Wetland & Aquatic Resources Technical Report

I-270 Corridor Improvements

July 2021

Prepared For:
CDOT Region 1
2829 West Howard Place
Denver, CO 80204

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Acronyms and Abbreviations

Acronym	Definition
AA	Assessment Area
AOI	Area of Interest
CDOT	Colorado Department of Transportation
CFR	*Code of Federal Regulations*
EA	Environmental Assessment
EO	Executive Order
EPA	U.S. Environmental Protection Agency
FAC	facultative
FACU	facultative upland
FACW	facultative wetland
FCI	Functional Capacity Index
FHWA	Federal Highway Administration
I-25	Interstate 25
I-270	Interstate 270
I-70	Interstate 70
I-76	Interstate 76
NWP	Nationwide Permit
NWPR	Navigable Waters Protection Rule
OBL	obligate wetland
PEM	palustrine emergent
PSS	palustrine scrub-shrub
UPL	upland
USACE	United State Army Corps of Engineers

1.0 Introduction

This Wetland Technical Report was prepared to support the I-270 Highway Improvement Project (project) Environmental Assessment (EA). The project is proposed by the Colorado Department of Transportation (CDOT) and the Federal Highway Administration (FHWA), in conjunction with local partners Adams County and Commerce City, to make improvements to 6 miles of Interstate 270 (I-270) in Adams County, Commerce City, and the City and County of Denver, Colorado, between Interstate 25 (I-25) and Interstate 70 (I-70) (Figure 1-1).

This report has been written in compliance with Executive Order (EO) 11990, "Protection of Wetlands," and is in accordance with 23 *Code of Federal Regulations* (CFR) 771, 23 CFR 777, and FHWA Technical Advisory T6640.8A. This report is preliminary in nature and is created to help inform the EA alternatives evaluation process; a formal and focused programmatic Wetland Findings will be created, in support of the project Section 404 federal permitting and National Environmental Policy Act process once project design advances to the approximately 90% design phase.

Wetland delineation maps are provided in Appendix A, wetland data sheets are provided in Appendix B, and site photos are provided in Appendix C. FACWet-related maps and data sheets are provided in Appendix D, preliminary wetland impact figures and tables are provided in Appendix E, and a preliminary onsite wetland mitigation concept summary is available in Appendix F.

Sections 1 and 2 of the EA and EA Appendix A contain the project setting and a detailed description of alternatives.

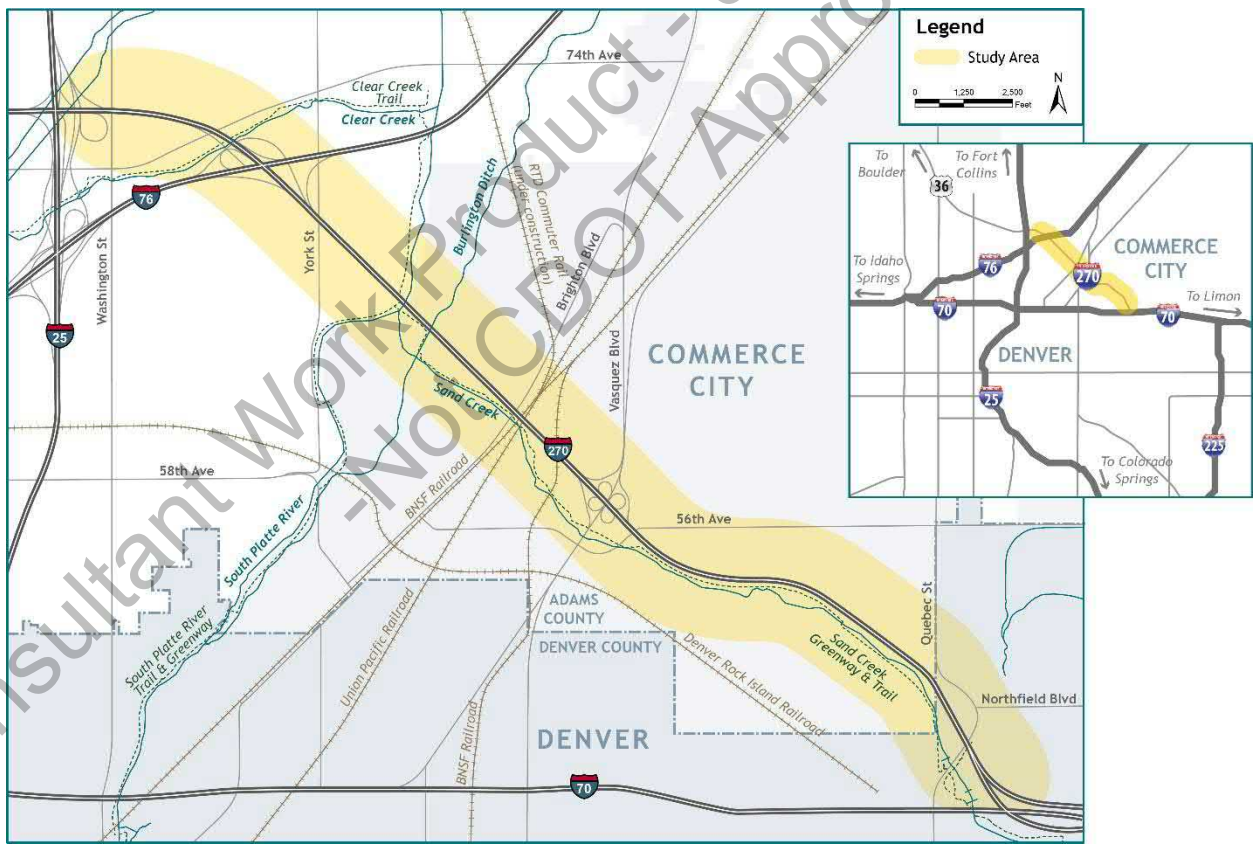

Figure 1-1. Project Location
Source: Jacobs

2.0 Regulatory Context

Various laws and regulations are in place to protect wetlands and waterways. Aquatic resources discussed in this report are protected by the following federal laws, regulations, and policies.

The federal Clean Water Act was enacted to restore and maintain the chemical, physical, and biological integrity of the U.S.'s waters through the elimination of discharges of pollutants. In support of this goal, the Clean Water Act established permit programs to control discharges into waters of the U.S. and provided the U.S. Environmental Protection Agency (EPA) and U.S. Army Corps of Engineers (USACE) with regulatory authority to issue permits. Section 404 established a program to regulate the discharge of dredged or fill material into waters of the U.S., including wetlands and streams, and requires the issuance of a permit for any activities resulting in such discharge, unless an exemption applies.

The USACE and EPA are responsible for making all final jurisdictional determinations. Under Section 404 of the Clean Water Act, the USACE and the EPA reserve the right to determine jurisdictional status on a case-by-case basis (41 CFR 219). On June 19, 2020, the District Court for the District of Colorado stayed the effective date of the Navigable Waters Protection Rule only in the state of Colorado. The judicial stay was lifted in Colorado on April 23, 2021. Upon the stay being lifted, the WOTUS [Waters of the United States] Rule, also known as the Navigable Waters Protection Rule (NWPR), is now effective in Colorado, and the federal permitting of the discharge of dredge or fill material into state waters will no longer cover certain state waters protected from unpermitted discharges by state law, including Section 25-8-501.

In accordance with EO 11990 and CDOT's Memorandum of Agreement with FHWA (CDOT 2019), which requires one-to-one replacement of all wetland area or wetland function, CDOT policy requires all wetland impacts to be mitigated, regardless of jurisdictional status.

Senate Bill 40 (33-5-101-107, CRS 1973 as amended) requires any agency of the state to obtain wildlife certification from Colorado Parks and Wildlife (CPW) when the agency plans construction in "...any stream or its bank or tributaries...". Compliance with these requirements is discussed in the Biological Resources Report prepared for the project (CDOT, 2020).

Agency Coordination

At the project onset, CDOT contacted the USACE to inform them of the project and confirm the appropriate agency contact. In August 2020, a resource agency meeting was held with the USACE in attendance. The project team also coordinated with USACE regarding potential jurisdictional status for roadside features.

3.0 Methods

To identify aquatic resources in the study area, a desktop evaluation was completed with available mapping and aerial images prior to fieldwork including the National Wetland Inventory Maps (USGS 2020b), U.S. Geological Survey 7.5-minute topographic maps, and Google Earth historic aerial imagery.

Jacobs biologists visited and evaluated the approximately 445-acre study area (see Figures in Appendix A) to delineate aquatic resources. While in the field, boundaries of wetlands and surface waters were recorded on tablets using Collector for ArcGIS. To establish submeter accuracy, Trimble R1 Global Navigation Satellite System receivers were paired with the tablets. Photos of wetland areas were taken while in the field (Appendix C).

To formally delineate wetlands and waters of the U.S. within the study area, biologists conducted field surveys during July 2020, and follow-up surveys in early October 2020 and December 2020 to account for study area adjustments. The wetland delineation was completed in accordance with the *Corps of Engineers Wetland Delineation Manual* (USACE 1987), and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Great Plains Region (Version 2.0)* (USACE 2010). Wetlands were

defined by vegetative, hydrologic, and soil features, and the data were recorded onto field data forms (Appendix B).

Vegetation was identified and documented within the strata-specific sampling radii recommended by the USACE (30 feet for trees, 15 feet for shrubs, 5 feet for herbs, and 15 feet for woody vines) (USACE 2010). Wetland indicator status for plant species was referenced in the "National Wetland Plant List: 2016 wetland ratings" (Lichvar et al. 2016). Species were classified as obligate wetland (OBL), facultative wetland (FACW), facultative (FAC), facultative upland (FACU), or upland (UPL). Plant species classified as FAC, FACW, or OBL are considered hydrophytic plants and are wetland indicators. Wetlands were also classified using the Cowardin classification system (Cowardin et al. 1979).

Hydrology and soil data were also collected at the sampling points. Hydrology indicators may include topographic position, presence of standing water and saturated soil, profile conditions, drainage patterns, water marks, sediment deposits, and oxidized root channels in the upper 18 inches of the soil profile. Wetland soil indicators may include presence of color streaking (mottling), gleying (grayish 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 in potential wetlands to verify indicators of vegetation, wetland hydrology, and hydric soils.

In addition, the "Functional Assessment of Colorado Wetlands (FACWet) Method" (Johnson et al. 2013) was completed. The Area of Interest (AOI) encompasses the area that could be directly or indirectly impacted by project activities. Within the AOI, areas of target habitat (wetlands) were defined as Assessment Areas (AA). The targeted habitat for this project included any waters, wetlands, or riparian vegetation. The wetlands were grouped into AAs according to hydrogeomorphic class, wetland type, and location within the AOI. Field observations for each AA were incorporated into FACWet data sheets (Appendix D).

The jurisdictional status of the wetlands and other waters were evaluated per the Rapanos Guidance, which was the active jurisdictional evaluation guidance at the time of the delineation but has since been reevaluated considering the recent adoption of the NWRP. In this report, Jacobs biologists have assigned a presumed jurisdictional status to each feature according to the NWPR. However, the USACE must review and formally determine the jurisdictional status of all waters of the U.S. This jurisdictional determination procedure would occur during the project's Section 404 permitting process.

Wetland impact areas were determined through Geographic Information System (GIS) evaluation of design data overlayed on the field delineated wetland data.

Onsite wetland mitigation concepts are based on field observations by CDOT and Jacobs biologists during wetland investigations and subsequent desktop analysis and mapping.

4.0 Results

4.1 General Site Conditions

4.1.1 Vegetation

Three broad wetland categories were delineated and mapped within the study area including herbaceous palustrine emergent (PEM) wetlands associated with natural riparian areas, palustrine scrub-shrub (PSS) wetlands associated with natural riparian areas, and PEM wetlands associated with stormwater hydrology. The typical hydrophytic vegetation characterizing these wetland types as well as the transitional upland communities is described below:

- **Riparian PEM:** PEM wetland areas generally associated with intermittent to perennial hydrologic regime on natural streams within the study area are generally dominated by one or more of the

following species: broadleaf cattail (*Typha latifolia*; OBL), Baltic rush (*Juncus balticus*; FACW), and inland salt grass (*Distichlis spicata*; FACW).

- **Riparian PSS:** PSS wetlands within the study area generally associated with natural streams are dominated by coyote willow (*Salix exigua*; FACW) and plains cottonwood (*Populus deltoides*; FAC). Understories contain cattails and Emory's sedge (*Carex emoryi*; OBL).
- **Stormwater PEM:** PEM wetlands associated with stormwater hydrology, including roadside swales and stormwater facilities within the study area, are generally dominated by one or more of the following species: broadleaf cattail (*Typha latifolia*; OBL), inland salt grass (*Distichlis spicata*; FACW), and Fuller's teasel (*Dipsacus fullonum*; FACU).
- **Upland Transition:** The upland transition is typically dominated by a mixture of grasses and forbs, including salt grass, blue grama (*Bouteloua gracilis*), western wheatgrass (*Pascopyrum smithii*), smooth brome (*Bromus inermis*), buffalo grass (*Bouteloua dactyloides*), sand dropseed (*Sporobolus cryptandrus*), side oats grama (*Bouteloua curtipendula*), and downy brome (*Bromus tectorum*).

The dominant vegetation observed throughout the study area primarily consisted of native and non-native grasses (that is, blue grama, western wheatgrass, smooth brome, and forbs including curly dock [*Rumex crispus*] and sweet clover [*Melilotus officinalis* spp]). Coyote willow, plains cottonwood, and Siberian elm (*Ulmus pumila*) are also present along the study area.

4.1.2 Hydrology and Geomorphology

The study area is located within the Middle South Platte–Cherry Creek Watershed (HUC 10190003) (USGS 2020b). Sand Creek flows northwest along the western side of I-270 before joining the South Platte River in the northern portion of the study area. Much of Sand Creek is heavily incised with steep, unstable banks, likely a result of the urbanized nature of the watershed, which leads to intense stormwater flows in a naturally unstable riparian area, characterized by deep unconsolidated sandy alluvium. Notably, a major flood event in September 2013 (approximately 14,000 cubic feet per second), which was approximately 14 times greater than the normal annual peak discharge event (approximately 1,000 cubic feet per second) (USGS 2020a), likely exacerbated and accelerated this channelization. This single event likely scoured the channel, creating floodplain terraces now disconnected from normal high-water events. As such, some former floodplain wetlands now have deficient hydrology to support wetlands, leading to stressed riparian habitat and invasion of weed species, notably teasle and Canada thistle. Dense patches of coyote willow (*Salix exigua*) abut Sand Creek, providing areas of wetland and riparian habitat. However, many of the willow stands are stressed (for example, lacking foliage, and weedy understory) in part because of the channel actively incising.

Clear Creek flows northeast under I-270 near the northern terminus of the study area before intersecting with the South Platte River. Like Sand Creek, Clear Creek is entrenched and is significantly affected by encroachment of urban development and flashy stormwater runoff events. Only a short section of Clear Creek passes through the study area where three large bridge structures span the waterway. The floodplain, which appears to be disconnected from natural seasonal flooding, contains a large riparian wetland complex modified by past borrow pits and dominated by coyote willow and mature plains cottonwood trees (*Populous deltoides* ssp *monilifera).* The wetland complex is somewhat cut off from natural floods by the existence of a berm and recreational trail. However, the complex does drain through culverts connecting the wetlands to Clear Creek.

The South Platte River flows north, under and perpendicular to I-270, near the center of the study area. The South Platte River is a highly manipulated stream, subject to altered flow regime because of water diversions; storage projects; treatment facilities; residential, commercial, and industrial use; and urban runoff. The I-270 bridge over the South Platte is a high bridge just downstream of a major wastewater treatment facility that discharges into the river. Through the study area, the banks of the South Platte

are very steep, which limits the riparian and wetland zone to a narrow strip at the stream's ordinary high-water mark.

The study area contains many roadside ditches, swales, and stormwater detention basins associated with runoff and drainage from I-270 and adjacent infrastructure. These stormwater wetland features along with agricultural ditches are generally not considered to be jurisdictional waters. Other sources of hydrology include stock ponds, stormwater runoff occurring as sheet flow across the interstate, and stormwater directed into permanent water quality features. These sources of hydrology also contribute to the formation and support of roadside drainage and water quality facility wetlands in portions of the study area.

4.1.3 Soils

There are 13 soil types mapped within the study area (NRCS 2018). These soil types are presented in Table 4-1. The soils in the study area's wetlands typically consist of loams, sandy loams, loamy sands, and clay loams. Of the 13 soil types present in the study area, 1 (7.7 percent) is classified as hydric (NRCS 2018).

Table 4-1. Soil Types within the Study Area

Soil Key [a]	Soil Name [a]	Hydric Rating [a]
AsB	Ascalon sandy loam, sandy substratum, 0 to 3 percent slopes	No
BoD	Blakeland loamy sand, 3 to 9 percent slopes	No
Lv	Loveland soils	No
Lw	Loamy alluvial land, moderately wet	No
MISLD	Gravel pits	No
NuA	Nunn clay loam, 0 to 1 percent slopes	No
NuB	Nunn clay loam, 1 to 3 percent slopes	No
Sm	Sandy alluvial land	Yes [b]
Tc	Terrace escarpments	No
TuB	Truckton loamy sand, 1 to 3 percent slopes	No
TuD	Truckton sandy loam, 3 to 9 percent slopes	No
VoA	Vona sandy loam, 1 to 3 percent slopes	No
VoB	Vona sandy loam, 1 to 3 percent slopes	No

[a] *Source: NRCS 2018*

[b] Generic soil unit was not described; it was assumed to be hydric based onsite observations and physiological landscape position.

4.2 Wetlands

Numerous wetland areas were identified within the study area. The study area boundaries are shown on Figure 1-1. Wetlands are generally associated with watercourses that flow through the study area and permanent stormwater facilities or highway drainage features such as roadside swales. Wetlands were grouped together for the purposes of simplifying the discussion. The wetland groupings were based on hydrogeomorphic class, wetland type, and location within the AOI. The following sections discuss each wetland grouping. Table 4-2 lists delineated wetlands within the study area; Table 4-3 lists other waters (non-vegetated channels and open water features) delineated within the study area.

4.2.1 Wetlands Associated with Clear Creek

These wetlands were located along the banks and historic floodplain of Clear Creek, which is the primary source of hydrology for these wetlands. The wetlands are a combination of PEM, dominated by herbaceous vegetation, and PSS, which support at least 30 percent shrub canopy (Cowardin et al. 1979). The wetland plants present at these wetlands included graminoids such as Emory's sedge (OBL), broadleaf cattail (OBL), Fuller's teasel (FACU), wild mint (*Mentha arvensis;* FACW), poison hemlock (*Conium maculatum*; FACW), and leafy spurge (*Euphorbia escula*; UPL); the shrub community is characterized by narrowleaf willow (FACW); and the tree canopy, where present, is dominated by plains cottonwood (FAC) and Siberian elm (UPL). Hydric soil indicators in these wetlands included sandy redox and 2.5 centimeters of mucky peat (USACE 2010). Wetland hydrology indicators included surface water, high-water table, saturation, drainage patterns, and geomorphic position (USACE 2010). Because Clear Creek is a jurisdictional waterway, wetlands adjacent to the stream or connected via culvert to Clear Creek are assumed to be jurisdictional.

4.2.2 Wetlands Associated with Sand Creek

These wetlands were located along portions of Sand Creek, which is the primary source of hydrology for these wetlands. The wetlands are a combination of PEM and PSS wetlands. The wetland plants present at these wetlands included graminoids such as inland salt grass (FACW), foxtail barley (*Hordeum jubatum*; FAC), common three-square (*Schoenoplectus pungens*; OBL), meadow foxtail (*Alopecurus pratensis*; FACW), pepperweed (*Lepidium perfoliatum;* FAC), red fescue (*Festuca rubra*; OBL), Fuller's teasel (FACU), Emory's sedge (OBL), Baltic rush (FACW), reed canary grass (*Phalaris arundinacea*; FACW), and broadleaf cattail (OBL); herbaceous plants such as Canada thistle (*Cirsium arvense*; FAC), Indian hemp (*Apocynum cannabinum*; FAC), and sweet clover (UPL); a shrub community dominated by coyote willow (FACW), snowberry (*Symphoricarpos occidentalis*; FACU), and Woods' rose (*Rosa woodsii*; FACU); and the tree canopy, where present, is dominated by plains cottonwood (FAC). Hydric soil indicators in these wetlands included hydrogen sulfide, thick dark surface, sandy redox, and redox dark surface (USACE 2010). The wetland hydrology indicators included high-water table, saturation, surface water, geomorphic position, hydrogen sulfide smell, oxidized rhizospheres on living roots, drift deposits, and drainage patterns (USACE 2010). Because Sand Creek is a jurisdictional waterway, wetlands adjacent to this creek including stream bank wetlands and floodplain wetlands with clear surface connectivity are assumed to be jurisdictional.

4.2.3 Wetlands Associated with the South Platte River

These wetlands were located along portions of the South Platte River, which is the primary source of hydrology for these wetlands. The wetlands are a combination of PEM and PSS wetlands (Cowardin et al. 1979). The wetland plants present at these wetlands included graminoids such as inland salt grass (FACW), foxtail barley (FAC), common three-square (OBL), meadow foxtail (FACW), pepperweed (FAC), red fescue (OBL), Fuller's teasel (FACU), Emory's sedge (OBL), Baltic rush (FACW), reed canary grass (FACW), and broadleaf cattail (OBL); herbaceous plants such as Canada thistle (FAC), Indian hemp (FAC), and sweet clover (UPL); a shrub community dominated by coyote willow (FACW), snowberry (FACU), and Woods' rose (FACU); and the tree canopy, where present, is dominated by plains cottonwood (FAC). Hydric soil indicators in these wetlands included hydrogen sulfide, thick dark surface, sandy redox, and redox dark surface (USACE 2010). The wetland hydrology indicators included high-water table, saturation, surface water, geomorphic position, hydrogen sulfide smell, oxidized rhizospheres on living roots, drift deposits, and drainage patterns (USACE 2010). Because the South Platte River is a jurisdictional waterway, wetlands adjacent to, or with clear surface connectivity to these surface waters, are assumed to be jurisdictional as well.

4.2.4 Wetlands Associated with Stormwater Drainage Infrastructure

The wetlands associated with highway drainage are located in roadside ditches and low spots along I-270 and the various roads that run parallel to and on and off I-270. Stormwater runoff from paved surfaces is the primary source of hydrology for these wetlands. The wetlands were primarily PEM (Cowardin et al. 1979). Some of these wetlands were a combination of PEM and PSS (Cowardin et al. 1979), but the shrub component is minimal. The wetland plants present at these wetlands included graminoids such as broadleaf cattail (OBL), inland salt grass (FACW), Baltic rush (FACW), Emory's sedge (OBL), common spike rush (*Eleocharis palustris*; OBL), reed canary grass (FACW), foxtail barley (FAC), and common three-square (OBL); the herbaceous plants Fuller's teasel (FACU), Indian hemp (FAC), and Canada thistle (FAC); and the shrub canopy, where present, is dominated by coyote willow (FACW). The most common hydric soil indicator in these wetlands was redox dark surface (USACE 2010). Other hydric soil indicators included depleted matrix, 2.5-centimeter mucky peat, sandy redox, thick dark surface, and hydrogen sulfide odor (USACE 2010). The most common wetland hydrology indicators included saturation, drift deposits, salt crust, and geomorphic position (USACE 2010). Other wetland hydrology indicators included high-water table, surface soil cracks, inundation visible on aerial imagery, and drainage patterns (USACE 2010).

Table 4-2. Summary of Delineated Wetlands

Wetland Name	Cowardin Class	Presumed Jurisdiction [a]	Comment/Significant Nexus	Area	
				Square Feet	Acres
W001	PSS	Jurisdictional	In-channel wetland direct nexus—abutting Sand Creek	8,658	0.199
W002	PSS	Jurisdictional	In-channel wetland direct nexus—abutting Sand Creek	25,841	0.593
W003	PEM	Non-jurisdictional	Roadside stormwater swale—overland nexus to Sand Creek	10,027	0.230
W010	PSS	Jurisdictional	Artificially created wetland potentially for mitigation—direct nexus to Sand Creek via culverts	55,175	1.267
W020	PEM	Jurisdictional	In-channel wetland direct nexus—abutting Sand Creek	13,106	0.301
W023	PSS	Jurisdictional	In-channel wetland direct nexus—abutting Sand Creek	277	0.006
W025	PSS	Jurisdictional	In-channel wetland direct nexus—abutting Sand Creek	3,441	0.079
W027	PSS	Jurisdictional	In-channel wetland direct nexus—abutting Sand Creek	16,591	0.381
W028	PSS	Jurisdictional	In-channel wetland direct nexus—abutting Sand Creek	47,123	1.082
W030	PSS	Jurisdictional	In-channel wetland direct nexus—abutting tributary to Sand Creek within Sand Creek floodplain	245	0.006
W031	PSS	Jurisdictional	In-channel wetland direct nexus—abutting Sand Creek	3,694	0.085
W032	PEM	Jurisdictional	In-channel wetland direct nexus—abutting Sand Creek	98	0.002
W050	PEM	Jurisdictional	In-channel wetland direct nexus—abutting Sand Creek	12,447	0.286
W051	PEM	Jurisdictional	In-channel wetland direct nexus—abutting Sand Creek	7,137	0.164
W052	PEM	Jurisdictional	In-channel wetland direct nexus—abutting Sand Creek	1,993	0.046
W053	PEM	Jurisdictional	In-channel wetland direct nexus—abutting Sand Creek	351	0.008
W070	PEM	Non-jurisdictional	Isolated—roadside swale	11,874	0.273
W100	PSS	Jurisdictional	In-channel wetland direct nexus—abutting Sand Creek	2,474	0.057

Table 4-2. Summary of Delineated Wetlands

Wetland Name	Cowardin Class	Presumed Jurisdiction [a]	Comment/Significant Nexus	Area	
				Square Feet	Acres
W195	PSS	Jurisdictional	Wetland fringed of constructed depressional feature—nexus to Sand Creek via overland flow and culverts	583	0.013
W200	PEM	Non-jurisdictional	Isolated—stormwater swale	7,848	0.180
W205	PSS	Jurisdictional	Constructed depressional feature in Sand Creek floodplain—overland nexus to Clear Creek	26,314	0.604
W210	PSS	Jurisdictional	Constructed depressional feature in Sand Creek floodplain—nexus via overland and culvert to Clear Creek	61,952	1.422
W215	PSS	Jurisdictional	In-channel wetland direct nexus—abutting Clear Creek	1,103	0.025
W216	PSS	Jurisdictional	In-channel wetland direct nexus—abutting Clear Creek	9,512	0.219
W220	PSS	Jurisdictional	Depressional feature in Sand Creek floodplain—overland nexus to Clear Creek	1,086	0.025
W230	PSS	Jurisdictional	In-channel wetland direct nexus—abutting South Platte River	245	0.006
W231	PSS	Jurisdictional	In-channel wetland direct nexus—abutting South Platte River	2,767	0.064
W232	PSS	Jurisdictional	In-channel wetland direct nexus—abutting South Platte River	732	0.017
W233	PSS	Jurisdictional	In-channel wetland direct nexus—abutting South Platte River	1,029	0.024
W300	PEM	Non-jurisdictional	Roadside swale—associated with highway construction and runoff	56,694	1.302
W320	PEM	Jurisdictional	In-channel wetland direct nexus—within Clear Creek floodplain	15,883	0.365
W330	PEM	Non-jurisdictional	Roadside swale—associated with highway construction and runoff	3,071	0.070
W340	PEM	Non-jurisdictional	Roadside swale—associated with highway construction and runoff	1,320	0.030
W401	PEM	Non-jurisdictional	Roadside swale—associated with highway construction and runoff	2,902	0.067
W410	PEM	Non-jurisdictional	Roadside swale—associated with highway construction and runoff	2,728	0.063
W420	PEM	Non-jurisdictional	Roadside swale—associated with highway construction and runoff	19,732	0.453
W430	PEM	Non-jurisdictional	Roadside swale—associated with highway construction and runoff	4,259	0.098
W440	PEM	Non-jurisdictional	Roadside swale—associated with highway construction and runoff	333	0.008
W450	PEM	Non-jurisdictional	Roadside swale—associated with highway construction and runoff	3,179	0.073
			Subtotal Jurisdictional	319,857	7.346
			Subtotal Non-jurisdictional	123,967	2.847
			Total	443,824	10.193

Table 4-2. Summary of Delineated Wetlands

Wetland Name	Cowardin Class	Presumed Jurisdiction [a]	Comment/Significant Nexus	Area	
				Square Feet	Acres

Source: Jacobs

[a] Jurisdictional status will be determined by USACE during Section 404 permitting, this table assumes use of the NWPR as a basis for determining jurisdictional status.

Table 4-3. Summary of Delineated Other Waters

Feature Name	Feature Type (Cowardin Class) [a]	Presumed Jurisdiction [a]	Approx. OHWM Width (feet)	Comment/Presumed Connectivity	Area	
					Square Feet	Acres
OW001 (Sand Creek)	R3AB	Jurisdictional	80	Sand Creek	65,855	1.512
OW025 (Sand Creek)	R3AB	Jurisdictional	60	Sand Creek	25,683	0.590
OW027 (Sand Creek)	R3AB	Jurisdictional	55	Sand Creek	2,243	0.051
OW030	R3RB	Jurisdictional	5	Unnamed intermittent stream, natural bottom, tributary and direct nexus with Sand Creek	516	0.012
OW050 (Sand Creek)	R3AB	Jurisdictional	100	Sand Creek	54,500	1.251
OW150 (O'Brien Ditch)	R3RB	Non-jurisdictional	50	O'Brien Ditch	21,247	0.488
OW195	L2AB	Jurisdictional	40	Gravel pit—associated with infrastructure construction	4,345	0.100
OW215 (Clear Creek)	R3AB	Jurisdictional	80	Clear Creek	60,202	1.382
OW230 (South Platte River)	R3AB	Jurisdictional	110	South Platte River	46,607	1.070
OW310	R6	Non-jurisdictional	3	Constructed stormwater swale—natural bottom	131	0.003
				Subtotal Jurisdictional	259,951	5.968
				Subtotal Non-jurisdictional	21,378	0.491
				Total	281,329	6.459

Source: Jacobs

[a] Jurisdictional status will be determined by USACE during Section 404 permitting, this table assumes use of the NWPR as a basis for determining jurisdictional status.

4.3 FACWet

The wetland areas are grouped into AAs in order 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 typically includes the study area and a 25-meter buffer; however, for this project the AOI is limited to the project designated study area because the study area serves the

same purpose as the AOI; maps of each AA are provided with the data forms in Appendix D. FACWet scores were recorded as Functional Capacity Indexes (FCIs). FCI score values are interpreted as noted in Table 4-4.

Table 4-4. 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 AAs 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	AA no longer possesses the basic criteria necessary to support wetland conditions.

Source: Johnson et al. 2013

Wetlands have been grouped into 10 AAs, according to hydrogeomorphic class, associated water body, and proximity. The FACWet data sheets are presented in Appendix D. The stressors and scores are summarized in Table 4-5.

Table 4-5. Stressors and FCI Scores

AA ID	Associated Surface Water	Wetland Identification	Stressor Discussion	FCI Score
AA-CC-1	Artificial wetlands adjacent to Clear Creek	W195, W200, W205, W210	Urban/commercial/industrial setting, situated under I-270 overpass, adjacent to I-270/Interstate 76 (I-76) interchange and Clear Creek bike path and park. Listed impacts confine and contribute to stress of AA.	0.69
AA-CC-2	Clear Creek	W215, W216, W220, W320	Urban/commercial/industrial setting, situated under I-270 overpass, adjacent to I-270/I-76 interchange and Clear Creek bike path and park. Listed impacts confine and contribute to stress of AA.	0.75
AA-I-1	Runoff from highway and associated infrastructure	W401	Urban/commercial/industrial setting, adjacent to, created by, and confined by I-270.	0.65
AA-1-2	Runoff from highway and associated infrastructure	W300, W330, W340, W410, W420, W430, W440, W450	Urban/commercial/industrial setting, adjacent to, created by, and confined between major transportation corridors.	0.66
AA-1-3	Runoff from highway and associated infrastructure	W070	Urban/commercial/industrial setting, adjacent to, created by, and confined by I-270.	0.65
AA-SP-1	South Platte River	W230, W231, W232, W233	Urban/commercial/industrial setting, situated under I-270 overpass, adjacent to Colorado Front Range bike path and park. Downstream of water treatment facility. Listed impacts confine and contribute to stress of AA.	0.75
AA-SC-1	Sand Creek	W100	Urban/commercial/industrial setting, adjacent to, created by, and confined by I-270.	0.75
AA-SC-2	Sand Creek	W050, W051, W052, W053	Urban/commercial/industrial setting, situated under HWY-85 overpass, adjacent to I-270 and Colorado Front Range bike path and park land. Listed impacts confine and contribute to stress of AA.	0.75
AA-SC-3	Sand Creek	W001, W002, W003, W020, W023, W025, W027, W028, W030, W031, W032	Urban/commercial/industrial setting, adjacent to I-270 and Colorado Front Range bike path and park land. Listed impacts confine and contribute to stress of AA.	0.75
AA-SC-4	Artificial wetlands adjacent to Sand Creek	W010	Wetland created by enhancements in stormwater basin. Adjacent to and stressed by highway and shopping center.	0.69

Source: Jacobs

5.0 Aquatic Resource Impacts

This project will result in permanent and temporary impacts to wetlands and other waters (such as unvegetated stream channels and ponds). This report discusses all impacts to wetlands and other waters, regardless of USACE jurisdictional status, because CDOT policy requires that all wetland impacts be replaced at a one-to-one ratio.

Impacts to aquatic resources were quantified with ArcGIS software by overlaying the conceptual project design onto the boundaries of delineated aquatic resources and calculating the intersecting wetland areas with the proposed construction activities. This involved using the proposed cut and fill lines as construction well as access and staging areas to establish the limits of disturbed area for impacts. Impacts to aquatic resources delineated within the study area are summarized in Appendix E.

5.1 No Action Alternative

The transportation projects that would occur under the No Action Alternative likely would have minor impacts to aquatic resources, but these impacts are undeterminable.

5.2 Proposed Action

The following project design and construction elements of the proposed action may result in permanent or temporary impacts to wetlands and other waters:

- Roadway widening and associated roadway embankment to accommodate the following:
  - Two additional highway travel lanes
  - An auxiliary lane between York Street and Vasquez Boulevard
  - Roadway shoulder widening
- Replacement of Vasquez Boulevard Bridge over Sand Creek
- New bridge piers on I-270 bridge over South Platte River
- Drainage and water quality ponds in vicinity of I-76 interchange
- Drainage outlet scour protection on Sand Creek
- Construction access and staging

Based on preliminary design concepts, permanent wetland impacts resulting from this project are anticipated to be approximately 122,000 square feet (2.803 acres). Temporary wetland impacts are anticipated to be approximately 22,700 square feet (0.525 acre) (Table 5-1). Permanent impacts to other waters are anticipated to be approximately 2,000 square feet (0.048 acre). Temporary impacts to other waters are anticipated to be approximately 55,000 square feet (1.264 acres) (Table 5-2).

Permanent impacts to presumed jurisdictional waters of the U.S. are anticipated to be 0.301 acre of wetland and 0.048 acre of other waters, for a total of 0.349 acre (12% of the project's total wetland and other waters permanent impacts), while temporary impacts to presumed jurisdictional waters of the U.S. are anticipated to be 0.517 acre of wetlands and 1.264 acres of other waters, for a total of 1.781 acres (99% of the project's total wetland and other waters temporary impacts). These impacts, which will be refined as project design progresses, are the result of likely grading needed to accommodate the widened highway, as well as related infrastructure such as bridges, culverts, and utilities (Appendix C).

Table 5-1. Summary of Wetland Impacts

Associated Surface Water	Cowardin Classification	Temporary Impacts (acres)	Permanent Impacts (acres)	Assumed Jurisdictional Status [a]
Clear Creek	PEM and PSS	0.00	0.250	Jurisdictional
Clear Creek	PEM	0.00	0.180	Non-jurisdictional
Sand Creek	PEM and PSS	0.504	0.007	Jurisdictional
South Platte River	PSS	0.013	0.044	Jurisdictional
Stormwater Wetlands [b]	PEM	0.008	2.322	Non-jurisdictional
Total	**NA**	**0.525**	**2.803**	**NA**

Source: Jacobs

[a] Jurisdictional status is assumed according to conditions in the field and review of maps and aerial imagery. Only USACE has the authority to determine what is jurisdictional. The jurisdictional status is based on NWPR.

[b] Stormwater Wetlands includes stormwater-related wetland features such as roadside ditches and water quality facilities.

NA = not applicable

Table 5-2. Summary of Other Waters Impacts

Associated Surface Water	Temporary Impacts (acres)	Permanent Impacts (acres)	Assumed Jurisdictional Status [a]
Sand Creek	1.251	0.010	Jurisdictional
South Platte River	0.013	0.038	Jurisdictional
Total	**1.264**	**0.048**	**NA**

Source: Jacobs

[a] Jurisdictional status is assumed according to conditions in the field and review of maps and aerial imagery. Only USACE has the authority to determine what is jurisdictional. The jurisdictional status is based on NWPR.

NA = not applicable

5.3 Indirect Effects

Indirect effects are caused by the project but are separated from direct effects by time or distance. Indirect wetland effects could include increased potential for noxious weeds to become established after construction activities occur. Indirect wetland impacts also could include increased stormwater runoff from the widened road leading to sedimentation and changed hydrology to both onsite and offsite wetlands and other waters. A project-specific stormwater management plan will be developed to include best management practices that will minimize or avoid potential indirect wetland effects.

6.0 Wetland Avoidance, Minimization, and Mitigation

6.1 Avoidance and Minimization Measures

This project will be designed to avoid and minimize impacts. As project design is refined, project biologists and designers will work together to avoid and minimize impacts to wetlands and surface waters by reducing and refining the project footprint where possible. Proposed staging areas will also be situated to avoid impacting wetlands and surface waters. A project-specific stormwater management plan will be developed to address the potential for construction-related soil erosion and sedimentation. Construction fencing or other visual barriers will be installed to protect against the possibility of incidental construction-related impacts.

6.2 Mitigation of Permanent Wetland Impacts

Per Section 404 of the Clean Water Act, impacts to wetlands must be avoided, minimized to the extent practicable, and mitigated when impacts are unavoidable. CDOT policy requires all wetland impacts to be mitigated, regardless of jurisdiction at a 1:1 ratio. All mitigation plans for the impacted existing wetlands within the study area will be developed in coordination with CDOT biologists and in accordance with CDOT and FHWA mitigation policy. Mitigation for impacts to jurisdictional wetlands will be subject to compliance with Section 404 permit conditions and standards. Mitigation for non-jurisdictional wetlands will be held to similar standards and monitoring protocol but may support roadside water quality as a primary function and purpose.

Jacobs and CDOT biologists evaluated the study area for the potential for onsite mitigation for permanent impacts to wetlands. Several preliminary wetland mitigation concepts have been developed to mitigate unavoidable wetland loss. Wetland mitigation may involve a combination of one or more of the onsite wetland mitigation concepts but may also involve the purchase of wetland bank credits. The preliminary onsite mitigation concepts are summarized in Appendix F.

6.3 Mitigation of Indirect and Temporary Wetland Impacts

The project will mitigate for temporary impacts by restoring areas to pre-existing conditions, including the revegetation of wetlands, which will be detailed in a landscape or mitigation specific plan set. As appropriate, the revegetation plans for restoration of temporary impacts will include considerations for soil conditions, hydrology, and surface elevations to ensure full restoration of the affected resource. Revegetation will include reseeding temporarily impacted wetlands with a native wetland seed mix, planting willow stakes or other native plant material, or otherwise use a combination of revegetation methods based on site conditions as appropriate for the specific location. The project may further minimize temporary impacts, and restoration effort, by preserving and covering wetlands that need to be crossed but are not otherwise filled or excavated. This may be accomplished by trimming shrubs to the ground (rather than grubbing, excavating, or removing the root mass), then covering soil and trimmed vegetation in the access areas with wetland tracking pads made from layers of weed-free straw and geotextile. Where excavation in wetlands must occur, wetland topsoil will be salvaged and stockpiled for restoration wherever possible (Table 6-1).

The spread of noxious weeds will be minimized by reseeding with native species those upland and wetland areas that are disturbed by construction, in accordance with Sections 207, 212, and 217 of the CDOT Standard Specifications. Noxious weed spread will also be minimized by implementing the project's noxious weed management plan.

