Appendix AES

Goetz Road Potable Water Storage Tank and Pipeline Project Shade/Shadow Analysis Memorandum

ESA

ESA

550 West C Street
Suite 750
San Diego, CA 92101
619.719.4200 phone
619.719.4201 fax

www.esassoc.com

memorandum

date November 1, 2019

to Joe Broadhead, Eastern Municipal Water District Project Manager

from Jason Nielsen, ESA Visual Resources Specialist; Sarah Spano, ESA Project Manager

subject Goetz Road Potable Water Storage Tank and Pipeline Project Shade/Shadow Analysis Memorandum

This memorandum presents the shade/shadow projections associated with installation of the Eastern Municipal Water District (EMWD) Goetz Road Potable Water Storage Tank and Pipeline Project (proposed project), and provides documentation to support evaluation under the California Environmental Quality Act (CEQA) for aesthetics resources. Specifically, the analysis included herein evaluates of whether the proposed project will "substantially degrade the existing visual character or quality of public views of the site and its surroundings? (public views are those that are experienced from publically accessible vantage point)" respective to the effects of shade/shadow. While CEQA does not require an analysis from private residential views, this analysis does include potential effects from shade/shadow onto surrounding properties.

Overview and Location

The proposed project is located approximately 2 miles west of Interstate 215, in the City of Perris (**Figure 1**). The proposed project would involve construction and operation of an 8 million gallon (MG) potable water storage tank and antenna tower on the northeast corner of Sotelo Road and Goetz Road. The proposed water storage tank would be approximately 42.25 feet in height and the antenna tower would be approximately 40 feet in height. The project also involves construction of a transmission pipeline in the adjacent City of Menifee, which is not included in this analysis since the pipeline will be installed below ground. The proposed project is being implemented in order to address a number of deficiencies in EMWD's 1627 pressure zone as identified in EMWD's Water Facilities Master Plan. Portions of EMWD's 1627 pressure zone are hydraulically isolated due to major north-south pipeline corridors that lack east-west capacity. Additionally, the pressure zone has low pressure, deficient storage, and insufficient pumping capacities. The project would correct existing storage deficiencies and provide additional storage volume for existing and proposed development in the 1627 pressure zone.

Existing Conditions

The proposed potable water storage tank and antenna tower would be constructed on a 2.85-acre parcel owned by EMWD (**Figure 2**). Onsite vegetation consists of annual grasses and scrub brush. Scattered granitic rock outcrops are also present on the site. Single-family residences are located on parcels adjacent to the proposed tank site to

the north, west, and south.

Methodology

The shade/shadow analysis prepared for the proposed project includes a series of high resolution aerial photographs depicting potential shade and shadow conditions throughout the year. To approximate shade and shadow conditions in the surrounding environment, shadows cast by the proposed potable water storage tank and antenna tower were simulated for the 2019 summer solstice (June 21), fall equinox (September 23), spring equinox (March 20), and winter solstice (December 21). Shadow projection time for summer, spring, and fall were taken at 9:00 a.m., 11:00 a.m., 1:00 p.m., 3:00 p.m., and 5:00 p.m. With the winter season having the shortest period of daylight, only three projection times were taken at 9:00 a.m., 11:00 a.m., and 3:00 p.m. A three-dimensional digital model of the proposed potable water storage tank and antenna tower were constructed using Sketch Up Pro. Sketch Up Pro uses algorithms and geo-location information to extrapolate sunlight and shadows throughout the year to create shade/shadow projections of the proposed water storage tank and antenna tower. It should be noted that the static high resolution aerial photographs produced by this process do not consider existing features, including surrounding terrain or vegetation, and as such additional features are not modeled in the projections.

Impact Analysis

Summer Solstice

Shadow projections cast by the proposed potable water storage tank and antenna tower at 9:00 a.m., 11:00 a.m., 1:00 p.m., 3:00 p.m., and 5:00 p.m. on the summer solstice (June 21) are depicted on **Figure 3**. As shown on the figure, shadows cast by the proposed water storage tank extend beyond the project site to the west, but are not anticipated to extend onto public right-of-ways such as Our Way or Sotelo Road, residential structures on adjacent parcels, or areas frequently used for outdoor activities. The shadows cast by the antenna tower would be completely contained within the proposed project property boundary. Consequently, shadows cast by the proposed project during summer would result in a less than significant impact as it relates to effects to the existing quality and character of public views of the site and its surroundings.

