Application for a Certificate of Environmental Compatibility

Irvington to East Loop

138 Kilovolt Transmission Line Project

Prepared for:

Arizona Power Plant and
Transmission Line Siting Committee

Submitted by:

Tucson Electric Power Company

Date: January 15, 2020
Case No. 186

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BEFORE THE
ARIZONA POWER PLANT AND TRANSMISSION LINE SITING COMMITTEE

In the matter of the Application of Tucson Electric Power Company, in conformance with the requirements of A.R.S. § 40-360, *et seq*., for a Certificate of Environmental Compatibility authorizing the Irvington to East Loop 138 kilovolt (kV) Transmission Line Project, which includes the construction of new 138 kV transmission lines originating at the Irvington Substation (Section 03, Township 15 South, Range 14 East), with an interconnection at the Port Substation (Section 18, Township 15 South, Range 15 East) and the Patriot Substation (Section 31, Township 14 South, Range 15 East), and terminating at the East Loop Substation (Section 08, Township 14 South, Range 15 East), each located within Pima County, Arizona.	Docket No. E-01933A- Case No. 186

APPLICATION FOR

CERTIFICATE OF ENVIRONMENTAL COMPATIBILITY

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LIST OF ACRONYMS AND ABBREVIATIONS

3d	3-dimensional
A	Amperes
ACC	Arizona Corporation Commission
ADA	Americans with Disabilities Act
ADOT	Arizona Department of Transportation
AM	Amplitude modulation
AMARG	Aerospace Maintenance and Regeneration Group
AN	Audible noise
A.R.S.	Arizona Revised Statutes
ASLD	Arizona State Land Department
ASM	Arizona State Museum
AZDA	Arizona Department of Agriculture
AZGFD	Arizona Game and Fish Department
BE	Biological Evaluation
"Boneyard"	DMAFB AMARG
CEC	Certificate of Environmental Compatibility
Committee	Arizona Power Plant and Transmission Line Siting Committee
COT	City of Tucson
dBA	A-weighted decibels
DMAFB	Davis-Monthan Air Force Base
DOD	Department of Defense
EMF	Electric and Magnetic Fields
ESA	Endangered Species Act
^{o}F	Degrees Fahrenheit
FAA	Federal Aviation Administration
FCC	Federal Communications Commission
FEMA	Federal Emergency Management Agency

FHWA	Federal Highway Administration
FIRM	Flood Insurance Rate Maps
FM	Frequency modulation
GIS	Geographic Information System
HCP	Habitat Conservation Plan
HDMS	Heritage Data Management System
I-10	Interstate 10
IPaC	Information for Planning and Consultation
IRA	Important Riparian Area
KOP	Key Observation Point
kV	Kilovolts
MBTA	Migratory Bird Treaty Act
mG	Milliguass
NRHP	National Register of Historic Places
NWP	Nationwide Permit
PAD	Planned Area Development
Port	Port of Tucson
Project	Irvington to East Loop 138 kV Transmission Line Project
PVS	Priority Vulnerable Species
ROW	Right-of-way
RTA	Regional Transportation Authority
RWRD	Regional Wastewater and Reclamation Department
SDCP	Sonoran Desert Conservation Plan
SGCN	Species of Greatest Conservation Need
SR	State Route
SWAP	State Wildlife Action Plan
TDOT	Tucson Department of Transportation
TEP	Tucson Electric Power Company
TIA	Tucson International Airport
UPRR	Union Pacific Railroad

USACE	U.S. Army Corps of Engineers
USAF	U.S. Air Force
USFWS	U.S. Fish and Wildlife Service
V	Volts

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A. INTRODUCTION

Tucson Electric Power Company (TEP) submits this application for a Certificate of Environmental Compatibility (CEC) granting authority to construct the Irvington to East Loop 138 kilovolt (kV) Transmission Line Project (Project).

A.1 PROJECT PURPOSE AND NEED

The Project will provide increased transmission capacity which will improve reliability, enable and enhance TEP's ability to respond to future load growth, provide contingency support to existing distribution substations, assist Davis-Monthan Air Force Base (DMAFB) in fulfilling the Department of Defense (DOD) directive for enhancing energy resiliency, and over time allow replacement of part of the existing aging 46 kV system serving the area. The existing electrical infrastructure does not provide sufficient capacity to serve future load growth, and needs to be enhanced to provide DMAFB the resiliency it needs in order to fulfill the DOD mandate.

A.2 PROJECT OVERVIEW

The Project will consist of building a new 138 kV transmission line totaling approximately 11 to 13 miles in length, depending on the alternative approved, to connect the existing Irvington Substation to the existing East Loop Substation. The Project will interconnect to the planned Port 138 kV Substation and to the planned Patriot 138 kV Substation.[1] The Project will cross private, City of Tucson (COT), and Pima County-owned land, as well as COT and Pima County road right-of-way (ROW). TEP is requesting a 300-foot corridor for the Preferred Route, to allow for siting flexibility.

The Project will consist of two (2) distinct portions – a southern portion and a northern portion. The southern portion will connect the existing Irvington Substation to the planned Patriot Substation. Two alternatives were investigated for this portion. However, through the public and stakeholder outreach process, one alternative was eliminated from consideration. As a result, one (1) route is being proposed for approval for the southern portion. Part of the southern portion, which is approximately one-mile long, will be constructed as a double-circuit line, with one circuit energized at 138 kV and the other at 46 kV. The length of the southern portion of the Project is approximately 7 miles.

The northern portion of the Project will connect the planned Patriot Substation to the existing East Loop Substation. Multiple route possibilities were identified for the northern portion of the Project. These alternatives are described in further detail in *Section B.1-4-v*. The length of the northern portion of the Project depends on the alternative, and ranges from approximately 4.13 to 5.72 miles. All of the northern alternatives use existing transmission corridors to some degree. In these areas, existing transmission lines would be temporarily de-energized, and transferred onto the newly erected structures. Those portions of the Project will be constructed and energized as double-circuit 138 kV or 138 kV and 46 kV transmission lines, depending on the northern alternative approved. The old structures would later be removed.

[1] Approval to construct Patriot Substation will be obtained from the City of Tucson (COT).

A.3 ENVIRONMENTAL STUDIES AND ROUTE SELECTION PROCESS OVERVIEW

TEP undertook a comprehensive planning process to identify environmentally compatible routes for the Project. As described thoroughly in Exhibit B, TEP implemented the process in sequential steps. This planning process started with the determination of the preliminary study area, continued with an analysis of opportunities and constraints, which evaluated potential locations of the transmission line and related facilities. The intent of this analysis was the identification of opportunities for locating the line, such as paralleling or using existing transmission line corridors, other linear features, and the avoidance of sensitive areas where locating the Project could have especially high impacts on land use, and biological, cultural, and/or visual resources. Next, TEP identified preliminary segments or 'links' that could comprise part of a route for the Project. TEP examined in greater detail the overall impact the Project would have on these resources. This research included field visits and review of relevant land use planning documents.

This approach enabled TEP to consider a broad range of alternative transmission line locations at the beginning of the process. The Company's analysis focused on environmental and land use impacts, public and stakeholder comments, and construction feasibility prior to TEP identifying final alternative transmission line routes. The result of this process was the identification of one preferred route and two alternative routes that minimized public and agency concerns and environmental impact as compared to the other potential routes, while still meeting TEP's system requirements, constructability, and cost considerations.

A.4 PUBLIC INVOLVEMENT OVERVIEW

Public participation is a vital part of TEP's environmental planning process, therefore comprehensive public involvement and communications activities were conducted as a part of the Project. These activities started in May 2019 with efforts to notify and inform the public, agencies, community leaders, and other affected stakeholders about the need and benefits of the Project. These public involvement activities lasted through September 2019. Public participation activities – including two stakeholder group meetings, two open houses, and meetings with the COT, Pima County, and various agencies – were employed to gather feedback on the proposed segments and the Project at large. TEP also gathered information regarding constraints associated with engineering feasibility, ROW availability, and associated costs. Using all of this information, a set of preliminary routes was developed.

Throughout the planning process, the public and stakeholders were given opportunities to provide comments through various methods. Two newsletters were mailed to provide information and receive feedback on the Project, and to announce the public open houses held at various stages in the process. A telephone information line and a webpage with an online comment form were used to help communicate information and receive comments. Exhibit J contains additional details of TEP's outreach for the Project.

A.5 NEED AND COMPATIBILITY

This application balances, all relevant matters in the broad public interest, including the need for an adequate, economical, and reliable supply of electric power, with the desire to minimize impacts on the environment and ecology of the state of Arizona. The Project will greatly enhance the reliability of the Company's electric grid. The Project will result in no adverse impacts on factors to be considered by the

Arizona Power Plant and Transmission Line Siting Committee (Committee) pursuant to Arizona Revised Statute (A.R.S.) §§ 40-360.06 and 40-360.13, including, but not limited to, existing land use plans; fish, wildlife, and plant life; areas unique because of biological wealth; scenic areas, historic sites and structures and archaeological sites; as well as the total environment of the area. As such, TEP respectfully requests that the Committee grant, and the Arizona Corporation Commission (ACC) approve the requested CEC for the Project.

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B. APPLICATION FOR CERTIFICATE OF ENVIRONMENTAL COMPATIBILITY

(Pursuant to A.R.S. §§ 40-360.03 and 40-360.06)

B.1 Project Information

1. *Name and address of Applicant:*
   Tucson Electric Power Company
   88 East Broadway Blvd, Tucson, AZ 85701
   PO Box 711, Tucson, AZ 85702

2. *Name, address and telephone number of a representative of Applicant who has access to technical knowledge and background information concerning this application, and who will be available to answer questions or furnish additional information:*
   Ed Beck
   Director, Transmission Development
   Tucson Electric Power Company
   88 East Broadway Blvd, Tucson, AZ 85701
   PO Box 711, Tucson, AZ 85702
   Phone: (520) 745-3196

3. *Dates on which Applicant filed a Ten-Year Plan in compliance with A.R.S. § 40-360.02, and designate each such filing in which the facilities for which this application is made were described. If they have not been previously described in a Ten-Year Plan, state the reasons therefore:*
   The Project was first identified in TEP's Ten-Year Plan Transmission Project for Years 2019-2028, filed in January 2019 under Docket No. E-00000D-19-0007. The Project was identified as two separate Planned High Voltage Transmission Projects. The first project was identified as "Irvington 138-kV Substation – Future Davis Monthan 138-kV Substation Transmission line". The second project was identified as "Future Davis Monthan 138-kV Substation – East Loop 138kV Substation Transmission Line". The Davis Monthan Substation has since been renamed to the Patriot Substation. The Project has not been identified in previous Ten-Year Plan filings.

4. *Description of transmission line:*
   i. *Nominal voltage for which the lines are designed; description of the proposed structures and switchyards or substations; purpose for constructing:*
      Nominal Voltage

      The southern portion of the line will contain two voltages for an approximate one-mile portion of the line. The nominal voltages will be 46 kV and 138 kV.

The nominal voltage of the single-circuit and double-circuit transmission lines for the northern portion of the Project is 138 kV. If Alternative A is selected, the segment between Escalante and Golf Links may be 46/138 kV double-circuit.

Description of Structures

The transmission line structures will be designed to accommodate up to two circuits of 138 kV transmission. However, they will be constructed with only one circuit of 138 kV unless specified otherwise. The structures will be tubular, self-weathering steel monopole structures and the conductor will have a non-specular finish to reduce visibility. The structures will typically be 75 to 110 feet above ground. Depending on the route selected, taller structures may be required for site specific clearance issues, such as spanning the DMAFB airplane bridge over Kolb Road. The average span length between structures will be approximately 650 feet.

Description of Substation and Switchyards

The Project originates at the existing Irvington 138 kV Substation and connects to the planned Patriot 138 kV Substation terminating at the existing East Loop 138 kV Substation.

A future substation, the planned Port Substation will be located on private land near South Kolb and East Valencia roads at the Port of Tucson (Port), an intermodal inland shipping and storage facility supporting the transportation of goods throughout the southwest. The planned substation will support increased energy demands and economic growth in the area. An in-service date has not been determined. The substation will be located on a 10-acre parcel.

The planned Patriot 138 kV Substation will be located on land owned by the COT, on the southwest corner of Escalante Road and Kolb Road. This site is in the northeastern corner of the DMAFB 309th Aerospace Maintenance and Regeneration Group (AMARG), an aircraft and missile storage and maintenance facility also known as the "Boneyard." The new substation would help DMAFB meet DOD-mandated energy resiliency directives, replace aging infrastructure near the end of its useful life and strengthen electric reliability for customers in the area. The substation is scheduled to be in service by the end of 2022. The substation will be located on an approximately 16-acre parcel.

See Exhibits G-1 through G-4 for typical structures; and Exhibit G-5 for visual simulations of the transmission line.

Project Purpose

The purpose of the Project is to provide increased transmission capacity, which will improve reliability, serve future load increases, enable and enhance TEP's ability to respond to future load growth, provide contingency support to existing distribution substations, assist DMAFB in fulfilling the DOD directive for enhancing energy resiliency, and over time allow replacement of part of the existing aging 46 kV system serving the

area. The Project will also assist TEP in meeting its obligation to provide reliable and affordable electrical power to customers within its service territory.

ii. Description of geographic points between which the transmission line will run; Straight-line distance between such geographic points; Length of the transmission line for each alternate route:

Description of Geographic Points

The southern portion of the Project will run southeast from the existing Irvington Substation to Littletown Road, and then east to Kolb Road. The line will then run almost due north along Kolb Road to the planned Patriot Substation at the southwest corner of Escalante and Kolb Roads.

The northern portion of the Project will run north from the planned Patriot Substation to the existing East Loop Substation southeast of the intersection of Speedway Boulevard and Kolb Road.

Straight-line Distance

The straight-line distance from the existing Irvington Substation to the planned Patriot Substation is approximately 3.74 miles (southern portion of the Project).

The straight-line distance from the planned Patriot Substation to the existing East Loop Substation is approximately 3.65 miles (northern portion of the Project).

Length of Transmission Line Alternatives

The distances of the transmission line alternatives are shown in Table 1:

Table 1. Alternative Distances

ALTERNATIVE	DISTANCE (MILES)
SOUTHERN TRANSMISSION LINES	
Alternative 1	7.06
NORTHERN TRANSMISSION LINE	
Alternative A	4.13
Alternative B2	5.72
Alternative C1	5.03

iii. Nominal width of right-of-way required; nominal length of span; typical height of supporting structures above ground; minimum height of conductor above ground:

Nominal Width of Right-of-Way

In areas not covered by existing franchise agreements, the applicant plans to acquire a 100-foot wide ROW.

Nominal Length of Span

The nominal length of span is approximately 650 feet.

Typical Height of Supporting Structures

Supporting structures typically will range from 75 feet to 110 feet for the transmission lines.

Minimum Height of Conductor

The minimum height of the 138 kV transmission line conductor above existing grade will be 25 feet.

iv. Estimated costs of the proposed transmission line and route:

Estimates for the routes are shown in Table 2. Variations in cost depend upon length of construction and quantity of materials required, as well as mitigation of existing conflicts and acquisition of land rights. The total Project cost is anticipated to range between $17.8-19.8 million, depending on which alternative is selected. Note that the construction and materials costs shown include (as required) the wreck out of existing transmission and distribution lines, relocation of existing distribution to underground, and construction of new transmission.

Table 2. Estimated Costs by Alternative*

ALTERNATIVE	CONSTRUCTION AND MATERIALS ($ MILLION)	LAND ACQUISITION ($ MILLION)	TOTAL COST ($ MILLION)
Alternative A	$ 12,474	$ 5,379	$ 17,853
Alternative B2	$ 13,973	$ 5,009	$ 18,982
Alternative C1	$ 13,089	$ 6,789	$ 19,878

*Combined cost of Alternative 1 and each lettered alternative.

v. Description of proposed route and switchyard locations. (If application contains alternative routes, list routes in order of applicant's preference with a summary of reasons for such order of preference and any changes such alternative routes would require in the plans reflected in (i) through (iv) hereof):

Description of Proposed Routes:

Southern portion (Irvington to Port to Patriot, Alternative 1)

NOTE: This portion of the Project is common to all alternatives, and going forward is combined with the northern alternatives.

- Alternative 1 begins at the existing Irvington Substation and continues southeast on the north side of the Union Pacific Railroad (UPRR) tracks past East Valencia Road and South

Craycroft Road to the Littletown Road alignment. The route continues east on Littletown Road, adjacent to planned Port Substation and then continues east to the east side of South Kolb Road. Turning north, the route continues to East Irvington Road, where it crosses to the west side of Kolb Road and continues north to the planned Patriot Substation.

- A portion of this route (approximately one-mile) will be constructed with two circuits, with one circuit energized at 138 kV and the other at 46 kV. The remaining length of the single-circuit 138 kV structures is approximately 6.18 miles (see Exhibit A-3).

Northern portion (Patriot to East Loop, Alternatives B2, A, and C1)

- **Alternative B2 (Preferred)** leaves the planned Patriot Substation and travels east on the south side of East Escalante Road to South Pantano Road, where it crosses to the east side of South Pantano Road and turns north to follow an existing 138 kV transmission line. The route follows South Pantano Road around the westerly curve at Arizona Street, and then turns due east on the north side of South Research Loop for less than a quarter-mile before turning north, crossing Pantano Wash, South Pantano Parkway, and East 22nd Street, before continuing along the east side of South Pantano Road. At East Fifth Street, the route turns west and continues along the existing 138 kV transmission line alignment to the existing East Loop Substation. TEP would rebuild the existing 138 kV transmission line with a double-circuit configuration to accommodate both existing and new transmission lines.
- **Alternative A** leaves the planned Patriot Substation and crosses to the east side of Kolb Road and heads north. The first approximately 1000 feet will be constructed as a double-circuit structure, with the west side of the structure energized at 46 kV and the east side of the structure energized as 138 kV. The alignment continues north along Kolb Road, and between East 22nd Street and East Loop Substation, TEP would rebuild an existing 138 kV transmission line with a double-circuit configuration to accommodate both the existing and new transmission lines.
- **Alternative C1** leaves the planned Patriot Substation and crosses to the east side of Kolb Road, then travels north. The first approximately 1000 feet will be constructed as a double-circuit structure, with the west side of the structure energized at 46 kV and the east side of the structure energized as 138 kV. As the alignment continues north, at the intersection of Golf Links Road and Kolb Road, the structures will be designed as double-circuit 138 kV capable but constructed as single-circuit 138 kV structures, with the conductor on the east side of the structures. The alignment continues north along Kolb Road to East 22nd Street, where it turns east and continues on the south side of East 22nd Street to the east side of the Pantano Wash. The route continues north between Pantano Road and the Pantano River Trail to East Kenyon Drive, where it crosses to the west side of the Pantano Wash. The route continues north along the Pantano Wash's west bank

before turning west and following the alignment of an existing 138 kV transmission line into the existing East Loop Substation.

The length of the entire single-circuit and double-circuit transmission line is approximately 4.13 to 5.72 miles, depending on which alternative is selected (see Exhibit A-3).

Reasons Alternative B2 is Preferred

Through the public outreach and stakeholder process, TEP reduced the alternatives in the southern portion to Alternative 1 as the common southern routing for all alternatives (see Exhibit B-1 for alternative analysis).

TEP selected Alternative B2 as its preferred alternative over Alternative A based on the following factors:

- Ability to double-circuit existing 138 kV line along Pantano Road (Alternatives B1 & B2) including removing the existing line from the Tucson Meadows neighborhood (Alternative B2);
- Wider ROW along Pantano Road (Alternatives B1 & B2), makes construction easier because of less interference with existing TEP facilities and other utilities;
- Alternative A has a greater number of conflicting utility uses than Alternatives B1 & B2;
- Alternative A would likely require i) the acquisition of aerial easements from private landowners due to the road's ROW width, ii) conflicts with a greater number of existing above-ground and buried utilities along Kolb Road, and iii) impediment to Americans with Disabilities Act (ADA) sidewalk planning requirements, likely requiring additional easement acquisition;
- Alternative A would result in two lines along Kolb Road, north of 22nd Street; a double-circuit 46 kV line on one side of Kolb Road and a double-circuit 138 kV line on the other side of Kolb Road, which would be less visually appealing.
- Alternative A impacts a major corridor and would cause more disruption to traffic flow during construction due to the narrow ROW.

Alternative C1 is included in this Application because the public requested that it be assessed and although it scored lower (see Exhibit B-1) than the other alternatives in the application, TEP wanted to ensure that the ACC and the Committee had an opportunity to review it.

vi. For each alternative route for which application is made, list the ownership percentages of land traversed by the entire route (federal, state, Indian, private, etc.):

Land ownership in the study area is private, and government-owned (i.e., local, state, and federal), to include Arizona State Land (ASLD), see Table 3. The portions of the alternatives in COT and Pima County road ROW would use TEP's existing franchise agreements, which allow for the transmission line to be located within County and City ROWs.

Table 3. Land Ownership Percentages*

ALTERNATIVE	COT	PIMA COUNTY	ASLD	DOD	PRIVATE
Alternative B2 (preferred)	41%	9%	2%	5%	43%
Alternative A	39%	10%	2%	6%	43%
Alternative C1	31%	9%	2%	5%	53%

*Alternative 1 is combined with each lettered alternative.

5. *List the areas of jurisdiction [as defined in A.R.S. § 40-360(1)] affected by each alternative site or route and designate those proposed sites or routes, if any, which are contrary to the zoning ordinances or master plans of any of such areas of jurisdiction.*

The southern portion of the Project is mostly within the jurisdiction of the COT with three portions within unincorporated Pima County. The northern portion of the Project (Patriot Substation to East Loop Substation) is entirely within the jurisdiction of the COT.

All the alternative routes are compatible with local land use plans and zoning.

The COT must issue a special exception land use permit and approve a development plan before construction can begin on the Patriot Substation. TEP expects to file an application for the land use permit in Spring 2020, and anticipates submitting a development plan later in 2020. Port Substation is within allowable zoning and will not require a land use permit. It has not been determined when a development plan would be submitted.

6. *Describe any environmental studies applicant has performed or caused to be performed in connection with this application or intends to perform or cause to be performed in such connection, including the contemplated date of completion.*

TEP has conducted environmental studies, including field studies and impact assessments, to support this application. Information and reports on these study efforts are contained in the following exhibits:

Exhibit A	Location and Land Use Maps
Exhibit B	Environmental Report
Exhibit C	Areas of Biological Wealth
Exhibit D	Biological Resources
Exhibit E	Scenic Areas, Historic Sites and Structures, and Archaeological Sites
Exhibit F	Recreational Purposes and Aspects
Exhibit G	Concepts of Proposed Facilities
Exhibit H	Existing Plans
Exhibit I	Anticipated Noise and Interference with Communication Signals
Exhibit J	Special Factors (Includes Public Involvement)

EXHIBIT A

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EXHIBIT A: LOCATION AND LAND USE MAPS

1. *Where commercially available, a topographic map, 1:250,000 scale, showing the proposed plant site and the adjacent area within 20 miles thereof. If application is made for alternative plant sites, all sites may be shown on the same map, if practicable, designated by applicant's order of preference.*

2. *Where commercially available, a topographic map, 1:62,500 scale, or each proposed plant site, showing the area within two miles thereof. The general land use plan within this area shall be shown on the map, which shall also show the areas of jurisdiction affected and any boundaries between such areas of jurisdiction. If the general land use plan is uniform throughout the area depicted, it may be described in the legend in lieu of an overlay*

3. *Where commercially available, a topographic map, 1:250,000 scale, showing any proposed transmission line route of more than 50 miles in length and the adjacent area. For miles less than 50 miles in length use a scale of 1:62,500. If application is made for alternative transmission line routes all routes may be shown on the same map, if practicable designated by applicant's order of preference.*

4. *Where commercially available, a topographic map, 1:62,500 scale, of each proposed transmission line route of more than 50 miles in length showing that portion of the route within two miles of any subdivided area. The general land use plan within the area shall be shown on a 1:62,500 map required for Exhibit A-3, and for the map required by this Exhibit A-4, which shall also show the areas of jurisdiction affected and any boundaries between such areas of jurisdiction. If the general land use plan is uniform throughout the area depicted, it may be described in the legend in lieu of on an overlay.*

EXHIBIT	CONTENTS
A-1	n/a
A-2	n/a
A-3	138 kV Transmission Line and Substation Project – Location
A-4	138 kV Transmission Line and Substation Project – Land Use

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East Loop

Patriot

Irvington

Port

- Alternative 1
- Alternative A
- Alternative B2 (Preferred)
- Alternative C1 (See Note)
- Existing Substation (Project)
- Planned Substation
- Routes
- Existing 138 kV Transmission Line
- Preliminary Study Area
- Revised Study Area
- Township - Range - Section
- Pima County
- City of Tucson

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Tucson Electric Power
Land Resources

Exhibit A-3

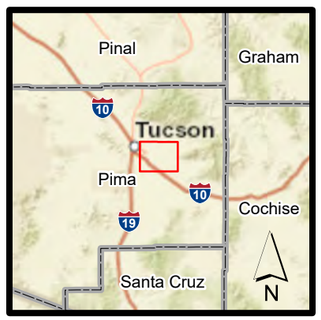
Irvington to East Loop 138 kV Transmission Line Project

Location

NOTE: Alternative C1 is an offset graphic representation to show common overlap alignments.

0 0.5 1
Miles

1:62,500



Sources: Esri, Tucson Electric Power, Pima County, City of Tucson, and Arizona State Land Department.
Projection: NAD 1983 UTM Zone 12N
Basemap: Esri World Topographic Map

This map is for planning purposes only.
UNS Energy makes no warranty of its accuracy.

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Revised Study Area Count	
Type	Count
Day Care Center	5
Care Home	12
Schools	22
Planned Area Development (PAD)	5
Development Permits	31
Development Plans	118

Planned Area Development		
Map ID	Project Name	Type
1	St. Joseph's Hospital PAD-13	Planned Area Development
2	Gateway Centre PAD-3	Planned Area Development
3	Valencia Crossing PAD-21	Planned Area Development
4	La Estancia PAD-7	Planned Area Development
5	Los Reales PAD-14	Planned Area Development
6	TEP Irvington Campus PAD-34	Planned Area Development

- Alternative 1
- Alternative A
- Alternative B2 (Preferred)
- Alternative C1 (See Note)
- Existing Substation (Project)
- Planned Substation
- Care Home
- Day Care Center
- Schools
- Existing 138kV Transmission Line
- Union Pacific Railroad
- Development Permits
- Development Plans - Incorporated Areas
- Revised Study Area
- Preliminary Study Area
- Parks
- Scenic Routes Buffer (Pima County)

Jurisdiction

- Pima County
- City of Tucson

Surface Management

- Military
- State
- Private (No Color)

City of Tucson Zoning

- C-1
- C-2
- C-3
- I-1
- I-2
- MH-1
- MH-2
- O-1
- O-3
- OCR-2
- OS
- P
- PAD-13
- PAD-14
- PAD-21
- PAD-3
- PAD-7
- R-1
- R-2
- R-3
- RH
- RV
- RX-1
- RX-2
- SH
- SR

Pima County Zoning

- CB-1
- CB-2
- CI-1
- CI-2
- CMH-1
- CR-1
- CR-3
- CR-4
- GR-1
- RH
- SH
- SP
- SR
- TH
- TR

12/11/2019 UA55909

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Tucson Electric Power
Land Resources

Exhibit A-4

Irvington to East Loop 138 kV Transmission Line Project

Land Use

NOTE: Alternative C1 is an offset graphic representation to show common overlap alignments.

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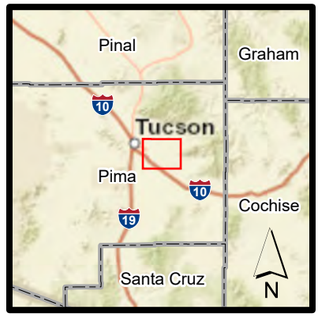
Miles

1:62,500



Sources: Esri, Tucson Electric Power, Pima County, City of Tucson, and Arizona State Land Department.
Projection: NAD 1983 UTM Zone 12N
Basemap: Esri World Topographic Map

This map is for planning purposes only.
UNS Energy make no warranty of its accuracy.

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EXHIBIT B

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EXHIBIT B: ENVIRONMENTAL REPORT

Attach any environmental studies which applicant has made or obtained in connection with the proposed site(s) or route(s). If an environmental report has been prepared for any federal agency or if a federal agency has prepared an environmental statement pursuant to Section 102 of the National Environmental Policy Act, a copy shall be included as a part of this exhibit.

B.1 Introduction

Environmental studies were conducted for the Project in 2019, and included biological resources, cultural resources, land use, and visual resources. The environmental planning process is described below. The biological, visual, cultural resource, and land use studies are discussed in detail in Exhibits C, D, E, and H, respectively.

B.2 Environmental Planning Process

B.2.1 Overview

The Project began with an evaluation by TEP of engineering and system requirements, which identified the need for a new 138 kV transmission line to serve growing energy needs, help DMAFB meet DOD energy resiliency mandates, and improve electric reliability for TEP customers.

A study area was identified that would allow development of a range of feasible routes connecting the existing Irvington Substation to the existing East Loop Substation, while interconnecting with TEP's proposed Port and Patriot Substations.

Throughout the planning process, a public involvement program was implemented to disseminate information, determine the acceptability of the alternative routes, and receive feedback. Public participation tools to achieve these objectives included meetings with stakeholders, open house meetings with the public, newsletters, a website, and a telephone information line.

B.2.2 Regional Study/Alternatives Identification

The Project Study Area (indicated on Exhibit A-3) is located south and northeast of DMAFB, in portions of the sections listed in Table 4, as indicated on the Tucson East and Tucson, Arizona, 7.5-minute United States Geological Survey topographic quadrangles:

Table 4. TRS Location of Project

TOWNSHIP, RANGE*	SECTIONS
T 14 S, R 15 E	8, 9, 16, 17, 20, 21, and 28–32
T 15 S, R 14 E	2, 3, 11, and 12
T 15 S, R 15 E	5, 7, 8, 17, and 18

*Gila and Salt River Baseline and Meridian

The Study Area includes land under the jurisdiction of the COT and Pima County. Major features in and near the Study Area include DMAFB (crossed by the Project), Tucson International Airport (TIA) (3 miles to the southwest), Interstate 10 (I-10) at the southern edge of the study area, and residential neighborhoods to the south and north. Existing 138 kV transmission lines are located along Alvernon Way, 22nd Street, Kolb Road, Pantano Road, Irvington Road, and Speedway Boulevard.

Stakeholder and Public Scoping

TEP received input and data from stakeholders and the public. Comments were received throughout the process and included two stakeholder and two neighborhood meetings, and two newsletter mailings. Comments are summarized and contained in Exhibit J. All input received from stakeholders and the public was used throughout the siting process to help TEP develop the alternative routes.

The alternatives, shown in Exhibit A-3 of the application, were selected based on TEP's objective of linking together the existing Irvington and East Loop Substations, while interconnecting with the planned Port and Patriot Substations, and considering future development, environmental concerns, future regional land use plans, and public opinion. The alternatives are discussed in more detail in *Section B.1-4-v* of the application.

B.3 Environmental Statements

B.3.1 US Fish and Wildlife Service (USFWS)

The results of the Biological Evaluation (BE) indicate that four special status species have the potential to occur in the Study Area: the western burrowing owl, rufous-winged sparrow, western yellow bat, and Brazilian free-tailed bat. Construction of the transmission line would have no impact on the western yellow bat or Brazilian free-tailed bat. Conducting construction at the East Loop Substation outside the breeding season, and limiting vegetation disturbance during construction would avoid potential impacts to the rufous-winged sparrow. A presence/absence survey of western burrowing owl habitat is recommended prior to construction. A "No Effect" determination was recommended as appropriate for this Project regarding its potential impacts to special status species (Tierra, 2019a) (See Exhibit C-2).

B.3.2 U.S. Army Corps of Engineers (USACE)

TEP assessed the Project's potential to impact USACE potentially jurisdictional waters, wetlands, or navigable waters in the study area. There are several ephemeral drainages present, including Pantano Wash, that are potential Waters of the United States, and under the jurisdiction of the USACE. TEP has determined that all washes would be spanned or paralleled outside of the Ordinary High Water Mark by the Project. No wetlands or navigable waters are present in the study area.

B.3.3 Federal Aviation Administration (FAA)

TEP will apply to the FAA for an obstruction evaluation of the new transmission line towers once an alternative is approved and designed. Initial analysis has determined that there will be no impacts.

Tucson Electric Power

Irvington to East Loop 138 kV Transmission Line Project

Alternative Route Development Report

Tucson Electric Power Company
November 2019

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ACRONYMS

ACC	Arizona Corporation Commission
ADOT	Arizona Department of Transportation
AZGFD	Arizona Game and Fish Department
CEC	Certificate of Compatibility
COT	City of Tucson
DMAFB	Davis-Monthan Air Force Base
EPNG	El Paso Natural Gas
HDMS	Heritage Data Management System
I-10	Interstate 10
IPAC	Information Planning and Conservation System
ROW	Right-of-way
RWRD	Regional Wastewater Reclamation Department
SW Gas	Southwest Gas
TEP	Tucson Electric Power
UPRR	Union Pacific Railroad
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey

1.0 Introduction

Tucson Electric Power (TEP) has identified the need for a new transmission to help serve growing energy needs in the study area and help Davis-Monthan Air Force Base (DMAFB) satisfy its energy resiliency requirements and improve electric reliability for customers in Tucson. The proposed 138 kV Irvington to East Loop transmission line will serve the new Port and Patriot Substations and is the second of several system improvements designed to provide additional transmission capacity in the central portion of the Tucson metro area.

2.0 Objective and Methodology

The objective of this study was to identify alternative routes to connect the Irvington and East Loop substations. These substations represent the fixed end points for the project as they are the tie-in points to the transmission system. The alternative routes also had to interconnect with the planned Port and Patriot substations.

The methodology used to determine possible routes to connect the two substations involved data collection and analysis to complete a multi-objective decision model that has been used successfully on scoping studies conducted for the purpose of siting energy facilities (Horst, T.J., 1982). Both components were conducted in coordination with project stakeholders and the public.

The decision model used criteria that were consistent with the relevant regulatory framework and decision process, which for this study was the Arizona Corporation Commission (ACC) Certificate of Environmental Compatibility (CEC) requirements. The decision model criteria were applied to a set of possible transmission line corridor alternatives within which the project could be routed. The results of this assessment were used to select three corridors that would be carried forward to the ACC CEC application.

3.0 Approach

The approach used to achieve the study objective involved several steps, which included:

Step 1: Define the study area;

Step 2: Define the criteria that would be considered during selection of the alternative routes;

Step 3a: Collect and rank the data that would be used to support the study;

Step 3b: Conduct engineering/constructability assessment;

Step 4: Conduct stakeholder and public scoping;

Step 5: Develop and rate transmission line alternatives;

Step 6: Select alternative routes to carry forward.

4.0 Step 1a: Preliminary Study Area & Links

The first step was to define the preliminary study area and secondly using the factors listed below; the preliminary links that could be connected to form alternative routes. TEP took in to consideration the following factors in the development of the Preliminary Study Area and links:

- The fixed end points of the project at the Irvington and East Loop substations;
- A need to interconnect with the planned Port and Patriot substations;
- A desire for the most direct route, as it reduces the overall cost of the project; and
- The generally accepted principle to first use established infrastructure corridors that meet the project objectives;
- A desire to co-locate with existing TEP infrastructure, where possible.

In the project area, there are a variety of existing infrastructure corridors in which a transmission line could be co-located. These existing infrastructure corridors include Interstate 10 (I-10) and the Union Pacific Railroad (UPRR) (outside of their existing rights-of-way), as well as Pima County and City of Tucson (COT) arterial streets.

There are also existing TEP 46 kV and 138 kV transmission lines along portions of Kolb Road and an existing 138 kV line along Pantano Road.

Utilizing these factors, TEP developed the Preliminary Study Area and links shown in Figure 1, which was presented to the public in the first public notification/meeting. However, following completion of the preliminary engineering/constructability (E/C) assessment and first round of outreach, the Preliminary Study Area was expanded east to include the Pantano Road alignment. In addition, the preliminary links were revised, with links being added along Pantano Road, Pantano Wash and others being removed in the southern-most portion of the study area (Figure 2).

5.0 Step 2: Criteria

The second step was to define the criteria that would be considered during selection of the alternative routes. TEP identified 11 criteria to be used during the evaluation process. The 11 criteria are aligned to the CEC decision factors (Arizona Revised Statute § 40-360.06) and TEP's design philosophy and standards and include the following:

1. Presence/ absence of an existing corridor and ability to use;
2. Existing and planned land use that is compatible with its use as a transmission line corridor;
3. Residential development adjacent to the corridor as measured by distance to existing residences and planned future development;
4. Presence/absence of sensitive receptors as measured by distance to existing sensitive receptors and distance from corridor;
5. Room for separation from existing utilities in the corridor as measured by existing and planned utilities and ranked by degree of mitigation required;
6. Viewshed associated with the corridor as measured by number of people viewing and type of viewing experience (i.e., commuter, recreationist, resident);
7. Known or potentially eligible cultural resources in the corridor as measured by documentation through previous survey effort and ranked by degree of mitigation required;
8. Special status species and/ or habitat as measured by the presence/ absence of potentially suitable habitat, including five general biological resource areas: special status species, water resources, wildlife linkages, riparian habitat, and native plants;
9. One-hundred-year floodplain as measured by location and engineering design;
10. Ability to construct and maintain the transmission line;
11. Cost of Construction.

Given the urban nature of the project, several criteria that would normally be evaluated were not included in the analysis, because it was determined early on that the factors were not present or could be avoided completely. These included presence of access roads, terrain, threatened and endangered species, and designated critical habitat.

6.0 Step 3a: Data Collection

Step 3a included the collection of data in support of analyzing the 11 criteria listed in Step 2. TEP collected data from Pima County GIS, COT, United States Geological Survey (USGS), Federal Emergency Management Agency (FEMA) website, Southwest Gas (SW Gas), Tucson Water, Pima County Regional Wastewater Reclamation Department (RWRD), Kinder Morgan, and El Paso

Natural Gas (EPNG), as well as design Bluestake information, and data from its own repository. Table 1 shows the data collected and the ranks assigned.

Table 1. Data Collected

Data	Comment	Source
Zoning		*Pima County GIS*
Sensitive Receptors	Schools, hospitals, day care and adult care facilities, etc. grouped together	*Pima County GIS, COT GIS*
Building Density		Derived from NLCD dataset, USGS
Development Plans		Pima County and COT GIS
Cultural Resources		Private Consultant
Washes/waterways/floodplains		Pima County GIS, FEMA.gov
Water, wastewater, gas utility lines		COT, SW Gas, Kinder Morgan, EPNG, Bluestake

7.0 Step 3b: Engineering/constructability

TEP's transmission line design team conducted a preliminary E/C assessment on the revised links developed following the first stakeholder and public outreach. The E/C assessment was later revised and finalized following a more robust analysis as part of the alternative route development process. The final assessment ranked the alternatives within the Final Study Area based on:

- Degree of difficulty
- System constraints
- Cost
- Relocation/reconstruction of existing TEP facilities
- Construction timeframe
- Outage requirements

The results of the E/C assessment can be viewed in Appendix A, Table A-1.

8.0 Step 4: Stakeholder and Public Scoping

TEP received input and data from stakeholders, as shown in Table 2. Public comments were received throughout the process and included two neighborhood meetings and two newsletter mailings. Public comments are summarized and contained in Exhibit J of TEP's application for a CEC. All input received from stakeholders and the public was used throughout the alternatives analysis process to help inform TEP in making decisions as to which links to keep and discard, and ultimately which links to combine to form the alternatives analyzed later in this report.

Table 2. Stakeholder Input

Stakeholder	Input	Response
Arizona Department of Transportation (ADOT)	Planned I-10 improvements in the study area. Parallel facilities in ADOT right-of-way (ROW) not allowed.	TEP excluded parallel facilities with all existing and future (planned) ADOT ROW from the analysis
SW Gas	Received locations of facilities. TEP should coordinate further once design is in progress.	TEP will coordinate with SWGas for crossings and parallels during the design phase.
EPNG	EPNG indicated that an *AC Interference Analysis/ Mitigation Study* will be required for any power line over 35 kV that parallels an EPNG pipeline for 250 feet or more and is within 300 feet of the pipeline, or crosses the pipeline. TEP will need to submit any crossing locations to EPNG personnel for impact analysis.	E/C assessment ranks were lowered in areas where this study would be required. In the event that the final approved route is within these areas, TEP will complete the required interference analysis and mitigate as necessary.
Kinder Morgan	Kinder Morgan indicated that an *AC Interference Analysis/Mitigation Study* will be required for any power line over 35 kV that parallel a pipeline for 250 feet or more and is within 300 feet of the pipeline, or crosses the pipeline. TEP will need to	E/C assessment ranks were lowered in areas where this study would be required. In the event that the final approved route is within these areas, TEP will complete the required interference analysis and mitigate as necessary.

Stakeholder	Input	Response
	submit any crossing locations to Kinder Morgan Corrosion management team personnel for impact analysis.	
RWRD	RWRD provided maps indicating facility locations. Tucson Water indicated that in areas of conflict a cone of influence study may be required and if near facilities susceptible to disturbance, pump around mitigation during construction or facility rebuilds may be required.	E/C assessment ranks were lowered in areas of conflict. In the event that the final approved route is within these areas, TEP will complete the required cone of influence study and mitigation as necessary.
Tucson Water	Tucson Water provided maps indicating facilities that are susceptible to AC interference. Tucson Water indicated that keeping the transmission line remote from these areas is preferable, however, where this is not practical, cathodic protection may be required.	E/C assessment ranks were lowered in areas where cathodic protection may be required.
UPRR	UPPR indicated that any parallel facilities should be at least 300 feet from the centerline of the railroad and crossings should be at a 90-degree angle.	E/C assessment ranks were lowered in areas where TEP will be within 300-feet of the centerline of the railroad. TEP will complete the required interference analysis and mitigate with any additional grounding as necessary. There are no anticipated UPRR crossings; but if required, TEP will obtain required permits form UPRR.
DMAFB	DMAFB indicated that Alternative 2, along Valencia Road, would impact the airfield's imaginary surfaces layer and be in conflict with DMAFB operations. The impact cannot be mitigated as pole heights cannot be reduced to an acceptable level. Pole	TEP removed Alternative 2 from consideration.

Stakeholder	Input	Response
	locations and heights were also assessed along Kolb Road and impacts can be mitigated.	
Pima Air and Space Museum/COT Tourism Department	Alternative 2 would have a negative visual effect at the entrance to the museum. Planes are towed from DMAFB to the museum, across Valencia Road and conductor clearance would have to be maintained or outage taken to allow plane to get under the transmission line.	Pole height requirements would exceed DMAFB imaginary surfaces and outages would be too costly and difficult to schedule at short notice. TEP removed Alternative 2 from consideration.

Of the thirty-five public comments received, twenty-one comments did not mention a route preference. Many of these comments pertained to location generally (such as burdens or opportunities for a particular part of town), appearance of facilities, or health concerns regarding electro-magnetic fields (EMFs).

The potential routes that garnered the most support were Alternatives C1 and C2 in the northern portion of the project (each received 8 favorable comments), and Alternative 1 in the southern portion (which received 7 comments in support). Alternatives B1 and B2 followed with five comments in support, while Alternative A received only three supportive comments.

9.0 Step 5: Alternative Route Selection

Utilizing the final preliminary links, TEP identified two alternatives (1 and 2) to connect the existing Irvington Substation to the proposed Port and Patriot substations, and five alternatives (A, B1, B2, C1, and C2) to connect the proposed Patriot Substation to the existing East Loop Substation as described below (Figure 3). Alternatives were selected based on the objective of linking together the relevant substations, while minimizing impacts through the use of existing infrastructure corridors and TEP infrastructure, and in consideration of the environment and public and stakeholder comment.

9.1 Alternatives 1 & 2 (Irvington to Port to Patriot)

Alternative 1 begins at the Irvington Substation and continues southeast on the north side of the UPRR tracks past East Valencia Road and South Craycroft Road to the Littletown Road alignment where it turns east and continues to the planned Port Substation. The route continues east from

the Port Substation to the east side of South Kolb Road. Turning north, the route continues along Kolb Road to East Irvington Road, where it crosses to the west side of Kolb Road and continues north to the planned Patriot Substation.

Alternative 2 begins at the Irvington Substation and continues southeast on the north side of the UPRR tracks to East Valencia Road and South Craycroft Road, where it turns east and continues on the north side of Valencia Road past the Pima Air and Space Museum. The route then turns south and continues to the Littletown Road alignment where it turns east and continues to the planned Port Substation. From the Port to Patriot substations, routing for Alternative 2 is the same as Alternative 1.

Alternatives 1 and 2 share a common route between the Port and Patriot substations.

9.2 Alternatives A, B1, B2, C1, and C2 (Patriot to East Loop)

Alternative A leaves the planned Patriot Substation and crosses to the east side of Kolb Road, then travels north to the existing East Loop Substation. Between East 22nd Street and East Loop Substation, TEP would rebuild an existing 138 kV transmission line with a double-circuit configuration to accommodate the new transmission line.

Alternative B1 leaves the planned Patriot Substation and travels east on the south side of East Escalante Road to South Pantano Road, where it crosses to the east side of Pantano Road and turns north to follow an existing 138 kV transmission line. At East Fifth Street, the route turns west and continues along the existing 138 kV transmission line alignment to the existing East Loop Substation. TEP would rebuild the existing 138 kV transmission line with a double-circuit configuration to accommodate the new transmission line.

Alternative B2 is identical to Alternative B1 except for a small segment between East Sundew Drive and South Research Loop, where Alternative B2 would more closely follow the alignment of Pantano Road, then turn east and continue on the north side of South Research Loop for less than a quarter-mile until rejoining with the alignment of Alternative B1.

Alternative C1 leaves the planned Patriot Substation and crosses to the east side of Kolb Road, then travels north to East 22nd Street, where it turns east and continues on the south side of 22nd Street to the east side of the Pantano Wash. The route continues north between Pantano Road and the Pantano River Park Trail to East Kenyon Drive, where it crosses to the west side of the Pantano Wash. The route continues north along the Pantano Wash's west bank before turning west and following the alignment of an existing 138 kV line into the existing East Loop Substation.

Alternative C2 leaves the planned Patriot Substation and travels east on the south side of Escalante Road to Pantano Road, where it crosses to the east side of Pantano Road and turns north to follow an existing 138 kV transmission line on the east side of Pantano Road to East Golf Links Road. The route turns east and travels on the north side of Golf Links Road for about a half-mile before it turns north and travels to the north side of the Pantano Wash. The route continues north between the Pantano River Park Trail and Pantano Road on the east side of the wash to 22nd Street. From this point to the East Loop Substation, the alignment of C2 is the same as C1.

10.0 Step 6: Alternative Route Rating

The team examined the results of the analysis, available information about the study area, stakeholder and public comments, and used the 11 evaluation criteria with the goal of determining the applicable rating for each alternative. Potential constraints to the constructability of the project alternatives were classified into three general rating categories. The rating categories for the criteria are as follows:

3 – No impact

2 – Impact that can be mitigated

1 – Impact that cannot be mitigated or would be approaching cost-prohibitive to mitigate

These three ratings were used to determine a relative level of constructability constraint for each alternative in each of the 11 evaluation criteria categories. The criteria ratings were totaled to provide an overall numeric score for each alternative. Alternatives with higher numeric scores had fewer constraints to construction while alternatives with lower scores had more constraints in each of the criteria categories.

10.1 Results of the Assessment

A discussion of the rating of the alternatives within each of the 11 criteria categories is provided in the following paragraphs. Table 6, at the end of this report, summarizes the results of the criteria ratings or "scores" (i.e., 3, 2, or 1) applied to each of the project alternatives and provides a total numeric score for each alternative. Figures referenced in this section of the report are located in Appendix B.

Note that Alternative 2 was removed prior to this assessment based on information gathered from DMAFB and the Pima Air and Space Museum related to the DMAFB's imaginary surface layer and the museum's operations.

10.1.1 Criterion 1 - Presence/absence of existing corridor and ability to use the corridor.

Using Criterion 1, each alternative was scored based on the presence or absence of an existing corridor and the ability to use the corridor. The study area includes transportation and TEP transmission line corridors. Buried utility corridors were not considered, as they often pose more of a constraint than an opportunity. Previous stakeholder outreach determined that the I-10 and UPRR corridors could not be used based on their owner's requirements and future plans. In addition, TEP evaluated their existing sub-transmission and transmission line system and determined the locations where co-location or placement of an additional line in the same ROW would be feasible.

Corridors were identified through review of aerial photography, USGS 7.5" quadrangle maps, and data provided by Pima County GIS, COT, SW Gas, EPNG, Kinder Morgan, as well as TEP's existing facility data.

Because Alternative 2 was removed from consideration, the Alternative 1 score was combined with each lettered alternative's score and averaged. A score of 3 was given to Alternatives that utilized an existing corridor, at least 75% of the time. A score of 2 was given to alternatives that utilized an existing corridor, 40-75% of the time. A score of 1 was given to those alternatives that utilized an existing corridor less than 40% of the time.

Alternatives A, B1, and B2 scored a 2 because it uses existing corridors around 40% of the time. Alternatives C1 and C2 scored a 1 because they use existing corridors less than 40% of the time.

10.1.2 Criterion 2 - Existing and planned land use is compatible with its use as a transmission line corridor

Using Criterion 2, each alternative was scored based on the presence/absence of compatible land uses in the alternative corridor (Appendix B, Figure B1). Land use designations obtained from the COT and Pima County, were included in the analysis and ranking.

Because Alternative 2 was removed from consideration, the Alternative 1 score was combined with each lettered alternative's score and averaged. A score of 3 was given to those alternatives that were compatible with the local land use plans and would not require additional coordination, approvals, or mitigation. A score of 2 was given to those alternatives that were compatible with the local land use plans but would require additional coordination or approvals. A score of 1 was given to those alternatives that were not compatible with the local land use plans or are compatible with mitigation, but mitigation would be approaching cost-prohibitive.

All alternatives except for C1 and C2 are compatible with local land use plans and were given a score of 3. Alternatives C1 and C2 would require additional approval from Pima Regional Flood Control District for placement adjacent to the Pantano Wash and received a score of 2.

10.1.3 Criterion 3 – Existing Residential land use adjacent to the corridor

Using Criterion 3, each alternative was scored based on the percent of existing residential land use within 300 feet of each alternative corridor (Appendix B, Figure B2). Aerial photographs and site visits were used to interpret the locations of residential use.

Because Alternative 2 was removed from consideration, the Alternative 1 score was combined with each lettered alternative's score and averaged. If residential use is less than 10%, a score of 3 was given. If residential use is 10% to 50%, a score of 2 was given. If residential use is greater than 50%, a score of 1 was given.

Alternatives C1 and C2 are less than 10%, therefore a score of 3 was given. The remaining alternatives were less than 50%, therefore a score of 2 was given.

10.1.4 Criterion 4 - Presence/Absence of sensitive receptors as measured by presence of sensitive receptors and distance from corridor.

Using Criterion 4, each alternative was scored based on a review of known locations of sensitive receptors (schools, hospitals, nursing homes, day care facilities, etc.) and their proximity to the proposed alternatives (Appendix B, Figure B3). Existing sensitive receptors were overlaid on aerial photographs and the proximity of the sensitive receptors to the proposed location of the alternative routes was measured to determine the score under this criterion. The parcel boundary was used as the receptor point. Note that some parcels had more than one sensitive receptor on the parcel (a school and a day care for example), which was counted as 1 receptor for the purpose of the study.

Because Alternative 2 was removed from consideration, the Alternative 1 score was combined with each lettered alternative's score and averaged. If no sensitive receptors were located less than 250 feet from the alignment, a score of 3 was given. If 1-3 sensitive receptors were located less than 250 feet from the alignment, a score of 2 was given. If greater than 3 sensitive receptors were located less than 250 feet from the alignment, a score of 1 was given.

Alternatives B1 and B2 have 12 sensitive receptors, Alternatives A and C1 have 10 sensitive receptors, and Alternative C2 has 8 sensitive receptors located within 250 feet of the alignment, therefore all of the alternatives received a score of 1.

10.1.5 Criterion 5 - Room for separation from potentially conflicting uses in the corridor

Using Criterion 5, each alternative was scored based on the room for separation from existing utilities in the corridor as measured by existing and planned utilities and by the degree of difficulty to manage the conflicting use and degree of mitigation required.

The primary conflicting uses in the study area are shown in Table 3 below.

Table 3. Primary Conflicting Uses in the Study Area

Conflicting Use	Alternative Affected
Existing UPRR line within 300 feet from centerline of the rails to the proposed alignment.	Alternative 1
Existing TEP overhead distribution line that would need to be placed underground along proposed alignment behind Pima Air and Space Museum between Valencia Rd. and Wilmot Rd.	Alternative 1
Existing TEP overhead distribution line that would need to be placed underground along Littletown Rd. between Wilmot and Centennial Rd.	Alternative 1
Existing Kinder Morgan petroleum/natural gas facility crossing at Pima Air and Space Museum and proposed alignment.	Alternative 1
Existing EPNG petroleum/natural gas facility crossing north of Littletown Rd and Centennial Dr.	Alternative 1
Existing SW Gas natural gas line facility that parallels proposed alignment from railroad at Pima Air and Space Museum to Wilmot Rd.	Alternative 1
Existing SW Gas natural gas line facility along Kolb Rd between Irvington Rd. and Escalante Rd. that parallels proposed alignment.	Alternative 1
Existing SW Gas natural gas line facility along Kolb Rd between Escalante Rd. and 22nd Street that parallels proposed alignment.	Alternative A, C1
Existing water line along Kolb Rd from Escalante Rd. to Seattle Rd.	Alternative A, C1
Existing water line along Kolb Rd from Golf Links Rd. to 22nd street.	Alternative A, C1
Existing wastewater facilities along Kolb Rd. from Seattle Rd. to Stella Rd.	Alternative A, C1
Existing wastewater facilities along Kolb Rd. from 31st St. to 22nd St.	Alternative A, C1
Existing TEP overhead distribution line that would need to be placed underground along Kolb Rd. from Escalante Rd to 34th St.	Alternative A, C1

Conflicting Use	Alternative Affected
Existing wastewater facilities along Kolb Rd. from 22nd St. to East Loop Substation.	Alternative A
Existing wastewater facilities along Escalante Rd. from Kolb Rd. to Poinciana Dr.	Alternative B1, B2, C2
Existing SW Gas natural gas line facility along Escalante Rd between Kolb Rd. and Pantano Rd. that parallels proposed alignment.	Alternative B1, B2, C2
Existing wastewater facilities along Escalante Rd. from Queen Palm Dr. to Carson Ave.	Alternative B1, B2, C2
Existing SW Gas natural gas line facility along Pantano Rd between Escalante Rd. and Golf Links Rd. that parallels proposed alignment.	Alternative B1, B2, C2
Existing TEP overhead distribution line that would need to be placed underground along Pantano Rd between Escalante Rd. and Golf Links Rd.	Alternative B1, B2, C2
Existing TEP overhead distribution line that would need to be placed underground along Pantano Rd between Golf Links Rd. and Arizona St.	Alternative B1, B2
Existing wastewater facilities along Pantano Rd. from 22nd St. to Broadway Ave.	Alternative B1, B2
Existing SW Gas natural gas line facility along Pantano Rd. between Broadway Ave. and 5th St. that parallels proposed alignment.	Alternative B1, B2
Existing TEP overhead distribution line that would need to be relocated along proposed alignment from Pantano Wash to East Loop Substation.	Alternative B1, B2, C1, C2
Existing TEP overhead distribution line that would need to be placed underground along Golf Links Rd. between Pantano Rd. and Pantano Wash	Alternative C2

Conflicting Use	Alternative Affected
Existing wastewater facilities along Golf Links Rd. between Pantano Rd. and Pantano Wash	Alternative C2
Existing SW Gas natural gas line facility along proposed alignment near Broadway and Hilton Hotel.	Alternative C1, C2
Existing SW Gas natural gas line facility along 22nd St. between Kolb Rd. and Pantano Wash	Alternative C1
Existing TEP overhead distribution line that would need to be placed underground along 22nd St. between Kolb Rd. and Pantano Wash	Alternative C1
Existing 138kV facilities at East Loop Substation that would require crossing structures.	Alternative C1
Existing 46kV facilities at East Loop Substation and Kolb Rd. that would require crossing structures.	Alternative A

Because Alternative 2 was removed from consideration, the Alternative 1 score was combined with each lettered alternative's score and averaged. A score of 3 was given to alternatives with adequate room for separation from the potentially conflicting uses with no mitigation. A score of 2 was given to alternatives without adequate room for separation from conflicting uses, but the conflicting use could be mitigated. A score of 1 was given to those alternatives without adequate room for separation from conflicting uses and the construction schedule impacts and cost to mitigate would be prohibitive.

Alternative A was given a score of 1 because the conflicting use was not only with TEP facilities, but would also require the relocation of other buried utilities (water, sewer, communications) along Kolb Road. The remaining alternatives were given a score of 2 because while multiple conflicting uses are also present, they would only require relocation of existing TEP facilities.

10.1.6 Criterion 6 - Viewshed associated with the corridor as measured by number of people viewing and type of viewing experience (i.e., commuter, recreationist, resident)

Using Criterion 6, each alternative was scored based the relative level of impact to existing viewsheds. The assessment involved a review of drawings of the proposed transmission line

designs and review of local planning documents, GIS data maps, photos taken in the project area, simulations created, and use of Google Earth Pro.

Because Alternative 2 was removed from consideration, the Alternative 1 score was combined with each lettered alternative's score and averaged. A score of 3 was given to alternatives that were compatible with the viewshed and would have an overall low impact. A score of 2 was given to alternatives that were compatible with the viewshed and would have an overall moderate impact. A score of 1 was given to alternatives that were compatible with the viewshed and would have a high impact.

The visual resources impact assessment evaluated the level of visual change, or contrast, that the proposed transmission line would introduce into each landscape setting in conjunction with effects to associated sensitive viewers. The components of the visual assessment included identification of the types of viewers and their sensitivity to the project in each segment of the route and characterization of impacts that were quantified as low, medium, or high. The visual impact assessment considered the effects of new structures (the proposed Project) introduced into the existing setting and associated sensitive viewers, which considered the influence of existing facilities (i.e., existing transmission lines, street light structures).

Overall, impacts are anticipated to be low for the proposed Project when it is adjacent to or parallel with similar developed settings or features, such as industrial settings, because visual change would be reduced. Residential and park/recreation settings, which are typically characterized by open space and developed recreational facilities, typically result in greater impacts when adjacent to the proposed Project, because it differs in form and line. Commercial and urban settings are characterized by large to moderate sized structures and/or open space; here, impacts are anticipated to be lower because form and line are similar to the proposed Project. Visual impacts resulting from the Project would typically be reduced when: (1) the proposed route occurs within an industrial setting that is similar in form and line, and (2) the route is within a corridor that has existing 138 kV or 46 kV transmission lines.

Visual impacts for each of the routes are described below, and outlined in Exhibit E.

Alternative 1 (Common to all)

Alternative 1 (see Exhibit G-5 of TEP's application for a CEC for simulations) is compatible with the existing setting, and impacts are anticipated to be low. This conclusion is based on the industrial nature of the setting, and existing transmission and distribution lines along the alignment. Viewer sensitivity is low, as viewer type is commuter. The land adjacent to this alternative is undeveloped, or industrial with DMAFB's Airplane Boneyard.

Alternative A

Alternative A (see Exhibit G-5 of TEP's application for a CEC for simulations) is compatible with the existing setting, and impacts are anticipated to be low. This conclusion is based on the existing transmission and distribution lines present along much of the road. Though the route is located along roadways lined with residential neighborhoods on both sides, and viewer sensitivity is moderate (the viewers live along this alternative), there is substantial existing vertical infrastructure that the proposed transmission line would not create a new impact. This alternative would be somewhat less visually appealing because it would result in two double-circuit transmission lines along Kolb Road, north of 22nd Street. A double-circuit 46 kV line on one side of the road and a double circuit 138 kV line on the other side of the road.

Alternatives B1 & B2

Alternatives B1 and B2 (see Exhibit G-5 of TEP's application for a CEC for simulations) are compatible with the existing setting, and impacts are anticipated to be low. This conclusion is based on the existing transmission and distribution lines present along much of the road. Though the route is located along roadways lined with residential neighborhoods on both sides, and viewer sensitivity is moderate (the viewers live along this alternative), there is substantial existing vertical infrastructure that the proposed transmission line would not create a new impact.

Alternatives C1 & C2

The portions of Alternatives C1 and C2 (see Exhibit G-5 of TEP's application for a CEC for simulations) along existing roadways are compatible with the existing setting, and impacts are anticipated to be low, due to existing transmission and distribution lines with the COT right-of-way. The northern portion of these alternatives are located within Pantano River Park, where viewer sensitivity is high and there are no existing vertical structures. Viewers are visiting the Pantano River Park, or are residents in the area, and this alternative would add vertical structures in areas where none currently exist. Power lines travel east-west along Broadway Boulevard, and approaching East Loop Substation, but they are more distant from the Pantano River Park Trail. The transmission line would be less compatible from a visual perspective, therefore the impact would be high.

Because Alternative 2 was removed from consideration, the Alternative 1 score was combined with each lettered alternative's score and averaged. Alternatives A, B1 and B2 would have a low impact on visual resources and scored a 3. Alternatives C1 and C2 would have a high impact on visual resources and scored a 1.

10.1.7 Criterion 7 - Known or potentially eligible cultural resources in the corridor as measured by documentation through previous survey effort and ranked by degree of mitigation required

Using Criterion 7, each alternative was scored based on the results of a cultural resources literature and records review, in which locations of recorded cultural resources were overlaid on maps of the study area and the alternatives.

Because Alternative 2 was removed from consideration, the Alternative 1 score was combined with each lettered alternative's score and averaged. A score of 3 was given to alternatives where no impacts to known or potentially eligible cultural resources would occur. A score of 2 was given to alternatives where known or potentially eligible cultural resources would be impacted but could be mitigated. A score of 1 was given to those alternatives where impacts to known or potentially eligible cultural resources would occur and could be mitigated, but mitigation would approach cost- prohibitive.

None of the alternatives would result in impacts to known or potentially eligible resources; therefore, all alternatives scored a 3.

10.1.8 Criterion 8 - Special status species and/or habitat as measured by the presence/absence of potentially suitable habitat

Using Criterion 8, each alternative was assigned a score based on their individual potential to impact five general biological resource areas: special status species, water resources, wildlife linkages, riparian habitat, and native plants.

TEP's consultant performed background "desktop" research, including a review of the U.S. Fish and Wildlife Service (USFWS) Information, Planning, and Conservation System (IPAC) and the Arizona Game and Fish Department (AZGFD) Heritage Data Management System (HDMS) to obtain information on sensitive biological resources that may be present in the study area. After compiling a list of special status species potentially occurring in the study area, a reconnaissance site visit of the study area was conducted. Site reconnaissance consisted of driving all the alternative corridors and stopping frequently to note plant species present, inspect areas with potentially suitable habitat for special status species, and to photographically document the study area. The assessed corridor width during the site visit included entire ROW of the roads and utility corridors associated with the alternatives. Following the site visit, special status species were assessed for their potential to occur in the study area based on the existing

Mitigation for the purposes of this assessment was considered to be avoidance of specific resource features, such as areas with occupied burrowing owl burrows, relocation of special status species (e.g., burrowing owls), and transplantation or revegetation of disturbed areas.

Riparian Habitat and Native Plants Weighted Score Modifiers

To account for variations between the alternatives in the amount of riparian habitat and native plants that may be impacted, a weighted modifier was applied to the score for each of the alternatives to aid in making a relative comparison between all the alternatives. For example, if there are Alternatives X, Y, and Z, with 400, 1,200, and 800 units of riparian habitat intersected and potentially impacted, respectively, the impact scores would be as follows:

- Alternative X, base score = 2, weighted modifier = 0, final score = 2 – 0 = 2
- Alternative Y, base score = 2, weighted modifier = 1, final score = 2 – 1 = 1
- Alternative Z, base score = 2, weighted modifier = 800 / 1200 = 0.67, final score = 2 – 0.67 = 1.33

In the example above, all three of the alternatives have a base score of 2 because they all intersect riparian habitat; this would serve to set these alternatives apart from additional alternatives that do not intersect riparian habitat (score = 3). Alternative X has a weighted modifier of zero because it intersects the least amount of riparian habitat of the three alternatives, and Alternative Y has a modifier of 1 because it intersects the most. Alternative Z intersects riparian habitat at an intermediate level in comparison to the other alternatives, so its amount of riparian habitat intersected is compared relative to Alternative Y, which has the most, by dividing the 800 units of habitat for Alternative Z by the 1,200 units for Alternative Y, resulting in a weighted modifier of 0.67 that is subtracted from the base score of 2, yielding a final score of 1.33 for Alternative Z's riparian habitat impacts. For the purposes of this analysis, length in meters was the unit used for the alternative weighted modifier values.

Table 4 below presents the combined impact scores for each alternative corridor and resource area evaluated in this report; a higher impact score indicates that the specific alternative would have correspondingly lower impacts on resources than an alternative with a lower score. The evaluation found that Alternative 1 would result in the least amount of impacts to resources for the southern portion of the proposed transmission line between the Irvington Substation and the planned Patriot Substation, and that Alternative A would result in the least amount of impacts for the northern portion of the proposed line from the planned Patriot Substation to East Loop Substation. Impact scores of the alternatives for each resource area analyzed are summarized in Sections 5.1–5.5 of the Biological Evaluation and Alternatives Analysis report completed by Tierra Right of Way, which is Exhibit C-2 of the Application for a CEC.

Table 4. Alternative Corridor Impact Score Summary

Resource Affected	Alt. 1	Alt. 2	Alt. A	Alt. B1	Alt. B2	Alt. C1	Alt. C2
Special Status Species	2	2	2	2	2	2	2
Water Resources	3	3	3	3	3	3	3
Wildlife Linkages	3	3	3	3	3	3	3
Riparian Habitat	2	1.038	3	1.871	1.871	1.411	1
Native Plants	2	1.109	2	1.675	1.675	1.675	1.675
Total	**12**	**10.14**	**13**	**11.546**	**11.546**	**11.086**	**10.675**
Alternative 1 + lettered Alternative Average	**-**	**-**	**12.5**	**11.773**	**11.773**	**11.543**	**11.338**

Because Alternative 2 was removed from consideration, Alternative 1 score was combined with each lettered alternative's score and averaged. A score of 3 was given to alternatives that had an overall impact score of 12-15. A score of 2 was given to alternatives that had an overall impact score of 9-12, and a score of 1 was given to alternatives with an overall impact score less than 9.

Alternative A was scored a 3 and the remaining alternatives were scored a 2.

10.1.9 Criterion 9 - 100-year Floodplains as measured by location and engineering design

Criterion 9 addresses the presence/ absence of FEMA 100-year floodplain (Appendix B, Figure B4). FEMA 100-year floodplain data was obtained for Pima County.

Because Alternative 2 was removed from consideration, the Alternative 1 score was combined with each lettered alternative's score and averaged. A score of 3 was given to alternatives that are not within a 100-year floodplain. A score of 2 was given to alternatives where the 100-year floodplain can be spanned by structures through engineering design. A score of 1 was given to those alternatives where structures would be located within a 100-year floodplain.

Alternatives A, B1, and B2 were given a score of 2 because the 100-year floodplain can be spanned. Alternatives C1 and C2 were given a score of 1 because structures would be located within the 100-year floodplain.

10.1.10 Criterion 10 - Ability to construct and maintain the transmission line

Criterion 10 addresses TEP's ability to construct and maintain the transmission line from existing access roads.

Because Alternative 2 was removed from consideration, the Alternative 1 score was combined with each lettered alternative's score and averaged. A score of 3 was given to the alternatives

that could be accessed easily from existing roads. A score of 2 was given to the alternatives that would require new access roads and there was sufficient room to safely access the transmission line. A score of 1 was given to the alternatives where access issues are present, and solutions have not been identified to date or may be cost-prohibitive.

Alternatives B1 and B2 were given a score of 3 because they can be accessed fully from existing roads or TEP access roads and construction would be fairly straight-forward. Alternatives A was given a score of 2 because the Kolb Road right-of-way is narrower than for Pantano Road and has more buried and above-ground utilities, therefore construction would be more difficult, requiring greater traffic control and the relocation of other utilities. C1 and C2 were also given a score of 2 because they would require new access roads and or possible access easements along the Pantano Wash in order to access the transmission lines safely for construction and maintenance.

10.1.11 Criterion 11 - Cost of Construction

A high-level cost estimate was completed for each alternative and the alternatives were ranked 1-5, with the least expensive alternative receiving a 3, the middle-range alternatives receiving a 2, and the most expensive alternative receiving a 1. The estimates included costs for construction and material, rebuilding of existing facilities where a shared ROW is used, rebuilding of distribution lines where they would need to be moved, as well as existing conflict mitigation and land easement acquisition costs. Table 5 illustrates the high-level cost estimates for each alternative.

Table 5. Irvington to East Loop 138kV Transmission High-Level Alternative Cost Estimates*

Alternative	Construction and Materials ($1,000's)	Land Acquisition ($1,000's)	Total Cost ($1,000's)
Alternative A	$ 12,474	$5,379	$ 17,853
Alternative B1	$ 13,469	$4,960	$ 18,429
Alternative B2	$ 13,973	$5,009	$ 18,982
Alternative C1	$13,089	$6,789	$19,878
Alternative C2	$15,217	$7,282	$22,499

*Combined cost of Alternative 1 and each lettered alternative cost.

11.0 Summary and Conclusion

The results summarized in Table 6 and more fully described in this report have shown, based on the criteria used in the assessment that Alternative A, B1, and B2 tied with a score of 25/33. Alternatives C1 (score of 20) and C2 (score of 19), scored significantly lower. Of the tied alternatives; Alternative A had the highest number of "3's" (no effect), but also had two (2) "1's" (major effect), as opposed to only one (1) "1" score. Although Alternative A is the least cost alternative, TEP selected Alternative B2 as its preferred alternative and Alternative A as its second preferred based on the following factors:

- Ability to double-circuit existing 138 kV line along Pantano Road (Alternatives B1 & B2) including removing the existing line from the Tucson Meadows neighborhood (Alternative B2);
- Wider ROW along Pantano Road (Alternatives B1 & B2), makes construction easier because of less interference with existing TEP facilities and other utilities;
- Alternative A has a greater number of conflicting utility uses then Alternatives B1 & B2;
- Alternative A would likely require the acquisition of aerial easements from private landowners due to the road's ROW width and number of existing above-ground and buried utilities along Kolb Road;
- Alternative A would result in two double-circuit lines along Kolb Road, north of 22nd Street; a double-circuit 46 kV line on one side of Kolb Road and a double-circuit 138 kV line on the other side of Kolb Road, which would be less visually appealing.

TEP selected Alternative C1 as its third alternative because the public requested that it be assessed and although it scored lower than the other alternatives that will be presented in the application, TEP wanted to ensure that the ACC and the ACC Line Siting Committee had an opportunity to review it (Figure 4).

Table 6. Irvington to East Loop 138kV Transmission Line Project Siting Report Matrix

CRITERIA	ALTERNATIVES*				
	A	**B1**	**B2**	**C1**	**C1**
1. Presence/Absence of an existing corridor and current use.	2	2	2	1	1
2. Existing and planned land use that is compatible with its use as a transmission line corridor.	3	3	3	2	2
3. Residential development adjacent to the corridor as measured by distance to existing residences and planned future development.	2	2	2	3	3
4. Presence/absence of sensitive receptors as measured by distance to existing sensitive receptors.	1	1	1	1	1
5. Room for separation from existing utilities in the corridor as measured by presence and degree of mitigation.	1	2	2	2	2
6. Viewshed associated with the corridor as measured by change in viewing experience and type of viewing experience (i.e. commuter, recreationist, resident).	3	3	3	1	1
7. Known or potentially eligible cultural resources in the corridor as measured by documentation through previous survey effort and ranked by degree of mitigation required.	3	3	3	3	3
8. Special status species and/or habitat as measured by presence/absence of potentially suitable habitat.	3	2	2	2	2
9. 100-year Floodplain as measured by location and engineering design.	2	2	2	1	1
10. Ability to construct and maintain the transmission line	2	3	3	2	2
11. Cost of Construction.	3	2	2	2	1
Total 1s (Major effect/impact on criteria)	2	1	1	4	5
Total 2s (Moderate effect/impact on criteria, relative to other alternatives)	4	6	6	5	4
Total 3s (No effect/impact or meets criteria)	5	4	4	2	2
Grand Total	**25**	**25**	**25**	**20**	**19**

*Alternative 1 has been combined with each lettered alternative.

12.0 Alternatives Not Considered

The following alternatives were not considered in this assessment because they either did not meet the objectives of the project or presented a significant constraint to the engineering, construction or cost of the project.

12.1 System Alternatives

No other system was considered as part of this assessment because 138 kV is required to meet future demand.

12.2 Alternative Pole Types and Materials

Only single-mast steel poles were considered for each line alternative. Due to the height required to facilitate construction of the lines, no other material would meet the engineering requirements of the system.

12.3 Alternative Pole Treatment

Due to the significant costs associated with initial painting and maintaining painted finishes, painted finishes were not considered as part of the alternatives assessment.

12.4 Undergrounding Lines

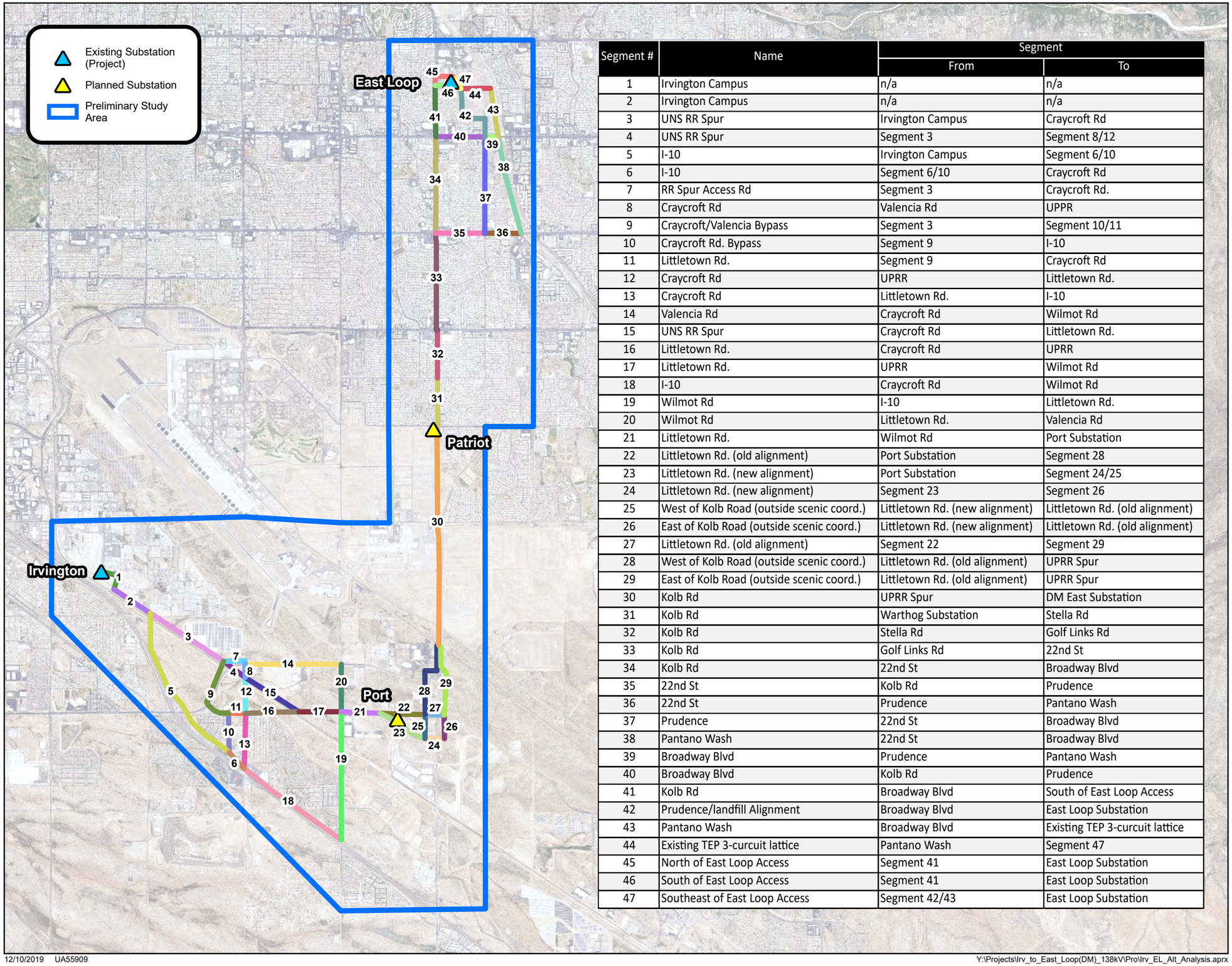
Underground installation of the 138 kV transmission lines was not considered as a feasible or prudent option for the alternatives considered in this assessment. Installing lines underground for a project of this scale would be cost-prohibitive, would significantly increase environmental impacts (due to the 1/ 4-mile clear area required at the ground surface above the line) and would significantly increase maintenance costs. Repair activities for underground utilities are also more difficult, thereby, increasing the cost to maintain reliability.

12.5 Route Alternatives Outside of the Study Area

Only those routes that were in the final study area were considered. There are no additional routes in the study area that have not been considered as part of this assessment. Line routes outside of the study area would not meet the primary project objective of connecting the Irvington and East Loop Substations.

13.0 References

Horst, T.J. 1982. “A Monte Carlo Methodology for Analyzing Environmental Uncertainties in Siting Energy Facilities.” IMACS. World Congress on System Simulation and Scientific Computation. Montreal, Canada.



Segment #	Name	Segment	
		From	To
1	Irvington Campus	n/a	n/a
2	Irvington Campus	n/a	n/a
3	UNS RR Spur	Irvington Campus	Craycroft Rd
4	UNS RR Spur	Segment 3	Segment 8/12
5	I-10	Irvington Campus	Segment 6/10
6	I-10	Segment 6/10	Craycroft Rd
7	RR Spur Access Rd	Segment 3	Craycroft Rd.
8	Craycroft Rd	Valencia Rd	UPPR
9	Craycroft/Valencia Bypass	Segment 3	Segment 10/11
10	Craycroft Rd. Bypass	Segment 9	I-10
11	Littletown Rd.	Segment 9	Craycroft Rd
12	Craycroft Rd	UPRR	Littletown Rd.
13	Craycroft Rd	Littletown Rd.	I-10
14	Valencia Rd	Craycroft Rd	Wilmot Rd
15	UNS RR Spur	Craycroft Rd	Littletown Rd.
16	Littletown Rd.	Craycroft Rd	UPRR
17	Littletown Rd.	UPRR	Wilmot Rd
18	I-10	Craycroft Rd	Wilmot Rd
19	Wilmot Rd	I-10	Littletown Rd.
20	Wilmot Rd	Littletown Rd.	Valencia Rd
21	Littletown Rd.	Wilmot Rd	Port Substation
22	Littletown Rd. (old alignment)	Port Substation	Segment 28
23	Littletown Rd. (new alignment)	Port Substation	Segment 24/25
24	Littletown Rd. (new alignment)	Segment 23	Segment 26
25	West of Kolb Road (outside scenic coord.)	Littletown Rd. (new alignment)	Littletown Rd. (old alignment)
26	East of Kolb Road (outside scenic coord.)	Littletown Rd. (new alignment)	Littletown Rd. (old alignment)
27	Littletown Rd. (old alignment)	Segment 22	Segment 29
28	West of Kolb Road (outside scenic coord.)	Littletown Rd. (old alignment)	UPRR Spur
29	East of Kolb Road (outside scenic coord.)	Littletown Rd. (old alignment)	UPRR Spur
30	Kolb Rd	UPRR Spur	DM East Substation
31	Kolb Rd	Warthog Substation	Stella Rd
32	Kolb Rd	Stella Rd	Golf Links Rd
33	Kolb Rd	Golf Links Rd	22nd St
34	Kolb Rd	22nd St	Broadway Blvd
35	22nd St	Kolb Rd	Prudence
36	22nd St	Prudence	Pantano Wash
37	Prudence	22nd St	Broadway Blvd
38	Pantano Wash	22nd St	Broadway Blvd
39	Broadway Blvd	Prudence	Pantano Wash
40	Broadway Blvd	Kolb Rd	Prudence
41	Kolb Rd	Broadway Blvd	South of East Loop Access
42	Prudence/landfill Alignment	Broadway Blvd	East Loop Substation
43	Pantano Wash	Broadway Blvd	Existing TEP 3-curcuit lattice
44	Existing TEP 3-curcuit lattice	Pantano Wash	Segment 47
45	North of East Loop Access	Segment 41	East Loop Substation
46	South of East Loop Access	Segment 41	East Loop Substation
47	Southeast of East Loop Access	Segment 42/43	East Loop Substation

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Figure 1

Irvington to East Loop 138 kV Transmission Line Project - Alternative Route Development Report

Preliminary Study Area and Preliminary Link Segments

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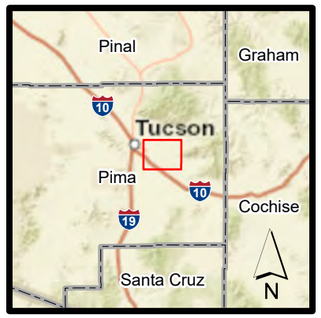

Sources: Esri, Tucson Electric Power, Pima County, City of Tucson, and Arizona State Land Department.
Projection: NAD 1983 UTM Zone 12N
Basemap: PAG Imagery 2017

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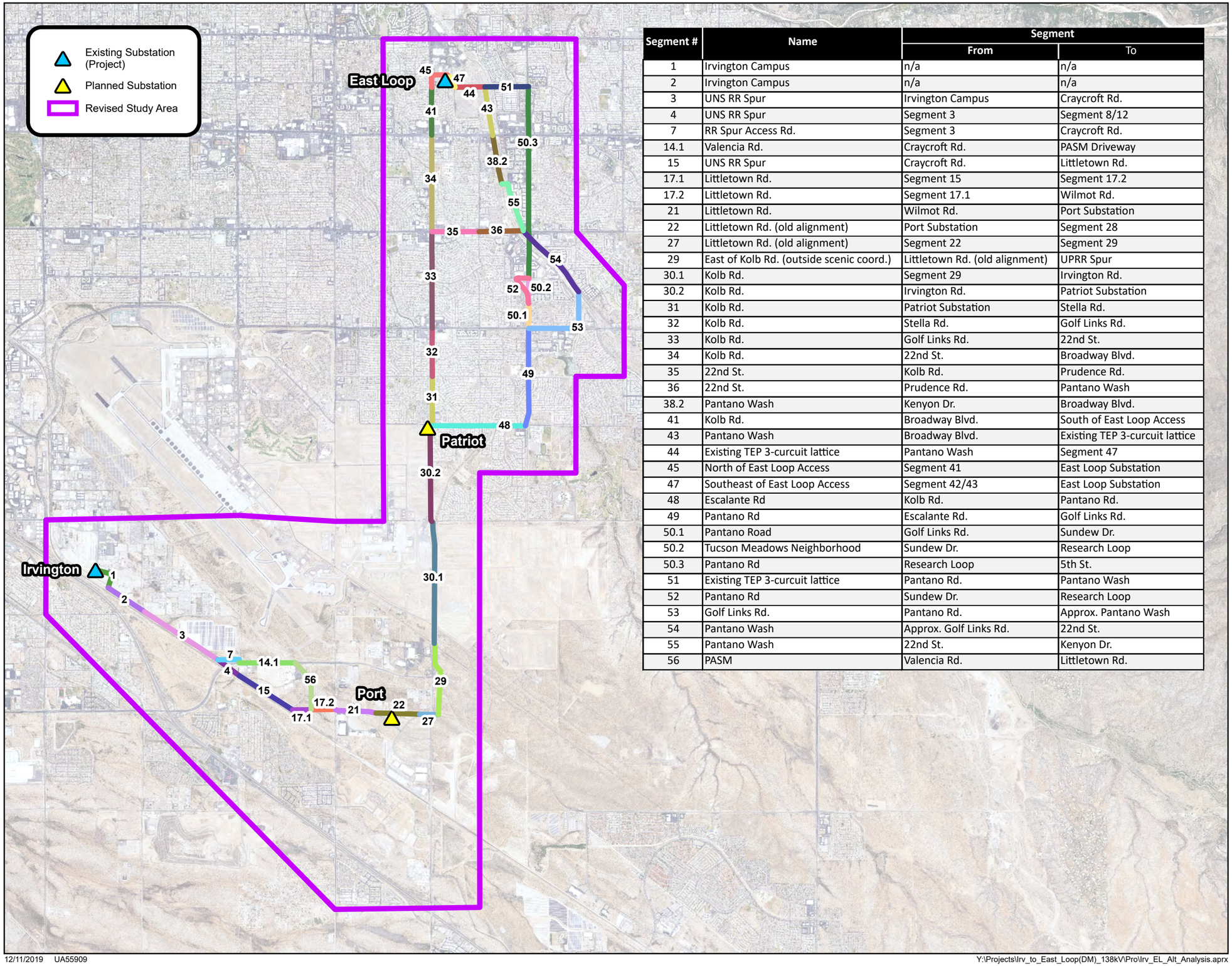

Segment #	Name	Segment	
		From	To
1	Irvington Campus	n/a	n/a
2	Irvington Campus	n/a	n/a
3	UNS RR Spur	Irvington Campus	Craycroft Rd.
4	UNS RR Spur	Segment 3	Segment 8/12
7	RR Spur Access Rd.	Segment 3	Craycroft Rd.
14.1	Valencia Rd.	Craycroft Rd.	PASM Driveway
15	UNS RR Spur	Craycroft Rd.	Littletown Rd.
17.1	Littletown Rd.	Segment 15	Segment 17.2
17.2	Littletown Rd.	Segment 17.1	Wilmot Rd.
21	Littletown Rd.	Wilmot Rd.	Port Substation
22	Littletown Rd. (old alignment)	Port Substation	Segment 28
27	Littletown Rd. (old alignment)	Segment 22	Segment 29
29	East of Kolb Rd. (outside scenic coord.)	Littletown Rd. (old alignment)	UPRR Spur
30.1	Kolb Rd.	Segment 29	Irvington Rd.
30.2	Kolb Rd.	Irvington Rd.	Patriot Substation
31	Kolb Rd.	Patriot Substation	Stella Rd.
32	Kolb Rd.	Stella Rd.	Golf Links Rd.
33	Kolb Rd.	Golf Links Rd.	22nd St.
34	Kolb Rd.	22nd St.	Broadway Blvd.
35	22nd St.	Kolb Rd.	Prudence Rd.
36	22nd St.	Prudence Rd.	Pantano Wash
38.2	Pantano Wash	Kenyon Dr.	Broadway Blvd.
41	Kolb Rd.	Broadway Blvd.	South of East Loop Access
43	Pantano Wash	Broadway Blvd.	Existing TEP 3-curcuit lattice
44	Existing TEP 3-curcuit lattice	Pantano Wash	Segment 47
45	North of East Loop Access	Segment 41	East Loop Substation
47	Southeast of East Loop Access	Segment 42/43	East Loop Substation
48	Escalante Rd	Kolb Rd.	Pantano Rd.
49	Pantano Rd	Escalante Rd.	Golf Links Rd.
50.1	Pantano Road	Golf Links Rd.	Sundew Dr.
50.2	Tucson Meadows Neighborhood	Sundew Dr.	Research Loop
50.3	Pantano Rd	Research Loop	5th St.
51	Existing TEP 3-curcuit lattice	Pantano Rd.	Pantano Wash
52	Pantano Rd	Sundew Dr.	Research Loop
53	Golf Links Rd.	Pantano Rd.	Approx. Pantano Wash
54	Pantano Wash	Approx. Golf Links Rd.	22nd St.
55	Pantano Wash	22nd St.	Kenyon Dr.
56	PASM	Valencia Rd.	Littletown Rd.