Table 6-1. Mitigation Commitments

Activity Triggering Mitigation	Location of Activity	Impact	Mitigation Commitment	Responsible Branch	Timing/Phase That Mitigation Will Be Implemented
Construction/ excavation activities	Throughout the study area	Ground disturbance impacting wetlands and surface waters	During final design, avoid and minimize impacts to wetlands and surface waters by reducing and refining the project footprint where possible.	CDOT Engineering and Environmental	Preconstruction

Table 6-1. Mitigation Commitments

Activity Triggering Mitigation	Location of Activity	Impact	Mitigation Commitment	Responsible Branch	Timing/Phase That Mitigation Will Be Implemented
Construction/ excavation activities	Throughout the study area	Potential for direct and/or indirect impacts wetlands and other Waters of the United States	Mitigate for temporary impacts by restoring areas to pre-existing conditions. Depending on approval by the USACE, permanent impacts will be mitigated through onsite mitigation, offsite mitigation, purchase of wetland bank credits, or use of a separate strategy, to both jurisdictional and non-jurisdictional wetlands at a minimum of a 1:1 ratio.	CDOT Engineering and Environmental	Pre-construction/ Construction
Construction/ excavation activities	Throughout the study area	Potential for direct and/or indirect impacts wetlands and other Waters of the United States	Equipment shall be refueled within a designated refueling containment area away from wetlands. The refueling containment area shall be located greater than 100 horizontal feet away from wetlands and other sensitive environmental areas.	CDOT Engineering and Environmental	Construction
Construction/ excavation activities	Throughout the study area	Potential for direct and/or indirect impacts wetlands and other Waters of the United States	Construction fencing and appropriate sediment control BMPs will be used to mark wetland boundaries and sensitive habitats during construction.	CDOT Engineering and Environmental	Construction
Construction/ excavation activities	Throughout the study area	Potential for direct and/or indirect impacts wetlands and other Waters of the United States	Seed and mulch disturbance areas adjacent to wetlands to reduce erosion and promote revegetation; plant supplemental vegetation as needed.	CDOT Engineering and Environmental	Construction
Construction/ excavation activities	Throughout the study area	Potential for direct and/or indirect impacts wetlands and other Waters of the United States	Work occurring in and near wetlands during construction activities will be monitored to ensure protection of wetlands.	CDOT Engineering and Environmental	Construction
Construction/ excavation activities	Throughout the study area	Potential for direct and/or indirect impacts wetlands and other Waters of the United States	Prohibit construction equipment from entering the OHWM except where identified on design plans.	CDOT Engineering and Environmental	Pre-construction/ Construction
Construction/ excavation activities	Throughout the study area	Potential for direct and/or indirect impacts wetlands and	Closely monitor construction activities to ensure that additional fill is not placed within the OHMW.	CDOT Engineering and Environmental	Construction

Table 6-1. Mitigation Commitments

Activity Triggering Mitigation	Location of Activity	Impact	Mitigation Commitment	Responsible Branch	Timing/Phase That Mitigation Will Be Implemented
		other Waters of the United States			
Construction/ excavation activities	Throughout the study area	Potential for direct and/or indirect impacts wetlands and other Waters of the United States	Use timber mats or geotextile/straw to minimize temporary impacts to wetlands from construction equipment traversing wetland areas.	CDOT Engineering and Environmental	Construction
Construction/ excavation activities	Throughout the study area	Potential for direct and/or indirect impacts wetlands and other Waters of the United States	Locate construction staging and materials stockpiling at least 50 feet from the edge of wetlands or open water, when possible. No staging will be allowed in wetlands.	CDOT Engineering and Environmental	Construction
Construction/ excavation activities	Throughout the study area	Potential for direct and/or indirect impacts wetlands and other Waters of the United States	Ensure BMPs and containment structures are in place for work conducted within and adjacent to the OHWM and mapped wetlands to prevent concrete washout and other potential pollutants from reaching open water and wetlands.	CDOT Engineering and Environmental	Construction
Construction/ excavation activities	Throughout the study area	Ground disturbance promoting noxious weed growth	Follow Sections 207, 212, and 217 of the CDOT Standard Specifications to avoid and minimize potential for noxious weed spread.	CDOT Engineering and Environmental	Pre-construction/ Construction

Source: Jacobs

6.4 Section 404 Permitting

A Section 404 permit will be required for this project. It is anticipated that a series of Nationwide Permits (NWPs) will be used to permit the proposed work (less than 0.50 acre of total permanent impacts to waters of the U.S.), including but not limited to NWP 14 for linear transportation projects and NWP 3 for maintenance (repair, rehabilitation, or replacement) of serviceable structures. Each NWP will constitute a separate and complete action, per the USACE definition. The project is located within the USACE Omaha District. Each district must permit project activities within their respective jurisdictional boundaries. Coordination with USACE is ongoing.

7.0 References

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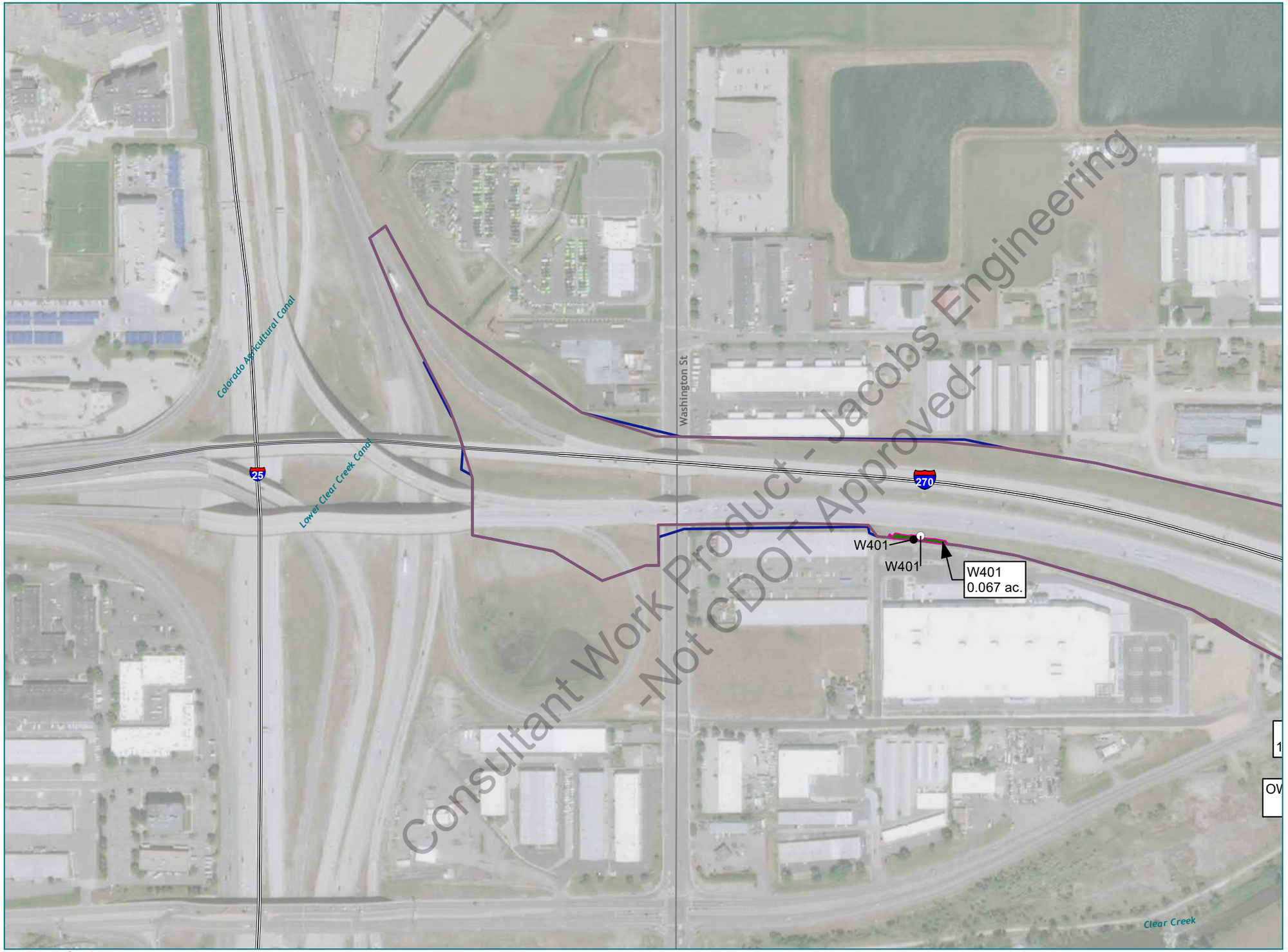
Appendix A
Wetland Delineation Map Book



I-270 ENVIRONMENTAL ASSESSMENT WETLAND DELINEATION MAPBOOK

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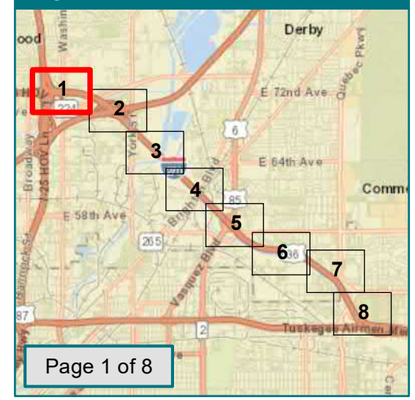

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Source: ESRI and its data partners

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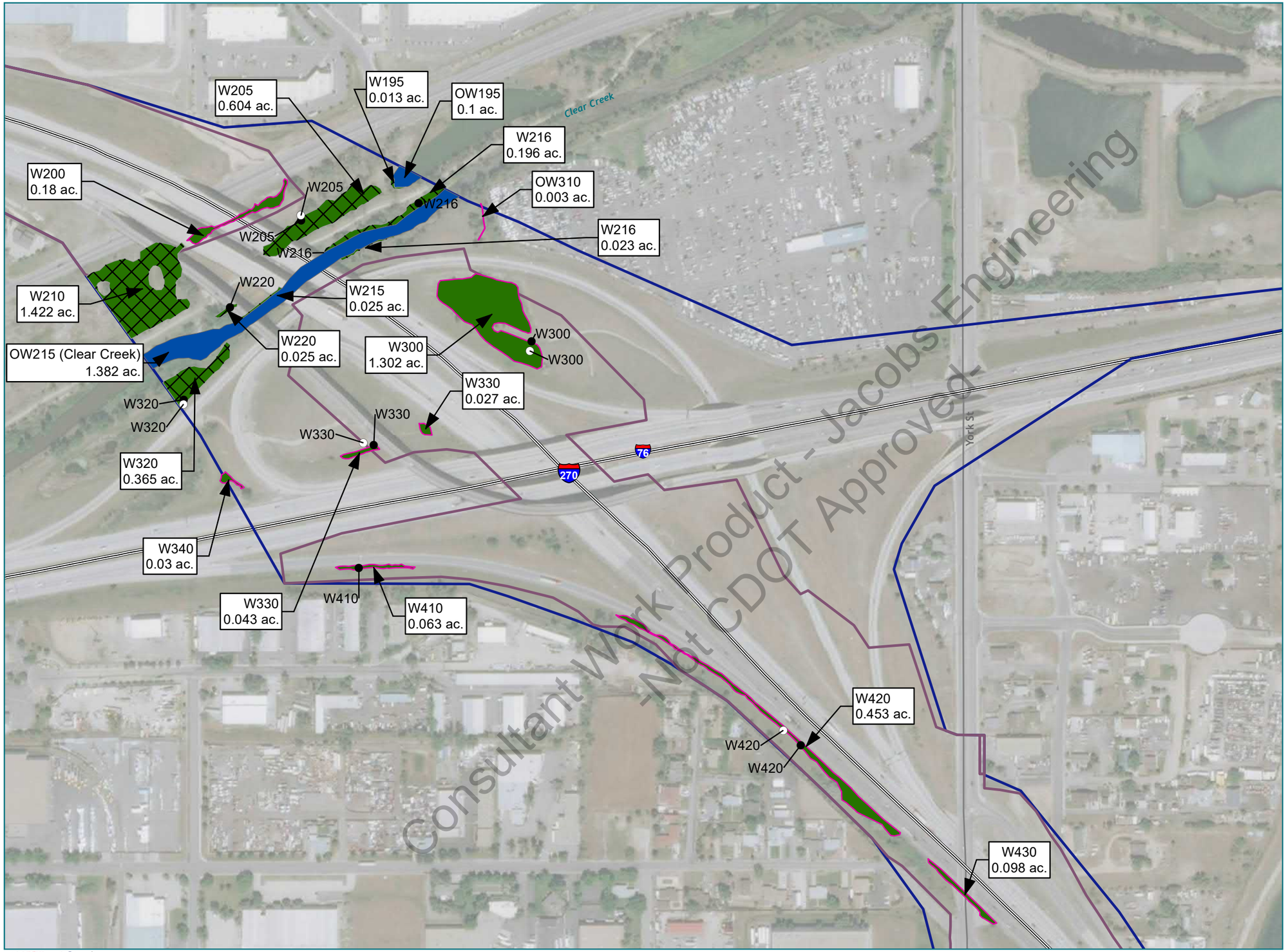

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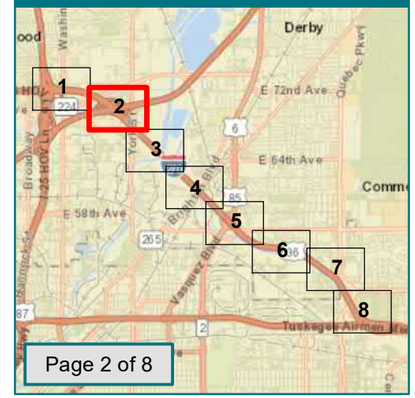

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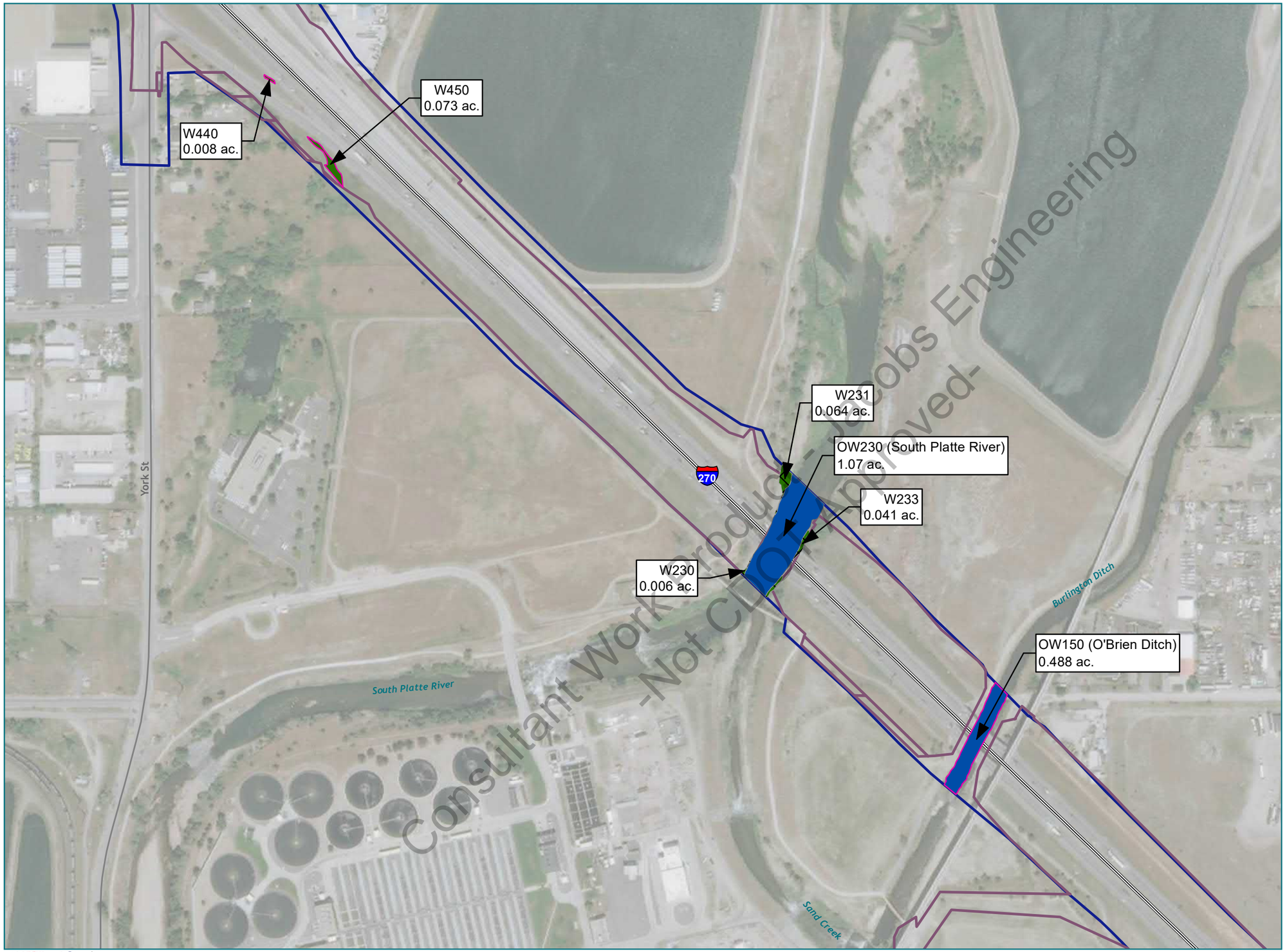

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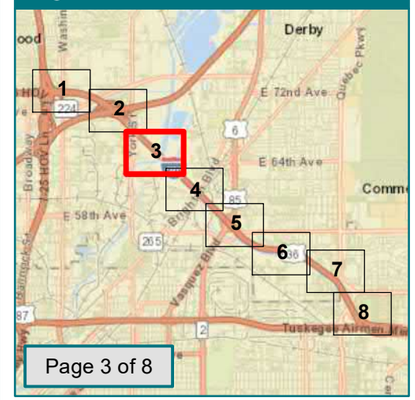

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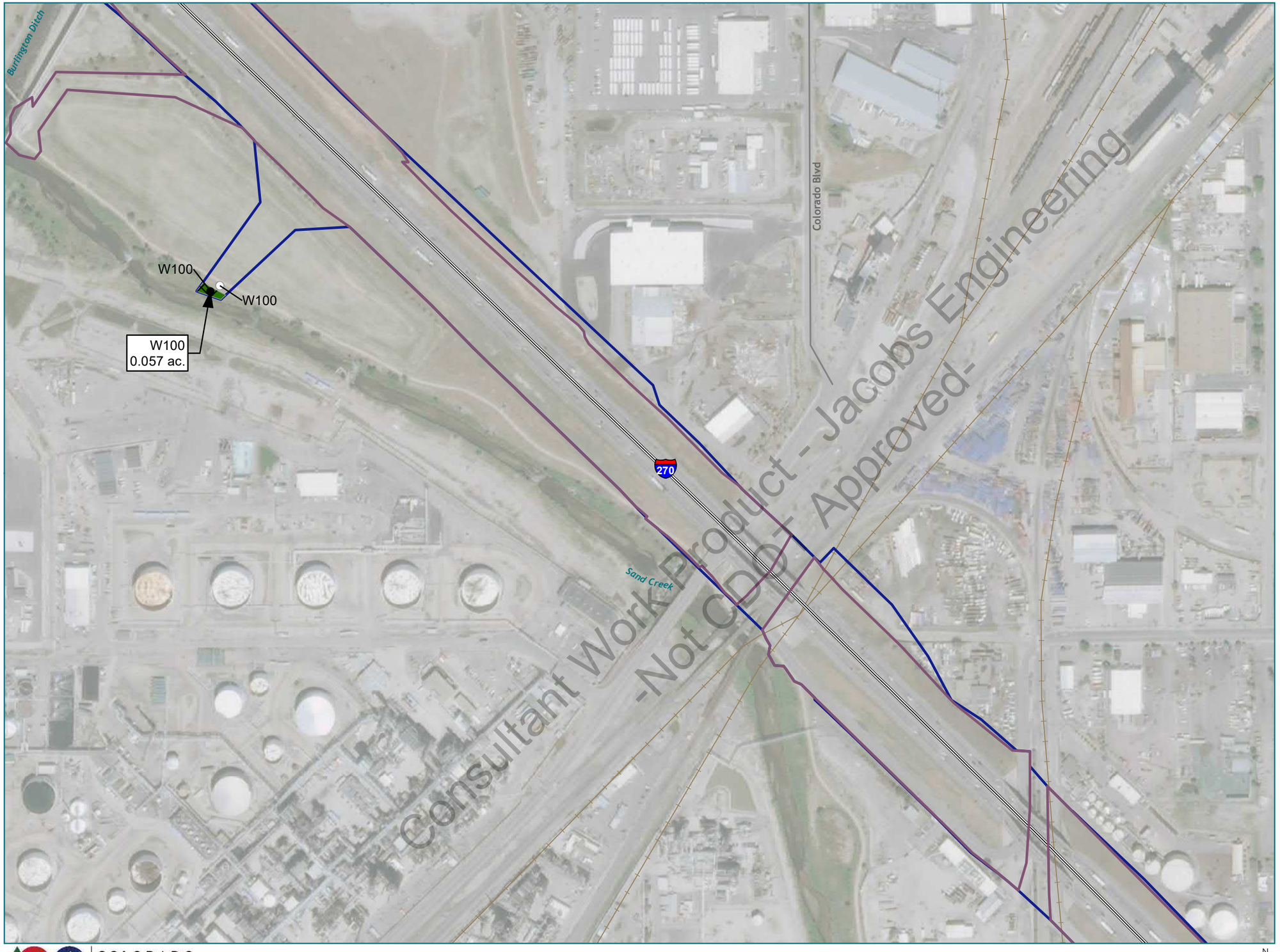

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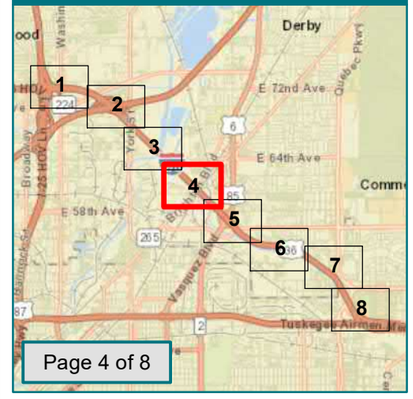

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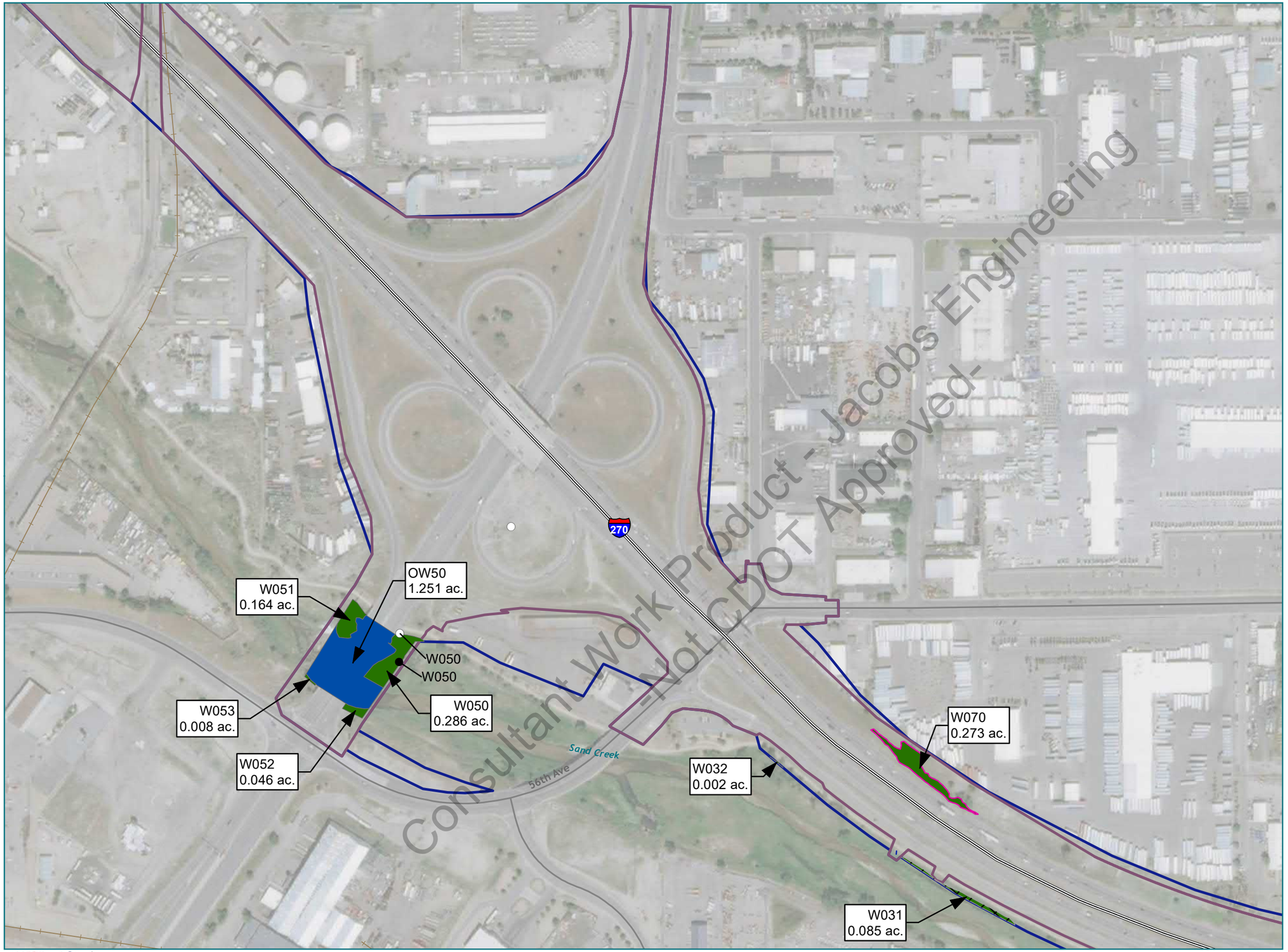

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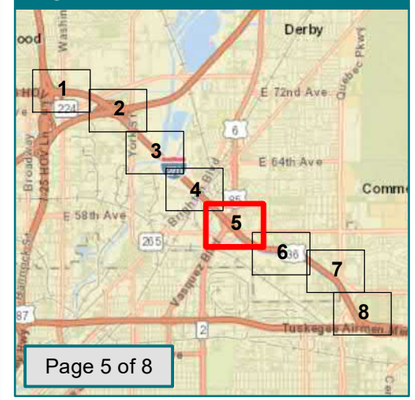

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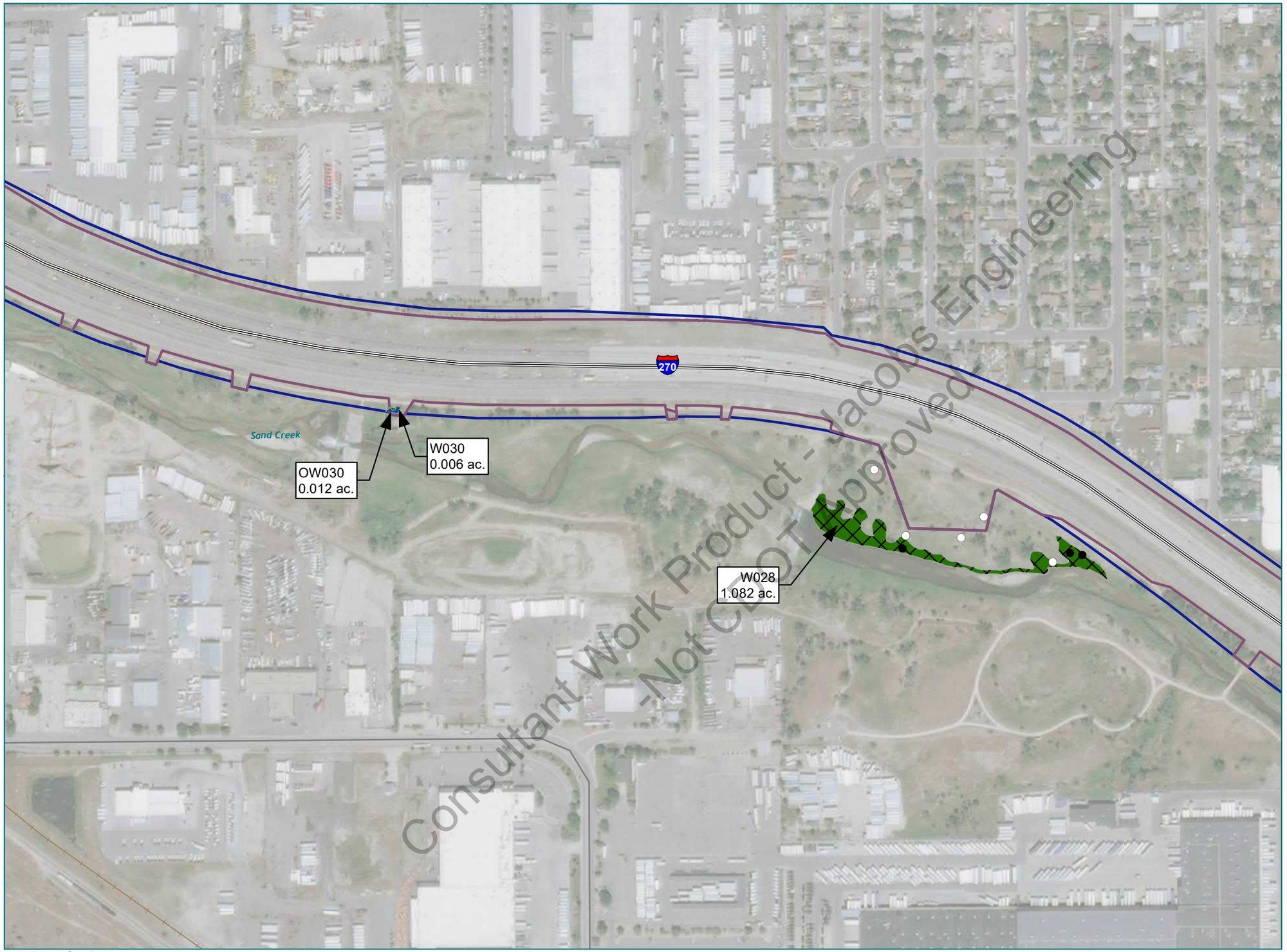

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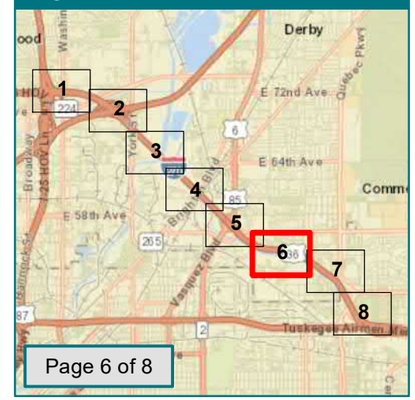

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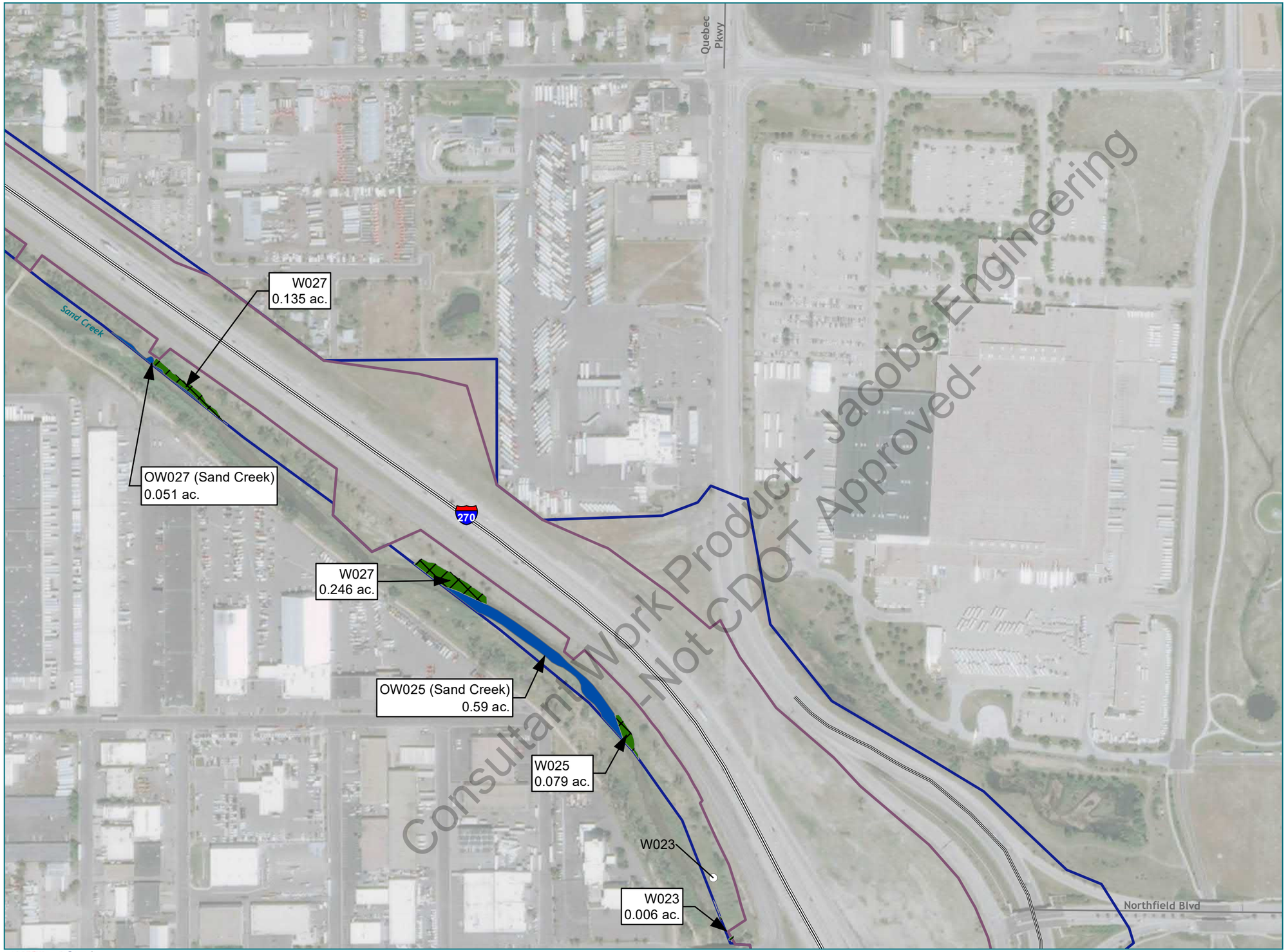

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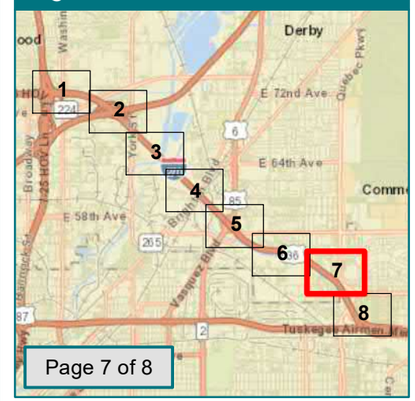

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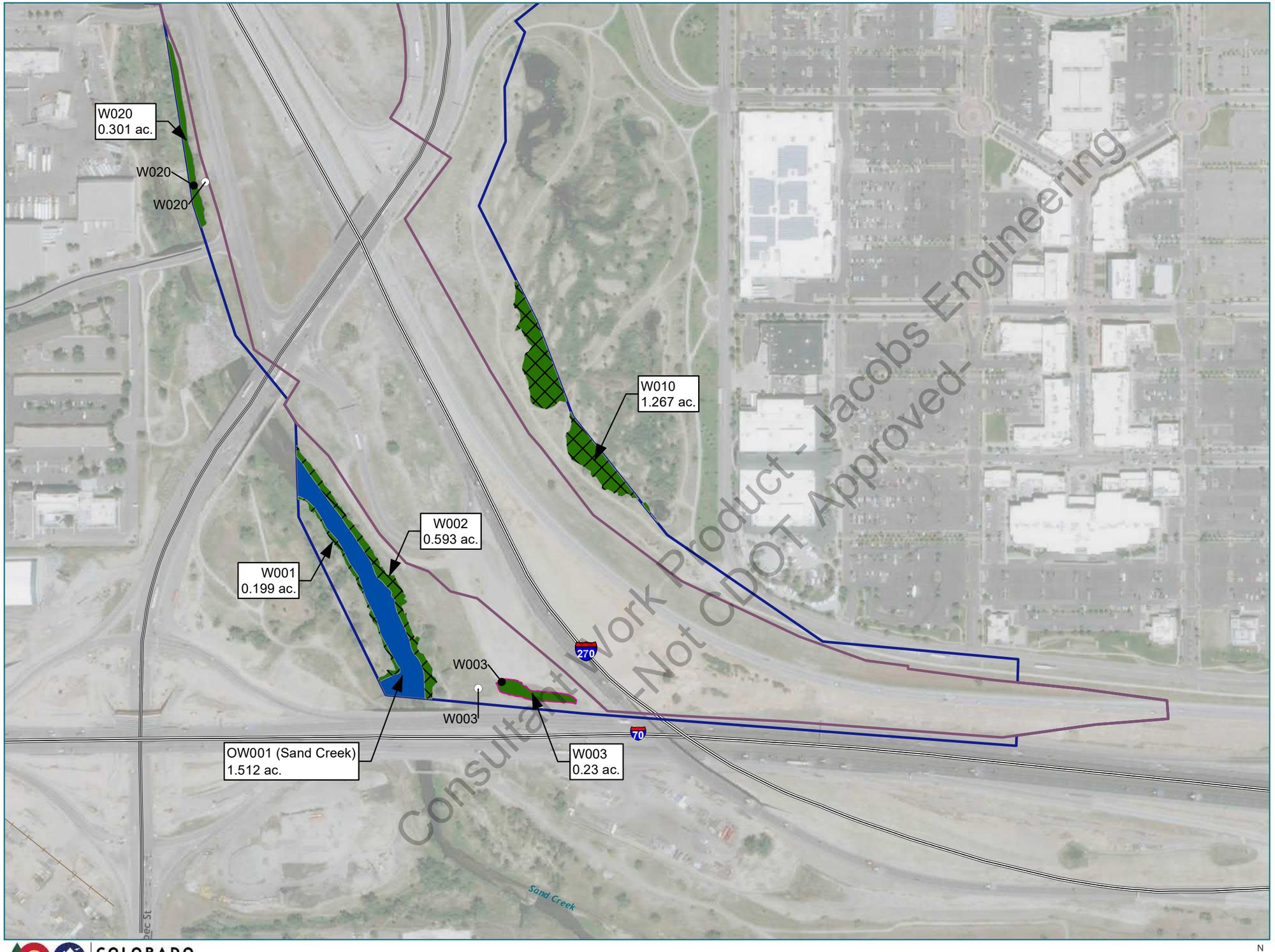

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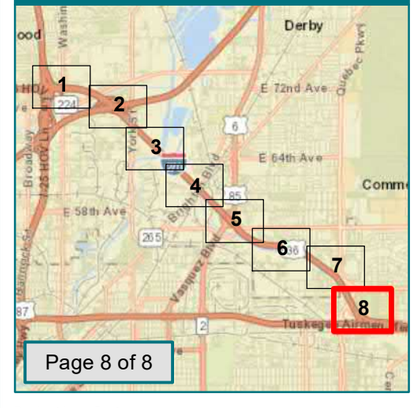
- Wetland, PSS, Jurisdictional

Regional Locator



Page 8 of 8

Projection: Custom
Lambert Conformal Conic
North American Datum 1983 (2011)

Source: ESRI and its data partners

COLORADO
Department of Transportation

0 2 4 Miles

N

I-270 Corridor Improvements

PATH: \\DC1VS01\GISPROJ\C\CDOT\I_270\MAPFILES\ENVIRO\WETLANDS\WUS_MAPBOOK_20210316.MXD - USER: BARNEYPG - DATE: 6/23/2021

Appendix B
Wetland Delineation Data Sheets

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: I-270 City/County: Adams Sampling Date: 6/09/20

Applicant/Owner: Colorado Department of Transportation State: Colorado Sampling Point: W003 upl

Investigator(s): Brett Hartmann, Pat Hickey Section, Township, Range: S21 T3S R67W

Landform (hillslope, terrace, etc.): swale Local relief (concave, convex, none): Convex Slope (%): 5

Subregion (LRR): LRR G Lat: 39.77877 Long: -104.8987 Datum:

Soil Map Unit Name: NOTCOM NWI classification: None

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 X, 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:

Swale had 2" of standing water at time of inspection due to heavy rains over the past 12 hours.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ = Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	10 = Total Cover		
Herb Stratum (Plot size: 10' x 10')			
1. Bromus japonicus	5	N	NL
2. Sporobolus airoides	70	Y	FAC
3. Hordeum jubatum	5	N	FACW
4. Bouteloua dactyloides	2	N	FACU
5. Lactuca serriola	1	N	FAC
6. Convolvulus arvensis	1	N	NL
7. Rumex crispus	1	N	FAC
8. Cultivated rye-grass, erosion control	10	Y	NL
9.			
10.			
	95 = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum 5

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: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	____	x 1 =	____
FACW species	5	x 2 =	10
FAC species	72	x 3 =	216
FACU species	2	x 4 =	8
UPL species	16	x 5 =	80
Column Totals:	95 (A)		314 (B)

Prevalence Index = B/A = 3.3

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 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 ____ No X

Remarks:

SOIL

Sampling Point: W003 upl

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 3/2	100						
2 - 12"	10 YR 4/3	100						

[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)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR F**)
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

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

no redox

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

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

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

Saturation Present? (includes capillary fringe) Yes X No _____ Depth (inches): 0

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

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

Remarks:

Standing water due to soil compaction and heavy rain events.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: I-270 City/County: Adams Sampling Date: 6/09/20

Applicant/Owner: Colorado Department of Transportation State: Colorado Sampling Point: W003 upl

Investigator(s): Brett Hartmann, Pat Hickey Section, Township, Range: S21 T3S R67W

Landform (hillslope, terrace, etc.): swale Local relief (concave, convex, none): Convex Slope (%): 5

Subregion (LRR): LRR G Lat: 39.77877 Long: -104.8987 Datum:

Soil Map Unit Name: NOTCOM NWI classification: None

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 X, 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:

Swale had 2" of standing water at time of inspection due to heavy rains over the past 12 hours.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	10 = Total Cover		
Herb Stratum (Plot size: 10' x 10')			
1. Bromus japonicus	5	N	NL
2. Sporobolus airoides	70	Y	FAC
3. Hordeum jubatum	5	N	FACW
4. Bouteloua dactyloides	2	N	FACU
5. Lactuca serriola	1	N	FAC
6. Convolvulus arvensis	1	N	NL
7. Rumex crispus	1	N	FAC
8. Cultivated rye-grass, erosion control	10	Y	NL
9.			
10.			
	95 = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum 5

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: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species	5	x 2 =	10
FAC species	72	x 3 =	216
FACU species	2	x 4 =	8
UPL species	16	x 5 =	80
Column Totals:	95 (A)		314 (B)

Prevalence Index = B/A = 3.3

Hydrophytic Vegetation Indicators:

X 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 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:

SOIL

Sampling Point: W003 upl

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 3/2	100						
2 - 12"	10 YR 4/3	100						

[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)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR F**)
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- X Sandy Gleyed Matrix (S4)
- X Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

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

no redox

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

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

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

Saturation Present? (includes capillary fringe) Yes X No _____ Depth (inches): 0

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

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

Remarks:

Standing water due to soil compaction and heavy rain events.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: I-270 City/County: Adams Sampling Date: 6/09/20

Applicant/Owner: Colorado Department of Transportation State: Colorado Sampling Point: W003 upl

Investigator(s): Brett Hartmann, Pat Hickey Section, Township, Range: S21 T3S R67W

Landform (hillslope, terrace, etc.): swale Local relief (concave, convex, none): Convex Slope (%): 5

Subregion (LRR): LRR G Lat: 39.77877 Long: -104.8987 Datum:

Soil Map Unit Name: NOTCOM NWI classification: None

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 X, 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:

Swale had 2" of standing water at time of inspection due to heavy rains over the past 12 hours.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
	____ = Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	10 = Total Cover		
Herb Stratum (Plot size: 10' x 10')			
1. Bromus japonicus	5	N	NL
2. Sporobolus airoides	70	Y	FAC
3. Hordeum jubatum	5	N	FACW
4. Bouteloua dactyloides	2	N	FACU
5. Lactuca serriola	1	N	FAC
6. Convolvulus arvensis	1	N	NL
7. Rumex crispus	1	N	FAC
8. Cultivated rye-grass, erosion control	10	Y	NL
9.			
10.			
	95 = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum 5

