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## 17.0 LANDSCAPING

This Section 17 includes the requirements for the Landscaping Work for the Region 2 Bridge Bundle Design Build Project (Project). This Work shall be completed in accordance with the Contract Documents.

### 17.1 Administrative Requirements

#### 17.1.1 Standards

The Contractor shall design and construct the Project in accordance with the requirements of the standards referenced in Book 3. The Contractor shall use the latest adopted edition at the time of the Proposal Due Date.

### 17.2 Design Requirements

#### 17.2.1 Submittals

All submittals shall be prepared, Reviewed, and submitted in accordance with the requirements set forth in Book 2, Section 3.

#### 17.2.2 Landscape Plan

The Contractor shall prepare and submit Landscape Plans for Acceptance by CDOT. The Landscape Plans shall be required for any area of Work where construction disturbance occurs, including permanent Right-of-Way (ROW), temporary Easements, staging, haul road, locations of fill/borrow, temporary fills, access locations or other areas that are disturbed as part of the Work.

The Landscape Plans shall include:

1. Identification of the existing vegetation locations in all areas that may be potentially disturbed within temporary Easements as part of the Work. This shall include species, location, condition, size, health, and a recommendation for remaining undisturbed, pruning, removal, or replacement in conformance with Book 2, Section 8.
2. Identification of areas adjacent to existing wetlands, trees, and significant vegetation.
3. Identification of removals, clearing and grubbing, and selective thinning areas in the areas between the limits of construction and the ROW.
4. Locations, mitigations, removals, and replacements of trees, shrubs, and landscapes impacted by the Work.
5. The locations of protected areas. The Contractor shall protect and maintain all existing vegetation in the Project, except for the vegetation that must be removed to accommodate construction of the Project. The Contractor shall identify access roads, temporary fills, and any haul roads. The Contractor shall conduct a Site walkthrough to identify areas to be protected to accommodate temporary access features. All

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construction operations shall be performed in such a manner to avoid these protected areas.

6. Temporary, Interim, and Permanent stabilization for each construction phase.
7. Areas to be permanently stabilized after completion shall follow the requirements of the CDOT *Standard Specifications for Road and Bridge Construction*, Sections 101, 107, 207, and 208, 212, 213, 214, and 620, 213 Mulching specifications, and other referenced material.
8. Disturbed areas where work has halted shall follow the requirements of the CDOT *Standard Specifications for Road and Bridge Construction*, Sections 101, 107, 207, and 208, 212, 213, 214, and 620, and other referenced material.
9. Removal of adjacent roadside vegetation shall be minimized where possible.
10. Unforeseen Conditions. The Contactor shall design and implement erosion and sediment control measures for correcting conditions unforeseen during the design of the project, or for emergency situations, that develop during construction. CDOT's Erosion Control and Stormwater Quality Guide and CDOT M Standards shall be used as a reference document for the purpose of designing erosion and sediment control measures. Measures and methods proposed by the Contractor shall be reviewed and approved in writing by the Engineer prior to installation.
11. Amend embankment to prepare topsoil with compost/bionutrients. Temporary erosion control and sediment control BMP's shall be maintained until the requirements of Book 2, Section 5 – Environmental are satisfied.
12. A schedule of when Work shall take place, per CDOT *Standard Specifications for Road and Bridge Construction (CDOT Standard Specifications)*, Sections 212 and 214.
13. A watering schedule listing the Days chosen to complete the required watering.
14. Drawings and a design intent narrative.

A field review or detailed aerial photo survey shall be conducted prior to starting any Landscape Work and shall be submitted with the Landscape plan to CDOT for Acceptance.

When the Landscape Plan is Accepted by CDOT and prior to the start of all construction Activities, the Contractor shall designate and clearly tag all existing plants that will remain undisturbed, pruned, or removed, as identified in the Landscape plan.

Upon completion of the designation and tagging activities, the Contractor shall conduct an inspection of the existing Landscape with CDOT prior to the start of construction. The Contractor shall install protection, finish pruning in accordance with the Accepted Landscape plan and address any issues identified during the inspection. Removals may take place over the life of the Project.

### 17.3 Construction Requirements

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### 17.3.1 Temporary Seeding and Stabilization

All temporary disturbed areas not within the work area shall be returned to preconstruction elevation and contours and reseeded with the CDOT Approved seed mix design. At any sites where work will be temporarily halted for 14 days or more, sediment and material stockpiles and disturbed areas shall be stabilized per 208.04

The Contractor shall control noxious weeds, if present prior to disturbance, as needed throughout construction.