Fall Equinox

Shadow projections cast by the proposed potable water storage tank and antenna tower at 9:00 a.m., 11:00 a.m., 1:00 p.m., 3:00 p.m., and 5:00 p.m. on the Fall (September 23) equinox are depicted on **Figure 4**. As shown on the figure, for the majority of the day the shadows are contained within the tank site; However, shadows cast by the proposed project extend beyond the project site to the west onto right-of-way Our Way at the 9:00 a.m. timeframe. The proposed water storage tank would not cast shadows upon adjacent residential properties at the evaluated times. The small timeframe during which a shadow would be cast on right-of-way Our Way would not impede visibility on the alignment. Additionally, the shadows cast by the antenna tower would be completely contained within the proposed project property boundary. Therefore, shadows cast by the proposed project during the fall months would result in a less than significant impact as it relates to effects to the existing quality and character of public views of the site and its surroundings.

Spring Equinox

Shadow projections cast by the proposed potable water storage tank and antenna tower at 9:00 a.m., 11:00 a.m., 1:00 p.m., 3:00 p.m., and 5:00 p.m. on the Spring (March 20) equinox are depicted on **Figure 5**. As shown on the figure, for the majority of the day the shadows are contained within the tank site. During the 9:00 a.m. timeframe, shadows extend west of the tank site boundary, and infringe slightly onto right-of-way Our Way. The proposed water storage tank would not cast shadows upon adjacent residential properties at the evaluated times. The small timeframe during which a shadow would be cast on a portion of right-of-way Our Way would not impede visibility on the alignment. Additionally, the shadows cast by the antenna tower would be completely contained within the proposed project property boundary. Therefore, shadows cast by the proposed project during the spring months would result in a less than significant impact as it relates to effects to the existing quality and character of public views of the site and its surroundings.

Winter Solstice

Shadow projections cast by the proposed potable water storage tank and antenna tower at 9:00 a.m., 11:00 a.m., and 3:00 p.m., on the winter solstice (December 21) are depicted on **Figure 6**. Due to the low angle of the sun during the winter months, the shadow projections would represent the worse-case scenario for the entire year. The shadows generated by the proposed water storage tank would extend beyond the project boundary at 9:00 a.m. to the northwest onto right-of-way Our Way. The small timeframe during which a shadow would be cast on right-of-way Our Way would not impede visibility on the alignment. The shadows would also extend slightly beyond the property boundary to the northeast at the 3:00 p.m. timeframe. However, none of the shadow projections would be cast onto nearby residential structures. It furthermore appears that the shadow would be cast onto foliage on the neighboring property and therefore would not infringe on areas used for outdoor activity. Additionally, the shadows cast by the antenna tower would be completely contained within the proposed project property boundary. Therefore, shadows cast by the proposed project during the winter months would result in a less than significant impact as it relates to effects to the existing quality and character of public views of the site and its surroundings.

