STATE OF COLORADO

Cazier - DNR, Tim <tim.cazier@state.co.us>

Documents in response to the PAR for Fountain Pit

1 message

Mark Heifner <mheifner610@gmail.com> Fri, Sep 2, 2022 at 2:24 PM
To: "Cazier - DNR, Tim" <tim.cazier@state.co.us>
Cc: "Davis, Scott" <SDAVIS@schmidtconstr.com>, "Chavez, Dan" <dchavez@schmidtco.co>, Nick Domingue <ndomingue@schmidtco.co>

Hi Tim,

Attached please find our responses to your adequacy letter. This includes the response letter, my report on the existing revegetated areas, a new Exhibit L - Reclamation Costs, and a new map which shows a likely anticipated layout of the operation for roughly the next 5 years, including a near future reclamation project on the northern portions of the East Side "wall" of the pit. Please contact me if you have any questions, which I suspect you will, or wish to discuss any of these things. Hopefully this will be sufficient to gain approval for this permit modernization technical revision.

Have a nice Labor Day Weekend.

Mark Heifner

4 attachments

- **2022 Fountain future layout F.pdf**
  3751K
- **Exhibit L Reclamation Costs - Complete F.pdf**
  2572K
- **Report on the Eco Condition of44 Acres of Reclaimed Land F.pdf**
  670K
- **Response to Adequacy letter F .pdf**
  136K

Mark A. Heifner

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September 2, 2022

Tim Cazier, PE
Environmental Protection Specialist
Colorado Division of Reclamation, Mining and Safety
1313 Sherman Street Room 215
Denver, CO 80203

RE: Responses to Preliminary Adequacy Letter on TR3 for Fountain Pit
Permit M-1982-155

Dear Mr. Cazier,

We have thoroughly reviewed your PAR letter and have prepared some additional materials in response to the 10 items in your letter. Following are our responses and the additional material needed to support our responses.

1) Exhibit D, Summary of Boundary Definitions: Paragraph 1B states the affected area boundary can change, but never exceed the permit boundary. While the latter phrase is correct, the DRMS wishes to clarify this statement: a) the affected area boundary for this permit is the same as the permit boundary; b) both boundaries can be revised (increased), but only through the amendment process. No response is necessary

> **Response:** You make an excellent point. Perhaps the solution to this is to alter the names of the lines on the annual report map. While we have been using the Affected Land boundary on the map as described in the TR, it might well be better to label the dashed magenta line as a "Disturbance Boundary" and indicate the bold, dashed red line as "Permit/Affected Land Boundary." On the upcoming annual report in December this will be implemented and a note included on the map regarding this change.

2) Exhibit D, Amount of New Land Opened for Mining at One Time: Paragraph 1 on p. 3 indicates on average about 15 acres is stripped at a time. No other estimates of disturbed area could be located in Exhibits D or E. The 2021 annual report states 302.5 acres are affected. The DRMS estimates at least 225 to 250 of these affected acres need to be seeded, or will need to be reseeded after reclamation grading is completed (this accounts for topsoil stockpiles that will be moved). Additional overburden stockpiles that are currently vegetated may also need to be used for backfill and eventually reseeded. Please provide a complete outline of the maximum acreage that disturbed at one time (see Comment #8 below for updates to Exhibit L).

Response: This is discussed extensively in the new Exhibit L included with this response letter. An examination of the approximately 30 year old stockpiles in the northwestern corner of the operation determined that they have completely returned to native vegetation now and, environmentally, should not be disturbed for any purpose other than correction of some minor erosion damages in a few places as well as some minor weed control and replanting of about 0.2 acres that was discovered where a small amount of soil was dumped sometime before 2017. This is discussed more in the response to another item. If disturbed and replanted it is highly unlikely that a similar vegetation community would become established. The existing vegetation is clearly not even close to what was originally planted to stabilize the topsoil piles.

3) Exhibit D, Topsoil and Overburden Removal and Stockpiling: Paragraph C on p.3 states stockpiling will be done near the location where it will be used for reclamation. Please provide an average or typical distance for the purpose of estimating hauling or pushing distances.