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Figure 2

Irvington to East Loop 138 kV Transmission Line Project - Alternative Route Development Report

Revised Study Area and Revised Link Segments

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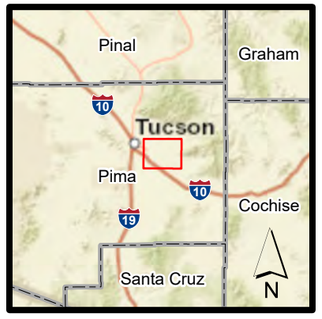

Sources: Esri, Tucson Electric Power, Pima County, City of Tucson, and Arizona State Land Department.
Projection: NAD 1983 UTM Zone 12N
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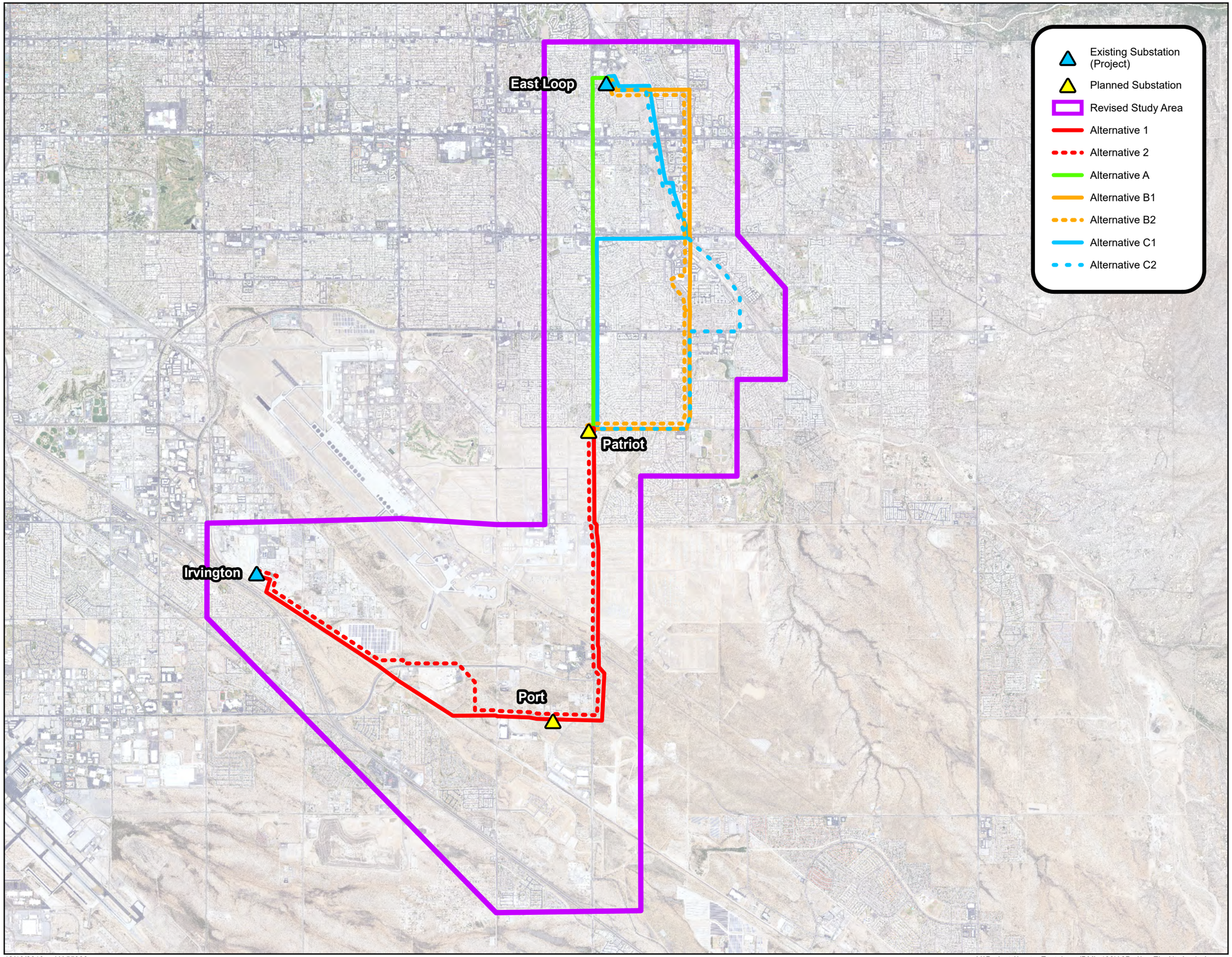

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Figure 3

Irvington to East Loop 138 kV Transmission Line Project - Alternative Route Development Report

Revised Study Area and Preliminary Routes

NOTE: Alternatives are offset graphic representation to show common overlap alignments.

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Sources: Esri, Tucson Electric Power, Pima County, City of Tucson, and Arizona State Land Department.
Projection: NAD 1983 UTM Zone 12N
Basemap: PAG Imagery 2017

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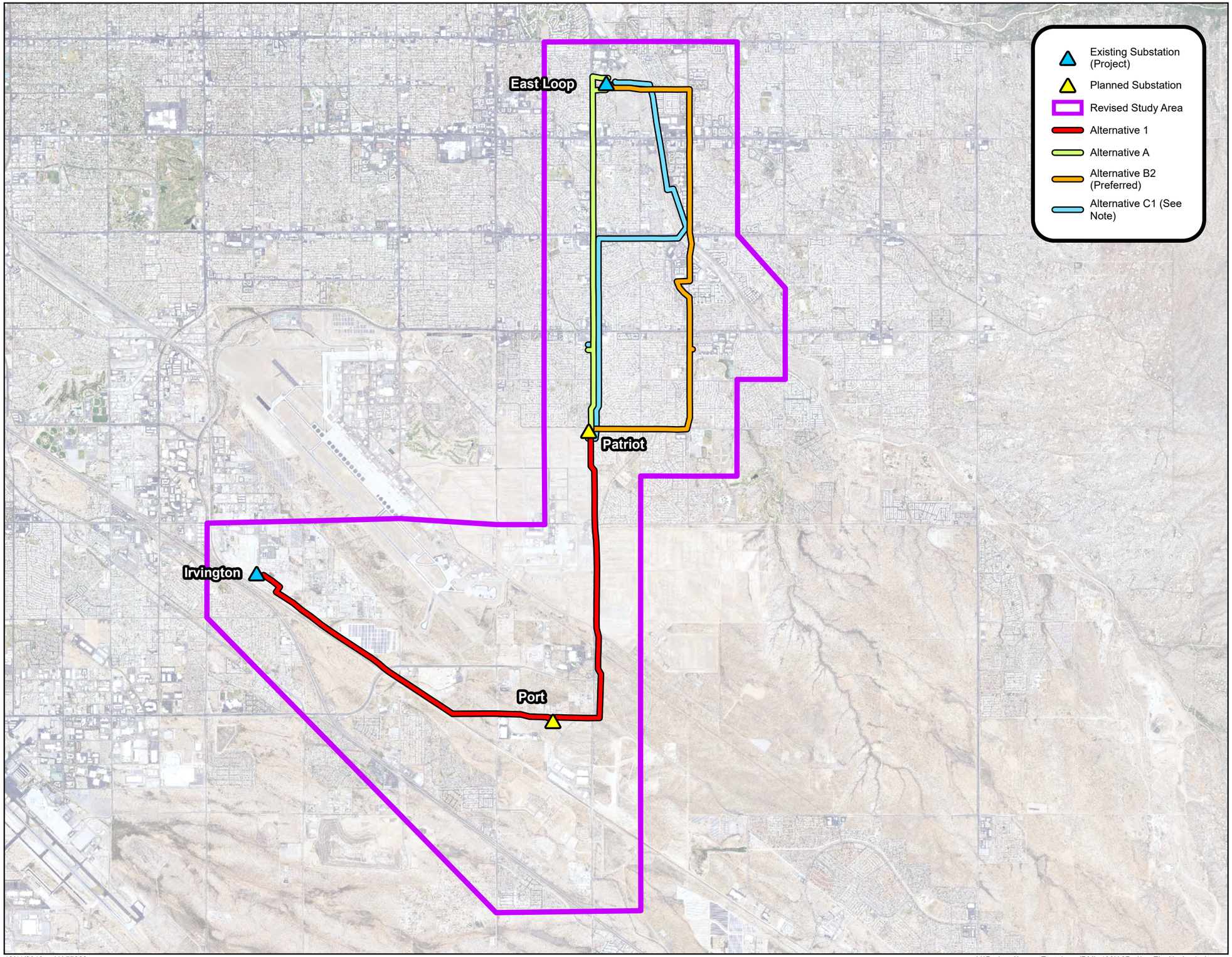

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Figure 4

Irvington to East Loop 138 kV Transmission Line Project - Alternative Route Development Report

Revised Study Area and Final Routes

NOTE: Alternative C1 is an offset graphic representation to show common overlap alignments.

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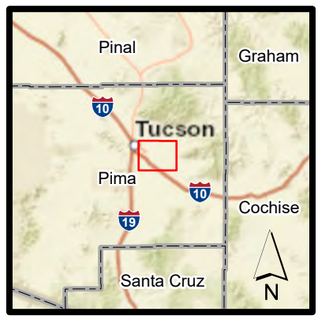

Sources: Esri, Tucson Electric Power, Pima County, City of Tucson, and Arizona State Land Department.
Projection: NAD 1983 UTM Zone 12N
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Appendix A

Table A-1. Preliminary Engineering/Constructability Analysis

Segment #	Name	Segment		Side of Road	Opportunities	Constraints	Systems Comments E.Luna	SW Gas Conflicts
		From	To					
1	Irvington Campus	n/a	n/a					
2	Irvington Campus	n/a	n/a	north of RR spur			existing dist line needs to stay, can underground but it has to still cross I-10 freeway	
3	UNS RR Spur	Irvington Campus	Craycroft Rd	north of RR spur			no constraints. Preferred path over segment 5 for 138kV and 13.8kV	Possible conflict S.P. Pipeline parallels tracks, might be on south side of tracks.
4	UNS RR Spur	Segment 3	Segment 8/12	north of RR spur			no constraints	Possible conflict S.P. Pipeline parallels tracks, might be on south side of tracks.
5	I-10	Irvington Campus	Segment 6/10	north of I-10			least preferred path. Already has triple 138 circuit we would like to avoid or build next too.	
6	I-10	Segment 6/10	Craycroft Rd	north of I-10		Existing distribution on N. Side would have to underground	we are ok with the dist going underground as long as we don't loss the feeder tie	
7	RR Spur Access Rd	Segment 3	Craycroft Rd.	either side of access road			no constraints	
8	Craycroft Rd	Valencia Rd	UPPR	either side of Craycroft			no constraints	
9	Craycroft/Valencia Bypass	Segment 3	Segment 10/11	Cross Country			no constraints	Distribution Line on South Side of Littletown Rd.

Segment #	Name	Segment		Side of Road	Opportunities	Constraints	Systems Comments E.Luna	SW Gas Conflicts
		From	To					
10	Craycroft Rd. Bypass	Segment 9	I-10	Cross Country			no constraints	
11	Littletown Rd.	Segment 9	Craycroft Rd	either side		School on N. side of road, distribution on S. side of road, distribution on S. would have to underground.	we are ok with dist going underground	Distribution Line on South Side of Littletown Rd.
12	Craycroft Rd	UPRR	Littletown Rd.	either side		Elementary and Middle School, Julien Wash, Park, and rickety bridge that equipment cannot cross.	no constraints	
13	Craycroft Rd	Littletown Rd.	I-10	west side	existing distribution ROW	Existing distribution on W. side would have to underground	we are ok with dist going underground	Distribution Line on East Side of Craycroft Rd.
14	Valencia Rd	Craycroft Rd	Wilmot Rd	either side			no constraints	No row conflict/cross DM main line on Valencia
15	UNS RR Spur	Craycroft Rd	Littletown Rd.	north of RR Spur	existing distribution ROW	Existing distribution on N. Side would have to underground	we are ok with dist going underground	Possible conflict S.P. Pipeline parallels tracks, might be on south side of tracks.
16	Littletown Rd.	Craycroft Rd	UPRR	either side			existing dist might be in the way	Distribution Line on South Side of Littletown Rd.
17	Littletown Rd.	UPRR	Wilmot Rd	either side		Existing Distribution on N. Side would have to underground	we are ok with dist going underground	Distribution Line on South Side of Littletown Rd.

Segment #	Name	Segment		Side of Road	Opportunities	Constraints	Systems Comments E.Luna	SW Gas Conflicts
		From	To					
18	I-10	Craycroft Rd	Wilmot Rd	north of I-10		Existing distribution on N. Side would have to underground	we are ok with dist going underground	
19	Wilmot Rd	I-10	Littletown Rd.	either side		Existing distribution on E. at Valencia and W. at Littletown would have to underground	we are ok with dist going underground	Distribution Line - Flips East and West side of Wilmot
20	Wilmot Rd	Littletown Rd.	Valencia Rd	either side		Existing distribution on W. side would have to underground	we are ok with dist going underground	High Pressure Feeder Line - Flips East and West side of Wilmot
21	Littletown Rd.	Wilmot Rd	Port Substation	either side	South side open	Distribution on N. Side would have to underground	we are ok with dist going underground	
22	Littletown Rd. (old alignment)	Port Substation	Segment 28	either side	South side open	Distribution on N. Side would have to underground	we are ok with dist going underground	No row conflict/cross DM main line
23	Littletown Rd. (new alignment)	Port Substation	Segment 24/25	either side			no constraints	Parallels DM main line on North side of Littletown
24	Littletown Rd. (new alignment)	Segment 23	Segment 26	either side			no constraints	
25	West of Kolb Road (outside scenic coord.)	Littletown Rd. (new alignment)	Littletown Rd. (old alignment)	west of Kolb			no constraints	
26	East of Kolb Road (outside scenic coord.)	Littletown Rd. (new alignment)	Littletown Rd. (old alignment)	east of Kolb		Possible distribution underground conflict.	agreed	
27	Littletown Rd. (old alignment)	Segment 22	Segment 29	either side			possible dist conflict	
28	West of Kolb Road (outside scenic coord.)	Littletown Rd. (old alignment)	UPRR Spur	west of Kolb			existing dist but if line is further west, no conflicts	

Segment #	Name	Segment		Side of Road	Opportunities	Constraints	Systems Comments E.Luna	SW Gas Conflicts
		From	To					
29	East of Kolb Road (outside scenic coord.)	Littletown Rd. (old alignment)	UPRR Spur	east of Kolb			no constraints	
30	Kolb Rd	UPRR Spur	DM East Substation	west of Kolb	on DMAFB property		no constraints	High Pressure Feeder Line - West side of Kolb (not sure if in road or on base?) Starts At Irvington Rd.
31	Kolb Rd	Warthog Substation	Stella Rd	either side	New build on west side or double-circuit 138/46 and underground dist on east side. 46kV is de-energized on east side, talk to systems about plan for 46kV.		existing dist on eastside need to look at	Distribution Line on East Side of Kolb Rd
32	Kolb Rd	Stella Rd	Golf Links Rd	either side	46kv on east side of road, 46kV is de-energized on east side until South Kolb Sub, talk to systems about plan for 46kV.	Distribution both sides of rd	need dist	Distribution Line on East Side of Kolb Rd
33	Kolb Rd	Golf Links Rd	22nd St	either side	Single-circuit dist on east side of rd	Double-circuit dist and 46kV on west side of rd	need dist and 46kV, source to South Kolb	Distribution Line - Flips East and West Side of Kolb Rd
34	Kolb Rd	22nd St	Broadway Blvd	either side	Existing single-circuit 138kV on east side of rd - rebuilt as double circuit	46kV and distribution on west side of road - rebuilt as 138/46kv double	either or for us, still need 46kV and dist	Distribution Line - Flips East and West Side of Kolb Rd in parts

Segment #	Name	Segment		Side of Road	Opportunities	Constraints	Systems Comments E.Luna	SW Gas Conflicts
		From	To					
						circuit with underground dist.		
35	22nd St	Kolb Rd	Prudence	either side		Distribution on north side	we will have to coordinate how to re-work dist	Distribution Line - North side of 22nd Street
36	22nd St	Prudence	Pantano Wash	either side		Distribution on North and South Side	we will have to coordinate how to re-work dist	High pressure Feeder North Side of 22nd Street
37	Prudence	22nd St	Broadway Blvd	either side		YMCA pre-school on east side, distribution on west side	we will have to coordinate how to re-work dist	Distribution Line - East side of Prudence
38	Pantano Wash	22nd St	Broadway Blvd	west side of wash		Proposed underground distribution on west side of wash.	we will have to coordinate how to re-work dist	Small Distribution line near Broadway
39	Broadway Blvd	Prudence	Pantano Wash	either side		Distribution on North side	we will have to coordinate how to re-work dist	Distribution line on Sout side of Broadway
40	Broadway Blvd	Kolb Rd	Prudence	either side		Double-circuit distribution on north side of rd	we will have to coordinate how to re-work dist	Distribution Line - North side of Broadway
41	Kolb Rd	Broadway Blvd	South of East Loop Access	east side	Existing 138kV on east side of rd	Double-circuit 46kV on west side of Kolb Rd.	we will have to coordinate how to re-work dist	Distribution Line - Flips East and West Side of Kolb Rd in parts

Segment #	Name	Segment		Side of Road	Opportunities	Constraints	Systems Comments E.Luna	SW Gas Conflicts
		From	To					
42	Prudence/landfill Alignment	Broadway Blvd	East Loop Substation	Cross Country		Existing distribution on west side of canal	we will have to coordinate how to re-work dist	
43	Pantano Wash	Broadway Blvd	Existing TEP 3-curcuit lattice	west side of wash			build new 138kv next to lattice	
44	Existing TEP 3-curcuit lattice	Pantano Wash	Segment 47	On existing TEP 3-curcuit lattice		Might have to cross possibly 4 - 138kV lines and 2 - 46kV lines.	build new 138kv next to lattice	
45	North of East Loop Access	Segment 41	East Loop Substation	Along parcel boundary				
46	South of East Loop Access	Segment 41	East Loop Substation	Along existing access road				
47	Southeast of East Loop Access	Segment 42/43	East Loop Substation	On existing TEP 3-curcuit lattice				

Appendix B

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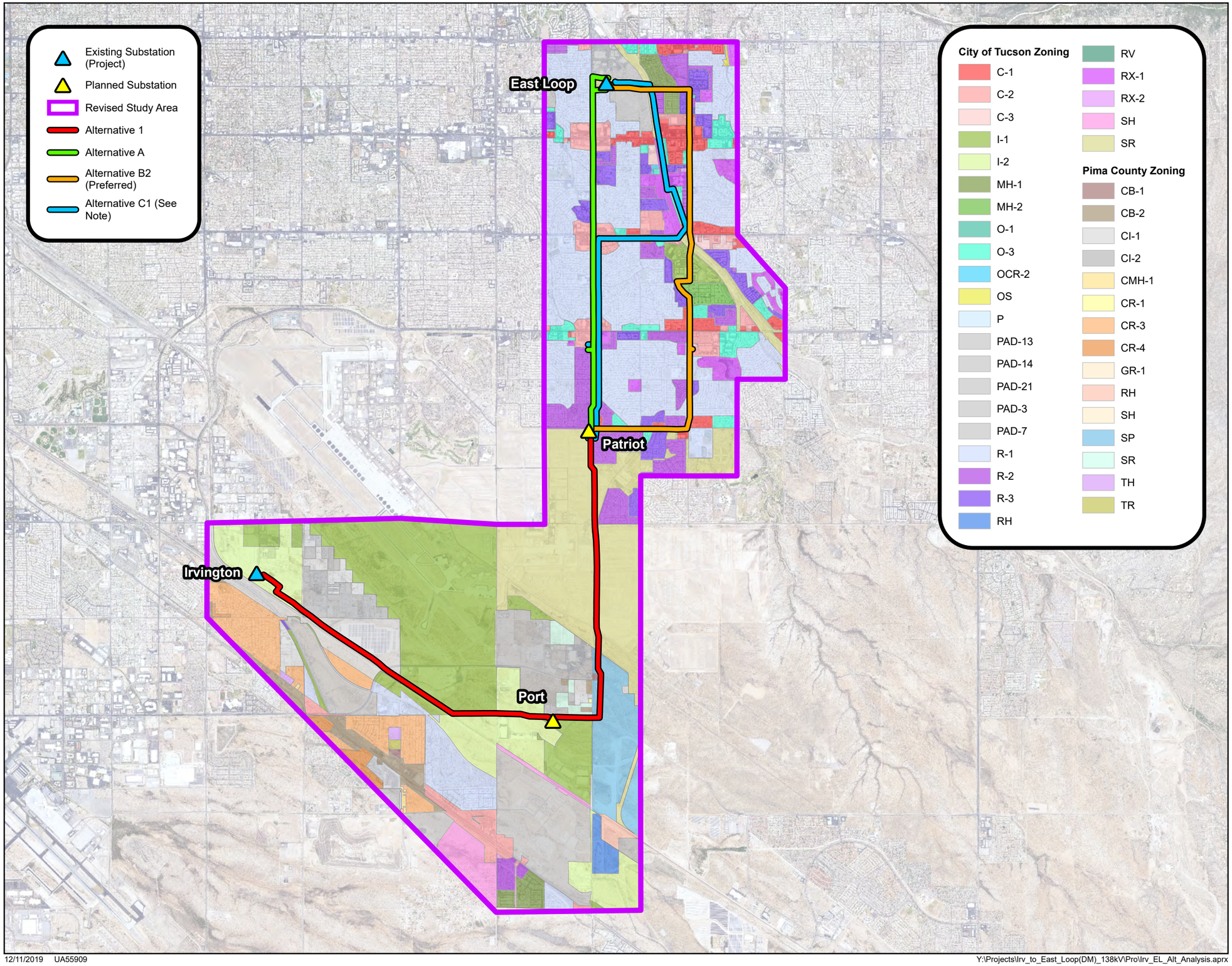

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Figure B1

Irvington to East Loop 138 kV Transmission Line Project - Alternative Route Development Report

Zoning

NOTE: Alternative C1 is an offset graphic representation to show common overlap alignments.

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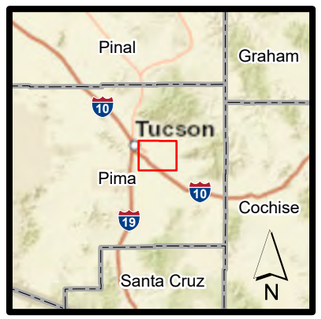

Sources: Esri, Tucson Electric Power, Pima County, City of Tucson, and Arizona State Land Department.
Projection: NAD 1983 UTM Zone 12N
Basemap: PAG Imagery 2017

This map is for planning purposes only.
UNS Energy make no warranty of its accuracy.

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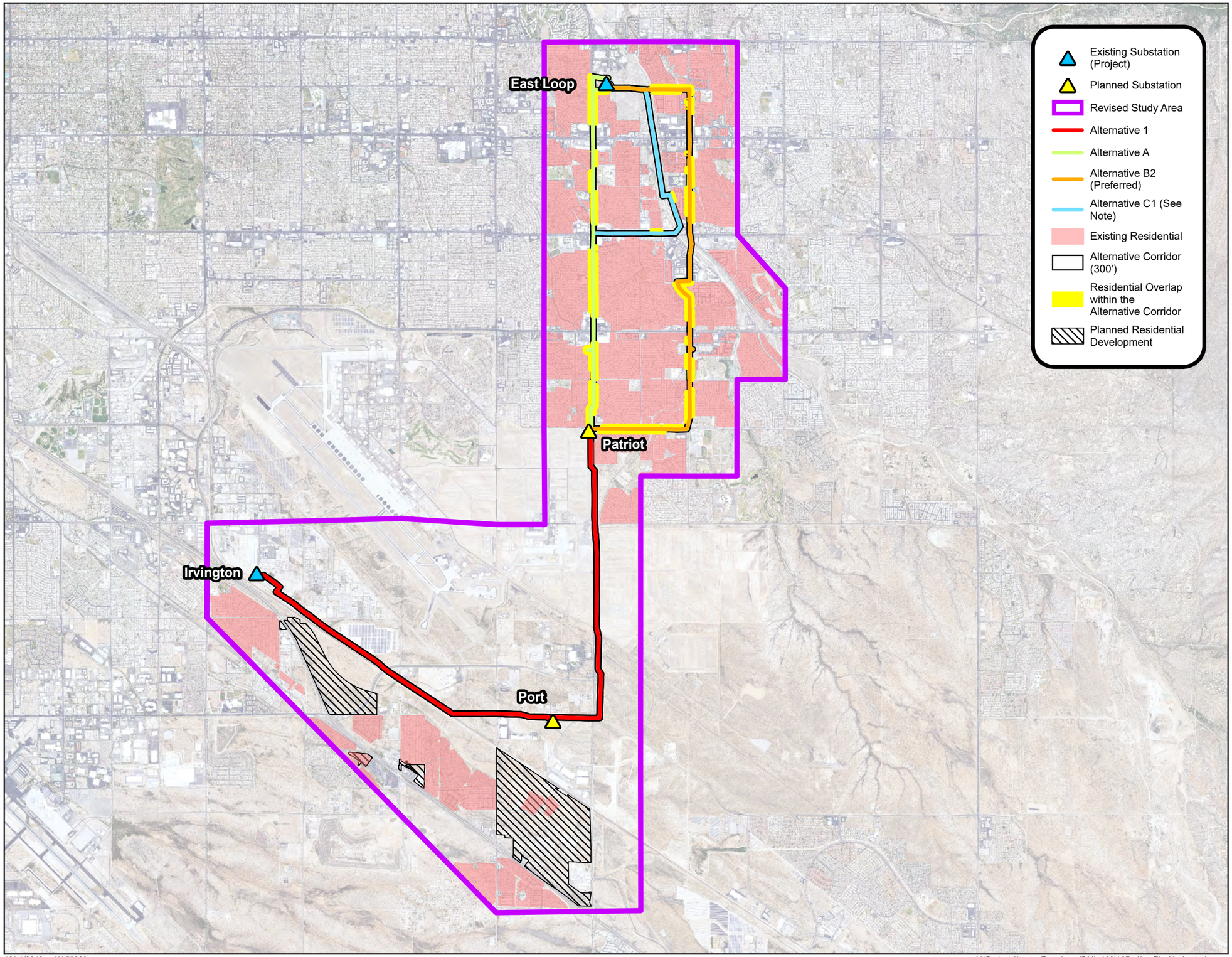

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Figure B2

Irvington to East Loop 138 kV Transmission Line Project - Alternative Route Development Report

Existing Residential

NOTE: Alternative C1 follows the same route as Alternative A from Patriot to E 22nd St and then the same route as Alternative B2 from Pantano Wash to East Loop.

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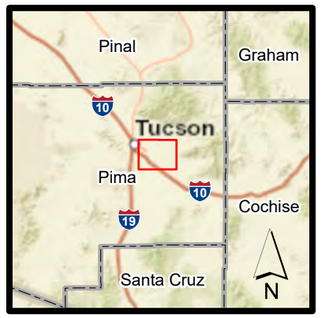

Sources: Esri, Tucson Electric Power, Pima County, City of Tucson, and Arizona State Land Department.
Projection: NAD 1983 UTM Zone 12N
Basemap: PAG Imagery 2017

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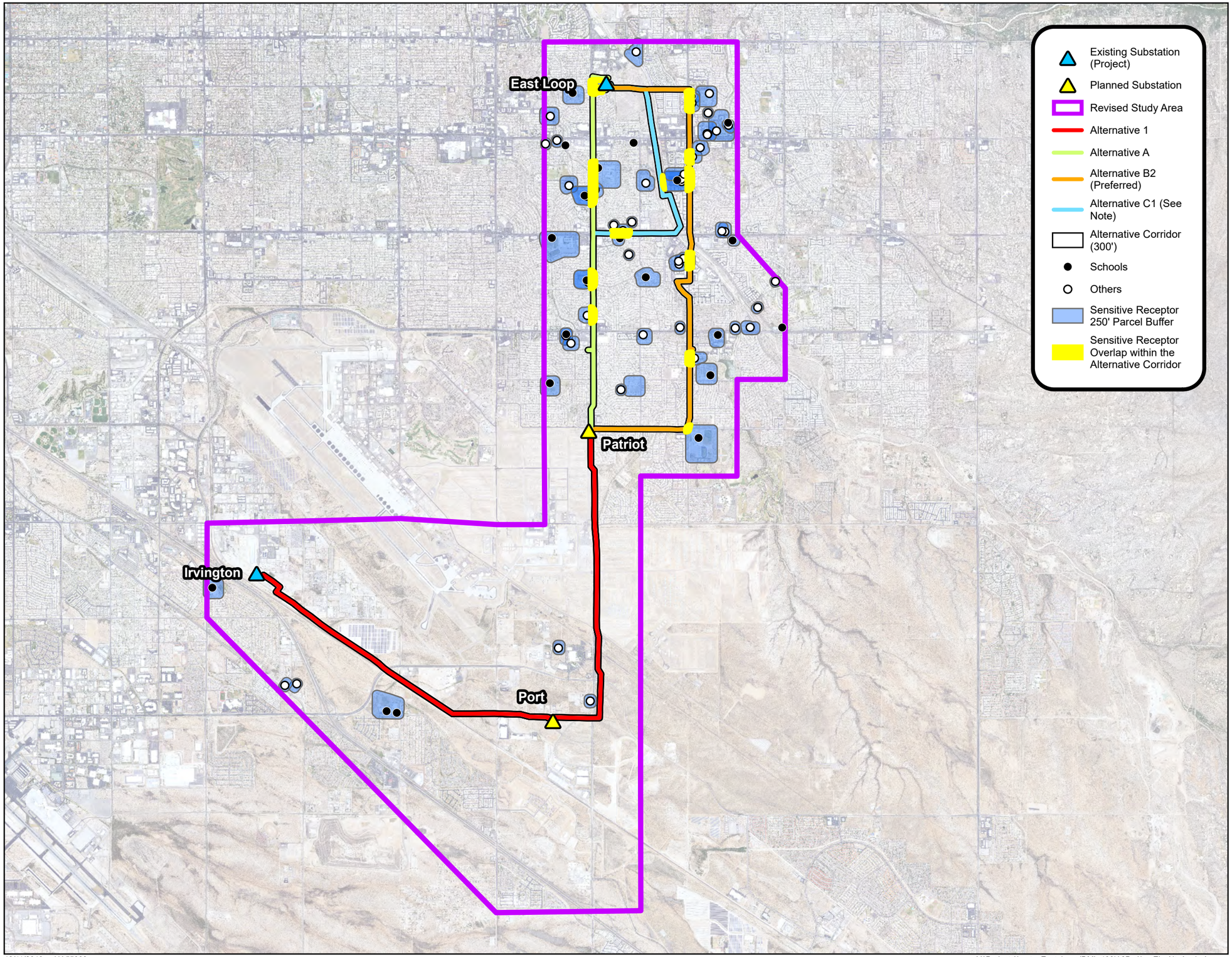

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Figure B3

Irvington to East Loop 138 kV Transmission Line Project - Alternative Route Development Report

Sensitive Receptors

NOTE: Alternative C1 follows the same route as Alternative A from Patriot to E 22nd St and then the same route as Alternative B2 from Pantano Wash to East Loop.

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Sources: Esri, Tucson Electric Power, Pima County, City of Tucson, and Arizona State Land Department.
Projection: NAD 1983 UTM Zone 12N
Basemap: PAG Imagery 2017

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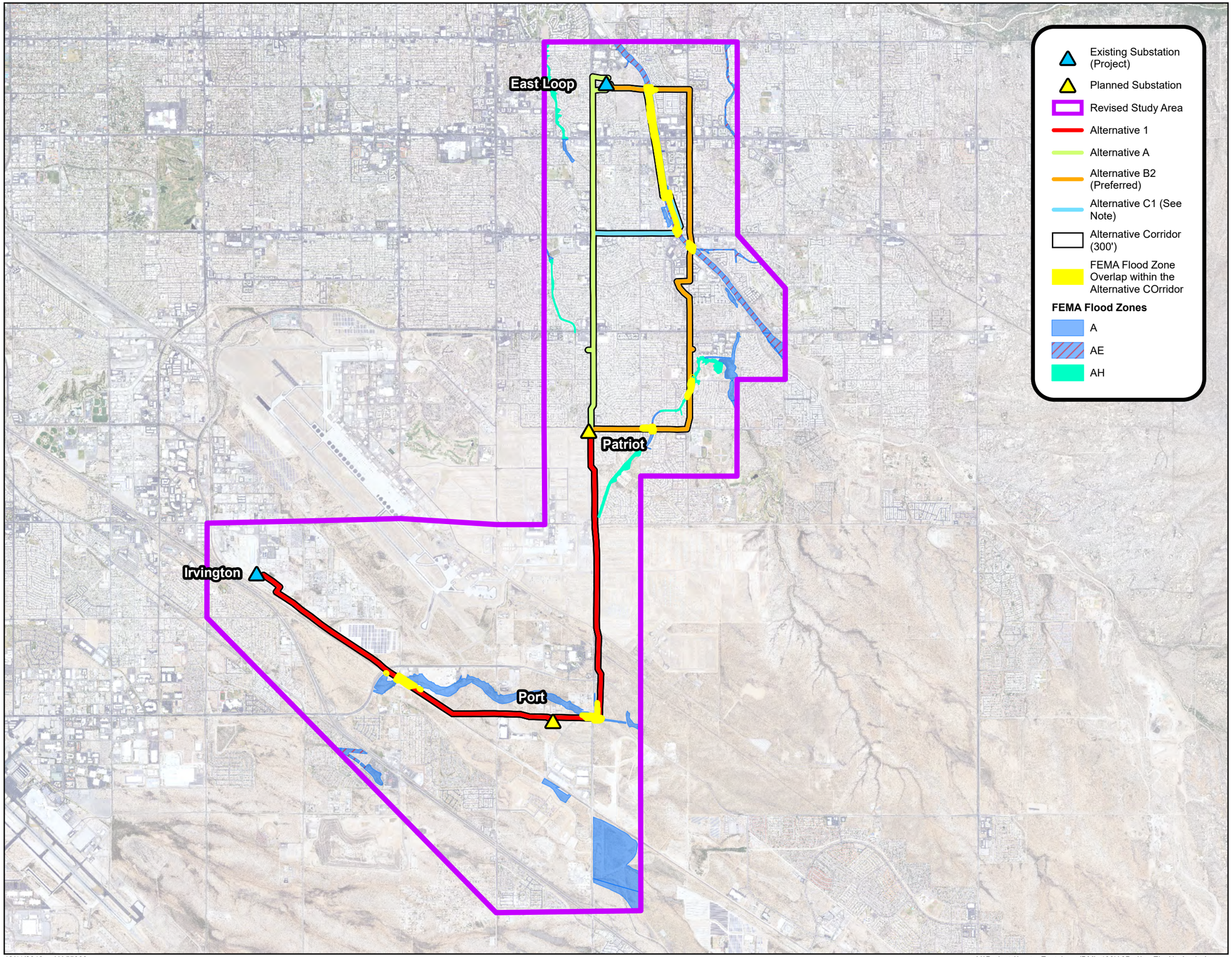

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Land Resources

Figure B4

Irvington to East Loop 138 kV Transmission Line Project - Alternative Route Development Report

FEMA Flood Zones

NOTE: Alternative C1 follows the same route as Alternative A from Patriot to E 22nd St and then the same route as Alternative B2 from Pantano Wash to East Loop.

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Sources: Esri, Tucson Electric Power, Pima County, City of Tucson, and Arizona State Land Department.
Projection: NAD 1983 UTM Zone 12N
Basemap: PAG Imagery 2017

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EXHIBIT C

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EXHIBIT C: AREAS OF BIOLOGICAL WEALTH

Describe any areas in the vicinity of the proposed site or route which are unique because of biological wealth or because they are habitats for rare and endangered species. Describe the biological wealth or species involved and state the effects, if any, the proposed facilities will have thereon.

C.1 Biological Wealth

C.1.1 Introduction

Exhibit C-1 maps the alternatives in relation to major washes and riparian habitat. The BE (Exhibit C-2 (Tierra, 2019a)), as well as this section, provide a general description of the existing environment with respect to vegetation, wildlife, and the potential for special status species to occur in the study area. The information provided includes a list of special status species obtained from the USFWS Information for Planning and Consultation (IPaC) online database, and species lists, ranges and habitat data obtained from the Arizona Game and Fish Department (AZGFD) Heritage Database Management System (HDMS) On-line Environmental Review tool, National Wetlands Inventory Maps, Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM), and review of habitat and life history requirements. The BE analyzed the entire Study Area (267 acres).

C.2 Special Status Species

Desktop research identified eighteen (18) special status species as potentially occurring within the study area. No proposed or designated critical habitats are located in the analysis area. A detailed screening analysis of each species' life history, habitat requirements, known range and distribution, and known locality information determined that fourteen (14) of the species could be removed from further consideration as the study area is either outside their ranges, or suitable habitat is not present. The four (4) species that have the potential to occur in the study area or vicinity are indicated in Table 5.

Table 5. Special Status Species with Potential to Occur

SPECIES	STATUS*	HABITAT	POTENTIAL HABITAT LOCATED WITHIN THE STUDY AREA	FINDING
Western burrowing owl *(Athene cunicularia hypugaea)*	1B PVS MBTA	Open, well-drained grasslands, steppes, deserts, prairies, and agricultural lands. Associated with burrowing mammals.	Yes	No impact
Western yellow bat *(Lasiurus xanthinus)*	1B	Hibernating (dead leaves of Washington fan palm *Washingtonia robusta*); roosting (sycamore, hackberries, cottonwoods)	Yes	No impact
Brazilian free-tailed bat (*Tadarida brasiliensis*)	1B	Caves, mine tunnels, bridges, parking garages, located high above the ground. Typically in lowland desertscrub	Yes	No impact
Rufous-winged sparrow (*Peucaea carpalis*)	1B, PVS	Flat or gently rolling desertscrub or thornscrub, with scattered spiny trees and shrubs	Yes	May impact, is not likely to lead to listing

*Key: E = Endangered (USFWS); T = Threatened (FWS); ENP = Experimental Non-essential Population (FWS); 1A = Species of Greatest Conservation Need (SGCN) Tier (AZGFD); HS = Highly Safeguarded (Arizona Department of Agriculture (AZDA)); PVS = Priority Vulnerable Species (Pima County SDCP); SR = Salvage Restricted (AZDA). 1B = SGCN (AZGFD).

The western burrowing owl is not afforded protection under the Endangered Species Act (ESA), but it is listed by the USFWS as a National Bird of Conservation Concern. It is also listed as endangered, threatened, or as a species of concern in nine U.S. states. All owls in Arizona are protected federally by the Migratory Bird Treaty Act (MBTA) and by Arizona state law (A.R.S. Title 17).

Portions of the Project area vegetated with scattered creosote contain suitable habitat, but no individuals, sign, or potentially suitable burrows were observed, therefore the study area is not currently occupied by this species. It is anticipated that construction of the Project would not impact the western burrowing owl, but it is recommended that a western burrowing owl survey be conducted prior to construction of the Project.

The western yellow bat hibernates among dead leaves of Washington fan palm in urban areas, and roosts in the leafy vegetation of sycamores, hackberries, and cottonwoods. Palm trees were observed in landscape plantings in various locations in the study area, that could be potentially used by this species as roosting sites. However, these palms are located beyond the road ROWs, and away from where the proposed transmission line would be placed. It is extremely unlikely that construction of the proposed transmission line would result in direct impacts to the western yellow bat.

Brazilian free-tailed bat is a Tier1B species in the Arizona State Wildlife Action Plan (SWAP). Threats to this species include habitat loss from excessive development, recreational caving, mine closures, roost destruction, and loss of foraging habitat. There is a known roosting colony of Brazilian free-tailed bats within the study area beneath the Broadway Bridge over the Pantano Wash. However, the transmission line would be located away from the bridge, and the equipment noise produced during line construction would be temporary, and negligible compared to the existing traffic noise. Construction of the proposed transmission line would have no impact on the Brazilian free-tailed bat.

Rufous-winged sparrow is a PVS in Pima County's Sonoran Desert Conservation Plan (SDCP), a Tier 1B species in AZGFD's SWAP, and is also protected under the federal MBTA. Threats to this bird consist of habitat loss from urban development and overgrazing. No rufous-winged sparrows were observed in the study area, however, potentially suitable habitat was observed in the vicinity of the existing East Loop Substation. To avoid potential temporary impacts to individuals or their habitat during construction, it is recommended that construction at the East Loop Substation be conducted outside the April to early September breeding season, and that vegetation disturbance be limited to the extent practicable during construction. Construction of the Project may temporarily impact the rufous-winged sparrow but is not likely to result in a trend towards federal listing or loss of viability.

C.3 Important Riparian Areas

There are no perennial waterways in the study area; however, there are several potentially USACE jurisdictional ephemeral washes, and one major drainage, Pantano Wash. All the drainages flow generally from southeast to northwest across the study area, and ultimately into the Santa Cruz River, approximately 5 miles to the west. The study area is mapped as Zones A, AE, AH, D and X by FEMA, indicating a flood risk ranging from ponding at depths of one to three feet to possible but undetermined. Construction of the proposed transmission line would not result in impacts to the floodplains because the topography of the area would not be substantially modified, and surface flows would not be altered, during construction.

All of the alternatives except Alternative A intersect Xeroriparian B, C, and D riparian habitat. Pantano Wash and its Class H (Hydroriparian) Important Riparian Area (IRA-H) is crossed or paralleled by Alternatives B2 and C1.

The transmission lines will span the washes and associated riparian habitat. In the event that disturbance to the washes is identified during construction, it would fall under USACE Nationwide Permit (NWP) 12 for Utility Line Activities, which would require a Pre-Construction Notification if the disturbance is greater than 0.1 acres. While most of the riparian habitat would be spanned by the proposed transmission line,

construction of the line would impact riparian habitat through the trimming required for line safety and equipment access.

C.4 Potential Impacts

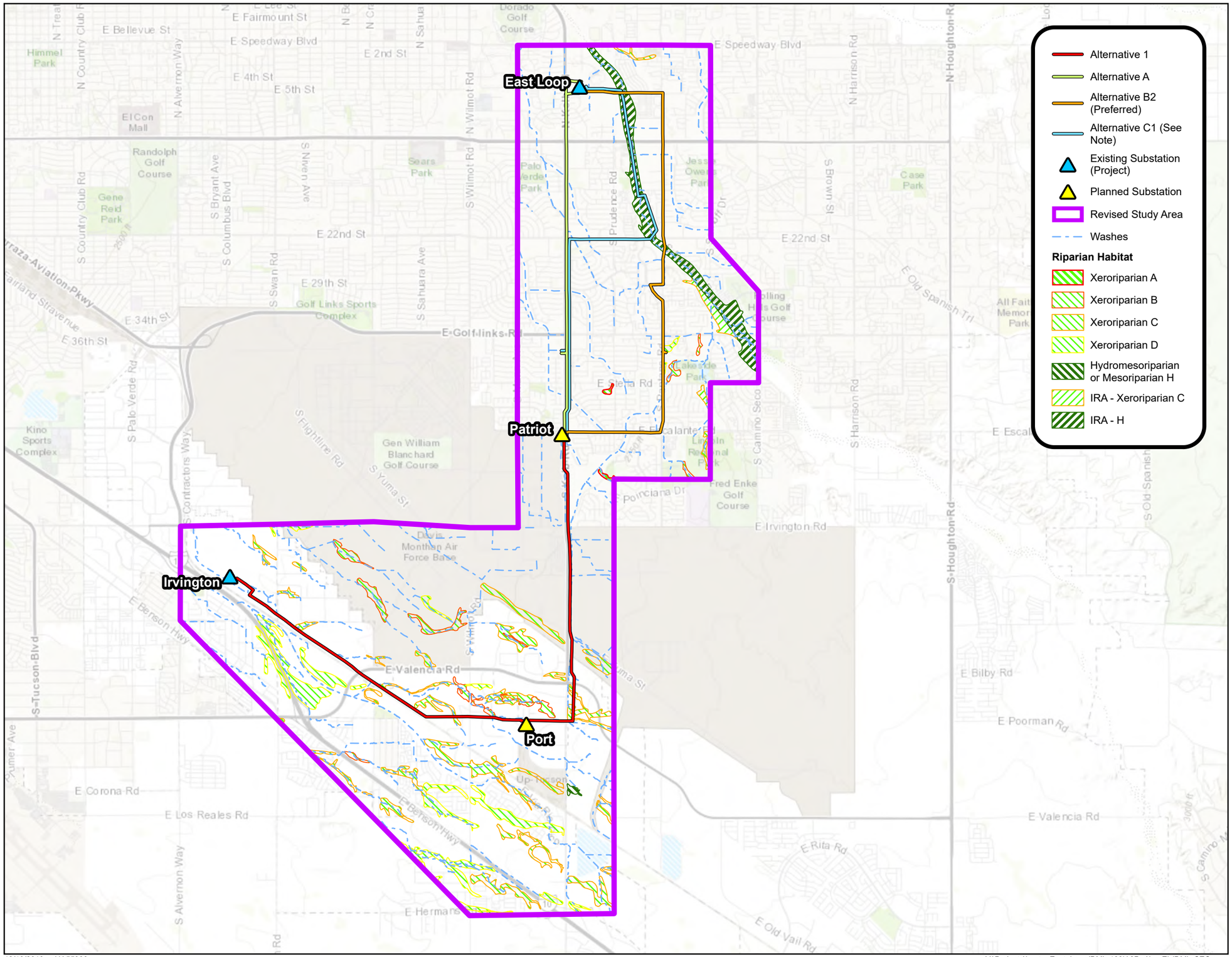
The potential for the Project's activities to affect any of the special status species was evaluated in the BE. With implementation of recommended avoidance measures, such as surveys and constructing outside the breeding season, the Project will have "No Effect" on species listed under the ESA. TEP will conduct all appropriate surveys, to include pre-construction breeding surveys.

C.5 Conclusion

The Project would have no effect on areas of biological wealth, or designated critical habitat, as these are not present in the study area. The Project would have no impact on species listed under the ESA, with implementation of recommended measures. Potential construction disturbances to the washes are not anticipated, but can be permitted under NWP 12, if necessary. Minimal, temporary, disturbance is anticipated to riparian habitat and vegetation due to plant trimming and removal to allow for equipment access during construction.

C.6 References

Tierra. (2019a). Biological Evaluation and Alternatives Analysis TEP Irvington-East Loop Transmission Line Project, Tucson, Pima County, Arizona: Tierra Right of Way.



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Tucson Electric Power
Land Resources

Exhibit C-1

Irvington to East Loop 138 kV Transmission Line Project

Biological

NOTE: Alternative C1 is an offset graphic representation to show common overlap alignments.

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Miles

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Sources: Esri, Tucson Electric Power, Pima County, City of Tucson, and Arizona State Land Department.
Projection: NAD 1983 UTM Zone 12N
Basemap: Esri World Topographic Map

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Biological Evaluation and Alternatives Analysis
TEP Irvington–East Loop Transmission Line Project
Tucson, Pima County, Arizona

Prepared by:
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Tierra Right of Way Services, Ltd.
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Prepared for:
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October 9, 2019

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ABSTRACT

PROJECT TITLE: Biological Evaluation and Alternatives Analysis: TEP Irvington–East Loop Transmission Line Project in Tucson, Pima County, Arizona

LAND STATUS: Private and Department of Defense

PROJECT DESCRIPTION: A Biological Evaluation was performed to identify and record any Federally or State-listed species or their habitats within the study area.

FIELD WORK DATE: September 25, 2019

ACRES SURVEYED: Approximately 108 ha (267 acres)

CONCLUSIONS: Tucson Electric Power (TEP) identified seven potential alternative corridors within the study area. Each of the corridors were assigned a score based on their individual potential to impact five general biological resource areas, including special status species, water resources, wildlife linkages, riparian habitat, and native plants.

The table below presents the combined impact scores for each alternative corridor and resource area evaluated in this report; a higher impact score indicates that the specific alternative would have correspondingly lower impacts on resources than an alternative with a lower score. The results of the evaluation found that Alternative 1 would result in the least amount of impacts to resources for the southern portion of the proposed transmission line between the Irvington Substation and the planned Patriot Substation. Alternative A would result in the least amount of impacts for the northern portion of the proposed line from the Patriot Substation to the East Loop Substation.

Alternative Corridor Impact Score Summary Table

Resource Affected	*Alt. 1*	*Alt. 2*	*Alt. A*	*Alt. B1*	*Alt. B2*	*Alt. C1*	*Alt. C2*
Special Status Species	2	2	2	2	2	2	2
Water Resources	3	3	3	3	3	3	3
Wildlife Linkages	3	3	3	3	3	3	3
Riparian Habitat	2	1.038	3	1.871	1.871	1.411	1
Native Plants	2	1.109	2	1.675	1.675	1.675	1.675
Total	12	10.147	13	11.546	11.546	11.086	10.675

1.0 INTRODUCTION

At the request of Tucson Electric Power Company (TEP), Tierra Right of Way Services, Ltd. (Tierra), performed an alternative corridor analysis and reconnaissance site visit for TEP's proposed transmission line project in Tucson, Arizona. The purpose of this analysis is to provide information regarding the biological resources present in the vicinity of the alternative transmission line corridors, collectively referred to as the "study area," and the potential impacts to those resources that may occur during construction and operation of the new transmission line. This Biological Evaluation (BE) includes descriptions of wildlife, native plants, suitable habitat for special status species and migratory birds, and water resources present in the study area that will assist TEP in their selection of alternative corridors for the new transmission line. The BE identifies potential impacts to these resources and can be used in support of TEP's application for a Certificate of Environmental Compliance (CEC) from the Arizona Corporation Commission (ACC) allowing the proposed transmission line's construction.

1.1 Study Area

The study area, which encompasses all seven of TEP's Irvington–East Loop transmission line alternative corridors, is in south-central and eastern Tucson and is roughly bounded by Alvernon Road, Valencia Road, Pantano Road, 5th Street, and Kolb Road (Figure 1). Specific Township, Range, and Section (TRS) locations of the study area are presented in Table 1.1.

Table 1.1. Study Area TRS Locations[a]

Township, Range[b]	Sections
Township 14 South, Range 15 East	8, 9, 16, 17, 20, 21, and 28–32
Township 15 South, Range 14 East	2, 3, 11, and 12
Township 15 South, Range 15 East	5, 7, 8, 17, and 18

[a] As indicated on the Tucson East and Tucson, Arizona, 7.5-minute U.S. Geological Survey (USGS) topographic quadrangle.

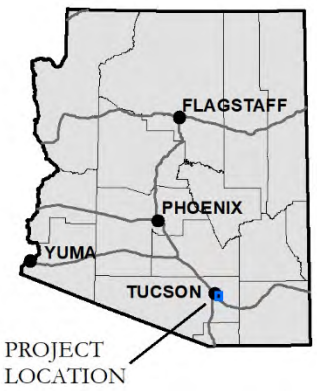
[b] Gila and Salt River Baseline and Meridian (G&SRB&M).

1.2 Alternatives

TEP has identified two alternatives (Alternatives 1 and 2) to connect the existing Irvington Substation to the proposed Port and Patriot substations, and five alternatives (Alternatives A, B1, B2, C1, and C2) to connect the proposed Patriot Substation to the existing East Loop Substation. The proposed Port Substation would be located approximately 2.0 km (1.2 miles) east of the Pima Air and Space Museum (PASM), just west of the intersection of Kolb Road and Centennial Drive, and the proposed Patriot Substation would be located at the southwest corner of Kolb and Escalante Roads on Davis Monthan Air Force Base (DMAFB).

1.2.1 Alternatives 1 & 2 (Irvington Substation–Port Substation–Patriot Substation)

Alternative 1 is approximately 11.57 km (7.18 miles) long and extends from the Irvington Substation to the southeast, on the north side of the Union Pacific Railroad tracks, to the Littletown Road alignment, turning east to the proposed Port Substation. From the Port Substation, the route continues east to Kolb Road. The route follows the eastern right-of-way (ROW) north along Kolb Road, through DMAFB, and crosses to the western ROW at Irvington Road and terminates at the proposed Patriot Substation.



Tierra Right of Way
A LAND SERVICES COMPANY

Sec. 8, 9, 16, 17, 20, 21, 28, 29, 30, 31, 32, T14S, R15E;
Sec. 2, 3, 11, 12, T15S, R14E; Sec. 5, 7, 8, 17, 18, T15S, R15E
City of Tucson, Pima County, Arizona
Tucson and Tucson East, AZ, 7.5-minute USGS Quadrangles

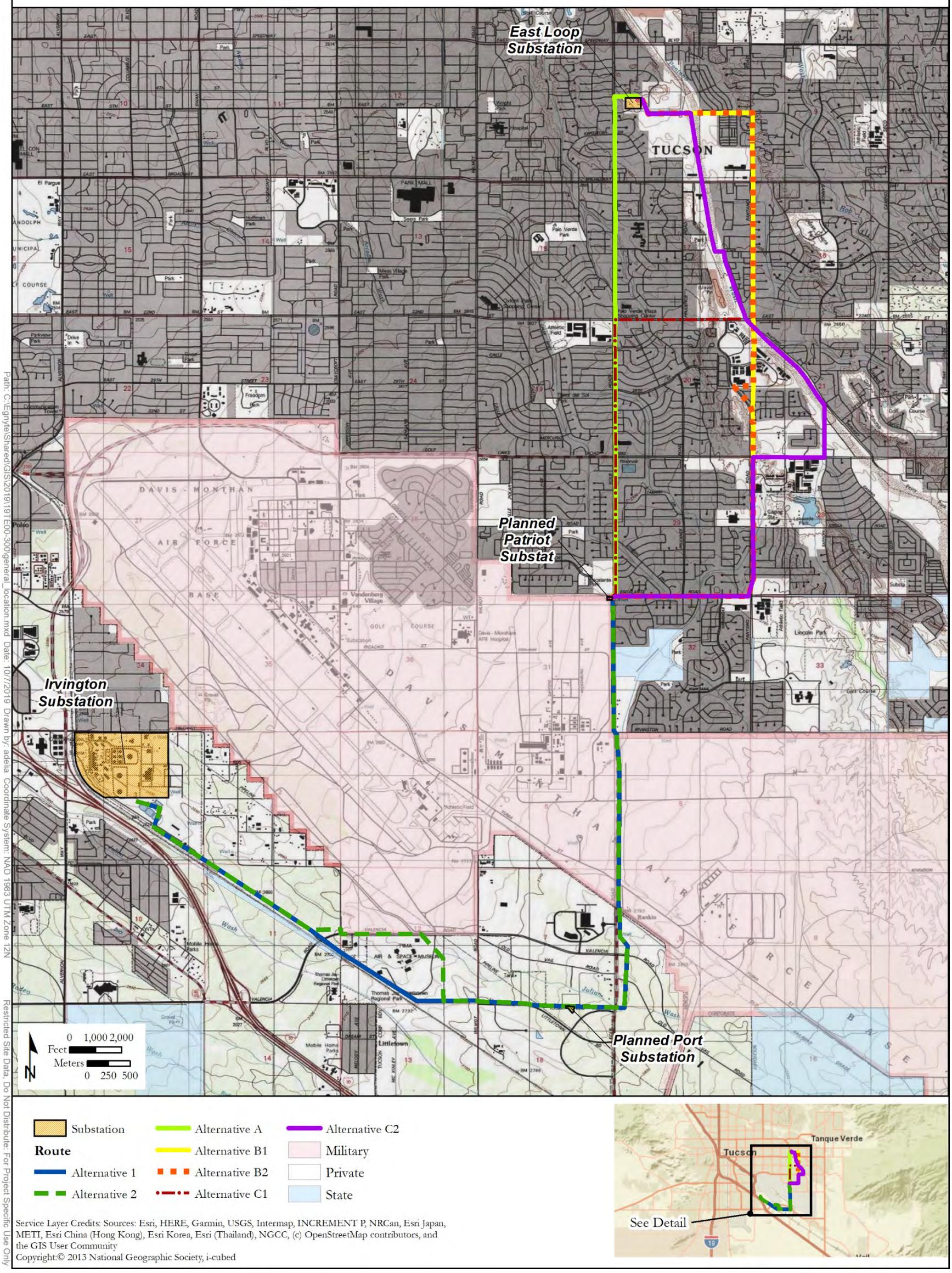


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Figure 1. Project location.

Alternative 2 is approximately 11.99 km (7.45 miles) long and extends from the Irvington Substation to the southeast, on the north side of the Union Pacific Railroad tracks, to Valencia and Craycroft Roads. Following Valencia Road to the east the route passes the PASM. The route turns south around the PASM and continues to the Littletown Road alignment, turns east, and continues to the proposed Port Substation.

From the Port to Patriot substations, routing for Alternative 2 is the same as Alternative 1.

1.2.2 Alternatives A, B1, B2, C1, and C2 (Patriot Substation–East Loop Substation)

Alternative A is approximately 6.23 km (3.87 miles) long and extends from the Patriot Substation to the north along the east side of Kolb Road to the existing East Loop Substation. Between East 22nd Street and East Loop Substation, TEP would rebuild an existing 138kV transmission line with a double-circuit configuration to accommodate the new transmission line.

Alternative B1 is approximately 8.78 km (5.45 miles) long and extends from the Patriot Substation east on the south side of Escalante Road to Pantano Road; the route follows the east side of Pantano Road to the north along an existing 138kV transmission line. At Fifth Street, the route continues along the existing 138kV transmission line alignment to the west and terminates at the existing East Loop Substation. TEP would rebuild the existing 138kV transmission line with a double-circuit configuration to accommodate the new transmission line.

Alternative B2 is approximately 9.06 km (5.63 miles) long and identical to Alternative B1, except for a small segment between East Sundew Drive and South Research Loop, where Alternative B2 more closely follows the alignment of Pantano Road to South Research Loop, then turns east along the northern ROW for less than a quarter-mile before rejoining the alignment of Alternative B1.

Alternative C1 is approximately 8.15 km (5.06 miles) long and extends from the Patriot Substation to the north along the east side of Kolb Road to 22nd Street; the route then turns east and follows the south side of 22nd Street to the east side of the Pantano Wash. The route continues north between Pantano Road and the Pantano Wash Path to East Kenyon Drive, where it crosses to the west side of the Pantano Wash. The route continues north along the Pantano Wash's west bank before turning west and following the alignment of an existing 138kV line into the existing East Loop Substation.

Alternative C2 is approximately 9.43 km (5.86 miles) long and extends from the Patriot Substation east on the south side of Escalante Road to Pantano Road; the route follows the east side of Pantano Road to the north along an existing 138kV transmission line to Golf Links Road. The route turns east and follows the north side of Golf Links Road for approximately 0.8 km (0.5 miles) before it turns north to the north side of the Pantano Wash. The route then continues north on the east side of the wash between the Pantano Wash Path and Pantano Road to 22nd Street and the existing 138kV alignment. From this point to the East Loop Substation, the alignment of C2 is the same as C1.

1.2.3 Functional Combinations of Alternatives

There are 10 possible combinations of the alternatives that could serve to functionally connect the Irvington Substation through the planned Port and Patriot Substations to the East Loop Substation. These 10 alternative combinations and their overall lengths are summarized in Table 1.2.

Table 1.2. Functional Alternative Route Combinations

Alternative Combination	Length
1, A	17.80 km (11.05 miles)
2, A	18.22 km (11.31 miles)
1, B1	20.35 km (12.64 miles)
2, B1	20.77 km (12.90 miles)
1, B2	20.63 km (12.81 miles)
2, B2	21.05 km (13.07 miles)
1, C1	19.72 km (12.25 miles)
2, C1	20.14 km (12.51 miles)
1, C2	21.00 km (13.04 miles)
2, C2	21.42 km (13.30 miles)

2.0 METHODS

Prior to conducting fieldwork, Tierra performed background "desktop" research, including a review of the U.S. Fish and Wildlife Service (FWS) Information, Planning, and Conservation System (IPAC) and the Arizona Game and Fish Department (AZGFD) Heritage Data Management System (HDMS) to obtain information on sensitive biological resources that may be present in the study area. After compiling a list of special status species potentially occurring in the study area, Senior Biologist Tim Jordan conducted a reconnaissance site visit of the study area on September 25, 2019. Site reconnaissance consisted of driving all the alternative corridors and stopping frequently to note plant species present, inspect areas with potentially suitable habitat for special status species, and to photographically document the study area. The assessed corridor width during the site visit included entire ROW of the roads and utility corridors associated with the alternatives. Following the site visit, special status species (listed in Section 4.1) were assessed for their potential to occur in the study area based on the existing characteristics of the area. Representative photographs of the alternative transmission line corridors in the study area can be found in Appendix B.

3.0 DESCRIPTION OF EXISTING CONDITIONS

3.1 General Overview

The seven alternative corridors within the study area are located in southeast Tucson, Arizona. The routes are within an urban area and follow previously disturbed existing road and utility ROWs. Land use consists of commercial, industrial, military, recreational, and residential areas; the latter is concentrated mostly in the portion of the study area, north of DMAFB. The topography of the study area is relatively flat with a slight northwestern aspect.

3.2 Biotic Community

The study area is located within the Arizona Upland subdivision of the Sonoran Desertscrub biotic community, as described and mapped by Brown (1994), at elevations ranging from approximately 780–854 m (2,560–2,800 feet) above mean sea level (AMSL).

The Arizona Upland biotic community is often referred to as "the Arizona Desert." It is the most watered and least desert-like desertscrub habitat in North America. Vegetation in this biotic community takes on the appearance of a scrubland or low woodland of leguminous trees with intervening spaces held by one or several open layers of shrubs and perennial succulents. Common tree species found in the Arizona Upland community include Velvet Mesquite *(Prosopis velutina)*, Foothills and Blue Palo Verde (*Parkinsonia microphylla* and *P. florida*), Ironwood *(Olneya tesota)*, and Desert Willow *(Chilopsis linearis)*. Common shrubs include Whitethorn and Catclaw Acacia (*Acacia constricta* and *A. greggii*), Creosote *(Larrea tridentata)*, Jojoba *(Simmondsia chinensis)*, Four-wing Saltbush *(Atriplex canescens)*, and Desert Broom *(Baccharis sarothroides)*. Forb and grass species commonly seen include Brittlebush *(Encelia farinosa)*, Jimmyweed *(Isocoma tenuisecta)*, Broom Snakeweed *(Gutierrezia sarothrae)*, Canyon Ragweed *(Ambrosia ambrosioides)*, Desert Marigold *(Baileya multiradiata)*, Desert Straw *(Stephanomeria pauciflora)*, Triangle-leaf Bursage *(Ambrosia deltoidea)*, Fluffgrass *(Dasyochloa pulchella)*, Sixweeks Grama *(Bouteloua barbata)*, and Bush Muhly *(Muhlenbergia porteri)*. Cacti species common in the Arizona Upland community include Saguaro *(Carnegiea gigantea)*, Fishhook Barrel *(Ferocactus wislizenii)*, Pincushion *(Mammillaria microcarpa)*, Desert Christmas Cactus *(Cylindropuntia leptocaulis)*, Chainfruit Cholla *(Cylindropuntia fulgida)*, Cane Cholla *(Cylindropuntia spinosior)*, Buckhorn Cholla *(Cylindropuntia versicolor)*, Engelmann's Prickly Pear *(Opuntia engelmannii)*, and hedgehog cactus (*Echinocereus* spp.). The lower contact of this subdivision is with the Lower Colorado River Valley biotic community at an elevation between 290–640 m (950–2,100 feet) AMSL. Over an elevation of approximately 1,000 m (3,300 feet) AMSL, the Arizona Desert merges with colder and wetter interior chaparral or semidesert grassland (Brown 1994).

The bimodal rainfall pattern of the Sonoran Desert allows for a greater structural diversity than in the Great Basin, Mohave, or Chihuahuan Deserts. The Sonoran Desert differs markedly from the other North American desert biotic communities, which are dominated by low shrubs, in its arboreal elements and its truly large cacti and succulent constituents. Even in its most arid parts, the Sonoran Desert exhibits tree, tall shrub, and succulent life forms along drainages and other favored habitats (Brown 1994).

Wildlife in the Arizona Uplands is as diverse as the vegetation. Mammals well represented in this biotic community include Black-tailed Jackrabbits *(Lepus californicus)*, ground squirrels (*Spermophilus* spp. and *Ammospermophilus* spp.), pocket mice (*Perognathus* spp.), kangaroo rats (*Dipodomys* spp.), Coyotes *(Canis latrans)*, Javelinas *(Tayassu tajacu)*, and numerous bat species (*Myotis* spp. and *Leptonycteris* spp., among others). The variety of birds is great and can include Harris's Hawk *(Parabuteo unicinctus)*, Mourning Dove *(Zenaida macroura)*, Gambel's Quail *(Callipepla gambelii)*, Burrowing Owl *(Athene cunicularia)*, Gila Woodpecker *(Melanerpes uropygialis)*, Verdin *(Auriparus flaviceps)*, Cactus Wren *(Campylorhynchus brunneicapillus)*, and Phainopepla *(Phainopepla nitens)* (Brown 1994).

Common reptiles found in the Arizona Upland include Desert Tortoise *(Gopherus agassizii)*, Zebra-tailed Lizard *(Callisaurus draconoides)*, Desert Iguana *(Dipsosaurus dorsalis)*, gecko (*Coleonyx* spp.), horned lizard (*Phrynosoma* spp.), whiptail (*Cnemidophorus* spp.), Ground Snake *(Sonora semiannulata)*, and rattlesnake (*Crotalus* spp.) (Brown 1994).

3.3 Vegetation in the Study Area

Several areas along the alternative corridors have been landscaped with a combination of native and non-native plants and most of the other vegetation present in the study area is ruderal, or that commonly found in disturbed areas. However, patches of native vegetation remain in several areas (see Table 3.1).

Table 3.1. Native Vegetation in the Study Area

Alternative	Location	Approximate Length	Notes
A	East Loop Substation	0.223 km (0.139 miles)	Arizona Upland vegetation surrounds the substation and area to east is mostly Blue Palo Verde
B1, B2, C1, and C2	East Loop Substation east to Pantano Wash	0.686 km (0.426 miles)	
1 and 2	Kolb Road north from Littletown Road to DMAFB	1.161 km (0.721 miles)	Cholla, Creosote, Foothills Palo Verde
1	Wilmot Road west to UPRR	0.864 km (0.537 miles)	Creosote flat
2	Wilmot Road west and north to PASM	1.032 km (0.641 miles)	Creosote flat, Mesquite/Palo Verde
2	Valencia Road west from PASM	0.339 km (0.212 miles)	Creosote flat
1	North of Valencia Overpass	0.111 km (0.069 miles)	
1 and 2	UPRR north of Valencia Road	1.088 km (0.676 miles)	

3.3.1 Native Plants

Native plants observed in the study area characteristic of the Arizona Upland biotic community described above include trees such as Velvet Mesquite, Blue Palo Verde, and Foothills Palo Verde. Other native species observed include Whitethorn Acacia, Creosote, Desert Broom, Burrobrush *(Hymenoclea monogyra)*, Graythorn *(Zizyphus obtusifolia)*, Brittlebush, Limoncillo *(Pectis angustifolia)*, Desert Marigold, Globemallow *(Sphaeralcea ambigua)*, Jimmyweed, Fluffgrass *(Dasyochloa pulchella)*, Sixweeks Threeawn *(Aristida adscensionis)*, Chainfruit Cholla, Fishhook Barrel, and Engelmann's Prickly Pear.

3.3.2 Riparian Vegetation

Review of Pima County GIS data indicates that all of the alternatives except for Alternative A intersect Pima County–regulated riparian habitat within the study area (Ordinance 2005-FC-2) (see Appendix A, Figures A.3 and A.4). This riparian habitat includes Xeroriparian B, C, and D areas, which are generally associated with ephemeral drainages and differ from the wetter types of riparian habitat by the lack of perennial water sources. Plants present in xeroriparian habitats are typical of those found in upland areas but are typically larger and occur at higher densities due to the presence of water.

Alternatives B1, B2, C1, and C2 cross or run parallel to the Pantano Wash and its Class H (Hydroriparian) Important Riparian Area (IRA–H). Important Riparian Areas occur along major river systems and washes and provide critical watershed and water resource management functions, as well as a framework for landscape linkages and biological corridors. Important Riparian Areas are valued

for their higher water availability, vegetation density, and biological productivity as compared to adjacent upland habitats. Hydroriparian habitats are generally associated with perennial watercourses and/or springs and typically contain plant communities with obligate or preferential wetland plant species such as willow and cottonwood. A summary of the regulated riparian habitats present in the study area and their lengths intersected by the alternatives and alternative combinations is presented in Table 3.2.

Table 3.2. Regulated Riparian Habitat in the Study Area

Alternative	Riparian Habitat Type	Intersected Length
1	C	0.400 km (0.249 miles)
2	C	0.416 km (o.258 miles)
A	n/a	0
B1	D, IRA	0.520 km (0.323 miles)
B2	D, IRA	0.520 km (0.323 miles)
C1	IRA	2.382 km (1.480 miles)
C2	B, D, IRA	4.043 km (2.512 miles)

3.3.3 Invasive and Non-native Plant Species

The Arizona Wildlands Invasive Plant Working Group (AZWIPWG) has developed categorized lists that are useful in assessing the varying degrees of invasiveness of plant species using ratings of High, Medium, and Low. These ratings are as follows:

High: These species have severe ecological impacts on ecosystems, plant and animal communities, and vegetational structure. Invasiveness attributes are conducive to moderate-to-high rates of dispersal and establishment. Species are usually widely distributed, both among and within ecosystems/ communities.

Medium: These species have substantial and apparent ecological impacts on ecosystems, plant and animal communities, and vegetational structure. Invasiveness attributes are conducive to moderate-to-high rates of dispersal, often enhanced by disturbance. Ecological amplitude and distribution range from limited to widespread.

Low: These species have minor, yet detectable, ecological impacts. Invasiveness attributes result in low-to-moderate rates of invasion. Ecological amplitude and distribution are generally limited, but the species can be problematic locally (AZWIPWG 2005).

Four AZWIPWG-listed weed species, the Medium-rated African Sumac *(Rhus lancea)* and Russian Thistle *(Salsola kali)* and the High-rated Buffelgrass *(Pennisetum ciliare)* and Fountain Grass *(P. setaceum)*, were identified in the study area at the time of the survey. A summary of the locations where these weeds were observed is presented in Table 3.3.

Table 3.3. AZWIPWG-listed Weed Species Locations

Species	Location	Alternatives
Buffelgrass *(Pennisetum ciliare)*	East Loop Substation east to Pantano Wash	A, B1, B2, C1, and C2
	Pantano Wash, west bank, Broadway north to 5th	C1 and C2
	22nd at Pantano Wash	C1 and C2
	Research Loop	B1 and B2
	Pantano and Escalante	B1, B2, and C2
	West from Kolb along Centennial and Littletown Roads, at Port Substation Site, and northwest along UPRR to Irvington Substation	1 and 2
Fountain Grass *(Pennisetum setaceum)*	Research Loop, UPRR	B1 and B2
	UPRR	1 and 2
African Sumac *(Rhus lancea)*	East Loop Substation	All
Russian Thistle *(Salsola kali)*	Broadway at Pantano Wash	C1 and C2

An additional three non-native plant species not on the AZWIPG list were observed during the survey. These plants included the introduced Cheeseweed *(Malva neglecta)* and London Rocket *(Sisymbrium irio)* and the naturalized Mexican Palo Verde *(Parkinsonia aculeata)*.

3.4 General Wildlife in the Study Area

Wildlife species observed in the study area at the time of the survey was limited to Mourning Dove *(Zenaida macroura)*, Curve-billed Thrasher *(Toxostoma curvirostre)*, Black-tailed Gnatcatcher *(Polioptila melanura)*, Common Raven (*Corvus corax)*, Turkey Vulture *(Cathartes aura)*, and whiptail (*Cnemidophorus* sp.). Some additional species expected to occur in urban areas such as the study area, but were not observed during the field visit, include Pigeon *(Columba livia)*, House Sparrow *(Passer domesticus)*, Redtail Hawk, *(Buteo jamaicensis)*, Cooper's Hawk *(Accipiter cooperii)*, Desert Cottontail *(Sylvilagus audubonii)*, and Coyote *(Canis latrans)*.

3.4.1 Wildlife Linkages

The AZGFD HDMS Online Review Tool Report (Appendix D) indicates that Wildlife Movement Areas are present in the study area in the vicinity of Kolb, Escalante, and Pantano Roads south of 22nd Street and north of Valencia Road. The washes within the study area can serve as wildlife corridors for small, urban species such as Coyote and Javelina *(Tayassu tajacu)*.

3.5 Water Resources in the Study Area

3.5.1 Waters of the U.S. including Wetlands

There are no perennial or intermittent waterways within the study area; however, several ephemeral drainages are present that would be crossed by the alternatives. The Pantano Wash is the major drainage in the study area, and it is crossed or paralleled by Alternatives B1, B2, C1, and C2. The drainages in the study area are potential Waters of the U.S. (WUS) under jurisdiction of the U.S. Army Corps of Engineers (USACE), except for some of the unnamed drainages that may not be

jurisdictional because they could be considered manmade water conveyances constructed entirely in uplands. A summary of the drainage crossings for each of the alternatives is presented in Table 3.4 and indicated on Figures A.5 and A.6 in Appendix A.

Table 3.4. Drainages Crossings in the Study Area

Alternative	Number of Drainage Crossings
1	**10:** Pima Air Museum Wash, nine unnamed drainages
2	**11:** Pima Air Museum Wash, ten unnamed drainages
A	**2:** Rose Hill Wash, one unnamed drainage
B1	**10:** Kinnison Wash (two crossings), Pantano Wash (two crossings), Guillermo Wash, five unnamed drainages
B2	**10:** Kinnison Wash (two crossings), Pantano Wash (two crossings), Guillermo Wash, five unnamed drainages
C1	**6:** Alamo Wash, Pantano Wash (two crossings, runs parallel), Rose Hill Wash, two unnamed drainages
C2	**11:** Kinnison Wash (two crossings), Atterbury Wash, Pantano Wash (two crossings, runs parallel), six unnamed drainages

Pre-field visit review of FWS National Wetland Inventory (NWI) GIS data indicated that there are no previously mapped wetlands in the study area. This absence of wetlands was confirmed during the reconnaissance survey.

3.5.2 Floodplains

Review of Federal Emergency Management Administration (FEMA) GIS data (see Appendix A, Figures A.5 and A.6) indicates that the alternative corridors cross FEMA Zone A, AE, AH, D, and X floodplains. Zone A areas have a 1 percent annual chance of flooding, with no determined flood depth or base flood elevations; Zone AE areas have established base flood elevations; Zone AH areas have base flood elevations determined with flood depths of 1–3 feet (usually areas of ponding); Zone D areas have possible but undetermined flood risk; and areas mapped as Zone X have a minimal 0.2 percent annual chance of flooding. A summary of the floodplains present in the study area and their lengths intersected by the alternatives is presented in (Table 3.5).

Table 3.5. Floodplains in the Study Area

Alternative	Floodplain	Intersected Length
1	Zone A	0.481 km (0.299 miles)
	Zone D	2.926 km (1.818 miles)
	Zone X	8.154 km (5.066 miles)
2	Zone A	0.319 km (0.198 miles)
	Zone D	3.915 km (2.433 miles)
	Zone X	7.750 km (4.816 miles)
A	Zone D	0.058 km (0.036 miles)
	Zone X	6.172 km (3.835 miles)

Alternative	Floodplain	Intersected Length
B1	Zone AE	0.436 km (0.270 miles)
	Zone AH	0.068 km (0.042 miles)
	Zone X	8.221 km (5.108 miles)
B2	Zone AE	0.436 km (0.271 miles)
	Zone AH	0.068 km (0.042 miles)
	Zone X	8.497 km (5.230 miles)
C1	Zone AE	0.802 km (0.498 miles)
	Zone D	0.058 km (0.036 miles)
	Zone X	7.283 km (4.525 miles)
C2	Zone AE	1.262 km (0.784 miles)
	Zone AH	0.068 km (0.042 miles)
	Zone D	0.052 km (0.032 miles)
	Zone X	8.042 km (4.997 miles)

4.0 FINDINGS

4.1 Special status species

Special status species were determined through a review of data as managed by the following agencies:

- FWS IPAC Official Species List of Threatened and Endangered species for the study area vicinity in Pima County, Arizona (Appendix C).
- AZGFD HDMS Online Review Tool Report for State Wildlife Action Plan (SWAP) (AZGFD 2012) Tier 1A and 1B Species of Greatest Conservation Need (SGCN) documented within 4.8 km (3.0 miles) of the study area (Appendix D).

The FWS lists five wildlife species (three Endangered and two Threatened), one Endangered flowering plant species, and no critical habitats for the study area vicinity in Pima County, Arizona (see Appendix C). AZGFD HDMS indicates that 14 SGCN are known to occur within 4.8 km (3.0 miles) of the study area, including the Threatened Yellow-billed Cuckoo *(Coccyzus americanus)*, Northern Mexican Gartersnake *(Thamnophis eques megalops)*, and Mexican Spotted Owl *(Strix occidentalis lucida)*; the latter species does not appear on the FWS Official Species List (see Appendix D).

The determinations of a wildlife species' potential for occurring in the study area were performed after the field reconnaissance site visit by analyzing four aspects of what constitutes suitable habitat. Suitable habitat can contain one or more of the following: foraging habitat, residential habitat, resting habitat, and mating habitat. Foraging habitat for a species contains food items, such as prey species and plants, and can also contain a water source. Residential habitat is a species' home, such as a burrow, nest, or some other form of shelter. Resting habitat can include temporary shelters, such as shade under a tree, shrub, or rock, and for bird species, perches for roosting or casual use. Mating habitat can be as simple as an area where other same-species individuals can be found or can be more complicated, such as a lekking area or other area used for mating displays.

Suitable habitat for plant species is determined by whether or not a suitable combination of soils, moisture, exposure, elevation, and other factors required by a given plant species is present within the area of concern. The biotic community of an area in question is also important; for example, a desert obligate plant is extremely unlikely to occur in a Petran Montane Conifer Forest biotic community.

Special status species were assessed for their potential to occur in the study area (Table 4.1). Potential to occur is ranked from lowest to highest using the ratings "0," "1," "2," "3," and "Present." A rating of "0" is assigned when there is no potential for a species to occur in the study area, such as when there is unsuitable habitat present or the range of the species in question is completely out of the study area. A rating of "1" is assigned when there is a low potential for a species to occur in the study area, such as when there is low quality habitat (containing only one of the four aspects that make up suitable habitat) present in the study area. The species under consideration may occur in an area with a rating of "1," but is not common. A rating of "2" is assigned when there is medium potential for a species to occur in the study area (the study area contains marginal habitat, two or three aspects of suitable habitat may be present, and the species is likely to occur). A rating of "3" is assigned when there is a high potential for a species to occur in the study area; all of the suitable habitat aspects are present, and the species is most likely to occur. A rating of "present" is given if the species was observed in the study area during the survey.

After analysis of the data, 14 of the 18 special status species were removed from further consideration because the study area either is outside their known range or suitable habitat is not present in the study area (potential = "0"). The remaining four species are discussed below in Section 4.2. Appendix E lists the species removed from further consideration and the justification for the determination.

Table 4.1. Listed Species and Their Potential for Occurrence in the Study Area

Scientific Name	Common Name	Status	Potential to Occur
AMPHIBIANS			
Lithobates yavapaiensis	Lowland Leopard Frog	1A[a]	0
BIRDS			
Athene cunicularia hypugaea	**Western Burrowing Owl**	**1B[a]**	**1**
Coccyzus americanus	Yellow-billed Cuckoo	T, 1A[a]	0
Falco peregrinus anatum	American Peregrine Falcon	1A[a]	0
Haliaeetus leucocephalus	Bald Eagle	1A[a]	0
Peucaea carpalis	**Rufous-winged Sparrow**	**1B[a]**	**1**
Sterna antillarum browni	California Least Tern	E	0
Strix occidentalis lucida	Mexican Spotted Owl	T, 1A[a]	0
MAMMALS			
Lasiurus xanthinus	**Western Yellow Bat**	**1B[a]**	**1**
Leptonycteris curasoae yerbabuenae	Lesser Long-nosed Bat	1A[a]	0
Panthera onca	Jaguar	E	0
Tadarida brasiliensis	**Brazilian Free-tailed Bat**	**1B[a]**	**3**

Scientific Name	Common Name	Status	Potential to Occur
REPTILES			
Heloderma suspectum	Gila Monster	1A[a]	0
Heloderma suspectum suspectum	Reticulate Gila Monster	1A[a]	0
Kinosternon sonoriense longifemorale	Sonoyta Mud Turtle	E	0
Terrapene ornata luteola	Desert Box Turtle	1A[a]	0
Thamnophis eques megalops	Northern Mexican Gartersnake	T, 1A[a]	0
PLANTS			
Coryphantha scheeri v. robustispina	Pima Pineapple Cactus	E	0

[a] = Documented within 4.8 km (3.0 miles) of the study area (AZGFD HDMS).

Key: E = Endangered (FWS), T = Threatened (FWS), 1A, B = SGCN Tier (AZGFD).

4.2 Special Status Species Assessment

4.2.1 Western Burrowing Owl *(Athene cunicularia hypugaea)*

Distribution and Habitat

The historic range of the Western Burrowing Owl includes Arizona, California, Colorado, Idaho, Iowa, Kansas, Louisiana, Minnesota, Montana, North Dakota, Nebraska, New Mexico, Nevada, Oklahoma, Oregon, South Dakota, Texas, Washington, Wyoming, Canada, and Mexico. This species breeds in North America, and migratory populations spend their non-breeding time primarily south of the Mexican border. Within Great Basin Desertscrub these owls tend to breed in open to dense stands of shrubs and low trees which include Big Sagebrush *(Artemisia tridentata)*, Saltbush *(Atriplex confertifolia),* Greasewood *(Sarcobatus vermiculatus)*, and Creosote *(Larrea tridentata)*. The owls are known to occur locally in open areas, generally year-round and statewide in Arizona, with only a few winter records on the Colorado Plateau in the northeastern portion of the State (AZGFD 2001).

Western Burrowing Owls inhabit a variety of biotic communities, including semidesert grassland, plains grassland, cropland, Great Basin desertscrub, the Lower Colorado and Arizona Upland subdivisions of Sonoran Desertscrub, barren ground, Great Basin grassland, Mojave Desertscrub; and rural and residential areas, including parks, orchards, and airports (FWS 2003).

Optimum Western Burrowing Owl habitat is described as containing short vegetation with the presence of fresh, small mammal burrows. Suitable burrowing owl habitat can also be located among trees and shrubs if the canopy cover is less than 30 percent of the total ground surface. Burrows are essential to burrowing owl habitat. Burrowing owls usually use burrows made by fossorial mammals, but also use man-made structures such as culverts, debris piles, and openings beneath cement or pavement. The burrows are generally located in flat, open areas. There is usually a small mound of dirt around the opening of the burrow, which is no smaller than 10 cm (4 inches) (FWS 2003).