Conclusion

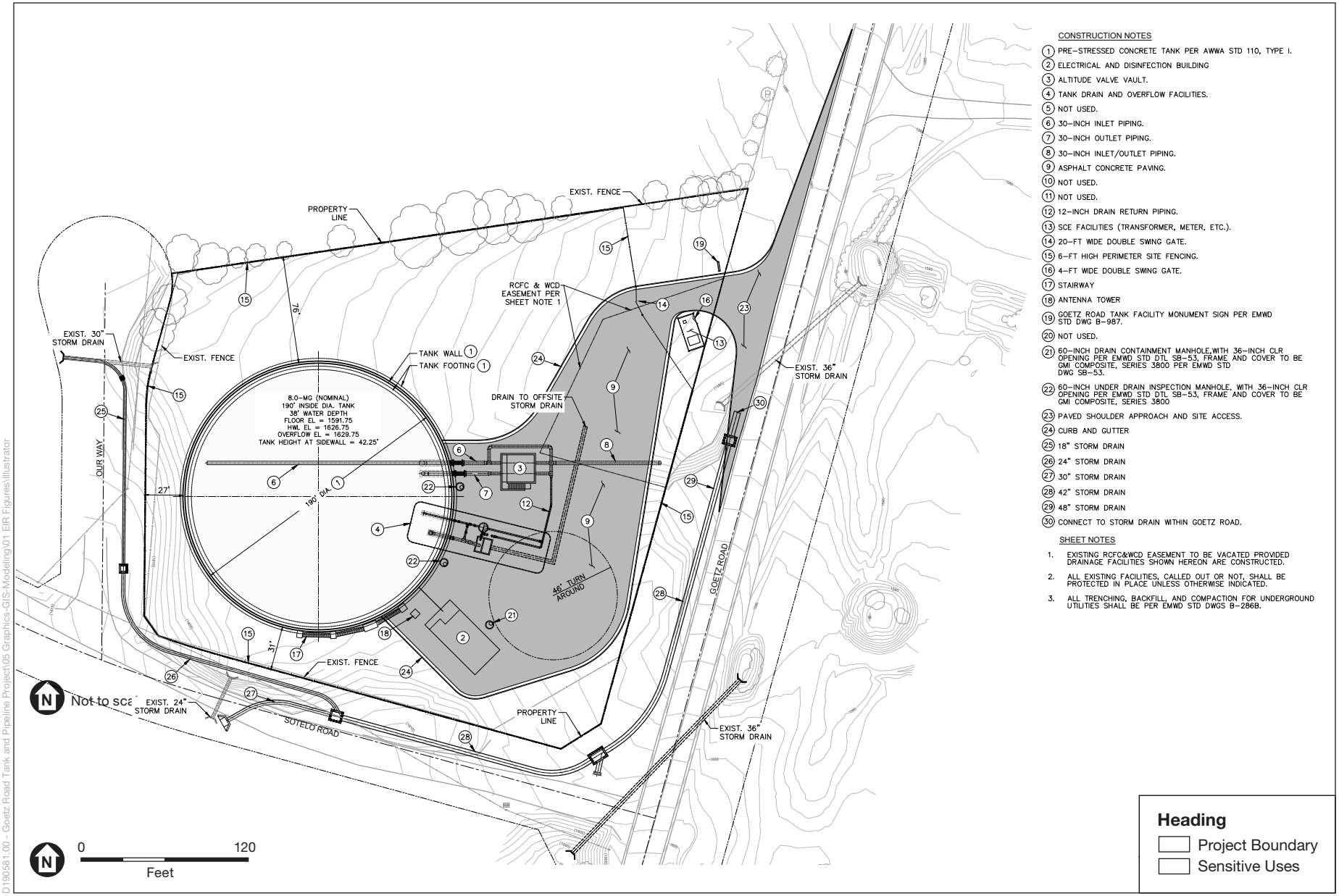
The summer months present the least amount of shade/shadow generated from the proposed water storage tank and antenna tower. During that time, the shadows are either entirely contained onsite or extend just beyond the property boundary to the west but do not fall onto rights-of-ways or adjacent properties. During the spring and fall seasons, shadows cast by the proposed potable water storage tank would extend to the west at the 9:00 a.m. timeframe onto right-of-way Our Way, but would not impede visibility on the alignment or otherwise negatively impact existing character or quality of public views. The proposed potable water storage tank projected shadow/shade impacts would be greatest in the winter months. During this time, proposed water storage tank shadows extend to the northwest at the 9:00 a.m. hour onto right-of-way Our Way and extend northeast at the 3:00 p.m. hour onto the adjacent residential property. However, even during the winter months, none of the shadow projections would be cast onto nearby residential structures or would impede visibility on neighboring rights-of-way. Therefore, impacts related to shade/shadow impacts resulting from operation of the proposed project would be considered less than significant.

SOURCE: ESRI, 2019; ESA, 2019.