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: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	____	x 1 =	____
FACW species	5	x 2 =	10
FAC species	72	x 3 =	216
FACU species	2	x 4 =	8
UPL species	16	x 5 =	80
Column Totals:	95 (A)		314 (B)

Prevalence Index = B/A = 3.3

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 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 ____ No X

Remarks:

SOIL

Sampling Point: W003 upl

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 3/2	100						
2 - 12"	10 YR 4/3	100						

[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)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR F**)
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

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

no redox

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

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

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

Saturation Present? (includes capillary fringe) Yes X No _____ Depth (inches): 0

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

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

Remarks:

Standing water due to soil compaction and heavy rain events.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: I-270 City/County: Adams Sampling Date: 6/09/20

Applicant/Owner: Colorado Department of Transportation State: Colorado Sampling Point: W003 upl

Investigator(s): Brett Hartmann, Pat Hickey Section, Township, Range: S21 T3S R67W

Landform (hillslope, terrace, etc.): swale Local relief (concave, convex, none): Convex Slope (%): 5

Subregion (LRR): LRR G Lat: 39.77877 Long: -104.8987 Datum:

Soil Map Unit Name: NOTCOM NWI classification: None

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 X, 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:

Swale had 2" of standing water at time of inspection due to heavy rains over the past 12 hours.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	10 = Total Cover		
Herb Stratum (Plot size: 10' x 10')			
1. Bromus japonicus	5	N	NL
2. Sporobolus airoides	70	Y	FAC
3. Hordeum jubatum	5	N	FACW
4. Bouteloua dactyloides	2	N	FACU
5. Lactuca serriola	1	N	FAC
6. Convolvulus arvensis	1	N	NL
7. Rumex crispus	1	N	FAC
8. Cultivated rye-grass, erosion control	10	Y	NL
9.			
10.			
	95 = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum 5

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: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species	5	x 2 =	10
FAC species	72	x 3 =	216
FACU species	2	x 4 =	8
UPL species	16	x 5 =	80
Column Totals:	95 (A)		314 (B)

Prevalence Index = B/A = 3.3

Hydrophytic Vegetation Indicators:

X 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 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:

SOIL

Sampling Point: W003 upl

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 3/2	100						
2 - 12"	10 YR 4/3	100						

[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)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- X Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR F**)
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- X Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

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

no redox

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

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

Water Table Present? Yes X No ___ Depth (inches): -2

Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches): 0

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

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

Remarks:

Standing water due to soil compaction and heavy rain events.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: I-270 City/County: Adams Sampling Date: 6/09/20

Applicant/Owner: Colorado Department of Transportation State: Colorado Sampling Point: W003 upl

Investigator(s): Brett Hartmann, Pat Hickey Section, Township, Range: S21 T3S R67W

Landform (hillslope, terrace, etc.): swale Local relief (concave, convex, none): Convex Slope (%): 5

Subregion (LRR): LRR G Lat: 39.77877 Long: -104.8987 Datum:

Soil Map Unit Name: NOTCOM NWI classification: None

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 X, 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:

Swale had 2" of standing water at time of inspection due to heavy rains over the past 12 hours.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
	____ = Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	10 = Total Cover		
Herb Stratum (Plot size: 10' x 10')			
1. Bromus japonicus	5	N	NL
2. Sporobolus airoides	70	Y	FAC
3. Hordeum jubatum	5	N	FACW
4. Bouteloua dactyloides	2	N	FACU
5. Lactuca serriola	1	N	FAC
6. Convolvulus arvensis	1	N	NL
7. Rumex crispus	1	N	FAC
8. Cultivated rye-grass, erosion control	10	Y	NL
9.			
10.			
	95 = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum 5

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: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	____	x 1 =	____
FACW species	5	x 2 =	10
FAC species	72	x 3 =	216
FACU species	2	x 4 =	8
UPL species	16	x 5 =	80
Column Totals:	95 (A)		314 (B)

Prevalence Index = B/A = 3.3

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 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 ____ No X

Remarks:

SOIL

Sampling Point: W003 upl

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 3/2	100						
2 - 12"	10 YR 4/3	100						

[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)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR F**)
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

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

no redox

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

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

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

Saturation Present? (includes capillary fringe) Yes X No _____ Depth (inches): 0

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

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

Remarks:

Standing water due to soil compaction and heavy rain events.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: I-270 City/County: Adams Sampling Date: 6/09/20

Applicant/Owner: Colorado Department of Transportation State: Colorado Sampling Point: W003 upl

Investigator(s): Brett Hartmann, Pat Hickey Section, Township, Range: S21 T3S R67W

Landform (hillslope, terrace, etc.): swale Local relief (concave, convex, none): Convex Slope (%): 5

Subregion (LRR): LRR G Lat: 39.77877 Long: -104.8987 Datum:

Soil Map Unit Name: NOTCOM NWI classification: None

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 X, 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:

Swale had 2" of standing water at time of inspection due to heavy rains over the past 12 hours.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	10 = Total Cover		
Herb Stratum (Plot size: 10' x 10')			
1. Bromus japonicus	5	N	NL
2. Sporobolus airoides	70	Y	FAC
3. Hordeum jubatum	5	N	FACW
4. Bouteloua dactyloides	2	N	FACU
5. Lactuca serriola	1	N	FAC
6. Convolvulus arvensis	1	N	NL
7. Rumex crispus	1	N	FAC
8. Cultivated rye-grass, erosion control	10	Y	NL
9.			
10.			
	95 = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum 5

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: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species	5	x 2 =	10
FAC species	72	x 3 =	216
FACU species	2	x 4 =	8
UPL species	16	x 5 =	80
Column Totals:	95 (A)		314 (B)

Prevalence Index = B/A = 3.3

Hydrophytic Vegetation Indicators:

X 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 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:

SOIL

Sampling Point: W003 upl

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 3/2	100						
2 - 12"	10 YR 4/3	100						

[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)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR F**)
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- X Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

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

no redox

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

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

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

Saturation Present? (includes capillary fringe) Yes X No _____ Depth (inches): 0

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

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

Remarks:

Standing water due to soil compaction and heavy rain events.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: I-270 City/County: Adams Sampling Date: 6/09/20

Applicant/Owner: Colorado Department of Transportation State: Colorado Sampling Point: W003 upl

Investigator(s): Brett Hartmann, Pat Hickey Section, Township, Range: S21 T3S R67W

Landform (hillslope, terrace, etc.): swale Local relief (concave, convex, none): Convex Slope (%): 5

Subregion (LRR): LRR G Lat: 39.77877 Long: -104.8987 Datum:

Soil Map Unit Name: NOTCOM NWI classification: None

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 X, 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:

Swale had 2" of standing water at time of inspection due to heavy rains over the past 12 hours.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
	____ = Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	10 = Total Cover		
Herb Stratum (Plot size: 10' x 10')			
1. Bromus japonicus	5	N	NL
2. Sporobolus airoides	70	Y	FAC
3. Hordeum jubatum	5	N	FACW
4. Bouteloua dactyloides	2	N	FACU
5. Lactuca serriola	1	N	FAC
6. Convolvulus arvensis	1	N	NL
7. Rumex crispus	1	N	FAC
8. Cultivated rye-grass, erosion control	10	Y	NL
9.			
10.			
	95 = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum 5

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: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	____	x 1 =	____
FACW species	5	x 2 =	10
FAC species	72	x 3 =	216
FACU species	2	x 4 =	8
UPL species	16	x 5 =	80
Column Totals:	95 (A)		314 (B)

Prevalence Index = B/A = 3.3

Hydrophytic Vegetation Indicators:

X 1 - Rapid Test for Hydrophytic Vegetation

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 ____ No X

Remarks:

SOIL

Sampling Point: W003 upl

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 3/2	100						
2 - 12"	10 YR 4/3	100						

[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)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR F**)
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

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

no redox

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

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

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

Saturation Present? (includes capillary fringe) Yes X No _____ Depth (inches): 0

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

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

Remarks:

Standing water due to soil compaction and heavy rain events.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: I-270 City/County: Adams Sampling Date: 6/09/20

Applicant/Owner: Colorado Department of Transportation State: Colorado Sampling Point: W003 upl

Investigator(s): Brett Hartmann, Pat Hickey Section, Township, Range: S21 T3S R67W

Landform (hillslope, terrace, etc.): swale Local relief (concave, convex, none): Convex Slope (%): 5

Subregion (LRR): LRR G Lat: 39.77877 Long: -104.8987 Datum:

Soil Map Unit Name: NOTCOM NWI classification: None

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 X, 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:

Swale had 2" of standing water at time of inspection due to heavy rains over the past 12 hours.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	10 = Total Cover		
Herb Stratum (Plot size: 10' x 10')			
1. Bromus japonicus	5	N	NL
2. Sporobolus airoides	70	Y	FAC
3. Hordeum jubatum	5	N	FACW
4. Bouteloua dactyloides	2	N	FACU
5. Lactuca serriola	1	N	FAC
6. Convolvulus arvensis	1	N	NL
7. Rumex crispus	1	N	FAC
8. Cultivated rye-grass, erosion control	10	Y	NL
9.			
10.			
	95 = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum 5

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: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species	5	x 2 =	10
FAC species	72	x 3 =	216
FACU species	2	x 4 =	8
UPL species	16	x 5 =	80
Column Totals:	95 (A)		314 (B)

Prevalence Index = B/A = 3.3

Hydrophytic Vegetation Indicators:

X 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 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:

SOIL

Sampling Point: W003 upl

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 3/2	100						
2 - 12"	10 YR 4/3	100						

[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)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR F**)
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- X 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

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

no redox

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

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

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

Saturation Present? (includes capillary fringe) Yes X No _____ Depth (inches): 0

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

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

Remarks:

Standing water due to soil compaction and heavy rain events.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: I-270 City/County: Adams Sampling Date: 6/09/20

Applicant/Owner: Colorado Department of Transportation State: Colorado Sampling Point: W003 upl

Investigator(s): Brett Hartmann, Pat Hickey Section, Township, Range: S21 T3S R67W

Landform (hillslope, terrace, etc.): swale Local relief (concave, convex, none): Convex Slope (%): 5

Subregion (LRR): LRR G Lat: 39.77877 Long: -104.8987 Datum:

Soil Map Unit Name: NOTCOM NWI classification: None

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 X, 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:

Swale had 2" of standing water at time of inspection due to heavy rains over the past 12 hours.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
	____ = Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	10 = Total Cover		
Herb Stratum (Plot size: 10' x 10')			
1. Bromus japonicus	5	N	NL
2. Sporobolus airoides	70	Y	FAC
3. Hordeum jubatum	5	N	FACW
4. Bouteloua dactyloides	2	N	FACU
5. Lactuca serriola	1	N	FAC
6. Convolvulus arvensis	1	N	NL
7. Rumex crispus	1	N	FAC
8. Cultivated rye-grass, erosion control	10	Y	NL
9.			
10.			
	95 = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum 5

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: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	____	x 1 =	____
FACW species	5	x 2 =	10
FAC species	72	x 3 =	216
FACU species	2	x 4 =	8
UPL species	16	x 5 =	80
Column Totals:	95 (A)		314 (B)

Prevalence Index = B/A = 3.3

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 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 ____ No X

Remarks:

SOIL

Sampling Point: W003 upl

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 3/2	100						
2 - 12"	10 YR 4/3	100						

[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)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR F**)
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

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

no redox

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

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

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

Saturation Present? (includes capillary fringe) Yes X No _____ Depth (inches): 0

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

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

Remarks:

Standing water due to soil compaction and heavy rain events.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: I-270 City/County: Adams Sampling Date: 6/09/20

Applicant/Owner: Colorado Department of Transportation State: Colorado Sampling Point: W003 upl

Investigator(s): Brett Hartmann, Pat Hickey Section, Township, Range: S21 T3S R67W

Landform (hillslope, terrace, etc.): swale Local relief (concave, convex, none): Convex Slope (%): 5

Subregion (LRR): LRR G Lat: 39.77877 Long: -104.8987 Datum:

Soil Map Unit Name: NOTCOM NWI classification: None

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 X, 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:

Swale had 2" of standing water at time of inspection due to heavy rains over the past 12 hours.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	10 = Total Cover		
Herb Stratum (Plot size: 10' x 10')			
1. Bromus japonicus	5	N	NL
2. Sporobolus airoides	70	Y	FAC
3. Hordeum jubatum	5	N	FACW
4. Bouteloua dactyloides	2	N	FACU
5. Lactuca serriola	1	N	FAC
6. Convolvulus arvensis	1	N	NL
7. Rumex crispus	1	N	FAC
8. Cultivated rye-grass, erosion control	10	Y	NL
9.			
10.			
	95 = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum 5

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: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species	5	x 2 =	10
FAC species	72	x 3 =	216
FACU species	2	x 4 =	8
UPL species	16	x 5 =	80
Column Totals:	95 (A)		314 (B)

Prevalence Index = B/A = 3.3

Hydrophytic Vegetation Indicators:

X 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 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:

SOIL

Sampling Point: W003 upl

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 3/2	100						
2 - 12"	10 YR 4/3	100						

[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)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR F**)
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ Sandy Gleyed Matrix (S4)
- X Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

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

no redox

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

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

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

Saturation Present? (includes capillary fringe) Yes X No _____ Depth (inches): 0

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

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

Remarks:

Standing water due to soil compaction and heavy rain events.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: I-270 City/County: Adams Sampling Date: 6/09/20

Applicant/Owner: Colorado Department of Transportation State: Colorado Sampling Point: W003 upl

Investigator(s): Brett Hartmann, Pat Hickey Section, Township, Range: S21 T3S R67W

Landform (hillslope, terrace, etc.): swale Local relief (concave, convex, none): Convex Slope (%): 5

Subregion (LRR): LRR G Lat: 39.77877 Long: -104.8987 Datum:

Soil Map Unit Name: NOTCOM NWI classification: None

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 X, 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:

Swale had 2" of standing water at time of inspection due to heavy rains over the past 12 hours.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
	____ = Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	10 = Total Cover		
Herb Stratum (Plot size: 10' x 10')			
1. Bromus japonicus	5	N	NL
2. Sporobolus airoides	70	Y	FAC
3. Hordeum jubatum	5	N	FACW
4. Bouteloua dactyloides	2	N	FACU
5. Lactuca serriola	1	N	FAC
6. Convolvulus arvensis	1	N	NL
7. Rumex crispus	1	N	FAC
8. Cultivated rye-grass, erosion control	10	Y	NL
9.			
10.			
	95 = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum 5

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: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	____	x 1 =	____
FACW species	5	x 2 =	10
FAC species	72	x 3 =	216
FACU species	2	x 4 =	8
UPL species	16	x 5 =	80
Column Totals:	95 (A)		314 (B)

Prevalence Index = B/A = 3.3

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 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 ____ No X

Remarks:

SOIL

Sampling Point: W003 upl

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 3/2	100						
2 - 12"	10 YR 4/3	100						

[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)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR F**)
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

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

no redox

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

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

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

Saturation Present? (includes capillary fringe) Yes X No _____ Depth (inches): 0

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

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

Remarks:

Standing water due to soil compaction and heavy rain events.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: I-270 City/County: Adams Sampling Date: 6/09/20

Applicant/Owner: Colorado Department of Transportation State: Colorado Sampling Point: W003 upl

Investigator(s): Brett Hartmann, Pat Hickey Section, Township, Range: S21 T3S R67W

Landform (hillslope, terrace, etc.): swale Local relief (concave, convex, none): Convex Slope (%): 5

Subregion (LRR): LRR G Lat: 39.77877 Long: -104.8987 Datum:

Soil Map Unit Name: NOTCOM NWI classification: None

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 X, 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:

Swale had 2" of standing water at time of inspection due to heavy rains over the past 12 hours.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ = Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	10 = Total Cover		
Herb Stratum (Plot size: 10' x 10')			
1. Bromus japonicus	5	N	NL
2. Sporobolus airoides	70	Y	FAC
3. Hordeum jubatum	5	N	FACW
4. Bouteloua dactyloides	2	N	FACU
5. Lactuca serriola	1	N	FAC
6. Convolvulus arvensis	1	N	NL
7. Rumex crispus	1	N	FAC
8. Cultivated rye-grass, erosion control	10	Y	NL
9.			
10.			
	95 = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum 5

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: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	____	x 1 =	____
FACW species	5	x 2 =	10
FAC species	72	x 3 =	216
FACU species	2	x 4 =	8
UPL species	16	x 5 =	80
Column Totals:	95 (A)		314 (B)

Prevalence Index = B/A = 3.3

Hydrophytic Vegetation Indicators:

X 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 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:

SOIL

Sampling Point: W003 upl

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 3/2	100						
2 - 12"	10 YR 4/3	100						

[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)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR F**)
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- X 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

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

no redox

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

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

Water Table Present? Yes X No ___ Depth (inches): -2

Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches): 0

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

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

Remarks:

Standing water due to soil compaction and heavy rain events.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: I-270 City/County: Adams Sampling Date: 6/09/20

Applicant/Owner: Colorado Department of Transportation State: Colorado Sampling Point: W003 upl

Investigator(s): Brett Hartmann, Pat Hickey Section, Township, Range: S21 T3S R67W

Landform (hillslope, terrace, etc.): swale Local relief (concave, convex, none): Convex Slope (%): 5

Subregion (LRR): LRR G Lat: 39.77877 Long: -104.8987 Datum:

Soil Map Unit Name: NOTCOM NWI classification: None

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 X, 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:

Swale had 2" of standing water at time of inspection due to heavy rains over the past 12 hours.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
	____ = Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	10 = Total Cover		
Herb Stratum (Plot size: 10' x 10')			
1. Bromus japonicus	5	N	NL
2. Sporobolus airoides	70	Y	FAC
3. Hordeum jubatum	5	N	FACW
4. Bouteloua dactyloides	2	N	FACU
5. Lactuca serriola	1	N	FAC
6. Convolvulus arvensis	1	N	NL
7. Rumex crispus	1	N	FAC
8. Cultivated rye-grass, erosion control	10	Y	NL
9.			
10.			
	95 = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum 5

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: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	____	x 1 =	____
FACW species	5	x 2 =	10
FAC species	72	x 3 =	216
FACU species	2	x 4 =	8
UPL species	16	x 5 =	80
Column Totals:	95 (A)		314 (B)

Prevalence Index = B/A = 3.3

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 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 ____ No X

Remarks:

SOIL

Sampling Point: W003 upl

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 3/2	100						
2 - 12"	10 YR 4/3	100						

[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)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR F**)
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

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

no redox

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

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

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

Saturation Present? (includes capillary fringe) Yes X No _____ Depth (inches): 0

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

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

Remarks:

Standing water due to soil compaction and heavy rain events.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: I-270 City/County: Adams Sampling Date: 6/09/20

Applicant/Owner: Colorado Department of Transportation State: Colorado Sampling Point: W003 upl

Investigator(s): Brett Hartmann, Pat Hickey Section, Township, Range: S21 T3S R67W

Landform (hillslope, terrace, etc.): swale Local relief (concave, convex, none): Convex Slope (%): 5

Subregion (LRR): LRR G Lat: 39.77877 Long: -104.8987 Datum:

Soil Map Unit Name: NOTCOM NWI classification: None

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 X, 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:

Swale had 2" of standing water at time of inspection due to heavy rains over the past 12 hours.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ = Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	10 = Total Cover		
Herb Stratum (Plot size: 10' x 10')			
1. Bromus japonicus	5	N	NL
2. Sporobolus airoides	70	Y	FAC
3. Hordeum jubatum	5	N	FACW
4. Bouteloua dactyloides	2	N	FACU
5. Lactuca serriola	1	N	FAC
6. Convolvulus arvensis	1	N	NL
7. Rumex crispus	1	N	FAC
8. Cultivated rye-grass, erosion control	10	Y	NL
9.			
10.			
	95 = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum 5

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: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	____	x 1 =	____
FACW species	5	x 2 =	10
FAC species	72	x 3 =	216
FACU species	2	x 4 =	8
UPL species	16	x 5 =	80
Column Totals:	95 (A)		314 (B)

Prevalence Index = B/A = 3.3

Hydrophytic Vegetation Indicators:

X 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 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:

SOIL

Sampling Point: W003 upl

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 3/2	100						
2 - 12"	10 YR 4/3	100						

[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)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR F**)
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

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

no redox

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

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

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

Saturation Present? (includes capillary fringe) Yes X No _____ Depth (inches): 0

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

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

Remarks:

Standing water due to soil compaction and heavy rain events.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: I-270 City/County: Adams Sampling Date: 6/09/20

Applicant/Owner: Colorado Department of Transportation State: Colorado Sampling Point: W003 upl

Investigator(s): Brett Hartmann, Pat Hickey Section, Township, Range: S21 T3S R67W

Landform (hillslope, terrace, etc.): swale Local relief (concave, convex, none): Convex Slope (%): 5

Subregion (LRR): LRR G Lat: 39.77877 Long: -104.8987 Datum:

Soil Map Unit Name: NOTCOM NWI classification: None

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 X, 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:

Swale had 2" of standing water at time of inspection due to heavy rains over the past 12 hours.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
	____ = Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	10 = Total Cover		
Herb Stratum (Plot size: 10' x 10')			
1. Bromus japonicus	5	N	NL
2. Sporobolus airoides	70	Y	FAC
3. Hordeum jubatum	5	N	FACW
4. Bouteloua dactyloides	2	N	FACU
5. Lactuca serriola	1	N	FAC
6. Convolvulus arvensis	1	N	NL
7. Rumex crispus	1	N	FAC
8. Cultivated rye-grass, erosion control	10	Y	NL
9.			
10.			
	95 = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum 5

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: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	____	x 1 =	____
FACW species	5	x 2 =	10
FAC species	72	x 3 =	216
FACU species	2	x 4 =	8
UPL species	16	x 5 =	80
Column Totals:	95 (A)		314 (B)

Prevalence Index = B/A = 3.3

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 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 ____ No X

Remarks:

SOIL

Sampling Point: W003 upl

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 3/2	100						
2 - 12"	10 YR 4/3	100						

[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)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR F**)
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

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

no redox

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

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

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

Saturation Present? (includes capillary fringe) Yes X No _____ Depth (inches): 0

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

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

Remarks:

Standing water due to soil compaction and heavy rain events.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: I-270 City/County: Adams Sampling Date: 6/09/20

Applicant/Owner: Colorado Department of Transportation State: Colorado Sampling Point: W003 upl

Investigator(s): Brett Hartmann, Pat Hickey Section, Township, Range: S21 T3S R67W

Landform (hillslope, terrace, etc.): swale Local relief (concave, convex, none): Convex Slope (%): 5

Subregion (LRR): LRR G Lat: 39.77877 Long: -104.8987 Datum:

Soil Map Unit Name: NOTCOM NWI classification: None

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 X, 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:

Swale had 2" of standing water at time of inspection due to heavy rains over the past 12 hours.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ = Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	10 = Total Cover		
Herb Stratum (Plot size: 10' x 10')			
1. Bromus japonicus	5	N	NL
2. Sporobolus airoides	70	Y	FAC
3. Hordeum jubatum	5	N	FACW
4. Bouteloua dactyloides	2	N	FACU
5. Lactuca serriola	1	N	FAC
6. Convolvulus arvensis	1	N	NL
7. Rumex crispus	1	N	FAC
8. Cultivated rye-grass, erosion control	10	Y	NL
9.			
10.			
	95 = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum 5

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: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	____	x 1 =	____
FACW species	5	x 2 =	10
FAC species	72	x 3 =	216
FACU species	2	x 4 =	8
UPL species	16	x 5 =	80
Column Totals:	95 (A)		314 (B)

Prevalence Index = B/A = 3.3

Hydrophytic Vegetation Indicators:

X 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 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:

SOIL

Sampling Point: W003 upl

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 3/2	100						
2 - 12"	10 YR 4/3	100						

[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)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- X Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR F**)
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- X Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

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

no redox

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

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

Water Table Present? Yes X No ___ Depth (inches): -2

Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches): 0

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

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

Remarks:

Standing water due to soil compaction and heavy rain events.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: I-270 City/County: Adams Sampling Date: 6/09/20

Applicant/Owner: Colorado Department of Transportation State: Colorado Sampling Point: W003 upl

Investigator(s): Brett Hartmann, Pat Hickey Section, Township, Range: S21 T3S R67W

Landform (hillslope, terrace, etc.): swale Local relief (concave, convex, none): Convex Slope (%): 5

Subregion (LRR): LRR G Lat: 39.77877 Long: -104.8987 Datum:

Soil Map Unit Name: NOTCOM NWI classification: None

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 X, 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:

Swale had 2" of standing water at time of inspection due to heavy rains over the past 12 hours.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
	____ = Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	10 = Total Cover		
Herb Stratum (Plot size: 10' x 10')			
1. Bromus japonicus	5	N	NL
2. Sporobolus airoides	70	Y	FAC
3. Hordeum jubatum	5	N	FACW
4. Bouteloua dactyloides	2	N	FACU
5. Lactuca serriola	1	N	FAC
6. Convolvulus arvensis	1	N	NL
7. Rumex crispus	1	N	FAC
8. Cultivated rye-grass, erosion control	10	Y	NL
9.			
10.			
	95 = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum 5

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: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	____	x 1 =	____
FACW species	5	x 2 =	10
FAC species	72	x 3 =	216
FACU species	2	x 4 =	8
UPL species	16	x 5 =	80
Column Totals:	95 (A)		314 (B)

Prevalence Index = B/A = 3.3

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 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 ____ No X

Remarks:

SOIL

Sampling Point: W003 upl

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 3/2	100						
2 - 12"	10 YR 4/3	100						

[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)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR F**)
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

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

no redox

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

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

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

Saturation Present? (includes capillary fringe) Yes X No _____ Depth (inches): 0

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

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

Remarks:

Standing water due to soil compaction and heavy rain events.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: I-270 City/County: Adams Sampling Date: 6/09/20

Applicant/Owner: Colorado Department of Transportation State: Colorado Sampling Point: W003 upl

Investigator(s): Brett Hartmann, Pat Hickey Section, Township, Range: S21 T3S R67W

Landform (hillslope, terrace, etc.): swale Local relief (concave, convex, none): Convex Slope (%): 5

Subregion (LRR): LRR G Lat: 39.77877 Long: -104.8987 Datum:

Soil Map Unit Name: NOTCOM NWI classification: None

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 X, 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:

Swale had 2" of standing water at time of inspection due to heavy rains over the past 12 hours.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ = Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	10 = Total Cover		
Herb Stratum (Plot size: 10' x 10')			
1. Bromus japonicus	5	N	NL
2. Sporobolus airoides	70	Y	FAC
3. Hordeum jubatum	5	N	FACW
4. Bouteloua dactyloides	2	N	FACU
5. Lactuca serriola	1	N	FAC
6. Convolvulus arvensis	1	N	NL
7. Rumex crispus	1	N	FAC
8. Cultivated rye-grass, erosion control	10	Y	NL
9.			
10.			
	95 = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum 5

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: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	____	x 1 =	____
FACW species	5	x 2 =	10
FAC species	72	x 3 =	216
FACU species	2	x 4 =	8
UPL species	16	x 5 =	80
Column Totals:	95 (A)		314 (B)

Prevalence Index = B/A = 3.3

Hydrophytic Vegetation Indicators:

X 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 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:

SOIL

Sampling Point: W003 upl

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 3/2	100						
2 - 12"	10 YR 4/3	100						

[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)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR F**)
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ Sandy Gleyed Matrix (S4)
- X Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

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

no redox

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

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

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

Saturation Present? (includes capillary fringe) Yes X No _____ Depth (inches): 0

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

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

Remarks:

Standing water due to soil compaction and heavy rain events.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: I-270 City/County: Adams Sampling Date: 6/09/20

Applicant/Owner: Colorado Department of Transportation State: Colorado Sampling Point: W003 upl

Investigator(s): Brett Hartmann, Pat Hickey Section, Township, Range: S21 T3S R67W

Landform (hillslope, terrace, etc.): swale Local relief (concave, convex, none): Convex Slope (%): 5

Subregion (LRR): LRR G Lat: 39.77877 Long: -104.8987 Datum:

Soil Map Unit Name: NOTCOM NWI classification: None

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 X, 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:

Swale had 2" of standing water at time of inspection due to heavy rains over the past 12 hours.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
	____ = Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	10 = Total Cover		
Herb Stratum (Plot size: 10' x 10')			
1. Bromus japonicus	5	N	NL
2. Sporobolus airoides	70	Y	FAC
3. Hordeum jubatum	5	N	FACW
4. Bouteloua dactyloides	2	N	FACU
5. Lactuca serriola	1	N	FAC
6. Convolvulus arvensis	1	N	NL
7. Rumex crispus	1	N	FAC
8. Cultivated rye-grass, erosion control	10	Y	NL
9.			
10.			
	95 = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum 5

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: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	____	x 1 =	____
FACW species	5	x 2 =	10
FAC species	72	x 3 =	216
FACU species	2	x 4 =	8
UPL species	16	x 5 =	80
Column Totals:	95 (A)		314 (B)

Prevalence Index = B/A = 3.3

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 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 ____ No X

Remarks:

SOIL

Sampling Point: W003 upl

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 3/2	100						
2 - 12"	10 YR 4/3	100						

[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)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR F**)
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

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

no redox

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

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

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

Saturation Present? (includes capillary fringe) Yes X No _____ Depth (inches): 0

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

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

Remarks:

Standing water due to soil compaction and heavy rain events.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: I-270 City/County: Adams Sampling Date: 6/09/20

Applicant/Owner: Colorado Department of Transportation State: Colorado Sampling Point: W003 upl

Investigator(s): Brett Hartmann, Pat Hickey Section, Township, Range: S21 T3S R67W

Landform (hillslope, terrace, etc.): swale Local relief (concave, convex, none): Convex Slope (%): 5

Subregion (LRR): LRR G Lat: 39.77877 Long: -104.8987 Datum:

Soil Map Unit Name: NOTCOM NWI classification: None

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 X, 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:

Swale had 2" of standing water at time of inspection due to heavy rains over the past 12 hours.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ = Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	10 = Total Cover		
Herb Stratum (Plot size: 10' x 10')			
1. Bromus japonicus	5	N	NL
2. Sporobolus airoides	70	Y	FAC
3. Hordeum jubatum	5	N	FACW
4. Bouteloua dactyloides	2	N	FACU
5. Lactuca serriola	1	N	FAC
6. Convolvulus arvensis	1	N	NL
7. Rumex crispus	1	N	FAC
8. Cultivated rye-grass, erosion control	10	Y	NL
9.			
10.			
	95 = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum 5

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: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	____	x 1 =	____
FACW species	5	x 2 =	10
FAC species	72	x 3 =	216
FACU species	2	x 4 =	8
UPL species	16	x 5 =	80
Column Totals:	95 (A)		314 (B)

Prevalence Index = B/A = 3.3

Hydrophytic Vegetation Indicators:

X 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 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:

SOIL

Sampling Point: W003 upl

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 3/2	100						
2 - 12"	10 YR 4/3	100						

[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)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR F**)
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

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

no redox

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

- X Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- X Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (**where tilled**)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)

Geomorphic Position (D2)

- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

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

Water Table Present? Yes X No ___ Depth (inches): -2

Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches): 0

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

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

Remarks:

Standing water due to soil compaction and heavy rain events.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: I-270 City/County: Adams Sampling Date: 6/09/20

Applicant/Owner: Colorado Department of Transportation State: Colorado Sampling Point: W003 upl

Investigator(s): Brett Hartmann, Pat Hickey Section, Township, Range: S21 T3S R67W

Landform (hillslope, terrace, etc.): swale Local relief (concave, convex, none): Convex Slope (%): 5

Subregion (LRR): LRR G Lat: 39.77877 Long: -104.8987 Datum:

Soil Map Unit Name: NOTCOM NWI classification: None

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 X, 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:

Swale had 2" of standing water at time of inspection due to heavy rains over the past 12 hours.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
	____ = Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	10 = Total Cover		
Herb Stratum (Plot size: 10' x 10')			
1. Bromus japonicus	5	N	NL
2. Sporobolus airoides	70	Y	FAC
3. Hordeum jubatum	5	N	FACW
4. Bouteloua dactyloides	2	N	FACU
5. Lactuca serriola	1	N	FAC
6. Convolvulus arvensis	1	N	NL
7. Rumex crispus	1	N	FAC
8. Cultivated rye-grass, erosion control	10	Y	NL
9.			
10.			
	95 = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum 5

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: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	____	x 1 =	____
FACW species	5	x 2 =	10
FAC species	72	x 3 =	216
FACU species	2	x 4 =	8
UPL species	16	x 5 =	80
Column Totals:	95 (A)		314 (B)

Prevalence Index = B/A = 3.3

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 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 ____ No X

Remarks:

SOIL

Sampling Point: W003 upl

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 3/2	100						
2 - 12"	10 YR 4/3	100						

[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)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR F**)
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

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

no redox

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

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

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

Saturation Present? (includes capillary fringe) Yes X No _____ Depth (inches): 0

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

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

Remarks:

Standing water due to soil compaction and heavy rain events.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: I-270 City/County: Adams Sampling Date: 6/09/20

Applicant/Owner: Colorado Department of Transportation State: Colorado Sampling Point: W003 upl

Investigator(s): Brett Hartmann, Pat Hickey Section, Township, Range: S21 T3S R67W

Landform (hillslope, terrace, etc.): swale Local relief (concave, convex, none): Convex Slope (%): 5

Subregion (LRR): LRR G Lat: 39.77877 Long: -104.8987 Datum:

Soil Map Unit Name: NOTCOM NWI classification: None

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 X, 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:

Swale had 2" of standing water at time of inspection due to heavy rains over the past 12 hours.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ = Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	10 = Total Cover		
Herb Stratum (Plot size: 10' x 10')			
1. Bromus japonicus	5	N	NL
2. Sporobolus airoides	70	Y	FAC
3. Hordeum jubatum	5	N	FACW
4. Bouteloua dactyloides	2	N	FACU
5. Lactuca serriola	1	N	FAC
6. Convolvulus arvensis	1	N	NL
7. Rumex crispus	1	N	FAC
8. Cultivated rye-grass, erosion control	10	Y	NL
9.			
10.			
	95 = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum 5

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: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	____	x 1 =	____
FACW species	5	x 2 =	10
FAC species	72	x 3 =	216
FACU species	2	x 4 =	8
UPL species	16	x 5 =	80
Column Totals:	95 (A)		314 (B)

Prevalence Index = B/A = 3.3

Hydrophytic Vegetation Indicators:

X 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 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:

SOIL

Sampling Point: W003 upl

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 3/2	100						
2 - 12"	10 YR 4/3	100						

[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)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR F**)
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

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

no redox

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

- X Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- X Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (**where tilled**)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)

Geomorphic Position (D2)

- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

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

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

Saturation Present? (includes capillary fringe) Yes X No _____ Depth (inches): 0

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

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

Remarks:

Standing water due to soil compaction and heavy rain events.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: I-270 City/County: Adams Sampling Date: 6/09/20

Applicant/Owner: Colorado Department of Transportation State: Colorado Sampling Point: W003 upl

Investigator(s): Brett Hartmann, Pat Hickey Section, Township, Range: S21 T3S R67W

Landform (hillslope, terrace, etc.): swale Local relief (concave, convex, none): Convex Slope (%): 5

Subregion (LRR): LRR G Lat: 39.77877 Long: -104.8987 Datum:

Soil Map Unit Name: NOTCOM NWI classification: None

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 X, 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:

Swale had 2" of standing water at time of inspection due to heavy rains over the past 12 hours.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
	____ = Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	10 = Total Cover		
Herb Stratum (Plot size: 10' x 10')			
1. Bromus japonicus	5	N	NL
2. Sporobolus airoides	70	Y	FAC
3. Hordeum jubatum	5	N	FACW
4. Bouteloua dactyloides	2	N	FACU
5. Lactuca serriola	1	N	FAC
6. Convolvulus arvensis	1	N	NL
7. Rumex crispus	1	N	FAC
8. Cultivated rye-grass, erosion control	10	Y	NL
9.			
10.			
	95 = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum 5

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: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	____	x 1 =	____
FACW species	5	x 2 =	10
FAC species	72	x 3 =	216
FACU species	2	x 4 =	8
UPL species	16	x 5 =	80
Column Totals:	95 (A)		314 (B)

Prevalence Index = B/A = 3.3

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 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 ____ No X

Remarks:

SOIL

Sampling Point: W003 upl

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 3/2	100						
2 - 12"	10 YR 4/3	100						

[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)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR F**)
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

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

no redox

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

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

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

Saturation Present? (includes capillary fringe) Yes X No _____ Depth (inches): 0

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

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

Remarks:

Standing water due to soil compaction and heavy rain events.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: I-270 City/County: Adams Sampling Date: 6/09/20

Applicant/Owner: Colorado Department of Transportation State: Colorado Sampling Point: W003 upl

Investigator(s): Brett Hartmann, Pat Hickey Section, Township, Range: S21 T3S R67W

Landform (hillslope, terrace, etc.): swale Local relief (concave, convex, none): Convex Slope (%): 5

Subregion (LRR): LRR G Lat: 39.77877 Long: -104.8987 Datum:

Soil Map Unit Name: NOTCOM NWI classification: None

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 X, 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:

Swale had 2" of standing water at time of inspection due to heavy rains over the past 12 hours.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ = Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	10 = Total Cover		
Herb Stratum (Plot size: 10' x 10')			
1. Bromus japonicus	5	N	NL
2. Sporobolus airoides	70	Y	FAC
3. Hordeum jubatum	5	N	FACW
4. Bouteloua dactyloides	2	N	FACU
5. Lactuca serriola	1	N	FAC
6. Convolvulus arvensis	1	N	NL
7. Rumex crispus	1	N	FAC
8. Cultivated rye-grass, erosion control	10	Y	NL
9.			
10.			
	95 = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum 5

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: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	____	x 1 =	____
FACW species	5	x 2 =	10
FAC species	72	x 3 =	216
FACU species	2	x 4 =	8
UPL species	16	x 5 =	80
Column Totals:	95 (A)		314 (B)

Prevalence Index = B/A = 3.3

Hydrophytic Vegetation Indicators:

X 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 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:

SOIL

Sampling Point: W003 upl

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 3/2	100						
2 - 12"	10 YR 4/3	100						

[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)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR F**)
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

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

no redox

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

- X Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- X Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (**where tilled**)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)

Geomorphic Position (D2)

- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

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

Water Table Present? Yes X No ___ Depth (inches): -2

Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches): 0

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

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

Remarks:

Standing water due to soil compaction and heavy rain events.

Appendix C
Photographic Log

W001 — View of W001. Looking north, from north end of feature

W001 — View of W001. Looking north, from south end of feature

W002 — View of W002, looking south east.

W003 — View of W003, looking southwest.

W010 — View of W010. Looking north, from middle of feature

W010 — View of W011. Looking east, from south end of feature


W020— View of W020, looking north.


W023 — View of W023, looking west.


W025 — View of W025, looking northwest.


W027 — View of W027, looking west.


W030 — View of W030, looking northeast.


W031 — View of W031, looking southeast.

W032 — View W032, looking southeast.

W050 — View of W050, looking southwest.

W051 - View of W051, looking sothwest.

W070 — View of W070, looking southeast.

W100 — View of W100, looking west.

W195/Gravel Pit — View of W195 and gravel pit, looking northwest.

W200 – View of W200, looking south.

W205 – View of W205, looking southwest.

W210 – View of W210, looking west

W216 — View of W216, looking southwest.

W230 — View of W230, looking northeast.

W231 — View of W231, looking southwest.


W232 — View of W232, looking southwest.


W300 — View of W300, looking northwest.


W320 — View of W320, looking southwest.


W330 — View of W330, looking west.


W330 — View of W330, looking east.


W340 — View of W340, looking south.

W401 — View of W401, looking west.

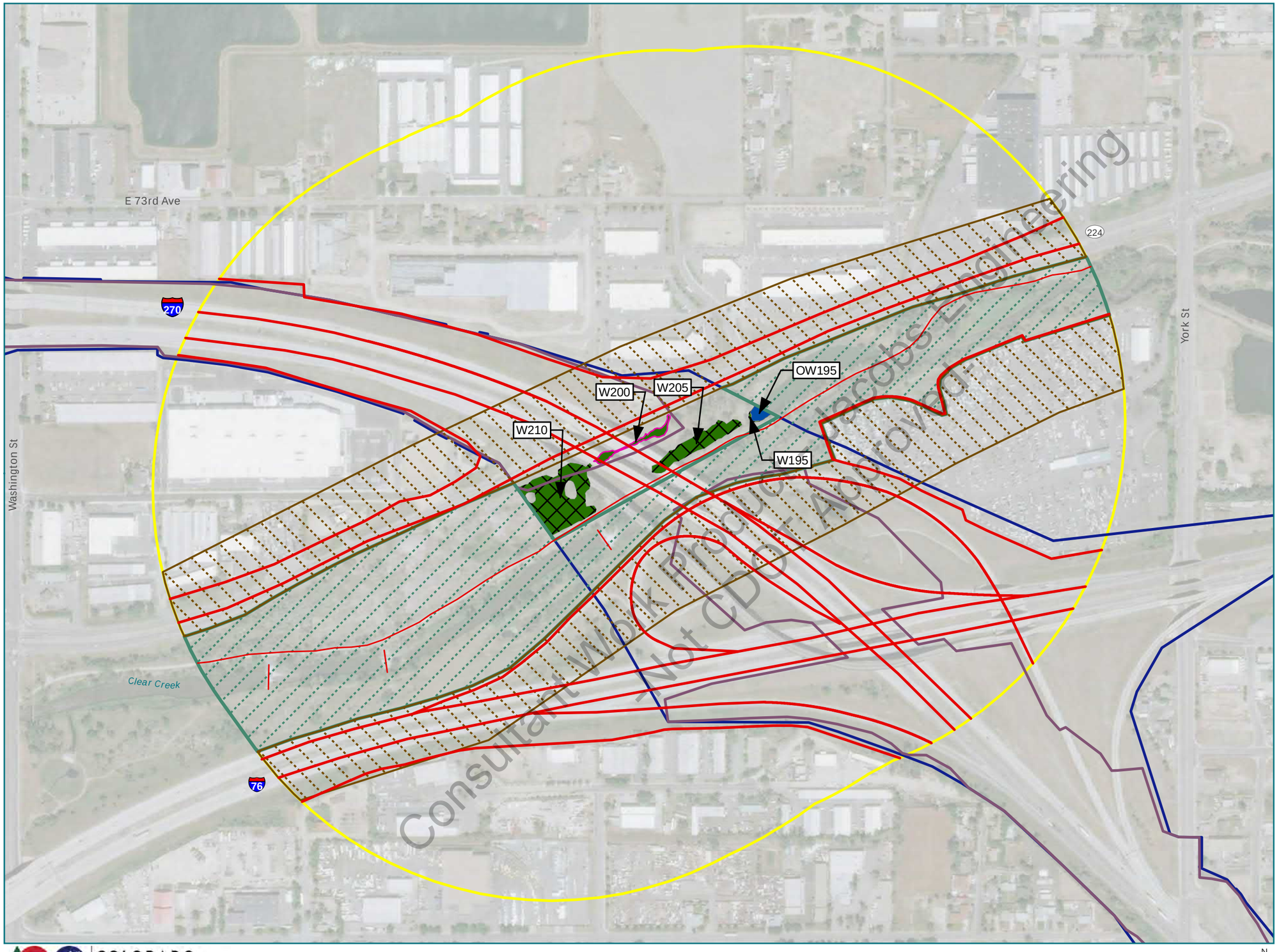
W410 — View of W410, looking northwest.