Results and Recommendations

The portions of the Alternative B1/B2/C1/C2 corridor east of the East Loop Substation to Pantano Wash and the Alternative 1/2 corridors west of Kolb Road and northwest along the UPRR to the Irvington Substation contain open areas with scattered Creosote that are potentially suitable for

Western Burrowing Owl; however, no individual's sign or potentially suitable burrows for this species were observed in these or any other areas along the alternative corridors during the survey. To determine presence/absence of this species and the subsequent potential for impacts to result from the proposed transmission line construction, Tierra recommends that a Western Burrowing Owl survey be conducted in these areas prior to final selection of an alternative corridor.

4.2.2 Western Yellow Bat *(Lasiurus xanthinus)*

Distribution and Habitat

In Arizona, Western Yellow Bat occurs in the southern portion of the state and is known primarily from the Tucson and Phoenix areas. This species is also found in Yuma, Sasabe, along the Bill Williams River, and in the Chiricahua Mountains.

Western Yellow Bat is a year-round resident in Arizona and is solitary roosting. It often hibernates among dead Washington fan palm leaves in urban areas. Other leafy vegetation such as sycamores, hackberries, and cottonwoods also provide roost sites (AZGFD 2003).

Results and Recommendations

Palm trees were observed in landscape plantings in the Alternative A and C1 corridor along Kolb Road, the Alternative C1 corridor along 22nd Street, the Alternative B1/B2/C2 corridor along Pantano Road south of Golf Links, and the Alternative B1/B2 corridor along Pantano Road north of 22nd Street that could be potentially used by this species as roosting sites. These palms are located beyond the road ROWs and away from where the proposed transmission line would be placed; therefore, it is extremely unlikely that construction of the proposed transmission line in any of these corridors would result in direct impacts to Western Yellow Bat through disturbance of potential roosting sites. Transmission line construction in the Alternative 1 and 2 corridors would have no impact on Western Yellow Bat because palm trees are not present along these corridors.

4.2.3 Rufous-winged Sparrow *(Peucaea carpalis)*

Distribution and Habitat

The range of the Rufous-winged Sparrow in Arizona includes the central and southern portions of eastern Pinal County, the eastern two-thirds of Pima County, and the western half of Santa Cruz County, including the Santa Cruz and Avra Valleys and the northern portion of the San Pedro River Valley near Winkelman. This species is a year-round resident within its range in Arizona.

Suitable habitat for Rufous-winged Sparrow consists of flat or gently rolling areas in Sonoran Desertscrub or Sinaloan Thornscrub and is characterized by scattered spiny trees and shrubs, such as hackberry, cholla, and Palo Verde. Grasses are an essential component of suitable habitat for this species, and xeroriparian habitat is typically included in territories. The breeding territories of Rufous-winged Sparrow range in size from 0.5–1.2 ha (1.2–3.0 acres) (SDCP 2001). The breeding season for this species is variable and dependent on rainfall and typically occurs between April and early September (Corman and Wise-Gervais 2005).

Results and Recommendations

No Rufous-winged Sparrows were observed during the survey; however, potentially suitable Arizona Upland desertscrub habitat for this species was observed in the vicinity of the East Loop Substation along the Alternative A and B1/B2/C1/C2 corridors. To avoid potential temporary impacts to Rufous-winged Sparrow individuals and their habitat during construction of the proposed

transmission line, Tierra recommends that construction at the East Loop Substation be conducted outside the April to early September breeding season and that vegetation disturbance be limited to the extent practicable during construction. Therefore, the proposed transmission line construction may impact Rufous-winged Sparrow, but it is not likely to result in a trend towards Federal listing or loss of viability.

4.2.4 Brazilian Free-tailed Bat *(Tadarida brasiliensis)*

Distribution and Habitat

The range of Brazilian Free-tailed Bat extends north form South America and the Caribbean Islands through most of Central America to southern Oregon, Nevada, northern Utah, northern Nebraska, Arkansas, northern Alabama, Mississippi, Georgia, and southern North Carolina. In Arizona, this species is found throughout the state in summer and only in the southern half of the state in winter, and in lesser numbers.

These bats roost in caves, mine tunnels, crevices in bridges, parking garages and buildings, and in attics. Some of these roosts are only used in spring and fall by bats as transition or resting roosts on their annual migration north and south. Roosts are generally high above the ground to allow free fall required to attain flight. In the spring, these migratory bats move northward from southern Arizona and Mexico. Brazilian Free-tailed bat is considered primarily a lowland desertscrub species, but they do sometimes range into coniferous forest and woodlands (AZGFD 2004).

Results and Recommendations

There is a known roosting colony of Brazilian Free-tailed Bats within the study area underneath the Broadway Bridge crossing the Pantano Wash in the vicinity of the C1/C2 alternative corridor. It would be unlikely for construction of the transmission line in the C1/C2 corridor to impact bats at the Broadway Bridge roost because the transmission line would be located away from the bridge on the west bank of the Pantano Wash. In addition, the bats present in the roost are likely accustomed to traffic noise on Broadway and the additional equipment noise that would be produced during construction of the line in the vicinity of the bridge would be negligible and temporary. Therefore, construction of the proposed transmission line would have no impact on Brazilian Free-tailed Bat.

5.0 CONCLUSIONS

Each of the alternatives was assigned a score based on their individual potential to impact five general biological resource areas: special status species, water resources, wildlife linkages, riparian habitat, and native plants.

A score of 3 indicated that no impacts to the resource area in question would occur due to selection of the alternative. A score of 2 was given to those alternatives that may impact a resource, but that impact can be mitigated, or a specific alternative intersected a greater quantity of a resource relative to the other alternatives (see below). A score of 1 was given to those alternatives that would likely impact a resource and the impact could either not be mitigated or the mitigation likely would be cost-prohibitive. Mitigation for the purposes of this assessment was considered to be avoidance of specific resource features, such as areas with occupied burrowing owl burrows, relocation of special status species (e.g., burrowing owls), and transplantation or revegetation of disturbed areas.

Riparian Habitat and Native Plants Weighted Score Modifiers

To account for variations between the alternatives in the amount of riparian habitat and native plants that may be impacted, a weighted modifier was applied to the score for each of the alternatives to aid in making a relative comparison between all the alternatives. For example, if there are Alternatives X, Y, and Z, with 400, 1,200, and 800 units of riparian habitat intersected and potentially impacted, respectively, the impact scores would be as follows:

- Alternative X, base score = 2, weighted modifier = 0, final score = 2 – 0 = 2
- Alternative Y, base score = 2, weighted modifier = 1, final score = 2 – 1 = 1
- Alternative Z, base score = 2, weighted modifier = 800 / 1200 = 0.67, final score = 2 – 0.67 = 1.33

In the example above, all three of the alternatives have a base score of 2 because they all intersect riparian habitat; this would serve to set these alternatives apart from additional alternatives that do not intersect riparian habitat (score = 3). Alternative X has a weighted modifier of zero because it intersects the least amount of riparian habitat of the three alternatives, and Alternative Y has a modifier of 1 because it intersects the most. Alternative Z intersects riparian habitat at an intermediate level in comparison to the other alternatives, so its amount of riparian habitat intersected is compared relative to Alternative Y, which has the most, by dividing the 800 units of habitat for Alternative Z by the 1,200 units for Alternative Y, resulting in a weighted modifier of 0.67 that is subtracted from the base score of 2, yielding a final score of 1.33 for Alternative Z's riparian habitat impacts. For the purposes of this analysis, length in meters was the unit used for the alternative weighted modifier values.

Table 5.1 below presents the combined impact scores for each alternative corridor and resource area evaluated in this report; a higher impact score indicates that the specific alternative would have correspondingly lower impacts on resources than an alternative with a lower score. Our evaluation found that Alternative 1 would result in the least amount of impacts to resources for the southern portion of the proposed transmission line between the Irvington Substation and the planned Patriot Substation, and that Alternative A would result in the least amount of impacts for the northern portion of the proposed line from the Patriot Substation to East Loop. Impact scores of the alternatives for each resource area analyzed in this report are summarized in Sections 5.1–5.5.

Table 5.1. Alternative Corridor Impact Score Summary

Resource Affected	Alt. 1	Alt. 2	Alt. A	Alt. B1	Alt. B2	Alt. C1	Alt. C2
Special Status Species	2	2	2	2	2	2	2
Water Resources	3	3	3	3	3	3	3
Wildlife Linkages	3	3	3	3	3	3	3
Riparian Habitat	2	1.038	3	1.871	1.871	1.411	1
Native Plants	2	1.109	2	1.675	1.675	1.675	1.675
Total	**12**	**10.147**	**13**	**11.546**	**11.546**	**11.086**	**10.675**

5.1 Special Status Species

The study area was assessed for 18 special status species listed by FWS and/or AZGFD. Of the 18 species, seven are listed as Threatened or Endangered and therefore warrant full protection under the Endangered Species Act (ESA). It was determined that the study area either does not currently contain suitable habitat for or is located outside of the known range of 14 of the 18 special status species assessed in this report.

Tierra determined that one or more of the alternative transmission line corridors in the study area contains suitable habitat for four State SGCN: Western Burrowing Owl, Western Yellow Bat, Rufous-winged Sparrow, and Brazilian Free-tailed Bat.

To determine the presence/absence of Western Burrowing Owl along the Alternative 1/2 and B1/B2/C1/C2 corridors and the subsequent potential for impacts to result from the proposed transmission line construction, Tierra recommends that Western Burrowing Owl presence/absence surveys be conducted in these areas prior to final selection of an alternative corridor.

To avoid potential temporary impacts to Rufous-winged Sparrow individuals and their habitat during construction of the proposed transmission line, Tierra recommends that construction at the East Loop Substation be conducted outside the April to early September breeding season and that vegetation disturbance be limited to the extent practicable during construction.

Tierra recommends that construction of the proposed transmission line would have no impact on Western Yellow Bat and Brazilian Free-tailed Bat. Tierra also recommends that a "No Effect" determination would be appropriate for the project regarding its potential impacts to species listed under the ESA.

Table 5.2. Summary of Special Status Species Impact Scores

Resource Affected	Alt. 1	Alt. 2	Alt. A	Alt. B1	Alt. B2	Alt. C1	Alt. C2
Special status species	2	2	2	2	2	2	2

5.2 Water Resources

Construction of the proposed transmission line in any of the alternative corridors is not likely to have impacts on water resources. WUS would not be impacted because the proposed transmission line would be constructed above ground, and it is anticipated that all waterways would be spanned by the line's conductors and that no dredge or fill operations for equipment access through the waterways would be required. Similarly, construction of the proposed transmission line would have no impacts on wetlands because none are present along the alternative corridors. Finally, construction of the proposed transmission line in any of the alternative corridors would not result in impacts to floodplains because the topography of the area would not be substantially modified during construction, and surface flows would not be altered.

Table 5.3. Summary of Water Resources Impact Scores

Resource Affected	Alt. 1	Alt. 2	Alt. A	Alt. B1	Alt. B2	Alt. C1	Alt. C2
Water resources	3	3	3	3	3	3	3

5.3 Wildlife Linkages

Construction of aboveground linear utilities, such as the proposed transmission line in any of the alternative corridors, would not likely have any long-term impacts on urban wildlife movement or create barriers to wildlife.

Table 5.4. Summary of Wildlife Linkages Impact Scores

Resource Affected	Alt. 1	Alt. 2	Alt. A	Alt. B1	Alt. B2	Alt. C1	Alt. C2
Wildlife linkages	3	3	3	3	3	3	3

5.4 Riparian Habitat

While it is anticipated that riparian habitat would mostly be spanned by the proposed transmission line, construction of the line would impact riparian habitat through trimming for line safety and removal to gain equipment access. With the exception of Alternative A, all the alternative corridors intersect varying amounts of xeroriparian habitat. Alternative C2 intersects the most riparian habitat of the five northern alternatives because it parallels the Pantano Wash and its corresponding IRA for a longer distance than Alternatives B1 and B2. Alternative C2 avoids a small amount of the Pantano IRA because it doesn't intercept the wash until 22nd Street, and Alternatives B1 and B2 avoid even more of the Pantano IRA because they only cross the wash. The Alternative 1 corridor intersects the least amount of riparian habitat of the two southern alternatives. Alternative 2 intersects more riparian habitat than the Alternative 1 corridor primarily because it is slightly longer and crosses relatively dense riparian areas east of the PASM.

Table 5.5. Summary of Riparian Habitat Impact Scores

Resource Affected	Alt. 1	Alt. 2	Alt. A	Alt. B1	Alt. B2	Alt. C1	Alt. C2
Riparian habitat	2	1.038	3	1.871	1.871	1.411	1

5.5 Native Plants

Native plants in the study area are protected by Arizona Native Plant Law (ANPL) and are also subject to additional local regulations within the city limits of Tucson and unincorporated Pima County. While it is anticipated that vegetation would mostly be spanned by the proposed transmission line, as would the riparian habitat addressed above, construction of the line would impact native plants through their removal to gain equipment access. The Alternative 1 and A corridors intersect the least amount of native vegetation of the alternatives. Alternative 2 intersects more native vegetation than the Alternative 1 corridor primarily because it is slightly longer and crosses relatively dense riparian areas east of the PASM. Alternative A and Alternatives B1, B2, C1, and C2 all intersect areas of native vegetation in the vicinity of the East Loop Substation, with Alternative A intersecting a lesser amount

because it runs along the north side of the substation, and the B1, B2, C1, and C2 alternatives because they run through a large area of native vegetation between the substation and Pantano Wash. The City of Tucson and Pima County have standards (COT LUC 3.8.0 and Pima County Chapter 18.72) for native plant preservation within construction areas and guidance for mitigation of impacts.

Table 5.6. Summary of Native Plants Impact Scores

Resource Affected	Alt. 1	Alt. 2	Alt. A	Alt. B1	Alt. B2	Alt. C1	Alt. C2
Native plants	2	1.109	2	1.675	1.675	1.675	1.675

6.0 REFERENCES

AZGFD (Arizona Game and Fish Department)

2001 *Athene cunicularia hypugaea*. Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix.

2003 *Lasiurus xanthinus*. Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix.

2004 *Tadarida brasiliensis*. Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix.

2012 *Arizona's State Wildlife Action Plan: 2012-2022*. Arizona Game and Fish Department, Phoenix.

Arizona Wildlands Invasive Plant Working Group (AZWIPG)

2005 Invasive Non-native Plants that Threaten Wildlands in Arizona. Available at: http://sbsc.wr.usgs.gov/research/projects/swepic/SWVMA/InvasiveNon-NativePlantsThatThreatenWildlandsInArizona.pdf. Accessed on April 3, 2012.

Brown, David E. (editor)

1994 *Biotic Communities: Southwestern United States and Northwestern Mexico*. University of Utah Press, Salt Lake City, UT. 341 pp.

Corman and Wise-Gervais (editors)

2005 *Arizona Breeding Bird Atlas*. University of New Mexico Press, Albuquerque.

FWS (U.S. Fish and Wildlife Service)

1995 *Lesser Long-nosed Bat Recovery Plan*. U.S. Fish and Wildlife Service, Albuquerque.

2003 *Status Assessment and Conservation Plan for the Western Burrowing Owl in the United States*. U.S. Department of Interior; Fish and Wildlife Service, Biological Technical Publication FWS/BTP-R6001-2003, Washington, D.C.

2007 *Lesser Long-nosed Bat 5-Year Review: Summary and Evaluation*. U.S. Fish and Wildlife Service, Phoenix.

Sonoran Desert Conservation Plan (SDCP)

2001 *Priority Vulnerable Species*. Sonoran Desert Conservation Plan. Pima County, Arizona Board of Supervisors. Tucson, AZ. 137 pp.

APPENDIX A. ALTERNATIVE DETAIL AND RESOURCE MAPS

Figure A.1. Alternative 1 and 2 corridor detail.

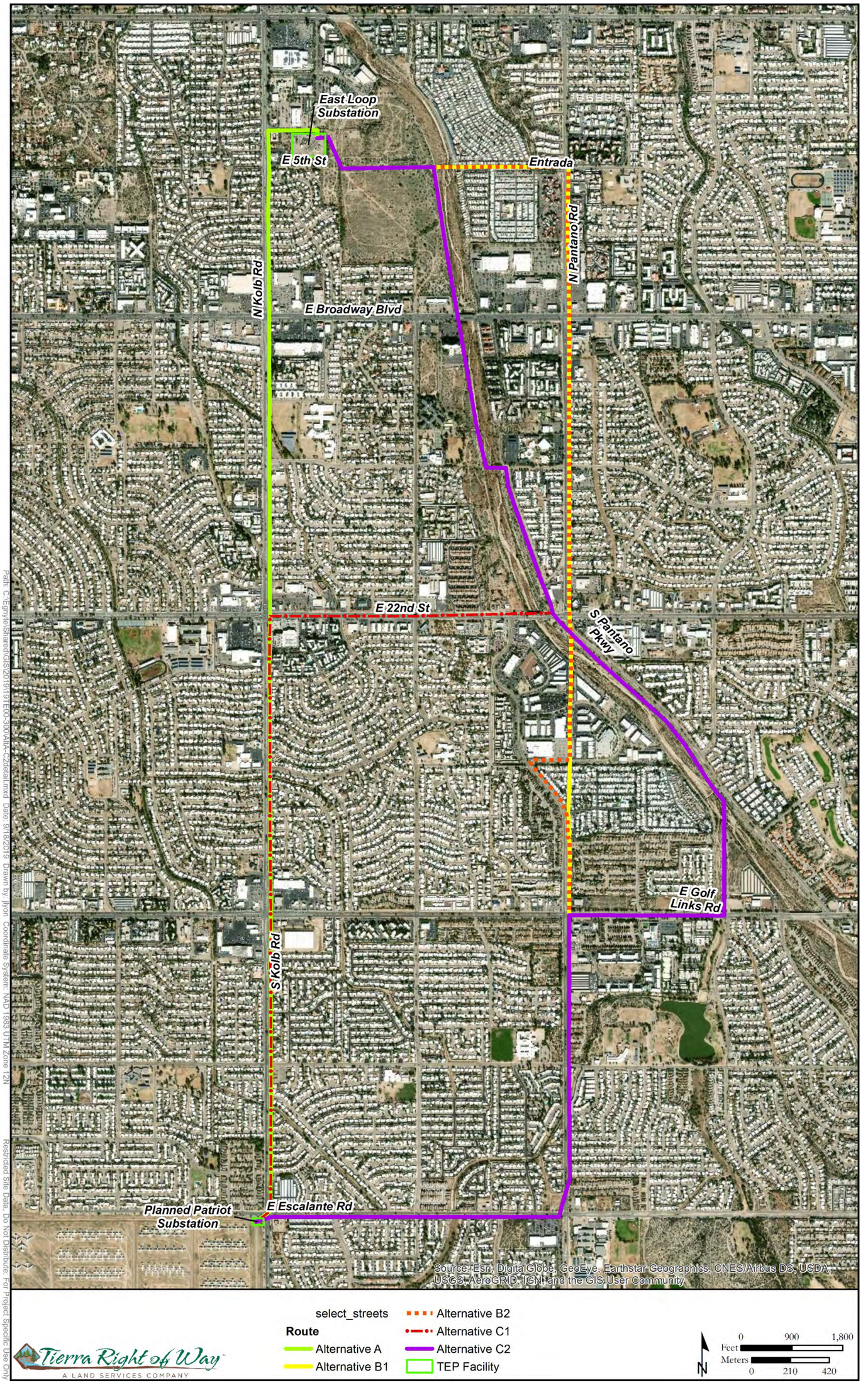


Figure A.2. Alternative A–C2 corridor detail.

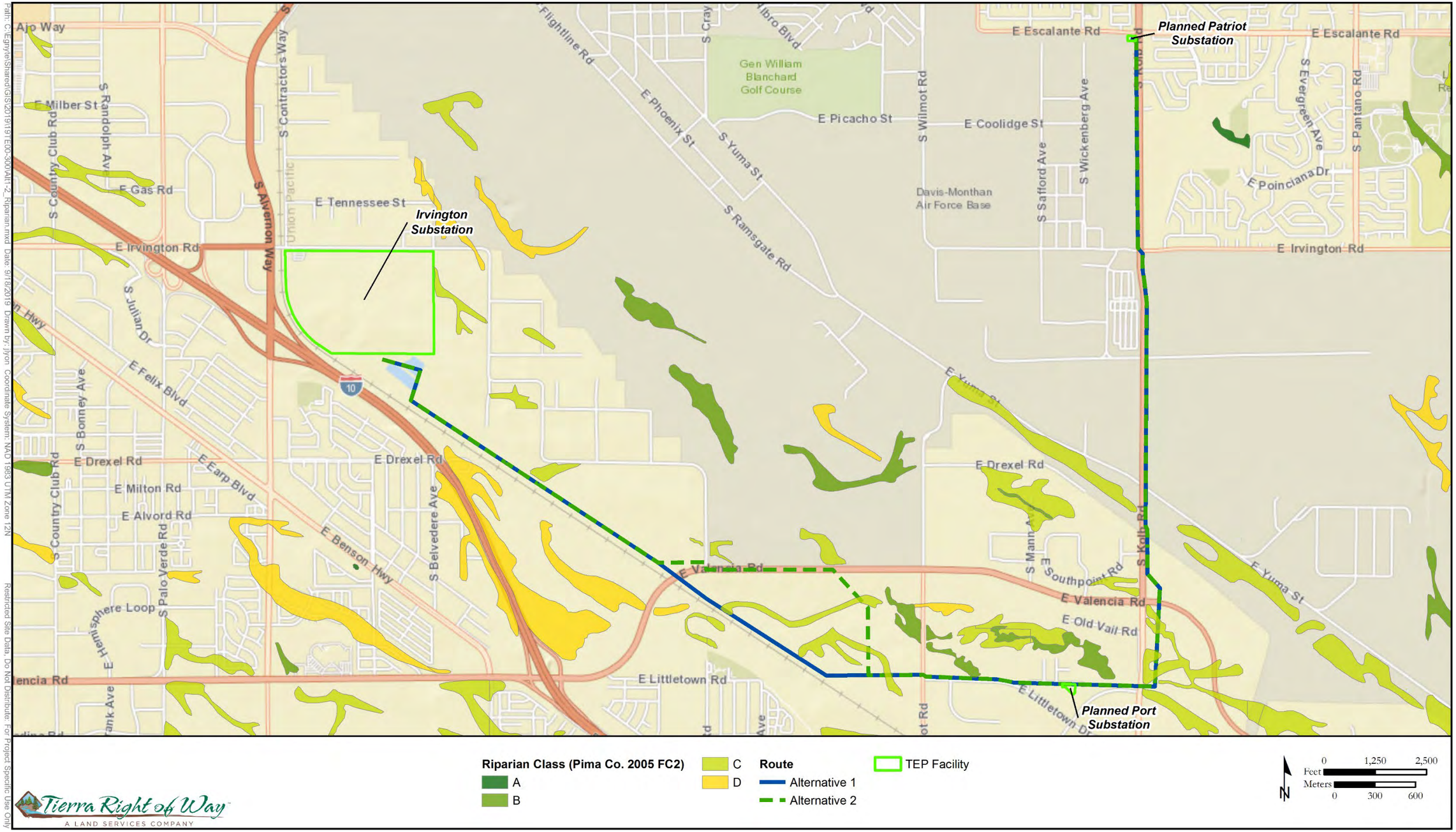


Figure A.3. Alternative 1 and 2 Riparian Habitat.

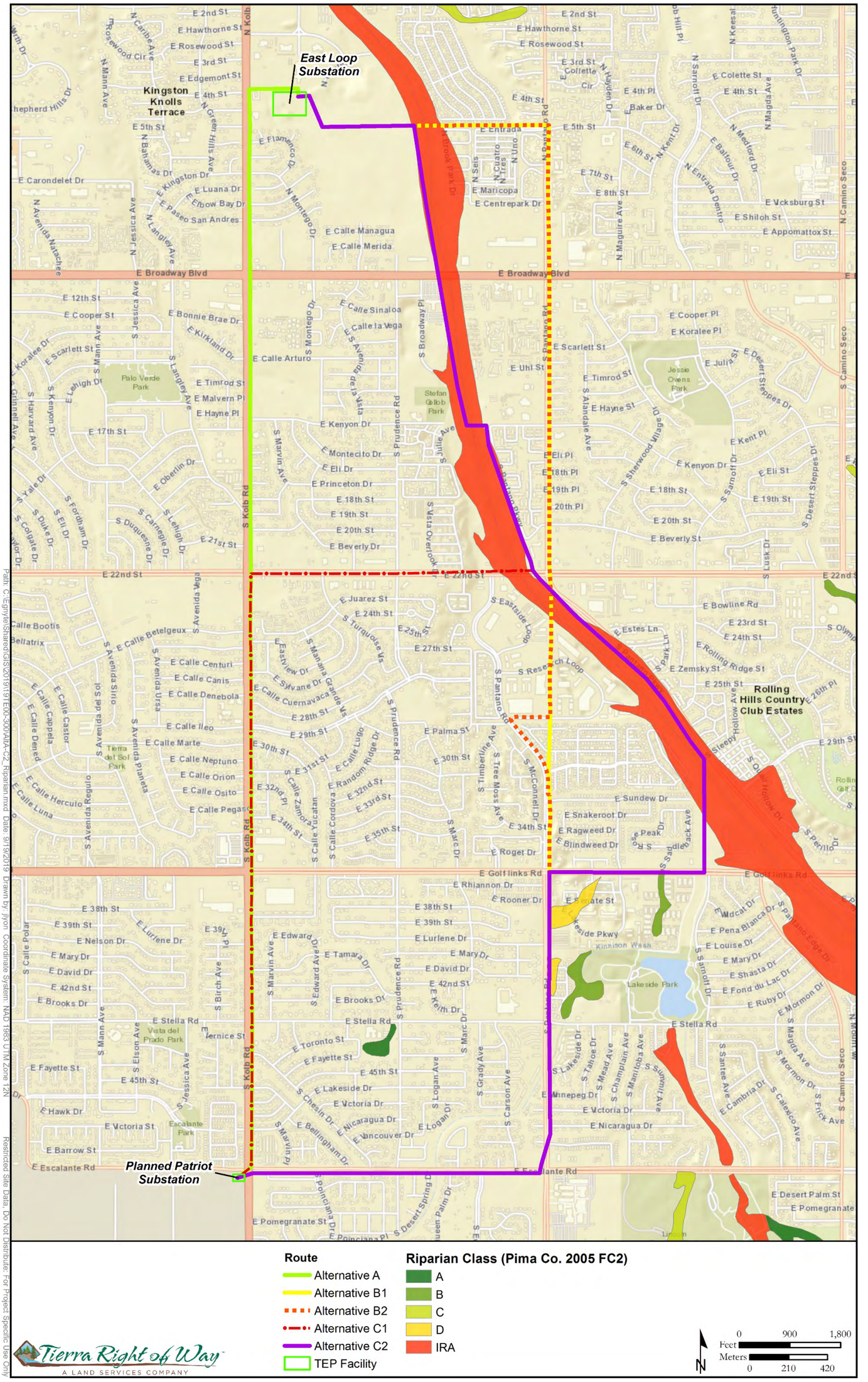
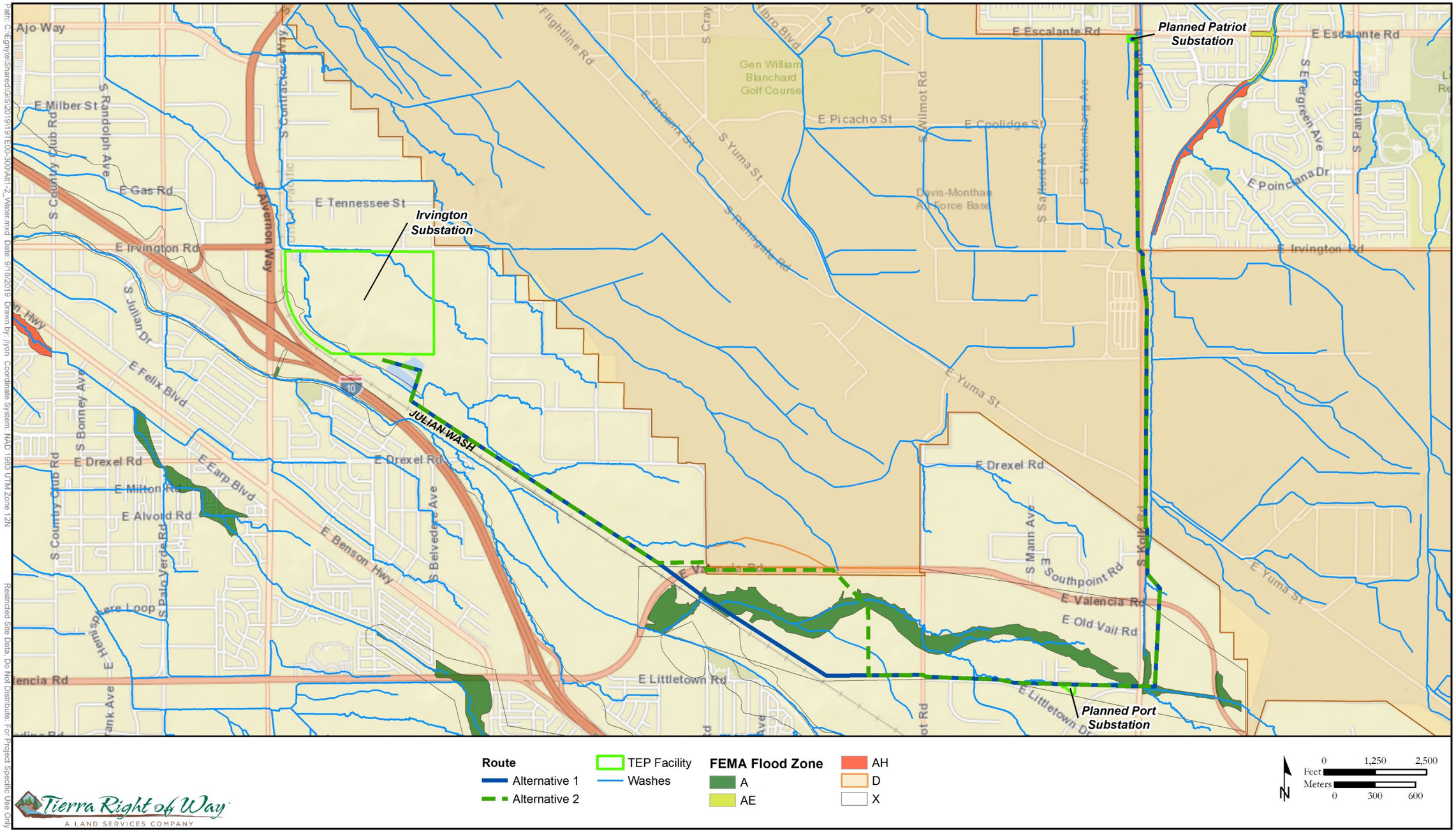


Figure A.4. Alternative A–C2 riparian habitat.



Path: C:\Egnyte\Shared\GIS\2019\19TE0-300\Alt1-2_Water.mxd Date: 9/18/2019 Drawn by: jlyon Coordinate System: NAD 1983 UTM Zone 12N

Restricted Site Data. Do Not Distribute For Project Specific Use Only

Figure A.5. Alternative 1 and 2 waterways/floodplains.

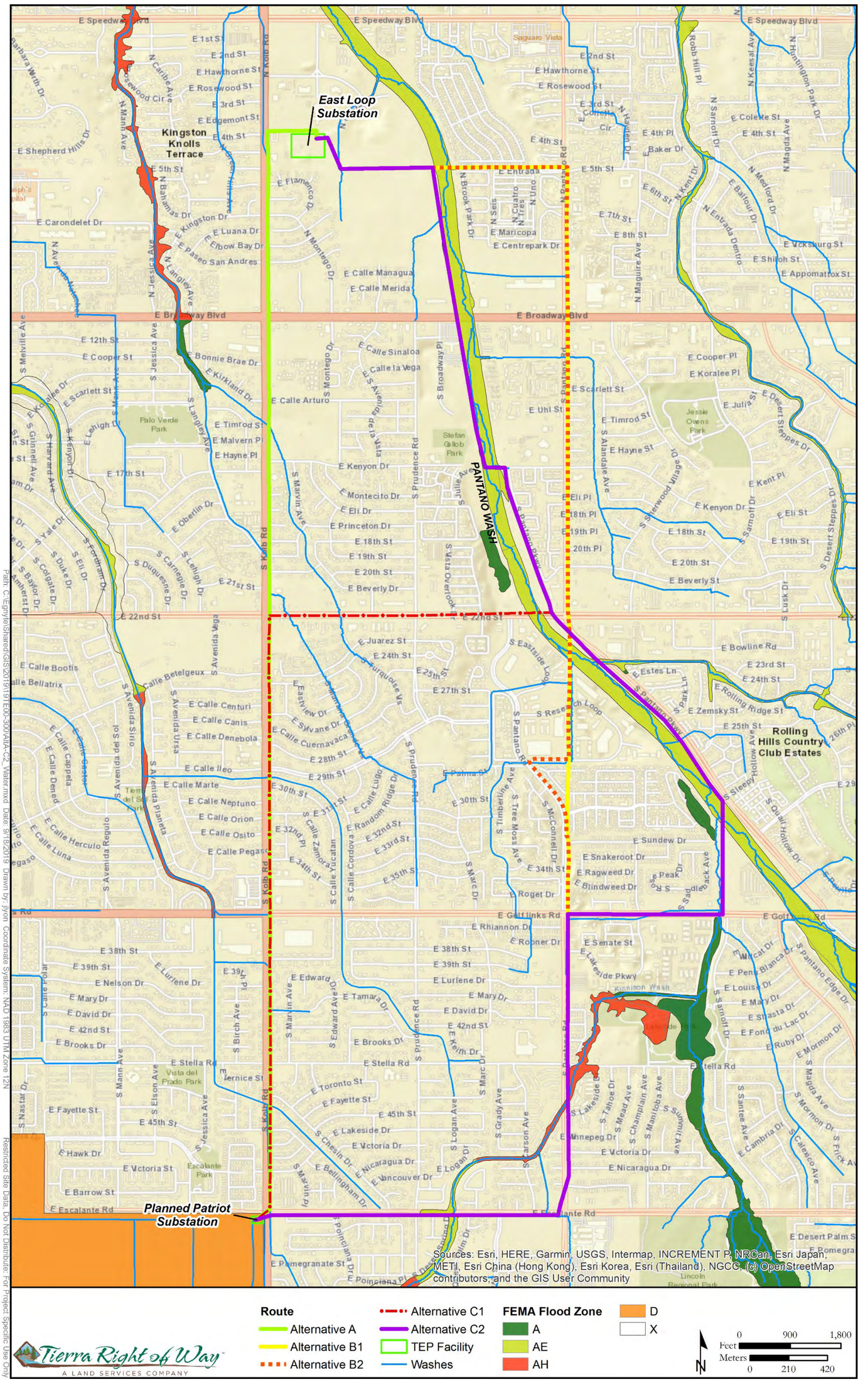


Figure A.6. Alternative A–C2 waterways/floodplains

APPENDIX B. REPRESENTATIVE STUDY AREA PHOTOGRAPHS

Photo B.1. Alternative A, view to south from Kolb and 4th.

Photo B.2. East Loop Substation overview, view to southwest.

Photo B.3. Alternative B1/B2, view to west from Pantano and Entrada.

Photo B.4. Alternative B1/B2 at Entrada alignment, view to east from Pantano Wash.

Photo B.5. Alternative C1/C2 at Entrada alignment, view to south along Pantano Wash.

Photo B.6. Alternative B1/B2/C1/C2 at Entrada alignment, view to west from Pantano Wash.

Photo B.7. Alternative C1/C2 at Broadway, view to north along Pantano Wash.

Photo B.8. Alternative B1/B2, view to north from Pantano and 22nd.

Photo B.9: Alternative C1, view to west along 22nd from Pantano Wash.

Photo B.10. Alternative C1/C2, view to north along Pantano Wash from 22nd.

Photo B.11. Alternative A, view to north from Kolb and 22nd.

Photo B.12. Alternative C1, view to east from Kolb and 22nd.

Photo B.13. Alternative C2, view to south from Pantano Parkway and Sleepy Hollow.

Photo B.14. Alternative C2, view to northwest along Pantano Wash from Pantano Parkway and Sleepy Hollow.

Photo B.15. Alternative C2, view to north from Golf Links just east of Sarnoff.

Photo B.16. Alternative C2, view to west along Golf Links from just east of Sarnoff.

Photo B.17. Alternative B1, view to north from Pantano and Arizona.

Photo B.18. Alternative B2, view to southeast from Pantano and Research Loop.

Photo B.19. Alternative B2, view to east from Pantano and Research Loop.

Photo B.20. Alternative B1/B2, view to north from Research Loop.

Photo B.21. Alternative B1/B2/C2, view to north from Pantano and Escalante.

Photo B.22. Alternative B1/B2/C2, view to west from Pantano and Escalante.

Photo B.23. Alternative A/C1, view to north from Kolb and Escalante.

Photo B.24. Patriot Substation site overview, view to southwest from Kolb and Escalante.

Photo B.25. Alternative 1/2, view to south from Kolb and Escalante.

Photo B.26. Alternative 1/2, view to south from Valencia.

Photo B.27. Alternative 1/2, view to north from Kolb and Centennial.

Photo B.28. Alternative 1/2, view to west from Kolb and Centennial.

Photo B.29. Port Substation site overview, view to west from Centennial.

Photo B.30. Alternative 1/2, view to east from Wilmot and Littletown.

Photo B.31. Alternative 1/2, view to west from Wilmot and Littletown.

Photo B.32. Alternative 2, view to north from Littletown.

Photo B.33. Alternative 1, view to east from Littletown at UPRR.

Photo B.34. Alternative 1, view to northwest along UPRR from Littletown.

Photo B.35. Alternative 2, view to southeast from Valencia just east of PAM.

Photo B.36. Alternative 1/2, view to northwest along UPRR from just north of Valencia overpass.

Photo B.37. Alternative 1/2, view to southeast along UPRR from Swan.

Photo B.38. Alternative 1/2, view to northwest along UPRR from Swan.

APPENDIX C. FWS OFFICIAL SPECIES LIST

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Arizona Ecological Services Field Office
9828 North 31st Ave
#c3
Phoenix, AZ 85051-2517
Phone: (602) 242-0210 Fax: (602) 242-2513
http://www.fws.gov/southwest/es/arizona/
http://www.fws.gov/southwest/es/EndangeredSpecies_Main.html

In Reply Refer To:
Consultation Code: 02EAAZ00-2019-SLI-0994
Event Code: 02EAAZ00-2019-E-02316
Project Name: TEP Irvington to East Loop

September 13, 2019

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The Fish and Wildlife Service (Service) is providing this list under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.). The list you have generated identifies threatened, endangered, proposed, and candidate species, and designated and proposed critical habitat, that may occur within one or more delineated United States Geological Survey 7.5 minute quadrangles with which your project polygon intersects. Each quadrangle covers, at minimum, 49 square miles. In some cases, a species does not currently occur within a quadrangle but occurs nearby and could be affected by a project. Please refer to the species information links found at:
http://www.fws.gov/southwest/es/arizona/Docs_Species.htm
http://www.fws.gov/southwest/es/arizona/Documents/MiscDocs/AZSpeciesReference.pdf .

The purpose of the Act is to provide a means whereby threatened and endangered species and the habitats upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 et seq.), Federal agencies are required to utilize their authorities to carry out programs for the conservation of Federal trust resources and to consult with us if their projects may affect federally listed species and/or designated critical habitat. A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, we recommend preparing a biological evaluation similar to a Biological Assessment to determine whether the project may

affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If the Federal action agency determines that listed species or critical habitat may be affected by a federally funded, permitted or authorized activity, the agency must consult with us pursuant to 50 CFR 402. Note that a "may affect" determination includes effects that may not be adverse and that may be beneficial, insignificant, or discountable. You should request consultation with us even if only one individual or habitat segment may be affected. The effects analysis should include the entire action area, which often extends well outside the project boundary or "footprint." For example, projects that involve streams and river systems should consider downstream effects. If the Federal action agency determines that the action may jeopardize a proposed species or adversely modify proposed critical habitat, the agency must enter into a section 7 conference. The agency may choose to confer with us on an action that may affect proposed species or critical habitat.
Candidate species are those for which there is sufficient information to support a proposal for listing. Although candidate species have no legal protection under the Act, we recommend considering them in the planning process in the event they become proposed or listed prior to project completion. More information on the regulations (50 CFR 402) and procedures for section 7 consultation, including the role of permit or license applicants, can be found in our Endangered Species Consultation Handbook at:
http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF.

We also advise you to consider species protected under the Migratory Bird Treaty Act (MBTA) (16 U.S.C. 703-712) and the Bald and Golden Eagle Protection Act (Eagle Act) (16 U.S.C. 668 et seq.). The MBTA prohibits the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests, except when authorized by the Service. The Eagle Act prohibits anyone, without a permit, from taking (including disturbing) eagles, and their parts, nests, or eggs. Currently 1026 species of birds are protected by the MBTA, including species such as the western burrowing owl (Athene cunicularia hypugea). Protected western burrowing owls are often found in urban areas and may use their nest/burrows year-round; destruction of the burrow may result in the unpermitted take of the owl or their eggs.

If a bald eagle (or golden eagle) nest occurs in or near the proposed project area, you should evaluate your project to determine whether it is likely to disturb or harm eagles. The National Bald Eagle Management Guidelines provide recommendations to minimize potential project impacts to bald eagles:
https://www.fws.gov/migratorybirds/pdf/management/
nationalbaldeaglenanagementguidelines.pdf
https://www.fws.gov/birds/management/managed-species/eagle-management.php.

The Division of Migratory Birds (505/248-7882) administers and issues permits under the MBTA and Eagle Act, while our office can provide guidance and Technical Assistance. For more information regarding the MBTA, BGEPA, and permitting processes, please visit the following: https://www.fws.gov/birds/policies-and-regulations/incidental-take.php. Guidance for minimizing impacts to migratory birds for communication tower projects (e.g. cellular, digital

television, radio, and emergency broadcast) can be found at: https://www.fws.gov/birds/bird-enthusiasts/threats-to-birds/collisions/communication-towers.php.

Activities that involve streams (including intermittent streams) and/or wetlands are regulated by the U.S. Army Corps of Engineers (Corps). We recommend that you contact the Corps to determine their interest in proposed projects in these areas. For activities within a National Wildlife Refuge, we recommend that you contact refuge staff for specific information about refuge resources.
If your action is on tribal land or has implications for off-reservation tribal interests, we encourage you to contact the tribe(s) and the Bureau of Indian Affairs (BIA) to discuss potential tribal concerns, and to invite any affected tribe and the BIA to participate in the section 7 consultation. In keeping with our tribal trust responsibility, we will notify tribes that may be affected by proposed actions when section 7 consultation is initiated.

We also recommend you seek additional information and coordinate your project with the Arizona Game and Fish Department. Information on known species detections, special status species, and Arizona species of greatest conservation need, such as the western burrowing owl and the Sonoran desert tortoise (Gopherus morafkai) can be found by using their Online Environmental Review Tool, administered through the Heritage Data Management System and Project Evaluation Program https://www.azgfd.com/Wildlife/HeritageFund/.

For additional communications regarding this project, please refer to the consultation Tracking Number in the header of this letter. We appreciate your concern for threatened and endangered species. If we may be of further assistance, please contact our following offices for projects in these areas:

Northern Arizona: Flagstaff Office 928/556-2001
Central Arizona: Phoenix office 602/242-0210
Southern Arizona: Tucson Office 520/670-6144

Sincerely,
/s/ Steven L. Spangle Field Supervisor

Attachment

Attachment(s):

- Official Species List

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Arizona Ecological Services Field Office
9828 North 31st Ave
#c3
Phoenix, AZ 85051-2517
(602) 242-0210

Project Summary

Consultation Code: 02EAAZ00-2019-SLI-0994

Event Code: 02EAAZ00-2019-E-02316

Project Name: TEP Irvington to East Loop

Project Type: TRANSMISSION LINE

Project Description: The proposed project involves an alternative corridor analysis for a proposed aerial electrical transmission line.

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/place/32.18191789978416N110.82366705348275W

Counties: Pima, AZ

Endangered Species Act Species

There is a total of 6 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Mammals

NAME	STATUS
Jaguar *Panthera onca* There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/3944	Endangered

Birds

NAME	STATUS
California Least Tern *Sterna antillarum browni* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/8104	Endangered
Yellow-billed Cuckoo *Coccyzus americanus* Population: Western U.S. DPS There is **proposed** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/3911	Threatened

Reptiles

NAME	STATUS
Northern Mexican Gartersnake *Thamnophis eques megalops* There is **proposed** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/7655	Threatened
Sonoyta Mud Turtle *Kinosternon sonoriense longifemorale* There is **proposed** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/7276	Endangered

Flowering Plants

NAME	STATUS
Pima Pineapple Cactus *Coryphantha scheeri var. robustispina* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/4919	Endangered

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

APPENDIX D. AZGFD HDMS ENVIRONMENTAL ONLINE REVIEW TOOL REPORT

Arizona Environmental Online Review Tool Report

Arizona Game and Fish Department Mission
To conserve Arizona's diverse wildlife resources and manage for safe, compatible outdoor recreation opportunities for current and future generations.

Project Name:
TEP Irvington to East Loop Transmission Line

User Project Number:
19TE0-300

Project Description:
The project involves an alternative corridor analysis for a proposed aerial electrical transmission line.

Project Type:
Energy Storage/Production/Transfer, Energy Transfer, Power line/electric line (new)

Contact Person:
Tim Jordan

Organization:
Tierra ROW Services, Ltd.

On Behalf Of:
CONSULTING

Project ID:
HGIS-09731

Please review the entire report for project type and/or species recommendations for the location information entered. Please retain a copy for future reference.

Disclaimer:

1. This Environmental Review is based on the project study area that was entered. The report must be updated if the project study area, location, or the type of project changes.
2. This is a preliminary environmental screening tool. It is not a substitute for the potential knowledge gained by having a biologist conduct a field survey of the project area. This review is also not intended to replace environmental consultation (including federal consultation under the Endangered Species Act), land use permitting, or the Departments review of site-specific projects.
3. The Departments Heritage Data Management System (HDMS) data is not intended to include potential distribution of special status species. Arizona is large and diverse with plants, animals, and environmental conditions that are ever changing. Consequently, many areas may contain species that biologists do not know about or species previously noted in a particular area may no longer occur there. HDMS data contains information about species occurrences that have actually been reported to the Department. Not all of Arizona has been surveyed for special status species, and surveys that have been conducted have varied greatly in scope and intensity. Such surveys may reveal previously undocumented population of species of special concern.
4. HabiMap Arizona data, specifically Species of Greatest Conservation Need (SGCN) under our State Wildlife Action Plan (SWAP) and Species of Economic and Recreational Importance (SERI), represent potential species distribution models for the State of Arizona which are subject to ongoing change, modification and refinement. The status of a wildlife resource can change quickly, and the availability of new data will necessitate a refined assessment.

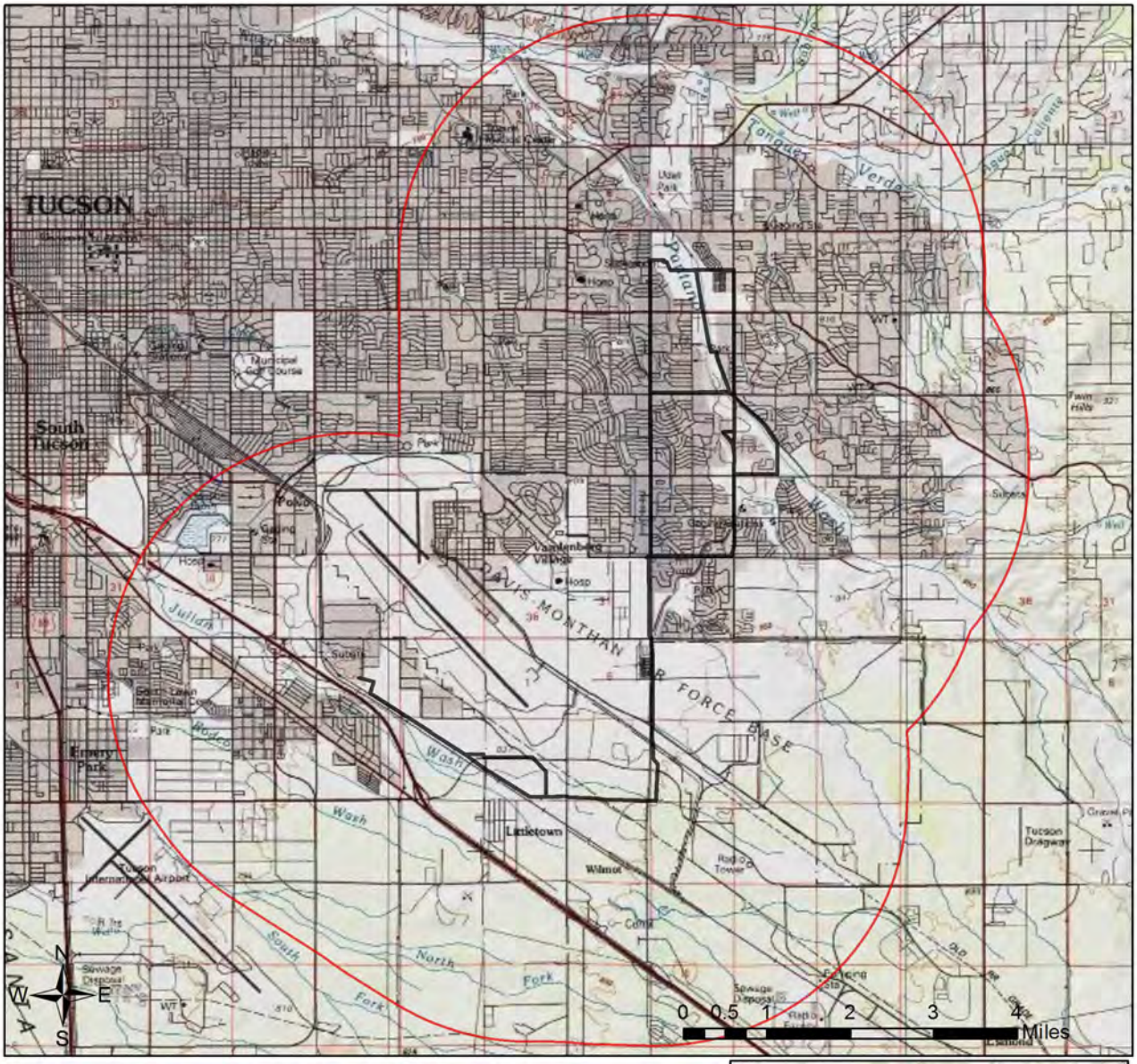
Locations Accuracy Disclaimer:
Project locations are assumed to be both precise and accurate for the purposes of environmental review. The creator/owner of the Project Review Report is solely responsible for the project location and thus the correctness of the Project Review Report content.

Recommendations Disclaimer:

1. The Department is interested in the conservation of all fish and wildlife resources, including those species listed in this report and those that may have not been documented within the project vicinity as well as other game and nongame wildlife.
2. Recommendations have been made by the Department, under authority of Arizona Revised Statutes Title 5 (Amusements and Sports), 17 (Game and Fish), and 28 (Transportation).
3. Potential impacts to fish and wildlife resources may be minimized or avoided by the recommendations generated from information submitted for your proposed project. These recommendations are preliminary in scope, designed to provide early considerations on all species of wildlife.
4. Making this information directly available does not substitute for the Department's review of project proposals, and should not decrease our opportunity to review and evaluate additional project information and/or new project proposals.
5. Further coordination with the Department requires the submittal of this Environmental Review Report with a cover letter and project plans or documentation that includes project narrative, acreage to be impacted, how construction or project activity(s) are to be accomplished, and project locality information (including site map). Once AGFD had received the information, please allow 30 days for completion of project reviews. Send requests to:
   Project Evaluation Program, Habitat Branch
   Arizona Game and Fish Department
   5000 West Carefree Highway
   Phoenix, Arizona 85086-5000
   Phone Number: (623) 236-7600
   Fax Number: (623) 236-7366
   Or
   PEP@azgfd.gov
6. Coordination may also be necessary under the National Environmental Policy Act (NEPA) and/or Endangered Species Act (ESA). Site specific recommendations may be proposed during further NEPA/ESA analysis or through coordination with affected agencies

TEP Irvington to East Loop Transmission Line

USA Topo Basemap With Locator Map



Project Boundary

Buffered Project Boundary

Project Size (acres): 267.41

Lat/Long (DD): 32.1772 / -110.8361

County(s): Pima

AGFD Region(s): Tucson

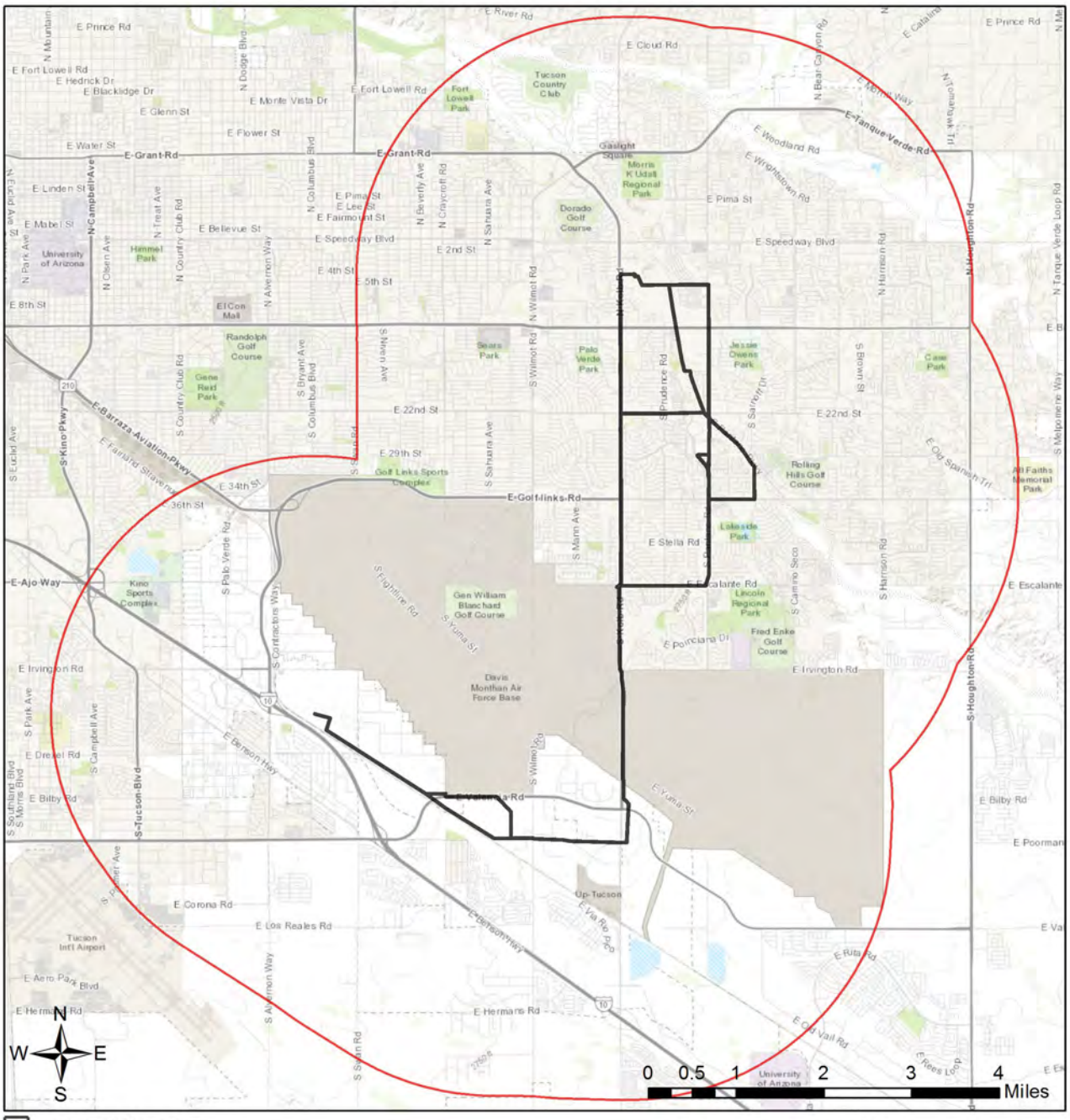
Township/Range(s): T14S, R15E; T15S, R14E; T15S, R15E

USGS Quad(s): TUCSON; TUCSON EAST

Service Layer Credits: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap

TEP Irvington to East Loop Transmission Line

Web Map As Submitted By User



Project Boundary

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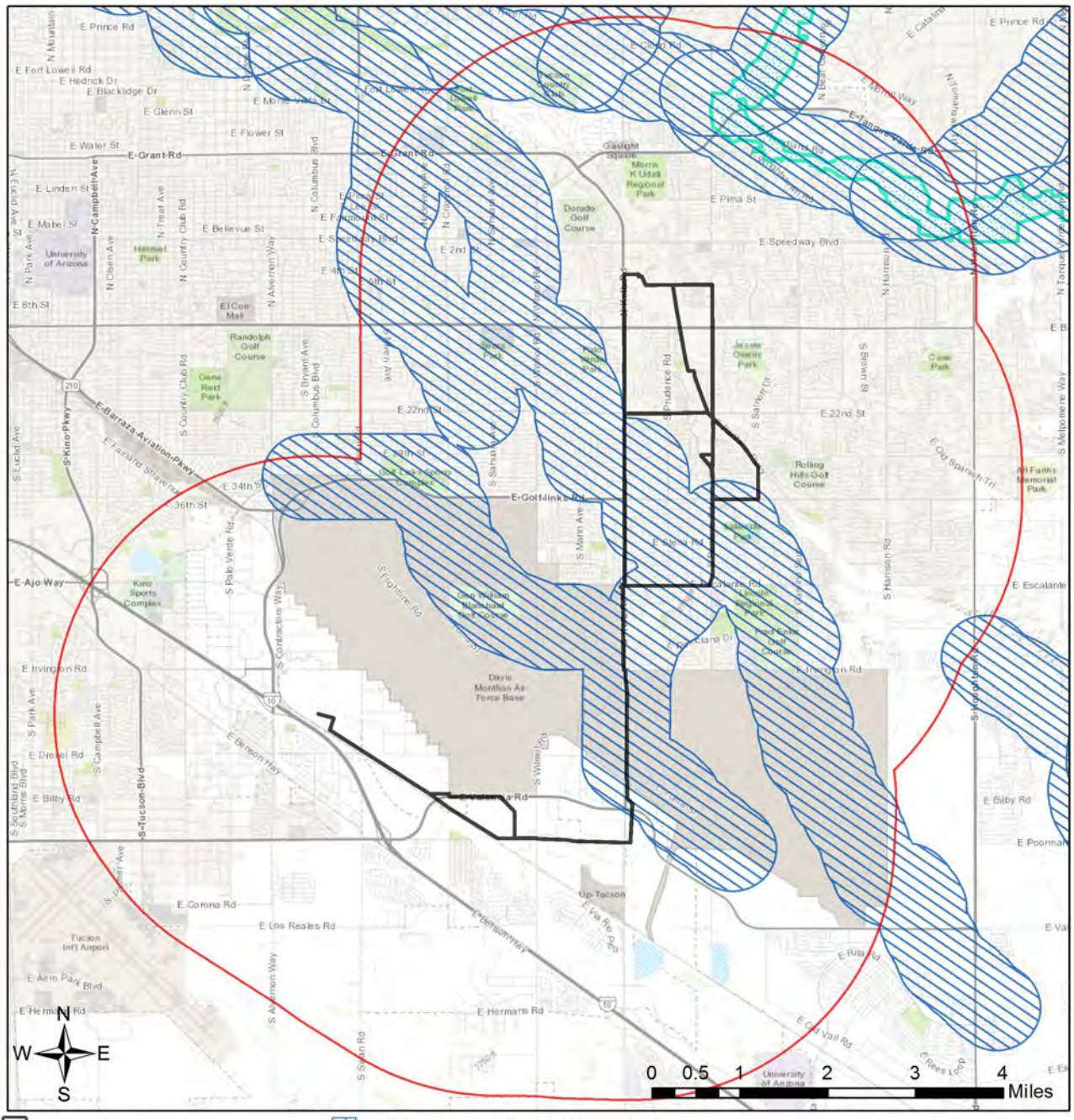
USGS Quad(s): TUCSON; TUCSON EAST

TEP Irvington to East Loop Transmission Line

Important Areas



- Project Boundary
- Buffered Project Boundary

County Stakeholder Assessment

- Wildlife Crossing Area
- Wildlife Movement Area - Diffuse
- Wildlife Movement Area - Landscape
- Wildlife Movement Area - Riparian/Wash
- Wildlife Connectivity
- Important Connectivity Zones
- Pinal County Riparian
- Critical Habitat
- Important Bird Areas

Project Size (acres): 267.41

Lat/Long (DD): 32.1772 / -110.8361

County(s): Pima

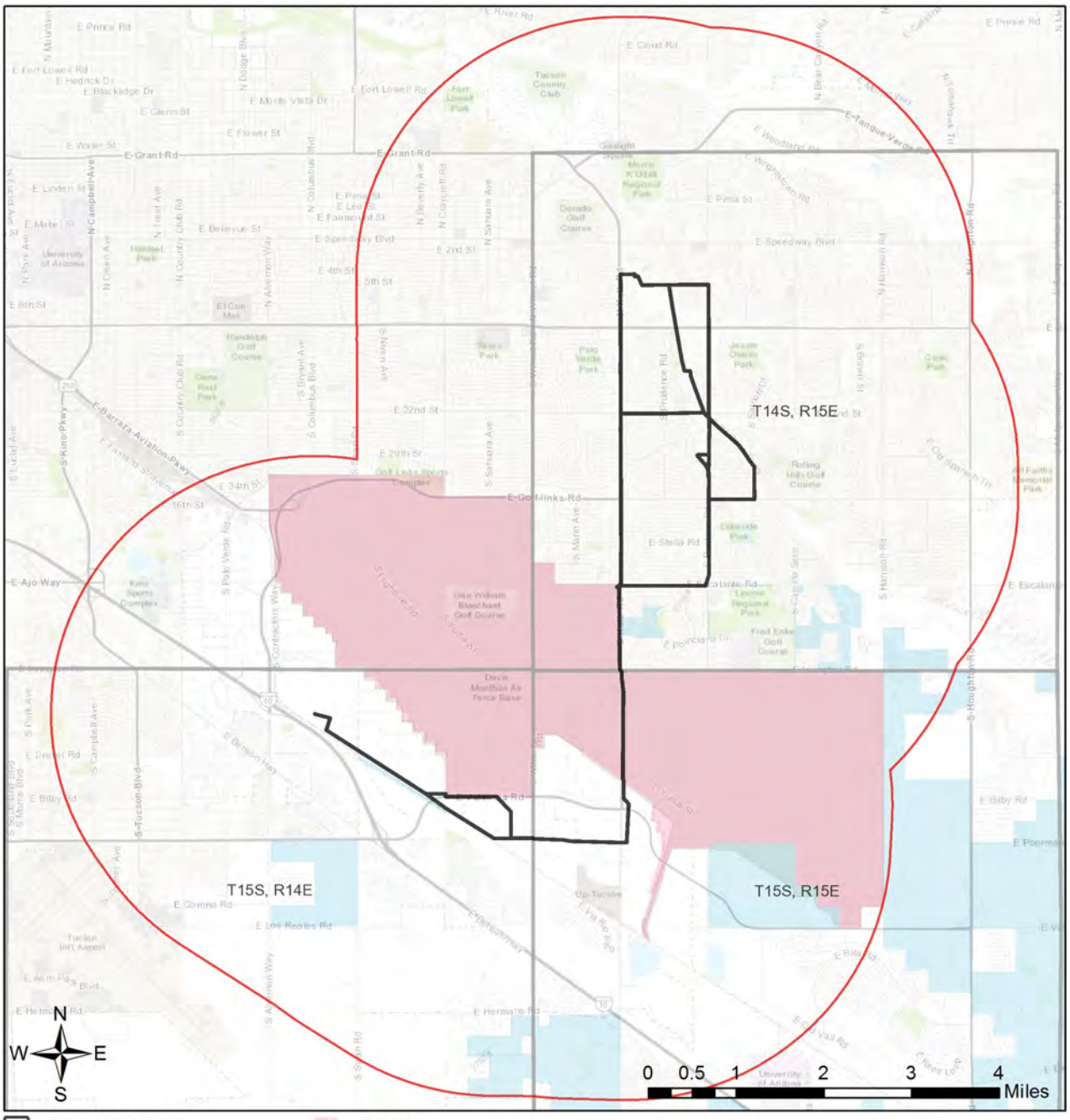
AGFD Region(s): Tucson

Township/Range(s): T14S, R15E; T15S, R14E; T15S, R15E

USGS Quad(s): TUCSON; TUCSON EAST

TEP Irvington to East Loop Transmission Line

Township/Ranges and Land Ownership



Project Boundary
Buffered Project Boundary
Township/Ranges

Land Ownership

AZ Game & Fish Dept.
BLM
BOR
Indian Res.
Military
Mixed/Other
National Park/Mon.
Private
State & Regional Parks
State Trust
US Forest Service
Wildlife Area/Refuge

Project Size (acres): 267.41
Lat/Long (DD): 32.1772 / -110.8361
County(s): Pima
AGFD Region(s): Tucson
Township/Range(s): T14S, R15E; T15S, R14E; T15S, R15E
USGS Quad(s): TUCSON; TUCSON EAST

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

Special Status Species Documented within 3 Miles of Project Vicinity

Scientific Name	Common Name	FWS	USFS	BLM	NPL	SGCN
Athene cunicularia hypugaea	Western Burrowing Owl	SC	S	S		1B
Bat Colony						
Choeronycteris mexicana	Mexican Long-tongued Bat	SC	S	S		1C
Coccyzus americanus	Yellow-billed Cuckoo (Western DPS)	LT	S			1A
Falco peregrinus anatum	American Peregrine Falcon	SC	S	S		1A
Gastrophryne olivacea	Western Narrow-mouthed Toad			S		1C
Haliaeetus leucocephalus	Bald Eagle	SC, BGA	S	S		1A
Heloderma suspectum suspectum	Reticulate Gila Monster					1A
Heloderma suspectum	Gila Monster					1A
Lasiurus xanthinus	Western Yellow Bat		S			1B
Leptonycteris yerbabuenae	Lesser Long-nosed Bat	SC				1A
Lithobates yavapaiensis	Lowland Leopard Frog	SC	S	S		1A
Peucaea carpalis	Rufous-winged Sparrow					1B
Strix occidentalis lucida	Mexican Spotted Owl	LT				1A
Tadarida brasiliensis	Brazilian Free-tailed Bat					1B
Terrapene ornata luteola	Desert Box Turtle			S		1A
Thamnophis eques megalops	Northern Mexican Gartersnake	LT	S			1A

Note: Status code definitions can be found at https://www.azgfd.com/wildlife/planning/wildlifeguidelines/statusdefinitions/
.

Special Areas Documented within the Project Vicinity

Scientific Name	Common Name	FWS	USFS	BLM	NPL	SGCN
Tucson Urban Riparian Linkages	Pima County Wildlife Movement Area - Riparian/Wash					

Note: Status code definitions can be found at https://www.azgfd.com/wildlife/planning/wildlifeguidelines/statusdefinitions/
.

Species of Greatest Conservation Need Predicted within the Project Vicinity based on Predicted Range Models

Scientific Name	Common Name	FWS	USFS	BLM	NPL	SGCN
Aix sponsa	Wood Duck					1B
Ammospermophilus harrisii	Harris' Antelope Squirrel					1B
Anthus spragueii	Sprague's Pipit	SC				1A
Antrostomus ridgwayi	Buff-collared Nightjar		S			1B
Aspidoscelis stictogramma	Giant Spotted Whiptail	SC	S			1B
Aspidoscelis xanthonota	Red-backed Whiptail	SC	S			1B
Athene cunicularia hypugaea	Western Burrowing Owl	SC	S	S		1B
Botaurus lentiginosus	American Bittern					1B
Buteo swainsoni	Swainson's Hawk					1C

Species of Greatest Conservation Need Predicted within the Project Vicinity based on Predicted Range Models

Scientific Name	Common Name	FWS	USFS	BLM	NPL	SGCN
Calypte costae	Costa's Hummingbird					1C
Chilomeniscus stramineus	Variable Sandsnake					1B
Cistothorus palustris	Marsh Wren					1C
Colaptes chrysoides	Gilded Flicker			S		1B
Coluber bilineatus	Sonoran Whipsnake					1B
Corynorhinus townsendii pallescens	Pale Townsend's Big-eared Bat	SC	S	S		1B
Crotalus tigris	Tiger Rattlesnake					1B
Cynanthus latirostris	Broad-billed Hummingbird		S			1B
Dipodomys spectabilis	Banner-tailed Kangaroo Rat			S		1B
Empidonax wrightii	Gray Flycatcher					1C
Euderma maculatum	Spotted Bat	SC	S	S		1B
Eumops perotis californicus	Greater Western Bonneted Bat	SC		S		1B
Falco peregrinus anatum	American Peregrine Falcon	SC	S	S		1A
Glaucidium brasilianum cactorum	Cactus Ferruginous Pygmy-owl	SC	S	S		1B
Gopherus morafkai	Sonoran Desert Tortoise	CCA	S	S		1A
Haliaeetus leucocephalus	Bald Eagle	SC, BGA	S	S		1A
Heloderma suspectum	Gila Monster					1A
Incilius alvarius	Sonoran Desert Toad					1B
Kinosternon sonoriense sonoriense	Desert Mud Turtle			S		1B
Lasiurus blossevillii	Western Red Bat		S			1B
Lasiurus xanthinus	Western Yellow Bat		S			1B
Leopardus pardalis	Ocelot	LE				1A
Leptonycteris yerbabuenae	Lesser Long-nosed Bat	SC				1A
Lepus alleni	Antelope Jackrabbit					1B
Lithobates yavapaiensis	Lowland Leopard Frog	SC	S	S		1A
Macrotus californicus	California Leaf-nosed Bat	SC		S		1B
Melanerpes uropygialis	Gila Woodpecker					1B
Melospiza lincolnii	Lincoln's Sparrow					1B
Melozone aberti	Abert's Towhee		S			1B
Micrathene whitneyi	Elf Owl					1C
Micruroides euryxanthus	Sonoran Coralsnake					1B
Myiarchus tyrannulus	Brown-crested Flycatcher					1C
Myotis occultus	Arizona Myotis	SC		S		1B
Myotis velifer	Cave Myotis	SC		S		1B
Myotis yumanensis	Yuma Myotis	SC				1B
Nyctinomops femorosaccus	Pocketed Free-tailed Bat					1B
Oreoscoptes montanus	Sage Thrasher					1C
Oreothlypis luciae	Lucy's Warbler					1C
Panthera onca	Jaguar	LE				1A

Species of Greatest Conservation Need Predicted within the Project Vicinity based on Predicted Range Models

Scientific Name	Common Name	FWS	USFS	BLM	NPL	SGCN
Peucaea carpalis	Rufous-winged Sparrow					1B
Phrynosoma solare	Regal Horned Lizard					1B
Phyllorhynchus browni	Saddled Leaf-nosed Snake					1B
Progne subis hesperia	Desert Purple Martin			S		1B
Setophaga petechia	Yellow Warbler					1B
Sphyrapicus nuchalis	Red-naped Sapsucker					1C
Spizella breweri	Brewer's Sparrow					1C
Tadarida brasiliensis	Brazilian Free-tailed Bat					1B
Vireo bellii arizonae	Arizona Bell's Vireo					1B
Vulpes macrotis	Kit Fox	No Status				1B

Species of Economic and Recreation Importance Predicted within the Project Vicinity

Scientific Name	Common Name	FWS	USFS	BLM	NPL	SGCN
Callipepla gambelii	Gambel's Quail					
Odocoileus hemionus	Mule Deer					
Pecari tajacu	Javelina					
Puma concolor	Mountain Lion					
Zenaida asiatica	White-winged Dove					
Zenaida macroura	Mourning Dove					

Project Type: Energy Storage/Production/Transfer, Energy Transfer, Power line/electric line (new)

Project Type Recommendations:
Minimize potential introduction or spread of exotic invasive species. Invasive species can be plants, animals (exotic snails), and other organisms (e.g., microbes), which may cause alteration to ecological functions or compete with or prey upon native species and can cause social impacts (e.g., livestock forage reduction, increase wildfire risk). The terms noxious weed or invasive plants are often used interchangeably. Precautions should be taken to wash all equipment utilized in the project activities before leaving the site. Arizona has noxious weed regulations (Arizona Revised Statutes, Rules R3-4-244 and R3-4-245). See Arizona Department of Agriculture website for restricted plants, https://agriculture.az.gov/. Additionally, the U.S. Department of Agriculture has information regarding pest and invasive plant control methods including: pesticide, herbicide, biological control agents, and mechanical control, http://www.usda.gov/wps/portal/usdahome. The Department regulates the importation, purchasing, and transportation of wildlife and fish (Restricted Live Wildlife), please refer to the hunting regulations for further information https://www.azgfd.com/hunting/regulations.

The Department recommends that wildlife surveys are conducted to determine if noise-sensitive species occur within the project area. Avoidance or minimization measures could include conducting project activities outside of breeding seasons.

For any powerlines built, proper design and construction of the transmission line is necessary to prevent or minimize risk of electrocution of raptors, owls, vultures, and golden or bald eagles, which are protected under state and federal laws. Limit project activities during the breeding season for birds, generally March through late August, depending on species in the local area (raptors breed in early February through May). Conduct avian surveys to determine bird species that may be utilizing the area and develop a plan to avoid disturbance during the nesting season. For underground powerlines, trenches should be covered or back-filled as soon as possible. Incorporate escape ramps in ditches or fencing along the perimeter to deter small mammals and herptefauna (snakes, lizards, tortoise) from entering ditches. In addition, indirect affects to wildlife due to construction (timing of activity, clearing of rights-of-way, associated bridges and culverts, affects to wetlands, fences) should also be considered and mitigated.

Based on the project type entered, coordination with State Historic Preservation Office may be required (http://azstateparks.com/SHPO/index.html).

Based on the project type entered, coordination with U.S. Fish and Wildlife Service (Migratory Bird Treaty Act) may be required (http://www.fws.gov/southwest/es/arizona/).

Vegetation restoration projects (including treatments of invasive or exotic species) should have a completed site-evaluation plan (identifying environmental conditions necessary to re-establish native vegetation), a revegetation plan (species, density, method of establishment), a short and long-term monitoring plan, including adaptive management guidelines to address needs for replacement vegetation.

Project Location and/or Species Recommendations:
HDMS records indicate that one or more **Listed, Proposed, or Candidate** species or **Critical Habitat** (Designated or Proposed) have been documented in the vicinity of your project. The Endangered Species Act (ESA) gives the US Fish and Wildlife Service (USFWS) regulatory authority over all federally listed species. Please contact USFWS Ecological Services Offices at http://www.fws.gov/southwest/es/arizona/ or:

Phoenix Main Office
9828 North 31st Avenue #C3
Phoenix, AZ 85051-2517
Phone: 602-242-0210
Fax: 602-242-2513

Tucson Sub-Office
201 N. Bonita Suite 141
Tucson, AZ 85745
Phone: 520-670-6144
Fax: 520-670-6155

Flagstaff Sub-Office
SW Forest Science Complex
2500 S. Pine Knoll Dr.
Flagstaff, AZ 86001
Phone: 928-556-2157
Fax: 928-556-2121

HDMS records indicate that **Western Burrowing Owls** have been documented within the vicinity of your project area. Please review the western burrowing owl resource page at:
https://www.azgfd.com/wildlife/speciesofgreatestconservneed/burrowingowlmanagement/.

Analysis indicates that your project is located in the vicinity of an identified ***wildlife habitat connectivity feature***. The **County-level Stakeholder Assessments** contain five categories of data (Barrier/Development, Wildlife Crossing Area, Wildlife Movement Area- Diffuse, Wildlife movement Area- Landscape, Wildlife Movement Area- Riparian/Washes) that provide a context of select anthropogenic barriers, and potential connectivity. The reports provide recommendations for opportunities to preserve or enhance permeability. Project planning and implementation efforts should focus on maintaining and improving opportunities for wildlife permeability. For information pertaining to the linkage assessment and wildlife species that may be affected, please refer
to: https://www.azgfd.com/wildlife/planning/habitatconnectivity/identifying-corridors/.
Please contact the Project Evaluation Program (pep@azgfd.gov) for specific project recommendations.

APPENDIX E. SPECIAL STATUS SPECIES EXCLUDED FROM FURTHER CONSIDERATION

Scientific Name	Common Name	Status	Habitat	Exclusion Justification
Coccyzus americanus	Yellow-billed Cuckoo	T, 1A	Streamside cottonwood, willow groves, or larger mesquite bosques mixed with tall isolated cottonwoods.	No suitable riparian habitat present in study area.
Coryphantha scheeri v. robustispina	Pima Pineapple Cactus	E	Ridges and alluvial hillsides in rocky, sandy soils.	No suitable habitat present in study area and study area is outside the range of this species.
Falco peregrinus anatum	American Peregrine Falcon	1A	Steep, sheer cliffs overlooking woodlands, riparian areas or other habitats supporting avian prey species in abundance.	No suitable habitat present in study area.
Haliaeetus leucocephalus	Bald Eagle	1A	Open areas, forest edges, and mountains near large lakes and rivers. Requires tall trees for nesting.	No suitable habitat present in study area.
Heloderma suspectum	Gila Monster	1A	Desert and mesquite grassland, but can also be found in pine-oak and tropical deciduous forests. Usually found in rocky foothill regions and not in open flats.	No suitable habitat present in study area.
Heloderma suspectum	Reticulate Gila Monster	1A		
Kinosternon sonoriense longifemorale	Sonoyta Mud Turtle	E	Ponds and streams. In the United States, only known from Quitobaquito Springs.	No suitable aquatic habitat present in study area.
Leptonycteris curasoae yerbabuenae	Lesser Long-nosed Bat	1A	Desert grassland and shrubland, chaparral, and lower-elevation oak woodlands with paniculate agaves and columnar cacti for forage.	No suitable forage plants present in study area.
Lithobates yavapaiensis	Lowland Leopard Frog	1A	Aquatic systems in desert grasslands and pinyon-juniper woodland at elevations of 146–2,500 m (480–6,200 feet).	No suitable habitat present in study area.
Panthera onca	Jaguar	E	Wet lowlands and oak/pine woodland.	No suitable habitat present in study area.
Sterna antillarum browni	California Least Tern	E	Open or sparsely vegetated sand, sandbars, gravel pits, or exposed flats along shorelines of inland rivers, lakes, reservoirs, or drainage systems.	No suitable habitat present in study area.

Scientific Name	Common Name	Status	Habitat	Exclusion Justification
Strix occidentalis lucida	Mexican Spotted Owl	T, 1A	Old-growth mixed conifer, pine-oak, and evergreen oak forests with high canopy closure, high stand density, a multiple layered canopy, uneven-aged stands, numerous snags, and downed woody matter.	No suitable habitat present in study area.
Terrapene ornata luteola	Desert Box Turtle	1A	Ponds and streams. In the United States, only known from Quitobaquito Springs.	No suitable habitat present in study area and study area is outside the range of this species.
Thamnophis eques megalops	Northern Mexican Gartersnake	T	Cienegas, stock tanks, riparian woodlands and forests, and streamside gallery forests.	No suitable habitat present in study area.

Key: E = Endangered (FWS), T = Threatened (FWS), 1A, B = SGCN Tier (AZGFD); HS = Highly Safeguarded (ADOA).

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EXHIBIT D

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EXHIBIT D: BIOLOGICAL RESOURCES

List the fish, wildlife, plant life and associated forms of life in the vicinity of the proposed site or route and describe the effects, if any, the proposed facilities will have thereon.

D.1 General Project Setting

The Project will be constructed in a largely urban area within the COT and Pima County. Approximate elevations within the study area range from 2,560 to 2,800 feet above mean sea level, sloping from southeast down to the northwest. The study area consists mostly of disturbed and landscaped areas, with a combination of native and non-native plants.

Annual precipitation recorded in Tucson, Arizona is 11.62 inches (WRCC, 2018). Nearly half of the annual rainfall occurs during the summer monsoon season (July to September); the remainder is spread over the balance of the year, with approximately one quarter of the total occurring during the winter rainy season (December to February). High summer temperatures are consistently just over 100 degrees Fahrenheit (°F), with winter highs approximately 68 °F (WRCC, 2018). Terrain is low profile valley floor. Soils in the study area are unconsolidated to strongly consolidated alluvial and aeolian deposits. Storm water runoff generally drains in a west-northwest direction.

D.2 Biological Resources

A brief discussion of vegetation and wildlife resources potentially occurring within the study area and the potential impacts to them from the Project are outlined below and described in more detail in the BE, Exhibit C-2.

Vegetation

Native plants observed in the study area are characteristic of the Arizona Upland biotic community, and include those listed in Table 6.

Table 6. Native Plants Observed in the Study Area

COMMON NAME	SPECIES
velvet mesquite	*Prosopis velutina*
blue paloverde	*Parkinsonia florida*
foothills paloverde	*Parkinsonia microphylla*
whitethorn acacia	*Vachellia constricta*
creosote	*Larrea tridentate*
desert broom	*Baccharis sarothroides*
burrobrush	*Hymenoclea monogyra*
graythorn	*Zizyphus obtusifolia*
brittlebush	*Encelia farinose*
limoncello	*Pectis angustifolia*
desert marigold	*Baileya multiradiata*
globemallow	*Sphaeralcea ambigua*
jimmyweed	*Isocoma pluriflora*
fluffgrass	*Dasyochloa pulchella*
sixweeks threeawn	*Aristida adscensionis*
chainfruit cholla	*Opuntia fulgida*
fishhook barrel cactus	*Ferocactus wislizenii*
Engelmann prickly pear	*Opuntia engelmannii*

Four weed species listed by the Arizona Wildlands Invasive Plant Working Group were identified in the study area (Table 7).

Table 7. Invasive, Non-native Plant Species Observed in the Project Area

SPECIES	RATING
buffelgrass *(Pennisetum ciliare)*	high
fountain grass *(Pennisetum setaceum)*	high
Russian thistle (Salsola kali)	medium
African sumac *(Rhus lancea)*	medium

Wildlife

Wildlife species observed in the study area at the time of the biological survey included those listed in Table 8.

Table 8. Wildlife Species Observed in the Study Area

COMMON NAME	SPECIES
mourning dove	*Zenaida macroura*
curve-billed thrasher	*Toxostoma curvirostre*
black-tailed gnatcatcher	*Polioptila Melanura*
common raven	*Corvus corax*
turkey vulture	*Cathartes aura*
whiptail	*Aspidoscelis sp.*

Wildlife Linkages

Wildlife movement areas are present in the study area in the form of urban riparian areas/washes, and can serve as wildlife corridors for small, urban species, such as coyote and javelina.

D.3 Impacts

Removal of vegetation associated with clearing and grading has the potential to impact nesting birds protected under the MBTA. In the event construction is scheduled during nesting/breeding seasons, TEP will conduct pre-construction bird surveys and avoid nesting birds until fledging is complete. Vegetation will be checked prior to construction to ensure there would be no impacts to migratory birds.

Native plants in the study area are protected by Arizona Native Plant Law and are also subject to additional Pima County and COT regulations. Jurisdictional standards for native plant preservation within construction areas and guidance for mitigation of impacts, will be followed. Some native vegetation and riparian habitat would be trimmed or removed to allow for equipment access during construction. Construction of the transmission line in the wildlife corridors would not have any long-term impacts on urban wildlife movement or create barriers to wildlife movement.

D.4 Conclusion

Impacts to general wildlife and vegetation along the alternative routes is anticipated to be minor, as existing roads will be used to access the corridors, and the corridors will not be entirely cleared of native vegetation.

D.5 References

Tierra. (2019a). Biological Evaluation and Alternatives Analysis TEP Irvington-East Loop Transmission Line Project, Tucson, Pima County, Arizona: Tierra Right of Way.

WRCC. (2018). *Arizona Climate Summaries: Tucson Univ of Arizona, Arizona – NCDC 1981-2010 Monthly Normals.* Retrieved from Western Region Climate Center: https://wrcc.dri.edu/cgi-bin/cliMAIN.pl?aztucs

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EXHIBIT E

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EXHIBIT E: SCENIC AREAS, HISTORIC SITES AND STRUCTURES, AND ARCHAEOLOGICAL SITES

Describe any existing scenic areas, historic sites and structures or archaeological sites in the vicinity of the proposed facilities and state the effects, if any, the proposed facilities will have thereon.

Exhibit E includes summaries of existing visual (scenic), historic sites and structures, and cultural resources, as well as the potential impacts the proposed Project may have on each resource.

E.1 Scenic Areas and Visual Resources

E.1.1 Overview

This portion of Exhibit E addresses the scenic and visual resources in the Project area. The area does not contain designated national, state, or local scenic areas. Pima County designated scenic major routes are present in the Project area and are crossed by the alternatives (see below for more information and Exhibit A-4). Visual resource inventory data were collected based on a review of existing and future land use plans, aerial photography, field reconnaissance, and visual simulations to compare the visual impact of the proposed facilities with the existing facilities. The narrative that follows provides a description of the visual resource inventory and characterization of impacts to the landscape setting and the associated sensitive viewers.

