

**VISUAL IMPACTS ASSESSMENT
138kV TRANSMISSION LINE KINO SUBSTATION TO DEMOSS-PETRIE
SUBSTATION IN TUCSON ARIZONA**

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I. INTRODUCTION

Tucson Electric Power (TEP) is developing plans for a new transmission line to strengthen electric reliability for customers in central Tucson and help satisfy increased demands for power within the community. The Kino to DeMoss-Petrie 138-kilovolt (kV) Transmission Line (the Project) will connect the existing Kino Substation to the existing DeMoss-Petrie Substation and interconnect with the planned University of Arizona (UA) North Substation (**Figure 1**). An Interim Siting Study was conducted by TEP and several alternative alignments have been identified based on selection criteria including the presence/absence of an existing corridor, residential use adjacent to the corridor, listed historic properties and districts adjacent to the corridor, sensitive receptors adjacent to the corridor, and room for separation from existing utilities in the corridor. The purpose of this Visual Resource Assessment is to describe visual impacts resulting from construction the Project.

Public outreach is a key component of TEP's planning process. TEP has held numerous community working group/stakeholder meetings for the Project since October 2019. TEP has set up a webpage¹ to provide the public with information about the project including virtual (due to COVID-19) public open houses, figures depicting the various alternatives, and virtual "tours" along each route. The webpage also allows community members to provide comments on the Project. A review of the comments provided to date indicates that potential visual impacts of the Project are of interest to the community. Comments focus on potential impacts to visual resources including blocking views to the mountains and scenic vistas, creating an industrial feel to the area, affecting overall quality of life, affecting the experience along the S. Kino Pkwy./N. Campbell Ave. route, a designated Gateway /Scenic Route from the airport into the City, as well as, on the other roads designated as such.

The study area delineated by TEP, that encompasses the evaluated alternative alignments, is located within the City of Tucson and landscapes are associated with urban settings consisting of residential, commercial, industrial, and park/recreation areas. Assessing visual impacts requires an understanding of the existing character of an area, the nature of the infrastructure project, and the type and sensitivity of viewers. Balancing the visual impacts with other factors such as the need for reliable energy presents a challenge. This visual assessment reflects a combination of objective and subjective evaluations of the existing landscape characteristics and potential changes to the landscape as a result of the Project.

2. PROJECT DESCRIPTION

TEP is evaluating eight potential transmission line routes within a defined study area to interconnect existing and planned substations that include:

¹ TEP's website can be accessed at: <https://www.tep.com/kino-to-demoss-petrie/>

Kino Substation: A new substation at the southeast corner of South Kino Parkway (S. Kino Pkwy.) and East 36th Street (E. 36th St.) to accommodate growing energy demands and support expected economic development in the area will go in to service by early October 2020. The substation occupies about 4.5 acres. Construction began in September 2019.

UA North Substation: This planned substation will tie into TEP's 138kV transmission system to accommodate increased energy demands in the area. It also will help maintain reliable service by supporting the eventual retirement of aging, lower capacity 46kV substations.

DeMoss-Petrie (DMP) Substation: Located near Interstate 10 (I-10) and West Grant Road (W. Grant Rd.), the substation serves as the point of interconnection for several high-voltage transmission lines and natural gas generating resources and an energy storage system.

The Kino to DeMoss-Petrie line will cross private property and utilize road right-of-way within the City of Tucson. Interconnecting the Kino Substation and planned UA North Substation to the existing DeMoss-Petrie Substation will strengthen reliability by adding redundancy, allowing TEP to deliver energy from more than one direction.

The eight alternative routes evaluated in this visual assessment are depicted in **Figure 2** and are described as follows:

- Southern alternatives: Southern alternative routes are identified numerically. There are four possible routes between the Kino Substation and the UA North Substation. Initially, TEP had identified six alternative routes; alternatives 4 and 6 were dropped from further analysis. The four remaining alternative routes, numbered 1, 2, 3, and 5 are evaluated in this analysis and are depicted in **Figures 3 through 6**, respectively.
- Northern alternatives: Northern alternative routes are identified by letters. There are four possible routes between the UA North Substation and the DMP Substation. Five alternative routes were initially identified between the planned UA North Substation and DMP Substation. Alternative C was dropped from further evaluation. The four remaining alternatives, A, B, D, and E are evaluated in this analysis and are depicted in **Figures 7 through 10**, respectively. A summary table of the visual assessment is presented in **Exhibit 1**.

To complete construction of the project, one of the southern alternatives will be combined with one of the northern alternatives.

3. METHODS

3.1. OVERVIEW

Visual impacts are defined as the change to the visual environment resulting from the introduction of modifications to the landscape. The degree of visual contrast resulting from a modification is directly related to the amount of attention that is drawn to that modification. This report analyzes the impacts to visual resources resulting from construction of the Project. It does so for each alternative route by the following criteria:

- (a) describing the proposed project features,
- (b) characterizing the existing landscape,
- (c) characterizing the visual impacts that the proposed project would have on the landscape,
- (d) identifying the viewers who will be affected by the project, and
- (e) anticipating the degree to which the project would negatively impact these viewers.

Aerial photographs were reviewed and each route was visited by a registered landscape architect to gather data regarding the existing character of the area. As noted above, there are two sets of alternatives: four alternative routes from Kino Substation to the planned UA North Substation (collectively, the southern routes), and four alternative routes from the planned UA North Substation to the DMP Substation (the northern routes).

3.2. PROPOSED PROJECT FEATURES

TEP is proposing to construct the 138kV line using tubular self-weathering steel monopoles that would typically stand between 75-85 feet (ft.) tall; up to 100 ft. tall may be required at major road or utility line crossings. The distance (span) between poles would be determined by local conditions and would range from 600 to 1,000 ft., averaging five to nine structures per mile. The intent is to use existing road rights-of-way when possible. **Exhibit 2** presents a typical 138kV monopole structure.

3.3. ALTERNATIVE ROUTES

The landscape setting for the proposed project is associated with urban land within the City of Tucson. Since the proposed alternatives are typically located within existing rights-of-way, the most common land use type is roadway. In addition, there are four land use types that adjoin the rights-of-way: residential, commercial/institutional, industrial, and park/university campus.

For the purposes of this assessment, the alternatives were divided into segments of similar landscape character. These segments are of varying lengths; therefore, the number of possible viewers of these segments varies.

3.3.1. Southern Routes: Kino Substation to the Planned UA North Substation

The southern segments are identified with an “S”. **Table 1** lists the 18 segments, their locations and the alternative routes of which they are a part.

Table 1. Alternative Routes for the 138kV Line to Connect the Kino Substation to Planned UA North Substation (Southern Routes)

Description of the Segment			Alternative Route			
Number	Segment	Location	1	2	3	5
S-1	S. Kino Pkwy.	Kino Substation to 22 nd St.	x		x	
S-2	S. Cherry Ave.	22 nd St. to UPRR	x	x	x	x
S-3	S. Kino Pkwy.	Aviation Pkwy. to E. Broadway Blvd.	x	x		
S-4	N. Campbell Ave.	E. Broadway Blvd. to E. 6 th St.	x	x		
S-5	N. Campbell Ave.	6 th St. to E. Speedway Blvd.	x	x		
S-6	N. Campbell – Elm – Vine	E. Speedway Blvd. to E. Elm St.	x	x		
S-7	E. Elm St.	N. Campbell Ave. to Planned UA North Substation	x	x		
S-8	S. Campbell Ave.	Kino Substation to E Silverlake		x		x
S-9	Cherrybelle Strav	E. Silverlake to 22 nd St.		x		x
S-10	17 th St. – West & North	S. Kino Ave. to Broadway Blvd.			x	x
S-11	E. Broadway Blvd.	S. Freemont to N. Euclid Ave.			x	x
S-12	N. Euclid Ave.	E. Broadway to E. 6 th St.			x	x
S-13	N. Euclid Ave.	E. 6 th St to University Blvd.			x	x
S-14	N. Euclid	University Blvd. to E Helen St.			x	x
S-15	E. Helen St.	N. Euclid Ave. to N Park Ave.			x	x
S-16	N. Park Ave.	Helen St to the alley between E Adams St. and E. Lee St.			x	x
S-17	Alley between E. Adams St. & E. Lee St.	N. Park Ave. to N Vine Ave.			x	x
S-18	N. Vine Ave.	Alley to Planned UA North Substation			x	x

3.3.2. Northern Routes: Planned UA North Substation to DeMoss-Petrie Substation

The northern segments are identified with an “N”. **Table 2** lists the 16 segments, their locations, and the alternative routes of which they are a part.

Table 2. Alternative Routes for the 138kV Line to Connect the Planned UA North Substation to the DeMoss-Petrie Substation

Description of the Segment			Alternative Route			
Number	Segment	Location	A	B	D	E
N-1	N. Vine Ave.	E. Elm to E Grant Rd.	x			
N-2	E. Grant Rd.	N. Vine Ave. to N. Park Ave.	x		x	
N-3	E. Grant Rd.	N. Park Ave. to N. Oracle Rd.	x	x	x	
N-4	E. Grant Rd.	N. Oracle Rd. to DeMoss-Petrie Substation	x	x	x	x
N-5	Alley between E Lee St. & E. Adams St.	Planned UA North Substation to N. Park Ave.		x		x
N-6	N. Park Ave.	Alley between E. Lee St & E. Adams St. to E. Grant Rd.		x		
N-7	E. Elm St.	Planned UA North Substation to N. Campbell Ave.			x	
N-8	N. Campbell Ave.	E. Elm St. to E. Grant Rd.			x	
N-9	E. Grant Rd.	N. Campbell Ave. to N. Vine Ave.			x	
N-10	N. Park Ave.	Alley between Lee and Adams to E. Helen St.				x
N-11	E. Helen St.	N. Park to N. Euclid Ave.				x
N-12	N. Euclid Ave.	E. Helen St. to E. Speedway Blvd.				x
N-13	E. Speedway Blvd.	N. Euclid Ave. to N. Stone Ave.				x
N-14	W. Speedway Blvd.	N. Stone Ave. to N. Main Ave.				x
N-15	N. Main Ave.	W. Speedway to Drachman St.				x
N-16	N. Oracle Rd.	W. Drachman St. to E. Grant Rd.				x

3.4. VIEWER SENSITIVITY

For each category of land use within the study area, the expectations of the casual observer for the visual character of the landscape varies. Accordingly, the level of concern and the degree of sensitivity for changes to that landscape also vary. Residential viewers, that is viewers located within a home or private yard, and viewers in parks are typically associated with longer and more frequent views of the surrounding environment. Therefore, viewer sensitivity in these settings is anticipated to be higher than in other settings. Similarly, sightseeing motorists are anticipated to pay greater than Average attention to their surroundings. Viewers associated with commercial business settings are anticipated to have moderate sensitivity, due to a shorter viewing duration. Sensitivity is anticipated to be relatively low for commuting motorists and from within industrial settings because these developments are associated with viewers who are focused on work-related activities and may not be as sensitive to changes in the landscape.

Viewer sensitivity to changes to the landscape resulting from installation of the proposed facilities will also depend on the character of the existing landscape. It is assumed that if the existing landscape incorporates features which are similar in form, line, scale and/ or color to the proposed transmission structures, viewer sensitivity to the resulting changes will be less than when compared to an existing landscape in which there are no similar features.

3.5. MITIGATION OF VISUAL IMPACTS

It will be possible to reduce the visual impacts of portions of some alignments. Mitigation techniques include:

- Pole spacing and location: New poles can be placed to span particularly sensitive views. In some instances, they can be placed closer to similar structures or to taller buildings.
- Materials: New poles can be fabricated using galvanized steel where existing facilities such as streetlights or playfield lighting are also fabricated with galvanized finishes.

3.6. VISUAL IMPACTS RATINGS

This report describes the degree to which proposed routes of new transmission lines would conflict with anticipated viewer sensitivities. It does so by noting the presence or absence of similar structures or other features that might attenuate or exacerbate the visual impacts resulting from construction of the new transmission line.

It is worth noting that the average heights of the proposed new poles will be between 75 and 85 ft. tall. The average height of existing transmission poles within the same rights of way as the proposed alternatives is estimated to be between 50 and 60 ft. tall. The average distance between proposed new poles will be 600 to 1,000 ft. The average distance between existing distribution and sub-transmission line poles is estimated at 120 to 160 ft. Therefore, if new poles are installed, they would be approximately 25 percent taller than existing transmission poles and approximately 75 percent fewer new poles would be required than existing poles over similar distances. In some areas, existing poles would be removed and replaced. These areas can be reviewed in TEP's project website in the Interim Siting Study.

It is also worth noting that streetlighting associated with arterial roadway typically average approximately 30 ft. in height. They typically line both sides of thoroughfares and are more closely spaced than would be the proposed new poles. They are typically constructed of galvanized steel and most of them are not connected by overhead electrical lines.

Visual impacts are rated by the degree to which the project conforms to viewer expectations and sensitivity. Visual impacts were rated as follows:

- Low: the proposed project is adjacent or parallel to similar features and/or is within a more industrial setting, and viewer sensitivity to changes to the landscape resulting from the project is low.
- Moderate: the proposed project is adjacent or parallel to similar features and viewer sensitivity to proposed changes is moderate or high.
- High: the proposed project introduces new visual forms that contrast with the existing landscape, the setting is residential or recreational, and viewer sensitivity is high.

