Bratcher, Mike, EMNRD

From:	Randall Hicks <r@rthicksconsult.com>
Sent:	Tuesday, March 19, 2013 2:53 PM
To:	Dade, Randy, EMNRD
Cc:	'Mike Stewart'; hlamb@helmsoil.com; cstoker@helmsoil.com; 'Carl Campbell'; tony@alamoresources.com; 'Tyler Woodruff'; Bratcher, Mike, EMNRD; Holm, Anchor E.
Subject:	Alamo - Cedar Lake
Attachments:	CedarLakeLocation-FloodingResponse.pdf

Randy

Alamo Permian has an approved APD for the Cedar Lake 5 well.

During the review of the temporary pit permit application, the State Land Office became concerned that the proposed location was located within a floodway between the ancient lakebed and Cedar Lake Draw. The purpose of the attached letter is to provide additional interpretation of historic and on-the-ground data but more importantly to clarify the intention of the operator to construct the location and access road in a manner that will minimize or eliminate the potential of erosion of the production pad. Provided OCD concurs with the proposed construction features outlined in the attachment, no action is required on your part.

Please call me if you need additional information. The contractor should begin construction of the location later this week.

Randall T. Hicks
505-266-5004 (office)
505-238-9515 (cell and best number to use)

R. T. HICKS CONSULTANTS, LTD.

901 Rio Grande Blvd NW ▲ Suite F-142 ▲ Albuquerque, NM 87104 ▲ 505.266.5004 ▲ Fax: 505.266-0745

March 19, 2013

Randy Dade
NMOCD District 2
811 South First Street
Artesia, New Mexico 88210

RE: Alamo Permian Cedar Lake #5, API - 30-015-41021

Dear Randy:

On behalf of Alamo Permian Resources, I would like to respond to the issues brought forth in the 3/13/13 email from the State Land Office, a portion of which is reproduced below. The purpose of this letter is to provide additional interpretation of historic and on-the-ground data but more importantly to clarify the intention of the operator to construct the location and access road in a manner that will minimize or eliminate the potential of erosion of the production pad.

My comments are based upon my site visit, an examination of historic air photographs, and other information attached hereto. These data allow me to conclude that the drilling the staked location pursuant to the approved APD will not pose a material risk to the environment. To provide a high level of certainty regarding the safety of the location, Alamo Permian will implement location and access road construction features that should assuage the stated concerns. Additionally, the operator listened to the concerns of the SLO and OCD regarding the use of a temporary pit at this location and will submit a C-144 EZ form to formally withdraw the permit application for a temporary pit.

Below, I provide our responses [*in italics*] to the comments provided by Mr. Holm [in plain text].

1. The currently proposed location is within the high water mark of Cedar Lake as shown by the gray soils on the aerial photo.

While recent aerial imagery does show gray in the area of the staked location, a field examination of the area does not display any evidence of standing water where the location will be built. North of the proposed location are features that suggest highly localized ponding may occur. The FEMA flood map identifies the location as an area of minimal flood risk. The USFS Wetlands Mapper and the National Hydrography Dataset show an ephemeral water body about 260 feet distant from the staked location (we measured a distance of 264 feet). The attached maps and imagery also show that standing water can exist within the ancient lakebed, but only in the excavated area in the center of the closed depression and possibly in the area mapped as a wetland/pond. The 1996 Google Earth Image shows the gray color north of the proposed location. While the proposed location may lie within the high water mark of the <u>ancient</u> lakebed (Pleistocene?), the location does not lie near the high water mark of the current ephemeral surface water bodies.

2. The currently proposed location is within the outfall of Cedar Lake into Cedar Draw.

Evaluation of historic aerial photographs (see attached) show that the natural watercourse draining Cedar Lake has been altered by oil and gas activity, specifically lease roads and pipeline construction. Examination of the 1996 Google image and the 1971 Soil Survey image shows evidence of drainage from the lakebed about 200 feet east of the staked location. About 100 feet west of the staked location, the 2009 Google Earth image shows what appears to be evidence of water flow between the ephemeral lake an Cedar Lake Draw. Because of the relatively small footprint, the location does not lie within the current outfall of the ancient lakebed.

2. Location of the well pad within these areas will cause damage to the outfall and cause flooding of nearby land, as well as likely washout of the well pad.

Improper construction of an access road to the location will likely cause some flooding. As outlined below, we propose to install a swale in the access road, which will prevent flooding and minimize the potential of erosion observed in the 2009 Google Earth image.