E.1.2 Landscape Setting

The regional landscape setting is characterized by four mountain ranges surrounding the basin in which the COT is situated. The Santa Cruz river flows generally south to north on the west side of the city. Four mountain ranges can typically be seen from any point in the basin. The Santa Catalina Mountains are to the north, Rincon Mountains to the east, Santa Rita Mountains to the south, and the Tucson Mountains are to the west side of the city. Major land uses in the region are urban and suburban development, open/undeveloped land, commercial development, industrial (heavy and light), the DMAFB, and airports (military and private).

The COT/Pima County Outdoor Lighting Code (2012) was established to protect access to the dark night sky and support astronomical activity. Two observatories are in the region, Kitt Peak to the west, and Mount Wrightson to the south. Pima County has a Scenic Routes Plan and COT has a Major Streets and Routes Plan comprised of a map and regulations that establish setbacks and other development regulations to preserve and enhance visual resources along designated roadways. Portions of Valencia Road and Kolb Road are designated by Pima County as scenic, major routes, and by COT as Gateway Arterials. I-10 near the Project area is also designated by Pima County as a Scenic Interstate Highway.

The landscape setting for the Project area is largely developed land within the COT and Pima County, with small portions of undeveloped land in the southern portion of the Project area. Within and adjacent to the Project Area there are five settings: commercial, residential, industrial, institutional, and undeveloped/open space. The four mountain ranges are all visible in the distance from the Project area.

Existing visual impacts include power transmission and distribution lines, DMAFB, the airplane "Boneyard," UPRR, and I-10. Residential communities line both sides of Kolb Road and Pantano Parkway, as well as Escalante Road, Golf Links Road, and 22nd Street. These residents are the primary sensitive viewers in the Project area.

A number of roads transect the Project Area, see Table 9.

Table 9. Main Roads in the Project Area

ROAD NAME	NUMBER OF LANES	SETTING
Valencia Road	6	Undeveloped, industrial ***MAJOR SCENIC ROAD***
Littletown Road	Dirt, 5	Undeveloped, industrial
Kolb Road	6	Undeveloped, industrial, residential, commercial ***MAJOR SCENIC ROAD***
Escalante Road	4	Residential, industrial
Golf Links Road	6	Residential, commercial
Pantano Parkway	4/5	Residential, institutional, commercial, undeveloped
22nd Street	6	Residential, commercial
Entrada	2	Residential
Research Loop	2	Institutional

Existing Power Lines in the Study Area

From Irvington Substation to Valencia Road, where the proposed alternative parallels UPRR and I-10, there are no existing power lines. An existing distribution line is located along the north side of the UPRR railway east of Valencia Road, and turns east at Littletown Road to parallel the proposed alternative to Kolb Road. An existing distribution line is located on the west side of Kolb Road, and street light structures are on both sides of the roadway, north to Valencia Road.

As Kolb Road dips below grade to allow for airplanes to move between areas of the "Boneyard," the existing power lines route to the east and west. An existing distribution line returns to the east side of Kolb Road about half a mile south of Escalante Road. North of Escalante Road an existing transmission line and distribution line are located along the east side of Kolb Road, as well as street lights on both sides. Another existing distribution line follows the west side of Kolb Road north of Vernice Street. At Golf Links Road, the existing transmission line switches to the west side of Kolb Road. North of 22nd Street, there

are existing transmission lines on both sides of Kolb Road, and an existing distribution line on the west side.

Escalante Road, between Kolb Road and Pantano Road, has both an existing transmission line and distribution line on the north side of the roadway. Pantano has transmission and distribution lines on the east side of the roadway, north to Sundew Drive. At this point the distribution line follows Pantano Road, and the transmission line continues due north. North of 22nd Street, the transmission line is on the east side of Pantano Road, and a distribution line on the west side. The transmission line turns west at 5th Street towards East Loop Substation.

East of Kolb Road, 22nd Street has distribution lines alternating sides till Pantano Wash. There are no existing lines along Pantano Wash.

Golf Links Road, east of Kolb Road, has an existing distribution line along the south side. There are no existing lines heading north from Golf Links Road to Pantano Wash, or along Pantano Wash.

Residential and recreational viewers are typically associated with longer viewing duration; therefore, viewer sensitivity in these settings is anticipated to be high. Sensitivity is anticipated to be low for industrial settings because these developments are associated with active industrial uses where viewers may not be as sensitive to changes in the landscape. The results of the visual inventory for each Project alternative follow.

Alternative 1 (Common to all)

This alternative is located adjacent to the north side of UPRR railway, and along Littletown Road, and Kolb Road. The area is a mix of undeveloped land and industrial uses, to include the DMAFB "Boneyard." An existing distribution line is located along the eastern portion of the route. Viewers would mainly be travelers along Valencia Road, Littletown Road, and Kolb Road.

Alternative B2 (Preferred)

This alternative is located within COT ROW along Escalante Road, Pantano Road, and within existing transmission line easements. Residential communities are located on both sides of the route for its entirety, excepting the last half mile as it approaches East Loop Substation. Existing transmission and distribution lines are currently located in the majority of the road ROW. Street lights, commercial establishments, and institutions (e.g., schools and churches) are present along the route. Viewers would be residents and travelers along Escalante Road, Pantano Road, Pantano Parkway, and Entrada.

Alternative A

This alternative is located within COT ROW along Kolb Road. Residential communities are located on both sides of Kolb Road throughout the alignment. Existing transmission and distribution lines, street lights, commercial establishments, and institutions (e.g., schools and churches) are present along the route. Viewers would be residents, visitors to the commercial facilities, churches and schools, and travelers along Kolb Road.

Alternative C1

This alternative is located within COT ROW along Kolb Road, and 22nd Street, and within easements along Pantano Wash and approaching East Loop Substation. Existing transmission and distribution lines, street lights, and commercial establishments are present along the Kolb Road portion of the route. Viewers would include residents, visitors to the commercial facilities, and travelers along Kolb Road, and 22nd Street. Additional viewers would be recreationists in Stefan Golub Park and along the portion of the route that follows the Pantano Wash and Pantano River Park.

E.1.3 Visual Simulations Methods

Field work was conducted to photograph the existing conditions from various locations throughout the study area. Fourteen (14) Key Observation Points (KOPs) were selected which best captured the view that could be impacted by construction of the new facilities. The view of individuals traveling through the area on Kolb Road, Escalante Road, Pantano Road, 22nd Street, Golf Links Road, and Broadway Boulevard were taken into account, as well as views along the railroad and Pantano Wash. See Exhibit H for additional information regarding public facilities and Exhibit F for additional recreation facilities in the Project area.

A georeferenced 3-dimensional (3d) model was created, using the engineered transmission line design, structure locations, types, pole finish, and heights. Note that only TEP's standard pole finish, which is self-weathering steel was simulated and analyzed. The model included the proposed 138 kV transmission lines and towers, and the existing and proposed 138 kV substations. The visual simulations were created of the proposed condition to illustrate what the Project would look like to viewers in the Study Area. See Exhibit G-5 for simulations of the proposed facilities.

E.1.4 Visual Assessment Results

The visual resources impact assessment evaluated the level of visual change, or contrast, that the proposed transmission lines would introduce into each landscape setting in conjunction with effects to associated sensitive viewers. The components of the visual assessment included identification of the types of viewers and their sensitivity to the Project in each segment of the route and characterization of impacts that were quantified as low, moderate, or high. The visual impact assessment considered the effects of new structures (the Project) introduced into the existing setting, associated sensitive viewers, and the influence of existing facilities (e.g., existing transmission and distribution lines, commercial and industrial establishments).

Overall, impacts are anticipated to be low for the Project when it is adjacent to or parallel with similar developed settings or features, such as along the roadways, because there would be minimal visual change. Residential settings typically result in greater impacts when adjacent to the Project, because the proposed condition differs in form and line, and introduces new vertical features. Visual impacts resulting from the Project would typically be reduced when: (1) the proposed route occurs within a setting that is similar in form and line, and (2) the route is within a corridor that has existing transmission or distribution lines.

Portions of Valencia Road and Kolb Road are designated scenic, major routes. I-10 is also mapped near the Project area as a scenic route.

Visual impacts for each of the routes are described below, and outlined in Exhibit E-1.

Alternative 1 (Common to all)

Alternative 1 (see Exhibit G-5 for simulations) is compatible with the existing setting, and impacts are anticipated to be low. This conclusion is based on the industrial nature of the setting, and existing transmission and distribution lines along the alignment, even though Valencia Road and Kolb Road are designated as scenic. Viewer sensitivity is low, as viewer type is commuter. The land adjacent to this alternative is undeveloped, or industrial, including the DMAFB "Boneyard."

Alternative B2 (Preferred)

Alternative B2 (see Exhibit G-5 for simulations) is compatible with the existing setting, and impacts are anticipated to be moderate. This conclusion is based on the existing transmission and distribution lines present along much of the road. Though the route is located along roadways lined with residential neighborhoods on both sides, viewer sensitivity is considered moderate (the viewers live along this alternative), as there is substantial existing vertical infrastructure, therefore, the proposed transmission line would not create a new impact.

Alternative A

Alternative A (see Exhibit G-5 for simulations) is compatible with the existing setting, and impacts are anticipated to be moderate. This conclusion is based on the existing transmission and distribution lines present along much of the road. Though Kolb Road is a major scenic road, and the route is located along roadways lined with residential neighborhoods on both sides, viewer sensitivity is considered moderate (the viewers live along this alternative), as there is substantial existing vertical infrastructure, therefore, the proposed transmission line would not create a new impact.

However, this alternative would be somewhat less visually appealing than the other alternatives, because it would result in two double-circuit transmission lines along Kolb Road, north of 22nd Street, one on each side (46 kV, and 138 kV as described above).

Alternative C1

The portion of Alternative C1 (see Exhibit G-5 for simulations) along Kolb Road and 22nd Street is compatible with the existing setting, and though Kolb Road is a major scenic road, impacts are anticipated to be moderate, due to existing transmission and distribution lines with the COT ROW. The northern portion of this alternative is located within Pantano River Park, where viewer sensitivity is high and there are no existing vertical structures. Viewers are visiting the Pantano River Park, or are residents in the area, and this alternative would add vertical structures in areas where none currently exist. Power lines travel east-west along Broadway Boulevard, and approaching East Loop Substation, but they are more distant from the Pantano River Park pathway.

E.2 Historic Sites and Structures, and Archaeological Sites

E.2.1 Overview

A Class I records review was conducted by Tierra Right of Way Services, to determine the extent of archaeological survey work performed along the alternative routes, and whether any sites have been recorded that intersect the seven proposed alternative corridors.

E.2.2 Inventory Methods and Results

The study included a records search of the Arizona State Museum's (ASM's) online database, AZSITE. The records review identified 38 cultural resource studies conducted within the Class I study area, five of which have been completed within the past 10 years. The review identified two previously recorded sites within the study area (see Exhibit E-2). No National Register Historic Districts or buildings listed on the National Register of Historic Places (NRHP) were located within the study area.

The two previously recorded sites include a linear site, AZ AA:12:875(ASM), an El Paso Natural Gas pipeline. The site is considered an in-use historic structure, and no longer qualifies as an archaeological site in the State of Arizona; additionally, natural gas lines have been exempted from Section 106 consideration, so there is no impact to the site, by definition. The other site is a known, prehistoric archaeological site, AZ BB:13:60(ASM), that has not been evaluated for the NRHP by the State Historic Preservation Office.

Recommendations

A Class III survey is recommended to determine the degree of mitigation appropriate for the known site in its current state, as well as to identify, record, and assess the significance of any prehistoric or historic cultural resources in the Project area that might be adversely affected by the proposed undertaking. However, because each alternative follows existing developed road rights-of-way and no significant prehistoric or historic archaeological sites have been previously identified in this part of Tucson, there is little potential for the survey to identify significant archaeological sites within any of the Project corridors.

The archaeologist's recommendations for the Project are to avoid the listed sites, and to comply with the requirements of A.R.S. § 41-865 should any human remains or cultural materials be discovered during ground-disturbing activities (Tierra, 2019b). No impacts or mitigation are anticipated.

E.3 References

Tierra. (2019b). Cultural Resources Records Search for the TEP Irvington-East Loop Transmission Line Project, City of Tucson, Pima County, Arizona: Tierra Right of Way.

Alternatives	From	To	Setting	Existing Features	Viewer Type	Viewer Sensitivity	Impact Level	Impacts
1	Irvington Substation	Patriot Substation	Undeveloped; industrial	Airplane Boneyard; existing distribution lines	Commute	Low	Low	Minor change in existing views
B2	Patriot Substation	East Loop Substation	Developed; residential neighborhoods	Single family homes, schools, commercial establishments, existing transmission & distribution lines	Commute, live, work	Moderate	Low	Minor change in existing views
A	Patriot Substation	East Loop Substation	Developed; residential neighborhoods	Single family homes, schools, commercial establishments, existing transmission & distribution lines	Commute, live, work	Moderate	Low	Minor change in existing views; would result in two double-circuite lines
C1	Patriot Substation	East Loop Substation	Developed; residential neighborhoods	Single family homes, schools, commercial establishments, existing transmission & distribution lines	Commute, live, work	Moderate-High	Moderate	Moderate change in existing views. Addition of vertical structures in areas where there are none (Pantano River Park).

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Tierra Right of Way
A LAND SERVICES COMPANY

October 10, 2019

Tucson Electric Power Company
Attn: Renee Darling
3950 E. Irvington Road
Tucson, Arizona 85714-2114

RE: Cultural Resources Records Search for the TEP Irvington–East Loop Transmission Line Project

At your request, Tierra performed a records search of the Arizona State Museum's (ASM's) online database, AZSITE, to determine the extent of archaeological survey work performed along the seven proposed route alternatives (Alternatives 1, 2, A, B1, B2, C1 and C2) and whether any sites intersect the project corridors.

The records search began by identifying all previously recorded sites and projects that intersect the seven proposed route alternatives (Figure 1). The search identified a total of 38 projects conducted within the study area (Table 1). Of these, five have been completed within the past 10 years. Areas covered by surveys older than 10 years may require an updated, current resurvey. In addition, the study area contains a total of two previously recorded sites (Table 2). No other sites are located in the vicinity of the project area (ca. 200 feet). In addition, no National Register Historic Districts or buildings listed on the National Register of Historic Places (NRHP) are located within the proposed alternatives.

The results of the search by each proposed alternative route (Alternatives 1, 2, A, B1, B2, C1 and C2) and information on archaeological sites within the project area are presented below.

Alternative 1

Alternative 1 is 7.18 miles in length. Approximately 33% (2.4 miles) of the route has been previously surveyed. Only 0.14% of Alternative 1 has been surveyed in the past 10 years (2011-231.ASM) (see Figure 1). One linear archaeological site is crossed by Alternative 1: AZ AA:12:875(ASM), El Paso Gas Pipeline No. 1007 (see Figure 1). It is an in-use linear feature that include portions determined eligible by the Arizona State Historic Preservation Office (SHPO). However, because they are in use and would be avoided, no mitigation should be required.

Alternative 2

Alternative 2 is 7.45 miles in length. Approximately 29% of the route (2.2 miles) has been previously surveyed. Only 0.13% of Alternative 2 has been surveyed in the past 10 years (2011-231.ASM) (see Figure 1). One linear archaeological site is crossed by Alternative 2: AZ AA:12:875(ASM), El Paso Gas Pipeline No. 1007 (see Figure 1). It is an in-use linear feature that include portions determined eligible by SHPO. However, because they are in use and would be avoided, no mitigation should be required.

Randye K. Ferrick, President & Broker
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Federal, State, and Local Permitting • GIS/CAD Mapping
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Alternative A

Alternative A is 3.87 miles in length. Approximately 85% of the route (3.3 miles) has been previously surveyed. Only 0.26% of Alternative A (0.01 miles) has been surveyed within the past 10 years (2010-252.ASM) (see Figure 1). No cultural resources intersect with Alternative A.

Alternative B1

Alternative B1 is 5.45 miles in length. Approximately 12.8% of the route (0.7 miles) has been previously surveyed. Only 0.37% of Alternative B1 (0.02 miles) has been surveyed within the past 10 years (2010-178.ASM) (see Figure 1). One archaeological site, AZ BB:13:60(ASM), intersects the alternative (see Figure 1). The site, a prehistoric lithic scatter, is unevaluated for the NRHP by SHPO.

Alternative B2

Alternative B2 is 5.63 miles in length. Approximately 13.3% of the route (0.75 miles) has been previously surveyed. Only 0.36% of Alternative B2 (0.02 miles) has been surveyed within the past 10 years (2010-178.ASM) (see Figure 1). One archaeological site, AZ BB:13:60(ASM) intersects the alternative (see Figure 1). The site, a prehistoric lithic scatter, is unevaluated for the NRHP by SHPO.

Alternative C1

Alternative C1 is 5.06 miles in length. Approximately 89% of the route (4.5 miles) has been previously surveyed. Only 5.93% (0.3 miles) of the alternative has been surveyed within the past 10 years (2010-252.ASM and 2013-378.ASM) (see Figure 1). No cultural resources intersect with Alternative C1.

Alternative C2

Alternative C2 is 5.86 miles in length. Approximately 3.5 miles of the route has been surveyed while only 0.3 miles of the alternative has been surveyed within the past 10 years (2011-4.ASM and 2013-378.ASM) (see Figure 1). No cultural resources intersect with Alternative C2.

Alternatives Analysis

For consistency, Tierra evaluated the alternatives using the same methodology utilized for TEP's IRV-Kino project (Lyon 2018). For that project, TEP identified 11 criteria to be used in their alternatives analysis that are aligned to the CEC decision factors (Arizona Revised Statute §40-360.06) and TEP's design philosophy and standards. Tierra was tasked with assessing Criterion 7, which is described as:

Criterion 7 - Known or potentially eligible cultural resources in the corridor as measured by documentation through previous survey effort and ranked by degree of mitigation required.

Using Criterion 7, each alternative was scored based on the results of the cultural resources literature and records review, in which locations of recorded cultural resources were overlaid on maps of the study area and the alternatives (see Figure 1).

A score of 3 was given to alternatives where no impacts to known or potentially eligible cultural resources would occur. A score of 2 was given to alternatives where known or potentially eligible cultural resources would be impacted but could be easily mitigated. A score of 1 was given to those

alternatives where impacts to known or potentially eligible cultural resources would occur and could be mitigated, but mitigation could be cost-prohibitive.

Alternatives 1 and 2 cross a linear site, AZ AA:12:875(ASM), an El Paso Natural Gas pipeline. Portions of the site have been previously determined eligible for the NRHP by SHPO; however, the site is considered an in-use historic structure and no longer qualifies as an archaeological site in the State of Arizona. Further, natural gas lines have been exempted from Section 106 consideration, so there is no impact to the site by definition. As a result, these alternatives scored a 3, as no mitigation is necessary (see Figure 1). Alternatives A, C1, and C2 do not intersect any known archaeological sites and, as a result, also scored a 3. As alternatives B1 and B2 intersect a known, prehistoric archaeological site, AZ BB:13:60(ASM), that has not been evaluated for the NRHP by SHPO, it has been scored a 1 as mitigation could be necessary. Survey of the alternatives would be necessary to determine the degree of mitigation (i.e., monitoring vs. phased data recovery) appropriate for the site in its current state.

In terms of survey needs, all alternatives will require nearly complete Class III survey, so all alternatives are considered equal in that regard. As each alternative is located in largely developed areas, it is unlikely that new sites will be found during the survey process. However, there is an increased likelihood for encountering cultural resources in the alternatives located closer to Pantano Wash (B1, B2, C1, C2).

Recommendations

Because only small portions of each alternative have been surveyed within the past 10 years and portions of each alternative have not been surveyed, Tierra recommends Class III surveys for the selected alternative(s) prior to construction to determine if sites are present and whether further mitigation is necessary. However, because each alternative follows existing developed road rights-of-way and no significant prehistoric or historic archaeological sites have been identified in this part of Tucson, there is little potential for the survey to identify significant archaeological sites within any of the project corridors. Due to Alternative A's distance from Pantano Wash, as compared with Alternatives B1, B2, C1, and C2, Alternative A is the least likely route to impact new archaeological sites in combination with either Alternative 1 or 2 and is, therefore, Tierra's best alternative recommendation for this project (Figure 2).

If you have any questions, please feel free to contact myself or the project manager, Chance Copperstone, at (520) 319-2106.

Sincerely,

Ashley D'Elia
Staff Archaeologist, Environmental Planning and Cultural Resources Division

Table 1. Summary of Previous Projects That Intersect the Proposed Alternative Routes

ASM Project No.	Project Name/Description	Performing Institution	Report Reference	Alternatives Crossed by Previous Project
1955-3.ASM	Southern Pacific Pipeline Survey	Southern Pacific Company	McConville and Holzkamper 1955	1
1979-51.ASM	TEP 138 kV Survey, NE Substation to E Loop Substation Through Snyder Substation	Arizona State Museum	Czaplicki 1979	B1, B2, C1, C2
1980-168.ASM	Transportation Corridor Project	Arizona State Museum	Rozen 1980	1, 2
1987-202.ASM	Pantano Wash Stabilization	Institute for American Research	Mayro 1987	B1, B2, C1, C2
1987-230.ASM	Davis-Monthan AFB Survey & Data Recovery	Statistical Research, Inc.	Altschul 1987	2
1989-107.ASM	Rillito Creek Recharge Project	Bureau of Reclamation	Laush 1989	A, C1, C2
1989-85.ASM	Pantano Wash Linear Park Survey	Statistical Research, Inc.	Altschul 1989	C1, C2
1993-90.ASM	Archaeological Survey pf the Intersection of Prudence	Desert Archaeology, Inc.	Goetze 1993	C1
1995-325.ASM	Golf Links Bikepath Survey	Desert Archaeology, Inc.	Freeman 1995	A, B1, B2, C1, C2
1996-287.ASM	22nd/Kolb Intersection Survey	Desert Archaeology, Inc.	Elson 1996	A, C1
1997-27.ASM	Survey for Kolb Rd. Landscaping, Broadway/Escalante	Desert Archaeology, Inc.	Eppley 1997	A, C1
1998-35.ASM	Broadway-Kolb Survey	Desert Archaeology, Inc.	Sliva 1998	A
1998-495.ASM	Los Reales Survey	SWCA, Inc.	Desruisseaux 1998	1, 2
1999-220.ASM	PedX Survey C	Desert Archaeology, Inc.	Diehl 1999	A, C1
1999-330.ASM	Pantano Wash Bank Protection CRA	Old Pueblo Archaeology	Jones 1999	C1, C2
1999-587.ASM	PBNS Level 3 Fiber Optic Line	SWCA, Inc.	Doak 1999	1, 2
2000-116.ASM	Jct. I-19 - Craycroft Rd.	ENTRANCO	Walsh 2000	1, 2
2000-314.ASM	Kinnison Wash and Pantano Road Survey Project	SWCA, Inc.	Sayre 2000	B1, B2, C2
2001-138.ASM	770 N. Kolb Road Survey	Desert Archaeology, Inc.	Brack 2001	A
2001-140.ASM	Broadway: Kolb to Pantano Survey	Desert Archaeology, Inc.	Diehl 2001a	A, C1, C2
2001-142.ASM	Vista del Sahuara Back to Basics	Desert Archaeology, Inc.	Diehl 2001b	A

ASM Project No.	Project Name/Description	Performing Institution	Report Reference	Alternatives Crossed by Previous Project
2001-402.ASM	Pantano: Escalante to Irvington Survey	Desert Archaeology, Inc.	Cook 2001	B1, B2, C2
2001-665.ASM	Jim's Autobody	Professional Archaeological Services and Technologies	Stephen 2001	B1, B2, C2
2002-30.ASM	M3 Cricket Monopole	Engineering and Environmental Consultants	Fuller 2002	C2
2003-1070.ASM	EPNG Tucson Class III Survey	SWCA, Inc.	Hesse and Gutierrez 2003	1, 2
2004-1037.ASM	Dietz Elementary Irrigation Survey	Desert Archaeology, Inc.	Diehl 2004	B2
2004-813.ASM	Pantano Wash	Harris Environmental Group	Twilling 2004	B1, B2, C1, C2
2005-1081.ASM	Southeast Quadrant Main Survey	Desert Archaeology, Inc.	Diehl 2005	B1, B2, C2
2005-700.ASM	Broadway North	Tierra Right of Way Services	Williams 2005	C1, C2
2006-1.ASM	SFPP, LP, El Paso to Phoenix Expansion Project, Arizona Portion: Cochise and Pima Counties	William Self Associates	Rieder et al. 2006	1
2007-45.ASM	City of Tucson 06 58	SWCA, Inc.	Tucker 2006	A
2008-355.ASM	EPNG Line 1007 FERC Reports & Baseline Studies	SWCA, Inc.	Hesse et al. 2009	1, 2
2008-74.ASM	Pima County FBOP Gravity Sewer Line Class III	WestLand Research	Cook and Malarchik 2008	1, 2
2010-178.ASM	Pantano Park Survey	Tierra Right of Way Services	Jones 2010	B1, B2
2010-252.ASM	Golf Links and Kolb Intersection Improvements	Statistical Research, Inc.	Linde and Graves 2010	A, C1
2011-231.ASM	Valencia and Kolb Archaeological Survey	SWCA, Inc.	Peterson 2011	1, 2
2011-4.ASM	La Paloma Academy Survey	Tierra Right of Way Services	Whitaker 2011	C2
2013-378.ASM	Pantano River Park Survey	Tierra Right of Way Services	Doak 2013	C1, C2

Note: Bolded survey numbers are those that occurred within the past 10 years.

Table 2. Previously Recorded Archaeological Sites That Intersect the Proposed Alternative Routes (SITES HAVE BEEN REDACTED FROM MAP)

Agency Number	Site Type	Period	NRHP Eligibility	IRV-East Loop Alt.
AZ AA:12:875(ASM)	El Paso Natural Gas Pipeline No. 1007	Historic (A.D. 1500-1950); Late historic (A.D. 1900-1950)	Portions determined eligible by SHPO	1, 2
AZ BB:13:60(ASM)	Lithic Scatter	Prehistoric (12,000 B.C. –A.D. 1500)	Not Evaluated	B1, B2

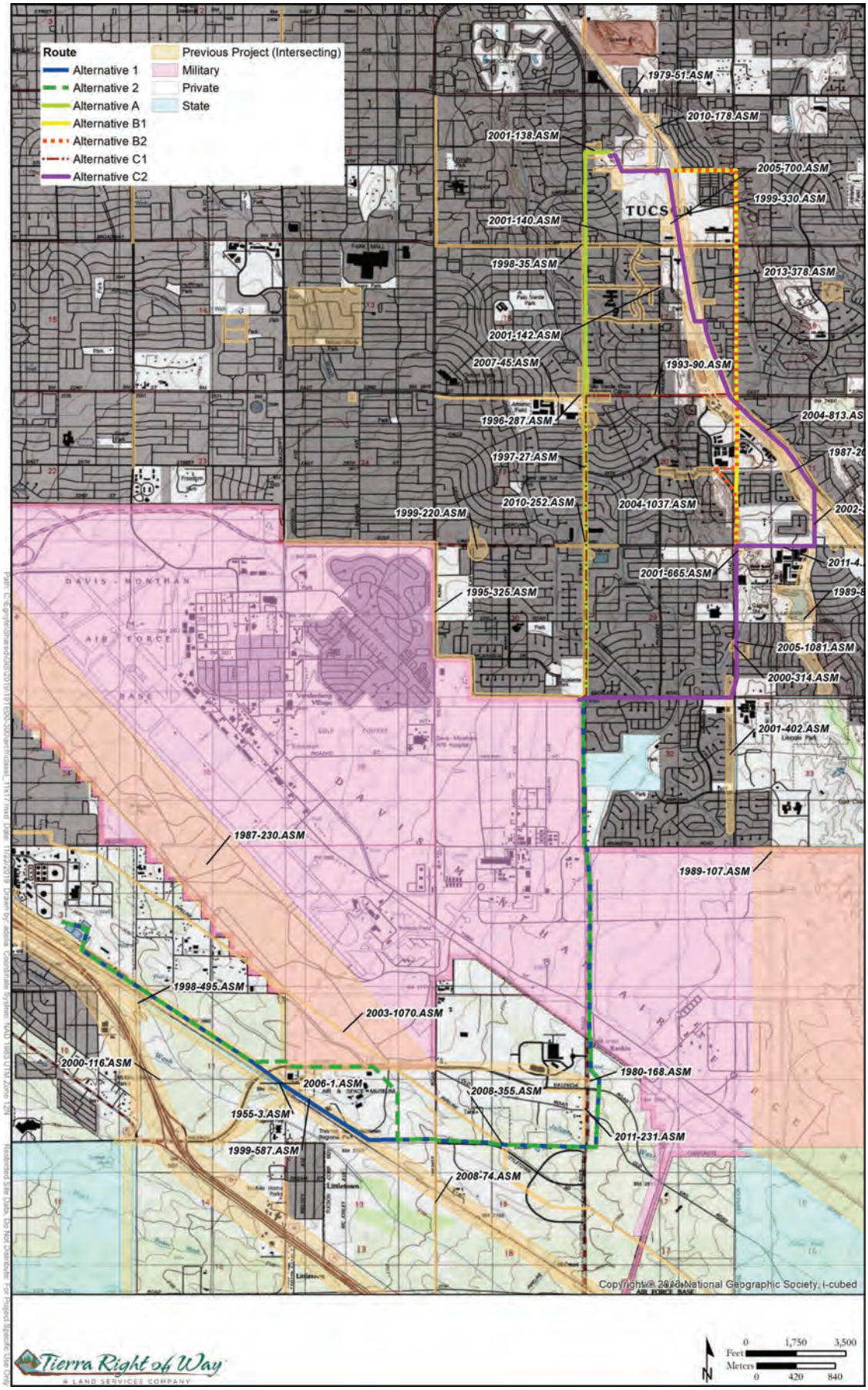

Figure 1. Map showing proposed alternative routes with intersecting previous projects (CONFIDENTIAL, public disclosure is prohibited by ARS §39-125; SITE LOCATIONS HAVE BEEN REDACTED).

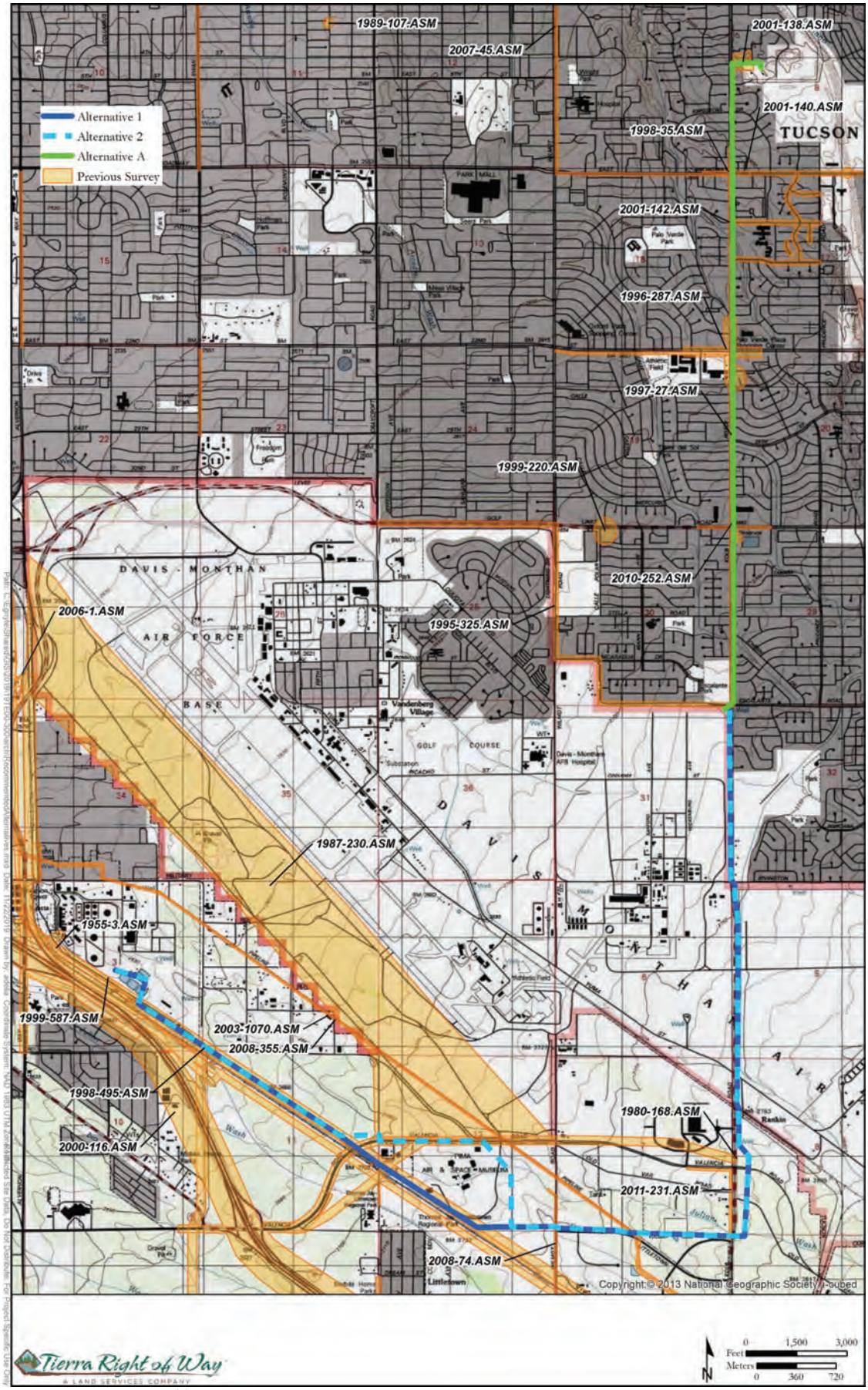

Figure 2. Map showing Tierra's recommended alternative routes with intersecting previous projects and previously recorded archaeological sites (CONFIDENTIAL, public disclosure is prohibited by ARS §39-125; SITE HAS BEEN REDACTED).

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EXHIBIT F

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EXHIBIT F: RECREATIONAL PURPOSES AND ASPECTS

State the extent, if any, the proposed site or route will be available to the public for recreational purposes, consistent with safety considerations and regulations and attach any plans the applicant may have concerning the development of the recreational aspects of the proposed site or route.

All of the alternative routes would be located within Pima County and COT road ROW to the extent practical and would be available to the public consistent with existing use. Portions of Alternatives C1 run adjacent to the Pantano Wash and would be co-located with the Pantano River Park. Once constructed, the transmission line would not impact public access or use of the Park, however some access and use restrictions would be required during construction.

Various recreational activities occur close to the alternative routes. There are also several municipal parks near the alternative routes that offer sports and playground facilities (see Exhibit F-1). Although these facilities are located in proximity to the alternative routes, the Project would not prevent recreational use from continuing at these facilities.

Table 10 lists the recreational facilities adjacent to, and within 1,500 feet of, the alternative routes. Other neighborhood parks and recreation centers are located greater than 1,500 feet from the alternatives.

Table 10. Recreation Facilities Adjacent to Alternatives

RECREATION FACILITY	LOCATION	ADJACENT TO ALTERNATIVE
Aviation Greenway	South side of Escalante Rd, north of the DMAFB Boneyard	All alternatives
Concord Hills Mini Parks	South of 22nd between Pantano and Kolb	C1
Escalante Park	6900 E Nicaragua Dr	1, A, C1
Groves Park	Between Pantano and Kolb, north of DMAFB	All alternatives
Jesse Owens Park	400 S Sarnoff Dr	B2
Julian Wash Greenway	Runs northwest along the railroad	All alternatives
Palo Verde Park	300 S Mann Av	A
Pantano River Park	Runs northwest along Pantano Wash	C1
Stefan Gollub Park	401 S Prudence Rd	C1
Thomas Jay Regional Park	6465 S Craycroft Rd (south of UPRR)	All alternatives
Vista Del Prado Park	6900 E Stella Rd	A, C1
Abraham Lincoln Regional Park	4325 S Pantano Rd	B2
Chuck Ford Lakeside Park	8201 E Stella Rd	B2

Table 11 lists recreational facilities within the Study area, but not adjacent to alternative routes.

Table 11. Additional Recreation Facilities within the Study Area

RECREATION FACILITY	LOCATION
Augie Acuna Los Ninos Neighborhood Park	5432 S Bryant Av
Fred Enke Golf Course	8251 E Irvington Rd
Terra Del Sol Park	6700 E Calle Marte
Michael Perry Park	8700 E Arbor St

The Julian Wash Greenway and the Pantano River Park are a part of the Loop, a shared-use trail complex located throughout Pima County and City of Tucson that has both soft and hard surface trails. Pima County is developing the Loop around metropolitan Tucson with links to Marana, Oro Valley, and South Tucson. Pima County residents and visitors can enjoy the more than 120 miles of shared-use paths that have already been completed. Transmission poles would be co-located with the river path similarly to existing transmission lines located along other portions of the Loop.

Visitors to the recreational facilities listed above would experience an impact from the added structures in the viewshed (see visual simulations in Exhibit G-5). Existing infrastructure within the viewshed of these recreational facilities include UPRR, I-10, the Sundt Generating Station, DMAFB, the DMAFB "Boneyard," various commercial and industrial facilities, roads, traffic signals, lighting, and multiple electric distribution and transmission lines. Due to the extent of existing infrastructure, the impact of the Project's additional structures on the viewshed of recreational facilities would be negligible.

Alternatives A, and B2 would not directly impact any of the listed facilities or recreational uses. Alternative C1 would directly impact the Pantano River Park by occupying space within the park's linear path. This impact would be moderate to high during construction and low following construction. The public would not have access to the Project for recreational purposes, except for Alternative C1, where it is located within the existing Pantano River Park.

East Loop
Patriot
Port
Irvington
Jesse Owens Park
Palo Verde Park
Concord Hills Mini Parks
Stefan Gollub Park
Pantano River Park
Terra Del Sol Park
Michael Perry Park
Vista Del Prado Park
Chuck Ford Lakeside Park
Escalante Park
Aviation Greenway
Abraham Lincoln Regional Park
Fred Enke Golf Course
Groves Park
Augie Acuna Los Ninos Neighborhood Park
Thomas Jay Regional Park
Julian Wash Greenway

Alternative 1
Alternative A
Alternative B2 (Preferred)
Alternative C1 (See Note)
Existing Substation (Project)
Planned Substation
Trails
Parks
Revised Study Area

Tucson Electric Power
Land Resources

Exhibit F-1

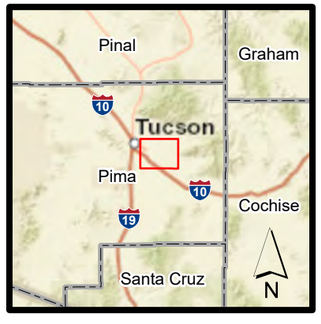
Irvington to East Loop 138 kV Transmission Line Project

Recreation

NOTE: Alternative C1 is an offset graphic representation to show common overlap alignments.

0 0.5 1
Miles

1:62,500



Sources: Esri, Tucson Electric Power, Pima County, City of Tucson, and Arizona State Land Department.
Projection: NAD 1983 UTM Zone 12N
Basemap: Esri World Topographic Map

This map is for planning purposes only.
UNS Energy make no warranty of its accuracy.

12/10/2019 UA55909

Y:\Projects\Irv_to_East_Loop(DM)_138kV\Pro\Irv_EL(DM)_CEC.aprx

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EXHIBIT G

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EXHIBIT G: CONCEPTS OF PROPOSED FACILITIES

Attach any artist's or architect's conception of the proposed plant or transmission line structures and switchyards, which applicant believes may be informative to the Committee.

EXHIBIT	CONTENTS
G-1	Single Circuit 138 kV Tangent Typical Configuration
G-2	Single Circuit 138 kV Deadend Typical Configuration
G-3	Double Circuit 138 kV Tangent Typical Configuration
G-4	Double Circuit 138 kV Deadend Typical Configuration
G-5	Visual Simulations

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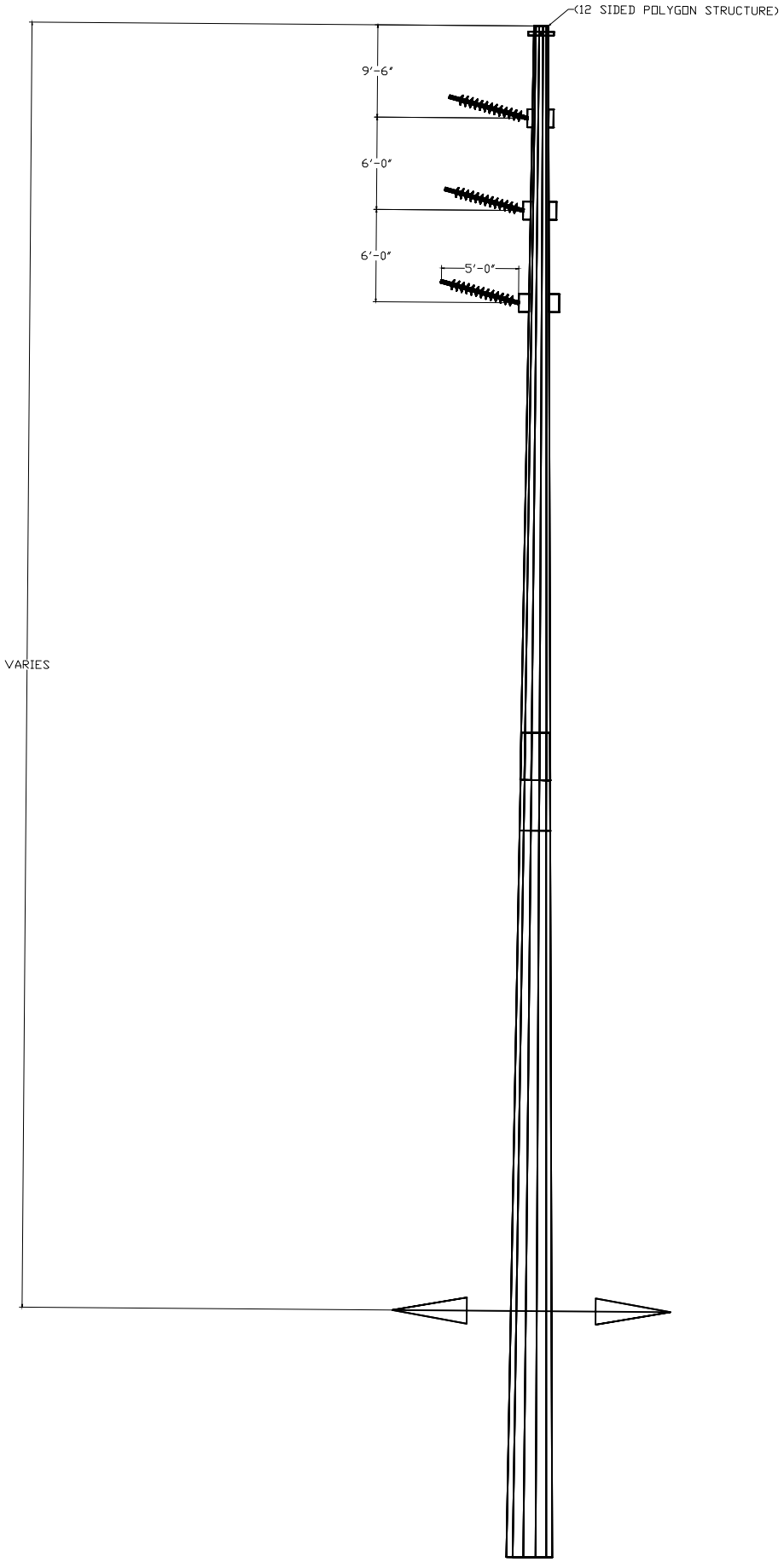
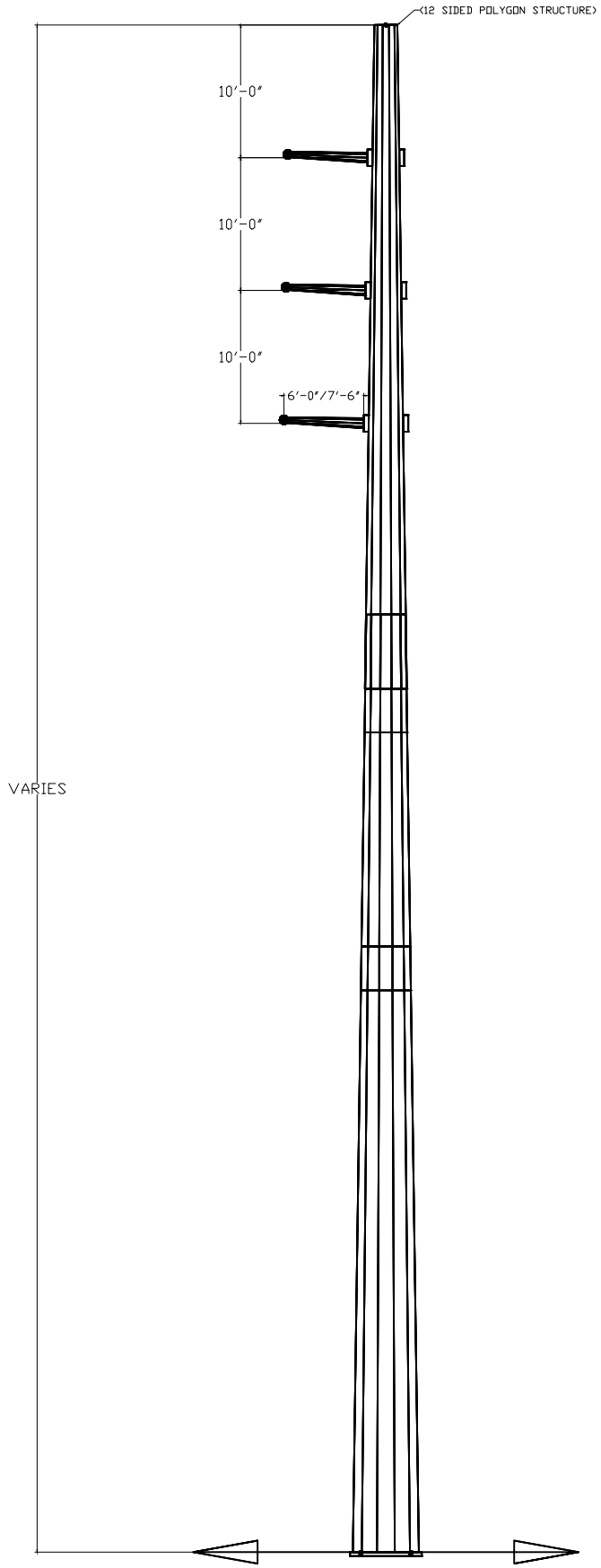
SINGLE CIRCUIT 138kV - TANGENT
TYPICAL CONFIGURATION



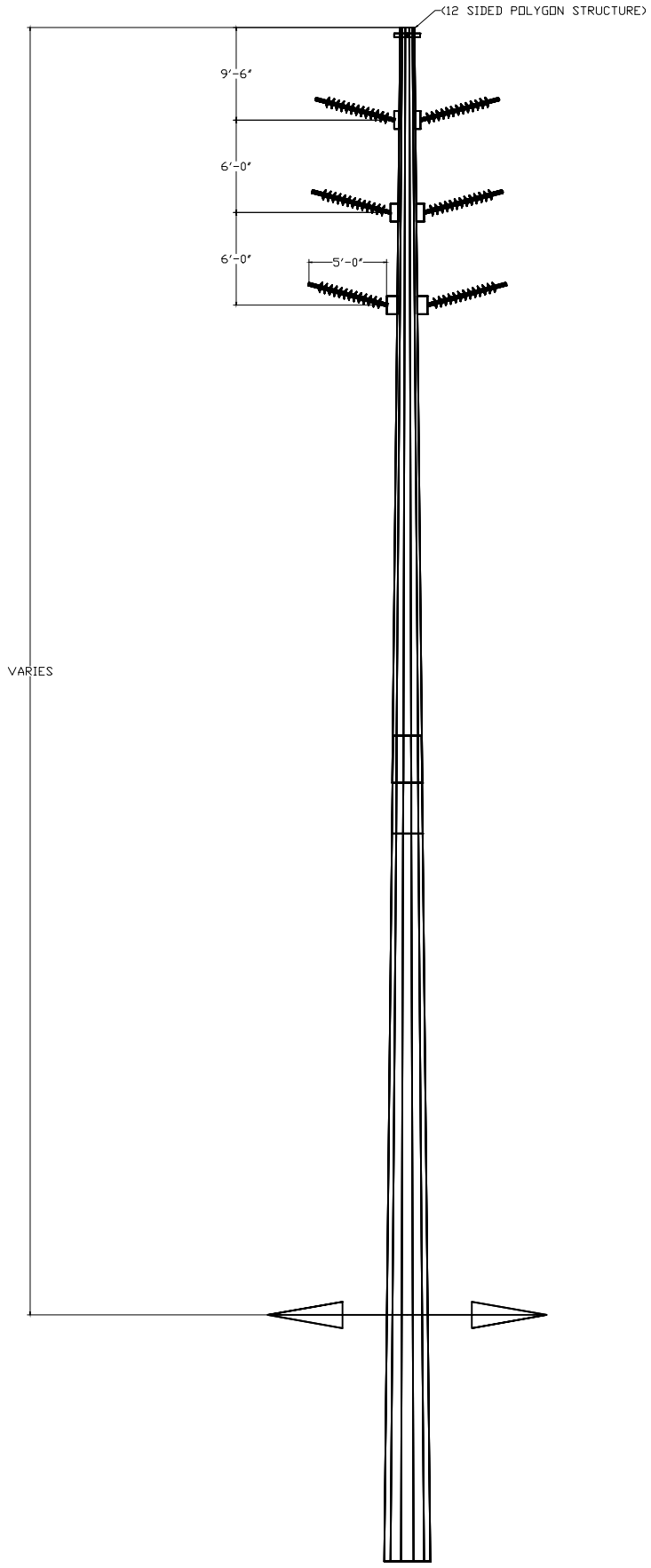
*All structure types are preliminary and dimensions are subect to change based on engineering parameters.
**Not to Scale

SINGLE CIRCUIT 138kV - DEADEND
TYPICAL CONFIGURATION



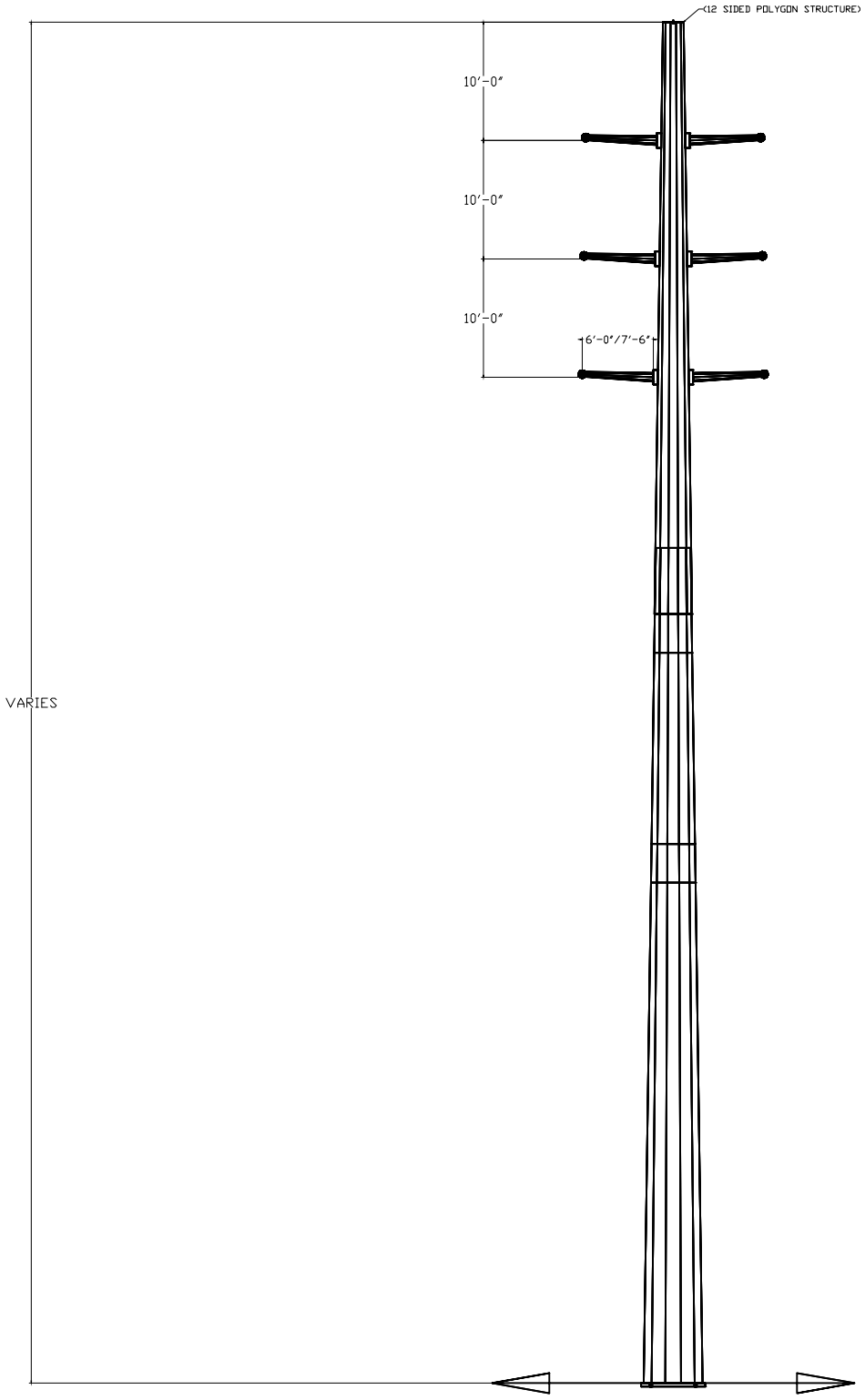
*All structure types are preliminary and dimensions are subect to change based on engineering parameters.
**Not to Scale

DOUBLE CIRCUIT 138kV - TANGENT
TYPICAL CONFIGURATION



*All structure types are preliminary and dimensions are subect to change based on engineering parameters.
**Not to Scale

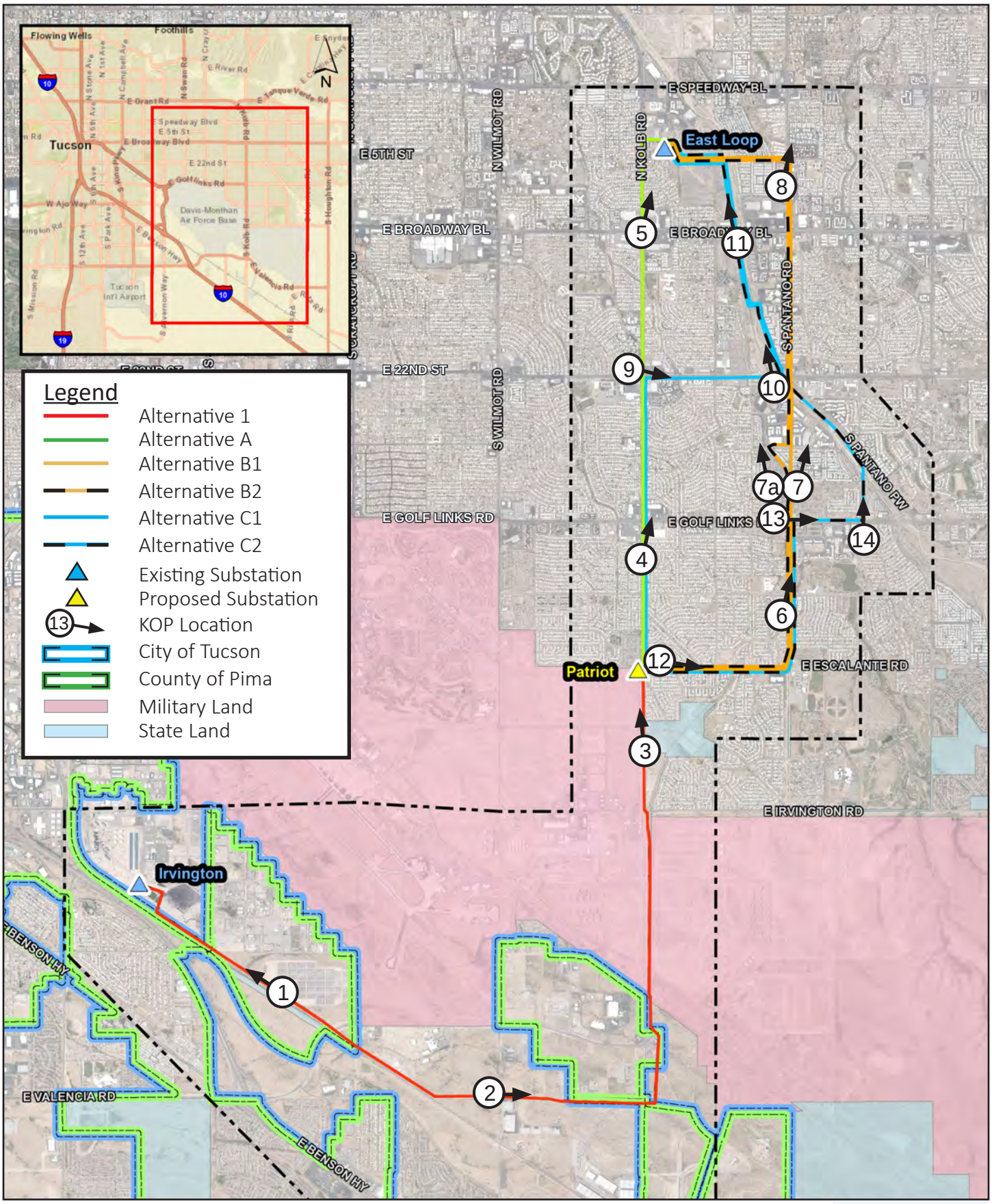
DOUBLE CIRCUIT 138kV - DEADEND
TYPICAL CONFIGURATION



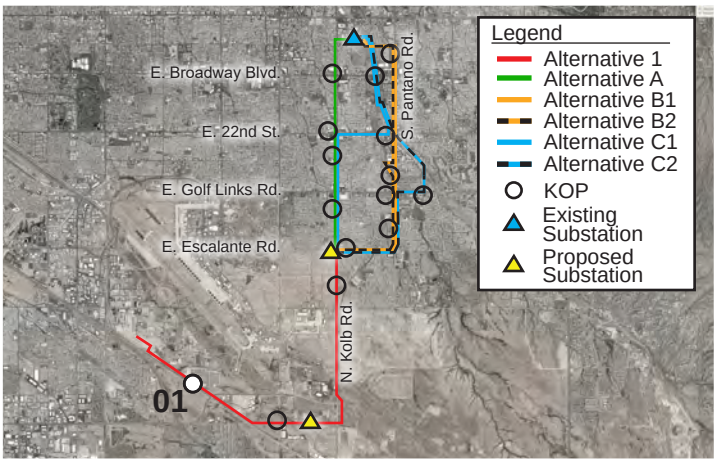
*All structure types are preliminary and dimensions are subect to change based on engineering parameters.
**Not to Scale

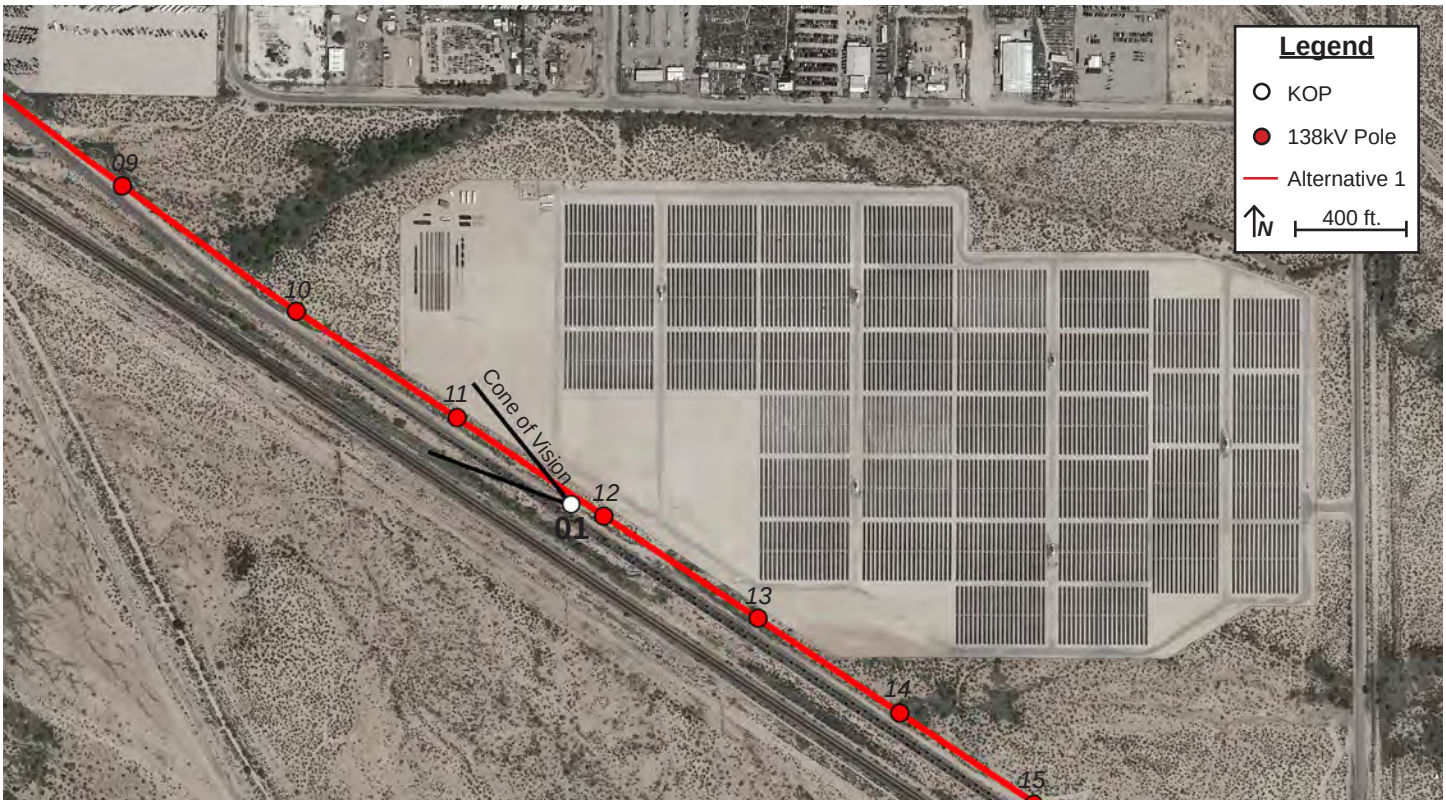
Irvington to East Loop 138 kV Transmission Line Project

Key Observation Point (KOP) - Key Map



Key Observation Point (KOP) # 01





Notes:

Camera Information

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- Sensor: APS-C 23.7mm x 15.7mm
- Lens: Pentax DA L 18-55mm
- Focal Length: 55mm
- 35mm Equivalent: 82mm
- F-Stop: f/13
- ISO:100

KOP

- Representative View for: Vantage from Eon Solar Yard looking northwest.
- Location: Along railroad service/access road.
- Latitude: 32.144831° N; Longitude: 110.884083° W
- View Point Elevation at Eye Level: 2,686 ft.
- Looking: northwest
- Poles Visible: Alternative 1 Structures 1-11
- Image File Name: IMGP0823.jpg

Simulation Notes

- Photo Taken: Oct 14th, 2019 at 12:10 pm
- The image is based on a single photo and represent approximately 22.8 degree horizontal field of view.
- This view is approximately 535 feet southeast of the nearest pole represented in the simulation.
- The simulation is based on the best information available and is preliminary. Final alignment and structure locations are subject to change based on final engineering and other factors.

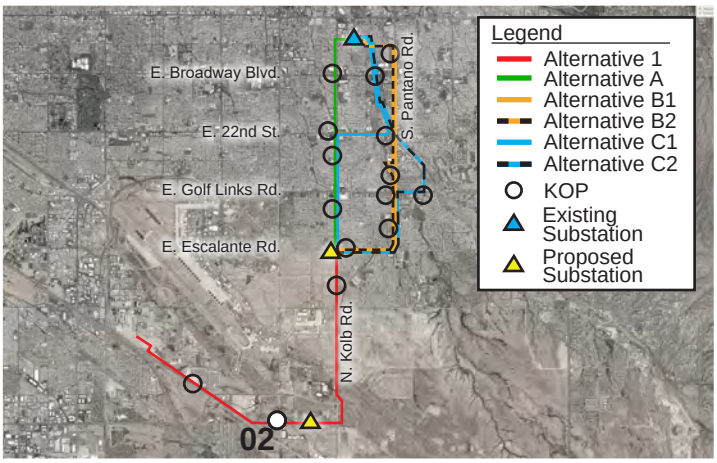
Key Observation Point (KOP) #1

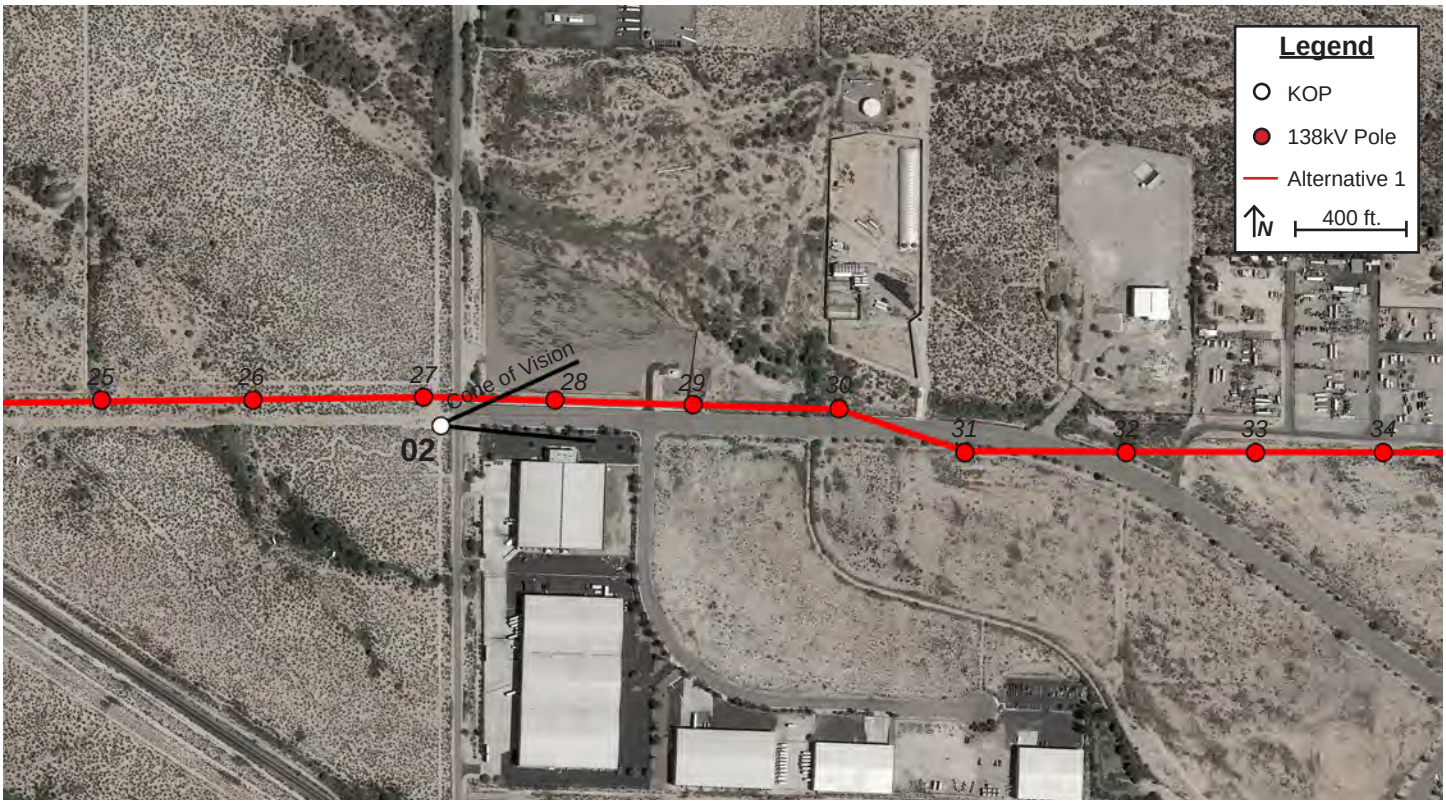
Current Condition

Simulated Condition

Alternative 1

Key Observation Point (KOP) # 02





Notes:

Camera Information

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- Lens: Pentax DA L 18-55mm
- Focal Length: 50mm
- 35mm Equivalent: 75mm
- F-Stop: f/13
- ISO:100

KOP

- Representative View for: vantage point from Wilmot and Littletown looking east.
- Location: S Wilmot Rd & E Littletown Rd
- Latitude: 32.134162° N; Longitude: 110.858196° W
- View Point Elevation at Eye Level: 2,764 ft.
- Looking: east
- Poles Visible: Alternative 1 Structures 28-30
- Image File Name: IMGP0861.jpg

Simulation Notes

- Photo Taken: Oct 14th, 2019 at 12:38 pm
- The image is based on a single photo and represent approximately 25 degree horizontal field of view.
- This view is approximately 460 feet west southwest of the nearest pole represented in the simulation.
- The simulation is based on the best information available and is preliminary. Final alignment and structure locations are subject to change based on final engineering and other factors.

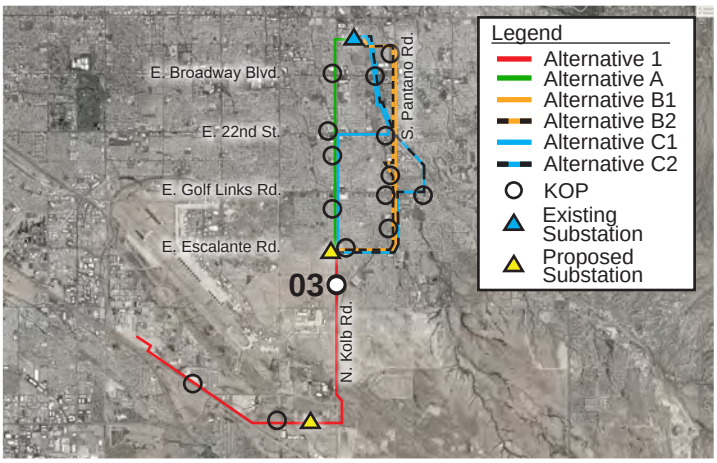
Key Observation Point (KOP) #2

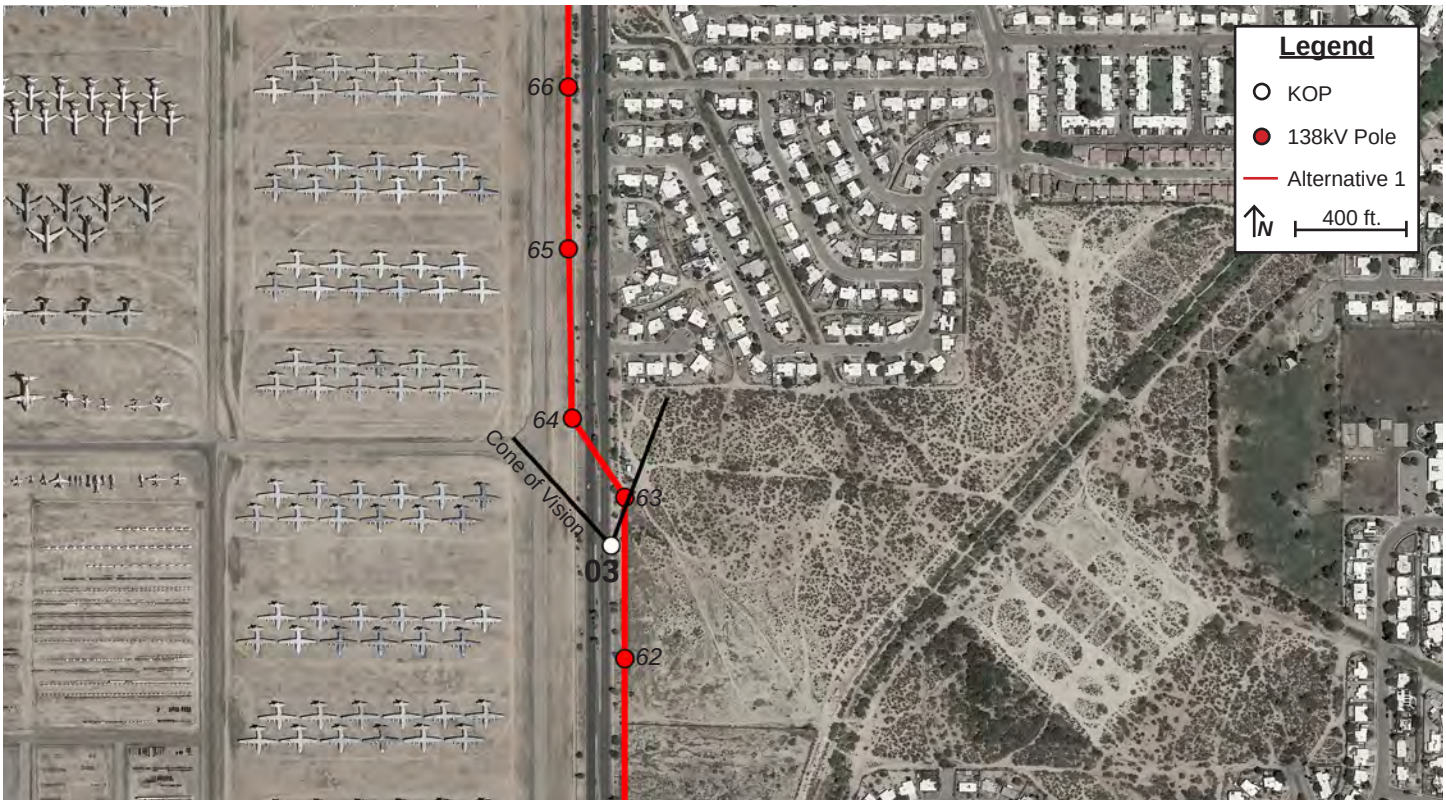
Current Condition

Simulated Condition

Alternative 1

Key Observation Point (KOP) # 03





Notes:

Camera Information

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- Lens: Pentax DA L 18-55mm
- Focal Length: 18mm
- 35mm Equivalent: 27mm
- F-Stop: f/8
- ISO:100

KOP

- Representative View for: motorists traveling northbound on South Kolb Rd.
- Location: 4341 S Kolb Rd
- Latitude: 32.170355° N; Longitude: 110.840718° W
- View Point Elevation at Eye Level: 2,740 ft.
- Looking: north
- Poles Visible: Alternative 1 Structures 63-70
- Image File Name: IMGP0911.jpg

Simulation Notes

- Photo Taken: Oct 14th, 2019 at 12:55 pm
- The image is based on a single photo and represent approximately 25 degree horizontal field of view.
- This view is approximately 233 feet west south of the nearest pole represented in the simulation.
- The simulation is based on the best information available and is preliminary. Final alignment and structure locations are subject to change based on final engineering and other factors.

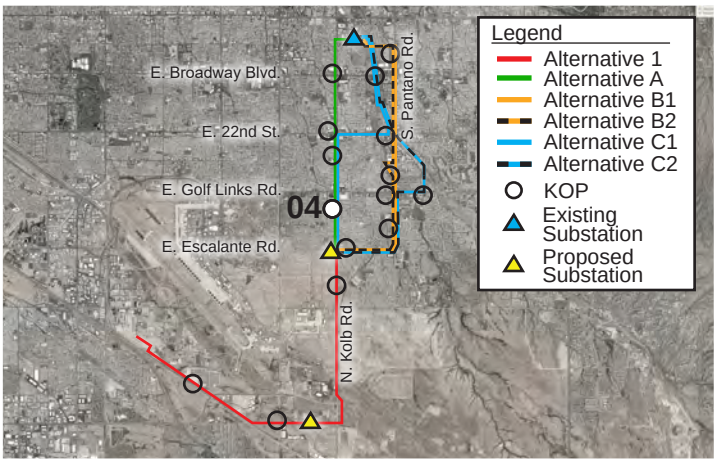
Key Observation Point (KOP) #3

Current Condition

Simulated Condition

Alternative 1

Key Observation Point (KOP) # 04



Notes:

Camera Information

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- Lens: Pentax DA L 18-55mm
- Focal Length: 50mm
- 35mm Equivalent: 75mm
- F-Stop: f/13
- ISO:100

KOP

- Representative View for: motorists traveling northbound on South Kolb Rd.
- Location: 3243 S Kolb Rd
- Latitude: 32.183862° N; Longitude: 110.841111° W
- View Point Elevation at Eye Level: 2,690 ft.
- Looking: north
- Poles Visible: Alternative A/C1 Structures 76-85 and 107
- Image File Name: IMGP0997.jpg

Simulation Notes

- Photo Taken: Oct 14th, 2019 at 1:22 pm
- The image is based on a single photo and represent approximately 25 degree horizontal field of view.
- This view is approximately 238 feet southwest of the nearest pole represented in the simulation.
- The simulation is based on the best information available and is preliminary. Final alignment and structure locations are subject to change based on final engineering and other factors.

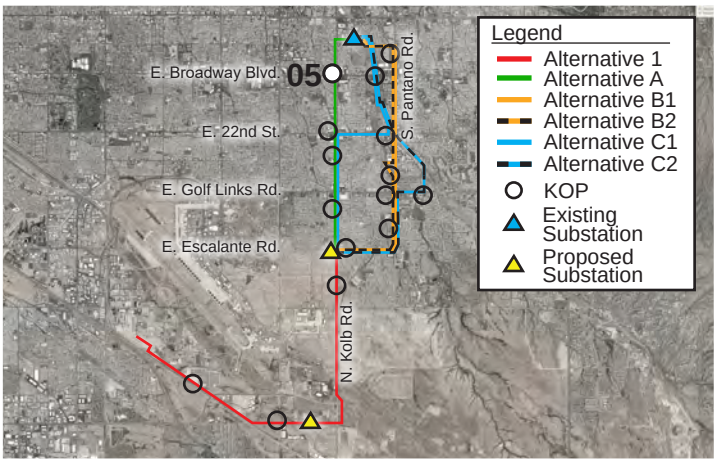
Key Observation Point (KOP) #4

Current Condition

Simulated Condition

Alternative A/C1

Key Observation Point (KOP) # 05



Notes:

Camera Information

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- Lens: Pentax DA L 18-55mm
- Focal Length: 50mm
- 35mm Equivalent: 75mm
- F-Stop: f/8
- ISO:100

KOP

- Representative View for: motorists traveling northbound on north Kolb Rd.
- Location: 39 N Kolb Rd
- Latitude: 32.221643° N; Longitude: 110.841217° W
- View Point Elevation at Eye Level: 2,663 ft.
- Looking: north
- Poles Visible: Alternative A Structures 99-104
- Image File Name: IMGP1033.jpg

Simulation Notes

- Photo Taken: Oct 14th, 2019 at 1:32 pm
- The image is based on a single photo and represent approximately 25 degree horizontal field of view.
- This view is approximately 693 feet southwest of the nearest pole represented in the simulation.
- The simulation is based on the best information available and is preliminary. Final alignment and structure locations are subject to change based on final engineering and other factors.

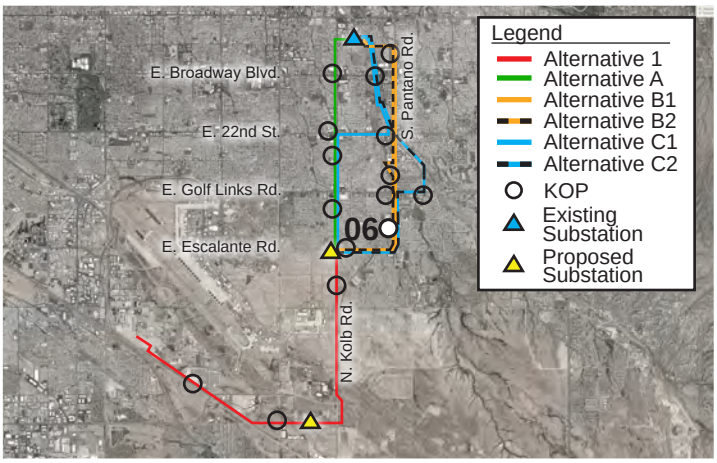
Key Observation Point (KOP) #5

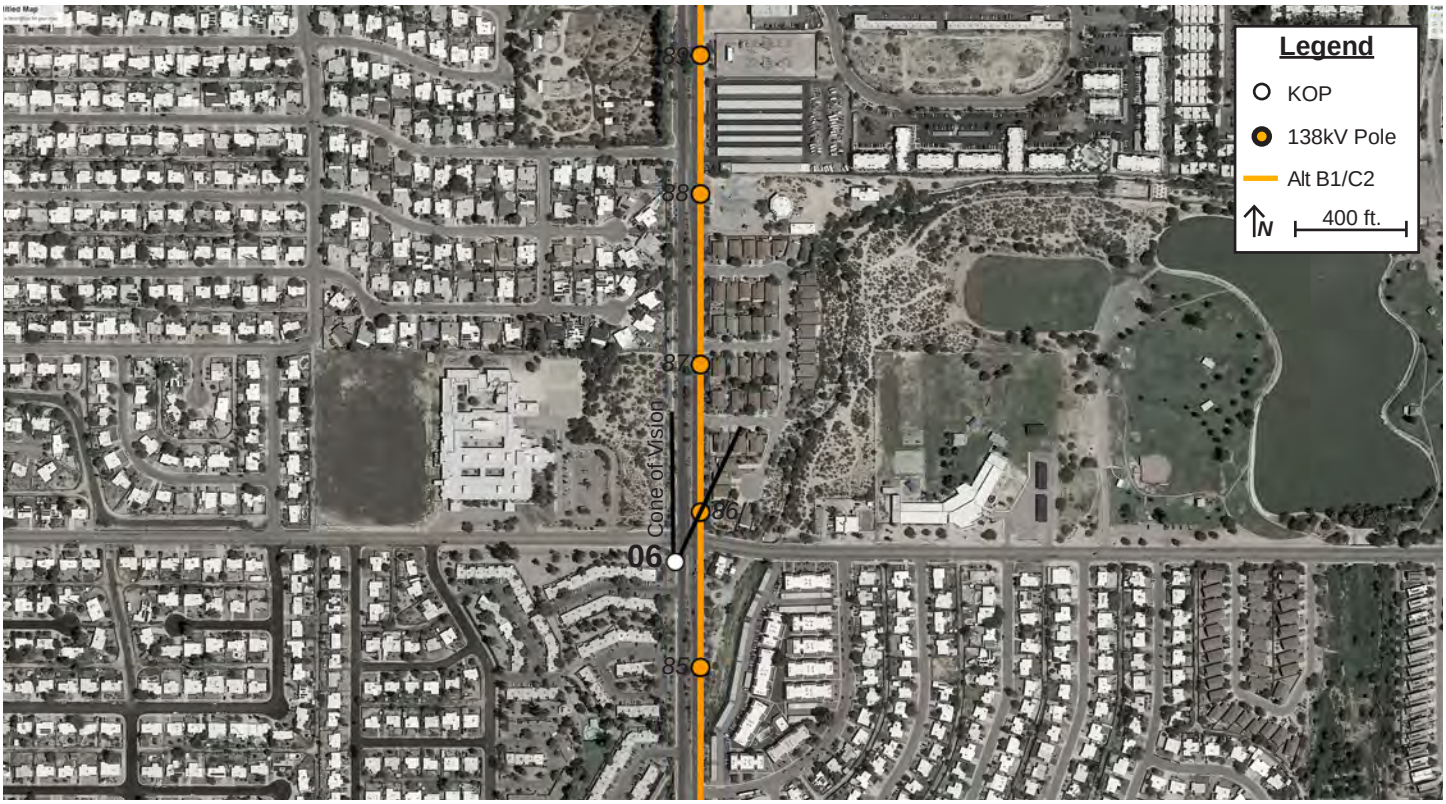
Current Condition

Simulated Condition

Alternative A

Key Observation Point (KOP) # 06





Notes:

Camera Information

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- Lens: Pentax DA L 18-55mm
- Focal Length: 50mm
- 35mm Equivalent: 75mm
- F-Stop: f/13
- ISO:100

KOP

- Representative View for: motorists traveling northbound on South Pantano Rd.
- Location: 3200 S Pantano Rd
- Latitude: 32.184445° N; Longitude: 110.824063° W
- View Point Elevation at Eye Level: 2,734 ft.
- Looking: north
- Poles Visible: Alternative B1 Structures 86-92 / Alternative C2 Structures 86-93
- Image File Name: IMGP1204.jpg

Simulation Notes

- Photo Taken: Oct 14th, 2019 at 3:01 pm
- The image is based on a single photo and represent approximately 25 degree horizontal field of view.
- This view is approximately 196 feet southwest of the nearest pole represented in the simulation.
- The simulation is based on the best information available and is preliminary. Final alignment and structure locations are subject to change based on final engineering and other factors.

