



Date: Tuesday, November 30, 2021

Project: Lyons Quarry Reclamation

To: Wyatt Webster, Environmental and Land Manager

From: Travis Snyder, HDR Project Manager

Subject: 2022 Reclamation Progress Summary

The following are updates for the reclamation of Lyons Quarry (DRMS permit #M1977-141) during the 2022 calendar year. Prior to the start of 2022, HDR Engineering, working as consultant to Aggregate Industries (AI)/Holcim-WCR, Inc., had finished technical revisions to the existing mine permit reclamation plan. Technical Revision #4 addressed reclamation to the floodplain area of the site and was conditionally approved in December of 2020. Technical Revision #5 addressed the main quarry pit area and was at the 30% concept design phase at the beginning of the year. During the Fall of 2021 initial erosion controls, drainage improvements, and excavation efforts towards overall reclamation were underway. Material was being excavated by Aggregate Industries without blasting, using conventional heavy equipment (excavator, bulldozer, haul trucks) on the sandstone overburden. Excavated material began to be placed in order to construct a ramp down in to Quarry 2.

January-March 2022:

- Re-grading on top of quarry highwall continued utilizing heavy equipment to move material from the top crest of the highwall to Quarry 2 for fill in the southwest corner of the site.
 - Excavation gradually began to move more-slowly as the sandstone overburden material become considerably harder to break through. A hydraulic hammer excavator attachment mobilized in 2021 was not able to keep up with the rate of excavation and blasting was determined to be required in late January. Working with Kiewit/CDOT operations on SH7 project adjacent to site, the closed highway did not require traffic control operations as long as notice was provided. Following initial structural surveys, drilling and blasting operations began in February 2022.
 - Up to this point excavation progress had been hindered by lack of qualified equipment operators. Equipment operator job postings had been up since early August 2020 but only a few qualified candidates were hired to work on this highly-phased, technical earthwork project. In February 2022 Aggregate decided to subcontract out the majority of the earthwork for the reclamation to Meridiam Partners, Inc. Aggregate would continue to oversee project, subcontractors (including HDR [engineering] and Buckley Powder [blasting]) and perform drilling for blasting. Meridiam Partners (MP) would complete all other tasks associated with the reclamation.
 - Drill experienced mechanical issues in late-February which required new parts to be sent from Switzerland. Initial estimates were a 30-day down



time. Drill was inoperable for over three months waiting on parts procurement and installation. This delay severely hindered schedule for quarry reclamation.

- MP Mobilized to the site in March 2022 with full complement of heavy equipment to handle both Phase I (quarry) and Phase II (floodplain) of reclamation. Schedule for MP had a completion date of October 2022.
- HDR/Aggregate continued to work with CDOT contractor (Kiewit) on Hwy 7 project to export fines material from floodplain area to be used on highway re-construction project adjacent to site.
- Continued soil germination bench study started in early November 2021 and is being performed by HDR at their warehouse to test soil amendments and seed mix with relatively-inorganic site soils. Bench test continued through summer 2022 before being transplanted to test plots on site.
- Floodplain development permit application and hydraulic analysis report submitted to Boulder County in early November 2021. Discussions and additional deliverables were provided to Boulder County through February 2022. Application was approved in March 2022 which allowed mobilization and initial excavation activities in Phase II area to begin.

April-June 2022:

- MP continued grading activities on top of the quarry highwall.
 - Blasted soil/rock material was pushed by dozer/placed by haul truck into Quarry 2 southeast corner to build up ramp for placing fill.
- Large boulders (>24-inch minimum diameter) were separated out and stockpiled to be used for scour berm. Scour berm construction started on west end of site working east.
 - Amendment to scour berm design/construction to include toe boulders and soil fill between boulders was submitted to Boulder County and DRMS per BC request.
- Drilling continued after three-month delay on May 16th. Second blast following the February shot occurred May 25th and resumed on a bi-weekly schedule through June.
- MP and Aggregate continued to monitor erosion BMPs and perform dust suppression activities per Boulder County erosion control and stormwater management plans.
- MP was able to continue work in floodplain while quarry reclamation was on hold during the drilling downtime delay.
 - MP split the Phase II floodplain work into several smaller plots. All subgrade plots received the following reclamation:
 - Strip overlying alluvial material and stockpile
 - Strip fines material from mining operations and stockpile
 - Strip available topsoil material down to water table and stockpile
 - Replace alluvial material in plot and compact
 - Replace topsoil material and prep for soil conditioning
 - All plots above grade including the orphan pile and vegetated berm were removed down to surrounding grade.
 - MP stockpiled over 15,000 CY of fines material from the floodplain reclamation areas in the old sediment pond area for Kiewit to export



