From:	andrew@rthicksconsult.com
To:	"David Harwell"
Cc:	"Randall Hicks"; Yu, Olivia, EMNRD; bblevins5252@gmail.com
Subject:	Memo of observations during staking 1RP-4953 - Produced Water Releases; 1RP-4778 Tomahawk SWD; 1RP-4821 - Coop 6 State Com Battery (1H)
Date:	Friday, July 27, 2018 1:01:23 PM
Attachments:	Memo - july 2018 restoration.pdf

David:

Attached is a summary of observations I made during the staking for the excavation and drilling at the above referenced locations. Of the 21 boreholes requested by NMOCD, 10 cannot be drilled due to overhead powerlines. The remaining 2 boreholes (COOP 6 location which is on State land) will disturbed an area with vegetation.

We will begin excavation/restoration work on Tuesday July 31st. Drilling for vertical delineation is delayed due to scheduling issues with the rig and is planned to commence on Wednesday afternoon of August 8th.

FYI: I made contact with Tanmar. They will be present on the 31st.

Andrew Parker
R.T. Hicks Consultants
Durango Field Office
Cell: (970) 570-9535

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505-266-5004 andrew@ rthicksconsult.com

Memo

To:	David Harwell (Advanced Energy)
From:	Andrew Parker
CC:	Ms. Yu (NMOCD)
Date:	July 27, 2018
Re:	1RP-4953 – Produced Water Releases; 1RP-4778 Tomahawk SWD; 1RP-4821 – Coop 6 State Com Battery (1H)

Below is a summary of observations made during the staking of boreholes and excavation locations for the 811 one-call. Powerlines and flowlines restrict access to about half of the proposed boreholes. The drill rig is required to have 20 horizontal feet of clearance between the borehole location and overhead powerlines. Moving the borehole location places the borehole beyond the release extent. Vertical delineation will be limited to the backhoe vertical extent during excavation.

Table 1: Summary of proposed borehole delineation restrictions.

Location	Borehole	Comments
Battle 34	Battle 34 North Battle 34 Pooling	Cannot drill due to overhead powerlines and pipelines. Moving borehole locations will place borehole beyond excavation extent.
E. of Battle 34	E. of Battle 34 Pooling Southwest Southeast	Cannot drill due to overhead powerlines. Moving borehole locations will place borehole beyond excavation extent.
Latitude (32 26 50)	32 26 50 Pooling 32 26 50 East 32 26 50 South	Cannot drill due to overhead powerlines. Moving borehole locations will place borehole beyond excavation extent.
W. of Merchant	No issues	No issues
Tomahawk SWD	HA-250 South	BLM surface. Will have to grade into undisturbed ground to center drill rig on release in road ditch. Will cause more surface disturbance than necessary to delineate extent of release along roadway.
COOP 6 State	SP-16	SLO surface. Cannot drill due to buried pipeline.
COOP 6 State	SP-21	SLO surface. Drill rig will cause more surface damage than good access the location. Suggest surface restoration of hydrocarbon impact at surface.
COOP 6 State	SP-26	SLO surface. Area shows no signs of impact from release. Mobilize a drill rig will cause unnecessary surface disturbance. Surrounding area has good surface vegetation.

Battle 34 & East of Battle 34 [**1RP-4953**]

Exhibit M1 shows the "Battle 34" and "East of Battle 34" relative to overhead powerlines and surface flowlines. Boreholes Battle 34 North, Battle 34 Pooling, Southwest, Southeast, and East of Battle 34 Pooling cannot be drilled as requested by NMOCD. These boreholes are either directly below an overhead powerline or within 20-feet of a powerline. Therefore, vertical delineation is not possible in these areas. Surface restoration will occur on the upper four feet or to the extent practical, whichever is less – with a liner placed at total-depth.

At the Battle 34 location, one borehole for vertical delineation can be drilled at the southern extent of the 4-foot excavation depth that is within the release area. At the East of Battle 34 location, drilling E. of Battle 34 Pooling may be possible if the drill rig can access the location which is on top of a sandhill.

Furthermore, Figures M1 & M2 shows the area is undergoing natural revegetation with the exception of the areas outlined by a red circle, which is suitable for one borehole for vertical delineation. Figure M3 shows the powerlines and flowlines that restrict drilling access at East of Battle 34.