3. The Well Pad should not be constructed within the high water mark of Cedar Lake or Cedar Draw.

We believe the evidence discussed above and the engineering precautions outlined below should adequately address this issue.

5. Any disposal pit located within the high water mark of Cedar Lake and Cedar Draw would be subject to flooding and erosion. Such disposal pit should not be allowed within these floodways.

Although we believe the location meets all OCD siting criteria for a temporary pit with on-site burial of stabilized waste, the operator will drill this well using closed loop/haul off.

NOTE: A newly formed sinkhole is located just to the south of the proposed well location. It is shown on the eastern edge of the high water mark of Cedar Draw in the aerial images attached. It would be prudent to avoid building any well pad or related disposal pit on or near this natural feature, since typically these features increase in radius over time.

North of the proposed location are small features that may be sinkholes or animal burrows that have expanded due to water entry. The area is not considered a high cave/karst area by the BLM. Localized karst features can occur in the general area and must be avoided or mitigated when building a pit or location. We observed no unstable ground at the location, but the animal burrows/small sinkholes are present north of the location.

Proposed Construction Measures

The location is surrounded by stabilized dunes that are 2-3 feet high. When these dunes are graded and the location leveled, we anticipate the elevation will be raised by about 1 foot. Over this base, the contractor will lay down about 6 inches of caliche, raising the elevation by about 1-2 feet above natural grade.

More important than raising the elevation of the location is creating an appropriate outfall from the ancient lakebed to Cedar Lake Draw. The 2009 Google Earth image documents

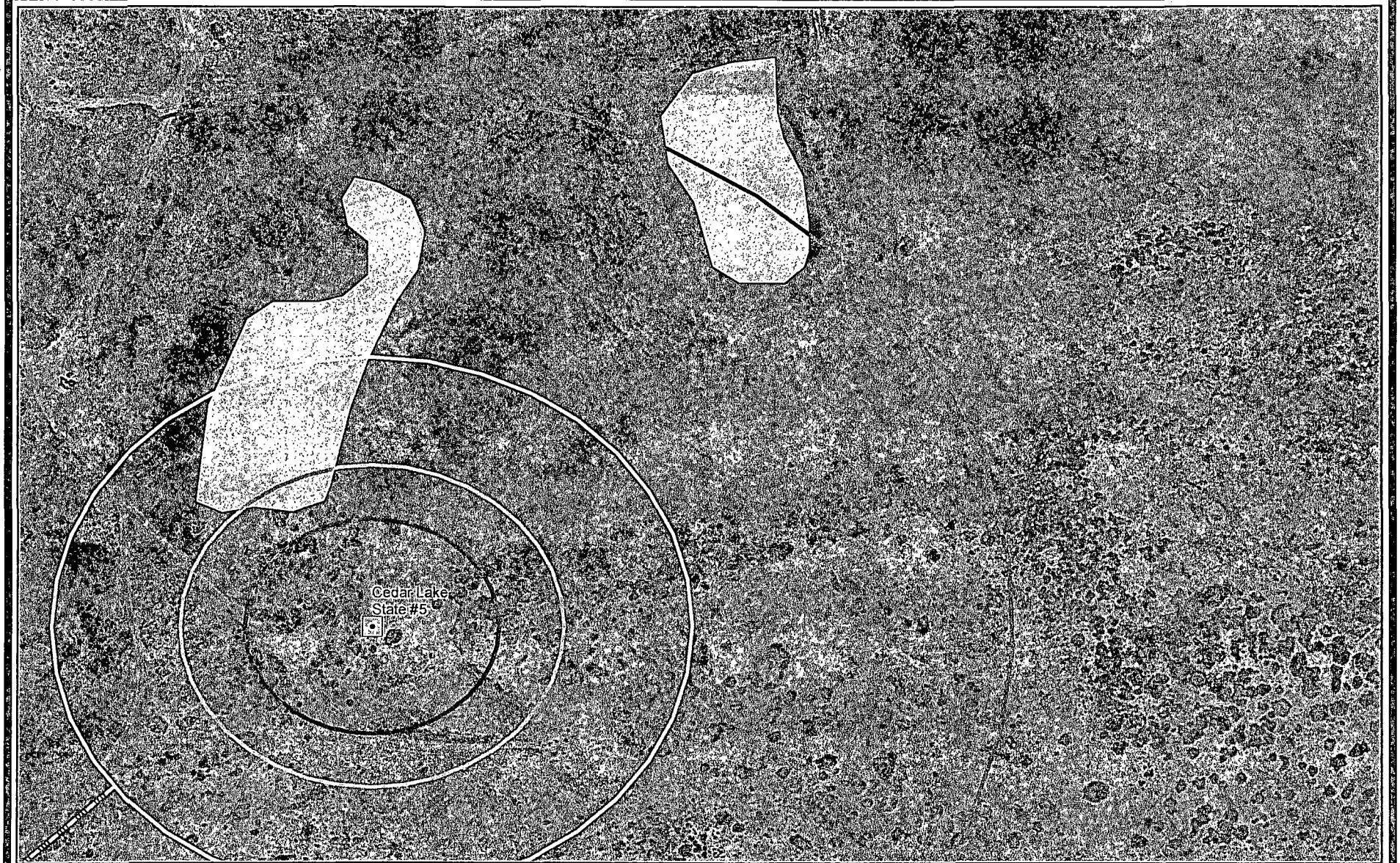
erosion caused by waters moving from the lakebed into Cedar Draw. We understand that a similar event could also erode a location and access road. Because the current road was placed over the natural drainage, which may have caused this 2009 erosion, operators in the area must expect an event similar to that observed in 2009 could damage the road. The proposed actions by Alamo Permian will lessen the potential of erosion of the lease road.