4. VISUAL ASSESSMENTS

4.1. SOUTHERN ROUTES: KINO SUBSTATION TO THE PLANNED UA NORTH SUBSTATION

4.1.1. Route 1 (Figure 3)

In general, Route 1 parallels South Kino Parkway (S. Kino Pkwy.) and North Campbell Avenue (N. Campbell Ave.), a heavily travelled four- to six-lane transportation corridor. As discussed above, viewer sensitivity of commuters is anticipated to be **low**. Kino/Campbell is also considered by the City of Tucson to be a Gateway Arterial. As such, its “appearance in contributing to a pleasant driving experience is important to the overall image of Tucson” (City of Tucson Major Streets and Routes Plan, 1982). As described in greater detail below, the existing visual character of the Route 1 alternative when viewed from the roadway varies considerably. Viewer sensitivity of sightseeing motorists is anticipated to range from **moderate to high** depending on the segment.

Visual impacts to the individual segments for non-motorists are characterized below:

4.1.1.1. Segment S-1: Kino Substation to 22nd St. (via S. Kino Pkwy.) (Photos 1, 2, and 3)

Route 1 begins at the Kino Substation at the southeast corner of S. Kino Pkwy. and E. 36th St., then runs north within the Kino right-of-way. S. Kino Pkwy. is a 40 mph, four-lane road with a landscaped median. On the west side of S. Kino Pkwy. is the Quincie Douglas Library, Recreation Center and Park interspersed with undeveloped land. Further north is Silverlake Park. Both Quincie-Douglas and Silverlake Park incorporate space for organized team sports, free play and passive recreation. Team sport participants and spectators are assumed to be primarily focused on the game. Park visitors engaged in free play and passive recreation are assumed be more aware of the surrounding environment. Due to the open nature of the park landscape, longer views toward the north and south are possible; therefore, multiple poles could be visible.

Currently, there are no overhead distribution lines that parallel the roadway within this segment of Route 1. If existing trees that line much of the western right-of-way are preserved, many views of the new facilities would be limited to the upper portions of the poles. Where existing vegetation is absent and the viewer is close to the roadway, the heavy traffic associated with S. Kino Pkwy. is assumed to

be more distracting than the proposed transmission facilities because traffic is in motion and generates considerable noise. Also, visible when looking toward S. Kino Pkwy. are existing streetlights and, from some locations within the park, existing playfield lights. Both types of structures are of similar visual character as the proposed facilities. Visual impacts to all park user types are anticipated to be **moderate**.

Single story residential development characterizes the landscape east of S. Kino Pkwy. opposite Silverlake Park and on both sides of S. Kino Pkwy. north of the park. Long views from backyards to the north and south appear to be possible, allowing for views of multiple poles. The homes are set back and partially screened from the right-of-way by existing trees and masonry walls. Therefore, many views of the new facilities would be limited to the upper portions of the poles. Also visible in this direction are existing streetlights, which are of similar form as the proposed facilities. There are no existing overhead electric lines within this reach of the S. Kino Pkwy. right-of-way. Visual impacts to views from residences within these neighborhoods are expected to be **moderate**.

At the northern reach of this segment, the land use transitions into undeveloped properties on the west side of N. Campbell Ave. and both undeveloped properties and the El Rio Community Health Clinic (El Rio) on the east side of and N. Campbell Ave. The S. Kino Pkwy. roadway is increasingly elevated from south to north as it crosses over 22nd St. Heavy traffic and the existing public art installations within the right-of-way are anticipated to be greater visual distractions to the casual viewer than the proposed facilities. Visual impacts of the project to El Rio staff and visitors are anticipated to be **low**.

4.1.1.2. Segment S-2: 22nd St. to Union Pacific Railroad (Photo 4)

The proposed alignment would be installed parallel to South Cherry Avenue (S. Cherry Ave.) up to the Union Pacific Railroad. Land use is characterized by industrial development on the east and west sides of S. Cherry Ave., which is a two-lane local road. Viewers are expected to primarily be employees of these businesses. Existing features include wood distribution poles with underbuild, and chain-link with barbed wire fencing. Little-to-no vegetation is present. Visual impacts are anticipated to be **low**.

4.1.1.3. Segment S-3: Aviation Blvd. to E. Broadway Blvd.

The proposed alignment would be installed parallel to South Cherry Avenue (S. Cherry Ave.) up to the Union Pacific Railroad (UPRR), then across the UPRR and Highway 210 (Aviation Parkway) rights-of-way before connecting back to S. Kino Pkwy. just north of 18th Street. On the south side of the railroad right-of-way, land use is characterized by industrial development on the east and west sides of S. Cherry Ave., which is a two-lane local road. Viewers are expected to primarily be employees of these businesses. Existing features include wood distribution poles with underbuild, and chain-link with barbed wire fencing. Little-to-no vegetation is present. Visual impacts are anticipated to be **low**.

After crossing the UPRR and Aviation Parkway rights-of-way, the alignment reconnects with S. Kino Pkwy. just north of 18th Street (18th St.). Land use to the east of S. Campbell Ave. appears to be industrial transitioning to commercial development. Beginning at 13th Street (13th St.), an existing distribution transmission line is located within the S. Kino Pkwy. right-of-way and extends north. This existing line would be of similar visual character as the proposed facilities. Other existing features include galvanized metal streetlights, traffic signals and wood distribution poles with underbuild both parallel and perpendicular to the roadway. For both land use types, visual impacts are anticipated to be **low**.

On the west side of the right-of-way is Cherry Field, which is dedicated to organized baseball. Visual impacts to park users are anticipated to be **low**. It is assumed that most park users are focused on a game or practice. Furthermore, the fields are lit by overhead light fixtures, which are of a similar visual character as the proposed facilities.

North of Cherry Field is a small single-story residential area. Visual impacts to residents of this neighborhood are anticipated to be **low to moderate**. Long views of multiple poles to the north or south appear to be possible from the yards of some homes. Also visible are existing east to west distribution lines within the development. If existing trees that line much of the western right-of-way are preserved, many views of the new facilities could be limited to the upper portions of the poles. Visible when looking west toward Kino are existing streetlights and the existing distribution line within the eastern right-of-way described above. Both types of structures are of similar visual character as the proposed facilities.

Commercial businesses occupy the southeast corner of E. Broadway Blvd. and S. Kino Pkwy. and visual impacts are anticipated to be **low**. Of much greater visual impact in this area is the heavy traffic associated with this major intersection.

4.1.1.4. Segment S-4: E. Broadway Blvd. to 6th St. (Photo 5)

At the E. Broadway Blvd. intersection, S. Kino Pkwy. transitions into N. Campbell Ave., a six-lane road with a landscaped median. There are commercial properties within the southern portion, but the dominant land use is single-story residential development. Development on both sides abut the backs of right-of-way, thereby limiting the possible distances from proposed structures to adjacent properties. An existing overhead transmission line with underbuild is located within the east right-of-way, as are three east to west wooden distribution poles. Galvanized metal streetlights are located on both sides of the right-of-way. These features are both parallel and perpendicular to the roadway and traffic signals. Both types of structures are of similar visual character as the proposed facilities. Walls, fences and mature vegetation line much of both sides of the roadway, so that views of the proposed facility from numerous residences would be limited or entirely blocked. Long views of multiple poles to the north or south do not appear to be possible from most homes. Conversely, if it is necessary to remove existing mature vegetation, increased visual impacts to residents are anticipated. Since the

existing distribution line lies within the east right-of-way, it is anticipated that the visual impact of constructing the proposed facilities within that right-of-way would be less than the impact of constructing within the west right-of-way. Limiting overhead facilities to one side of the right-of-way would reduce overall visual clutter in this area. Visual impacts to residents are anticipated to be **moderate to high**, depending on the degree to which existing vegetation is removed.

4.1.1.5. Segment S-5: 6th St. to East Speedway Blvd. (Photo 6)

This segment continues within the N. Campbell Ave. right-of-way. The dominant land use on the east side of this reach of N. Campbell Ave. is single story residential development.

Development abuts the back of right-of-way, thereby limiting the possible distances from proposed structures to adjacent properties. Existing wood distribution poles with underbuild are located within the east right-of-way and galvanized metal streetlights are located on both sides of the right-of-way, both parallel and perpendicular to the roadway, and traffic signals. Both types of structures are of similar visual character as the proposed facilities. Walls, fences, and mature vegetation are associated with many of the residences, so that many views of the proposed facility from the residences would be limited to the upper portions of the poles or entirely blocked. Long views of multiple poles to the north or south do not appear to be possible from most homes. Conversely, if it is necessary to remove existing mature vegetation, increased visual impacts to residents are anticipated. Visual impacts to residents are anticipated to be **moderate to high**, depending on the degree to which existing vegetation is removed.

The dominant land use on the west side of this reach of N. Campbell Ave. is the UA campus. The campus is atypical of the surrounding city because of the high volume of pedestrian and bicycle traffic, which allow for longer view times. Like some park settings, the portion of the campus immediately west of Campbell is largely open, allowing for longer views. Therefore, multiple poles would be visible from within this area. As stated above, there are existing wood distribution poles and galvanized streetlights, which are of similar visual character as the proposed facilities. The visibility from campus of many of the existing transmission poles is reduced by the presence of tall mature trees within the neighborhood to the east. These trees reduce the silhouette effect of the existing poles. It is assumed that these trees would have a similar mitigating effect on the visibility of the lower portions of the proposed poles. Given the possible span distances described above, it is also possible that it would not be necessary to install new poles within the open campus areas. The heavy traffic associated with N. Campbell Ave. is assumed to be a considerable visual distraction to the casual viewer when near the roadway. Visual impacts to university students, staff and visitors are anticipated to be **moderate to high**, depending on the degree to which existing vegetation and existing structures would reduce the silhouette effect of the proposed new facilities.

4.1.1.6. Segment S-6: E. Speedway Blvd. to E. Elm St. (Photo 7)

This segment continues within the N. Campbell Ave. right-of-way, a six-lane roadway with a landscaped median. Land use within this reach of N. Campbell Ave. is highly diverse and includes on the east side commercial businesses, private residences, Saints Peter & Paul Catholic Church and Our Savior's Lutheran Church, and a school. Land use on the west side is dominated by multi-story buildings associated with the UA and Banner University Medical Center. Galvanized metal streetlights are located on both sides of the roadway and wood distribution poles with underbuild both parallel and perpendicular to the roadway, located within most of the length of the east right-of-way. Both types of structures are of similar visual character as the proposed facilities.

Although set back from the roadway and visually "softened" by semi-mature trees that line much of the west right-of-way, the multi-story university and medical buildings dominate the visual character of this reach of Campbell due to their mass and height. It is assumed that unlike the main campus described above, pedestrians and bicyclists do not typically frequent the area adjacent to the right-of-way. Mature vegetation on the east side of N. Campbell Ave. appears to be mostly associated with private residences. In combination with walls that surround these properties, it is anticipated that views of the proposed structures from these residences would be limited. Similarly, long views of multiple poles to the north or south do not appear to be possible from most homes. Since the existing distribution line is within the east right-of-way, it is anticipated that the visual impact of constructing the proposed facilities within that right-of-way would be less than the impact of constructing within the west right-of-way. Limiting overhead facilities to one side of the right-of-way would reduce overall visual clutter in this area. Visual impacts to the highly diverse population who live in, work, or visit these various homes and institutions are anticipated to be **low to moderate**.

4.1.1.7. Segment S-7: N. Campbell Ave. to the Planned UA North Substation (Photo 8)

Route 1 leaves the Campbell Ave. right-of-way and turns west onto E. Elm St. are, a two-lane road servicing functions associated with the UA and Banner University Medical Center. (Elm transitions into N. Ring Rd. and then into E. Chauncy Ln. All are referred to as E. Elm St. in this report.) The route ends at the planned UA North Substation. Land use to either side of Elm within the area is entirely dedicated to the University of Arizona and Banner University Medical Center. Visual impacts are anticipated to primarily affect residents to the north, though this road is also used by hospital staff, patients, and visitors. As discussed above, the multi-story buildings associated with Banner dominate the visual character of the area due to their mass and height. Most of the area between Elm and residences to the north consists of detention basins lined with immature trees. Consequently, views from these residences toward Elm and Banner are unbroken. Streetlights are located on both sides of the roadway. Visual impacts to employees, visitors and nearby residents are anticipated to be **low**.

4.1.2. Route 2 (Figure 4)

Route 2 would be constructed within a portion of the S. Campbell Ave. right-of-way and within the S. Cherrybelle Stravenue right-of-way. Commuting motorists are not anticipated to utilize either of these two-lane roads. North of 22nd St., the proposed route would follow the same alignment as **Route 1**, segments S-3 to S-7. From E. 18th St. to the planned UA North Substation discussed above. Visual impacts to the undescribed individual segments are characterized below:

4.1.2.1. Segments S-8: Kino Substation to Silverlake Rd. (Photos 9-10)

Route 2 bears east along E. 36th St., then north along S. Campbell Ave., which consists of two one-way roads separated by a wide landscaped median (approximately 100 ft. wide). The proposed alignment would be located within the median. Residential development characterizes the land use on both sides of the right-of-way. Visual impacts to views from residences within this neighborhood are expected to be **high**. The right-of-way is unusually wide for a residential neighborhood. Coupled with the single story architecture, the uneven distribution of mature trees and the fact that the majority of trees are relatively short native mesquites (with a typical maximum height of 25 to 30 ft.), long views from residential yards appear to be possible, allowing for views of multiple poles. There are no overhead transmission facilities parallel to the right-of-way and relatively few streetlights. The visual impact of the new poles would be somewhat attenuated by the groups of mature palm trees (approximate heights of 40 ft.) within the median. The forms of the poles would repeat the vertical habit of these trees.