Figure M 1: Photograph viewing south along access road. The red circle is a potential location for one borehole for vertical delineation that is within the spill release area. The remaining spill area is undergoing natural revegetation. Numerous on-surface flowlines cross the area.

Figure M 2: Photograph viewing west-southwest along the east-west extent of spill area. The red circle is the same area as shown in Figure M1.

Figure M 3: Photograph at E. of Battle 34, viewing east. Proposed boring Southwest (foreground) and Southeast (background, orange circle) are identified by pink flagging. Powerlines are directly overhead. Drill rig requires 20-feet of clearance from powerlines.

Latitude (32 26 50) [**1RP-4953**]

Exhibit M2 shows the Latitude location relative to overhead powerlines and surface flowlines. Boreholes 32 26 50 Pooling, 32 26 50 East, and 32 26 50 South cannot be drilled as requested by NMOCD. These boreholes are either directly below an overhead powerline or within 20-feet of a powerline. Therefore, vertical delineation is not possible in these areas. Surface restoration will occur on the upper four feet or to the extent practical, whichever is less – with a liner placed at total-depth.

Figure M4 shows the powerlines and flowlines that restrict drilling access for the three boreholes referenced above.

Figure M 4: Photograph viewing west along powerline/pipelines. Powerlines and flowlines restrict access to drill rig. Proposed boreholes are identified with pink flagging (see orange circles). From left to right : 32 26 50 South, 32 26 50 East, and 32 26 50 Pooling.

West of Merchant [**1RP-4953**]

Exhibit M3 shows the W. of Merchant location relative to the release extent. No obstructions exist at this location. Figure M5 shows the southern proposed excavation area during our July 2018 staking. Figure M6 shows the southern release extent from the March 2018 sampling. The green circle identifies a mesquite bush present in both figures for perspective. The southern release extent is beginning to undergo natural revegetation as shown in Figure M5.

Figure M 5: Photograph of the southern release extent viewing north-northeast. The release extent shows signs of natural revegetation. The green circled mesquite bush is the same bush show in Figure M 6.

Figure M 6: Photograph of the southern release extent viewing east-northeast. The dark green pin flag (photo center) is the location of a March 2018 sample point. The green circled mesquite bush is the same bush in Figure M 5.

Tomahawk SWD [1RP-4778]

Exhibit M4 shows the Tomahawk SWD location relative to the tank battery and well pad. Sample HA-250 along the roadside ditch may not be accessible without grading an area along the west side of the road (Figure M7), which is on BLM surface. Figure M8 shows the area around HA-4 (Trench 4). This area is undergoing natural revegetation and does not need to be restored. Furthermore, it lies within a drainage.

Figure M9 shows excavated material from the March 2018 sampling event from the area within Trench 5. The excavated material will be removed and the area restored.

Figure M 7: Photo along BLM access road viewing south toward HA-250 borehole location. To drill at this location will involve grading the bar ditch and destroying vegetation. An arch clearance may be required prior to any grading activities.

Figure M 8: Photograph of the HA-4 (Trench 4) area viewing west-southwest toward a caliche road along BLM surface. The area is undergoing natural revegetation and does not need to be restored.

Figure M 9: Excavated material, in the area of Trench 5, from the March 2018 sampling event to be removed during restoration activities.

COOP 6 State Com Battery (1H) [1RP-4821]

Exhibit M6 shows the location relative to the release extent and nearby infrastructure. As shown in Exhibit M6, three locations are identified for vertical delineation. All three locations are not suitable for drilling. Borehole SP-16 is located near a buried pipeline (Figure M10). Moving the location to the north will place the borehole out of the release area. Location 21 & 26 lies within an area that has vegetation growth. Accessing these two areas with a drill rig will cause unnecessary damage to the vegetation (Figures M11 and M12). Location 21 exhibits evidence of the release as indicated by hydrocarbon staining (Figure M13). We recommend restoring the upper soil layer in this area.

Figure M 10: Photo of proposed location of borehole SP-16. The location is within a pipeline easement. The COOP6 State 1H tank battery is visible photo left.