- Kiewit began exporting fines May 7th and continued through October 2022. Fines were re-used on CDOT SH7 project as topsoil material in several areas along the highway corridor.

July-September 2022:

- Operations resumed through September as they had in June. Drilling continued to have periods of down time with the drill being inoperable due mechanical issues.
 - Highwall excavation resumed following the drill and blast cycle on a biweekly schedule. Top crest of quarry began rough grading at 2H:1V at highest point along west end.
 - Fill operation in Quarry 2 continued. As the quarry was filled from east rim to west rim, fill began to be placed further to the north creating a ramp where tracking of haul trucks and bulldozer could provide necessary compaction. Rough grading of quarry swale was not started, however.
 - Floodplain reclamation process continued as noted above. Equipment was transported around to north side of South St. Vrain Creek to perform grading/reclamation of area cut off by 2013 flood. Kiewit stopped hauling export fines material during July-August while paving for SH7 project was ongoing.
- Germination bench test transplanted to test plots July 6th.
- AI officially transferred the site ownership to Holcim-WCR, Inc. following a DRMS Surety-Related Inspection on August 26, 2022.

October-December 2021:

- Issues from the delays with drill down time forced the schedule to be adjusted and Holcim to look at alternatives for increasing productivity. To maximize the efficiency of the excavation process for the overburden removal of the highwall, AI and MP agreed to perform a temporary demobilization of all MP equipment and personnel effective Monday, September 26.
 - The temporary demobilization was expected to last 6-7 weeks to allow the AI driller and blasting subcontractor to clear 3-4 large areas of blasting that have been prepared along the highwall.
 - Each blast was expected to occur at two-week intervals and once sufficient area was completed, MP remobilized with the necessary equipment to complete the grading work in both Phase 1 (quarry) and Phase 2 (floodplain).
 - MP re-mobilized starting in mid-November. A new project schedule running through May 2023 was developed to account for certain tasks, including highwall stabilization and revegetation, to occur during outside of the winter season.
- The final blast event for the highwall occurred November 21st. MP has began the process of removing the final areas of sandstone overburden from the highwall crest.
- Floodplain re-grading is expected to be complete in the 2022 calendar year as most areas are now being covered with organic soil material salvaged from the vegetated berm area (revegetation not to occur until Spring 2023 to allow for best germination conditions).



- Quarry 2 rough grading will begin in December and continue into catchment berm construction in 2023.
- Riprap lining for the swale, drainage channels, and scour berm toe channel will continue.
- Scour berm construction is currently on hold until the catchment berm for Quarry 1 is completed.
- Germination pilot test has gone dormant for the winter. HDR will continue to monitor through the Spring of 2023 for additional changes in the test results.

Due to delays with bird nest habitat, permit reviews and the lack of available equipment operators, and most notably in 2022, drill mechanical issues, the project has had several schedule setbacks. Aggregate is working through these issues to complete reclamation as quickly as possible but also is aware that operations may be slowed by winter conditions and subsurface changes in rock type. The overall safety of equipment operators working along the quarry highwall is the highest priority and adding additional equipment or pushing higher production rates may not always be the right choice for the success of the project. Holcim and HDR have been providing Boulder County with biweekly progress reports on the scope and schedule of work performed. Boulder County is aware of the schedule extension into Spring 2023 and understands the challenges that led to this delay. Aggregate will continue to coordinate with DRMS and Boulder County to assure that quality control and project goals are met as expeditiously as possible.