For the proposed access road to the Cedar Lake #5 location, the contractor will carefully examine the staked location, the access road and the area of erosion displayed in the 2009 Google Earth image. The contractor will construct a small swale in the road to direct drainage away from the proposed location into Cedar Lake Draw. Where this outfall is expected to cross the existing lease road, a second swale will be constructed to direct the flow. We invite OCD or SLO representatives to visit the location during construction to witness the actual mitigation measures planned by the construction contractor.

Sincerely,
R.T. Hicks Consultants

Randall Hicks
Principal

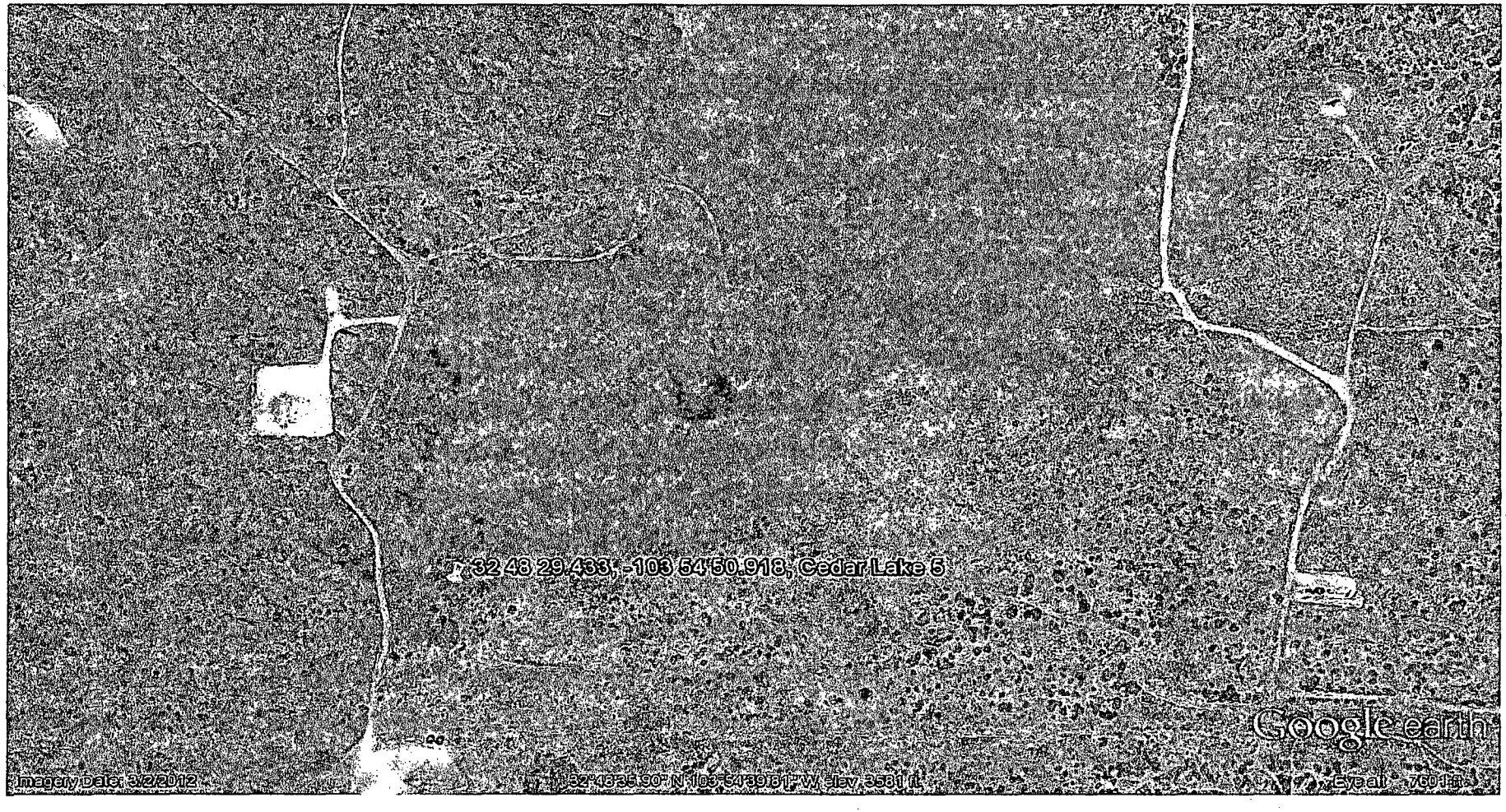
Copy: Alamo Permian Resources
New Mexico State Land Office