W420 — View of W420, looking northwest.

W430 — View of W430, looking northwest.

W440 — View of W440, looking northwest.

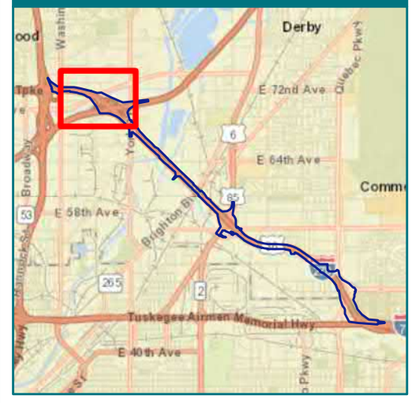
Appendix D
FACWet Maps and Data Sheets



I-270 WETLAND FINDINGS REPORT
ASSESSMENT AREA AA-CC-1

- Migration Dispersal Barrier - Minor
- Migration Dispersal Barrier - Major
- Estimated Historic Habitat Area
- Existing Natural Habitat
- Area of Interest (Study Area)
- Approximate Project Disturbance Limits
- OWUS, Jurisdictional
- Wetland, PEM, Assumed Non-Jurisdictional
- Wetland, PSS, Jurisdictional
- Habitat Connectivity Envelope

Regional Locator



Projection: Custom
Lambert Conformal Conic
North American Datum 1983 (2011)

Source: ESRI and its data partners

COLORADO
Department of Transportation

0 2 4 Miles

N

I-270 Corridor Improvements

PATH: \\DC1VS01\GISPROJ\CICDOT\I_270\MAPFILES\ENVIRO\WETLANDS\FACWETAA_CC_1.MXD - USER: BARNEYPG - DATE: 3/10/2021

ADMINISTRATIVE CHARACTERIZATION

General Information			
	AA-CC-1	Date of Evaluation:	1/29/2021
Site Name or ID:	AA-CC-1 - W195, W200, W205, and W210 (Clear	Project Name:	I-270 (STU 2706-043)
404 or Other Permit Application #:	NA	Applicant Name:	CDOT
Evaluator Name(s):	Brett Hartmann and Pat Hickey	Evaluator's professional position and organization:	Biologists (Jacobs)

Location Information:			
Site Coordinates (Decimal Degrees, e.g., 38.85, -104.96):	AA-CC-1, Aggregated Score for multiple Clear Creek Wetland polygons (Centroid: 39.825479, -104.968962)	Geographic Datum Used (NAD 83):	NAD83
		Elevation	5127
Location Information:	Constructed, depressional wetlands adjacent to and within flood plain of Clear Creek		
Associated stream/water body name:	Clear Creek	Stream Order:	Riverine
USGS Quadrangle Map:	Commerce City, CO 2019	Map Scale: (Circle one)	1:24,000 / 1:100,000 / Other 1:
Sub basin Name (8 digit HUC):	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)	ac.	[X]	Measured: 2.219879				
		[ ]	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)	ac.	[X]	Measured	ac.	ac.	ac.	ac.
		[ ]	Estimated	ac.	ac.	ac.	ac.

Characteristics or Method used for AA boundary determination:	W195, W200, W205, and W210 are similar wetlands in close proximty with in same HGM class. Therefore, these wetlands are grouped into a single assessment area (AA).
Notes:	Measured with Collector Web Map

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 occur in the AA?

  Ute Lady's tresses
- ☐ Species of concern according to the Colorado Natural Heritage (CNHP) are known to occur in the AA?
- ☐ The site is located within a potential conservation area or element occurrence buffer area as determined by CNHP?
- ☐ 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)	Constructed depressional wetland adjacent to clear creek and located with the Clear Creek flood plain. Potential remediated pit mine associated with highway construction.				
	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)	Prior to 1994 appeard to be upland habitat adjacent to Clear Creek			
	Previous HGM Class	Riverine	Slope	Depressional	Lacustrine

Notes (include information on the AA's HGM subclass and regional subclass): Historical imagery appears to show upland habitat in portions of this wetland prior to 1994

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
P	P	E	RV	E	h	80
		SS	BLD	E	h	20

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.

See Map Attached

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*	Very little or no loss of wetlands in the HCEor negligible.
<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:

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-270
X	Secondary Highway	I-76
X	Tertiary Roadway	E-70th
	Railroad	
X	Bike Path	Clear Creek Trail
X	Urban Development	Urban environment
	Agricultural Development	
X	Artificial Water Body	excavated portions: potentially road base mining
	Fence	
X	Ditch or Aqueduct	Constructed system
X	Aquatic Organism Barriers	Rip-rap, culverts

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	0.70
SV 1.2 Score	0.75

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

Variable 1 Score 0.73

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 average of the two sub-variable scores.

SV 2.1 - Buffer Condition

0.6 ***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

1.00 Percent of AA with Buffer

0.70 ***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)	*15*	*25*	*14*	*12*	*10*	*5*	*8*	*8*	12
Line #	1	2	3	4	5	6	7	8	**Avg. Buffer Width (m)**

0.65 ***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

0.7 ***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	Industrial/commercial facilities adjacent
	x	Urban	Urban environment
		Residential	
		Rural	
		Dryland Farming	
		Intensive Agriculture	
		Orchards or Nurseries	
		Livestock Grazing	
	x	Transportation Corridor	I-270, I-76
	x	Urban Parklands	trail system adjacent
	x	Dams/impoundments	Managed flow
	x	Artificial Water body	Portions of wetland are constructed; potentially road base mining pits
	x	Physical Resource Extraction	potentially road base mining pits
		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	**+**	0.7	**) ÷**	2	= **Variable 2 Score**	0.65

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
X	Ditches or Drains (tile, etc.)	road side ditches and structure help feed AA's hydrology
	Dams	
	Diversions	
	Groundwater pumping	
	Draw-downs	
X	Culverts or Constrictions	erts and other stormwater structure create and manage hydrology to the
X	Point Source (urban, ind., ag.)	Heavily managed urban environment
	Non-point Source	
	Increased Drainage Area	
X	Storm Drain/Urban Runoff	AA used to manage SW drain/ runoff
X	Impermeable Surface Runoff	adjace to highway surfaces
	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 0.65

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	water source is artificially constructed
×	Ditches	ditches feed hydrology
×	Ponding/Impoundment	ponded/open water in AA seasonally
×	Culverts	culverts feed and release flow
×	Road Grades	adjacent and feed by run off from road
	Channel Incision/Entrenchment	
×	Hardened/Engineered Channel	concrete structures manage flow
	Enlarged Channel	
×	Artificial Banks/Shoreline	constructed wetland
	Weirs	
×	Dikes/Levees/Berms	Berm seperating wetland from Clear Creek
	Diversions	
	Sediment/Fill 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	artificial water source
	Ditches	
	Dikes/Levees	
×	Road Grades	bike trail raised on berms between wetland and Clear Creek
×	Culverts	
	Diversions	
×	Constrictions	culverts themselves and and obstruction in culverts are constrictions
	Channel Incision/Entrenchment	
	Hardened/Engineered Channel	
×	Artificial Stream Banks	wetland edges and artifical and berms in places
	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 0.6

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
X	General	Dredging/Excavation/Mining	ars to be created from mining mitigation associated with highway construc
X		Fill, including dikes, road grades, etc	Adjacent to roadways and under highway
X		Grading	road and walking trail adjacent
X		Compaction	due to construction and siturbance
		Plowing/Disking	
		Excessive Sedimentation	
		Dumping	
		Hoof Shear/Pugging	
X		Aggregate or Mineral Mining	potential aggregate mining
X		Sand Accumulation	loose sediment from runoff and erosion
	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 0.7

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	x	agriculture upstream	0.70
	Agricultural Runoff	x	agriculture upstream	
	Septic/Sewage	x	placed in an urban enviroment	
	Excessive Algae or Aquatic Veg.			
	Cumulative Watershed NPS	x	urban environment	
	CDPHE Impairment/TMDL List	x	Clear Creek	
SV 7.2 Sedimentation/ Turbidity	Excessive Erosion	X	unstable banks	0.90
	Excessive Deposition			
	Fine Sediment Plumes			
	Agricultural Runoff	X	agriculture upstream	
	Excessive Turbidity	X	urban run off	
	Nearby Construction Site	X	urban environment	
	Cumulative Watershed NPS	x	urban environment	
	CDPHE Impairment/TMDL List	x	Clear Creek	
SV 7.3 Toxic contamination/ pH	Recent Chemical Spills	x	urban environment	0.60
	Nearby Industrial Sites	x	urban environment	
	Road Drainage/Runoff	x	adjacent to roadways, run off div	
	Livestock	x	agriculture upstream	
	Agricultural Runoff	x	agriculture upstream	
	Storm Water Runoff	x	urban environment	
	Fish/Wildlife Impacts	x	urban environment	
	Vegetation Impacts	x	weedy	
	Cumulative Watershed NPS	x	urban environment	
	Acid Mine Drainage			
	Point Source Discharge	x	sewer treatment plant, Urban en	
	CDPHE Impairment/TMDL List	x	Clear Creek	
	Metal staining on rocks and veg.			
SV 7.4 Temperature	Excessive Temperature Regime			0.70
	Lack of Shading	x	tree removal	
	Reservoir/Power Plant Discharge	x	stormwater	
	Industrial Discharge	x	urban/industrial environment	
	Cumulative Watershed NPS	x	urban environment	
	CDPHE Impairment/TMDL List	x	Clear Creek	
SV 7.5 Soil chemistry/ Redox potential	Unnatural Saturation/Desaturation			0.80
	Mechanical Soil Disturbance	x	urban environment	
	Dumping/introduced Soil	x	construction	
	CDPHE Impairment/TMDL List	x	Clear Creek	

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
0.70	+	0.90	+	0.60	+	0.70	+	0.80	=	3.70

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 0.7

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 weighting 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	0.2	0	0.8	0	
Stressor	**Tree**	**Shrub**	**Herb**	**Aquatic**	**Comments**
Noxious Weeds					
Exotic/Invasive spp.					
Tree Harvest					
Brush Cutting/Shrub Removal					
Livestock Grazing					
Excessive Herbivory					
Mowing/Haying			20%		
Herbicide					
Loss of Zonation/Homogenization			70%		
Dewatering					
Over Saturation	20%		20%		
DIFFERENCE BETWEEN CURRENT COVERAGE AND REFERENCE/EXPECTED	0.25	0.15	0.05	0	

Reference/Expected % Cover of Layer	0.45	+	0.15	+	0.85	+	0.00	= 1.45
	x		x		x		x	÷
Veg. Layer Sub-variable Score	0.8		0.5		0.8		0	**See sub-variable scoring guidelines on following page**
	=		=		=		=	
Weighted Sub-variable Score	0.36	+	0.08	+	0.68	+		= 1.115

Variable 8 Score 0.77

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)**	0.73
	Variable 2:	**Contributing Area (CA)**	0.65
Hydrology	**Variable 3:**	**Water Source (Source)**	0.65
	Variable 4:	**Water Distribution (Dist)**	0.70
	Variable 5:	**Water Outflow (Outflow)**	0.60
Abiotic and Biotic Habitat	**Variable 6:**	**Geomorphology (Geom)**	0.70
	Variable 7:	**Chemical Environment (Chem)**	0.70
	Variable 8:	**Vegetation Structure and Complexity (Veg)**	0.77

Functional Capacity Indices

Function 1 -- Support of Characteristic Wildlife Habitat

$V1_{connect}$	+	$V2_{CA}$	+	$(2 \times V8_{veg})$						Total Functional Points		FCI
0.73	+	0.65	+	1.54	+		+		=	2.91	÷ 4 =	0.73

Function 2 -- Support of Characteristic Fish/aquatic Habitat

$(3 \times V3_{source})$	+	$(2 \times V4_{dist})$	+	$(2 \times V5_{outflow})$	+	$V6_{geom}$	+	$V7_{chem}$					
1.95	+	1.40	+	1.20	+	0.70	+	0.70	+		=	5.95	÷ 9 =	0.66

Function 3 -- Flood Attenuation

$V2_{CA}$	+	$(2 \times V3_{source})$	+	$(2 \times V4_{dist})$	+	$(2 \times V5_{outflow})$	+	$V6_{geom}$	+	$V8_{veg}$				
0.65	+	1.30	+	1.40	+	1.20	+	0.70	+	0.77	=	6.02	÷ 9 =	0.67

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

$V3_{source}$	+	$(2 \times V4_{dist})$	+	$(2 \times V5_{outflow})$	+	$V6_{geom}$							
0.65	+	1.40	+	1.20	+	0.70	+		+		=	3.95	÷ 6 =	0.66

Function 5 -- Nutrient/Toxicant Removal

$(2 \times V2_{CA})$	+	$(2 \times V4_{dist})$	+	$V6_{geom}$		$V7_{chem}$							
1.30	+	1.40	+	0.70	+	0.70	+		+		=	4.10	÷ 6 =	0.68

Function 6 -- Sediment Retention/Shoreline Stabilization

$V2_{CA}$	+	$(2 \times V6_{geom})$	+	$(2 \times V8_{veg})$									
0.65	+	1.40	+	1.54	+		+		+		=	3.59	÷ 5 =	0.72

Function 7 -- Production Export/Food Chain Support

$V1_{connect}$	+	$(2 \times V5_{outflow})$	+	$V6_{geom}$	+	$V7_{chem}$	+	$(2 \times V8_{veg})$						
0.73	+	1.20	+	0.70	+	0.70	+	1.54	+		=	4.86	÷ 7 =	0.69

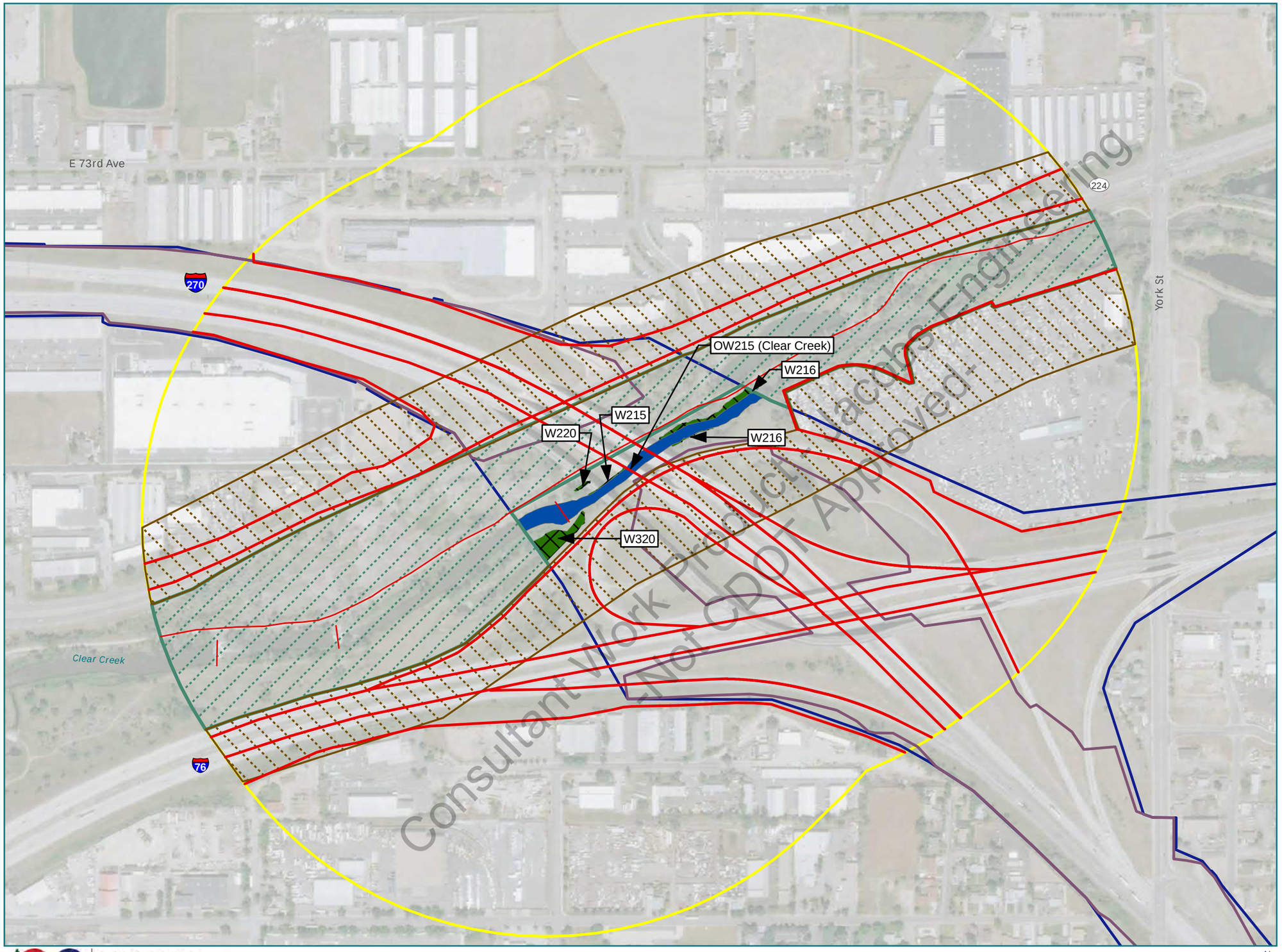
Sum of Individual FCI Scores **4.81**

Divide by the Number of Functions Scored **÷ 7**

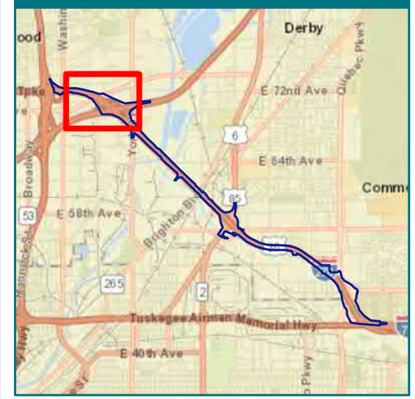
Composite FCI Score **0.69**

I-270 WETLAND FINDINGS REPORT
ASSESSMENT AREA AA-CC-2

- Migration Dispersal Barrier - Minor
- Migration Dispersal Barrier - Major
- Estimated Historic Habitat Area
- Existing Natural Habitat
- Area of Interest (Study Area)
- Approximate Project Disturbance Limits
- OWUS, Jurisdictional
- Wetland, PSS, Jurisdictional
- Habitat Connectivity Envelope



Regional Locator



Projection: Custom
Lambert Conformal Conic
North American Datum 1983 (2011)

Source: ESRI and its data partners

COLORADO
Department of Transportation

0 2 4 Miles

N

I-270 Corridor Improvements

PATH: \\DC1VS01\GISPROJ\C\CDOT\I_270\MAPFILES\ENVIRO\WETLANDS\FACWET\AA_CC_2.MXD - USER: BARNEYPG - DATE: 3/10/2021

ADMINISTRATIVE CHARACTERIZATION

General Information			
	AA-CC-2	Date of Evaluation:	1/21/2021
Site Name or ID:	AA-CC-2: W215, W216, W220, W320 (Clear Creek)	Project Name:	I-270 (STU 2706-043)
404 or Other Permit Application #:	NA	Applicant Name:	CDOT
Evaluator Name(s):	Brett Hartmann and Pat Hickey	Evaluator's professional position and organization:	Biologists (Jacobs)

Location Information:			
Site Coordinates (Decimal Degrees, e.g., 38.85, -104.96):	AA-CC-2, Aggregated Score for multiple Clear Creek Wetland polygons (Centroid: 39.825044, -104.968267)	Geographic Datum Used (NAD 83):	NAD83
		Elevation	5121
Location Information:	Riverine wetlands associated with edges of Clear Creek		
Associated stream/water body name:	Clear Creek	Stream Order:	Riverine
USGS Quadrangle Map:	Commerce City, CO 2019	Map Scale: (Circle one)	1:24,000 / 1:100,000 / Other 1:
Sub basin Name (8 digit HUC):	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)	ac.	[X]	Measured: 0.633255				
		[ ]	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)	ac.	[X]	Measured	ac.	ac.	ac.	ac.
		[ ]	Estimated	ac.	ac.	ac.	ac.
Characteristics or Method used for AA boundary determination:	W215, W216, W220, and W320 are similar wetlands in close proximty with in same HGM class. Therefore, these wetlands are grouped into a single assessment area (AA).						

Notes:	Measured with Collector Web Map

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 occur in the AA?

  Ute Lady's tresses
- ☐ Species of concern according to the Colorado Natural Heritage (CNHP) are known to occur in the AA?
- ☐ The site is located within a potential conservation area or element occurrence buffer area as determined by CNHP?
- ☐ 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)	Wetlands associated with the edges of clear clear. Creek is incised and wetlands are sloped and terraced down to the creek				
	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)	Wetland has been confined between highway and walking trail berms since pre-1994 according to aerial imagery.			
	Previous HGM Class	Riverine	Slope	Depressional	Lacustrine

Notes (include information on the AA's HGM subclass and regional subclass):

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
P	P	E	RV	E	h	80
		SS	BLD	E	h	20
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.

See Map Attached

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*	Very little or no loss of wetlands in the HCEor negligible.
<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:

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-270
x	Secondary Highway	I-76
x	Tertiary Roadway	E 70th and parking lots
	Railroad	
x	Bike Path	Clear Creek trail
x	Urban Development	Located in an urban setting
x	Agricultural Development	upstream
	Artificial Water Body	
x	Fence	multiple properties
x	Ditch or Aqueduct	feed by ditches
x	Aquatic Organism Barriers	flow control structures

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	0.60
SV 1.2 Score	0.70

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 average 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

0.80 Percent of AA with Buffer

0.70 ***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*	*12*	*20*	*25*	*8*	*5*	*15*	*22*	15
Line #	1	2	3	4	5	6	7	8	**Avg. Buffer Width (m)**

0.7 ***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

0.7 ***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/industrial environment
x	Urban	Urban Environment
	Residential	
	Rural	
	Dryland Farming	
	Intensive Agriculture	
	Orchards or Nurseries	
	Livestock Grazing	
x	Transportation Corridor	I-76, I-270
x	Urban Parklands	Clear creek trail and park adjacent
x	Dams/impoundments	flow control structures
x	Artificial Water body	potential road base quarry
x	Physical Resource Extraction	road base 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**				
(0.7	**+**	0.7	**) ÷**	2	=	**Variable 2 Score** 0.70

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
X	Ditches or Drains (tile, etc.)	road side ditches and structure help feed AA's hydrology
	Dams	
X	Diversions	Diversion and other management structures throughout clear creak
	Groundwater pumping	
	Draw-downs	
X	Culverts or Constrictions	culverts and other stormwater structure feed hydrology to the AA
X	Point Source (urban, ind., ag.)	Heavily managed urban environment
	Non-point Source	
	Increased Drainage Area	
X	Storm Drain/Urban Runoff	SW drain/ runoff contributes to hydrology of AA
X	Impermeable Surface Runoff	adjace to highway and other compacted surfaces due to urban
	Irrigation Return Flows	
	Mining/Natural Gas Extraction	
	Transbasin Diversion	
X	Actively Managed Hydrology	Urban course that has been highly altered and managed in the past.

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 0.7

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	surrounding lands and water stuctures in constant flux due to construction
×	Ditches	ditches feed hydrology
×	Ponding/Impoundment	caused at diversion and stormwater structures
×	Culverts	runoff from culverts contributes to hydrology
×	Road Grades	adjacent and feed by run off from road and path grading.
×	Channel Incision/Entrenchment	Channelshows signs of Incision and Entrenchment. Substrate prone to erosion.
×	Hardened/Engineered Channel	concrete structures manage flow and armor banks
×	Enlarged Channel	artificially enlarged in places to slow flow
×	Artificial Banks/Shoreline	heavily managed urban creek
	Weirs	
×	Dikes/Levees/Berms	Berms and grading contain Clear Creek
	Diversions	
×	Sediment/Fill Accumulation	runoff from urban setting

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	
	Culverts	
	Diversions	
	Constrictions	
X	Channel Incision/Entrenchment	substrate prone to erosion
X	Hardened/Engineered Channel	Urban environment
	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 0.95

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
X	General	Dredging/Excavation/Mining	appears to be created from mining mitigation associated with highway
X		Fill, including dikes, road grades, etc	Adjacent to roadways and under highway
X		Grading	road and walking trail adjacent
X		Compaction	due to construction and siturbance
		Plowing/Disking	
X		Excessive Sedimentation	loose sediment from runoff and erosion
		Dumping	
		Hoof Shear/Pugging	
		Aggregate or Mineral Mining	
X		Sand Accumulation	loose sediment from runoff and erosion
	Channels Only	Channel Instability/Over Widening	erosion prone substrate
		Excessive Bank Erosion	erosion prone substrate
X		Channelization	erosion prone substrate
X		Reconfigured Stream Channels	Urban environment
X		Artificial Banks/Shoreline	Urban environment
X		Beaver Dam Removal	Urban environment
		Substrate Embeddedness	
X		Lack or Excess of Woody Debris	Urban environment

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 0.7

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	x	agriculture upstream	0.70
	Agricultural Runoff	x	agriculture upstream	
	Septic/Sewage	x	placed in an urban enviroment	
	Excessive Algae or Aquatic Veg.			
	Cumulative Watershed NPS	x	urban environment	
	CDPHE Impairment/TMDL List	x	Clear Creek	
SV 7.2 Sedimentation/ Turbidity	Excessive Erosion	X	unstable banks	0.90
	Excessive Deposition			
	Fine Sediment Plumes			
	Agricultural Runoff	X	agriculture upstream	
	Excessive Turbidity	X	urban run off	
	Nearby Construction Site	X	urban environment	
	Cumulative Watershed NPS	x	urban environment	
	CDPHE Impairment/TMDL List	x	Clear Creek	
SV 7.3 Toxic contamination/ pH	Recent Chemical Spills	x	urban environment	0.60
	Nearby Industrial Sites	x	urban environment	
	Road Drainage/Runoff	x	adjacent to roadways, run off div	
	Livestock	x	agriculture upstream	
	Agricultural Runoff	x	agriculture upstream	
	Storm Water Runoff	x	urban environment	
	Fish/Wildlife Impacts	x	urban environment	
	Vegetation Impacts	x	weedy	
	Cumulative Watershed NPS	x	urban environment	
	Acid Mine Drainage			
	Point Source Discharge	x	sewer treatment plant, Urban en	
	CDPHE Impairment/TMDL List	x	Clear Creek	
	Metal staining on rocks and veg.			
SV 7.4 Temperature	Excessive Temperature Regime			0.70
	Lack of Shading	x	tree removal	
	Reservoir/Power Plant Discharge	x	stormwater	
	Industrial Discharge	x	urban/industrial environment	
	Cumulative Watershed NPS	x	urban environment	
	CDPHE Impairment/TMDL List	x	Clear Creek	
SV 7.5 Soil chemistry/ Redox potential	Unnatural Saturation/Desaturation			0.80
	Mechanical Soil Disturbance	x	urban environment	
	Dumping/introduced Soil	x	construction	
	CDPHE Impairment/TMDL List	x	Clear Creek	

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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
0.70	+	0.90	+	0.60	+	0.70	+	0.80	=	3.70

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 0.72

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 weighting 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	0.2	0.05	0.83	0	
Stressor	**Tree**	**Shrub**	**Herb**	**Aquatic**	**Comments**
Noxious Weeds			2%		Leafy Spurge, teasel
Exotic/Invasive spp.					
Tree Harvest					
Brush Cutting/Shrub Removal					
Livestock Grazing					
Excessive Herbivory					
Mowing/Haying			20%		
Herbicide					
Loss of Zonation/Homogenization			70%		
Dewatering					
Over Saturation	20%		20%		
DIFFERENCE BETWEEN CURRENT COVERAGE AND REFERENCE/EXPECTED	0.25	0.1	0.02	0	

Reference/Expected % Cover of Layer	0.45	+	0.15	+	0.85	+	0.00	= 1.45
	x		x		x		x	÷
Veg. Layer Sub-variable Score	0.8		0.7		0.8		0	**See sub-variable scoring guidelines on following page**
	=		=		=		=	
Weighted Sub-variable Score	0.36	+	0.11	+	0.68	+		= 1.145

Variable 8 Score 0.79

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)**	0.70
Hydrology	**Variable 3:**	**Water Source (Source)**	0.70
	Variable 4:	**Water Distribution (Dist)**	0.70
	Variable 5:	**Water Outflow (Outflow)**	0.95
Abiotic and Biotic Habitat	**Variable 6:**	**Geomorphology (Geom)**	0.70
	Variable 7:	**Chemical Environment (Chem)**	0.72
	Variable 8:	**Vegetation Structure and Complexity (Veg)**	0.79

Functional Capacity Indices

Function 1 -- Support of Characteristic Wildlife Habitat

$V1_{connect}$	+	$V2_{CA}$	+	$(2 \times V8_{veg})$						Total Functional Points		FCI
0.65	+	0.70	+	1.58	+		+		=	2.93	÷ 4 =	0.73

Function 2 -- Support of Characteristic Fish/aquatic Habitat

$(3 \times V3_{source})$	+	$(2 \times V4_{dist})$	+	$(2 \times V5_{outflow})$	+	$V6_{geom}$	+	$V7_{chem}$					
2.10	+	1.40	+	1.90	+	0.70	+	0.72	+		=	6.82	÷ 9 =	0.76

Function 3 -- Flood Attenuation

$V2_{CA}$	+	$(2 \times V3_{source})$	+	$(2 \times V4_{dist})$	+	$(2 \times V5_{outflow})$	+	$V6_{geom}$	+	$V8_{veg}$			
0.70	+	1.40	+	1.40	+	1.90	+	0.70	+	0.79	=	6.89	÷ 9 =	0.77

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

$V3_{source}$	+	$(2 \times V4_{dist})$	+	$(2 \times V5_{outflow})$	+	$V6_{geom}$							
0.70	+	1.40	+	1.90	+	0.70	+		+		=	4.70	÷ 6 =	0.78

Function 5 -- Nutrient/Toxicant Removal

$(2 \times V2_{CA})$	+	$(2 \times V4_{dist})$	+	$V6_{geom}$		$V7_{chem}$							
1.40	+	1.40	+	0.70	+	0.72	+		+		=	4.22	÷ 6 =	0.70

Function 6 -- Sediment Retention/Shoreline Stabilization

$V2_{CA}$	+	$(2 \times V6_{geom})$	+	$(2 \times V8_{veg})$									
0.70	+	1.40	+	1.58	+		+		+		=	3.68	÷ 5 =	0.74

Function 7 -- Production Export/Food Chain Support

$V1_{connect}$	+	$(2 \times V5_{outflow})$	+	$V6_{geom}$	+	$V7_{chem}$	+	$(2 \times V8_{veg})$						
0.65	+	1.90	+	0.70	+	0.72	+	1.58	+		=	5.55	÷ 7 =	0.79

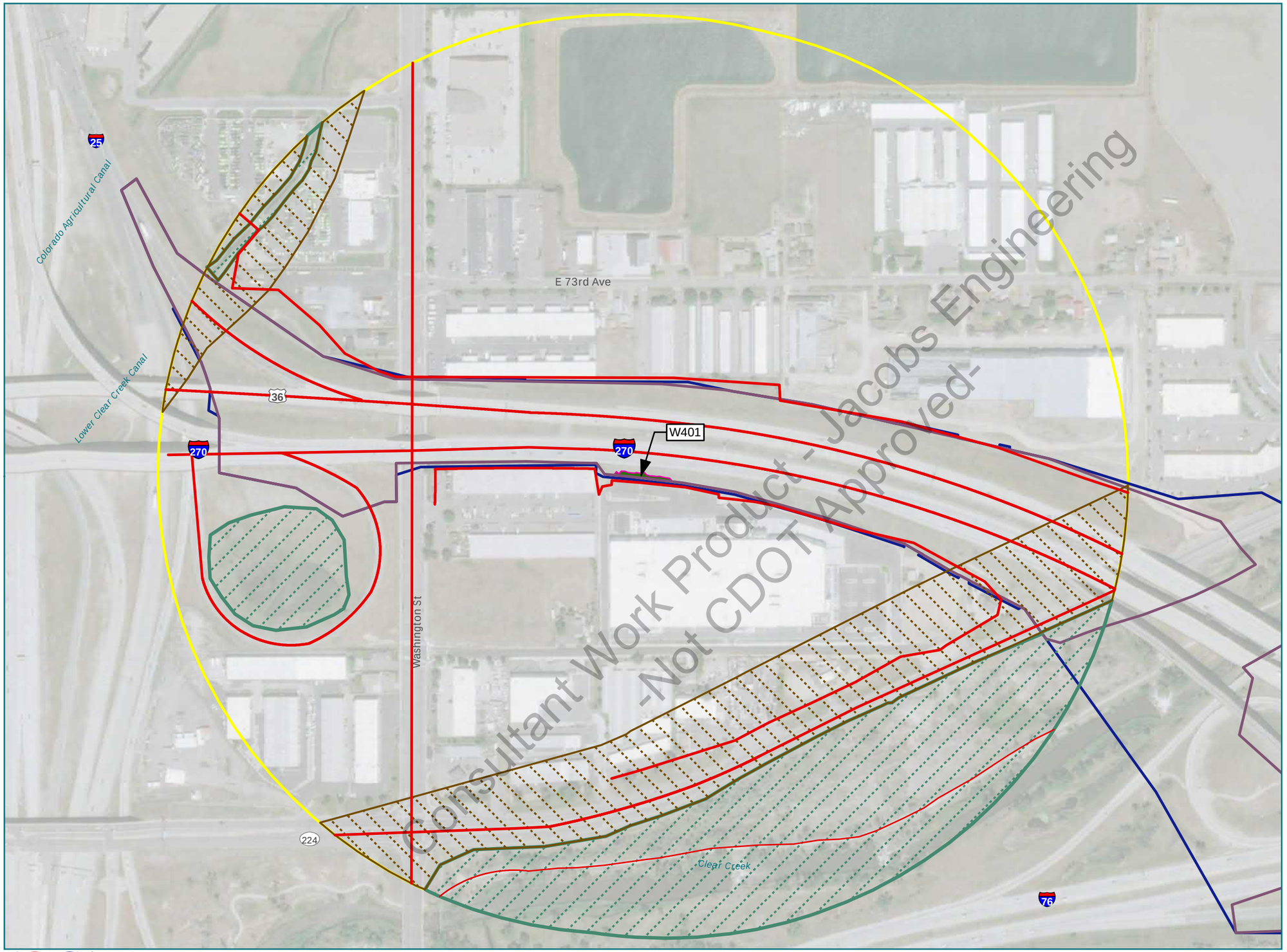
Sum of Individual FCI Scores **5.27**

Divide by the Number of Functions Scored **÷ 7**

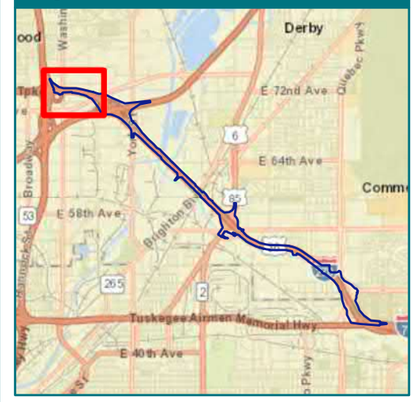
Composite FCI Score **0.75**

I-270 WETLAND FINDINGS REPORT
ASSESSMENT AREA AA-I-1

- Migration Dispersal Barrier - Minor
- Migration Dispersal Barrier - Major
- Estimated Historic Habitat Area
- Existing Natural Habitat
- Area of Interest (Study Area)
- Approximate Project Disturbance Limits
- Wetland, PEM, Assumed Non-Jurisdictional
- Habitat Connectivity Envelope



Regional Locator



Projection: Custom
Lambert Conformal Conic
North American Datum 1983 (2011)

Source: ESRI and its data partners

COLORADO
Department of Transportation

0 2 4 Miles

N

I-270 Corridor Improvements

PATH: \\DC1VS01\GISPROJ\C\CDOT\I_270\MAPFILES\ENVIRO\WETLANDS\FACWETIAA_I_1.MXD - USER: BARNEYPG - DATE: 3/12/2021

ADMINISTRATIVE CHARACTERIZATION

General Information			
	AA-I-1	Date of Evaluation:	1/21/2021
Site Name or ID:	AA-I-1: W401 (Infrastructure)	Project Name:	I-270 (STU 2706-043)
404 or Other Permit Application #:	NA	Applicant Name:	CDOT
Evaluator Name(s):	Brett Hartmann and Pat Hickey	Evaluator's professional position and organization:	Biologists (Jacobs)

Location Information:			
Site Coordinates (Decimal Degrees, e.g., 38.85, -104.96):	AA-I-1, Score for single Infrastructure Wetland polygons (Centroid: 39.827195, -104.975384)	Geographic Datum Used (NAD 83):	NAD83
		Elevation	5160
Location Information:	Depressional wetland associated with infrastructure run of.		
Associated stream/water body name:	Highway runoff	Stream Order:	NA
USGS Quadrangle Map:	Commerce City, CO 2019	Map Scale: (Circle one)	1:24,000 1:100,000 Other 1:
Sub basin Name (8 digit HUC):	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)	ac.	[X]	Measured: 0.066621				
		[ ]	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)	ac.	[X]	Measured	ac.	ac.	ac.	ac.
		[ ]	Estimated	ac.	ac.	ac.	ac.
Characteristics or Method used for AA boundary determination:	W401 is placed alone assessment area (AA) due to its distance and isolation from other AAs.						

Notes:

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 occur in the AA?
- ☐ Species of concern according to the Colorado Natural Heritage (CNHP) are known to occur in the AA?
- ☐ The site is located within a potential conservation area or element occurrence buffer area as determined by CNHP?
- ☐ 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)	Wetlands associated with highway run off. Wetland is located in a highway ditch and fed by runoff				
	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)	Depressional wetland appears to have formed around 2003 with the creation of the highway. Run off from recently constructed highway collected and flowed down hill in this location.			
	Previous HGM Class	Riverine	Slope	Depressional	Lacustrine

Notes (include information on the AA's HGM subclass and regional subclass): Depressional wetland appears to have been present since creation of highway

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
P	P	E	RV	E	h	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.

See Map attached

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*	Very little or no loss of wetlands in the HCEor negligible.
<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:

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-270
	Secondary Highway	
	Tertiary Roadway	
	Railroad	
	Bike Path	
x	Urban Development	Located in an urban setting
x	Agricultural Development	upstream
	Artificial Water Body	
x	Fence	multiple properties
x	Ditch or Aqueduct	is a ditch
x	Aquatic Organism Barriers	infrastructure

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	0.60
SV 1.2 Score	0.60

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

Variable 1 Score 0.60

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 average of the two sub-variable scores.