### 17.3.2 Clearing and Work Area Limits Identification and Protection

The Contractor shall delineate the clearing and work limits for Acceptance by the CDOT (see Book 2, Section 5 – Environmental, Migratory Birds for bird nesting survey requirements). Existing vegetation and or sensitive environments to remain shall be identified and protected. BMP's shall be used to prevent degradation of habitats adjacent to construction area. The CDOT Project Manager will flag those trees adjacent to the boundary that are to remain in place. If trees, shrubs and willows are within the Contractor delineated clearing and work limits the following requirements will apply:

1. The Contractor shall use all appropriate care to avoid damage or removal of the flagged trees. Trees that are damaged shall be replaced at the Contractor's expense. Trees that are damaged and assessed as salvageable shall be promptly repaired, pruned, wrapped, and protected from further damage at the Contractor's expense.
2. Any native tree removed with a diameter of 2 inches or greater will be replaced in-kind at a 1:1 ratio in the same work area. The diameter of a tree is the measured diameter 2-foot up the tree from the ground surface.
3. Shrubs and willows removed shall be replaced with live willow cuttings collected from nearby stands. Willow cuttings will be placed on 2 foot centers.
4. All planted trees and shrubs located in planting areas as shown in the Plans shall be protected with geotextile fabric and wood chip mulch. Trees will not be accepted if the ball of earth surrounding the roots is cracked or broken during delivery and planting.
5. The Contractor shall repair or replace in-kind all landscape material and vegetation on private property which is disturbed by the Work. Replaced materials shall be equal or better to the existing materials in size, type and condition.

### 17.3.3 Protected Areas

The Contractor shall install temporary fencing for the protection of all existing vegetation that is designated to remain undisturbed and any additional areas defined in Book 2, Section 5. After installation of the fence, the Contractor shall request a field Inspection from CDOT prior to proceeding with the Work.

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Fencing shall be placed at the drip line for trees. Construction Activities, such as earth disturbance, storage, staging, or parking inside the drip line shall be prohibited. No chemicals shall be applied or used around or near these areas that would be detrimental to vegetation health.

The Contractor shall immediately report damage to any tree within the Work area designated to remain undisturbed to CDOT for assessment of the damage and survivability. Trees that are damaged shall be replaced at the Contractor's expense if CDOT's, at their sole discretion, determines the tree(s) will not survive.

Any trees and shrubs impacted within temporary Easements shall be replaced. The replacement trees and shrubs shall be placed in the same area or in same general vicinity.

### **17.3.3 Removal of Trees and Shrubs**

Tree stumps within the Roadway prism or within 10 feet of the edges of Roadway pavements shall be completely removed and disposed of off Site. All other tree stumps within the Project area shall be ground to 3 feet below finished grade.

All trees or shrubs removed from the Project shall become the property of the Contractor and shall be completely disposed of off Site by the Contractor.

### **17.3.4 Tree and Shrub Transplanting**

The Contractor may transplant trees and shrubs. The Contractor shall not use non-native trees or shrubs.

### **17.3.5 Pruning**

The Contractor, if needed, shall have all root and branch pruning that interfere with the Work completed by a licensed and certified tree surgeon. All Work shall be in accordance with American National Standard Institute (ANSI) A300.

#### Root Pruning

Tree roots 2 inches or greater in diameter shall not be removed, unless they interfere with the work. Extensive root pruning may require tree replacement as directed by CDOT.

Roots below the excavation depth for the work shall not be pruned.

#### Branch Pruning

The Contractor may prune branches that will interfere with the Work per the Approved Landscape plan and according to Section 240 – *Protection of Migratory Birds, Biological Work Performed by the Contractor's Biologist* of the CDOT *Standard Specifications*.

The Contractor shall remove weak or dead branches on trees that are to remain within the ROW.

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### 17.3.6 Replacement Plant Material

Replaced Materials shall comply with Section 214 of CDOT's *Standard Specifications* and be equal or better to the existing Materials in type and function.

### 17.3.7 Staking and Watering

New replacement trees shall be guyed in accordance with M-Standard Plans M-214-1 and Section 214 of the CDOT *Standard Specifications*. Trees shall be staked for two growing seasons. All guying material shall be removed by the Contractor at completion of the Landscape Establishment Period, defined in Section 17.2.10.3.

