

Preliminary Application for Site Certificate for the Speedway Energy Facility

Background Information Exhibit

**Submitted to
Oregon Energy Facility Siting Council**

Prepared for



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Acronyms and Abbreviations

Acronym/Abbreviation	Definition
AC	alternating current
APLIC	Avian Power Line Interaction Committee
Applicant	BGTF Speedway Project LLC
ASC	Application for Site Certificate
BESS	battery energy storage system
BPA	Bonneville Power Administration
CFR	Code of Federal Regulations
DC	direct current
DNH	Determination of No Hazard
EFSC	Oregon Energy Facility Siting Council
EPA	U.S. Environmental Protection Agency
FAA	Federal Aviation Administration
Facility	Speedway Energy Facility
gen-tie	generation tie
HV	high-voltage
kV	kilovolt
Li-ion	lithium-ion
LLC	limited liability company
mG	milligauss
MW	megawatt
NESC	National Electrical Safety Code
O&M	operations and maintenance
OAR	Oregon Administrative Rules
ODOE	Oregon Department of Energy
ORS	Oregon Revised Statutes
POI	point of interconnection
SCADA	supervisory control and data acquisition
SPCC	Spill Prevention, Control, and Countermeasure
US-#	U.S. Route [designation]

1.0 Introduction

BGTF Speedway Project LLC (Applicant) proposes construction and operation of the Speedway Energy Facility (Facility), a renewable energy facility incorporating wind, solar, and battery energy storage, located on privately owned land in unincorporated Sherman County, Oregon. This preliminary Application for Site Certificate (ASC) includes the information necessary for the Oregon Department of Energy (ODOE) and the Energy Facility Siting Council (EFSC) to issue a Site Certificate for the Facility according to the Project Order under Oregon Administrative Rules (OAR) 345-015-0160(1) and the required contents of an ASC as indicated under OAR 345-021-0010.

Per OAR 345-021-0010(3), this document provides background information that supplements the information required by OAR 345, Divisions 22–24 and addressed in Exhibits A through O of this application.

2.0 Facility Information – OAR 345-021-0010(3)(a)(A)

OAR 345-021-0010(3) In addition to the material required in OAR 345, divisions 22 through 24, the applicant must submit in an exhibit called “Background Information Exhibit” the following background information about the project to assist the Council in its review of the application:

(a) Information about the proposed facility, construction schedule and temporary disturbances of the site, including:

(A) A description of the proposed energy facility, including as applicable:

The Applicant proposes construction and operation of the Facility, a renewable energy facility incorporating wind and solar energy generation, as well as battery energy storage, located in unincorporated Sherman County, Oregon (Figure 1).

The Facility’s site boundary encompasses 23,936 acres of privately owned land and is bisected by U.S. Route 97 (US-97). The area within the site boundary will be developed with wind turbines and separate solar arrays, while avoiding sensitive resource areas and reserving other areas for continued agricultural practices. The northernmost portion of the site boundary is 3.3 miles southeast of the city of Moro, and the middle portion of the site boundary is 0.6 miles from the city of Grass Valley. The Facility’s proposed point of interconnection (POI) to the regional electrical grid will be via a new Bonneville Power Administration (BPA) switchyard to be located within the site boundary, adjacent to the existing BPA 500-kilovolt (kV) Ashe-Marion Transmission Line, which runs northeast/southwest through the site boundary.

The Facility’s wind components consist of up to 44 wind turbine generators as well as associated wind turbine foundations and collection system. The solar components include solar modules as well as associated mounting and tracking systems and electrical components. The solar array area comprises up to 62 separate arrays, each separately fenced, and approximately 2,555,202 total modules. The Facility also includes a battery energy storage system (BESS) with up to 1,400 MW of

storage capacity, configured as six separate BESS areas within the site boundary. The Facility also includes six collector substations proposed adjacent to the six BESS areas and one central substation located adjacent to the POI. Other related or supporting facilities include six operations and maintenance (O&M) areas proposed adjacent to the six BESS areas and collector substations, site access roads, and temporary construction yards.

Figure 3 shows the preliminary Facility layout and contains sub-figures including overview maps and site detail maps.

2.1 Key Definitions and Design Considerations

2.1.1 Definition of Site Boundary and Micrositing Area

The Facility's site boundary establishes the perimeter of the site, within which all proposed major components and related and supporting facilities will be located. The site boundary encompasses approximately 23,936 acres of private land.

The Applicant has established a micrositing area within the site boundary (Figure 2). The micrositing area is a specific, continuous area of approximately 22,278 acres within the site boundary, where the construction of the Facility's major components and related and supporting facilities has been planned. The micrositing area excludes specific areas within the site boundary as requested by underlying landowners. The permanent footprint of Facility components will be much smaller than the micrositing area and is estimated at 8,048 acres based on preliminary design.

The micrositing area has been surveyed in accordance with ODOE requirements for the ASC, and impact calculations and analyses will be based on a worst-case, or most conservative, scenario customized for each resource under an EFSC standard. The Applicant will demonstrate as part of the ASC that the proposed Facility meets all applicable standards for a wind energy facility and solar energy facility.

2.1.2 Wind Turbine Technology

The Applicant has analyzed impacts using a representative turbine model with maximum worst-case dimensions and limited the total maximum number of turbines to 44. The specific model and manufacturer used will be determined near the time of construction. This preliminary Facility layout has involved significant engineering design work guiding the placement of turbines and supporting facilities while minimizing their impacts, and while representative of the final layout, does not necessarily indicate the specific location for each turbine, the final turbine model, or the final location of all the supporting facilities. The final layout will be determined prior to construction and will reflect additional survey data, final engineering design, and the Applicant's ongoing process of avoiding and minimizing impacts.

The Applicant requests flexibility to adjust the precise location of each turbine up to 100 feet in any direction, consistent with what is anticipated to be allowed by the Determination of No Hazard (DNH) to be issued by the Federal Aviation Administration (FAA) under 14 Code of Federal

Regulations (CFR), Part 77. The Applicant initiated the DNH process by submitting Form 7460-1, Notice of Proposed Construction or Alteration to the FAA for each wind turbine location on April 20, 2026. The adjustment of any turbine within this DNH 100-foot allowance would only occur if the new location were within the micrositing area, avoided sensitive resources (e.g., regulated cultural resources and jurisdictional wetlands and water bodies), and did not increase the severity of impacts as regulated by EFSC standards under OAR 345, Division 22.

2.1.3 Solar and BESS Selection Technology

The Applicant has evaluated impacts for the proposed solar arrays and BESS, considering different technology options, while limiting the total maximum number of solar modules and maintaining the same maximum spatial area footprint of the solar array area (the cumulative area within the fence line, comprised of 62 separately fenced arrays) and BESS areas. This approach will allow the Applicant to select the most appropriate system for generating and storing solar energy available at the time equipment is acquired, as well as optimal combination of wind and solar generation, so long as the system selected results in no greater impact than allowed for in the Site Certificate and satisfies all conditions of the Site Certificate. In analyzing impacts, it is assumed that the solar array would be constructed at its maximum level of impact in addition to the maximum number of wind turbines as described above. The final layout will be determined prior to construction and will reflect additional survey data, final engineering design, and the Applicant's ongoing process of avoiding and minimizing impacts.

2.1.4 Grid Interconnection

The Facility's POI will be via a new BPA switchyard to interconnect with the BPA 500-kV Ashe-Marion Transmission Line, which runs through the site boundary. The new BPA switchyard will be within the micrositing area, and based on communications with BPA to date, the Applicant anticipates the location to be directly adjacent to the Ashe-Marion Transmission Line, near where it is shown on Figure 4. However, the final location for the BPA switchyard within the micrositing area will be determined and permitted separately by BPA.

2.2 Electric Generating Capacity – OAR 345-021-0010(3)(a)(A)(i)

(i) For electric power generating plants, the nominal electric generating capacity and the average electrical generating capacity, as defined in ORS 469.300;

As defined by Oregon Revised Statutes (ORS) 469.300(4)(c), the Facility will have a nominal generating capacity of up to 1,800 MW (1,400 MW from solar and 400 MW from wind) and an average electrical generating capacity of 1,533 MW (1,400 MW from solar and 133 MW from wind).¹

¹ The Facility is expected to contribute up to 1,400 MW to the regional electrical grid based on the Facility's current interconnection position request.

2.3 Overview of Major Components – OAR 345-021-0010(3)(a)(A)(ii)

(ii) Major components, structures and systems, including a description of the size, type and configuration of equipment used to generate, store, transmit, or transport electricity, useful thermal energy, or fuels;

The Facility's major components, structures, and systems are summarized below:

- Wind turbines including the nacelle, blades, rotor, tower, foundations, and generator step-up transformers and transformer foundations, and associated switchgear; and
- Solar arrays which include modules, racking or tracker systems, posts, cabling, and inverters and transformers.

Exhibits A through O of this ASC analyze potential impacts associated with the worst-case scenario layout (i.e., largest Facility layout) within the site boundary. The equipment and layout selected at final design will not exceed the potential impacts analyzed in this ASC.

The following description of major components is based on the best design information available at this time. Description of related and supporting facilities is provided in Section 2.10; see Attachment 1 for the Facility Component Summary table. Figure 3 shows the preliminary Facility layout, including major and supporting components, and contains sub-figures including overview maps and site detail maps.

2.3.1 Wind Components

Wind Turbines

A wind turbine generator consists of a three-bladed rotor, attached to a nacelle that is mounted on a tubular tower. In operating mode, the rotor is located on the upwind side of the tower. A drawing of a typical wind turbine is depicted in Attachment 2.

The locations of the 44 wind turbines are shown on Figures 3.1 and 3.2. The preliminary Facility layout and the assessments in this ASC assume the use of a turbine with the dimensions listed below².

- Each turbine with generating capacity of up to 8 MW;
- Tower height (i.e., hub height) of up to 410 feet;
- Rotor diameter of up to 575 feet;
- Total maximum blade tip height of up to 698 feet; and
- Minimum blade tip clearance of 32 feet.

² To ensure conservative analyses for purposes of this ASC, the specifications provided here represent maximum, worst-case dimensions associated with multiple turbine models that remain potential options. Therefore, the ultimate turbine model that is selected will present a lower overall impact than has been assessed in this ASC.

The turbine begins generating electricity at wind speeds of approximately 7 miles per hour, although this wind speed varies by turbine size and manufacturer. At wind speeds greater than about 60 miles per hour, the turbines will shut down and the rotor will be automatically locked to prevent damage to the machine.

The turbines will be marked and lit according to FAA standards (FAA Advisory Circular 70/7460-1L), but no other lighting will be used on the turbines. FAA standards call for painting the turbines and towers white or light gray, making them visible to pilots from the air. Flashing red aviation lighting will be mounted atop turbines. Under current FAA standards, all of the lights will be programmed to flash in unison, allowing the entire Facility to be perceived as a single unit by pilots flying at night. The specific location, operation, and type of aviation lighting system will be determined in consultation with FAA prior to commencing operation of the Facility.

Nacelles

The nacelle sits atop the turbine tower. It houses the gearbox, generator, power converter, and control systems for the turbine. Access to the nacelle is via a ladder inside the turbine tower, which is accessible by a locked doorway at the base of the tower. The nacelle is mounted to the turbine tower on a geared plate that allows the turbine to rotate horizontally, orienting the nacelle such that the rotor faces into the wind to maximize capture of the available wind resource.

Blades and Rotors

Turbine blades are attached to the rotor hub, which is mounted to the front of the nacelle. A rotor blade is made of lightweight wood, metal, laminated fiberglass, and carbon fiber.

Turbine Towers

A turbine tower is a cylindrical steel structure tapered from the base to the top. The nacelle is mounted on top. Each tower is hollow and will feature a locked entry door at ground level, with an internal access ladder with safety platforms for access to the nacelle. Towers will be fabricated in sections and assembled on-site.

Turbine Foundations

A turbine tower is secured to a reinforced concrete foundation. The actual foundation type and design for each tower will be determined after on-site geotechnical studies are completed but are often either spread-footing (most common) or caisson-type concrete foundations. The spread-footing foundations typically reach a depth of 16–20 feet below grade and 85–100 feet in diameter; exact design dimensions depend on turbine model and soil conditions. At some locations, the foundation subbase may require improvement to raise the bearing capacity.

During construction, a temporary staging area will be cleared beside each turbine tower base, where turbine components will be offloaded and staged prior to assembly. An engineered, graveled pad may be installed adjacent to the foundation. During construction, this or temporary rig matting will serve as a pad for the construction crane, and following construction, as a parking area for maintenance vehicles. This temporary disturbance area is approximated by a 300-foot radius (600-

foot diameter) circle around the turbine. Permanent disturbance of the foundations is approximated by a 25-foot radius (50-foot-diameter) circle around the turbine. Following erection of the turbines, the temporary disturbance areas will be reclaimed through regrading to pre-construction contours, restoration of topsoil as needed, soil decompaction if necessary, and seeding or planting to restore habitat, as appropriate. The Applicant will coordinate with landowners for final restoration requirements in agricultural areas.

Pad-mount Transformer

For wind turbines that do not have a step-up transformer in the nacelle, a pad-mounted step-up transformer is installed at each turbine to step up the output voltage from the turbine (575–900 volts) to the collector system voltage (34.5 kV). Typically, the pad-mount transformer is a rectangular box located adjacent to the base of the turbine tower and supported by a concrete pad or foundation.

2.3.2 Solar Components

The solar components of the Facility, as described below, are located within the solar array area. The solar array area comprises up to 62 separate fenced arrays. Each of these separately fenced areas is numbered based on its associated collector substation (e.g., solar arrays 1A through 1J connect to collector substation 1) as shown on Figure 3.3.

Solar Modules

Solar modules use mono- or poly-crystalline cells to generate electricity by converting sunlight energy into direct current (DC) electrical energy. The electrical generation from a single solar module will vary by module size and the number of cells per module. The modules currently proposed have a nameplate rating up to 800 watts, and the dimensions of each module will be approximately 6 to 9 feet long and 3 to 5 feet wide. The maximum height of the top edge of the modules when at full tilt will be up to 12 feet above ground. Solar modules consist of antireflective glass, a metal frame, and wire connectors. The solar modules will be connected in strings, with up to four strings on a tracker. Rows of trackers will be separated by a minimum of 10 feet between the leading and trailing edge of the modules. The module strings are connected via cables and combiner boxes. The configuration of strings (the solar array) can vary depending on the equipment type and topography. The actual number of modules used will vary depending on the module technology, spacing, mounting equipment, and other design criteria, which are subject to change during final design.

The preliminary layout shown in Figure 3 for the purpose of analyzing maximum potential impacts, includes 2,555,202 modules in strings of approximately 26 modules per string.

Tracker Systems and Posts

Strings of solar modules will be mounted on fixed-tilt or single-axis tracker systems. The single-axis trackers optimize electricity production by rotating the solar modules to follow the path of the sun. The length of each tracker string may vary by topography and the number of modules that the

tracker can hold. The drive unit for the single-axis tracking system can control a single string or multiple strings of modules through a series of mechanical linkages and gearboxes. As the sun moves throughout the day, the trackers will adjust accordingly, optimizing solar energy production. The tracker system, and associated posts, will be specifically designed to withstand wind, snow, and seismic loads. Each tracker will be supported by multiple driven steel posts, which could be round hollow posts, or pile-type posts (i.e., H-pile, C-pile, S-pile). Post depth may vary depending on soil conditions, but the posts are typically installed 5 to 15 feet below the surface, depending on soil conditions.

The analysis presented in this ASC assumes 24,570 racks and up to 368,540 posts will be installed. The actual number of posts and foundation method may vary depending on the final racking system, topography, height of the solar modules, and site-specific geological conditions. Post locations will be determined by the final layout of the tracker system and geotechnical investigations of the solar array area within the Facility site boundary prior to final design.

Inverters and Transformers

Solar inverters and step-up transformers will collect DC power generated by solar modules, convert into AC power, and increase the voltage before connecting to the Facility's collector substations. Low-voltage cabling will link each solar module to the inverters and transformers. Inverters serve the function of converting DC power supply to an AC power supply in accordance with electrical requirements. The AC power from the inverters is routed to step-up transformers that will increase the output voltage from the inverter to the desired Facility collector substation feed voltage of 34.5 kV. The inverter and transformer specifications will comply with applicable requirements of the National Electrical Safety Code (NESC) and Institute of Electrical and Electronics Engineers standards.

The inverters and step-up transformers will be located together at stations dispersed throughout the solar array area. The number of inverter and transformers may vary depending on the final design. Figure 3.3 depicts a solar layout with 356 inverter and step-up transformer stations (i.e., one inverter and one step-up transformer at each station). Each station would include a 4400-kilowatt inverter that consists of 4 integrated 1100-kilowatt individual units.

Each inverter/step-up transformer station will sit on a concrete foundation approximately 30 feet by 12 feet and 2 to 3 feet in depth, which is subject to change during detailed design.

An example of an inverter and step-up transformer station is depicted in Attachment 2.

Low-Voltage Cabling

Solar modules generate DC electricity. Cables collect and aggregate the DC before it is converted to AC and sent to the Facility collector substations. Low-voltage cabling will connect the solar panels of each tracker string in a series and combine multiple strings to a single combiner box. Cabling from multiple combiner boxes will connect to a single inverter/step-up transformer station, which will convert the DC to AC and connect to the buried collection system. The cabling system for the

preliminary layout shown on Figure 3 uses approximately 8,663 Load Break Disconnect (LBD) combiner boxes. The exact number of combiner boxes will be determined during final design.

Cabling can be mounted to the tracker system, placed in cable trays, or buried.

2.4 Facility Site Plan – OAR 345-021-0010(3)(a)(A)(iii)

(iii) A site plan and general arrangement of buildings, equipment and structures;

A preliminary site plan is included in Figure 3.

2.5 Fuel and Chemical Storage Facilities – OAR 345-021-0010(3)(a)(A)(iv)

(iv) Fuel and chemical storage facilities, including structures and systems for spill containment;

The Facility does not require fuel or chemicals for the generation of electricity. During construction of the Facility, small quantities of chemical materials may be utilized in the temporary construction areas, and stored at the O&M buildings. Such materials may include cleaners, insecticides or herbicides, paint, or solvents. None will be present in substantial, reportable quantities and all materials will be handled in accordance with state and federal standards.

Fuels will be the only hazardous material that may be stored in substantial quantities on-site during construction. During construction, on-site fuel storage may be placed in designated areas within the temporary construction areas (up to six aboveground 1,000-gallon diesel tanks and two aboveground 1,000-gallon gasoline tanks are anticipated). Secondary containment and refueling procedures for on-site fuel storage will follow the Facility's Spill Prevention, Control, and Countermeasure (SPCC) Plan. Secondary containment will be compliant with requirements in 40 CFR §112, which requires secondary containment for all aboveground, buried, and partially buried containers. It is anticipated that the majority of fuel containers will have self-contained secondary containment (e.g., double-walled containers) that provide capacity for the entire container plus precipitation, but in some cases smaller containers (e.g., drums) will be placed in a constructed secondary containment area that is impervious and is diked or otherwise contained to provide the required fuel and precipitation capacity.

Most fuel will be delivered to the temporary construction areas by a licensed specialized tanker vehicle on an as-needed basis. The gasoline tanks are expected to be filled once per month. There will be no substantial quantities of lubricating oils, hydraulic fluid for construction equipment, or other hazardous materials maintained on-site during construction. Lubricating oil and hydraulic fluids for construction equipment will be either stored in small quantities on-site or brought in on an as-needed basis for equipment maintenance by a licensed contractor using a specialized vehicle, and waste oils removed by the same maintenance contractor. Hydraulic oils for the turbines and dielectric oils for the transformers will similarly arrive on an as-needed basis and transferred into the receiving components; none will be stored on-site.

There will be no substantial quantities of fuels or oils on-site for operation of the wind components, except as contained in qualified oil-filled equipment including the turbine gearboxes. Lubricating oil

(up to 5 gallons per turbine per year) will be brought in on an as-needed basis for periodic oil changes in the turbine gearboxes by a maintenance contractor using a specialized vehicle, and waste oils will be removed in the same way. Small quantities of gear oil may be maintained on-site for occasional top-offs; it is estimated that less than 10 gallons will be stored in each O&M building at any given time. A full gear oil change will be done as needed by a specialized contractor and used oils will be removed for recycling.

During Facility operations the primary chemical storage will occur in the transformers that use oil for cooling. The estimated oil capacity of one 34.5/230-kV collection transformer is ~20,000 gallons, and the estimated oil capacity of the 230/500-kV central substation transformer is ~30,000 gallons. Transformers at the inverter stations and for the BESS and collector substation will be ground-mounted units constructed on concrete pads with secondary spill containment traps designed to minimize the possibility of accidental leakage. Transformers typically use mineral oil or seed oil that is biodegradable and considered nontoxic. Transformer coolant does not contain polychlorinated biphenyls or compounds listed as extremely hazardous by the U.S. Environmental Protection Agency (EPA). The small quantity and nontoxic nature of the oils combined with the fact that the transformers will be included in secondary containment on concrete pads will minimize risk effects of potential spills on soils.

Small quantities (2 to 3 gallons) of pesticides or herbicides, paint, solvents, cleaners or other chemicals may be stored in the O&M buildings during Facility operations. Storage of these chemicals will follow label instructions. No underground storage tanks will be installed at the O&M buildings. No extremely hazardous materials identified under 40 CFR 355 are anticipated to be produced, used, stored, transported, or disposed of at the Facility during operation.

In the unlikely event of a spill, the Applicant or the Applicant's contractor will follow response measures outlined in its operations SPCC Plan as required under 40 CFR 112. As part of this plan, equipment containing oil or hazardous materials will be regularly monitored for leaks, and measures will be put in place if any are found to quickly control and remove spills.

The Facility's BESS is anticipated to use lithium-ion (Li-ion) batteries. Li-ion battery systems are modular systems that contain multiple smaller battery cells. The cells are hermetically sealed and are the primary containment for the battery. The module containing the cells serves as a secondary leak-proof containment. Modules are placed on anchored racks within steel containers. The risk of leaking is low because in the unlikely case that a battery cell ruptures the battery cells and their modules are contained in the BESS steel container. Used Li-ion batteries can be considered hazardous waste by the EPA and will be disposed of according to the most current guidelines at the end of their useful life.

2.6 Fire Prevention and Control – OAR 345-021-0010(3)(a)(A)(v)

(v) Equipment and systems for fire prevention and control;

Exhibit M – Wildfire Prevention and Risk Management provides detailed information on wildfire risks and prevention. This section provides a summary of these topics. While wind and solar

facilities do not pose a significant fire risk, the Applicant is committed to implementing the following actions during Facility siting and design, construction, and operations. Fire prevention and control associated with the BESS components in particular are discussed below.

The greatest risk of fire will occur during construction of the Facility, when welding and metal cutting for foundation rebar frames will take place, and vehicles and construction equipment may be used in areas of tall, dry grass. To prevent fires from occurring, the construction contractor will implement a number of systems and procedures. These will include requirements to conduct welding or metal cutting only in areas cleared of vegetation, and to keep emergency firefighting equipment on-site when potentially hazardous operations are taking place. Construction workers will be prohibited from parking vehicles in areas of tall dry vegetation to prevent fires caused by contact with hot mufflers or catalytic converters. On-site employees will also receive training on fire prevention and response and have on-site fire extinguishers to respond to small fires. In the event of a large fire, emergency responders will be dispatched.

While incidents of wind turbine fires have occurred, these incidents are rare and have generally been traceable to poor maintenance or electrical malfunction. The risk of turbine fires will be minimized through proper maintenance of the turbine and its critical mechanical and electrical components. Lightning protection systems are built into the turbine blades and tower to electrically ground the entire structure and to eliminate the potential for lightning-caused fires.

Fire prevention specific to solar arrays is dependent on proper installation and maintenance of electrical equipment to prevent short-circuits and consequent sparking, and reduction in fuel to reduce the chance of fire spreading. All electrical equipment will meet National Electrical Code and Institute of Electrical and Electronics Engineers standards and will not pose a significant fire risk. Well-qualified employees will be used to install and maintain electrical equipment. The solar array will have shielded electrical cabling, as required by applicable code, to prevent electrical fires. Vegetation within the solar array area will be managed as needed to reduce fuels for fire. Vegetation near and under solar panels may be mowed periodically. Weeds will be managed in accordance with the weed management procedures described in the Draft Vegetation and Soil Management Plan (see Exhibit C – Soil Protection, Attachment C-2). The solar arrays will include a minimum 20-foot noncombustible, defensible space clearance on the inside of perimeter fencing in its entirety (i.e., all the way around perimeter fencing inside the solar arrays). In many locations, this space will be substantially larger (30+ feet). In addition, the Facility will maintain a 20-foot-wide fire break outside all east-facing solar perimeter fencing where bordering non-participating properties or situated upwind of residences and buildings. This additional fire break was developed based on the prevailing wind direction of the area—from west to east—and was developed in consultation with the South Sherman Fire & Rescue chief (see Exhibit L – Public Services, Attachment L-3).

The electrical collection system and collector substations will have redundant surge arrestors to deactivate the Facility during instances of unusual operational events that could start fires. The collector substations will have also sufficient spacing between equipment to prevent the spread of

fire. With proper maintenance and safety checks, the electrical collection system and 230-kV collector lines are unlikely to cause a fire.

Facility roads will be sufficiently sized for emergency vehicle access in accordance with current Oregon Fire Code requirements, including Section 503 and Appendix D – Fire Apparatus Access Roads. Specifically, new access roads will be graveled and range from 16 to 24 feet in width with a minimum internal radius of 40 feet and less than 10 percent grade to provide access to emergency vehicles. These roads also serve as de facto fire breaks, in addition to providing improved site access to emergency vehicles. The areas immediately around the BESS, substations, and O&M buildings will be graveled, with no vegetation present.

See Exhibit M for additional discussion of Facility fire prevention measures and coordination with local emergency responders. Smoke/fire detectors will be placed around the site that will be tied to the supervisory control and data acquisition (SCADA) system (see Section 2.10) and will contact local firefighting services. The O&M buildings will have basic firefighting equipment for use on-site during maintenance activities, such as shovels, beaters, portable water for hand sprayers, fire extinguishers, and other equipment.

Battery Energy Storage System

The chemicals used in Li-ion batteries are generally nontoxic but do present a flammability hazard. Li-ion batteries are susceptible to overheating and typically require cooling systems dedicated to each BESS enclosure, especially at the utility scale (LAZARD 2021). In the unlikely event of a thermal runaway event, an overheating lithium-ion cell may release gases primarily consisting of carbon dioxide and smaller portions of carbon monoxide, hydrocarbons and hydrogen. The electrolyte solution, usually consisting of ethylene or propylene carbonates, may also vaporize and vent if the cell overheats (Battery University 2022). However, importantly, modern BESS products come with systems that detect, manage, and mitigate the impact of a thermal event to the battery system and environment.

The Applicant will implement the following fire prevention and control methods to minimize fire and safety risks for the Li-ion batteries proposed for the BESS:

- The batteries will be stored in sealed modules within enclosures incorporating engineered venting and/or secondary containment.
- Ample working space will be provided around the battery energy storage system for maintenance and safety purposes.
- Off-site, 24-hour monitoring of the BESS will be implemented and will include shutdown capabilities.
- Transportation of lithium-ion batteries is subject to 49 CFR 173.185. This regulation contains requirements for prevention of a dangerous evolution of heat; prevention of short circuits; prevention of damage to the terminals; and prevention of batteries coming into contact with other batteries or conductive materials. Adherence to the requirements and regulations, personnel training, safe interim storage, and segregation from other potential

waste streams will minimize any public hazard related to transport, use, or disposal of batteries.

- Design of the BESS will be in accordance with applicable Underwriters Laboratories (UL; specifically, 1642, 1741, 1973, 9540, together with large-scale fire testing under UL 9540A), National Electric Code, and National Fire Protection Association (specifically 855) standards, which require rigorous industry testing and certification related to fire safety and/or other regulatory requirements applicable to battery storage at the time of product procurement.
- Additionally, the Applicant will employ the following design practices, as applicable to the available technology and design at time of construction:
 - Use of Lithium-iron phosphate battery chemistry, which is a more thermally stable Li-ion cathode chemistry;
 - Use of HVAC and/or liquid cooling systems to maintain battery temperatures within the optimal range, which reduces the risk of battery malfunction that could lead to fire;
 - Employment of an advanced and proven battery management system;
 - Qualification testing of battery systems in accordance with UL 9540A (UL Solutions 2023);
 - Employment of fire control panels with 24-hour battery backup;
 - Installation of fire sensors, alarms, and thermal management systems in every battery enclosure;
 - Implementation of locks and fencing to prevent entry of unauthorized personnel;
 - Installation of remote power disconnect switches; and
 - Clear and visible signs to identify remote power disconnect switches.

2.7 Thermal Power Plants – OAR 345-021-0010(3)(a)(A)(vi)

(vi) For thermal power plants, combustion turbine power plants, or other facilities designed to generate electricity from gas, liquid, or solid fuels:

(I) A discussion of the source, quantity and availability of all fuels proposed to be used in the facility to generate electricity or useful thermal energy;

(II) If the facility will generate electric power from natural gas, petroleum, coal or any form of solid, liquid or gaseous fuel derived from such material, a discussion of methods the facility will use to ensure that the facility does not emit greenhouse gasses into the atmosphere, and a description of any equipment the facility will use to capture, sequester, or store greenhouse gases;

(III) A description of energy flows within the facility, including power cycle and steam cycle diagrams, as appropriate;

(IV) A description of equipment and systems for disposal of waste heat generated by the facility; and

(V) The fuel chargeable to power heat rate of the energy facility.

The Facility is not a thermal power plant, combustion turbine power plant, or other facility designed to generate electricity from any gas, liquid, or solid fuels. The Facility will generate wind and solar power; consequently, no waste heat will be generated. Therefore, this rule is not applicable.

2.8 Surface Facilities Related to Underground Gas Storage – OAR 345-021-0010(3)(a)(A)(vii)

(vii) For surface facilities related to underground gas storage, estimated daily injection and withdrawal rates, horsepower compression required to operate at design injection or withdrawal rates, operating pressure range and fuel type of compressors;

The Facility does not involve underground gas storage. Therefore, this rule is not applicable.

2.9 Facilities for Storage of Liquefied Natural Gas – OAR 345-021-0010(3)(a)(A)(viii)

(viii) For facilities to store liquefied natural gas, the volume, maximum pressure, liquefaction and gasification capacity in thousand cubic feet per hour;

The Applicant does not propose the storage of liquefied natural gas. Therefore, this rule is not applicable.

2.10 Description of Related and Supporting Facilities – OAR 345-021-0010(3)(a)(B)

(B) A description of major components, structures and systems of each related or supporting facility;

In addition to the major components described in Section 2.3, the Facility's related or supporting facilities will consist of the electrical collection system, BESS, O&M areas; site access and service roads; perimeter fencing and gates; temporary construction areas; meteorological data collection towers (met towers); and communication and SCADA systems.

2.10.1 Electrical Collection System

The Facility's electrical collection system includes a series of components situated between the step-up transformers for the wind turbines and solar arrays, and the Facility's central substation where the generated power will be stepped up from 230 kV to 500 kV in order to connect to BPA's existing 500-kV transmission system. The collection system includes 34.5-kV collector lines, six collector substations, and 230-kV aboveground collector lines. The collection system initially carries power generated by the wind turbines and solar arrays at 34.5 kV. The 34.5-kV collector lines will carry the power to one of six collector substations, in which the voltage will be stepped up from 34.5 kV to 230 kV. Power will then be transmitted from the six collector substations via proposed aboveground 230-kV collector lines to the central substation.

34.5-kV Collector Lines

The 34.5-kV collector lines will connect the 34.5-kV wind and solar step-up transformers to six collector substations. The 34.5-kV wind and solar collector lines are planned to be constructed underground and buried to a minimum depth of 3 feet. The 34.5-kV collector lines will consist of three wires, or phases; each cable will be an insulated, stranded metal conductor. The Applicant primarily proposes installation of underground 34.5-kV collector lines via open cut trenching, with directional boring proposed as needed to avoid impacts to sensitive resources such as stream crossings and to avoid other constraints such as US-97. Based on further geotechnical investigation, short segments of aboveground 34.5-kV collector line may be required to avoid impacts where directional boring is determined to be infeasible; however, no aboveground segments are proposed at this time.

The total length of underground collector line construction trenches connecting the wind energy transformers to the collector substations will be approximately 32 miles. The total length of underground collector line construction trenches associated with solar will be approximately 187 miles, which includes approximately 88 miles within the solar array area and approximately 99 miles located outside of the solar array area. For the purposes of the ASC, the Applicant assumes a temporary impact corridor approximately 50 feet wide for the wind 34.5-kV collector lines and 30 feet wide (or 15 feet on each side from the outermost line, where multiple lines run in parallel) outside of the solar array area. Temporary impacts from 34.5-kV collector line construction will be restored and revegetated following construction.

Collector Substations

Up to six collector substations will be constructed to support the Facility at various locations within the microsite area (Figure 3). The collector substations are approximately 2.8 acres each. Each collector substation will consist of one 230-kV transformer, switchgear and other equipment (e.g., protection & controls, metering, communications) as will be determined in final design.

Prior to construction, the collector substation sites will be cleared and graded, with a bed of crushed rock applied for a durable surface. All collector substations will be enclosed by a locked chain-link fence that is up to 8-feet tall.

The 34.5-kV collector lines from the wind and solar transformers will connect into the collector substations, where transformers will step the power up to 230 kV for more efficient delivery within the Facility. From these collector substations, 230-kV collector lines will transmit the power to the Facility's central substation.

230-kV Collector Lines

The Facility proposes aboveground 230-kV collector lines to connect the six collector substations to the one central substation. Figure 3 shows that the 230-kV collector lines are proposed in one central corridor that runs for approximately 14 miles between the six collector substations down the middle of the microsite area. Within this central corridor, there will be up to two circuits and six individual collector lines.

The 230-kV collector lines will be supported by 166 steel poles in a variety of pole-structure designs. For the majority of the collector line route, monopoles will be used, with some locations using two-pole structures where the lines change direction. Where the 230-kV collector lines cross under the existing BPA aboveground transmission lines, up to eight shorter poles will be placed in parallel in order to maintain a safe distance from the existing BPA structures and lines.

The 230-kV collector lines will be designed to maintain a minimum conductor-to-ground clearance of 28 feet (minimum ground clearance varies with location per safety codes) and the pole-structures will be an average of approximately 115 feet above ground, with a minimum height of approximately 50 feet and maximum height of approximately 135 feet. The spacing between pole-structures will be an average of approximately 600 feet depending on the terrain, with a minimum spacing of approximately 150 feet and a maximum spacing of approximately 950 feet.

The pole-structures will have a range of foundation diameters including 4 feet for direct embed light-duty tangent monopoles and 8 feet for dead-end engineered steel monopoles on foundation.

The 230-kV collector lines will be designed following Avian Power Line Interaction Committee (APLIC; 2006) recommendations to prevent electrocution of birds. APLIC-recommended measures are intended to protect raptors, cranes, and other large birds from accidental electrocution and are sufficient to protect even the largest birds that may try to roost on the 230-kV collector lines.

2.10.2 Central Substation

The Facility will include one central substation located east of US-97. The central substation will be adjacent to the POI, which will be a new BPA switchyard next to the existing BPA 500-kV Ashe-Marion Transmission Line that is shown on Figure 4. Pending final BPA design and coordination of their new switchyard, the Facility central substation could be up to 6,000 feet away from the BPA switchyard. The central substation will consist of up to six 500-kV generator step-up transformers, switchgear, circuit-breakers and fuses, bus bar and insulators, disconnect switches, relaying, surge arresters, grounding, associated control wiring, and other equipment (e.g., protection & control systems, metering equipment, communications) as will be determined at final design. Transformers typically use mineral oil or seed oil that is biodegradable and considered nontoxic (see Section 2.5) .

The central substation will be developed within the approximately 26.2-acre area shown on Figure 3. Prior to construction, the central substation site will be cleared and graded, with a bed of crushed rock applied for a durable surface. No additional temporary workspace is required for construction of the central substation outside of the 26.2-acre site. The central substation will be enclosed by a locked chain-link fence that is up to 8-feet tall, and will be fenced separately from the solar arrays, collector substations, and BESS.

The 230-kV collector lines will interconnect to the central substation, where the six 500-kV generator step-up transformers will step up the power from 230 kV to 500 kV in order to interconnect to BPA's 500-kV transmission system.

2.10.3 500-kV Generation-tie Transmission Line

The POI at the BPA switchyard is located within the micrositing area. Therefore, the Facility does not propose a generation-tie transmission line (gen-tie transmission line) that extends outside of the site boundary. There will be a short stretch of 500-kV gen-tie transmission line that spans aboveground from the central substation to the BPA switchyard. This aboveground gen-tie transmission line will be approximately 650 feet in length based on the current design and connected to A-frame dead-end structures within the central substation and BPA switchyard, so no support pole structures are anticipated outside of these two facilities. The height of the gen-tie transmission line will conform to the NESC minimum of 50 feet, although it could be higher depending on BPA's final switchyard location. Depending on final micrositing, the 500-kV line may be a maximum of up to 6,000 feet in length. The 500-kV line is fully contained within the micrositing area.

2.10.4 Battery Energy Storage System

The Facility includes a BESS with the capability of storing up to 1,400 MW/5,600 MWh using Li-ion technology. The BESS is capable of storing and later deploying energy generated by the Facility and/or charging and discharging directly from and to the electrical grid. The Facility's BESS will be configured in six separate BESS areas, one near each collector substation (Figure 3). The BESS areas range in size from approximately 11.1 to 12.9 acres.

At each BESS area, the system will use a series of modular containers. Each container will be placed on a concrete slab-on-grade foundation, and each BESS area is expected to be surfaced with stone aggregate. Each container or integrated battery unit will be approximately 30 feet in length, up to 10 feet in width, and up to 10 feet in height. The containers are rated for outdoor environments and hold the batteries and a battery management system. Current Li-ion systems include a fire prevention system and cooling units placed on top of, beside or within containers or skids. See Section 2.6 for fire prevention and control methods.

The total number of components associated with 1,400 MW of BESS at full augmentation includes 1,808 containers, 1,808 inverters, and 452 transformers. Two of the BESS areas are proposed with 320 containers, 320 inverters, and 80 transformers and four of the BESS areas with 292 containers, 292 inverters, and 73 transformers. The batteries and associated equipment would be periodically augmented as needed to maintain 1,400 MW of energy storage capability over the life of the BESS (20 years), taking into account natural degradation of the batteries over time. The impact analysis and modeling included throughout this ASC assesses the total number of BESS containers (i.e., 1,808 containers), inverters, and transformers associated with full augmentation.

Prior to construction, each BESS area will be cleared and graded. No additional temporary workspace is required for construction of the BESS areas outside of the areas shown on Figure 3. Each BESS area will be enclosed by a locked chain-link fence that is up to 8-feet tall, and will be fenced separately from the solar arrays, collector substations, O&M areas, and the central substation.

Battery Type – Lithium-ion Batteries

Li-ion batteries are the most common type of utility-scale BESS technologies to date, and what is assumed for the BESS component of the Facility. Lithium-ion batteries are a type of rechargeable battery where lithium ions, suspended in an electrolyte, move from negative to positive electrodes and back when recharging. Li-ion batteries experience degradation of performance over their useful lifespan, which depends on several factors including battery technology, rate/number of charge and discharge cycles, temperature, and other operating parameters. Although dependent on these factors, Li-ion batteries typically have an expected useful life of 20 years. Li-ion batteries are generally used in utility-scale applications when rapid, short-term (minute) deployments of power are needed. For example, Li-ion batteries can smooth the fluctuating generation from solar arrays, which can vary based on time of day and cloud cover, to deliver consistent and predictable power to the grid.

Li-ion battery systems are modular systems in which each module contains multiple individual battery cells. Each cell serves as the primary containment for the gel or liquid electrolyte materials. The packaged cells are relatively small, generally about the size of a desktop computer processor, and come in casings that serve as sealed secondary containment. The cells are contained within a module, which is collected in a pack, and then wired into a string, and finally into the full modular unit. The quantities per modular unit could change based on the most current model procured for the Facility, but the general framework is typical for utility-scale Li-ion systems.

BESS Equipment

The BESS design will include, but not be limited to, the following elements. The details and complexity of these elements depend on the final BESS design.

- Battery storage equipment, including batteries and racks or containers, inverters, isolation transformers, and switchboards;
- Balance of plant equipment, which may include medium-voltage and low-voltage electrical systems, fire detection, alarm, thermal management and climate-control systems, and network/SCADA systems;
- Thermal management equipment that will be integrated on top of, besides, or within the containers or skids depending on the model selected; and
- High-voltage (HV) equipment, including a step-up transformer, HV circuit breaker, HV current transformers and voltage transformers, a packaged control building for the HV breaker and transformer equipment, HV towers, structures, and HV cabling.

The battery containers will be placed on slab-on-grade concrete foundations. Each container holds the batteries, a battery management system, and a fire prevention system. Cooling units will be placed either on top of the containers or along the side. By connecting multiple containers, the BESS can be scaled to the desired capacity during detailed design by the Engineering, Procurement, and Construction (EPC) contractor.

BESS Operations and Maintenance

The batteries and other materials for the BESS will be manufactured off-site and transported to the Facility by truck. As applicable, defective or decommissioned parts will be disposed of or recycled in compliance with 49 CFR 173.185, which regulates the transportation of batteries.

The O&M activities typically consist of minimal procedures that do not require tampering with the battery cell components. Throughout the Facility's lifetime, the BESS will require periodic augmentation and the addition of battery units to supplement capacity lost due to degradation.

The BESS will be housed in engineered enclosures that incorporate safety and containment features, which will be inspected according to the manufacturer's recommendations (assumed to be monthly).

2.10.5 Operations and Maintenance Buildings

The Facility will include up to six separate O&M areas located adjacent to the collector substations and BESS areas (Figure 3). The O&M areas range in size from 5 to 5.6 acres. It is anticipated that each O&M area will include an O&M building, one or more storage containers, and a graveled parking area. Each O&M building will be up to 24 feet in height and include a small administrative area with a SCADA control room, a work area to perform minor repairs, and a storage area for spare parts, transformer oil, and other incidental chemicals. The administrative area will be air conditioned and include offices, kitchen/break room, restrooms, and locker rooms with showers. Each O&M area will also include a permanent graveled parking area, and one to two standard-sized Conex storage containers will be located adjacent to each O&M building. The buildings will each have an on-site well and septic system and power will be supplied by a local service provider using overhead and/or underground lines. All O&M areas will be enclosed by a locked chain-link fence that is up to 8-feet tall, and will be fenced separately from the solar arrays, collector substations, BESS areas, and the central substation.

Prior to construction, the O&M areas will be cleared and graded, with a bed of crushed rock applied for a durable surface.

2.10.6 Site Access and Service Roads

Turbine and solar array components will be delivered to the Facility site via truck. The primary transportation route will follow I-84, then turn south on US-97 at Biggs Junction, and then south into the site boundary using a variety of existing roads including Sherars Bridge Highway/State Route 216 (OR-216) and other existing county roads. Multiple county roads within the site boundary will be used to access new and existing roads within the Facility (see Exhibit L).

Access to the wind turbine sites, solar arrays, collector substations, BESS areas, O&M areas, central substation, and temporary construction areas will be via a network of existing or new access roads to be constructed or improved as part of the Facility's construction within the site boundary. To accommodate the oversize load vehicles that will be used to transport wind turbine components and other large equipment to the site, some modifications to turning radii and slope of existing

roads will be necessary. A limited number of roads will be used for oversize vehicles, and necessary routes have been determined based on the proposed placement of new access roads to Facility parcels. The proposed roadway modifications include two main types of changes. The first and most commonly needed modification would include increasing the turning radius of one or more legs of an intersection to allow an oversize vehicle to safely make a turn. The second type of modification would be constructing an alternative alignment for a roadway segment, alongside the existing road to provide adequate turning radii and avoid grades that are too steep for the oversize vehicles to safely traverse. These areas will be restored following the completion of construction by removing gravel surfacing, restoring appropriate contours with erosion and stormwater control best management practices, decompacting as needed, and revegetating the area appropriately. All existing public roads used to access the Facility will be left in “as good or better” condition than that which existed prior to the start of construction. To minimize impacts to agricultural operations, grazing lands, and wildlife habitat, existing county and private roads and farm access tracks will be utilized to the greatest extent practicable. The Applicant has and will continue to coordinate with the Sherman County Road Department on locations and details of proposed road improvements.

All newly constructed and improved existing access roads will be graded and graveled to meet load requirements for heavy construction equipment, as necessary. Most of the new access roads for wind turbines will be initially constructed to be wider than needed for operations, to accommodate the large equipment needed for construction. Following turbine construction, the site access roads will be narrowed for use during operations. Crane paths have been identified for movement of the cranes that are necessary to erect the wind turbines. Where possible, crane paths follow the alignment of access roads. In limited locations, crane paths do not follow proposed access road alignments, and these areas will be temporarily disturbed during construction. The additional disturbed width and temporary crane paths required during construction will be restored following the completion of construction by removing gravel surfacing (if needed and used), restoring appropriate contours with erosion and stormwater control best management practices, decompacting as needed, and revegetating the area appropriately.

For new access roads proposed for wind turbines, a temporary impact corridor 100 feet in width and a permanent impact corridor ranging between 16 to 24 feet in width are used; these corridors encompass the access roads, as well as most crane paths, cut and fill slopes, and any necessary drainage or erosion control features. Where crane paths do not follow roads, they may temporarily disturb a 75-foot-wide corridor. New access roads for the solar arrays both inside and outside of perimeter fencing have a temporary impact corridor of 60 feet in width and a permanent impact corridor of 16 feet in width. New access roads for the purpose of accessing the collector substations, BESS areas, and O&M areas have a temporary impact corridor of 48 feet in width and a permanent impact corridor of 24 feet in width.

To conservatively estimate maximum potential impacts, a temporary disturbance corridor along the collector line route is assumed to be a minimum of 100 feet wide along the length of the 230-kv collector lines. The temporary disturbance corridor for the 230-kV collector lines gets wider where multiple poles are proposed, up to 280 feet wide at its widest location. The selection of pole-

structure locations has precluded the need to travel across streams and wetlands during construction and other sensitive resources will be avoided. During operations, light maintenance trucks will be driven infrequently, approximately once per year as needed, within the same temporary disturbance corridor along the transmission lines. Given the minimal disturbance from such activity, this route is not included as a permanent access road.

The total mileage of the new access roads proposed outside of the solar array area for wind, solar, collector substations, BESS areas, O&M areas is approximately 27 miles. Approximately 72 miles of new access roads are proposed within the solar array area. The Facility includes approximately 14 miles of crane path along the alignment of proposed new access roads and approximately 8 miles of crane path outside of areas where new access road is proposed.