Response: The locations of two new soil/overburden stockpiles are shown on the Future Conditions Map included in the new Exhibit L. Nearly all distribution of this material will be by truck and deposited at the location where it will be used. These will be located on each side of the operation to reduce haul distances by roughly 50%.

4) Exhibit D, Wash Plant: The third paragraph A on p.4 states a new wash plant is expected to be brought online in 2022. The DRMs approved a wash plant revision with the submittal of TR-2 in 1998. No impact to the financial warrantee was indicated at the time. If the wash plant facility is considered portable (i.e., it can be easily placed on a flatbed or wheels attached to the structure and it can be pulled off site), then the DRMS will not require bonding for demolition and disposal. Please indicate whether or not the new wash plant is portable. If the wash plant is not portable, please provide dimensions of the structure(s)for the purpose of estimating demolition costs. [*Note: the approval of TR-2 included the following stipulation: The water secured by the operatorfor use in theproposed wash plant must meet the requirements of applicable Colorado water laws and regulations*]

Response: The wash plant is definitely not portable. It's supports are imbedded in concrete. That is necessary to keep it from becoming unstable or sinking into the ground. Information on the two structures are provided in the information included with this response to the adequacy letter. Details on the Wash Plant are included in the new Exhibit L.

The water used is purchased from Colorado Springs but is not potable, but it is clean.

5) Exhibit D, Conveyors: The second paragraph D on p. 4 mentions conveyors used to transport materials. Based on Google Earth imagery and photographs taken during the March 15, 2022 inspection, it appears two existing conveyor lines totaling about 900 feet are fixed (i.e., not portable). The DRMS will need to hold an appropriate bond for demolition and removal of these and future conveyors. Please indicate whether or not thetwo existing segments (a north-south line of approximately 500 feet and an east-west line of approximately 375 feet) are portable. If they are not portable, please provide lengths and belt widths.

Response: All conveyors associated with the screening plant and with the wash plant are portable. The new conveyors for the wash plant are on wheels. Conveyors for the screening plant are placed on the top of moveable concrete support blocks (see photo in Exhibit L) and when moved are simply picked up and moved to a new location. Then the concrete support blocks, most of which have been used for this purpose for years and years, are relocated and the conveyor is simply set on top of the blocks and leveled and adjusted for stability. Furthermore, the screening plant itself and associated equipment are all portable. Only the wash plant itself is fixed due to its height and the mass it must carry. See the response to Item 4 for a discussion of the wash plant.

6) Performance Warranty clarification: The third paragraph on p. 9 states “the Performance Warranty guarantees that even if the bond is insufficient Schmidt and/or its parent company will complete the reclamation or provide the funds to have that done.” While this is technically correct, it is not practical as it is typically when a Permittee defaults that the DRMS has to revoke the permit and forfeit the bond, in which case the Permittee would not have the funds to provide any extra needed for reclamation. For this reason,the DRMS monitors how much bond is required for reclamation and works to ensure the appropriate amount is posted. No response is necessary.

7) Highwall Configuration: An important consideration in the reclamation cost estimate is the configuration, heights and lengths of the highwalls during typical mining operations. During a telephone call with Mr. Mark Heifneron August 2, 2022 it was conveyed that current operations strip overburden and topsoil to a depth of 8 to 10 feet leaving a vertical highwall, whereas the product mined is accomplished in two sequential lifts varying between 15 and 30 feet (also a near vertical highwall), depending on the depth of the deposit. In addition, a perimeter road is constructed at the base of the overburden/topsoil layer which transitions to the bottom of the first lift mined at a slope of roughly 1H:1V, requiring less backfill for reclamation. Furthermore, as there is a geometric increase in the amount of cut/fill needed for highwall reduction as the height increases, it would likely be advantageous, more accurate and less costly for reclamation bonding to break out the three different highwall configurations i)overburden/topsoil, ii)perimeter road, and iii) production highwall). Please confirm your wish to proceed in this manner and provide typical heights and maximum lengths for each type of highwall (also include the slope,e.g., near vertical or angle of repose).