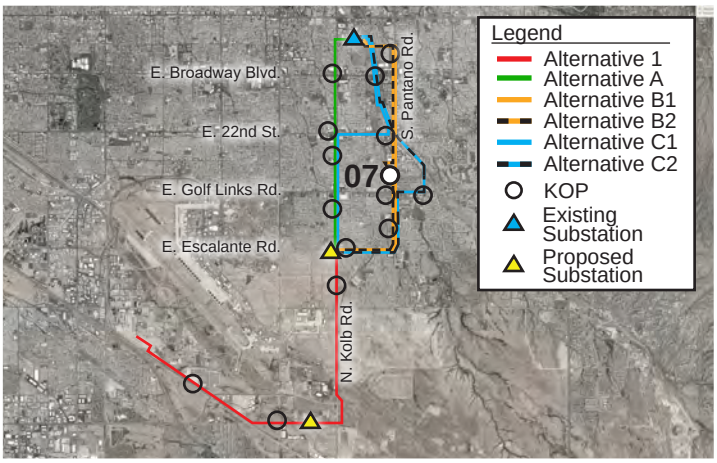
Key Observation Point (KOP) #6

Current Condition

Simulated Condition

Alternative B1/C2

Key Observation Point (KOP) # 07



Notes:

Camera Information

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- Focal Length: 35mm
- 35mm Equivalent: 52mm
- F-Stop: f/13
- ISO:100

KOP

- Representative View for: motorists traveling northbound on South Pantano Rd, and entry to Tucson Meadows
- Location: 2101 S Pantano Rd
- Latitude: 32.196336° N; Longitude: 110.823854° W
- View Point Elevation at Eye Level: 2,663 ft.
- Looking: north
- Poles Visible: Alternative B1 Structures 94-99
- Image File Name: IMGP1168.jpg

Simulation Notes

- Photo Taken: Oct 14th, 2019 at 2:40 pm
- The image is based on a single photo and represent approximately 35.2 degree horizontal field of view.
- This view is approximately 349 feet south of the nearest pole represented in the simulation.
- The simulation is based on the best information available and is preliminary. Final alignment and structure locations are subject to change based on final engineering and other factors.

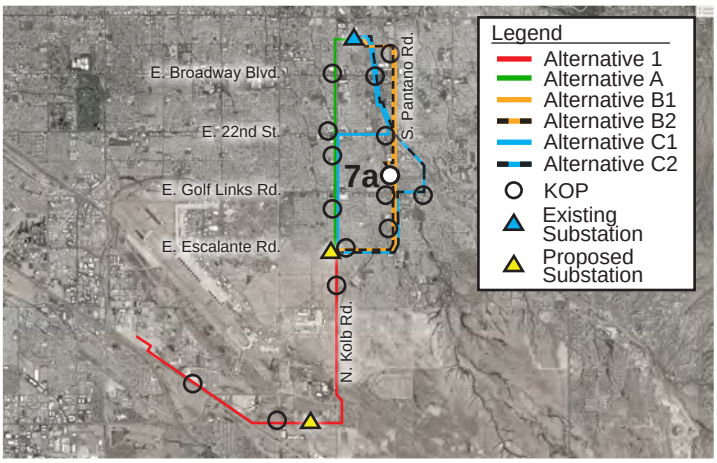
Key Observation Point (KOP) #7

Current Condition

Simulated Condition

Alternative B1

Key Observation Point (KOP) # 07a



Notes:

Camera Information

- Type: Pentax K-30
- Sensor: APS-C 23.7mm x 15.7mm
- Lens: Pentax DA L 18-55mm
- Focal Length: 35mm
- 35mm Equivalent: 52mm
- F-Stop: f/13
- ISO:100

KOP

- Representative View for: motorists traveling northbound on South Pantano Rd
- Location: 2101 S Pantano Rd
- Latitude: 32.196336° N; Longitude: 110.823854° W
- View Point Elevation at Eye Level: 2,663 ft.
- Looking: northwest
- Poles Visible: Alternative B2 Structures 94,95 & 98-104
- Image File Name: IMGP1169.jpg

Simulation Notes

- Photo Taken: Oct 14th, 2019 at 2:41 pm
- The image is based on a single photo and represent approximately 35.2 degree horizontal field of view.
- This view is approximately 349 feet south of the nearest pole represented in the simulation.
- The simulation is based on the best information available and is preliminary. Final alignment and structure locations are subject to change based on final engineering and other factors.

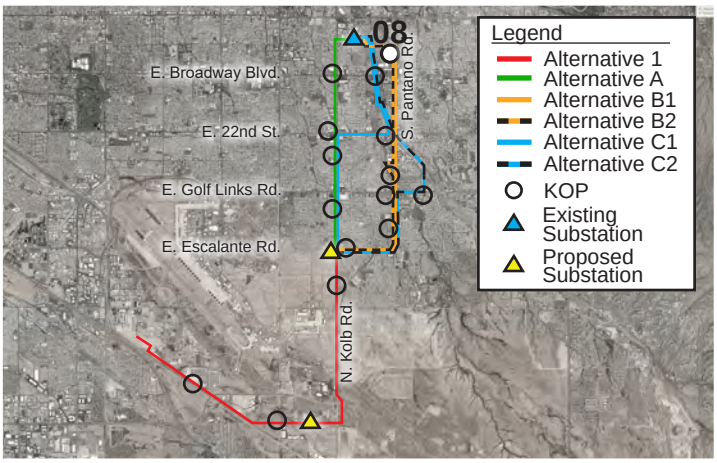
Key Observation Point (KOP) #7a

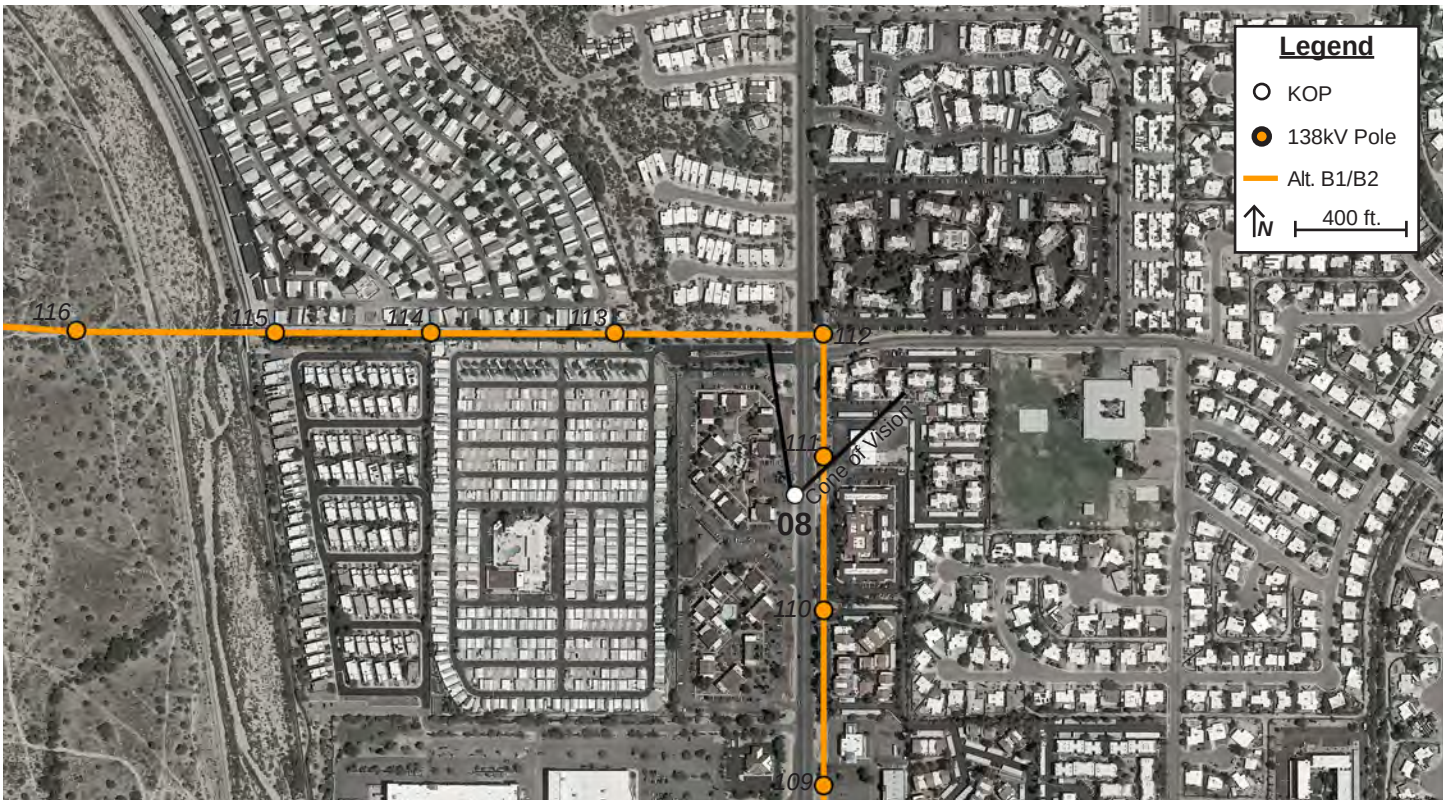
Current Condition

Simulated Condition

Alternative B2

Key Observation Point (KOP) # 08





Notes:

Camera Information

- Type: Pentax K-30
- Sensor: APS-C 23.7mm x 15.7mm
- Lens: Pentax DA L 18-55mm
- Focal Length: 21mm
- 35mm Equivalent: 31mm
- F-Stop: f/8
- ISO:100

KOP

- Representative View for: motorists traveling northbound on North Pantano Rd
- Location: 424 N Pantano Rd
- Latitude: 32.226754° N; Longitude: 110.823968° W
- View Point Elevation at Eye Level: 2,596 ft.
- Looking: northeast
- Poles Visible: Alternative B1 Structures 111,112 or Alternative B2 Structures 121,122
- Image File Name: IMGP1313.jpg

Simulation Notes

- Photo Taken: Oct 14th, 2019 at 3:58 pm
- The image is based on a single photo and represent approximately 55.7 degree horizontal field of view.
- This view is approximately 152 feet southwest of the nearest pole represented in the simulation.
- The simulation is based on the best information available and is preliminary. Final alignment and structure locations are subject to change based on final engineering and other factors.

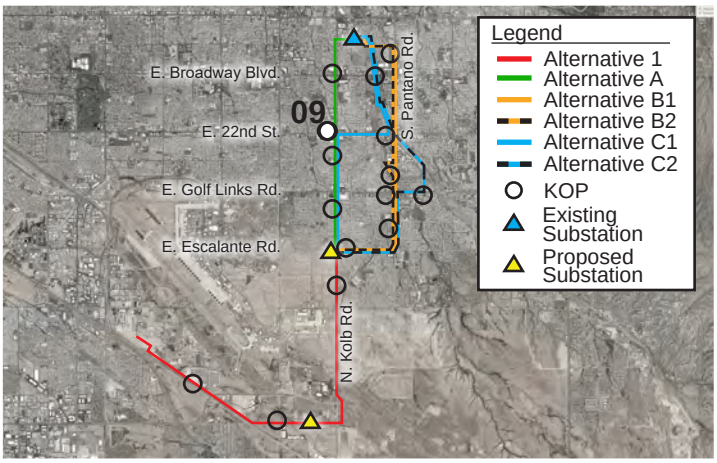
Key Observation Point (KOP) #8

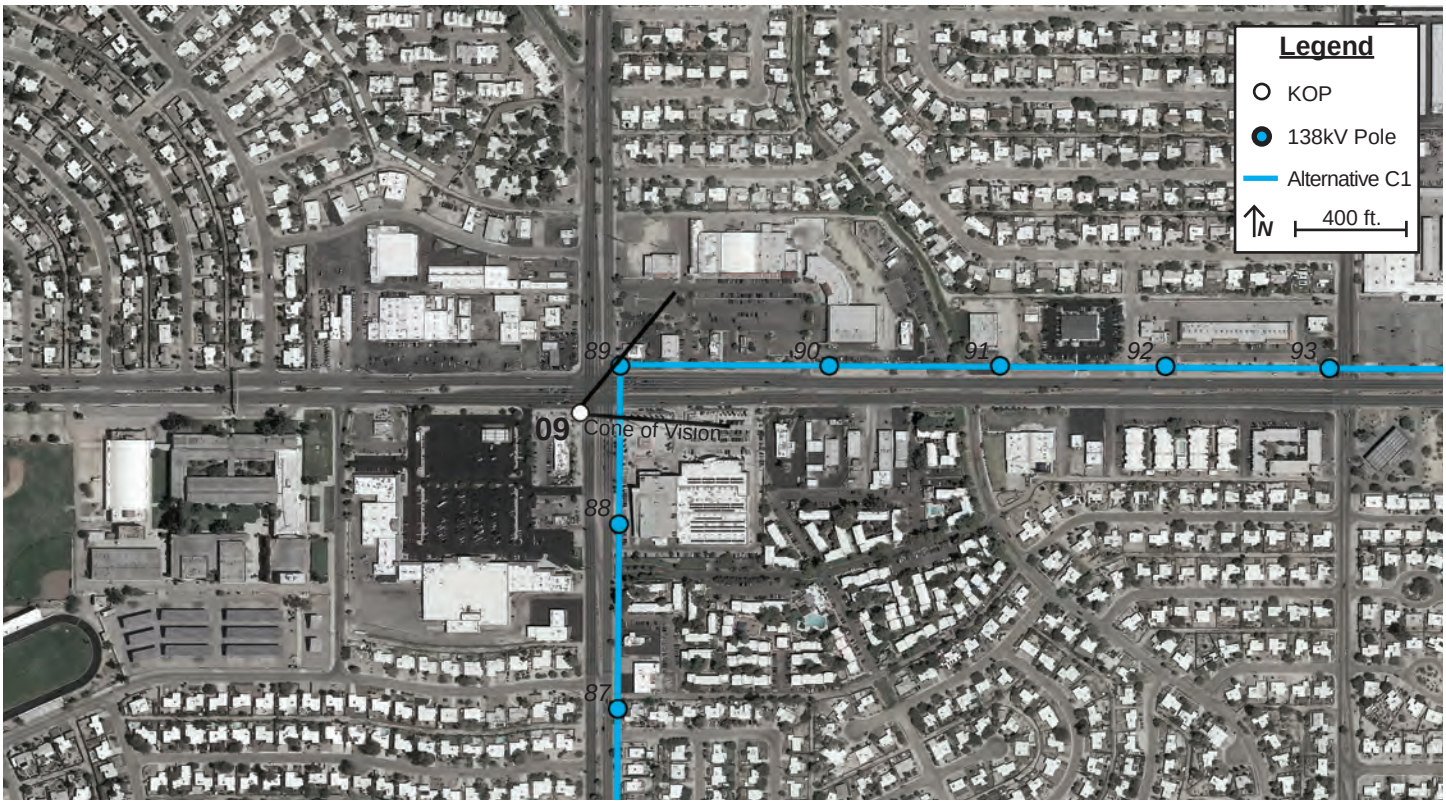
Current Condition

Simulated Condition

Alternative B1/B2

Key Observation Point (KOP) # 09





Notes:

Camera Information

- Type: Pentax K-30
- Sensor: APS-C 23.7mm x 15.7mm
- Lens: Pentax DA L 18-55mm
- Focal Length: 21mm
- 35mm Equivalent: 31mm
- F-Stop: f/13
- ISO:100

KOP

- Representative View for: motorists traveling eastbound on East 22nd St
- Location: Intersection of E 22nd St and S Kolb Rd
- Latitude: 32.206257° N; Longitude: 110.841200° W
- View Point Elevation at Eye Level: 2,654 ft.
- Looking: east
- Poles Visible: Alternative C1 Structures 89-96
- Image File Name: IMGP1054.jpg

Simulation Notes

- Photo Taken: Oct 14th, 2019 at 2:05 pm
- The image is based on a single photo and represent approximately 55.7 degree horizontal field of view.
- This view is approximately 235 feet southwest of the nearest pole represented in the simulation.
- The simulation is based on the best information available and is preliminary. Final alignment and structure locations are subject to change based on final engineering and other factors.

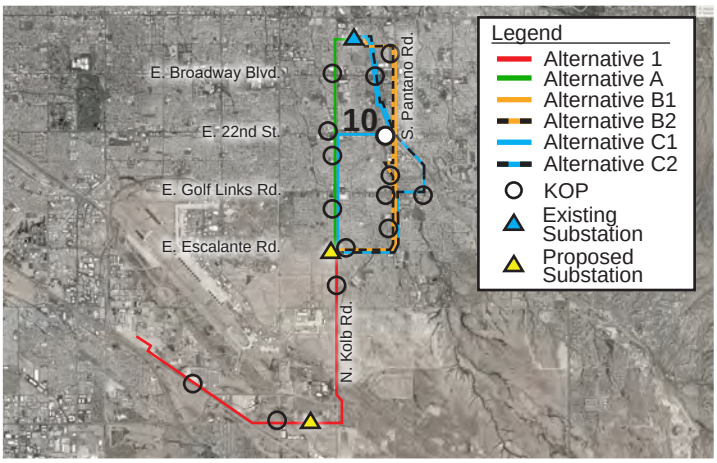
Key Observation Point (KOP) #9

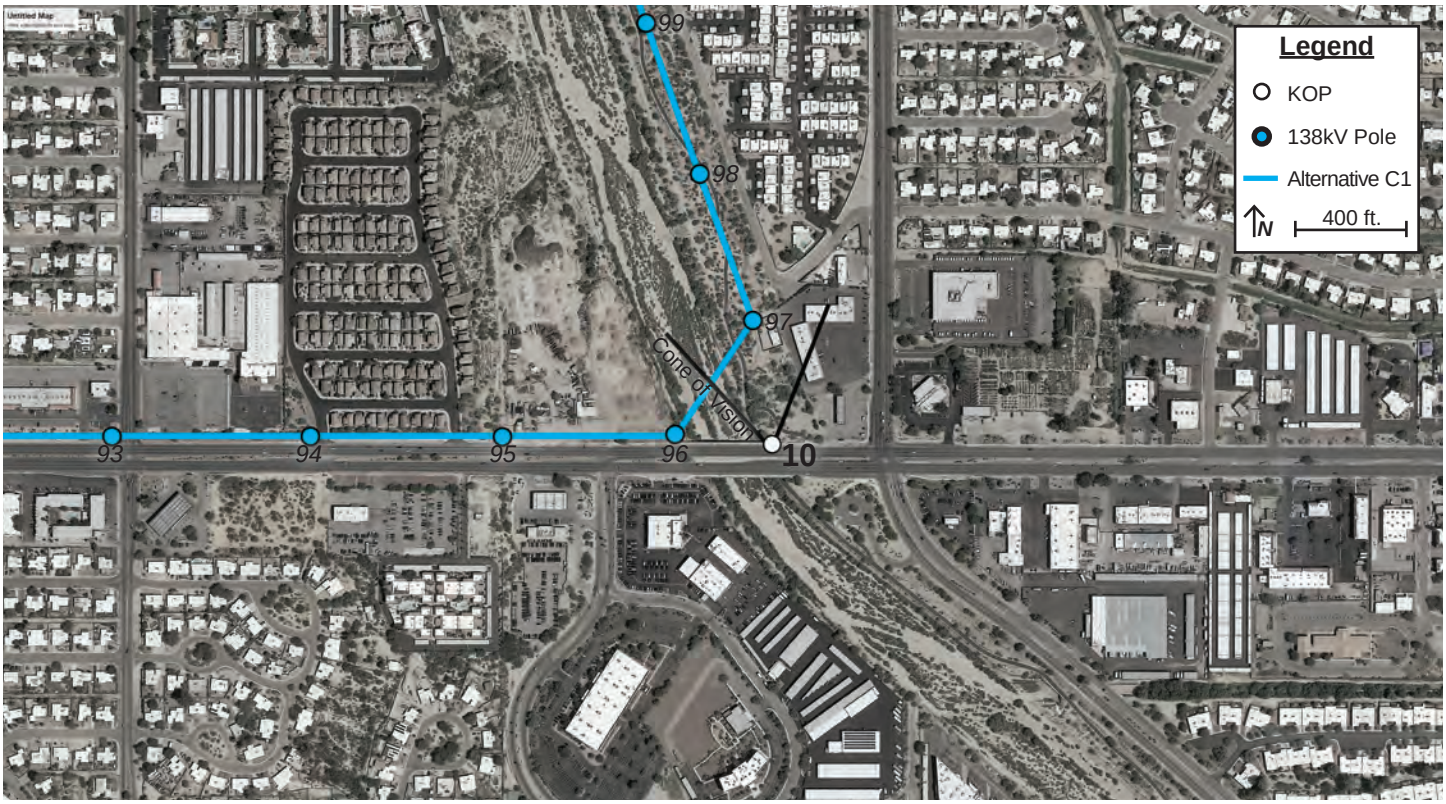
Current Condition

Simulated Condition

Alternative C1

Key Observation Point (KOP) # 10





Notes:

Camera Information

- Type: Pentax K-30
- Sensor: APS-C 23.7mm x 15.7mm
- Lens: Pentax DA L 18-55mm
- Focal Length: 18mm
- 35mm Equivalent: 27mm
- F-Stop: f/11
- ISO:100

KOP

- Representative View for: motorists traveling westbound on East 22nd St
- Location: 7800 E 22nd St
- Latitude: 32.206570° N; Longitude: 110.825109° W
- View Point Elevation at Eye Level: 2,631 ft.
- Looking: north northwest
- Poles Visible: Alternative C1 Structures 97-102
- Image File Name: IMGP1130.jpg

Simulation Notes

- Photo Taken: Oct 14th, 2019 at 2:15 pm
- The image is based on a single photo and represent approximately 63.3 degree horizontal field of view.
- This view is approximately 427 feet south of the nearest pole represented in the simulation.
- The simulation is based on the best information available and is preliminary. Final alignment and structure locations are subject to change based on final engineering and other factors.

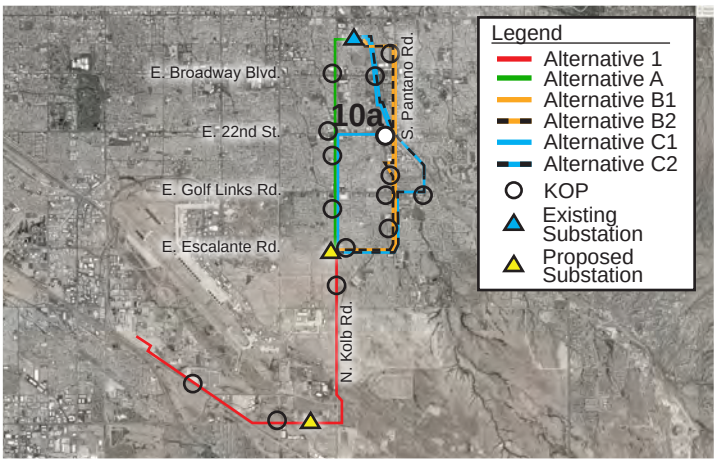
Key Observation Point (KOP) #10

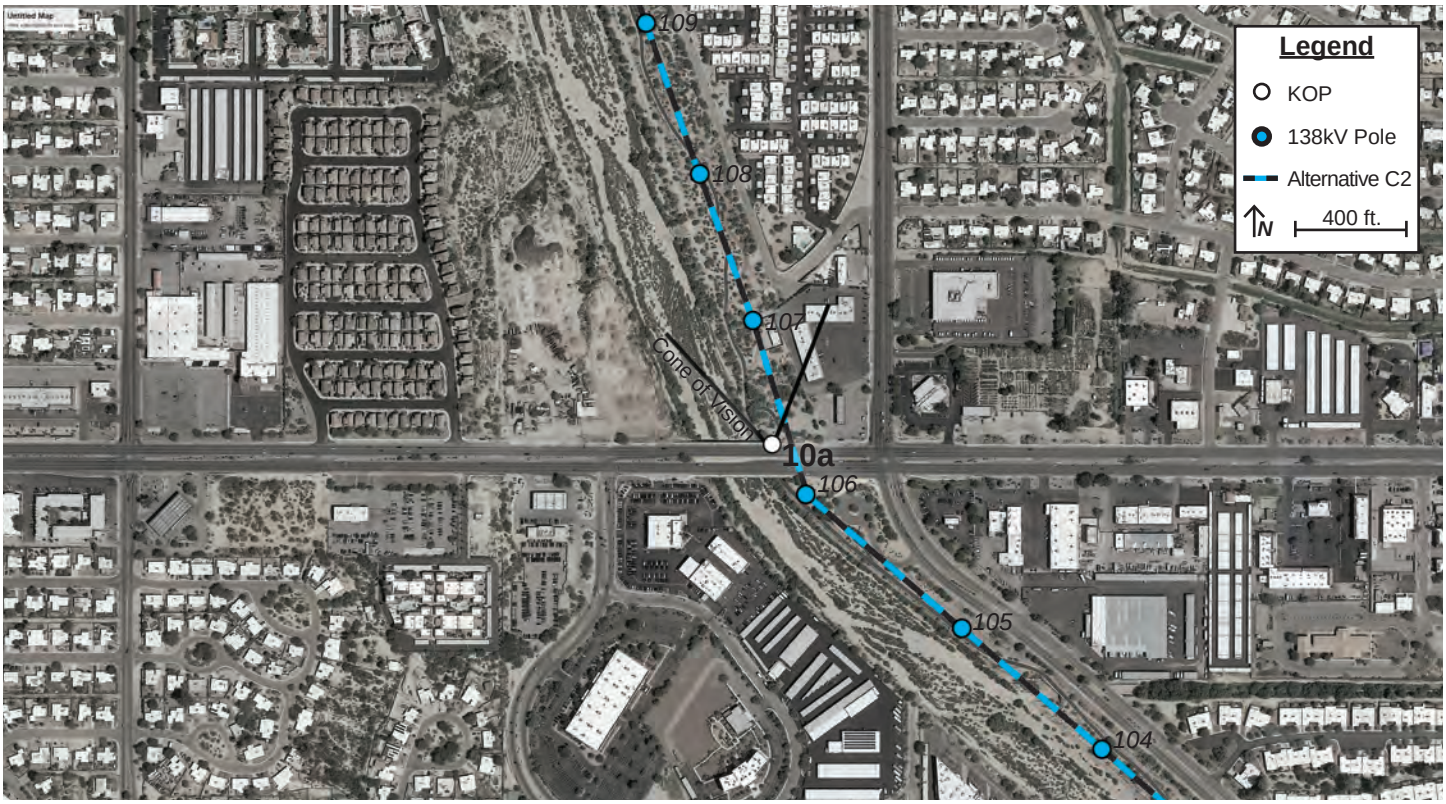
Current Condition

Simulated Condition

Alternative C1

Key Observation Point (KOP) # 10a





Notes:

Camera Information

- Type: Pentax K-30
- Sensor: APS-C 23.7mm x 15.7mm
- Lens: Pentax DA L 18-55mm
- Focal Length: 18mm
- 35mm Equivalent: 27mm
- F-Stop: f/11
- ISO:100

KOP

- Representative View for: motorists traveling westbound on East 22nd St
- Location: 7800 E 22nd St
- Latitude: 32.206570° N; Longitude: 110.825109° W
- View Point Elevation at Eye Level: 2,631 ft.
- Looking: north northwest
- Poles Visible: Alternative C2 Structures 107-112
- Image File Name: IMGP1130.jpg

Simulation Notes

- Photo Taken: Oct 14th, 2019 at 2:15 pm
- The image is based on a single photo and represent approximately 63.3 degree horizontal field of view.
- This view is approximately 427 feet south of the nearest pole represented in the simulation.
- The simulation is based on the best information available and is preliminary. Final alignment and structure locations are subject to change based on final engineering and other factors.

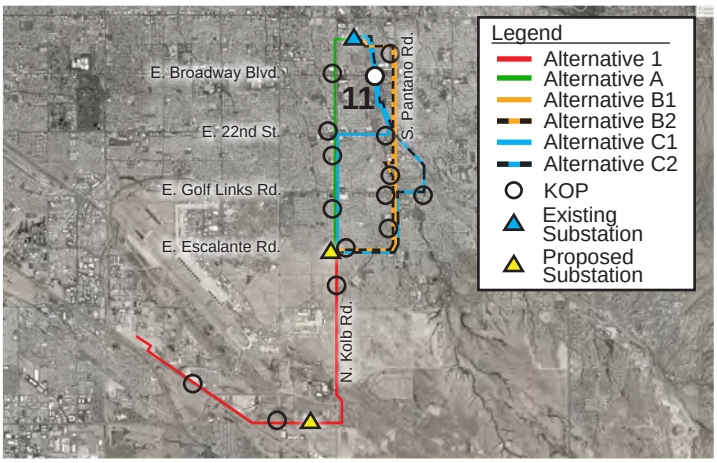
Key Observation Point (KOP) #10a

Current Condition

Simulated Condition

Alternative C2

Key Observation Point (KOP) # 11



Notes:

Camera Information

- Type: Pentax K-30
- Sensor: APS-C 23.7mm x 15.7mm
- Lens: Pentax DA L 18-55mm
- Focal Length: 18mm
- 35mm Equivalent: 27mm
- F-Stop: f/11
- ISO:100

KOP

- Representative View for: motorists traveling westbound on East Broadway Blvd
- Location: 7601 E Broadway Blvd
- Latitude: 32.221131° N; Longitude: 110.829030° W
- View Point Elevation at Eye Level: 2,595 ft.
- Looking: northwest
- Poles Visible: Alternative C1 Structures 107-111
- Image File Name: IMGP1241.jpg

Simulation Notes

- Photo Taken: Oct 14th, 2019 at 3:37 pm
- The image is based on a single photo and represent approximately 63.3 degree horizontal field of view.
- This view is approximately 354 feet southeast of the nearest pole represented in the simulation.
- The simulation is based on the best information available and is preliminary. Final alignment and structure locations are subject to change based on final engineering and other factors.

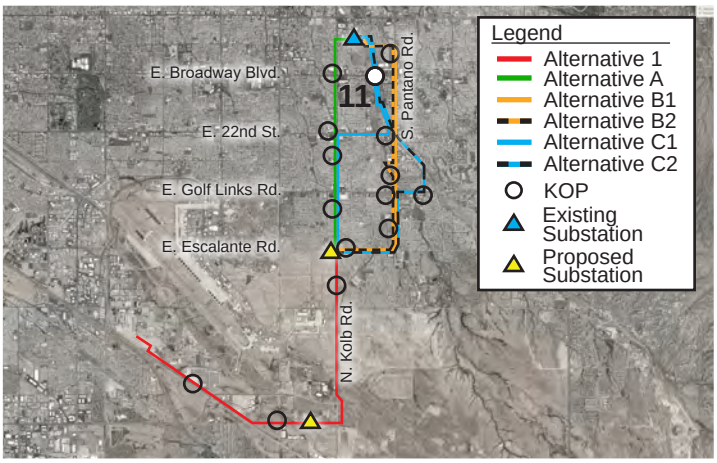
Key Observation Point (KOP) #11

Current Condition

Simulated Condition

Alternative C1

Key Observation Point (KOP) # 11a



Notes:

Camera Information

- Type: Pentax K-30
- Sensor: APS-C 23.7mm x 15.7mm
- Lens: Pentax DA L 18-55mm
- Focal Length: 18mm
- 35mm Equivalent: 27mm
- F-Stop: f/11
- ISO:100

KOP

- Representative View for: motorists traveling westbound on East Broadway Blvd
- Location: 7601 E Broadway Blvd
- Latitude: 32.221131° N; Longitude: 110.829030° W
- View Point Elevation at Eye Level: 2,595 ft.
- Looking: northwest
- Poles Visible: Alternative C2 Structures 117-121
- Image File Name: IMGP1241.jpg

Simulation Notes

- Photo Taken: Oct 14th, 2019 at 3:37 pm
- The image is based on a single photo and represent approximately 63.3 degree horizontal field of view.
- This view is approximately 354 feet southeast of the nearest pole represented in the simulation.
- The simulation is based on the best information available and is preliminary. Final alignment and structure locations are subject to change based on final engineering and other factors.

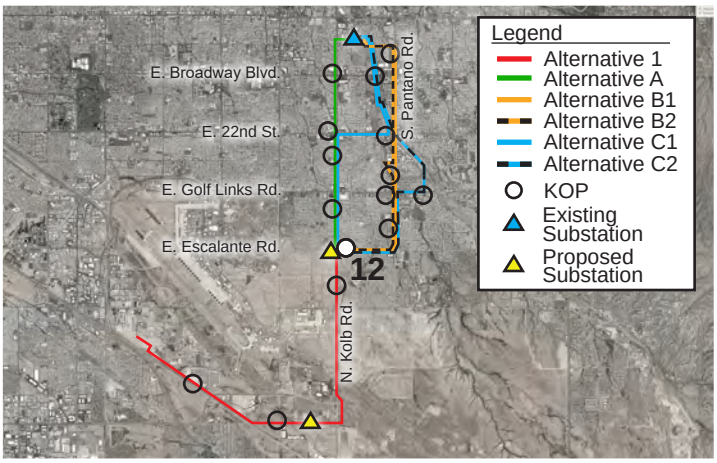
Key Observation Point (KOP) #11a

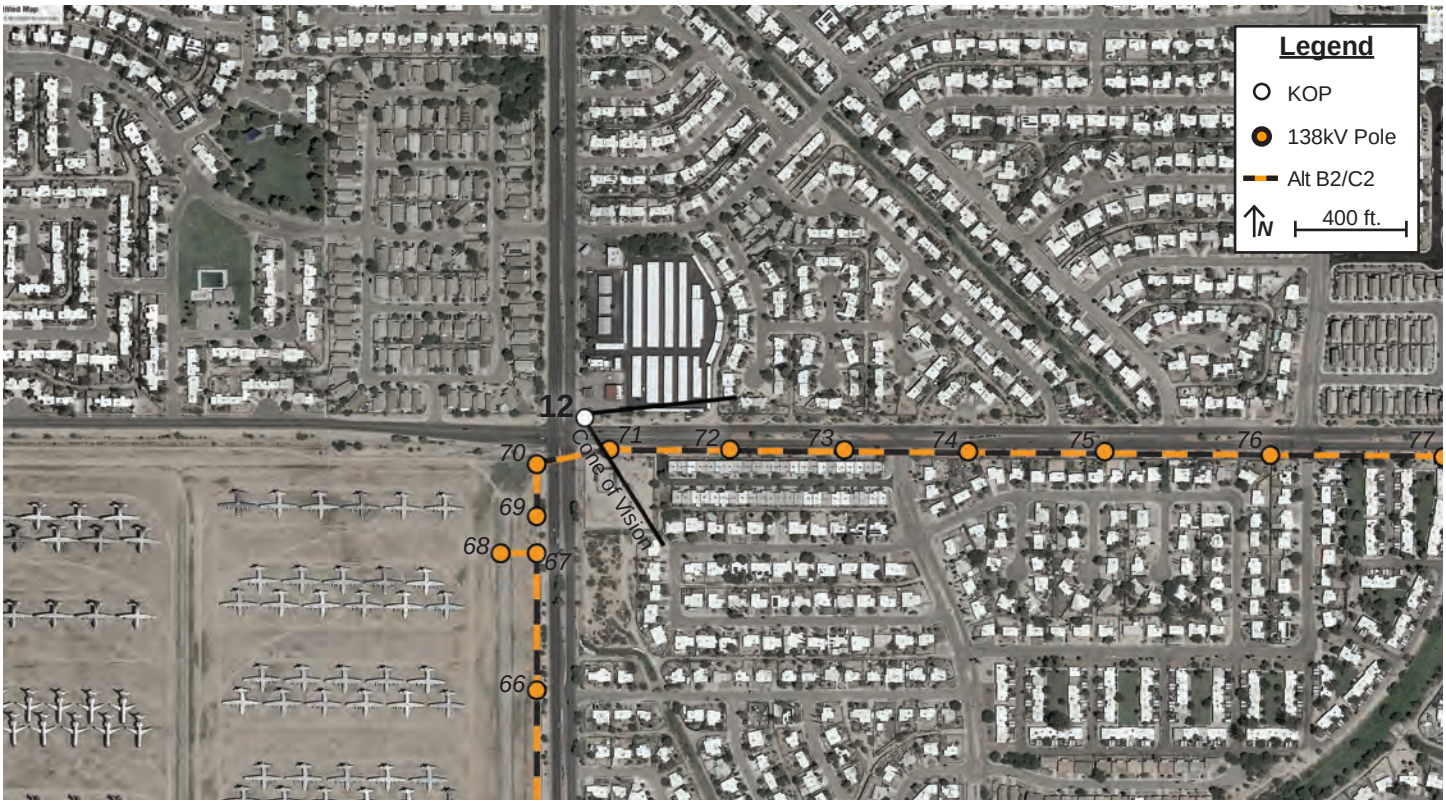
Current Condition

Simulated Condition

Alternative C2

Key Observation Point (KOP) # 12





Notes:

Camera Information

- Type: Pentax K-30
- Sensor: APS-C 23.7mm x 15.7mm
- Lens: Pentax DA L 18-55mm
- Focal Length: 18mm
- 35mm Equivalent: 27mm
- F-Stop: f/7.1
- ISO:100

KOP

- Representative View for: motorists traveling eastbound on East Escalante Rd
- Location: 7114 E Escalante Rd
- Latitude: 32.177507° N; Longitude: 110.840682° W
- View Point Elevation at Eye Level: 2,719 ft.
- Looking: east southeast
- Poles Visible: Alternative B2/C2 Structures 71-76
- Image File Name: IMGP0923.jpg

Simulation Notes

- Photo Taken: Oct 14th, 2019 at 1:06 pm
- The image is based on a single photo and represent approximately 35.2 degree horizontal field of view.
- This view is approximately 122 feet northwest of the nearest pole represented in the simulation.
- The simulation is based on the best information available and is preliminary. Final alignment and structure locations are subject to change based on final engineering and other factors.

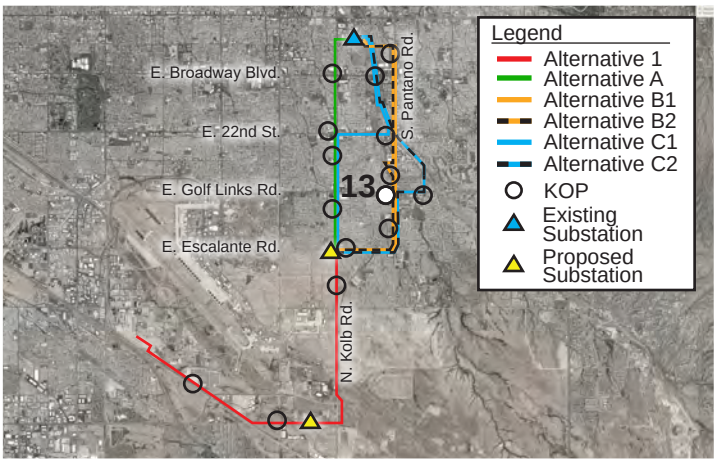
Key Observation Point (KOP) #12

Current Condition

Simulated Condition

Alternative B2/C2

Key Observation Point (KOP) # 13



Notes:

Camera Information

- Type: Pentax K-30
- Sensor: APS-C 23.7mm x 15.7mm
- Lens: Pentax DA L 18-55mm
- Focal Length: 50mm
- 35mm Equivalent: 75mm
- F-Stop: f/11
- ISO:100

KOP

- Representative View for: motorists traveling eastbound on East Golf Links Rd
- Location: Intersection of E Golf Links Rd & S Pantano Rd
- Latitude: 32.192086° N; Longitude: 110.824071° W
- View Point Elevation at Eye Level: 2,699 ft.
- Looking: east
- Poles Visible: Alternative C2 Structures 92-95
- Image File Name: IMGP1195.jpg

Simulation Notes

- Photo Taken: Oct 14th, 2019 at 2:51 pm
- The image is based on a single photo and represent approximately 25 degree horizontal field of view.
- This view is approximately 697 feet west of the nearest pole represented in the simulation.
- The simulation is based on the best information available and is preliminary. Final alignment and structure locations are subject to change based on final engineering and other factors.

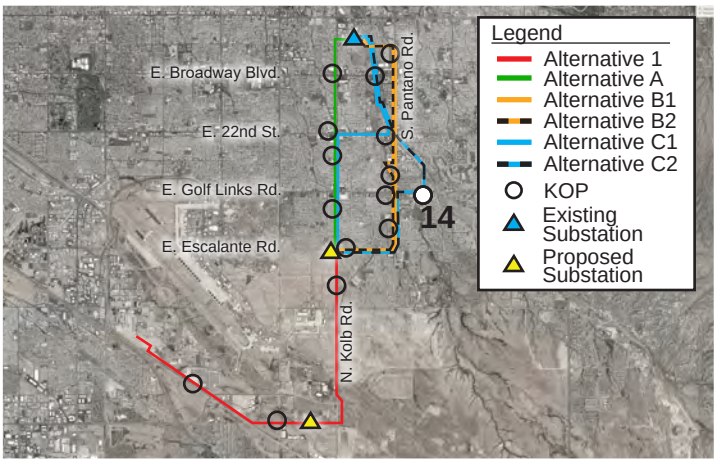
Key Observation Point (KOP) #13

Current Condition

Simulated Condition

Alternative C2

Key Observation Point (KOP) #14



Notes:

Camera Information

- Type: Pentax K-30
- Sensor: APS-C 23.7mm x 15.7mm
- Lens: Pentax DA L 18-55mm
- Focal Length: 50mm
- 35mm Equivalent: 75mm
- F-Stop: f/11
- ISO:100

KOP

- Representative View for: motorists and residents traveling northbound on South Sarnoff Drive
- Location: 2621 S Sarnoff Dr
- Latitude: 32.191211° N; Longitude: 110.814618° W
- View Point Elevation at Eye Level: 2,682 ft.
- Looking: north
- Poles Visible: Alternative C2 Structures 96-100
- Image File Name: IMGP1228.jpg

Simulation Notes

- Photo Taken: Oct 14th, 2019 at 3:11 pm
- The image is based on a single photo and represent approximately 25 degree horizontal field of view.
- This view is approximately 312 feet west of the nearest pole represented in the simulation.
- The simulation is based on the best information available and is preliminary. Final alignment and structure locations are subject to change based on final engineering and other factors.

Key Observation Point (KOP) #14

Current Condition

Simulated Condition

Alternative C2

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EXHIBIT H

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EXHIBIT H: EXISTING PLANS

To the extent applicant is able to determine, state the existing plans of the state, local government and private entities for other developments at or in the vicinity of the proposed site or route.

H.1 Federal

United States Air Force (USAF) Energy Flight Plan provides a mandate for the DMAFB Installation Development Plan. The USAF Energy Flight Plan outlines a number of objectives that move DMAFB towards greater energy independence.

The following goals from the Energy Flight Plan are part of DMAFB's plan to "Improve Resiliency" and "Assure Supply:"

- *By fiscal year 2020, increase the use of energy resiliency technologies and partnerships for critical infrastructure to improve energy security.*
- *By fiscal year 2025, eliminate 20% of single points of failure for facility energy associated with critical infrastructure.*
- *By fiscal year 2035, eliminate 100% of energy shortfall to improve contingency operations.*

Meeting these goals requires 1) the creation of an additional transformer in proximity to DMAFB's largest load, thus eliminating a single point of failure, and 2) the creation of a secondary point of entry for electrical power.

TEP also consulted with DMAFB personnel regarding the development of the Patriot Substation, and the proximity of the Project to DMAFB. The Project supports DMAFB resiliency planning efforts and does not impede any additional existing or future DMAFB plans. DMAFB planners worked with TEP on developing an Alternative that would minimize potential conflicts on DMAFB. DMAFB provided a letter supporting the Project, see Exhibit J-6.

Additionally, TEP consulted with DMAFB planners regarding the base's Inner Horizontal Surfaces. The Inner Horizontal Surface is one of several imaginary surfaces which the FAA uses to determine whether an object is an obstruction to air navigation. The Inner Horizontal Surface is 150 feet above the established airport elevation. Evaluation of the proposed alignment by DMAFB determined that the Project would not penetrate the airfield's Inner Horizontal Surface. In the event it is determined that a pole would penetrate the Inner Horizontal Surface, TEP would continue to coordinate with DMAFB to receive an airfield waiver for this penetration.

H.2 State

Arizona Department of Transportation

The Arizona Department of Transportation (ADOT), in conjunction with the Federal Highway Administration (FHWA) and the Regional Transportation Authority (RTA) in Pima County, is studying potential improvement to two roadway corridors that intersect the southern portion of the Study Area.

ADOT plans to extend State Route (SR) 210 along Alvernon Way to I-10, as well as rebuild sections of the I-10 corridor. As a result, TEP excluded from the alternatives analysis the ADOT I-10 ROW, the existing SR 210 corridor, and the Alvernon Way corridor (future SR 210 alignment).

None of the alternatives cross an ADOT facility. If any portion of the selected alternatives crosses perpendicular to ADOT's existing and/or future facilities, TEP would obtain permits for facilities located in or crossing ADOT ROW.

ADOT has not commented on the Project.

Arizona State Land Department

ASLD owned land is present along Kolb Road, on the east side of the road between Escalante Road and Irvington Road (see Exhibit A-4: Land Use). TEP would need to acquire a lease from ASLD to parallel this approximately 1200 foot-long segment along Kolb Road.

ASLD has not commented on the Project.

H.3 County

The Pima County SDCP guides the balance of conservation and protection of cultural and natural resources with the region's efforts to develop and grow economically. The SDCP considered critical habitats, biological corridors, important riparian areas, mountain parks, historical and cultural preservation, and ranch conservation in forming a land management plan for Pima County.

The Pima County Comprehensive Land Use Plan, Pima Prospers, was updated in 2011. The comprehensive plan integrated the SDCP as well as the Conservation Lands System. The Study Area is outside the county preserves as defined in the SDCP, in addition to being outside of the county's Conservation Lands System.

The portion of the Study Area southwest of DMAFB is defined as a high growth area in the county's comprehensive plan. Pima County views this location as a focal area in its economic development strategy, with the expansion of TIA and planned future capital improvement projects along I-10. The development of additional transmission facilities in the Project area would support the county's goals for economic growth.

Pima County Regional Flood Control District provided a letter supporting the Project and indicating that they had no objection to Alternative B2 (see Exhibit J-9).

TEP also coordinated with Pima County Regional Wastewater and Reclamation Department (RWRD) and the proposed alternatives avoid these facilities to the extent practical. Where impacts are unavoidable, TEP would further coordinate any required studies and mitigation necessary to minimize impacts.

TEP met with Pima Air and Space Museum, which is located on land owned by Pima County and the Pima County Department of Attractions and Tourism. It was stated that Alternative 2 would have a negative visual effect at the entrance to the museum. Also, planes are towed from DMAFB to the museum, across Valencia Road. Conductor clearance would have to be maintained, or an outage taken, to allow planes to get under the transmission line. For these reasons, as well as others, Alternative 2 was removed from further evaluation (ref comment from October 7, 2019, in Comment Summary, Exhibit J-5).

H.4 City

The COT General & Sustainability Plan, Plan Tucson, was adopted by voters in November 2013. Plan Tucson outlines a number of cross-agency goals in the areas of social environment, natural environment, economic development, and the built environment.

Under Plan Tucson, COT is leveraging a Parks and Connections Bond to fund park and greenway improvements. The Project area includes one park slated for redevelopment or improvement, Jesse Owens Park. None of the Project's route alternatives would impact park improvement plans.

The Project area also includes sections of The Loop, a hard surface pedestrian path that runs along the Pantano Wash. Alternative C-1 would have permanent visual impacts for users of this greenway. The development of these alternatives may have temporary impacts to users during the construction period, but would not impede future use or maintenance of the trail.

TEP coordinated with the COT's Planning and Development Services, Tucson Department of Transportation (TDOT), and Tucson Water.

Tucson Water was consulted during the development of TEP's alternative routes. Tucson Water shared Geographic Information System (GIS) shapefiles and location information for their facilities within the Study Area. Cathodic protection for water mains and buried wastewater lines, which are susceptible to disturbance, was among their top concerns. TEP has coordinated with Tucson Water, and the proposed alternatives avoid these facilities to the extent practical. Where impacts are unavoidable, TEP would further coordinate any required studies and mitigation necessary to minimize impacts.

TEP considered current and planned transportation plans in the study area, including the following:

- RTA plans to widen Valencia Road from Alvernon Way to Kolb Road
- RTA plans to widen Valencia Road from Houghton Road to Kolb Road
- ADOT plans to rebuild sections of I-10 and traffic interchanges at Wilmot Road, Kolb Road, and Rita Road
- Proposition 101 funded road upgrades and maintenance
- Proposition 407 funded greenway and bikeway upgrades and maintenance

The Project does not conflict with any of the above transportation plans.

COT is preparing a Habitat Conservation Plan (HCP) to support COT's Incidental Take Permit to minimize and mitigate the impacts of take of species listed under the ESA related to planned urban development, water supply and capital improvement projects. The Project is not anticipated to impact the HCP Planning Area.

TDOT provided a letter in September 2019 outlining several potential issues that could affect the Project. TEP took these comments into account when removing Alternative 2 and selecting Alternative B2 as its preferred alternative. In particular, the request to maintain ADA sidewalks along Kolb Road would be difficult and could require the acquisition of additional private ROW.

H.5 Private

H.5.1 Port of Tucson

The Port is a full-service inland port, rail yard, and intermodal shipping facility located southeast of COT, 70 miles north of the Interstate 19 Mexico border crossing in Nogales, Arizona. The facility is located adjacent to the UPRR Mainline and I-10. The Port consists of 1.8 million square feet of warehousing, distribution, and manufacturing facilities located on 767 acres of private land.

TEP consulted with the Port regarding their future development plans and growing energy needs. In 2019 it was determined that the Port would require a substation to be located closer to peak load, and provide an additional point of entry for electrical power. As a result, TEP considered the location of the planned Port Substation in its alternative routes for the Project.

The Port has provided a letter indicating their support of the Project, noting that it will "provide needed electrical infrastructure to the Port of Tucson/Century Park Research Center as the area accommodates industrial development" (see Exhibit J-10).

H.5.2 UPRR

An active UPRR line is within the Project area. The proposed Alternative 1 alignment is approximately 115 feet north of the railway centerline. None of the alternatives would cross the UPRR line. TEP does not anticipate any impacts to UPRR and would coordinate with the railroad regarding an encroachment permit for any potential parallel construction.

H.5.3 UG Fiber Optic Lines

TEP obtained GIS shapefiles and as-built information for underground fiber optic lines in the study area and utilized this information in the siting study and selection of the preferred alternative.

H.5.4 Easements/Land Acquisition

The alternatives would be located within existing land rights or new easements from private landowners, totaling approximately 43-53% of the alignment, to account for multiple factors, including aerial crossings, ADA accessibility on public sidewalks, and private land crossings.

H.6 Land Use

H.6.1 Overview

TEP conducted a land use inventory and an assessment of potential impacts that may occur as a result of construction and operation of the Project.

H.6.2 Inventory

The land use inventory included land jurisdiction and ownership, and existing and future land uses. Methods used for the land use inventory included review of comprehensive plans, area land use plans, area transportation plans, review and interpretation of maps, aerial imagery, other documents, field verification, and communication with governmental agencies within the Project area.

H.6.3 Jurisdiction and Land Ownership

The Project area includes land within the jurisdiction of COT and Pima County (see Exhibit A-4, Table 12).

Table 12. Jurisdiction of Alternatives

ALTERNATIVE	ALTERNATIVE LENGTH (MILES)	COT JURISDICTION		PIMA COUNTY JURISDICTION	
		MILES	% OF TOTAL	MILES	% OF TOTAL
A	11.19	9.66	86%	1.53	14%
B2	12.78	11.25	88%	1.53	12%
C1	12.09	10.56	87%	1.53	13%

The alternatives cross land owned by COT, Pima County, ASLD, and DOD, which would require land right acquisition, except for locations where the line will be installed per TEP's franchise agreements with those jurisdictions. All the alternatives would require the acquisition of new easements from private landowners as discussed in Section H.5.4.

H.6.4 Existing Land Use

Existing land uses are mapped in Exhibit A-4. Overall, the study area is a developed urban area with all land uses present. The land use categories identified in Exhibit A-4 are described below.

Residential: Residential land uses primarily include high and medium density single-family residential areas and apartment complexes on both the southwestern and northeastern portions of the Study Area.

TEP analyzed the percentage of residential land use adjacent to each proposed alternative. Because Alternative 2 was removed from consideration, Alternative 1 has been combined with each alternative. For Alternative C1, residential use is roughly 7.5% of the corridor. Alternative B2 is approximately 10%, and alternative A is approximately 12% of the corridor. Scoring based on this criteria can be found in section 10.1.3 of the Alternatives Route Development Report (Exhibit B-1).

Commercial: Commercial businesses including office/business parks, retail, hotel, etc., are distributed throughout the Study Area, but are particularly concentrated along Kolb Road, Pantano Road, Escalante Road, E Golf Links Road, 22nd Street, and Broadway Blvd.

Industry/Light Industry: Industrial uses are located in the study area, along Irvington Road and Alvernon Way, Valencia Road east of Wilmot Road, and south of Drexel Road between Wilmot Road and Kolb Road.

Utilities: The following utilities are located within the Study Area:

Electrical (TEP):

- Generating stations
- Substations
- Transmission and distribution lines

Communication:

- Telephone
- Cable
- Active cell towers
- Underground fiber optic lines

Gas:

- Active gas lines (El Paso Natural Gas, Southwest Gas)
- Active petroleum line (Kinder Morgan)

Water:

- Active water lines (Tucson Water)
- Active wastewater lines (Pima County RWRD)

Public/Quasi-public:

Alternative B2 has 12 sensitive receptors, and Alternatives A and C1 have 10 sensitive receptors each, located within 250 feet of the 300-foot wide alternative corridor (see Table 13).

Table 13. Sensitive Receptors* within 250 feet of Alternatives Corridor

ALTERNATIVE**	SCHOOLS	OTHER	TOTAL
Alternative A	3	7	**10**
Alternative B2	3	9	**12**
Alternative C1	3	7	**10**

* No Hospitals or Libraries are within the Revised Study Area. "Other" GIS layer includes Churches, Addiction Treatment Centers, Preschools, Assisted Living Facilities, Nursing Homes, Retirement Homes, and Day Care Centers.

** Alternative 1 has been combined with the other alternatives

Transportation: Major arterials in the Study Area include I-10, Valencia Road, Kolb Road, Golf Links Road, Broadway Boulevard, Speedway Boulevard, Alvernon Way, Irvington Road, Escalante Road, Pantano Road, Camino Seco Road, and 22nd Street. COT has designated Valencia Road and Kolb Road as Gateway Arterials. Additionally, a UPRR line is located adjacent to and approximately 150 feet north of the I-10 ADOT ROW.

Pima County designated scenic major routes are present within the Study Area, at the bridge crossing of Valencia Road and Craycroft Road, Valencia Road from Wilmot Road to Kolb Road, Kolb Road from Valencia Road to UPRR, and I-10 from Valencia Road to Los Reales Road (Pima County, 2015).

Vacant/Undeveloped Land: Privately owned vacant land is located in the southern portion of the Study Area, north of I-10 between Craycroft Road and Kolb Road. Vacant and developed lots are located east of Kolb Road, south of Irvington Road. A number of small, vacant lots are scattered throughout the Study Area.

Municipal Parks/Recreation Complex: See Exhibit F-1.

H.6.5 Future Land Use

Future Land Uses (see Exhibit A-4) within the Study Area are expected to be similar to existing land uses, as the Study Area is nearly fully developed. Outreach with Pima County, COT, and other stakeholders revealed the following known future plans:

- Commercial development and expansion at the Port
- Residential Planned Area Development between Wilmot Road and Kolb Road, north of Benson Highway
- New Micro Hospital between Wilmot Road and Kolb Road, north of Benson Highway
- Park improvements plans for Jesse Owens Park and Lakeside Park
- Extension of SR 210 along Alvernon Way to I-10
- Rebuild of sections of I-10
- Widening of Valencia Road from Alvernon Way to Kolb Road, and Houghton Road to Kolb Road

Land use plans are listed in Table 14, and mapped on Exhibit A-4.

Table 14. Land Use Plans in the Study Area

PROJECT NAME	JURISDICTION
Planned Area Development (PAD)-3 Gateway Centre	COT
PAD-7 La Estancia	COT
PAD-13 St. Joseph's Hospital	COT
PAD-14 Los Reales	COT
PAD-21 Valencia Crossing	COT
PAD-34 TEP Irvington Campus PAD	COT
Jesse Owens Park Improvements Development Package	COT
Lakeside Park Improvements Development Package	COT
Extension of SR 210 along Alvernon Way to I-10	ADOT
Valencia Road Public Improvement	RTA
Port of Tucson Expansion	Private

H.7 Impact Assessment and Results

Land use impacts may be defined primarily as 1) restrictions on a land use that would result from the construction or operation of the proposed Project or 2) incompatibility of the Project with existing plans. Typically, restrictions on land use would result from ROW or easement acquisition across a property.

Alternatives B2 and A are 50% and 49% within road ROWs respectively. Though these alternatives would restrict future use of the parcels outside of road ROW, due to existing infrastructure within and adjacent to the corridor, the impact of these alternatives on land use would be minimal Alternative C1 would be partially built along Pantano Wash, with only 40% of the alignment in road ROW. Alternative C1 has the potential to impose a greater impact on existing land uses. (Note, as previously indicated, Alternative 1 has been combined with each alternative.)

The Project is compatible with existing land use plans, therefore the effect of the Project on adjacent land use within the Study Area would be minimal.

H.8 Conclusion

The Project is consistent with local and regional land use plans, including COT and Pima County. Land use impacts are anticipated to be minimal. The Project would have a positive indirect impact on current and future land uses in the region, by improving the availability of reliable electric service.

H.9 References

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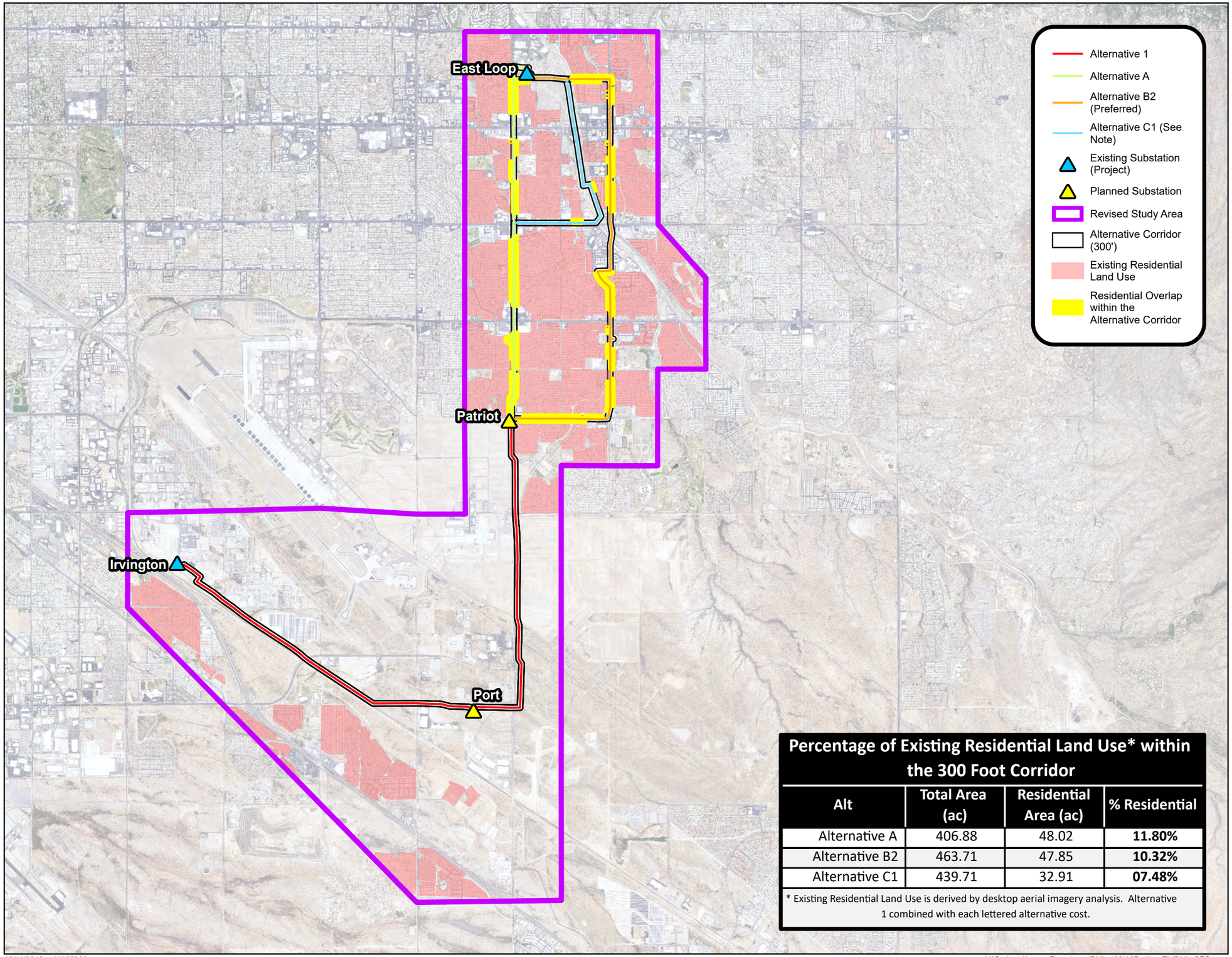

Percentage of Existing Residential Land Use* within the 300 Foot Corridor

Alt	Total Area (ac)	Residential Area (ac)	% Residential
Alternative A	406.88	48.02	**11.80%**
Alternative B2	463.71	47.85	**10.32%**
Alternative C1	439.71	32.91	**07.48%**

* Existing Residential Land Use is derived by desktop aerial imagery analysis. Alternative 1 combined with each lettered alternative cost.

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Tucson Electric Power
Land Resources

Exhibit H-1

Irvington to East Loop 138 kV Transmission Line Project

Residential

NOTE: Alternative C1 follows the same route as Alternative A from Patriot to E 22nd St and then the same route as Alternative B2 from Pantano Wash to East Loop.

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Miles

1:62,500

Sources: Esri, Tucson Electric Power, Pima County, City of Tucson, and Arizona State Land Department.
Projection: NAD 1983 UTM Zone 12N
Basemap: Pima Association of Governments Imagery 2017

This map is for planning purposes only.
UNS Energy make no warranty of its accuracy.

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EXHIBIT I

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EXHIBIT I: ANTICIPATED NOISE AND INTERFERENCE WITH COMMUNICATION SIGNALS

Describe the anticipated noise emission levels and any interference with communication signals which will emanate from the proposed facilities.

I.1 Corona and Audible Noise

Noise emanating from a transmission line is caused by corona. Corona is the electrical ionization of the air that occurs near the surface of the energized conductor and suspension hardware due to very high electric field strength. Certain electromagnetic effects are inherently associated with overhead transmission of electrical power at high voltage. These effects are produced by the electric and magnetic fields (EMFs) of the transmission line with one of the primary effects being corona discharge. Corona effects are manifested as audible noise (AN), radio interference, and television interference. These particular effects will be minimized by line location, line design, and construction practices. Results presented in this exhibit are based on consideration of the various possible construction configurations along the alternative routes. Corona may result in AN being produced by a transmission line. Corona noise levels are typically 40 to 50 A-weighted decibels (dBA) at the edge of the ROW. In comparison, a vacuum cleaner typically produces 60 to 80 dBA.

The amount of corona produced by a transmission line is a function of the voltage of the line, the diameter of the conductors, the locations of the conductors in relation to each other, the elevation of the line above sea level, the condition of the conductors and hardware, and the local weather conditions. Corona typically becomes a design concern for transmission lines at 345 kV and above and is less noticeable from lines that are operated at lower voltages, such as the proposed 138 kV transmission line.

The electric field gradient is greatest at the surface of the conductor. Large-diameter conductors have lower electric field gradients at the conductor surface; hence, lower corona than smaller conductors, everything else being equal. The conductors for the Project would be selected to have large diameters, and thus a reduced potential to create AN. Irregularities (such as nicks and scrapes on the conductor surface or sharp edges on suspension hardware) concentrate the electric field at these locations, increasing the electric field gradient and the resulting corona at these spots. Similarly, foreign objects on the conductor surface, such as dust or insects, can cause irregularities on the surface that are a source for corona.

Corona also increases at higher elevations where the density of the atmosphere is less than at sea level. AN varies with elevation with the relationship of A/300, where A is the elevation of the line above sea level measured in meters (EPRI 2005). AN at a 600-meter (1,968.5 feet) elevation would be twice the AN at 300 meters (984.25 feet), all other things being equal.

Raindrops, snow, fog, hoarfrost, and condensation accumulated on the conductor surface are also sources of surface irregularities that can increase corona. During fair weather, the number of these condensed water droplets or ice crystals is usually small, and the corona effect is also small. However, during wet weather, the number of these sources increases (e.g., due to rain drops standing on the conductor) and

corona effects are therefore greater. During wet or foul weather conditions, the conductor would produce the greatest amount of corona noise; yet noise generated by heavy rain hitting the ground would typically be greater than the noise generated by corona, thus masking the AN from the transmission line.

Corona produced on a transmission line can be reduced by the design of the transmission line and the selection of hardware and conductors used for the construction of the line; for instance, the use of conductor hangers that have rounded rather than sharp edges, and no protruding bolts with sharp edges would reduce corona. The conductors themselves can be made with larger diameters and handled so that they have smooth surfaces without nicks, burrs, or scrapes in the conductor strands.

The transmission lines proposed here will be designed to reduce corona generation. Baseline ambient noise levels were estimated using the relationship between population density and noise levels.

Alternative 1 (the southern portion common to all) is located along an active railroad, a busy commuter roadway, and bisects an industrial area, with a population density ranging from 16 to 314 people per square mile. The other three alternatives (B2, A, and C1) are located in an urban area along COT roadways with multiple traffic lanes. The northern section of Alternative C1 is within a river park, but is between two secondary roads, and proximal to an arterial 5 lane road. Population density within the northern area of the Project ranges from 2,000 to 7,000 people per square mile. A noise study conducted along Kolb Road north of the Project Area determined local ambient noise levels to be around 55 to 69 dBA (Sound Solutions, 2017). Sensitive noise receptors are present in the highly populated northern portion of the Project area.

Some level of noise will result from transmission line construction, operation, and maintenance. During construction, equipment used for assembly and erection of structures, and wire pulling and splicing activities will generate noise. Noise from construction activities would be audible, particularly to the closest residents. Typical construction activities can create AN of about 80 dBA due to bulldozers, drills, and heavy equipment. This construction noise, however, would not be considered to be a major impact because construction would occur during daytime hours when tolerance to noise is higher, and would be temporary, lasting only a few days at a time in any one location. Long-term noise impacts from transmission line operation and maintenance activities are expected to be minimal.

I.2 Radio Interference

Corona-generated radio interference is most likely to affect the amplitude modulation (AM) radio broadcast band (535 to 1,605 kilohertz); frequency modulation (FM) radio is rarely affected. Only AM receivers located very near to transmission lines that are tuned to a weak station have the potential to be affected by radio interference. An example is the humming noise on an AM radio that happens when the radio is near a power line, but diminishes as the radio moves away from the line. FM radio is rarely affected by transmission lines. FM radio receivers usually do not pick up interference from transmission lines, because corona-generated radio frequency noise currents decrease in magnitude with increasing frequency and are quite small in the FM broadcast band (88 to 108 megahertz). In addition, the excellent interference rejection properties inherent in FM radio systems make them virtually immune to amplitude-type disturbances.

Residential areas located in the vicinity of the Project's alternative alignments are in close proximity to other existing power lines; therefore, additional radio interference as a result of the Project's implementation is not expected. There is one active communications tower previously licensed by the Federal Communications Commission (FCC) located along Alternative B2, and one tower not FCC-registered along Alternative 1 (see Exhibit I-1). TEP will coordinate with the tower owner during project design as needed. No radio interference is anticipated from the Project. Potential impacts will be further assessed following design and any impacts mitigated as needed.

I.3 Television Interference

Interference with traditional television reception from the transmission line's corona effects may occur during periods of bad weather, but is usually only a concern for transmission lines of 345 kV or greater and only for receivers within 500 feet of the line. Because the voltage would not exceed 138 kV, television interference is not expected.

I.4 Electric and Magnetic Field Effects

EMFs are produced by power lines. These fields would induce voltages and currents on nearby conductive objects. Electric fields are produced whenever a conductor is connected to a source of electrical voltage. An example of this is the plugging of a lamp into a wall outlet in a home. When the lamp is plugged in, a voltage is induced in the cord to the lamp, which causes an electric field to be created around the cord. Magnetic fields are produced whenever an electrical current flows in a conductor. In the lamp example, if the lamp is turned on (allowing electricity to flow to the lamp), a magnetic field is created around the lamp cord in addition to the electric field. These fields exist around overhead and underground power lines, house wiring, computers, power tools, appliances, and anything that carries or uses electricity, and EMF strength is typically measured in milligauss (mG). Table 15 demonstrates examples of EMF levels from various electrical sources (see also Figure 1). This information was provided in both a poster and a handout available to the public at the Open House Meetings (see Exhibit J-3.3).

Both current and voltage are required to transmit electrical energy over a transmission line. The current, a flow of electrical charge, measured in amperes (A), creates a magnetic field. This can fluctuate with the amount of line loading at any given time. The voltage (force or pressure that causes the current to flow), measured in units of volts (V) or kV, creates an electric field. Though an electric field is present anytime a line is energized, even from one end, the magnetic field exists only when electricity flows. It is general practice to consider both fields together as EMF values in assessing the amount of effect at the outer edge of a transmission line's ROW.

Table 15. EMF Strength of Various Electrical Sources at Various Distances (mG)

APPLIANCE	DISTANCE FROM SOURCE (FT)			
	0.5	1	2	3
Baby Monitor	6	1	-	-
Electric Oven	9	4	-	-
Food Processor	30	6	2	-
Hair Dryer	300	1	-	-
Microwave Oven	200	4	10	2
Refrigerator	2	2	1	-
Video Display Terminal	14	5	2	-
Washing Machine	20	7	1	-

Source: National Institute of Environmental Health Sciences

EMF decreases in strength with increased distance from the source. In addition, electric fields are further weakened by obstacles such as walls, roofs, trees, and vegetation. However, magnetic fields are not easily shielded by most materials and are primarily reduced in strength by distance alone.

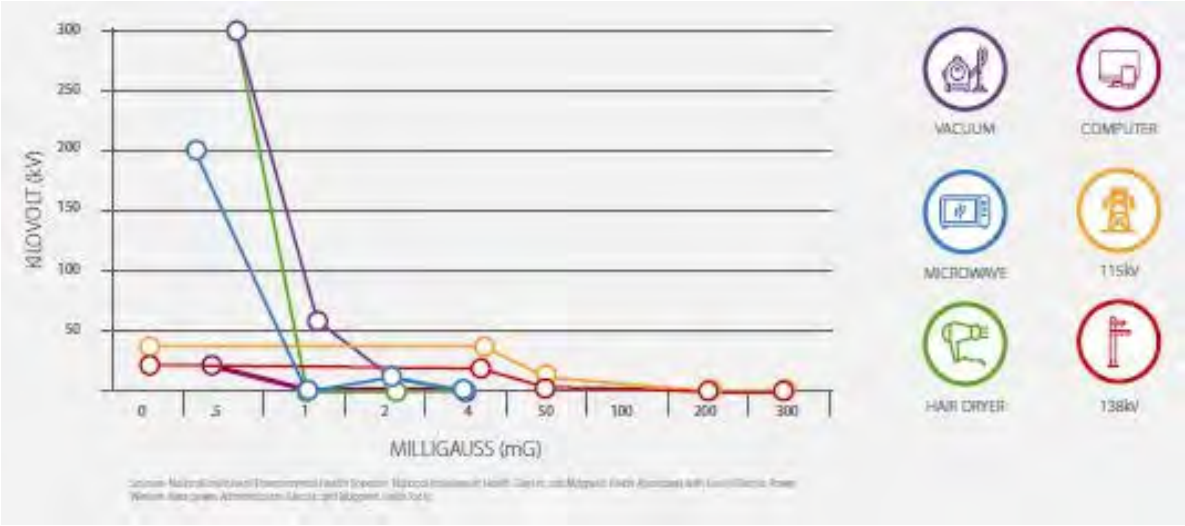

Figure 1. EMFs from Various Sources

An electric and magnetic field effects analysis was performed on the proposed transmission line structure configurations, using Bonneville Power Administration's Corona and Field Effects Program software (Version 3) (see Exhibit I-2). Calculated EMF values for the proposed 138 kV line between Irvington Substation and East Loop Substation are comparable to common household appliances. The maximum calculated magnetic field at Location 1, 30.2 mG, is nearly equivalent to the median magnetic field produced by a food processor from 6 inches away, 30 mG. At the edge of ROW, the calculated magnetic field for Location 6, 13.3 mG, was found to be weaker than the median magnetic field while standing 6 inches away from a conventional video display terminal for a personal computer. A hair dryer or microwave oven from a half foot away can be found to produce stronger magnetic fields than what has been calculated at any of the locations analyzed along the proposed route. Table 15 may be further

compared with Table 16 for a better understanding of the strength of the calculated magnetic fields produced by the proposed 138 kV line.

Table 16. Calculated Magnetic Field Results (mG)

LOCATION*	VALUE AT EDGE OF ROW	MAXIMUM VALUE	DISTANCE TO <0.1 mG (FT)
1	7.3	30.2	395
2	6.9	16.4	510
3	3.3	6.9	323
4	5.6	10.7	510
5	12.1	25.5	758
6	13.3	27.8	795
7	6.4	14.1	510

*See Exhibit I-2 for map of locations

The EMF values associated with this Project are expected to be comparable to other 138 kV transmission lines in the state, and are expected to be within generally accepted standards at the edge of the ROW (Figure 2 and Figure 3).

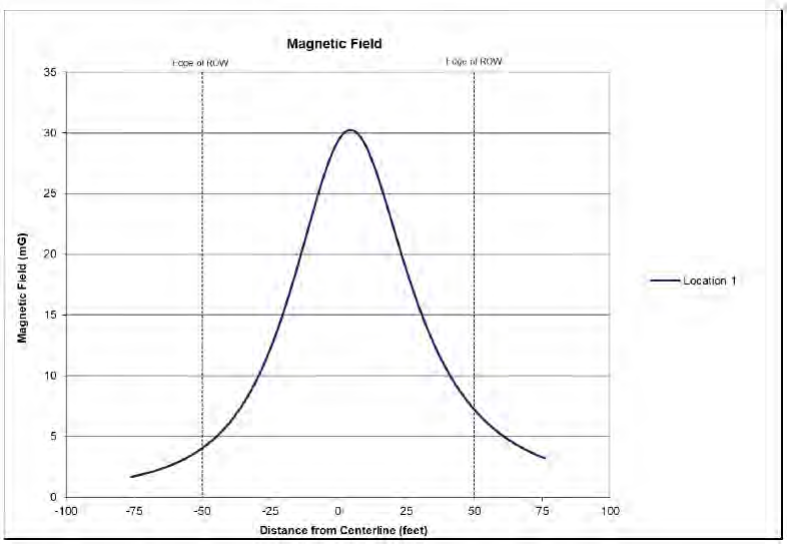

Figure 2. Magnetic Field at Distance from Centerline

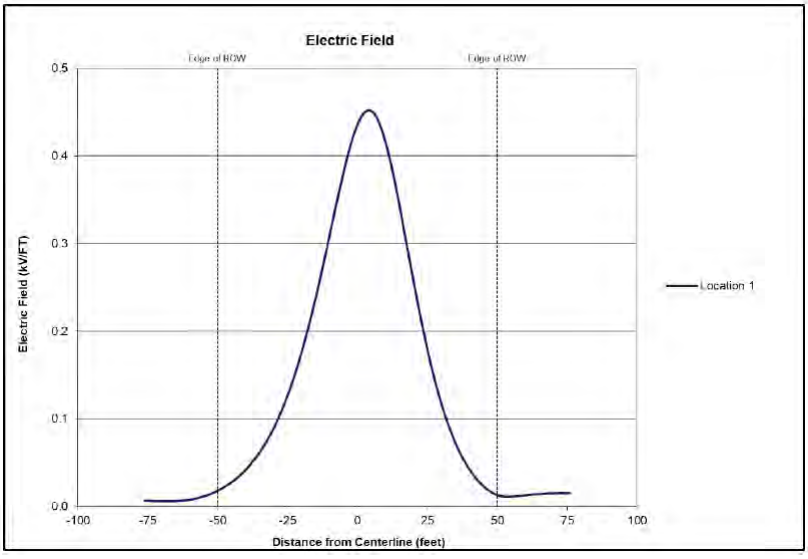

Figure 3. Electric Field at Distance from Centerline

I.5 References

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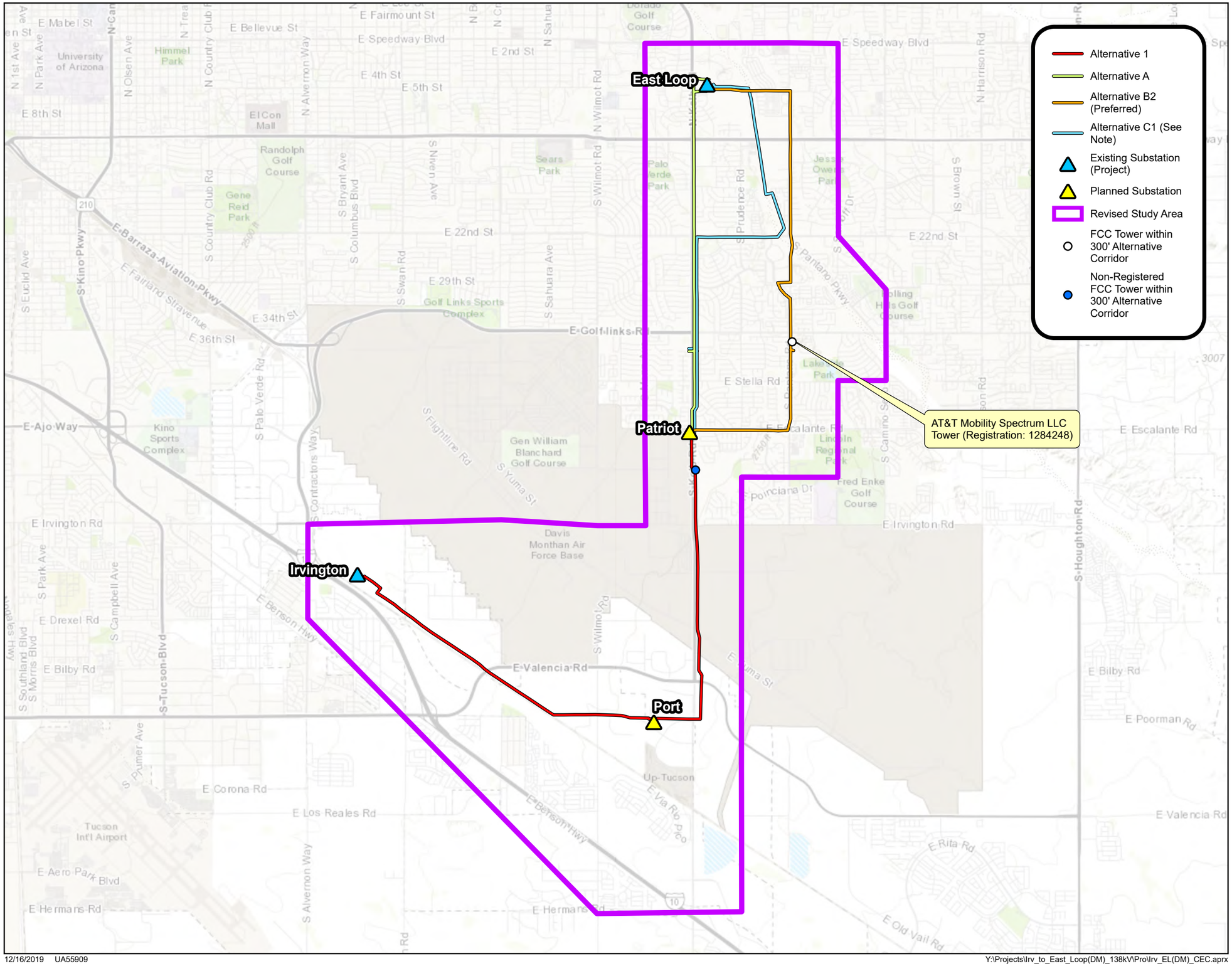

TEP
Tucson Electric Power
Land Resources

Exhibit I-1

Irvington to East Loop 138 kV Transmission Line Project

Federal Communications Commission (FCC)

NOTE: Alternative C1 is an offset graphic representation to show common overlap alignments.

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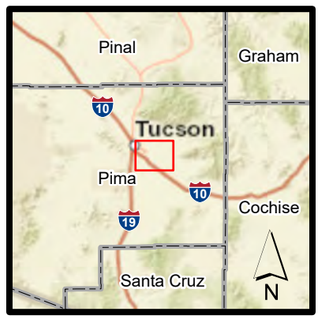

Sources: Esri, Tucson Electric Power, Pima County, City of Tucson, and Arizona State Land Department.
Projection: NAD 1983 UTM Zone 12N
Basemap: Esri World Topographic Map

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November 26, 2019

TUCSON ELECTRIC POWER

Irvington – East Loop Transmission Line

EMF Analysis

Revision 0

PROJECT NUMBER:
161294

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IRVINGTON-EAST LOOP EMF ANALYSIS

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REVISION HISTORY						
REV.	ISSUE DATE	ISSUED FOR	PREP BY	CHKD BY	APPD BY	NOTES
A	2019-11-15	Appvl	JDJ	JCB	GKB	Issued for client's review and approval
0	2019-11-26	Impl	JDJ	JCB	GKB	Issued for implementation

"Issued For" Definitions:

- "Prelim" means this document is issued for preliminary review, not for implementation
- "Appvl" means this document is issued for review and approval, not for implementation
- "Impl" means this document is issued for implementation
- "Record" means this document is issued after project completion for project file

TABLE OF CONTENTS

INTRODUCTION

This study is to perform EMF calculations for a new Tucson Electric Power (TEP) 138 kV transmission line that connects the existing Irvington and East Loop Substations. The 138 kV transmission line will also interconnect with the proposed Patriot and Port Substations. The new 138 kV transmission line consists of vertical construction that has sections joining other existing circuits along the proposed route alternatives. POWER Engineers, Inc.'s (POWER) engineering service for this study was to perform calculations to determine the predicted electric and magnetic fields from the transmission line and report the calculated electric and magnetic fields in tabular and plot formats.

DATA

Electric and magnetic fields (EMF) from a transmission line are based on the electrical and physical characteristics. Specifically, these factors are driven by: the voltage and current loading of the line; the physical conductor characteristics; relationships of each phase conductor to the other phases and shield wires; and the heights of the conductors from the ground. As a result, several variable factors will affect results. The following data was used for the analysis. Should any of this data change, the results will also change.

- For the 138 kV line, a maximum operating voltage of 105% of nominal voltage (144.9 kV) was used for electric and magnetic field analysis.
- A maximum loading for each transmission line was provided by TEP.
- A single 954 kcmil ACSS 45/7 Rail conductor was used for each phase of the 138 kV line. Other conductors used in the analysis are specified in Appendix A.
- The shield wire was OPGW 96 fiber optic cable #5-99-0352, which is 0.563 inches in diameter, or as specified in Appendix A.
- The phasing arrangement and spacing was assumed as labeled on the structure drawings provided for reference in Appendix A.
- The total right-of-way width was assumed to be 100 feet, with the reference centered on the structure.
- The minimum conductor height for the lowest phase conductor was set to the clearance value provided in Appendix A.
- All lines below 46 kV were not analyzed in the EMF calculations.

Note that the data listed above was the best available and was not the final design at the time of this analysis. The final design of the proposed line will be chosen when a route has been selected and all field constraints have been identified.

Figure 1 below shows the proposed alternative routes of the 138 kV transmission line from Irvington Substation to planned Patriot Substation to East Loop Substation. The EMF analysis was conducted at

several locations along the proposed routes per the request of TEP. Details of each location are provided in Appendix A.