4.1.2.2. Segments S-9: Silverlake Rd. to 22nd St. (Photo 11)

This segment is located within the S. Cherrybelle Stravenue right-of-way, a two-lane road. Existing land use development associated with Cherrybelle can be characterized as institutional, including the main U.S. Post Office for the City of Tucson and the El Rio Health Clinic, as well as industrial. Impacts to viewers within this area are anticipated to be **low**.

4.1.3. Route 3 (Figure 5)

Visual impacts associated with the **Route 3** alternative are characterized below:

4.1.3.1. Segments S-1 and S-2: S. Kino Pkwy. to E. 22nd to S Kino at E. 17th St

The route would follow the **Route 1** alignment, segments S-1 and S-2, until Kino intersects with E. 17th St.

4.1.3.2. Segment S-10: S. Kino Pkwy. to E. Broadway Blvd. (Photos 12-15)

From S. Kino Pkwy., the proposed alignment would parallel rights-of-way associated with E. 17th St., S. Highland Ave., E. Manlove St., and S. Fremont Ave., all of which are two-lane local roads. It would

cross a highly eclectic blend of land uses including industrial, commercial, single- and two-story residential, dispersed recreation, a small park, and a school. Of these, the dominant land use is dispersed recreation: there exists a network of multi-use paths associated with a network of detention basins constructed for flood control for the Arroyo Chico drainage. These basins create open space that allows for long views from the paths and from the adjacent properties and roadways. The dominant land use surrounding the network of basins is residential. Distribution lines exist within a southern portion of the basin complex and within several local rights-of-way. There are a limited number of streetlights. The structures associated with the distribution lines are of similar visual character as the proposed facilities. Visual impacts to the variety of residents, recreationalists, employees are anticipated to be **moderate to high**.

4.1.3.3. Segment S-11: N. Fremont Ave. to N. Euclid Ave.

This section is within the Broadway Blvd. right-of-way. Broadway is currently under construction to create a six-lane arterial. Primary viewers are assumed to be commuters. Similar to S. Kino Blvd. and Campbell Ave., Broadway Blvd. is considered by the City of Tucson to be a Gateway Arterial. Therefore, the aesthetics of the driving experience are considered important. Visual impacts associated with this segment of the route are anticipated to be **moderate to low**. Commercial businesses dominate the south side of the right-of-way. Multi-story apartment buildings predominate on the north. There are no overhead transmission lines that parallel the right-of-way. Streetlights are located on both sides of the road and are of a similar visual character as the proposed facilities.

4.1.3.4. Segment 12: E. Broadway Blvd. to E. 6th St. (Photos 16-17)

From E. Broadway Blvd., the route heads north adjacent to North Euclid Avenue (N. Euclid Ave.), a heavily travelled four-lane arterial. Euclid Ave. is a heavily used four-lane arterial. Land use to either side of this reach of Euclid Ave. is dominated by one-story single- and multi-family housing. Beginning at 8th Street (8th St.), land use west of the right-of-way is associated with Tucson High School. Development on both sides, including Tucson High School, abuts the back of right-of-way, thereby limiting the possible distances from proposed structures to adjacent properties. North of 8th St., the scale of the high school architecture, combined with its proximity to the right-of-way, dominates the landscape. Where vegetation is absent, views to the north or south of proposed new poles from residential properties seems be likely. Currently visible from these same properties are existing distribution lines with underbuild that are located the full length of the west right-of-way and about half the length of the east right-of-way. Four wood distribution poles with underbuild and a 46kV sub-transmission line cross the N. Euclid Ave. roadway. Traffic signals are installed at the halfway point of this segment at the 9th Street intersection. Streetlights are located on the east right-of-way. Approximately 200 ft. to the south of the intersection at 6th St., there exists in the west right-of-way a painted steel transmission pole with an approximate height of 75 ft. All of these structures are similar in visual character as the proposed facilities. The heavy traffic associated with Euclid is assumed to be a visual distraction to the casual viewer when near the roadway. Visual impacts resulting from

construction of this segment of the proposed facilities are anticipated to be **low to moderate**, depending on the degree to which existing transmission facilities can be incorporated into the proposed facilities, thereby minimizing overall visual clutter.

4.1.3.5. Segment 13 (cont.): 6th St. to University Blvd. (Photo 18)

North of 6th St, the alignment continues adjacent to N. Euclid Ave. Multi-story buildings associated with the UA dominate the east side of the right-of-way, giving this segment an urban feel. Single-story residences dominate the west side. Viewers are anticipated to be residents. Development on both sides is marked by reduced setbacks from the right-of-way. Where vegetation is absent, views to the north or south of proposed new poles from residential properties seem be likely. Distribution lines with underbuild are located the full length of the west right-of-way and are currently visible from these same residences. Two distribution lines cross the E. Euclid Ave. roadway. Traffic signals are installed at the 5th Street (5th St.) intersection. Galvanized metal streetlights are located on the east right-of-way. All of these structures are similar in visual character as the proposed facilities. It is anticipated that installing the new facilities in the east right-of-way would reduce visual impacts since they would contrast less with the multi-story university architecture than they would with the single-story residential architecture that dominates the west right-of-way. Visual impacts resulting from construction of this segment of the proposed facilities are anticipated to be **low to moderate**.

4.1.3.6. Segment 14 (cont.): University Blvd. to E. Speedway Blvd. to E. Helen St.

The alignment continues adjacent to N. Euclid Ave. From University Boulevard to 1st Street (1st St.), the adjacent landscape is dominated by multi-story residential, university or hotel structures on both sides of the right-of-way. North of 1st St., the landscape is characterized by one-story university buildings to the east of the roadway. Land west of the roadway is occupied by a small residential development and a church. Development on both sides is marked by reduced setbacks from the right-of-way. As a result, the southern portion of this segment appears urban in character, possibly reducing the visual impact caused by the proposed facilities. Pedestrian and bicycle use are estimated to be heaviest at the intersection with University Boulevard. Overhead power lines associated with the Tucson streetcar follow the space immediately above that same roadway. An overhead transmission line crosses E. Euclid Ave. at 1st Ave. Galvanized metal streetlights and vegetation are located on both sides of the right-of-way. These structures are similar in visual character as the proposed facilities. Impacts resulting from construction of this segment of the proposed facilities are anticipated to be **low to moderate**.

4.1.3.7. Segment S-15: E. Euclid Ave. to N. Park Ave. (Photo 19)

The route would be located adjacent to E. Helen St., a two-lane local road. Land use to either side of Helen St. appears to be mostly residential. Half of the land use north of the right-of-way is dedicated to one- and two-story student housing and the viewer sensitivity of residents of this housing is

assumed to be low. Visual impacts to all residents in this portion of the proposed route are anticipated to be **moderate**. An existing distribution line with underbuild is located within the south right-of-way and is similar in visual character to the proposed facilities.

4.1.3.8. Segment S-16: Helen St. to the alley between E. Adams St. and E. Lee St. (Photo 20)

The proposed route would be located within the N. Park Ave. right-of-way. N. Park Ave. is a two-lane collector street in a residential area, mainly consisting of apartment and multi-family housing. It appears to be frequently used by university students walking and cycling to the university and viewers are expected to be residents. Land use on both sides of the right-of-way is dominated by two-story apartment buildings and the viewer sensitivity of residents is assumed to be low. An existing distribution line with underbuild is located within the east right-of-way and is similar in visual character to the proposed facilities. Vegetation is found on both sides of the route. Visual impacts resulting from construction of this segment of the proposed facilities are anticipated to be **low**.

4.1.3.9. Segment S-17: N. Park Ave. to N. Vine Ave. (Photos 21-22)

The proposed route would be located within an east to west alley between E. Adams St. and E. Lee St. Most land use to either side appears to be residential. The visual impacts resulting from construction of this segment of the proposed facilities are anticipated to be **low**. An existing 46kV sub-transmission line with underbuild runs the full length of the proposed alignment. In addition, there are numerous distribution lines perpendicular to the orientation of the alley. These structures are similar in visual character as the proposed facilities.

4.1.3.10. Segment S-18: N. Park Ave. to Planned UA North Substation (Photos 23)

This segment continues north within the N. Vine Ave. right-of-way. Land use to the east side of the of way is dedicated to facilities management for the UA and two existing 46 kV substations. To the west are three residences. Existing distribution lines and 46kV sub-transmission with underbuild are located on both sides of the right-of-way. The poles on the east side are approximately 75 ft. tall and are constructed of painted or weathered steel. These structures are similar in visual character as the proposed facilities. Visual impacts resulting from construction of this segment of the proposed facilities are anticipated to be **low**.

4.1.4. Route 5 (Figure 6)

4.1.4.1. Segments S-8, S-9, S-2 and S-10 through S-18

The route would follow the **Route 2 (S-8, S-9, S-2, S-10)** alignment between E. 36th St. and E. 22nd St. and the **Route 3 (S-10 to S-16)** alignment north of E. 22nd St. to the planned UA North Substation. All segments from these routes have been discussed earlier in this report. Visual impacts associated with the **Route 5** alternative are anticipated to be **moderate**.

4.2. NORTHERN ROUTES: PLANNED UA NORTH SUBSTATION TO THE DEMOSS-PETRIE SUBSTATION

4.2.1. Route A (Figure 7)

The majority of **Route A** parallels Grant Road, a heavily travelled four- to six-lane arterial. Most viewers are anticipated to be commuters for whom visual impacts are anticipated to be **low**. Visual impacts associated with **Route A** individual segments for non-motorists are described below:

4.2.1.1. Segment N-1: E. Elm St. to E. Grant Rd. (Photo 23)

Route A begins at the planned UA North Substation and would be located within the N. Vine Ave. right-of-way, a two-lane local road. The dominant land use on both sides of the road is residential, buildings associated with the UA and a church. Viewers along this route include residents. The right-of-way width limits the possible distances from proposed structures to adjacent properties. Existing weathered steel 46kV sub-transmission utility poles with underbuild are located on the east side of the right-of-way between E. Elm St. and the alley between E. Lester and E. Linden St. These are both perpendicular and parallel to the roadway. The poles are approximately 75 ft. tall. There are no electric lines parallel to N. Vine north of E. Linden St. and very few streetlights. Numerous east to west transmission lines with underbuild cross the roadway and are of similar visual character as the proposed facilities. Many of the residential yards contain mature vegetation or are fenced or walled. Therefore, some views of the new facilities would be limited to the upper portions of the poles or blocked entirely. Where vegetation is absent, it is likely that longer views of several poles will be possible. Some of these views would also include views of the existing overhead distribution lines. Visual impacts resulting from construction of this segment of the proposed facilities are anticipated to be **moderate to high**.

4.2.1.2. Segment N-2: N. Vine Ave. to N. Park Ave. (Photo 24)

Route A continues west within the E. Grant Rd. right-of-way. E. Grant Rd. is a heavily travelled, four-lane arterial. The dominant land use is residential. There are no existing overhead utilities within the right-of-way; some mature vegetation is present. Traffic signals and galvanized metal streetlights line one or both sides of the roadway and are of similar visual character as the proposed facilities. When viewed from adjacent residences, the heavy traffic associated with E. Grant Rd. is assumed to attract greater visual attention than the proposed transmission facilities because traffic is in motion and generates considerable noise. Visual impacts resulting from construction of this segment of the proposed facilities are anticipated to be **moderate**. The right-of-way width limits the possible distances from proposed structures to adjacent properties. (It is worth noting that construction plans for the widening of both the roadway and right-of-way associated with E. Grant Rd., are currently in development).

4.2.1.3. Segment N-3: N. Park Ave. to N. Oracle Rd. (Photo 25)

The route continues within the N. Grant Rd. right-of-way, which transitions into a six-lane roadway with a landscaped median. Land use consists of a mix of commercial businesses (McDonalds, Farmers Insurance, 99 Cent Store, CVS, Fry's Food, etc.) and private residences. An existing 46kV sub-transmission distribution line with underbuild is located the length of the south right-of-way. The poles range from about 82 to 100 ft. tall and are constructed of weathered steel. Traffic signals are located at several intersections, as are commercial signs, and galvanized metal streetlights are located on both sides of the roadway. Several wood distribution utility poles with lines cross the roadway. These structures are similar in visual character as the proposed facilities. The road alignment has rolling terrain, which allows for occasional open views to the east and the north. On the west side of the alignment at North Stone Avenue (N. Stone Ave.), the building setbacks decrease, which constrains views. Visual impacts resulting from construction of this segment of the proposed facilities are anticipated to be **low**.

4.2.1.4. Segment N-4: N. Oracle Rd. to DeMoss-Petrie Substation (Photos 26-28)

The route continues west within the N. Grant Rd. right-of-way west to the DeMoss-Petrie Substation, east of I-10. The dominant land use is commercial. Existing self-weathering 46kV sub-transmission lines and wood distribution poles with underbuild are located much of the length of the south right-of-way and for a portion of the north right-of-way. Most poles are 75 to 80 ft. tall. Traffic signals are located at several intersections and streetlights are located on both sides of the roadway. Several utility lines cross the roadway. These structures are similar in visual character as the proposed facilities. There is also an art sculpture at the intersection of E. Grant Rd. and North Oracle Road (N. Oracle Rd.) and open views of the Tucson Mountains when travelling west. Little vegetation is present. Visual impacts resulting from construction of this segment of the proposed facilities are anticipated to be **low**.