2.10.7 Perimeter Fencing and Gates

Perimeter fencing will enclose the solar arrays as well as the collector substations, BESS areas, and central substation to restrict public access during construction and operations. Facility components will be enclosed by approximately 128.3 miles of perimeter fencing. The fence posts will be set in concrete and/or driven into the ground.

Perimeter fencing around the solar arrays will total approximately 120.3 miles in length consist of wide-gauge cattle fencing. The solar perimeter fencing will be 7 feet in height and have lockable vehicle access gates.

The fencing around the collector substations, BESS areas, O&M areas, and central substation will total approximately 8 miles in length. This fencing will be up to 8 feet in height, have lockable vehicle access gates, and be chain-link.

The locations of specific access points and gates will depend on the final configuration of the solar arrays and related infrastructure which will be determined at final design. First responders will have access to locked gates via lock box or other approved method.

Corridors between solar module racking will be at least 10 feet wide and solar module racking will be at least 20 feet from perimeter fencing or more.

2.10.8 Temporary Construction Areas

During construction, the Applicant will establish seven temporary construction areas including five temporary laydown areas and two temporary welcome yards. The temporary laydown areas are between 27 and 53 acres and are located at various locations within the micrositing area to facilitate the delivery and assembly of material and equipment. The temporary laydown areas will contain field construction offices; will be used to store construction equipment when not in use; will be used for storage of construction supplies and materials; may contain temporary concrete batch plants; and may be used for assembly of some Facility components. Typically, wind turbine components will be delivered directly to each turbine site rather than being received and stored at the laydown yards. The laydown areas will be a graded area, surfaced in gravel, as necessary will be marked and signed as "Private, No Trespassing" with on-site security staff.

In addition to the laydown yards, two smaller welcome yards (less than 8 acres each) will be located at site entrances near US-97. The welcome yards will be used for arriving trucks and other large vehicles as a staging area and safe pull-off from main roads before being directed to other parts of the site.

Restoration of temporary construction areas will typically involve removal of gravel surfacing; re-grading to pre-construction contours; restoration of topsoil as needed; soil decompaction if necessary; and seeding and/or planting to restore agricultural or habitat lands as appropriate. The Applicant will coordinate with the landowner for final restoration requirements in agricultural areas.

The Applicant anticipates that the construction contractor will utilize an on-site temporary concrete batch plant instead of sourcing concrete from existing suppliers. Therefore, for the purposes of the ASC, the Applicant assumes that multiple temporary concrete batch plants will be utilized during construction of the Facility. The concrete batch plants will be located within one of the temporary construction areas and therefore do not have associated independent impact areas. The permits for the use of temporary batch plants will be secured by the construction contractor through Sherman County. In addition, each concrete batch plant requires a state air quality permit, which will also be held by the construction contractor or a qualified third-party contractor. These third-party permits are described in more detail in Exhibit A – Organizational Expertise. The Applicant may, at the time of construction, choose to instead purchase concrete directly from a licensed third-party contractor and have it delivered to the site as required, thereby removing the need for on-site batch plants. If on-site batch plants are used, the qualified third-party contractor will be responsible for identifying appropriate sources for rock and water and obtaining any needed permits, with support from the Applicant as needed. The contractor will similarly be responsible for obtaining rock/gravel for road construction. Potential third-party permits are described in more detail in Exhibit A.

2.10.9 Meteorological Data Collection Towers

Up to three permanent met towers will be installed throughout the site boundary, which will be permitted separately through Sherman County. The met towers will measure the wind speeds around the Facility for verification of the wind turbines' performance and will have a maximum height of up to approximately 410 feet to match the hub height of the selected turbine. Five additional met towers have previously been fully permitted through Sherman County and are located on-site. Impacts from these met towers are described in their respective permits.

2.10.10 Communication and SCADA System

A communication system consisting of fiber optic and copper communication lines will connect the wind turbines, solar array, BESS, and substations to the O&M buildings. These communication lines will run alongside the collector lines. Where buried, the communication lines are placed above the collector lines in the trench, and where overhead, run alongside the collector lines. This communication system allows each turbine, solar string, BESS, and substation to be monitored by a

SCADA system, installed in the O&M buildings. This system monitors these components and the met tower data for variables such as meteorological conditions, critical operating parameters, and power output. The turbines and solar array are controlled and monitored via the SCADA system, and can be controlled remotely. SCADA software is tuned specifically to the needs of each project by the turbine and/or solar module manufacturer or a third-party SCADA vendor.

2.10.11 Temporary Workforce Housing

The Applicant has not proposed any temporary on-site or off-site facilities for housing construction workers as part of this ASC, but the Applicant understands that the state may be developing regulations to allow temporary workforce housing for renewable energy projects. Accordingly, the Applicant may re-evaluate potential opportunities for temporary on-site or off-site facilities if a permitting pathway becomes available. The Applicant would secure any necessary authorizations for such facilities directly from the relevant permitting authority.

2.11 Approximate Dimensions of the Facility – OAR 345-021-0010(3)(a)(C)

(C) The approximate dimensions of major facility structures and visible features;

The Facility's major structures and their approximate dimensions are described below. Dimensions included in the descriptions are for representative purposes only. The vendor, size, number, and arrangement of the wind turbines, solar arrays, and other related or supporting components will be verified prior to construction at final engineering and design.

2.11.1 Wind Turbine Dimensions

Maximum wind turbine dimensions are as follows:

- Tower height (i.e., hub height) of up to 410 feet;
- Rotor diameter of up to 575 feet;
- Total maximum blade tip height of up to 698 feet; and
- Minimum blade tip clearance of 32 feet.

2.11.2 Solar Array Dimensions

The solar array area includes 62 separately fenced solar arrays. Each solar array will comprise linear rows (strings) of modules within the perimeter fence line depicted in Figure 3.3. Representative solar panels measure approximately 6 to 8 feet long and 3 to 5 feet wide and 1.3 inches thick. The maximum height of the solar array will be 12 feet when the modules are at full tilt on the racking system. Panels will sit approximately 10 feet off the ground, although height will be dependent on topography across the site. Perimeter fencing approximately 7 feet in height will enclose each solar array. The exact number and size of modules, layout, and associated equipment specifications will be determined during final design, and the actual solar array equipment and layout selected will not exceed the impacts analyzed.

2.11.3 Battery Energy Storage System Dimensions

The Facility's BESS will be configured in six separate BESS areas, one near each collector substation (Figure 2). The BESS areas range in size from 11.1 to 12.9 acres. The total number of components associated with 1,400 MW of BESS at full augmentation includes 1,808 containers, 1,808 inverters, and 452 transformers. Two of the BESS areas are proposed with 320 containers, 320 inverters, and 80 transformers. The remaining four BESS areas are proposed to have 290 containers, 290 inverters, and 73 transformers. The BESS containers, inverters, and transformers will be placed on aggregate base material and gravel. The BESS containers will house the Facility batteries. As described above, each container will be approximately 30 feet in length, 10 feet in width, and 10 feet in height and located on concrete pads within the six separate graveled areas. Each container holds the batteries, a supervisory and power management system, and a fire prevention system. Cooling units will be placed either on top of the containers or along the side depending on the equipment selected at final design.

Each of the six BESS areas will be individually fenced separately from the solar arrays and collector substations, and O&M areas. The entire footprint of each BESS area is assumed to be permanently disturbed. As stated above, the technology described in this exhibit is preliminary and, while final design may differ, impacts will not exceed those analyzed in this ASC.

2.11.4 34.5-kV Underground Collector Line Dimensions

The 34.5-kV collector lines will run underground for improved reliability. The approximately 219 miles of underground collector lines from the wind turbines and solar arrays to the collector substations will be directly buried at a depth of approximately 3 feet. The solar-related 34.5-kV collector lines will be both within the solar array area and occur outside the solar array area as needed to connect to collector substations.

2.11.5 Collector Substation Dimensions

The Facility is proposed with up to six collector substations, each situated on an approximately 2.8-acre site, individually fenced separately from the solar arrays, BESS areas, and O&M areas. The collector substations will be placed on aggregate base material and gravel. The actual dimensions will be determined at final design. The entire footprint of each collector substation is assumed to be permanently disturbed. The tallest collector substation components will be approximately 30 to 40 feet in height.

2.11.6 230-kV Collector Lines Dimensions

The Facility's collector substations will connect to the central substation via aboveground 230-kV collector lines to be located in one central corridor that runs approximately 14 miles down the middle of the microsite area.

The 230-kV collector lines will be supported by steel pole-structures an average of approximately 115 feet above ground, with a minimum height of approximately 50 feet and maximum height of approximately 135 feet. The spacing between pole-structures will be an average of approximately 600 feet depending on the terrain.

2.11.7 Central Substation Dimensions

The Facility's 230-kV collector lines will terminate in the central substation, which is proposed on approximately 26.2-acre site, individually fenced separately from the solar arrays, collector substations, O&M areas, and BESS areas. The central substations will be placed on aggregate base material and gravel. The actual dimensions will be determined at final design. The entire footprint of each central substation is assumed to be permanently disturbed. The tallest central substation components will be approximately 40 to 50 feet in height.

2.11.8 500-kV Gen-tie Transmission Line Dimensions

There will be a short stretch of 500-kV gen-tie transmission line that spans aboveground from the central substation to the POI at the BPA switchyard. This aboveground gen-tie transmission line will be approximately 650 feet in length and connected to A-frame dead-end structures within the central substation and BPA switchyard, so no support pole-structures are anticipated outside of these two facilities. It is anticipated that the minimum height of the 500-kV line will be 50 feet.

2.11.9 Operations and Maintenance Area Dimensions

The Facility will include up to six separate O&M areas located adjacent to the collector substations and BESS areas (Figure 2). The O&M areas range in size from 5 to 5.6 acres. It is anticipated that each O&M area will include an O&M building, one or more storage containers, and a graveled parking area. Each O&M building will be up to 24 feet in height. Each O&M area will also include permanent graveled parking area, and one to two standard-sized Conex storage containers will be located adjacent to each O&M building. The entire footprint of each O&M area is assumed to be permanently disturbed.

2.11.10 Temporary Construction Area Dimensions

During construction, the Applicant will establish seven temporary construction areas including five temporary laydown areas and two temporary welcome yards. The temporary laydown areas are between 27 and 53 acres and are located at various locations within the micrositing area to facilitate the delivery and assembly of material and equipment. Two smaller welcome yards (less than 8 acres each) will be located at site entrances near US-97. The temporary laydown areas may contain temporary aboveground fuel tanks. If needed, the Applicant's contractor will determine the capacity of the aboveground fuel tanks needed for construction. The on-site fuel storage will include secondary containment and follow refueling procedures for on-site fuel storage in the contractor's SPCC Plan.

2.12 Pipelines and Transmission Line Corridors – OAR 345-021-0010(3)(a)(D)

(D) If the proposed energy facility is a pipeline or a transmission line or has, as a related or supporting facility, a transmission line or pipeline that, by itself, is an energy facility under the definition in ORS 469.300, a corridor selection assessment explaining how the applicant selected the corridors for analysis in the application. In the assessment, the applicant must evaluate the corridor adjustments the Department has described in the project order, if any. The applicant may select any corridor for analysis in the application and may select more than one corridor. However, if the applicant selects a new corridor, then the applicant must explain why the applicant did not present the new corridor for comment at an informational meeting under OAR 345-015-0130. In the assessment, the applicant must discuss the reasons for selecting the corridors, based upon evaluation of the following factors:

- (i) Least disturbance to streams, rivers and wetlands during construction;*
- (ii) Least percentage of the total length of the pipeline or transmission line that would be located within areas of Habitat Category 1, as described by the Oregon Department of Fish and Wildlife;*
- (iii) Greatest percentage of the total length of the pipeline or transmission line that would be located within or adjacent to public roads and existing pipeline or transmission line rights-of-way;*
- (iv) Least percentage of the total length of the pipeline or transmission line that would be located within lands that require zone changes, variances or exceptions;*
- (v) Least percentage of the total length of the pipeline or transmission line that would be located in a protected area as described in OAR 345-022-0040;*
- (vi) Least disturbance to areas where historical, cultural or archaeological resources are likely to exist;*
- (vii) Greatest percentage of the total length of the pipeline or transmission line that would be located to avoid seismic, geological and soils hazards; and*
- (viii) Least percentage of the total length of the pipeline or transmission line that would be located within lands zoned for exclusive farm use.*

The Facility is not a pipeline, nor a transmission line as defined by ORS 469.300. The Facility includes neither a pipeline nor a transmission line that, by themselves, would be considered an energy facility under ORS 469.300(11)(a)(C). The 230-kV collector lines will be within a central corridor approximately 14 miles in length, but entirely within rural Sherman County and not across more than one city or county. The 500-kV transmission line is anticipated to be approximately 650 feet in length and will be entirely within rural Sherman County and not across more than one city or county.

2.13 Description of Pipelines and Transmission Lines – OAR 345-021-0010(3)(a)(E)

(E) If the proposed energy facility is a pipeline or transmission line or has, as a related or supporting facility, a transmission line or pipeline of any size:

(i) The length of the pipeline or transmission line;

The Facility's collector substations will connect to the central substation via aboveground 230-kV collector lines to be located in one central corridor that runs approximately 14 miles down the middle of the micrositing area.

The short 500-kV transmission line that spans aboveground from the central substation to the adjacent POI at the BPA switchyard will be approximately 650 feet in length based on the current design, with a maximum of up to 6,000 feet based on final micrositing. The 500-kV line is fully contained within the micrositing area inside the site boundary.

(ii) The proposed right-of-way width of the pipeline or transmission line, including to what extent new right-of-way will be required or existing right-of-way will be widened;

The right-of-way required for the aboveground 230-kV collector lines will be 125 feet in width and is fully contained within the micrositing area inside the site boundary. In one location where the aboveground 230-kV collector lines will need to cross under the existing BPA 500-kV transmission lines, the right-of-way will be 250 feet in width.

(iii) If the proposed transmission line or pipeline corridor follows or includes public right-of-way, a description of where the transmission line or pipeline would be located within the public right-of-way, to the extent known. If the applicant proposes to locate all or part of a transmission line or pipeline adjacent to but not within the public right-of-way, describe the reasons for locating the transmission line or pipeline outside the public right-of-way. The applicant must include a set of clear and objective criteria and a description of the type of evidence that would support locating the transmission line or pipeline outside the public right-of-way, based on those criteria;

Neither the 230-kV collector lines nor the 500-kV gen-tie transmission line follow public right-of-way. The 230-kV collector lines corridor does cross over several county roads and highway rights-of-way including from north to south: Blagg Lane, Rutledge Road, US-97, Earls Lane, Michigan Lane, and Finnegan Road. However, the 230-kV collector lines corridor will provide the most direct connection between collector substations and central substation within the site boundary, regardless of whether it is located within a public right-of-way. This will limit the amount of 230-kV collector lines required and in turn decrease visual impacts and impacts to other resources.

The 500-kV transmission line that spans aboveground from the central substation to the POI at the BPA switchyard does not cross or follow public rights-of-way.

(iv) For pipelines, the operating pressure and delivery capacity in thousand cubic feet per day and the diameter and location, above or below ground, of each pipeline; and

The Facility does not include a pipeline; therefore, this requirement is not applicable.

(v) For transmission lines, the rated voltage, load carrying capacity, type of current, and a description of transmission line structures and their dimensions.

The 230-kV collector lines will have a rated voltage of up to 230 kV and be able to carry 1,184 amps under standard conditions. The type of current is alternating current. The 500-kV transmission line will have a rated voltage of up to 500 kV and be able to carry 1,359 amps under standard conditions. The type of current is alternating current.

2.14 Facility Construction Schedule – OAR 345-021-0010(3)(a)(F)

(F) A construction schedule including the date by which the applicant proposes to begin construction and the date by which the applicant proposes to complete construction. Construction is defined in OAR 345-001-0010. The applicant must describe in this exhibit all work on the site that the applicant intends to begin before the Council issues a site certificate. The applicant must include an estimate of the cost of that work. For the purpose of this exhibit, “work on the site” means any work within a site or corridor, other than surveying, exploration or other activities to define or characterize the site or corridor, that the applicant anticipates or has performed as of the time of submitting the application.

Facility construction is targeted to commence as early as Q3 2027, pending issuance of a Site Certificate from EFSC. The completion of commissioning and start of commercial operation is targeted for December 2029, though the Applicant will try to bring the Facility online earlier if achievable. However, given that construction could conceivably be delayed by weather or other unforeseen circumstances such as market changes or delays to interconnection availability, the Applicant seeks flexibility to build the Facility in one or more phases, and requests a deadline for construction completion of 3 years after the deadline for beginning construction. Additional engineering and geotechnical investigations may occur prior to issuance of the Site Certificate. As defined in ORS 469.300(6), surveying and exploration activities (such as geotechnical investigations) are excluded from the definition of construction work, and preconstruction conditions may be satisfied for the applicable Facility component, as applicable based on final design and configuration. No other construction work is anticipated to begin prior to issuance of the Site Certificate.

3.0 Facility Location – OAR 345-021-0010(3)(b)

OAR 345-021-0010(3)(b) Information about the location of the proposed facility, including:

3.1 Proposed Locations of Facility Sites – OAR 345-021-0010(3)(b)(A)

(A) A map or maps showing the proposed locations of the energy facility site, all related or supporting facility sites and all areas that might be temporarily disturbed during construction of the facility in relation to major roads, water bodies, cities and towns, important landmarks and

topographic features, using a scale of 1 inch = 2000 feet or smaller when necessary to show detail;

The proposed location of Facility sites is shown in the figures listed below. A geodatabase of the site boundary, micrositing areas, and other proposed locations, to the extent known at the time of this submittal, is also provided to ODOE under separate cover.

Figure 1 is a vicinity map showing county and state boundaries, major roads, communities, and other recognizable features within approximately 20 miles of the Facility.

Figure 2 depicts the micrositing area within the site boundary.

Figure 3 depicts the preliminary site layout.

- Figure 3.1 includes all major components of the full Facility.
- Figure 3.2 shows the preliminary site layout with only wind components and shared components, including numbered labels for wind turbines.
- Figure 3.3 shows the preliminary site layout with only solar components and shared components, including numbered and lettered labels for solar areas.
- Figures 3.1 through 3.3 include detail maps showing proposed infrastructure within the site boundary at a scale of 1 inch = 2000 feet.

Figure 4 shows other energy generation facilities that are known to be operating or proposed within 10 miles of the site boundary.

3.2 Site Description – OAR 345-021-0010(3)(b)(B)

(B) A description of the location of the proposed energy facility site, the proposed site of each related or supporting facility and areas of temporary disturbance, including the total land area (in acres) within the proposed site boundary, the total area of permanent disturbance, and the total area of temporary disturbance. If a proposed pipeline or transmission line is to follow an existing road, pipeline or transmission line, the applicant must state to which side of the existing road, pipeline or transmission line the proposed facility will run, to the extent this is known; and

The site boundary encompasses approximately 23,936 acres of private land. Table 1 summarizes the location of the proposed Facility by the Public Land Survey System's Township, Range, and Section, as well as by county of parcels that are directly affected by permanent or temporary Facility impacts.

Table 1. Facility Location by Township, Range, Section, and County

Township	Range	Section	County
20S	16E	36	Sherman
20S	17E	3, 4, 5, 9, 10, 11, 14, 15, 21, 22, 23, 26, 27, 28, 29, 31, 32, 34, 35	Sherman
30S	16E	1, 2, 3, 10, 11, 14, 16, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34	Sherman
30S	17E	2, 31, 32, 33	Sherman
40S	16E	5, 6	Sherman

Table 2 provides the estimated acres of temporary and permanent disturbance resulting from the construction of the Facility, as well as the assumptions that were used in the calculations. The individual component disturbance areas were calculated using preliminary design data and represent the Applicant's best estimate of preliminary impacts for each component. However, the individual component impacts do not sum to the totals shown at the bottom of Table 2. This is because many of the individual component impact areas will overlap; simply summing the component impact areas would indicate greater impacts than would actually occur. Instead, the totals were calculated using consolidated data, with areas of overlap eliminated, to estimate total temporary and permanent disturbance areas.

Table 2. Estimated Temporary and Permanent Disturbance (in Acres)

Infrastructure	Amount	Permanent Disturbance Assumptions	Permanent Disturbance Area (Acres)	Temporary Disturbance Assumptions	Temporary Disturbance Area (Acres) ¹
Wind turbine	44 turbines	50-ft diameter	2.0	300-ft diameter	225.2
34.5-kV collector lines (underground, wind)	31.6 miles	N/A	N/A	50-ft width	179.1
Solar array areas	62 areas	Entire area within fenceline	7819.9	20 feet outside fenceline	293.2
Fire breaks	30 areas	20 feet outside fenceline in select areas ²	35.7	N/A	N/A
34.5-kV collector lines (underground, solar)	186.6 miles	N/A	N/A	15 feet from outermost line (30-ft to 140-ft range) ³	499.1
Collector substations	6 substations	2.75 acres each	16.5	N/A	N/A
230-kV collector lines (aboveground)	14.2 miles	Pole footprints	0.2	50 feet from outermost line (100-ft to 280-ft range) ⁴	215.8
Central substation	1 substation	26.2 acres	26.2	N/A	N/A
BESS	6 areas	Within fenceline ⁵	70.7	N/A	N/A
O&M buildings	6 areas	Approx. 5 acres each ⁶	31.0	N/A	N/A
Access roads (wind)	19.2 miles	16-ft, 20-ft, or 24-ft width ⁷	46.1	100-ft width	225.2
Access roads (solar and shared)	80 miles	16-ft or 24-ft width ⁷	155.8	48-ft or 60-ft width ⁷	387.7
Existing road improvements	49 locations	N/A	N/A	30-ft or 50-ft additional width ⁸	77.0
Crane path	7.8 miles	N/A	N/A	75-ft width	132.6
Crane path on road	13.7 miles	N/A	N/A	75-ft width	246.5
Temporary construction areas	7 areas	N/A	N/A	Acreage plus 25-ft buffer ⁹	232.1
Overall Total Impacts (No Overlap)¹⁰			8048.4		1643.6
¹ Acreages for temporary disturbance include only those areas that will be restored after construction. Where temporary and permanent disturbance areas overlap, the permanent disturbance area is counted in the permanent acreage and removed from the temporary disturbance area.					

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Infrastructure	Amount	Permanent Disturbance Assumptions	Permanent Disturbance Area (Acres)	Temporary Disturbance Assumptions	Temporary Disturbance Area (Acres) ¹
² Permanent disturbance is based on a 20-foot wide, maintained fire break outside all east-facing solar perimeter fencing where bordering non-participating properties or situated upwind of residences and buildings (see Section 2.6). Additional fire break is located within each solar array fenceline and disturbance is included within the solar array areas acreage. ³ Corridor is narrowest (30 ft) in locations with one collector line, and wider in areas with multiple collector lines. ⁴ Corridor is narrowest (100 ft) in locations with one pole, and wider where collector lines are split across multiple poles. Acreage calculations are based on the number of poles expected at each location in preliminary design, as described in Section 2.10.1. ⁵ Based on preliminary design showing BESS areas ranging from 11.1 to 12.9 acres. ⁶ Based on preliminary design showing O&M building areas ranging from 5 to 5.6 acres. ⁷ Acreage calculations are based on preliminary widths provided by design contractors, which include widths for each road segment within the range provided. ⁸ Acreage calculations are based on preliminary widths provided by design contractors, which include widths for each road segment. ⁹ Based on preliminary design showing five laydown areas ranging from 27 to 53 acres and two welcome yards less than 8 acres each. ¹⁰ Totals are calculated using consolidated data, with areas of overlap eliminated. Therefore, totals are not a sum of the Facility component rows.					

3.3 Locations of Nearby Energy Facilities – OAR 345-021-0010(3)(b)(C)

(C) For energy generation facilities, a map showing the approximate locations of any other energy generation facilities that are known to the applicant to be permitted at the state or local level within the study area as defined in OAR 345-001-0010 for impacts to public services.

As shown on Figure 4, the Golden Hills, Klondike III, Daybreak, Bakeoven, and Sunset energy generation facilities are permitted under EFSC and located within 10 miles of the site boundary. The Hay Canyon energy generation facility was permitted by Sherman County and is located within 10 miles of the site boundary. The Buckley and Yellow Rosebush energy generation facilities are proposed/under review by EFSC and are located within 10 miles of the site boundary. The existing BPA 500-kV Ashe-Marion Transmission Line runs northeast/southwest through the site boundary. The existing BPA 230-kV Jones Canyon-Santiam Transmission Line runs adjacent and parallel to the Ashe-Marion line through the site boundary. The 69-kV transmission line runs north/south through the northeastern portion of the site boundary; this transmission line is owned and operated by PacifiCorp. No other existing energy generation facilities have been identified within 10 miles of the Facility.

4.0 Property Owner Information – OAR 345-021-0010(3)(c)(A)

OAR 345-021-0010(3)(c) A list of the names and mailing addresses of property owners, as described in this subsection:

(A) The list must include all owners of record, as shown on the most recent property tax assessment roll, of property located:

(i) Within 100 feet of property which is the subject of the application, where the subject property is wholly or in part within an urban growth boundary;

(ii) Within 250 feet of the property which is the subject of the application, where the subject property is outside an urban growth boundary and not within a farm or forest zone; or

(iii) Within 500 feet of the property which is the subject of the application, where the property is within a farm or forest zone.

(B) The applicant must submit an updated list of property owners as requested by the Department before the Department issues notice of any public hearing on the application for a site certificate as described in OAR 345-015-0220; and

(C) In addition to incorporating the list in the application, the applicant must submit the list to the Department in an electronic format approved by the Department.

Attachment 3 includes the names and mailing addresses of all landowners of record within the notification area as defined by OAR 345-21-0010(3)(c)(A). An Excel spreadsheet of Attachment 3 has also been included with this submittal.

5.0 Applicable Statutes, Rules, and Local Government Ordinances – OAR 345-021-0010(3)(d)

OAR 345-021-0010(3)(d) Identification, by legal citation, of all state statutes and administrative rules and local government ordinances containing standards or criteria that the proposed facility must meet for the Council to issue a site certificate, other than statutes, rules and ordinances identified in OAR 345-022-0010(c), and identification of the agencies administering those statutes, administrative rules and ordinances. The applicant must identify all statutes, administrative rules and ordinances that the applicant knows to be applicable to the proposed facility, even if not identified in the project order. To the extent not addressed by other materials in the application, the applicant must include a discussion of how the proposed facility meets the requirements of the applicable statutes, administrative rules and ordinances.

5.1 Applicable Rules and Ordinances

Table 3 identifies by legal citation and relevant administering agency the state statutes and administrative rules and local government ordinances referenced in other exhibits, with the exception of those presented in Exhibit A – Organizational Expertise, which addresses OAR 345-022-0010. The identified statutes, rules, and ordinances contain standards or criteria that the Facility must meet for EFSC to issue a site certificate.

Applicable state statutes, administrative rules, and local government ordinances containing Land Use standards are identified in Exhibit D – Land Use.

Table 3. Statutes, Rules, and Local Ordinances Referenced in Other Exhibits

Administering Agency	Agency Address	Program Description Legal Citation	Relevant Exhibit
Oregon Department of Agriculture	Oregon Department of Agriculture 635 Capitol Street NE Salem, OR 97301 (503) 986-4550	OAR 345-022-0070 Threatened and Endangered Species ORS 564.105	G (Fish and Wildlife Habitat), H (Threatened and Endangered Species)
Oregon Department of Fish and Wildlife – Habitat Conservation Division	Oregon Department of Fish and Wildlife – Habitat Conservation Division 2042 SE Paulina Highway Prineville, OR 97754 (541) 447-5111	OAR 345-022-0060 Fish and Wildlife Habitat OAR 345-022-0070 Threatened and Endangered Species Habitat Conservation OAR Chapter 635, Division 415 (Fish and Wildlife Habitat Mitigation Policy) ORS 496.172	G, H
Oregon Water Resources Department – Water Rights Division	Oregon Water Resources Department 725 Summer Street NE, Suite A Salem, OR 97301 (503) 986-0900	OAR 345-022-0160(1) General Standards for Siting Facilities OAR Chapter 690 (Water Resources Department)	02 (Water Use)
Oregon Department of State Lands	Oregon Department of State Lands 775 Summer St. NE, Suite 100 Salem, OR 97301-1279 (503) 986-5200	OAR 345-022-0160(1) General Standards for Siting Facilities OAR Chapter 141	01 (Wetlands and Other Waters)
Oregon Department of Environmental Quality – Water Quality & Stormwater Control	Oregon Department of Environmental Quality 475 NE Bellevue Drive, Suite 110 Bend, OR 97701 (541) 633-2024	OAR 345-022-0022 Soil Protection	C (Soil Protection)
Oregon Department of Environmental Quality – Noise	Oregon Department of Environmental Quality 811 SW Sixth Avenue Portland, OR 97204-1390 (503) 229-5696	OAR 345-022-0160(2) General Standards for Siting Facilities OAR Chapter 340, Division 35 (Noise Control Regulations)	03 (Noise)

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Administering Agency	Agency Address	Program Description Legal Citation	Relevant Exhibit
Oregon Department of Environmental Quality – Hazardous Waste Management	Oregon Department of Environmental Quality 811 SW Sixth Avenue Portland, OR 97204-1390 (503) 229-5696	OAR 345-022-0120 Waste Minimization ORS Chapter 466 (Hazardous Waste and Hazardous Materials); and OAR Chapter 340	N (Waste Minimization)
Oregon Department of Environmental Quality – Solid Waste	Oregon Department of Environmental Quality 811 SW Sixth Avenue Portland, OR 97204-1390 (541) 298-7255 ext. 221 (Eastern Region)	OAR 345-022-0120 Waste Minimization OAR Chapter 340, Division 93 (Solid Waste General Provisions)	N
Oregon Department of Geology and Mineral Industries	Oregon Department of Geology and Mineral Industries 800 NE Oregon Street, Suite 965 Portland, OR 97232 (971) 673-1555	OAR 345-022-0020 Structural Standard	B (Structural Standard)
Oregon Parks and Recreation Department, State Historic Preservation Office – Archaeological	State Historic Preservation Office 725 Summer Street NE, Suite C Salem, OR 97301 (503) 986-0690	OAR 345-022-0090 Historic, Cultural and Archaeological Resources ORS 358.920-358.955 (Archaeological Objects and Sites)	J (Historic, Cultural and Archaeological Resources)
Oregon Office of State Fire Marshal	Office of State Fire Marshal 3565 Trelstad Avenue SE Salem, OR 97317 (503) 378-3473	OAR 345-022-0115 Wildfire Prevention and Risk Mitigation	M (Wildfire Prevention and Risk Management)

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Administering Agency	Agency Address	Program Description Legal Citation	Relevant Exhibit
Oregon Department of Land Conservation and Development	Department of Land Conservation and Development 635 Capitol Street NE, Suite 150 Salem, OR 97301 (503) 373-0050	OAR 345-022-0030 Land Use Oregon Statewide Planning Goals ORS Chapter 195 (Local Government Planning Coordination); ORS Chapter 197 (Comprehensive Land Use Planning Coordination); ORS Chapter 215 (County Planning, Zoning, Housing Codes); ORS Chapter 469 (Energy, Conservation Program, Energy Facilities); OAR Chapter 660 (Department of Land Conservation and Development Administrative Rules)	D (Land Use)
Sherman County Planning Department	Sherman County Planning Department 66365 Lonerock Road Moro, OR 97039 (541) 565-3601	OAR 345-022-0030 Land Use Sherman County Zoning Ordinance Sherman County Comprehensive Plan	D

5.2 Need Standard for Nongenerating Facilities – OAR 345, Division 23

OAR 345-023-0005 – Need for Facility. This division applies to nongenerating facilities as defined in ORS 469.503(2)(e), except nongenerating facilities that are related or supporting facilities. To issue a site certificate for a facility described in sections (1) through (3), the Council must find that the applicant has demonstrated the need for the facility. The Council may adopt need standards for other nongenerating facilities. This division describes the methods the applicant shall use to demonstrate need. In accordance with ORS 469.501(1)(L), the Council has no standard requiring a showing of need or cost-effectiveness for generating facilities. The applicant shall demonstrate need:

(1) For electric transmission lines under the least-cost plan rule, OAR 345-023-0020(1), or the system reliability rule for transmission lines, OAR 345-023-0030, or by demonstrating that the transmission line is proposed to be located within a “National Interest Electric Transmission Corridor” designated by the U.S. Department of Energy under Section 216 of the Federal Power Act;

(2) For natural gas pipelines under the least-cost plan rule, OAR 345-023-0020(1), or the economically reasonable rule for natural gas pipelines, OAR 345-023-0040;

(3) For storage facilities for liquefied natural gas with storage capacity of three million gallons or greater under the least-cost plan rule, OAR 345-023-0020(1), or the economically reasonable rule for liquefied natural gas storage facilities, OAR 345-023-0040.

(4) If the proposed facility is a non-generating facility for which the applicant must demonstrate need under OAR 345-023-0005, the applicant must submit information about the need for the facility, providing evidence to support a finding by the Council as required by OAR 345-023-0005(1)-(3), including identification of the rule in Division 23 of this chapter under which the applicant chooses to demonstrate need.

Not applicable. The Facility is not a non-generating energy facility.

5.3 Materials Analysis

Many sections of OAR 345 Division 22 incorporate a materials analysis. In order to reduce repetition, the material analysis for the Facility has been included below.

5.3.1 Materials Inventory

(A) An inventory of substantial quantities of industrial materials flowing into and out of the proposed facility during construction and operation;

5.3.1.1 Construction Materials

The Facility will include wind and solar components, as described in Section 2.3, as well as supporting facilities described in Section 2.10. The primary raw construction materials for the Facility are rock and gravel (aggregate), steel, water, and concrete. Table 4 provides a list of industrial materials that would be used during Facility construction, based on current engineering

estimates. Water required for construction is discussed in Exhibit O2. Solid wastes generated by the Facility during construction are outlined in Exhibit N.

Table 4. Inventory of Construction Materials

Material	Quantity/Units	Ultimate Disposition
Wind Components		
Wind turbines ¹	Up to approx. 1,023 tons per turbine, consisting of: • 896 tons steel/iron • 17 tons other metals • 43 tons polymer • 59 tons glass/carbon composites • 8 tons other materials	At each of 44 turbine locations
Collector lines (34.5 kV)	1,046,051 ft (including conductors and ground)	Between wind turbines and collector substations, underground
Solar Components		
Solar modules	2,555,202 modules	Throughout solar array area
Steel solar module tracker posts	Up to 368,540 posts, 240 pounds each	Throughout solar array area
Inverters/transformers	356 joint inverter/transformer units	Throughout solar array area
Collector lines (34.5 kV)	4,271,982 ft (including conductors and ground)	Throughout solar array area and between solar arrays and collector substations, underground
Fencing	635,121 ft	Around 62 separately-fenced solar arrays (total length)
Shared Facilities		
Batteries	1,808 self-contained units	Throughout six BESS areas
BESS inverters	1,808 inverters	Throughout six BESS areas
Collector lines (230 kV)	110,000 ft	Connecting six collector substations and central substation
Fiber optic and copper communication lines	1,336,029 ft	From substations to solar inverters and turbines
Fencing	12,874 ft (substations) 17,078 ft (BESS) 12,164 ft (O&M areas)	Around substations, BESS areas, and O&M areas (total length for each use)
Concrete		
Turbine foundations	700 yd ³ each	At each of 44 turbine locations
Aboveground collection line pole foundations	7500 yd ³ total	Along 230-kV collector line

Material	Quantity/Units	Ultimate Disposition
Substations	3,246 yd ³ total	Substation foundations (divided across six collector substations and one central substation)
BESS pads	18,806 yd ³ total	BESS areas (divided across six areas)
O&M foundations	18,360 yd ³ total	O&M areas (divided across six areas)
Aggregate (Rock/Gravel)		
Inverter/transformer foundations	9,500 yd ³ total	At inverter/transformer locations
Substations	20,400 yd ³ total	Substation foundations (divided across six collector substations and one central substation)
BESS pads	33,071 yd ³ total	BESS areas (divided across six areas)
O&M buildings	55,000 yd ³ total	O&M areas (divided across six areas)
Access roads	3,510 tons	Maintained as on-site roadbed
Temporary construction areas	45,960 tons	Laydown and welcome yards (divided across seven areas)
¹ Conservatively based on an indicative turbine model representing one of the largest current potential options.		

5.3.1.2 Operational Materials Inventory

Materials used during Facility operations are variable and dependent upon the maintenance or repair events that occur during the life of the Facility. Major replacement or repair events are possible during the life of the Facility; however, since the cause and extent of these types of potential events are unknown, no estimates have been provided for the number of major components that would be needed. Minor maintenance may also require the replacement and removal of smaller components, which are not expected to constitute substantial amounts of industrial materials. Table 5 provides an estimated inventory of industrial materials that will be used in substantial quantity during operation. Operations materials would be delivered to the required location at the time needed.

Table 5. Inventory of Operations Materials

Material	Quantity/Units	Ultimate Disposition
Spare solar panels	Up to 51,105 solar panels	Stored in the O&M areas until needed
Spare batteries	Up to 56 modules	Stored in the O&M areas until needed

Material	Quantity/Units	Ultimate Disposition
Turbine lubricant and gear oil	660 gallons (15 gallons per turbine, 44 turbines)	Full oil change done as-needed by a specialized contractor and used oils removed for disposal or recycling
Transformer oil	Collector substation transformers: • 115,500 gallons (19,250 gallons per transformer, 6 transformers) Central substation transformers: • 180,300 gallons (30,050 gallons per transformer, 6 transformers) Solar array transformers: • 284,800 gallons (800 gallons per transformer, 356 transformers)	Within transformer boxes for cooling. (No extra oil will be stored outside of transformers. Additional oil only required due to failure and provided on an as needed basis.)
Herbicide (weed control)	12 gallons (2 gallons per O&M building, 6 O&M buildings)	Stored in the O&M areas until needed

5.3.2 Hazardous Materials Handling and Management

(B) The applicant's plans to manage hazardous substances during construction and operation, including measures to prevent and contain spills; and

Potentially hazardous substances used during Facility construction and operations will be used in a manner that is protective of human health, protective of the environment, and that complies with applicable local, state, and federal environmental laws and regulations. If a potentially hazardous substance is necessary for use during Facility construction or operations, Safety Data Sheets will be made available and located at the construction staging area or the relevant Facility component. Highly toxic substances or extremely hazardous substances in excess of threshold planning quantities will not be necessary to support Facility construction or operations. Materials used during Facility construction and operations will be selected so that they minimize the potential for producing "hazardous waste," as defined by the Resource Conservation and Recovery Act. Accidental releases of hazardous materials will be prevented or minimized through proper containment of these substances during use and transportation to the Facility site in accordance with the SPCC Plan.

5.3.2.1 Construction Materials

Potentially hazardous materials used for construction include fuels, lubricating oils, cleaners, paint, unused solvents, herbicides, pesticides, and spent vehicle and equipment fluids and components (e.g., used oil, used hydraulic fluids, spent fluids, oily rags, and spent lead-acid or nickel-cadmium

batteries). During construction, on-site fuel storage may be placed in designated areas within the temporary construction areas. Secondary containment and refueling procedures for on-site fuel storage will follow the contractor's SPCC Plan.

Applicable local, state, and federal environmental laws and regulations will be followed for managing hazardous materials in a manner that is protective of human health and the environment. As will be described in the SPCC Plan, accidental releases of hazardous materials will be prevented or minimized through proper containment of these substances during use and transportation to the Facility site. Potentially hazardous substances will not be permanently present within the construction areas in quantities that exceed Oregon State Fire Marshal Reportable Quantities.³

Fuels will be the only hazardous material that is expected to be stored in substantial quantities on-site during construction. The Applicant anticipates that diesel fuel and gasoline may be kept on-site for fueling of construction equipment and will be stored in temporary aboveground tanks in the construction staging areas, within an area that provides for secondary containment. Additional details about estimated amounts of fuels and anticipated storage facilities are provided in Section 2.5. Secondary containment and refueling procedures for on-site fuel storage will follow the contractor's SPCC Plan. Secondary containment will be compliant with requirements in 40 CFR §112.7(c), which requires secondary containment for aboveground, buried, and partially buried containers.

Fuel for construction equipment will be delivered to the site via a specialized mobile vehicle by a licensed service contractor on an as-needed basis. Construction equipment will be regularly inspected to detect potential leaks or other issues that may require maintenance. Potentially hazardous substances related to the maintenance of the construction equipment will only be brought to the construction site by a maintenance technician on an as-needed basis, and unused or waste substances will be removed during the same service call. Refueling will take place a substantial distance from waterways or wetlands to prevent water quality impacts in the event of an accidental release.

Small amounts of explosive material may be used in limited areas to support turbine foundation installation. These materials will be handled, stored, and transported by a licensed blasting contractor in strict accordance with Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF) and OSHA regulations. Explosives and detonators will be stored off-site or in approved, secure, weather-resistant mobile magazines, segregated by type, and brought to the specific foundation location on an as-needed basis. Any unused materials or related waste will be removed from the site, and operations will be monitored to prevent environmental or structural impacts.

In the unlikely event of an accidental hazardous materials release, the spill or release will be cleaned up and the contaminated soil or other materials impacted by the spill will be disposed of

³ "Reportable quantity" refers to the amount of hazardous substance that has to be released into the environment before the EPA requires notification of the release to the National Response Center pursuant to the Comprehensive Environmental Release, Compensation, and Liability Act, also known as Superfund. These numerical designations are listed under 49 Code of Federal Regulations 172.101 Appendix A, Table 1 and Table 2.

and treated according to applicable regulations as described in the SPCC Plan. Spill kits with absorbents, absorbent pads, spill socks, and disposable bags will be maintained in close proximity to construction activities, as specified in the contractor's SPCC Plan. The Oregon Emergency Management Division's Oregon Emergency Response System will be immediately notified of reportable spills per OAR Chapter 340 Division 142.

5.3.2.2 Operational Materials

Internal battery components within the BESS may include hazardous substances; however, batteries are considered non-hazardous equipment when used according to the recommendations of the manufacturer and as long as their integrity is maintained (i.e., not damaged and internal seal is intact). Li-ion batteries present a flammability hazard and require cooling systems to prevent overheating. The BESS will have integrated safety systems that monitor battery performance to detect malfunctions and implement response measures. These monitoring systems include notifying operators of failures, depowering the system, or deploying fire suppression devices. O&M staff will also conduct inspections of the battery cells for damage on a regular basis. Batteries will be housed in leak-proof containers to prevent inadvertent releases of hazardous materials. The EPA is currently working on a proposal for universal waste standards that would specifically be tailored for lithium-ion batteries and separate from the existing general battery universal waste category (EPA 2025a). These universal waste standards that will be tailored for Li-ion batteries will aim to improve safety standards and reduce fires from mismanaged end of life Li-ion batteries while promoting battery recycling. Because these new standards are not yet adopted, the Applicant will adhere to the EPA's current Universal Waste Regulation that addresses the responsible disposal and recycling of batteries (EPA 2025b).

The O&M buildings will store small quantities of lubricants, degreasers, herbicides, and other chemicals in a manner consistent with the label instructions. No underground storage tanks will be installed within the O&M areas or within the Facility site boundary. No extremely hazardous materials (as defined by 40 CFR 355) are anticipated to be produced, used, stored, transported, or disposed of at this Facility during operation. Additional details about estimated amounts of fuels and anticipated storage facilities are provided in Section 2.5.

In the unlikely event of an accidental hazardous materials release, the spill or release will be cleaned up and the contaminated soil or other materials disposed of and treated according to applicable regulations. The Applicant will have an operations SPCC Plan to detail appropriate response measures. The Applicant will report spills or releases of hazardous materials during operation as noted above to the Oregon Emergency Management Division's Oregon Emergency Response System per reporting requirements detailed in OAR Chapter 340 Division 142.

For the replacement of batteries during operation, the Applicant will follow the handling guidelines of 49 CFR 173.185 related to the shipment of Li-ion batteries. The regulations include requirements for prevention of a dangerous evolution of heat, prevention of short circuits, and prevention of damage to the terminals. They also require that no battery will come into contact with other batteries or conductive materials. Licensed third-party battery suppliers will be responsible for

transporting batteries to and from the Facility in accordance with applicable regulations. Spent batteries will be disposed of at a facility permitted to handle them in compliance with applicable Resource Conservation and Recovery Act and Toxic Substances Control Act regulations administered by the EPA or Oregon Department of Environmental Quality. Adherence to the requirements and regulations (including personnel training, safe interim storage, and segregation from other potential waste streams) will minimize safety hazards related to transport, use, or disposal of batteries.

5.3.3 Non-Hazardous Waste Management

(C) The applicant's plans to manage non-hazardous waste materials during construction and operation.

The Applicant will fully comply with all applicable waste handling and disposal regulations on lands associated with the Facility, during both construction and operation. Solid waste will be stored in a manner that does not constitute a fire, health, or safety hazard until such time as it can be hauled off for recycling or disposal, as appropriate. Exhibit N provides details on the types and amounts of waste, and procedures and systems for the handling and disposal of waste materials.

6.0 Specific Standards – OAR 345-021-0010(3)(e)

OAR 345-021-0010(3)(e) If the proposed facility is a facility for which the Council has adopted specific standards, information about the facility providing evidence to support findings by the Council as required by the following rules:

(A) For wind energy facilities, OAR 345-024-0010 and 345-024-0015;

(B) For surface facilities related to underground gas storage reservoirs, OAR 345-024-0030, including information required by OAR 345-024-0030(3);

(C) For any transmission line under Council jurisdiction, OAR 345-024-0090; and

(D) For a fossil-fueled power plant or other facility that emits carbon dioxide, OAR 345-024-0500 to 345-024-0720.

The Facility includes wind generation, aboveground 230-kV collector lines, and 500-kV gen-tie transmission line. Therefore, the siting standards for wind energy facilities under OAR 345-024-0010 and OAR 345-024-0015, and siting standards for transmission lines under OAR 345-024-0090. The Facility does not include surface facilities related to underground gas storage reservoirs or a fossil-fueled power plant or other facility that emits carbon dioxide.

6.1 Siting Standards for Wind Energy Facilities

6.1.1 OAR 345-024-0010 Public Health and Safety Standards for Wind Energy Facilities

To issue a site certificate for a proposed wind energy facility, the Council must find that the applicant:

(1) Can design, construct and operate the facility to exclude members of the public from close proximity to the turbine blades and electrical equipment.