SV 2.1 - Buffer Condition

0.6 ***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

0.50 Percent of AA with Buffer

0.60 ***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)	*18*	*16*	*8*	*2*	*2*	*10*	*15*	*14*	11
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

0.6 ***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/industrial environment
x	Urban	Urban Environment
	Residential	
	Rural	
	Dryland Farming	
	Intensive Agriculture	
	Orchards or Nurseries	
	Livestock Grazing	
x	Transportation Corridor	adjacent to I-270
	Urban Parklands	
x	Dams/impoundments	flow control structures
x	Artificial Water body	ditch created by transportation corridors and runnoff
x	Physical Resource Extraction	road base extraction and construction
x	Biological Resource Extraction	construction and maintenance

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	**+**	0.6	**) ÷**	2	= **Variable 2 Score**	0.60

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
X	Ditches or Drains (tile, etc.)	Is a ditch
	Dams	
X	Diversions	trash, elevation changes, aggregate
	Groundwater pumping	
	Draw-downs	
X	Culverts or Constrictions	feeds ditch
X	Point Source (urban, ind., ag.)	Heavily managed urban environment
	Non-point Source	
	Increased Drainage Area	
X	Storm Drain/Urban Runoff	SW drain/ runoff contributes to hydrology of AA
X	Impermeable Surface Runoff	adjace to highway and other compacted surfaces due to urban
	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 0.65

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	surrounding lands and water stuctures in constant flux due to construction
×	Ditches	Is a ditch
	Ponding/Impoundment	
×	Culverts	runoff from culverts contributes to hydrology
×	Road Grades	adjacent and feed by run off from road grading.
	Channel Incision/Entrenchment	
	Hardened/Engineered Channel	
	Enlarged Channel	
×	Artificial Banks/Shoreline	heavily managed urban ditch
	Weirs	
×	Dikes/Levees/Berms	Road grade
	Diversions	
×	Sediment/Fill Accumulation	runoff from urban setting, trash

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 0.65

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	Road grade and barriers
×	Ditches	is a ditch
	Dikes/Levees	
×	Road Grades	confined by roads
×	Culverts	placed at outflow
×	Diversions	road grade
×	Constrictions	urban envronment
	Channel Incision/Entrenchment	
×	Hardened/Engineered Channel	Compacted soils from grading
	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	
X	General	Fill, including dikes, road grades, etc	Adjacent to highway and infrastructure
X	General	Grading	Adjacent to highway and infrastructure
X	General	Compaction	grading
	General	Plowing/Disking	
X	General	Excessive Sedimentation	loose sediment from runoff and erosion
X	General	Dumping	Adjacent to highway, lots of trash
	General	Hoof Shear/Pugging	
	General	Aggregate or Mineral Mining	
X	General	Sand Accumulation	loose sediment from runoff and erosion
	Channels Only	Channel Instability/Over Widening	
	Channels Only	Excessive Bank Erosion	
	Channels Only	Channelization	
	Channels Only	Reconfigured Stream Channels	
	Channels Only	Artificial Banks/Shoreline	
	Channels Only	Beaver Dam Removal	
	Channels Only	Substrate Embeddedness	
	Channels Only	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 0.6

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	x	agriculture upstream	0.70
	Agricultural Runoff	x	agriculture upstream	
	Septic/Sewage	x	placed in an urban enviroment	
	Excessive Algae or Aquatic Veg.			
	Cumulative Watershed NPS	x	urban environment	
	CDPHE Impairment/TMDL List			
SV 7.2 Sedimentation/ Turbidity	Excessive Erosion			0.75
	Excessive Deposition	X	highway run of	
	Fine Sediment Plumes			
	Agricultural Runoff	X	agriculture upstream	
	Excessive Turbidity	X		
	Nearby Construction Site	X	urban environment	
	Cumulative Watershed NPS	x		
	CDPHE Impairment/TMDL List			
SV 7.3 Toxic contamination/ pH	Recent Chemical Spills	x	urban environment	0.60
	Nearby Industrial Sites	x	urban environment	
	Road Drainage/Runoff	x	adjacent to highway	
	Livestock	x	agriculture upstream	
	Agricultural Runoff	x	agriculture upstream	
	Storm Water Runoff	x	adjacent to highway	
	Fish/Wildlife Impacts	x		
	Vegetation Impacts	x	weedy	
	Cumulative Watershed NPS	x		
	Acid Mine Drainage			
	Point Source Discharge	x	urban environment	
	CDPHE Impairment/TMDL List			
	Metal staining on rocks and veg.			
SV 7.4 Temperature	Excessive Temperature Regime	x	concrete adjacent	0.60
	Lack of Shading	x	No trees	
	Reservoir/Power Plant Discharge	x	stormwater	
	Industrial Discharge	x	urban environment	
	Cumulative Watershed NPS	x		
	CDPHE Impairment/TMDL List			
SV 7.5 Soil chemistry/ Redox potential	Unnatural Saturation/Desaturation			0.80
	Mechanical Soil Disturbance	x	urban environment	
	Dumping/introduced Soil	x	construction	
	CDPHE Impairment/TMDL List			

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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
0.70	+	0.75	+	0.60	+	0.60	+	0.80	=	3.45

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 0.72

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 weighting 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	1	0	
Stressor	**Tree**	**Shrub**	**Herb**	**Aquatic**	**Comments**
Noxious Weeds					
Exotic/Invasive spp.					
Tree Harvest					
Brush Cutting/Shrub Removal					adjacent to highway
Livestock Grazing					
Excessive Herbivory					
Mowing/Haying					
Herbicide					
Loss of Zonation/Homogenization					Urban environment
Dewatering					
Over Saturation					fed by highway run off
DIFFERENCE BETWEEN CURRENT COVERAGE AND REFERENCE/EXPECTED	0.45	0.15	0.2	0	
Reference/Expected % Cover of Layer	0.45	+ 0.15	+ 0.85	+ 0.00	= 1.45
	x	x	x	x	
Veg. Layer Sub-variable Score	0.5	0.5	0.8	0	÷ **See sub-variable scoring guidelines on following page**
	=	=	=	=	
Weighted Sub-variable Score	0.23	+ 0.08	+ 0.68	+ 0.00	= 0.98

Variable 8 Score 0.68

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)**	0.60
	Variable 2:	**Contributing Area (CA)**	0.60
Hydrology	**Variable 3:**	**Water Source (Source)**	0.65
	Variable 4:	**Water Distribution (Dist)**	0.65
	Variable 5:	**Water Outflow (Outflow)**	0.70
Abiotic and Biotic Habitat	**Variable 6:**	**Geomorphology (Geom)**	0.60
	Variable 7:	**Chemical Environment (Chem)**	0.72
	Variable 8:	**Vegetation Structure and Complexity (Veg)**	0.68

Functional Capacity Indices

Function 1 -- Support of Characteristic Wildlife Habitat

$V1_{connect}$	+	$V2_{CA}$	+	$(2 \times V8_{veg})$						Total Functional Points		FCI
0.60	+	0.60	+	1.35	+		+		=	2.55	÷ 4 =	0.64

Function 2 -- Support of Characteristic Fish/aquatic Habitat

$(3 \times V3_{source})$	+	$(2 \times V4_{dist})$	+	$(2 \times V5_{outflow})$	+	$V6_{geom}$	+	$V7_{chem}$						
1.95	+	1.30	+	1.40	+	0.60	+	0.72	+		=	5.97	÷ 9 =	0.66

Function 3 -- Flood Attenuation

$V2_{CA}$	+	$(2 \times V3_{source})$	+	$(2 \times V4_{dist})$	+	$(2 \times V5_{outflow})$	+	$V6_{geom}$	+	$V8_{veg}$				
0.60	+	1.30	+	1.30	+	1.40	+	0.60	+	0.68	=	5.88	÷ 9 =	0.65

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

$V3_{source}$	+	$(2 \times V4_{dist})$	+	$(2 \times V5_{outflow})$	+	$V6_{geom}$								
0.65	+	1.30	+	1.40	+	0.60	+		+		=	3.95	÷ 6 =	0.66

Function 5 -- Nutrient/Toxicant Removal

$(2 \times V2_{CA})$	+	$(2 \times V4_{dist})$	+	$V6_{geom}$	+	$V7_{chem}$								
1.20	+	1.30	+	0.60	+	0.72	+		+		=	3.82	÷ 6 =	0.64

Function 6 -- Sediment Retention/Shoreline Stabilization

$V2_{CA}$	+	$(2 \times V6_{geom})$	+	$(2 \times V8_{veg})$										
0.60	+	1.20	+	1.35	+		+		+		=	3.15	÷ 5 =	0.63

Function 7 -- Production Export/Food Chain Support

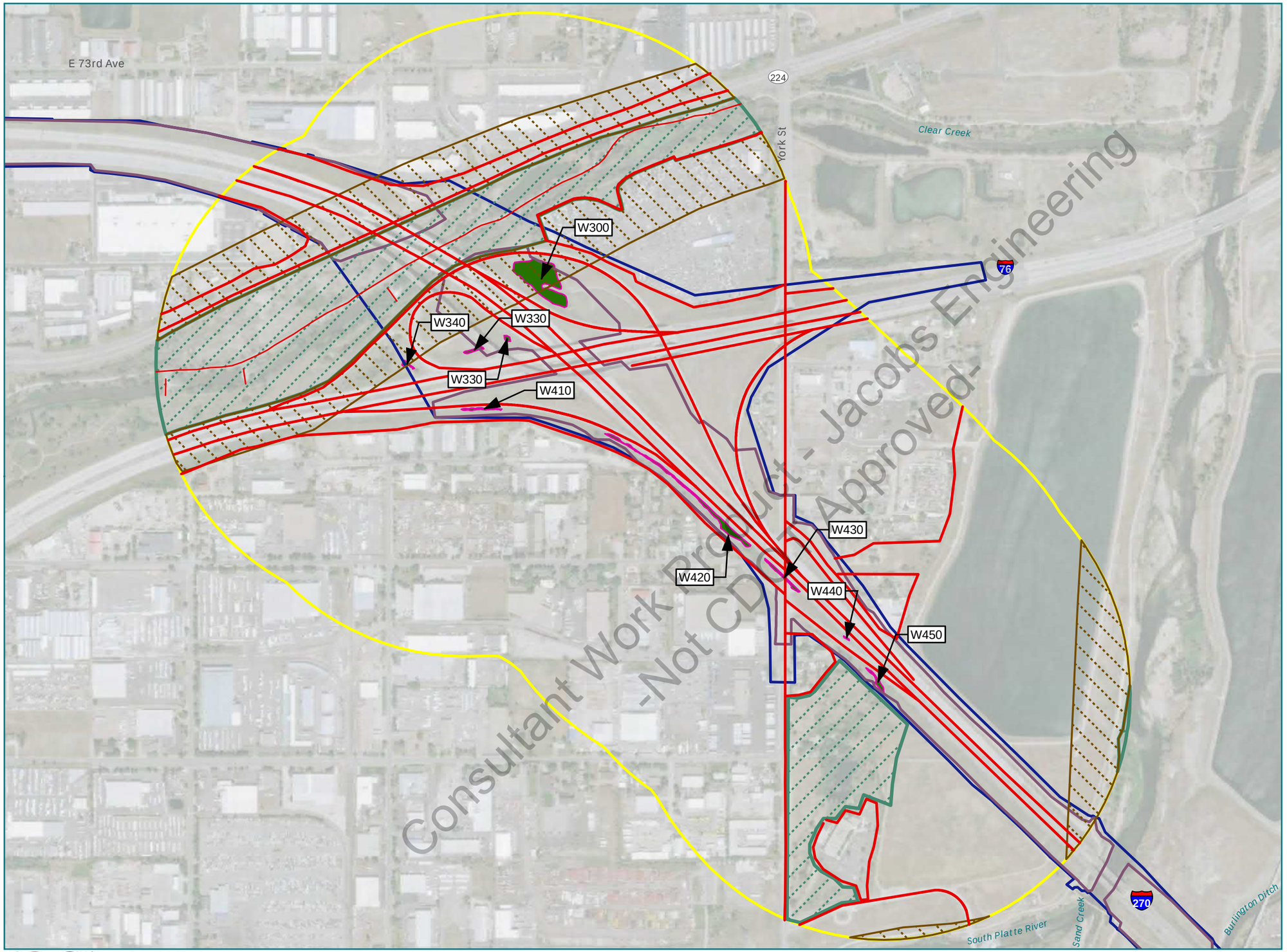
$V1_{connect}$	+	$(2 \times V5_{outflow})$	+	$V6_{geom}$	+	$V7_{chem}$	+	$(2 \times V8_{veg})$						
0.60	+	1.40	+	0.60	+	0.72	+	1.35	+		=	4.67	÷ 7 =	0.67

Sum of Individual FCI Scores **4.55**

Divide by the Number of Functions Scored **÷ 7**

Composite FCI Score **0.65**

I-270 WETLAND FINDINGS REPORT
ASSESSMENT AREA AA-I-2



- Migration Dispersal Barrier - Minor
- Migration Dispersal Barrier - Major
- Estimated Historic Habitat Area
- Existing Natural Habitat
- Area of Interest (Study Area)
- Approximate Project Disturbance Limits
- Wetland, PEM, Assumed Non-Jurisdictional
- Habitat Connectivity Envelope

Regional Locator

Projection: Custom
Lambert Conformal Conic
North American Datum 1983 (2011)

Source: ESRI and its data partners

COLORADO
Department of Transportation

0 2 4 Miles

N

I-270 Corridor Improvements

PATH: \\DC1VS01\GISPROJ\C\CDOT\I_270\MAPFILES\ENVIRO\WETLANDS\FACWETIAA_I_2.MXD - USER: BARNEYPG - DATE: 3/12/2021

ADMINISTRATIVE CHARACTERIZATION

General Information			
	AA-I-2	Date of Evaluation:	1/21/2021
Site Name or ID:	AA-I-2: W300, W330, W340, W401, W410, W420, W430,	Project Name:	I-270 (STU 2706-043)
404 or Other Permit Application #:	NA	Applicant Name:	CDOT
Evaluator Name(s):	Brett Hartmann and Pat Hickey	Evaluator's professional position and organization:	Biologists (Jacobs)

Location Information:			
Site Coordinates (Decimal Degrees, e.g., 38.85, -104.96):	AA-I-1, Aggregated Score for similar Infrastructure Wetland polygons (Centroid: 39.821518, -104.962088)	Geographic Datum Used (NAD 83):	NAD83
		Elevation	5160
Location Information:	Depressional wetland associated with infrastructure runoff.		
Associated stream/water body name:	Highway runoff	Stream Order:	NA
USGS Quadrangle Map:	Commerce City, CO 2019	Map Scale: (Circle one)	1:24,000 / 1:100,000 / Other 1:
Sub basin Name (8 digit HUC):	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)	ac.	[X]	2.096336				
		[ ]	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)	ac.	[X]	Measured	ac.	ac.	ac.	ac.
		[ ]	Estimated	ac.	ac.	ac.	ac.
Characteristics or Method used for AA boundary determination:	W300, W330, W340, W401, W410, W420, W430, W440, and W450 are similar wetlands in close proximty with in same HGM class. Therefore, these wetlands are grouped into a single assessment area (AA).						

Notes:	Measured with Collector Web Map

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 occur in the AA?
- ☐ Species of concern according to the Colorado Natural Heritage (CNHP) are known to occur in the AA?
- ☐ The site is located within a potential conservation area or element occurrence buffer area as determined by CNHP?
- ☐ 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)	Wetlands associated with highway run off. Wetland is located in a highway ditch and fed by runoff				
	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)	Depressional wetland appears to have formed with the creation of the highway. Run off from recently constructed highway collected and flows down hill towards the South Platte flood plain			
	Previous HGM Class	Riverine	Slope	Depressional	Lacustrine

Notes (include information on the AA's HGM subclass and regional subclass): Depressional wetland appears to have been present since creation of highway

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
P	P	E	RV	E	h	95
		SS	BLD	E	h	5
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.

See Map Attached

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*	Very little or no loss of wetlands in the HCEor negligible.
<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:

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-270
x	Secondary Highway	I-76
x	Tertiary Roadway	multiple roads adjacent and leading to highways
	Railroad	
	Bike Path	
x	Urban Development	Located in an urban setting
x	Agricultural Development	upstream
	Artificial Water Body	
x	Fence	multiple properties
x	Ditch or Aqueduct	is a ditch
x	Aquatic Organism Barriers	infrastructure

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	0.60
SV 1.2 Score	0.60

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

Variable 1 Score 0.60

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 average of the two sub-variable scores.

SV 2.1 - Buffer Condition

0.6 ***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

0.50 Percent of AA with Buffer

0.60 ***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)	*5*	*10*	*6*	*0*	*2*	*10*	*8*	*3*	6
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

0.6 ***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/industrial environment
	x	Urban	Urban Environment
		Residential	
		Rural	
		Dryland Farming	
		Intensive Agriculture	
		Orchards or Nurseries	
		Livestock Grazing	
	x	Transportation Corridor	adjacent to highways
	x	Urban Parklands	adjacent
	x	Dams/impoundments	flow control structures
	x	Artificial Water body	ditch created by transportation corridors and runnoff
	x	Physical Resource Extraction	road base extraction and construction
	x	Biological Resource Extraction	construction and maintenance

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	**+**	0.6	**) ÷**	2	=	**Variable 2 Score** 0.60

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
X	Ditches or Drains (tile, etc.)	Is a ditch
	Dams	
X	Diversions	trash, elevation changes, aggregate
	Groundwater pumping	
	Draw-downs	
X	Culverts or Constrictions	feeds ditch
X	Point Source (urban, ind., ag.)	Heavily managed urban environment
	Non-point Source	
	Increased Drainage Area	
X	Storm Drain/Urban Runoff	SW drain/ runoff contributes to hydrology of AA
X	Impermeable Surface Runoff	adjace to highway and other compacted surfaces due to urban
	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 0.65

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	surrounding lands and water stuctures in constant flux due to construction
×	Ditches	Is a ditch
	Ponding/Impoundment	
×	Culverts	runoff from culverts contributes to hydrology
×	Road Grades	adjacent and feed by run off from road grading.
	Channel Incision/Entrenchment	
	Hardened/Engineered Channel	
	Enlarged Channel	
×	Artificial Banks/Shoreline	heavily managed urban ditch
	Weirs	
×	Dikes/Levees/Berms	Road grade
	Diversions	
×	Sediment/Fill Accumulation	runoff from urban setting, trash

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 0.65

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	Road grade and barriers
×	Ditches	is a ditch
	Dikes/Levees	
×	Road Grades	confined by roads
×	Culverts	placed at outflow
×	Diversions	road grade
×	Constrictions	urban envronment
	Channel Incision/Entrenchment	
×	Hardened/Engineered Channel	Compacted soils from grading
	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 0.75

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	
X	General	Fill, including dikes, road grades, etc	Adjacent to highway and infrastructure
X	General	Grading	Adjacent to highway and infrastructure
X	General	Compaction	grading
	General	Plowing/Disking	
X	General	Excessive Sedimentation	loose sediment from runoff and erosion
X	General	Dumping	Adjacent to highway, lots of trash
	General	Hoof Shear/Pugging	
	General	Aggregate or Mineral Mining	
X	General	Sand Accumulation	loose sediment from runoff and erosion
	Channels Only	Channel Instability/Over Widening	
	Channels Only	Excessive Bank Erosion	
	Channels Only	Channelization	
	Channels Only	Reconfigured Stream Channels	
	Channels Only	Artificial Banks/Shoreline	
	Channels Only	Beaver Dam Removal	
	Channels Only	Substrate Embeddedness	
	Channels Only	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 0.6

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	x	agriculture upstream	0.70
	Agricultural Runoff	x	agriculture upstream	
	Septic/Sewage	x	placed in an urban enviroment	
	Excessive Algae or Aquatic Veg.			
	Cumulative Watershed NPS	x	urban environment	
	CDPHE Impairment/TMDL List			
SV 7.2 Sedimentation/ Turbidity	Excessive Erosion			0.75
	Excessive Deposition	X	highway run of	
	Fine Sediment Plumes			
	Agricultural Runoff	X	agriculture upstream	
	Excessive Turbidity	X		
	Nearby Construction Site	X	urban environment	
	Cumulative Watershed NPS	x		
	CDPHE Impairment/TMDL List			
SV 7.3 Toxic contamination/ pH	Recent Chemical Spills	x	urban environment	0.60
	Nearby Industrial Sites	x	urban environment	
	Road Drainage/Runoff	x	adjacent to highway	
	Livestock	x	agriculture upstream	
	Agricultural Runoff	x	agriculture upstream	
	Storm Water Runoff	x	adjacent to highway	
	Fish/Wildlife Impacts	x		
	Vegetation Impacts	x	weedy	
	Cumulative Watershed NPS	x		
	Acid Mine Drainage			
	Point Source Discharge	x	urban environment	
	CDPHE Impairment/TMDL List			
	Metal staining on rocks and veg.			
SV 7.4 Temperature	Excessive Temperature Regime	x	concrete adjacent	0.60
	Lack of Shading	x	No trees	
	Reservoir/Power Plant Discharge	x	stormwater	
	Industrial Discharge	x	urban environment	
	Cumulative Watershed NPS	x		
	CDPHE Impairment/TMDL List			
SV 7.5 Soil chemistry/ Redox potential	Unnatural Saturation/Desaturation			0.80
	Mechanical Soil Disturbance	x	urban environment	
	Dumping/introduced Soil	x	construction	
	CDPHE Impairment/TMDL List			

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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
0.70	+	0.75	+	0.60	+	0.60	+	0.80	=	3.45

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 0.72

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 weighting 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	0.05	0.9	0	
Stressor	**Tree**	**Shrub**	**Herb**	**Aquatic**	**Comments**
Noxious Weeds					
Exotic/Invasive spp.					
Tree Harvest					
Brush Cutting/Shrub Removal					adjacent to highway
Livestock Grazing					
Excessive Herbivory					
Mowing/Haying					
Herbicide					
Loss of Zonation/Homogenization					Urban environment
Dewatering					
Over Saturation					fed by highway run off
DIFFERENCE BETWEEN CURRENT COVERAGE AND REFERENCE/EXPECTED	0.45	0.1	0.05	0	

Reference/Expected % Cover of Layer	0.45	+	0.15	+	0.85	+	0.00	=	1.45
	x		x		x		x		÷
Veg. Layer Sub-variable Score	0.5		0.6		0.8		0		**See sub-variable scoring guidelines on following page**
	=		=		=		=		
Weighted Sub-variable Score	0.23	+	0.09	+	0.68	+	0.00	=	0.995

Variable 8 Score 0.69

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)**	0.60
	Variable 2:	**Contributing Area (CA)**	0.60
Hydrology	**Variable 3:**	**Water Source (Source)**	0.65
	Variable 4:	**Water Distribution (Dist)**	0.65
	Variable 5:	**Water Outflow (Outflow)**	0.75
Abiotic and Biotic Habitat	**Variable 6:**	**Geomorphology (Geom)**	0.60
	Variable 7:	**Chemical Environment (Chem)**	0.72
	Variable 8:	**Vegetation Structure and Complexity (Veg)**	0.69

Functional Capacity Indices

Function 1 -- Support of Characteristic Wildlife Habitat

$V1_{connect}$	+	$V2_{CA}$	+	$(2 \times V8_{veg})$						Total Functional Points		FCI
0.60	+	0.60	+	1.37	+		+		=	2.57	÷ 4 =	0.64

Function 2 -- Support of Characteristic Fish/aquatic Habitat

$(3 \times V3_{source})$	+	$(2 \times V4_{dist})$	+	$(2 \times V5_{outflow})$	+	$V6_{geom}$	+	$V7_{chem}$						
1.95	+	1.30	+	1.50	+	0.60	+	0.72	+		=	6.07	÷ 9 =	0.67

Function 3 -- Flood Attenuation

$V2_{CA}$	+	$(2 \times V3_{source})$	+	$(2 \times V4_{dist})$	+	$(2 \times V5_{outflow})$	+	$V6_{geom}$	+	$V8_{veg}$				
0.60	+	1.30	+	1.30	+	1.50	+	0.60	+	0.69	=	5.99	÷ 9 =	0.67

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

$V3_{source}$	+	$(2 \times V4_{dist})$	+	$(2 \times V5_{outflow})$	+	$V6_{geom}$								
0.65	+	1.30	+	1.50	+	0.60	+		+		=	4.05	÷ 6 =	0.68

Function 5 -- Nutrient/Toxicant Removal

$(2 \times V2_{CA})$	+	$(2 \times V4_{dist})$	+	$V6_{geom}$	+	$V7_{chem}$								
1.20	+	1.30	+	0.60	+	0.72	+		+		=	3.82	÷ 6 =	0.64

Function 6 -- Sediment Retention/Shoreline Stabilization

$V2_{CA}$	+	$(2 \times V6_{geom})$	+	$(2 \times V8_{veg})$										
0.60	+	1.20	+	1.37	+		+		=	3.17	÷ 5 =	0.63

Function 7 -- Production Export/Food Chain Support

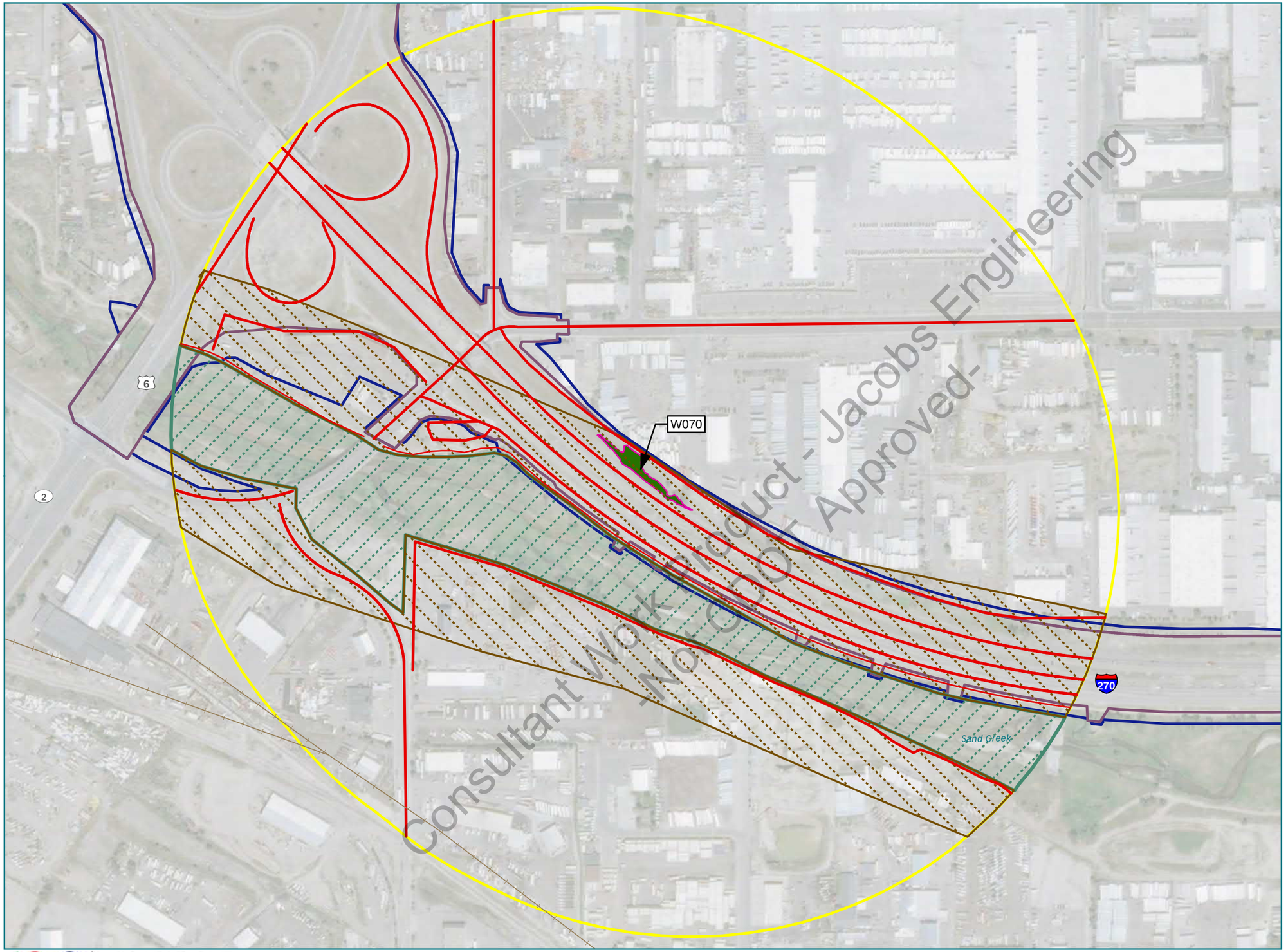
$V1_{connect}$	+	$(2 \times V5_{outflow})$	+	$V6_{geom}$	+	$V7_{chem}$	+	$(2 \times V8_{veg})$						
0.60	+	1.50	+	0.60	+	0.72	+	1.37	+		=	4.79	÷ 7 =	0.68

Sum of Individual FCI Scores **4.61**

Divide by the Number of Functions Scored **÷ 7**

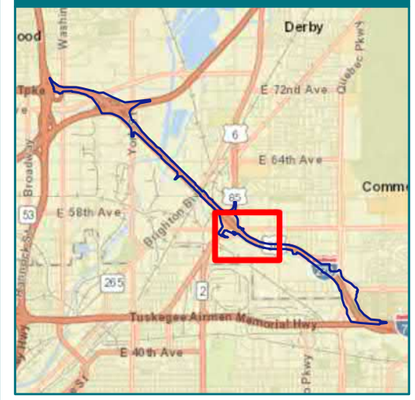
Composite FCI Score **0.66**

I-270 WETLAND FINDINGS REPORT
ASSESSMENT AREA AA-I-3



- Migration Dispersal Barrier - Minor
- Migration Dispersal Barrier - Major
- Estimated Historic Habitat Area
- Existing Natural Habitat
- Area of Interest (Study Area)
- Approximate Project Disturbance Limits
- Wetland, PEM, Assumed Non-Jurisdictional
- Habitat Connectivity Envelope

Regional Locator



Projection: Custom
Lambert Conformal Conic
North American Datum 1983 (2011)

Source: ESRI and its data partners

COLORADO
Department of Transportation

0 2 4 Miles

N

I-270 Corridor Improvements

PATH: \\DC1VS01\GISPROJ\C\CDOT\I_270\MAPFILES\ENVIRO\WETLANDS\FACWET\AA_I_3.MXD - USER: BARNEYPG - DATE: 3/5/2021

ADMINISTRATIVE CHARACTERIZATION

General Information			
	AA-I-3	Date of Evaluation:	1/21/2021
Site Name or ID:	AA-I-3: W070 (Infrastructure)	Project Name:	I-270 (STU 2706-043)
404 or Other Permit Application #:	NA	Applicant Name:	CDOT
Evaluator Name(s):	Brett Hartmann and Pat Hickey	Evaluator's professional position and organization:	Biologists (Jacobs)

Location Information:			
Site Coordinates (Decimal Degrees, e.g., 38.85, -104.96):	AA-I-3, Score for single Infrastructure Wetland polygon (Centroid: 39.797111, -104.928947)	Geographic Datum Used (NAD 83):	NAD83
		Elevation	5180
Location Information:	Depressional wetland associated with infrastructure run off.		
Associated stream/water body name:	Highway runoff	Stream Order:	NA
USGS Quadrangle Map:	Commerce City, CO 2019	Map Scale: (Circle one)	1:24,000 1:100,000 Other 1:
Sub basin Name (8 digit HUC):	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)	ac.	[X]	Measured: .0272599				
		[ ]	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)	ac.	[X]	Measured	ac.	ac.	ac.	ac.
		[ ]	Estimated	ac.	ac.	ac.	ac.
Characteristics or Method used for AA boundary determination:	W070 is placed alone assessment area (AA) due to its distance and isolation from other AAs.						

Notes:

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 occur in the AA?
- ☐ Species of concern according to the Colorado Natural Heritage (CNHP) are known to occur in the AA?
- ☐ The site is located within a potential conservation area or element occurrence buffer area as determined by CNHP?
- ☐ 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)	Wetlands associated with highway run off. Wetland is located in a highway ditch and fed by runoff				
	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)	Depressional wetland appears to have formed with the creation of the highway. Run off from recently constructed highway collected and flowed down hill in this location.			
	Previous HGM Class	Riverine	Slope	Depressional	Lacustrine

Notes (include information on the AA's HGM subclass and regional subclass): Depressional wetland appears to have been present since creation of highway

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
P	P	E	RV	E	h	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.

See Map Attached

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*	Very little or no loss of wetlands in the HCEor negligible.
<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:

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-270
x	Secondary Highway	adjacent
x	Tertiary Roadway	adjacent
	Railroad	
	Bike Path	
x	Urban Development	Located in an urban setting
x	Agricultural Development	upstream
	Artificial Water Body	
x	Fence	multiple properties
x	Ditch or Aqueduct	is a ditch
x	Aquatic Organism Barriers	infrastructure

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	0.60
SV 1.2 Score	0.60

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

Variable 1 Score 0.60

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 average of the two sub-variable scores.

SV 2.1 - Buffer Condition

0.6 ***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

0.50 Percent of AA with Buffer

0.60 ***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)	*8*	*8*	*9*	*3*	*2*	*6*	*7*	*2*	6
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

0.6 ***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/industrial environment
x	Urban	Urban Environment
	Residential	
	Rural	
	Dryland Farming	
	Intensive Agriculture	
	Orchards or Nurseries	
	Livestock Grazing	
x	Transportation Corridor	adjacent to I-270
	Urban Parklands	
x	Dams/impoundments	flow control structures
x	Artificial Water body	ditch created by transportation corridors and runnoff
x	Physical Resource Extraction	road base extraction and construction
x	Biological Resource Extraction	construction and maintenance

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	**+**	0.6	**) ÷**	2	=	**Variable 2 Score** 0.60

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
X	Ditches or Drains (tile, etc.)	Is a ditch
	Dams	
X	Diversions	trash, elevation changes, aggregate
	Groundwater pumping	
	Draw-downs	
X	Culverts or Constrictions	feeds ditch
X	Point Source (urban, ind., ag.)	Heavily managed urban environment
	Non-point Source	
	Increased Drainage Area	
X	Storm Drain/Urban Runoff	SW drain/ runoff contributes to hydrology of AA
X	Impermeable Surface Runoff	adjace to highway and other compacted surfaces due to urban
	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 0.65

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	surrounding lands and water stuctures in constant flux due to construction
×	Ditches	Is a ditch
	Ponding/Impoundment	
×	Culverts	runoff from culverts contributes to hydrology
×	Road Grades	adjacent and feed by run off from road grading.
	Channel Incision/Entrenchment	
	Hardened/Engineered Channel	
	Enlarged Channel	
×	Artificial Banks/Shoreline	heavily managed urban ditch
	Weirs	
×	Dikes/Levees/Berms	Road grade
	Diversions	
×	Sediment/Fill Accumulation	runoff from urban setting, trash

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 0.65

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	Road grade and barriers
×	Ditches	is a ditch
	Dikes/Levees	
×	Road Grades	confined by roads
×	Culverts	placed at outflow
×	Diversions	road grade
×	Constrictions	urban envronment
	Channel Incision/Entrenchment	
×	Hardened/Engineered Channel	Compacted soils from grading
	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	
X	General	Fill, including dikes, road grades, etc	Adjacent to highway and infrastructure
X	General	Grading	Adjacent to highway and infrastructure
X	General	Compaction	grading
	General	Plowing/Disking	
X	General	Excessive Sedimentation	loose sediment from runoff and erosion
X	General	Dumping	Adjacent to highway, lots of trash
	General	Hoof Shear/Pugging	
	General	Aggregate or Mineral Mining	
X	General	Sand Accumulation	loose sediment from runoff and erosion
	Channels Only	Channel Instability/Over Widening	
	Channels Only	Excessive Bank Erosion	
	Channels Only	Channelization	
	Channels Only	Reconfigured Stream Channels	
	Channels Only	Artificial Banks/Shoreline	
	Channels Only	Beaver Dam Removal	
	Channels Only	Substrate Embeddedness	
	Channels Only	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 0.6

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	x	agriculture upstream	0.70
	Agricultural Runoff	x	agriculture upstream	
	Septic/Sewage	x	placed in an urban enviroment	
	Excessive Algae or Aquatic Veg.			
	Cumulative Watershed NPS	x	urban environment	
	CDPHE Impairment/TMDL List			
SV 7.2 Sedimentation/ Turbidity	Excessive Erosion			0.75
	Excessive Deposition	X	highway run of	
	Fine Sediment Plumes			
	Agricultural Runoff	X	agriculture upstream	
	Excessive Turbidity	X		
	Nearby Construction Site	X	urban environment	
	Cumulative Watershed NPS	x		
	CDPHE Impairment/TMDL List			
SV 7.3 Toxic contamination/ pH	Recent Chemical Spills	x	urban environment	0.60
	Nearby Industrial Sites	x	urban environment	
	Road Drainage/Runoff	x	adjacent to highway	
	Livestock	x	agriculture upstream	
	Agricultural Runoff	x	agriculture upstream	
	Storm Water Runoff	x	adjacent to highway	
	Fish/Wildlife Impacts	x		
	Vegetation Impacts	x	weedy	
	Cumulative Watershed NPS	x		
	Acid Mine Drainage			
	Point Source Discharge	x	urban environment	
	CDPHE Impairment/TMDL List			
	Metal staining on rocks and veg.			
SV 7.4 Temperature	Excessive Temperature Regime	x	concrete adjacent	0.60
	Lack of Shading	x	No trees	
	Reservoir/Power Plant Discharge	x	stormwater	
	Industrial Discharge	x	urban environment	
	Cumulative Watershed NPS	x		
	CDPHE Impairment/TMDL List			
SV 7.5 Soil chemistry/ Redox potential	Unnatural Saturation/Desaturation			0.80
	Mechanical Soil Disturbance	x	urban environment	
	Dumping/introduced Soil	x	construction	
	CDPHE Impairment/TMDL List			

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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
0.70	+	0.75	+	0.60	+	0.60	+	0.80	=	3.45

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 0.72

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 weighting 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	0.9	0	
Stressor	**Tree**	**Shrub**	**Herb**	**Aquatic**	**Comments**
Noxious Weeds					
Exotic/Invasive spp.					
Tree Harvest					
Brush Cutting/Shrub Removal					adjacent to highway
Livestock Grazing					
Excessive Herbivory					
Mowing/Haying					
Herbicide					
Loss of Zonation/Homogenization					Urban environment
Dewatering					
Over Saturation					fed by highway run off
DIFFERENCE BETWEEN CURRENT COVERAGE AND REFERENCE/EXPECTED	0.45	0.15	0.2	0	
Reference/Expected % Cover of Layer	0.45	+ 0.15	+ 0.85	+ 0.00	= 1.45
	x	x	x	x	
Veg. Layer Sub-variable Score	0.5	0.5	0.8	0	÷ **See sub-variable scoring guidelines on following page**
	=	=	=	=	
Weighted Sub-variable Score	0.23	+ 0.08	+ 0.68	+ 0.00	= 0.98

Variable 8 Score 0.68

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)**	0.60
	Variable 2:	**Contributing Area (CA)**	0.60
Hydrology	**Variable 3:**	**Water Source (Source)**	0.65
	Variable 4:	**Water Distribution (Dist)**	0.65
	Variable 5:	**Water Outflow (Outflow)**	0.70
Abiotic and Biotic Habitat	**Variable 6:**	**Geomorphology (Geom)**	0.60
	Variable 7:	**Chemical Environment (Chem)**	0.72
	Variable 8:	**Vegetation Structure and Complexity (Veg)**	0.68

Functional Capacity Indices

Function 1 -- Support of Characteristic Wildlife Habitat

$V1_{connect}$	+	$V2_{CA}$	+	$(2 \times V8_{veg})$						Total Functional Points		FCI
0.60	+	0.60	+	1.35	+		+		=	2.55	÷ 4 =	0.64

Function 2 -- Support of Characteristic Fish/aquatic Habitat

$(3 \times V3_{source})$	+	$(2 \times V4_{dist})$	+	$(2 \times V5_{outflow})$	+	$V6_{geom}$	+	$V7_{chem}$						
1.95	+	1.30	+	1.40	+	0.60	+	0.72	+		=	5.97	÷ 9 =	0.66

Function 3 -- Flood Attenuation

$V2_{CA}$	+	$(2 \times V3_{source})$	+	$(2 \times V4_{dist})$	+	$(2 \times V5_{outflow})$	+	$V6_{geom}$	+	$V8_{veg}$				
0.60	+	1.30	+	1.30	+	1.40	+	0.60	+	0.68	=	5.88	÷ 9 =	0.65

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

$V3_{source}$	+	$(2 \times V4_{dist})$	+	$(2 \times V5_{outflow})$	+	$V6_{geom}$								
0.65	+	1.30	+	1.40	+	0.60	+		+		=	3.95	÷ 6 =	0.66

Function 5 -- Nutrient/Toxicant Removal

$(2 \times V2_{CA})$	+	$(2 \times V4_{dist})$	+	$V6_{geom}$	+	$V7_{chem}$								
1.20	+	1.30	+	0.60	+	0.72	+		+		=	3.82	÷ 6 =	0.64

Function 6 -- Sediment Retention/Shoreline Stabilization

$V2_{CA}$	+	$(2 \times V6_{geom})$	+	$(2 \times V8_{veg})$										
0.60	+	1.20	+	1.35	+		+		+		=	3.15	÷ 5 =	0.63

Function 7 -- Production Export/Food Chain Support

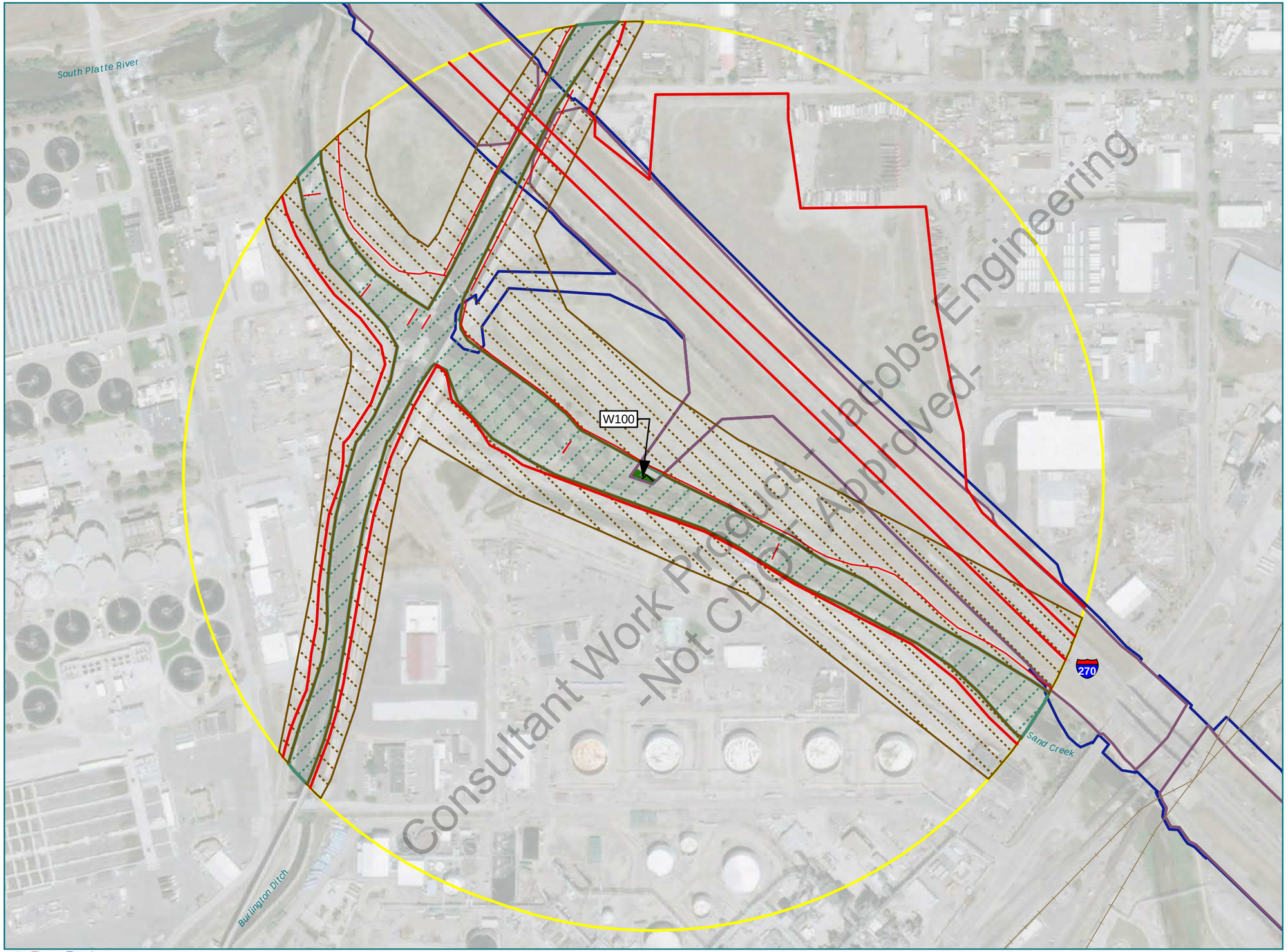
$V1_{connect}$	+	$(2 \times V5_{outflow})$	+	$V6_{geom}$	+	$V7_{chem}$	+	$(2 \times V8_{veg})$						
0.60	+	1.40	+	0.60	+	0.72	+	1.35	+		=	4.67	÷ 7 =	0.67

Sum of Individual FCI Scores **4.55**

Divide by the Number of Functions Scored **÷ 7**

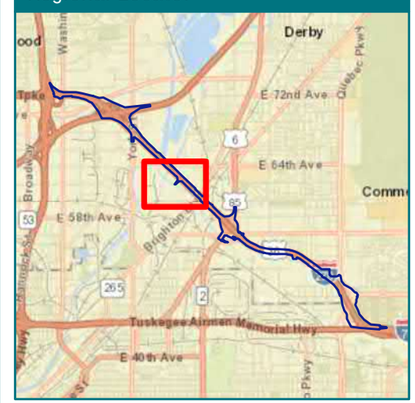
Composite FCI Score **0.65**

I-270 WETLAND FINDINGS REPORT
ASSESSMENT AREA AA-SC-1



- Migration Dispersal Barrier - Minor
- Migration Dispersal Barrier - Major
- Estimated Historic Habitat Area
- Existing Natural Habitat
- Area of Interest (Study Area)
- Approximate Project Disturbance Limits
- Wetland, PSS, Jurisdictional
- Habitat Connectivity Envelope

Regional Locator



Projection: Custom
Lambert Conformal Conic
North American Datum 1983 (2011)

Source: ESRI and its data partners

COLORADO
Department of Transportation

0 2 4 Miles

N

I-270 Corridor Improvements

PATH: \\DC1VS01\GISPROJ\C\CDOT\I_270\MAPFILES\ENVIRO\WETLANDS\FACWET\AA_SC_1.MXD - USER: BARNEYPG - DATE: 3/5/2021

ADMINISTRATIVE CHARACTERIZATION

General Information			
	AA-SC-1	Date of Evaluation:	1/21/2021
Site Name or ID:	AA-SC-1: W100 (Sand Creek)	Project Name:	I-270 (STU 2706-043)
404 or Other Permit Application #:	NA	Applicant Name:	CDOT
Evaluator Name(s):	Brett Hartmann and Pat Hickey	Evaluator's professional position and organization:	Biologists (Jacobs)

Location Information:			
Site Coordinates (Decimal Degrees, e.g., 38.85, -104.96):	AA-SC-1, Score for Sand Creek Wetland polygon (Centroid: 39.808580, -104.947189)	Geographic Datum Used (NAD 83):	NAD83
		Elevation	5145
Location Information:	Riverine wetlands associated with edges of Sand Creek		
Associated stream/water body name:	Sand Creek	Stream Order:	Riverine
USGS Quadrangle Map:	Commerce City, CO 2019	Map Scale: (Circle one)	1:24,000 / 1:100,000 / Other 1:
Sub basin Name (8 digit HUC):	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)	ac.	[X]	Measured: .056801				
		[ ]	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)	ac.	[X]	Measured	ac.	ac.	ac.	ac.
		[ ]	Estimated	ac.	ac.	ac.	ac.
Characteristics or Method used for AA boundary determination:	W100 is placed alone assessment area (AA) due to its distance and isolation from other AAs.						