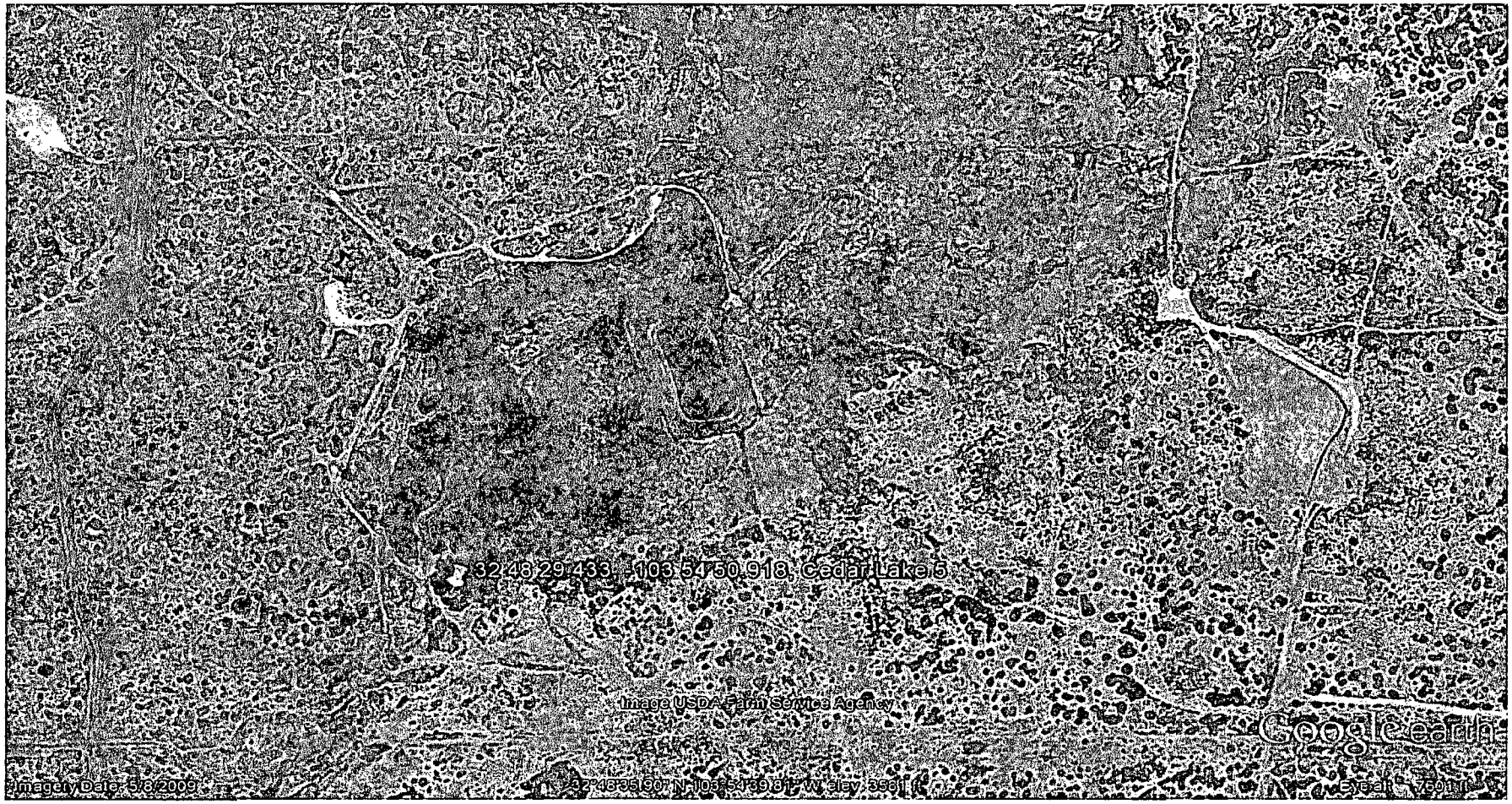
N
W E
S

0 200
Feet

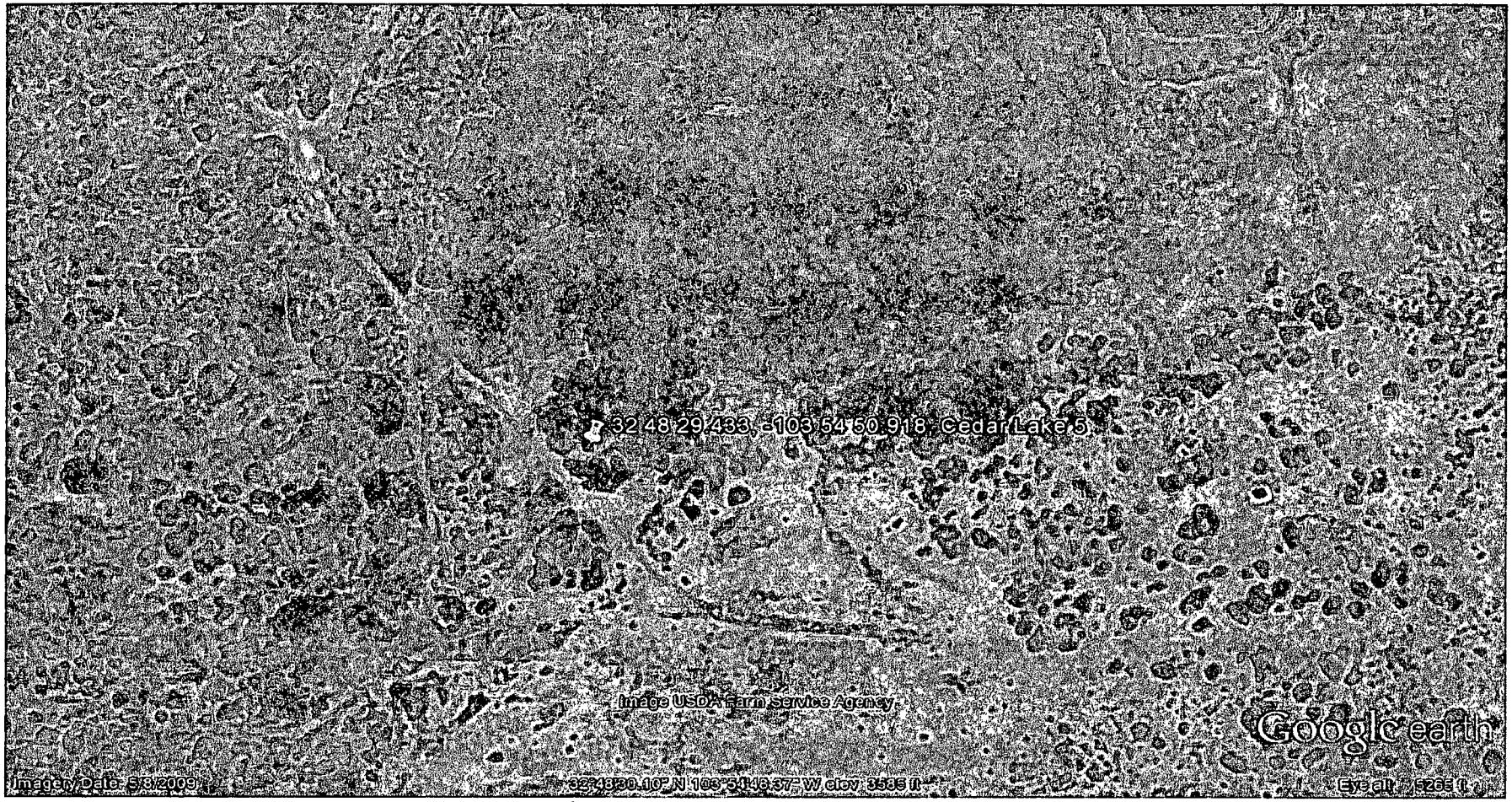
R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	Air Photo Showing Surface Water (Mapped Wetlands)	Figure EX - 1
	Alamo Permian Cedar Lake State #5	Feb 2013