Public access to Facility components will be minimal to none. All Facility facilities will be located on private lands; therefore, public access is already restricted and limited. Access roads developed for the purposes of Facility construction and operation will be gated and locked, as necessary, when not actively in use. Should the Facility site be accessed without permission, design features of the Facility components will limit the accessibility of the Facility components to the public and are designed to prevent tampering with Facility equipment. The wind turbines can be accessed only through a steel door that will be kept locked except during maintenance. The wind turbines will have a minimum ground-to-blade clearance of 32 feet. The O&M buildings will be locked when not occupied. The Facility O&M buildings, collector substations, solar arrays, BESS, central substation, and temporary construction areas will be within fenced enclosures, enclosed individually. Access to solar arrays will be designed to allowing for emergency vehicle entry and egress. The BESS will be enclosed in locked steel containers. The 230-kV collector lines will utilize aboveground poles that inhibit climbing. The temporary construction areas will be signed as “Private, No Trespassing” with on-site security staff.

The Facility has also been designed around setbacks that further limit public access to the wind turbines, solar arrays, and associated electrical components. The Facility has been designed in accordance with the Sherman County 2007 Wind Power Ordinance (39-2007, Sherman County 2007) that contains wind turbine setback requirements; see Exhibit D, Figure D-10, that demonstrates the associated setback(s) compliance. Specifically:

- The Applicant proposed a total of 100 turbines in the preliminary layout which has since been reduced to 44 turbines during the design process, to both avoid constraints and comply with the Sherman County Wind Power Ordinance.
- Pursuant to Section 6 of the Sherman County Wind Power Ordinance (Sherman County 2007), the minimum setback distance of one mile has been applied to all wind turbines from boundary lines of any incorporated city in Sherman County (e.g., Grass Valley).
- Pursuant to Sections 3 and 4 of the Sherman County Wind Power Ordinance (Sherman County 2007), the Facility also complies with all applicable specified or mutually negotiated property line setbacks, as detailed in Exhibit D, Section 5.3.

County-required setbacks are analyzed in detail in Exhibit D of this ASC. With these restrictions, design features, and setbacks, the only persons who will come in close proximity to the wind

turbines, solar arrays, or electrical equipment will be employees of the Facility, or the landowners on whose property the Facility is located. Landowners will not be in close proximity to the turbine blades, given the 32 feet or greater of ground-to-blade clearance of the wind turbines.

(2) Can design, construct and operate the facility to preclude structural failure of the tower or blades that could endanger the public safety and to have adequate safety devices and testing procedures designed to warn of impending failure and to minimize the consequences of such failure.

Prevention of structural failure of wind turbines includes designing, engineering, and constructing the Facility to meet or exceed all current applicable standards. This includes avoiding dangers to human safety related and nonseismic hazards in many ways, including conducting site-specific geotechnical evaluations for the Facility to inform design and construction. Exhibit B provides information on structural codes and standards that will be followed in Facility design.

During operation, a rigorous inspection program of the turbine foundations as well as the BESS (monthly) will be maintained. In addition, the SCADA system (described in Section 2.10.10 above) acts as the “nerve center” of the Facility by connecting individual turbines, solar strings, BESS, substation(s), and meteorological towers to a central computer housed in the O&M buildings. The SCADA system allows each component of the Facility to be monitored for activity in present time. If an issue arises with a turbine or solar string, it alerts the O&M staff so that the component can be shut down to minimize consequences of failure and potential safety risks.

In addition, as noted above, the Facility is designed to maintain substantial setbacks such that, in the highly unlikely event of a catastrophic failure, the collapsed turbine or thrown blades could not impact public roads or nonparticipating property owners.

Failure of turbine components and turbine foundations is extremely rare. It is primarily addressed and avoided through careful selection of turbine and foundation characteristics based on site specific geotechnical conditions as described in Exhibit B, and careful construction methods by experienced professionals to ensure the turbine is installed in accordance with best safety practice. Once the turbines have been safely installed, continued safe operation depends on monitoring how the structures respond to design or unusual stresses, such as rotational, axial, torsion, bending, and vibration stresses. Turbines and their foundations are regularly inspected during monthly operating rounds and regular annual turbine maintenance activities. Operating rounds consist of a visual assessment of turbine foundations and the materials connecting the turbine to the foundation, as well as observation of SCADA data that provide insight into how the turbine structural components are withstanding the stresses applied to them. Annual turbine maintenance includes inspections on turbine components, lubrications and replacement of worn parts as necessary.

In the event an anomaly is observed, the engineering team is advised, and further inspection may be carried out by subject matter experts to determine the root cause and recommend action to rectify the issue.

Structural failure of tower and blades is similarly rare and very unlikely. If it does occur, it is most often relatively soon after construction. Tower failure early in the life cycle of a facility most commonly occurs due to faulty construction, material defects, or improper design (Ma et al. 2018). These causes of failure are mitigated through careful material selection from reliable vendors, construction by experienced contractors, and design by reliable and experienced engineers, all of which are described elsewhere in this ASC. Testing of materials during and after the construction process verifies proper installation. Failure of turbines during normal operation is also uncommon but, when it does occur, it is most often due to improper maintenance or early material degradation (Ma et al. 2018). These failure factors are avoided through proper training and oversight of operational staff and verified through routine inspections. During extreme conditions such as typhoons, hurricanes, or earthquakes, wind tower collapse can occur. Finally, mechanical or electrical failures or lightning strikes can cause fires. Electrical concerns are identified by the SCADA system during operation and mechanical factors are identified during inspections.

Turbine towers and blades are regularly inspected during annual turbine maintenance activities. These inspections include all turbine-related components for irregular wear and may be supplemented with further repair as needed.

In the event an anomaly is observed by the SCADA system or during an inspection, original equipment manufacturer (i.e., OEM) engineering is advised, and further inspection may be carried out by subject matter experts to determine root cause and resulting action required to rectify the issue.

6.1.2 OAR 345-024-0015 Cumulative Effects Standards for Wind Energy Facilities

To issue a site certificate for a proposed wind energy facility, the Council must find that the applicant can design and construct the facility to reduce cumulative adverse environmental effects in the vicinity by practicable measures including, but not limited to, the following:

This standard is focused on the wind generation portion of the Facility. In order to fully describe impacts, all components of the Facility are included in the discussion below, including related or supporting facilities to the wind generation as well as the solar arrays and BESS.

(1) Using existing roads to provide access to the facility site, or if new roads are needed, minimizing the amount of land used for new roads and locating them to reduce adverse environmental impacts.

During Facility construction and operation, existing interstate, state, and county roads will be used to access the Facility area. Turbine and solar array components will be delivered to the Facility site via truck. The primary transportation route will follow I-84, then turn south on US-97 at Biggs Junction, and then south into the site boundary using a variety of existing roads including Sherars Bridge Highway/State Route 216 (OR-216) and other existing county roads. These same existing roads will be used by construction workers and by operational staff. Multiple county roads within the site boundary will be used to access new and existing roads within the Facility (see Exhibit L).

Access to the wind turbine sites, solar arrays, collector substations, BESS areas, O&M areas, central substation, temporary construction areas will be via a network of existing or new access roads to be constructed or improved as part of the Facility's construction within the site boundary. To accommodate the oversize load vehicles that will be used to transport wind turbine components and other large equipment to the site, some modifications to turning radii and slope of existing roads will be necessary. A limited number of roads will be used for oversize vehicles, and necessary routes have been determined based on the proposed placement of new access roads to Facility parcels. The proposed roadway modifications include two main types of changes. The first and most commonly needed modification would include increasing the turning radius of one or more legs of an intersection to allow an oversize vehicle to safely make a turn. These have been planned to minimally impact non-participating parcels and make use of Facility parcel land. The second type of modification would be constructing an alternative alignment for a roadway segment, alongside the existing road to provide adequate turning radii and avoid grades that are too steep for the oversize vehicles to safely traverse. These areas will be restored following the completion of construction by removing gravel surfacing, restoring appropriate contours with erosion and stormwater control best management practices, decompacting as needed, and revegetating the area appropriately. All existing public roads used to access the Facility will be left in "as good or better" condition than that which existed prior to the start of construction. To minimize impacts to agricultural operations, grazing lands, and wildlife habitat, existing county and private roads and farm access tracks will be utilized to the greatest extent practicable.

All newly constructed and improved existing access roads will be graded and graveled to meet load requirements for heavy construction equipment, as necessary. Most of the new access roads for wind turbines will be initially constructed to be wider than needed for operations, to accommodate the large equipment needed for construction. Following turbine construction, the site access roads will be narrowed for use during O&M. Crane paths have been identified for movement of the cranes that are necessary to erect the wind turbines. Where possible, crane paths follow the alignment of access roads proposed for O&M. In limited locations, crane paths do not follow proposed access road alignments, and these areas will be temporarily disturbed during construction. The additional disturbed width and temporary crane paths required during construction will be restored following the completion of construction by removing gravel surfacing (if needed and used), restoring appropriate contours with erosion and stormwater control best management practices, decompacting as needed, and revegetating the area appropriately.

Where new access roads are needed, they are sited to limit the overall impact of the Facility to soils, habitat, and agricultural practices. For example, new access roads are generally sited along the edges of farm fields to limit disruptions to plowing patterns, wherever possible. Roads are placed within the fields where the alternative is an impact to a sensitive resource. Through an iterative design process, some access roads have been re-routed or eliminated entirely to avoid impacts to wetlands, streams, and archaeological and culturally significant features. The additional disturbed areas required for access during construction will be restored following the completion of construction by removing gravel surfacing, restoring appropriate contours with erosion and

stormwater control best management practices (see Exhibit C), decompacting as needed, and revegetating the area appropriately.

(2) Using underground transmission lines and combining transmission routes.

The Facility proposes the use of 34.5-kV collector lines to connect the wind and solar step-up transformers to six collector substations. The 34.5-kV wind and solar collector lines are planned to be constructed underground and buried to a minimum depth of 3 feet. The Applicant primarily proposes installation of underground 34.5-kV collector lines via open cut trenching, with directional boring proposed as needed to avoid impacts to sensitive resources such as stream crossings and to avoid other constraints such as US-97. Currently, no above ground 34.5-kV collector lines are proposed. However, based on further geotechnical investigation, short segments of aboveground 34.5-kV collector line may be required to avoid impacts where directional boring is determined to be infeasible.

The Facility's collector substations will connect to the central substation via aboveground 230-kV collector lines to be located in one central corridor that runs approximately 14 miles down the middle of the micrositing area. Within this central corridor, there will be up to two circuits and 6 individual collector lines, but they will be strung on a single set of pole-structures. The 230-kV collector lines will be supported by 120 pole-structures, consisting of 166 poles in a variety of pole-structure designs. The pole-structures will be an average of approximately 115 feet above ground, with a minimum height of approximately 50 feet and maximum height of approximately 135 feet. The spacing between pole-structures will be an average of approximately 600 feet depending on the terrain.

There will be permanent impacts only in the pole structure locations. Aside from the pole structure footprints, there will be no permanent impacts associated with the 230-kV collector lines. Temporary impacts from construction will be restored and revegetated following construction. The 230-kV collector lines will be designed following APLIC (APLIC 2006) recommendations to prevent electrocution of birds. APLIC-recommended measures are intended to protect raptors, cranes, and other large birds from accidental electrocution and are sufficient to protect even the largest birds that may try to roost on the 230-kV collector lines.

500-kV Gen-tie Transmission Line

The proposed POI at the BPA switchyard is located within the site boundary. Therefore, the Facility does not propose a gen-tie transmission line that extends outside of the site boundary. There will be a short stretch of 500-kV gen-tie transmission line that spans aboveground from the central substation to the BPA switchyard. This aboveground gen-tie transmission line will be approximately 650 feet in length and likely connected to A-frame dead-end structures within the central substation and BPA switchyard, so no support pole-structures are anticipated outside of these two facilities.

(3) Connecting the facility to existing substations, or if new substations are needed, minimizing the number of new substations.

The Applicant proposes the minimum number of new substations needed to interconnect 1,400 MW of renewable energy to the regional electrical grid by utilizing available capacity on the existing BPA 500-kV Ashe-Marion Transmission Line at the POI, located within the site boundary and Facility. The Facility's 34.5-kV collector lines will connect the 230/34.5-kV wind and solar step-up transformers to six proposed collector substations. The collector substations will be constructed to support the Facility at various locations within the micrositing area (Figure 2). The collector substations are approximately 2.8 acres each. Each collector substation will consist of one 230-kV transformer to step the power up to 230 kV to reduce electrical loss within the Facility. From the collector substations, 230-kV collector lines will transmit the power to the Facility's one central substation. The central substation will be approximately 26.2 acres, adjacent to the proposed POI. The central substation will consist of up to six 500/230-kV generator step-up transformers to step up the power from 230 kV to 500 kV in order to interconnect to BPA's existing 500-kV transmission system. The Facility proposes the development of approximately 43 acres as the collector substations and central substation. These substations are needed to collect and step up the renewable energy to 500 kV for interconnect with the existing BPA electrical system. The Facility will provide mitigation for the 43 acres either as agricultural mitigation for areas currently cultivated in wheat (see Attachment D-3 to Exhibit D) or as habitat mitigation for areas outside of cultivation (see Attachment G-2 to Exhibit G).

(4) Designing the facility to reduce the risk of injury to raptors or other vulnerable wildlife in areas near turbines or electrical equipment.

The Facility has been sited and designed to minimize impacts to raptors and other wildlife, as well as wildlife habitat, as described in Exhibits G and H of this ASC. The Facility has been sited in areas dominated by agricultural use and along existing roads where feasible, and impacts to native habitats have been avoided and minimized to the extent possible, to reduce the risk of injury to vulnerable wildlife including raptors. Based on the results of surveys, the Applicant sited Facility components to avoid all permanent impacts to wetlands and streams, and to minimize impacts to other habitats including Category 2 habitat (see Exhibit G). The Facility layout was redesigned in order to avoid areas within ODFW-designated Mule Deer Winter Range (ODFW 2013) to the extent feasible. The Applicant also applied a voluntary 0.25-mile turbine setback from nests of state sensitive raptors to minimize collision risk and nesting disturbance to the extent feasible. Other design aspects of the Facility that will minimize impacts to wildlife and wildlife habitat include the use of a largely underground electrical collection system; use of downward-shielded lighting that will utilize motion-sensor switches to provide lighting only when needed; the application of APLIC design standards for the aboveground 230-kV collector line; the use of freestanding, non guyed turbines, and the use of wildlife-friendly fencing, intended to blend with what farmers already have in the area, to fence the solar arrays.

Additional measures to avoid and minimize impacts to wildlife will be implemented during Facility construction. These include raptor nest monitoring and seasonal construction timing restrictions; having on-site environmental monitors during construction; implementing a Facility-specific

worker environmental training program; observing low speed limits; and initiating revegetation as soon as practicable. Additional measures are described in Exhibits G and H.

Finally, the Applicant will provide mitigation for unavoidable impacts to wildlife habitat as outlined in the Draft Habitat Mitigation Plan and monitor bird and bat fatalities, and raptor nests as described in the Draft Wildlife Monitoring and Mitigation Plan (Attachments G-2 and G-3, respectively, of Exhibit G). The avoidance and minimization measures and the proposed mitigation and monitoring measures together limit the impacts to wildlife as feasible, and compensate for those unavoidable impacts as mandated by EFSC approval standards, in compliance with the ODFW Habitat Mitigation Policy.

(5) Designing the components of the facility to minimize adverse visual features.

Visual impacts of the Facility are primarily related to views of the turbines, solar array, 230-kV aboveground collector lines, and, to a lesser degree (due to being collocated or dispersed amongst taller Facility infrastructure), other facilities such as the 500-kV gen-tie transmission line, access roads, substations, O&M buildings, meteorological towers, BESS, fencing and gates, and temporary construction areas. These components will not represent significant visual structures within the site boundary in the context of an expansive solar array, the taller 230-kV aboveground collector lines, and the substantially taller and more visible wind turbines. Exhibit I – Scenic Resources provides a detailed analysis of aesthetic changes to the vicinity resulting from Facility construction and operation.

Due to the size of modern wind turbines, opportunities and measures to effectively reduce visual impacts of the Facility are limited. However, the Applicant has or will utilize a number of design, engineering, and other measures to reduce visual impacts to the extent practicable. To avoid and minimize visual impacts, the Applicant has sited the Facility in a remote area of Sherman County and designed the turbine and solar array such that visibility would be minimized as much as practicable from the nearest towns (e.g., Moro and Grass Valley). The Facility has also been designed in accordance with the Sherman County 2007 Wind Power Ordinance (39-2007, Sherman County 2007) that contains wind turbine setback requirements.

Additional measures that the Applicant will employ to minimize visual impacts of the Facility, include:

- The wind turbines will be appropriately set back from project boundaries, constraints, surrounding land uses, and the rights-of-way of county roads and state and interstate highways;
- The wind turbines and towers will be painted in a white or light gray, low-reflectivity coating;
- The solar module crystalline cells will be housed within antireflective glass panels to prevent glare;
- The solar arrays will be installed with a racking system that enables the photovoltaics to track the sun through the day, and thus limit the duration the arrays are at maximum-tilt;

- The O&M buildings, substations and BESS will be designed and painted to be generally consistent with the surrounding landscape;
- Electrical collector lines will be placed underground as practicable;
- Vegetation clearing and ground disturbance will be limited to the minimum area necessary to safely and efficiently install the Facility equipment;
- Access roads and other areas of ground disturbance will be watered during construction, as needed, to avoid the generation of airborne dust;
- Temporary impact areas will be restored and revegetated as soon as practicable following completion of construction; and
- Lighting will be kept to the minimum necessary and designed to prevent offsite glare (see further info below).

See Exhibit I for further details regarding design measures to minimize visual impacts.

(6) Using the minimum lighting necessary for safety and security purposes and using techniques to prevent casting glare from the site, except as otherwise required by the Federal Aviation Administration or the Oregon Department of Aviation.

The effects of Facility lighting will be minimal. Lighting for the Facility will consist of the minimum necessary for safety purposes. Lights at the O&M buildings, BESS, and substations will be downward-shielded and aimed inward to the site to avoid casting glare offsite. These lights will not typically be on at night; instead they will utilize motion-sensor switches to provide lighting only when needed.

Lighting of the turbines will consist of the minimum required by FAA regulations. The turbines will be marked and lighted according to FAA standards (FAA Advisory Circular 70/7460-1L), but no other lighting will be used on the turbines. FAA standards call for painting the turbines and towers white or light gray, making them visible to pilots from the air. Flashing red aviation lighting will be mounted atop turbines. Under current FAA standards, all of the lights will be programmed to flash in unison, allowing the entire Facility to be perceived as a single unit by pilots flying at night. The specific location, operation, and type of aviation lighting system will be determined in consultation with FAA prior to commencing operation of the Facility. FAA lighting may also be installed on the met towers, depending on the overall lighting scheme for the Facility, to be determined prior to operation and in consultation with FAA.

The Applicant will base the final lighting design on FAA recommendations.

6.2 Siting Standards for Transmission Lines

6.2.1 OAR 345-024-0090 Siting Standards for Transmission Lines

To issue a site certificate for a facility that includes any transmission line under Council jurisdiction, the Council must find that the applicant:

(1) Can design, construct and operate the proposed transmission line so that alternating

current electric fields do not exceed 9 kV per meter at one meter above the ground surface in areas accessible to the public;

Attachment 4 provides modeling results for alternating current electric fields and demonstrates that these electric fields do not exceed 9 kilovolts per meter (kV/m) in areas accessible to the public.

(2) Can design, construct and operate the proposed transmission line so that induced currents resulting from the transmission line and related or supporting facilities will be as low as reasonably achievable.

Attachment 4 provides modeling results for induced currents resulting from the 230-kV collector lines, 500-kV gen-tie transmission line, and related or supporting facilities in areas accessible to the public.

(3) If the proposed energy facility is a transmission line or has, as a related or supporting facility, a transmission line of any size, the applicant must submit the following:

Attachment 4 addresses the submittal requirements listed in OAR 345-024-0090(3). A summary of that information has been provided below.

6.2.2 Overview of Induced Current, Induced Voltage, and Nuisance Shock

Electric currents can be induced by electric and magnetic fields in conductive objects near transmission lines. In particular, the concern is for very long objects parallel and close to the line. The primary concern is the potential for small electric currents to be induced by electric fields in metallic objects close to transmission lines. Metallic roofs, farming equipment, and large vehicles, vineyard trellises, and fences are examples of objects that can develop a small electric charge in proximity to high-voltage transmission lines. Object characteristics, degree of grounding, and electric field strength affect the amount of induced charge. An electric current can flow when an object has an induced charge and a path to ground is presented. The amount of current flow is determined by the impedance of the object to ground and the voltage induced between the object and ground. The amount of induced current that can flow is important to evaluate because of the potential for nuisance shocks.

A common induced voltage hazard occurs on wire fences that parallel overhead transmission lines. If the fence is ungrounded, it could possess the voltage of the net electric field of the overhead conductors at the location of the fence. A person touching such a fence would become a conducting path for the current to flow to ground and will feel a momentary shock. The alternating current static voltage on the fence bleeds off quickly but is still a concern. This hazard is easily removed by bonding the fence wires along the length of the fence to grounding rods that are driven into the soil.

It will be a rare situation for the ideal conditions to occur (i.e., a large metallic object which is perfectly insulated from the ground, located in the highest calculated electric field of almost 4.5 kV/m within the right-of-way of the 230-kV North segment of the collector lines, and touched by a perfectly grounded person) where the possibility of a perceived nuisance shock could occur. The

maximum electric field generated by both the 230-kV South segment of the collector lines and 500-kV gen-tie transmission line is less than the 230-kV North segment of the collector lines. The calculated electric fields at the right-of-way edges and beyond (0.10 kV/m maximum at right-of-way for the North segment of the 230-kV collector lines; 0.04 kV/m maximum at right-of-way for the South segment of the 230-kV collector lines; 0.18 kV/m maximum at right-of-way for the 500-kV gen-tie transmission line) will be sufficiently low enough that nuisance shocks should not occur. The calculated maximum magnetic fields (241.2 milligauss [mG] within the right-of-way of the North segment of the 230-kV collector lines; 100.6 mG within the right-of-way of the South segment of the 230-kV collector lines; 149.6 mG within the right-of-way of the 500-kV gen-tie transmission line) are sufficiently low that induced current in a metallic object should not occur. Note that the proposed 230-kV collector lines and 500-kV gen-tie transmission line are located within the site boundary of the Facility.

6.2.3 National Electrical Safety Code Provisions Relevant to Induced Current

The NESC sets the standards for practical safeguarding of people during the installation, operation, or maintenance of electric supply and communication lines and associated equipment. NESC Rule 234G.3 (NESC 2023) addresses induced current and sets forth a certain standard to ensure the safety and health implications of the same are properly addressed.

For voltages exceeding 98 kV ac to ground, either the clearances shall be increased or the electric field, or the effects thereof, shall be reduced by other means, as required, to limit the steady-state current due to electrostatic effects to 5 mA, rms, if an ungrounded metal fence, building, sign, billboard, chimney, radio or television antenna, tank or other installation, or any ungrounded metal attachments thereto, were short-circuited to ground.

The 5-mA figure embedded in the NESC rule is a scientifically derived health and safety limitation, intended to eliminate the potential for harmful electric shock. The threshold of perception for current flowing through the human body is approximately 1 mA (Dalziel and Mansfield 1950). If the current is increased sufficiently beyond a person's perception threshold, it can become bothersome and possibly startling. Larger currents can cause the muscles of the arm and hand to involuntarily contract so that a person cannot let go of an electrified object. The value at which 99.5 percent of men, women, and children can still let go of an object is approximately 9, 6, and 5 mA, respectively. To address this safety concern, NESC Rule 234G.3 limits the steady-state current due to electrostatic effects to 5 mA; it is a performance standard aimed at limiting the potential charge that could be developed so that a potential nuisance shock would not be harmful to children.

The NESC is updated every 5 years. The Facility will be designed, constructed, and operated in accordance with the version of the NESC that is most current at the time that the final engineering of the Facility is completed.

6.2.4 Predicted Induced Current

Empirical evidence has yielded a known relationship between short-circuit current and electric field strength for various types and sizes of objects. Based on these known relationships, Table 6 indicates the maximum current that could be induced in several types of vehicles and agricultural-related pieces of equipment potentially present in the site boundary.

Table 6. Induced Current Factors

Object	I_{sc}/E (mA/kV/m)	Maximum Induced Current (mA) ¹
Car—L 4.6 m x W 1.78 m x H 1.37 m	0.088	0.40
Pickup Truck—L 5.2 m x W 2.0 m x H 1.7m	0.10	0.45
Large Tractor-Trailer—Total Length 15.75 m Trailer: 12.2 m x W 2.4 m x H 3.7 m	0.64	2.91
Combine—L 9.15 m x W 2.3 m x H 3.5 m	0.38	1.73
Source: Table 7.8-2, from EPRI 2005. I_{sc} = short-circuit current E = AC electric field m = meter 1. Maximum induced current calculated for strongest predicted electric field of 4.5 kV/m, associated with the Facility.		

Induced currents from transmission line magnetic fields are typically not a hazard because almost no voltage is involved. A current-carrying conductor will induce a current to flow in another conductor that is parallel to it. Induced currents result from the net AC magnetic field. In the common case of grounded fences, electrical loops can be created in which induced currents can flow. The value of the induced current will depend on the magnetic field strength; the size, shape, and location of the conducting object; and the object-to-ground resistance.

Based on the induced current factors calculated in Table 6, the steady-state current generated in a worst-case scenario due to electrostatic effects is less than 5 mA.

7.0 NEPA-Related Documents – OAR 345-021-0010(3)(f)

OAR 345-021-0010(3)(f) Documents prepared in connection with an environmental assessment or environmental impact statement for the proposed facility under the National Environmental Policy Act of 1970, if any, may contain some of the information required under the application information requirements in OAR 345, divisions 021 and 022. The applicant may copy relevant sections of such documents into the appropriate exhibits of the site certificate application. The applicant may otherwise submit full copies of those documents and include, in the appropriate exhibits of the site certificate application, cross-references to the relevant sections of those documents. The applicant may use such documents only to avoid duplication. The applicant must

include additional information in the site certificate application as needed to meet the requirements of the application information requirements in OAR 345, divisions 021 and 022.

The Facility is not located on federal land and has no federal nexus requiring analysis under the National Environmental Policy Act.

8.0 Contents of the Application – OAR 345-021-0010(3)(g)

OAR 345-021-0010(3)(g) The applicant must include a table of contents in the preliminary application identifying the location of each required exhibit.

Table 7 lists the relevant exhibits included in this ASC. These exhibits have been attached to this submittal as appropriate.

Table 7. Division 22 Exhibits

Standard	Exhibit
OAR 345-022-0000 General Standard of Review	This Application
OAR 345-022-0010 Organizational Expertise	Exhibit A. Organizational Expertise
OAR 345-022-0020 Structural Standard	Exhibit B. Structural Standard
OAR 345-022-0022 Soil Protection	Exhibit C. Soil Protection
OAR 345-022-0030 Land Use	Exhibit D. Land Use
OAR 345-022-0040 Protected Areas	Exhibit E. Protected Areas
OAR 345-022-0050 Retirement and Financial Assurance	Exhibit F. Retirement and Financial Assurance
OAR 345-022-0060 Fish and Wildlife Habitat	Exhibit G. Fish and Wildlife Habitat
OAR 345-022-0070 Threatened and Endangered Species	Exhibit H. Threatened and Endangered Species
OAR 345-022-0080 Scenic Resources	Exhibit I. Scenic Resources
OAR 345-022-0090 Historic, Cultural and Archaeological Resources	Exhibit J. Historic, Cultural and Archaeological Resources
OAR 345-022-0100 Recreation	Exhibit K. Recreation
OAR 345-022-0110 Public Services	Exhibit L. Public Services
OAR 345-022-0115 Wildfire Prevention and Risk Management	Exhibit M. Wildfire Prevention and Risk Management Exhibit
OAR 345-022-0120 Waste Minimization	Exhibit N. Waste Minimization Exhibit
OAR 345-022-0130 State and Local Laws and Regulations	Exhibit O. State and Local Laws and Regulations Exhibit • Exhibit O1: Wetlands and Other Jurisdictional Waters • Exhibit O2: Water Use • Exhibit O3: Noise and Cooling Towers

9.0 Other Information Requested in the Project Order – OAR 345-021-0010(3)(i)

OAR 345-021-0010(3)(i) Any other information that the Department requests in the project order or in a notification regarding expedited review.

Within Section IV – Application Requirements of the Project Order (ODOE 2026), ODOE has requested Additional Clarification or Information Requirements for various sections of this ASC. These requirements are summarized in Table 5 of the Project Order and detailed in Sections IV.A through IV.Q of the Project Order. The Applicant has addressed these requirements in the respective sections of this ASC which correspond to the sections of the Project Order in which they are requested.

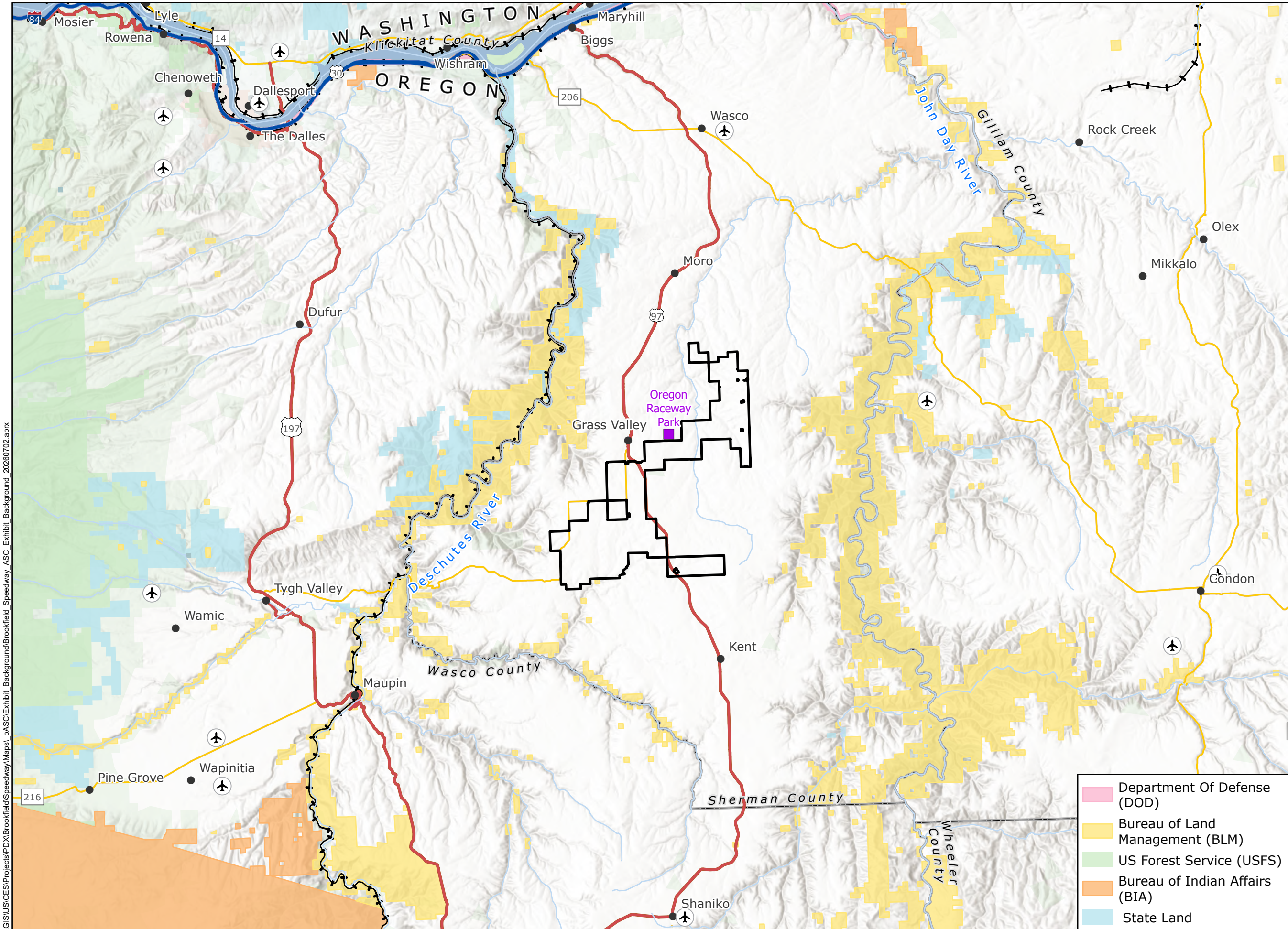
10.0 References

- APLIC (Avian Power Line Interaction Committee). 2006. Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006. Edison Electric Institute, APLIC, and the California Energy Commission. Washington, D.C. and Sacramento, CA.
[https://www.aplic.org/uploads/files/2643/SuggestedPractices2006\(LR-2\).pdf](https://www.aplic.org/uploads/files/2643/SuggestedPractices2006(LR-2).pdf)
- Battery University. 2022. BU-304a: Safety Concerns with Li-ion. February 2022.
http://batteryuniversity.com/learn/article/safety_concerns_with_li_ion.
- Dalziel, C.F., and T H. Mansfield. 1950. Effects of Frequency on Perception Currents. AIEE Transactions 69:1162–1168.
- EPA (U.S. Environmental Protection Agency). 2025a. Improving Recycling and Management of Renewable Energy Wastes: Universal Waste Regulations for Solar Panels and Lithium Batteries. September 25, 2025. Accessed June 18, 2026.
<https://www.epa.gov/hw/improving-recycling-and-management-renewable-energy-wastes-universal-waste-regulations-solar#lithium>
- EPA. 2025b. Universal Waste. August 6, 2025. Accessed June 18, 2026.
<https://www.epa.gov/hw/universal-waste>
- EPRI (Electric Power Research Institute). 2005. AC Transmission Line Reference Book: 200 kV and Above. Third edition. EPRI, Palo Alto, CA. 1011974.
- LAZARD. 2021. Lazard’s Levelized Cost of Storage—Version 7.0.
<https://www.lazard.com/media/451882/lazards-levelized-cost-of-storage-version-70vf.pdf>.
- Ma, Y, P. Martinez-Vazquez, and C. Baniotopoulos. 2018. Wind turbine tower collapse cases: a historical overview. Proceedings of the Institution of Civil Engineers – Structures and Buildings 172 (8): 547-555. <https://doi.org/10.1680/jstbu.17.00167>

- NESC (National Electric Safety Code). 2023. National Electrical Safety Code. 2023 ed. Institute of Electrical and Electronics Engineers, Inc., New York, NY. 287 pages.
- ODFW (Oregon Department of Fish and Wildlife). 2013. ODFW Winter Range for Eastern Oregon. <https://nrimp.dfw.state.or.us/DataClearinghouse/default.aspx?p=202&XMLname=885.xml>.
- ODOE (Oregon Department of Energy). 2026. Speedway Energy Facility Project Order, Revised. February 26, 2026, revised May 4, 2026.
<https://www.oregon.gov/energy/facilities/Facilities%20library/2026-05-06-SEFNOI-Amended-Project-Order-2026-05-04.pdf>
- Sherman County. 2007. Sherman County 2007 Wind Power Ordinance. Ordinance No. 39-2007, adopted November 21, 2007. Not available online (provided directly by the Sherman County Planning Director).
- UL Solutions. 2023. UL 9540A Test Method. Available online at: <https://www.ul.com/services/ul-9540a-test-method>.

Figures

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Speedway Energy Facility

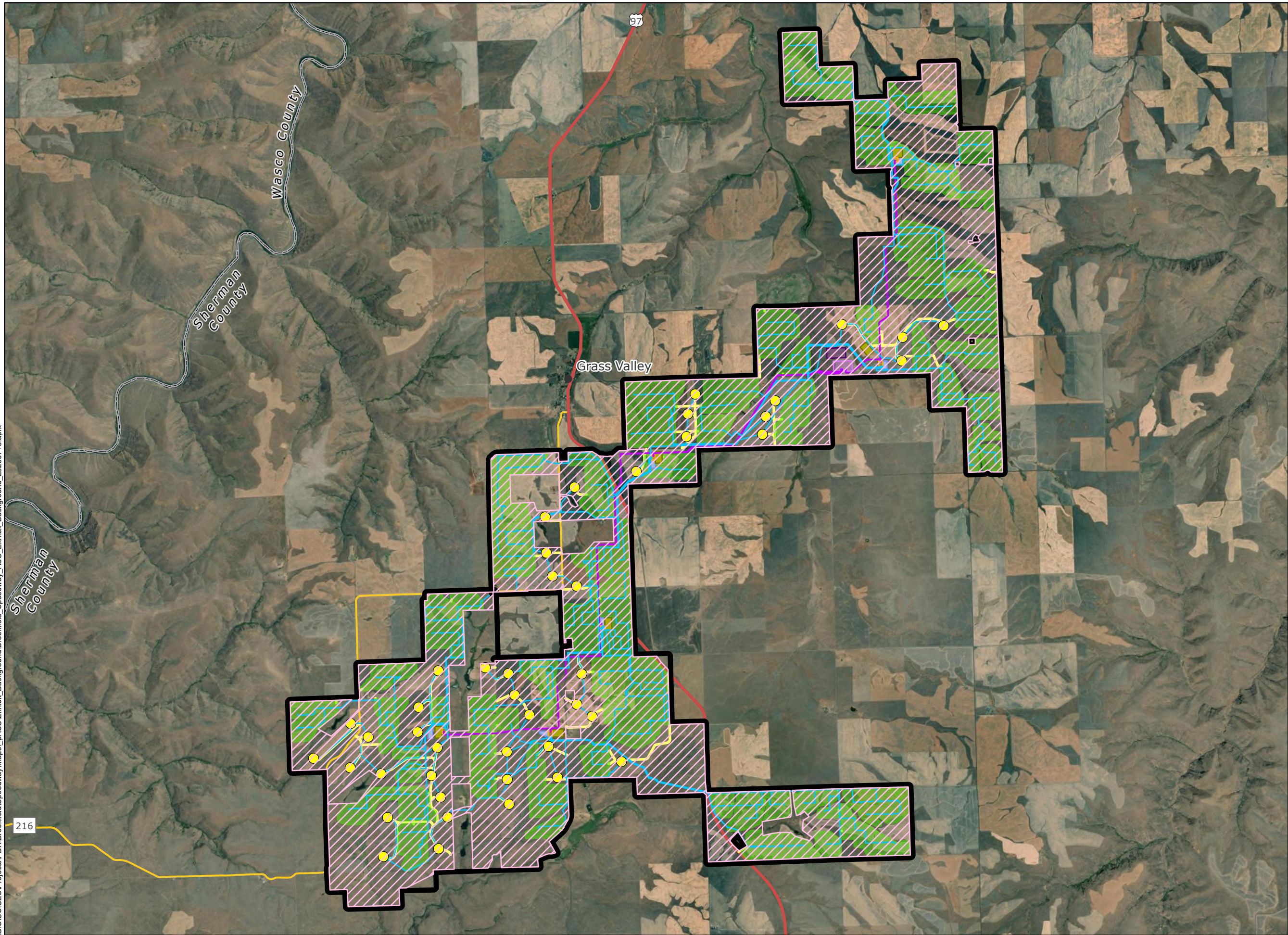
Figure 1 Vicinity Map

SHERMAN COUNTY, OR

- Facility Site Boundary
 - City/Town
 - County Boundary
 - State Boundary
 - Interstate Highway
 - US Highway
 - State Highway
 - Private Recreation Area
 - Airport/Airfield
 - Railroad
 - River/Stream
 - Waterbody
- TETRA TECH
- Speedway Energy



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Speedway Energy Facility

Figure 2
Micrositing Area

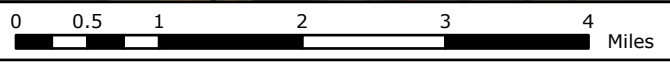
SHERMAN COUNTY, OR

- Facility Site Boundary
- Micrositing Area Boundary
- Wind Turbine
- Solar Array Fenceline
- 34.5kV Collector Lines (Underground)
- Collector Substation
- 230kV Collector Lines (Aboveground)
- Central Substation
- Point of Interconnection
- Battery Energy Storage System (BESS)
- O&M Facility
- Access Road
- City/Town
- County Boundary
- US Highway
- State Highway



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Speedway Energy Facility

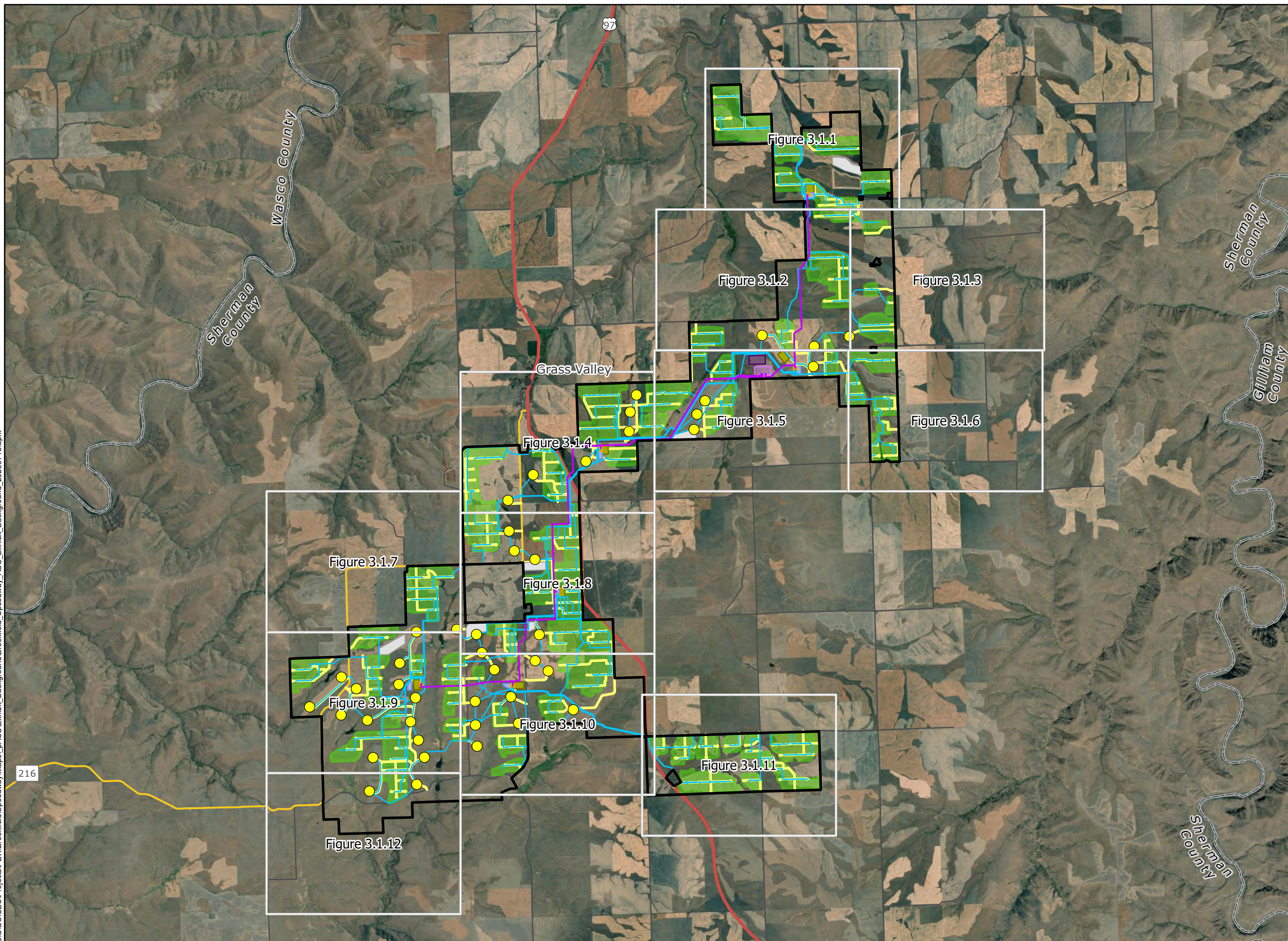
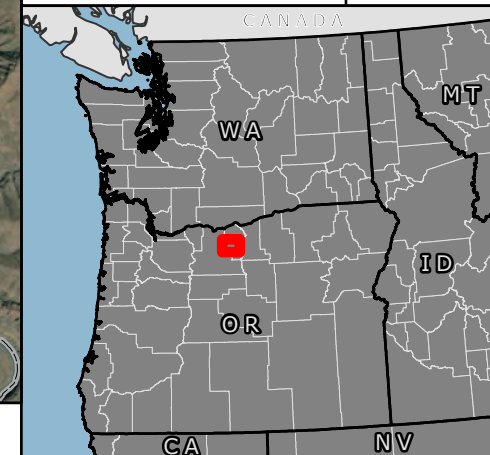
Figure 3.1 Preliminary Facility Layout

SHERMAN COUNTY, OR

- Map Grid
- Facility Site Boundary
- Wind Turbine
- Solar Array Fenceline
- 34.5kV Collector Lines (Underground)
- Central Substation
- 230kV Collector Lines (Aboveground)
- Collector Substation
- Point of Interconnection
- Battery Energy Storage System (BESS)
- O&M Facility
- Access Road
- Temporary Construction Area
- City/Town
- County Boundary
- US Highway
- State Highway
- County Roads