Notes:

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 occur in the AA?

  Ute Lady's tresses
- ☐ Species of concern according to the Colorado Natural Heritage (CNHP) are known to occur in the AA?
- ☐ The site is located within a potential conservation area or element occurrence buffer area as determined by CNHP?
- ☐ 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)	Wetlands associated with the edges of Sand Creek. Sand Creek and associated wetlands are been confined between highway, walking trails, industrial facilities, and commercial properties				
	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)	Flood plane had been encroached on by urban and industrial development.			
	Previous HGM Class	Riverine	Slope	Depressional	Lacustrine

Notes (include information on the AA's HGM subclass and regional subclass):

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
P	P	E	RV	E	h	80
		SS	BLD	E	h	20

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.

See Map attached

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*	Very little or no loss of wetlands in the HCEor negligible.
<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:

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-270
	Secondary Highway	
x	Tertiary Roadway	adjacent
	Railroad	
x	Bike Path	Colorado Front Range Trail
x	Urban Development	Located in an urban setting
x	Agricultural Development	upstream
	Artificial Water Body	
x	Fence	multiple properties
x	Ditch or Aqueduct	feed by ditch
x	Aquatic Organism Barriers	infrastructure and flow controls

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	0.60
SV 1.2 Score	0.70

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 average 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

0.55 Percent of AA with Buffer

0.70 ***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)	*20*	*40*	*35*	*20*	*120*	*115*	*80*	*20*	56
Line #	1	2	3	4	5	6	7	8	**Avg. Buffer Width (m)**

0.7 ***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

0.7 ***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/industrial environment
	x	Urban	Urban Environment
		Residential	
		Rural	
		Dryland Farming	
		Intensive Agriculture	
		Orchards or Nurseries	
		Livestock Grazing	
	x	Transportation Corridor	adjacent to I-270
	x	Urban Parklands	adjacent to public space and trail
	x	Dams/impoundments	flow control structures
	x	Artificial Water body	ditches and basins created for transportation corridors and runnoff
	x	Physical Resource Extraction	road base extraction and construction
	x	Biological Resource Extraction	Urban Environment

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**				
(0.7	**+**	0.7	**) ÷**	2	=	**Variable 2 Score** 0.70

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
X	Ditches or Drains (tile, etc.)	road side ditches and structure help feed AA's hydrology
X	Dams	Dam in place to control flow
X	Diversions	Diversion and other management structures throughout clear creak
	Groundwater pumping	
	Draw-downs	
X	Culverts or Constrictions	culverts and other stormwater structure feed hydrology to the AA
X	Point Source (urban, ind., ag.)	Heavily managed urban environment, heavey industrial facilities adjace
	Non-point Source	
	Increased Drainage Area	
X	Storm Drain/Urban Runoff	SW drain/ runoff contributes to hydrology of AA
X	Impermeable Surface Runoff	adjace to highway and other compacted surfaces due to urban
	Irrigation Return Flows	
	Mining/Natural Gas Extraction	
	Transbasin Diversion	
X	Actively Managed Hydrology	Urban course that has been highly altered and managed in the past.

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 0.7

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	surrounding lands and water stuctures in constant flux due to construction
×	Ditches	ditches feed hydrology
×	Ponding/Impoundment	caused at diversion and stormwater structures
×	Culverts	runoff from culverts contributes to hydrology
×	Road Grades	adjacent and feed by run off from road and path grading.
×	Channel Incision/Entrenchment	Channelshows signs of Incision and Entrenchment. Substrate prone to erosion.
×	Hardened/Engineered Channel	concrete structures manage flow and armor banks
×	Enlarged Channel	artificially enlarged in places to slow flow
×	Artificial Banks/Shoreline	heavily managed urban creek
	Weirs	
×	Dikes/Levees/Berms	Berms and grading contain Sand Creek
	Diversions	
×	Sediment/Fill Accumulation	runoff from urban setting

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	
	Culverts	
	Diversions	
	Constrictions	
X	Channel Incision/Entrenchment	substrate prone to erosion
X	Hardened/Engineered Channel	Urban environment
	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 0.95

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
X	General	Dredging/Excavation/Mining	appears to be created from mining mitigation associated with highway
X		Fill, including dikes, road grades, etc	Adjacent to roadways and under highway
X		Grading	road and walking trail adjacent
X		Compaction	due to construction and siturbance
		Plowing/Disking	
X		Excessive Sedimentation	loose sediment from runoff and erosion
		Dumping	
		Hoof Shear/Pugging	
		Aggregate or Mineral Mining	
X		Sand Accumulation	loose sediment from runoff and erosion
	Channels Only	Channel Instability/Over Widening	erosion prone substrate
		Excessive Bank Erosion	erosion prone substrate
X		Channelization	erosion prone substrate
X		Reconfigured Stream Channels	Urban environment
X		Artificial Banks/Shoreline	Urban environment
X		Beaver Dam Removal	Urban environment
		Substrate Embeddedness	
X		Lack or Excess of Woody Debris	Urban environment

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 0.7

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	x	agriculture upstream	0.70
	Agricultural Runoff	x	agriculture upstream	
	Septic/Sewage	x	placed in an urban enviroment	
	Excessive Algae or Aquatic Veg.			
	Cumulative Watershed NPS	x	urban environment	
	CDPHE Impairment/TMDL List	x	Clear Creek	
SV 7.2 Sedimentation/ Turbidity	Excessive Erosion	X	unstable banks	0.90
	Excessive Deposition			
	Fine Sediment Plumes			
	Agricultural Runoff	X	agriculture upstream	
	Excessive Turbidity	X	urban run off	
	Nearby Construction Site	X	urban environment	
	Cumulative Watershed NPS	x	urban environment	
	CDPHE Impairment/TMDL List	x	Clear Creek	
SV 7.3 Toxic contamination/ pH	Recent Chemical Spills	x	urban environment	0.60
	Nearby Industrial Sites	x	urban environment	
	Road Drainage/Runoff	x	adjacent to roadways, run off div	
	Livestock	x	agriculture upstream	
	Agricultural Runoff	x	agriculture upstream	
	Storm Water Runoff	x	urban environment	
	Fish/Wildlife Impacts	x	urban environment	
	Vegetation Impacts	x	weedy	
	Cumulative Watershed NPS	x	urban environment	
	Acid Mine Drainage			
	Point Source Discharge	x	sewer treatment plant, Urban en	
	CDPHE Impairment/TMDL List	x	Clear Creek	
	Metal staining on rocks and veg.			
SV 7.4 Temperature	Excessive Temperature Regime			0.70
	Lack of Shading	x	tree removal	
	Reservoir/Power Plant Discharge	x	stormwater	
	Industrial Discharge	x	urban/industrial environment	
	Cumulative Watershed NPS	x	urban environment	
	CDPHE Impairment/TMDL List	x	Clear Creek	
SV 7.5 Soil chemistry/ Redox potential	Unnatural Saturation/Desaturation			0.80
	Mechanical Soil Disturbance	x	urban environment	
	Dumping/introduced Soil	x	construction	
	CDPHE Impairment/TMDL List	x	Clear Creek	

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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
0.70	+	0.90	+	0.60	+	0.70	+	0.80	=	3.70

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 0.72

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 weighting 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	0.2	0	0.8	0	
Stressor	**Tree**	**Shrub**	**Herb**	**Aquatic**	**Comments**
Noxious Weeds			5%		
Exotic/Invasive spp.					
Tree Harvest					
Brush Cutting/Shrub Removal					
Livestock Grazing					
Excessive Herbivory					
Mowing/Haying			20%		
Herbicide					
Loss of Zonation/Homogenization			70%		
Dewatering					
Over Saturation	20%		20%		
DIFFERENCE BETWEEN CURRENT COVERAGE AND REFERENCE/EXPECTED	0.35	0.03	0	0	

Reference/Expected % Cover of Layer	0.45	+ 0.15	+ 0.85	+ 0.00	=	1.45	
	x	x	x	x			
Veg. Layer Sub-variable Score	0.8	0.5	0.85	0	÷		**See sub-variable scoring guidelines on following page**
	=	=	=	=			
Weighted Sub-variable Score	0.36	+ 0.08	+ 0.72	+	=	1.1575	

Variable 8 Score 0.80

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)**	0.70
Hydrology	**Variable 3:**	**Water Source (Source)**	0.70
	Variable 4:	**Water Distribution (Dist)**	0.70
	Variable 5:	**Water Outflow (Outflow)**	0.95
Abiotic and Biotic Habitat	**Variable 6:**	**Geomorphology (Geom)**	0.70
	Variable 7:	**Chemical Environment (Chem)**	0.72
	Variable 8:	**Vegetation Structure and Complexity (Veg)**	0.80

Functional Capacity Indices

Function 1 -- Support of Characteristic Wildlife Habitat

$V1_{connect}$	+	$V2_{CA}$	+	$(2 \times V8_{veg})$						Total Functional Points		FCI
0.65	+	0.70	+	1.60	+		+		=	2.95	÷ 4 =	0.74

Function 2 -- Support of Characteristic Fish/aquatic Habitat

$(3 \times V3_{source})$	+	$(2 \times V4_{dist})$	+	$(2 \times V5_{outflow})$	+	$V6_{geom}$	+	$V7_{chem}$						
2.10	+	1.40	+	1.90	+	0.70	+	0.72	+		=	6.82	÷ 9 =	0.76

Function 3 -- Flood Attenuation

$V2_{CA}$	+	$(2 \times V3_{source})$	+	$(2 \times V4_{dist})$	+	$(2 \times V5_{outflow})$	+	$V6_{geom}$	+	$V8_{veg}$				
0.70	+	1.40	+	1.40	+	1.90	+	0.70	+	0.80	=	6.90	÷ 9 =	0.77

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

$V3_{source}$	+	$(2 \times V4_{dist})$	+	$(2 \times V5_{outflow})$	+	$V6_{geom}$								
0.70	+	1.40	+	1.90	+	0.70	+		+		=	4.70	÷ 6 =	0.78

Function 5 -- Nutrient/Toxicant Removal

$(2 \times V2_{CA})$	+	$(2 \times V4_{dist})$	+	$V6_{geom}$	+	$V7_{chem}$								
1.40	+	1.40	+	0.70	+	0.72	+		+		=	4.22	÷ 6 =	0.70

Function 6 -- Sediment Retention/Shoreline Stabilization

$V2_{CA}$	+	$(2 \times V6_{geom})$	+	$(2 \times V8_{veg})$										
0.70	+	1.40	+	1.60	+		+		+		=	3.70	÷ 5 =	0.74

Function 7 -- Production Export/Food Chain Support

$V1_{connect}$	+	$(2 \times V5_{outflow})$	+	$V6_{geom}$	+	$V7_{chem}$	+	$(2 \times V8_{veg})$						
0.65	+	1.90	+	0.70	+	0.72	+	1.60	+		=	5.57	÷ 7 =	0.80

Sum of Individual FCI Scores **5.28**

Divide by the Number of Functions Scored **÷ 7**

Composite FCI Score **0.75**

I-270 WETLAND FINDINGS REPORT
ASSESSMENT AREA AA-SC-2

- Migration Dispersal Barrier - Minor
- Migration Dispersal Barrier - Major
- Estimated Historic Habitat Area
- Existing Natural Habitat
- Area of Interest (Study Area)
- Approximate Project Disturbance Limits
- OWUS, Jurisdictional
- Wetland, PEM, Jurisdictional
- Habitat Connectivity Envelope

W051
OW50
W053
W050
W052
Sand Creek
6
270
2

Regional Locator

Projection: Custom
Lambert Conformal Conic
North American Datum 1983 (2011)

Source: ESRI and its data partners

COLORADO
Department of Transportation

0 2 4 Miles

N

I-270 Corridor Improvements

PATH: \\DC1VS01\GISPROJ\C\CDOT\I_270\MAPFILES\ENVIRO\WETLANDS\FACWET\AA_SC_2.MXD - USER: BARNEYPG - DATE: 3/5/2021

ADMINISTRATIVE CHARACTERIZATION

General Information	AA-SC-2	Date of Evaluation:	1/21/2021
Site Name or ID:	AA-SC-2: W050, W051, W052, and W053 (Sand	Project Name:	I-270 (STU 2706-043)
404 or Other Permit Application #:	NA	Applicant Name:	CDOT
Evaluator Name(s):	Brett Hartmann and Pat Hickey	Evaluator's professional position and organization:	Biologists (Jacobs)

Location Information:			
Site Coordinates (Decimal Degrees, e.g., 38.85, -104.96):	AA-CC-2, Aggregated Score for multiple Sand Creek Wetland polygons (Centroid: 39.798286, -104.935695)	Geographic Datum Used (NAD 83):	NAD83
		Elevation	5150
Location Information:	Riverine wetlands associated with edges of Sand Creek		
Associated stream/water body name:	Sand Creek	Stream Order:	Riverine
USGS Quadrangle Map:	Commerce City, CO 2019	Map Scale: (Circle one)	1:24,000 / 1:100,000 / Other 1:
Sub basin Name (8 digit HUC):	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)	ac.	[X]	Measured: 0.50341				
		[ ]	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)	ac.	[X]	Measured	ac.	ac.	ac.	ac.
		[ ]	Estimated	ac.	ac.	ac.	ac.
Characteristics or Method used for AA boundary determination:	W050, W051, W052, and W053 are similar wetlands in close proximty with in same HGM class. Therefore, these wetlands are grouped into a single assessment area (AA).						

Notes:	

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 occur in the AA?

  Ute Lady's tresses
- ☐ Species of concern according to the Colorado Natural Heritage (CNHP) are known to occur in the AA?
- ☐ The site is located within a potential conservation area or element occurrence buffer area as determined by CNHP?
- ☐ 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)	Wetlands associated with the edges of Sand Creek. Creek and wetlands are confined by bridge in this location.				
	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)	Wetland has been confined between highway and industrial facilities.			
	Previous HGM Class	Riverine	Slope	Depressional	Lacustrine

Notes (include information on the AA's HGM subclass and regional subclass):

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
P	P	E	RV	E	h	80
		SS	BLD	E	h	15
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.

See Map Attached

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*	Very little or no loss of wetlands in the HCEor negligible.
<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:

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-270
x	Secondary Highway	HWY-85
x	Tertiary Roadway	adjacent
	Railroad	
x	Bike Path	Colorado Front Range Trail
x	Urban Development	Located in an urban setting
x	Agricultural Development	upstream
	Artificial Water Body	
x	Fence	multiple properties
x	Ditch or Aqueduct	feed by ditch
x	Aquatic Organism Barriers	infrastructure and flow controls

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	0.60
SV 1.2 Score	0.70

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 average 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

0.55 Percent of AA with Buffer

0.70 ***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*	*20*	*18*	*25*	*30*	*12*	*15*	*15*	18
Line #	1	2	3	4	5	6	7	8	**Avg. Buffer Width (m)**

0.7 ***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

0.7 ***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/industrial environment
	x	Urban	Urban Environment
		Residential	
		Rural	
		Dryland Farming	
		Intensive Agriculture	
		Orchards or Nurseries	
		Livestock Grazing	
	x	Transportation Corridor	adjacent to I-270
	x	Urban Parklands	adjacent to public space and trail
	x	Dams/impoundments	flow control structures
	x	Artificial Water body	ditches and basins created for transportation corridors and runnoff
	x	Physical Resource Extraction	road base extraction and construction
	x	Biological Resource Extraction	Urban Environment

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**				
(	0.7	**+**	0.7	**) ÷**	2	= **Variable 2 Score**	0.70

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
X	Ditches or Drains (tile, etc.)	road side ditches and structure help feed AA's hydrology
X	Dams	Dam in place to control flow
X	Diversions	Diversion and other management structures throughout clear creak
	Groundwater pumping	
	Draw-downs	
X	Culverts or Constrictions	culverts and other stormwater structure feed hydrology to the AA
X	Point Source (urban, ind., ag.)	Heavily managed urban environment, heavey industrial facilities adjace
	Non-point Source	
	Increased Drainage Area	
X	Storm Drain/Urban Runoff	SW drain/ runoff contributes to hydrology of AA
X	Impermeable Surface Runoff	adjace to highway and other compacted surfaces due to urban
	Irrigation Return Flows	
	Mining/Natural Gas Extraction	
	Transbasin Diversion	
X	Actively Managed Hydrology	Urban course that has been highly altered and managed in the past.

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 0.7

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	surrounding lands and water stuctures in constant flux due to construction
×	Ditches	ditches feed hydrology
×	Ponding/Impoundment	caused at diversion and stormwater structures
×	Culverts	runoff from culverts contributes to hydrology
×	Road Grades	adjacent and feed by run off from road and path grading.
×	Channel Incision/Entrenchment	Channelshows signs of Incision and Entrenchment. Substrate prone to erosion.
×	Hardened/Engineered Channel	concrete structures manage flow and armor banks
×	Enlarged Channel	artificially enlarged in places to slow flow
×	Artificial Banks/Shoreline	heavily managed urban creek
	Weirs	
×	Dikes/Levees/Berms	Berms and grading contain Sand Creek
	Diversions	
×	Sediment/Fill Accumulation	runoff from urban setting

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	
	Culverts	
	Diversions	
	Constrictions	
X	Channel Incision/Entrenchment	substrate prone to erosion
X	Hardened/Engineered Channel	Urban environment
	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 0.95

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
X	General	Dredging/Excavation/Mining	appears to be created from mining mitigation associated with highway
X		Fill, including dikes, road grades, etc	Adjacent to roadways and under highway
X		Grading	road and walking trail adjacent
X		Compaction	due to construction and siturbance
		Plowing/Disking	
X		Excessive Sedimentation	loose sediment from runoff and erosion
		Dumping	
		Hoof Shear/Pugging	
		Aggregate or Mineral Mining	
X		Sand Accumulation	loose sediment from runoff and erosion
	Channels Only	Channel Instability/Over Widening	erosion prone substrate
		Excessive Bank Erosion	erosion prone substrate
X		Channelization	erosion prone substrate
X		Reconfigured Stream Channels	Urban environment
X		Artificial Banks/Shoreline	Urban environment
X		Beaver Dam Removal	Urban environment
		Substrate Embeddedness	
X		Lack or Excess of Woody Debris	Urban environment

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 0.7

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	x	agriculture upstream	0.70
	Agricultural Runoff	x	agriculture upstream	
	Septic/Sewage	x	placed in an urban enviroment	
	Excessive Algae or Aquatic Veg.			
	Cumulative Watershed NPS	x	urban environment	
	CDPHE Impairment/TMDL List	x	Clear Creek	
SV 7.2 Sedimentation/ Turbidity	Excessive Erosion	X	unstable banks	0.90
	Excessive Deposition			
	Fine Sediment Plumes			
	Agricultural Runoff	X	agriculture upstream	
	Excessive Turbidity	X	urban run off	
	Nearby Construction Site	X	urban environment	
	Cumulative Watershed NPS	x	urban environment	
	CDPHE Impairment/TMDL List	x	Clear Creek	
SV 7.3 Toxic contamination/ pH	Recent Chemical Spills	x	urban environment	0.60
	Nearby Industrial Sites	x	urban environment	
	Road Drainage/Runoff	x	adjacent to roadways, run off div	
	Livestock	x	agriculture upstream	
	Agricultural Runoff	x	agriculture upstream	
	Storm Water Runoff	x	urban environment	
	Fish/Wildlife Impacts	x	urban environment	
	Vegetation Impacts	x	weedy	
	Cumulative Watershed NPS	x	urban environment	
	Acid Mine Drainage			
	Point Source Discharge	x	sewer treatment plant, Urban en	
	CDPHE Impairment/TMDL List	x	Clear Creek	
	Metal staining on rocks and veg.			
SV 7.4 Temperature	Excessive Temperature Regime			0.70
	Lack of Shading	x	tree removal	
	Reservoir/Power Plant Discharge	x	stormwater	
	Industrial Discharge	x	urban/industrial environment	
	Cumulative Watershed NPS	x	urban environment	
	CDPHE Impairment/TMDL List	x	Clear Creek	
SV 7.5 Soil chemistry/ Redox potential	Unnatural Saturation/Desaturation			0.80
	Mechanical Soil Disturbance	x	urban environment	
	Dumping/introduced Soil	x	construction	
	CDPHE Impairment/TMDL List	x	Clear Creek	

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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
0.70	+	0.90	+	0.60	+	0.70	+	0.80	=	3.70

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 0.72

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 weighting 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	0.1	0.12	0.77	0	
Stressor	**Tree**	**Shrub**	**Herb**	**Aquatic**	**Comments**
Noxious Weeds			19%		Canada thistle, teasel, pepperweed
Exotic/Invasive spp.					
Tree Harvest					
Brush Cutting/Shrub Removal					
Livestock Grazing					
Excessive Herbivory					
Mowing/Haying			20%		
Herbicide					
Loss of Zonation/Homogenization			70%		
Dewatering					
Over Saturation	20%		20%		
DIFFERENCE BETWEEN CURRENT COVERAGE AND REFERENCE/EXPECTED	0.35	0.03	0.08	0	

Reference/Expected % Cover of Layer	0.45	+ 0.15	+ 0.85	+ 0.00	=	1.45		
	x	x	x	x				
Veg. Layer Sub-variable Score	0.7	0.9	0.75	0	÷		**See sub-variable scoring guidelines on following page**	
	=	=	=	=				
Weighted Sub-variable Score	0.32	+ 0.14	+ 0.64	+	=	1.0875		

Variable 8 Score 0.75

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)**	0.70
Hydrology	**Variable 3:**	**Water Source (Source)**	0.70
	Variable 4:	**Water Distribution (Dist)**	0.70
	Variable 5:	**Water Outflow (Outflow)**	0.95
Abiotic and Biotic Habitat	**Variable 6:**	**Geomorphology (Geom)**	0.70
	Variable 7:	**Chemical Environment (Chem)**	0.72
	Variable 8:	**Vegetation Structure and Complexity (Veg)**	0.75

Functional Capacity Indices

Function 1 -- Support of Characteristic Wildlife Habitat

$V1_{connect}$	+	$V2_{CA}$	+	$(2 \times V8_{veg})$						Total Functional Points		FCI
0.65	+	0.70	+	1.50	+		+		=	2.85	÷ 4 =	0.71

Function 2 -- Support of Characteristic Fish/aquatic Habitat

$(3 \times V3_{source})$	+	$(2 \times V4_{dist})$	+	$(2 \times V5_{outflow})$	+	$V6_{geom}$	+	$V7_{chem}$						
2.10	+	1.40	+	1.90	+	0.70	+	0.72	+		=	6.82	÷ 9 =	0.76

Function 3 -- Flood Attenuation

$V2_{CA}$	+	$(2 \times V3_{source})$	+	$(2 \times V4_{dist})$	+	$(2 \times V5_{outflow})$	+	$V6_{geom}$	+	$V8_{veg}$				
0.70	+	1.40	+	1.40	+	1.90	+	0.70	+	0.75	=	6.85	÷ 9 =	0.76

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

$V3_{source}$	+	$(2 \times V4_{dist})$	+	$(2 \times V5_{outflow})$	+	$V6_{geom}$								
0.70	+	1.40	+	1.90	+	0.70	+		+		=	4.70	÷ 6 =	0.78

Function 5 -- Nutrient/Toxicant Removal

$(2 \times V2_{CA})$	+	$(2 \times V4_{dist})$	+	$V6_{geom}$	+	$V7_{chem}$								
1.40	+	1.40	+	0.70	+	0.72	+		+		=	4.22	÷ 6 =	0.70

Function 6 -- Sediment Retention/Shoreline Stabilization

$V2_{CA}$	+	$(2 \times V6_{geom})$	+	$(2 \times V8_{veg})$										
0.70	+	1.40	+	1.50	+		+		+		=	3.60	÷ 5 =	0.72

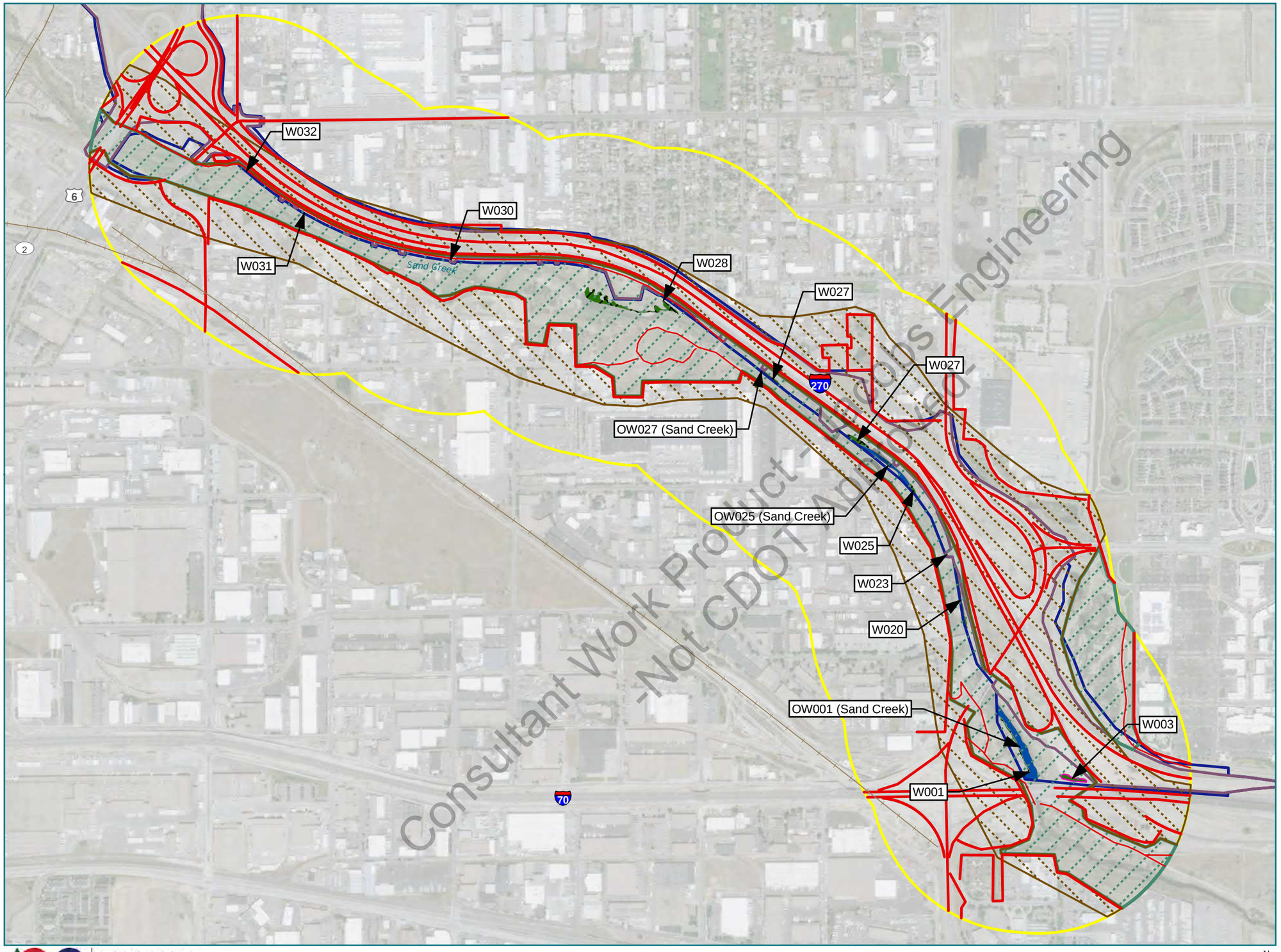
Function 7 -- Production Export/Food Chain Support

$V1_{connect}$	+	$(2 \times V5_{outflow})$	+	$V6_{geom}$	+	$V7_{chem}$	+	$(2 \times V8_{veg})$						
0.65	+	1.90	+	0.70	+	0.72	+	1.50	+		=	5.47	÷ 7 =	0.78

Sum of Individual FCI Scores **5.22**

Divide by the Number of Functions Scored **÷ 7**

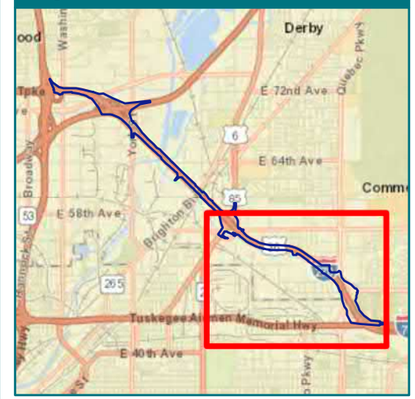
Composite FCI Score **0.75**



I-270 WETLAND FINDINGS REPORT
ASSESSMENT AREA AA-SC-3

- Migration Dispersal Barrier - Minor
- Migration Dispersal Barrier - Major
- Estimated Historic Habitat Area
- Existing Natural Habitat
- Area of Interest (Study Area)
- Approximate Project Disturbance Limits
- OWUS, Jurisdictional
- Wetland, PEM, Jurisdictional
- Wetland, PEM, Assumed Non-Jurisdictional
- Wetland, PSS, Jurisdictional
- Habitat Connectivity Envelope

Regional Locator



Projection: Custom
Lambert Conformal Conic
North American Datum 1983 (2011)

Source: ESRI and its data partners

COLORADO
Department of Transportation

0 2 4 Miles

N

I-270 Corridor Improvements

PATH: \\DC1VS01\GISPROJ\C\CDOT\I_270\MAPFILES\ENVIRO\WETLANDSIFACWETIAA_SC_3.MXD - USER: BARNEYPG - DATE: 3/12/2021

ADMINISTRATIVE CHARACTERIZATION

General Information			
	AA-SC-3	Date of Evaluation:	1/21/2021
Site Name or ID:	AA-SC-3: W001, W002, W003, W020, W025, W027,	Project Name:	I-270 (STU 2706-043)
404 or Other Permit Application #:	NA	Applicant Name:	CDOT
Evaluator Name(s):	Brett Hartmann and Pat Hickey	Evaluator's professional position and organization:	Biologists (Jacobs)

Location Information:			
Site Coordinates (Decimal Degrees, e.g., 38.85, -104.96):	AA-CC-3, Aggregated Score for multiple Sand Creek Wetland polygons (Centroid: 39.793515, -104.916033)	Geographic Datum Used (NAD 83):	NAD83
		Elevation	5190
Location Information:	Riverine wetlands associated with edges of Sand Creek		
Associated stream/water body name:	Sand Creek	Stream Order:	Riverine
USGS Quadrangle Map:	Commerce City, CO 2019	Map Scale: (Circle one)	1:24,000 / 1:100,000 / Other 1:
Sub basin Name (8 digit HUC):	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)	ac.	[X]	Measured: 2.821396				
		[ ]	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)	ac.	[X]	Measured	ac.	ac.	ac.	ac.
		[ ]	Estimated	ac.	ac.	ac.	ac.
Characteristics or Method used for AA boundary determination:	W001, W002, W003, W020, W025, W027, W028, W030, W031, and W032 are similar wetlands in close proximty with in same HGM class. Therefore, these wetlands are grouped into a single assessment area (AA).						

Notes:	Measured in collector web map

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 occur in the AA?

  Ute Lady's tresses
- ☐ Species of concern according to the Colorado Natural Heritage (CNHP) are known to occur in the AA?
- ☐ The site is located within a potential conservation area or element occurrence buffer area as determined by CNHP?
- ☐ 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)	Wetlands associated with the edges of Sand Creek. Sand Creek and associated wetlands are been confined between highway, walking trails, industrial facilities, and commercial properties				
	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)	Flood plane had been encroached on by urban and industrial development.			
	Previous HGM Class	Riverine	Slope	Depressional	Lacustrine

Notes (include information on the AA's HGM subclass and regional subclass):

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
P	P	E	RV	E	h	75
		SS	BLD	E	h	25
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.

See Map Attached

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*	Very little or no loss of wetlands in the HCEor negligible.
<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:

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-270
x	Secondary Highway	HWY-85
x	Tertiary Roadway	adjacent
	Railroad	
x	Bike Path	Colorado Front Range Trail
x	Urban Development	Located in an urban setting
x	Agricultural Development	upstream
	Artificial Water Body	
x	Fence	multiple properties
x	Ditch or Aqueduct	feed by ditch
x	Aquatic Organism Barriers	infrastructure and flow controls

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	0.60
SV 1.2 Score	0.70

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 average 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

0.60 Percent of AA with Buffer

0.70 ***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)									
Line #	1	2	3	4	5	6	7	8	Avg. Buffer Width (m)

0.7 ***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

0.7 ***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/industrial environment
x	Urban	Urban Environment
	Residential	
	Rural	
	Dryland Farming	
	Intensive Agriculture	
	Orchards or Nurseries	
	Livestock Grazing	
x	Transportation Corridor	adjacent to I-270
x	Urban Parklands	adjacent to public space and trail
x	Dams/impoundments	flow control structures
x	Artificial Water body	ditches and basins created for transportation corridors and runnoff
x	Physical Resource Extraction	road base extraction and construction
x	Biological Resource Extraction	Urban Environment

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				
(	0.7	+	0.7	) ÷	2	= **Variable 2 Score**	0.70

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
X	Ditches or Drains (tile, etc.)	road side ditches and structure help feed AA's hydrology
X	Dams	Dam in place to control flow
X	Diversions	Diversion and other management structures throughout clear creak
	Groundwater pumping	
	Draw-downs	
X	Culverts or Constrictions	culverts and other stormwater structure feed hydrology to the AA
X	Point Source (urban, ind., ag.)	Heavily managed urban environment, heavey industrial facilities adjace
	Non-point Source	
	Increased Drainage Area	
X	Storm Drain/Urban Runoff	SW drain/ runoff contributes to hydrology of AA
X	Impermeable Surface Runoff	adjace to highway and other compacted surfaces due to urban
	Irrigation Return Flows	
	Mining/Natural Gas Extraction	
	Transbasin Diversion	
X	Actively Managed Hydrology	Urban course that has been highly altered and managed in the past.

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 0.7

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	surrounding lands and water stuctures in constant flux due to construction
×	Ditches	ditches feed hydrology
×	Ponding/Impoundment	caused at diversion and stormwater structures
×	Culverts	runoff from culverts contributes to hydrology
×	Road Grades	adjacent and feed by run off from road and path grading.
×	Channel Incision/Entrenchment	Channelshows signs of Incision and Entrenchment. Substrate prone to erosion.
×	Hardened/Engineered Channel	concrete structures manage flow and armor banks
×	Enlarged Channel	artificially enlarged in places to slow flow
×	Artificial Banks/Shoreline	heavily managed urban creek
	Weirs	
×	Dikes/Levees/Berms	Berms and grading contain Sand Creek
	Diversions	
×	Sediment/Fill Accumulation	runoff from urban setting

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	
	Culverts	
	Diversions	
	Constrictions	
X	Channel Incision/Entrenchment	substrate prone to erosion
X	Hardened/Engineered Channel	Urban environment
	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 0.95

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
X	General	Dredging/Excavation/Mining	appears to be created from mining mitigation associated with highway
X		Fill, including dikes, road grades, etc	Adjacent to roadways and under highway
X		Grading	road and walking trail adjacent
X		Compaction	due to construction and siturbance
		Plowing/Disking	
X		Excessive Sedimentation	loose sediment from runoff and erosion
		Dumping	
		Hoof Shear/Pugging	
		Aggregate or Mineral Mining	
X		Sand Accumulation	loose sediment from runoff and erosion
	Channels Only	Channel Instability/Over Widening	erosion prone substrate
		Excessive Bank Erosion	erosion prone substrate
X		Channelization	erosion prone substrate
X		Reconfigured Stream Channels	Urban environment
X		Artificial Banks/Shoreline	Urban environment
X		Beaver Dam Removal	Urban environment
		Substrate Embeddedness	
X		Lack or Excess of Woody Debris	Urban environment

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 0.7

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	x	agriculture upstream	0.70
	Agricultural Runoff	x	agriculture upstream	
	Septic/Sewage	x	placed in an urban enviroment	
	Excessive Algae or Aquatic Veg.			
	Cumulative Watershed NPS	x	urban environment	
	CDPHE Impairment/TMDL List	x	Clear Creek	
SV 7.2 Sedimentation/ Turbidity	Excessive Erosion	X	unstable banks	0.90
	Excessive Deposition			
	Fine Sediment Plumes			
	Agricultural Runoff	X	agriculture upstream	
	Excessive Turbidity	X	urban run off	
	Nearby Construction Site	X	urban environment	
	Cumulative Watershed NPS	x	urban environment	
	CDPHE Impairment/TMDL List	x	Clear Creek	
SV 7.3 Toxic contamination/ pH	Recent Chemical Spills	x	urban environment	0.60
	Nearby Industrial Sites	x	urban environment	
	Road Drainage/Runoff	x	adjacent to roadways, run off div	
	Livestock	x	agriculture upstream	
	Agricultural Runoff	x	agriculture upstream	
	Storm Water Runoff	x	urban environment	
	Fish/Wildlife Impacts	x	urban environment	
	Vegetation Impacts	x	weedy	
	Cumulative Watershed NPS	x	urban environment	
	Acid Mine Drainage			
	Point Source Discharge	x	sewer treatment plant, Urban en	
	CDPHE Impairment/TMDL List	x	Clear Creek	
	Metal staining on rocks and veg.			
SV 7.4 Temperature	Excessive Temperature Regime			0.70
	Lack of Shading	x	tree removal	
	Reservoir/Power Plant Discharge	x	stormwater	
	Industrial Discharge	x	urban/industrial environment	
	Cumulative Watershed NPS	x	urban environment	
	CDPHE Impairment/TMDL List	x	Clear Creek	
SV 7.5 Soil chemistry/ Redox potential	Unnatural Saturation/Desaturation			0.80
	Mechanical Soil Disturbance	x	urban environment	
	Dumping/introduced Soil	x	construction	
	CDPHE Impairment/TMDL List	x	Clear Creek	

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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
0.70	+	0.90	+	0.60	+	0.70	+	0.80	=	3.70

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 0.72

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 weighting 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	0.25	0	0.85	0	
Stressor	**Tree**	**Shrub**	**Herb**	**Aquatic**	**Comments**
Noxious Weeds			5%		Canada thistle
Exotic/Invasive spp.					
Tree Harvest					
Brush Cutting/Shrub Removal					
Livestock Grazing					
Excessive Herbivory					
Mowing/Haying			20%		
Herbicide					
Loss of Zonation/Homogenization			70%		
Dewatering					
Over Saturation	20%		20%		
DIFFERENCE BETWEEN CURRENT COVERAGE AND REFERENCE/EXPECTED	0.35	0.03	0	0	

Reference/Expected % Cover of Layer	0.45	+ 0.15	+ 0.85	+ 0.00	=	1.45	
	x	x	x	x			
Veg. Layer Sub-variable Score	0.8	0.5	0.85	0	÷		**See sub-variable scoring guidelines on following page**
	=	=	=	=			
Weighted Sub-variable Score	0.36	+ 0.08	+ 0.72	+	=	1.1575	

Variable 8 Score 0.80

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)**	0.70
Hydrology	**Variable 3:**	**Water Source (Source)**	0.70
	Variable 4:	**Water Distribution (Dist)**	0.70
	Variable 5:	**Water Outflow (Outflow)**	0.95
Abiotic and Biotic Habitat	**Variable 6:**	**Geomorphology (Geom)**	0.70
	Variable 7:	**Chemical Environment (Chem)**	0.72
	Variable 8:	**Vegetation Structure and Complexity (Veg)**	0.80

Functional Capacity Indices

Function 1 -- Support of Characteristic Wildlife Habitat

$V1_{connect}$	+	$V2_{CA}$	+	$(2 \times V8_{veg})$						Total Functional Points		FCI
0.65	+	0.70	+	1.60	+		+		=	2.95	÷ 4 =	0.74

Function 2 -- Support of Characteristic Fish/aquatic Habitat

$(3 \times V3_{source})$	+	$(2 \times V4_{dist})$	+	$(2 \times V5_{outflow})$	+	$V6_{geom}$	+	$V7_{chem}$						
2.10	+	1.40	+	1.90	+	0.70	+	0.72	+		=	6.82	÷ 9 =	0.76

Function 3 -- Flood Attenuation

$V2_{CA}$	+	$(2 \times V3_{source})$	+	$(2 \times V4_{dist})$	+	$(2 \times V5_{outflow})$	+	$V6_{geom}$	+	$V8_{veg}$				
0.70	+	1.40	+	1.40	+	1.90	+	0.70	+	0.80	=	6.90	÷ 9 =	0.77

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

$V3_{source}$	+	$(2 \times V4_{dist})$	+	$(2 \times V5_{outflow})$	+	$V6_{geom}$								
0.70	+	1.40	+	1.90	+	0.70	+		+		=	4.70	÷ 6 =	0.78

Function 5 -- Nutrient/Toxicant Removal

$(2 \times V2_{CA})$	+	$(2 \times V4_{dist})$	+	$V6_{geom}$	+	$V7_{chem}$								
1.40	+	1.40	+	0.70	+	0.72	+		+		=	4.22	÷ 6 =	0.70

Function 6 -- Sediment Retention/Shoreline Stabilization

$V2_{CA}$	+	$(2 \times V6_{geom})$	+	$(2 \times V8_{veg})$										
0.70	+	1.40	+	1.60	+		+		+		=	3.70	÷ 5 =	0.74

Function 7 -- Production Export/Food Chain Support

$V1_{connect}$	+	$(2 \times V5_{outflow})$	+	$V6_{geom}$	+	$V7_{chem}$	+	$(2 \times V8_{veg})$						
0.65	+	1.90	+	0.70	+	0.72	+	1.60	+		=	5.57	÷ 7 =	0.80

Sum of Individual FCI Scores **5.28**

Divide by the Number of Functions Scored **÷ 7**

Composite FCI Score **0.75**

I-270 WETLAND FINDINGS REPORT
ASSESSMENT AREA AA-SC-4

- Migration Dispersal Barrier - Minor
- Migration Dispersal Barrier - Major
- Estimated Historic Habitat Area
- Existing Natural Habitat
- Area of Interest (Study Area)
- Approximate Project Disturbance Limits
- Wetland, PSS, Jurisdictional
- Habitat Connectivity Envelope

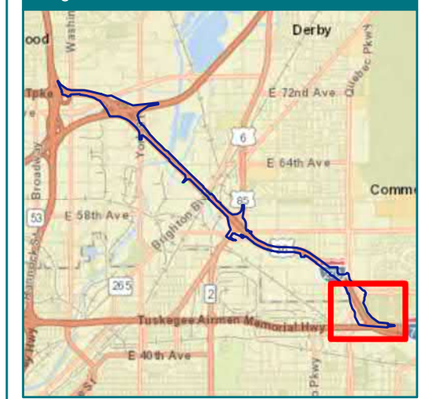
W010

270

70

Sand Creek

Regional Locator



Projection: Custom
Lambert Conformal Conic
North American Datum 1983 (2011)

Source: ESRI and its data partners

COLORADO
Department of Transportation

0 2 4 Miles

N

I-270 Corridor Improvements

PATH: \\DC1VS01\GISPROJ\C\CDOT\I_270\MAPFILES\ENVIRO\WETLANDS\FACWET\AA_SC_4.MXD - USER: BARNEYPG - DATE: 3/12/2021

ADMINISTRATIVE CHARACTERIZATION

General Information	AA-I-4	Date of Evaluation:	1/21/2021
Site Name or ID:	AA-I-4: W010 (Infrastructure)	Project Name:	I-270 (STU 2706-043)
404 or Other Permit Application #:	NA	Applicant Name:	CDOT
Evaluator Name(s):	Brett Hartmann and Pat Hickey	Evaluator's professional position and organization:	Biologists (Jacobs)

Location Information:			
Site Coordinates (Decimal Degrees, e.g., 38.85, -104.96):	AA-SC-4, Score for single Infrastructure Wetland polygons (Centroid: 39.781646, -104.898556)	Geographic Datum Used (NAD 83):	NAD83
		Elevation	5230
Location Information:	essional wetland associated with infrastructure run off. Constructed wetland for stormwater manage		
Associated stream/water body name:	Highway runoff	Stream Order:	NA
USGS Quadrangle Map:	Commerce City, CO 2019	Map Scale: (Circle one)	1:24,000 1:100,000 Other 1:
Sub basin Name (8 digit HUC):	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)	ac.	[X]	Measured: 1.258935				
		[ ]	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)	ac.	[X]	Measured	ac.	ac.	ac.	ac.
		[ ]	Estimated	ac.	ac.	ac.	ac.
Characteristics or Method used for AA boundary determination:	W010 is placed alone assessment area (AA) due to its distance and isolation from other AAs.						