4.2.2. Route B (Figure 8)

Similar to **Route A** described above, the majority of **Route B** parallels E. Grant Rd., a heavily travelled six-lane arterial. Most viewers are expected to be commuters for whom visual impacts are anticipated to be **low**. Visual impacts associated with **Route B** individual segments for non-motorists are described below:

4.2.2.1. Segment N-5: Planned UA North Substation to N. Park Ave. (Photos 21 and 22)

The first part of this segment would be located within the N. Vine Ave. right-of-way. Land use to the east side of the right-of-way is dedicated to facilities management for the University of Arizona. To the west are three residences. Visual impacts resulting from construction of this segment of the proposed facilities are anticipated to be **low**. Existing transmission lines are located on both sides of the right-of-way. The poles on the east side are approximately 70 ft. tall at the south end and are

constructed of painted or weathered steel; smaller poles to the north are constructed of wood. The utilities on the west side of the roadway appear to be non-electrical in nature and are attached to wood poles. These structures are similar in visual character as the proposed facilities.

The segment would continue west from N. Vine Ave. to N. Park Ave. within an east to west alley between Adams St. and Lee St. Most land use to either side appears to be residential. The visual impacts resulting from construction of this segment of the proposed facilities are anticipated to be **low**. An existing 46kV sub-transmission line with underbuild runs the full length of the proposed alignment. In addition, there are numerous distribution lines perpendicular to the orientation of the alley. These structures are similar in visual character as the proposed facilities.

4.2.2.2. Segment N-6: Alley between E. Lee St. and E. Adams St. to E. Grant Rd. (Photo 20)

The proposed route would be located within the Park Ave. right-of-way. Park Ave. is a two-lane collector street. It appears to be frequently used by university students walking and cycling to the university. Land use on both sides of the right-of-way is dominated by one-story residences with several two-story apartment buildings. Visual impacts resulting from construction of this segment of the proposed facilities are anticipated to be **low**. An existing 46 kV sub-transmission line with underbuild is located within the east right-of-way. Numerous distribution lines cross the roadway. These structures are similar in visual character to the proposed facilities.

4.2.2.3. Segments N-3 and N-4: N. Park Ave. to the DeMoss-Petrie Substation

From N. Park Ave., this route follows **Route A** west to the DeMoss-Petrie Substation within the E. Grant Rd. right-of-way and visual impacts are described in that section.

4.2.3. Route D (Figure 9)

The majority of **Route D** parallels N. Campbell Avenue and E. Grant Ed, both of which are heavily travelled arterials. Most viewers are expected to be commuters for whom visual impacts are anticipated to be **low**. As discussed earlier, N. Campbell Rd. is considered by the City of Tucson to be a Gateway Arterial. Therefore, the aesthetics of the driving experience are considered important. Viewer sensitivity of sightseeing motorists is anticipated to be **moderate to high**. Visual impacts associated with **Route D** individual segments for non-motorists are described below:

4.2.3.1. Segment N-7: Planned UA North Substation to N. Campbell Ave. (Photo 8)

Route D is parallel to E. Elm St, following the same as alignment as **Routes 1 and 2** (S-7). As discussed earlier, Elm is a two-lane road and land use to either side is entirely dedicated to the University of Arizona and Banner University Medical Center. (From east to west, E. Elm St. transitions into N. Ring Rd. and then into E. Chauncy Ln. All are referred to as E. Elm St. in this report.) Visual impacts are anticipated to primarily affect residents to the north, though the road is also used by hospital staff,

patients and visitors. The multi-story buildings associated with Banner dominate the visual character of the area due to their mass and height. Most of the area between Elm and residences to the north consists of detention basins lined with immature trees. Consequently, views from these residences toward Elm and Banner are unbroken. Streetlights are located on both sides of the roadway. Visual impacts to employees, visitors and nearby residents are anticipated to be **low**.

To complete the project, one of the southern alignment alternatives will be combined with one of the northern alignment alternatives. Two possible combinations of alternatives include **Route 1D** and **Route 2D**. If one of these combinations of alternatives is constructed, two transmission lines would be installed parallel to E. Elm St., one on each side of the road. The southern route would be going west to the planned UA North Substation; the northern route would be going east from the planned UA North Substation to Campbell Ave.

4.2.3.2. Segment N-8: E. Elm St. to E. Grant Rd. (Photo 29)

The proposed route would be located within the Campbell Ave. right-of-way. There are no existing overhead utility lines immediately adjacent to this reach of Campbell. An existing distribution line is located adjacent to the west frontage road. Streetlights are located on both sides of the road and there are traffic signals at one pedestrian crossing. These structures are similar in visual character to the proposed facilities. The dominant land use on both sides of the road is residential. Frontage roads and six-foot walls line most of both sides of the roadway, allowing for separation between the road and adjacent residences. Both sides are also lined with mature native trees. Multiple poles could be visible from some residences within this segment. It seems likely that the walls and vegetation would limit these views to the upper portions of the facilities. Visual impacts resulting from construction of this segment of the proposed facilities are anticipated to be **moderate**.

4.2.3.3. Segment N-9: N. Campbell Ave. to N. Vine Ave.

The route heads west within the E. Grant Rd. right-of-way, a four-lane arterial. The dominant land use on both sides of the road is residential. Visual impacts to non-commuters resulting from construction of this segment of the proposed facilities are anticipated to be **moderate**. The right-of-way width limits the possible distances from proposed structures to adjacent properties (however, see discussion above regarding ongoing plans for right-of-way improvements). There are no existing overhead utilities within the right-of-way. One north to south 46kV sub-transmission lines crosses the roadway and streetlights are located in the north right-of-way. Both are of similar visual character as the proposed facilities. Many of the front yards of adjacent residences have mature vegetation and/or are surrounded by walls, which will limit views of the proposed facilities. Where visible, the heavy traffic associated with Grant Rd. is assumed to attract greater attention than the proposed transmission facilities because traffic is in motion and generates considerable noise.

4.2.3.4. Segments N-2, N-3, and N-4: North Vine Avenue to DeMoss-Petrie Substation

Visual impacts associated with the remainder of this route (to the DeMoss-Petrie Substation) are described above under **Route A**.

4.2.4. Route E (Figure 10)

Visual impacts to individual segments resulting from construction of this route are characterized below:

4.2.4.1. Segment N-5: E. Elm St. (planned UA North Substation) to N. Park Ave.

Visual impacts resulting from this route are described above under **Route B**.

4.2.4.2. Segment N-10: Alley between E. Lee St. and E. Adams St. to E. Helen St. (Photo 20)

From the alleyway between Adams and Lee, the route turns south parallel to N. Park Ave. N. Park Ave. is a two-lane collector street in a residential area, mainly consisting of apartment and multi-family housing. It appears to be frequently used by university students walking and cycling to the university and viewers are expected to be residents. Land use on both sides of the right-of-way is dominated by two-story apartment buildings and the viewer sensitivity of residents is assumed to be low. An existing distribution line with underbuild is located within the east right-of-way and is similar in visual character to the proposed facilities. Vegetation is found on both sides of the route. Visual impacts resulting from construction of this segment of the proposed facilities are anticipated to be **low**.

4.2.4.3. Segment N-11: N. Park Ave. to N. Euclid Ave. (Photo 19)

From N. Park Ave. the route turns east parallel to E. Helen St., a local two-lane road. Land use to either side of Helen St. appears to be mostly residential. Approximately half of the land use north of the right-of-way is dedicated to one- and two-story student housing and the viewer sensitivity of residents of this housing is assumed to be low. An existing distribution line with underbuild is located within the south right-of-way and is similar in visual character to the proposed facilities. Visual impacts to all residents in this portion of the proposed route are anticipated to be **moderate**.

4.2.4.4. Segment N-12 N. E. Helen St. to E. Speedway Blvd.

From Helen St, the alignment follows N. Euclid Ave. for one block south to E. Speedway Blvd. As discussed earlier, Euclid is a four-lane road. Adjacent land uses include residential and commercial. Streetlights line both sides of the road. There are no other overhead utilities. Visual impacts resulting from construction of this segment of the proposed facilities are anticipated to be **moderate**.

4.2.4.5. Segment N-13: N. Euclid Ave. to N. Stone Ave. (Photos 30-32)

This portion of the alignment would be located within the E. Speedway Blvd. right-of-way. Speedway is a heavily travelled four-lane arterial. The dominant land use on both sides of the road is mostly residential, although commercial businesses are located at major intersections and there are two large church properties. Anza Park is located at the southeast corner of N. Stone Ave. Development abuts the back of right-of-way, thereby limiting the possible distances from proposed structures to adjacent properties. There are no existing overhead utilities parallel to the right-of-way. Two north to south distribution lines cross the roadway at the western end of the segment, there are traffic signals at major intersections and galvanized metal streetlights are located on both sides of the road. These structures are of similar visual character as the proposed facilities. Many if not most residences face onto W. Speedway Blvd. and relatively few have walls or mature vegetation of sufficient height to block views into the roadway. The heavy traffic associated with W. Speedway Blvd. is assumed to be a greater visual distraction than the proposed transmission facilities. Visual impacts to non-commuters resulting from construction of this segment of the proposed facilities are anticipated to be **moderate**.

4.2.4.6. Segment N-14: N. Stone Ave. to N. Main Ave.

The proposed alignment continues east parallel to W. Speedway Blvd., a four- to six-lane arterial. Land use to either side of Speedway in this segment is mixed. About half of the properties are private residences. Other uses include commercial, several undeveloped properties or parking lots and Pima Community College. Several distribution and sub-transmission lines perpendicular to the roadway are located within this segment. A pedestrian crossing signal is located near the middle of this segment and both sides of the road are lined with streetlights. These structures are of similar visual character as the proposed facilities. Pedestrian traffic associated with the college is assumed to be high but limited to the Stone Ave. intersection. Visual impacts to non-commuters resulting from construction of this segment of the proposed facilities are anticipated to be **low to moderate**.

4.2.4.7. Segment N-15: W. Speedway Blvd. to E. Drachman St. (Photo 33)

This portion of the alignment would be located within the N. Main Ave. right-of-way. Main is a major four-lane roadway and most viewers are expected to be commuters. The dominant land use on both sides of the road is commercial. Visual impacts to non-commuters resulting from construction of this segment of the proposed facilities are anticipated to be **low**. There are no overhead transmission lines within the right-of-way parallel to the roadway. A distribution and a 46kV sub-transmission line cross the road and streetlights are located on both sides of the road. These structures are of similar visual character as the proposed facilities.

4.2.4.8. Segment N-16: E. Drachman St. to E. Grant Rd (Photos 34 and 35)

This portion of the alignment would be located within the N. Oracle Rd right-of-way. Oracle is a six-lane transportation corridor and most viewers are anticipated to be commuters. It is also considered

by the City of Tucson to be a Gateway Arterial. Therefore, the aesthetics of the driving experience are considered important. Viewer sensitivity of sightseeing motorists is anticipated to be **moderate to high**. Land use on both sides of the right-of-way are dominated by commercial businesses. Visual impacts to non-commuters resulting from construction of this segment of the proposed facilities are anticipated to be **moderate to high**. There are no overhead transmission lines that parallel the road and a limited number that cross it. Streetlights are located on both sides of the roadway. Perhaps the most striking visual characteristic are the signs advertising motels in the southern section of this portion of the alignment. The historic character of these signs might conflict with the visual character of the proposed facilities. Other advertising signs and billboards further north up Oracle Rd. have a more modern character and are not anticipated to conflict with the proposed facilities.

4.2.4.9. Segment N-4: Oracle Road to DeMoss-Petrie Substation

Visual impacts resulting from this segment along E. Grant Rd are described above under **Route A, Segment N-4**.

5. RANKING VISUAL IMPACT ASSESSMENTS

5.1. METHODS

Visual impacts are defined as changes to the visual environment resulting from the introduction of modifications to the landscape. The degree of visual contrast resulting from a modification is directly related to the amount of attention that is drawn to that modification.

In order to rank the alignment alternatives with respect to visual impacts, a value was assigned to each segment as follows:

- **High Visual Impact** A value of 1 was assigned to segments in which the installation of proposed TEP facilities would attract significant negative viewer attention.
- **Moderate Visual Impact** A value of 2 was assigned to segments in which the installation of proposed TEP facilities would attract moderate negative viewer attention.
- **Low Visual Impact** A value of 3 was assigned to segments in which the installation of proposed TEP facilities would attract little to no negative viewer attention.

As discussed in Section 4 of this report, many of the segments are utilized and enjoyed by a diverse population, from commuters to local residents. To reflect this diversity, values assigned to each segment were rarely whole numbers. More frequently, they were of intermediate value, between 1 and 2 or between 2 and 3.

The value of a proposed route was determined by calculating the average value of the contributing segments. The value of an overall project alternative was determined by calculating the average value of the contributing southern and northern routes.

The assignment of these values is based on the professional opinion of the landscape architect regarding the characterization of the existing landscape, the anticipated visual impacts to the landscape resulting from construction of the proposed TEP facilities, and the anticipated reactions of viewers to these facilities. No formal attempt was made to assign values based on numbers of viewers nor was any formal attempt made to solicit the opinions of possible viewers.

5.2. RESULTS

The values assigned to each segment can be seen in **Exhibit 1**.

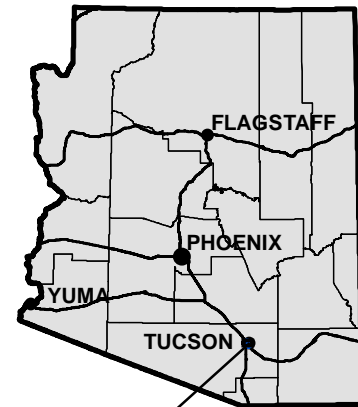
As discussed earlier, to complete construction of the project, one of the southern alternatives will be combined with one of the northern alternatives. The possible north-south alternative route combinations and their respective visual impact values are shown below in **Table 3**.