Response: This is addressed in the new Exhibit L included with this response. That exhibit shows cross-sectional profiles of four possible highwall configurations that can occur at various times during the mining and how each configuration influences the amount of material that needs to be moved in cut and fill and how much needs to be brought in to make up deficiencies in producing a 3:1 final slope in the case of default. It therefore also shows the amount of material needed to reduce slopes to 3:1 on the part of the permittee. A few other comments here may be in order.

1. All cuts and highwalls are vertical or very nearly so (overburden and working face).

2. The number of lifts is usually 2, however in some special cases only 1 is used.

8) Maximum Disturbance Area/Exhibit L: Amendment 2 (AM-2) approved in 1986 indicated no more than 40 acres would need seeding at any given time. The latest annual report(December 2021)states the disturbed area at the time was 302.5 acres. Based on Goggle Earth images and the topsoil stockpiles identified on the 2021 annual report map, the DRMS estimates there is 200 acres that require seeding and another 25 to 50 acres that will need reseeding after existing topsoil and/or overburden stockpiles and used for reclamation. As the 40-acre limit has been exceeded, Exhibit L needs to be updated to reflect current conditions and the bond adjusted accordingly. Please provide an updated Exhibit L to reflect this and other reclamation tasks discussed in this adequacy letter.

Response: The new Exhibit L includes a layout map of the types of disturbance expected over the next approximately 5 years including areas that could be released from bond (about 44 acres) in the near future, about 52 acres of new reclamation to be done in the next couple of years. It also defines the amount of land needed to properly conduct the operation including mining areas, processing and stockpiling areas, transportation corridors, and various equipment and product storage areas.That totals 172 acres. But some of this could potentially be reclaimed in the near future, but right now is needed.

This operation could not possibly be operated with only 40 acres as a limit. Even the current mining and processing area requires about 90 to 125 acres and that does not include transportation corridors to the scale and entrance or any areas for storage. The site has been that way for at least the last two decades and has been bonded accordingly. The plan is to reclaim about 100 acres in the next two years and hopefully get 44 acres released as soon as erosion repairs can be made and those small areas (perhaps 0.2 acre total, at most) are repaired and adequately revegetated.

Looking back at the annual report for 1987, done by Cooley and submitted less than a year after the amendment was approved, it appears that the 40 acres was already exceeded. However, as the annual

reports back then were not very clear or detailed, it is really hard to tell what the situation was with regard to major, moderate, and minor disturbance. After this method of bonding was first implemented in the mid-1970's to make it easier for operators to bond their operations without spending a fortune for the bond this problem of identifying, on the ground which category was which and staying within those limitations became a difficulty in annual reports and even during on the ground inspections. The problem is the categories do not have distinct boundaries as was thought when they were defined and the acreages in each change rapidly in many aggregate operations. Thus, in my opinion, it is not an easily administered approach due to the boundaries effectively being rather subjective on the ground and in operation.

This the main reason why this approach needs to be abandoned on this operation and rather use a bonding approach that fits the dynamics of this kind of operation. Even the boundary between major disturbance (active mining) and moderate disturbance (mined but not yet begun with reclamation) is much more like a transition zone rather than a clearly defined boundary. However, going from moderate disturbance to minor disturbance is usually well defined, but not always.

9) Drainage: As part of the aforementioned phone call with Mr.Heifner, the final reclamation disposition of the sediment/wash ponds north of the truck scale were discussed. Mr. Heifner indicated he planned to perform investigations of these ponds related to wetland plants and the basin floors suitability for grazing later this month. The DRMS concurs that his investigation will be beneficial in determining an appropriate reclamation plan for this roughly10-acre area.

Response: Included in the materials submitted here is my report on the investigation of this area. Please refer to that.

10) Exhibit E, Drainage Control: Paragraphs 3A and 3B on p. 5 of Exhibit E discusses two options for site drainage control for final reclamation. The DRMS accepts the underlying gravels are likely sufficient to empty collected water in accordance with the time allowed by water law, given the currently available information. If information obtained in the future as mining progresses to the south proves to be false, a permit revision will need to submitted to revise the drainage plan accordingly at that time. No response is necessary.