Notes:	

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 occur in the AA?
- ☐ Species of concern according to the Colorado Natural Heritage (CNHP) are known to occur in the AA?
- ☐ The site is located within a potential conservation area or element occurrence buffer area as determined by CNHP?
- ☐ 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)	Wetlands associated with highway run off. Wetland is located in a stormwater structure. Stormwater structure has been constructed in an attempt to mimic a natural wetland.				
	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)	Once upland environment. Historic imagery appear to show a prarie dog colony in the location of the current wetland.			
	Previous HGM Class	Riverine	Slope	Depressional	Lacustrine

Notes (include information on the AA's HGM subclass and regional subclass): Depressional wetland appears to have been present since creation of highway

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
P	P	E	RV	E	h	75
		SS	BLD	E	h	25
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.

See Map Attached

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*	Very little or no loss of wetlands in the HCEor negligible.
<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:

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-70
	Secondary Highway	
x	Tertiary Roadway	Quebec Street and others
	Railroad	
x	Bike Path	Northfield Pond Park
x	Urban Development	shopping center adjaent
x	Agricultural Development	upstream
	Artificial Water Body	
x	Fence	multiple properties
x	Ditch or Aqueduct	Constructed, feed by runoff
x	Aquatic Organism Barriers	flow control structures

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	0.70
SV 1.2 Score	0.70

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

Variable 1 Score 0.70

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 average of the two sub-variable scores.

SV 2.1 - Buffer Condition

0.8 ***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

0.70 Percent of AA with Buffer

0.80 ***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)	*20*	*35*	*60*	*55*	*55*	*20*	*50*	*50*	43
Line #	1	2	3	4	5	6	7	8	**Avg. Buffer Width (m)**

0.7 ***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

0.6 ***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/industrial environment
x	Urban	Urban Environment
	Residential	
	Rural	
	Dryland Farming	
	Intensive Agriculture	
	Orchards or Nurseries	
	Livestock Grazing	
x	Transportation Corridor	adjacent to highways
x	Urban Parklands	is in a park. Park is there because of created wetland
x	Dams/impoundments	flow control structures
x	Artificial Water body	sw basin
x	Physical Resource Extraction	road base extraction and construction
	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**				
(0.7	**+**	0.6	**) ÷**	2	=	**Variable 2 Score** 0.65

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
X	Ditches or Drains (tile, etc.)	Is a ditch
	Dams	
X	Diversions	trash, elevation changes, aggregate
	Groundwater pumping	
	Draw-downs	
X	Culverts or Constrictions	feeds ditch
X	Point Source (urban, ind., ag.)	Heavily managed urban environment
	Non-point Source	
	Increased Drainage Area	
X	Storm Drain/Urban Runoff	SW drain/ runoff contributes to hydrology of AA
X	Impermeable Surface Runoff	adjace to highway and other compacted surfaces due to urban
	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 0.65

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	surrounding lands and water stuctures in constant flux due to construction
×	Ditches	Is a ditch
	Ponding/Impoundment	
×	Culverts	runoff from culverts contributes to hydrology
×	Road Grades	adjacent and feed by run off from road grading.
	Channel Incision/Entrenchment	
	Hardened/Engineered Channel	
	Enlarged Channel	
×	Artificial Banks/Shoreline	heavily managed urban ditch
	Weirs	
×	Dikes/Levees/Berms	Road grade
	Diversions	
×	Sediment/Fill Accumulation	runoff from urban setting, trash

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 0.8

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	Road grade and barriers
×	Ditches	is a ditch
	Dikes/Levees	
×	Road Grades	confined by roads
×	Culverts	placed at outflow
×	Diversions	road grade
×	Constrictions	urban envronment
	Channel Incision/Entrenchment	
×	Hardened/Engineered Channel	Compacted soils from grading
×	Artificial Stream Banks	artificial wetland
	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 0.75

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	
X	General	Fill, including dikes, road grades, etc	Adjacent to highway and infrastructure
X	General	Grading	Adjacent to highway and infrastructure
X	General	Compaction	grading
X	General	Plowing/Disking	graded to lower elevation to support wetland
X	General	Excessive Sedimentation	loose sediment from runoff and erosion
X	General	Dumping	Adjacent to highway,public space, some trash
	General	Hoof Shear/Pugging	
	General	Aggregate or Mineral Mining	
X	General	Sand Accumulation	loose sediment from runoff and erosion
	Channels Only	Channel Instability/Over Widening	
	Channels Only	Excessive Bank Erosion	
	Channels Only	Channelization	
	Channels Only	Reconfigured Stream Channels	
	Channels Only	Artificial Banks/Shoreline	
	Channels Only	Beaver Dam Removal	
	Channels Only	Substrate Embeddedness	
	Channels Only	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 0.6

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	x	agriculture upstream	0.70
	Agricultural Runoff	x	agriculture upstream	
	Septic/Sewage	x	placed in an urban enviroment	
	Excessive Algae or Aquatic Veg.			
	Cumulative Watershed NPS	x	urban environment	
	CDPHE Impairment/TMDL List			
SV 7.2 Sedimentation/ Turbidity	Excessive Erosion			0.75
	Excessive Deposition	X	highway run of	
	Fine Sediment Plumes			
	Agricultural Runoff	X	agriculture upstream	
	Excessive Turbidity	X		
	Nearby Construction Site	X	urban environment	
	Cumulative Watershed NPS	x		
	CDPHE Impairment/TMDL List			
SV 7.3 Toxic contamination/ pH	Recent Chemical Spills	x	urban environment	0.60
	Nearby Industrial Sites	x	urban environment	
	Road Drainage/Runoff	x	adjacent to highway	
	Livestock	x	agriculture upstream	
	Agricultural Runoff	x	agriculture upstream	
	Storm Water Runoff	x	adjacent to highway	
	Fish/Wildlife Impacts	x		
	Vegetation Impacts	x	weedy	
	Cumulative Watershed NPS	x		
	Acid Mine Drainage			
	Point Source Discharge	x	urban environment	
	CDPHE Impairment/TMDL List			
	Metal staining on rocks and veg.			
SV 7.4 Temperature	Excessive Temperature Regime	x	concrete adjacent	0.60
	Lack of Shading	x	No trees	
	Reservoir/Power Plant Discharge	x	stormwater	
	Industrial Discharge	x	urban environment	
	Cumulative Watershed NPS	x		
	CDPHE Impairment/TMDL List			
SV 7.5 Soil chemistry/ Redox potential	Unnatural Saturation/Desaturation			0.80
	Mechanical Soil Disturbance	x	urban environment	
	Dumping/introduced Soil	x	construction	
	CDPHE Impairment/TMDL List			

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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
0.70	+	0.75	+	0.60	+	0.60	+	0.80	=	3.45

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 0.72

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 weighting 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	1	0	
Stressor	**Tree**	**Shrub**	**Herb**	**Aquatic**	**Comments**
Noxious Weeds					
Exotic/Invasive spp.					
Tree Harvest					
Brush Cutting/Shrub Removal					adjacent to highway
Livestock Grazing					
Excessive Herbivory					
Mowing/Haying					
Herbicide					
Loss of Zonation/Homogenization					Urban environment
Dewatering					
Over Saturation					fed by highway run off
DIFFERENCE BETWEEN CURRENT COVERAGE AND REFERENCE/EXPECTED	0.45	0.15	0.2	0	

Reference/Expected % Cover of Layer	0.45	+	0.15	+	0.85	+	0.00	=	1.45
	x		x		x		x		÷
Veg. Layer Sub-variable Score	0.5		0.5		0.8		0		**See sub-variable scoring guidelines on following page**
	=		=		=		=		
Weighted Sub-variable Score	0.23	+	0.08	+	0.68	+	0.00	=	0.98

Variable 8 Score 0.68

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)**	0.70
	Variable 2:	**Contributing Area (CA)**	0.65
Hydrology	**Variable 3:**	**Water Source (Source)**	0.65
	Variable 4:	**Water Distribution (Dist)**	0.80
	Variable 5:	**Water Outflow (Outflow)**	0.75
Abiotic and Biotic Habitat	**Variable 6:**	**Geomorphology (Geom)**	0.60
	Variable 7:	**Chemical Environment (Chem)**	0.72
	Variable 8:	**Vegetation Structure and Complexity (Veg)**	0.68

Functional Capacity Indices

Function 1 -- Support of Characteristic Wildlife Habitat

$V1_{connect}$	+	$V2_{CA}$	+	$(2 \times V8_{veg})$						Total Functional Points		FCI
0.70	+	0.65	+	1.35	+		+		=	2.70	÷ 4 =	0.68

Function 2 -- Support of Characteristic Fish/aquatic Habitat

$(3 \times V3_{source})$	+	$(2 \times V4_{dist})$	+	$(2 \times V5_{outflow})$	+	$V6_{geom}$	+	$V7_{chem}$						
1.95	+	1.60	+	1.50	+	0.60	+	0.72	+		=	6.37	÷ 9 =	0.71

Function 3 -- Flood Attenuation

$V2_{CA}$	+	$(2 \times V3_{source})$	+	$(2 \times V4_{dist})$	+	$(2 \times V5_{outflow})$	+	$V6_{geom}$	+	$V8_{veg}$				
0.65	+	1.30	+	1.60	+	1.50	+	0.60	+	0.68	=	6.33	÷ 9 =	0.70

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

$V3_{source}$	+	$(2 \times V4_{dist})$	+	$(2 \times V5_{outflow})$	+	$V6_{geom}$								
0.65	+	1.60	+	1.50	+	0.60	+		+		=	4.35	÷ 6 =	0.73

Function 5 -- Nutrient/Toxicant Removal

$(2 \times V2_{CA})$	+	$(2 \times V4_{dist})$	+	$V6_{geom}$		$V7_{chem}$								
1.30	+	1.60	+	0.60	+	0.72	+		+		=	4.22	÷ 6 =	0.70

Function 6 -- Sediment Retention/Shoreline Stabilization

$V2_{CA}$	+	$(2 \times V6_{geom})$	+	$(2 \times V8_{veg})$										
0.65	+	1.20	+	1.35	+		+		+		=	3.20	÷ 5 =	0.64

Function 7 -- Production Export/Food Chain Support

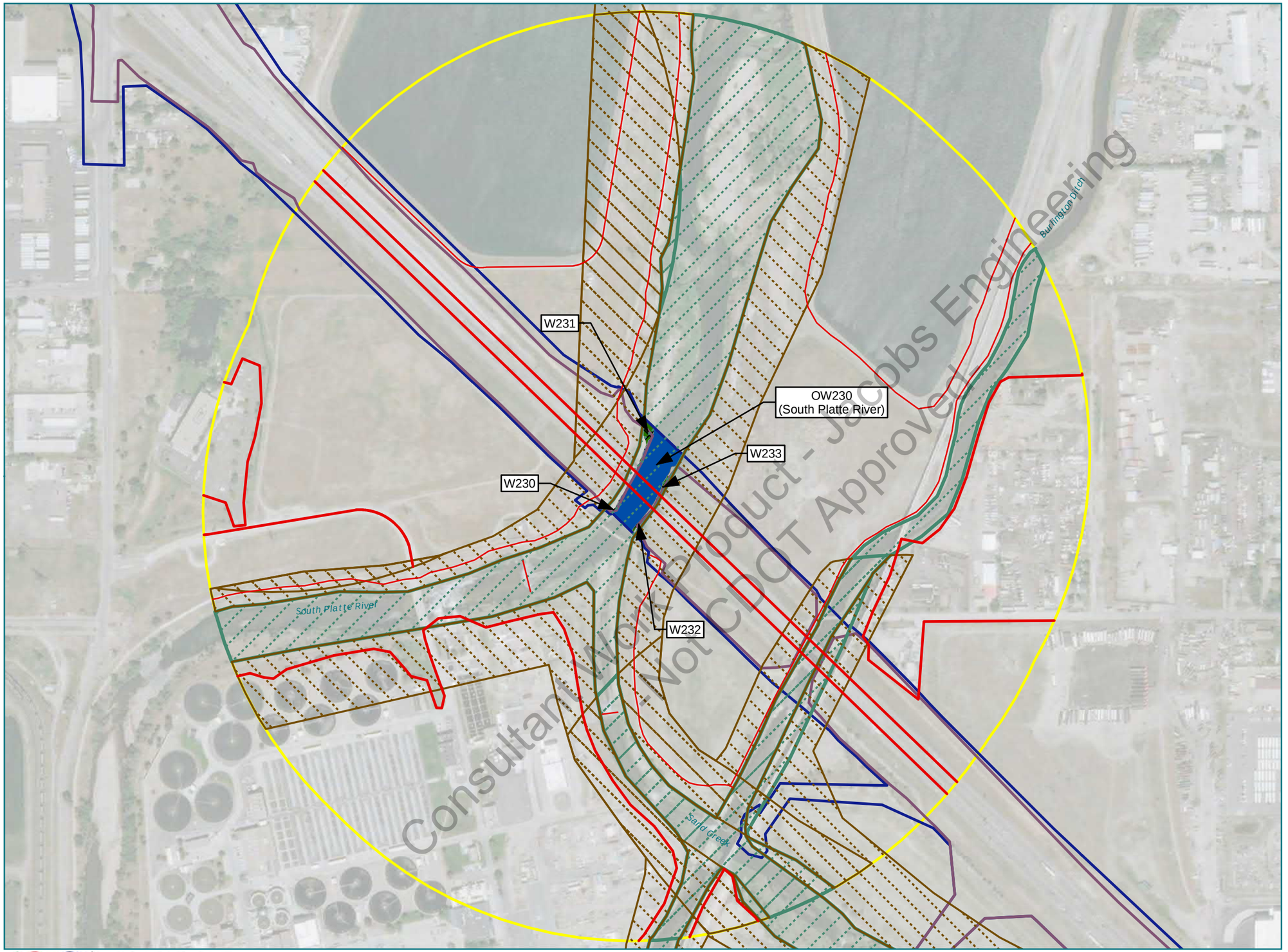
$V1_{connect}$	+	$(2 \times V5_{outflow})$	+	$V6_{geom}$	+	$V7_{chem}$	+	$(2 \times V8_{veg})$						
0.70	+	1.50	+	0.60	+	0.72	+	1.35	+		=	4.87	÷ 7 =	0.70

Sum of Individual FCI Scores **4.85**

Divide by the Number of Functions Scored **÷ 7**

Composite FCI Score **0.69**

I-270 WETLAND FINDINGS REPORT
ASSESSMENT AREA AA-SP-1



- Migration Dispersal Barrier - Minor
- Migration Dispersal Barrier - Major
- Estimated Historic Habitat Area
- Existing Natural Habitat
- Area of Interest (Study Area)
- Approximate Project Disturbance Limits
- OWUS, Jurisdictional
- Wetland, PSS, Jurisdictional
- Habitat Connectivity Envelope

Regional Locator

Projection: Custom
Lambert Conformal Conic
North American Datum 1983 (2011)

Source: ESRI and its data partners

COLORADO
Department of Transportation

0 2 4 Miles

N

I-270 Corridor Improvements

PATH: \\DC1VS01\GISPROJ\C\CDOT\I_270\MAPFILES\ENVIRO\WETLANDS\FACWET\AA_SP_1.MXD - USER: BARNEYPG - DATE: 3/11/2021

ADMINISTRATIVE CHARACTERIZATION

General Information	AA-SC-3	Date of Evaluation:	1/21/2021
Site Name or ID:	AA-SP-1: W230, W231, W232, W233	Project Name:	I-270 (STU 2706-043)
404 or Other Permit Application #:	NA	Applicant Name:	CDOT
Evaluator Name(s):	Brett Hartmann and Pat Hickey	Evaluator's professional position and organization:	Biologists (Jacobs)

Location Information:			
Site Coordinates (Decimal Degrees, e.g., 38.85, -104.96):	AA-SP-1, Aggregated Score for multiple South Platte River Wetland polygons (Centroid: 39.814083, -104.951943)	Geographic Datum Used (NAD 83):	NAD83
		Elevation	5110
Location Information:	Riverine wetlands associated with edges of the South Platte River		
Associated stream/water body name:	Sand Creek	Stream Order:	Riverine
USGS Quadrangle Map:	Commerce City, CO 2019	Map Scale: (Circle one)	1:24,000 / 1:100,000 / Other 1:
Sub basin Name (8 digit HUC):	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)	ac.	[X]	Measured: .109583				
		[ ]	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)	ac.	[X]	Measured	ac.	ac.	ac.	ac.
		[ ]	Estimated	ac.	ac.	ac.	ac.
Characteristics or Method used for AA boundary determination:	W230, W231, W232, and W232 are similar wetlands in close proximty with in same HGM class. Therefore, these wetlands are grouped into a single assessment area (AA).						

Notes:	Measured in collector web map

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 occur in the AA?

  Ute Lady's tresses
- ☐ Species of concern according to the Colorado Natural Heritage (CNHP) are known to occur in the AA?
- ☐ The site is located within a potential conservation area or element occurrence buffer area as determined by CNHP?
- ☐ 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)	Wetlands associated with the edges of Sand Creek. Sand Creek and associated wetlands are been confined between highway, walking trails, industrial facilities, and commercial properties				
	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)	Flood plane had been encroached on by urban and industrial development.			
	Previous HGM Class	Riverine	Slope	Depressional	Lacustrine

Notes (include information on the AA's HGM subclass and regional subclass):

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
P	P	E	RV	E	h	75
		SS	BLD	E	h	25
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.

See Map Attached

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*	Very little or no loss of wetlands in the HCEor negligible.
<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:

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-270
x	Secondary Highway	
x	Tertiary Roadway	adjacent
	Railroad	
x	Bike Path	Colorado Front Range Trail
x	Urban Development	Located in an urban setting
x	Agricultural Development	upstream
	Artificial Water Body	
x	Fence	multiple properties
x	Ditch or Aqueduct	feed by ditch
x	Aquatic Organism Barriers	infrastructure and flow controls

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	0.60
SV 1.2 Score	0.70

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 average 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

0.60 Percent of AA with Buffer

0.70 ***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)	*5*	*10*	*2*	*2*	*5*	*8*	*5*	*10*	6
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

0.7 ***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/industrial environment
x	Urban	Urban Environment
	Residential	
	Rural	
	Dryland Farming	
	Intensive Agriculture	
	Orchards or Nurseries	
	Livestock Grazing	
x	Transportation Corridor	adjacent to I-270
x	Urban Parklands	adjacent to public space and trail
x	Dams/impoundments	flow control structures
x	Artificial Water body	ditches and basins created for transportation corridors and runnoff
x	Physical Resource Extraction	road base extraction and construction
x	Biological Resource Extraction	Urban Environment

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 **+** 0.7) ÷ 2 = **Variable 2 Score** 0.65

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
X	Ditches or Drains (tile, etc.)	road side ditches and structure help feed AA's hydrology
X	Dams	Dam in place to control flow
X	Diversions	Diversion and other management structures throughout clear creak
	Groundwater pumping	
	Draw-downs	
X	Culverts or Constrictions	culverts and other stormwater structure feed hydrology to the AA
X	Point Source (urban, ind., ag.)	Heavily managed urban environment, heavey industrial facilities adjace
	Non-point Source	
	Increased Drainage Area	
X	Storm Drain/Urban Runoff	SW drain/ runoff contributes to hydrology of AA
X	Impermeable Surface Runoff	adjace to highway and other compacted surfaces due to urban
	Irrigation Return Flows	
	Mining/Natural Gas Extraction	
	Transbasin Diversion	
X	Actively Managed Hydrology	Urban course that has been highly altered and managed in the past.

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 0.7

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	surrounding lands and water stuctures in constant flux due to construction
×	Ditches	ditches feed hydrology
×	Ponding/Impoundment	caused at diversion and stormwater structures
×	Culverts	runoff from culverts contributes to hydrology
×	Road Grades	adjacent and feed by run off from road and path grading.
×	Channel Incision/Entrenchment	Channelshows signs of Incision and Entrenchment. Substrate prone to erosion.
×	Hardened/Engineered Channel	concrete structures manage flow and armor banks
×	Enlarged Channel	artificially enlarged in places to slow flow
×	Artificial Banks/Shoreline	heavily managed urban creek
	Weirs	
×	Dikes/Levees/Berms	Berms and grading contain Sand Creek
	Diversions	
×	Sediment/Fill Accumulation	runoff from urban setting

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	
	Culverts	
	Diversions	
	Constrictions	
X	Channel Incision/Entrenchment	substrate prone to erosion
X	Hardened/Engineered Channel	Urban environment
	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 0.95

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
X	General	Dredging/Excavation/Mining	appears to be created from mining mitigation associated with highway
X		Fill, including dikes, road grades, etc	Adjacent to roadways and under highway
X		Grading	road and walking trail adjacent
X		Compaction	due to construction and siturbance
		Plowing/Disking	
X		Excessive Sedimentation	loose sediment from runoff and erosion
		Dumping	
		Hoof Shear/Pugging	
		Aggregate or Mineral Mining	
X		Sand Accumulation	loose sediment from runoff and erosion
	Channels Only	Channel Instability/Over Widening	erosion prone substrate
		Excessive Bank Erosion	erosion prone substrate
X		Channelization	erosion prone substrate
X		Reconfigured Stream Channels	Urban environment
X		Artificial Banks/Shoreline	Urban environment
X		Beaver Dam Removal	Urban environment
		Substrate Embeddedness	
X		Lack or Excess of Woody Debris	Urban environment

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 0.7

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	x	agriculture upstream	0.70
	Agricultural Runoff	x	agriculture upstream	
	Septic/Sewage	x	placed in an urban enviroment	
	Excessive Algae or Aquatic Veg.			
	Cumulative Watershed NPS	x	urban environment	
	CDPHE Impairment/TMDL List	x	Clear Creek	
SV 7.2 Sedimentation/ Turbidity	Excessive Erosion	X	unstable banks	0.90
	Excessive Deposition			
	Fine Sediment Plumes			
	Agricultural Runoff	X	agriculture upstream	
	Excessive Turbidity	X	urban run off	
	Nearby Construction Site	X	urban environment	
	Cumulative Watershed NPS	x	urban environment	
	CDPHE Impairment/TMDL List	x	Clear Creek	
SV 7.3 Toxic contamination/ pH	Recent Chemical Spills	x	urban environment	0.60
	Nearby Industrial Sites	x	urban environment	
	Road Drainage/Runoff	x	adjacent to roadways, run off div	
	Livestock	x	agriculture upstream	
	Agricultural Runoff	x	agriculture upstream	
	Storm Water Runoff	x	urban environment	
	Fish/Wildlife Impacts	x	urban environment	
	Vegetation Impacts	x	weedy	
	Cumulative Watershed NPS	x	urban environment	
	Acid Mine Drainage			
	Point Source Discharge	x	sewer treatment plant, Urban en	
	CDPHE Impairment/TMDL List	x	Clear Creek	
	Metal staining on rocks and veg.			
SV 7.4 Temperature	Excessive Temperature Regime			0.70
	Lack of Shading	x	tree removal	
	Reservoir/Power Plant Discharge	x	stormwater	
	Industrial Discharge	x	urban/industrial environment	
	Cumulative Watershed NPS	x	urban environment	
	CDPHE Impairment/TMDL List	x	Clear Creek	
SV 7.5 Soil chemistry/ Redox potential	Unnatural Saturation/Desaturation			0.80
	Mechanical Soil Disturbance	x	urban environment	
	Dumping/introduced Soil	x	construction	
	CDPHE Impairment/TMDL List	x	Clear Creek	

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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
0.70	+	0.90	+	0.60	+	0.70	+	0.80	=	3.70

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 0.72

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 weighting 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	0.25	0	0.85	0	
Stressor	**Tree**	**Shrub**	**Herb**	**Aquatic**	**Comments**
Noxious Weeds			5%		Canada thistle
Exotic/Invasive spp.					
Tree Harvest					
Brush Cutting/Shrub Removal					
Livestock Grazing					
Excessive Herbivory					
Mowing/Haying			20%		
Herbicide					
Loss of Zonation/Homogenization			70%		
Dewatering					
Over Saturation	20%		20%		
DIFFERENCE BETWEEN CURRENT COVERAGE AND REFERENCE/EXPECTED	0.35	0.03	0	0	

Reference/Expected % Cover of Layer	0.45	+ 0.15	+ 0.85	+ 0.00	=	1.45	
	x	x	x	x			
Veg. Layer Sub-variable Score	0.8	0.5	0.85	0	÷		**See sub-variable scoring guidelines on following page**
	=	=	=	=			
Weighted Sub-variable Score	0.36	+ 0.08	+ 0.72	+	=	1.1575	

Variable 8 Score 0.80

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)**	0.65
Hydrology	**Variable 3:**	**Water Source (Source)**	0.70
	Variable 4:	**Water Distribution (Dist)**	0.70
	Variable 5:	**Water Outflow (Outflow)**	0.95
Abiotic and Biotic Habitat	**Variable 6:**	**Geomorphology (Geom)**	0.70
	Variable 7:	**Chemical Environment (Chem)**	0.72
	Variable 8:	**Vegetation Structure and Complexity (Veg)**	0.80

Functional Capacity Indices

Function 1 -- Support of Characteristic Wildlife Habitat

$V1_{connect}$	+	$V2_{CA}$	+	$(2 \times V8_{veg})$						Total Functional Points		FCI
0.65	+	0.65	+	1.60	+		+		=	2.90	÷ 4 =	0.72

Function 2 -- Support of Characteristic Fish/aquatic Habitat

$(3 \times V3_{source})$	+	$(2 \times V4_{dist})$	+	$(2 \times V5_{outflow})$	+	$V6_{geom}$	+	$V7_{chem}$						
2.10	+	1.40	+	1.90	+	0.70	+	0.72	+		=	6.82	÷ 9 =	0.76

Function 3 -- Flood Attenuation

$V2_{CA}$	+	$(2 \times V3_{source})$	+	$(2 \times V4_{dist})$	+	$(2 \times V5_{outflow})$	+	$V6_{geom}$	+	$V8_{veg}$				
0.65	+	1.40	+	1.40	+	1.90	+	0.70	+	0.80	=	6.85	÷ 9 =	0.76

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

$V3_{source}$	+	$(2 \times V4_{dist})$	+	$(2 \times V5_{outflow})$	+	$V6_{geom}$								
0.70	+	1.40	+	1.90	+	0.70	+		+		=	4.70	÷ 6 =	0.78

Function 5 -- Nutrient/Toxicant Removal

$(2 \times V2_{CA})$	+	$(2 \times V4_{dist})$	+	$V6_{geom}$	+	$V7_{chem}$								
1.30	+	1.40	+	0.70	+	0.72	+		+		=	4.12	÷ 6 =	0.69

Function 6 -- Sediment Retention/Shoreline Stabilization

$V2_{CA}$	+	$(2 \times V6_{geom})$	+	$(2 \times V8_{veg})$										
0.65	+	1.40	+	1.60	+		+		+		=	3.65	÷ 5 =	0.73

Function 7 -- Production Export/Food Chain Support

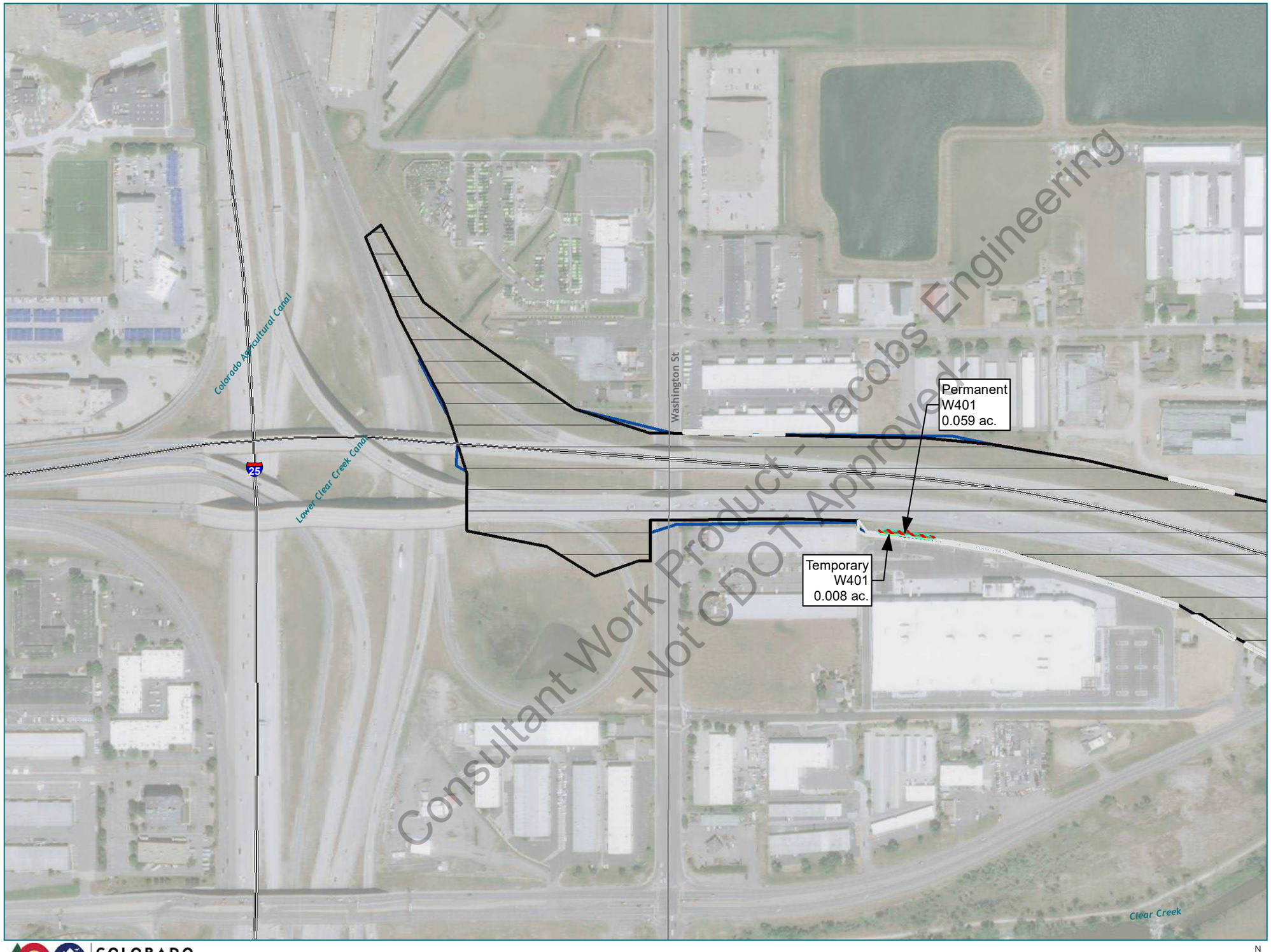
$V1_{connect}$	+	$(2 \times V5_{outflow})$	+	$V6_{geom}$	+	$V7_{chem}$	+	$(2 \times V8_{veg})$						
0.65	+	1.90	+	0.70	+	0.72	+	1.60	+		=	5.57	÷ 7 =	0.80

Sum of Individual FCI Scores 5.24

Divide by the Number of Functions Scored ÷ 7

Composite FCI Score 0.75

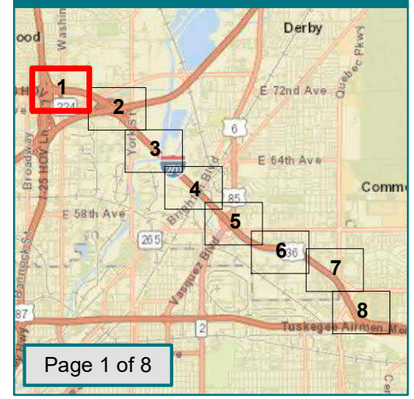
Appendix E
Wetland Impacts Maps and Impact Summary Table



I-270 ENVIRONMETAL ASSESSMENT WETLAND DELINEATION MAPBOOK

- Jurisdictional Other Waters
- Non-Jurisdictional Other Waters
- Jurisdictional PEM Wetland
- Jurisdictional PSS Wetland
- Non-Jurisdictional Wetland
- Permanently Impacted
- Temporarily Impacted
- Permanent Impact Area
- Temporary Impact Area
- Study Area

Regional Locator



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Department of Transportation

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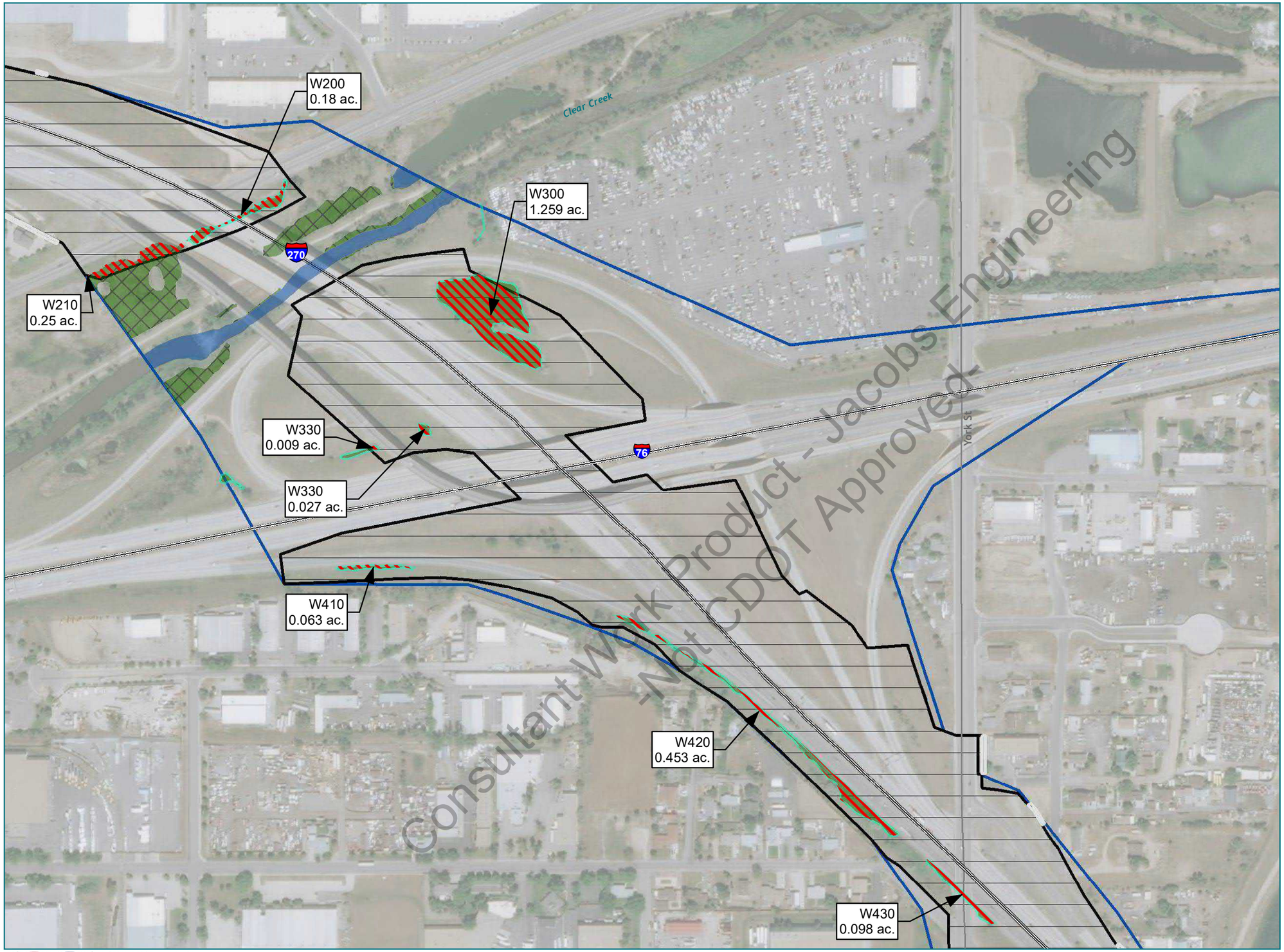

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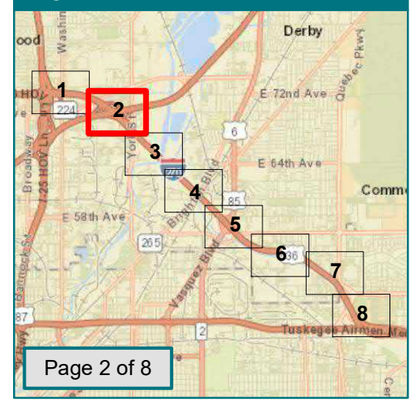
Regional Locator