Goetz Road Potable Water Storage Tank and Transmission Pipeline Project

Figure 1
Project Vicinity

ESA



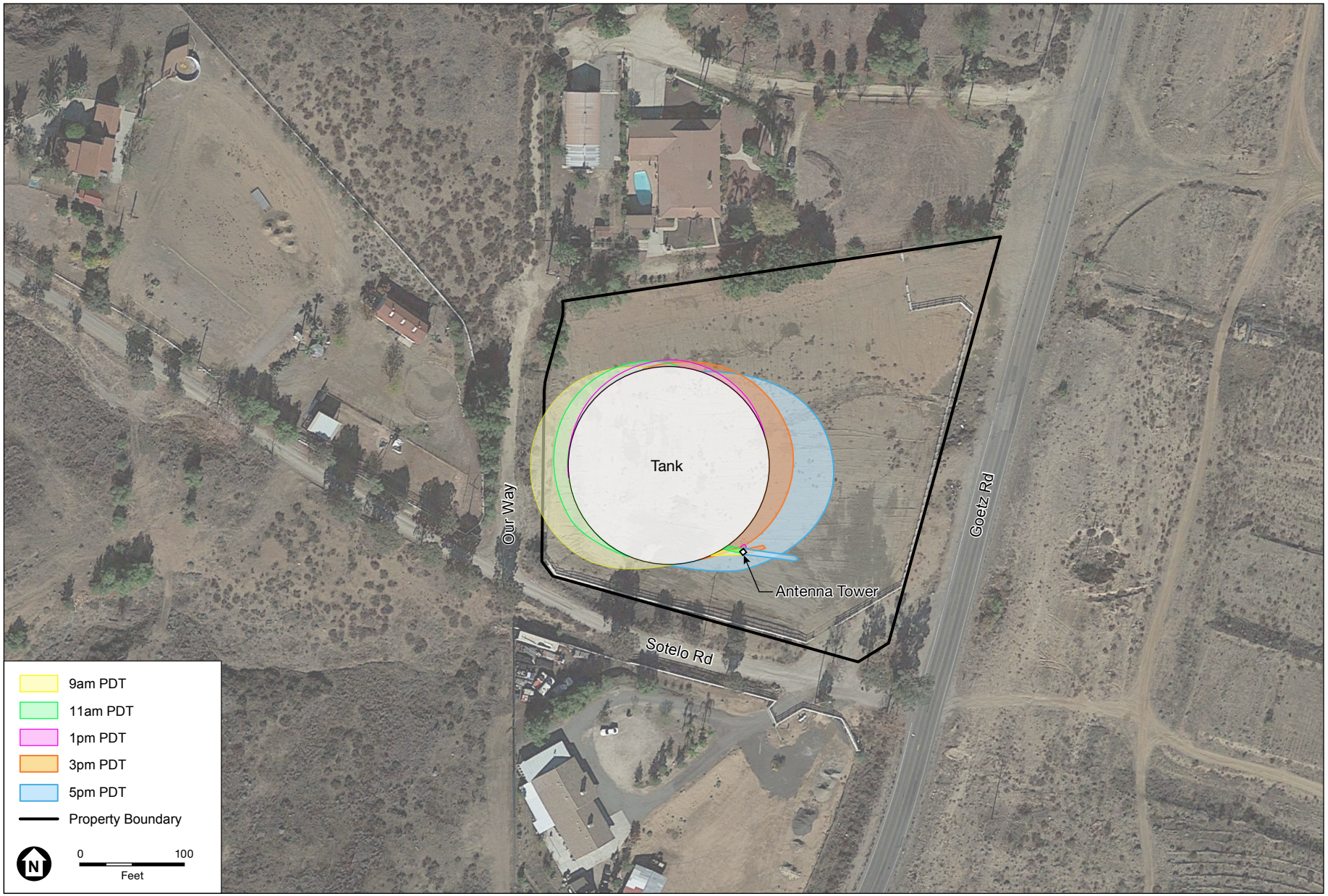
SOURCE: Dudek, 2019

Goetz Road Potable Water Storage Tank and Transmission Pipeline Project