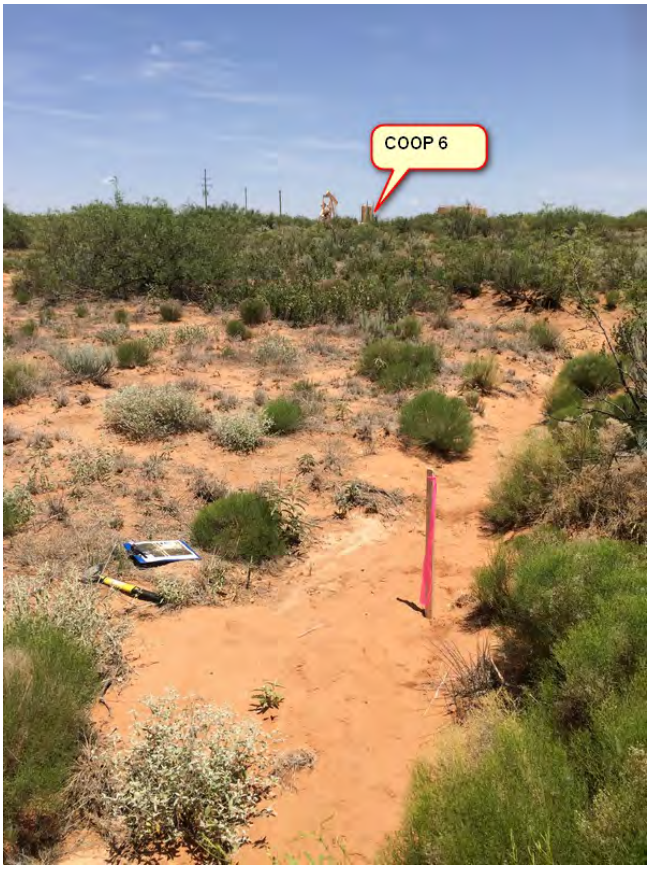

Figure M 11: Photograph of SP-26 viewing east toward the COOP 6 State 1H location. The release is within a small undefined drainage. The surround area supports vegetation.

Figure M 12: Photograph of SP-26 viewing west. The release is within a small undefined drainage. The surround area supports vegetation.

Figure M 13: Photograph of the hydrocarbon surface staining at SP-21.

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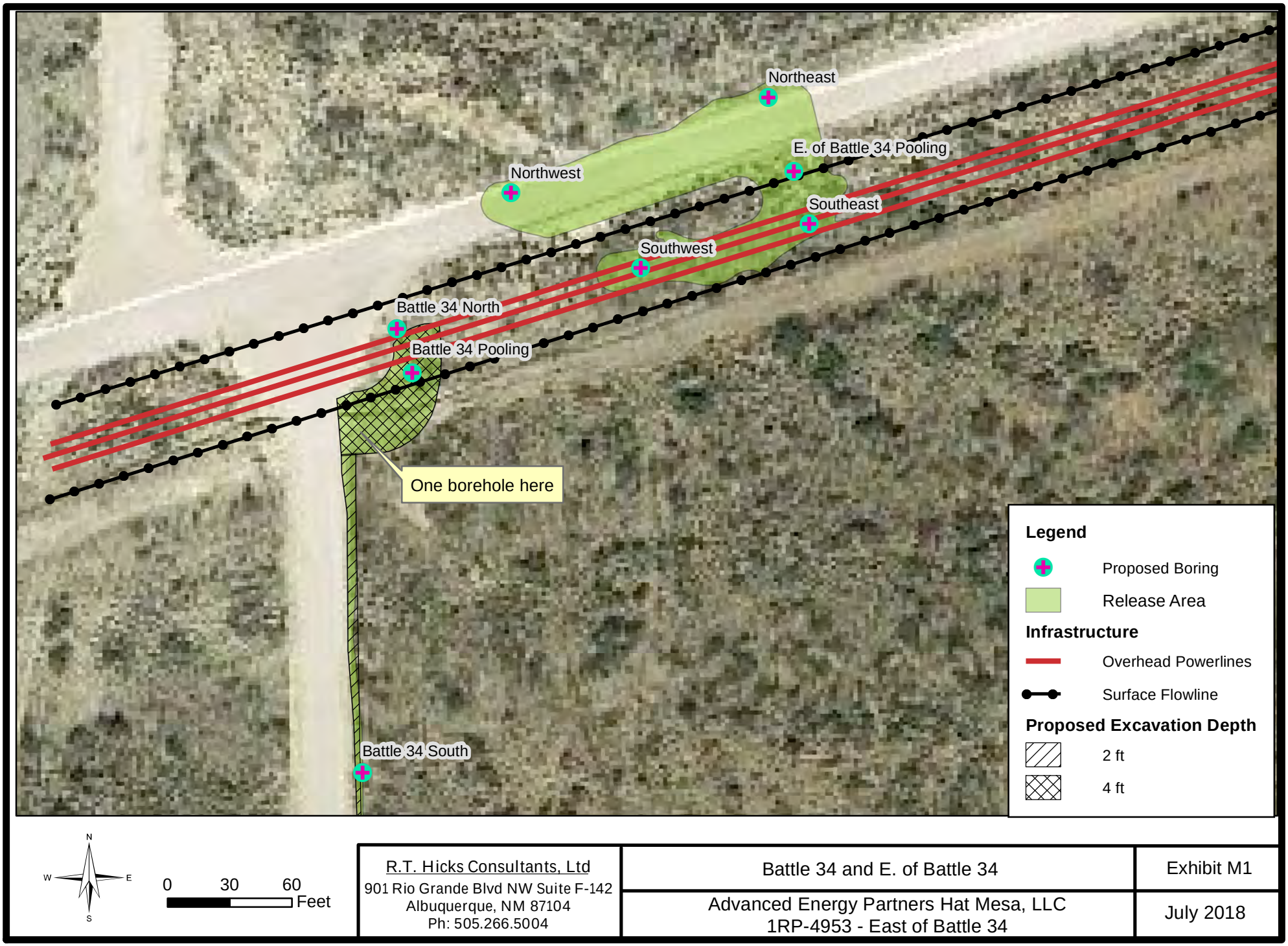