The Contractor shall water new and protected trees on the Project until the Project has reached the Landscape Establishment Period. The Contractor shall water the plant Material per Section 214 of the CDOT *Standard Specifications*.

### 17.3.8 Topsoil

The existing topsoil should be stripped and stored separately for use on the Project to the extent practical. All topsoil shall follow the requirements in according to sections 207 and 212 of the CDOT *Standard Specifications*.

All topsoil, either imported or salvaged on Site, shall be treated with an herbicide for noxious weeds identified in the INWMP prior to final seeding.

### 17.3.9 Permanent Native Seeding

Placement of soil conditioning and fertilizer, seeding and mulching shall not be done in a single operation, and shall be completed within 48 hours following each construction phase or prior to any winter shutdown work. All seeding requirements in the Approved project SWMP shall also be followed. Fertilizer shall not be used adjacent to wetlands and waterways. Refer to CDOT *Standard Specification* Section 212 for additional requirements.

All disturbed areas that are not surfaced shall be re-vegetated to replicate or enhance native vegetative communities. Re-vegetation species that attract wildlife to the Highway or practices that allow noxious weeds shall not be used.

Due to high failure rates the Contractor will not be allowed to use hydromulching and/or hydroseeding or straw.

Seeding shall follow Section 212 of the CDOT *Standard Specifications* and Book 2, Section 5. Seeding of areas shall be completed in conjunction with erosion control requirements, final Roadside cut/fill slopes and as required in Book 2, Section 5.

If any detention facilities are incorporated into the Project, the slopes shall be planted with an Approved seed mix.

Placement of soil conditioner, topsoil, seeding, mulching (weed free), and mulch tackifier (or soil retention blanket) shall not be completed in a single operation, but shall be completed immediately following each area that is to final grade, per CDOT *Standard Specifications*,

Sections 208, 212, and 213.

The Contractor shall place native seed, mulch (weed free), and mulch tackifier after each construction phase and prior to any winter shutdown Work.

The Contractor shall use CDOT Online Transportation Information System (OTIS)(<https://dtdapps.coloradodot.info/MapView/>) to find the correct seed mix for each structure segment and the seed mix shall be Approved by CDOT prior to placement in accordance with Book 2 Section 5 – Environmental.

Soil conditioning and fertilizer requirements are as follows:

Soil Conditioning (Acre)		
Biological nutrient organic based fertilizer (lbs/acre)*	Humate (lbs/acre)	Compost (cys/acre) (1/2 inch depth)
300	200	65

Roadside ditches that have been disturbed by construction shall be lined with soil retention blanket or turf reinforcement blanket to contain the design flow width (wetted perimeter), designed based on the hydraulics of the ditch for both before and after the final stabilization is established. If soil retention blanket is used, mulch and tackifier are not required.

### 17.3.9 Reseeding Operations and Corrective Stabilization

Prior to final acceptance:

1. Seeded areas shall be reviewed during the 7 day inspections by the Erosion Control Supervisor for bare soils caused by surface or wind erosion. Bare areas caused by surface or gully erosion, blown away mulch, etc. shall be re-graded, seeded, mulched and have mulch tackifier (or blanket) applied as necessary.
2. Seeded areas shall be watered as appropriate to establish native vegetation regrowth irrigated until seeding is established.
3. The Contractor shall maintain seeding/mulch/tackifier, mow to control weeds or apply herbicide to control weeds in the seeded areas until Final Acceptance.

### 17.3.12 Noxious Weed Management Plan

Identify and provide a Noxious Weed Management plan if state noxious weeds are present in accordance with Book 2 Section 5 – Environmental.

### 17.3.13 Landscaping Inspection, Establishment, Acceptance, and Warranty Period

#### 17.3.13.1 Interim Landscape Inspections

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The Work shall meet the requirements of the Contract Documents prior to proceeding to the next Activity. The Contractor's Environmental Compliance Manager (ECM) shall conduct inspections at completion of the following Activities:

1. Completion of the subgrade preparation.
2. Completion of finished grade preparation.
3. Layout of trees.
4. Layout of all plant materials.
5. Completion of seeding operations.

Nonconforming Work shall be replaced or repaired promptly by the Contractor at its own expense. When damage endangers public safety or traffic, remedial action shall be taken immediately to ensure safety and prevent further disruption of traffic.