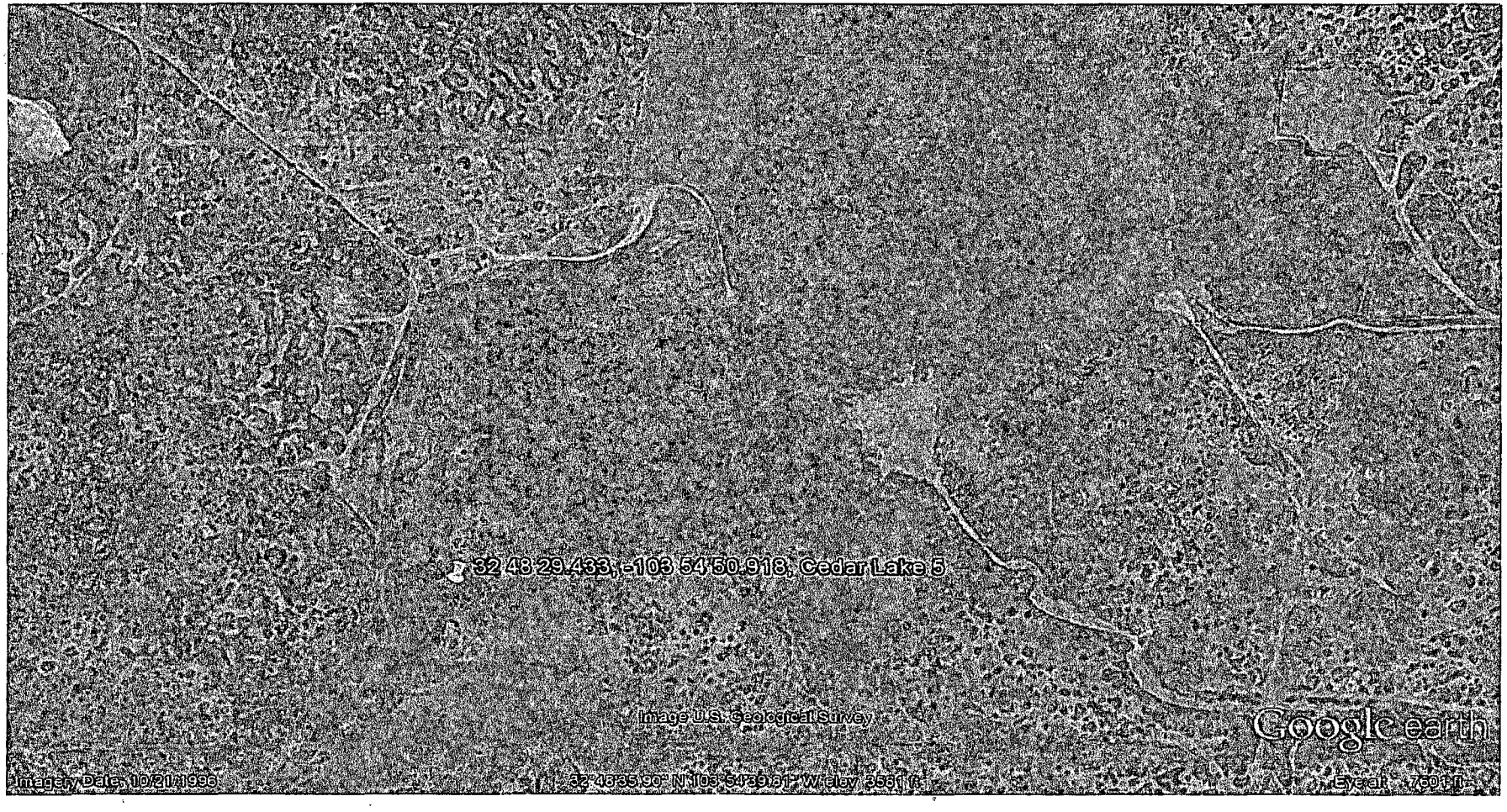
3/2/2012 Google Image showing ancient lakebed and Cedar Lake 5 location