R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	Battle 34 and E. of Battle 34	Exhibit M1
	Advanced Energy Partners Hat Mesa, LLC 1RP-4953 - East of Battle 34	July 2018

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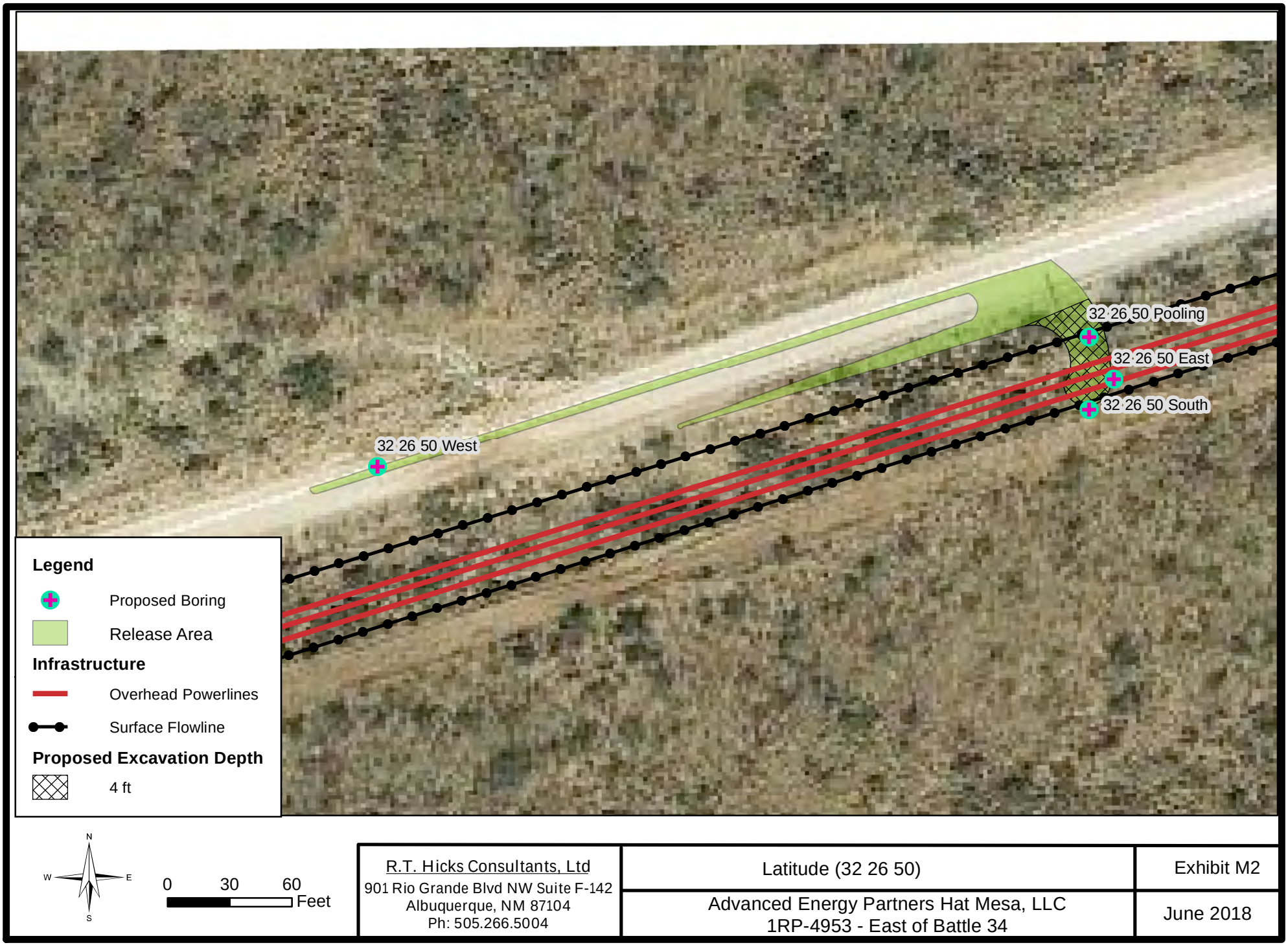