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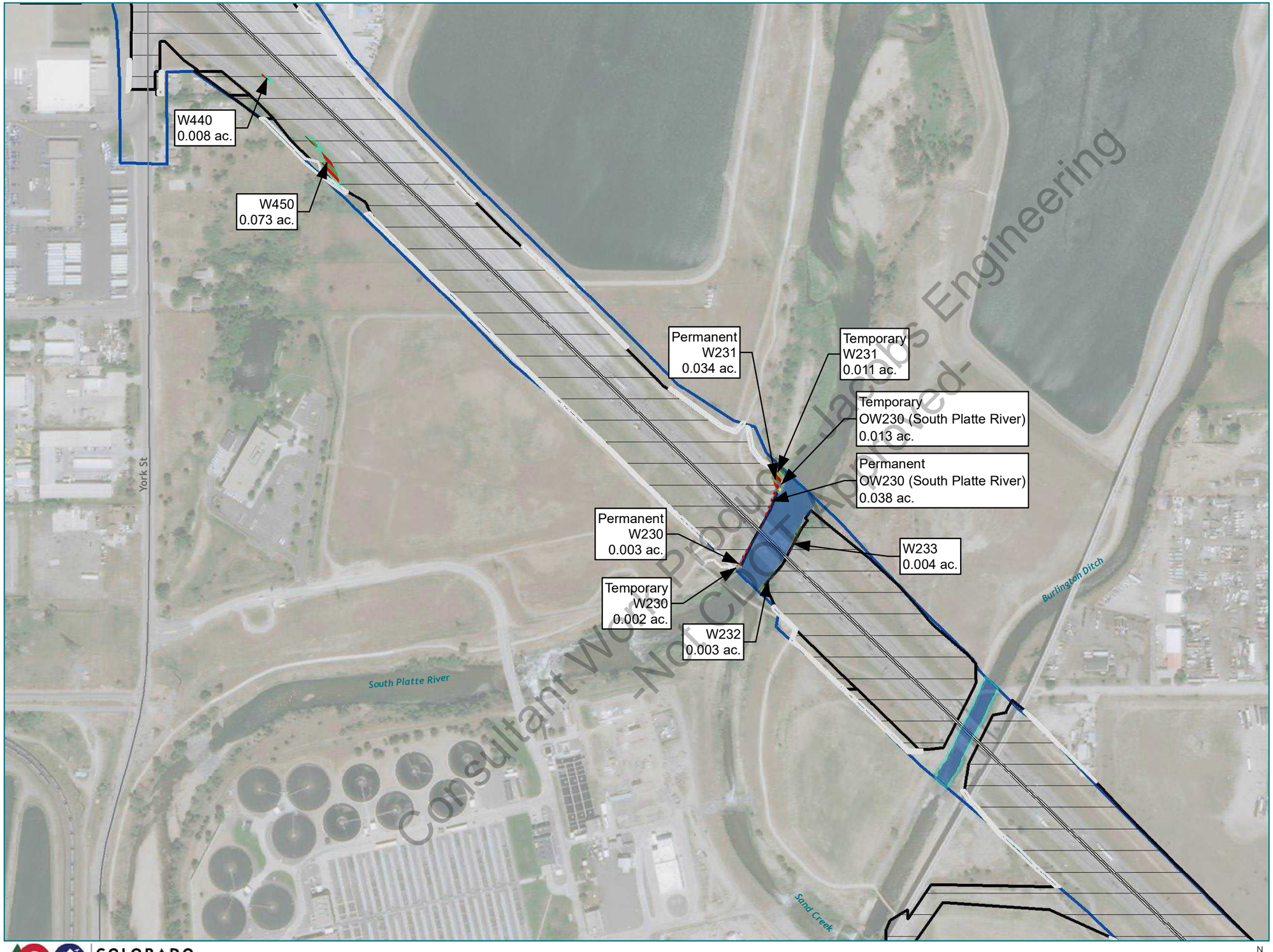

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WETLAND DELINEATION MAPBOOK

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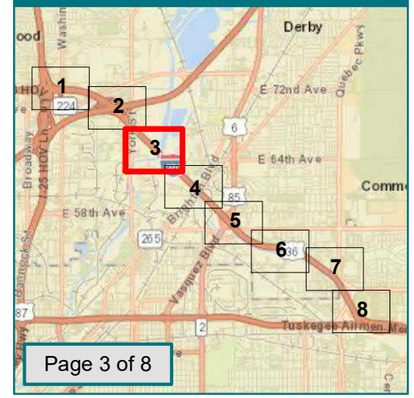
Regional Locator



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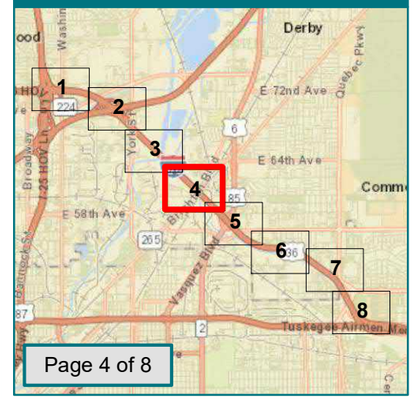
Regional Locator



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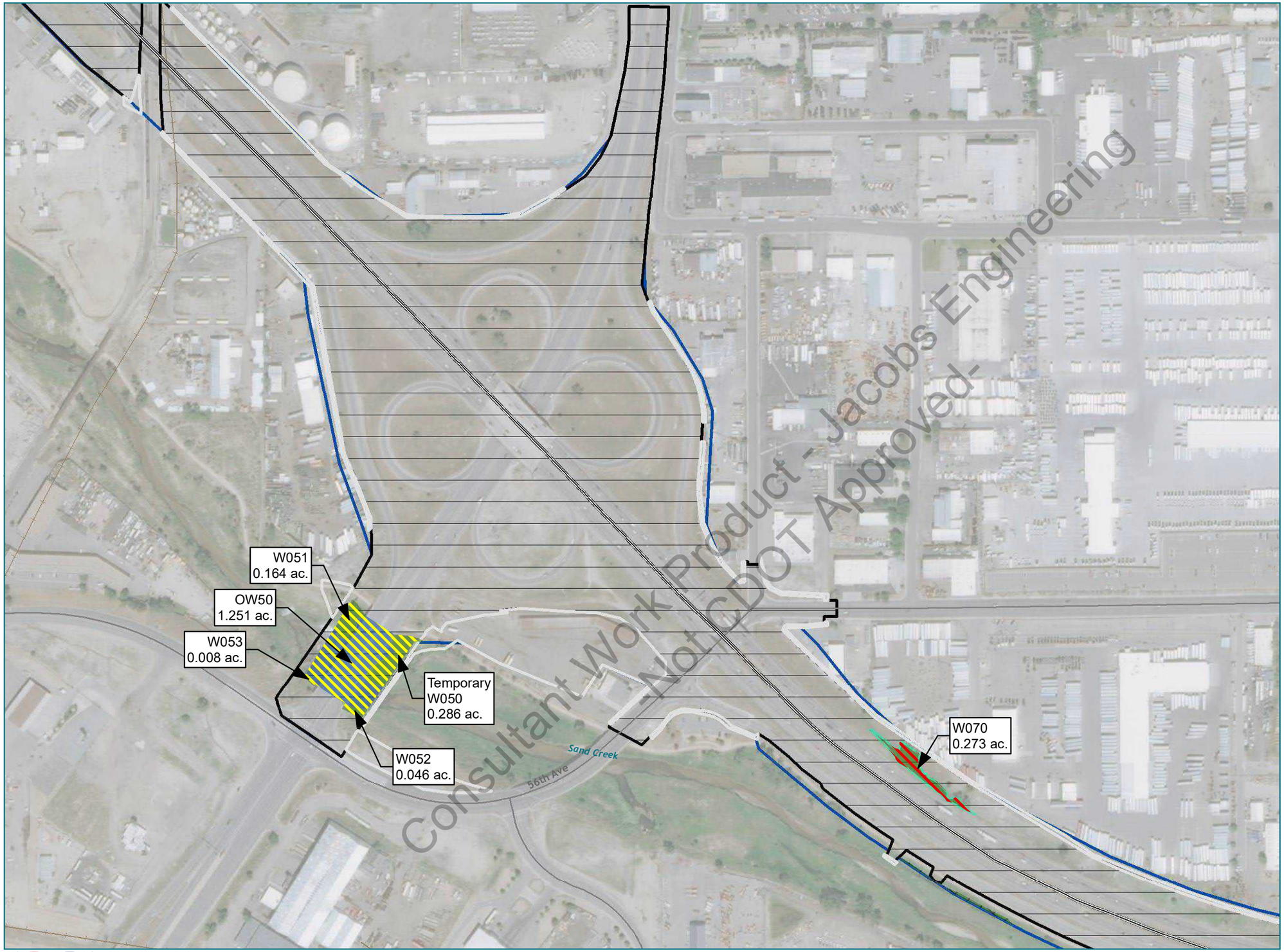

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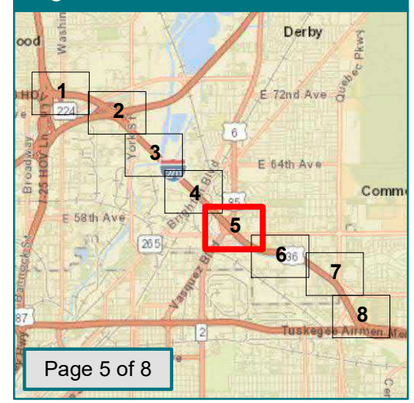

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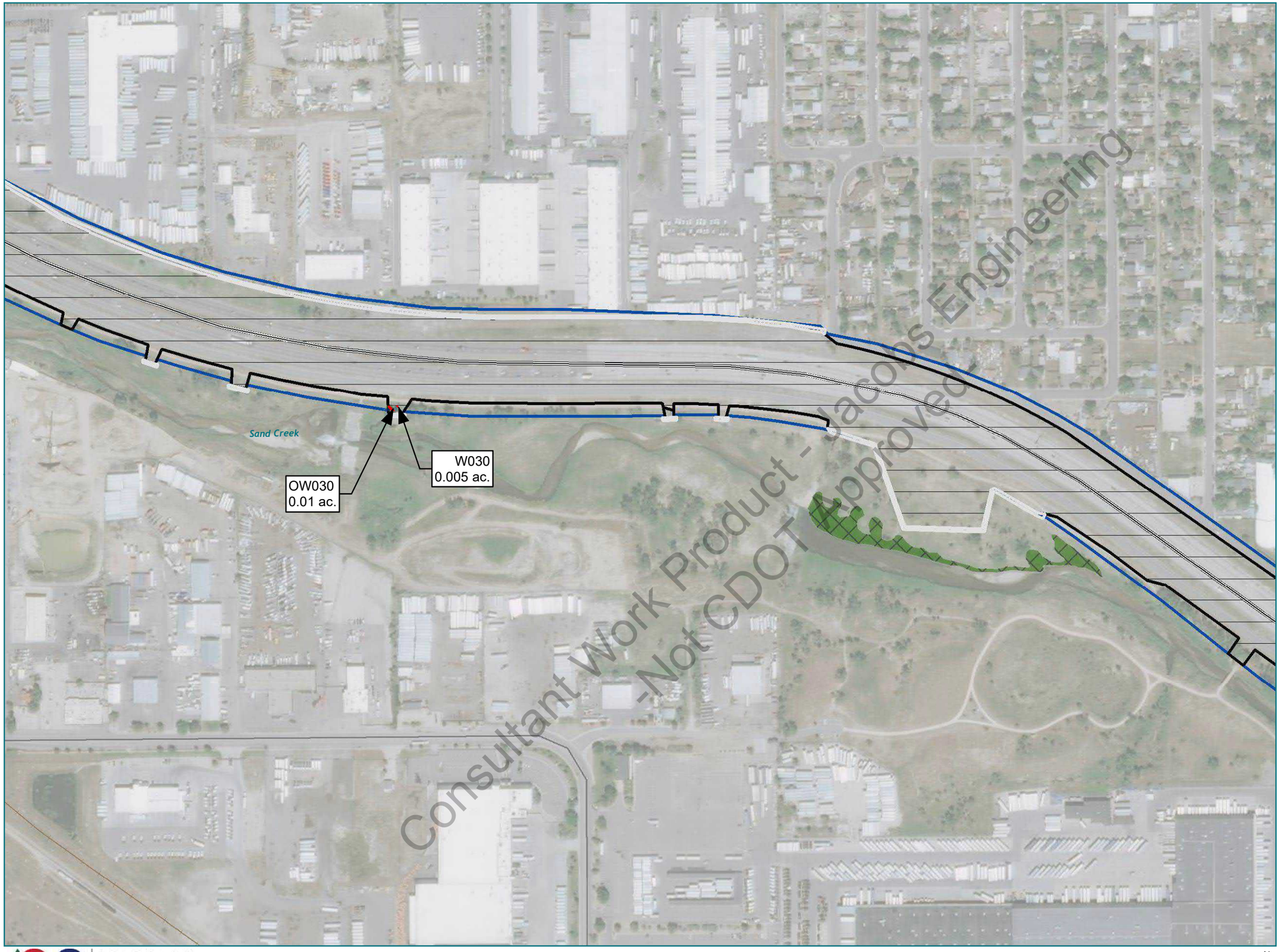

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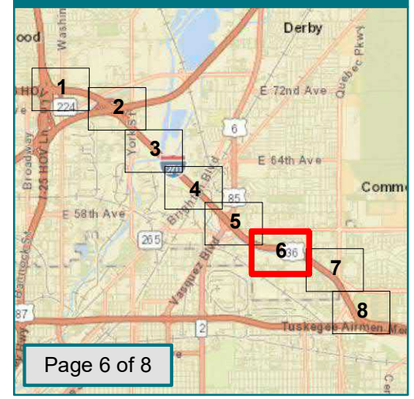

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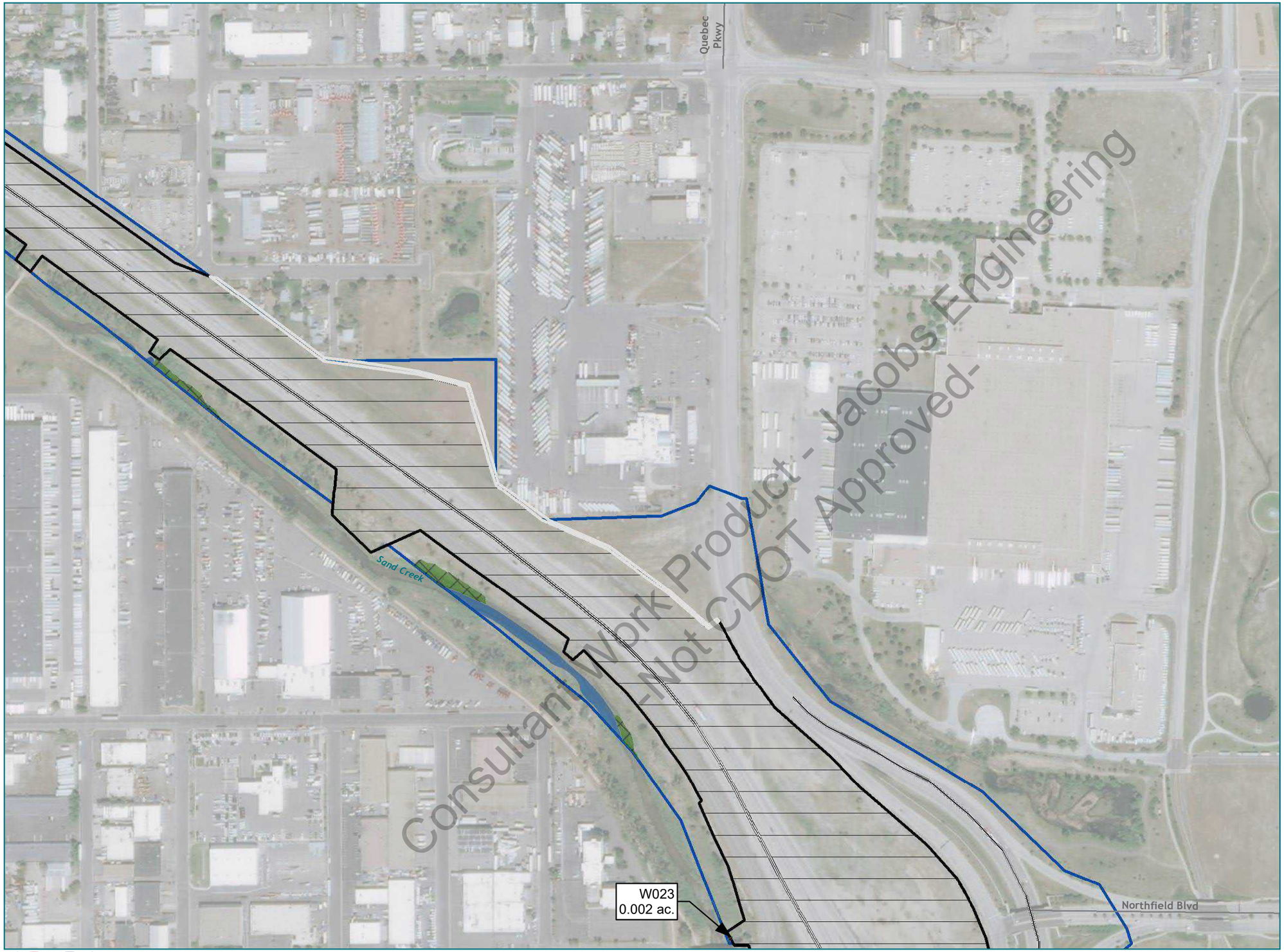

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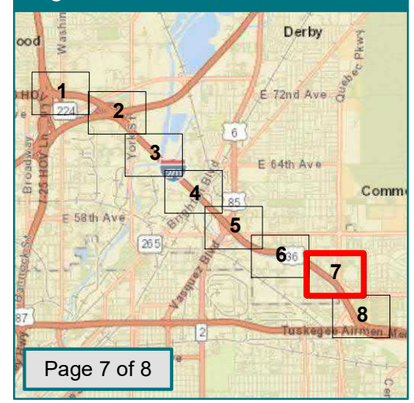
Regional Locator



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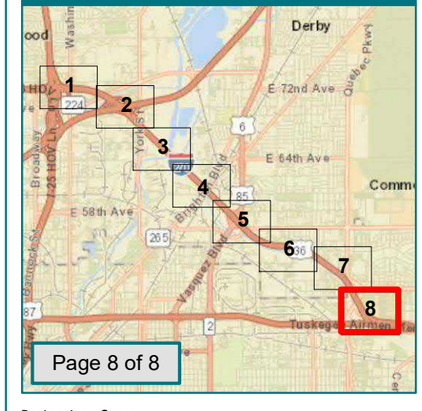
- Permanent Impact Area
- Temporary Impact Area
- Study Area

Regional Locator



Projection: Custom
Lambert Conformal Conic
North American Datum 1983 (2011)

Source: ESRI and its data partners

COLORADO
Department of Transportation

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I-270 Corridor Improvements

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Appendix F
Preliminary Onsite Wetland Mitigation Concept Summary

I-270 Preliminary Wetland Mitigation Concepts

PREPARED FOR:	CDOT Region 1
COPY TO:	**FHWA CO Division**
PREPARED BY:	EA Team
DATE:	June 14, 2021

The purpose of this memorandum is to summarize preliminary conceptual wetland mitigation alternatives for the I-270 Corridor Improvements project (project) in accordance with Executive Order 11990 and CDOT's agreement with FHWA which requires 1 to 1 replacement of all wetlands.

The mitigation evaluation process identified potential mitigation, including onsite locations within or immediately adjacent to the study area that appear to have potential for wetland restoration, creation, enhancement, or preservation. The evaluation looked for signs of anthropogenic related ecological stress that may have led to altered or degraded wetland conditions. This evaluation was completed with both desktop evaluation and onsite inspections. Through this process, several mitigation alternatives were developed to meet compensatory wetland mitigation needs. These alternatives are briefly summarized in this document.

Based on preliminary design concepts, permanent impacts resulting from this project are anticipated to be approximately 122,000 square feet (2.803 acres). Temporary impacts are anticipated to be approximately 22,700 square feet (0.525 acre). Permanent impacts to other waters are anticipated to be approximately 2,000 square feet (.048 acre). Temporary impacts to other waters are anticipated to be approximately 55,000 square feet (1.264 acres). These impacts, which will be refined as project design progresses, are the result of likely grading needed to accommodate the widened highway, as well as related infrastructure such as bridges, culverts, and utilities.

It is assumed that roadside ditch and stormwater related wetlands will be mitigated through the reestablishment of new roadside drainage wetlands and other stormwater facilities. It is also assumed that SB40 mitigation needs may be accommodated within the onsite wetland mitigation concepts. If offsite, wetland mitigation bank credits are used for the project, then additional SB40 mitigation (riparian plantings) may be needed.

All potential mitigation concepts and locations discussed in this document would require further evaluation prior to site selection and design.

Onsite Mitigation Alternatives

Concept 1: Sand Creek Floodplain Wetland Enhancement

Sand Creek generally follows the south side of I-270 through most of the urbanized project corridor and presents opportunities for wetland and riparian restoration or enhancement. The creek and adjacent floodplain wetlands are degraded due to urban development which has channelized Sand Creek and affected water quality and stormwater runoff hydrology. Therefore, wetland mitigation was prioritized in areas that offered an opportunity to help improve water quality, abate the urban stormwater flooding and help restore original floodplain conditions. Two sites (A and B) were identified as higher priority locations due to CDOT property ownership and proximity to stormwater management outlets and water quality facilities.

Site A: Sand Creek Floodplain Milepost 3.4

Site A (Figure 1) may offer the most cost-effective option for wetland mitigation due to the fact that CDOT already owns most of the floodplain at this location. Wetland mitigation at this location would seek to restore historic floodplain wetlands. The primary hydrology sources would be Sand Creek seasonal flooding and shallow floodplain groundwater. The project also plans to locate a permanent water quality control basin or vault at this location, which could outlet into the wetland mitigation area to provide a secondary source of hydrology and also help to provide secondary water quality treatment and stormwater flood abatement. The site is also located adjacent to a Commerce City Park and the Sand Creek Regional Greenway Trail, which provides opportunity for community engagement and education.

Site B: Sand Creek Floodplain Milepost 3.9

Site B (Figure 2) also involves some existing CDOT property but would likely require a land acquisition or work with Commerce City to develop a wetland conservation easement. This site is also located at the outlet of a proposed permanent water quality and stormwater detention facility. Therefore, like Site A, this site offers opportunities to restore historic floodplain wetlands, provide secondary water quality treatment, and potentially additional stormwater flood abatement.

Concept 2: Vasquez Bridge Channel and Riparian Restoration.

Site C: Sand Creek Floodplain at the Vasquez Bridge

A large metal sheet-pile weir exists just downstream of the Vasquez Bridge. There has been some discussion of removing this structure and replacing it with a more natural grade control feature such as a rock ramp that would allow for fish passage and improve other ecological functions (refer to light blue area on Figure 3). Such an activity may serve as mitigation along with some ecological enhancement of the adjacent floodplain, including expanded floodplain wetland area. Area of wetland restoration is undetermined.

Concept 3: Clear Creek Floodplain Wetland Enhancement

Site D and E: Clear Creek Floodplain Left and Right Bank

A large section of the Clear Creek floodplain near the I-270 interchange with I-76 is somewhat disconnected from the stream on both the north and south banks (Figure 4). An opportunity may exist to improve floodplain connectivity, create new riparian wetlands, and enhance existing wetlands. A gravel pond exists on river left, north, that presents an opportunity for enhancement with the creation of wetlands to change the gravel pond into a more natural floodplain wetland and pond. The enhancements would improve many functions including water quality, flood abatement, and habitat availably and continuity. The concept involves connecting the river to its natural floodplain; therefore, this proposal may require some floodplain analysis.

Concept 4: Interchange Infield Wetland

Site F: Infield Wetland at I-270 and I-76 Interchange

A few stormwater related wetland areas exist within the infield of the I-270/I-76 Interchange. This condition presents an opportunity to increase the size of the stormwater wetland features and enhance the existing wetlands (Figure 5). These features would provide secondary water quality treatment and would help to abate stormwater surges in Clear Creek, but otherwise have limited ecological function due to the location in the infield of two major highways.

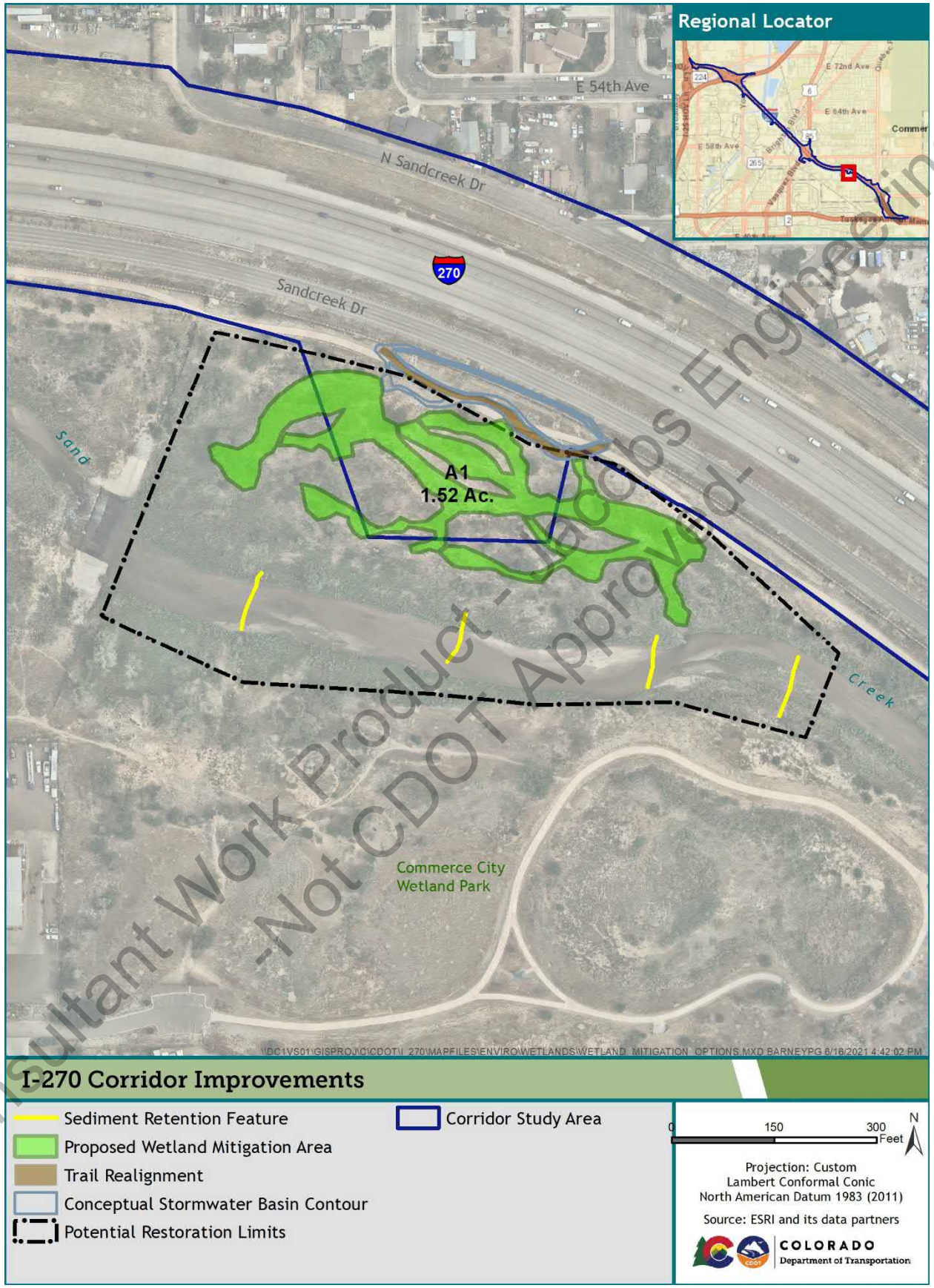

Figure 1: Aerial Image of Site A

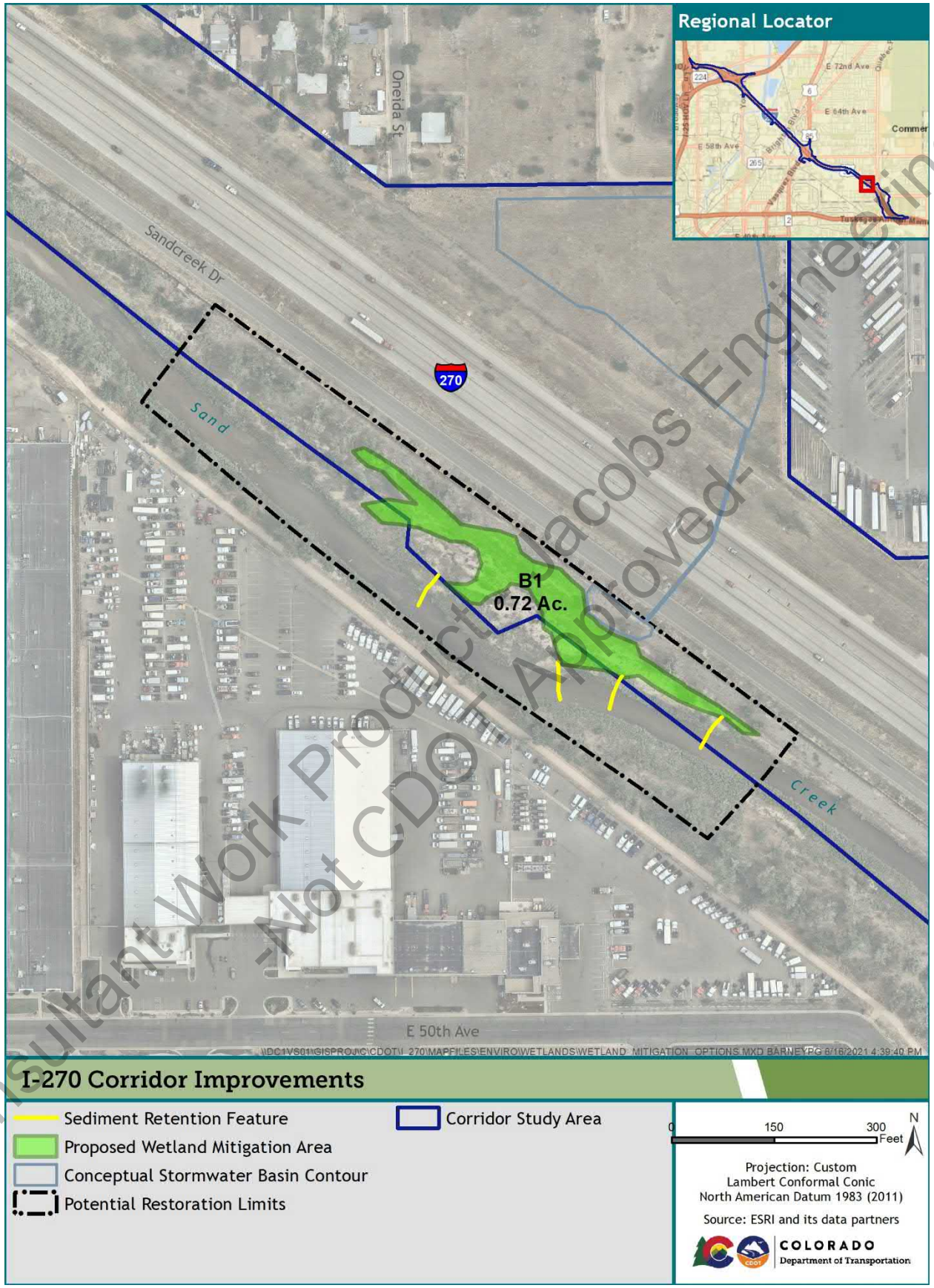

Figure 2: Aerial Image of Site B

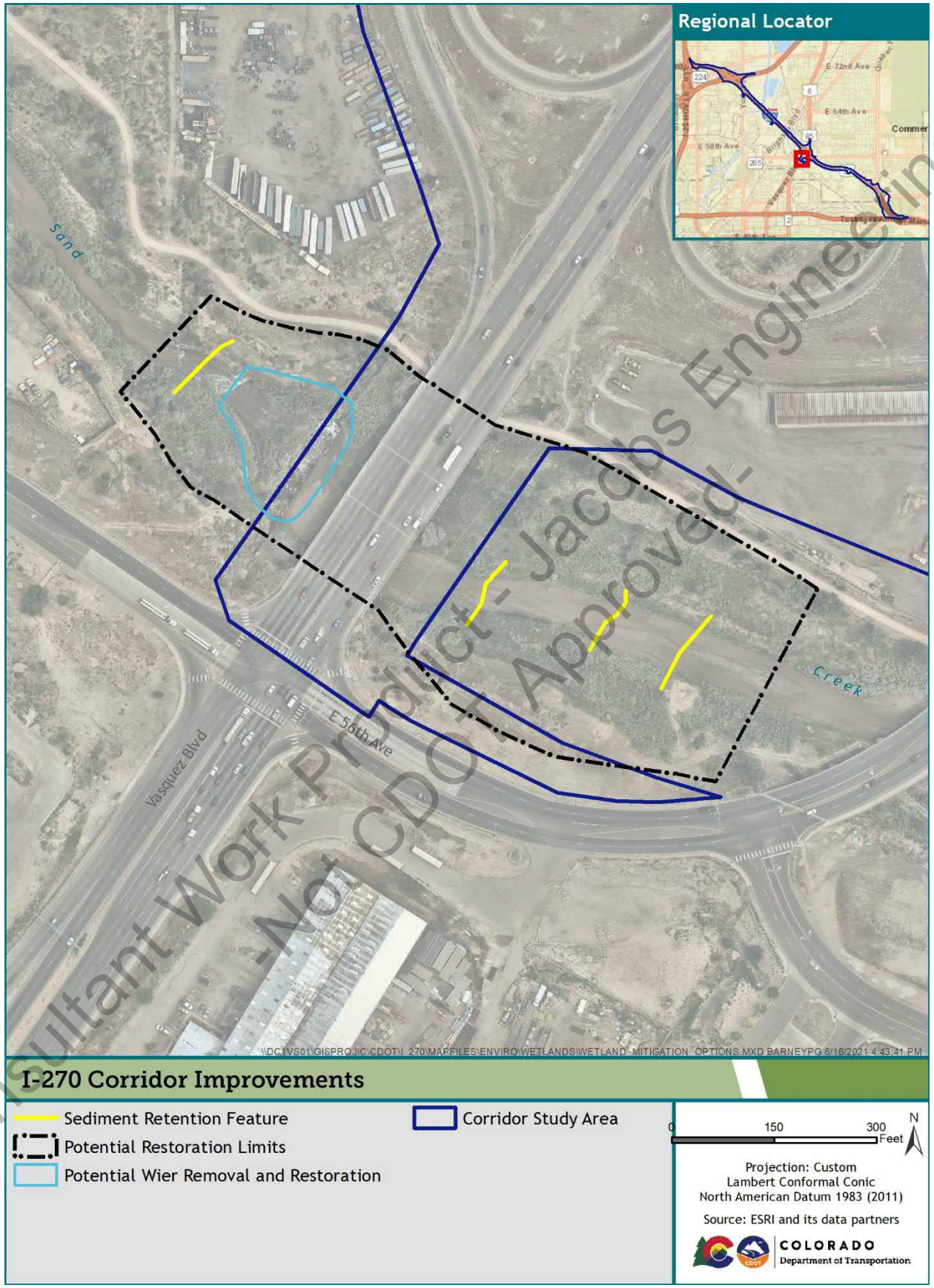

Figure 3: Aerial Image of Site C

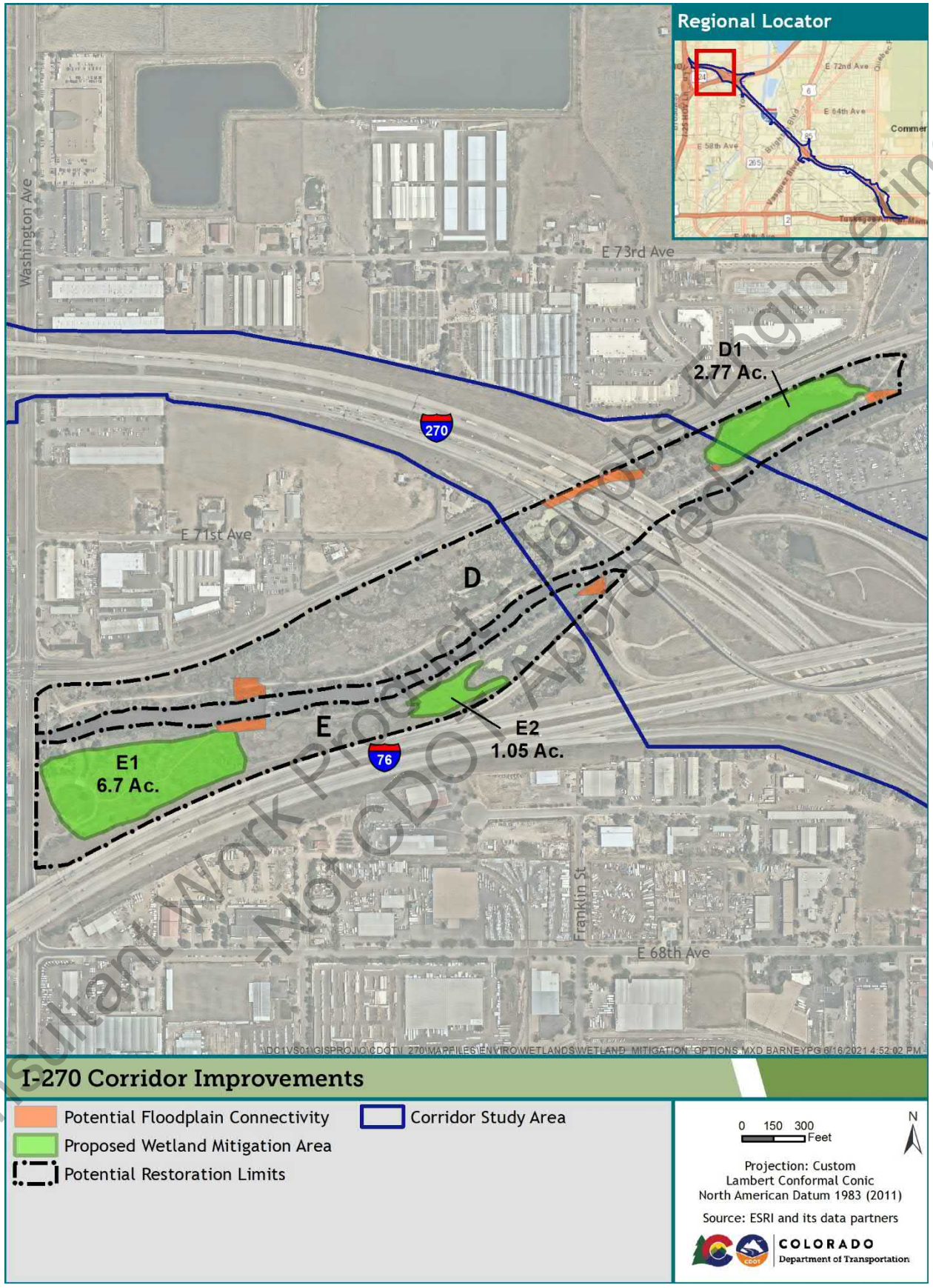

Figure 4: Potential Clear Creek Floodplain Enhancements

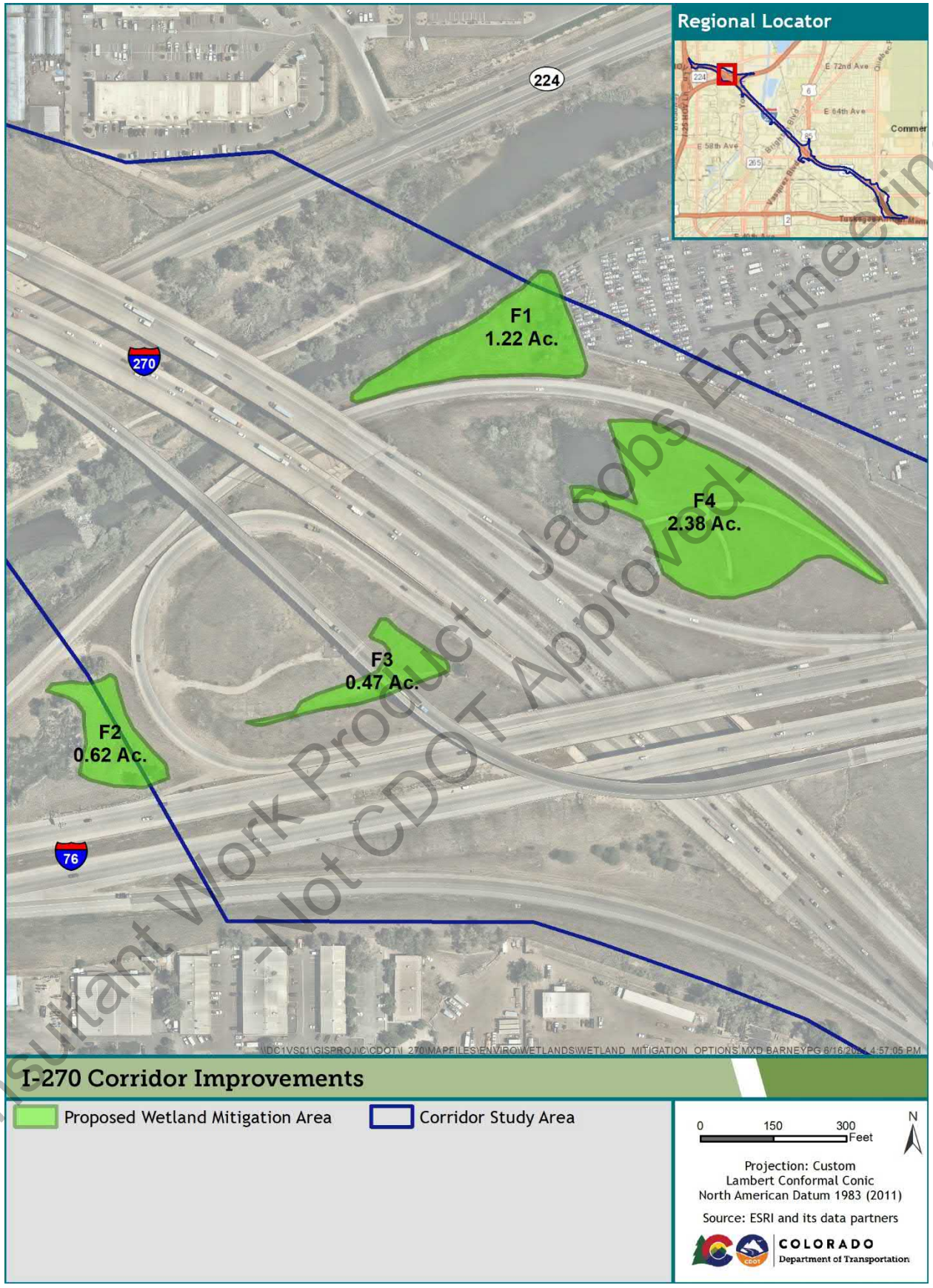

Figure 5: I-270/I-76 Interchange Potential Wetland Creation Areas

Offsite Mitigation Alternatives

Concept 5: Wetland Mitigation Bank Credits

A final option for wetland mitigation involves the purchase of wetland credits at a regional mitigation bank. This option would offer expediency but would not improve or replace localized ecological functions.