Reference Map



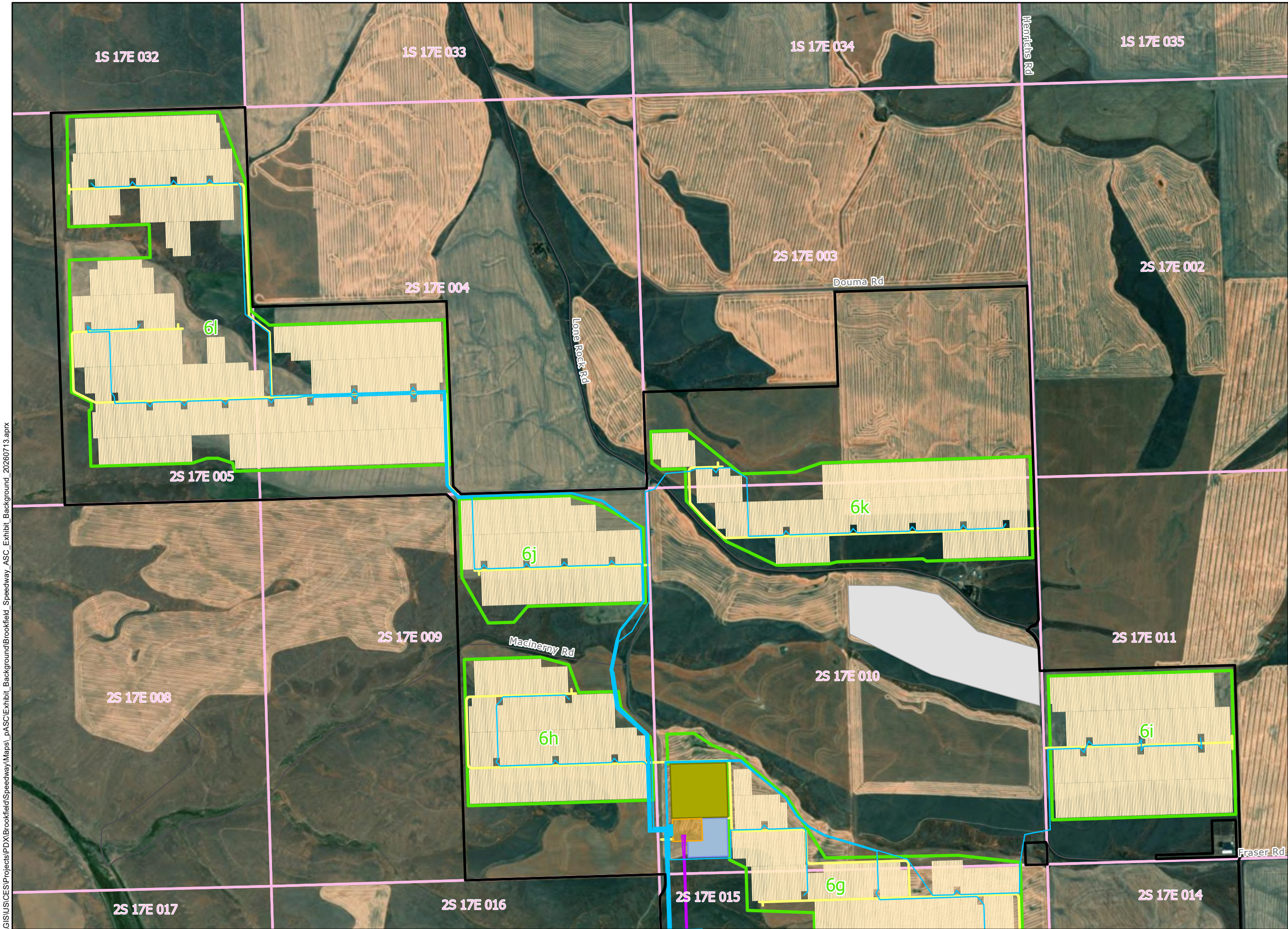
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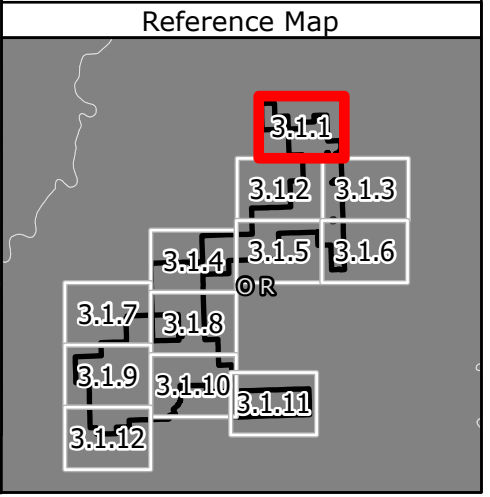


Speedway Energy Facility

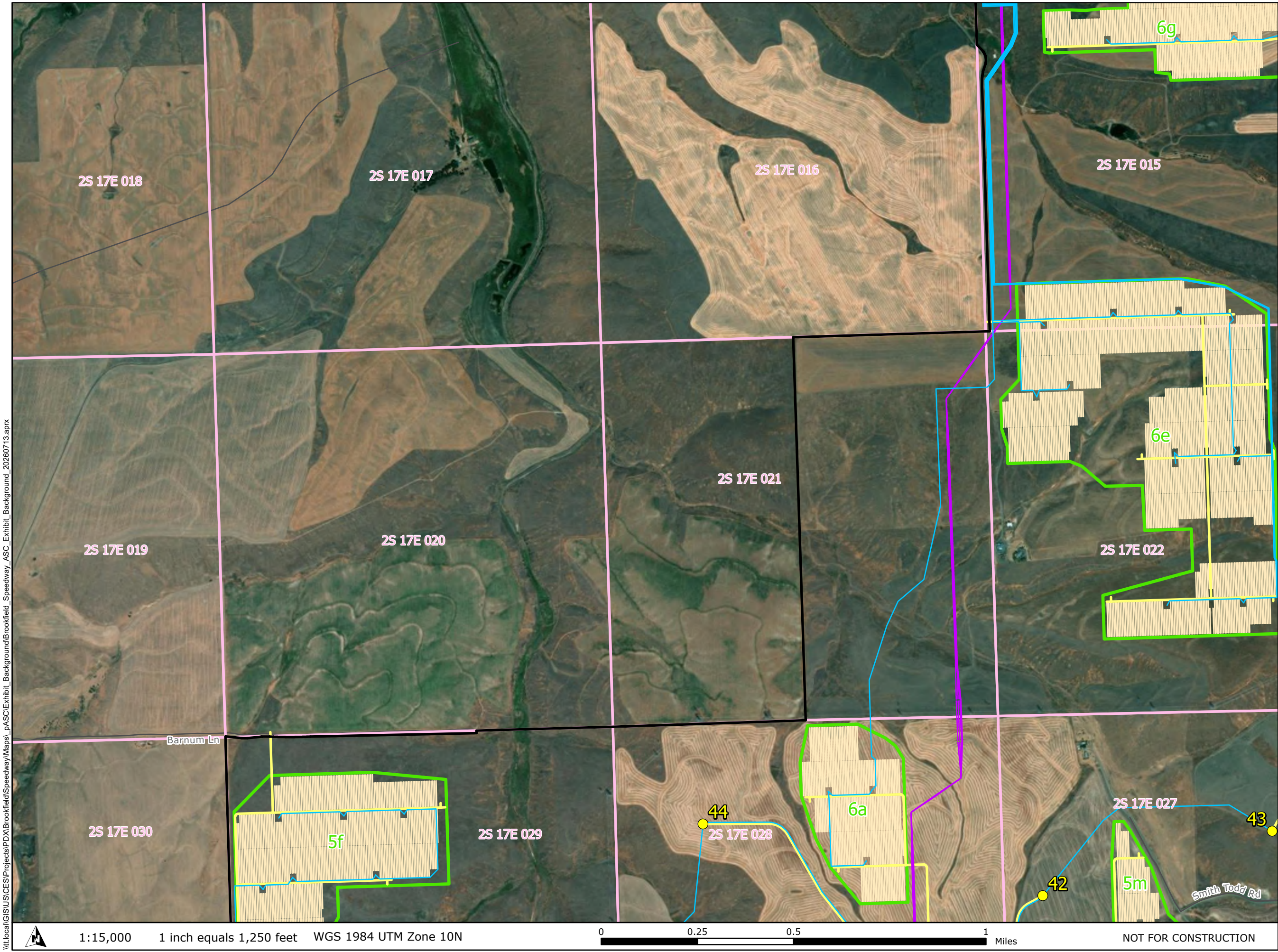
Figure 3.1.1 Preliminary Facility Layout

SHERMAN COUNTY, OR

- Facility Site Boundary
 - Solar Array Fenceline
 - Solar Array
 - 34.5kV Collector Lines (Underground)
 - Collector Substation
 - 230kV Collector Lines (Aboveground)
 - Battery Energy Storage System (BESS)
 - O&M Facility
 - Access Road
 - Temporary Construction Area
 - County Roads
 - Township/Range/Section
- TETRA TECH Speedway Energy



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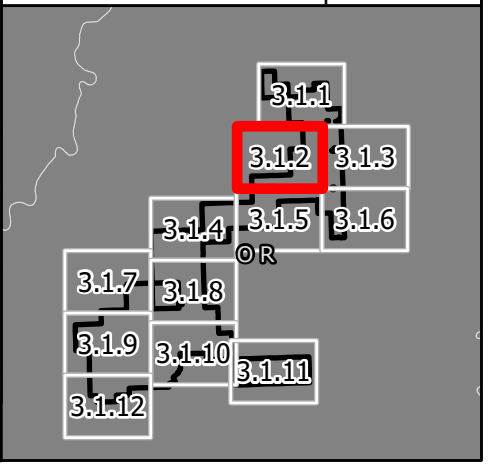
Figure 3.1.2 Preliminary Facility Layout

SHERMAN COUNTY, OR

- Facility Site Boundary
- Wind Turbine
- Solar Array Fenceline
- Solar Array
- 34.5kV Collector Lines (Underground)
- Collector Substation
- 230kV Collector Lines (Aboveground)
- Battery Energy Storage System (BESS)
- Access Road
- County Roads
- Township/Range/Section

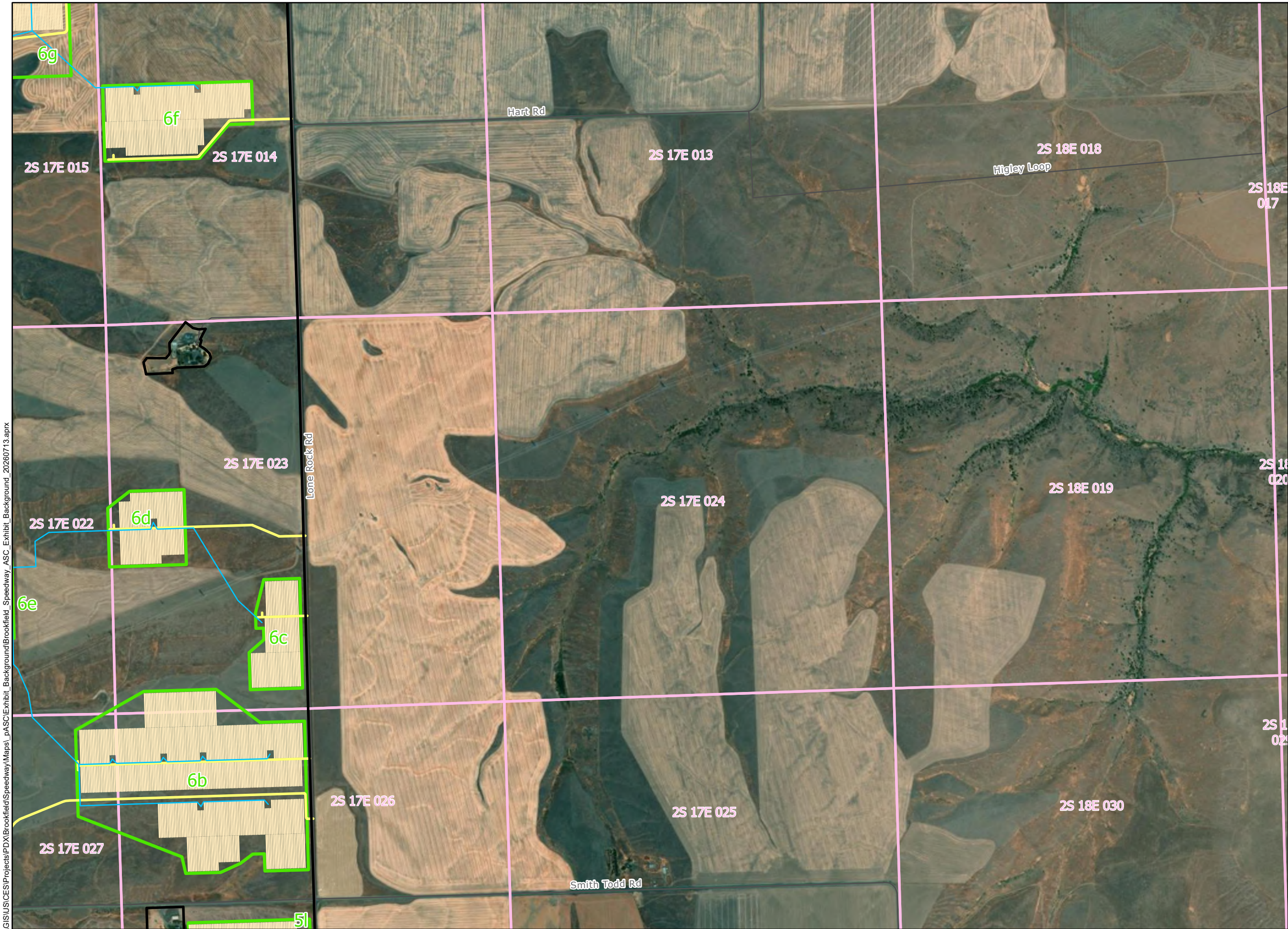


Reference Map



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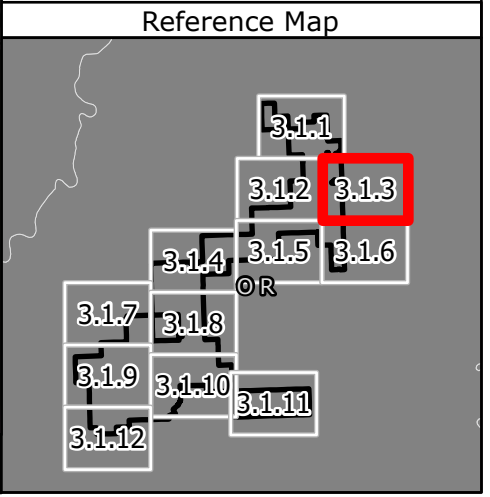


Speedway Energy Facility

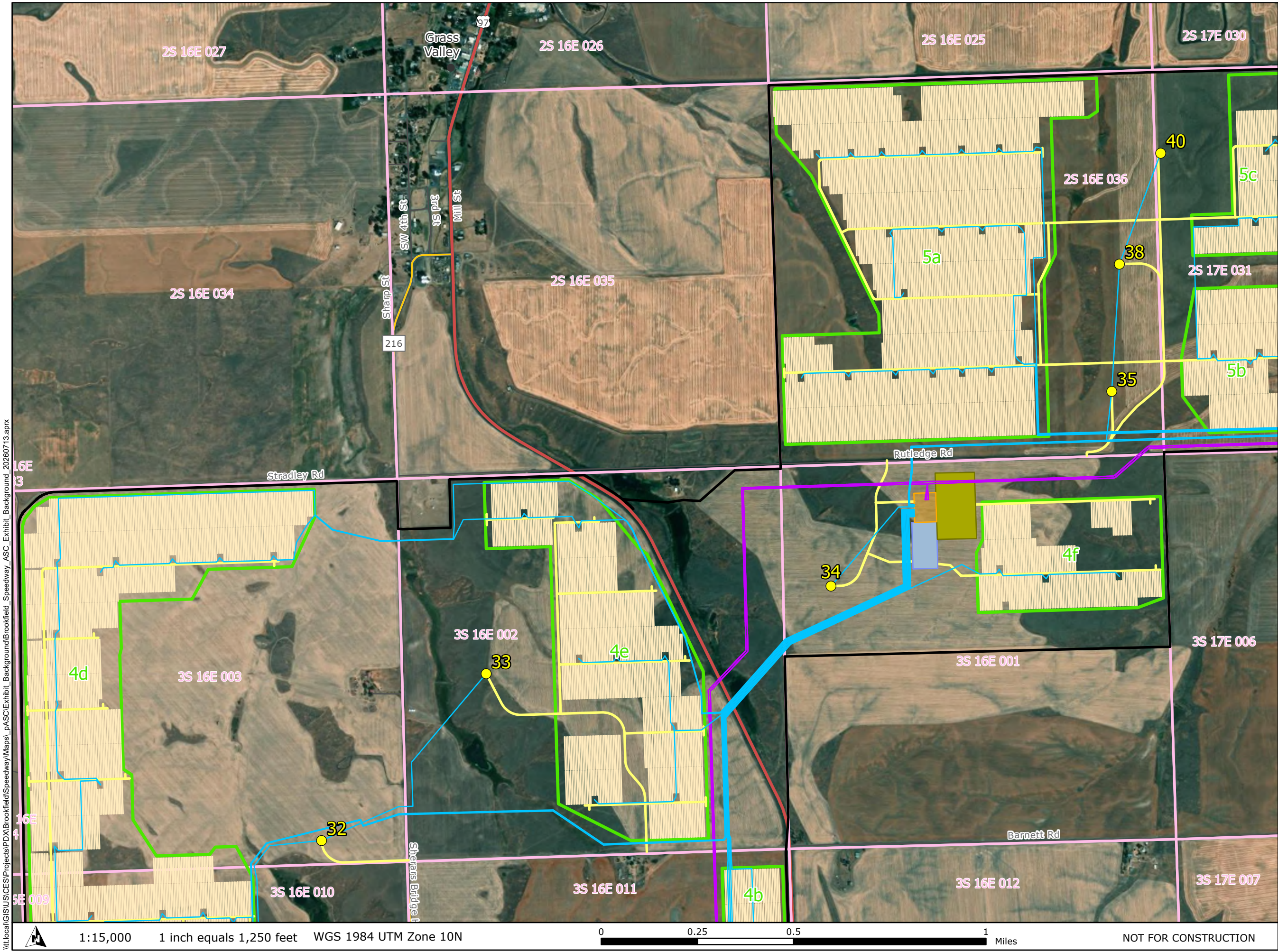
Figure 3.1.3 Preliminary Facility Layout

SHERMAN COUNTY, OR

- Facility Site Boundary
 - Solar Array Fenceline
 - Solar Array
 - 34.5kV Collector Lines (Underground)
 - Collector Substation
 - 230kV Collector Lines (Aboveground)
 - Access Road
 - County Roads
 - Township/Range/Section
- TETRA TECH
- Speedway Energy



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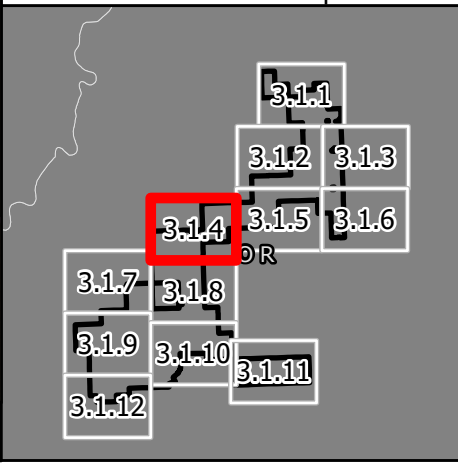
Figure 3.1.4 Preliminary Facility Layout

SHERMAN COUNTY, OR

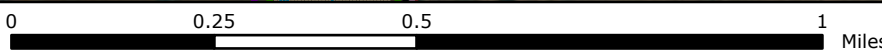
- Facility Site Boundary
- Wind Turbine
- Solar Array Fenceline
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- 34.5kV Collector Lines (Underground)
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- Battery Energy Storage System (BESS)
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- Access Road
- City/Town
- US Highway
- State Highway
- County Roads
- Township/Range/Section



Reference Map

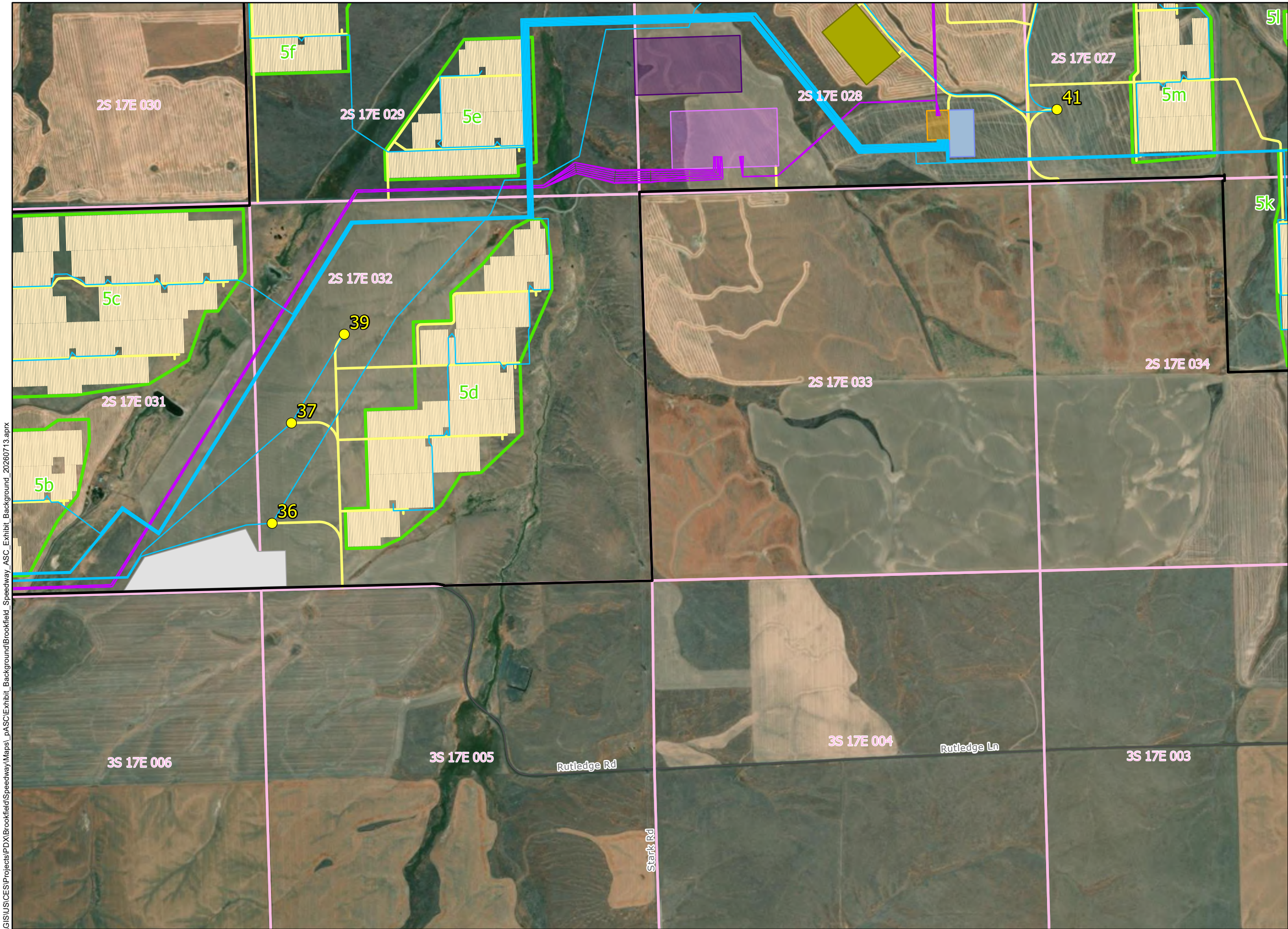


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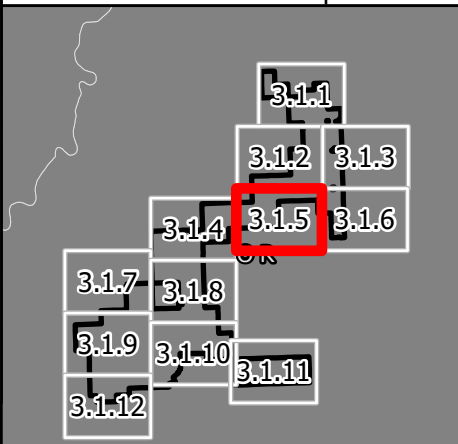
**Figure 3.1.5
Preliminary
Facility Layout**

SHERMAN COUNTY, OR

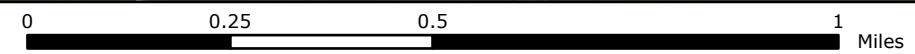
- Facility Site Boundary
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- Access Road
- Temporary Construction Area
- County Roads
- Township/Range/Section



Reference Map



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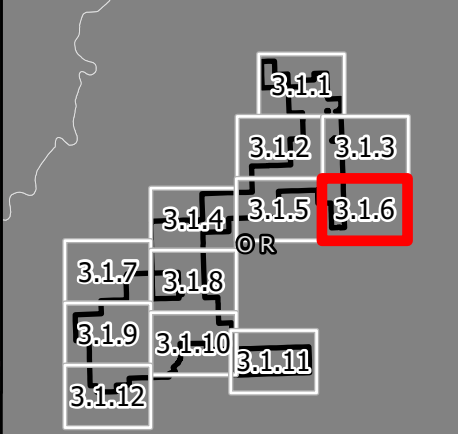
**Figure 3.1.6
Preliminary
Facility Layout**

SHERMAN COUNTY, OR

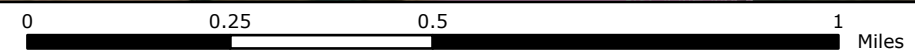
- Facility Site Boundary
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- Access Road
- County Roads
- Township/Range/Section



Reference Map

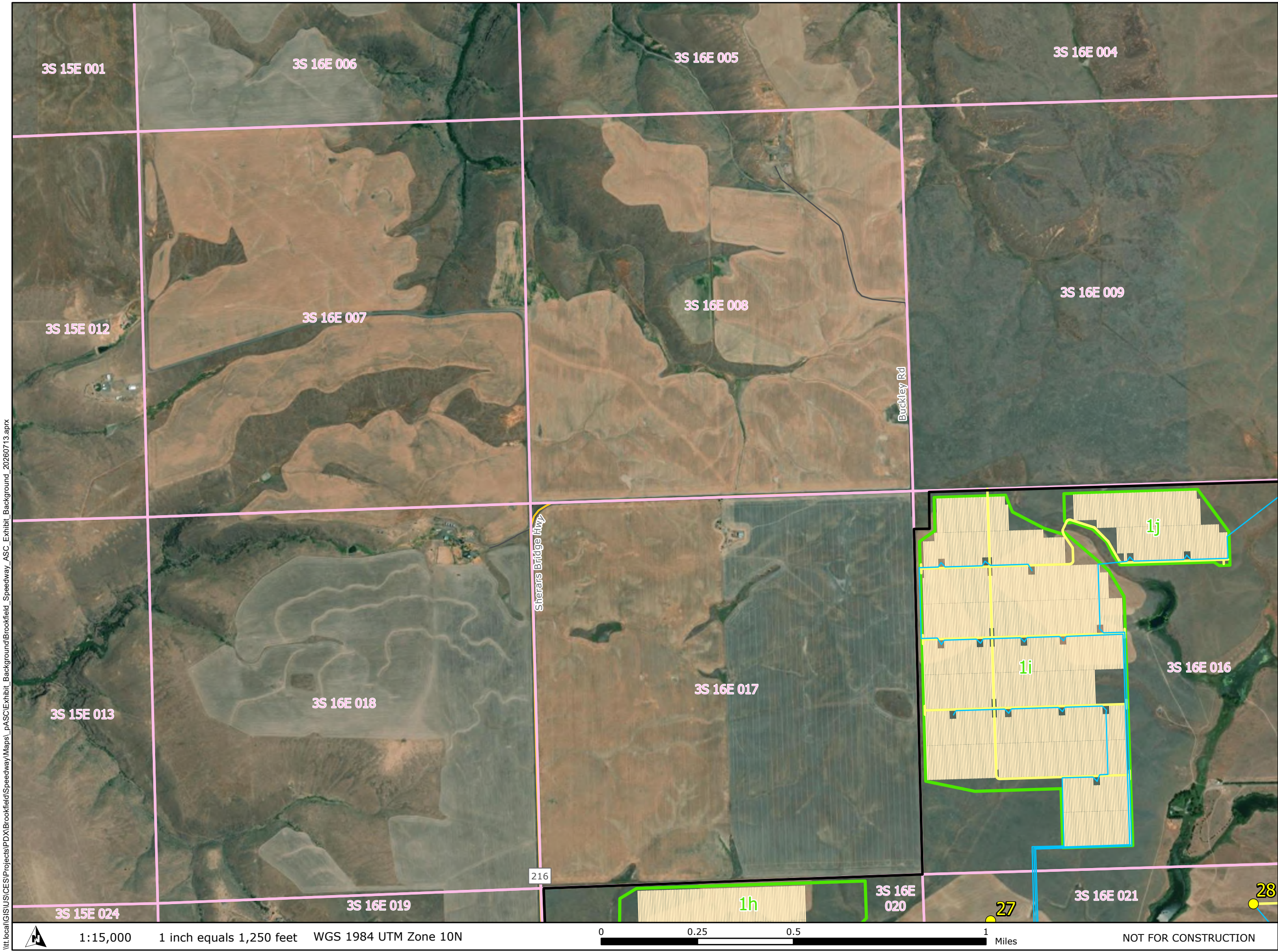


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Speedway Energy Facility

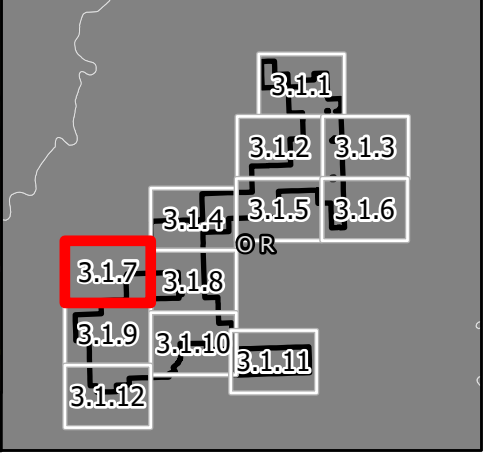
**Figure 3.1.7
Preliminary
Facility Layout**

SHERMAN COUNTY, OR

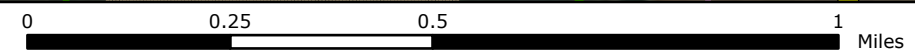
- Facility Site Boundary
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- Access Road
- State Highway
- County Roads
- Township/Range/Section



Reference Map

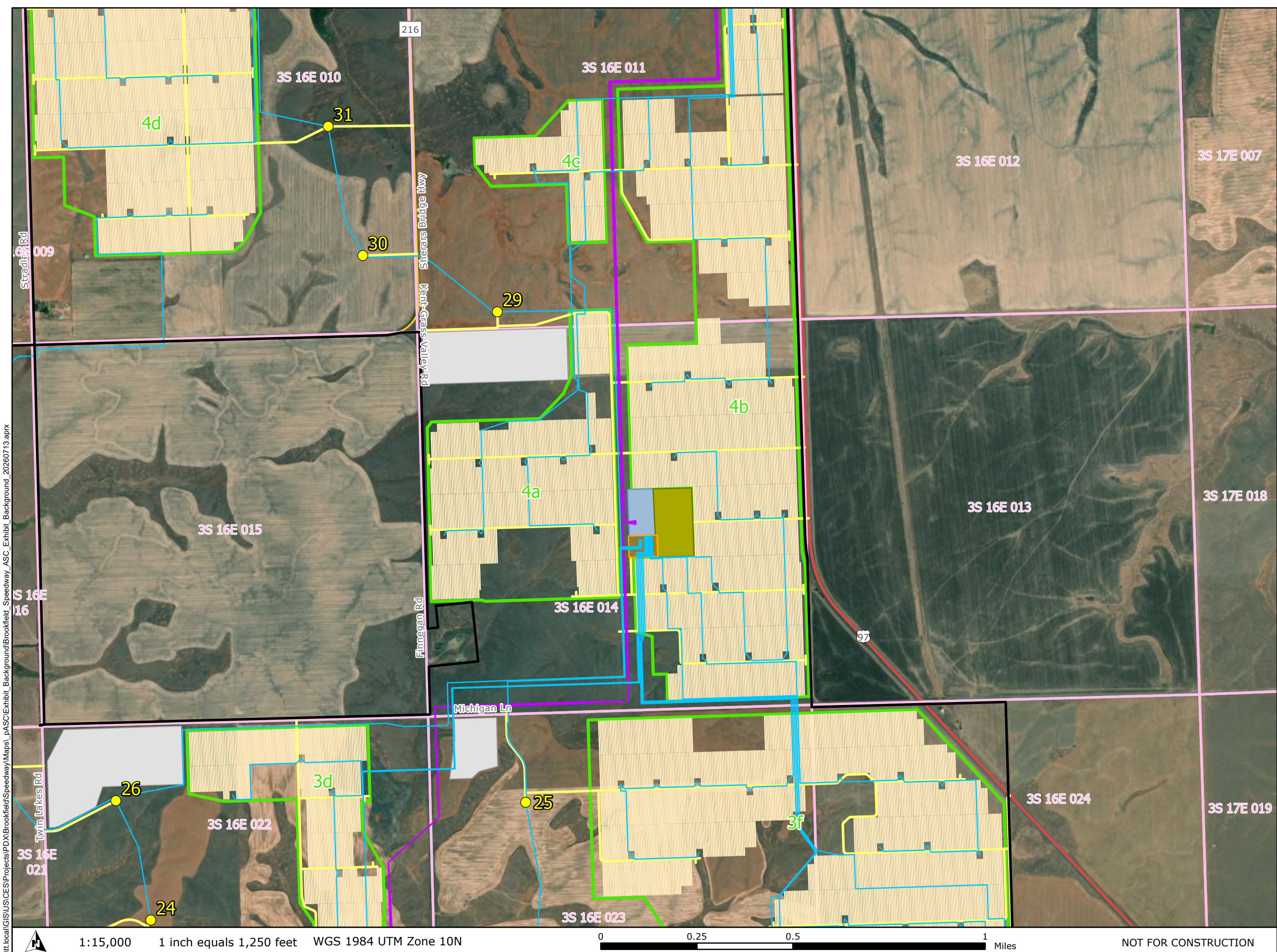


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Speedway Energy Facility

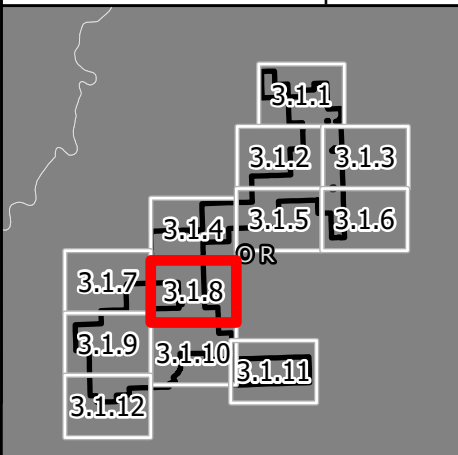
**Figure 3.1.8
Preliminary
Facility Layout**

SHERMAN COUNTY, OR

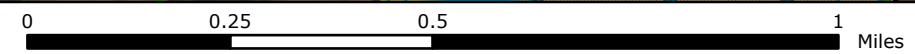
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NOT FOR CONSTRUCTION

Speedway Energy Facility

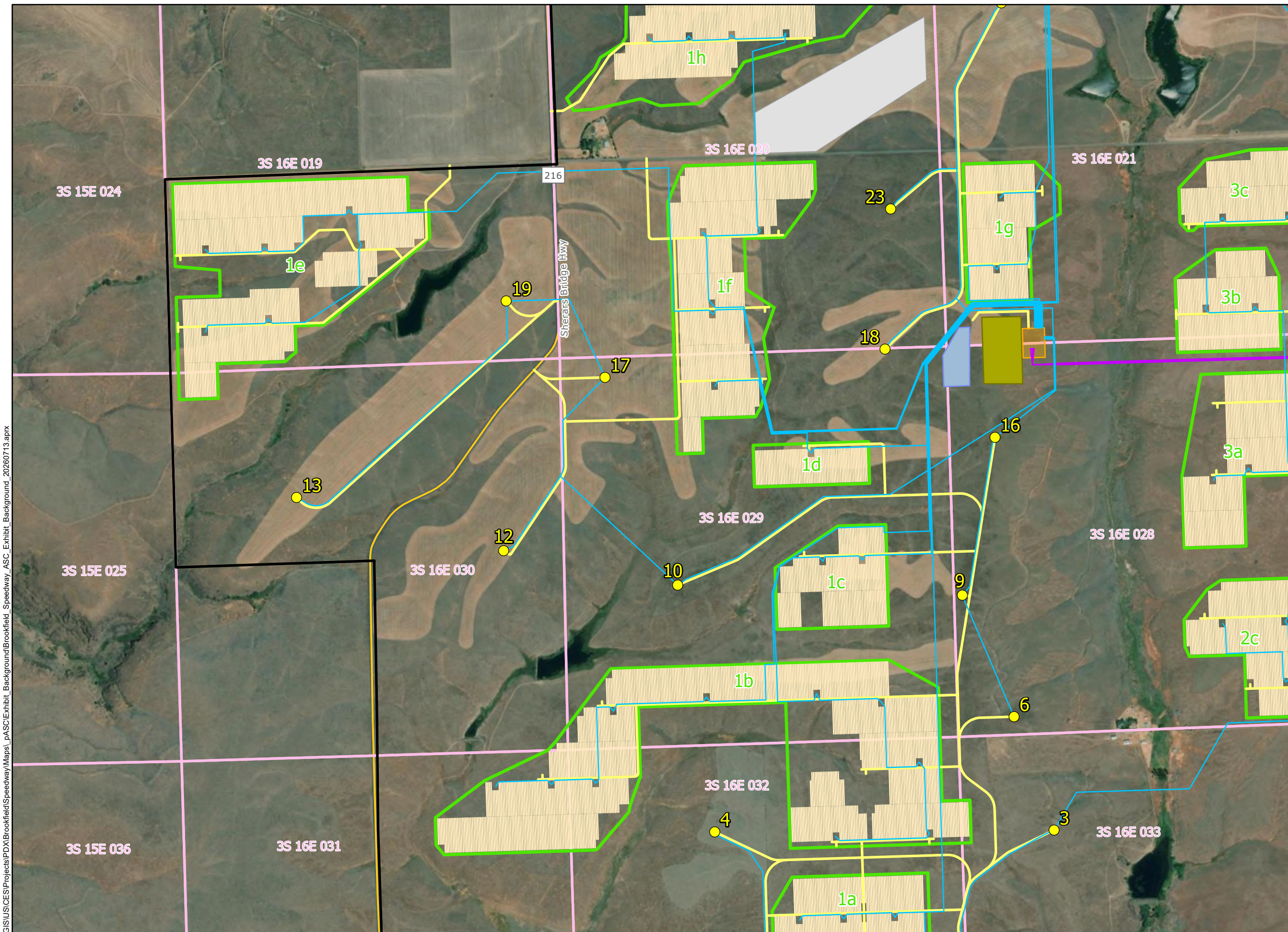
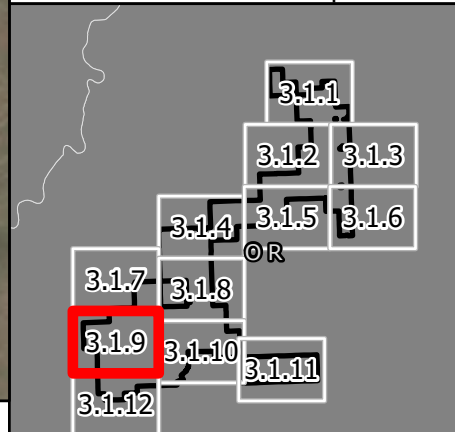
Figure 3.1.9
Preliminary
Facility Layout

SHERMAN COUNTY, OR

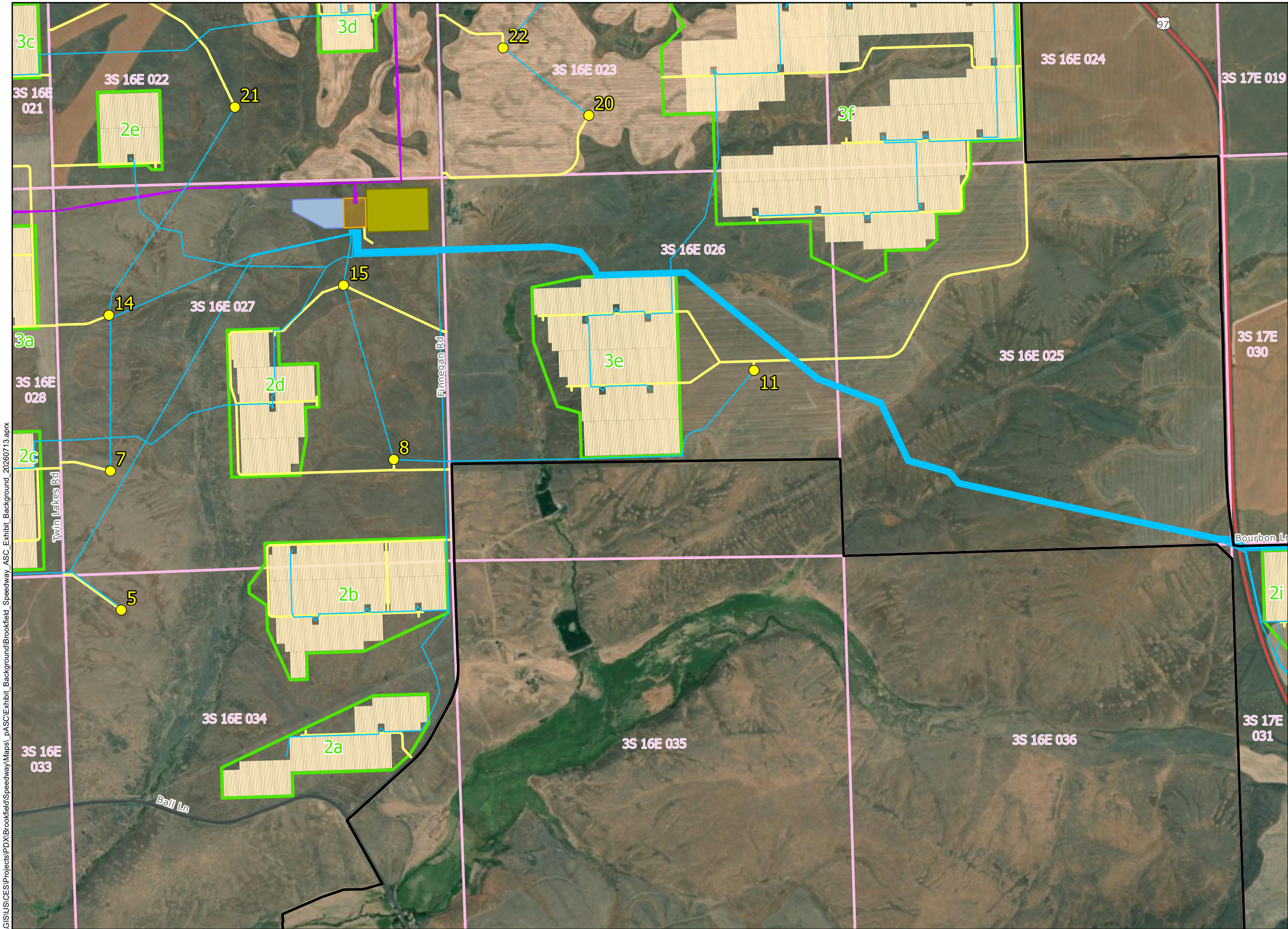
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- Township/Range/Section



Reference Map



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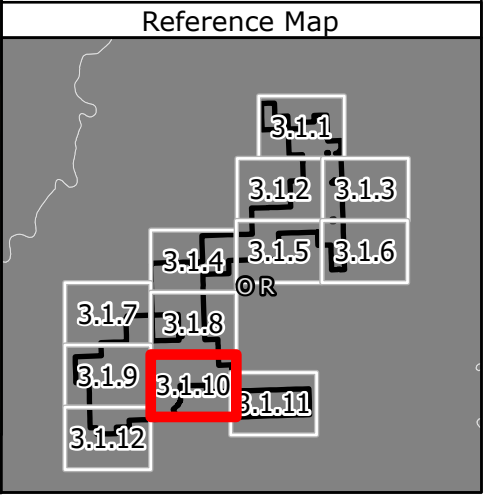


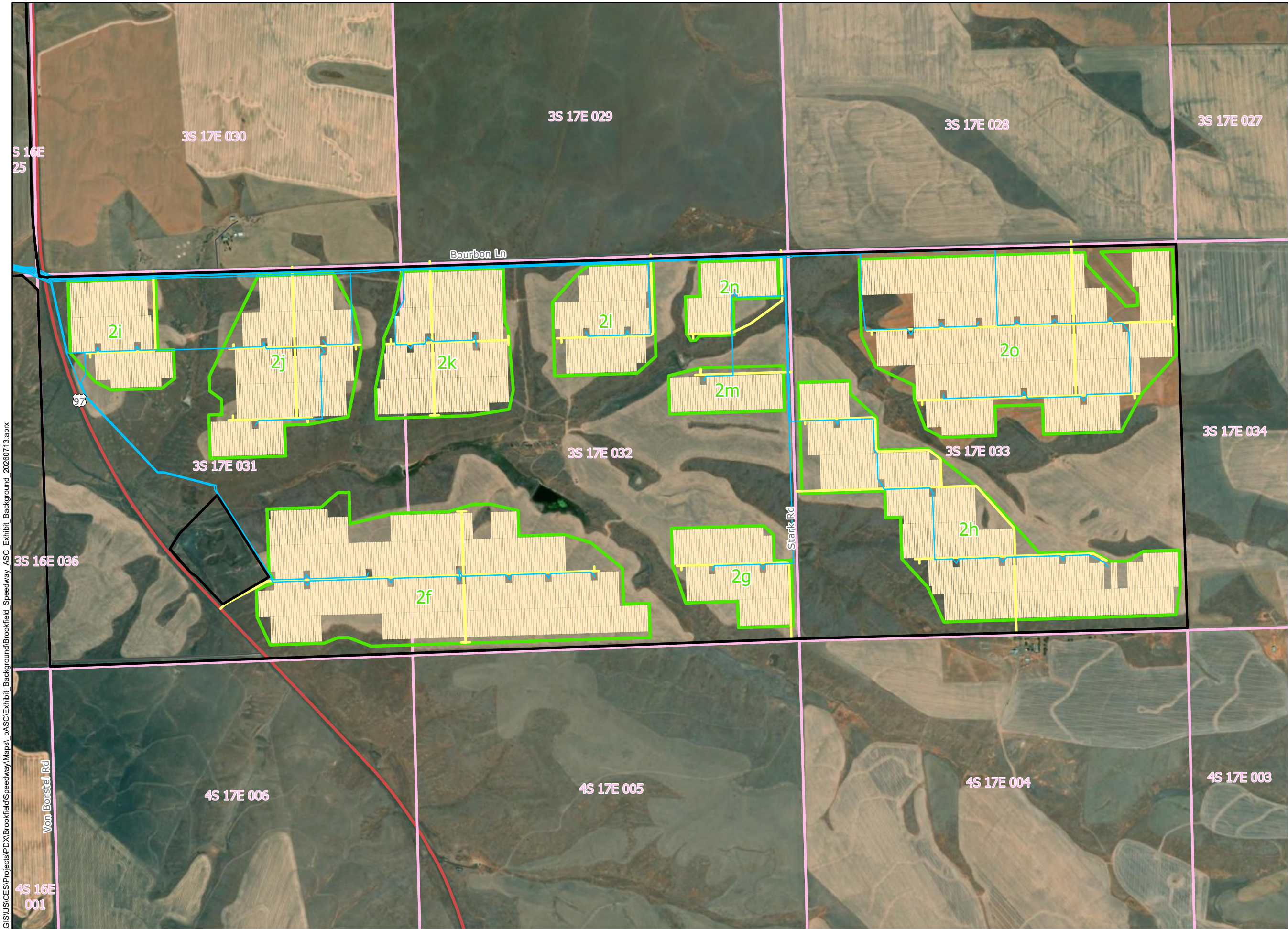
Speedway Energy Facility

Figure 3.1.10 Preliminary Facility Layout

SHERMAN COUNTY, OR

- Facility Site Boundary
 - Wind Turbine
 - Solar Array Fenceline
 - Solar Array
 - 34.5kV Collector Lines (Underground)
 - Collector Substation
 - 230kV Collector Lines (Aboveground)
 - Battery Energy Storage System (BESS)
 - O&M Facility
 - Access Road
 - US Highway
 - County Roads
 - Township/Range/Section
- TETRA TECH Speedway Energy