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Latitude (32 26 50)

Exhibit M2

Advanced Energy Partners Hat Mesa, LLC
1RP-4953 - East of Battle 34

June 2018

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R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	West of Merchant	Exhibit M3
	Advanced Energy Partners Hat Mesa, LLC 1RP-4953 - East of Battle 34	July 2018

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Proposed Boreholes	Exhibit M5
Advanced Energy: COOP 6 State 1H	July 2018

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Memo

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Table 1: Summary of proposed borehole delineation restrictions.

Location	Borehole	Comments
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E. of Battle 34	E. of Battle 34 Pooling Southwest Southeast	Cannot drill due to overhead powerlines. Moving borehole locations will place borehole beyond excavation extent.
Latitude (32 26 50)	32 26 50 Pooling 32 26 50 East 32 26 50 South	Cannot drill due to overhead powerlines. Moving borehole locations will place borehole beyond excavation extent.
W. of Merchant	No issues	No issues
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Battle 34 & East of Battle 34 [**1RP-4953**]

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Latitude (32 26 50) [**1RP-4953**]

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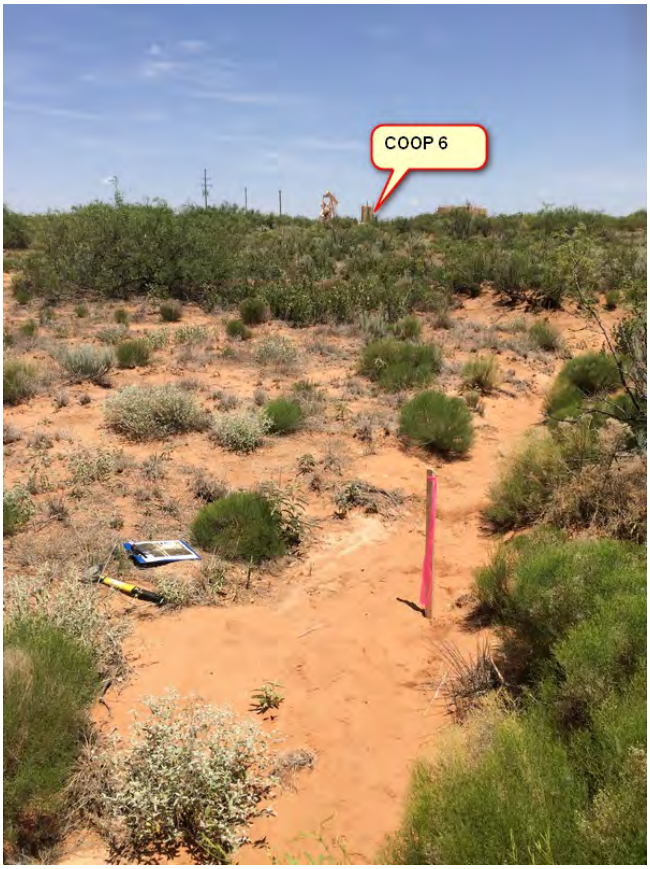

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Figure M 13: Photograph of the hydrocarbon surface staining at SP-21.