Response: We concur with your assessment of the situation at the south end. Unfortunately, information for the far end of the permit area is sparse at best and geologically there are several possibilities that could exist. Projection from the workings to the east are about the best than can be done, but planning on assumptions is a precarious process. It could well be that the far south end is

best to simply leave alone and cease mining a bit further to the north where conditions are more like what they have been. Geologically, it is apparent that the Pierre Shale bedrock determines what can be done in the way of gravel extraction. It is likely the shale has been eroded in the valley, but how much and how is the side of the valley configured? Unknown at this time. Here it could be fully mineable while next door it was not. But all of this is many years away.

If you have any further questions or wish to discuss anything in this response please contact me.

Sincerely,

Mark A. Heifner

cc: Scott Davis
Dan Chavez
Nick Domingue

List of Additional Information Provided
September 2, 2022
Fountain Pit M-1982-155 TR3

1. Two photos of the new Wash Plant being installed at the operation.

2. A report on the ecological condition of about 44 acres of revegetated land in the northwestern corner of the permitted area, including soil/overburden piles on mined land. This report includes photographs of parts of the area examined.

3. A new Exhibit L - Reclamation Costs containing information to aid in estimation of the bond. This includes various information on slope and highwall reductions, portable conveyors, details on the new Wash Plant, and a map showing the expected layout of the operation including soil/overburden stockpiles, operational areas, and reclamation areas. This map covers approximately the next 5 years.

Item still outstanding -

1. A new Exhibit S providing authorization to mine closer than 200' of the Colorado Springs Utility (CSU) easement for adjacent 430 Kv powerlines.

Information has been provided to CSU with regard to what is needed and Schmidt is awaiting response.

The notarized letter from CSU will be provided as soon as it is received. Until then Schmidt Construction agrees to keep, in the future, all mining and excavations at least 200 feet from the powerline easement rather than the current distance of approximately 100 feet.

Report on the Ecological Condition of 44 Acres of Revegetated Land at the Fountain Pit, permit M-1982-155

by Mark A. Heifner, ecologist

Introduction: This large sand and gravel pit located on a low mesa about 2 miles southwest of Fountain, Colorado in El Paso County has been in operation since the 1970's, a remarkably long time. The company who owns the gravel pit, Schmidt Construction Company of Colorado Springs, has mined the gravels at this site for many decades with a short period in the last half of the 1980's when Cooley Gravel Company located in the Denver area mined the gravels. During that time Cooley modified the permit and added a great many acres to the permit.

The area of interest for this report is in the northwestern corner of the permit. Even before Cooley operated the pit a very large stockpile of soil and overburden blended together was established just east of Charter Oak Ranch Road which runs south along the western boundary of the gravel pit. However, nothing was ever done with this stockpile of material intended for reclamation purposes. Thus this stockpile has been sitting for 40 years or more. It is not even known whether any seed was applied to this material to protect it from erosion. That probably did occur at some point but that seems to be missing from the record. Therefore, based on a lack of evidence, it must be assumed that whatever is growing on the stockpile arrived by invasion from surrounding areas.

In 1999 and 2000 settling ponds were established on mined land beside and east of the stockpile. The ponds were built to provide a place for a gravel washing operation that was installed by Schmidt. This system remained in operation for only a few years until a drought mostly dried up the water source. Another attempt at washing was subsequently established using water from another source. But that became too expensive and the washing was deemed unprofitable mainly due to the cost of water. Thus the settling ponds were used off and on for several years. Once the washing ended the water in the ponds was allowed to evaporate or drain into the groundwater, a process that is very slow due to the fact that the silt and clay that accumulates can retain a great deal of water for many years, even if the sediment is only a few feet deep as it is here.

Also, overburden stripped off land ahead of the mining was stockpiled north of these sediment ponds in a long gradual south facing slope. This mostly occurred during and after the washing was done and its purpose was primarily to backfill old mining areas as a reclamation action. Also, it was thought some of the material could be used to topdress the gravel pit for reclamation. Unfortunately, none of that happened, but it did result in an excellent slope that partially connects with the soil/overburden stockpile to the west and southwest of this slope. The total amount of land examined was about 44 acres, but only about 23 acres was examined in critical detail.

Purpose of this Study: As this land appears to be fully reclaimed in accordance with the law an examination of the land is needed to gather evidence to support a bond release on this land. It

is also necessary to see if there are any particular problems present that need corrective action prior to consideration for release.