Table 3. Visual Impact Values for Possible Alternative Routes for Kino Substation to Planned UA North Substation to DeMoss-Petrie Substation 138kV Line

	Alternative											
	1A	1B	1D	1E	2A	2B	2D	2E	3A	3D	5A	5D
Visual Impact Value	2.26	2.48	2.25	2.20	2.31	2.53	2.30	2.25	2.50	2.49	2.51	2.50

FIGURES

ARIZONA

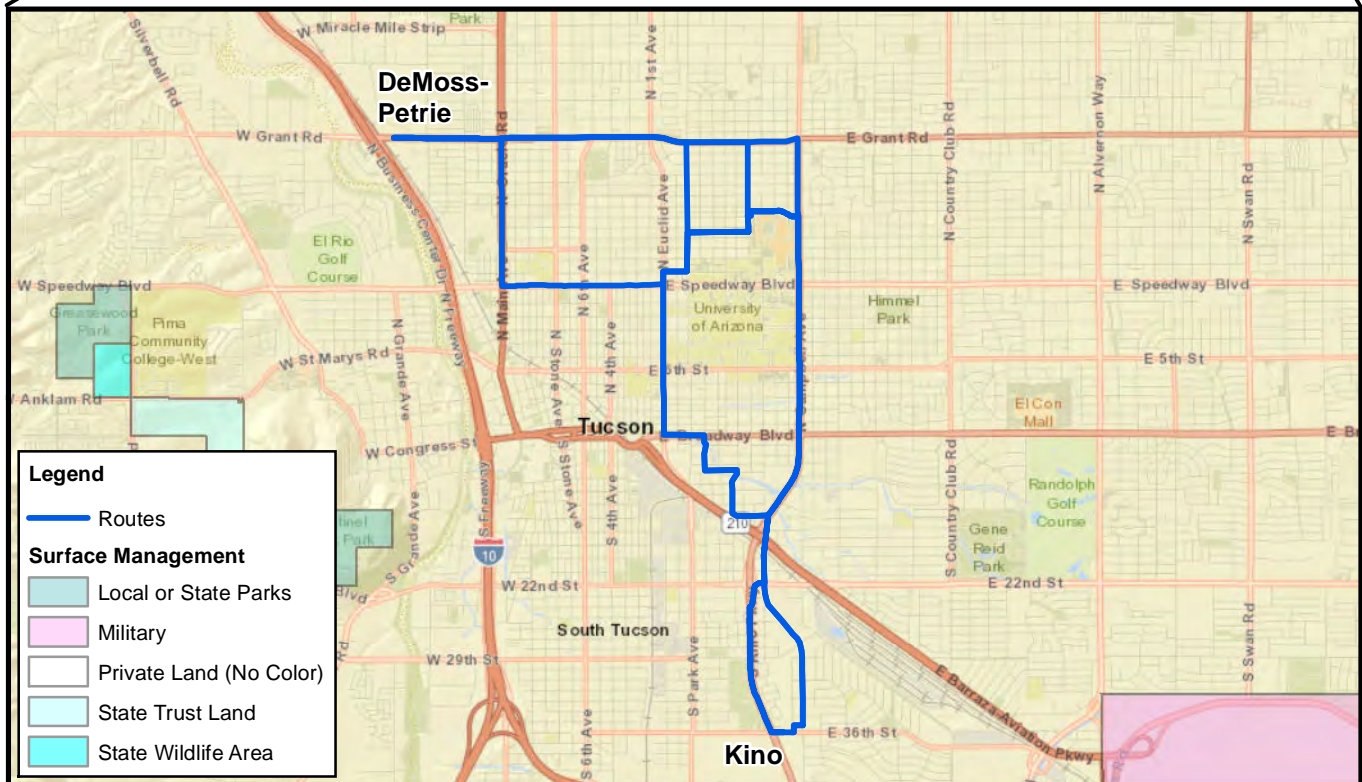


PROJECT LOCATION

PROJECT VICINITY



Approximate Scale 1 Inch = 10 Miles



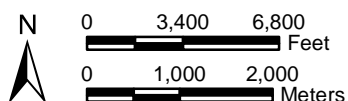
T14S, R13E, Portions of Sections 1 and 2,
 T14S, R14E, Portions of Sections 6, 7, 18 and 19,
 Pima County, Arizona
 Data Source: TEP
 Surface Management: BLM 2019, WRI modified 2019
 Image Source: ArcGIS Online, World Street Map

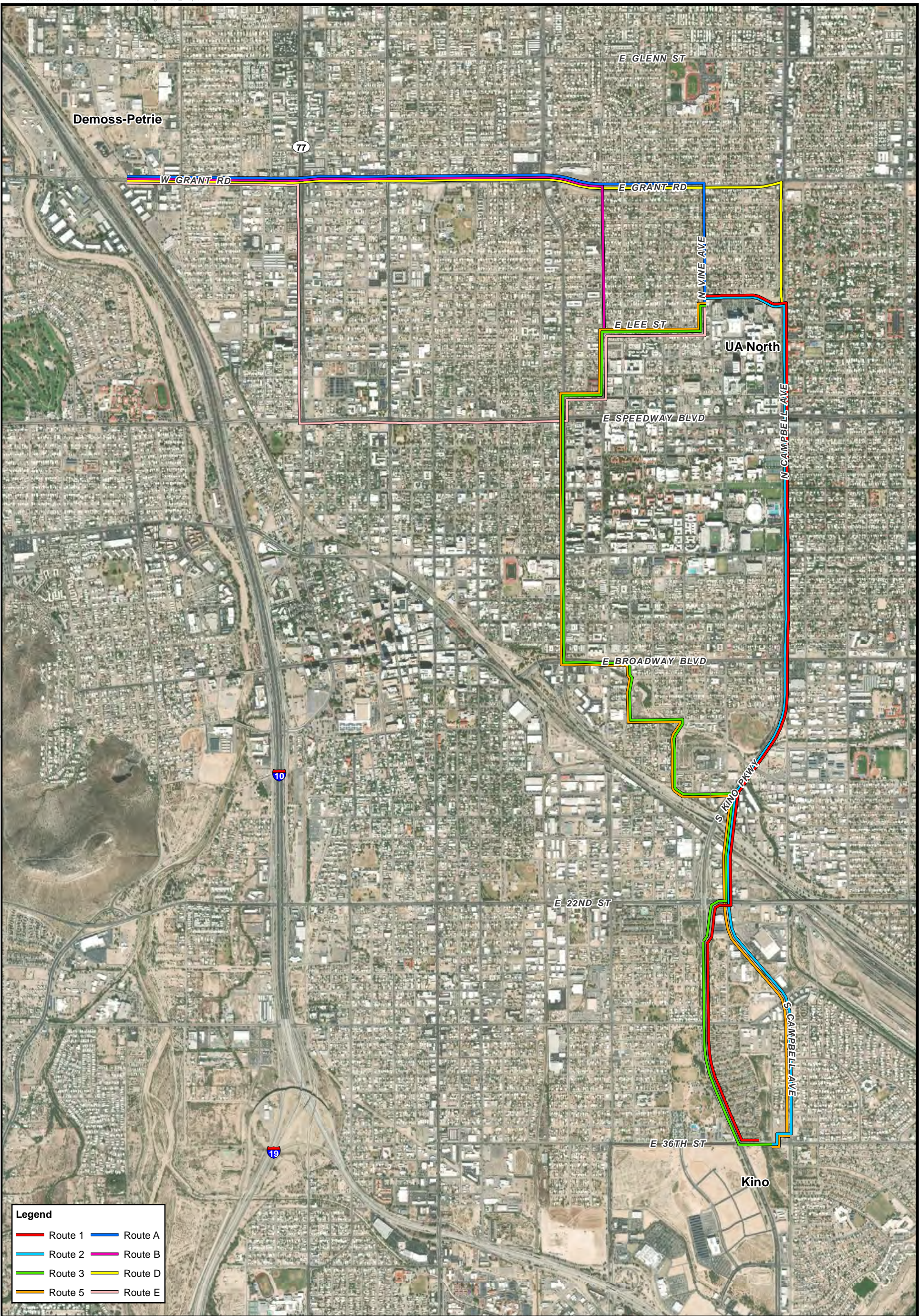
TUCSON ELECTRIC POWER CO.
Kino to DeMoss-Petrie 138-Kilovolt (kV)
Transmission Line Project
Visual Assessment

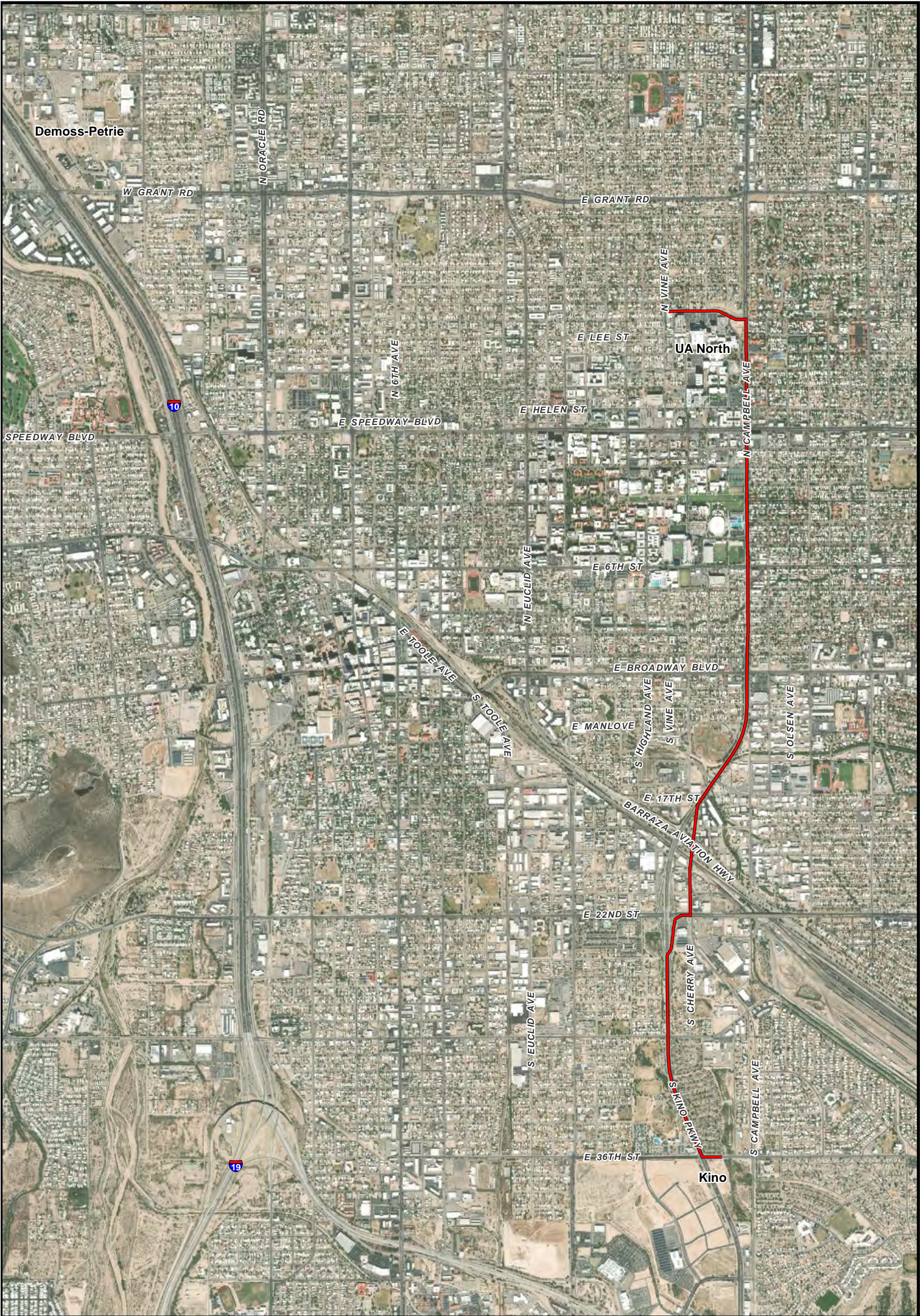
VICINITY MAP

Figure 1

WestLand Resources



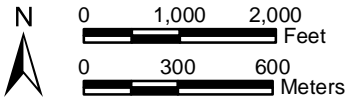




T14S, R14E, Portions of Sections 6, 7, 18 and 19,
Pima County, Arizona
Data Source: TEP
Image Source: ArcGIS Online, World Imagery 7-10-2019