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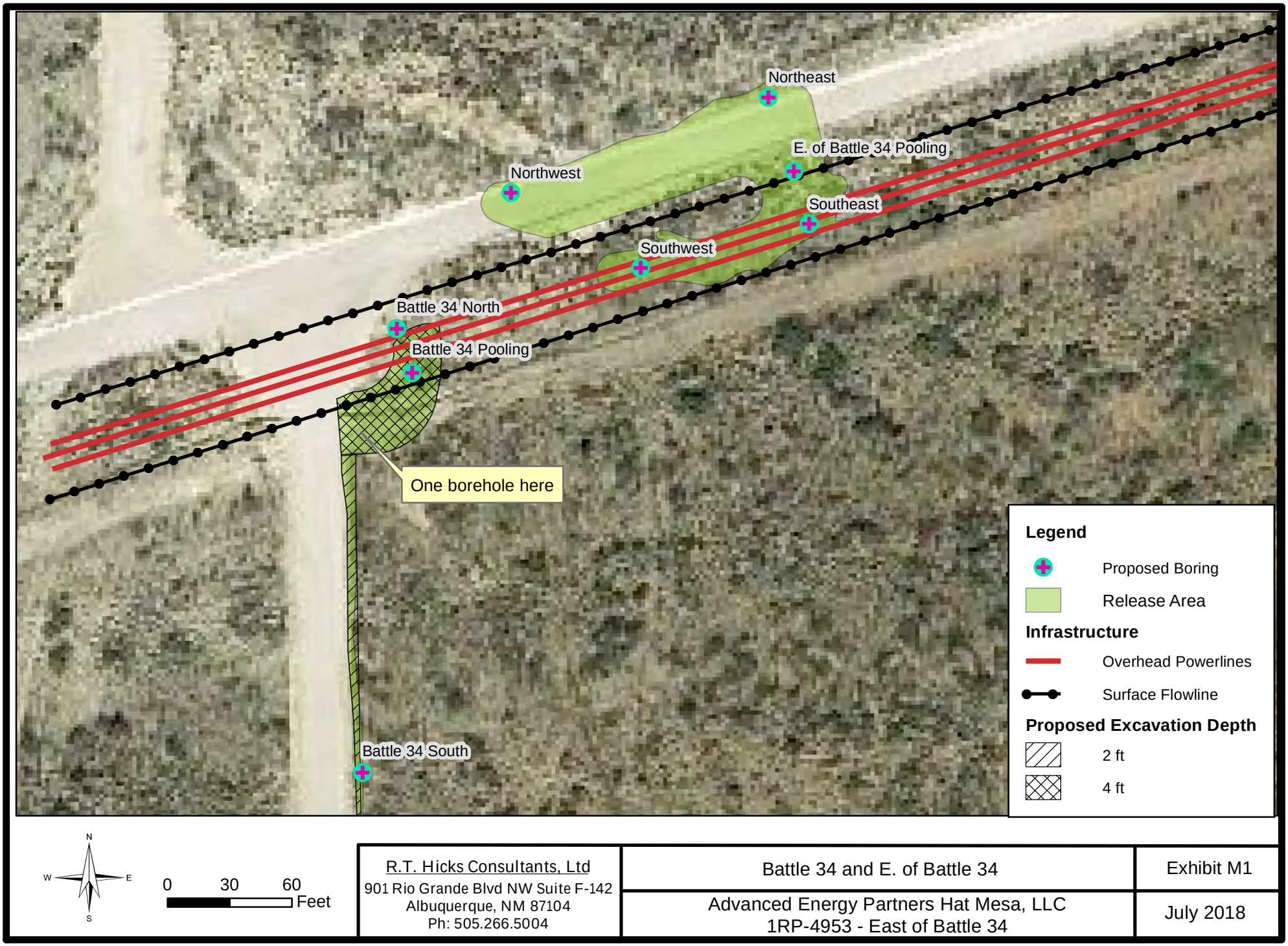