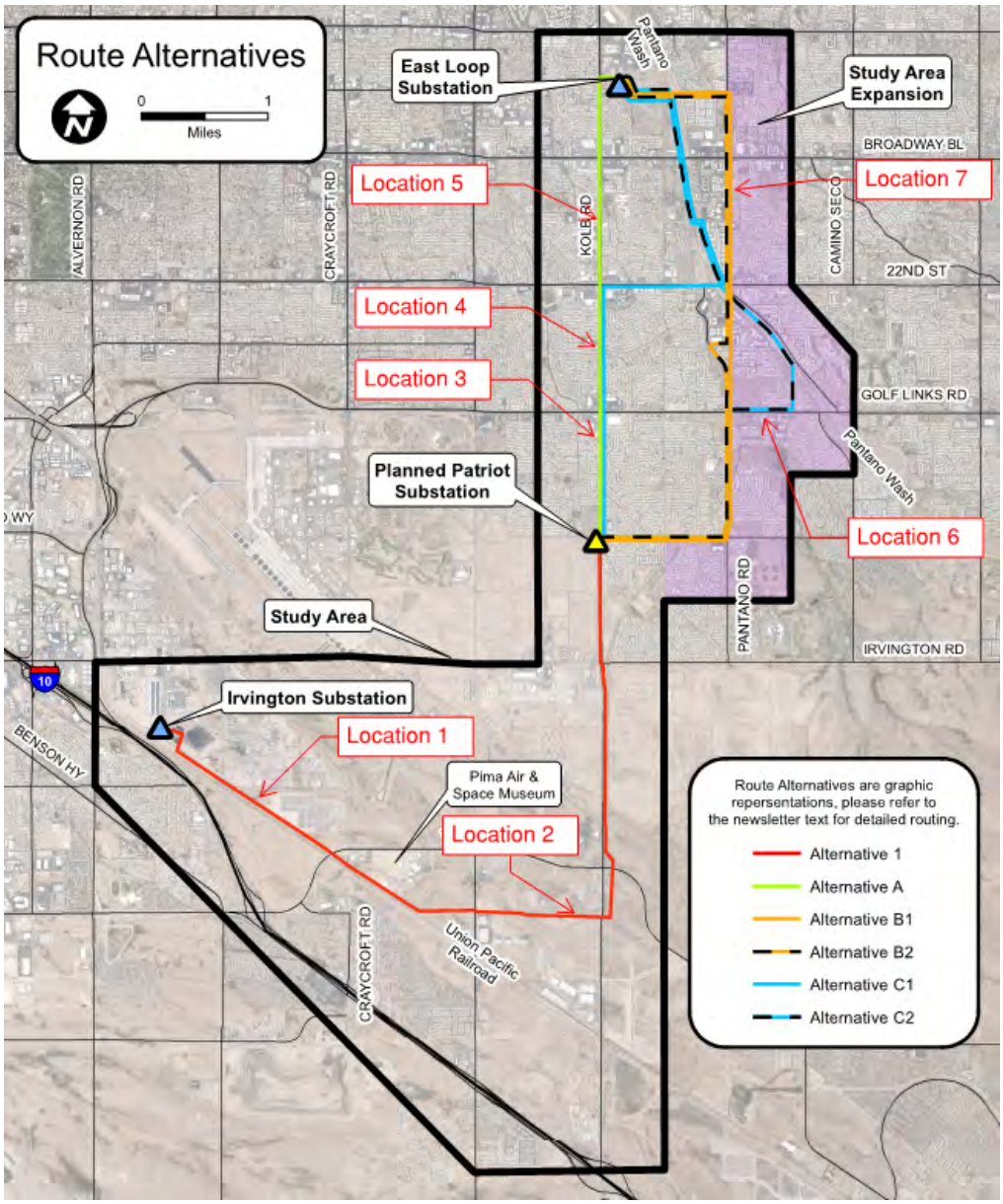


Figure 1: Irvington to East Loop Transmission Line Route Alternatives

ANALYSIS

The electric and magnetic field effects analysis was performed using Bonneville Power Administration's (BPA) Corona and Field Effects Program (CAFEP) software (Version 3) on the proposed transmission line structure configurations. CAFEP uses the electrical and physical

characteristics of the transmission line to calculate electric and magnetic fields from the transmission lines.

The electric fields are primarily a function of the maximum operating voltage of line. Magnetic fields are primarily a function of the line current loading, which varies over time. The electric and magnetic fields calculations were performed at 105% of the nominal voltage and 100% of the maximum line loading.

The electric and magnetic field values are typically reported at various locations across the right-of-way. Values reported include the maximum electric and magnetic fields within the right-of-way for the given structures, the electric and magnetic fields at the edge of the right-of-way (the larger of the two edges), and the distance at which the electric and magnetic fields fall below 0.01 kV/ft and 0.1 mG respectively. Also included for reference are plots of the calculated electric and magnetic fields across the entire width of the right-of-way and beyond the right-of-way.

For the analysis, electric and magnetic fields were analyzed at a minimum conductor height (mid-span, maximum sag for the loading provided), as this location will produce the worst-case scenario.

Exposure to EMF is a common occurrence, both at home and at work. Table 1 lists median magnetic field strengths, measured in milligauss (mG), for common household items at discrete distances. A dash indicates no measurable difference after the item was turned on.

TABLE 1: TYPICAL MAGNETIC FIELD LEVELS (mG)

APPLIANCE	DISTANCE FROM SOURCE (FT)			
	0.5	1	2	3
Baby Monitor	6	1	-	-
Electric Oven	9	4	-	-
Food Processor	30	6	2	-
Hair Dryer	300	1	-	-
Microwave Oven	200	4	10	2
Refrigerator	2	2	1	-
Video Display Terminal (PCs with color monitors)	14	5	2	-
Washing Machine	20	7	1	-

Source: National Institute of Environmental Health Sciences

RESULTS

Electric Field

The electric field strength is a measure of the force per unit charge at a given point in space relative to a charged object. It can be measured in volts or kilovolts per feet (kV/ft). Table 2 shows a summary of the calculated electric field resultant values in the right-of-way for each tangent structure configuration at each location. Values were calculated at the minimum conductor height (mid-span) at a height of one meter above the ground per IEEE Std 644-1994 (R2008), "IEEE Standard Procedures for Measurement of Power Frequency Electric and Magnetic Fields from AC Power Lines".

TABLE 2: CALCULATED ELECTRIC FIELD RESULTS [kV/FT]

CASE	EDGE OF ROW	MAXIMUM IN ROW	DISTANCE (IN FEET) TO <0.01 kV/FT	PLOT
Location 1	0.02	0.45	124	Figure 2
Location 2	0.02	0.24	106	Figure 3
Location 3	0.04	0.20	75	Figure 4
Location 4	0.03	0.16	72	Figure 5
Location 5	0.05	0.32	128	Figure 6
Location 6	0.05	0.32	135	Figure 7
Location 7	0.03	0.21	66	Figure 8

Figures 2 through Figure 8 show a plot of the calculated electric fields across the right-of-way for each structure configuration at that location.

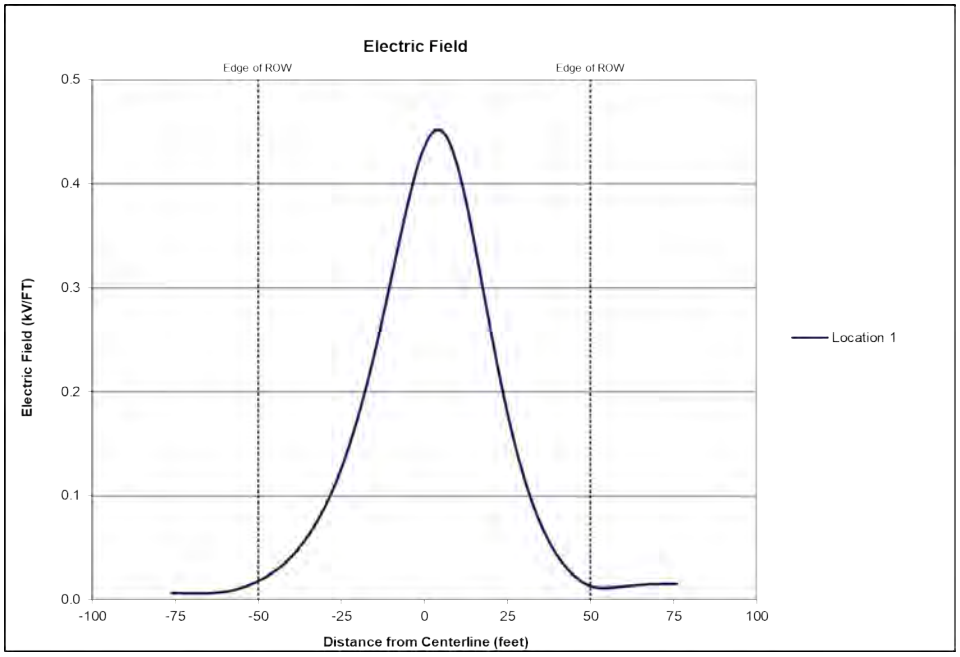


Figure 2: Calculated Electric Field at Location 1

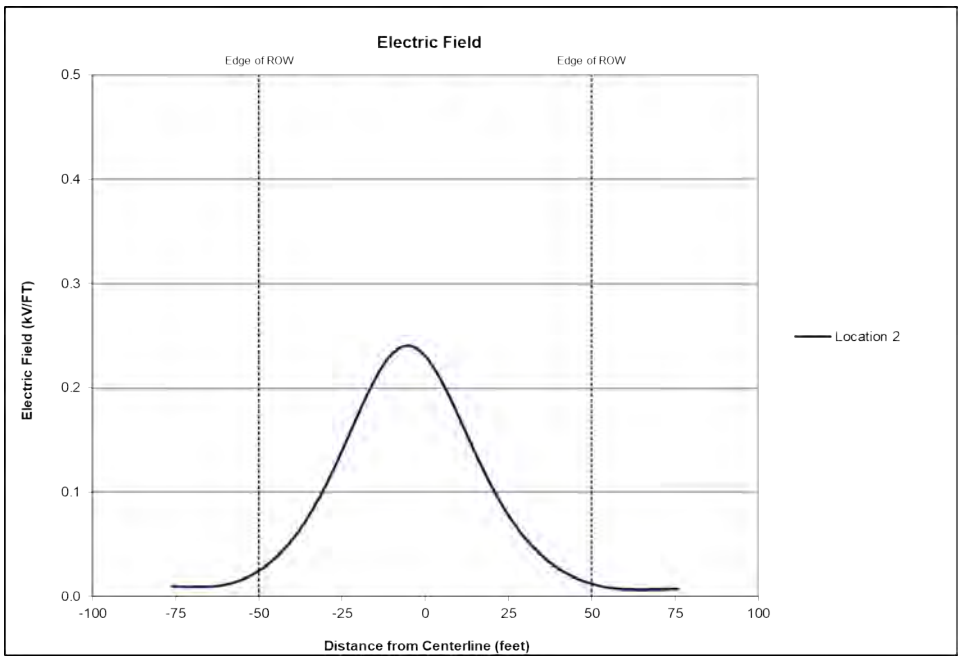


Figure 3: Calculated Electric Field at Location 2

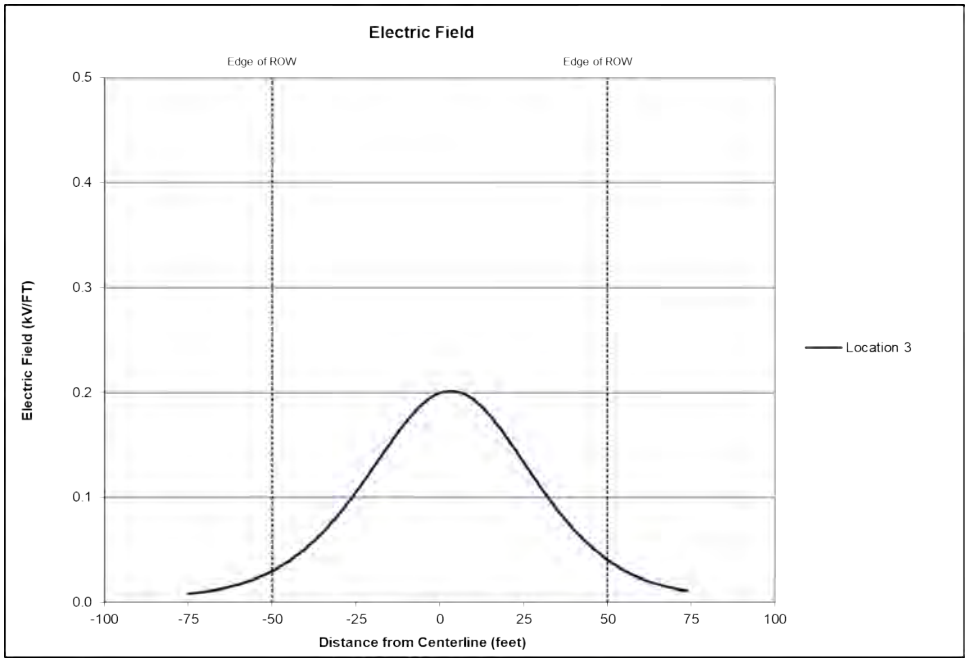


Figure 4: Calculated Electric Field at Location 3

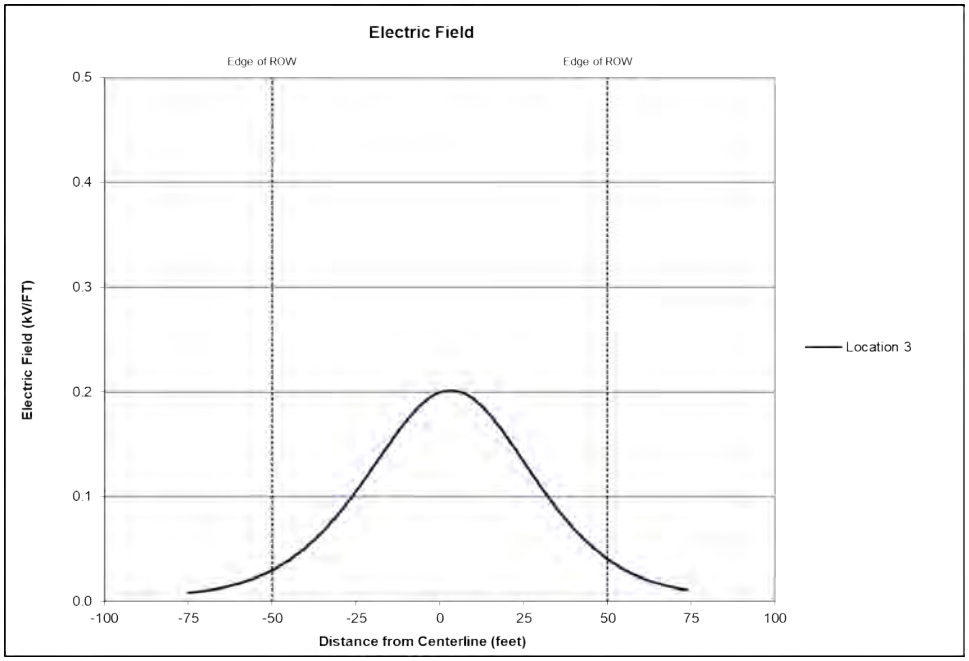


Figure 5: Calculated Electric Field at Location 4

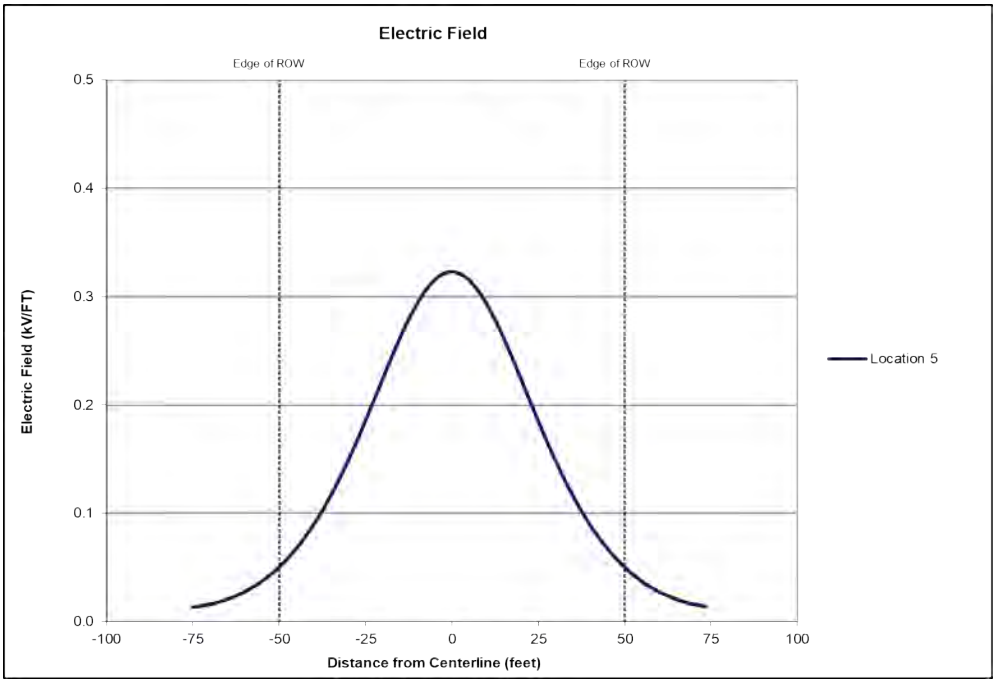


Figure 6: Calculated Electric Field at Location 5

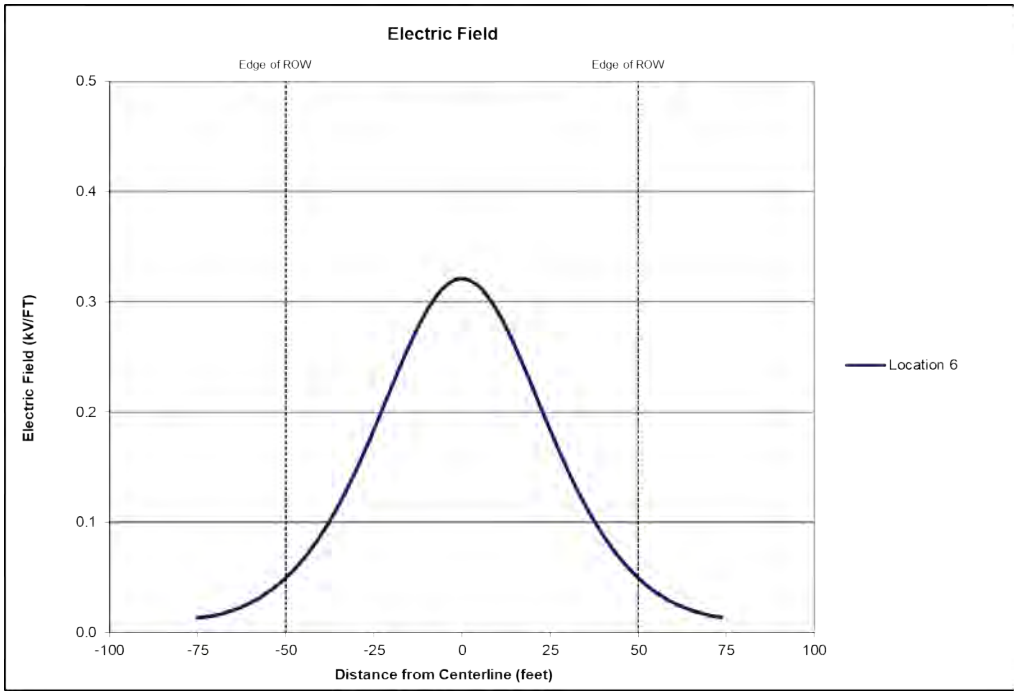


Figure 7: Calculated Electric Field at Location 6

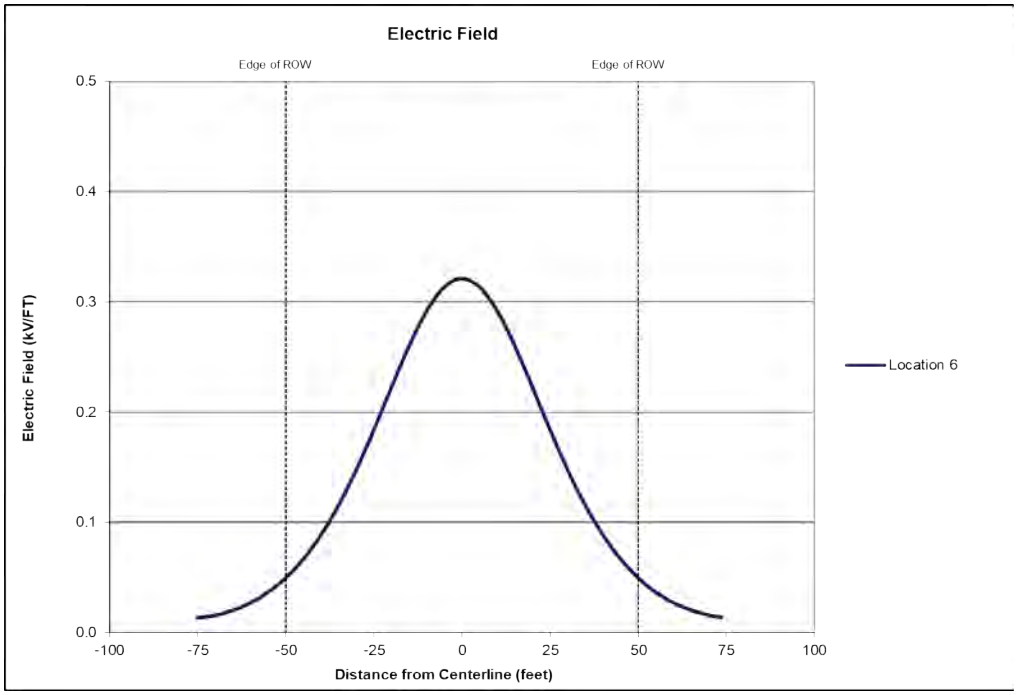


Figure 8: Calculated Electric Field at Location 7

Magnetic Field

The reported magnetic field values are the magnetic flux density at a given point in space. Magnetic flux density is measured in gauss or milligauss (mG) or in micro-Teslas (µT). These values can be easily converted as one tesla equals 10,000 gauss, or simply 10 mG equals 1 µT.

Table 3 shows a summary of the calculated magnetic field resultant values in the right-of-way, assuming 100 % maximum current loading. Values are calculated at the minimum conductor height (mid-span) at a height of one meter above the ground per IEEE Std 644-1994 (R2008).

TABLE 3: CALCULATED MAGNETIC FIELD RESULTS – 100% LOADING [MG]

CASE	EDGE OF ROW	MAXIMUM IN ROW	DISTANCE (IN FT.) TO <0.1 mG	PLOT
Location 1	7.3	30.2	395	Figure 9
Location 2	6.9	16.4	510	Figure 10
Location 3	3.3	6.9	323	Figure 11
Location 4	5.6	10.7	510	Figure 12
Location 5	12.1	25.5	758	Figure 13
Location 6	13.3	27.8	795	Figure 14
Location 7	6.4	14.1	510	Figure 15

Figures 9 through Figure 15 shows a plot of the calculated magnetic fields across the right-of-way for each structure configuration at that location.

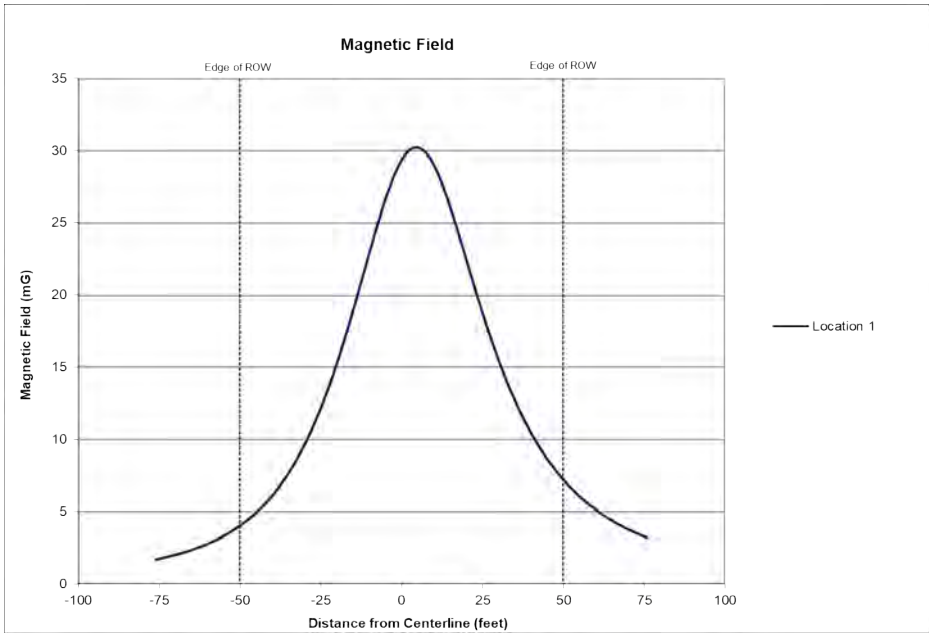


Figure 9: Calculated Magnetic Field at Location 1

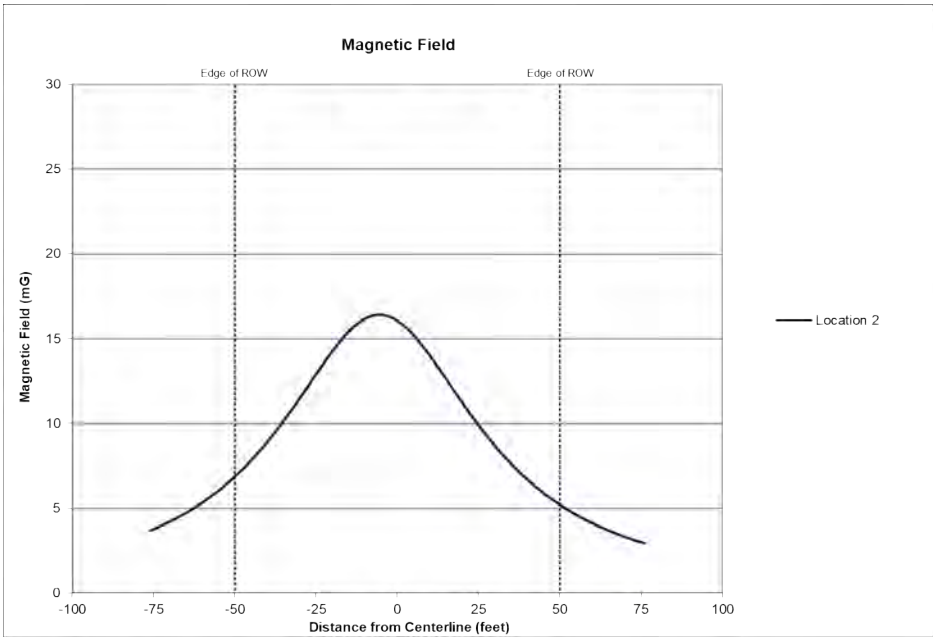


Figure 10: Calculated Magnetic Field at Location 2

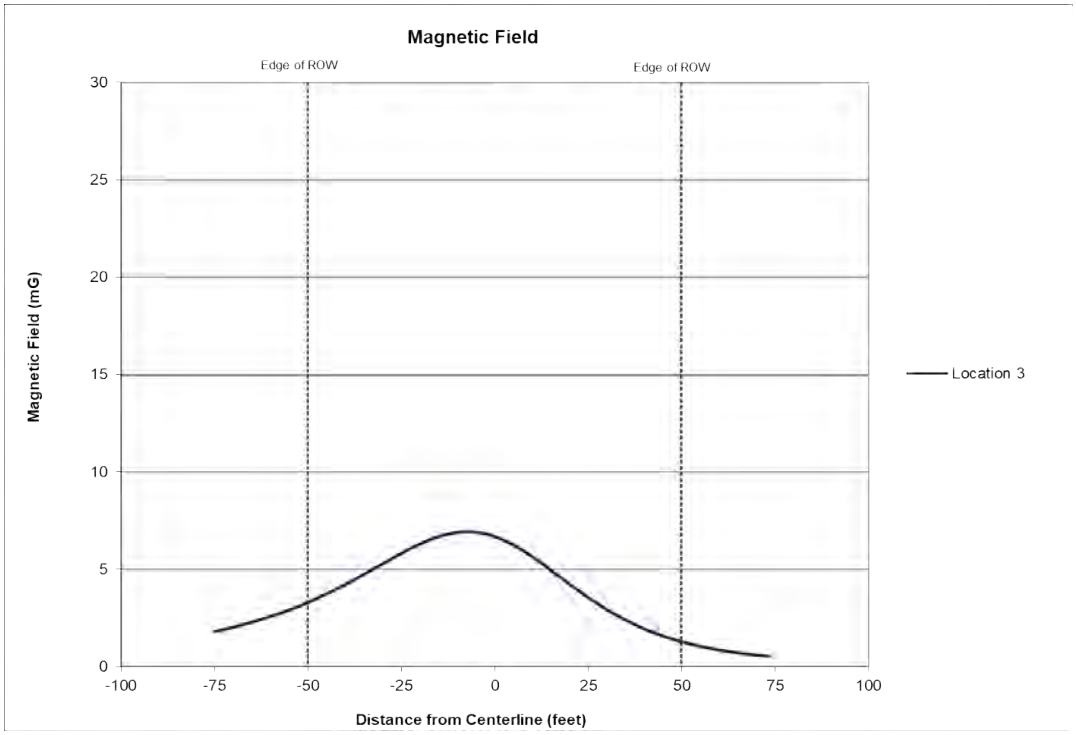


Figure 11: Calculated Magnetic Field at Location 3

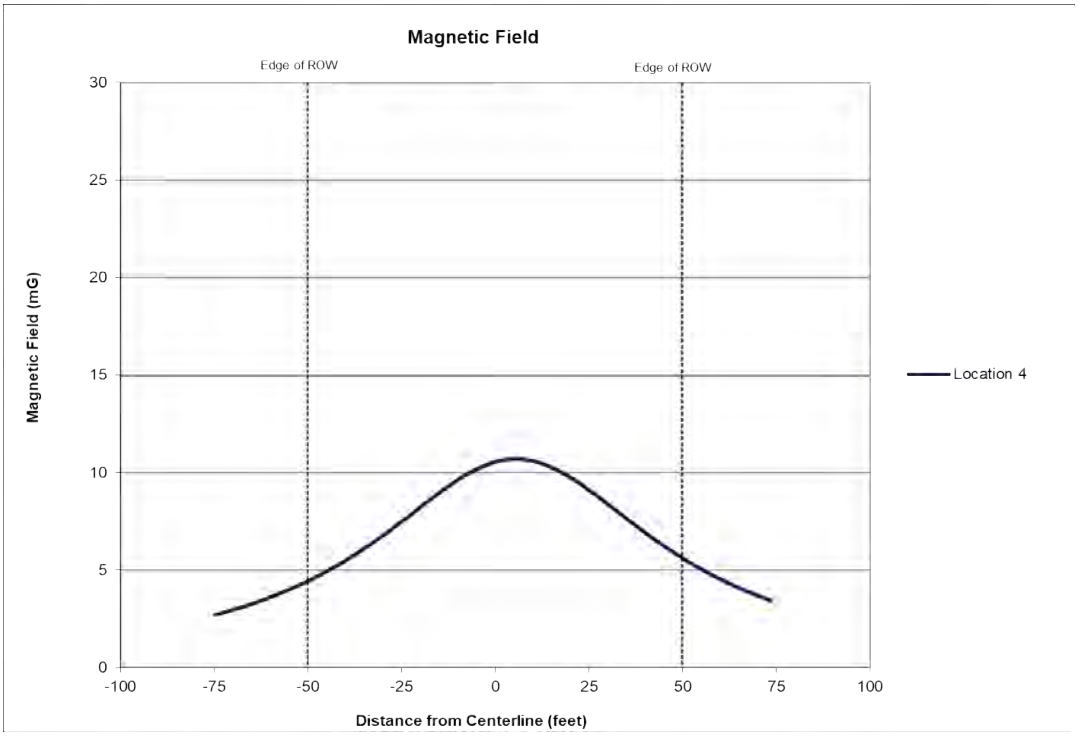


Figure 12: Calculated Magnetic Field at Location 4

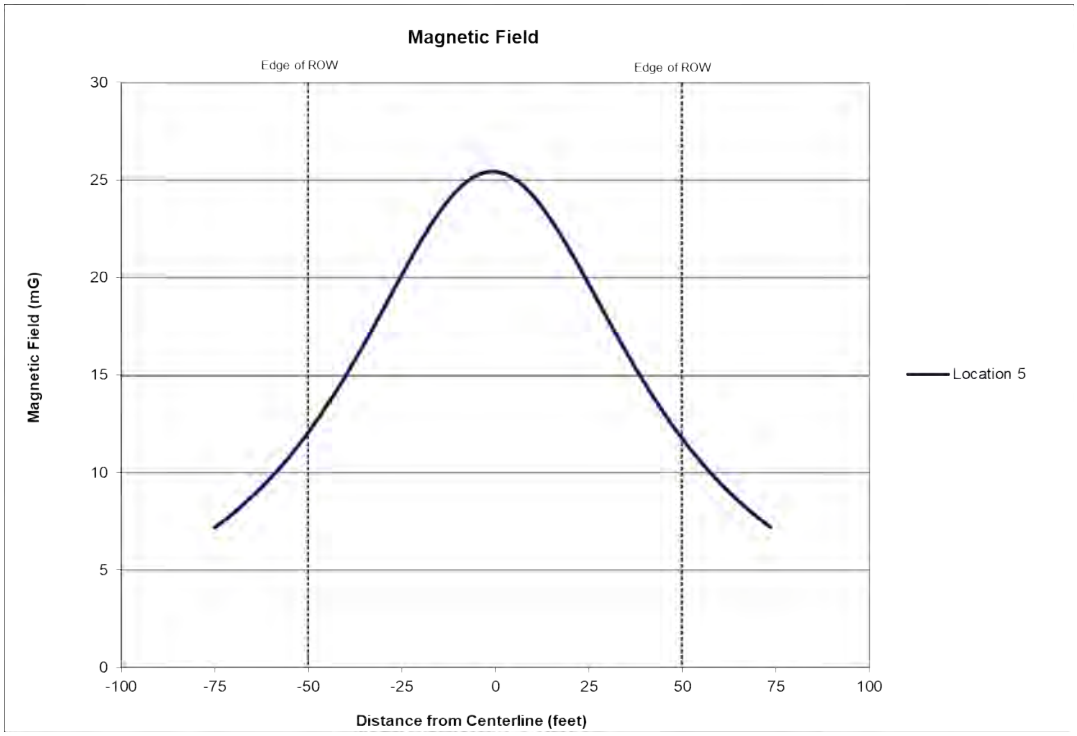


Figure 13: Calculated Magnetic Field at Location 5

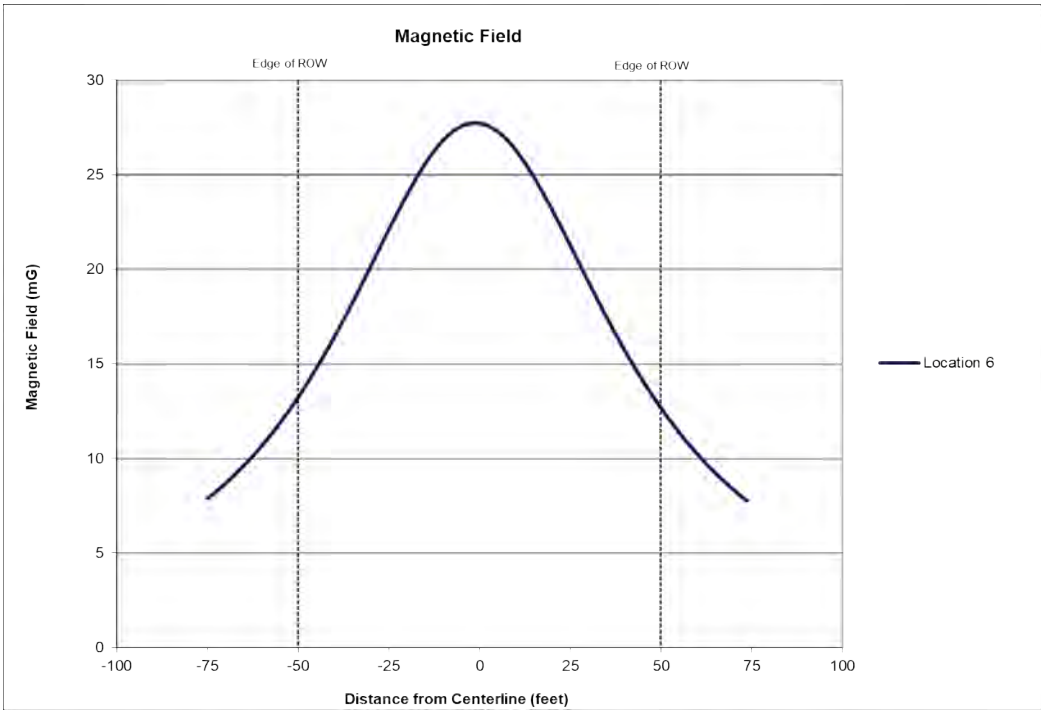


Figure 14: Calculated Magnetic Field at Location 6

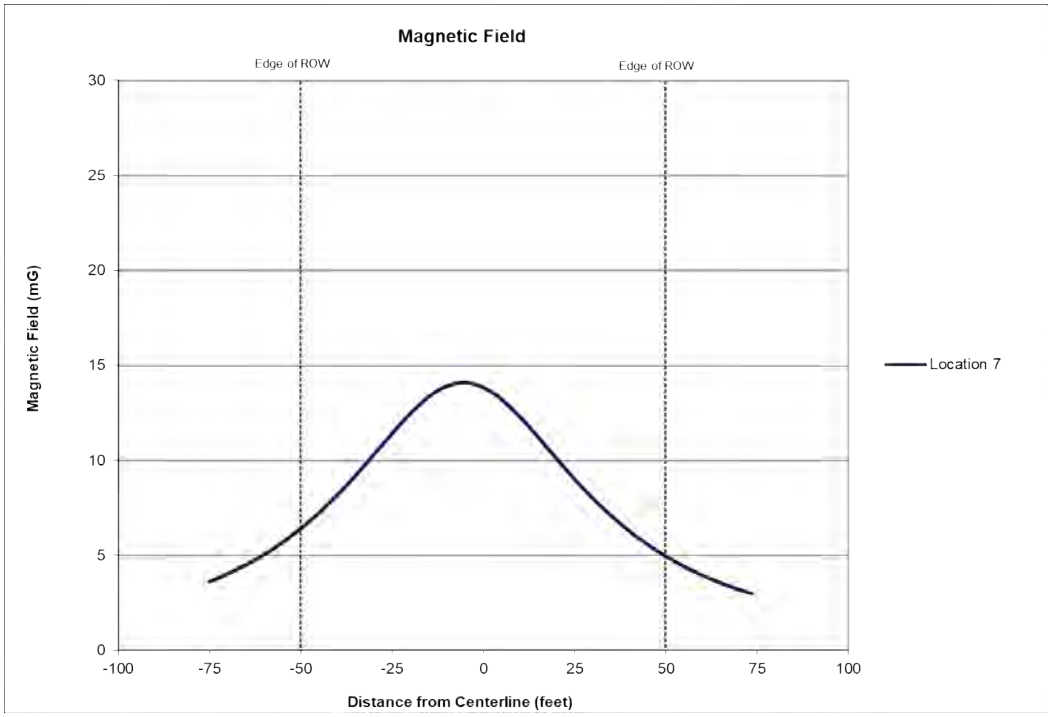
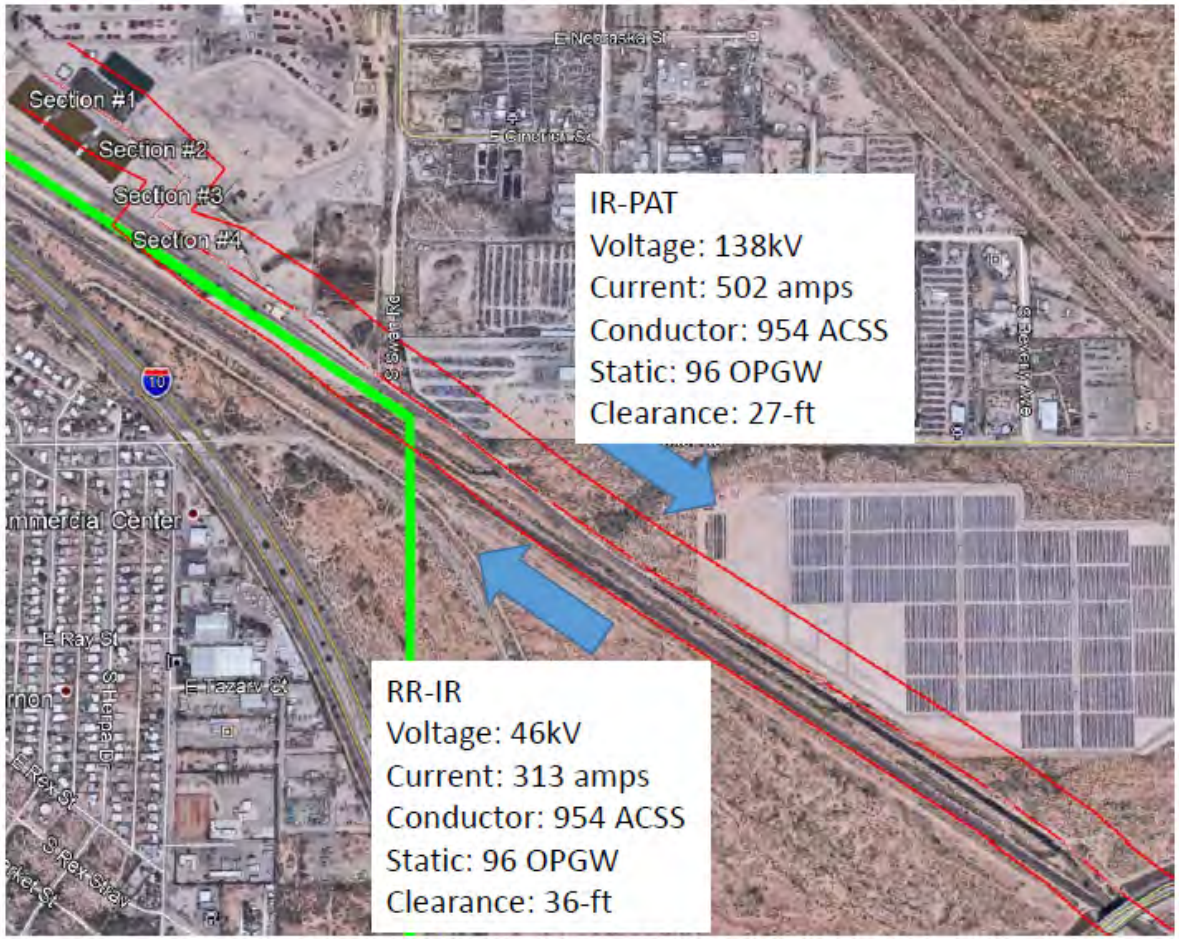


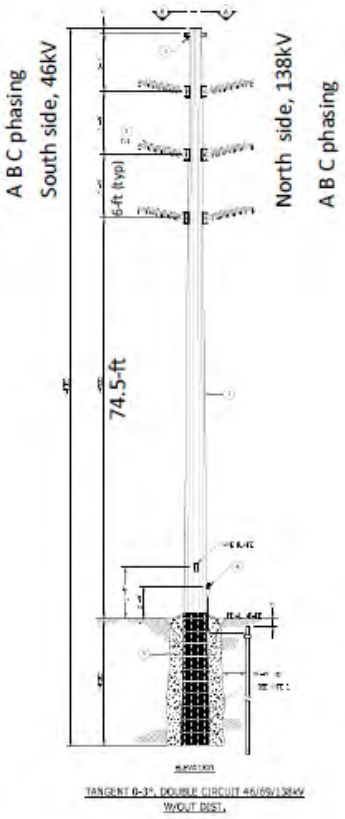
Figure 15: Calculated Magnetic Field at Location 7

CONCLUSION

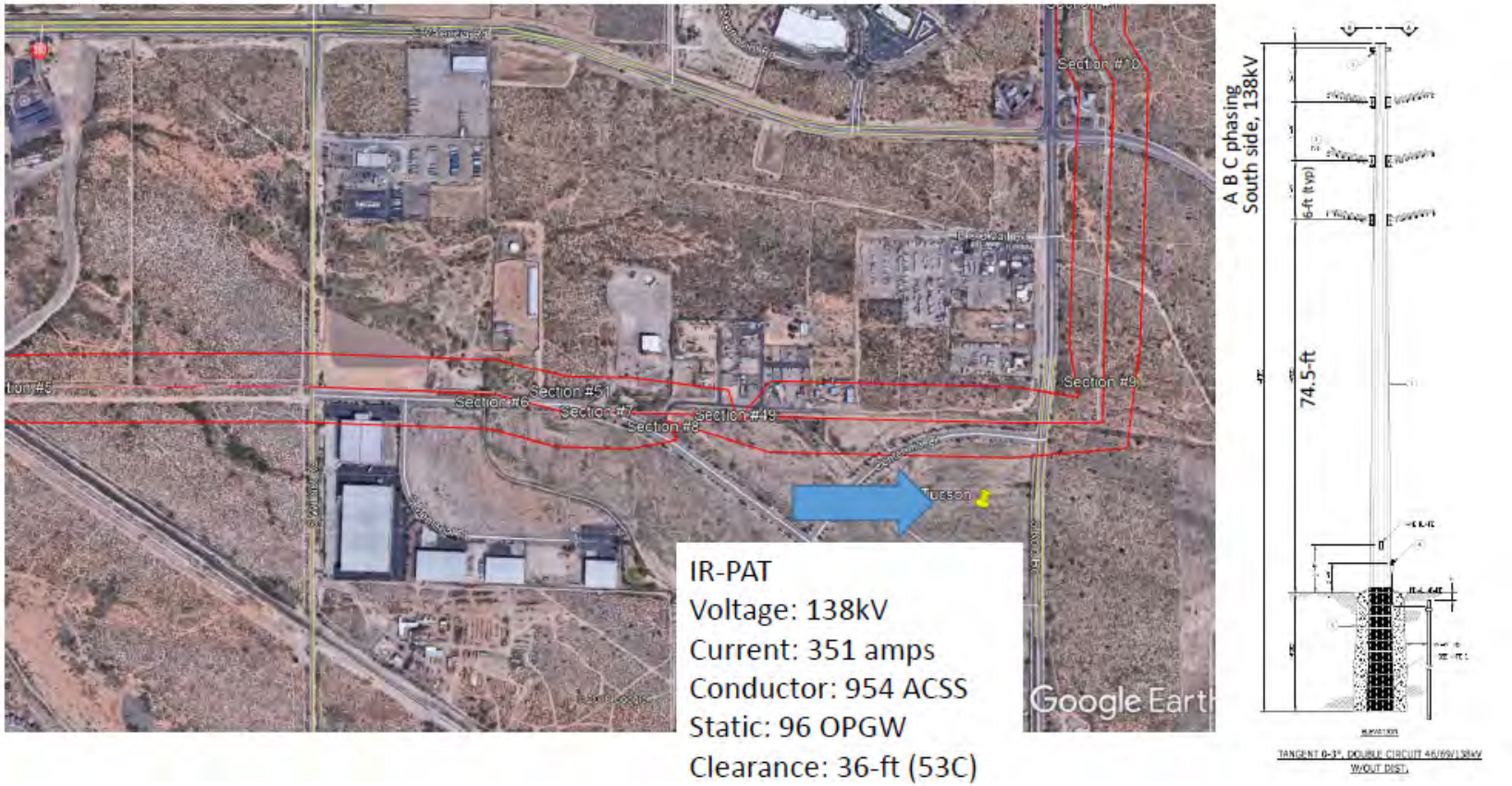
Calculated EMF values for the proposed 138 kV line between Irvington Substation and East Loop Substation are comparable to common household appliances. The maximum calculated magnetic field at Location 1, 30.2 mG, is nearly equivalent to the median magnetic field produced by a food processor from 6 inches away, 30 mG. At the edge of right-of-way, the calculated magnetic field for Location 6, 13.3 mG, was found to be weaker than the median magnetic field while standing 6 inches away from a conventional video display terminal for a personal computer. A hair dryer or microwave oven from a half foot away can be found to produce stronger magnetic fields than what has been calculated at any of the locations analyzed along the proposed route. Table 3 may be further compared with Table 1 for a better understanding of the strength of the calculated magnetic fields produced by the proposed 138 kV line.

APPENDIX A – STRUCTURE DRAWINGS & DATA

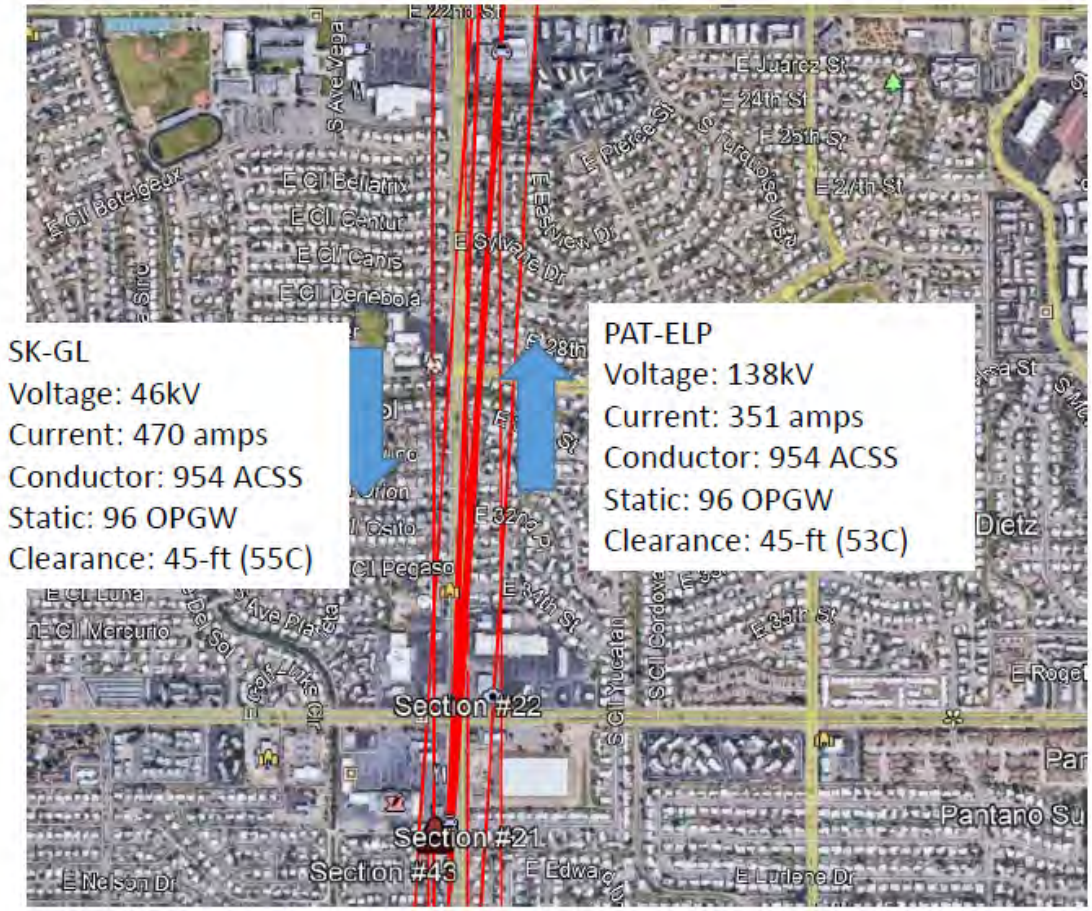


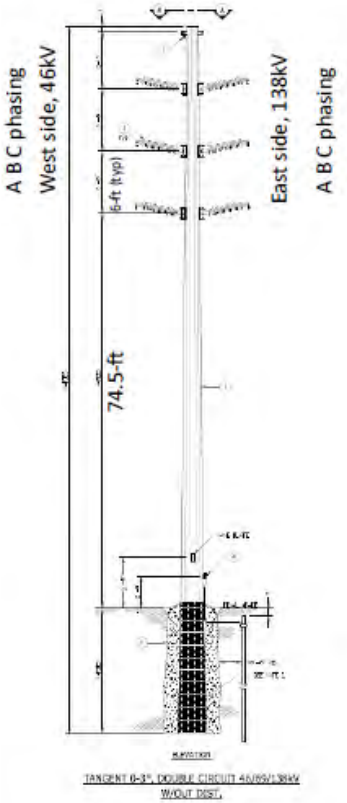


Location 1: Irvington Substation to Planned Patriot Substation



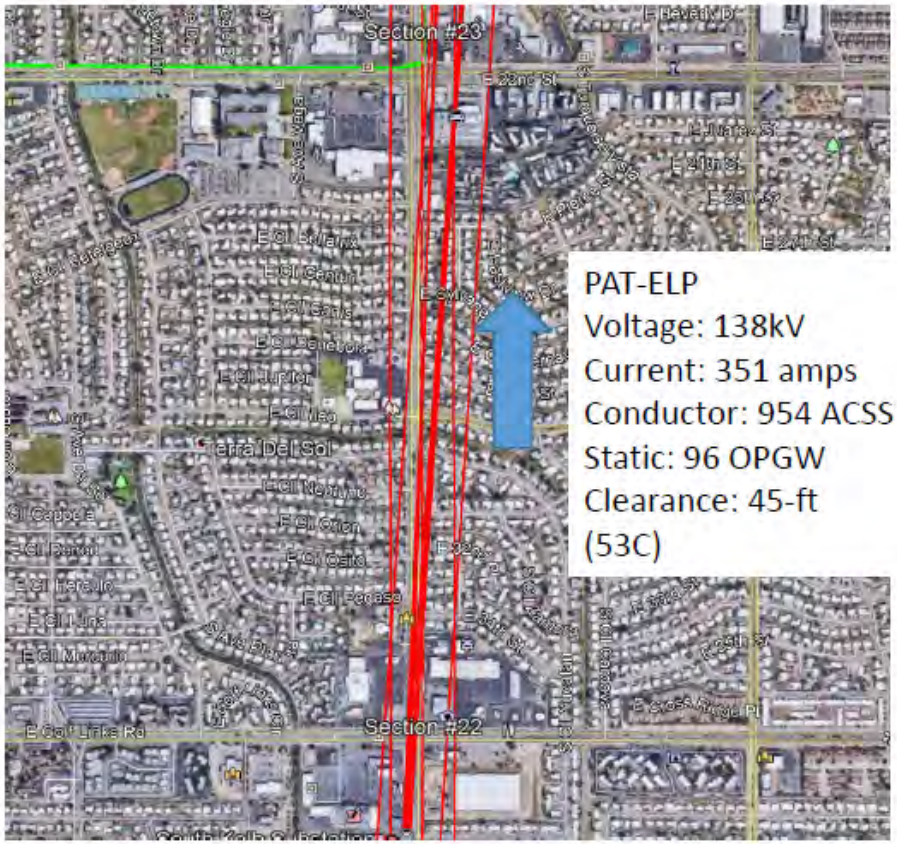
Location 2: Irvington Substation to Planned Patriot Substation

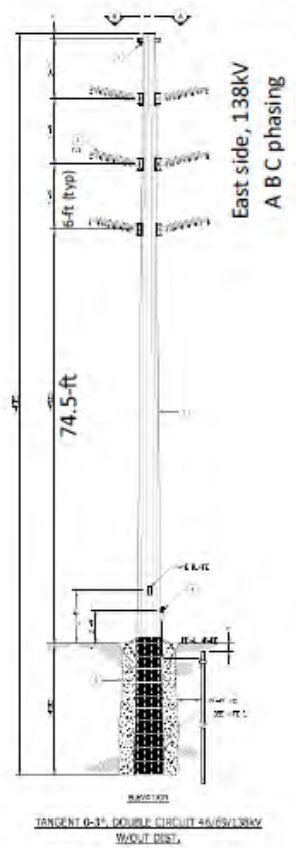




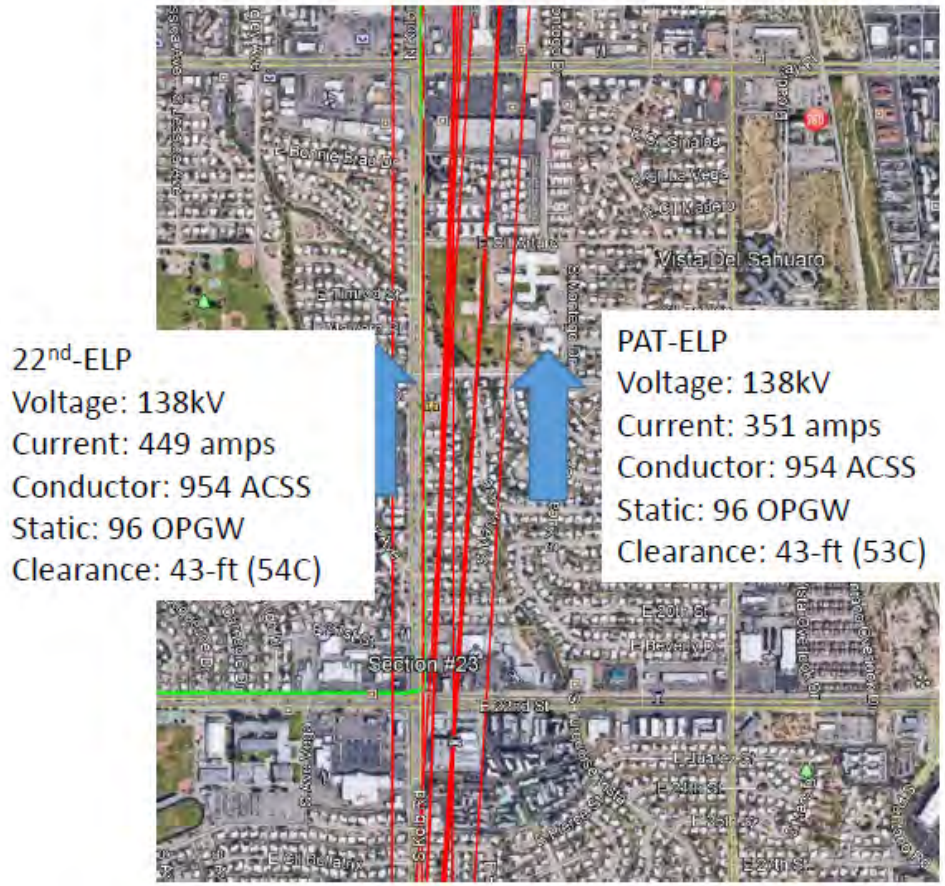
Location 3: Planned Patriot Substation to East Loop Substation

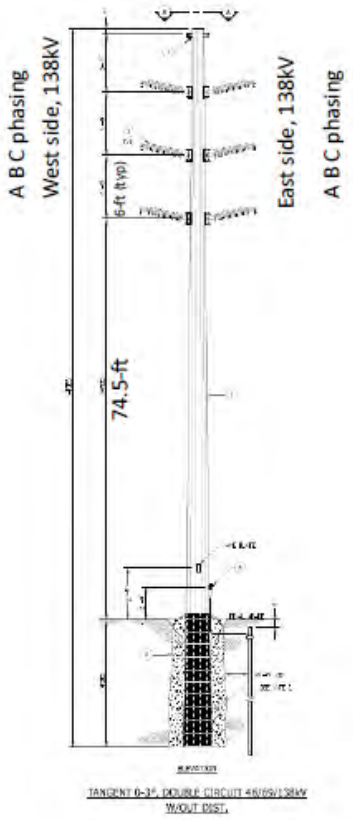
Exhibit Page 253



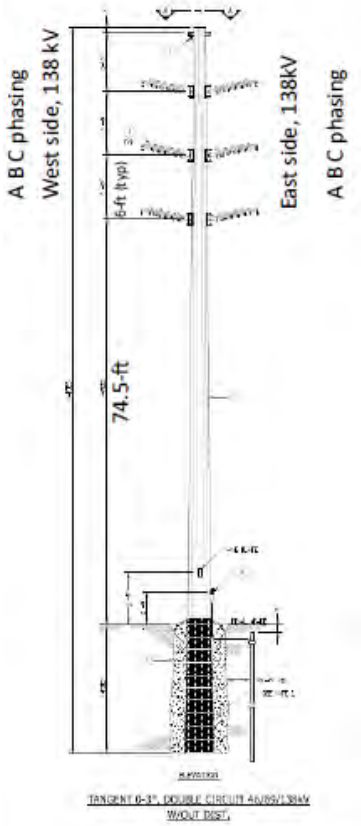


Location 4: Planned Patriot Substation to East Loop Substation



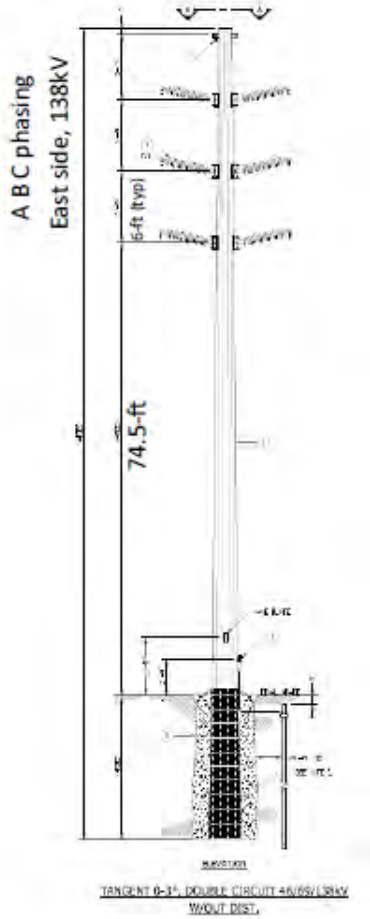


Location 5: Planned Patriot Substation to East Loop Substation



Location 6: Planned Patriot Substation to East Loop Substation

PAT-ELP
Voltage: 138kV
Current: 351 amps
Conductor: 954 ACSS
Static: 96 OPGW
Clearance: 39-ft
(53C)



Location 7: Planned Patriot Substation to East Loop Substation

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EXHIBIT J

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EXHIBIT J: SPECIAL FACTORS

Describe any special factors not previously covered herein, which applicant believes to be relevant to an informed decision on its application.

J.1 Introduction

A public involvement program was initiated in May 2019 and continued through September 2019 to notify and inform the public, agencies, community leaders, and other affected stakeholders about the Project.

J.2 Public Involvement Program Summary

Public participation is an important part of TEP's environmental planning process. Public involvement and communications activities were conducted as part of the Project to inform the public of the need and benefits of the Project and to solicit public input.

The public planning process was intended to ensure effective and timely communication among TEP staff, the public, agencies, and stakeholders. TEP used several different public outreach efforts to inform affected members of the community in the Study Area. Those efforts included:

- *Briefings with community leaders, agencies, and jurisdictions*
- *Two stakeholder workshops*
- *Individual stakeholder meetings*
- *Two newsletter mailings*
- *Two public open house meetings*
- *Project telephone information line*
- *Project email address*
- *Project-specific webpage on TEP's Internet website, including an online comment form*

The outreach effort was designed to offer interested parties an opportunity to gain information and provide input. The public was provided the opportunity to review and comment on the Project. The various methods of communication and public interaction listed above are explained below.

J.2.1 Stakeholder Briefings and Workshops

In order to introduce the proposed Project, gauge the level of stakeholder concern, and identify potential issues, individual briefings were conducted with key individuals within the various jurisdictions and agencies. At these briefings, the Project's team members explained the purpose and need of the Project, provided the Project's description, outlined the transmission line siting process, and solicited suggestions and opinions. In return, the community leaders provided TEP with their input on public concerns and sensitive resource areas within the Study Area.

TEP held two stakeholder workshops with stakeholders that had a higher interest in the Project. The first stakeholder meeting was held on May 7, 2019 at William M. Clements Recreation Center. One hundred and thirteen (113) individuals were invited, and 9 agency and organization representatives attended (see Exhibit J-1 for the Stakeholder Meeting sign-in sheets). The first stakeholder meeting covered an overview of the Project, the role of the ACC and the Committee in the process, the results of TEP's initial research,

and the preliminary segments that could be combined to form potential routes. The group discussed opportunities and constraints for the Project (see Exhibit J-2.2 for the PowerPoint presentation). Notes from Stakeholder Meeting #1 are located in Exhibit J-1.2.

The second stakeholder meeting was held on July 23, 2019 at William M. Clements Recreation Center. One hundred and thirteen (113) individuals were invited, and 10 agency and organization representatives attended (see Exhibit J-1 for sign-in sheets). The second stakeholder meeting covered an overview of the Project, the stakeholder role, the preliminary route alternatives, and next steps (see Exhibit J-2.3 for the PowerPoint presentation). Notes from Stakeholder Meeting #2 are located in Exhibit J-1.2.

TEP also emailed Project newsletters, maps, and additional Project status information to all 113 members of the stakeholder list, requesting written comments, throughout the duration of public outreach.

Community leaders and other stakeholders are listed in Table 17.

Table 17. Stakeholder List and Participation Level

AGENCY/ORGANIZATION	NAME	AREAS OF INTEREST/TITLE	LEVEL OF PARTICIPATION
US Elected Officials/Staff			
US Senate	Hector Reyes	Constituent Affairs Representative for Senator Sinema	Briefed, Stakeholder Mtg 1 & 2
US Senate	CJ Karamargin	Senator McSally	Briefed
US Congress	Ron Barber	Congresswoman Ann Kirkpatrick/ District #2 Congressional	Briefed
US Congress	Billy Kovacs	Congresswoman Ann Kirkpatrick/ District #2 Congressional	Briefed, Stakeholder Mtg 1
State Elected Officials/Staff			
Arizona Governor's Office	Becky Freeman	Governor Doug Ducey	Newsletters emailed
Arizona Corporation Commissioners and Policy Staff	Elijah Abinah	Utilities Director	Newsletters emailed
Arizona Senator	Andrea Dalessandro	District 2	Newsletters emailed
Arizona Representative	Daniel Hernandez	District 2	Newsletters emailed
Arizona Representative	Rosanna Gabaldón	District 2	Newsletters emailed
Arizona Senator	Dave Bradley	District 10	Newsletters emailed
Arizona Representative	Domingo DeGrazia	District 10	Newsletters emailed
Arizona Representative	Kirsten Engel	District 10	Newsletters emailed
County Officials/Staff			

AGENCY/ORGANIZATION	NAME	AREAS OF INTEREST/TITLE	LEVEL OF PARTICIPATION
Pima County	Chuck Huckelberry	County Administrator	Newsletters emailed
Pima County	Carmine DeBonis, JR	Deputy County Administrator	Newsletters emailed
Pima County	Tom Burke	Deputy County Administrator	Newsletters emailed
Pima County	Jan Lesher	Deputy County Administrator	Newsletters emailed
Pima County	Ana Olivares	Director, Department of Transportation	Newsletters emailed
Pima County	Carla Blackwell	Director, Development Services	Newsletters emailed
Pima County	Ramon Valadez	Supervisor, District 2	Newsletters emailed
Pima County	Steve Christy	Supervisor, District 4	Newsletters emailed
Pima County	Diana Durazo		Newsletters emailed
Pima County	Greg Hitt		Stakeholder Mtg 1&2
Pima County	Karen Simms	Natural Resources, Parks, and Recreation	Stakeholder Mtg 1&3
Pima County	Sandi Garrick	Utility Liaison	Stakeholder Mtg 1&2
Pima County	Diane Frisch	Director, Attractions and Tourism	Briefed
Pima County Regional Flood Control District	Ann Moynihan	Civil Engineering Manager	Stakeholder Mtg 2
Pima County Regional Flood Control District	Deidre Brosnihan	Civil Engineering Manager	Newsletters emailed
Pima County Air & Space Museum	Scott Marchand	Executive Director, Pima Air & Space Museum	Briefed
City Elected Officials/Staff			
City of Tucson	Michael Ortega	City Manager	Newsletters emailed
City of Tucson	Claire Kaufman	Mayor Jonathan Rothschild Office	Newsletters emailed
City of Tucson	Diana Alarcon	Director, Transportation	Stakeholder Mtg 2
City of Tucson	Tom Fisher	Dept of Transportation, Project Manager	Stakeholder Mtg 2
City of Tucson	Mike Graham	Public Information Officer, Transportation	Newsletters emailed

AGENCY/ORGANIZATION	NAME	AREAS OF INTEREST/TITLE	LEVEL OF PARTICIPATION
City of Tucson	Scott Clark	Planning and Development Services Department	Newsletters emailed
City of Tucson	Brent Dennis	Parks & Recreation	Newsletters emailed
City of Tucson - Ward 2	Paul Cunningham	Councilmember, Ward 2	Briefed
City of Tucson - Ward 2	Katie Bolger	Chief of Staff	Briefed
City of Tucson - Ward 4	Shirley Scott	Councilmember, Ward 4	Newsletters emailed
City of Tucson - Ward 4	Martha Cantrell	Council Aide, Ward 4	Stakeholder Mtg 1
City of Tucson - Ward 5	Richard Fimbres	Councilmember, Ward 5	Newsletters emailed
City of Tucson - Ward 5	Mark Kerr	Chief of Staff	Newsletters emailed
Tucson Water	Dean Trammel	Civil Engineer	Newsletters emailed
Tucson Water	Fernando Molina	Public Information Officer	Newsletters emailed
Stakeholder Organizations			
Arizona Department of Transportation	Rudy Perez	Planning Program Manager, Major Projects Group	Newsletters emailed
Arizona Dept. of Transportation	Rod Lane	District Engineer	Newsletters emailed
Arizona Department of Transportation	Priscilla Thompson	Utility Engineering Coordinator	Newsletters emailed
DMAFB-355 CES/CENP	Bonnie Kacey Carter	Base Community Planner	Briefed, Stakeholder Mtg 2
DMAFB-355 CES/CENP	Gary Krivokapich		Stakeholder Mtg 1
DMAFB-355 CES/CENP	Jared Frosch		Stakeholder Mtg 2
DMAFB	Steven Schumaker		Newsletters emailed
AMARG (Boneyard)	Jennifer Barnard	Colonel	Briefed
Arizona Army National Guard	Jim Grayson	Director of Planning and Programming	Newsletters emailed
Port of Tucson	Mike Levin	Executive Vice President	Briefed
Port of Tucson	Alan Levin	Owner	Briefed
Pima Air & Space Museum	Ruben Encinas	Director of Facilities	Briefed
El Paso Natural Gas	Kelley Sims	Land Department	
Kinder Morgan	Randy Kimbell		
Kinder Morgan	Brice Box		Newsletters emailed
Kinder Morgan	Glen Reed	Operator	Newsletters emailed
Kinder Morgan	Scott Ward	Manager	Newsletters emailed

AGENCY/ORGANIZATION	NAME	AREAS OF INTEREST/TITLE	LEVEL OF PARTICIPATION
Kinder Morgan	Kevin Otto	Corrosion Supervisor	Newsletters emailed
Kinder Morgan	Jeremiah Nickless		Stakeholder Mtg 2
Kinder Morgan	Milo Francese	Line Rider	Newsletters emailed
Metropolitan Pima Alliance	Allyson Solomon	Director	
Southwest Gas	Steve Sousa		Stakeholder Mtg 1&2
Southwest Gas	Hector Rivas Cabrera		Stakeholder Mtg 1&2
Southwest Gas	Randy Cheney		
Union Pacific Railroad	Renay Robison	Real Estate Manager	Newsletters emailed
Pima Association of Governments	Sheila Storm	Communications Director	Newsletters emailed
Neighborhood Associations			
Broadway/Northeast	Gary Snell	President	Newsletters emailed
Dietz	Candace Mondragon	President	Newsletters emailed
El Gheko	Thomas Wills	President	Newsletters emailed
Groves Lincoln Park	Richard Schwartz	Vice President	Stakeholder Mtg 1&2
Harold Bell Wright Estates	John Utz		Newsletters emailed
Hilton Road Community Association	Jim Kramp		Newsletters emailed
Mortimore	Patricia Smith		Newsletters emailed
Palo Verde Park	Norma Coffman	President	Newsletters emailed
Stella Mann	Jodie Woodman	President	Newsletters emailed
Terra Del Sol	David McClure	President	Newsletters emailed
Vail Preservation Society	JJ Lamb	President	Stakeholder Mtg 1
Cielito Lindo Du Tubac	Lois Zettlemoyer	President	Newsletters emailed
Palm Grove #3 Town Home Association	Joseph O'Hagin	President	Newsletters emailed
Educational Organizations			
Academy of Tucson Middle School	Susan Creenan	Principal	Newsletters emailed
Amerischools College Preparatory	Claudio Bravo	Principal	Newsletters emailed
Booth/Fickett Magnet School	Demetra Baxter-Oliver	Principal	Newsletters emailed
Compass High School *	Kelly Nagashima	Student Services	Newsletters emailed

AGENCY/ORGANIZATION	NAME	AREAS OF INTEREST/TITLE	LEVEL OF PARTICIPATION
Craycroft Elementary School	James Ridge	Principal	Newsletters emailed
Dietz K-8 School	Jesus Vasquez	Principal	Newsletters emailed
Erickson Elementary School	Marie Daranyi	Principal	Newsletters emailed
Family Life Academy *	Christopher Taylor	School Administrator	Newsletters emailed
Ford Elementary School	Diana Johnston	Principal	Newsletters emailed
Hudlow Elementary School	Cheri LaRochelle	Principal	Newsletters emailed
Kellond Elementary School	Brenda Meneguin	Principal	Newsletters emailed
La Paloma Academy - Lakeside Campus *	Sean Watins	Principal	Newsletters emailed
Lauffer Middle School	Thom Luedemann	Principal	Newsletters emailed
Los Ninos Elementary School	Deedee Krause	Principal	Newsletters emailed
Our Mother of Sorrows Catholic School	Tom Cahalane	Msgr.	Newsletters emailed
Palo Verde High School	Eric Brock	Principal	Newsletters emailed
River of Life Christian School	E. Lane	Principal	Newsletters emailed
Santa Rita High School	Tamara Ray	Principal	Newsletters emailed
Schumaker Center	Meghan Ruiz	Coordinator	Newsletters emailed
Sonoran Science Academy	Erdal Cocak	Principal	Newsletters emailed
Sunnyside Unified School District	Steven Holmes	Superintendent	Newsletters emailed
Tucson International Academy-East *	Peter Meehan	Principal	Newsletters emailed
Tucson Unified School District	Gabriel Trujillo	Superintendent	Newsletters emailed
Vail Unified School District	Calvin Baker	Superintendent	Newsletters emailed
Wheeler Elementary School	Dora Saldamando	Principal	Newsletters emailed

J.2.1.4 Pima County

TEP coordinated with Pima County Air and Space Museum. TEP met with Pima Air and Space Museum, which is located on land owned by Pima County and the Pima County Department of Tourism. It was stated that Alternative 2 would have a negative visual effect at the entrance to the museum. Additionally, Alternative 2 would interfere with the Museum's ability to tow aircraft from DMAFB across Valencia Road. For these reasons, Alternative 2 was removed from further evaluation and Alternative 1 was carried forward (ref comment from October 7, 2019, in Comment Summary, Exhibit J-5).

J.2.2 Newsletters

Throughout the duration of public outreach, TEP prepared and mailed two newsletters to residents, business owners, landowners, and agency/organization representatives in the Study Area (Exhibit J-2). See Table 18 for more information.

Table 18. Newsletters

NEWSLETTER #	DATE MAILED	NUMBER OF RECIPIENTS
1	May 1, 2019	21,700
2	August 5, 2019	36,000

The first newsletter was sent to provide Project information, the Study Area and potential route segments, and to announce upcoming public meetings. The second newsletter provided specific information regarding potential alternatives that TEP had selected based upon previous input, and requested comment and preferences related to the alternatives.

J.2.3 Public Open House

TEP conducted two rounds of public outreach. Due to the size of the Study Area, TEP planned a meeting in both the northern and southern portions of the Study Area for each round of public outreach. TEP published newspaper public notices of all public meetings in the Arizona Daily Star. Copies of the public notices and affidavits of publication are included in Exhibit J-3.1.

See Exhibit J-3.3 for copies of posters on display at the public open houses. The sign-in sheet is included as Exhibit J-3.2. Comments received are in Exhibit J-4.

SOUTHERN #1

May 21, 2019

Littletown Community Center
6465 S Craycroft Rd
Tucson, Arizona 85756

Six members of the public attended. Questions asked were in relation to the Project need, substation siting, health effects, and visual effects. Two written comments were received.

NORTHERN #1

May 22, 2019

Ott Family YMCA
401 S. Prudence Rd
Tucson, Arizona 85710

Fourteen members of the public and one agency representative attended. Questions asked were in relation to the Project need, substation siting, health effects, and visual effects. Four written comments were received.

NORTHERN #2

August 20, 2019

Tucson City Council Ward 2 Office
7575 E Speedway Blvd
Tucson, Arizona

Eight members of the public attended. Questions asked were in relation to the potential routes, substation siting, health effects, and visual effects. No written comments were received.

SOUTHERN #2

August 22, 2019

Littletown Community Center

Three members of the public attended. Questions asked largely pertained to the potential routes, and which routes TEP would be carrying forward in the application. One written comment was received.

J.2.4 Telephone Information Line

A toll-free telephone information line was established for the Project. The automated message, in English, encouraged callers to leave a message requesting either more information or a return call. The telephone number was advertised in the newsletters and on the Project website. The information line voicemail was checked regularly; more frequently following newsletter mailings and public open houses. To date, a total of ten voicemails were received. All messages received were entered into the comment tracking database. All messages that required a response were answered by one of the appropriate Project team members.

J.2.5 Internet Website

The Internet has evolved into a primary source of information, therefore TEP maintains a website featuring their various projects throughout southeastern Arizona. The site address is http://www.tep.com. A page devoted to the Project was added to the TEP website before other public participation activities commenced, and was updated throughout the planning process. The specific Project page is https://www.tep.com/irvington-east-loop/.

The Project webpage was updated regularly to include both general and specific information on the Project, including the toll-free Project information line number, the latest maps, and all the Project newsletters. After the public open houses, the displays and graphics presented were added to the Project webpage.

The Project webpage also allowed people to submit comments via an online public comment form, or to request more information. To date, TEP has received a total of 35 public comments, 14 of which were online responses. Comments submitted through the website were entered into the comment tracking database (discussed below in Section J.2.6).

J.2.6 Comment Tracking Database (Exhibit J-5)

At the time of preparation of the application, 35 public comments were received regarding the proposed Project from the various sources discussed above.

In the comment database, comments were sorted by area of interest or concern (e.g., health and safety, Project cost, appearance, location, etc.). This information was used to understand the concerns of the community in regards to the Project, and incorporate the concerns into TEP's plans where possible.

J.3 Public Comments Received

A total of 35 comments were received and categorized. The topics covered health, cost, appearance, location, and other. Figure 4 shows the percent of each type of comment received. Respondents frequently indicated that location was of interest to them, with location being relevant to roughly 63% of responses from the public.

Of the 35 public comments received, 21 comments did not mention a route preference. Many of these comments pertained to location generally (such as burdens or opportunities for a particular part of town), appearance of facilities, or health concerns regarding EMFs. The public was permitted to comment on all alternative routes.

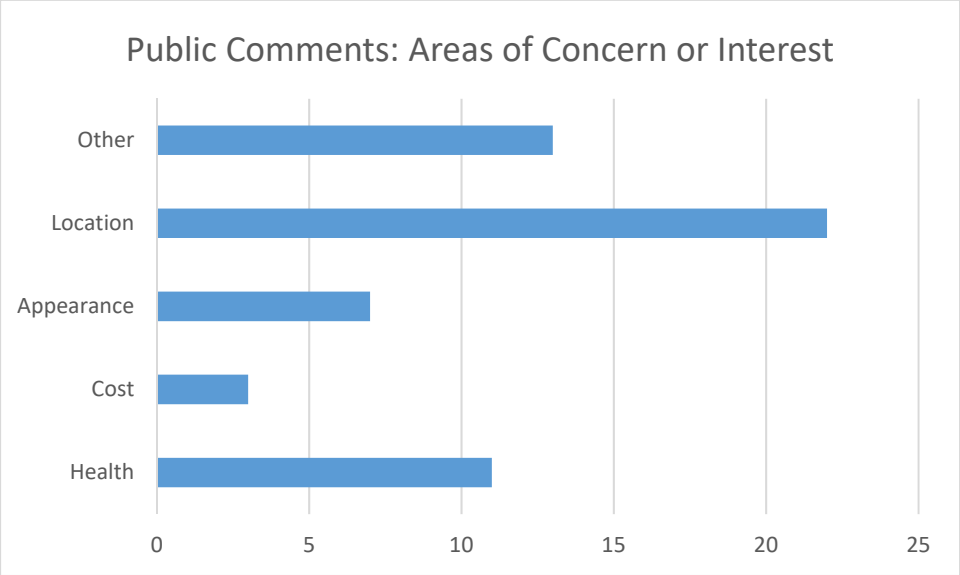

Figure 4. Public Comments and Concerns by Topic

TEP also recorded the public's preferred alternatives. Of the 35 landowners, business owners, and area residents who provided public comment for the Project, 40% of respondents supported an alternative route, or multiple alternative routes. Figure 5 depicts the alternative route preferences indicated by respondents. Alternative C1 garnered the most support, with eight comments in favor, while Alternative B2 received five comments in support. Alternative A was the route with the least amount of favorable mentions with three supportive comments.

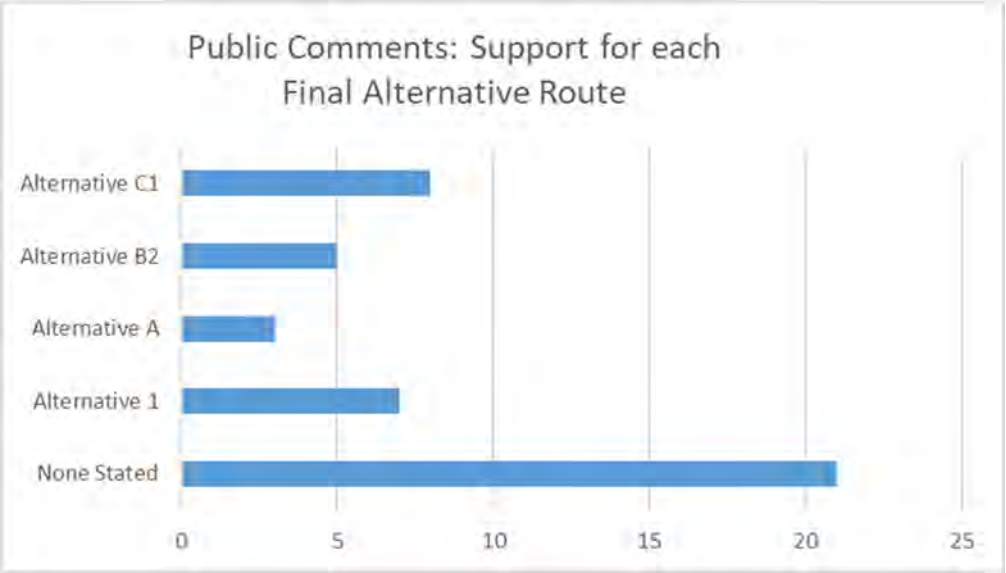

Figure 5. Alternative Route Support by the Public

See Exhibit J-4 for copies of comments received from the public, and Exhibit J-5 for summary table of comments received.

Irvington-East Loop Transmission Line

TEP

Sign-in Sheet

Date May 7, 2019

	Name	Address, City, Zip Code	Email	Phone Number
1	Gary Krivokapich	DM AFB 520 228 6026	Gary.KRIVOKAPICH.1@US.AF.MIL	
2	Donovan Sandoval	TEP		
3	Steve Sowa	SWG 520 724-6249	steve.sowa@swgas.com	
4	Randy Cheney	SwG 520-794-6144	randy.cheney@swgas.com	
5	Kenny Varga	TEP		
6	Eric Raatz	TEP	ERAATZ@TEP.com	
7	Alicia Ware	TEP	aware@TEP.com	
8	Hector Reyes	U.S. Senate	Hector_Reyes@sinema.senate.gov	(202) 981 1291
9	Greg Hitt	PIMA COUNTY	GHITT@PIMA.GOV	
10	Rich Schwartz	Groves Lincoln Park 520-349-4130		
11	Martha Cantrell	Ward 4, City of Tucson 791-3199	martha.cantrell@tucsonaz.gov	
12	Sandi J. Garrick	Pima County 349-2888	sandi.garrick@pima.gov	
13	JJ Lamb	Vail Preservation Society 520-419-4428	vailpreservationsociety@gmail.com	
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Stakeholder Meeting # 1

EXHIBIT J-1

Irvington-East Loop Transmission Line

TEP

Sign-in Sheet

Date July 23, 2019

	Name	Address, City, Zip Code	Email	Phone Number
1	JARED FROSCH	DAVIS-MONTHAN	jared.frosch.1@us.af.mil	228-5141
2	Ann Moynihan	PCRFCD	ann.moynihan@pima.gov	724-4638
3	Richard Schwartz	7701 E. Poinciana Dr		520-790-9147
4	Hector Reyes	Sen Sinema's Office	hector_reyes@sinema.senate.gov	2029811291
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Irvington-East Loop Transmission Line

TEP

Sign-in Sheet

Date July 28, 2019

	Name	Address, City, Zip Code	Email	Phone Number
1	GREG H. M	201 N. STONE AVE TUCSON	GREG.HITT@PIMA.GOV	724 6567
2	JEREMIAH NICKLESS,	49 N. 53RD AVE PHOENIX, AZ 85043	JEREMIAH_NICKLESS@KINDERMORGAN.COM	480-528-1651
3	Hector Rivas Cabrera	3401 East Gas Road, Tucson AZ 85714	Hector.RivasCabrera@swgas.com	(520)-794-6234
4	Steve Sosa	3401 E. Gas Rd Tucson AZ 85714	steve.sosa@swgas.com	794-6249
5	TOM FISHER	TDOT, 201 N. STONE AVE, 5TH FLOOR	TOM.FISHER	837-6752
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Tucson Electric Power

Irvington to East Loop
138kV Line Siting Project
Stakeholder Meeting #1

May 7, 2019
9:00-10:00

Invitees: See Stakeholder List

Status of alternatives assessment:

1. Introductions
2. Project Overview (DTD)
3. Transmission System Requirements (DP&E)
4. Proposed Substation Locations (Renee Darling)
5. Stakeholder Input (All)
6. Closing / Q&A

Notes:

Lincoln Groves NA:
- Receives complaints about power lines, interference from high voltage lines, and flicker.
- Concerned that the project only benefits DMAFB and not residents.
- Black outs and brown outs are common in their area; will the project address this issue?
- What percent in reliability metric will this change? TEP: DP&E agrees to speak in detail about this issue with representative after the meeting.