The condition of the vegetation needs to be assessed to see what is growing there and if any serious noxious weeds are present that need to be controlled or eradicated. The condition of the land needs to be determined to see if there are significant erosion area hiding in the grasslands. The sediment basins need to be examined to see if any small ponds are present and determine whether any quicksand, a common hazard in settling ponds, is present.

The investigation was done completely on foot so no damage would be done to the vegetation by driving on it and so the soil condition could be examined almost step by step and also so the primary or dominant plant species could be identified. Also cover estimates could be made along the way to characterize the vegetation to see if it is sufficiently dense to adequately protect the land. This field work was performed on August 19, 2022 and it took about twp hours to cover 0.9 miles.

Results: The results are divided into two sections defined by the two habitats present. First are the two connected sediment ponds or, rather, their remains. Second are the slopes which are 99% in compliance with the maximum 3:1 slope as stated in the Technical Revision 3 currently under consideration. These are two very different environments and potentially the growth environments could result in very different vegetation communities. If that is the case then both need to meet the standards to have a release make sense.

Most of the land included in this area is a slope of some kind. The only really level land is within the sediment ponds; everything else is either up or down (or across following a contour on a slope). The primary settling pond, the largest, includes about 6.8 acres. The secondary settling pond is about 2.3 acres. So about 9.1 acres of the 44 is in settling ponds and about 35 acres is in slopes.

Sediment Basins: Both the primary and secondary sediments basins are almost mirror images of each other. Vegetation cover is robust almost everywhere and even where it is thinner due to a slight susceptibility of holding ponded water in the recent past, the vegetation is composed of a high diversity of grass and forb species. Estimates of cover is generally about 80% in the most robust areas to about 50% where the cover is bit more sparse. But plant vigor is the same nearly everywhere and flowering and seed production is high in 2022 which has been a bit above average in precipitation during the summer. Dominant grass species include two species of native needlegrass along with the Short-grass Prairie dominant blue grama. All three are excellent forage for cattle although cattle tend to avoid needlegrass when its seed is maturing due to the needle-sharp points of the seed callus. Other grasses include rye grasses, bluegrasses, dropseed.

Among the wildflowers common sunflower, a native, as well as hairy golden-aster, also a native are abundant and in August flower profusely. Trees are mainly a few cottonwoods as well as some stray Chinese elms whose seeds probably blew in from somewhere within a few miles of the site. Shrubs are mainly, and sadly, *Tamarisk* that undoubtedly were planted by birds after they ate seeds along nearby streams and even Fountain Creek were that species is common. The only sub-shrub noted was Rabbitbrush and there is a good deal of that on the berms surrounding the ponds where the soil is dry and rocky.

There formerly was an abundance of the ubiquitous willow, *Salix exigua*, an obligate wetland species. Most have died now as a result of the ponds drying out and only a few are struggling to come back or just hold their own.

As for the *Tamarix* these, like the willows, are in the process of dying. However, this species is a master at finding water where there is little and persisting for a long time. Checking the ground around the healthier plants showed not a single young plant even though it appears the healthier ones are flowering and seeding. This lack of reproduction will be explained when it comes to discussing the soils in the sediment ponds.

In general the woody plants are faring poorly as most require a good deal of water to survive and even though at one time there was a lot of that available, there is little now. The soil is a very dense silty clay with a light rusty color. However it does not appear to create dry areas with the common curled jig-saw puzzle patterns. Instead it stays smooth and fairly soft. That is likely due to a lack of bentonite in the crushed fines derived from the crushed Pikes Peak Granite that is produced at this operation. That undoubtedly is a major factor in why the vegetation is rich and diverse but still lacks the very high density and cover of vegetation growing in these kinds of conditions. The sediment discharged into here was undoubtedly completely devoid of organic matter and therefore was very poor nutritionally. Now, after about 15 or so years of growth the organic matter is increasing and the vegetation is responding favorably to that introduction. Seed germination is still probably not up to what it should be, but that will also increase as the microbial part of the soil becomes more robust.