Speedway Energy Facility

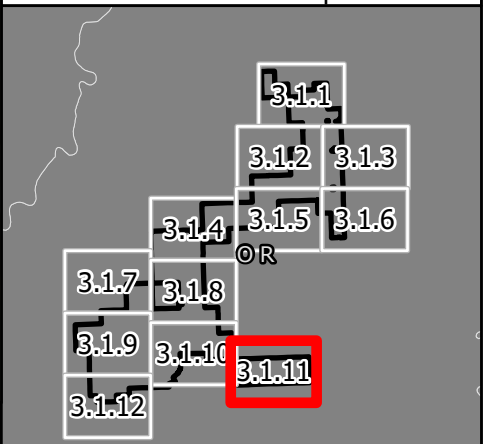
**Figure 3.1.11
Preliminary
Facility Layout**

SHERMAN COUNTY, OR

- Facility Site Boundary
- Solar Array Fenceline
- Solar Array
- 34.5kV Collector Lines (Underground)
- Collector Substation
- 230kV Collector Lines (Aboveground)
- Access Road
- US Highway
- County Roads
- Township/Range/Section



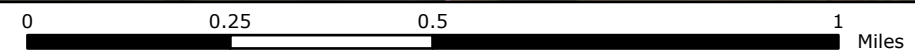
Reference Map



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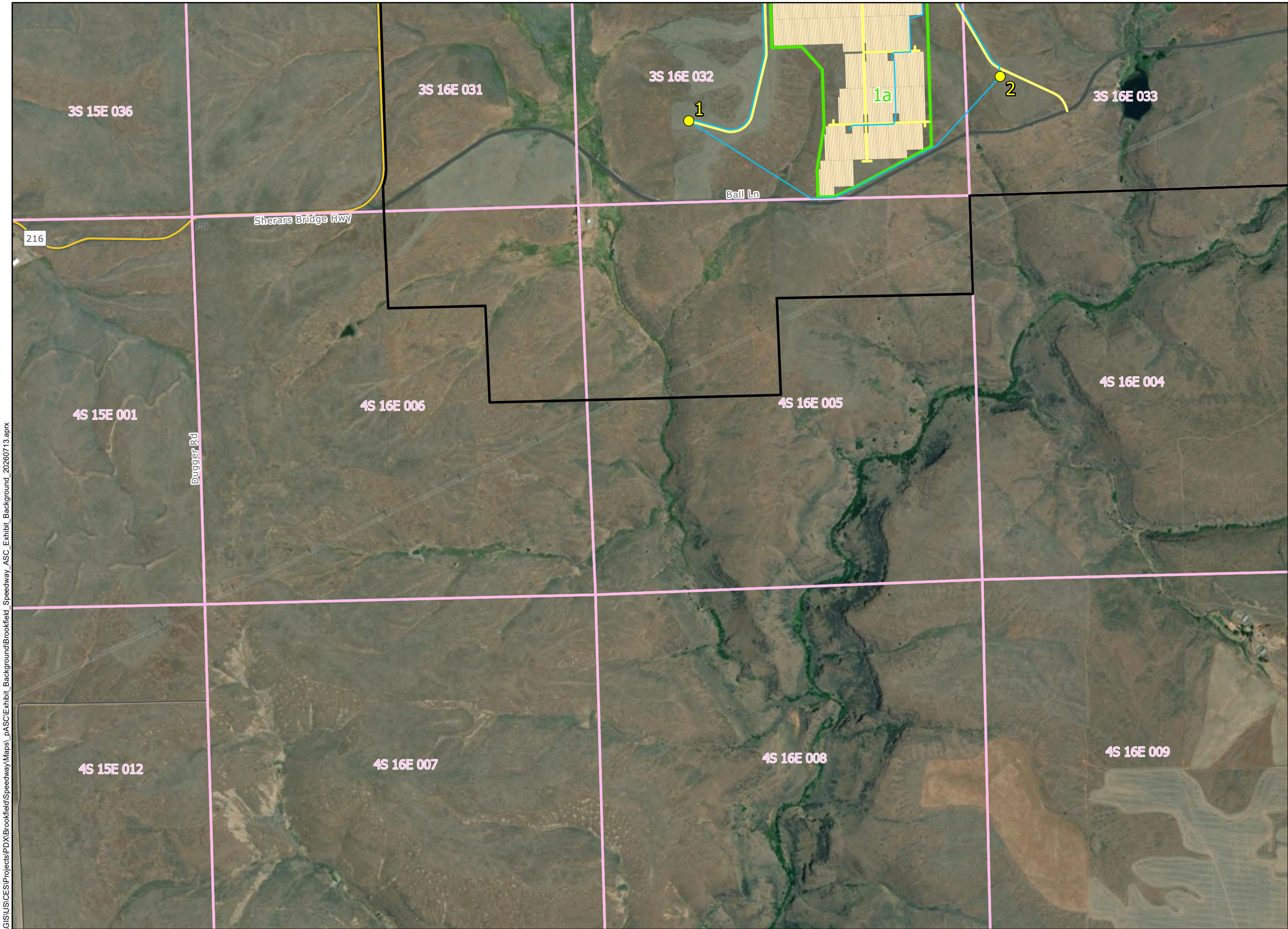


1:15,000 1 inch equals 1,250 feet WGS 1984 UTM Zone 10N



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**Speedway
Energy Facility**

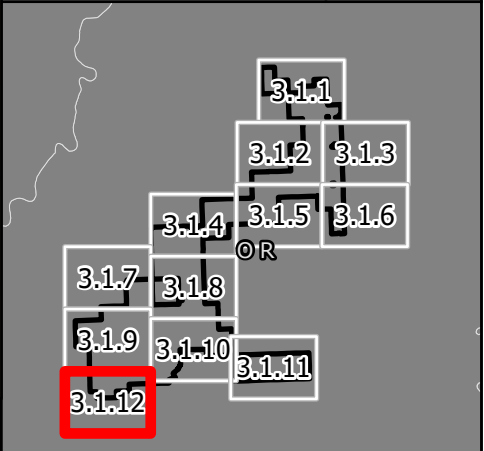
**Figure 3.1.12
Preliminary
Facility Layout**

SHERMAN COUNTY, OR

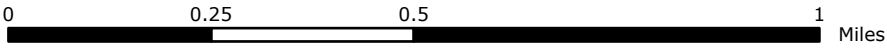
- Facility Site Boundary
- Wind Turbine
- Solar Array Fenceline
- Solar Array
- 34.5kV Collector Lines (Underground)
- Collector Substation
- 230kV Collector Lines (Aboveground)
- Access Road
- State Highway
- County Roads
- Township/Range/Section



Reference Map

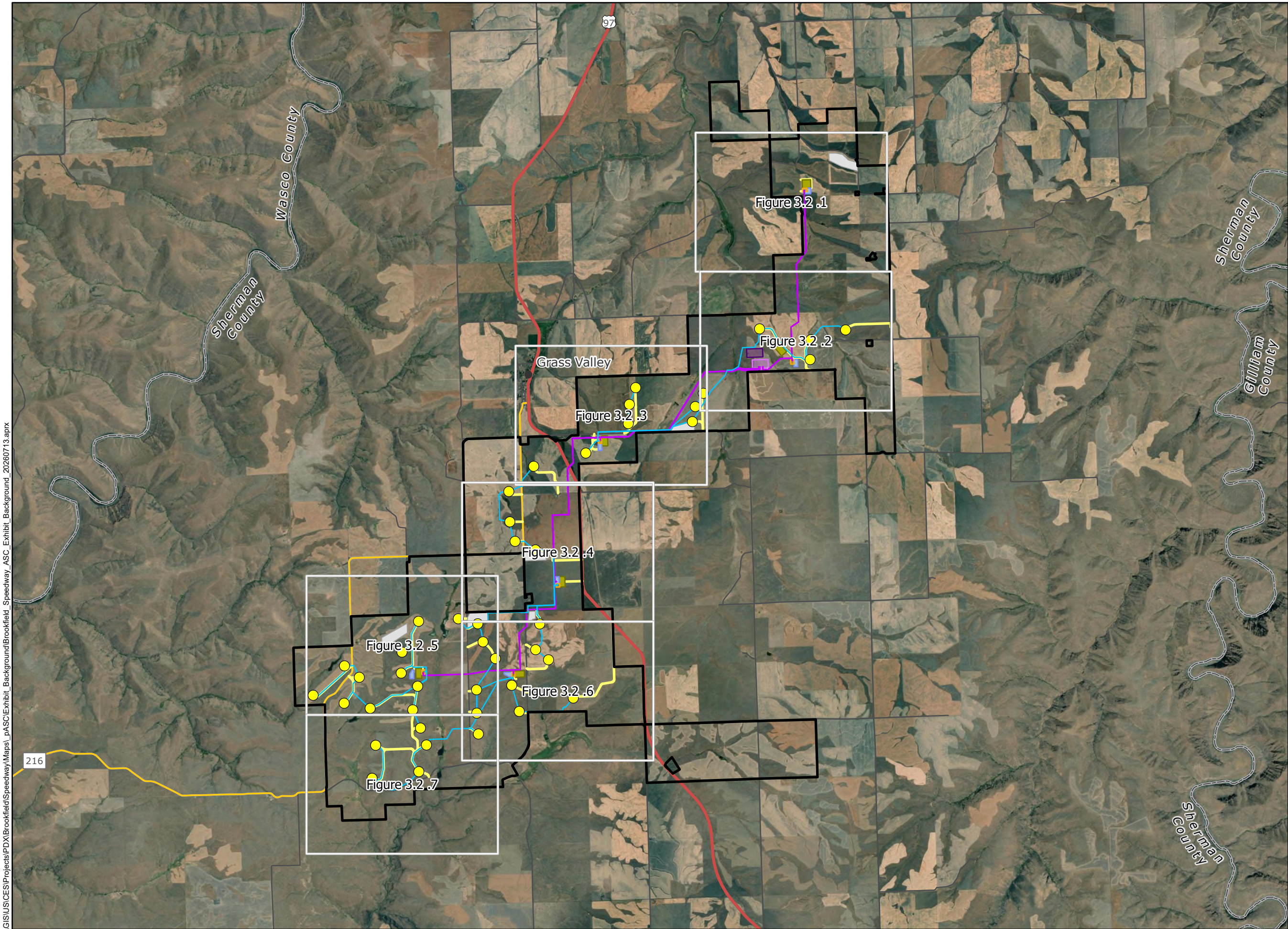


1:15,000 1 inch equals 1,250 feet WGS 1984 UTM Zone 10N



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Speedway Energy Facility

**Figure 3.2
Preliminary
Facility Layout
Wind Components**

SHERMAN COUNTY, OR

- Map Grid
- Facility Site Boundary
- Wind Turbine
- 34.5kV Collector Lines (Underground)
- Collector Substation
- 230kV Collector Lines (Aboveground)
- Central Substation
- Point of Interconnection
- Battery Energy Storage System (BESS)
- O&M Facility
- Access Road
- Temporary Construction Area
- City/Town
- County Boundary
- US Highway
- State Highway
- County Roads

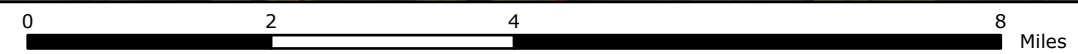


Reference Map



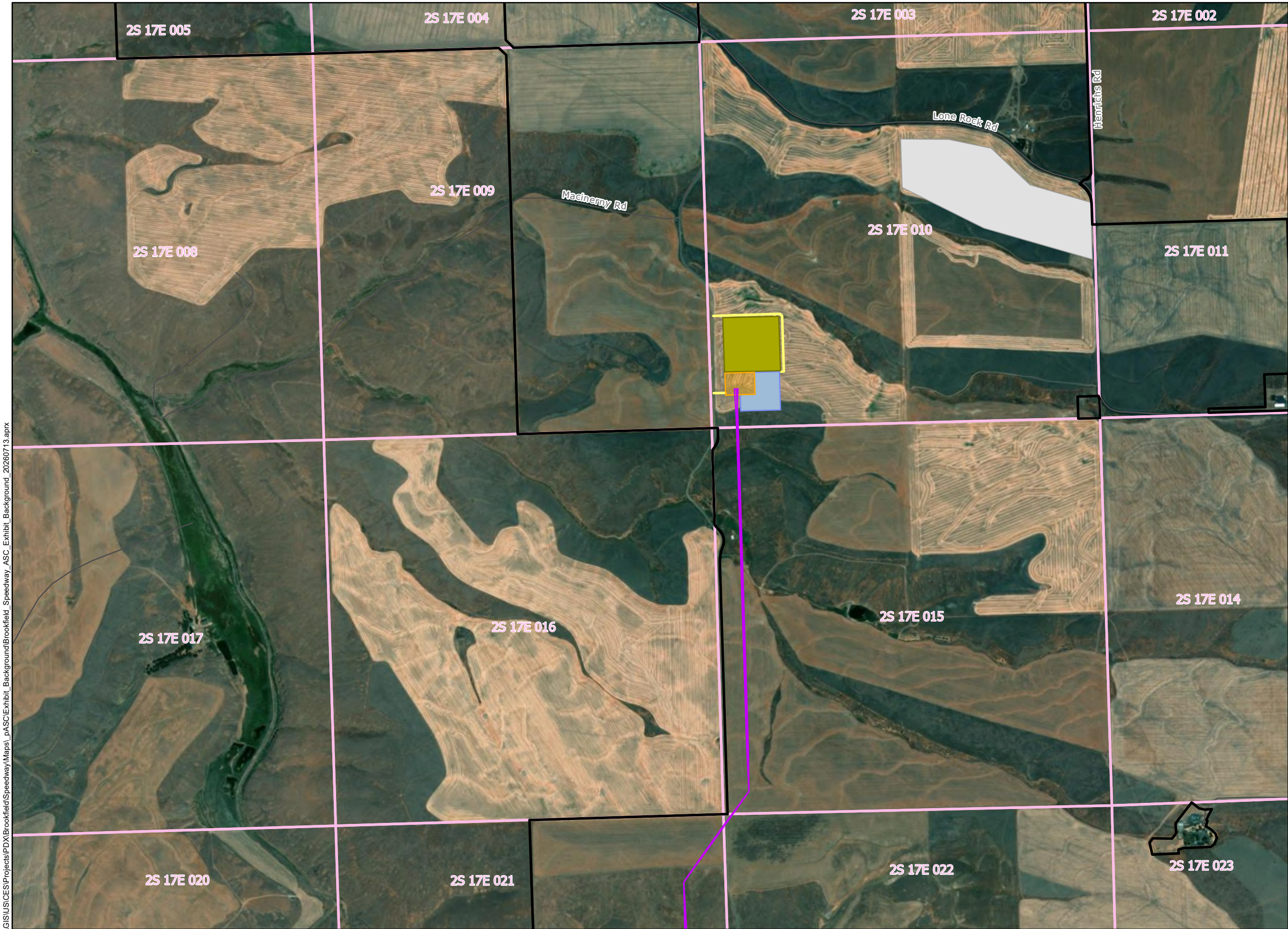
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WGS 1984 UTM Zone 10N



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Speedway Energy Facility

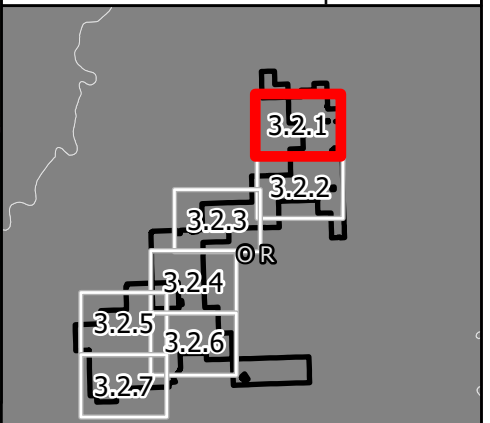
**Figure 3.2.1
Preliminary
Facility Layout
Wind Components**

SHERMAN COUNTY, OR

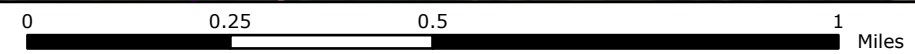
- Facility Site Boundary
- 34.5kV Collector Lines (Underground)
- Collector Substation
- 230kV Collector Lines (Aboveground)
- Battery Energy Storage System (BESS)
- O&M Facility
- Access Road
- Crane Path
- Crane Path on Access Road
- Temporary Construction Area
- County Roads
- Township/Range/Section



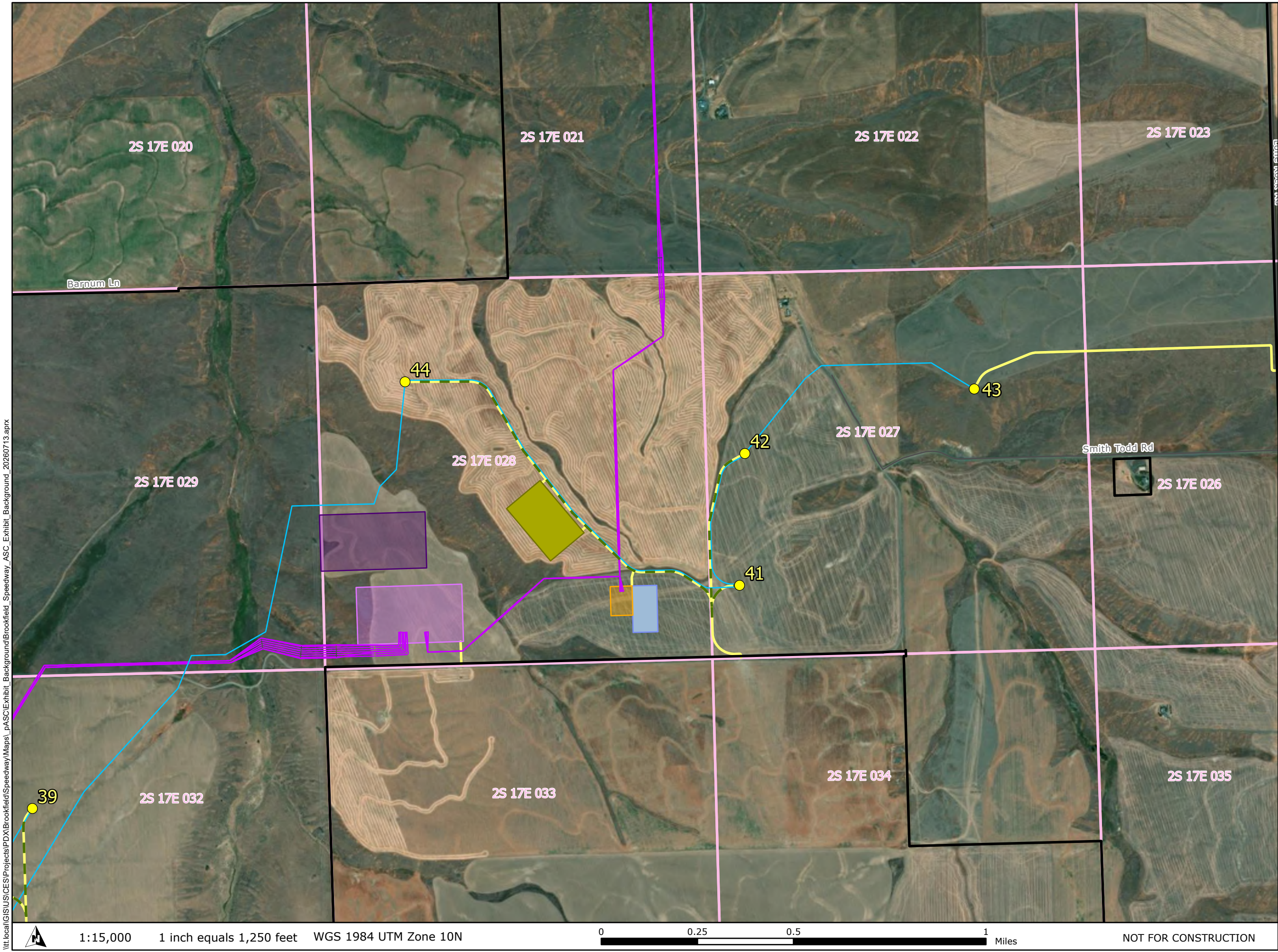
Reference Map



1:15,000 1 inch equals 1,250 feet WGS 1984 UTM Zone 10N



NOT FOR CONSTRUCTION



Speedway Energy Facility

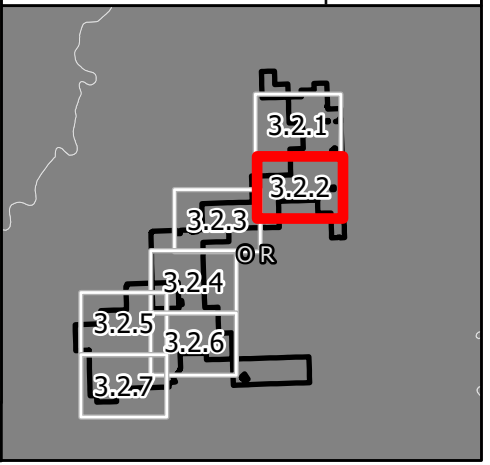
**Figure 3.2.2
Preliminary
Facility Layout
Wind Components**

SHERMAN COUNTY, OR

- Facility Site Boundary
- Wind Turbine
- 34.5kV Collector Lines (Underground)
- Collector Substation
- 230kV Collector Lines (Aboveground)
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- Battery Energy Storage System (BESS)
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- Crane Path
- Crane Path on Access Road
- County Roads
- Township/Range/Section



Reference Map



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Speedway Energy Facility

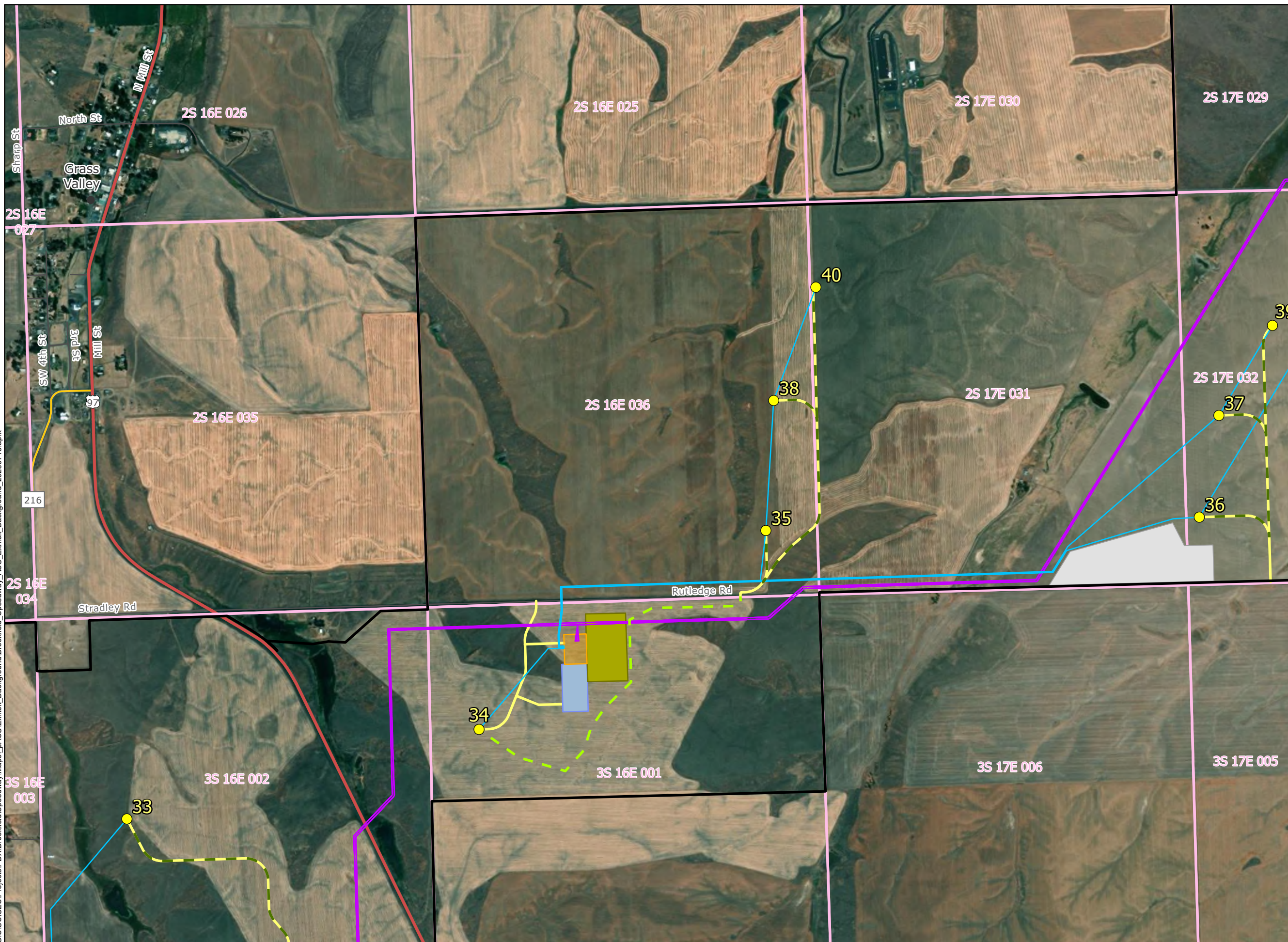
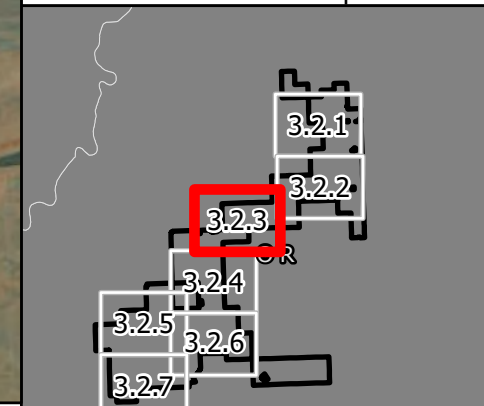
Figure 3.2.3
Preliminary
Facility Layout
Wind Components

SHERMAN COUNTY, OR

- Facility Site Boundary
- Wind Turbine
- 34.5kV Collector Lines (Underground)
- Collector Substation
- 230kV Collector Lines (Aboveground)
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- Access Road
- Crane Path
- Crane Path on Access Road
- Temporary Construction Area
- City/Town
- US Highway
- State Highway
- County Roads
- Township/Range/Section



Reference Map



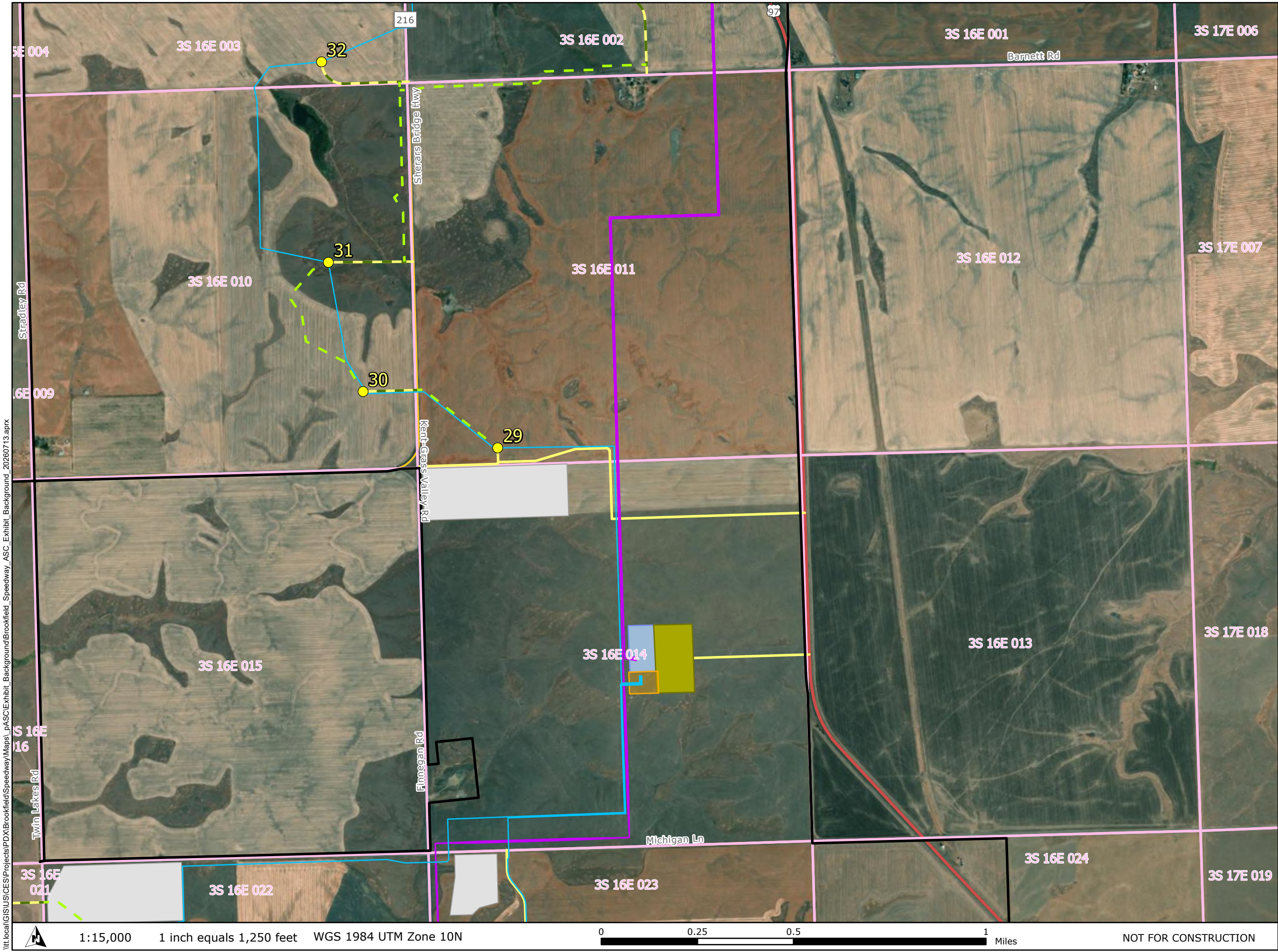
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1:15,000 1 inch equals 1,250 feet WGS 1984 UTM Zone 10N

0 0.25 0.5 1 Miles

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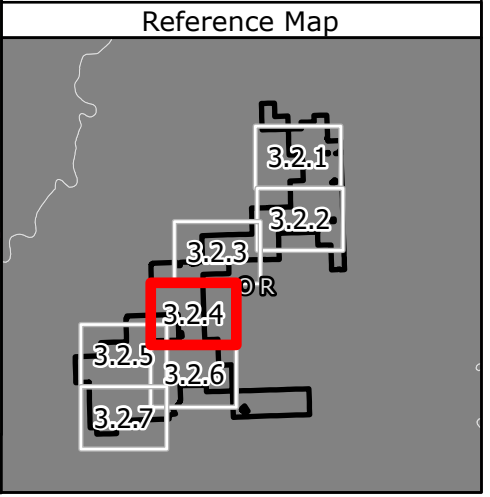


Speedway Energy Facility

Figure 3.2.4 Preliminary Facility Layout Wind Components

SHERMAN COUNTY, OR

- Facility Site Boundary
 - Wind Turbine
 - 34.5kV Collector Lines (Underground)
 - Collector Substation
 - 230kV Collector Lines (Aboveground)
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 - State Highway
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 - Township/Range/Section
- TETRA TECH Speedway Energy



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Speedway Energy Facility

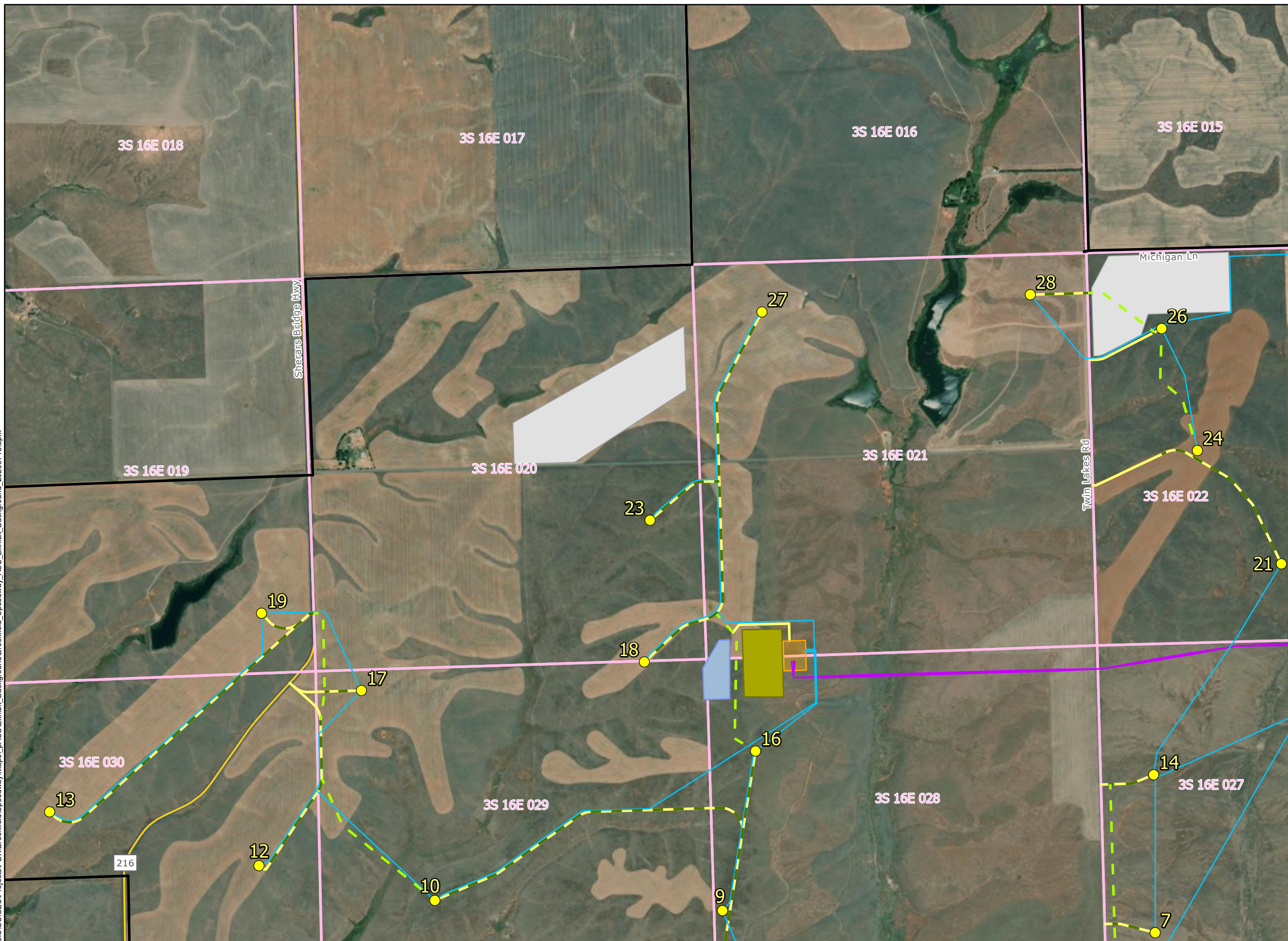
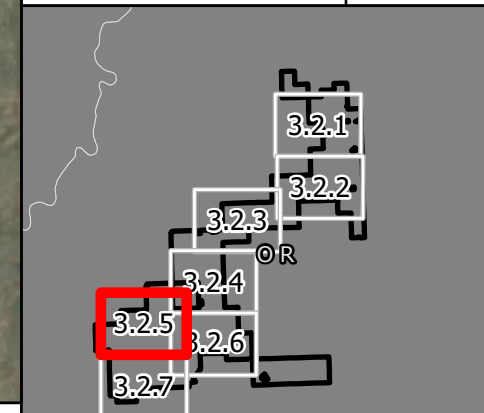
Figure 3.2.5
Preliminary
Facility Layout
Wind Components

SHERMAN COUNTY, OR

- Facility Site Boundary
- Wind Turbine
- 34.5kV Collector Lines (Underground)
- Collector Substation
- 230kV Collector Lines (Aboveground)
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- O&M Facility
- Access Road
- Crane Path
- Crane Path on Access Road
- Temporary Construction Area
- State Highway
- County Roads
- Township/Range/Section



Reference Map

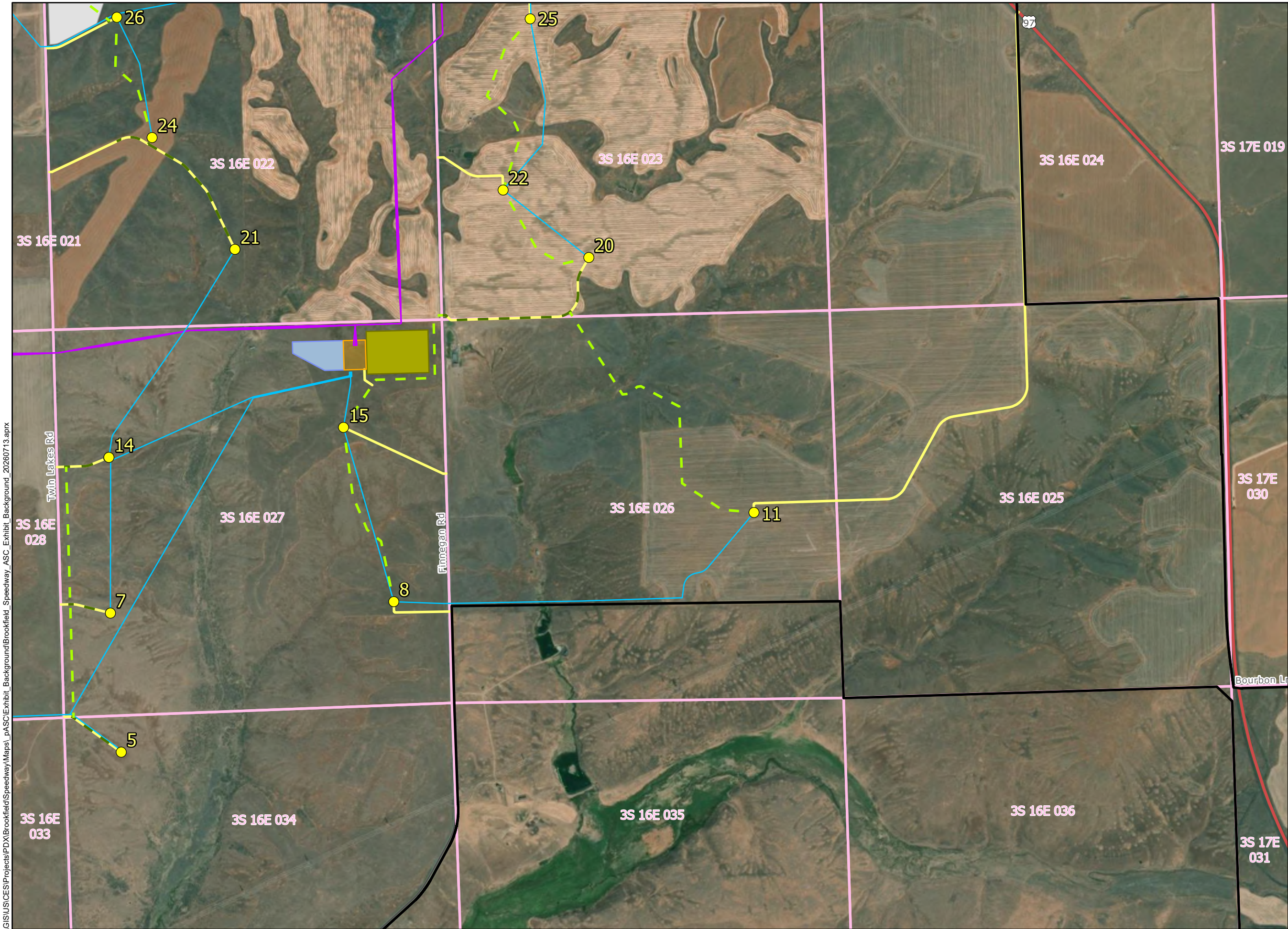


1:15,000 1 inch equals 1,250 feet WGS 1984 UTM Zone 10N

0 0.25 0.5 1 Miles

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Speedway Energy Facility

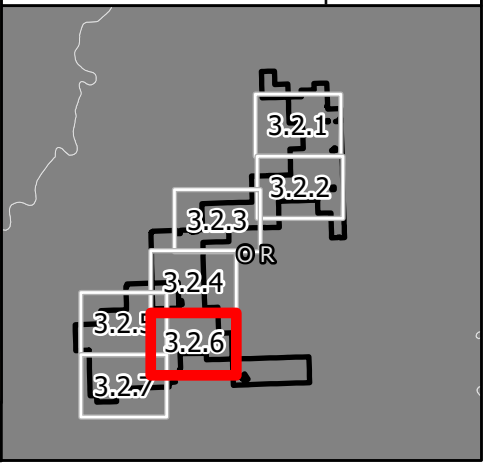
**Figure 3.2.6
Preliminary
Facility Layout
Wind Components**

SHERMAN COUNTY, OR

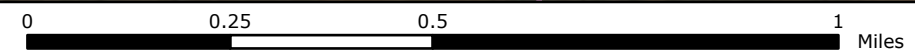
- Facility Site Boundary
- Wind Turbine
- 34.5kV Collector Lines (Underground)
- Collector Substation
- 230kV Collector Lines (Aboveground)
- Battery Energy Storage System (BESS)
- O&M Facility
- Access Road
- Crane Path
- Crane Path on Access Road
- Temporary Construction Area
- US Highway
- County Roads
- Township/Range/Section



Reference Map

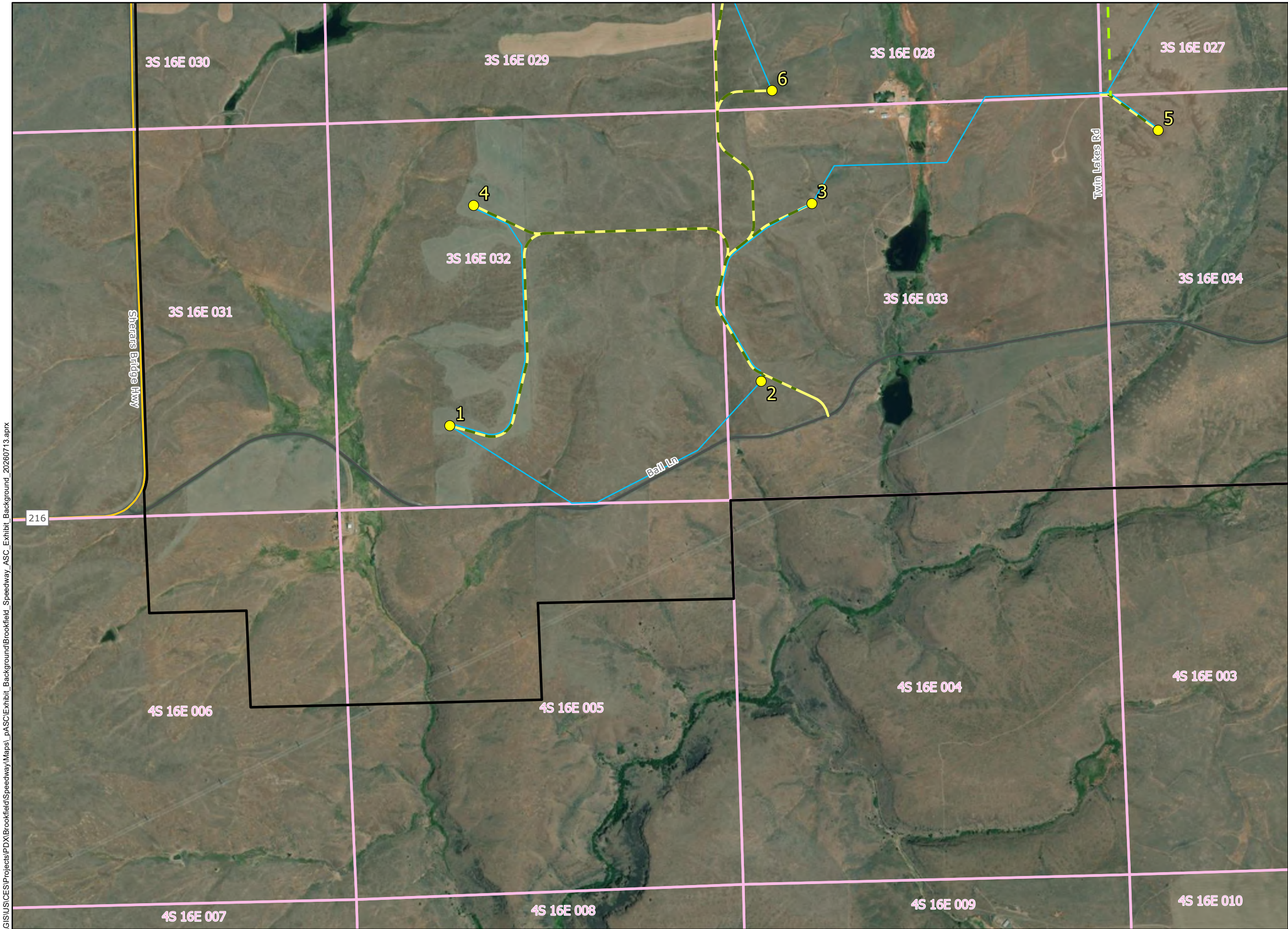


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Speedway Energy Facility

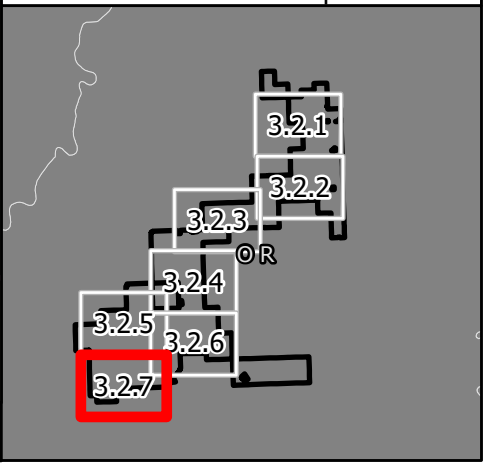
**Figure 3.2.7
Preliminary
Facility Layout
Wind Components**

