



Appendix D-1

Innovative Revegetation Study Task 4 Field Visit Observations

Date of Field Visit: 11/19/2013

Location: Southern Urban Foothills (Region 2)

TerraLogic Team Attendees: Aaron DeJoia, Art Hirsch

The TerraLogic Team attended a CDOT Regional Erosion Control Assessment Team (RECAT) inspection of a Southern Urban Foothills Project. The focus of the assessment was for compliance to CDOT erosion control specifications. The TerraLogic Team tried to observe field conditions and review documentation relevant to revegetation actions. The following are our QC observations and recommendations:

We were not able to completely fill out the QC Checklist since it would require more time with the Project Erosion Control Specialist (ECS); the next meeting will be specific about revegetation issues and a complete checklist will be completed.

Basic Findings 11/19/13:

- 1) Soil amendments were not consistently used on the project which is a CDOT specification. The areas that were amended had the best vegetative growth and less soil compaction. It is doubtful that some areas were tilled or scarified before planting.
- 2) A maximum of 4 inches of topsoil were stockpiled throughout the project area (Appendix B).
- 3) Straw mulch appeared to be applied to all required areas. Application rate could not be accurately determined due to high rate of straw displaced by wind along ROW.
- 4) Tackifier was not added to the straw mulch which is a CDOT specification requirement. As a result this resulted in the straw being blown away and large areas of exposed soil. This was a RECAT finding that needs corrective action.
- 5) The Region 2 Water Quality Pollution Control Manager did not perform the percent vegetative cover and has the understanding that noxious/non-native weeds count as percent cover. This appears to be contrary to CDOT protocol. There is a lack of time for her to watch and review contractors during seeding and other critical revegetation times. She feels that she is not adequately trained to review and assess revegetation actions.
- 6) Contracted Manager is reviewing conformance to specifications; however, it appears that revegetation specifications are not being followed or documented; such as soil amendments and tackifier already mentioned above. It is not clear if Contracted Manager has and is referencing a CDOT Specification QC checklist to track revegetation compliance.
- 7) It was noted that seed mix was being stored in drill seed applicator (in a metal bin). The viability of the stored seed is questionable since seed viability can be impacted by temperature extremes and should be stored in shed that avoids temperature extremes.

- 8) Seed tags are being gathered by the ECS and are available for review at the Kiewit office.
- 9) Seed mix was developed at a drill seeded rate of 177 PLS lb/acre. This is well over the optimal seeding rate of 60 PLS lb/acre used in standard reclamation practice. Seed mix consisted of approximately 70% sod forming grasses, 80% warm season grasses, and 93% grasses that prefer clay and or loam soil types. This seed mix is questionable for the soil types out at the site. Soil series include Pring coarse sandy loam, Blendon sandy loam, Tomah-Crowfoot loamy sands, Stapleton sandy loam, Kettle gravelly loam, Blakeland loamy sand, Columbine gravelly sandy loam, and Truckton sandy loam.
- 10) No one that we talked to could verify that the drill seeders had been calibrated prior or during the project.
- 11) Two seed drills were inspected during the site investigation. One of the seed drills was placing the seed behind the openers and the press wheels did not appear to be applying adequate downforce. This seeder did not have depth bands on the openers (212.07). The second seed drill reviewed had proper seed placement and depth bands.
- 12) Seeding was performed outside of appropriate windows (September 1 through March 15) (212.03). Seeding should be done from September 1 to soil freezing conditions. It is very probable that vegetation started from summer planting will not survive winter conditions.
- 13) Straw mulch on site was all identified as being weed free (blue twine) and appeared to be of adequate length to facilitate crimping (213.02).
- 14) The seed mixture could be reduced down to 2-3 native species that will allow for site stabilization and adequate vegetative cover. After stabilization, native vegetation adjacent to the revegetation area will migrate back; thus letting nature re-establish the area. The reduction in the number of seed mix species will reduce seed mix costs.

Date of Field Visit: 2/18/14

TerraLogic Team Attendees: Aaron DeJoia

The TerraLogic Team conducted a QC inspection for seeding operations on February 18, 2014 to review seeding and straw mulching operation on the I-25 Design Build Project near Colorado Springs. Due to high winds during the inspection event, all seeding and straw mulching operations were suspended prior to the team's arrival. Therefore the focus of the assessment was altered to review soil handling practices and material storage and suitability. The following are our QC observations and recommendations:

Basil Ryer and myself (team) met with the On-site Environmental Manager to discuss current operations and practices. Although not all of the QC checklist was able to be completed, important aspects of revegetation were reviewed and documented.