The lack of reproduction of *Tamarix* is most certainly due to the generally dry surface soils. It appears that all the *Tamarix* are old plants and most have dead tops and some with live branches only around the base. This is clear evidence that even the deep water in the dense soils is now scarce. *Tamarix* has a very high water requirement and without frequent replenishment of soil moisture they decline rapidly.

It was apparent that depressions containing water were not present anywhere in the sediment basins. If that was the case, they would be surrounded by very lush vegetation and possibly cattails, bull rushes, sedges and willows would be present. None of those conditions were noted anywhere. However, there are a few places where runoff from the slopes enter the basins. At those locations there is some rather lush grass growth and some cottonwoods, most of which had drought killed tops. At one time these were obviously wet, but the water was not deep as there are no depressions associated with them and now the ground is as firm as it is everywhere else. These spots may collect some water after a series of big storms and that water might spread out across the top of the soil in surrounding areas, but it is apparent that the buildup of water does not reach much depth. This inspection was done on a Friday and the previous Tuesday afternoon Fountain Pit had received about 2" of rain over a short period of time. Ground evidence showed that the water had flowed into one of these entry locations. The ground was more damp in this area and some water had accumulated on the surface, but at the time the spot was visited there was no open water present and no mud.

In other places around the northern perimeter of the primary sediment basin it is apparent that at one time a good deal of water accumulated, mainly because of flow off of nearby long slopes during wet periods. But no remaining evidence of the rich vegetation was seen, however minor accumulation of water can occur, but it does not stay there long enough to alter the vegetation or

soil to create a minor wetland habitat. That process usually takes about two weeks of submergence.

Slopes: From the primary sediment pond our journey took us up a major drainage that accumulates water from the slopes to the west and to the north. The water then flows down the drainage to where it enters the northwest corner of the primary sediment pond. Near the toe of this drainage is some erosion damage where the soil has been eroded away leaving a gully 2 to 3 feet deep. Examining the upper end of this gully that is only about 50 feet long there is a pouroff into the gully. It is apparent that some water had flowed down the drainage and deposited a little bit of fresh sediment in a more gradual spot just before it reaches the pouroff into the gully. The pouroff had recently been active, likely on the previous Tuesday. A small amount of headward erosion had occurred, but it is clear that erosion is very slow here. The bottom of the gully is well vegetated all the way to within inches of the pouroff.

There are a few other similar gullies at the bottom of the long north slope that leads down to the primary sediment basin. Most of the erosion is quite old but deep enough that it will take a considerable amount of time for natural stabilization to occur. These were undoubtedly quite active before the rich vegetation developed on the slopes. As these slopes are primarily composed of overburden which is a gray colored, blocky and firm silty-sandy clay loam, it is apparent that on unprotected slopes this material is quite erodible. That shows that in the use of this material to create final slopes around the gravel pit, protection from severe erosion should be used or the 3:1 slopes are likely to present a considerable maintenance issue until the vegetation is established. It is also clear that any final slopes that are steeper than 3:1 would not have likely succeeded in revegetation without a lot of very good luck. Cooley Gravel's original proposed slopes of 2:1 around the pit would have rarely worked when using this overburden.

Moving up the slope toward the top of the hill of overburden it was immediately noticed that the density and cover of the vegetation on these slopes far exceeds the density and cover of the vegetation in the sediment basins. This is quite surprising as this area is a drier slope. Both areas have soils that contain a good deal of minus 200 particle size. However, the overburden on the slopes have a bit less of that particle size as well as a higher abundance of fine to very fine sand and even a small percentage of small pieces of gravel. Thus the soil on the slopes is more porous than the soil in the sediment basin which has very little of particle sizes greater than about 1/100 of an inch while the overburden on the slopes contains a multitude of particle sizes. This allows precipitation to be captured by plant roots more easily than the very tight waste from the washing of the gravels.

The grass vegetation here is quite diverse and composed of almost entirely native species that are adapted to soils that have a bit more clay than the undisturbed vegetation where mining has not occurred.

Species diversity is quite high for a site that is only about 40 years old. Most of the species are obviously derived from the native vegetation and it does not appear there are many species that relate back to the low diversity protective seed mixture listed in the mining and reclamation permit for the operation. That should not be taken to mean it was not planted, but the species in that mixture have a hard time surviving in the face of the strong competitors that invaded from the natural vegetation in this area. They probably all died out many years ago.