SHERMAN COUNTY, OR

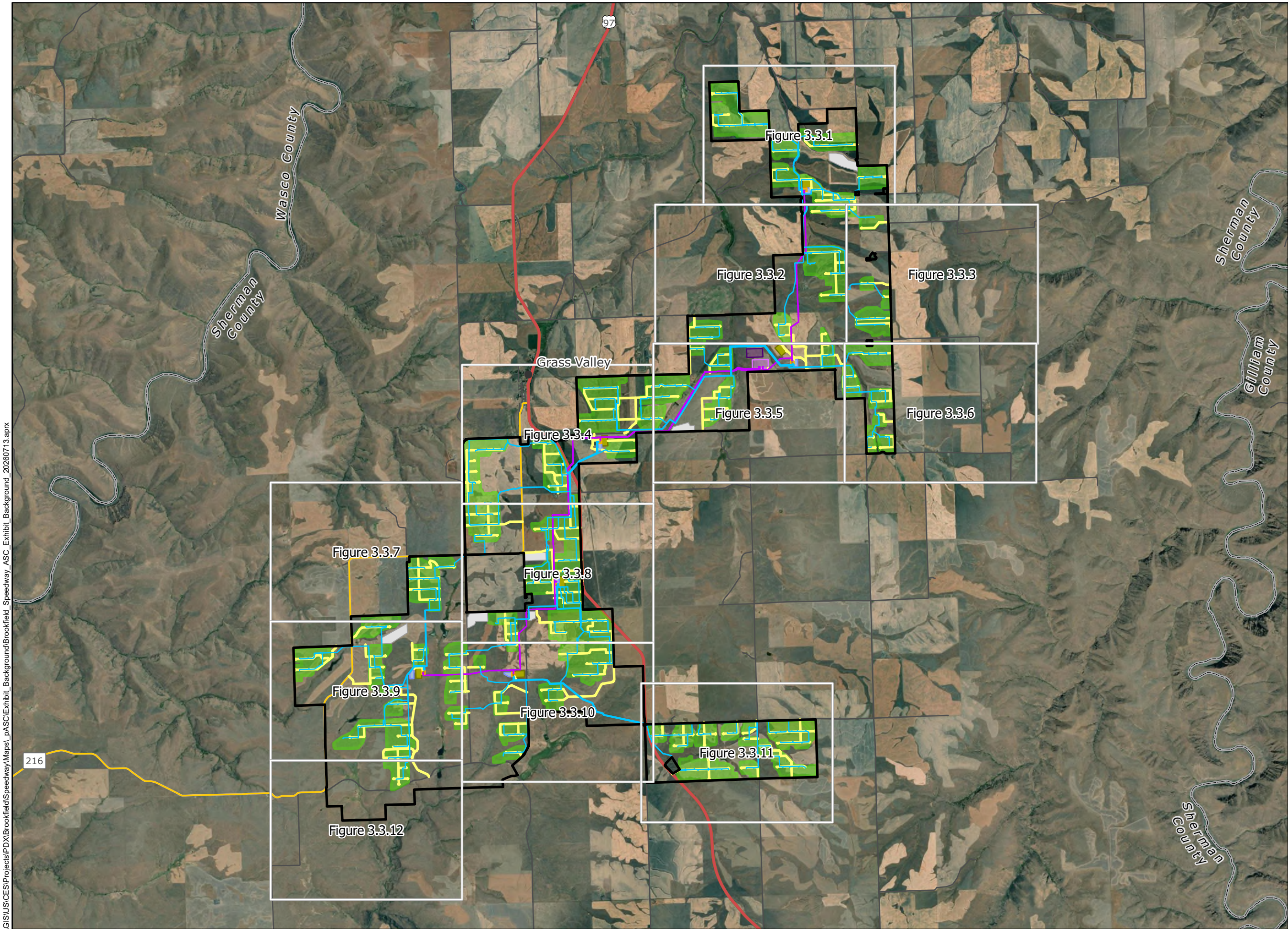
- Facility Site Boundary
- Wind Turbine
- 34.5kV Collector Lines (Underground)
- Collector Substation
- 230kV Collector Lines (Aboveground)
- Access Road
- Crane Path
- Crane Path on Access Road
- State Highway
- County Roads
- Township/Range/Section



Reference Map



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Speedway Energy Facility

**Figure 3.3
Preliminary
Facility Layout
Solar Components**

SHERMAN COUNTY, OR

- Map Grid
- Facility Site Boundary
- Solar Array Fenceline
- 34.5kV Collector Lines (Underground)
- Collector Substation
- 230kV Collector Lines (Aboveground)
- Central Substation
- Point of Interconnection
- Battery Energy Storage System (BESS)
- Access Road
- O&M Facility
- Temporary Construction Area
- City/Town
- County Boundary
- US Highway
- State Highway
- County Roads

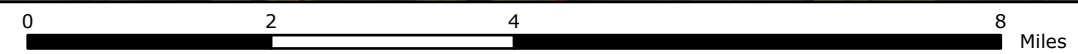


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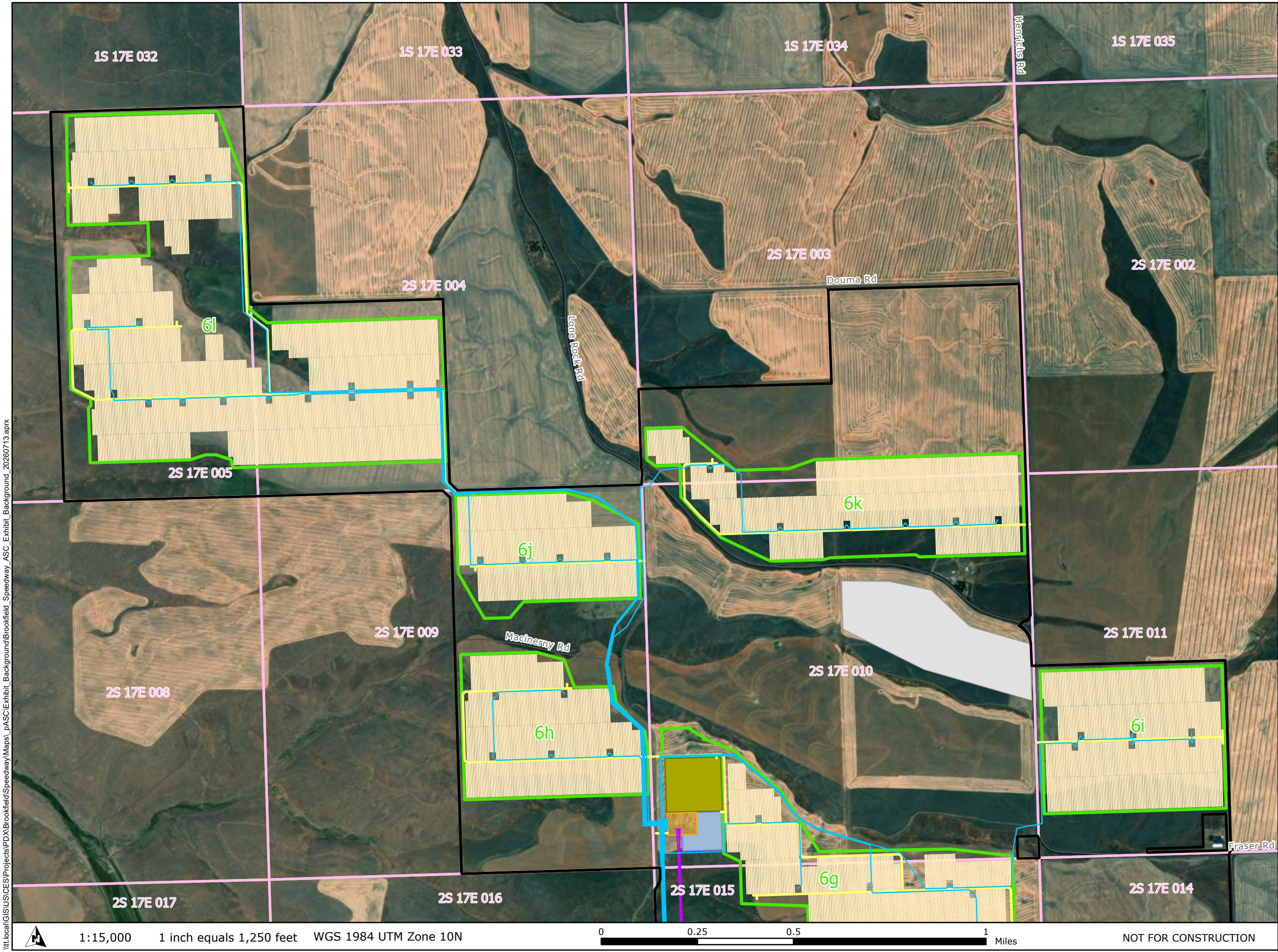
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WGS 1984 UTM Zone 10N



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Speedway Energy Facility

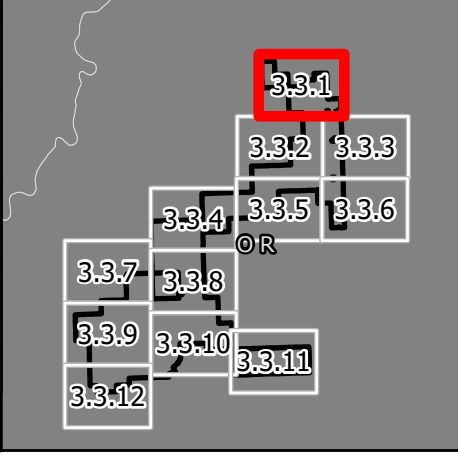
**Figure 3.3.1
Preliminary
Facility Layout
Solar Components**

SHERMAN COUNTY, OR

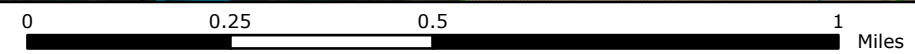
- Facility Site Boundary
- Solar Array Fenceline
- Solar Array
- 34.5kV Collector Lines (Underground)
- Collector Substation
- 230kV Collector Lines (Aboveground)
- Battery Energy Storage System (BESS)
- O&M Facility
- Access Road
- Temporary Construction Area
- County Roads
- Township/Range/Section



Reference Map

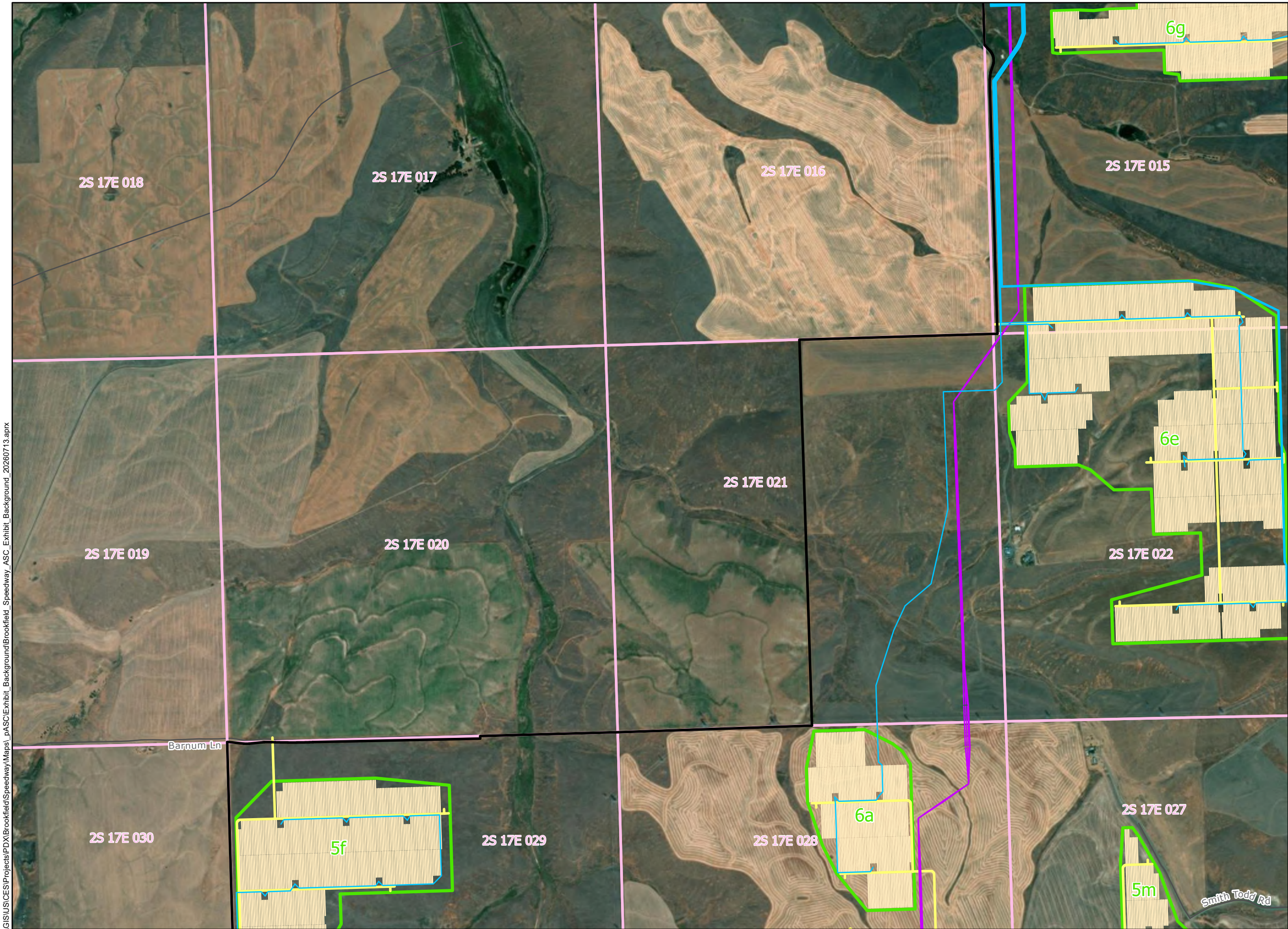


1:15,000 1 inch equals 1,250 feet WGS 1984 UTM Zone 10N



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Speedway Energy Facility

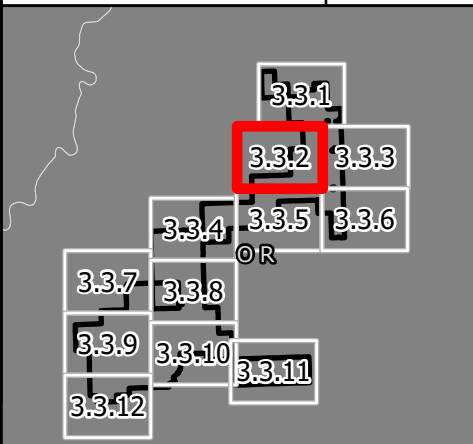
**Figure 3.3.2
Preliminary
Facility Layout
Solar Components**

SHERMAN COUNTY, OR

- Facility Site Boundary
- Solar Array Fenceline
- Solar Array
- 34.5kV Collector Lines (Underground)
- Collector Substation
- 230kV Collector Lines (Aboveground)
- Battery Energy Storage System (BESS)
- Access Road
- Temporary Construction Area
- County Roads
- Township/Range/Section



Reference Map





Speedway Energy Facility

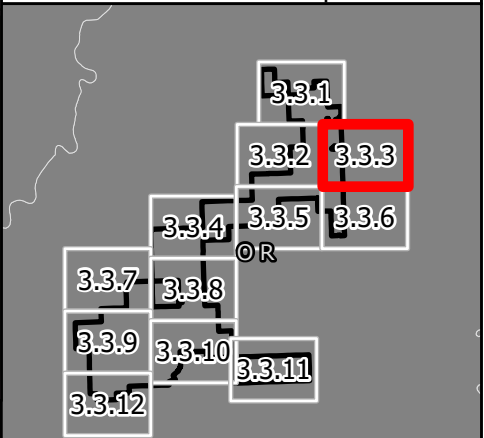
**Figure 3.3.3
Preliminary
Facility Layout
Solar Components**

SHERMAN COUNTY, OR

- Facility Site Boundary
- Solar Array Fenceline
- Solar Array
- 34.5kV Collector Lines (Underground)
- Collector Substation
- 230kV Collector Lines (Aboveground)
- Access Road
- Temporary Construction Area
- County Roads
- Township/Range/Section



Reference Map



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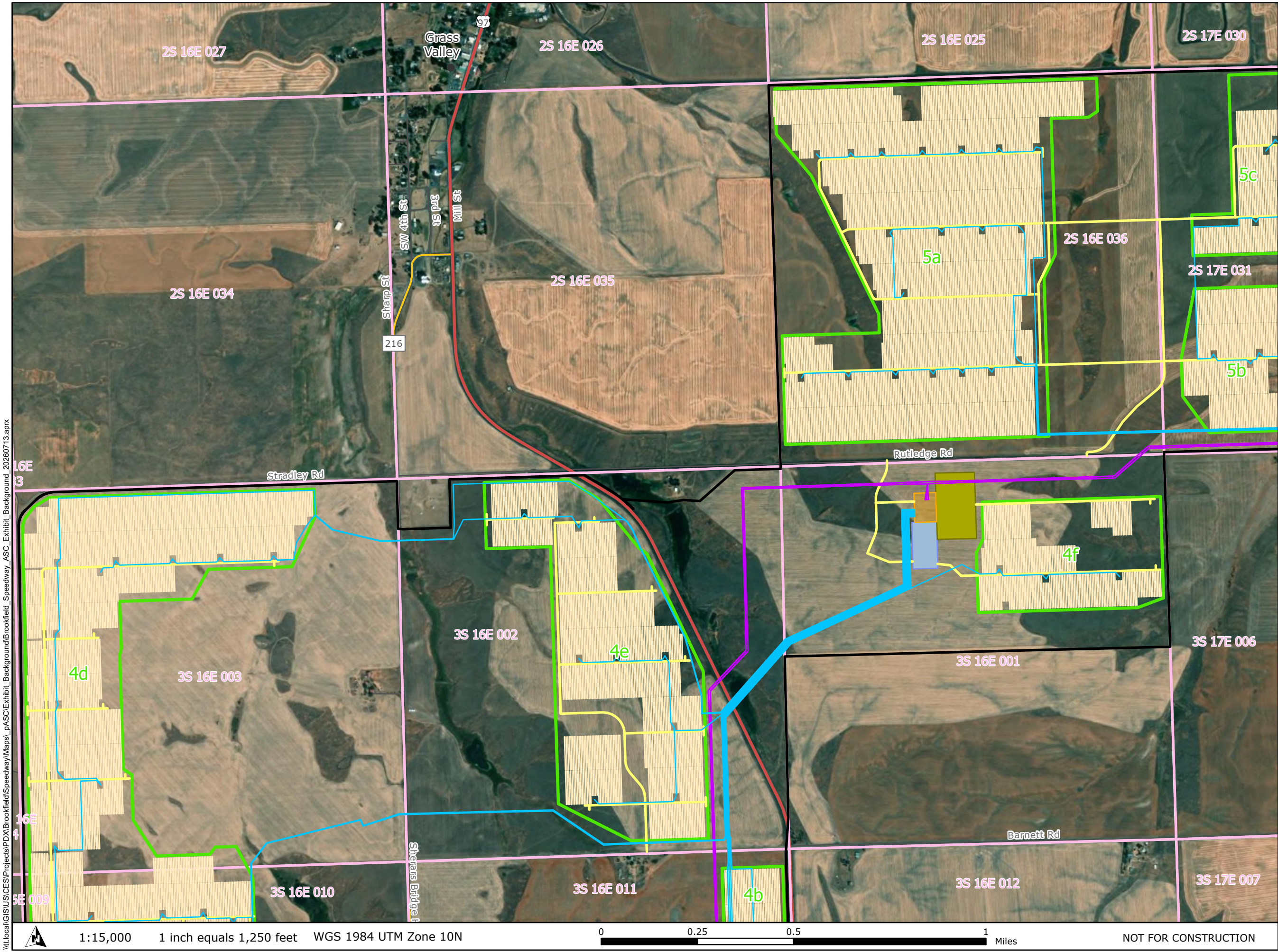


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Speedway Energy Facility

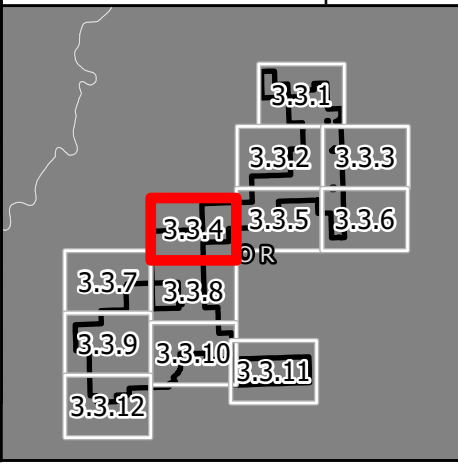
Figure 3.3.4 Preliminary Facility Layout Solar Components

SHERMAN COUNTY, OR

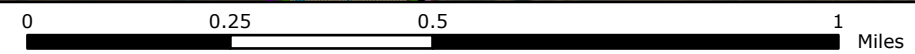
- Facility Site Boundary
- Solar Array Fenceline
- Solar Array
- 34.5kV Collector Lines (Underground)
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- Battery Energy Storage System (BESS)
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- Access Road
- Temporary Construction Area
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- US Highway
- State Highway
- County Roads
- Township/Range/Section



Reference Map

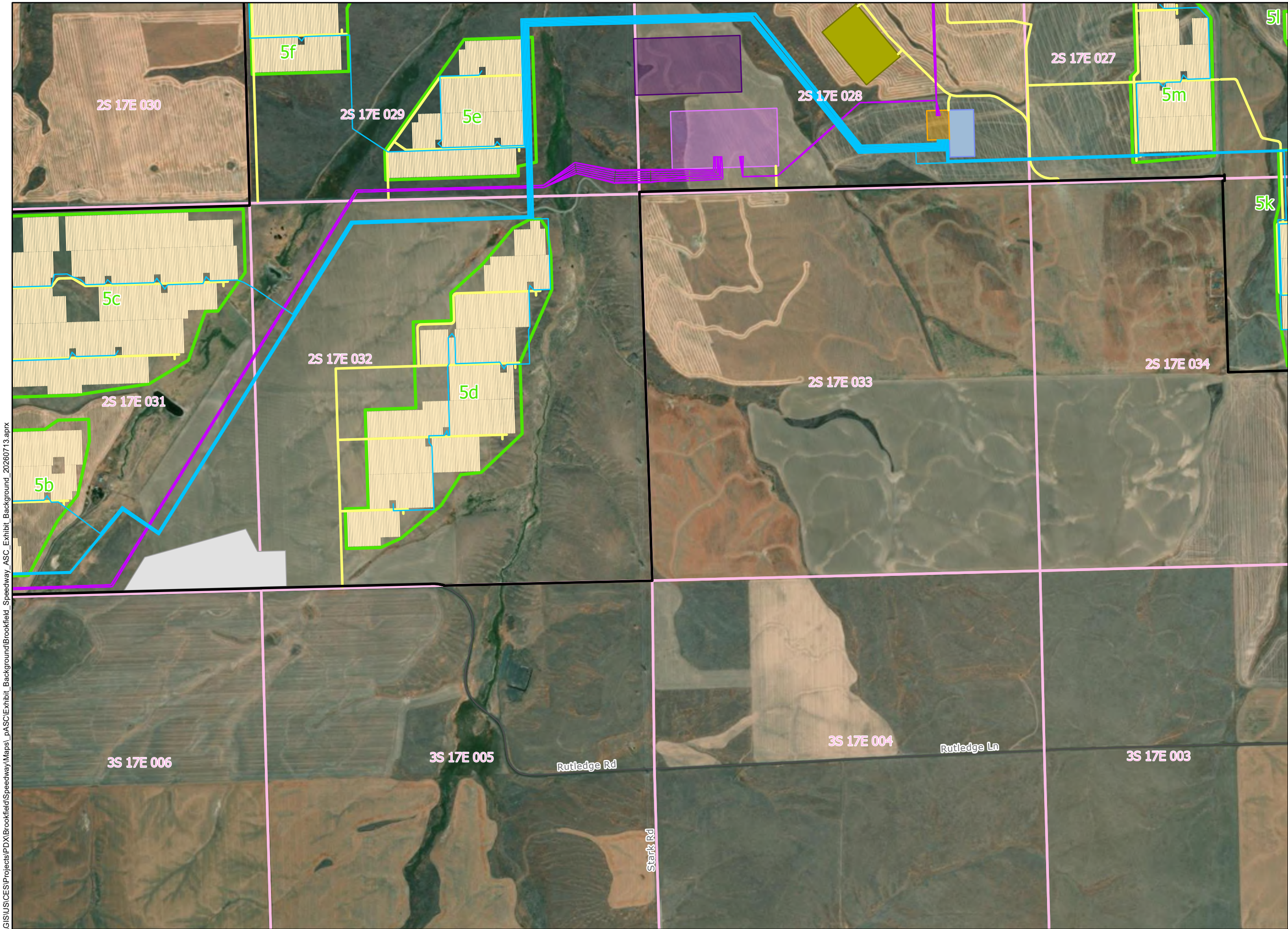


1:15,000 1 inch equals 1,250 feet WGS 1984 UTM Zone 10N



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Speedway Energy Facility

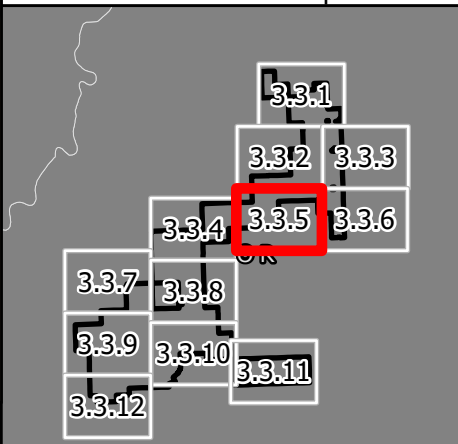
**Figure 3.3.5
Preliminary
Facility Layout
Solar Components**

SHERMAN COUNTY, OR

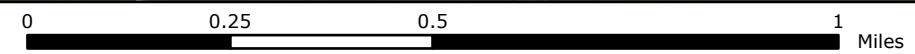
- Facility Site Boundary
- Solar Array Fenceline
- Solar Array
- 34.5kV Collector Lines (Underground)
- Collector Substation
- 230kV Collector Lines (Aboveground)
- Central Substation
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- Temporary Construction Area
- County Roads
- Township/Range/Section



Reference Map



1:15,000 1 inch equals 1,250 feet WGS 1984 UTM Zone 10N



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Speedway Energy Facility

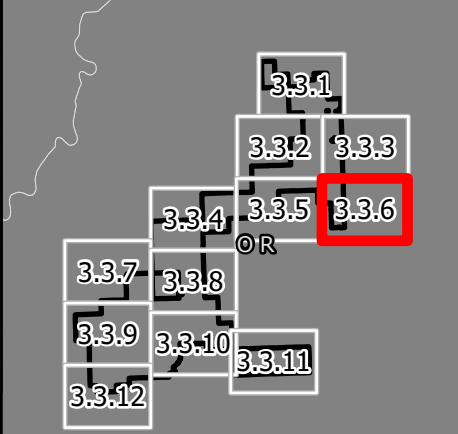
**Figure 3.3.6
Preliminary
Facility Layout
Solar Components**

SHERMAN COUNTY, OR

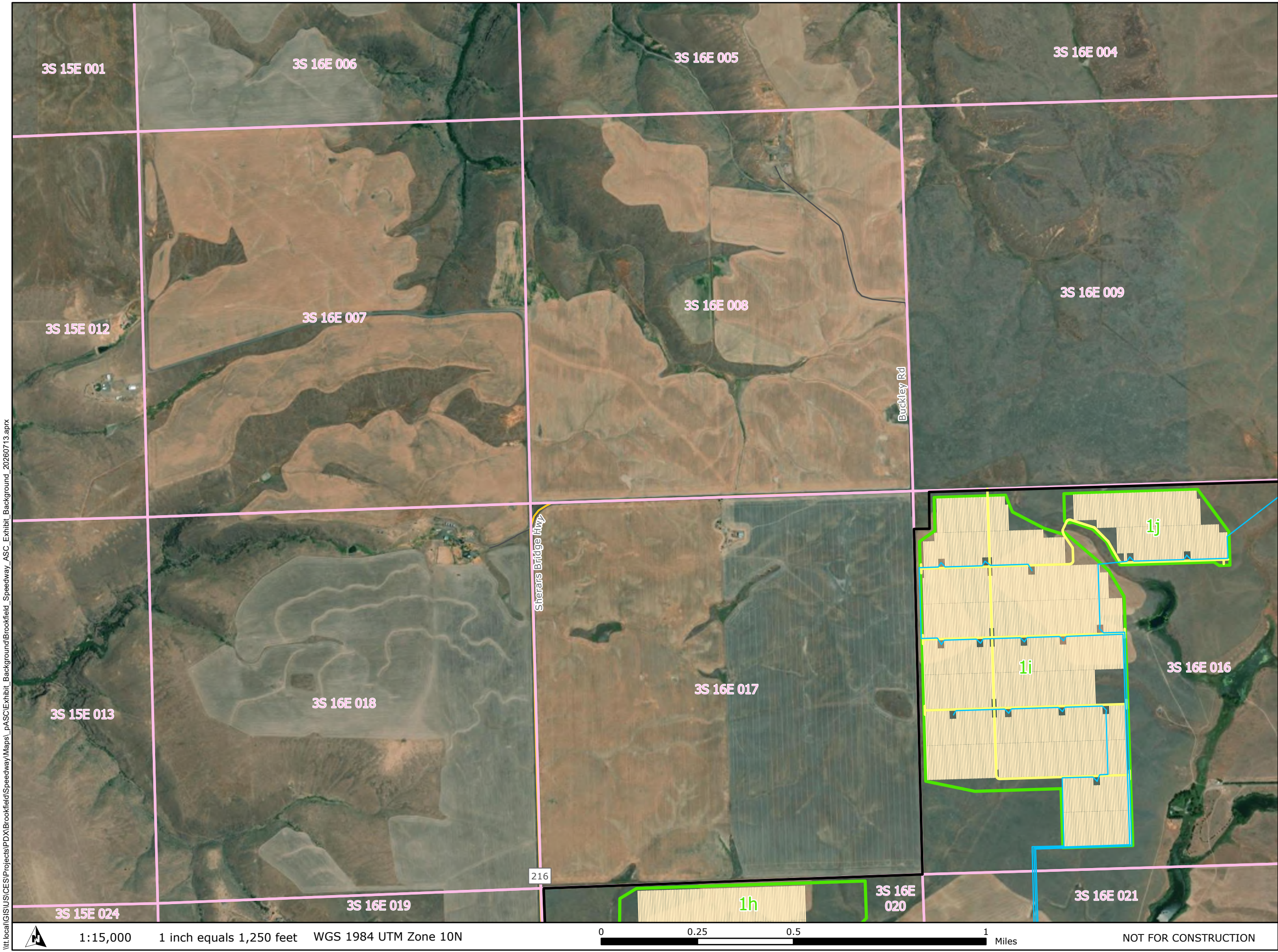
- Facility Site Boundary
- Solar Array Fenceline
- Solar Array
- 34.5kV Collector Lines (Underground)
- Collector Substation
- 230kV Collector Lines (Aboveground)
- Access Road
- Temporary Construction Area
- County Roads
- Township/Range/Section



Reference Map



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Speedway Energy Facility

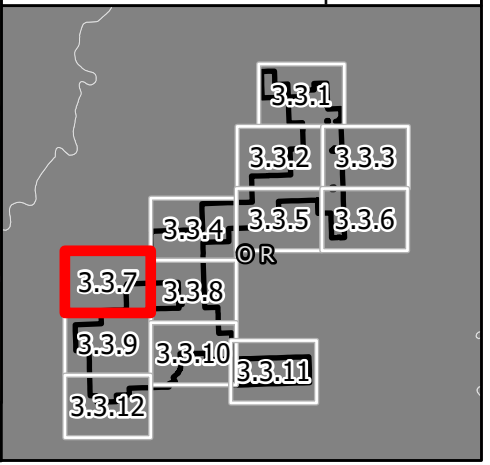
**Figure 3.3.7
Preliminary
Facility Layout
Solar Components**

SHERMAN COUNTY, OR

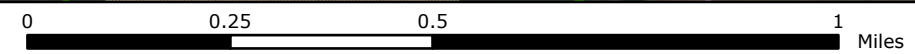
- Facility Site Boundary
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- 34.5kV Collector Lines (Underground)
- Collector Substation
- 230kV Collector Lines (Aboveground)
- Access Road
- Temporary Construction Area
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Reference Map

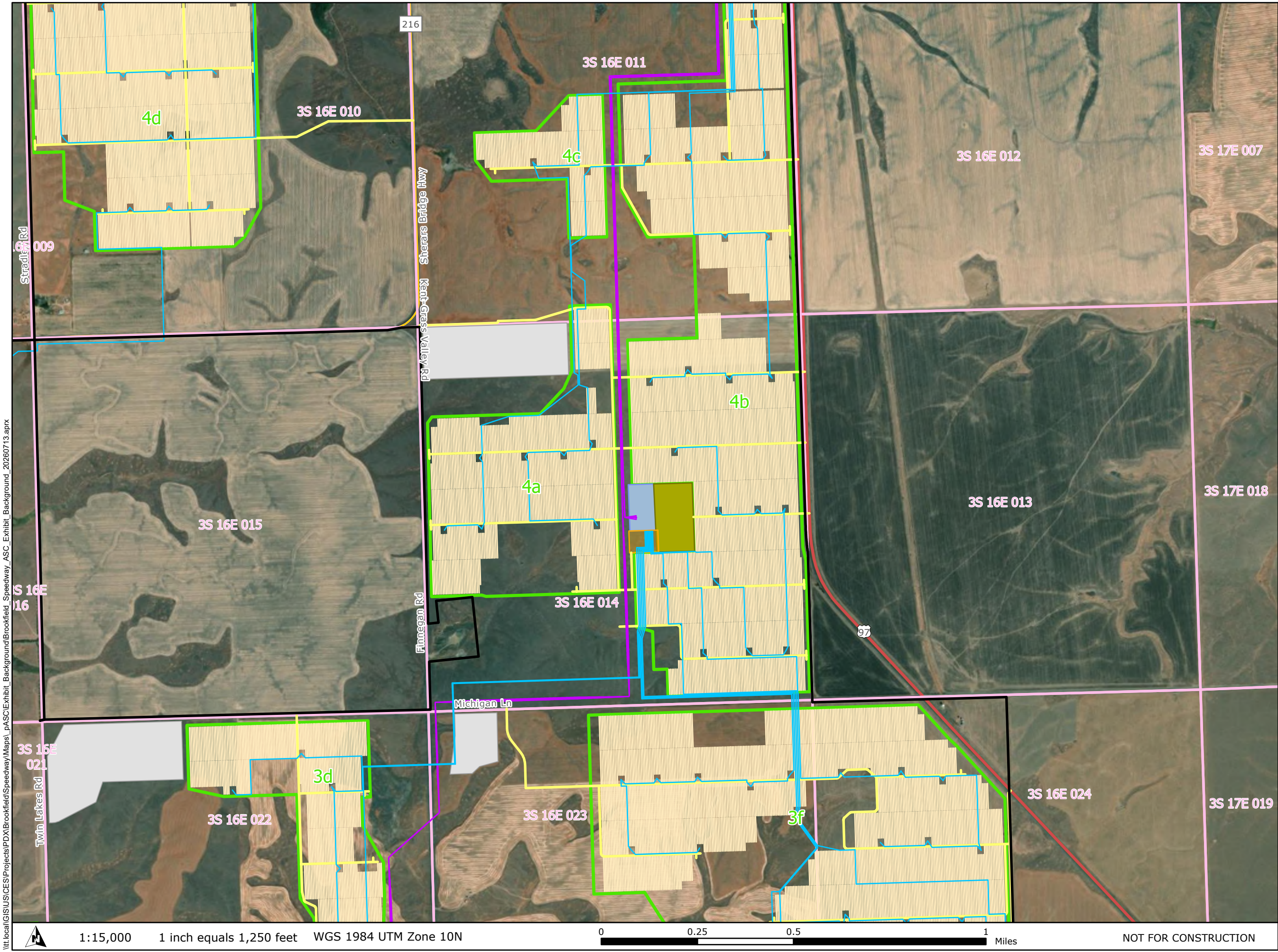


1:15,000 1 inch equals 1,250 feet WGS 1984 UTM Zone 10N



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Speedway Energy Facility

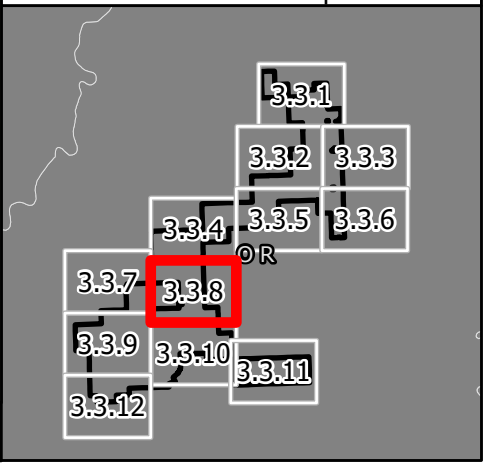
**Figure 3.3.8
Preliminary
Facility Layout
Solar Components**

SHERMAN COUNTY, OR

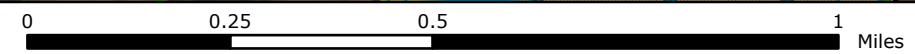
- Facility Site Boundary
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Reference Map



1:15,000 1 inch equals 1,250 feet WGS 1984 UTM Zone 10N



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Speedway Energy Facility

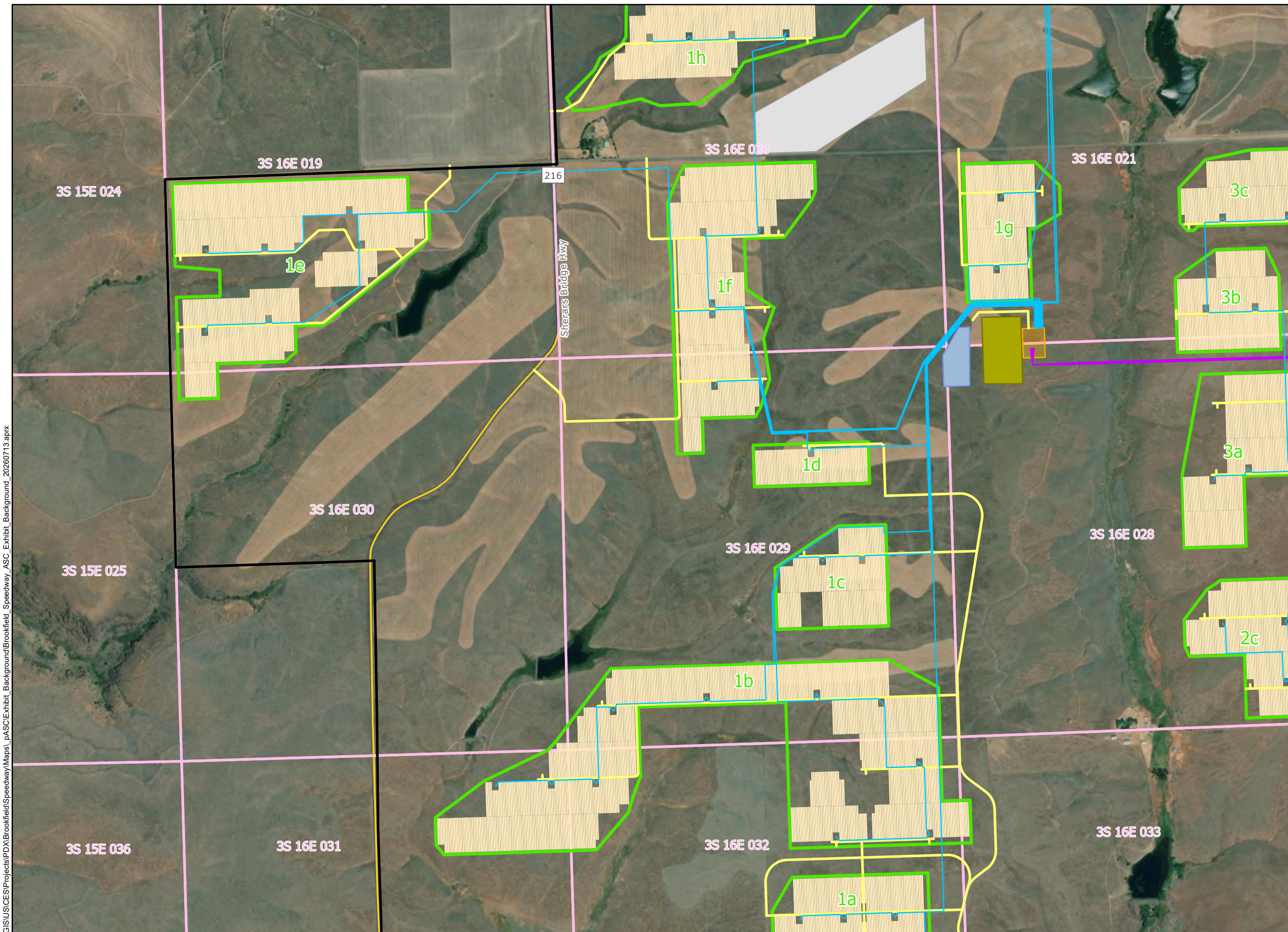
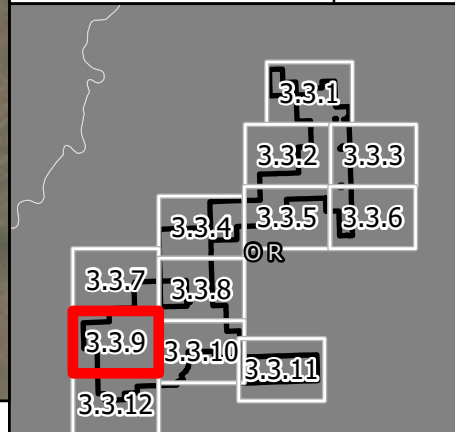
Figure 3.3.9
Preliminary
Facility Layout
Solar Components

SHERMAN COUNTY, OR

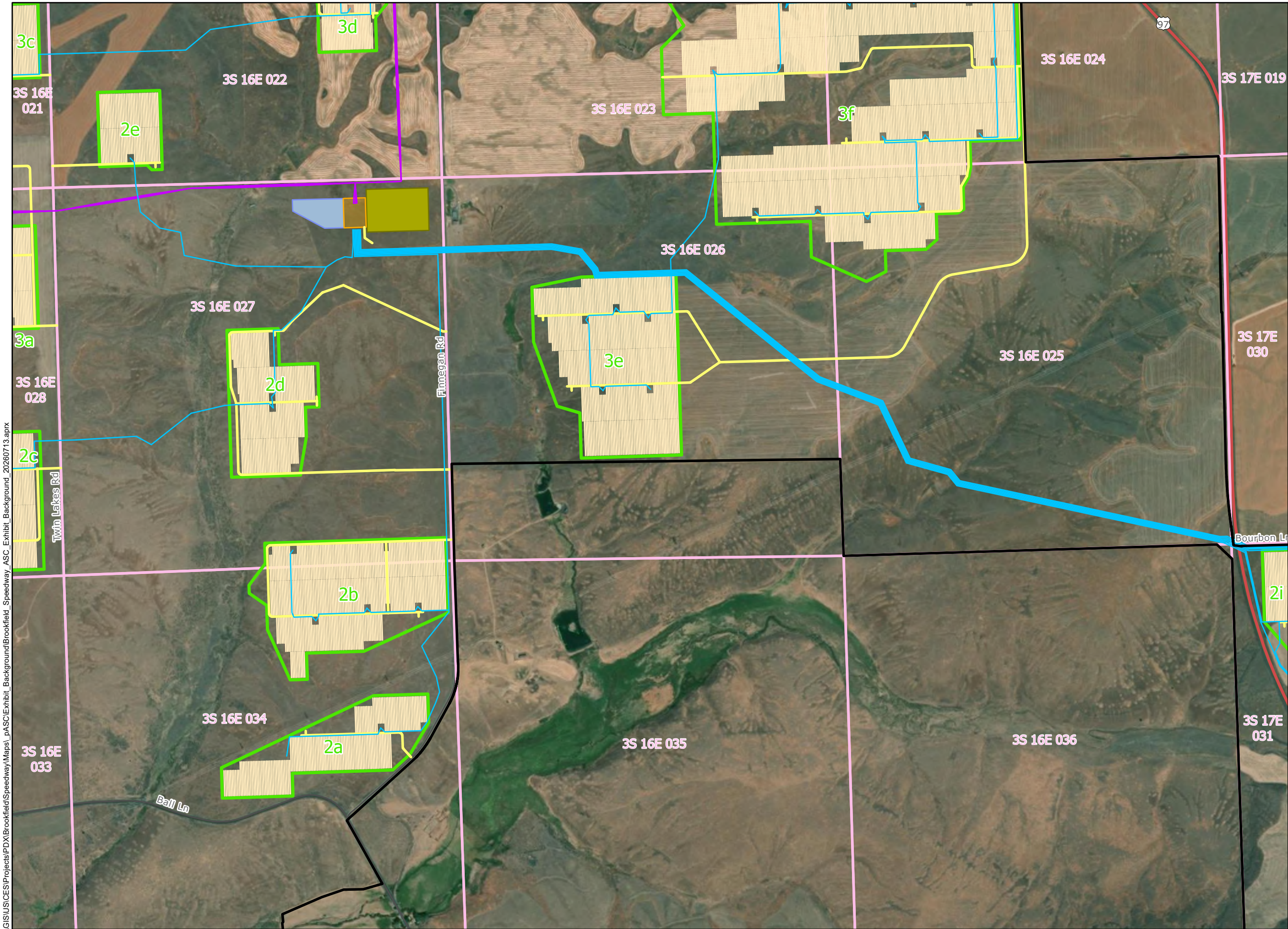
- Facility Site Boundary
- Solar Array Fenceline
- Solar Array
- 34.5kV Collector Lines (Underground)
- Collector Substation
- 230kV Collector Lines (Aboveground)
- Battery Energy Storage System (BESS)
- O&M Facility
- Access Road
- Temporary Construction Area
- State Highway
- County Roads
- Township/Range/Section



Reference Map



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Speedway Energy Facility

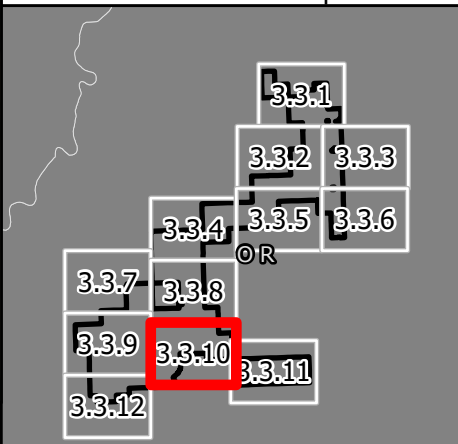
**Figure 3.3.10
Preliminary
Facility Layout
Solar Components**