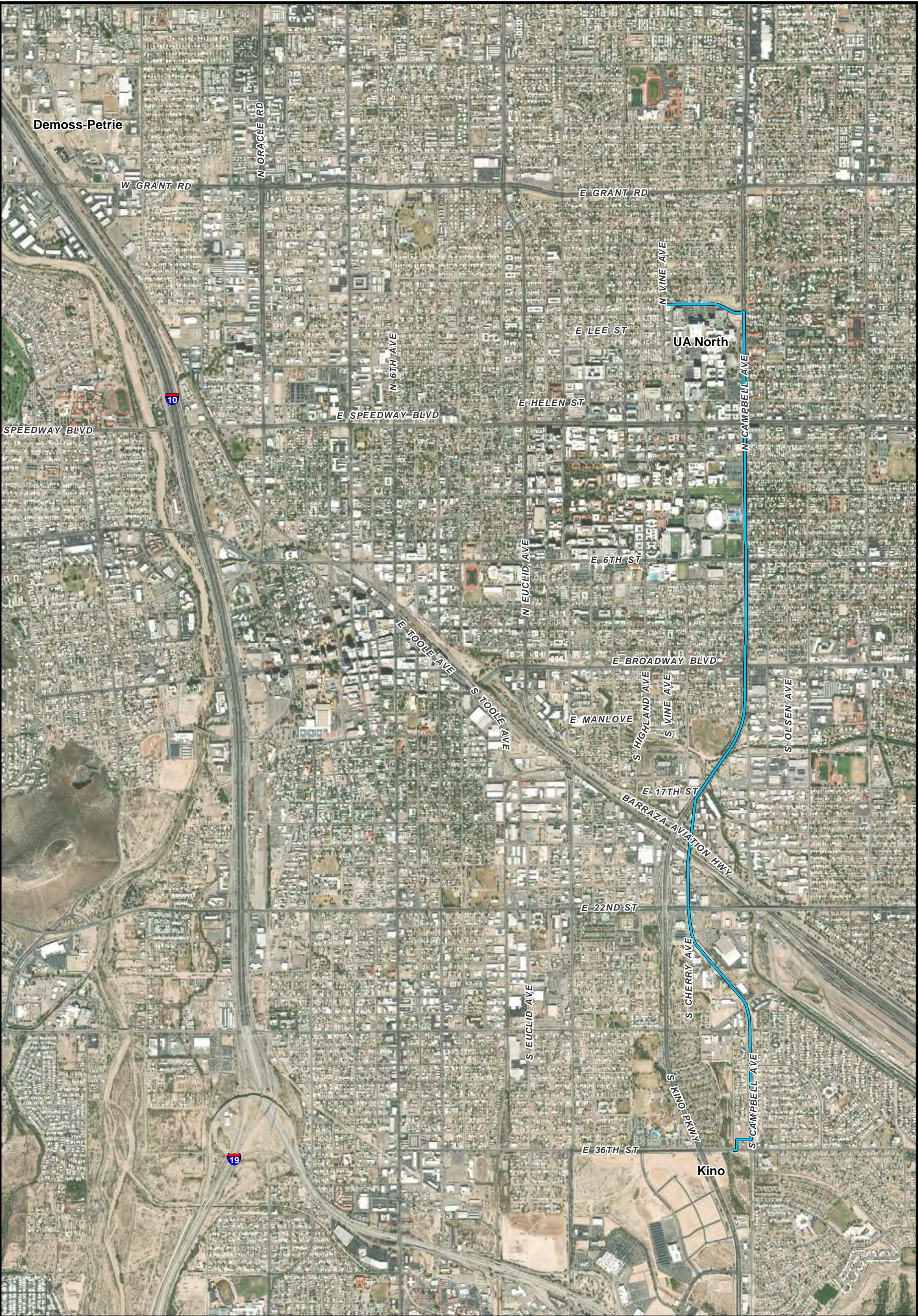
Legend

Route 1



TUCSON ELECTRIC POWER CO.
Kino to DeMoss-Petrie 138-Kilovolt (kV)
Transmission Line Project
Visual Assessment

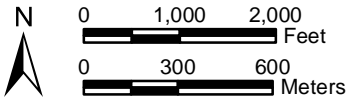
KINO SUBSTATION TO
NORTH UA PROPOSED SUBSTATION:
ROUTE 1
Figure 3



T14S, R14E, Portions of Sections 6, 7, 18 and 19,
Pima County, Arizona
Data Source: TEP
Image Source: ArcGIS Online, World Imagery 7-10-2019

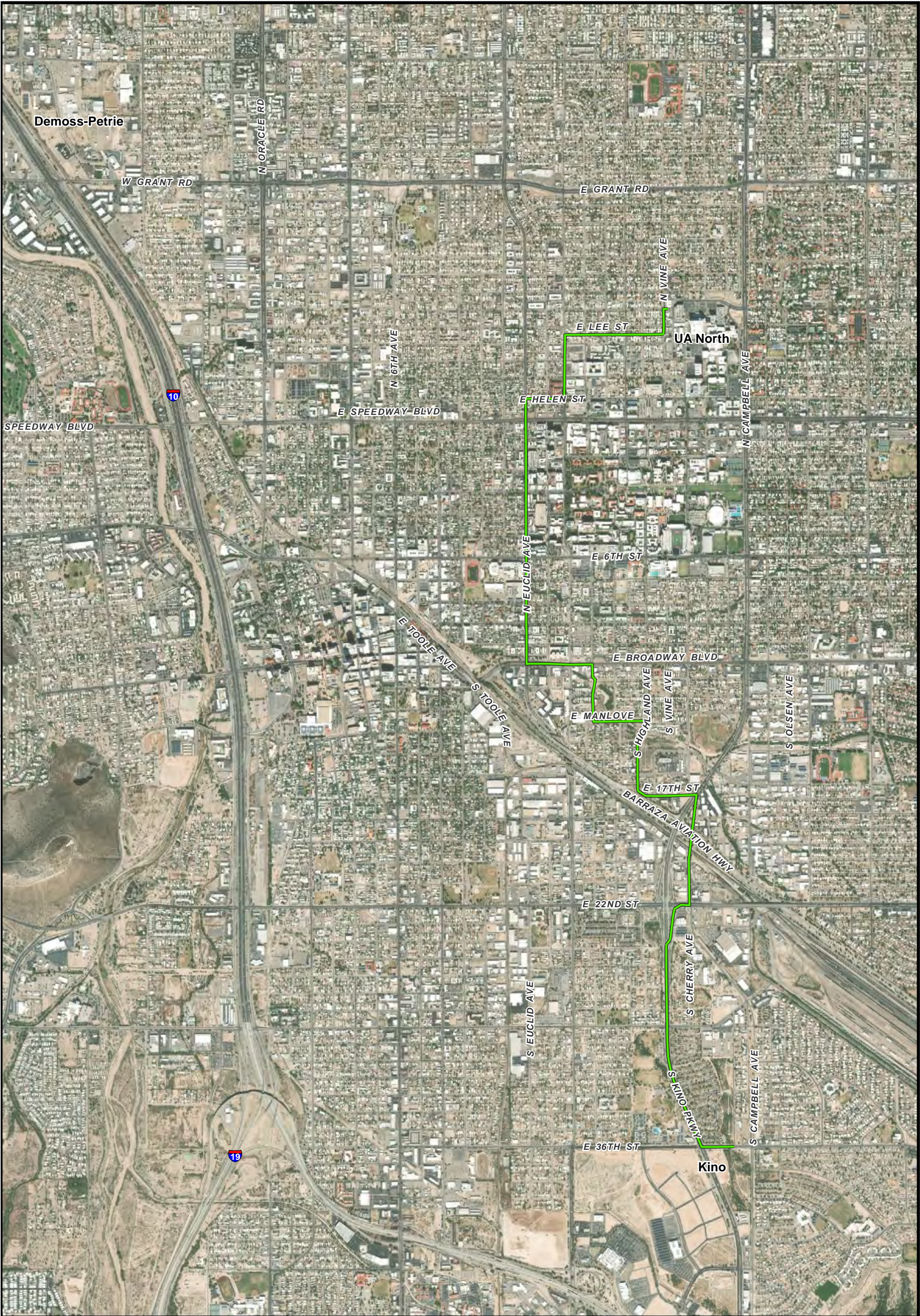
Legend

Route 2



TUCSON ELECTRIC POWER CO.
Kino to DeMoss-Petrie 138-Kilovolt (kV)
Transmission Line Project
Visual Assessment

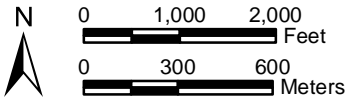
KINO SUBSTATION TO
NORTH UA PROPOSED SUBSTATION:
ROUTE 2
Figure 4



T14S, R14E, Portions of Sections 6, 7, 18 and 19,
Pima County, Arizona
Data Source: TEP
Image Source: ArcGIS Online, World Imagery 7-10-2019

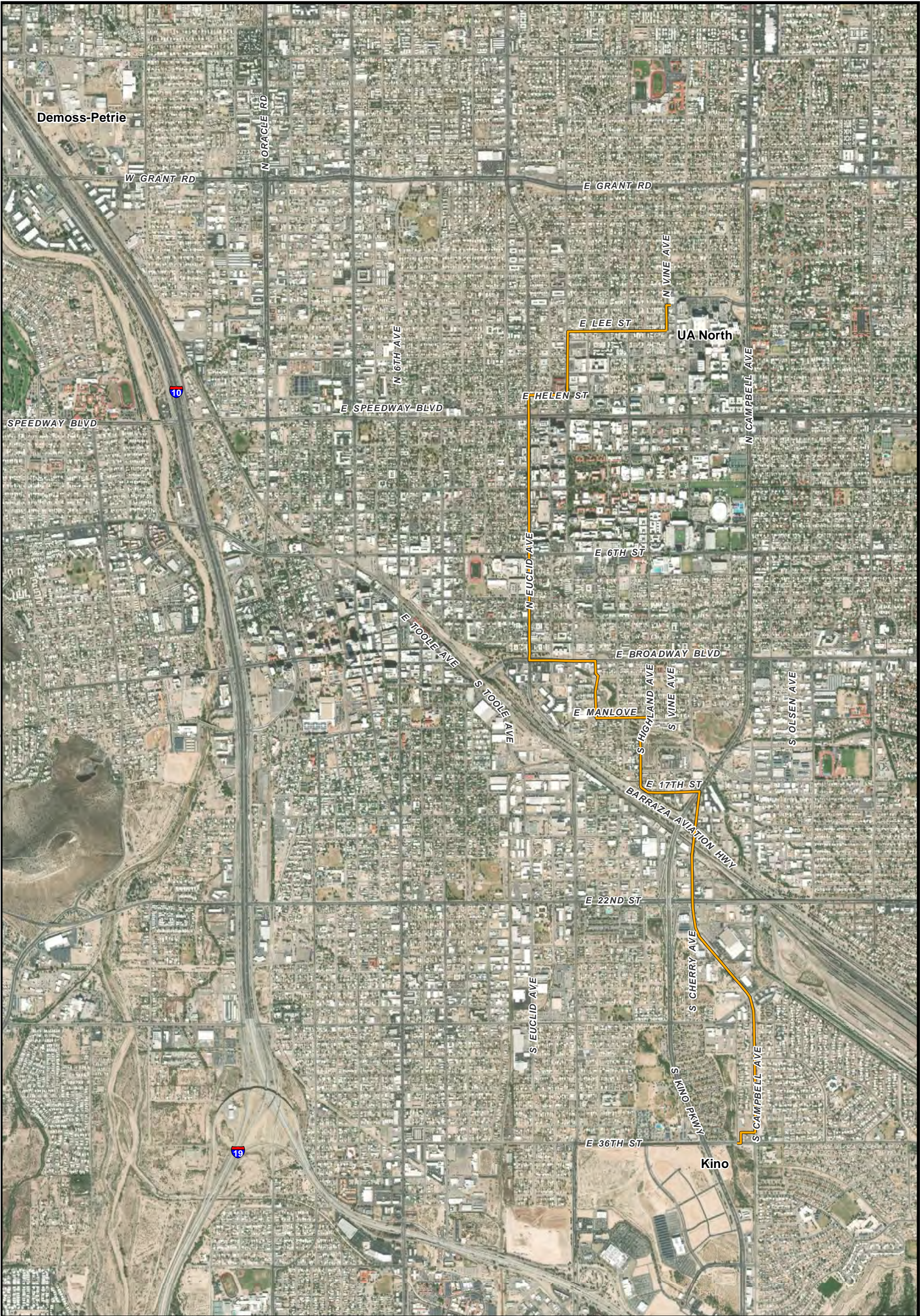
Legend

Route 3



TUCSON ELECTRIC POWER CO.
Kino to DeMoss-Petrie 138-Kilovolt (kV)
Transmission Line Project
Visual Assessment

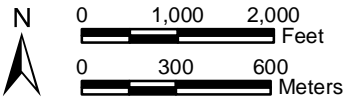
KINO SUBSTATION TO
NORTH UA PROPOSED SUBSTATION:
ROUTE 3
Figure 5



T14S, R14E, Portions of Sections 6, 7, 18 and 19,
Pima County, Arizona
Data Source: TEP
Image Source: ArcGIS Online, World Imagery 7-10-2019