The dominant species is shared by a common needlegrass (*Hesperostipa comata*, formerly known as *Stipa comata)* and Blue Grama (*Bouteloua gracilis).* Subdominants include Scribner's needlegrass, and two species of Bluegrass. Thus, the primary species are much the same as was seen in the sediment ponds but there the needlegrasses are strongly dominant. Also the forbs are similar here as in the sediment ponds, but they are much less vigorous here. In addition there is a scattering of yucca and a very few cholla cactus. These last two are very common in the surrounding natural vegetation.

Woody vegetation on the hills, other than some rabbitbrush, is almost totally absent. However, at the base of the east side of the pile are two very large and very successful Russian Olive trees. These are growing in an in slight dip in the topography where runoff from the steeper east slope accumulates. Strangely though Russian Olive was not found in the sediment basins probably because the soil there is far too dense. Russian Olive enjoys a somewhat more open textured soil that has a good water supply. These are magnificent trees that are not creating the usual infestation associated with this species in river and stream floodplains. It is recommended that they remain for wildlife purposes.

Sadly, at the very crest of the hill of soil and overburden someone dumped some very rich (fertile) topsoil on the ground and spread it out into a layer of soil from a few inches to perhaps a foot deep. These two areas that total perhaps 0.2 acres on the very top of the hill is populated by an almost pure and very dense growth of annual weeds. These piles were established sometime before the current topographic map. The photography for that map was taken on December 2, 2016.

It is a strange and telling situation that these weeds are so dense and dominant that almost nothing else can invade the land they inhabit. This situation invariably occurs because the soil is extremely fertile and high in nitrogen, organic matter, and high amounts of other vital nutrients. The nitrogen is cycled around and around and the weeds take advantage of that nitrogen by growing thickly. In effect, the weeds have captured this ground and simply repeat the cycle each year. Strangely, or seemingly so, very few of these weeds can be found beyond the edge of this particular soil. The competition in the naturally developed vegetation is too high for them to get more than a few plants that can compete for a year and then they are gone.

The solution to this is to kill off the weeds very thoroughly with an herbicide and promptly plant the soil with a vigorous grass species that can consume a lot of the nitrogen without cycling it. This can be done in combination with the main seed mixture shown in the Technical Revision. Then keep the return of the weeds under control with careful herbicide treatment while avoiding using types or amounts of herbicide that would hinder the growth of the desired vegetation. Fortunately these areas are small enough that heavy equipment is not needed, as getting to this location with heavy equipment would damage, perhaps seriously, some excellent revegetation.

Conclusions:

1) At least 95% of the slopes in this 44 acres is 4:1 or less steep. And 3:1 slopes are very uncommon and span very short areas.

2) The topography of the uplands is compatible with a grazing land use, but is also variable enough that habitat diversity is fairly high providing moderately interesting visual variations.

3) The vegetation density and cover is excellent and composed of species that can withstand the rigors of an even drier environment than what is present at this time.

4) Species diversity and growth habit is also diverse which indicates the vegetation is reasonably closed ecologically.

5) Nearly all of the plant species are natives and derived from surrounding natural vegetation. This is important because it means the genetic forms of the plants are native to this location rather than being from widely separated locations that results in a diverse genetics that may not be well suited to this location. The plants here, being native to this location, are fully adapted to living together "peacefully." This translates to long term survivability. In fact this land could potentially be used as a seed source for planting highly adapted species in future reclamation at this mining operation.

6) The *Tamarix* infestation of the settling ponds unfortunately must be eradicated.

7) There are a number of small erosion damages at the toe of some slopes where water collects into stronger and erosive streams. These need to be repaired gently so to not damage the excellent vegetation surrounding these places. Use rubber wheeled equipment operated only when the soil is dry and weigh the appropriateness of using small equipment and taking more trips with using larger equipment and taking fewer trips. Never use tracked equipment or it will do more damage than the erosion has done.