Billy Kovacs, Candidate:
- What is the benefit of segment 3 Vs. segment 5? TEP: We don't have currently have all utility information or feedback from local residents to push it one way VS. the other.

Southwest Gas:
- There is a high pressure gas main on segment 20; there are additional gas lines on a portion of 20 on both the east and west side.
- Agrees to provide base-maps so TEP can look for conflicts.

Representative Sinema's Office:
- Will the route stick to one side of Kolb? TEP: We would rebuild existing, possibly UG distribution, because the preference is to stay on one side unless there are engineering conflicts.

Pima County:
- Will review segments/ TEP shapefiles and follow up with any concerns.
- Pima Co. Utility Coordinator requests TEP consider using galvanized steel poles with a matte finish. Remarks, "we don't have large trees here for the core-10 to blend into," and prefers the look of lighter color poles. Pima County will submit a letter with this request included, again.

Action Items:

1. Share shapefiles with those who requested
2. Coordinate with SW gas RE: existing lines
3. Follow up with Neighborhood Assoc. representative
4. Send out dates of public meetings, and next stakeholder meeting

Tucson Electric Power

Irvington to East Loop
138kV Line Siting Project
Stakeholder Meeting #2

July 23, 2019
9:00-10:30

Invitees: See Stakeholder List

Status of alternatives assessment:

1. Introductions
2. Project Overview (DTD)
3. Transmission System Requirements (DTD)
4. Proposed Substation Locations (Renee Darling)
5. Request for Stakeholder Input (All)
6. Closing / Q&A

Notes:

Pima County:
- Concerned that poles in proximity to Pima Air and Space Museum may interfere with retired planes being transported into the museum.
- Indicated that they may not support the route on Valencia. This area requires further review.
- Offered to arrange a meeting with Pima Air and Space museum.

Kinder Morgan:
- 15' clearance is required from their facilities.
- Believes Level 3 may be moving their fiber lines in the southern portion of the study area, from south of UP tracks to north side of tracks in eastern Tucson.
- Any line crossings will require mitigation for cathodic protection.

DMAFB:
- Asked about the height of lightening masts at the Patriot substations; TEP responds typically 55", and they may or may not be needed based off of future electrical engineering studies.

TDOT:
- Indicated that there are plans for a lot of growth on the southern end of the study area; and possible needs for roadway improvements.

TDOT:
- If the Pantano Wash route is selected, would that make it possible to light the river path? That would be beneficial to residents/users.
- Street lights continued; if routes are going to be located in areas where there are no street lights, it would be in their interest to discuss how this could be addressed.
- TDOT requests TEP look into the issue and provide follow-up.
- Requests that TEP share PP presentation with all attendees via email.

Regional Flood Control District:

- Why would the route cross the Pantano multiple times (east-west)? TEP: There are existing infrastructure and topographic constraints.
- Is there a concept sketch of where the poles would be relative to bank protection, etc?
- They request to see a 3D design or the fly over before the application process.
- Requests shapefiles or access to an external GIS/interactive map. TEP: must determine what information is public knowledge/ can be shared.
- Will TEP provide constraints maps showing the conflicts for each route?

Representative Sinema's Office:
- Requests KOP's and/or Google fly over to assess visual impacts on Kolb Rd and the Pantano Wash.

Lincoln Groves NA:
- Concerned about having transmission lines on 3 sides of the neighborhood. Would prefer the route go east on Irvington from Pantano and TEP rebuild existing 138kV from Irvington north.

Action Items:

1. Share project shapefiles for alternative routes with attendees that requested
2. Share PP presentation
3. Set meeting with Pima County/ Air and Space Museum
4. Set 1-1 meeting with RFCD to discuss pole placement in Pantano Wash
5. Request plans from Level 3
6. Request presentation time at the next RUCC meeting

Tucson Electric Power

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Mail Stop RC131
Tucson, AZ 85701-0711

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Irvington-East Loop Transmission Line

Public Open House Meetings

Tuesday, May 21 | 6-7:30 p.m.
Littletown Community Center
6465 South Craycroft Road
Tucson, AZ 85746

Wednesday, May 22nd | 5:30-7 p.m.
Ott Family YMCA
401 S. Prudence Road
Tucson, AZ 85710

tep.com/irvington-east-loop

Help us **improve your electric service!**

TEP wants to hear from you about potential routes for a planned transmission line that will help strengthen electric reliability for customers in Tucson. Read inside to learn how you can share your comments.

Energy Grid Update
Irvington-East Loop Transmission Line
May 2019

TEP Plans New Transmission Line to Meet Growing Energy Needs, Support D-M

Tucson Electric Power (TEP) is developing plans for a new transmission line to help serve growing energy needs. The project would help Davis-Monthan Air Force Base satisfy its energy resiliency requirements and improve electric reliability for customers in Tucson.

TEP must determine a route for the Irvington-East Loop 138 kilovolt (kV) Transmission Line, which will connect the Irvington Substation to the East Loop Substation. The line also must interconnect with the planned Port and Patriot substations. TEP encourages residents, property owners and other stakeholders to share their input about potential routes and help inform the company as it refines project plans.

STUDY AREA and PROJECT BENEFITS
In determining where to locate new energy infrastructure, TEP considers the projected energy needs of nearby residential and commercial customers, anticipated economic development, proximity to existing equipment, project costs, geography, the environment, public input and other factors. Transmission lines link substations that change the voltage of electric current for transmission and delivery of electric service to area customers.

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

- **Irvington Substation** (terminus point): TEP is upgrading and relocating this substation to expand capacity and accommodate new generating resources currently under construction at the company's Irvington Campus, located near South Alvernon and East Irvington roads.

- **Port Substation** (planned point of interconnection): TEP plans to build this substation on a 10-acre site near South Kolb and East Valencia roads at the Port of Tucson, an intermodal inland shipping and storage facility supporting the transportation of goods throughout the Southwest. The planned substation is designed to accommodate increased energy demands and economic growth in the area. An in-service date has not been determined.

- **Patriot Substation** (planned point of interconnection): TEP plans to build this substation on a 16-acre site near South Kolb and East Escalante roads at Davis-Monthan. The new substation will help Davis-Monthan meet Department of Defense-mandated energy resiliency directives, replace aging infrastructure that has reached the end of its useful life and strengthen electric reliability for customers in the area. The substation is scheduled to be in service in 2021.

- **East Loop Substation** (terminus point): Located near East Speedway Boulevard and South Kolb Road, this existing substation feeds multiple circuits that deliver electric service to homes and businesses throughout the area.

TEP conducted a siting analysis to identify multiple potential line route segments that it could combine in various ways to form a route. The enclosed map identifies each segment with a number. Residents and other stakeholders can use these identifying numbers to share thoughts or concerns in their comments about specific segments.

TEP also will use additional input from upcoming public open house meetings and a previous stakeholder meeting held in May to identify up to three (3) alternative transmission line routes for further consideration. Members of the community will have additional opportunities to comment on these alternative routes in the future.

TEP employees install upgrades at the East Loop substation. The planned transmission line would connect East Loop to new and existing substations.

The Irvington-East Loop line would cross private property and government-owned land in the City of Tucson and portions of unincorporated Pima County. TEP would build the line with self-weathering steel monopoles that stand between 75-110 feet tall. Taller structures may be required at major road or line crossings.

REQUIRED APPROVALS and TIMELINE
The Arizona Corporation Commission (ACC) must approve a Certificate of Environmental Compatibility (CEC) for the transmission line before it can be built. After TEP applies for a CEC later this year, the Arizona Power Plant and Transmission Line Siting Committee will review the application in a public process that includes opportunities for neighbors and other stakeholders to provide comments. If a CEC is granted, it will be sent to the ACC for final review and approval.

Irvington-East Loop Transmission Line

The City of Tucson must approve a development plan and issue a special exception land use permit before construction can begin on the Patriot Substation. TEP expects to file an application for the land use permit later this year and anticipates submitting a development plan in 2020.

The City of Tucson also must approve a development plan for the Port Substation prior to construction. TEP has not determined when it will file this plan. Current zoning will accommodate substation construction.

TEP is planning to place the Irvington-East Loop transmission line into service in 2021.

PUBLIC PARTICIPATION
To help determine the line route, TEP encourages residents, property owners and other stakeholders to share their input by:

- Mailing a letter with your comments to:
  P.O. Box 711
  ATTN: Irvington-East Loop
  Mail Stop RC131
  Tucson, AZ 85701-0711
- Sending comments to IRV2EL@tep.com.
- Visiting tep.com/irvington-east-loop and filling out an online comment form.
- Calling (520) 382-4662 and leaving a voicemail message.

Please use identifying numbers in the map to identify segments described in your comments.

TEP also invites you to attend a public open house meeting where you can ask questions, submit comments and learn more about the project. TEP has scheduled two open houses.

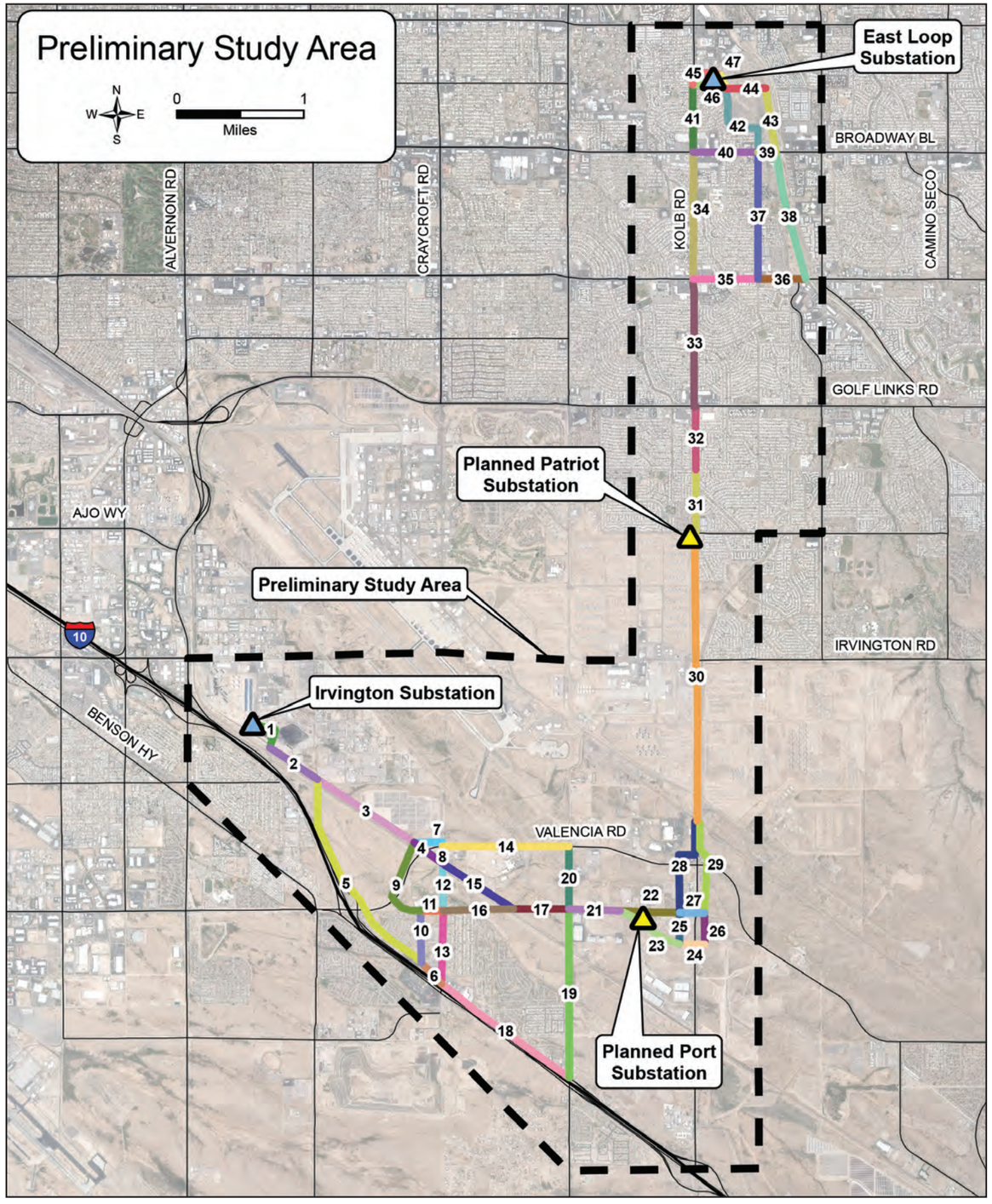
Tuesday, May 21 | 6-7:30 p.m.
Littletown Community Center
6465 S. Craycroft Road
Tucson, AZ 85756

Wednesday, May 22nd | 5:30-7 p.m.
Ott Family YMCA
401 S. Prudence Road
Tucson, AZ 85710

To view a high-resolution version of this map, visit tep.com/irvington-east-loop.

TEP recomienda a los residentes y propietarios a compartir sus opiniones sobre posibles rutas para líneas de transmisión. Por favor comparta sus ideas utilizando la información de contacto que se menciona arriba. También está invitado a asistir a una próxima reunión abierta al público sobre el proyecto. Si tiene alguna pregunta, comuníquese con nosotros al (520) 382-4662 o IRV2EL@tep.com. Gracias por su interés en el proyecto.

Number	Description
1.	On TEP's Irvington Campus
2.	Southern edge of TEP's Irvington Campus
3.	North of TEP railroad spur between TEP Irvington Campus and Craycroft
4.	North of TEP railroad spur between segment 3 and 8/12
5.	North of Interstate 10 between TEP Irvington Campus and segments 6/10
6.	North of Interstate 10 between segments 5/10 and Craycroft
7.	Either side of the railroad spur access road between Segment 3-Craycroft
8.	Either side of Craycroft between Valencia and the Union Pacific rail line
9.	Craycroft/Valencia bypass between segment 3 and segments 10/11
10.	Craycroft bypass between Littletown Road and Segments 9, 11
11.	Either side of Littletown Road between Segment 9 and Craycroft
12.	Either side of Craycroft between Union Pacific rail line and Littletown Road
13.	West side of Craycroft between Littletown Road and Interstate 10
14.	Either side of Valencia between Craycroft and Wilmot
15.	North of TEP railroad spur between Craycroft and Littletown Road
16.	Either side of Littletown Road between Craycroft and Union Pacific rail line
17.	Either side of Littletown Road between Union Pacific rail line and Wilmot
18.	North of Interstate 10 between Craycroft and Wilmot
19.	Either side of Wilmot between Interstate 10 and Littletown Road
20.	Either side of Wilmot between Littletown Road and Valencia
21.	Either side of Littletown Road between Wilmot and the Port Substation
22.	Either side of Littletown Road (old alignment) between the Port Substation and Segment 28
23.	Either side of Littletown Road (new alignment) between the Port Substation and segments 24/25
24.	Either side of Littletown Road (new alignment) between Segment 23 and Segment 26
25.	West of Kolb (outside scenic corridor) between Littletown Road's new and old alignments
26.	East of Kolb (outside scenic corridor) between Littletown Road's new and old alignments
27.	Either side of Littletown Road (old alignment) between Segment 22 and Segment 29
28.	West of Kolb (outside scenic corridor) between Littletown Road (old alignment) and Union Pacific Railroad spur
29.	East of Kolb (outside scenic corridor) between Littletown Road (old alignment) and Union Pacific Railroad spur
30.	West side of Kolb between the Union Pacific Railroad spur and Patriot Substation
31.	Either side of Kolb between Patriot Substation and Stella Road
32.	Either side of Kolb between Stella Road and Golf Links
33.	Either side of Kolb between Golf Links and 22nd
34.	Either side of Kolb between 22nd and Broadway
35.	Either side of 22nd between Kolb and Prudence Road
36.	Either side of 22nd between Prudence Road and the Pantano Wash
37.	Either side of Prudence Road between 22nd and Broadway
38.	West side of the Pantano Wash between 22nd and Broadway
39.	Either side of Broadway between Prudence Road and the Pantano Wash
40.	Either side of Broadway between Kolb and Prudence Road
41.	Either side of Kolb between Broadway and East Loop Substation access road
42.	Prudence Road/landfill alignment between Broadway and East Loop Substation
43.	West side of Pantano Wash between Broadway and existing TEP transmission structures
44.	Utilizes existing TEP transmission structures between Pantano Wash and Segment 47
45.	Access located north of East Loop Substation
46.	Access located south of East Loop Substation
47.	Access located southeast of East Loop Substation



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Irvington-East Loop Transmission Line

More Public Open House Meetings Scheduled

Tuesday, August 20 | 5-6:30 p.m.
Tucson City Council Ward 2 Office
7575 E. Speedway Blvd.

Thursday, August 22 | 6-7:30 p.m.
Littletown Community Center
6465 S. Craycroft Road

tep.com/irvington-east-loop

Help Us Design Our Local Electric Grid

TEP is identifying potential routes for a planned transmission line that will strengthen electric reliability for customers in Tucson. Read inside to learn how you can participate in TEP's process.

Energy Grid Update
Irvington-East Loop Transmission Line
Newsletter #2 – August 2019

TEP Uses Public Input to Develop Possible Routes for New Transmission Line

Tucson Electric Power (TEP) has identified potential routes for a planned transmission line project to serve growing energy needs, help Davis-Monthan Air Force Base meet Department of Defense-mandated energy resiliency requirements and improve electric reliability for TEP customers within and near the project study area.

TEP must obtain route approval from the Arizona Corporation Commission (ACC) for the Irvington-East Loop 138 Kilovolt (kV) Transmission Line, which will connect TEP's existing Irvington and East Loop substations while interconnecting with TEP's planned Port and Patriot substations.

In May 2019, TEP held public meetings and conducted other outreach efforts. Based on residents' comments and additional data provided by other local utilities, TEP expanded the preliminary study area to allow consideration of additional route options. Some recipients of this newsletter are located in the larger, revised study area and were added to the project outreach contact list.

TEP invites members of the public to attend upcoming open house meetings to ask questions, submit comments and learn more about the project. TEP will use public input to identify three alternative transmission line routes that will be included in its application for approval to build the transmission line.

POTENTIAL LINE ROUTES

TEP plans for new energy infrastructure by considering the projected energy needs of nearby residential and commercial customers, anticipated economic development, proximity to existing equipment, project costs, geography, the environment, public input and other factors.

Potential line routes within the revised study area are shown on the map. TEP has identified two alternatives (1 and 2) to connect the existing Irvington Substation to the proposed Port and Patriot substations, and five alternatives (A, B1, B2, C1, and C2) to connect the proposed Patriot Substation to the existing East Loop Substation as described below.

<u>Alternatives 1 & 2 (Irvington to Port to Patriot)</u>

- **Alternative 1** begins at the Irvington Substation and continues southeast on the north side of the Union Pacific Railroad tracks past East Valencia and South Craycroft roads to the Littletown Road alignment where it turns east and continues to the planned Port Substation. The route continues east from the Port Substation to the east side of South Kolb Road. Turning north, the route continues to East Irvington Road, where it crosses to the west side of Kolb and continues north to the proposed Patriot Substation.

- **Alternative 2** begins at the Irvington Substation and continues southeast on the north side of the Union Pacific Railroad tracks to East Valencia and South Craycroft roads, where it turns east and continues on the north side of Valencia past the Pima Air and Space Museum. The route then turns south and continues to the Littletown Road alignment where it turns east and continues to the proposed Port Substation. From the Port to Patriot substations, routing for Alternative 2 is the same as Alternative 1.

A typical weathering steel monopole supporting a 138 kilovolt transmission line.

Alternatives 1 and 2 share a common route between the Port and Patriot substations.

<u>Alternatives A, B1, B2, C1, and C2</u> (Patriot to East Loop)

- **Alternative A** leaves the Patriot Substation and crosses to the east side of Kolb, then travels north to the existing East Loop Substation. Between East 22nd Street and East Loop Substation, TEP would rebuild an existing 138 kV transmission line with a double-circuit configuration to accommodate the new transmission line.

- **Alternative B1** leaves the Patriot Substation and travels east on the south side of East Escalante Road to South Pantano Road, where it crosses to the east side of Pantano and turns north to follow an existing 138 kV transmission line. At East Fifth Street, the route turns west and continues along the existing 138 kV transmission line alignment to the existing East Loop Substation. TEP would rebuild the existing 138 kV transmission line with a double-circuit configuration to accommodate the new transmission line.

- **Alternative B2** is identical to Alternative B1 except for a small segment between East Sundew Drive and South Research Loop, where Alternative B2 would more closely follow the alignment of Pantano, then turn east and continue on the north side of South Research Loop for less than a quarter-mile until rejoining with the alignment of Alternative B1.

- **Alternative C1** leaves the Patriot Substation and crosses to the east side of Kolb, then travels north to East 22nd Street, where it turns east and continues on the south side of 22nd Street to the east side of the Pantano Wash. The route continues north between Pantano Road and the Pantano Wash Path to East Kenyon Drive, where it crosses to the west side of the Pantano Wash. The route continues north along the Pantano Wash's west bank before turning west and following the alignment of an existing 138 kV line into the existing East Loop Substation.

- **Alternative C2** leaves the Patriot Substation and travels east on the south side of Escalante to Pantano, where it crosses to the east side of Pantano and turns north to follow an existing 138kV transmission line on the east side of Pantano Road to East Golf Links Road. The route turns east and travels on the north side of Golf Links for about a half-mile before it turns north and travels to the north side of the Pantano Wash. The route continues north between the Pantano Wash Path and Pantano Road on the east side of the wash to 22nd Street. From this point to the East Loop Substation, the alignment of C2 is the same as C1.

The Irvington-East Loop transmission line would cross private property and government-owned land in the City of Tucson and portions of unincorporated Pima County. TEP would build the line with self-weathering steel monopoles that stand 75-110 feet tall. Taller structures may be required at major road or line crossings.

REQUIRED APPROVALS and TIMELINE

Under state law, TEP must secure a Certificate of Environmental Compatibility (CEC) before building this transmission line project. TEP plans to file a CEC application later this year with the Arizona Power Plant and Transmission Line Siting Committee, which will review the application in a public process that allows neighbors and other stakeholders to provide comments. If the Line Siting Committee grants a CEC, it will be sent to the ACC for final review and approval.

The City of Tucson must issue a special exception land use permit and approve a development plan before construction can begin on the Patriot Substation. TEP expects to file an application for the land use permit later this year and anticipates submitting a development plan in 2020.

The City of Tucson also must approve a development plan for the Port Substation prior to construction. TEP has not determined when it will file this plan.

TEP is planning to place the Irvington-East Loop Transmission Line into service in 2021.

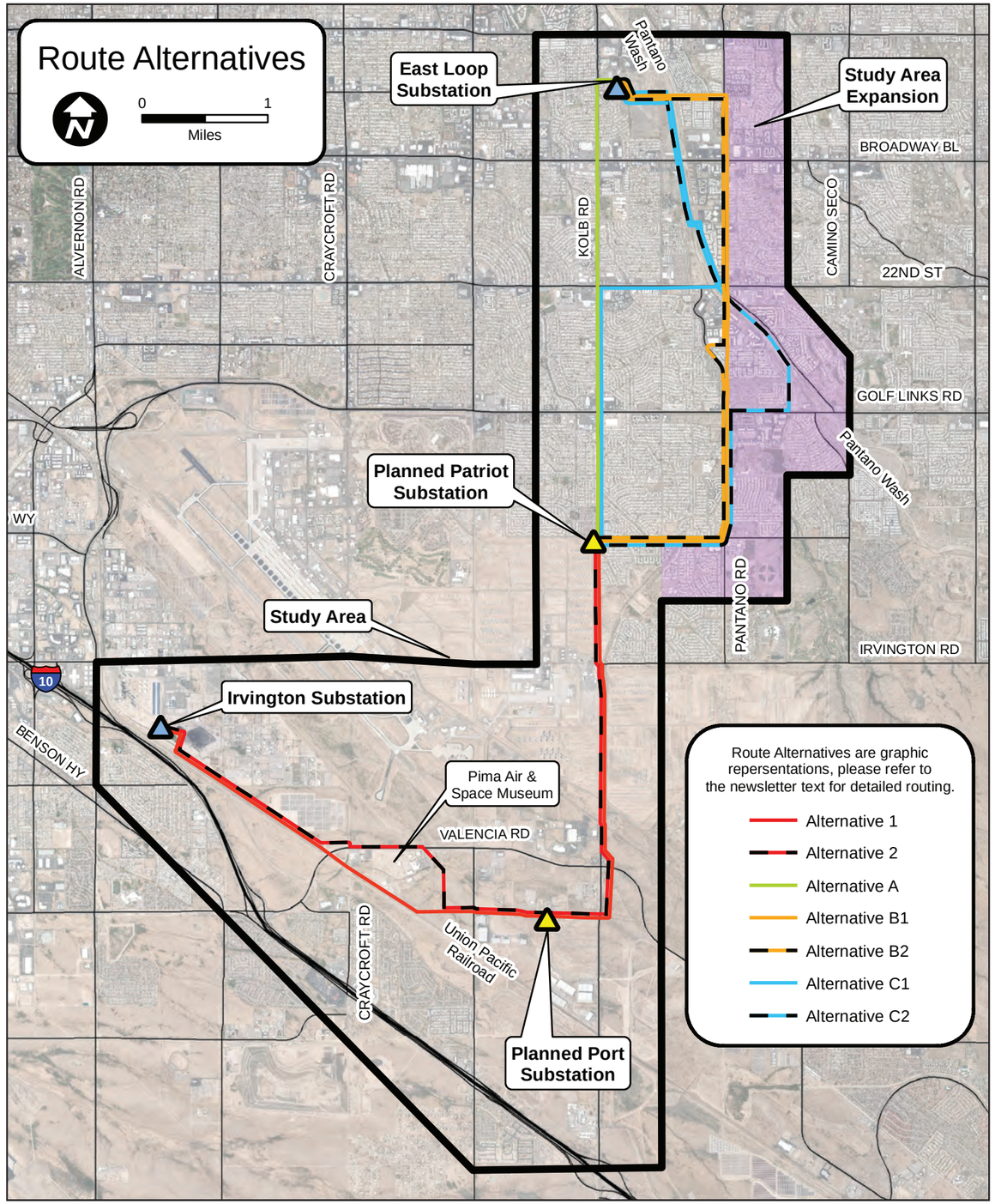
PUBLIC PARTICIPATION

TEP encourages residents, property owners and other stakeholders to share their input by:

- Attending the public meetings listed on the cover of this newsletter
- Mailing a letter with comments to:
  P.O. Box 711
  ATTN: Irvington-East Loop
  Mail Stop RC131
  Tucson, AZ 85701-0711
- Sending comments to IRV2EL@tep.com
- Visiting tep.com/irvington-east-loop and filling out an online comment form
- Calling (520) 382-4662 and leaving a voicemail message

Electronic versions of this map and a previous newsletter are available at tep.com/irvington-east-loop. Requests for a printed copy of the previous newsletter may be submitted using the contact information above.

TEP recomienda a los residentes y propietarios a compartir sus opiniones sobre posibles rutas para líneas de transmisión. Por favor comparta sus ideas utilizando la información de contacto que se menciona arriba. También está invitado a asistir a una próxima reunión abierta al público sobre el proyecto. Si tiene alguna pregunta, comuníquese con nosotros al (520) 382-4662 o IRV2EL@tep.com. Gracias por su interés en el proyecto.



Irvington-East Loop Transmission Line
Proyecto de Línea de Transmisión Irvington a East Loop

Public Comment Form
Formulario de comentario público

Comments submitted will become part of the project record. / *Comentarios seran parte de los archivos del proyecto*

Name

Nombre

Address

Dirección

City/State/ZIP code

Ciudad/Estado/Código Postal

Email

Correo Electrónico

Phone

- ☐ **Resident in Study Area** *Residente dentro del área de estudio*
- ☐ **Business Owner in Study Area** *Empresario dentro del área de estudio*
- ☐ **Live/Work Near Study Area** *Vive/Trabaja cerca del área de estudio*
- ☐ **Other Interested Party** *Otro partido de interés*
- ☐ **Special Interest Group** *Grupo de interés*

1. Please indicate any issues that are important to you in evaluating the transmission line:
Por favor cuéntenos sus preocupaciones y temas importantes para usted en su evaluación de el proyecto de la línea de transmisión

2. Is there any additional Information that you would like TEP to consider when designing these projects:
Alguna información adicional que le gustaría contribuir para que TEP considere en el diseño de el proyecto

3. I would like additional information about:
Me gustaría información adicional sobre

4. I heard about this project through:
Aprendí sobre el proyecto atreves de

- ☐ **Newsletter Mailing** *Boletín enviado por la oficina de correo*
- ☐ **Word of Mouth** *Boca en boca*
- ☐ **Public Meeting** *Reunión Pública*
- ☐ **Other** *Otro*
- ☐ **Project Website** *El sitio de internet del proyecto*

THANK YOU FOR YOUR PARTICIPATION!
Gracias por su participación

Irvington-East Loop Transmission Line
Proyecto de Línea de Transmisión Irvington a East Loop

Tucson Electric Power

Public Comment Form
Formulario de comentario público

THANK YOU FOR YOUR PARTICIPATION!
Gracias por su participación

Please submit comments by using one of these methods:

- Leave this form at the public open house
- Mail this form or a letter to the address on this page
- E-mail comments to IRV2EL@tep.com
- Visit tep.com/irvington-east-loop and fill out an online comment form
- Call (833) 523-0886 and leave a voicemail message

Por favor someta sus comentarios atreves de una de las siguientes maneras

- Deje ésta página de comentarios en la Reunión Pública
- Envié ésta página o una carta por correo postal a la dirección en esta página
- Por correo electrónico a IRV2EL@tep.com
- Visite tep.com/irvington-east-loop y llene la hoja en línea
- Llame a (833) 523-0886 y deje un mensaje

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Tucson Electric Power
P.O. Box 711
ATTN: Irvington-East Loop
Mail Stop RC131
Tucson, AZ 85701-0711

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Irvington-East Loop 138 Kilovolt Transmission Line

Línea de trasmisión de 138-Kilovoltios de Irvington a East Loop

Please Note:

Comments submitted will become part of the project record.

Name

First Last

Address

Street Address

Address Line 2

City State / Province / Region

Postal / Zip Code Country

United States

Email

Phone Number

- ### -

Please indicate your interest in the projects.

Check All That Apply

- [ ] Resident in Study Area (Residente dentro del área de estudio)
- [ ] Business Owner in Study Area (Empresario dentro del área de estudio)
- [ ] Live/Work Near Study Area (Vive/Trabaja cerca del área de estudio)

- [ ] Special Interest Group (Grupo de interés)
- [ ] Other Interested Party (Otro partido de interés)

Please indicate any issues that are important to you in evaluating the projects:

Is there any additional information that you would like to contribute that could add value to these projects:

I would like additional information about:

I heard about these projects through:

- [ ] Project Website (El sitio de internet del proyecto)
- [ ] Newsletter Mailing (Boletín enviado por la oficina de correo)
- [ ] Public Meeting (Junta publica)
- [ ] Word of Mouth (Boca en boca)
- [ ] Other (Otro)

Irvington-East Loop Transmission Line

Irvington to East Loop 138-kV Transmission Line Project

Stakeholder Meeting

May 7, 2019
9:00-11:00 a.m.

Irvington-East Loop Transmission Line

Agenda

- Introductions
- Project Need & Description
- Role of the Arizona Corporation Commission
- TEP's Design Philosophy
- TEP's Line Siting Process and the Stakeholder Role
- Group discussion of opportunities and constraints

Introductions

Irvington-East Loop Transmission Line

Project Need

- Growing demand for power in the study area requires new substations.
- New 138-kV transmission line from nearest generation source (Irvington) to serve substations.
- Support Davis-Monthan Air Force Base efforts to meet energy resiliency requirements
- Maintain reliable electric service.
- Meet future capacity requirements.

Irvington-East Loop Transmission Line

Project Description

- New approx. XX-mile-long 138 kV transmission line built with self-weathering steel monopoles between 75-110 feet tall
- New 138 kV Patriot Substation on 16 acre site at Escalante and Kolb.
- New 138 kV Port Substation on 10 acre site at Valencia and Kolb.

Irvington-East Loop Transmission Line

Line Siting Process

- The ACC sites and certificates electric transmission lines greater than 115-kV.
- Line Siting Committee reviews application and makes recommendation to the ACC.
- Project requires a Certificate of Environmental Compatibility.
- ACC Responsible for reviewing:
  - Total environment (fish, wildlife, plants)
  - Existing state, local government, and private development plans
  - Noise
  - Recreational impacts
  - Scenic areas, historic sites & structures, archaeological sites
  - Interference with communication facilities
  - Technical aspects
  - Costs
  - Other applicable federal and state laws

Irvington-East Loop Transmission Line

Design Philosophy

- Work within or next to existing infrastructure and corridors where practical.
- Work with landowners and stakeholders to avoid or minimize impacts to sensitive areas.

Irvington-East Loop Transmission Line

TEP's Line Siting Process

- Identify the need for the Project.
- Identify the Preliminary Study Area.
- Prepare Public Notification Plan/Identify stakeholders.
- Collect baseline data/conduct internal analysis.
- Conduct first public/stakeholder outreach.
- Identify & analyze opportunities and constraints.
- Develop multiple proposed routes.
- Conduct second public/stakeholder outreach.
- Conduct impact assessment/engineering & constructability assessment/route comparison.
- Identify alternative routes to carry forward in ACC application for a CEC.
- Prepare and file ACC application.

Irvington-East Loop Transmission Line

Stakeholder Role

- Review information provided.
- Assist in identification of opportunities and constraints.
- Provide data if requested.
- Attend stakeholder meetings.
- Consult and collaborate, as needed.
- Identify and explain your preferred alternative.

Irvington-East Loop Transmission Line

Discussion

- Focus on opportunities.
- Review segments.
- Document stakeholder input.

Irvington-East Loop Transmission Line

Next Steps

- Public Meeting #1 - May 21st *& 22nd, 2019.
- Incorporate public & stakeholder comments.
- Obtain additional data from stakeholders, if needed.
- Develop preliminary routes.
- Stakeholder Workshop #2.
- Public Meeting #2.
- Identify alternative routes.
- Prepare & file ACC CEC Application Spring 2018.

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Irvington-East Loop Transmission Line

Irvington to East Loop 138-kV Transmission Line Project

Stakeholder Meeting

July 23, 2019
9:00-10:00 a.m.

Irvington-East Loop Transmission Line

Agenda

- Introductions
- Project Need & Description
- Role of the Arizona Corporation Commission
- TEP's Design Philosophy
- TEP's Line Siting Process and the Stakeholder Role
- Group discussion of opportunities and constraints

Introductions

Irvington-East Loop Transmission Line

Project Need

- Growing demand for power in the study area requires new substations.
- New 138-kV transmission line from nearest generation source (Irvington) to serve substations.
- Support Davis-Monthan Air Force Base efforts to meet energy resiliency requirements
- Maintain reliable electric service.
- Meet future capacity requirements.

Irvington-East Loop Transmission Line

Project Description

- New approx. 8 to 11.3-mile-long 138 kV transmission line built with self-weathering steel monopoles between 75-110 feet tall
- New 138 kV Patriot Substation on 16 acre site at Escalante and Kolb.
- New 138 kV Port Substation on 10 acre site near Valencia and Kolb.

Irvington-East Loop Transmission Line

Line Siting Process

- The ACC sites and certificates electric transmission lines greater than 115-kV.
- Line Siting Committee reviews application and makes recommendation to the ACC.
- Project requires a Certificate of Environmental Compatibility.
- ACC Responsible for reviewing:
  - Total environment (fish, wildlife, plants)
  - Existing state, local government, and private development plans
  - Noise
  - Recreational impacts
  - Scenic areas, historic sites & structures, archaeological sites
  - Interference with communication facilities
  - Technical aspects
  - Costs
  - Other applicable federal and state laws

Irvington-East Loop Transmission Line

Design Philosophy

- Work within or next to existing infrastructure and corridors where practical.
- Work with landowners and stakeholders to avoid or minimize impacts to sensitive areas.

Irvington-East Loop Transmission Line

TEP's Line Siting Process

- Identify the need for the Project.
- Identify the Preliminary Study Area.
- Prepare Public Notification Plan/Identify stakeholders.
- Collect baseline data/conduct internal analysis.
- Conduct first public/stakeholder outreach.
- Identify & analyze opportunities and constraints.
- Develop multiple proposed routes.
- Conduct second public/stakeholder outreach. 

- Conduct impact assessment/engineering & constructability assessment/route comparison.
- Identify alternative routes to carry forward in ACC application for a CEC.
- Prepare and file ACC application.

Irvington-East Loop Transmission Line

Stakeholder Role

- Review information provided.
- Assist in identification of opportunities and constraints.
- Provide data if requested.
- Attend stakeholder meetings.
- Consult and collaborate, as needed.
- Identify and explain your preferred alternative.

Irvington-East Loop Transmission Line

Discussion

- Focus on opportunities.
- Review routes.
- Document stakeholder input.

Irvington-East Loop Transmission Line

Next Steps

- Public Meeting #2 – August 20th & 22nd, 2019.
- Incorporate public & stakeholder comments.
- Finalize alternative routes.
- Prepare ACC CEC Application Fall 2019.
- File ACC CEC Application early 2020.

Irvington-East Loop Transmission Line

Next Steps

Tuesday, August 20th
Run time: 5:00 – 6:30 PM
Tucson City Council Ward 2 Office
7575 E. Speedway Blvd.

Thursday, August 22nd
Run Time: 6:00 – 7:30 PM
Littletown Community Center
6465 S. Craycroft Rd.

Public Notice

Irvington-East Loop Transmission Line

Tucson Electric Power (TEP) is developing plans for a new transmission line to help serve growing energy needs. The project would help Davis-Monthan Air Force Base satisfy its energy resiliency requirements and improve electric reliability for customers in Tucson.

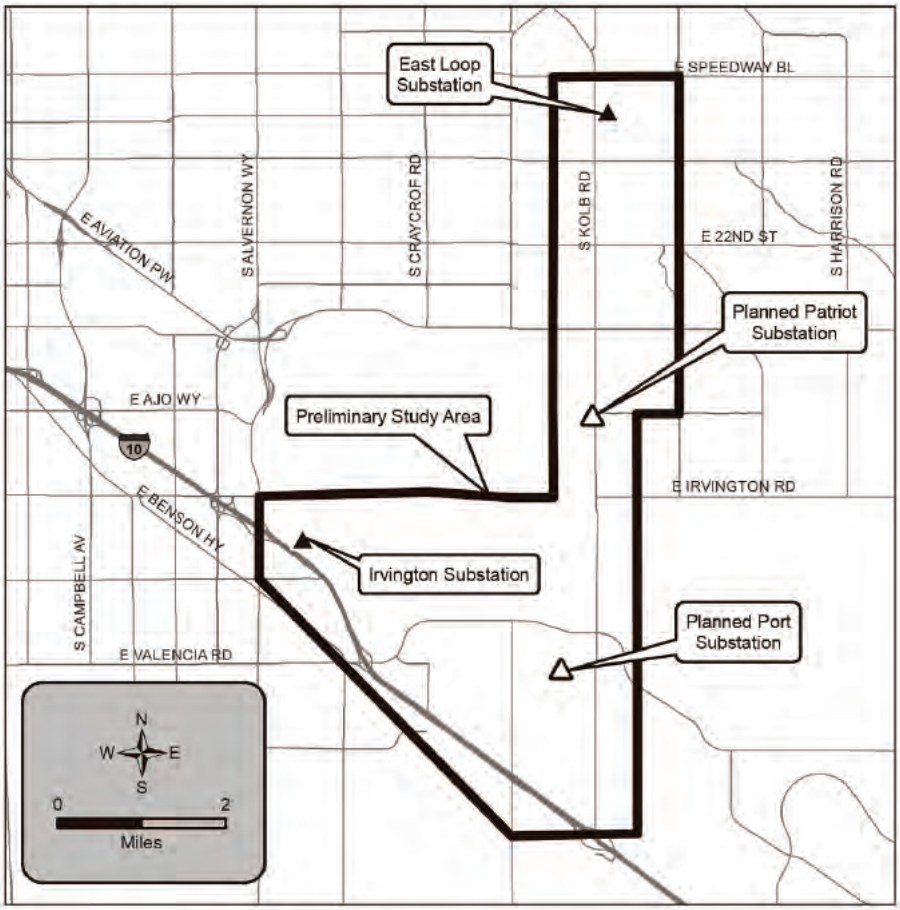
TEP must determine a route for the Irvington-East Loop 138 Kilovolt Transmission Line, which will connect the Irvington and East Loop substations. The line also must interconnect with the planned Port and Patriot substations.

TEP encourages residents, property owners and other stakeholders to share their input about potential routes by attending upcoming open house meetings. TEP representatives will be present to talk about why the project is needed and benefits for customers.

Open House Meetings

Tuesday, May 21 | 6-7:30 p.m.
Littletown Community Center
6465 S. Craycroft Road

Wednesday, May 22 | 5:30-7 p.m.
Ott Family YMCA
401 S. Prudence Road



TEP

Tucson Electric Power

View a more detailed map and submit comments about potential line routes at tep.com/irvington-east-loop

Publish May 12, 2019 • Arizona Daily Star

ARIZONA DAILY STAR

Tucson, Arizona

STATE OF ARIZONA)
COUNTY OF PIMA)

Debbie Sanchez, being first duly sworn deposes and says: that she is the Advertising Representative of **TNI PARTNERS,** a General Partnership organized and existing under the laws of the State of Arizona, and that it prints and publishes the Arizona Daily Star, a daily newspaper printed and published in the City of Tucson, Pima County, State of Arizona, and having a general circulation in said City, County, State and elsewhere, and that the attached ad was printed and

Legal Notice

published correctly in the entire issue of the said Arizona Daily Star on each of the following dates, to-wit:

MAY 12, 2019

Debbie Sanchez

Subscribed and sworn to before me this 13th day of May 2019

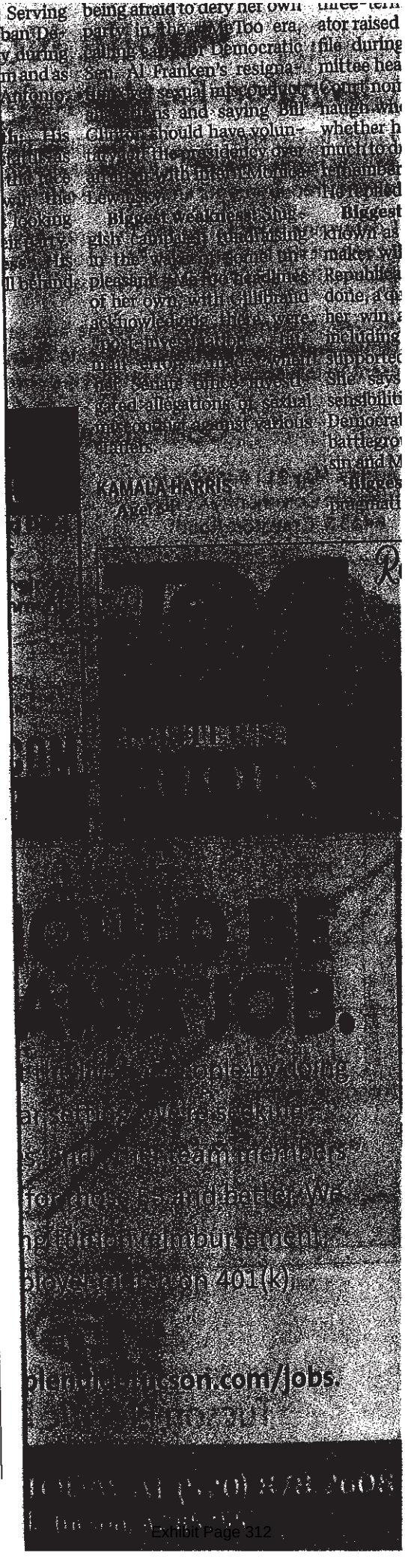
Lydia Fimbres

Notary Public

LYDIA FIMBRES
Notary Public - Arizona
Pima County
My Comm. Expires Oct 18, 2019

My commission expires

AD NO. TUC-0000706



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Public Notice

Irvington-East Loop Transmission Line

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TEP must determine a route for the Irvington-East Loop 138 Kilovolt Transmission Line, which will connect the Irvington and East Loop substations. The line also must interconnect with the planned Port and Patriot substations.

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Littletown Community Center
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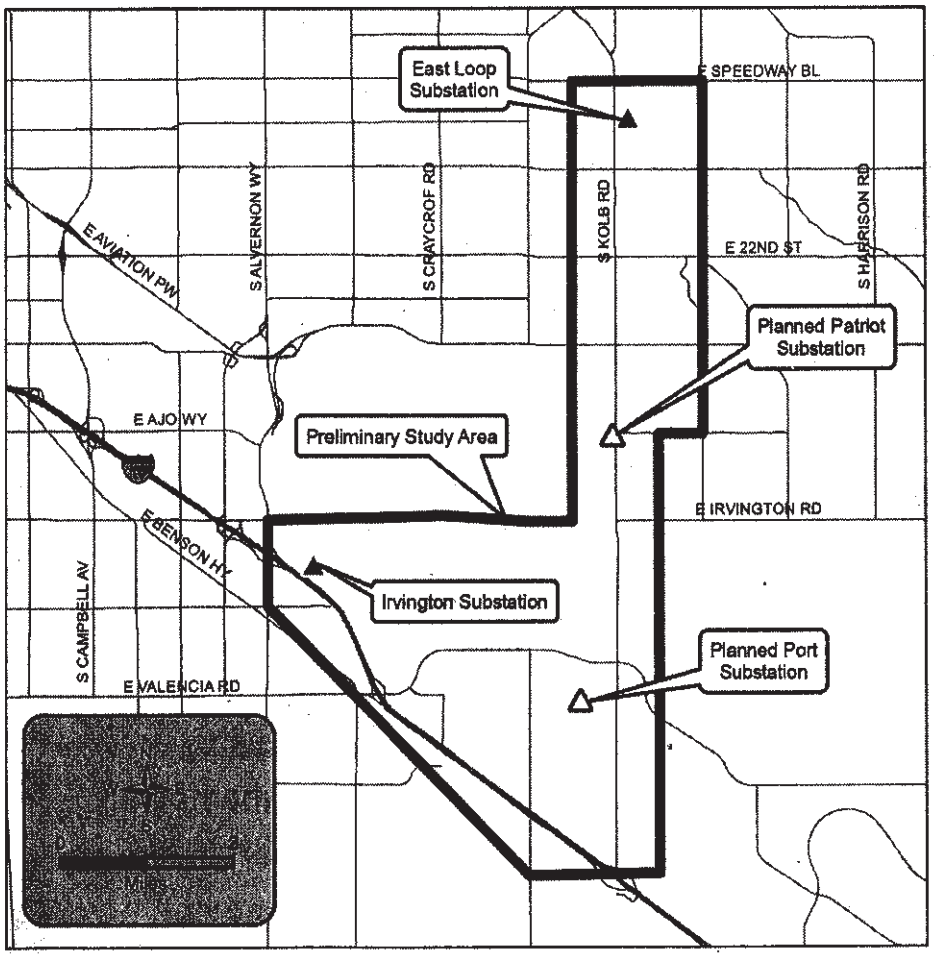
Wednesday, May 22 | 5:30-7 p.m.
Ott Family YMCA
401 S. Prudence Road



TEP

Tucson Electric Power

View a more detailed map and submit comments about potential line routes at tep.com/irvington-east-loop

Public Notice

Irvington-East Loop Transmission Line

Tucson Electric Power (TEP) is developing plans for a new transmission line to help serve growing energy needs. The project would help Davis-Monthan Air Force Base satisfy its Department of Defense-mandated energy resiliency requirements and improve electric reliability for customers within and near the project study area.

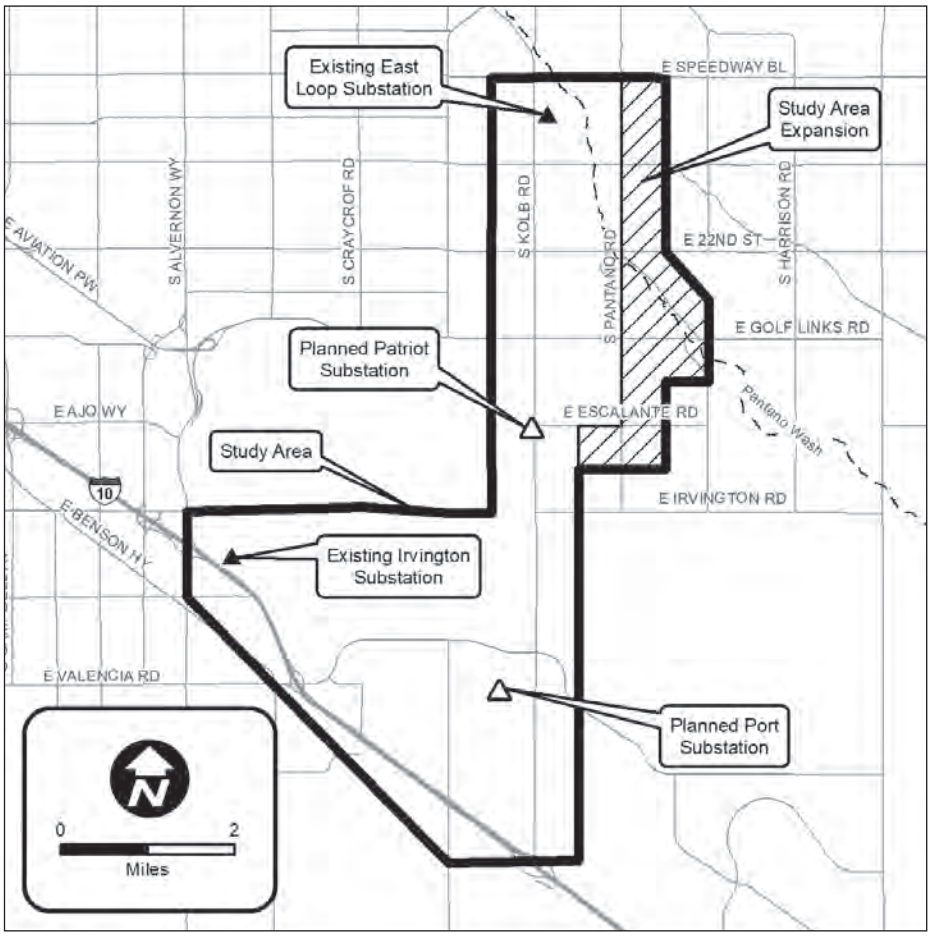
TEP must determine a route for the Irvington-East Loop 138 Kilovolt Transmission Line, which will connect the existing Irvington and East Loop substations. The line also must interconnect with the planned Port and Patriot substations.

TEP encourages residents, property owners and other stakeholders to share their input about potential routes by attending upcoming open house meetings. TEP representatives will be present to talk about the need for the project and its benefits for customers.

Open House Meetings

Tuesday, August 20 | 5-6:30 p.m.
Tucson City Council Ward 2 Office
7575 E. Speedway Blvd.

Thursday, August 22 | 6-7:30 p.m.
Littletown Community Center
6465 S. Craycroft Road



TEP

Tucson Electric Power

View a detailed map with potential line routes and submit comments at tep.com/irvington-east-loop

Irvington-East Loop Transmission Line

TEP

Sign-in Sheet

Date May 21, 2019

	Name	Address, City, Zip Code	Email	Phone Number
1	MANUEL P. RUIZ	5932 S. HERMOSA DR.	N/A	UNLISTED
2	DONNA & R. LAUDONE	5184 E Agave Vista -	-	-
3	Sandra Yanez	4737 E. Twin Flower PL		520-336-2118
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Irvington-East Loop Transmission Line

TEP

Sign-in Sheet

Date ~~5/22/19~~ May 21, 2019

	Name	Address, City, Zip Code	Email	Phone Number
1	TED + VAL GOLEMBIEWSKI	6668 S. HIDDEN FL WAY T/A 85756	GOLEMBIEWSKI @JUNO.COM	
2				
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Irvington-East Loop Transmission Line

TEP

Sign-in Sheet

Date May 22, 2019

	Name	Address, City, Zip Code	Email	Phone Number
1	Kacey Carter	Davis-Monthan	kacey.carter.1@us.af.mil	228-3291
2	Randy Armenta	1432 S. Marc Dr	randyarmenta@hotmail	886-3506
3	DAVE GEBERT	4032 E 7th ST	Tevadave@cox.net	
4	Ed Ackerley	932 N Bedford Tucson, AZ 85710	Ed@GCLcoalitionforMayor.com	850-7058
5	ALEXIS H. RIVERA-RIOS	1521 S ROLLS RD TUCSON AZ 85710	AHRIVERA@TAMU.edu	760-198
6				
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Irvington-East Loop Transmission Line

TEP

Sign-in Sheet

Date May 22, 2019

	Name	Address, City, Zip Code	Email	Phone Number
1	Jerry Tulino	6911 E. Baker St.		
2	Linda Lee	6985 E Furlong Dr		
3	Joyce Smith	6948 E Lula Pl		
4	Nancy Arce	3722 S. Prudence Rd	NRCINAZ@AOL.com	
5	Lori Patterson	7041 E. Edgemont St		296-5044
6	Gail Lawley	7854 E Hawthorne St		
7	[illegible]	12771 E Wentworth Ct		(520) 907-4573
8	[illegible] Di Fiusci	7433 E 19th St Tucson 85710		
9	Steve Hilton	600 N. Kolb Road Tucson 85710		520 885-2687
10	Carmen Gonzalez-Rivera	1521 South Kolb Rd Tucson 85710	CSgonzal@gmail.com	520-760-1980
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Public Open House Meeting # 1 (north)

Irvington-East Loop Transmission Line

TEP

Welcome

Please Sign In

Bienvenidos

(Hablamos español)

Por favor Regístrese

For more information / Para más información:
www.tep/projects.com

Irvington-East Loop Transmission Line

This approximately 14-mile proposed 138 kilovolt transmission line would link existing and planned substations to increase reliability for existing and future customers.

PURPOSE and NEED

- Interconnect four substations (two existing, two planned) to increase system flexibility and reliability
- Expand system capacity to accommodate higher peak usage levels
- Create a looped system that will allow new substations to be served from multiple sources
- Help connect local electric grid to new and existing generating resources at TEP's Irvington Campus

BENEFITS

- Strengthen service reliability for customers
- Help meet future energy needs, increases in energy usage
- Help Davis-Monthan AFB meet Department of Defense energy resiliency directives
- Support economic growth in southeast Tucson
- Expand, reinforce electric transmission system
- Support potential future retirement of aging, lower-capacity substations

PROJECT CONSIDERATIONS

- Future energy needs of nearby residential, commercial customers
- Anticipated economic development
- Proximity to existing electric infrastructure
- Project costs
- Geography
- The environment
- Public and stakeholder input
- Other factors

TEP is upgrading the Irvington Substation to accommodate new generating resources.

Pole Characteristics

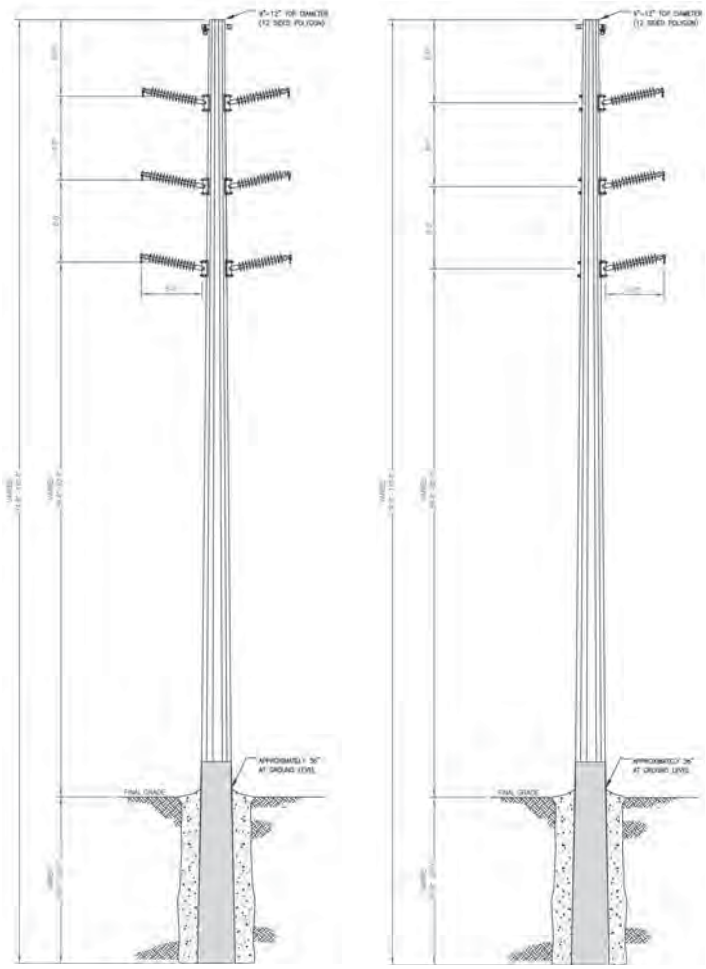
Type: Tubular weathering steel monopoles

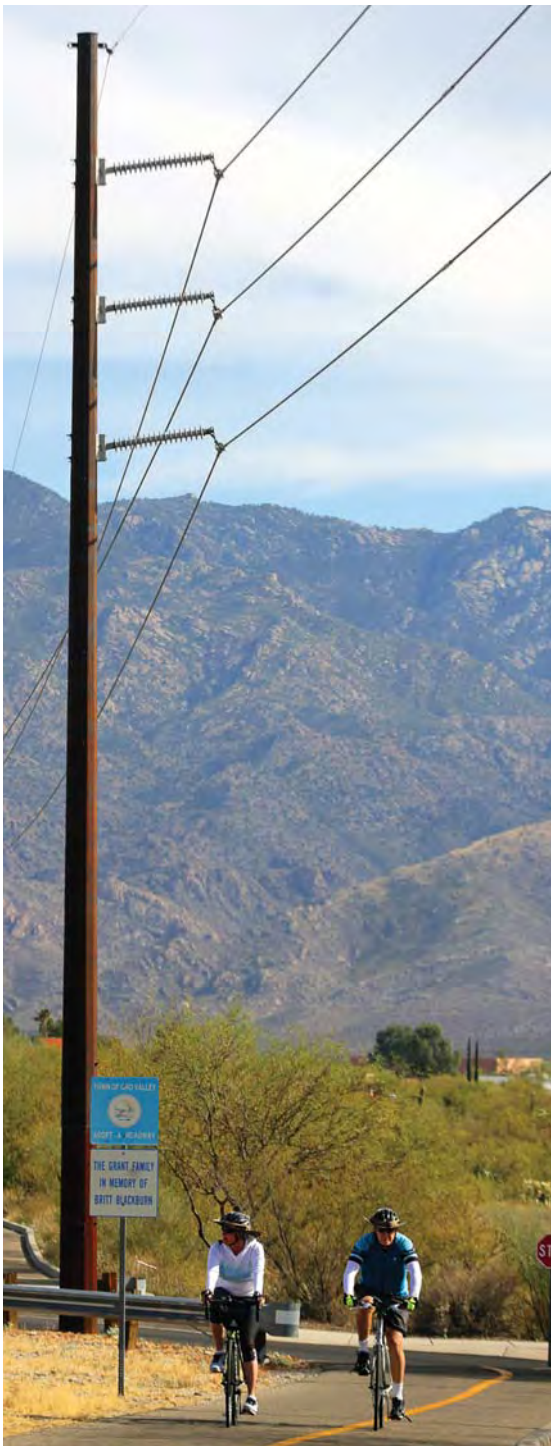
Pole height: Typically 75-110 feet

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

Poles per mile: 5-9 Structures

Right of way width: Up to 100 feet





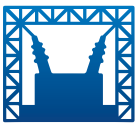
A typical weathering steel monopole supporting a 138 kilovolt transmission line

How Electricity Gets to You

1. **Power Plant** – where electricity is generated utilizing resources such as natural gas, the sun, wind or coal

2. **Extra High Voltage (EHV) Transmission System** – system of wires connecting power plant generators to bulk switchyards

3. **Bulk Switchyards** – connect EHV transmission lines to High Voltage (HV) transmission lines



4. **High Voltage Transmission System** – system of wires connecting bulk switchyards to distribution substations

5. **Substations** – reduce or "step down" transmission line voltage and connect high voltage transmission lines to lower voltage distribution lines

6. **13.8-kV Distribution Lines** – where power is safely distributed overhead or underground

7. **Customer** – safe, reliable power delivered to your door

Tucson Electric Power

A SUSTAINABLE ENERGY FUTURE

As our community grows and changes, TEP will satisfy customers' future energy needs by investing in efficient, innovative technologies to build a stronger, more flexible and responsive electric grid.

TRANSMISSION RESOURCE IMPROVEMENTS

New and upgraded transmission resources strengthen the local electric system and offer greater flexibility to reduce the length and frequency of service outages.

TEP is evaluating more than a dozen 138 kilovolt (kV) transmission line projects over the next decade.

New transmission resources would support economic development while enabling TEP to deliver power from more diverse and sustainable resources.

ENERGY STORAGE

TEP also expects to make greater use of energy storage systems, which can boost power output levels quickly to help maintain the required balance between energy demand and supply.

FLEXIBLE, EFFICIENT NATURAL GAS RESOURCES

TEP plans to invest in flexible, fast-responding natural gas reciprocating internal combustion engines that provide an affordable way to manage power fluctuations associated with intermittent renewable resources.

These efficient new resources will be built here in our community to help ensure the delivery of reliable electric service to customers.

SOLAR AND RENEWABLE POWER

TEP is expanding solar and wind systems with a goal of delivering at least 30 percent of its power from renewable resources by 2030 – twice the level required by 2025 under Arizona's Renewable Energy Standard.

TEP will buy solar energy at a historically low price from a new 100-megawatt (MW) solar array and an accompanying 30-MW energy storage system. This new, local system will provide power for 21,000 homes.

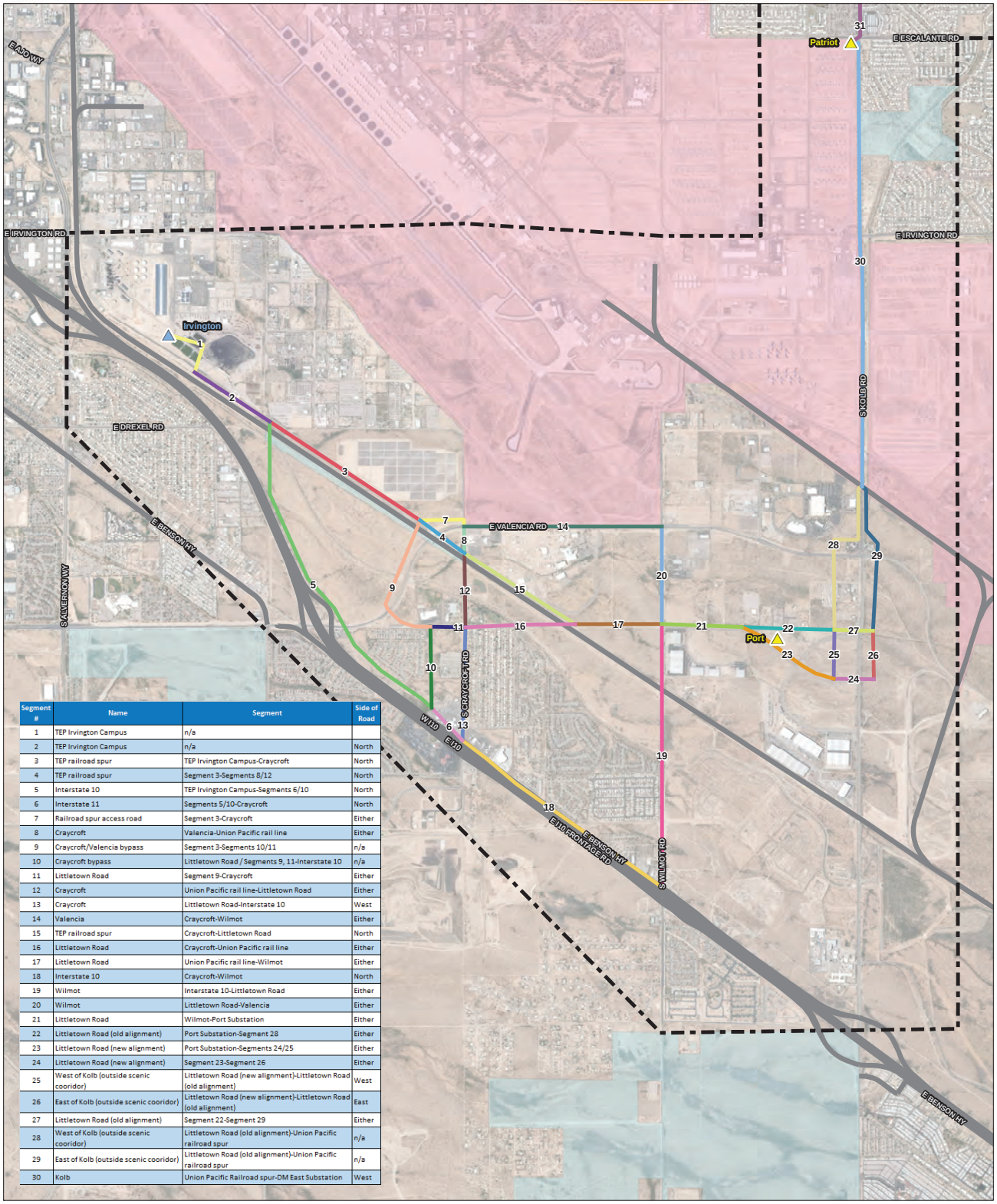
MOVING AWAY FROM COAL

TEP continues its efforts to retire and replace some coal-fired generating resources with Unit 2 at the San Juan Generating Station in New Mexico, scheduled to be shut down by the end of this year.

GIS Station

See where you live in relation to the project

Irvington-East Loop Transmission Line (South)



Segment #	Name	Segment	Side of Road
1	TEP Irvington Campus	n/a	
2	TEP Irvington Campus	n/a	North
3	TEP railroad spur	TEP Irvington Campus-Craycroft	North
4	TEP railroad spur	Segment 3-Segments 8/12	North
5	Interstate 10	TEP Irvington Campus-Segments 6/10	North
6	Interstate 11	Segments 5/10-Craycroft	North
7	Railroad spur access road	Segment 3-Craycroft	Either
8	Craycroft	Valencia-Union Pacific rail line	Either
9	Craycroft/Valencia bypass	Segment 3-Segments 10/11	n/a
10	Craycroft bypass	Littletown Road / Segments 9, 11-Interstate 10	n/a
11	Littletown Road	Segment 9-Craycroft	Either
12	Craycroft	Union Pacific rail line-Littletown Road	Either
13	Craycroft	Littletown Road-Interstate 10	West
14	Valencia	Craycroft-Wilmot	Either
15	TEP railroad spur	Craycroft-Littletown Road	North
16	Littletown Road	Craycroft-Union Pacific rail line	Either
17	Littletown Road	Union Pacific rail line-Wilmot	Either
18	Interstate 10	Craycroft-Wilmot	North
19	Wilmot	Interstate 10-Littletown Road	Either
20	Wilmot	Littletown Road-Valencia	Either
21	Littletown Road	Wilmot-Port Substation	Either
22	Littletown Road (old alignment)	Port Substation-Segment 28	Either
23	Littletown Road (new alignment)	Port Substation-Segments 24/25	Either
24	Littletown Road (new alignment)	Segment 23-Segment 26	Either
25	West of Kolb (outside scenic cooridor)	Littletown Road (new alignment)-Littletown Road (old alignment)	West
26	East of Kolb (outside scenic cooridor)	Littletown Road (new alignment)-Littletown Road (old alignment)	East
27	Littletown Road (old alignment)	Segment 22-Segment 29	Either
28	West of Kolb (outside scenic cooridor)	Littletown Road (old alignment)-Union Pacific railroad spur	n/a
29	East of Kolb (outside scenic cooridor)	Littletown Road (old alignment)-Union Pacific railroad spur	n/a
30	Kolb	Union Pacific Railroad spur-DM East Substation	West

Tucson Electric Power

Irvington to East Loop (DM) 138kV Transmission Line

Preliminary Study Area and Segments (South)

Planned Substations
Existing/Approved Substations
Exclusion Zone (UPRR and ADOT)
Preliminary Study Area
Township - Range - Section

Surface Management
Military
Private (No Color)
State

0 600 1,200 Feet

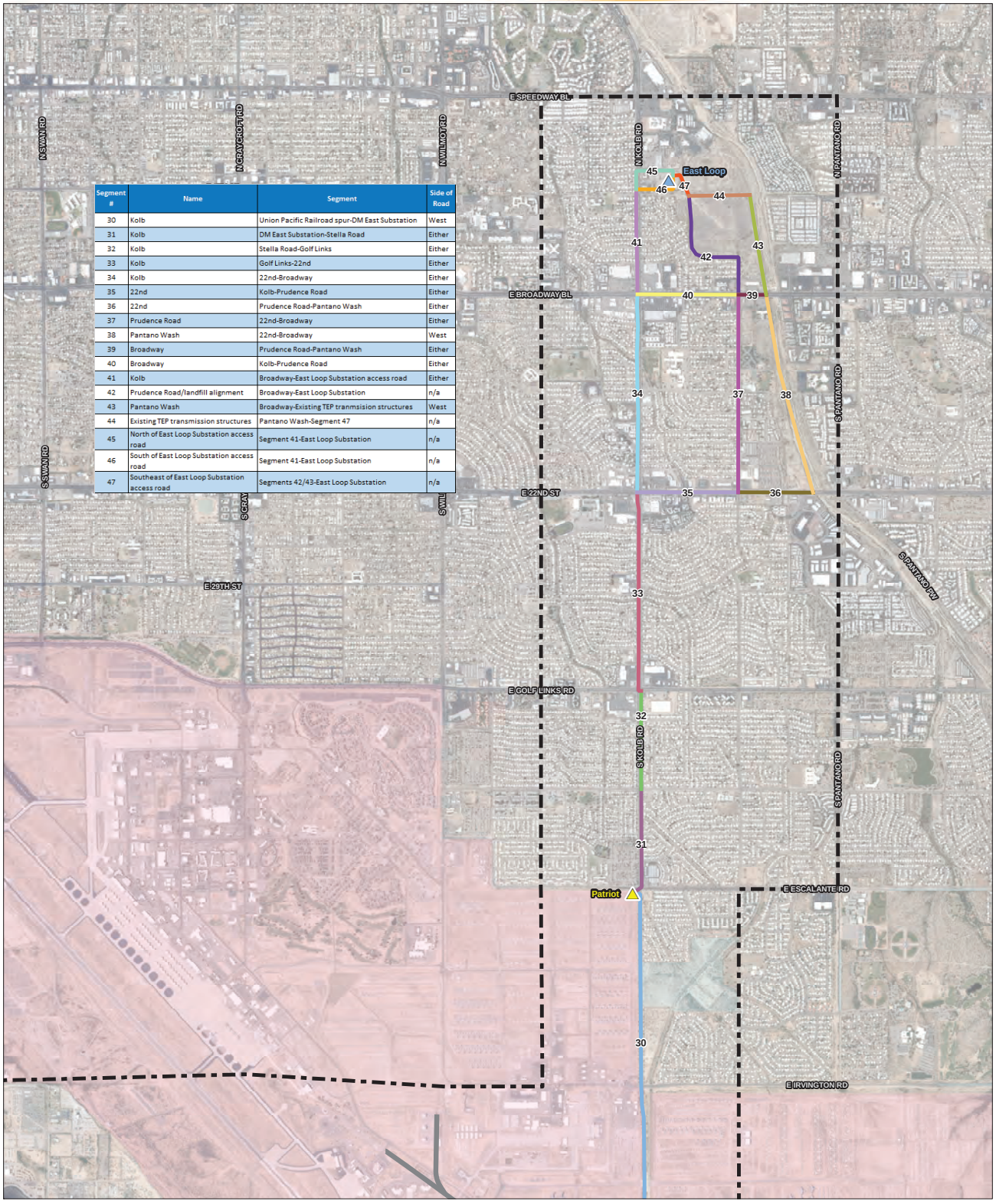
1 Inch = 1,200 Feet

Sources: ESRI, TEP, UNS, BLM, and Pima County GIS.
Projection: NAD 1983 UTM Zone 12N
Basemap: PAG Imagery 2015

This map is for planning purposes only. TEP and UNS Energy make no warranty of its accuracy.

5/6/2019 UA55909 Y:\Projects\Irv_to_East_Loop(DM)_138kV\MXDs\Irv_DM_Study_Segments_South.mxd

Irvington-East Loop Transmission Line (North)



Segment #	Name	Segment	Side of Road
30	Kolb	Union Pacific Railroad spur-DM East Substation	West
31	Kolb	DM East Substation-Stella Road	Either
32	Kolb	Stella Road-Golf Links	Either
33	Kolb	Golf Links-22nd	Either
34	Kolb	22nd-Broadway	Either
35	22nd	Kolb-Prudence Road	Either
36	22nd	Prudence Road-Pantano Wash	Either
37	Prudence Road	22nd-Broadway	Either
38	Pantano Wash	22nd-Broadway	West
39	Broadway	Prudence Road-Pantano Wash	Either
40	Broadway	Kolb-Prudence Road	Either
41	Kolb	Broadway-East Loop Substation access road	Either
42	Prudence Road/landfill alignment	Broadway-East Loop Substation	n/a
43	Pantano Wash	Broadway-Existing TEP tranmsision structures	West
44	Existing TEP transmission structures	Pantano Wash-Segment 47	n/a
45	North of East Loop Substation access road	Segment 41-East Loop Substation	n/a
46	South of East Loop Substation access road	Segment 41-East Loop Substation	n/a
47	Southeast of East Loop Substation access road	Segments 42/43-East Loop Substation	n/a

Tucson Electric Power

Irvington to East Loop (DM) 138kV Transmission Line

Preliminary Study Area and Segments (North)

Planned Substations
Existing/Approved Substations
Exclusion Zone (UPRR and ADOT)
Preliminary Study Area

Surface Management
Military
Private (No Color)
State

0 600 1,200
Feet

1 Inch = 1,200 Feet

Sources: ESRI, TEP, UNS, BLM, and Pima County GIS.
Projection: NAD 1983 UTM Zone 12N
Basemap: PAG Imagery 2015

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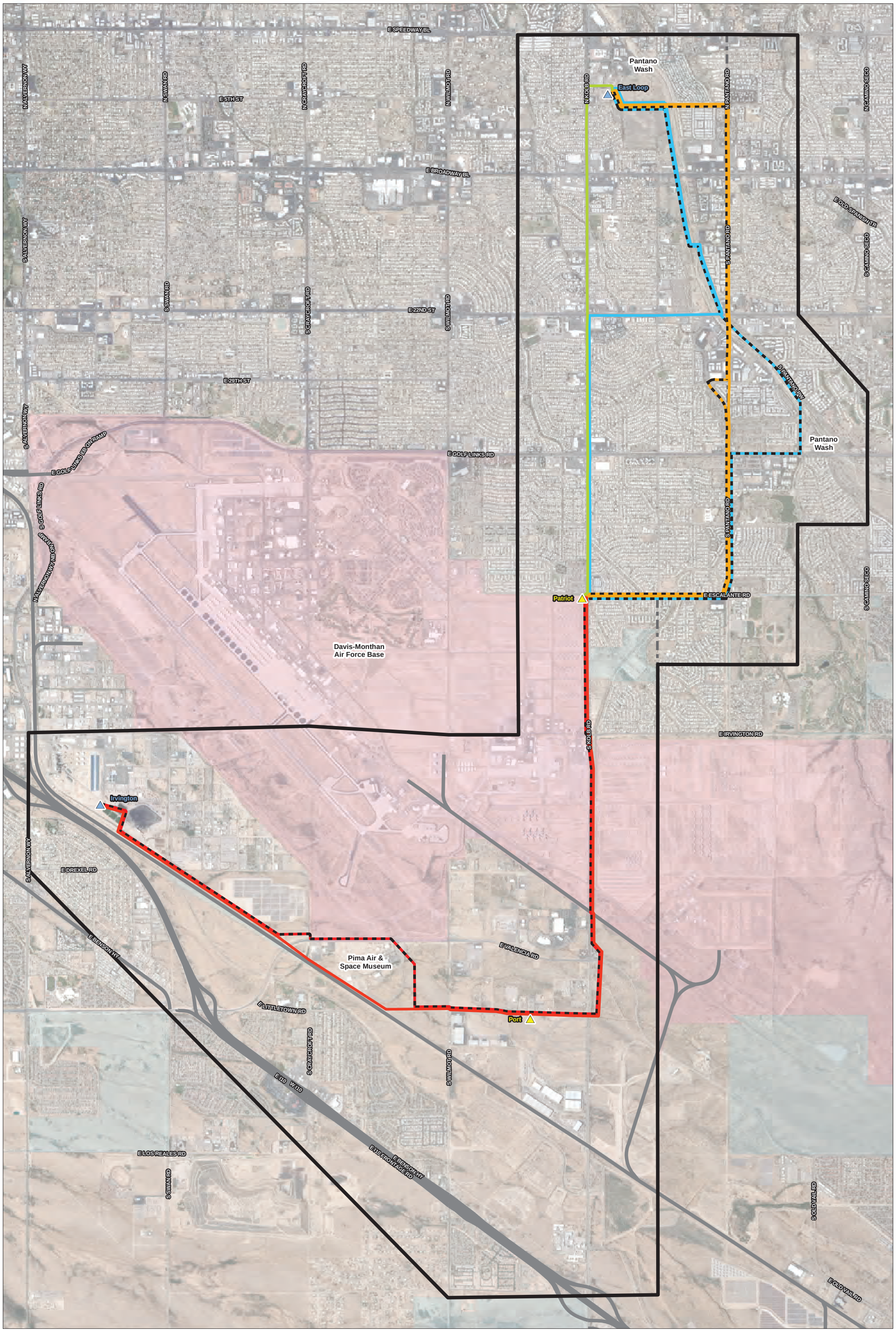
5/6/2019 UA55909 Y:\Projects\Irv_to_East_Loop\DM)_138kV\MXDs\Irv_to_East_Loop_segments_North.mxd

Irvington-East Loop Transmission Line

TEP



Irvington to East Loop 138kV Transmission Line Project

Revised Study Area and Routes

Irvington to Patriot
- Alternative 1
- Alternative 2

Patriot to East Loop
- Alternative A
- Alternative B1
- Alternative B2
- Alternative C1
- Alternative C2

- Planned Substations
- Existing/Approved Substations
- Exclusion Zone (UPRR and ADOT)
- Preliminary Study Area
- Revised Study Area

Surface Management
- Military
- Private (No Color)
- State

0 600 1,200 Feet

1 Inch = 1,200 Feet

Route Alternatives are graphic repersentations, please refer to the newsletter text for detailed routing.

Sources: ESRI, TEP, UNS, BLM, and Pima County GIS.
Projection: NAD 1983 UTM Zone 12N
Basemap: PAG Imagery 2015

This map is for planning purposes only. TEP and UNS Energy make no warranty of its accuracy.

8/14/2019 UA55909

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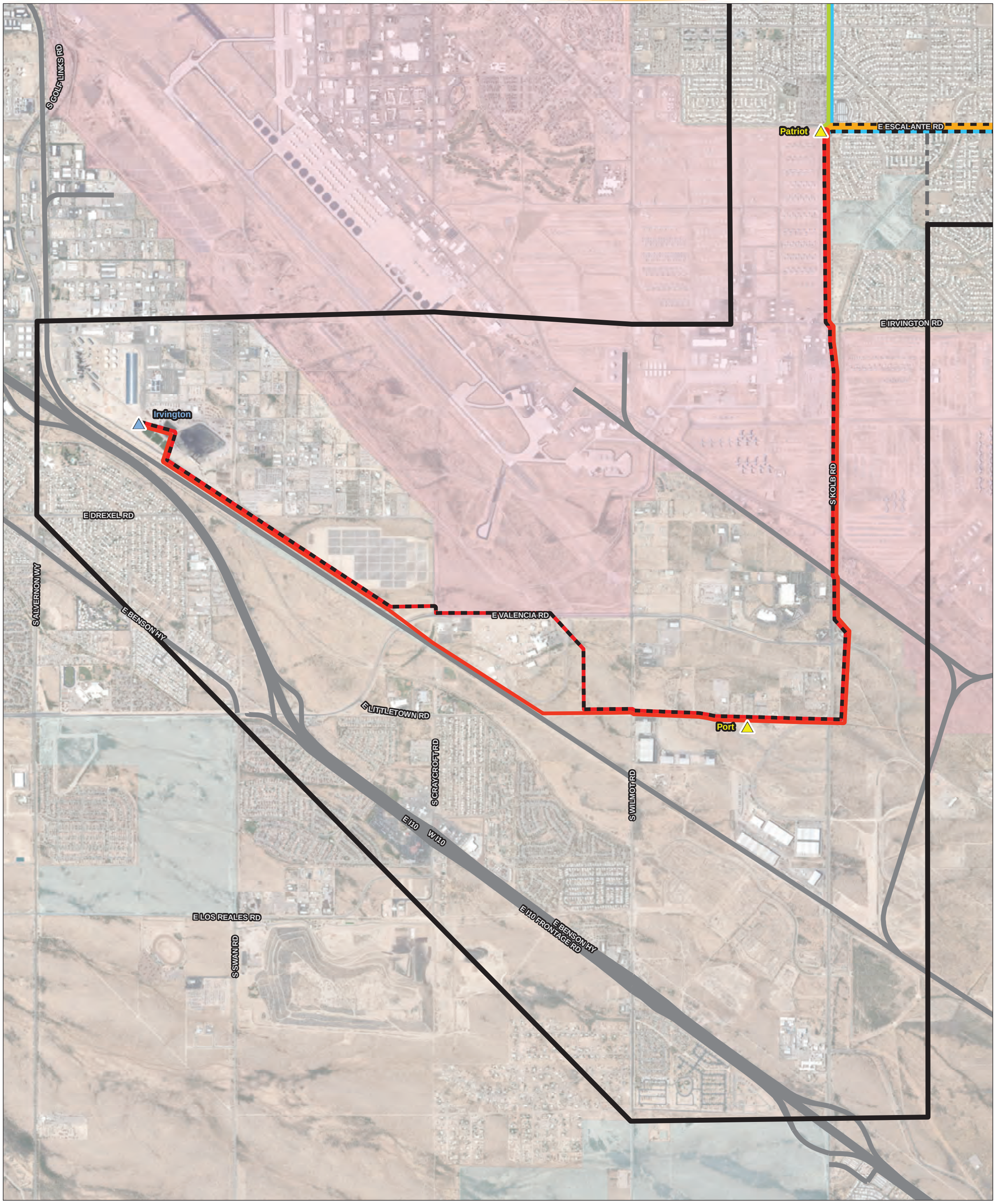
August 2019 Open Houses

Irvington-East Loop Transmission Line (South)

TEP



TEP
Tucson Electric Power

Irvington to East Loop 138kV Transmission Line Project

Revised Study Area and Routes (South)

Irvington to Patriot
- Alternative 1
- Alternative 2

Patriot to East Loop
- Alternative A
- Alternative B1
- Alternative B2
- Alternative C1
- Alternative C2

- Planned Substations
- Existing/Approved Substations
- Exclusion Zone (UPRR and ADOT)
- Preliminary Study Area
- Revised Study Area

Surface Management
- Military
- Private (No Color)
- State

N

0 600 1,200
Feet

1 Inch = 1,200 Feet

Route Alternatives are graphic repersentations, please refer to the newsletter text for detailed routing.

Sources: ESRI, TEP, UNS, BLM, and Pima County GIS.
Projection: NAD 1983 UTM Zone 12N
Basemap: PAG Imagery 2015

This map is for planning purposes only. TEP and UNS Energy make no warranty of its accuracy.