SHERMAN COUNTY, OR

- Facility Site Boundary
- Solar Array Fenceline
- Solar Array
- 34.5kV Collector Lines (Underground)
- Collector Substation
- 230kV Collector Lines (Aboveground)
- Battery Energy Storage System (BESS)
- O&M Facility
- Access Road
- Temporary Construction Area
- US Highway
- County Roads
- Township/Range/Section

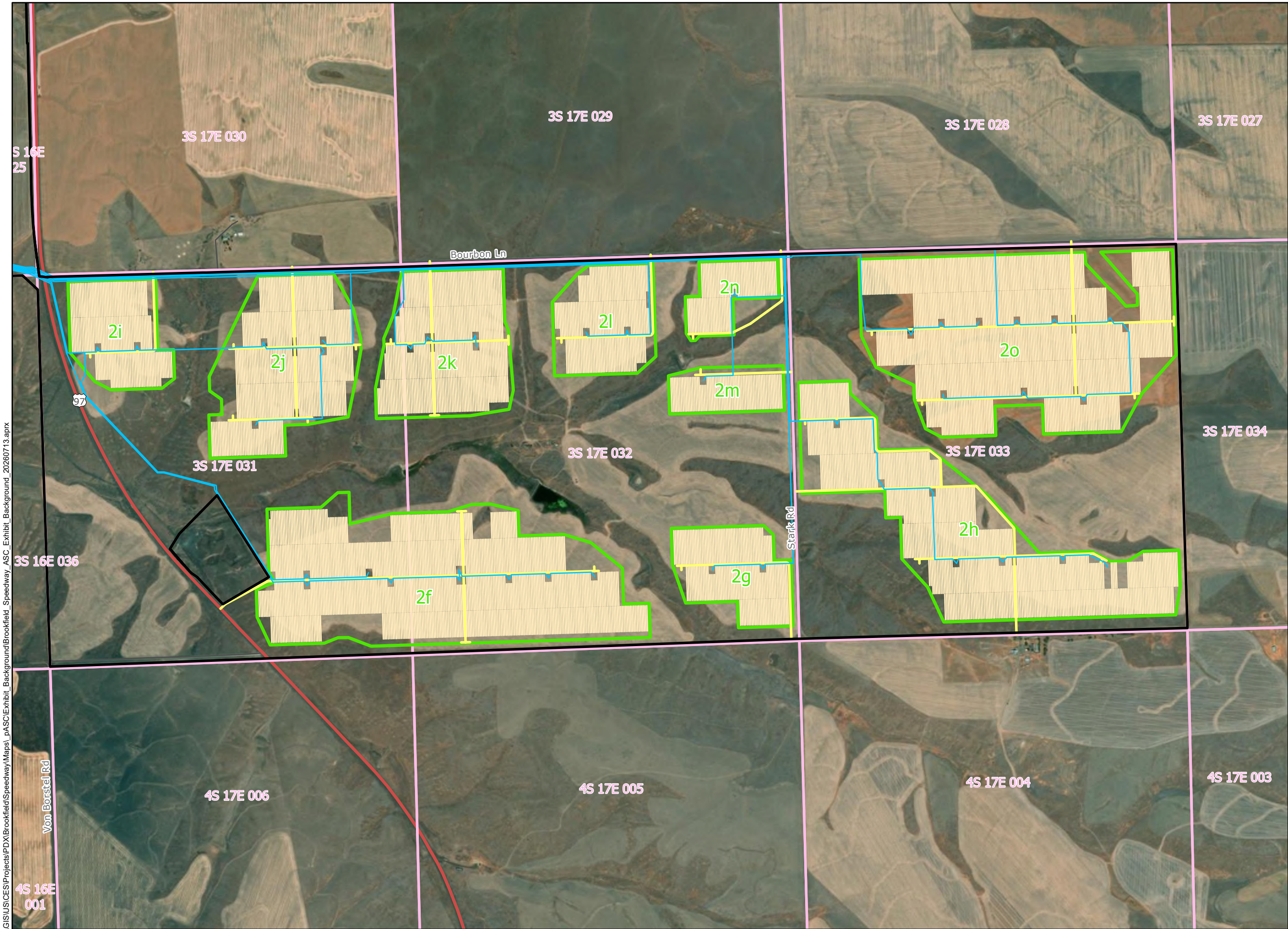


Reference Map



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\\tt.local\GIS\US\CES\Projects\PDX\Brookfield\Speedway\Maps_p\ASC\Exhibit_Background\Brookfield_Speedway_ASC_Exhibit_Background_20260713.aprx



Speedway Energy Facility

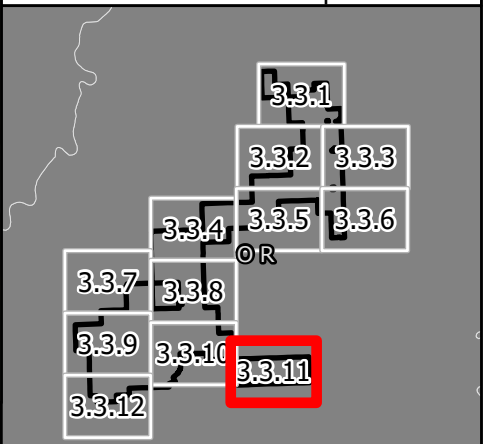
**Figure 3.3.11
Preliminary
Facility Layout
Solar Components**

SHERMAN COUNTY, OR

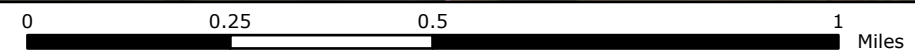
- Facility Site Boundary
- Solar Array Fenceline
- Solar Array
- 34.5kV Collector Lines (Underground)
- Collector Substation
- 230kV Collector Lines (Aboveground)
- Access Road
- Temporary Construction Area
- US Highway
- County Roads
- Township/Range/Section



Reference Map

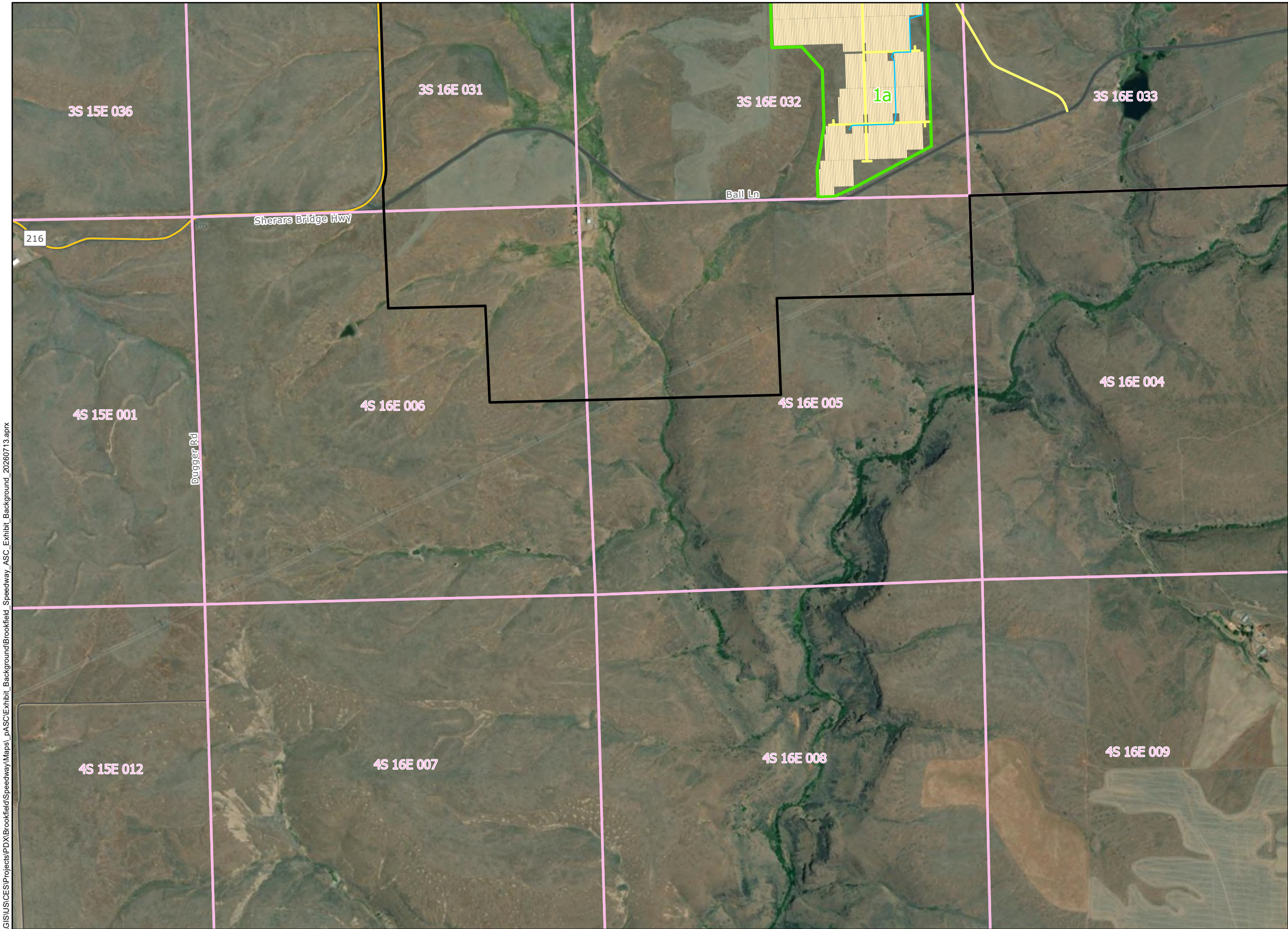


1:15,000 1 inch equals 1,250 feet WGS 1984 UTM Zone 10N



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Speedway Energy Facility

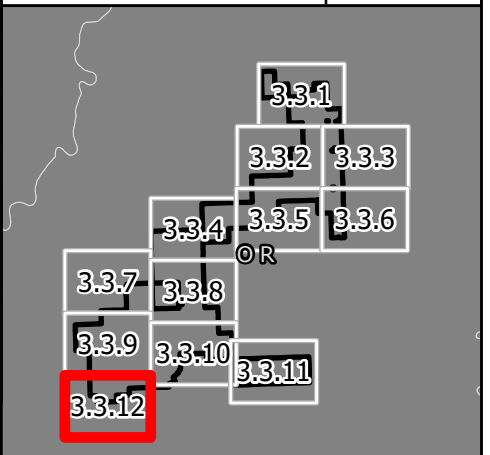
**Figure 3.3.12
Preliminary
Facility Layout
Solar Components**

SHERMAN COUNTY, OR

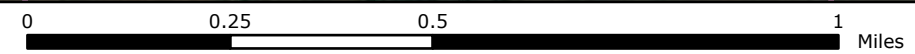
- Facility Site Boundary
- Solar Array Fenceline
- Solar Array
- 34.5kV Collector Lines (Underground)
- Collector Substation
- 230kV Collector Lines (Aboveground)
- Access Road
- Temporary Construction Area
- State Highway
- County Roads
- Township/Range/Section



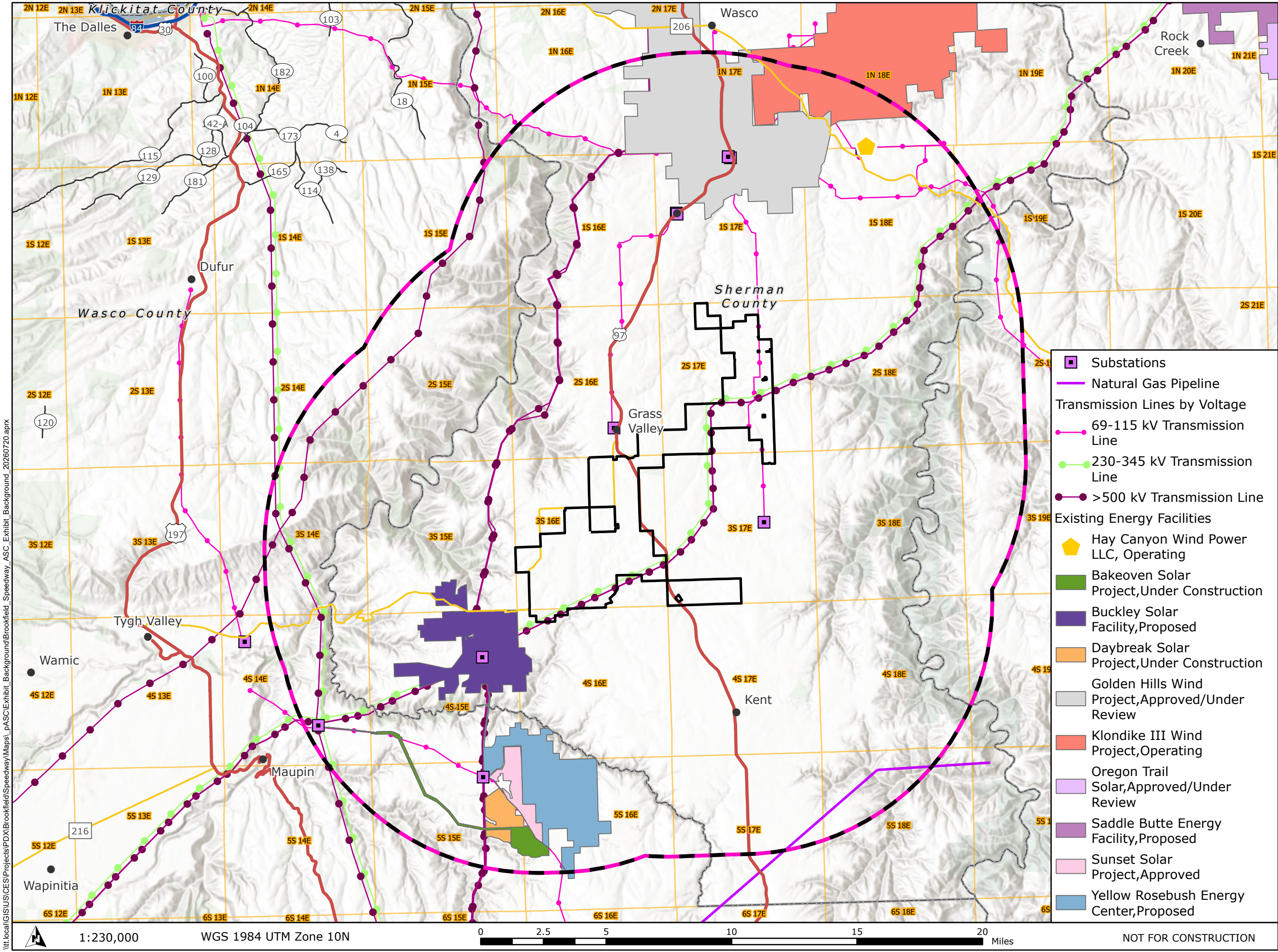
Reference Map



1:15,000 1 inch equals 1,250 feet WGS 1984 UTM Zone 10N



NOT FOR CONSTRUCTION



Speedway Energy Facility

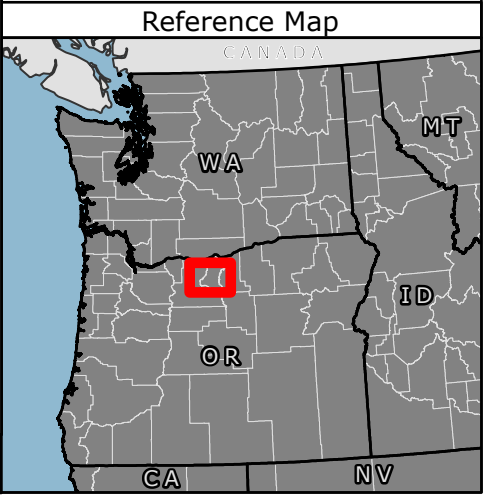
Figure 4
Energy Facilities within 10 miles

SHERMAN COUNTY, OR

- Facility Site Boundary
- Analysis Area (10 mile buffer)
- City/Town
- County Boundary
- Township Range
- Interstate Highway
- US Highway
- State Highway
- County Highway

- Substations
- Natural Gas Pipeline
- Transmission Lines by Voltage
 - 69-115 kV Transmission Line
 - 230-345 kV Transmission Line
 - >500 kV Transmission Line
- Existing Energy Facilities
 - Hay Canyon Wind Power LLC, Operating
 - Bakeoven Solar Project, Under Construction
 - Buckley Solar Facility, Proposed
 - Daybreak Solar Project, Under Construction
 - Golden Hills Wind Project, Approved/Under Review
 - Klondike III Wind Project, Operating
 - Oregon Trail Solar, Approved/Under Review
 - Saddle Butte Energy Facility, Proposed
 - Sunset Solar Project, Approved
 - Yellow Rosebush Energy Center, Proposed

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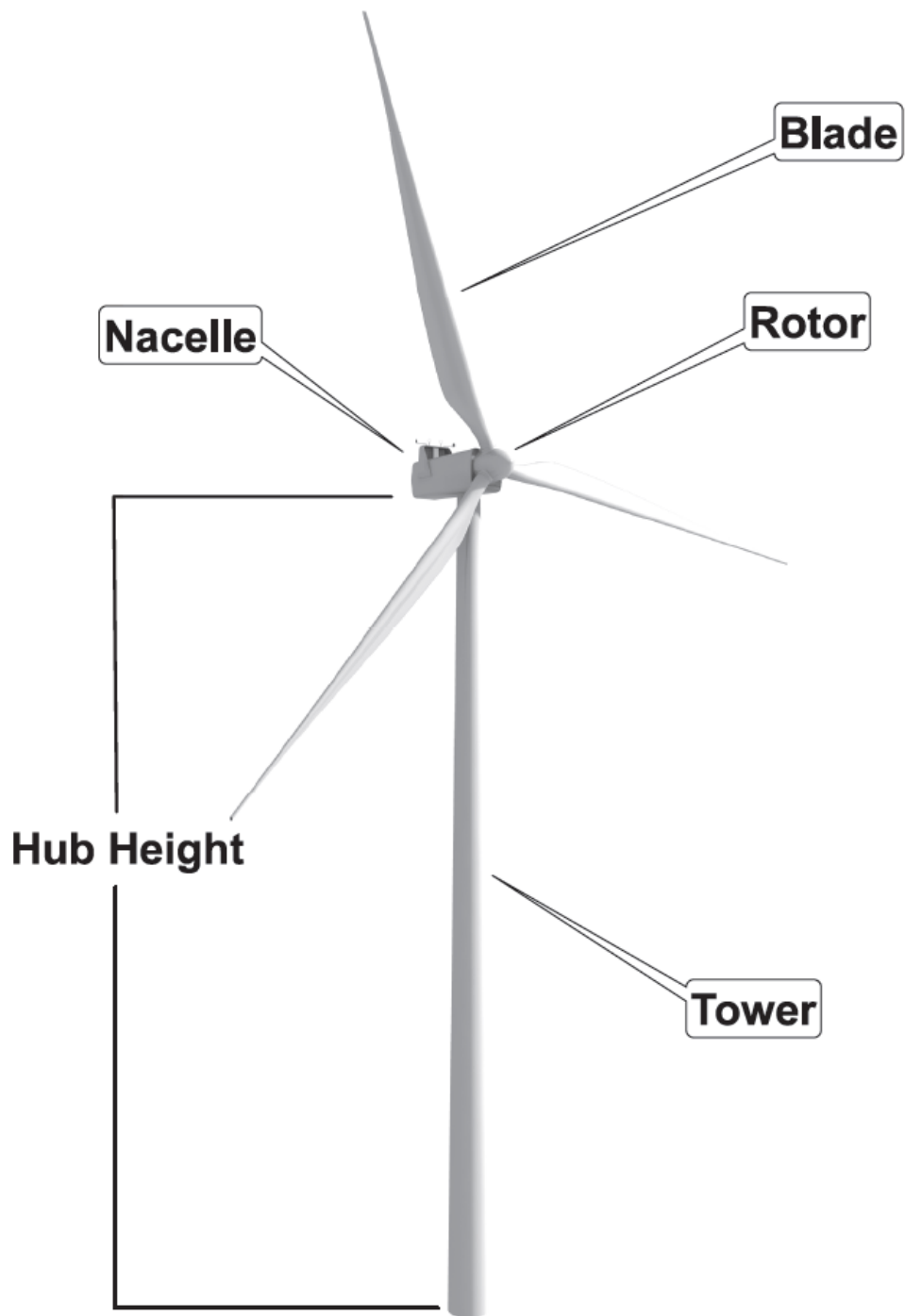
Attachment 1. Facility Component Summary

Facility Component Summary Table

Component and Design Standard	No.	Unit
Site Boundary		
Site boundary	23,936	acres
Micrositing area	22,278	acres
Maximum footprint (permanent disturbance)	8,048.4	acres
Wind Components		
Number of wind turbines	44	turbines
Max. blade tip height	698	feet
Min. aboveground blade tip clearance	32	feet
Max. hub height	410	feet
Max. rotor diameter	575	feet
Max. noise level, per turbine	109.2	dBA
Turbine foundations - area	0.045	acres/each
Transformers, pad-mounted	44	total
Approx. transformer oil-containing capacity	30,000	gallons/each
Solar Components		
<i>Solar Modules</i>		
Approx. total number	2,555,202	modules
Max height at full-tilt	12	feet
<i>Posts</i>		
Approx. total number (assumes all concrete foundations)	368,540	posts
<i>Inverter Step-Up Transformer Units</i>		
Approx. total number	356	units
Noise level	100	dBA
Approx. transformer oil-containing capacity	800	gallons/each
Related and Supporting Facility Components		
<i>34.5-kV Collection System</i>		
Collector line length, belowground - wind	32	miles
Collector line length, belowground - solar	187	miles
<i>Collector Substations</i>		
Number of collector substations	6	substations
Transformers per substation	1	each
Site size (each; approx.)	2.8	acres
Approx. transformer oil-containing capacity	20,000	gallons/each
Transformer noise level	103	dBA

Component and Design Standard	No.	Unit
230-kV Collector Lines		
Collector line length (aboveground)	14	miles
Structures (steel); quantity	166	poles
Max. height of structures	135	feet
Central Substation		
Generator step-up transformers	6	transformer
Site size (approx.)	26.2	acres
Approx. transformer oil-containing capacity	30,000	gallons/each
Transformer noise level	107	dBA
Battery Energy Storage System		
Approx. total battery packs (lithium-ion)	1,808	packs
Site size (each)	11.1 – 12.9	(min. – max.); acres
Approx. container dimensions	10 x 10 x 30	H x W x L; feet
Noise level (broadband)	90	dBA
O&M Areas		
Quantity	6	buildings
Site size (each)	5 – 5.6	(min. – max.); acres
Height (building)	24	feet
Access Roads		
Width	16 – 24	(min. – max.); feet
Length (outside solar fencing; approx.)	27	miles
Length (inside solar fencing; approx.)	72	miles
Perimeter Fence		
Length – solar array fencing	120.3	miles
Height – solar array fencing	7	feet
Length – substations, BESS, and O&M	8	miles
Height – substations, BESS, and O&M	8	feet
Temporary Construction Areas		
Quantity – laydown areas	5	areas
Site size – laydown areas (each)	27 – 53	(min. – max.); acres
Quantity – welcome yards	2	areas
Site size – welcome yards (each)	8	(max.); acres
Acronyms: dBA = A-weighted decibels; kV = kilovolt; O&M = operations and maintenance; SCADA = supervisory, control and data acquisition		

Attachment 2. Representative Images of Components



Speedway Energy Facility

**FIGURE 2-1
TYPICAL WIND TURBINE**

SHERMAN COUNTY, OREGON



Series 7 *TR1*.

505-540 Watt Thin Film Solar Module



Series 7 *TR1* thin film solar modules combine First Solar's thin film technology with an optimized structural design to deliver improved efficiency, enhanced installation velocity, and unmatched lifetime energy performance for large/utility-scale PV projects.



More Lifetime Energy per Nameplate Watt

- Industry's best (0.3%/yr) warranted degradation rate (>89% power output after 30 years)
- Superior temperature coefficient, spectral and shading response



Unmatched Quality and Reliability

- End-to-end manufacturing process for globally consistent quality
- Tested and certified to IEC standards and beyond
- Durable glass/glass construction
- Immune to and warranted against power loss from cell cracking
- 30-year Linear Performance Warranty
- 12-year Limited Product Warranty



Optimized Module Design

- Optimized back rail mount design enhances installation velocity
- Frameless design improves soiling and snow shedding
- Dual junction box design reduces wire management complexity and cost



Industry's Most Eco-efficient PV Solution

- Industry leading carbon footprint, water footprint and energy payback time
- Globally available PV module recycling services



America's Solar Company

- Designed, responsibly sourced, and manufactured in the USA

19.3%
HIGH BIN EFFICIENCY

30YR
LINEAR PERFORMANCE
WARRANTY

98%
WARRANTY START POINT

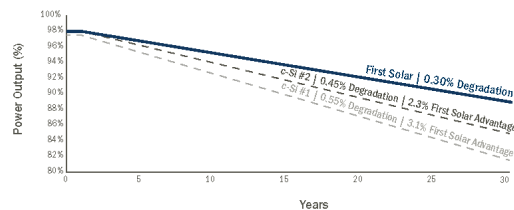
0.3%
WARRANTED ANNUAL
DEGRADATION RATE



Learn more about First Solar
and Series 7 *TR1*
at firstsolar.com/S7

First Solar, Inc. | firstsolar.com | info@firstsolar.com

First Solar Lifetime Energy Advantage
From 30 Year Warranted Annual Power Degradation



MPD-00640-07-US | JAN 2023

Speedway Energy Facility

FIGURE 2-2 REPRESENTATIVE SOLAR MODULE

SHERMAN COUNTY, OREGON





Speedway Energy Facility

**FIGURE 2-3
EXAMPLE SOLAR ARRAY**

SHERMAN COUNTY, OREGON

SG4400UD-MV-US

MV Grid-connected PV Inverter for 1500Vdc System



HIGH YIELD

- Advanced three-level technology
- Full power operation at 40 °C (104 °F)
- Effective cooling, wide operation temperature

EASY O&M

- Integrated current, voltage and MV parameters monitoring function for online analysis and trouble shooting
- Modular design, easy for maintenance

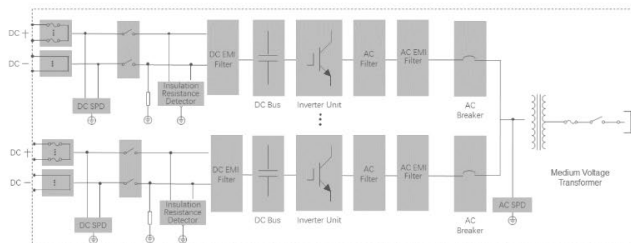
SAVED INVESTMENT

- Low transportation and installation cost due to 20-foot container size design
- DC 1500V system, low system cost
- Q at night

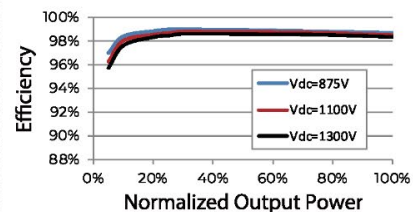
GRID SUPPORT

- Compliance with standards: UL 1741, UL 1741 SA/SB, IEEE 1547, Rule 21 and NEC code
- Low / High voltage ride through (L/HVRT), L/HFRT, soft start / stop
- Active & reactive power control and power ramp rate control

CIRCUIT DIAGRAM



EFFICIENCY CURVE



Speedway Energy Facility

FIGURE 2-4 REPRESENTATIVE INVERTER/TRANSFORMER

SHERMAN COUNTY, OREGON





Speedway Energy Facility

**FIGURE 2-5
EXAMPLE BESS AREA**

SHERMAN COUNTY, OREGON

Attachment 3. Property Owners within 500 Feet of the Site Boundary (List and Mapbook)

Preliminary Application for Site Certificate for the Speedway Energy Facility
Property Owner List and Tax Lot Map - Sherman County Assessor Data (Obtained May 28, 2026)

MapTaxlot	OWNER	IN CARE OF	MAILING ADDRESS
01S17E00007900	COELSCH, LEO W	COELSCH, KRISTA L	63711 COELSCH ROAD MORO, OR 97039
01S17E00008000	COELSCH, LEO W	COELSCH, KRISTA L	63711 COELSCH ROAD MORO, OR 97039
01S17E00008100	OLSEN PROPERTIES LLC		64981 OLSEN ROAD MORO, OR 97039
02S16E00003400	BIRD FAMILY TRUST	BIRD, STEVEN J	PO BOX 156 WASCO, OR 97065
02S16E00004400	ARLONE A STRADLEY TRUST	STRADLEY, ARLONE A TRUSTEE	PO BOX 66 GRASS VALLEY, OR 97029
02S16E00004500	ARLONE A STRADLEY TRUST	STRADLEY, ARLONE A TRUSTEE	PO BOX 66 GRASS VALLEY, OR 97029
02S16E00005000	BIRD FAMILY TRUST	BIRD, STEVEN J	PO BOX 156 WASCO, OR 97065
02S16E00005100	ROLFE LAND & CATTLE CO LLC		96000 ROSEBUSH LN GRASS VALLEY, OR 97029
02S16E2600200	ROLFE, FRED M & NANCY		PO BOX 144 GRASS VALLEY, OR 97029-0144
02S17E00001000	POWELL, PATRICK A TRUSTEE		PO BOX 440 WASCO, OR 97065
02S17E00001100	COELSCH, LEO W	COELSCH, KRISTA L	63711 COELSCH ROAD MORO, OR 97039
02S17E00001101	COELSCH, LEO W & KRISTA		63711 COELSCH ROAD MORO, OR 97039
02S17E00001500	BARNUM, RICHARD		3141 BUTTE STREET KLAMATH FALLS, OR 97601
02S17E00001600	POWELL, PATRICK A TRUSTEE		PO BOX 440 WASCO, OR 97065
02S17E00001700	POWELL, PATRICK, TRUSTEE		PO BOX 440 WASCO, OR 97065
02S17E00001800	BLAIR, PHILIP J & NETTIE L		35939 ABBIE LANE ASTORIA, OR 97103
02S17E00001900	BLACKBURN, GARY L ETAL		25940 S JEWELL ROAD BEAVERCREEK, OR 97004
02S17E00002600	HART, DARRYL R		63461 FRASER ROAD MORO, OR 97039
02S17E00002700	PINKERTON RANCH	PINKERTON, T DEAN	PO BOX 343 MORO, OR 97039
02S17E00002701	DEGRANGE, MICHAEL & AMBER	WELLS FARGO REAL ESTATE TAX	DES MOINES, IA 50328
02S17E00002800	POWELL, PATRICK A TRUSTEE		PO BOX 440 WASCO, OR 97065
02S17E00002900	SODERLUND, CHRISTOPHER		3008 W GRACE ST BOISE, ID 83703
02S17E00003000	MOORE, CHRISTOPHER & PATTI		65578 LONEROCK RD MORO, OR 97039
02S17E00003001	HART, DARRYL & TERESA		63461 FRASER ROAD MORO, OR 97039
02S17E00003100	BARNUM, RICHARD		3141 BUTTE STREET KLAMATH FALLS, OR 97601
02S17E00003400	BARNUM, RICHARD		3141 BUTTE STREET KLAMATH FALLS, OR 97601
02S17E00003500	ARLONE A STRADLEY TRUST	STRADLEY, ARLONE A TRUSTEE	PO BOX 66 GRASS VALLEY, OR 97029
02S17E00003600	ARLONE A STRADLEY TRUST	STRADLEY, ARLONE A TRUSTEE	PO BOX 66 GRASS VALLEY, OR 97029
02S17E00003700	SODERLUND, CHRISTOPHER		3008 W GRACE ST BOISE, ID 83703
02S17E00003800	CAMPBELL, STEPHEN FARM & CABIN TRUST	GRANT SIMPSON	PO BOX 370 MORO, OR 97039
02S17E00003801	SIMPSON, NANCY J & RICHARD C		PO BOX 165 MORO, OR 97039
02S17E0000400	SODERLUND, CHRISTOPHER		3008 W GRACE ST BOISE, ID 83703
02S17E00004100	LONG, SUSAN K & WILFORD C TRST		4005 S W JERALD WAY PORTLAND, OR 97221

Preliminary Application for Site Certificate for the Speedway Energy Facility
Property Owner List and Tax Lot Map - Sherman County Assessor Data (Obtained May 28, 2026)

MapTaxlot	OWNER	IN CARE OF	MAILING ADDRESS
02S17E00004300	LONG, SUSAN K & WILFORD C TRST		4005 SW JERALD WAY PORTLAND, OR 97221
02S17E00004500	PADGET, G DALE & DEANNA D TRST		60945 LONEROCK ROAD GRASS VALLEY, OR 97029
02S17E00004600	BLAGG, CARRIE L TRUSTEE		60744 LONE ROCK ROAD GRASS VALLEY, OR 97029
02S17E00004601	BLAGG, KYLE J	NORTHWEST FARM CREDIT SERVICES, FLCA	2001 S FLINT ROAD SPOKANE, WA 99224
02S17E00004800	BLAGG, CARRIE L TRUSTEE		60744 LONE ROCK ROAD GRASS VALLEY, OR 97029
02S17E00004900	BLAGG, CARRIE L TRUSTEE		60744 LONE ROCK ROAD GRASS VALLEY, OR 97029
02S17E00005000	BELSHE, JAMES R & JERRINE A		PO BOX 327 WASCO, OR 97065
02S17E00005000	BARNETT, LEE		26550 DRY CREEK RD BELGRADE, MT 59714
02S17E00005100	KOCK FARMS LLC		PO BOX 6 GRASS VALLEY, OR 97029
02S17E00005200	PACIFIC MOTORSPORTS MGMT LLC	OREGON RACEWAY PARK	PO BOX 386 BEAVERTON, OR 97075
02S17E00005300	ROLFE LAND & CATTLE CO LLC		96000 ROSEBUSH LN GRASS VALLEY, OR 97029
02S17E00005400	ROLFE LAND & CATTLE CO LLC		96000 ROSEBUSH LN GRASS VALLEY, OR 97029
02S17E00005500	HELEN OLDS RANCH LLC	BARBARA RALSTON MEMBER	PO BOX 52 GRASS VALLEY, OR 97029
02S17E00005600	ZIEGLER FARMS LLC	C/O PAM GOLDSBERRY	201 J STREET LEBANON, OR 97355
02S17E00006000	PINKERTON RANCHES		PO BOX 302 MORO, OR 97039
02S17E00006001	MARTIN, AUSTEN		PO BOX 331 MORO, OR 97039
02S17E00007000	POWELL, PATRICK A TRUSTEE		PO BOX 440 WASCO, OR 97065
02S17E00008000	BELSHE, JAMES R & JERRINE A		PO BOX 327 WASCO, OR 97065
02S17E00009000	OLSEN PROPERTIES LLC		64981 OLSEN ROAD MORO, OR 97039
02S17E00009001	HANLON, GERARD A		64002 LONEROCK ROAD MORO, OR 97039
03S15E00002400	JUSTESEN, FRED & JONNIE		59720 TWIN LAKES RD GRASS VALLEY, OR 97029
03S15E00002800	JUSTESEN, FRED & JON		59720 TWIN LAKES ROAD GRASS VALLEY, OR 97029
03S15E00007000	CHRISTIANSSEN, KATHERINE J		PO BOX 104 GRASS VALLEY, OR 97029
03S16E00001000	TRIMBLE FARMS LLC		PO BOX 10 SANDY, OR 97055
03S16E00001000	BIRD, STEVEN & LINDA		PO BOX 156 WASCO, OR 97065
03S16E00001100	BIRD, STEVEN & LINDA		PO BOX 156 WASCO, OR 97065
03S16E00001200	JUSTESEN, FRED & JONNIE		59720 TWIN LAKES RD GRASS VALLEY, OR 97029
03S16E00001300	EARL RANCH LLC		60906 HWY 216 GRASS VALLEY, OR 97029
03S16E00001400	TRIMBLE FARMS LLC		PO BOX 10 SANDY, OR 97055
03S16E00001600	SCHILLING RANCH, LLC		1435 E 16 ST THE DALLES, OR 97058

Preliminary Application for Site Certificate for the Speedway Energy Facility
Property Owner List and Tax Lot Map - Sherman County Assessor Data (Obtained May 28, 2026)

MapTaxlot	OWNER	IN CARE OF	MAILING ADDRESS
03S16E00001700	JUSTESEN, FRED & JONNIE		59720 TWIN LAKES RD GRASS VALLEY, OR 97029
03S16E00001800	SALOMON, PAULINE TRUSTEE		59720 TWIN LAKES RD GRASS VALLEY, OR 97029
03S16E00001900	SALOMON, PAULINE TRUSTEE		59720 TWIN LAKES RD GRASS VALLEY, OR 97029
03S16E0000200	BUCK HOLLOW RANCH INC		59720 TWIN LAKES ROAD GRASS VALLEY, OR 97029
03S16E00002000	STATE OF OREGON*	EXEMPT	63055 NORTH HIGHWAY 97 BEND, OR 97703
03S16E00002100	VON BORSTEL, PATRICIA TRUST	ROBERT C VON BORSTEL II TRSTEE	PO BOX 1042 LAKE OSWEGO, OR 97034
03S16E00002200	JUSTESEN, FRED & JONNIE		59720 TWIN LAKES RD GRASS VALLEY, OR 97029
03S16E00002300	MICHIGAN CEMETERY ASSN	EXEMPT	UNKNOWN UNKNOWN, OR 00000
03S16E00002400	HECTOR, ELLEN TRUSTEE		2529 SIERRA BERMEJA DRIVE SIERRA VISTA, AZ 85650
03S16E00002500	SCHILLING RANCH, LLC		1435 E 16 ST THE DALLES, OR 97058
03S16E00002600	CHRISTIENSEN, KATHERINE J		PO BOX 104 GRASS VALLEY, OR 97029
03S16E00002700	JUSTESEN, FRED & JONNIE		59720 TWIN LAKES RD GRASS VALLEY, OR 97029
03S16E00002800	JUSTESEN, FRED A & JONNIE L		59720 TWIN LAKES ROAD GRASS VALLEY, OR 97029
03S16E00002900	EARL RANCH LLC		60906 HWY 216 GRASS VALLEY, OR 97029
03S16E00003000	JUSTESEN, FRED & JON		59720 TWIN LAKES ROAD GRASS VALLEY, OR 97029
03S16E00003100	JUSTESEN, FRED		59720 TWIN LAKES ROAD GRASS VALLEY, OR 97029
03S16E00003200	JUSTESEN, FRED & JUSTESEN JON		59720 TWIN LAKES ROAD GRASS VALLEY, OR 97029
03S16E00003300	ROLFE, JOHNATHAN		96485 MONKLAND LANE MORO, OR 97039
03S16E00003400	FINNEGAN RANCH LLC	HULBERT, JEAN	PO BOX 157 GRASS VALLEY, OR 97029
03S16E00003401	JUSTESEN, FRED & JON		59720 TWIN LAKES ROAD GRASS VALLEY, OR 97029
03S16E00003500	NOGLE, PAT & NOGLE, WHITNEY		59599 STARK ROAD GRASS VALLEY, OR 97029
03S16E00003501	NOGLE, PAT		58558 HIGHWAY 216 GRASS VALLEY, OR 97029
03S16E00003600	FINNEGAN RANCH LLC	HULBERT, JEAN	PO BOX 157 GRASS VALLEY, OR 97029
03S16E00003700	FINNEGAN RANCH LLC	HULBERT, JEAN	PO BOX 157 GRASS VALLEY, OR 97029
03S16E00003800	RUGGLES, JESSE	RUGGLES, CATHERINE	58030 FINNEGAN ROAD GRASS VALLEY, OR 97029

Preliminary Application for Site Certificate for the Speedway Energy Facility
Property Owner List and Tax Lot Map - Sherman County Assessor Data (Obtained May 28, 2026)

MapTaxlot	OWNER	IN CARE OF	MAILING ADDRESS
03S16E00003801	RUGGLES, JESSE DEAN	CATHERINE ANN RUGGLES	58266 FINNEGAN ROAD GRASS VALLEY, OR 97029
03S16E00003900	SALOMON, PAULINE TRUSTEE		59720 TWIN LAKES RD GRASS VALLEY, OR 97029
03S16E0000400	EARL RANCH LLC		60906 HWY 216 GRASS VALLEY, OR 97029
03S16E00004000	RICHARDS CORPORATION		2800 156TH AV SE SUITE 130 BELLEVUE, WA 98007
03S16E00004100	GALLEY, JOHN & J DIANE TRUST	SUPPRESSED NAME	PO BOX 65 MORO, OR 97039
03S16E00004200	BERGE, JAMES C ETAL	GUNDERSON, PEDER & GAIL	PO BOX 147 GRASS VALLEY, OR 97029
03S16E00004300	RUGGLES, JESSE DEAN	RUGGLES, CATHERINE	58030 FINNEGAN ROAD GRASS VALLEY, OR 97029
03S16E0000500	ARLONE A STRADLEY TRUST	STRADLEY, ARLONE A TRUSTEE	PO BOX 66 GRASS VALLEY, OR 97029
03S16E0000600	EAKIN, BRAD & STACY		59246 HORSESHOE BEND RD GRASS VALLEY, OR 97029
03S16E0000900	LEMLEY, RANDY		14130 SW 105TH AVE APT #3 TIGARD, OR 97224
03S16E0200100	BUCK HOLLOW RANCH INC		59720 TWIN LAKES ROAD GRASS VALLEY, OR 97029
03S16E0200200	SUSI, SCOTT & TONYA	MANN MORTGAGE, LLC	1220 WHITEFISH STAGE KALISPELL, MT 59901
03S16E0200300	BUCK HOLLOW RANCH INC		59720 TWIN LAKES ROAD GRASS VALLEY, OR 97029
03S16E0200400	BUCK HOLLOW RANCH INC		59720 TWIN LAKES ROAD GRASS VALLEY, OR 97029
03S16E0200401	BROWN KRISTINE, WEIS, NICHOLAS		PO BOX 62 MORO, OR 97039
03S17E00001100	KOCK, JULIA O'HARA		1027 OLD HWY 8 ROOSEVELT, WA 99356-9717
03S17E00001200	TRIMBLE FARMS LLC		PO BOX 10 SANDY, OR 97055
03S17E00002700	JUSTESEN, TATE	GRASS VALLEY RANCHES LLC	2211 SW FIRST AVENUE UNIT 301 PORTLAND, OR 97201
03S17E00002800	JUSTESEN, TATE	GRASS VALLEY RANCHES LLC	2211 SW FIRST AVENUE UNIT 301 PORTLAND, OR 97201
03S17E00003500	EAKIN, BRAD & STACY		59246 HORSESHOE BEND RD GRASS VALLEY, OR 97029
03S17E00003600	PADGET, G DALE & DEANNA D TRST		60945 LONEROCK ROAD GRASS VALLEY, OR 97029
03S17E00003700	MILLER, JUSTIN D & CHARLES E		PO BOX 318 WASCO, OR 97065
03S17E00003800	ROLFE, JOHNATHAN		96485 MONKLAND LANE MORO, OR 97039
03S17E00003801	JOHNSON, SUSANNA & JOEL	BAYSHORE MORTGAGE FUNDING, LLC	2108 EMMORTON PARK ROAD STE 204 EDGEWOOD, MD 21040
03S17E00003900	EARL RANCH LLC		60906 HWY 216 GRASS VALLEY, OR 97029

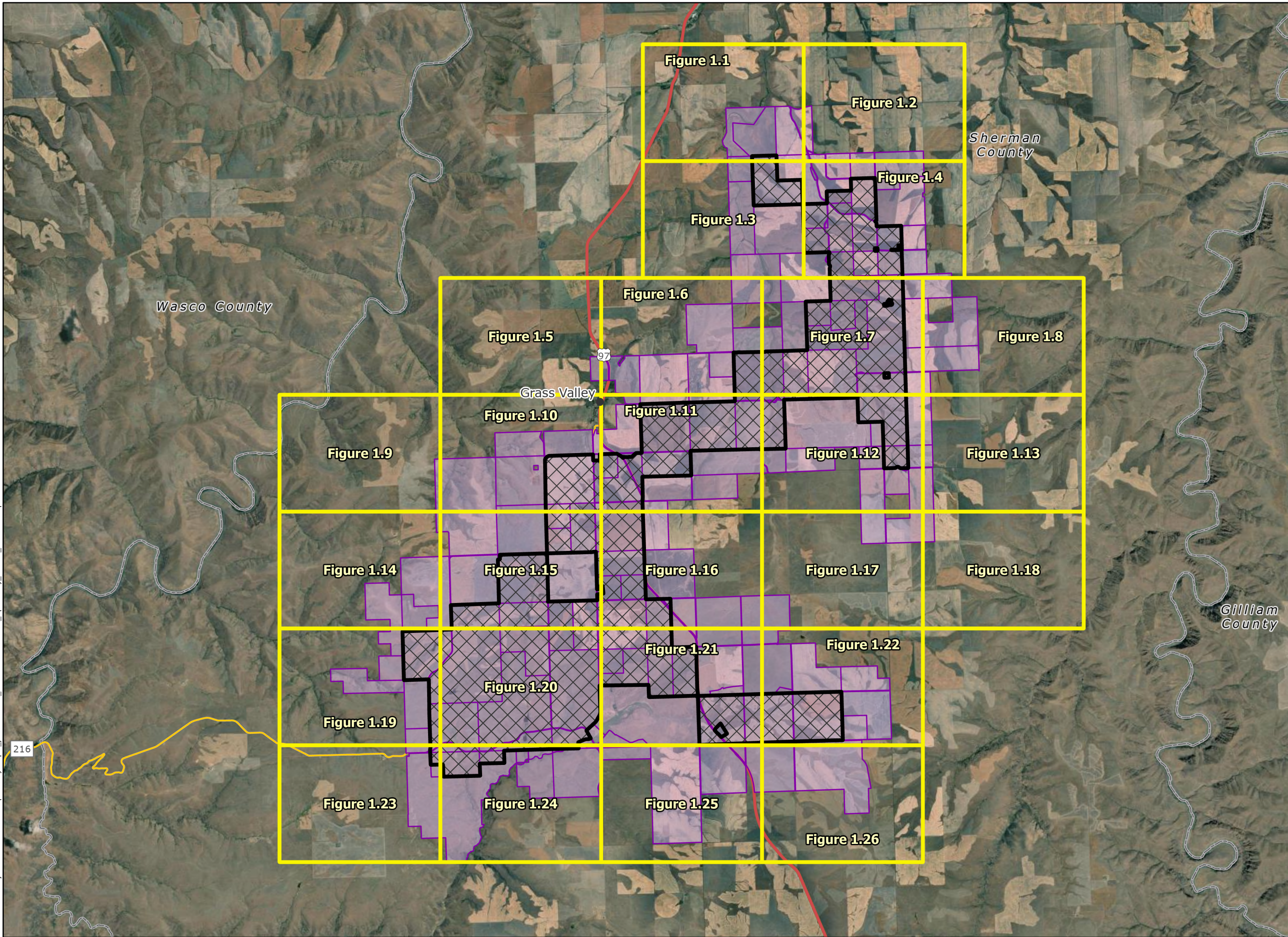
Preliminary Application for Site Certificate for the Speedway Energy Facility
Property Owner List and Tax Lot Map - Sherman County Assessor Data (Obtained May 28, 2026)