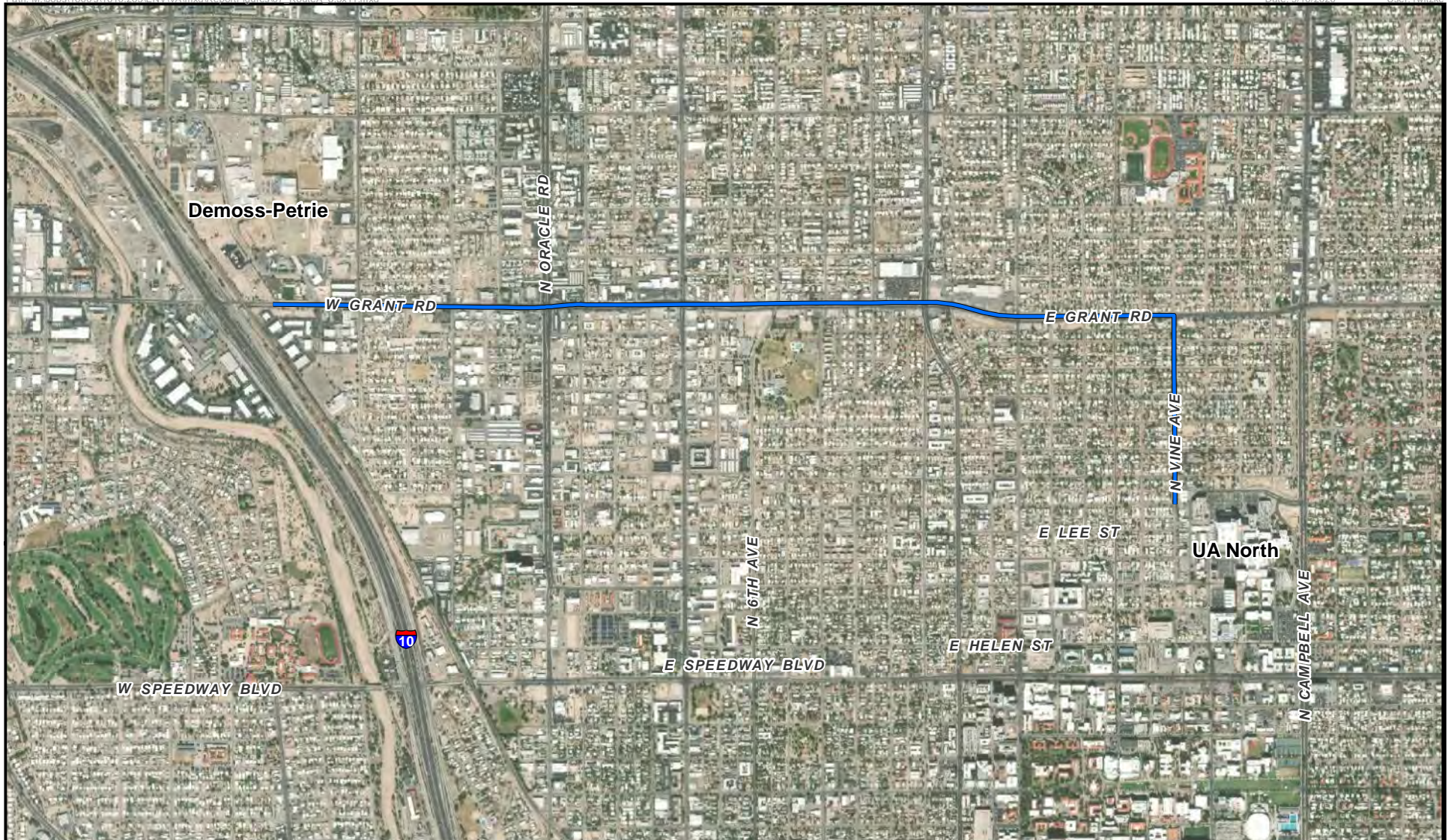
Legend

Route 5

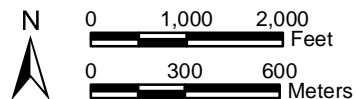
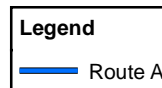


TUCSON ELECTRIC POWER CO.
Kino to DeMoss-Petrie 138-Kilovolt (kV)
Transmission Line Project
Visual Assessment

KINO SUBSTATION TO
NORTH UA PROPOSED SUBSTATION:
ROUTE 5
Figure 6

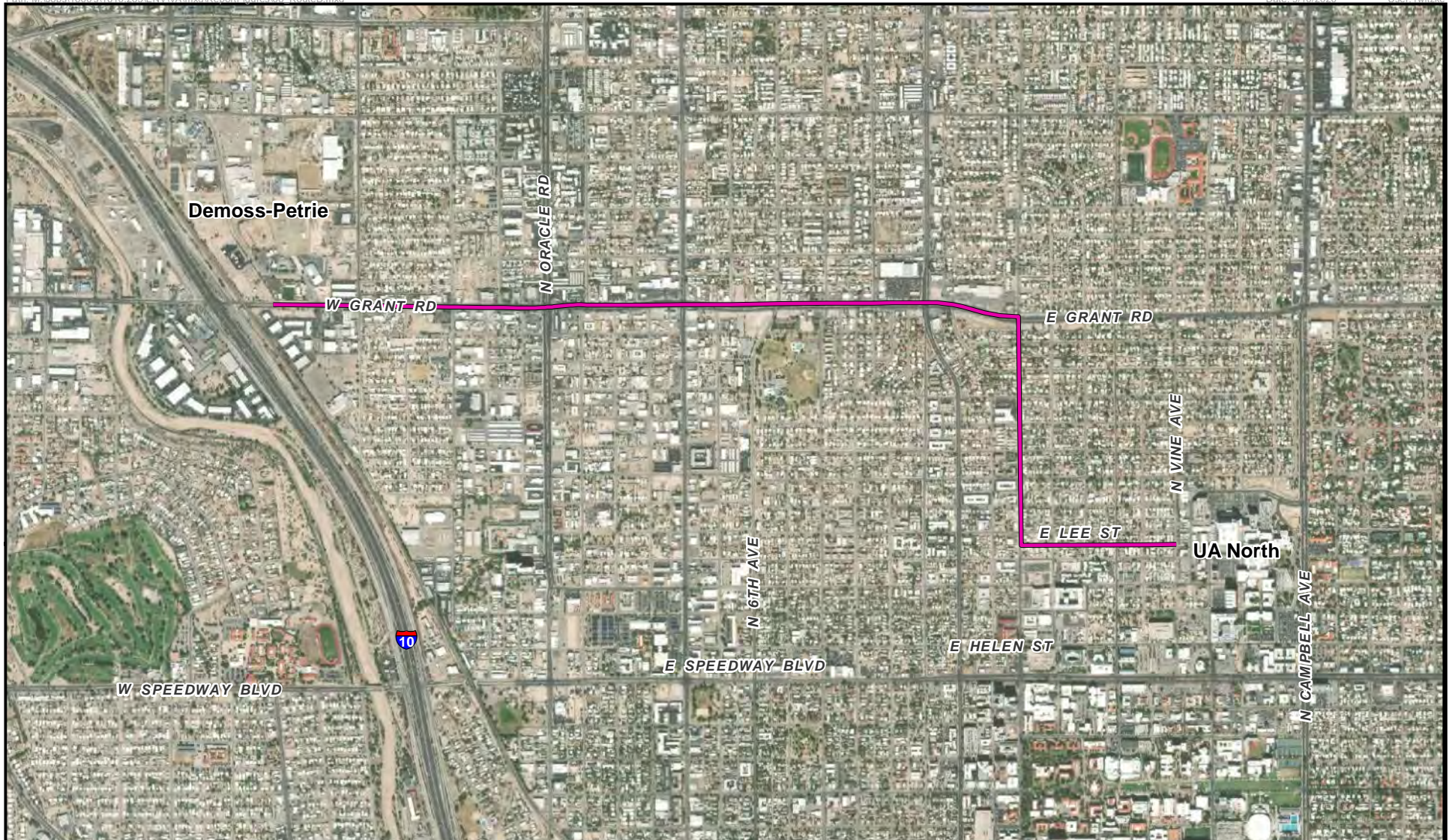


T14S, R13E, Portions of Sections 1 and 2,
T14S, R14E, Portion of Section 6,
Pima County, Arizona
Data Source: TEP
Image Source: ArcGIS Online, World Imagery 7-10-2019

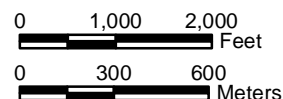


TUCSON ELECTRIC POWER CO.
Kino to DeMoss-Petrie 138-Kilovolt (kV)
Transmission Line Project
Visual Assessment

**NORTH UA PROPOSED SUBSTATION
TO DEMOSS-PETRIE SUBSTATION:
ROUTE A**
Figure 7

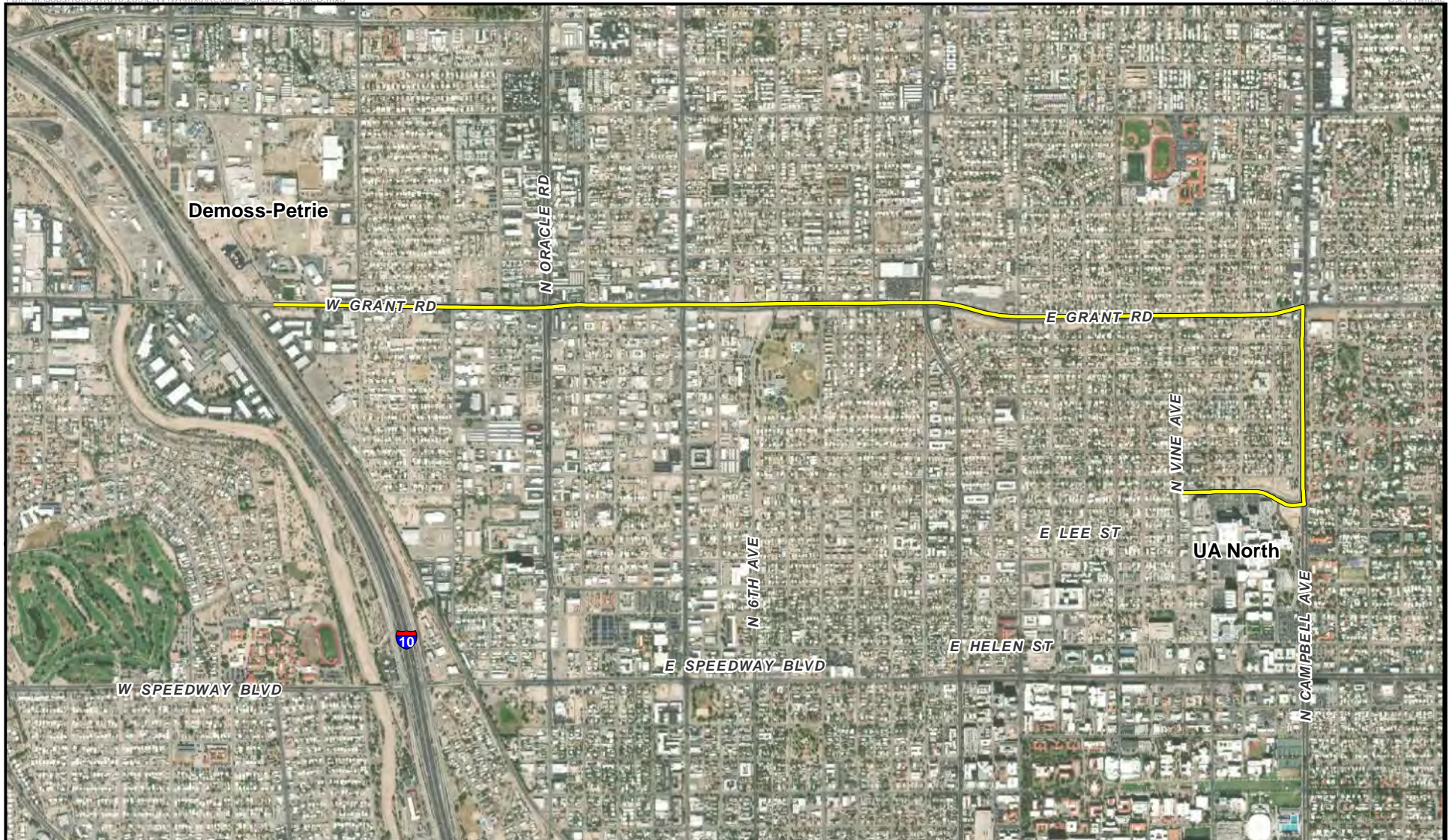


T14S, R13E, Portions of Sections 1 and 2,
T14S, R14E, Portion of Section 6,
Pima County, Arizona
Data Source: TEP
Image Source: ArcGIS Online, World Imagery 7-10-2019

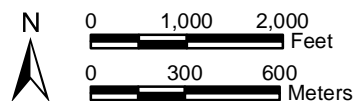
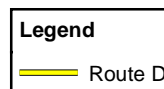


TUCSON ELECTRIC POWER CO.
Kino to DeMoss-Petrie 138-Kilovolt (kV)
Transmission Line Project
Visual Assessment