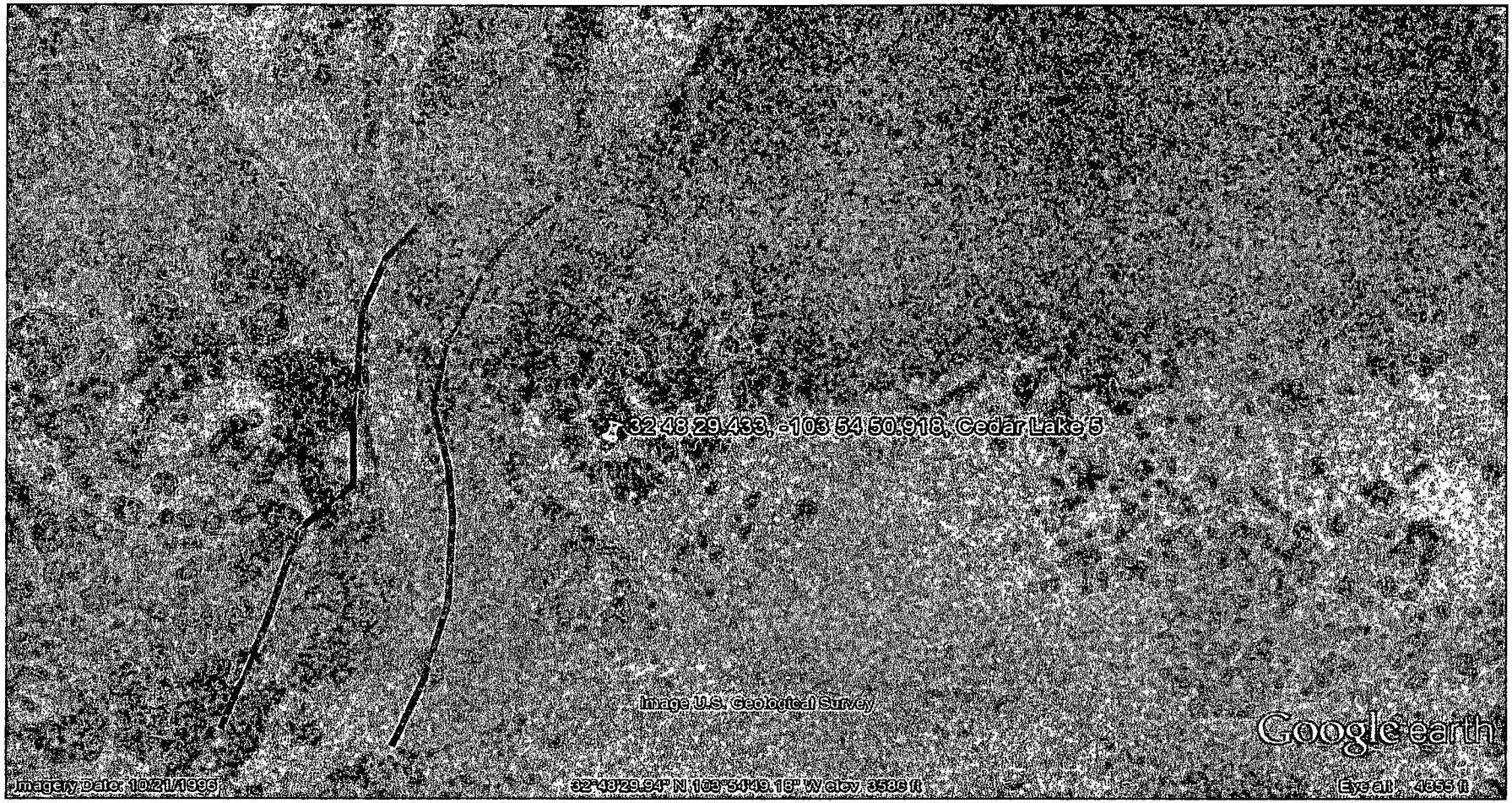
May 8, 2009 Google Earth Image showing location. Note erosion west of proposed location probably due to water flow from ephemeral pond to Cedar Lake Draw