### **17.3.13.2 Substantial Landscape Completion**

Substantial Landscape Completion is defined as when all seeding, trees, or plant materials have been planted and are completed in compliance with the requirements of the Contract Documents. Trees and plants shall be healthy and in flourishing condition and be free of dying branches and branch tips; and shall bear foliage of normal density, size, and color.

Prior to Substantial Landscape Completion, a Landscape Inspection shall be held with CDOT at each structure segment to determine Acceptance of trees, plant Material and seeding areas. Upon Acceptance, CDOT will issue a Notice of Substantial Landscape Completion.

### **17.3.14 Landscape Establishment Period**

The Landscape Establishment Period will commence at Project Final Acceptance, which will be contingent upon issuance of a written "Notice of Substantial Landscape Completion" from CDOT in accordance with the requirements of Section 214 of the CDOT *Standard Specifications* and herein.

The Landscape Establishment Period will last for 12 months, and will begin the following spring if Notice of Substantial Landscape Completion is issued in the fall.

All landscape installations shall be completely maintained by the Contractor during the Landscape Establishment Period. The Contractor shall submit a detailed Landscape Maintenance Plan in accordance with the requirements of Section 214 of the Standard Specifications and prior to issuance of the Notice of Substantial Landscape Completion. CDOT will inspect the landscape installations on at least a monthly basis to determine the acceptability of the maintenance Work. Nonconforming maintenance will be brought up to acceptable levels within 5 Days of receipt of notice of maintenance deficiencies.

The Landscape Establishment Period can run concurrently with the Project Warranty Period and the Wetland Establishment Period. Both the Landscape Establishment and Wetland Establishment Periods could extend past the Project Warranty Period.

### **17.3.15 Final Landscape Acceptance**

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Upon completion of the Landscape Establishment Period, at the Contractor's request, CDOT will inspect the Landscaping to determine compliance to the requirements of the Contract Documents. All Landscape installations shall be fully established, weed-free, clean, smooth, properly graded, and without tree or plant mortality in order to be Accepted by CDOT.

The Contractor shall schedule a final Landscape Inspection and Verification walkthrough after this walkthrough, the Contractor shall submit a letter requesting Final Landscape Acceptance from CDOT. The Landscape Establishment Period and Contractor maintenance will terminate after CDOT Acceptance is reached. Should CDOT identify any areas of Nonconforming Work, the Contractor shall correct the deficiencies and extend the Landscape Establishment Period for a minimum of one additional growing season at no additional cost to the Project. If Final Landscape Acceptance occurs in the fall, the Contractor shall continue to maintain the Landscaped area until the following spring. Any dead trees, plant material, or seeding areas shall be replaced or repaired at no additional cost to the Project.

At the request of the Contractor, a final field review of the Landscaping shall be conducted to ensure compliance with the Contract Documents. The results of the Landscape final field review of the Project re-vegetation shall be submitted showing both the conditions of all landscape items. The Contractor shall remove all temporary erosion and sediment control measures following Landscape Establishment Period, unless otherwise specified by CDOT.

#### **17.3.16 Landscape Warranty Period**

All trees, shrubs, and ground covers, including seeding, shall be completely Warranted by the Contractor for 1-year from the date of Final Landscape Acceptance. Any plant Material deemed deficient following this 1-year Warranty period, shall be replaced in kind by the Contractor at no additional cost to the Project, and shall be Warranted for 1 additional year by the Contractor. Any additional 1-year Warranty period beyond the initial 1-year Warranty period will be considered an extended Warranty period. Another Inspection will be conducted at the request of the Contractor at the end of the extended Warranty period to determine Acceptance or rejection.

If access to a completed Landscaped area is required by the Contractor after Final Landscape Acceptance, Landscape Materials will be considered existing and shall be protected in accordance with the requirements of the Contract Documents.

#### **17.4 Deliverables**

At a minimum, the Contractor shall submit the following to CDOT for review, Approval and/or Acceptance:

Deliverable	Review, Acceptance or Approval	Schedule
Final Landscape Plan	Acceptance	As part of the Final RFC document submittal for each segment
Noxious Weed Management Plan	Acceptance	Prior to disturbance at each segment
Landscape Maintenance Plan	Acceptance	Prior to the Notice of Substantial Landscape Completion
Landscape As-Constructed Plans	Acceptance	After Final Landscape Inspection at each segment
Letter requesting Final Landscape Acceptance	Acceptance	After Final Landscape Inspection and Verification Walkthrough for each segment

All deliverables shall also conform to the requirements of Section 3 - Quality Management.