2 \times V2_{CA})$	+	$(2 \times V4_{dist})$	+	$V6_{geom}$		$V7_{chem}$								
1.25	+	1.40	+	0.75	+	0.65	+		+		=	4.05	÷ 6	= 0.68

Function 6 -- Sediment Retention/Shoreline Stabilization

$V2_{CA}$	+	$(2 \times V6_{geom})$	+	$(2 \times V8_{veg})$										
0.63	+	1.50	+	1.30	+		+		=	3.43	÷ 5	= 0.69		

Function 7 -- Production Export/Food Chain Support

$V1_{connect}$	+	$(2 \times V5_{outflow})$	+	$V6_{geom}$	+	$V7_{chem}$	+	$(2 \times V8_{veg})$						
0.65	+	1.40	+	0.75	+	0.65	+	1.30	+		=	4.75	÷ 7	= 0.68

Sum of Individual FCI Scores 4.71

Divide by the Number of Functions Scored ÷ 7

Composite FCI Score 0.67