Basic Findings 2/18/14:

- 1) Straw mulching and seeding were suspended during high wind events.

- 2) All straw mulch bales visually inspected on-site were identified as being weed free through the use of multi-colored twine (Picture 1).



Picture 1. Straw mulch twine indicating weed free straw.

- 3) Straw bales inspected on site appeared to have adequate straw length to facilitate proper crimping (Picture 2).



Picture 2. Straw length of bales inspected.

- 4) Straw bales were all in good physical shape and no decomposed straw was observed.
- 5) Mulching material was cereal straw (appeared to be wheat straw). According to the SWMP documents provided to the team only native hay is specified. The use of straw mulch is out of spec but should not negatively impact reclamation success.
- 6) All seed bags visually inspected on-site were appropriately labeled (Picture 3).

I-25 NORTH DESIGN BUILD			
LOT # : G-140066			
Mixture / Variety:	Purity %	Germ%	Origin:
WESTERN WHEATGRASS, ARRIBA	18.68	85	ID
GALLETA, VIVA	13.87	95	TX
SWITCHGRASS, BLACKWELL	10.86	97	KS
GREEN NEEDLE, LODORM	08.51	93	MT
SIDEOTS GRAMA, VAUGHN	08.43	94	KS
LITTLE BLUESTEM, CAMPER	08.40	94	NE
OATS, MORGAN	08.39	96	CAN
BLUE GRAMA, NATIVE	06.21	85	KS
BLANKETFLOWER, VNS	03.30	80	IND
INLAND SALTGRASS, VNS	02.73	97	UT
PRAIRIE CONEFLOWER, VNS	01.82	82	KS
PRAIRIE JUNEGRASS, BLUE MTN.	00.58	92	ID
SAND DROPSSEED, VNS	00.28	97	KS
Crop: 0.01% Inert: 8.13% Weeds: 0.10% Net Wt. 38.0#			
Noxious Weeds: NONE FOUND Tested: OCT. 2013			
CUSTOM MIX FOR TP ENTERPRISES @ COLORADO SPGS., CO			
EACH 38# BAG COVERS APPROX. 1 ACRE			
Sharo Bros. Seed Co. Greeley, CO 80631 (970) 356-4710			

Picture 3. Seed tag label.

- 7) Seed was tested within the past 6 months for viability as documented on the provided seed tag (Picture 3).
- 8) Seed mixture on-site had different plant species and seeding rate than specified in the SWMP drawing provided to the team. Planting of the reviewed seed mix will result in approximately 75.2 PLS per square foot with approximately 60% of the grass being sod forming species, 32% being cool season grasses and 36% of the species being species that prefer sand and/or loam soils. Seed mix selection could be problematic for reclamation success due to the high sand content of the project site, and lack of quick germinating cool season perennials.
- 9) Seed is being stored off-site therefore we do not know if seed storage is proper at this time.
- 10) Does not appear as if tackifier is being used on the straw mulch. This condition resulted in the straw being blown away and large areas of exposed soil.
- 11) Topsoil salvage piles were reviewed. The following items were identified:
 - a. Some mixing of topsoil with subsoil was occurring (Picture 4)
 - b. Topsoil was not protected from wind or water erosion (Picture 5)
 - c. Topsoil piles were not clearly identified with signage. Topsoil had been stockpiled since October 2013.



Picture 4. Topsoil mixed with subsoil.



Picture 5. No wind or water erosion on topsoil piles.

- 12) Topsoil salvage depths have varied across the project. On average the topsoil salvage depth has been approximately 6 inches.

- 13) Topsoil spreading was being completed on portions of the ROW (Picture 6). It was noticed that prior to spreading the subsoil was not prepared for topsoil placement. . A clear and definite discontinuity was being established which could decrease reclamation success. This potential discontinuity between soil layers could result in poor water movement between soil layers. This lack of soil water movement between soil layers could increase erosion, decrease plant growth, and/or create a boundary that could lead to mass movement of the soil. It is not known at this time whether actions will be taken to remove this discontinuity once topsoil placement is finished.



Picture 6. Topsoil spreading in progress.

14) Soil sample from the stockpiled top soil was collected and tested according to the Study Plan.