NORTH UA PROPOSED SUBSTATION
TO DEMOSS-PETRIE SUBSTATION:
ROUTE B
Figure 8

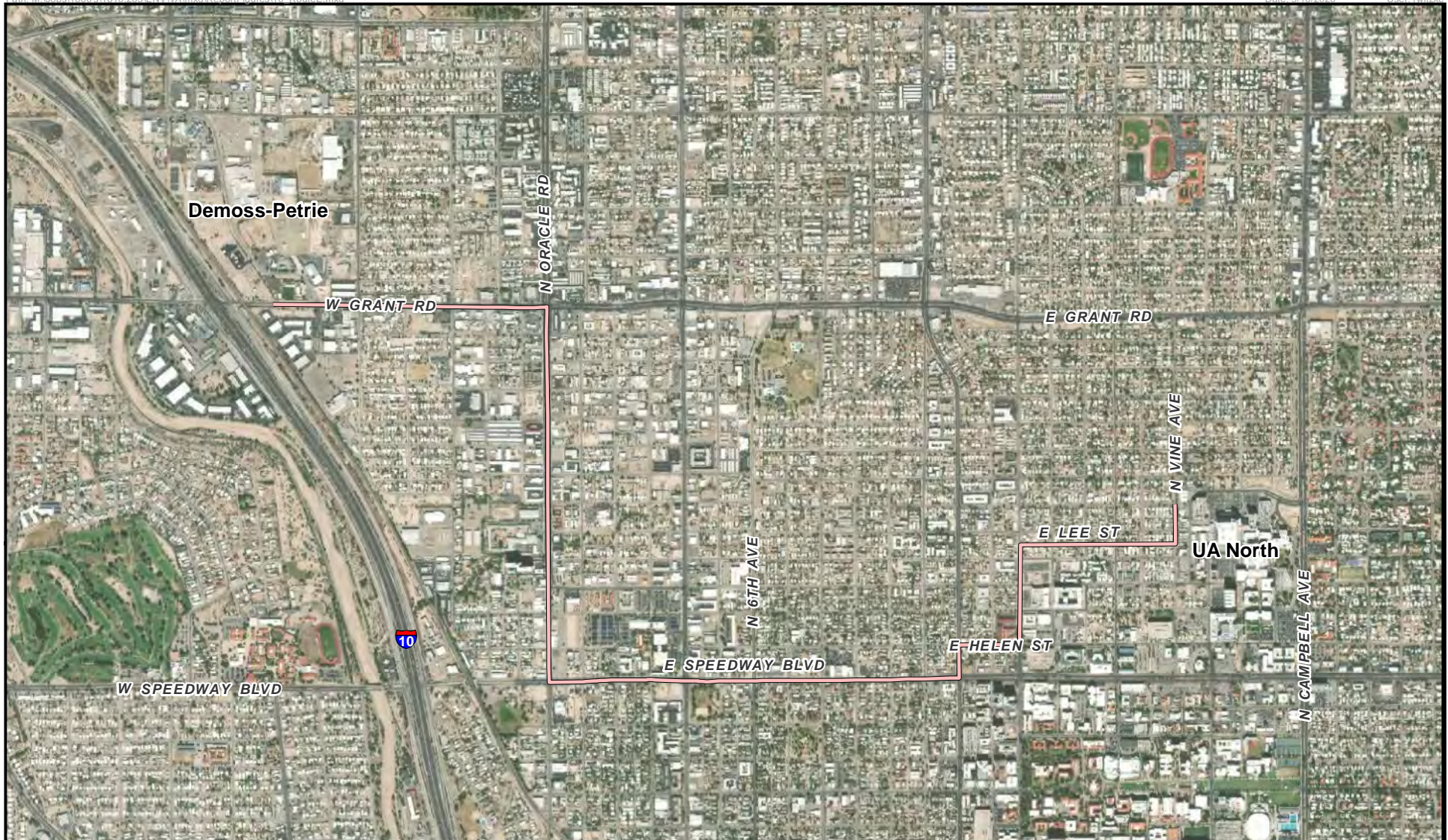


T14S, R13E, Portions of Sections 1 and 2,
T14S, R14E, Portion of Section 6,
Pima County, Arizona
Data Source: TEP
Image Source: ArcGIS Online, World Imagery 7-10-2019

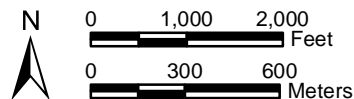
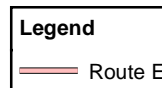


TUCSON ELECTRIC POWER CO.
Kino to DeMoss-Petrie 138-Kilovolt (kV)
Transmission Line Project
Visual Assessment

**NORTH UA PROPOSED SUBSTATION
TO DEMOSS-PETRIE SUBSTATION:
ROUTE D
Figure 9**



T14S, R13E, Portions of Sections 1 and 2,
T14S, R14E, Portion of Section 6,
Pima County, Arizona
Data Source: TEP
Image Source: ArcGIS Online, World Imagery 7-10-2019



TUCSON ELECTRIC POWER CO.
Kino to DeMoss-Petrie 138-Kilovolt (kV)
Transmission Line Project
Visual Assessment

**NORTH UA PROPOSED SUBSTATION
TO DEMOSS-PETRIE SUBSTATION:
ROUTE E
Figure 10**

EXHIBITS

Exhibit 1. Visual Impact Values by Segment

SOUTHERN ALTERNATIVE ROUTES: 138 kV Line from Kino Substation to Planned UA North Substation

Alternative 1							
Segment	S-1	S-2	S-3	S-4	S-5	S-6	S-7
Visual Impact Value	1.25	3.00	2.00	1.25	1.00	2.25	3.00
Average Value	1.96						

Alternative 2								
Segment	S-8	S-9	S-2	S-3	S-4	S-5	S-6	S-7
Visual Impact Value	1	3	3	2	1.25	1	2.25	3
Average Value	2.06							

Alternative 3											
Segment	S-1	S-2	S-10	S-11	S-12	S-13	S-14	S-15	S-16	S-17	S-18
Visual Impact Value	1.25	3	1.5	2.5	2.5	2.5	2.5	2	3	3	3
Average Value	2.43										

Alternative 5												
Segment	S-2	S-8	S-9	S-10	S-11	S-12	S-13	S-14	S-15	S-16	S-17	S-18
Visual Impact Value	3	1	3	1.5	2.5	2.5	2.5	2.5	2	3	3	3
Average Value	2.46											

NOTHERN ALTERNATIVE ROUTES: 138 kV Line from Planned UA North Substation to DeMoss Petrie Substation

Alternative A				
Segment	N-1	N-2	N-3	N-4
Visual Impact Value	1.25	3	3	3
Average Value	2.56			

Alternative B				
Segment	N-3	N-4	N-5	N-6
Visual Impact Value	3	3	3	3
Average Value	3.00			

Alternative D						
Segment	N-2	N-3	N-4	N-7	N-8	N-9
Visual Impact Value	3	3	3	3	1.25	2
Average Value	2.54					

Alternative E									
Segment	N-5	N-10	N-11	N-12	N-13	N-14	N-15	N-16	N-4
Visual Impact Value	3	3	2	2.5	2.5	2	3	1	3
Average Value	2.44								

Kino to DeMoss-Petrie Transmission Line Project

TEP
Tucson Electric Power

Pole Characteristics

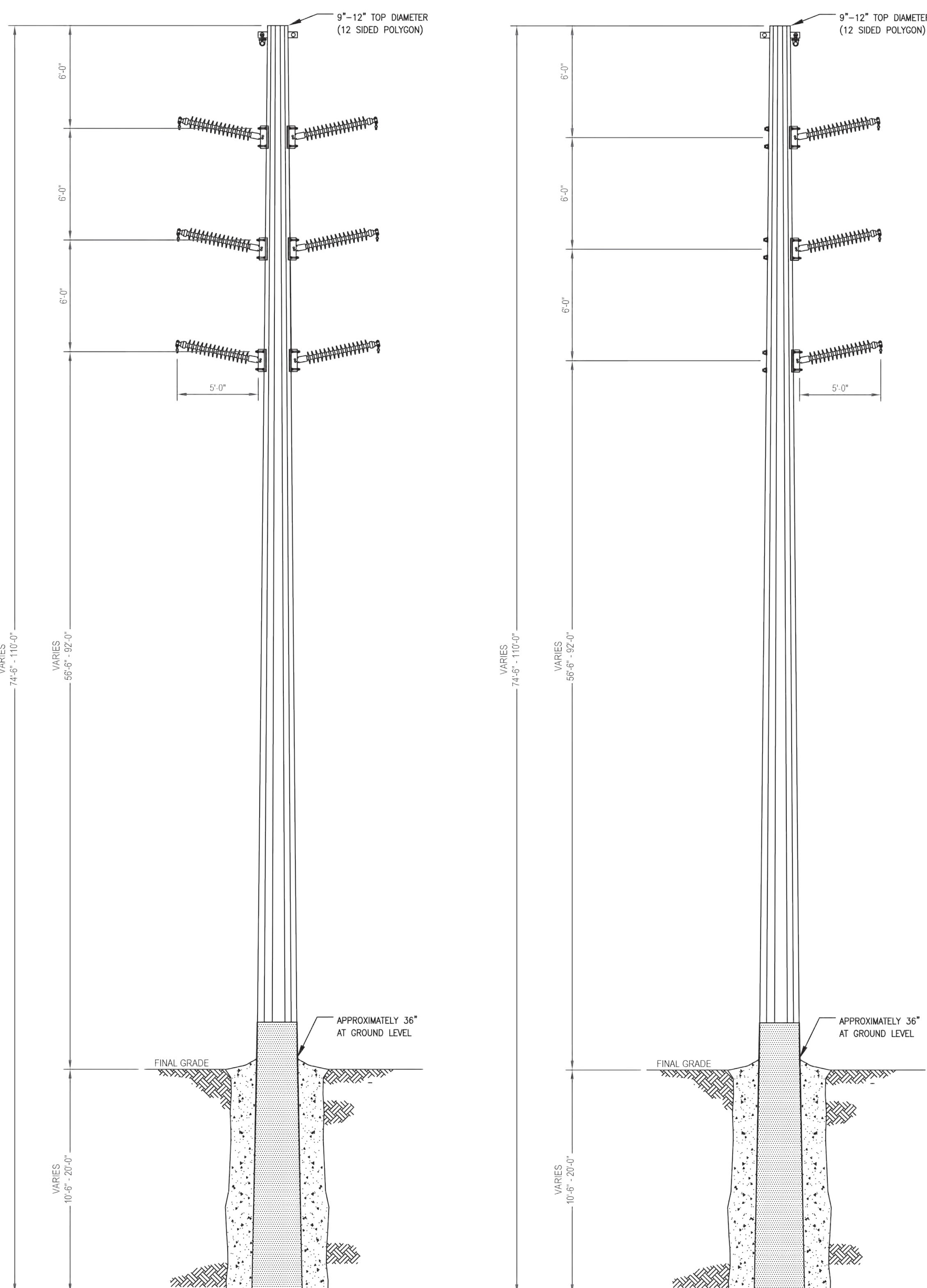
Type: Tubular weathering steel monopoles

Pole height: Typically 75-110 feet

Span length: 600-1,000 feet
(distance between poles)

Poles per mile: 5-9 Structures

Right of way width: Up to 100 feet



A typical weathering steel monopole supporting a 138 kilovolt transmission line

ATTACHMENT I
Representative
Photographs of
Each Alternative
Routes



Photo 1. View north on S. Kino Blvd from E 36th St. (Segment S-1)



Photo 3. View north on S. Kino Blvd across E. Silverlake Rd. (Segment S-1)



Photo 2. View south on S. Kino Blvd from E. Silverlake Rd. (Segment S-1)



Photo 4. View north on S. Cherry Ave. from E. 21st St. (Segment S-2)



Photo 5. View north on Campbell Ave. from E. Broadway Blvd (Segment S-4)



Photo 7. View north on Campbell Ave. from Speedway Blvd (Segment S-6)



Photo 6. View north on Campbell Ave. from E 6th St. (Segment S-6)



Photo 8. View east on Elm St. from approx. location of planned UA North Substation (Segments S-7 and N-7)



Photo 9. View north on northbound S. Campbell Ave from E 36th St.
(Segment S-8)



Photo 10. View south on northbound S. Campbell Ave from E Silverlake Rd.
(Segment S-8)



Photo 11. View northwest on S. Cherrybelle Strav. from E. Silverlake Rd.
(Segment S-9)



Photo 12. View east on E. 17th St. from Highland Ave. (Segment S-10)



Photo 13. View north on S. Highland Ave. from 17th St. (Segment S-10)



Photo 15. View west from Highland at the end of Manlove St. (Segment S-10)



Photo 14. View southwest on Highland Ave. from Manlove St. (Segment S-10)



Photo 16. View north on N. Euclid Ave. from Broadway Blvd (Segment S-12)



Photo 17. View north on Euclid Ave. from 6th St. toward Tucson High School (Segment S-12)



Photo 19. View west on Helen St. from Park Ave. (Segment S-15 and N-11)



Photo 18. View south on Euclid Ave. from University Blvd (Segment S-13)



Photo 20. View north on Park Ave. from just south of Lee St. (Segments S-16, N-6 and N-10)



Photo 21. View west on alley between E. Adams St. and E. Lee St. from N. Vine Ave. (Segment S-17 and N-5)



Photo 22. View west on alley between E. Adams St. and E. Lee St. (Segment S-17 and N-5)



Photo 23. View north on N. Vine Ave., north of E Adams St. (Segments S-18 and N-1)



Photo 24. View east on E. Grant Rd. from N. Park Ave. (Segment N-2)



Photo 25. View west on E. Grant Rd. at N. Park Ave. (Segment N-3)



Photo 26. View east on E. Grant Rd. and N. Stone Ave. (Segment N-4)



Photo 27. View east on E. Grant Rd. at N. Flowing Wells Rd. (Segment N-4)



Photo 28. View west on E. Grant Rd. near I-10 and Demoss-Petrie Substation (Segment N-4)



Photo 29. View south on N. Campbell Ave. from E Grant Rd. (Segment N-8)



Photo 31. View east on Speedway Blvd. from N 6th Ave. (Segment N-13)



Photo 30. View west on E. Speedway Blvd from N. Euclid Ave. (Segment N-13)



Photo 32. View west on E. Speedway Blvd from N 6th Ave. (Segment N-13)



Photo 33. View north on N. Main Ave. at W Speedway Blvd (Segment N-15)



Photo 35. View south on N. Oracle Rd. from W. Grant Rd. (Segment N-16)



Photo 34. View north on N. Oracle Rd. north of W Drachman St. (Segment N-16)