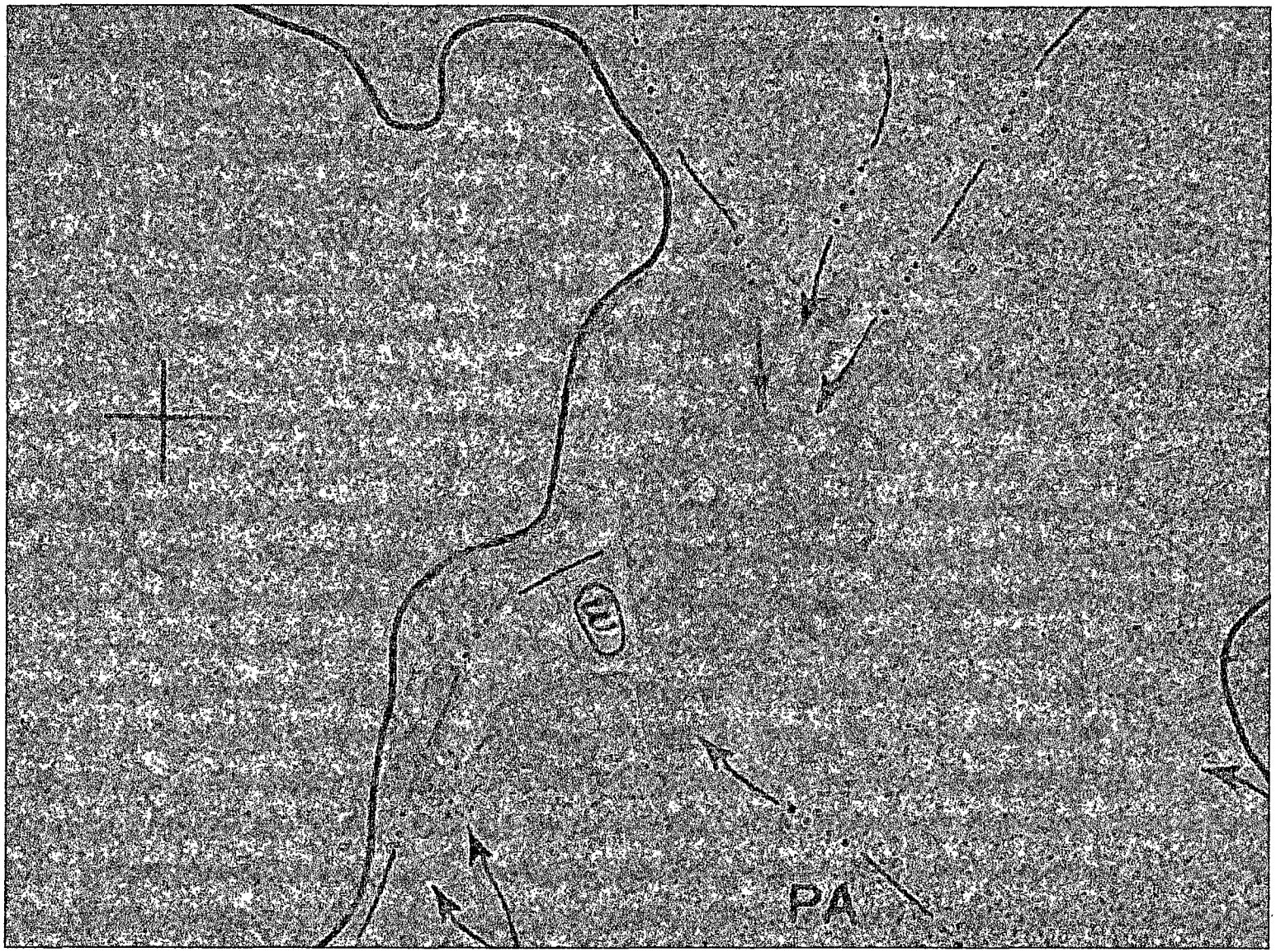
May 8, 2009 Google Image showing relationship between proposed location and probably erosion caused by flow from ephemeral pond into Cedar Lake Draw. Distance between staked location and center of probable erosion is about 100 feet.



October 21, 1996 Google Image showing alluvial fan development east of central excavated impoundment. The ancient lakebed is starting to fill in with sediment.



This closer view of the 1996 Google Image shows the outflow from the ephemeral pond into Cedar Lake Draw between the blue lines. The original outflow to Cedar Lake Draw lies about 200 feet west of the proposed location. Currently, the lease road occupies this drainage.



The 1971 Eddy County Soil Survey map of the area shows the drainage from the center of the lake to Cedar Draw. This interpretation in the Soil Survey is consistent with our interpretation of the 1996 Google Earth image.