Figure 2
Proposed Site Plan

ESA PCR

0 2000
Feet



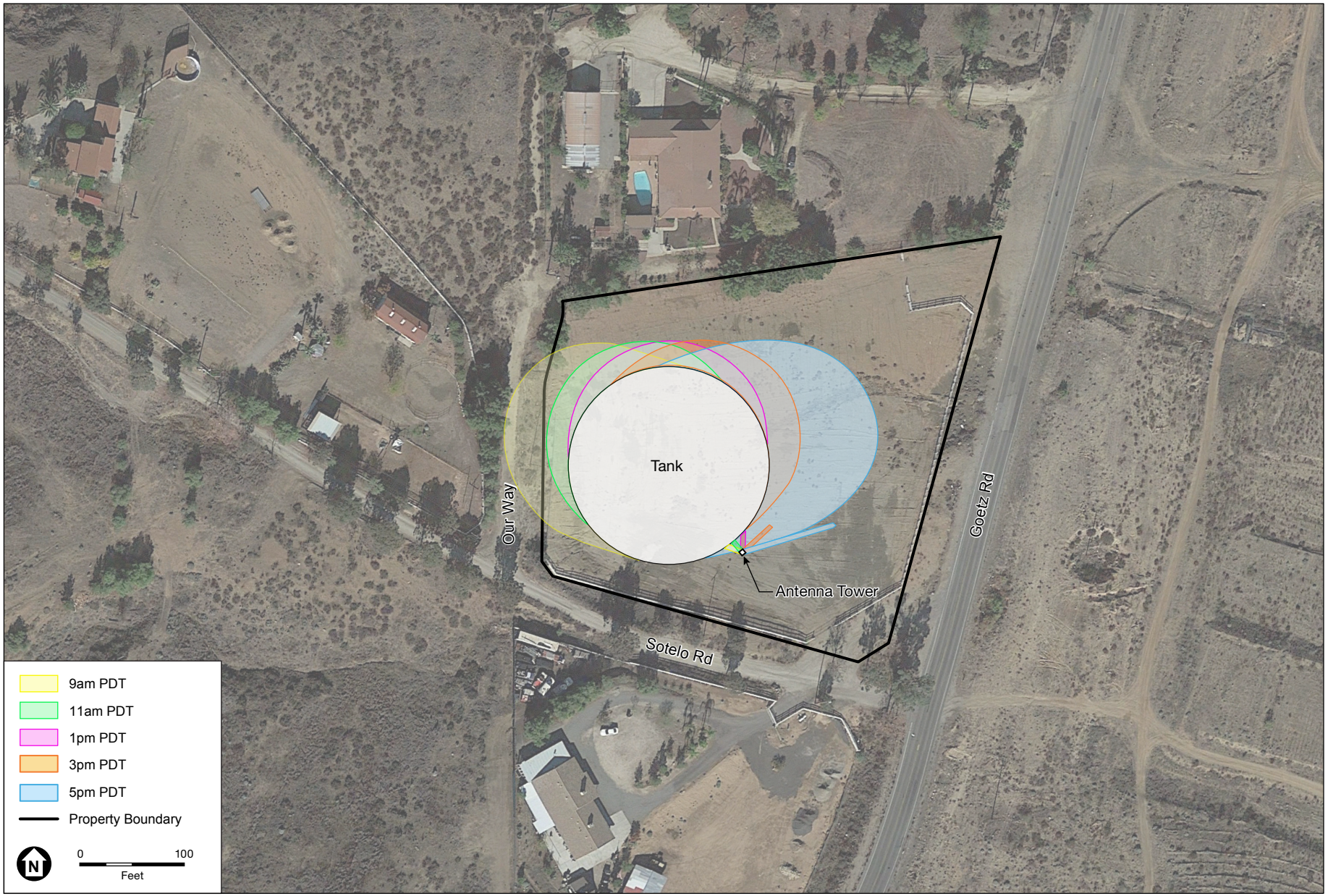
LAX\19xxxx\D190581.00 - Goetz Road Tank and Pipeline Project\05 Graphics-GIS-Modeling\Illustrator