Exhibit Page 328

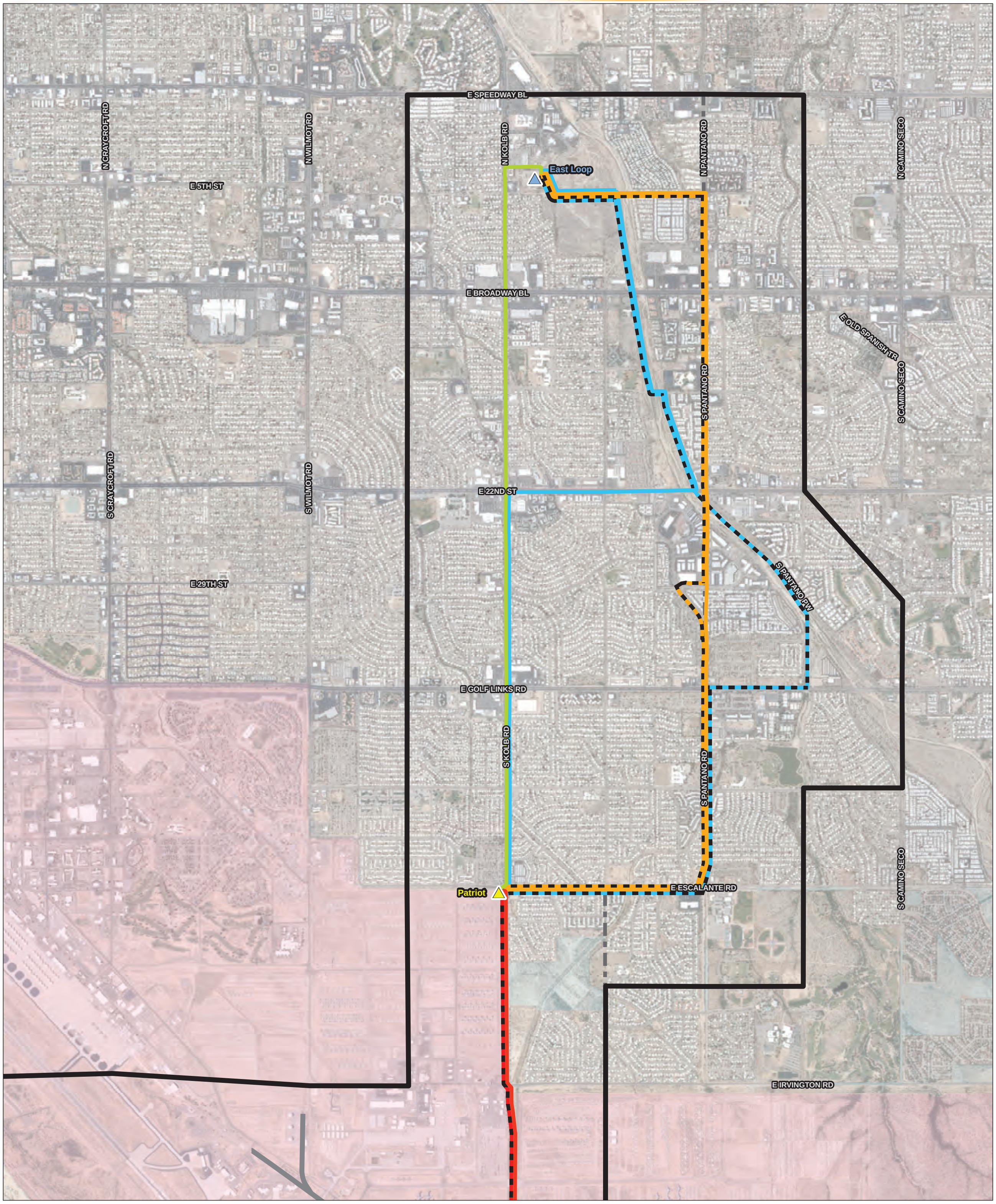
8/13/2019 UA55909

Y:\Projects\Irv_to_East_Loop(DM)_138kV\MXDs\Irv_EL(DM)_Routes_South.mxd

August 2019 Open Houses

Irvington-East Loop Transmission Line (North)

TEP



TEP Tucson Electric Power

Irvington to East Loop 138kV Transmission Line Project

Revised Study Area and Routes (North)

Irvington to Patriot
- Alternative 1
- Alternative 2

Patriot to East Loop
- Alternative A
- Alternative B1
- Alternative B2
- Alternative C1
- Alternative C2

- Planned Substations
- Existing/Approved Substations
- Exclusion Zone (UPRR and ADOT)
- Preliminary Study Area
- Revised Study Area

Surface Management
- Military
- Private (No Color)
- State

0 600 1,200
Feet
1 Inch = 1,200 Feet

Route Alternatives are graphic repersentations, please refer to the newsletter text for detailed routing.

Sources: ESRI, TEP, UNS, BLM, and Pima County GIS.
Projection: NAD 1983 UTM Zone 12N
Basemap: PAG Imagery 2015

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Exhibit Page 329

8/13/2019 UA55909

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Irvington-East Loop 138 kilovolt (kV) Transmission Line

Fact Sheet – April 2019

Tucson Electric Power (TEP) is developing plans for a new transmission line to help satisfy growing energy needs, support Davis-Monthan Air Force Base efforts to meet energy resiliency requirements and improve electric reliability for customers in east Tucson.

TEP must determine a route for the Irvington-East Loop 138 kilovolt (kV) Transmission Line, which will connect the Irvington Substation to the East Loop Substation. The line also must interconnect with the planned Port Substation and the planned DM East Substation. TEP encourages residents, property owners and other stakeholders to share their input about potential routes and help inform the company as it refines project plans.

STUDY AREA and PROJECT BENEFITS

TEP considers the projected energy needs of nearby residential and commercial customers, anticipated economic development, proximity to existing equipment, project costs, geography and other factors in determining where to locate new electric infrastructure. Substations house equipment that changes the voltage of electric current for transmission and delivery of electric service to area customers.

TEP will evaluate potential routes within a defined study area that could be used to interconnect existing and planned substations that include:

- **Irvington Substation** (terminus point): TEP is upgrading and relocating this substation to expand capacity and accommodate new generating resources currently under construction at the company's Irvington Campus, located near South Alvernon and East Irvington roads.

- **Port Substation** (planned point of interconnection): TEP plans to build this substation on a 10-acre site near South Kolb and East Valencia roads at the Port of Tucson, an intermodal inland shipping and storage facility supporting the transportation of goods throughout the Southwest. The planned substation is designed to accommodate increased energy demands and economic growth in the area. An in-service date has not been determined.

TEP employees install upgrades at the East Loop substation.

- **DM East Substation** (planned point of interconnection): TEP plans to build this substation on a 16-acre site near South Kolb and East Escalante roads at Davis-Monthan. The new substation will help Davis-Monthan meet Department of Defense-mandated energy resiliency directives, replace aging infrastructure that has reached the end of its useful life and strengthen electric reliability for customers in the area. The substation is scheduled to be in service in fall 2021.

- **East Loop Substation** (terminus point): Located near East Speedway Boulevard and South Kolb Road, this existing substation feeds multiple circuits that deliver electric service to homes and businesses throughout the area.

The Irvington-East Loop line would cross privately- and government-owned land in the City of Tucson and portions of unincorporated Pima County. TEP would build the line with self-weathering steel monopoles between 75-110 feet tall. Taller structures may be required at major road or line crossings.

REQUIRED APPROVALS and TIMELINE

TEP must secure a Certificate of Environmental Compatibility (CEC) for the transmission line prior to construction. After TEP files a CEC application with the Arizona Corporation Commission (ACC) later this year, the Arizona Power Plant and Transmission Line Siting Committee will review the application in a public process that includes opportunities for neighbors and other stakeholders to provide comments. If a CEC is granted, the committee will send the certificate to the ACC for final review and approval.

The City of Tucson must approve a development plan and issue a special exception land use permit before construction can begin on the DM East Substation. TEP expects to file an application for the land use permit later this year. The City of Tucson also must approve a development plan for the Port Substation prior to construction. TEP has not yet determined when it will file an application.

The TEP Irvington-East Loop transmission line is expected to be in service by fall 2021.

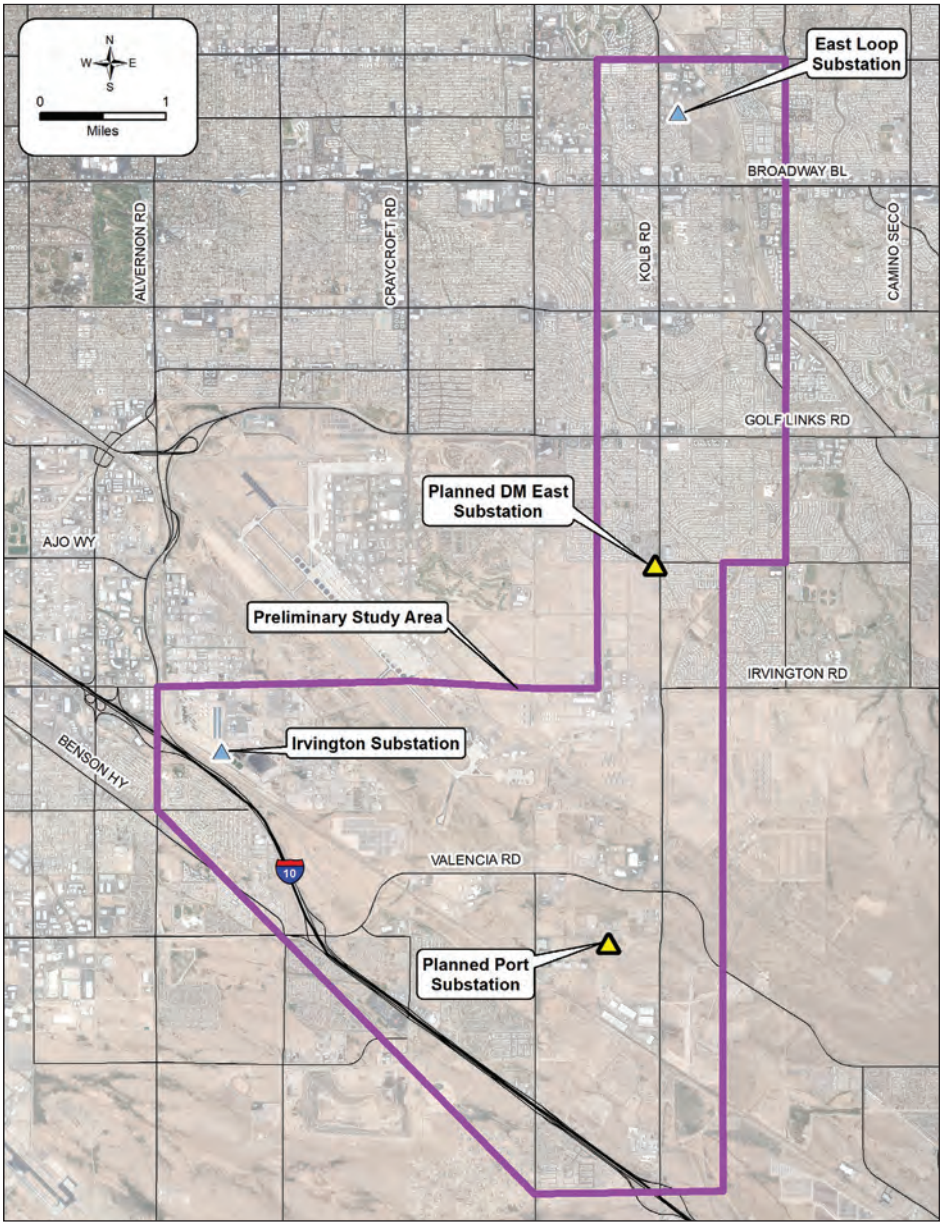
Tucson Electric Power

PUBLIC PARTICIPATION

TEP will schedule public open house meetings where attendees can ask questions and learn more about the project. More information will be mailed to study area residents and property owners, and posted on tep.com. To help TEP determine where to route the line, please take a few moments to share

- Mailing a comment form or a letter to:
  Tucson Electric Power
  ATTN: Irvington-East Loop
  PO Box 711
  Tucson, AZ 85702
- Sending comments to IRV2EL@tep.com
- Additional methods for providing feedback will be added in the near future

PROPOSED STUDY AREA



Irvington-East Loop Transmission Line

TEP

Sign-in Sheet

Date Aug 20, 2019

	Name	Address, City, Zip Code	Email	Phone Number
1	Cathe Vega	7021 E Rosewood 85710	undiethetucsonsun@gmail	488-7755
2	Henry Vega	6770 E. Carondelet Dr. #322 85710	hrvega50@gmail.com	
3	Trudy Richard	8242 E. 20th St. 85710	sissyclikr@aol.com 886-9825	(488-7794)
4	Robert Bialek	7474 E SPEEDWAY		
5	Dawn Houghton	9110 E. 26th ST 85710	NA	NA
6	Sharon L. Conine	8231 E. Lynch Pl. 85710		
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Irvington-East Loop Transmission Line

TEP

Sign-in Sheet

Date Aug 20, 2019

	Name	Address, City, Zip Code	Email	Phone Number
1	JACK & DIANNE BURGESS	7233 E. FAYETTE ST., TUCSON 85730	burgess602@gmail.com	850-6663
2				
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Irvington-East Loop Transmission Line

TEP

Sign-in Sheet

Date Aug 22, 2019

	Name	Address, City, Zip Code	Email	Phone Number
1	MICHAEL SALYO	5175 E. AGAVE VISTA DR.	michaelsalyo@yaho	2103156962
2	LAudonio, Bob/Donna	5184 E Agave Vista Dr.		520.520 8061
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Irvington-East Loop Transmission Line
Proyecto de Línea de Transmisión Irvington a East Loop

TEP

Public Comment Form
Formulario de comentario público

Comments submitted will become part of the project record. / *Comentarios seran parte de los archivos del proyecto*

Name [redacted]
Nombre

Address [redacted]
Dirección

City/State/ZIP code [redacted]
Ciudad/Estado/Código Postal

Email [redacted]
Correo Electrónico

Phone [redacted]

- [x] **Resident in Study Area** *Residente dentro del área de estudio*
- [ ] **Live/Work Near Study Area** *Vive/Trabaja cerca del área de estudio*
- [ ] **Special Interest Group** *Grupo de interés*
- [ ] **Business Owner in Study Area** *Empresario dentro del área de estudio*
- [ ] **Other Interested Party** *Otro partido de interés*

1. Please indicate any issues that are important to you in evaluating the transmission line:
Por favor cuéntenos sus preocupaciones y temas importantes para usted en su evaluación de el proyecto de la línea de transmisión

I am concerned about escalating the amount of magnetic field in an area where there are so many homes. We already have big poles down Pantano. I fear higher waves of magnetic field will make health problems. I wish the new electric poles would be installed far from homes (in the Pantano wash!!)

2. Is there any additional information that you would like TEP to consider when designing these projects:
Alguna información adicional que le gustaría contribuir para que TEP considere en el diseño de el proyecto

Right now our neighborhoods have upgraded readers for meters :(Gas, water as well as TEP.) We have almost everyone using wifi + wireless telephones.. People carry there cell phones in pocket (over their heart) talk with it near their ears.

3. I would like additional information about: More Research is needed!!
Me gustaría información adicional sobre

I think TEP should look at problems like heart murmurs, cancer, increase of children who are hyper-active, autistic ... elders who have been getting... alzheimers in greater numbers, (+ at younger ages than they used to get alzheimers) there are lots of pollutants and known causes, but shouldn't we examine the danger of magnetic field increase since we know it can also be called a pollutant. of these!

4. I heard about this project through:
Aprendí sobre el proyecto atreves de

- [x] **Newsletter Mailing** *Boletín enviado por la oficina de correo*
- [x] **Public Meeting** *Reunión Pública*
- [ ] **Project Website** *El sitio de internet del proyecto*
- [ ] **Word of Mouth** *Boca en boca*
- [ ] **Other** *Otro*

THANK YOU FOR YOUR PARTICIPATION!
Gracias por su participación

Irvington-East Loop Transmission Line
Proyecto de Línea de Transmisión Irvington a East Loop

TEP

Public Comment Form
Formulario de comentario público

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Name [redacted]
Nombre

Address [redacted]
Dirección

City/State/ZIP code [redacted]
Ciudad/Estado/Código Postal

Email [redacted]
Correo Electrónico

Phone [redacted]

- ☐ **Resident in Study Area** *Residente dentro del área de estudio*
- ☒ **Live/Work Near Study Area** *Vive/Trabaja cerca del área de estudio*
- ☐ **Special Interest Group** *Grupo de interés* [redacted]
- ☐ **Business Owner in Study Area** *Empresario dentro del área de estudio*
- ☐ **Other Interested Party** *Otro partido de interés*

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Por favor cuéntenos sus preocupaciones y temas importantes para usted en su evaluación de el proyecto de la línea de transmisión

Supplying Power needs to DMAFB & Part of Tucson (future)

2. Is there any additional Information that you would like TEP to consider when designing these projects:
Alguna información adicional que le gustaría contribuir para que TEP considere en el diseño de el proyecto

3. I would like additional information about:
Me gustaría información adicional sobre

4. I heard about this project through:
Aprendí sobre el proyecto atreves de

- ☒ **Newsletter Mailing** *Boletín enviado por la oficina de correo*
- ☐ **Public Meeting** *Reunión Publica*
- ☐ **Project Website** *El sitio de internet del proyecto*
- ☐ **Word of Mouth** *Boca en boca*
- ☐ **Other** *Otro*

THANK YOU FOR YOUR PARTICIPATION!
Gracias por su participación

Irvington-East Loop Transmission Line
Proyecto de Línea de Transmisión Irvington a East Loop

TEP

Public Comment Form
Formulario de comentario público

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Name
Nombre

Address
Dirección

City/State/ZIP code
Ciudad/Estado/Código Postal

Email
Correo Electrónico

Phone

[redacted]

- [x] **Resident in Study Area** *Residente dentro del área de estudio*
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1. Please indicate any issues that are important to you in evaluating the transmission line:
Por favor cuéntenos sus preocupaciones y temas importantes para usted en su evaluación de el proyecto de la línea de transmisión

Due to health concerns & mobility issues, would prefer segment 3.

2. Is there any additional Information that you would like TEP to consider when designing these projects:
Alguna información adicional que le gustaría contribuir para que TEP considere en el diseño de el proyecto

3. I would like additional information about:
Me gustaría información adicional sobre

future meetings & cost to customers & design of poles

4. I heard about this project through:
Aprendí sobre el proyecto atreves de

- [ ] **Newsletter Mailing** *Boletín enviado por la oficina de correo*
- [x] **Public Meeting** *Reunión Pública*
- [ ] **Project Website** *El sitio de internet del proyecto*
- **Word of Mouth** *en boca*
- [x] **Other** *Otro*

THANK YOU FOR YOUR PARTICIPATION!
Gracias por su participación

Irvington-East Loop Transmission Line
Proyecto de Línea de Transmisión Irvington a East Loop

TEP

Public Comment Form
Formulario de comentario público

Comments submitted will become part of the project record. / *Comentarios seran parte de los archivos del proyecto*

Name
Nombre

Address
Dirección

City/State/ZIP code
Ciudad/Estado/Código

Email
Correo

Phone

- [x] **Resident in Study Area** *Residente dentro del área de estudio*
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1. Please indicate any issues that are important to you in evaluating the transmission line:
Por favor cuéntenos sus preocupaciones y temas importantes para usted en su evaluación de el proyecto de la línea de transmisión

I do not want additional poles in new areas. Keep to existing routes if at all possible.

2. Is there any additional Information that you would like TEP to consider when designing these projects:
Alguna información adicional que le gustaría contribuir para que TEP considere en el diseño de el proyecto

3. I would like additional information about:
Me gustaría información adicional sobre

4. I heard about this project through:
Aprendí sobre el proyecto atreves de

- [x] **Newsletter Mailing** *Boletín enviado por la oficina de correo*
- [x] **Public Meeting** *Reunión Pública*
- [ ] **Project Website** *El sitio de internet del proyecto*
- [ ] **Word of Mouth** *Boca en boca*
- [ ] **Other** *Otro*

THANK YOU FOR YOUR PARTICIPATION!
Gracias por su participación

Irvington-East Loop Transmission Line
Proyecto de Línea de Transmisión Irvington a East Loop

TEP

Public Comment Form
Formulario de comentario público

Comm[redacted]*rte de los archivos del proyecto*

Name
Nombre

Address
Dirección

City/State/ZIP code
Ciudad/Estado/C[redacted]

Email
Correo Electróni[redacted]

Phone

- [x] **Resident in Study Area** *Residente dentro del área de estudio*
- [ ] **Business Owner in Study Area** *Empresario dentro del área de estudio*
- [ ] **Live/Work Near Study Area** *Vive/Trabaja cerca del área de estudio*
- [ ] **Other Interested Party** *Otro partido de interés*
- [ ] **Special Interest Group** *Grupo de interés*

1. Please indicate any issues that are important to you in evaluating the transmission line:
Por favor cuéntenos sus preocupaciones y temas importantes para usted en su evaluación de el proyecto de la línea de transmisión

2. Is there any additional Information that you would like TEP to consider when designing these projects:
Alguna información adicional que le gustaría contribuir para que TEP considere en el diseño de el proyecto

3. I would like additional information about:
Me gustaría información adicional sobre

estoy de acuerdo con el Proyecto

4. I heard about this project through:
Aprendí sobre el proyecto atreves de

- [ ] **Newsletter Mailing** *Boletín enviado por la oficina de correo*
- [ ] **Word of Mouth** *Boca en boca*
- [ ] **Public Meeting** *Reunión Pública*
- [x] **Other** *Otro*
- [ ] **Project Website** *El sitio de internet del proyecto*

THANK YOU FOR YOUR PARTICIPATION!
Gracias por su participación

Irvington-East Loop Transmission Line
Proyecto de Línea de Transmisión Irvington a East Loop

TEP

Public Comment Form
Formulario de comentario público

Comments submitted will become part of the project record. / *Comentarios seran parte de los archivos del proyecto*

Name [redacted]
Nombre

Address
Dirección

City/State
Ciudad/Est

Email
Correo Ele

Phone

- [ ] **Resident in Study Area** *Residente dentro del área de estudio*
- [x] **Live/Work Near Study Area** *Vive/Trabaja cerca del área de estudio*
- [ ] **Special Interest Group** *Grupo de interés*
- [ ] **Business Owner in Study Area** *Empresario dentro del área de estudio*
- [ ] **Other Interested Party** *Otro partido de interés*

1. Please indicate any issues that are important to you in evaluating the transmission line:
Por favor cuéntenos sus preocupaciones y temas importantes para usted en su evaluación de el proyecto de la línea de transmisión

Cost: use existing poles (or replace them with dual as needed)

2. Is there any additional Information that you would like TEP to consider when designing these projects:
Alguna información adicional que le gustaría contribuir para que TEP considere en el diseño de el proyecto

3. I would like additional information about:
Me gustaría información adicional sobre

4. I heard about this project through:
Aprendí sobre el proyecto atreves de

- [x] **Newsletter Mailing** *Boletín enviado por la oficina de correo*
- [ ] **Public Meeting** *Reunión Pública*
- [ ] **Project Website** *El sitio de internet del proyecto*
- [ ] **Word of Mouth** *Boca en boca*
- [x] **Other** *Otro*

THANK YOU FOR YOUR PARTICIPATION!
Gracias por su participación

Irvington-East Loop Transmission Line
Proyecto de Línea de Transmisión Irvington a East Loop

TEP

Public Comment Form
Formulario de comentario público

Comments submitted will become part of the project record. / *Comentarios seran parte de los archivos del proyecto*

Name
Nombre [redacted]

Address
Dirección [redacted]

City/State/ZIP code
Ciudad/Estado/Código Postal [redacted]

Email
Correo [redacted]

Phone [redacted]

- ☐ **Resident in Study Area** — *Residente dentro del área de estudio*
- ☐ **Live/Work Near Study Area** — *Vive/Trabaja cerca del área de estudio*
- ☐ **Special Interest Group** — *Grupo de interés*
- ☒ **Business Owner in Study Area** — *Empresario dentro del área de estudio*
- ☐ **Other Interested Party** — *Otro partido de interés*

1. Please indicate any issues that are important to you in evaluating the transmission line:
Por favor cuéntenos sus preocupaciones y temas importantes para usted en su evaluación de el proyecto de la línea de transmisión

SAFETY IN TRANSMISSION LINE CHOSEN ROUTE. [redacted] WE HAVE TEP TRANSMISSION LINES TO THE NORTH & SOUTH OF OUR CHURCH COMING FROM EAST LOOP SUBSTATION. WE HAVE HAD HOMELESS ISSUES ~~AT~~ LIVING UNDERNEATH THE NORTH TRANSMISSION LINE ON TEP PROPERTY THE CHURCH'S PREFERANCE WOULD BE LINE 44 FROM THE EASTLOOP SUBSTATION. THANK YOU FOR

2. Is there any additional information that you would like TEP to consider when designing these projects: YOUR CONSIDERATION.
Alguna información adicional que le gustaría contribuir para que TEP considere en el diseño de el proyecto

3. I would like additional information about:
Me gustaría información adicional sobre

4. I heard about this project through:
Aprendí sobre el proyecto atreves de

- ☒ **Newsletter Mailing** — *Boletín enviado por la oficina de correo*
- ☒ **Public Meeting** — *Reunión Pública*
- ☐ **Project Website** — *El sitio de internet del proyecto*
- ☐ **Word of Mouth** — *Boca en boca*
- ☐ **Other** — *Otro*

THANK YOU FOR YOUR PARTICIPATION!
Gracias por su participación

Irvington-East Loop Transmission Line
Proyecto de Línea de Transmisión Irvington a East Loop

TEP

Public Comment Form
Formulario de comentario público

Comments submitted will become part of the project record. / *Comentarios seran parte de los archivos del proyecto*

Name
Nombre [redacted]

Address
Direccion [redacted]

City/State/ZIP code
Ciudad/Estado/Código Postal [redacted]

Email
Correo E [redacted]

Phone [redacted]

- [x] **Resident in Study Area** *Residente dentro del área de estudio*
- [ ] **Live/Work Near Study Area** *Vive/Trabaja cerca del área de estudio*
- [ ] **Special Interest Group** *Grupo de interés*
- [ ] **Business Owner in Study Area** *Empresario dentro del área de estudio*
- [ ] **Other Interested Party** *Otro partido de interés*

1. Please indicate any issues that are important to you in evaluating the transmission line:
Por favor cuéntenos sus preocupaciones y temas importantes para usted en su evaluación de el proyecto de la línea de transmisión

Impact the least number of residences would be preferential

2. Is there any additional Information that you would like TEP to consider when designing these projects:
Alguna información adicional que le gustaria contribuir para que TEP considere en el diseño de el proyecto

If you use the Pantano Wash choice, it would have less impact on roads construction-wise.

3. I would like additional information about:
Me gustaria información adicional sobre

none – I appreciate the personal explanation at the meeting

4. I heard about this project through:
Aprendi sobre el proyecto atreves de

- [x] **Newsletter Mailing** *Boletín enviado por la oficina de correo*
- [ ] **Public Meeting** *Reunión Pública*
- [ ] **Project Website** *El sitio de internet del proyecto*
- [ ] **Word of Mouth** *Boca en boca*
- [ ] **Other** *Otro*

THANK YOU FOR YOUR PARTICIPATION!
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Proyecto de Línea de Transmisión Irvington a East Loop

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Public Comment Form
Formulario de comentario público

Comments submitted will become part of the project record. / *Comentarios seran parte de los archivos del proyecto*

Name
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Addre
Direccion

City/State/ZIP code
Ciudad/Estado/Código Postal

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Correo

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- [x] **Resident in Study Area** *Residente dentro del área de estudio*
- [x] **Live/Work Near Study Area** *Vive/Trabaja cerca del área de estudio*
- [ ] **Special Interest Group** *Grupo de interés*
- [ ] **Business Owner in Study Area** *Empresario dentro del área de estudio*
- [ ] **Other Interested Party** *Otro partido de interés*

1. Please indicate any issues that are important to you in evaluating the transmission line:
Por favor cuéntenos sus preocupaciones y temas importantes para usted en su evaluación de el proyecto de la línea de transmisión

I would chose Alternative Route 2. The further the electrical lines are from my house and community, the better.

2. Is there any additional Information that you would like TEP to consider when designing these projects:
Alguna información adicional que le gustaría contribuir para que TEP considere en el diseño de el proyecto

Continue educating residents and keeping us informed

3. I would like additional information about:
Me gustaría información adicional sobre

4. I heard about this project through:
Aprendí sobre el proyecto atreves de

- [x] **Newsletter Mailing** *Boletín enviado por la oficina de correo*
- [ ] **Public Meeting** *Reunión Pública*
- [ ] **Project Website** *El sitio de internet del proyecto*
- [ ] **Word of Mouth** *Boca en boca*
- [ ] **Other** *Otro*

THANK YOU FOR YOUR PARTICIPATION!
Gracias por su participación

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Comment Date *Category* *Heard About*	*Support*	*Issues/Phone Message/Comments*	*Additional Info*	*Requested Info*	*Concerns Topics*	*Alternative Preferred*	*ResponseNotes*
Comment Method: Comment Form							
9/10/2019 Resident in Study Area Newsletter Mailing	☐	Impact the least number of residences would be preferential.	If you use the Pantano Wash choice, it would have less impact on roads construction-wise.	None. I appreciate the personal explanation at the meeting.		C1, C2	
9/10/2019 Resident in Study Area Newsletter Mailing, Public Meeting	☐	I am concerned about escalating the amount of magnetic field in an area where there are so many houses. We already have big poles down Pantano. I fear higher waves of magnetic field will make health problems. I wish the new electric poles would be installed far from houses (in the Pantano Wash!!).	Right now our neighborhoods have upgraded readers for meters (gas, water, as well as TEP). We have almost every one using WiFi and wireless telephones. People carry their cell phones in pockets (over their hearts) talk with it near their ears. More research is needed!!	I think TEP should look at problems like heart murmurs, cancer, increase of children who are hyperactive, autistic.. Elders who have been getting alzheimers in greater numbers (and at earlier ages than they used to get alzheimers). There are lots of pollutants and known causes, but shouldn't we examine the danger of magnetic field increase since we know it can be also called a pollutant.	Health, Location	C2	
8/22/2019 Resident in Study Area, Live/Work near Study Area Newsletter Mailing	☐	I would choose Alternative Route 2. The further the electrical lines are from my house and community, the better.	Continue educating residents and keeping us informed.		Location		

Comment Date *Category* *Heard About*	*Support*	*Issues/Phone Message/Comments*	*Additional Info*	*Requested Info*	*Concerns Topics*	*Alternative Preferred*	*ResponseNotes*
Comment Method: Comment Form							
5/22/2019 Business Owner in Study Area Newsletter Mailing, Public Meeting	☐	Safety in transmission line chosen route. I pastor the church west of the East Loop TEP Substation. We have TEP transmission lines to the north & south of our church coming from East Loop Substation. We have had homeless issues living underneath the north transmission line on TEP property. The church's preference would be line 44 from the East Loop Substation. Thank you for your consideration.			Health, Location	B1, B2, C2	
5/22/2019 Live/Work near Study Area Newsletter Mailing	☐	Cost. Use existing poles (or replace them with dual as needed).			Cost		
5/22/2019 Resident in Study Area Other	☑			Estoy de acuerdo con el proyecto. I agree with the project			
5/22/2019 Resident in Study Area Newsletter Mailing, Public Meeting	☐	I do not want additional poles in new areas. Keep to existing routes if at all possible.			Appearance		
6/4/2019 Resident in Study Area, Business Owner in Study Area, Live/Work near Study Area Public Meeting, Other	☐	Due to health concerns & visibility issues, would prefer Segment 3.		Future meetings and cost to customers & design of poles.	Health, Cost, Appearance, Location	A, C1	
5/22/2019 Live/Work near Study Area, Special Interest Group Newsletter Mailing	☐	Supplying power needs to DMAFB & Port of Tucson (future)			Other		

Comment Date *Category* *Heard About*	*Support*	*Issues/Phone Message/Comments*	*Additional Info*	*Requested Info*	*Concerns Topics*	*Alternative Preferred*	*ResponseNotes*
Comment Method: WuFoo/Online							
8/29/2019 Resident in Study Area Public Meeting, Word of Mouth	☐	My concern for my daughter's health who resides on 7160 E. Chelsie Kaye Lane which is very close to where the Patriot Substation is being considered to be installed . I strongly advocate for the relocation of the Patriot Substation . I also understand that TEP is going build a line of steel monopolies along Golf Links Rd where my son resides on 2492 S. Rosa Peak Dr. My son is dealing with health issues and is not in any condition to have other potential sources come against his health . Find an alternative solution to your project other than Golf Links Rd. I would like additional information about: I would like to see research and effects on this familiar project other than TEP alliances .	I would like additional information about: I would like to see research and effects on this familiar project other than TEP alliances .		Health, Location	1, B1, B2, A, C1	Henry Vega, Thank you for your feedback regarding the Irvington-East Loop 138-kilovolt (kV) Transmission Line project. The location of the planned Patriot Substation was dependent upon land availability and considerations of Davis-Monthan Air Force Base. TEP will help Davis-Monthan to meet Department of Defense-mandated energy resiliency requirements with the development of the Patriot substation. The City of Tucson must issue a special exception land use permit and approve a development plan before construction can begin. We would be happy to provide you with information about any public meetings regarding the substation development process. It's worth noting that Alternatives A, C-1, B-1 and B-2, which only cross Golf Links Road at South Kolb Road, remain under consideration at this time. For more information about transmission lines, electro-magnetic fields (EMFs) and public health, please visit our website at tep.com/electric-and-magnetic-fields. We appreciate your concerns and will include them in the project record provided to the Arizona Corporation Commission. For up to date news on the potential routes, please visit our project website https://www.tep.com/irvington-east-loop/. Thank you,
5/18/2019 Resident in Study Area Public Meeting	☐	I don't want another set of power lines near our neighborhood at the SW corner of I10 and Valencia. It looks like the proposed path of the line is fairly close to my house. We already have to live with large power lines on the west side of the neighborhood. I don't want our families to have another set of transmission lines on the east side. Please shift the lines east or west to avoid proximity to our neighborhood.			Location		RESPONSE IN: G:\Line Siting\Irvington to East Loop 2019\Outreach\Comment Tracking Database\TEP Responses\Responses by week
5/20/2019 Resident in Study Area Newsletter Mailing	☐	I believe this transmission line is too close to resident homes. Please consider moving it away from resident homes.			Location, Other		RESPONSE IN: G:\Line Siting\Irvington to East Loop 2019\Outreach\Comment Tracking Database\TEP Responses\Responses by week

Comment Date *Category* *Heard About*	*Support*	*Issues/Phone Message/Comments*	*Additional Info*	*Requested Info*	*Concerns Topics*	*Alternative Preferred*	*ResponseNotes*
Comment Method: WuFoo/Online							
5/22/2019 Resident in Study Area Newsletter Mailing	☐	I believe living so close to these power lines can be harmful to families that live so close to them I would like for it to be route 2 instead of route 5. We already have large power lines west of our community and feel like it can be a health risk to our families let's not add to this situation another reason why to be concerned about the environment. We have kids and who knows what type of radiation power lines attract in process. Please take out concerns into consideration an move them further away from housing development and keep families safe.			Health, Location		RESPONSE IN: G:\Line Siting\Irvington to East Loop 2019\Outreach\Comment Tracking Database\TEP Responses\Responses by week
6/5/2019 Resident in Study Area, Live/Work near Study Area Other	☐	If the project is completed on the east side of Kolb street, I would prefer that poles are placed as far as possible from the front of the residences, preferably on the corner of each block and using the farthest distance possible between poles or placing the least poles possible. I am worried about the street looking too cramped with the old and new poles. Also safety issues during and after the construction are a concern			Health, Appearance, Location		RESPONSE IN: G:\Land Resources\AA - Active Projects\TEP\IRV - East Loop (DM)\Planning\Outreach\Comment Tracking Database\TEP Responses\Drafts
8/7/2019 Resident in Study Area Newsletter Mailing, Public Meeting	☐	I'm a resident on Kolb Rd. I received your updated alternative list through the mail. My main concern is the placement of the monopole locations since my house faces the northbound kolb rd. From my perspective, my preference would be any alternative EXCEPT A and C1 since the transmission lines would be constructed. However, depending on the placement of the monopoles [preferably not in front my house], then alternatives A and C1 would be tolerable. On the previous public meeting, it was indicated that usually transmission poles are build in the corners of blocks and the distance between them was fairly large. I wouldn't mind if the poles were installed in near the crosswalk where some businesses are located and the next pole somewhere south of Sylvane, In summary, my preference given the options would be any alternative except A and C			Location	1, B1, B2, C2	
8/7/2019 Resident in Study Area Newsletter Mailing	☐	Do not run any more lines along the wash. Leave the little bit of nature left in Tucson alone. So, I opt for alternative 1, and. Alternative A. Simpler, straighter, and possibly less expensive.			Cost, Appearance, Location	1, A	

Comment Date *Category* *Heard About*	*Support*	*Issues/Phone Message/Comments*	*Additional Info*	*Requested Info*	*Concerns Topics*	*Alternative Preferred*	*ResponseNotes*
Comment Method: WuFoo/Online							
5/8/2019 Live/Work near Study Area Newsletter Mailing	☐	I'm just concerned on how the plant will look. The plant on Irvington is hideous and I do not want that same look so close to my home. By the way, your email address provided for IRV2EL@tep.com is not working.			Appearance, Other		Thank you for your feedback regarding the Irvington-East Loop 138-kilovolt (kV) Transmission Line project. We appreciate your concerns and will include them in the project record provided to the Arizona Corporation Commission. We will work toward determining a route for a new transmission line that will connect two existing substations to two planned substations. The planned Patriot Substation would be located on a 16-acre parcel at South Kolb and East Escalante roads. The planned Port Substation would be located on a 10-acre parcel near South Kolb and East Valencia roads. I can assure you that the scale of a single 138kV substation is considerably smaller than the infrastructure located at TEP's Irvington Campus, which includes a power plant, warehouse storage, training yards and multiple substation facilities on more than 300 acres. For your reference, I have attached a photograph of TEP's Del Cerro Substation, which was built using TEP's current standards and is representative of the planned substations' design. If you have additional questions or concerns, please consider visiting the project website at https://www.tep.com/irvington-east-loop/ and attending one of the upcoming public meetings listed below
8/31/2019 Resident in Study Area, Business Owner in Study Area, Live/Work near Study Area Newsletter Mailing	☐	Concern is Viewscape - Prefer current Alternatives A and 2			Appearance, Location	A	Thank you for your feedback regarding the Irvington-East Loop 138-kilovolt (kV) Transmission Line project. We appreciate your concerns and will include them in the project record provided to the Arizona Corporation Commission. We hope that you will stay engaged with the project. Please visit our website https://www.tep.com/irvington-east-loop/ for regular project updates.

Comment Date *Category* *Heard About*	*Support*	*Issues/Phone Message/Comments*	*Additional Info*	*Requested Info*	*Concerns Topics*	*Alternative Preferred*	*ResponseNotes*
Comment Method: WuFoo/Online							
10/7/2019 Business Owner in Study Area Other	☐	I am the Executive Director of the Pima Air & Space Museum and as an organization, in conjunction with Pima County, we strongly object to any routing directly along Valencia Road, TEP Alternative 2, that then crosses our front gate and property. We are a global destination attraction and This route would place unsightly poles directly across and in front of our main entrance and give a poor impression of Tucson to out of town visitors. This also has significant impact on the museums ability to move aircraft across Valencia road from D-M. The Museum strongly supports Route 1 as the preferred option, and after meetings with TEP and County stakeholders onsite the Museum is prepared to make land easement concessions along the south end of our property to accommodate TEPs set back requirements in order for TEP Alternative 1 route to be the main future route in this area.			Appearance, Location, Other	1	Scott Marchand, Thank you for submitting a formal comment regarding the Irvington-East Loop 138-kilovolt (kV) Transmission Line project. We appreciate your concerns and will include them in the project record provided to the Arizona Corporation Commission. If you have any additional questions or concerns, please reach out directly to Renee Darling, Environmental and Land Use Supervisor, Land Resources department by phone at 520-884-3642 or email at rdarling@tep.com. We would be happy to provide the updated preferred routes to you when available, and meet to discuss them further if needed. We hope that you will stay engaged with the project as we move forward in developing our application for the Arizona Corporation Commission. Please visit our website https://www.tep.com/irvington-east-loop/ for regular project updates. Thank you,

Comment Date *Category* *Heard About*	*Support*	*Issues/Phone Message/Comments*	*Additional Info*	*Requested Info*	*Concerns Topics*	*Alternative Preferred*	*ResponseNotes*
Comment Method: WuFoo/Online							
8/28/2019 Resident in Study Area Newsletter Mailing	☐	I have 2 children whose homes are in the areas where the proposed alternate routes are. My daughter lives at Kolb and Escalante, so if the proposed lines pass by her home, she will be exposed to those emissions along with those from the planned Patriot substation. I feel it's an unfair burden to expect some homeowners to be exposed to even more emf's than everyone else is exposed to and feel that TEP should go to any lengths to avoid this. My son lives at Saddleback and Golf Links and he will also be exposed to more emf's, along with a school located across the street from Saddleback and Golf Links Rd. I believe that the best solution is to locate the lines running east along Irvington Rd and going north in the least populated area of the east side. If TEP is unwilling to do this, I choose Alternative A, C1 or C2, where there are already lines in place and residents, of which I am one, are already dealing with it, rather than to put this on so many other homeowners. Thank you. I would like additional information about: Future meetings.	Future Meetings		Health, Location	C1, C2	Cathy Vega, Thank you for your feedback regarding the Irvington-East Loop 138-kilovolt (kV) Transmission Line project. We appreciate your concerns and will include them in the project record provided to the Arizona Corporation Commission. At this stage in the project, TEP has identified potential routes for the planned Irvington-East Loop 138kV transmission line. The transmission line must connect TEP's existing Irvington substation to the existing East Loop substation while also tying in the proposed Port substation (Littletown Rd east of Kolb) and Patriot substation (Davis Month Air Force Base, at Kolb and Escalante). One challenging aspect of this project is route planning in a dense urban environment. TEP will evaluate the potential routes internally based on a number of factors including constructability; opportunities to utilize existing facilities; proximity to schools, hospitals, and homes; environmental concerns; and public feedback, among others. We do appreciate your concerns and comments. If you have concerns about electromagnetic fields, we invite you to visit our website at tep.com/electric-and-magnetic-fields. We hope that you will stay engaged with the project. Please visit our website https://www.tep.com/irvington-east-loop/ for regular project updates as preferred routes are identified. Thank you,

Comment Date *Category* *Heard About*	*Support*	*Issues/Phone Message/Comments*	*Additional Info*	*Requested Info*	*Concerns Topics*	*Alternative Preferred*	*ResponseNotes*
Comment Method: WuFoo/Online							
8/26/2019 Resident in Study Area, Business Owner in Study Area, Live/Work near Study Area Newsletter Mailing	☐	Access , flood control, traffic - The flood control that has been done for the Amazon / Valencia Kolb intersection has downed power poles west of the culvert and flows out of control. The planed transmission lines are to be constructed in this area and poses a danger to east of the port project. I was unable to attend the public meeting on the 22nd at Littletown Center. please allow me to view the plans online			Health, Location		David Alberding, Thank you for your feedback regarding the Irvington-East Loop 138-kilovolt (kV) Transmission Line project. We appreciate your concerns and will include them in the project record provided to the Arizona Corporation Commission. At this stage in the project, TEP has identified potential routes for the planned transmission line. These routes will be evaluated internally based on a number of factors including constructability, opportunities to utilize existing facilities, environmental concerns, public feedback and other factors. Throughout the siting process, we'll continually consider current and potential flood control measures in the area. We appreciate your comments and hope that you will stay engaged with the project. Please visit our website https://www.tep.com/irvington-east-loop/ for regular project updates including current project maps. Thank you,

Comment Date *Category* *Heard About*	*Support*	*Issues/Phone Message/Comments*	*Additional Info*	*Requested Info*	*Concerns Topics*	*Alternative Preferred*	*ResponseNotes*
Comment Method: Voicemail/Toll-Free							
5/6/2019 Resident in Study Area Newsletter Mailing	☐	Mailing recipient upset that their name change was not reflected on the newsletter mailing. Requests TEP update their name for any upcoming mailings.			Other		Changed name on mailing list.
8/21/2019 Resident in Study Area Newsletter Mailing	☐	Two comments. Choose the route that will have the least disturbance to land and follows existing routes that have already been constructed. Two, Why can't TEP do more of local based electricity? Why doesn't TEP use roof top solar and local electricity collection rather than transmission based electricity? Why does electricity need to travel?			Location, Other		
8/19/2019 Resident in Study Area Newsletter Mailing	☐	Where the northern routes are relative to their home/ how their home will be effected. Concerns include weather events, and effects of radiation. How close will the line east of Kolb and north of Broadway be to their home.			Health, Location		Provided call back information. Provided information on the possible route nearest their home, apx. 1.5 miles south of them. Provided website for additional information.
8/9/2019 Resident in Study Area Newsletter Mailing	☐	Received newsletter #2 but it did not inlcude a cover letter. Send complete information to her home.					Followed up with phone call to inquire about the cover letter issue and confirm address. Called customer service about a recent outage issue, the pre-recorded message about when the power will be restored. JR to follow up with CSR's for follow up.
8/8/2019	☐	(No contact given) Caller would like to see lighter color poles used. Dislikes the appearance of the "rusted," pole and feels that they stick out against the skyline.			Appearance		
8/8/2019 Resident in Study Area	☐	Based on his age - 63, would like to know if there is a utility discount available					Forwarding to Customer Service
8/7/2019 Resident in Study Area Newsletter Mailing	☑	Expressed concerns over the health effect of line going over people's homes or businesses where people spend considerable time. Believes if there are health effects it would lead to costs. Would like to see new line located in road ROW or along Pantano Wash. Perfers C-1 if in ROW, or C-3. Expressed support for the project purpose and need.			Health, Cost, Location	C1	
5/16/2019 Newsletter Mailing	☐	Message states, this is Ron give me a call.					Called back, got VM, provided means of reaching out to the project/providing comment.

Comment Date *Category* *Heard About*	*Support*	*Issues/Phone Message/Comments*	*Additional Info*	*Requested Info*	*Concerns Topics*	*Alternative Preferred*	*ResponseNotes*
Comment Method: Email							
8/31/2019 Resident in Study Area, Business Owner in Study Area, Live/Work near Study Area	☐	Hello, I live and work in the Study Area. I own properties in it as well. Here are my thoughts: Alternative 2 Alternative A Thank you, Alan Cowan Falconworks Land Rover & British Tucson, Arizona 520-294-3572			Location	A	Thank you for your feedback regarding the Irvington-East Loop 138-kilovolt (kV) Transmission Line project. We appreciate your concerns and will include them in the project record provided to the Arizona Corporation Commission. We hope that you will stay engaged with the project as we move forward to identifying the preferred routes that will be included in our application for the Arizona Corporation Commission. Please visit our website https://www.tep.com/irvington-east-loop/ for regular project updates. Thank you,
8/25/2019 Newsletter Mailing	☑	To all it may concern, Both of the above alternatives (B1 and B2) propose running this line on the south side of Escalante Rd. from Kolb Rd. to Pantano Rd. The reference source is TEP Energy Grid Update, Irvington-East Loop Transmission Line, Newsletter #2 – August 2019 a Copy is Attached. I have serious concerns about the placement of this 138 Kilovolt (kV) Transmission Line because; 1. all of the existing lines are now on the north side of Escalante and any new lines should simply be tied into the existing lines path not add additional line placement; 2. the south side of Escalante currently has extensively and more noticeable vegetation in the form of trees which are noticeably taller and could impact any new transmission lines. The attached pictures were taken today standing on the south side of Escalante Rd. and S. Desert Spring Dr. They serve to document my concerns noted above (the first two are looking west and the second two are looking east). Question 1: The property lot on the Southeast corner of Kolb Rd. and Escalante Rd. was fairly recently finished off, fenced and landscaped. Is this TEP's property? Is it in fact the location for the Patriot Substation? Page 1 of the TEP Newsletter indicates the Patriot Substation would be across the street on the east side of Kolb Rd. which is currently part of AMARC. So what is the property across Kolb Rd. on the west side to be used for? Question 2: Do TEP employees actually go out now and physically walk these routes to look at what exists now or drive these routes slowly and take pictures to see how a p			Location	1, A, C1, C2	Response to be sent by J Barrios

Comment Date *Category* *Heard About*	*Support*	*Issues/Phone Message/Comments*	*Additional Info*	*Requested Info*	*Concerns Topics*	*Alternative Preferred*	*ResponseNotes*
Comment Method: Email							
8/25/2019	☐	Hello, I don't think that alternative C2 is a good idea because people walk and ride their bikes there along the Pantano wash. Maybe alternative 2 would be a better route. Thank you, Audrey Smith			Location, Other		Thank you for your feedback regarding the Irvington-East Loop 138-kilovolt (kV) Transmission Line project. We appreciate your concerns and will include them in the project record provided to the Arizona Corporation Commission. We hope that you will stay engaged with the project as we move forward to identifying the preferred routes that will be included in our application for the Arizona Corporation Commission. Please visit our website https://www.tep.com/irvington-east-loop/ for regular project updates. Thank you,
8/9/2019 Resident in Study Area	☐	I'm against route alterative A I'm right on Kolb and 6 lanes of traffic and the high tension lines that already exist are plenty of ugliness to deal with so please try the other routes that you have on the list. I'm only sending in one vote for my property so please make it count. Thank you; Steve Billheimer 520-444-6151			Appearance, Location	1, B1, B2, C1, C2	Thank you for your feedback regarding the Irvington-East Loop 138-kilovolt (kV) Transmission Line project. We appreciate your concerns and will include them in the project record provided to the Arizona Corporation Commission. We hope that you will stay engaged with the project as we move forward to identifying the preferred routes that will be included in our application for the Arizona Corporation Commission. Please visit our website https://www.tep.com/irvington-east-loop/ for regular project updates. Thank you,
Newsletter Mailing							
5/19/2019	☐	To Whom It May Concern, May 19, 2019 We want no transmission lines North of Broadway (routes 41 and 45) nor on either side of Kolb, but especially, not on the West side of Kolb.			Location	1, B1, B2, C1, C2	RESPONSE IN DRAFT: G:\Line Siting\Irvington to East Loop 2019\Outreach\Comment Tracking Database\TEP Responses\Responses by week

Comment Date *Category* *Heard About*	*Support*	*Issues/Phone Message/Comments*	*Additional Info*	*Requested Info*	*Concerns Topics*	*Alternative Preferred*	*ResponseNotes*
Comment Method: Email							
10/10/2019 Resident in Study Area	☐	Dear TEP, Thank you for opening up communication regarding the new power lines you are considering setting up near the Kolb and Escalante area. I am very concerned about the danger of these powerlines being placed in this area as I live in the Barrio Escalante area on Chelsie Kate Lane. I would like you to consider placing them in another location as my house is right off Kolb. Thank you. Sincerely, Jessica Vega			Health, Location		Thank you for your feedback regarding the Irvington-East Loop 138-kilovolt (kV) Transmission Line project. We appreciate your concerns and will include them in the project record provided to the Arizona Corporation Commission. Whenever possible, we do try to develop routes that have the least impacts on neighborhoods, schools, public accommodations, and other sensitive features. If you would like some information on health and safety as it relates to power lines, please look at our website: https://www.tep.com/electric-and-magnetic-fields/. We will be happy to address any questions you may have. We hope that you will stay engaged with the project as we move forward to identifying the preferred routes that will be included in our application for the Arizona Corporation Commission. Please visit our website https://www.tep.com/irvington-east-loop/ for regular project updates.

Comment Date *Category* *Heard About*	*Support*	*Issues/Phone Message/Comments*	*Additional Info*	*Requested Info*	*Concerns Topics*	*Alternative Preferred*	*ResponseNotes*
Comment Method: **Email**							

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DEPARTMENT OF THE AIR FORCE
355TH CIVIL ENGINEER SQUADRON (ACC)
DAVIS-MONTHAN AIR FORCE BASE, ARIZONA

December 5, 2019

Nicholas M. Germanos, P.E.
Deputy Base Civil Engineer
355th Civil Engineer Squadron
3775 S. Fifth Street
Davis-Monthan AFB AZ 85707

Tucson Electric Power
Attn: Irvington-East Loop
Mail Stop RC131
P.O. Box 711
Tucson AZ 85701-0711

Subject: Support for Irvington-East Loop 138 kV Transmission Line

Dear Tucson Electric Power

Davis-Monthan AFB fully supports Tucson Electric Power's proposed Irvington-East Loop 138 kV Transmission Line and Patriot Substation. This support includes the planned location of the substation and the specific, proposed routing of the transmission lines themselves. This project will provide essential support to the base in our efforts to comply with energy security and resiliency directives issued by the Department of Defense and Headquarters United States Air Force.

In addition to achieving our compliance with federal resiliency directives, the project will assist us in achieving the energy security objectives stated in our 2016 Installation Development Plan. Furthermore, we understand that the project will also improve electric reliability for Tucson Elecric Power customers within and near the project study area.

If I can be of further assistance, please do not hesitate to contact me by phone at (520) 228-3401, or via email at nicholas.germanos@us.af.mil.

Sincerely

Nicholas M. Germanos, P.E.
Deputy Base Civil Engineer

TRAIN – DEPLOY – WIN
RESCUE & ATTACK!

CeCe Aguda

From: CAguda@tep.com
Sent: Friday, November 22, 2019 2:40 PM
To: CeCe Aguda
Subject: FW: TEP Transmission Line Poles
Attachments: Pole Height Calc Map 1.png; smime.p7s; ATT00001.txt; ATT00002.htm

Categories: Important

From: Darling, Renee
Sent: Friday, November 22, 2019 3:39:48 PM (UTC-07:00) Arizona
To: Aguda, Cece
Subject: FW: TEP Transmission Line Poles

FYI

Renee Darling
Supervisor, Environmental & Land Use Planning
Tucson Electric Power Company
Land Resources – RC131
3950 E. Irvington Road
Tucson, AZ. 85714-2114
520-884-3642 Fax 520-545-1436
rdarling@tep.com

From: CARTER, BONNIE K CIV USAF ACC 355 CES/CENPP <bonnie.carter@us.af.mil>
Sent: Thursday, August 15, 2019 4:32 PM
To: Ware, Alicia <AWare@tep.com>
Cc: Varga, Kenneth <KVarga@tep.com>; Darling, Renee <RDarling@tep.com>; GERMANOS, NICHOLAS M GS-13 USAF ACC 355 CES/CEN <nicholas.germanos@us.af.mil>; FROSCH, JARED C GS-12 USAF ACC 355 CES/CENP <jared.frosch.1@us.af.mil>; KRIVOKAPICH, GARY GS-12 USAF ACC 355 CES/CEN <gary.krivokapich.1@us.af.mil>
Subject: [EXTERNAL E-Mail]RE: TEP Transmission Line Poles

Alicia
I finally had a moment to complete the calculations of max pole heights for the 6 pole points you provided coordinate for. I also added 5 additional points along Valencia to show you the limitations on pole heights within these zones of the airfield imaginary surfaces. You can see by the max pole heights for these 5 points are so low, this is the reason we had asked you to route the transmission lines outside of this area. I have numbered each pole and placed a table on the map image attached to reference to max pole heights we calculated using Unified Facilities Code 3-260-01, Airfield and Heliport Planning and Design.
If you have any other poles you want me to check just shoot me over the coordinates and I can do the same as I have here. Let know if you have any questions.

B. Kacey Carter, Civ USAF ✪
Base Community Planner
355th Civil Engineer Squadron/CENPP
Davis-Monthan AFB AZ
520-228-3291
bonnie.carter@us.af.mil

From: AWare@tep.com
Sent: Wednesday, August 7, 2019 4:42 PM
To: CARTER, BONNIE K CIV USAF ACC 355 CES/CENPP
Cc: KVarga@tep.com; RDarling@tep.com
Subject: [Non-DoD Source] RE: TEP Transmission Line Poles

Kacey,

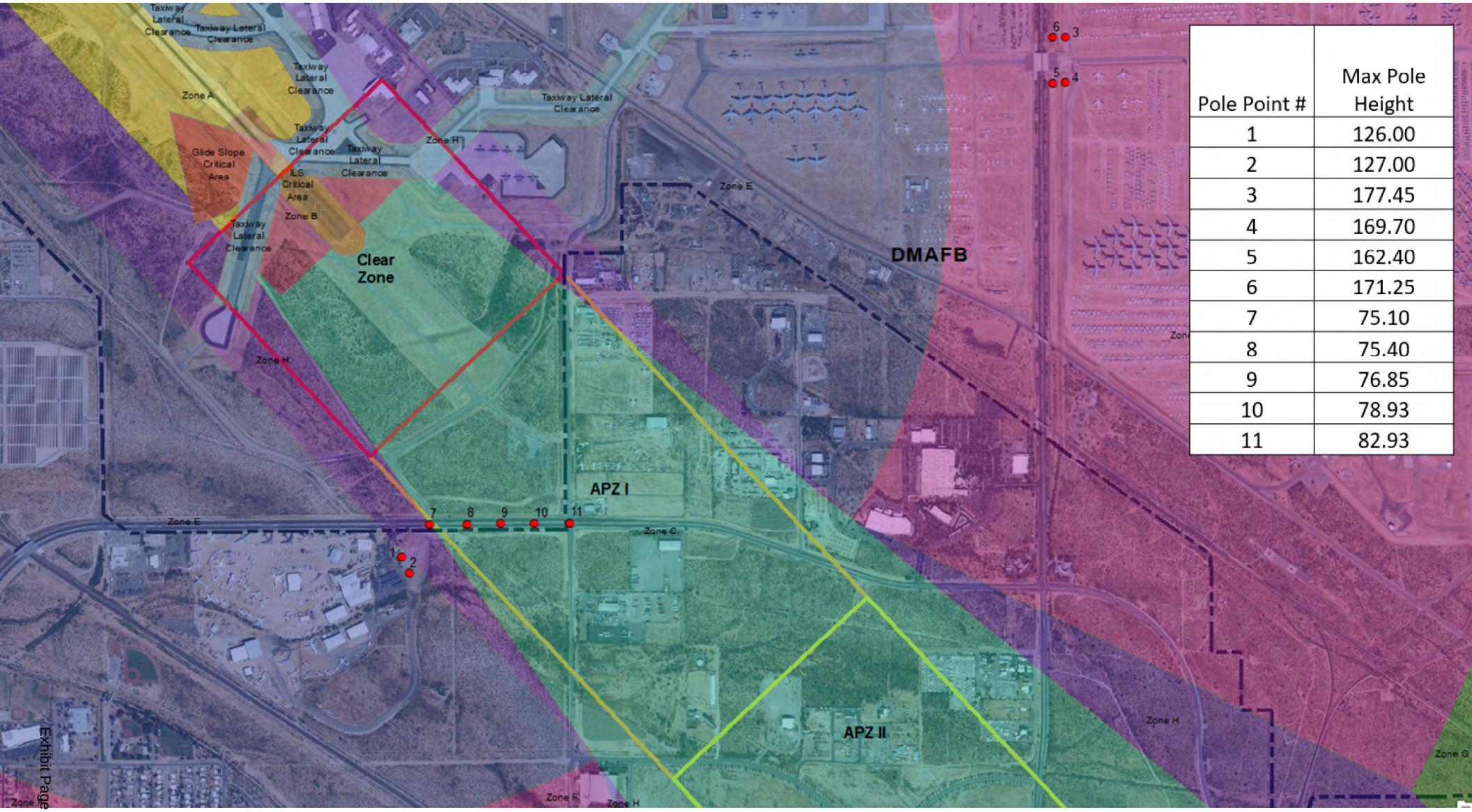
We are also looking at the heights for the structures along Valencia Rd. near the Pima Air and Space Museum. The Pima Air and Space Museum has also asked for some clearance requirements in order to tow planes into the museum. I believe that you had mentioned in a previous email that our height ceiling in the area was 110'-0". I have provided points for the two tallest structures in the area for the Pima Air and Space Museum. Would you be able to check these for us in regards to the elevation of the runway? Again these points are in Arizona Central State Plane NAD83 and the elevations are based on PAG data. Let me know if you need the points in a different format.

Structure 1
Northing: 416459.3800
Easting: 1025785.6900
Approximate Elevation: 2728.1800
Structure Height Above Grade: 110'-0"

Structure 2
Northing: 415991.9500
Easting: 1026201.5600
Approximate Elevation: 2728.2200
Structure Height Above Grade: 110'-0"

Thanks for your help.

Alicia Ware
Tucson Electric Power
Civil/Transmission Engineer
Office: (520) 745-3149 | Cell: (520) 490-3873
88 East Broadway Mail Stop HQE611, Tucson, Az 85701
Email: aware@tep.com



Pole Point #	Max Pole Height
1	126.00
2	127.00
3	177.45
4	169.70
5	162.40
6	171.25
7	75.10
8	75.40
9	76.85
10	78.93
11	82.93

SOUTHWEST GAS CORPORATION

August 23, 2019

Tucson Electric Power Company
Attn: Renee Darling
Land Resources – RC131
3950 E. Irvington Road
Tucson, AZ. 85714-2114

RE: TUCSON ELECTRIC POWER'S IRVINGTON TO EAST LOOP 138KV TRANSMISSION LINE

Ms. Darling,

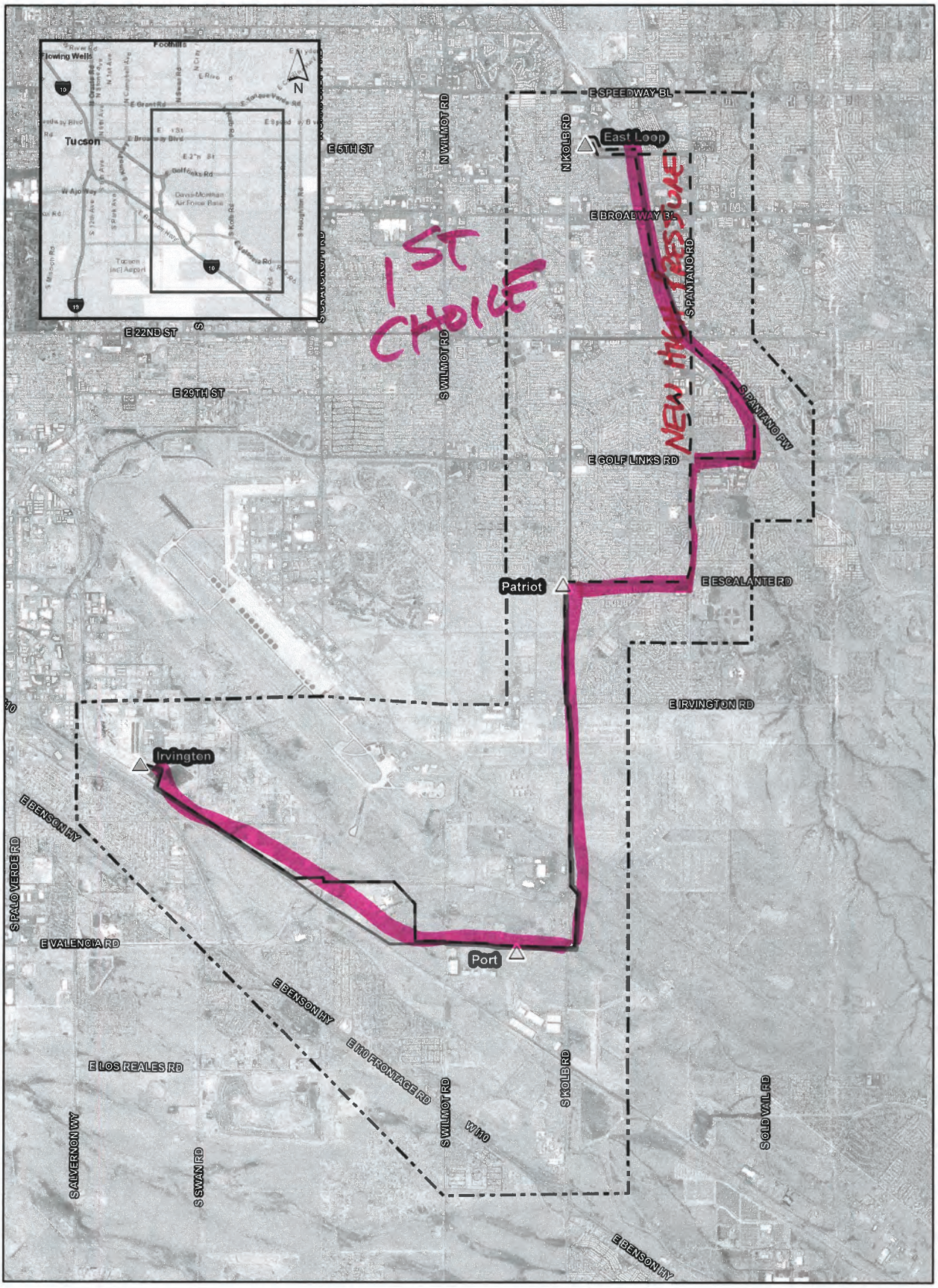
The Southwest Gas Corrosion Department has reviewed the transmission power line proposed routes. The two chosen routes are expected to cause fewer incidents with the existing corrosion protection system compared to other options. However, there is a possibility that once the transmission power line is in service, the design voltage could cause CP issues on SWG steel system.

SWG requests to be included in the distribution of future submittals and final plans in order to verify further if SWG facilities will be in conflict with proposed improvements. If you have any questions or require any additional information, please contact me at (520) 794-6234.

Very Respectfully,

Hector Rivas Cabrera
Engineer I
Southern Arizona Division
Hector.RivasCabrera@swgas.com

Enc: SWG PREFERRED ROUTES - IRVINGTON TO EAST LOOP TEP PROJECT



TEP
Tucson Electric Power
Land Resources

Irvington to East Loop 138kV Transmission Line

Route Alternatives

- Planned Substations
- Existing/Approved Substations
- Revised Study Area

Irvington to Patriot

- Alternative 1
- Alternative 2

Patriot to East Loop

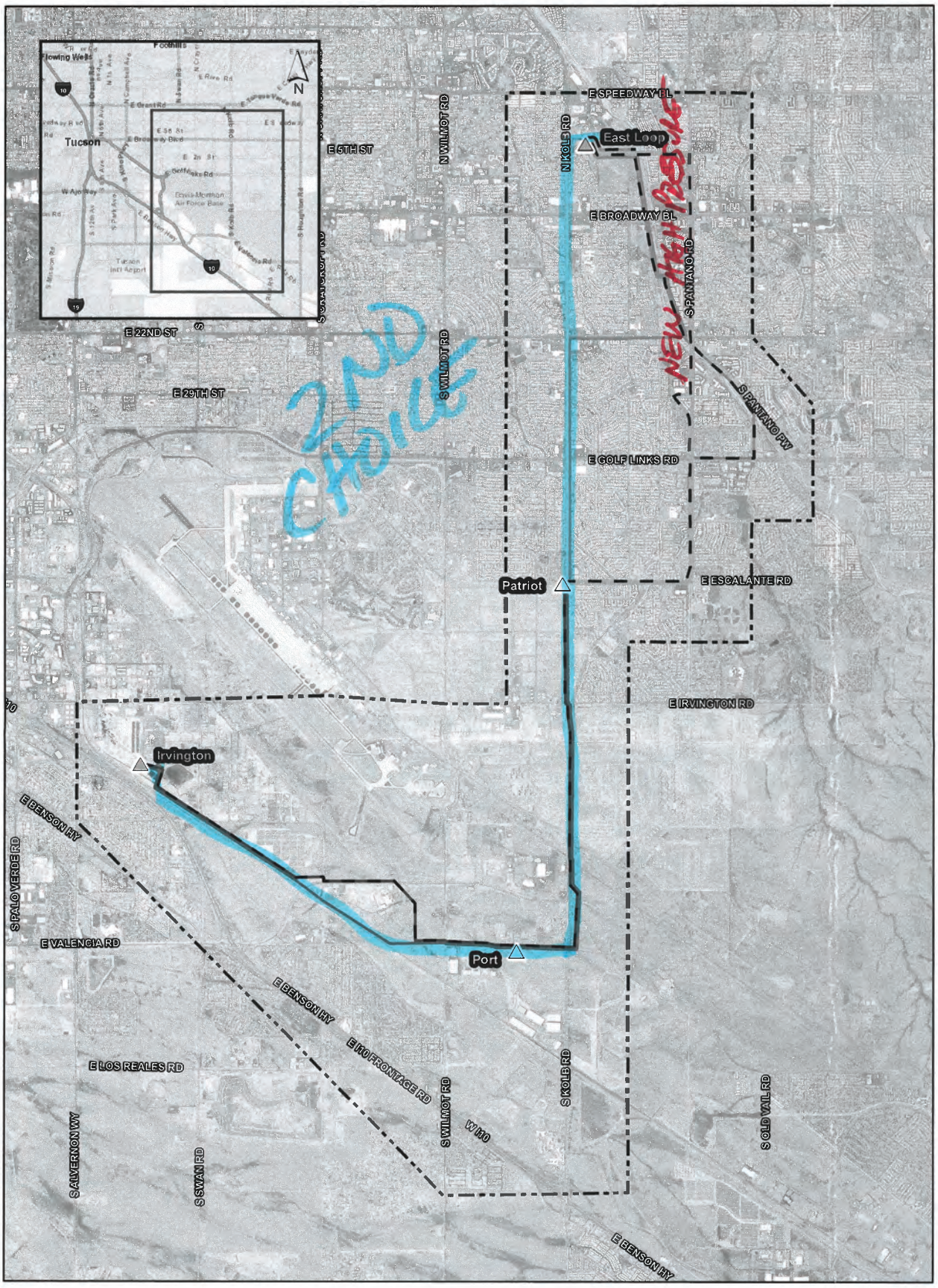
- Alternative A
- Alternative B1
- Alternative B2
- Alternative C1
- Alternative C2

0 2,000 4,000
Feet
1 Inch = 4,000 Feet

Sources: ESRI, TEP, UNS, and Pima County GIS
Projection: NAD 1983 UTM Zone 12N
Basemap: PAG Imagery 2015

This map is for planning purposes only. TEP and UNS Energy make no warranty of its accuracy.

7/5/2019 ua53279 Y:\Projects\Irv_to_East_Loop(DM)_138kV\MXD\Irv_to_East_Loop(DM)_Route_Alts.mxd



TEP
Tucson Electric Power
Land Resources

Irvington to East Loop 138kV Transmission Line

Route Alternatives

△ Planned Substations
▲ Existing/Approved Substations
Revised Study Area

Irvington to Patriot
Alternative 1
Alternative 2

Patriot to East Loop
Alternative A
Alternative B1
Alternative B2
Alternative C1
Alternative C2

0 2,000 4,000
Feet
1 Inch = 4,000 Feet

Sources: ESRI, TEP, UNS, and Pima County GIS.
Projection: NAD 1983 UTM Zone 12N
Basemap: PAG Imagery 2015

This map is for planning purposes only. TEP and UNS Energy make no warranty of its accuracy.

7/5/2019 ua53279 Y:\Projects\Irv_to_East_Loop(DM)_138kV\MXD\Irv_EL(DM)_Routes_1A.mxd

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CITY OF TUCSON
DEPARTMENT OF TRANSPORTATION

September 16, 2019

Renee Darling
Supervisor, Environmental & Land Use Planning
Tucson Electric Power Company
Land Resources – RC131
3950 E Irvington Road
Tucson, AZ 85714-2114

SUBJECT: Irvington to East Loop 138kV Transmission Line

Dear Ms. Darling:

The City of Tucson Department of Transportation is providing these comments regarding TEP's proposed Irvington to East Loop 138kV Transmission Line project. City staff reviewed the alternative routes for the new line and summarized some issues to serve as a guideline for selecting the final route. While these comments do not recommend a particular route, they should assist TEP in making a well-informed final decision. Transportation staff will continue to work with TEP as needed to assist with that final decision.

- Negative visual impacts to roadways, adjacent businesses and tourism attractions (i.e. Pima Air and Space Museum) should be minimized as much as possible. In general, the large poles and lines should not cause major harm to the aesthetics of these facilities as that could result in economic losses.

- Poles must be carefully located at major intersections to provide a safe Sight Visibility Triangle (SVT) for all vehicle turning movements, as well as pedestrian and bicycle movements. The same applies to commercial center driveways where poles can potentially block safe ingress and egress. TEP staff must work with Transportation Department staff throughout the major phases of the design process to ensure pole placement is appropriate.

- In the past, large TEP transmission line poles have been placed in the City's public right-of-way where pedestrian access is partially blocked or fully blocked for wheelchair users. Any placement of poles must not block pedestrian access to the extent it violates the Americans with Disabilities Act (ADA) design requirements. A minimum 4-foot wide paved pedestrian route must be provided per PROWAG design guidelines. Where new poles are installed on pedestrian routes, TEP will be required to provide a minimum 4-foot wide concrete sidewalk around the pole footprint on both sides to tie into the City's sidewalk network. Any existing concrete sidewalk that is removed must be replaced to meet minimum ADA design requirements.

- New overhead lines and poles should be located so they do not disrupt or require the removal of existing tree canopies. In the event the City's trees must be removed, TEP will be required to replace the trees with equal quantity, type, and size and include a two-year warranty backed by a reputable local landscape company or nursery.

P.O. BOX 27210 • TUCSON, AZ 85726-7210
(520) 791-4371 • FAX (520) 791-5902
https://www.tucsonaz.gov

- The City has future plans to upgrade and widen Kolb Road to 6 lanes between Valencia and Escalante. The work also includes reconstruction of the sloped embankments on both sides of the roadway which travels through the DMAFB property. Future work will require a NEPA clearance. It is recommended that TEP lines and poles be placed outside of the City's right-of-way in order to avoid impacts to the NEPA process. Does TEP already have an agreement to place lines on DMAFB property along this stretch of Kolb Road?

- TEP has expressed that there are challenges with installing infrastructure adjacent to residential areas where aerial easements may be required. The City would also prefer to minimize those conflicts and recommends that routes are chosen where there is the least impact to residential units and community centers.

Thank you for the opportunity to be part of your planning process and we look forward to a successful project. If you have questions or need clarification of these comments, please contact Deputy Director Robin Raine or me at (520) 791-4371.

Sincerely,

Diana W. Alarcon, CAPP
Director

Cc: Michael J. Ortega, P.E., City Manager
Robin Raine, P.E., Transportation Deputy Director

PIMA COUNTY
FLOOD CONTROL

December 3, 2019

Renee Darling
Supervisor, Environmental & Land Use Planning
Tucson Electric Power Company
Land Resources – RC131
3950 E. Irvington Road
Tucson AZ 85714-2114

Re: Preferred Alternative for Irvington-East Loop (IRV-EL) 138 KV Transmission Line

Dear Ms. Darling:

The Regional Flood Control District (District) has received your email of November 25, 2019, which contained a map showing TEP's final route options for this project, the preferred alternative, and a request for comment on route options.

While Alternative A impacts District Facilities less than the preferred alternative Alternative B2, the impacts of Alternative B2 to our facilities are expected to be minor as this route will replace an existing line. The District has no objection to Alternative B2 provided that the District continues to receive notifications about the project progress and that prior to start of construction TEP will obtain Facility Impact Permits for any activities within District Facilities.

Sincerely,

Ann B. Moynihan, P.E., CFM
Civil Engineering Manager

Suzanne Shields, P.E., Director
201 N. Stone Avenue, 9th Floor, Tucson, Arizona 85701-1207 • Phone: 520-724-4600 • Fax: 520-724-4621

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Century Park Research Center

Global Logistics Hub to the Southwest and Mexico

520.623.1411
www.century-park.com

Mike Levin
Port of Tucson
6964 E Century Park Dr.
Tucson, AZ 85756

December 5th, 2019

Tucson Electric Power,
Attn: Irvington-East Loop
Mail Stop RC131
P.O Box 711
Tucson, AZ 85701-0711

Subject: ***Support for Irvington-East Loop 138 kV Transmission Line and Port Substation***

Dear Tucson Electric Power,

The Port of Tucson would like to express our support for TEP's proposed Irvington-East Loop 138 kV Transmission Line and Port Substation. This project will provide needed electrical infrastructure to the Port of Tucson/Century Park Research Center as the area accommodates industrial development.

The Port of Tucson is located in an active Foreign Trade Zone and supports international trade. Additionally, the Port is located in close proximity to major transportation corridors. As such, this area is particularly attractive to high-demand energy customers that value and depend on reliable power service. Most recently notable, the worldwide online retail distributor, Amazon, has built and brought into operation a new distribution center within this area. Both the City of Tucson and Pima County have designated our several-hundred-acre land area as "Shovel Ready" and this project will compliment and further strengthen that designation. Additionally, we understand that the project will also improve electric reliability for TEP customers within and near the project study area. For these reasons and many others, we reiterate our support for this much needed expansion of TEP infrastructure.

Sincerely,

Mike Levin
President, Port of Tucson

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From: Marinez, Adriana <AMarinez@tep.com>
Sent: Monday, November 25, 2019 10:09 AM
To: Darling, Renee <RDarling@tep.com>
Cc: Rucker, Jasmine <JRucker@tep.com>
Subject: Irvg to EL - Public Official Outreach

Steven and I briefed Ward 2 Council Member Paul Cunningham on the Irvington to East Loop project when we met with him about the TEP rate case on 9/24/19. He was concerned about the aesthetics of the lines and asked that they be buried. We explained the complexity and cost of undergrounding transmission and discussed undergrounding distribution in those areas as a possible alternative. We also encouraged him to submit written comment.

He included the following about the project in his newsletter:

Irvington East Loop Transmission Line Update

Posted September 27, 2019

Tucson Electric Power is developing plans for a new transmission line to help serve growing energy needs. The project would help Davis-Monthan Air Force Base satisfy its energy resiliency requirements and improve electric reliability for customers in Tucson.

TEP must determine a route for the Irvington-East Loop 138 Kilovolt Transmission Line, which will connect the Irvington Substation to the East Loop Substation. The line also must interconnect with the planned Port and Patriot substations. TEP has identified potential routes within a revised, expanded study area.

https://www.tucsonaz.gov/ward-2?page=1&__ncforminfo=Rsp6tDGwNjMJHWifzF838ex8o1TJNaooZFjD3Nx7bMpueckHIqPnDVLSShOTgfHm4n17GngJO-D_yC0BRRgHhUWrM0Wn3IGJ

Let me know if you need anything else.

Thanks,

Adriana Mariñez
Government Relations Local A airs
UNS Energy Corp. | Tucson Electric Power & UniSource Energy Services
520-884-3677 (o)
520-528-1512 (c)

Irvington East Loop Transmission Line Update

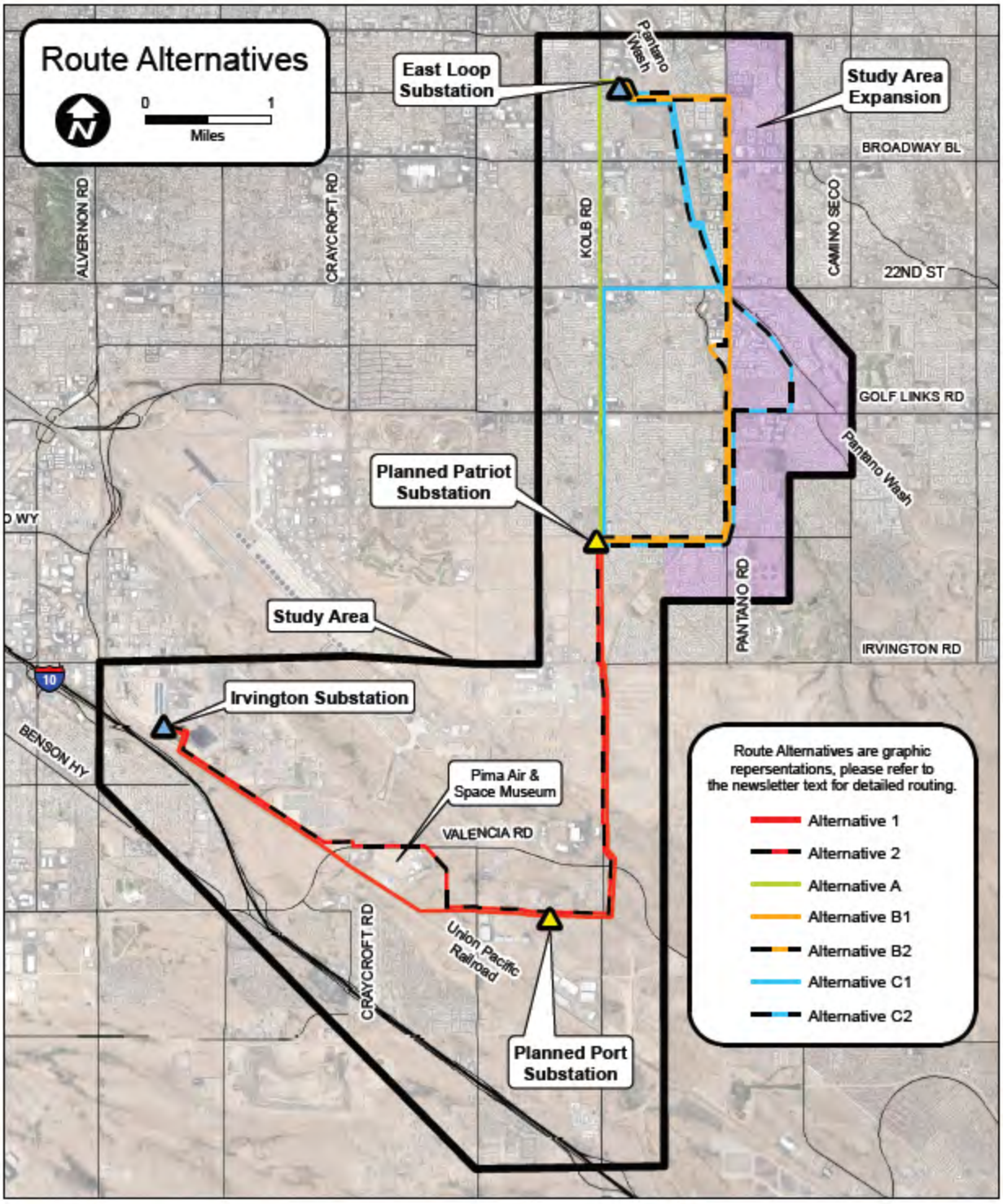
Posted September 27, 2019

Tucson Electric Power is developing plans for a new transmission line to help serve growing energy needs. The project would help Davis-Monthan Air Force Base satisfy its energy resiliency requirements and improve electric reliability for customers in Tucson.

TEP must determine a route for the Irvington-East Loop 138 Kilovolt Transmission Line, which will connect the Irvington Substation to the East Loop Substation. The line also must interconnect with the planned Port and Patriot substations. TEP has identified potential routes within a revised, expanded study area.

The company invites residents, property owners and other stakeholders to ask questions, submit comments and learn more about the project. TEP will use public input to identify three alternative transmission line routes that will be included in its application for approval to build the transmission line.

For more information, please visit https://www.tep.com/irvington-east-loop/



Irvington East Loop Transmission Line Update

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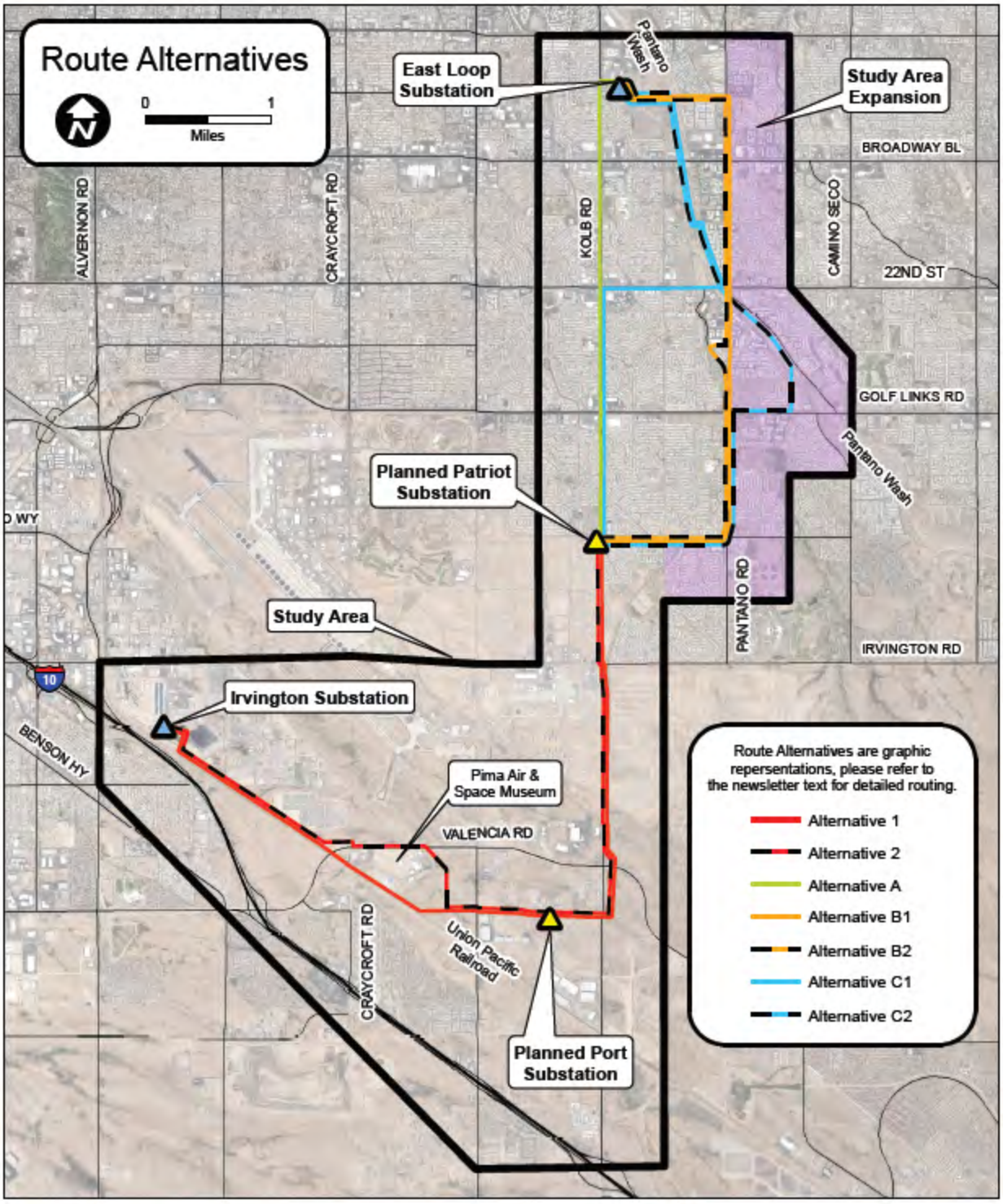

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