Mountain Valley Stone Northeastern Mine Reclamation

Background:

In 2017, Mountain Valley Stone met its obligation of reclaiming their Northeastern most mine site. For this project, Mountain Valley Stone partnered with students from Wasatch High School's Center for Advanced Proffessional Studies (CAPS) who are focussed on agricultural and environmental work opportunities. This was not only an opportunity to involve local students and provide for their education, but to bring in the technological benefit of aerial drone use for site observation. Through Mountain Valley Stone's working with the Wasatch CAPS students, they were able to create and implement a plan for the revegetation of the area.

Ground Prep:

Before reclamation of the area began, Mountain Valley Stone had done some preparation work. "Top Soil from stockpiles [were] moved during reclamation and spread on the surface of the quarry. The mixture [was] approximately 4-6 inches thick. Soil materials [were] spread with a rubber tired front end loader after ripping roads and compacted areas and restoration contouring has been completed". In regards to the seed bed preparation, Mountain Valley Stone ripped certain "compacted disturbed areas other than roads . . . to a depth of 6-12 inches with the ripper spaced at the maximum of two feet. The surface was left in a slightly rough condition immediately prior to addition of topsoil and seeding. The compacted surfaces of the road ways were ripped to a depth of 18-24 inches and also left in a graded but slightly rough condition."

Seed Mix:

The following seed mix (see Fig 1.1) was recommended by the Utah Department of Oil Gas and Mines (DOGM) to be planted after ground preparation on the

	Restoration Seed Mix	Lbs/ac (PLS)
Achillea millefolium	Common yarrow	0.1
Agropyron dasystachum	Thickspike Wheatgrass	1
Agropyron intermedium	Intermediate Wheatgrass	1
Agropyron spicatum	Bluebunch Wheatgrass	2
Amelanchier alnifolia	Serviceberry	1
Artemesia tridentate	Big Sagebrush	0.1/0.5
Elymus cinereus	Basin Wildrye	2
Kochia prostrata	Forage Kochia	0.5
Linum lewisii	Linum Lewisii	1
Medicago sativa	Alfalfa	0.5
Melilotus officinalis	Yellow Sweetclover	0.5
Penstemon strictus	Rocky Mountain Penstemon	0.5
Poa secunda	Canby Bluegrass	0.3
Purshia tridentate	Bitterbrush	1
Sanguisorba minor	Small burnet	1.5
	Total:	13/13.5

property. Using recommendations from DOGM biologists appropriate amount of each seed for the 2.1 acre reclaimation area was obtained from Granite Seed company in Lehi Ut. The topsoil was disturbed to accept the seed from the broadcast spreader to distribute the seed mix. On the steeper and lower portion of the area small terraces were raked in to better hold water and give some resistance to erosion. In the upper northwest corner of the reclaimation area, a layer of planting mulch was spread over the seed.This area was 560 square ft in size. This will serve as a test plot to see if the increase in mulch will aid in seed germination. After broadcasting the seed CAPS students lightly raked the soil to cover the seed and protect it against wind, birds and other wildlife. To help promote germination and plant growth 20 lbs of urea based nitrogen fertilizer or (46-0-0)was evenly applied to the reclaimation area.

Plan:

During the germination we will be monitoring through aerial imagery and transect lines. This upcoming spring, using aerial photogrophy, the stone quary will be closely monitored. The percent of cover will be determined after monitoring. Growth progress and overall plant vigor will be monitored using NDVI Filters applied to aerial imagery. Transect Lines will provide a way to observe changes taking place in the reclamation area over time.

Aerial photography: Through the use of a DJI Phantom 4 drone and the software DroneDeploy,aerial photographs will be collected at regular intervals in order to monotor long term growth.

Conclusion:

Mountain Valley Stone was successful by completing outstanding work in site reclamation after the use of an area for mineral mining. This project included outstanding work in revegetation and results from implementing environmental technologies. Involving and giving students educational opportunities and using aerial drone photography to examine the progression of the project shows that meeting this requirement was taken far above regular obligation. This site will continue to provide educational opportunities for students interested in environmental work and while using these same forms of technology, they can help Mountain Valley Stone to continue to monitor the progress of the site as it is restored back to natural habitat.


Approximate location of water seep Elevation: 6550 ft
Phase 1 51 Acres
Phase 2a 10 Acres
Phase 2b 10 acres storage


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