SOURCE: ESA, 2019; Basemap Google Earth, 2019

Goetz Road Potable Water Storage Tank and Transmission Pipeline Project

Figure 3
Summer Solstice (June 21) Shadows

ESA



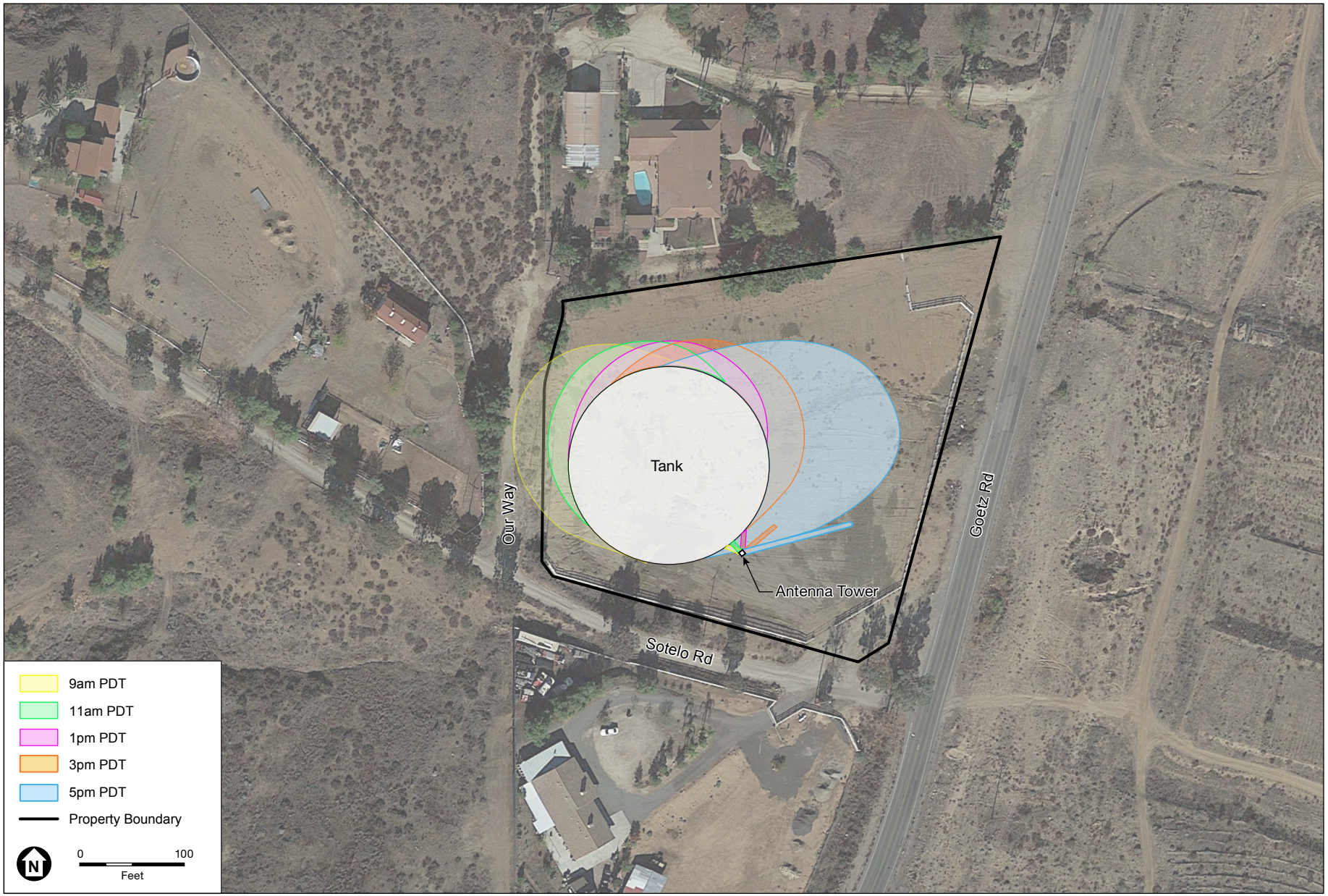
LAX\19xxxx\D190581.00 - Goetz Road Tank and Pipeline Project\05 Graphics-GIS-Modeling\Illustrator

SOURCE: ESA, 2019; Basemap Google Earth, 2019

Goetz Road Potable Water Storage Tank and Transmission Pipeline Project

Figure 4
Spring Equinox (March 20) Shadows

ESA



LAX\19xxxx\D190581.00 - Goetz Road Tank and Pipeline Project\05 Graphics-GIS-Modeling\Illustrator

SOURCE: ESA, 2019; Basemap Google Earth, 2019

Goetz Road Potable Water Storage Tank and Transmission Pipeline Project

Figure 5
Fall Equinox (September 23) Shadows

ESA

LAX\19xxxx\D190581.00 - Goetz Road Tank and Pipeline Project\05 Graphics-GIS-Modeling\Illustrator

SOURCE: ESA, 2019; Basemap Google Earth, 2019

Goetz Road Potable Water Storage Tank and Transmission Pipeline Project

Figure 6
Winter Solstice (December 21) Shadows

ESA