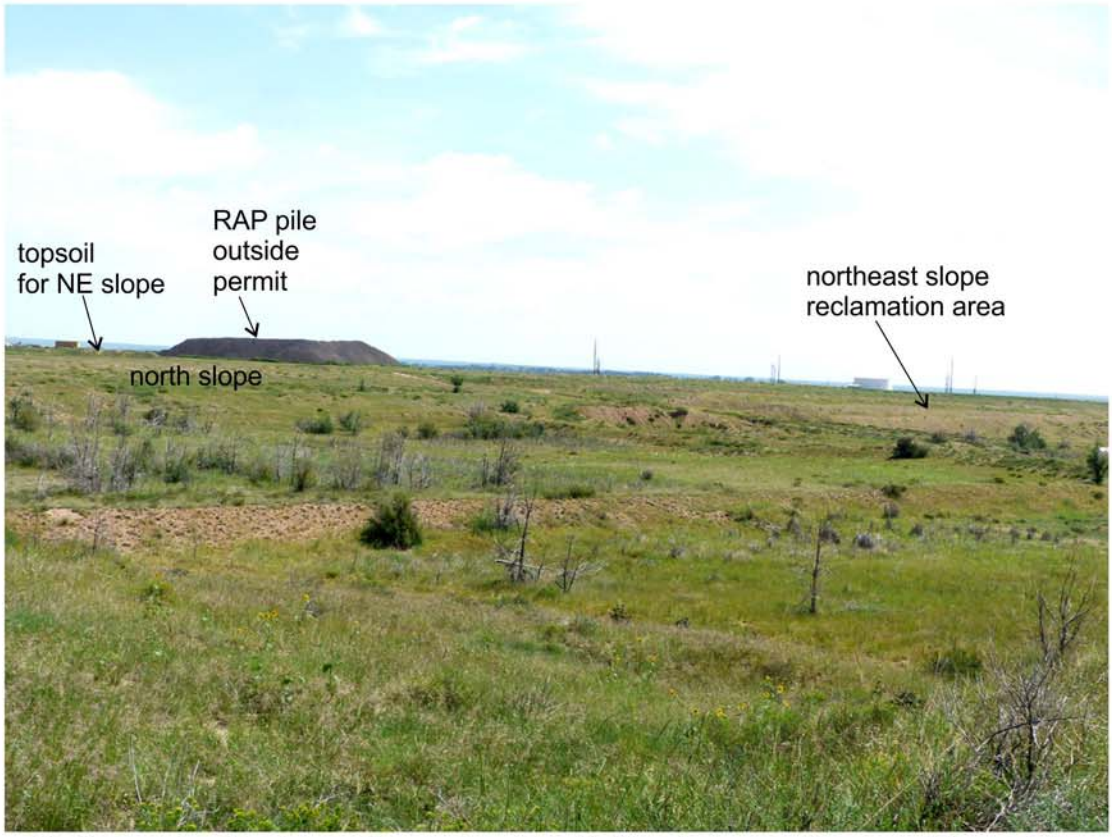
8) Remove entrenched weed infestation on the two deposits of rich soil on the high spots. Be very careful about accessing this area with vehicles.

Outer edge of the sediment basins. Essentially a very sturdy dam. Actual sediment basins are on the left. Bare slope in background is on adjacent land and is not part of this area of examination.

Interior of the east (primary) sediment basin that is now dry. Note the dead trees and shrubs caused by the drying out of the sediment in the basin. A wide variety of grasses and wildflowers have invaded. The slightly blurry trees are *Tamarix* that need to be eradicated.

Minor gully erosion on lower part of slope leading up hill from sediment basins. Nearly stabilized. Needs some repair.

View of vegetation on the north side of the top of the mound of soil/overburden. Most of the grasses are needle grasses and blue grama. Cholla and yucca have also invaded. All vegetation is natural established by invasion.



Sediment basins from above showing divider between the two. Most of the trees are *Tamarix,* but no signs of reproduction were seen. All the vegetation is a result of invasion and not planting or seeding. Most species are native.

From the scale looking northwest at the south facing slope of the now vegetated soil/overburden stockpile established in the 1980's. Virtually all the vegetation is composed of native plants that invaded this are from surrounding natural land.