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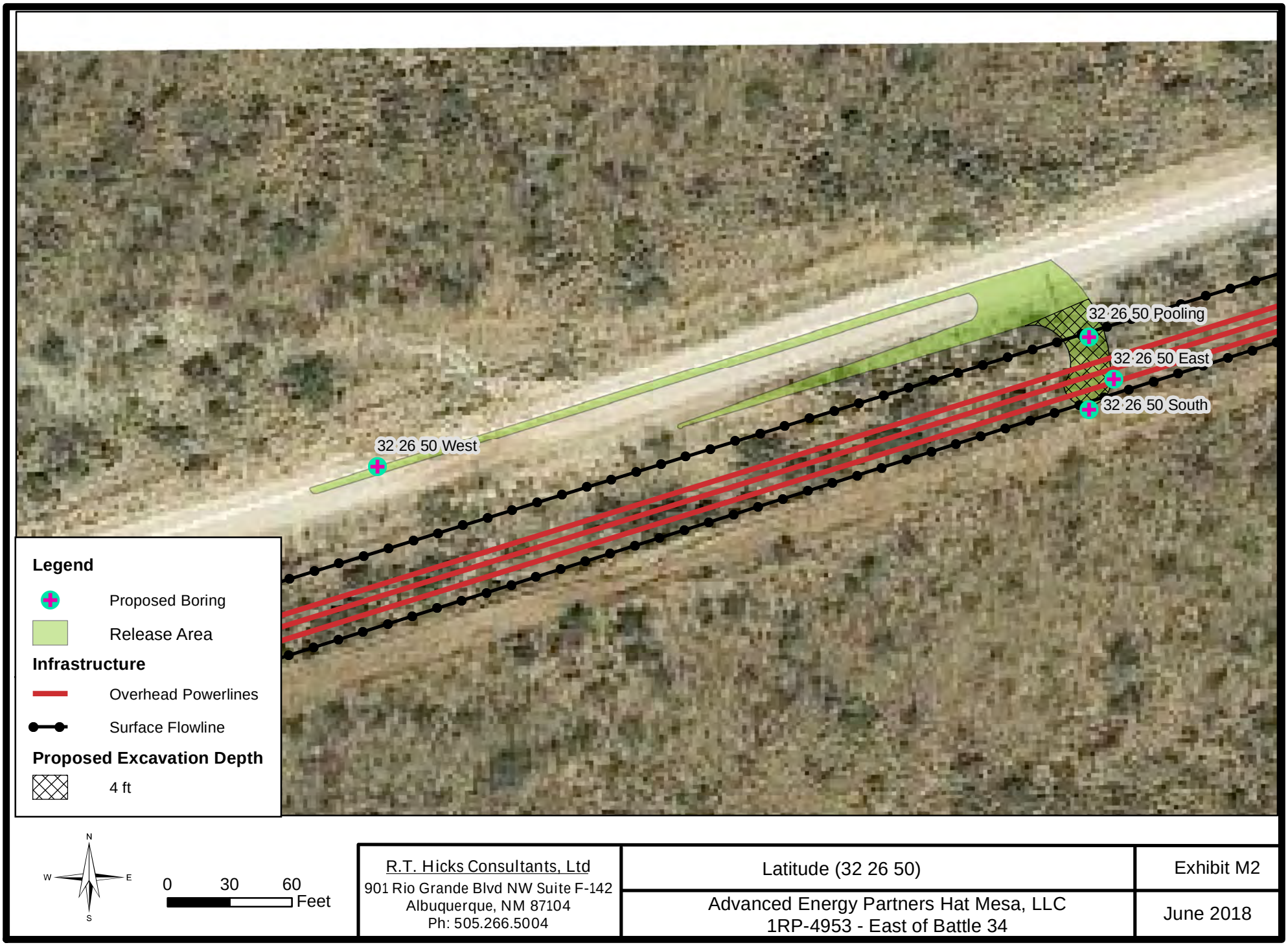

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Latitude (32 26 50)

Exhibit M2

Advanced Energy Partners Hat Mesa, LLC
1RP-4953 - East of Battle 34

June 2018

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R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	West of Merchant	Exhibit M3
	Advanced Energy Partners Hat Mesa, LLC 1RP-4953 - East of Battle 34	July 2018

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Proposed Boreholes	Exhibit M5
Advanced Energy: COOP 6 State 1H	July 2018