MapTaxlot	OWNER	IN CARE OF	MAILING ADDRESS
03S17E0000400	PADGET, G DALE & DEANNA D TRST		60945 LONEROCK ROAD GRASS VALLEY, OR 97029
03S17E00004000	STATE OF OREGON*	HWY COMM EXEMPT	63055 NORTH HIGHWAY 97 BEND, OR 97703
03S17E00004100	EARL RANCH LLC		60906 HWY 216 GRASS VALLEY, OR 97029
03S17E00004200	BOURBON ROAD RENEWABLES LLC		60906 HWY 216 GRASS VALLEY, OR 97029
03S17E00004300	EAKIN, BRAD T & STACY JO		59246 HORSESHOE BEND ROAD GRASS VALLEY, OR 97029
03S17E00004400	ROLFE, JOHNATHAN & KALIE		96485 MONKLAND LANE MORO, OR 97039
03S17E0000500	WHEELER, MICK S.		60335 HORSESHOE BEND ROAD GRASS VALLEY, OR 97029
03S17E0000600	PADGET, DARREN D & BRENDA J		95908 RUTLEDGE LANE GRASS VALLEY, OR 97029
03S17E0000601	BLAGG, CARRIE L TRUSTEE		60744 LONE ROCK ROAD GRASS VALLEY, OR 97029
03S17E0000700	ZIEGLER FARMS LLC	C/O PAM GOLDSBERRY	201 J STREET LEBANON, OR 97355
03S17E0000901	VON BORSTEL, LEE A		56424 VON BORSTEL ROAD GRASS VALLEY, OR 97029
04S16E0000100	VON BORSTEL, STUART J & CAROL		93415 LIBERTY LANE GRASS VALLEY, OR 97029
04S16E00001300	SALOMON, PAULINE TRUSTEE		59720 TWIN LAKES RD GRASS VALLEY, OR 97029
04S16E00001400	BERGE, JAMES C ETAL	GUNDERSON, PEDER & GAIL	PO BOX 147 GRASS VALLEY, OR 97029
04S16E00001500	FEDERAL GOVERNMENT**	EXEMPT	UNKNOWN, OR 00000
04S16E00001600	BROWN, JAMES E	BROWN, JOYCE A	2235 NW LARCHLEAF LANE REDMOND, OR 97756
04S16E0000200	RUGGLES, JESSE DEAN	RUGGLES, CATHERINE	58030 FINNEGAN ROAD GRASS VALLEY, OR 97029
04S16E0000300	D.L.L. TRUST	LUCCHESE, LISA & DAVID	5142 ESTASI STREET LAS VEGAS, NV 89135
04S16E0000400	D.L.L. TRUST	LUCCHESE, LISA & DAVID	5142 ESTASI STREET LAS VEGAS, NV 89135
04S16E0000500	RUGGLES, JESSE DEAN	CATHERINE ANN RUGGLES	58030 FINNEGAN ROAD GRASS VALLEY, OR 97029
04S16E0000600	RUGGLES, JESSE DEAN	CATHERINE ANN RUGGLES	58030 FINNEGAN ROAD GRASS VALLEY, OR 97029
04S16E0000800	FEDERAL GOVERNMENT***	EXEMPT	3050 NE 3rd PRINEVILLE, OR 97754
04S17E0000500	ROLFE, JOHNATHAN & KALIE		96845 MONKLAND LANE MORO, OR 97039
04S17E0000600	HATTRUP FAMILY LLC	LUCCHESI, ANN	11 CORTE LA PAZ SAN RAFAEL, CA 94903

Preliminary Application for Site Certificate for the Speedway Energy Facility
Property Owner List and Tax Lot Map - Sherman County Assessor Data (Obtained May 28, 2026)

MapTaxlot	OWNER	IN CARE OF	MAILING ADDRESS
04S17E0000700	VON BORSTEL, ALAN W	VON BORSTEL, JUDY M	56712 VON BORSTEL ROAD GRASS VALLEY, OR 97029
Note: * Sherman County tax lots with "State of Oregon" in the "Owner" field do not have address or other identifying information. The Applicant reviewed the Oregon Department of Transportation (ODOT) material source network map (ODOT 2026) and both Tax Lot 03S16E00002000 and 03S17E00004000 are listed as "ODOT source" aggregate sites. The address for the ODOT Region 4 headquarters is provided. Reference: ODOT (Oregon Department of Transportation). 2026. Material Source Network Map. Accessed June 2026. https://www.oregon.gov/ODOT/GeoEnvironmental/Pages/Material-Source.aspx			
Note: ** Sherman County tax lots with "Federal Government" in the "Owner" field do not have address or other identifying information. The Applicant reviewed available data on the Protected Areas Database of the United States (PADUS 2024) and was unable to determine the specific federal management agency for Tax Lot 04S16E00001500.			
Note: *** Sherman County tax lots with "Federal Government" in the "Owner" field do not have address or other identifying information. The Applicant reviewed available data on the Protected Areas Database of the United States (PADUS 2024) and was able to determine that Tax Lot 04S16E0000800 is managed by the Bureau of Land Management (BLM) Prineville District. The address for the BLM Prineville District Office is provided. Reference: USGS (U.S. Geological Survey). 2024. Gap Analysis Project (GAP) 2024, Protected Areas Database of the United States (PAD-US) 4.0: U.S. Geological Survey data release, https://doi.org/10.5066/P96WBCHS			

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Speedway Energy

Figure 1 Taxlots Index

SHERMAN COUNTY, OR

- Facility Site Boundary
- Taxlot Boundary¹
- City/Town
- US Highway
- State Highway
- County Boundary
- Map Grid

¹Data received from Sherman County
5/28/26



Reference Map

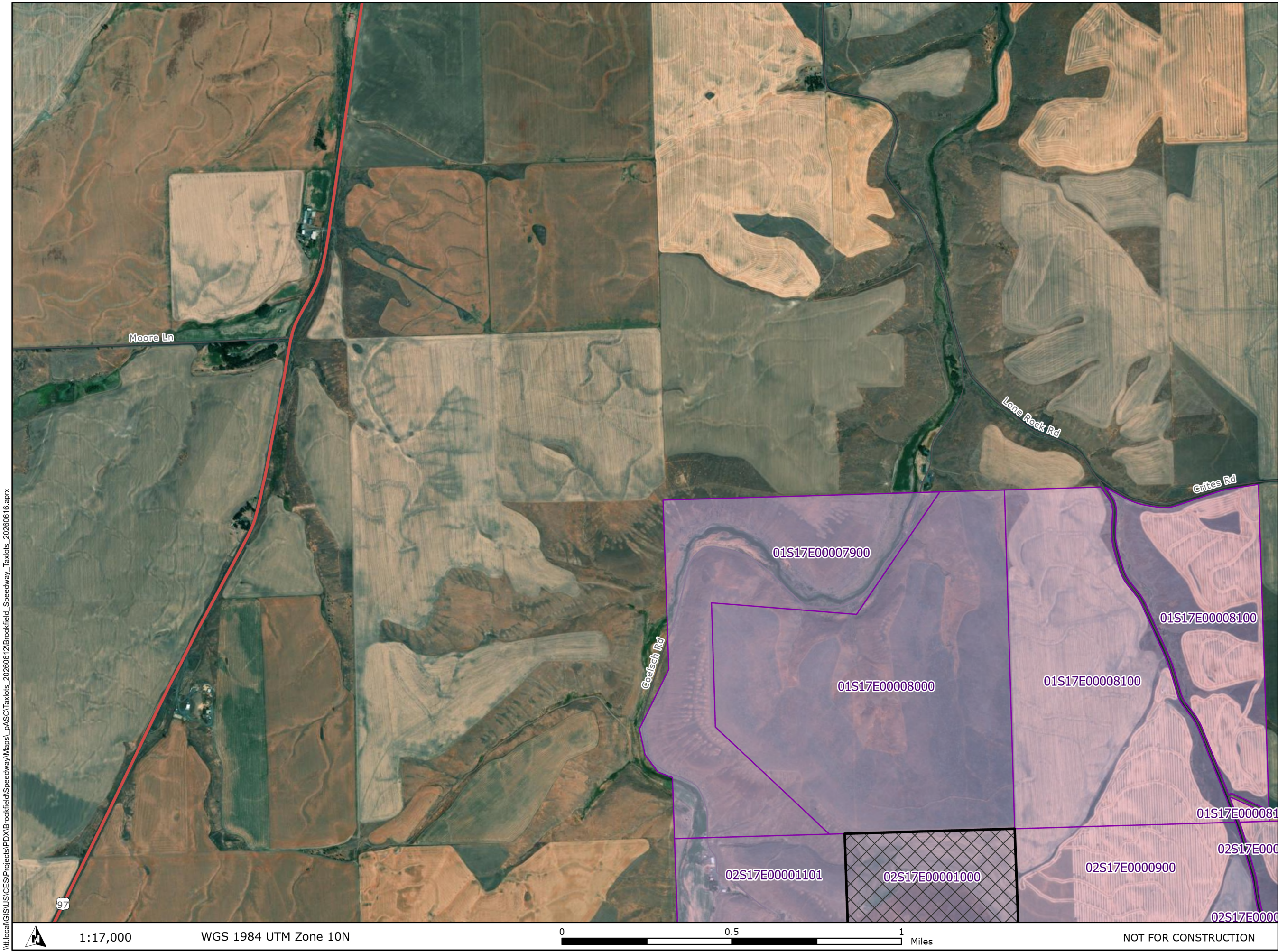


1:120,000

WGS 1984 UTM Zone 10N

0 0.5 1 2 3 4 Miles

NOT FOR CONSTRUCTION



Speedway Energy

**Figure 1.1
Taxlots**

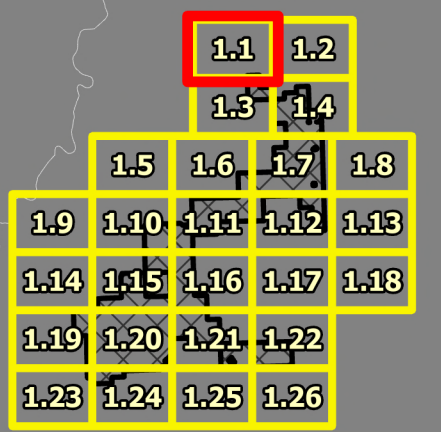
SHERMAN COUNTY, OR

- Facility Site Boundary
- Taxlot Boundary¹
- US Highway
- Local Roads

¹Data received from Sherman County
5/28/26



Reference Map

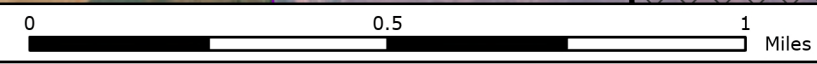


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WGS 1984 UTM Zone 10N



NOT FOR CONSTRUCTION



Speedway Energy

Figure 1.2
Taxlots

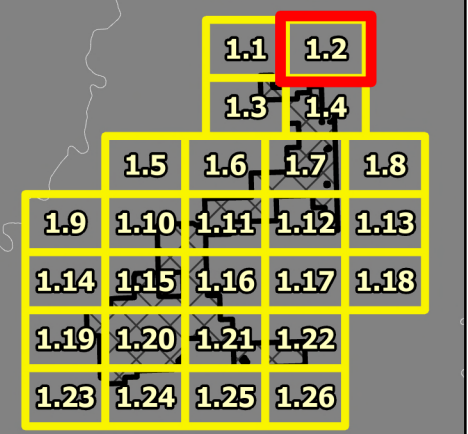
SHERMAN COUNTY, OR

- Facility Site Boundary
- Taxlot Boundary¹
- Local Roads

¹Data received from Sherman County
5/28/26



Reference Map



\\tt.local\GIS\US\CES\Projects\PD\X\Brookfield\Speedway\Maps\pASC\Taxlots_20260612\Brookfield_Speedway_Taxlots_20260616.aprx



Speedway Energy

**Figure 1.3
Taxlots**

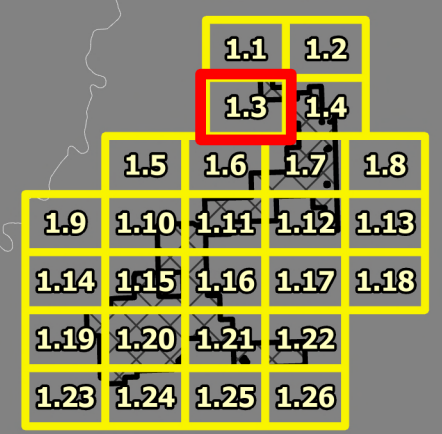
SHERMAN COUNTY, OR

- Facility Site Boundary
- Taxlot Boundary¹
- US Highway
- Local Roads

¹Data received from Sherman County
5/28/26



Reference Map



\\tlocal\GIS\US\CES\Projects\PDX\Brookfield\Speedway\Maps_p\ASC\Taxlots_20260612\Brookfield_Speedway_Taxlots_20260616.aprx

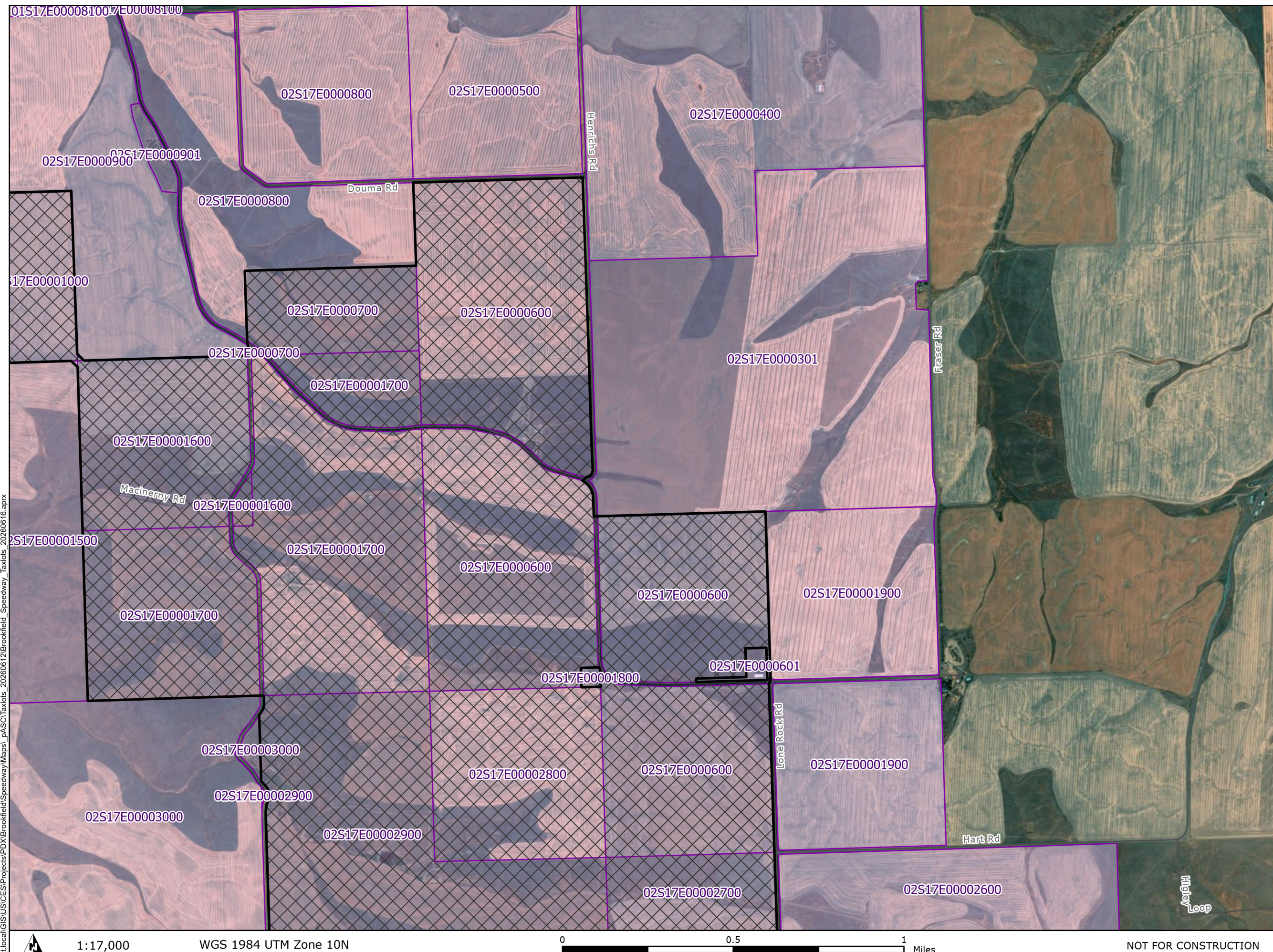


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WGS 1984 UTM Zone 10N

0 0.5 1 Miles

NOT FOR CONSTRUCTION



Speedway Energy

Figure 1.4 Taxlots

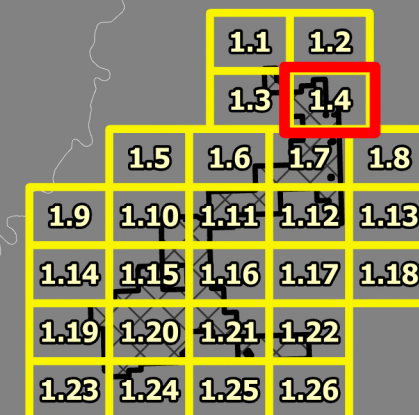
SHERMAN COUNTY, OR

-  Facility Site Boundary
 Taxlot Boundary¹
 Local Roads

¹Data received from Sherman County
5/28/26



Reference Map



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Speedway Energy

Figure 1.5
Taxlots

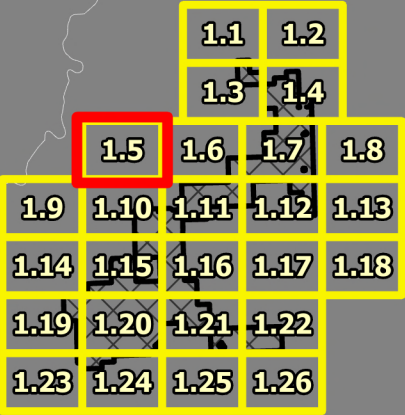
SHERMAN COUNTY, OR

- Facility Site Boundary
- Taxlot Boundary¹
- US Highway
- Local Roads

¹Data received from Sherman County
5/28/26

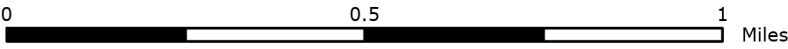


Reference Map

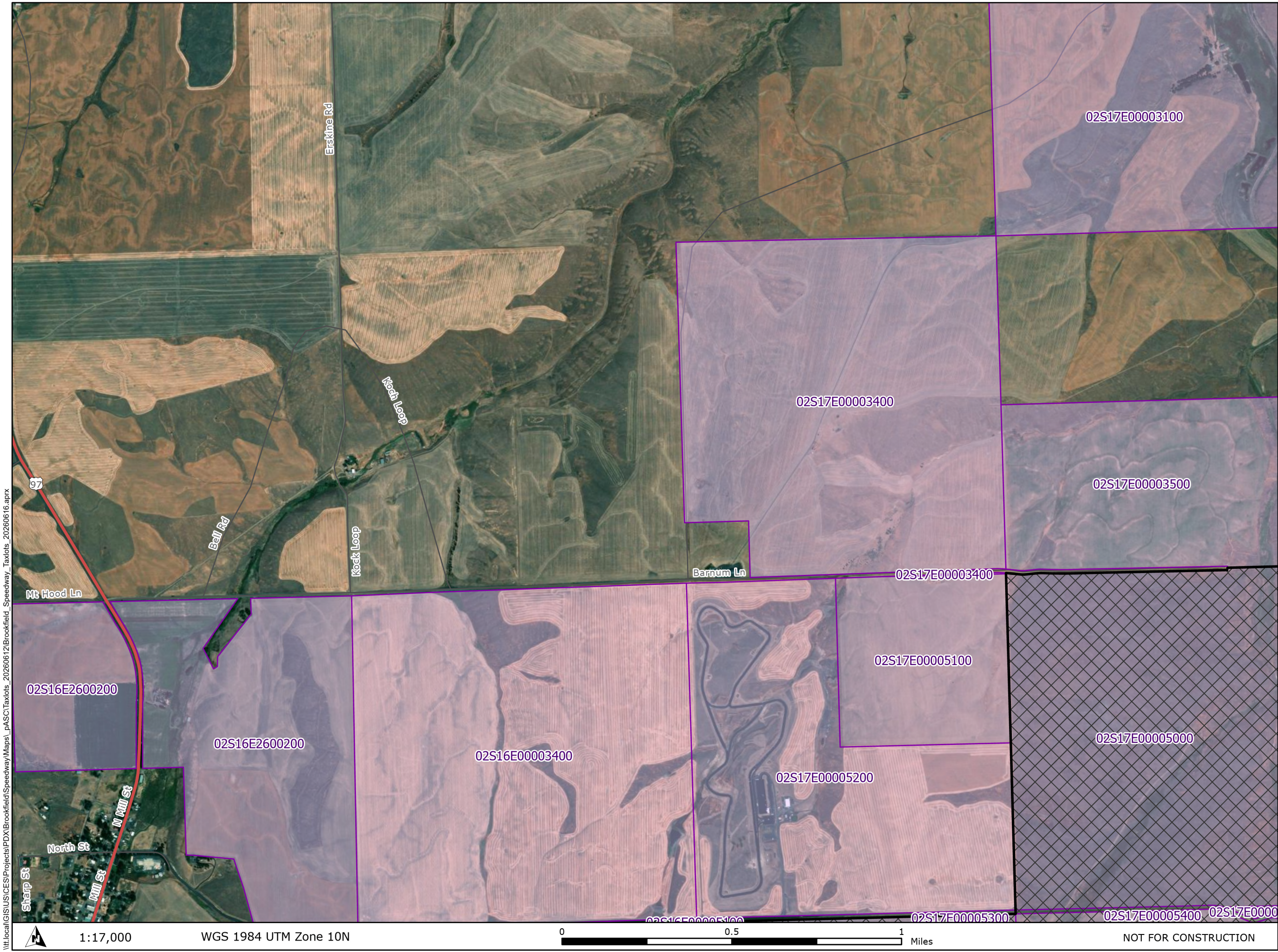


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WGS 1984 UTM Zone 10N



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Speedway Energy

Figure 1.6
Taxlots

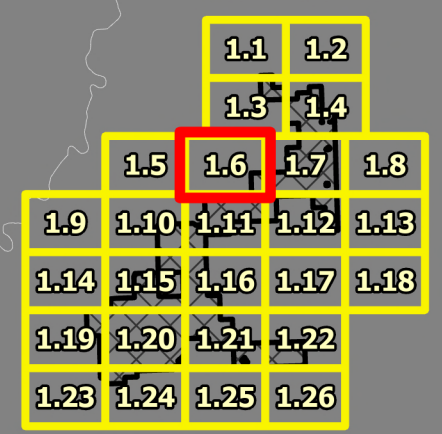
SHERMAN COUNTY, OR

-  Facility Site Boundary
-  Taxlot Boundary¹
-  US Highway
-  Local Roads

¹Data received from Sherman County
5/28/26



Reference Map



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Speedway Energy

**Figure 1.7
Taxlots**

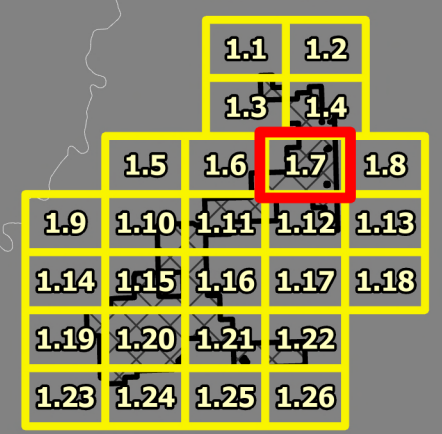
SHERMAN COUNTY, OR

-  Facility Site Boundary
-  Taxlot Boundary¹
-  Local Roads

¹Data received from Sherman County
5/28/26



Reference Map



\\tt-local\GIS\US\Projects\PD\X\Brookfield\Speedway\Maps_p\ASC\Taxlots_20260612\Brookfield_Speedway_Taxlots_20260616.aprx

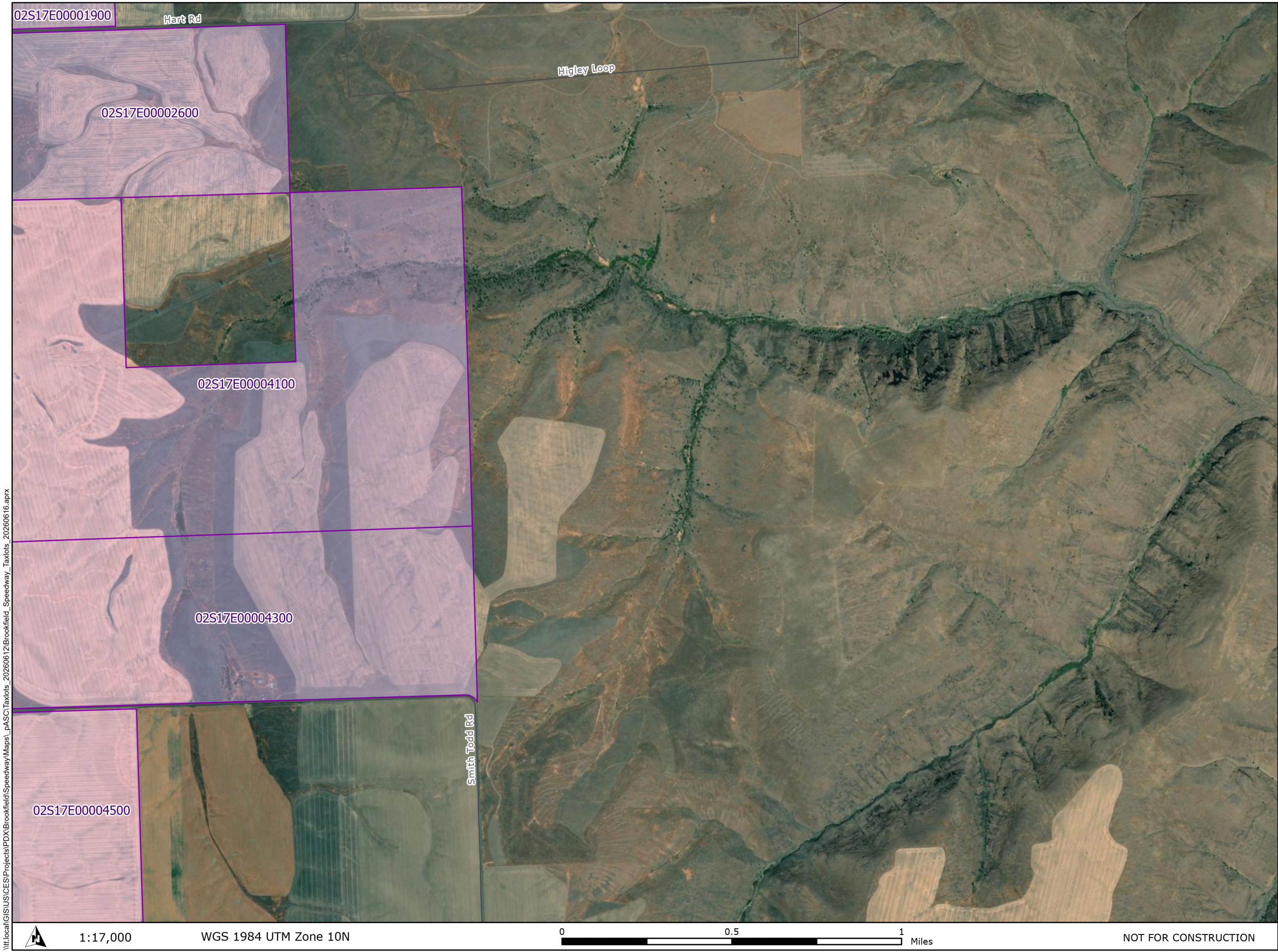


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WGS 1984 UTM Zone 10N

0 0.5 1 Miles

NOT FOR CONSTRUCTION



Speedway Energy

Figure 1.8
Taxlots

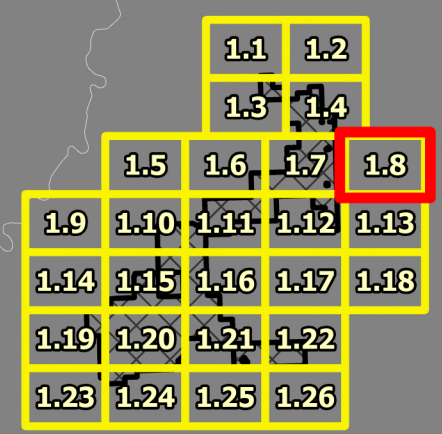
SHERMAN COUNTY, OR

- Facility Site Boundary
- Taxlot Boundary¹
- Local Roads

¹Data received from Sherman County
5/28/26



Reference Map

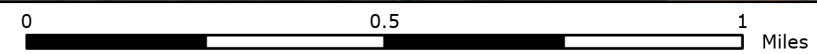


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WGS 1984 UTM Zone 10N



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Speedway Energy

**Figure 1.9
Taxlots**

SHERMAN COUNTY, OR

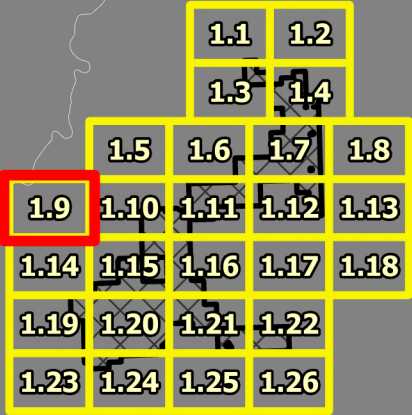
-  Facility Site Boundary
-  Taxlot Boundary¹

¹Data received from Sherman County
5/28/26



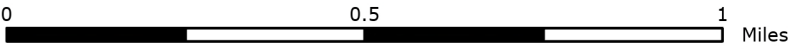
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Reference Map



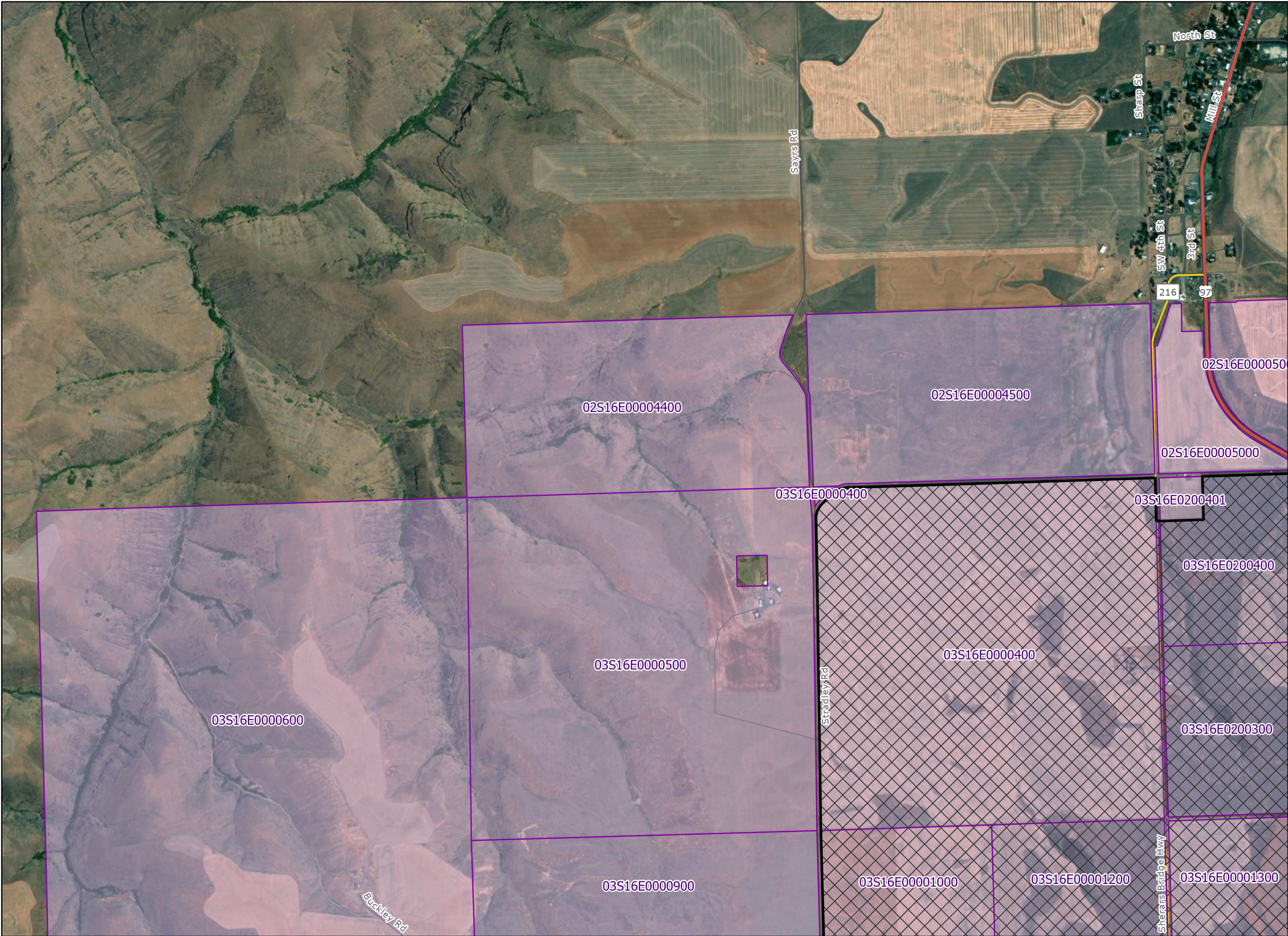
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WGS 1984 UTM Zone 10N



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Speedway Energy

Figure 1.10
Taxlots

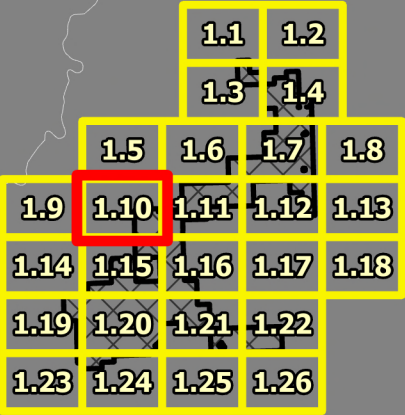
SHERMAN COUNTY, OR

- Facility Site Boundary
- Taxlot Boundary¹
- US Highway
- State Highway
- Local Roads

¹Data received from Sherman County
5/28/26

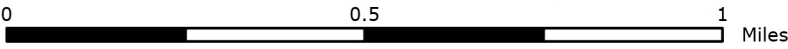


Reference Map

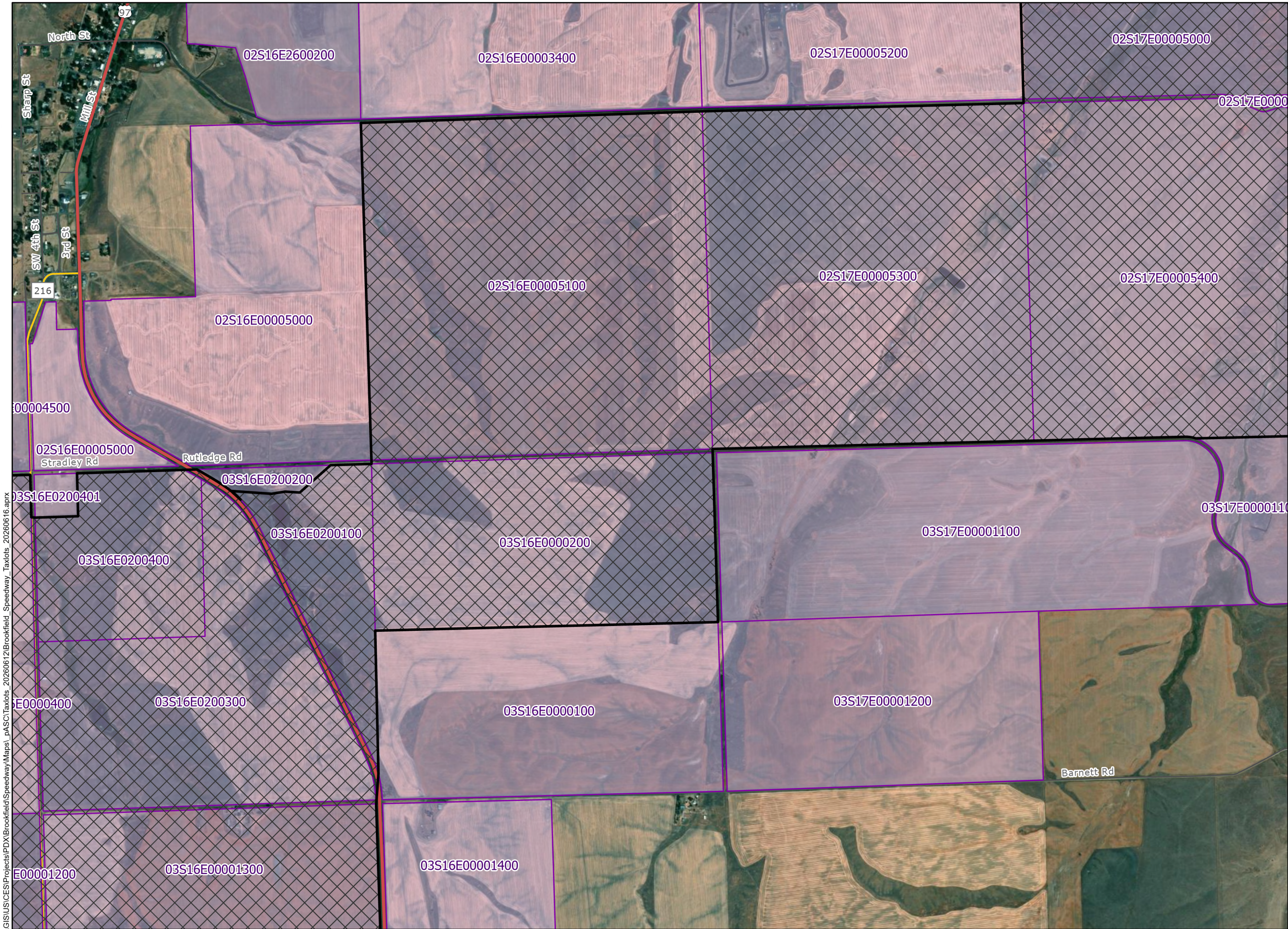


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WGS 1984 UTM Zone 10N



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Speedway Energy

Figure 1.11
Taxlots

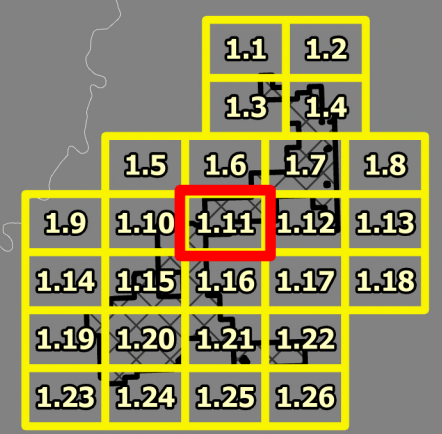
SHERMAN COUNTY, OR

- Facility Site Boundary
- Taxlot Boundary¹
- US Highway
- State Highway
- Local Roads

¹Data received from Sherman County
5/28/26



Reference Map



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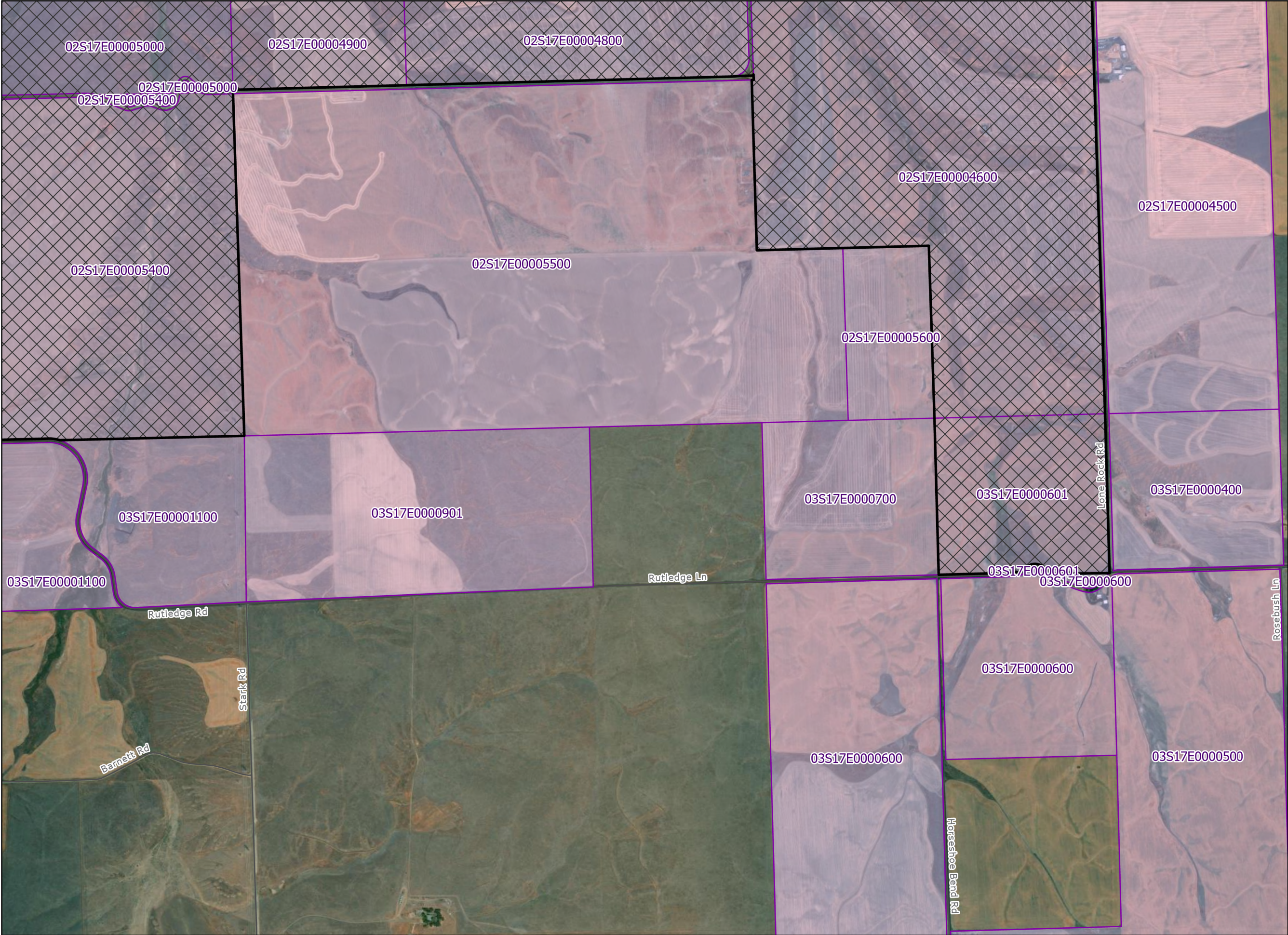
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WGS 1984 UTM Zone 10N

0 0.5 1 Miles

NOT FOR CONSTRUCTION

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Speedway Energy

Figure 1.12
Taxlots

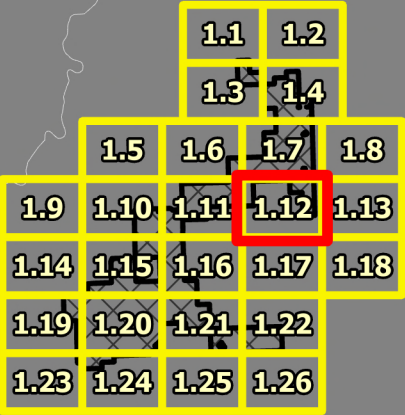
SHERMAN COUNTY, OR

- Facility Site Boundary
- Taxlot Boundary¹
- Local Roads

¹Data received from Sherman County
5/28/26

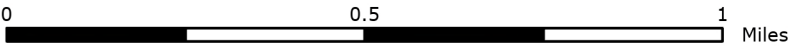


Reference Map



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Speedway Energy

Figure 1.13
Taxlots

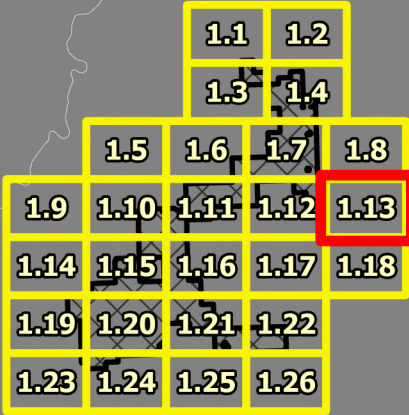
SHERMAN COUNTY, OR

- Facility Site Boundary
- Taxlot Boundary¹
- Local Roads

¹Data received from Sherman County
5/28/26



Reference Map



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WGS 1984 UTM Zone 10N



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Speedway Energy

**Figure 1.14
Taxlots**

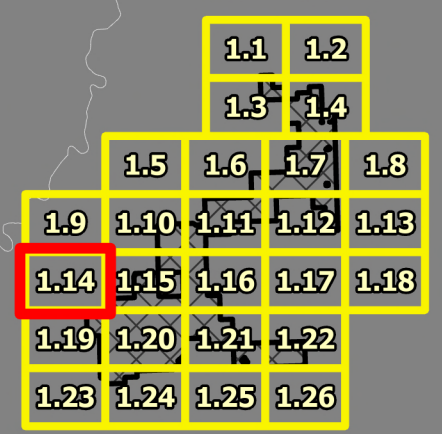
SHERMAN COUNTY, OR

-  Facility Site Boundary
-  Taxlot Boundary¹
-  State Highway
-  Local Roads

¹Data received from Sherman County
5/28/26



Reference Map

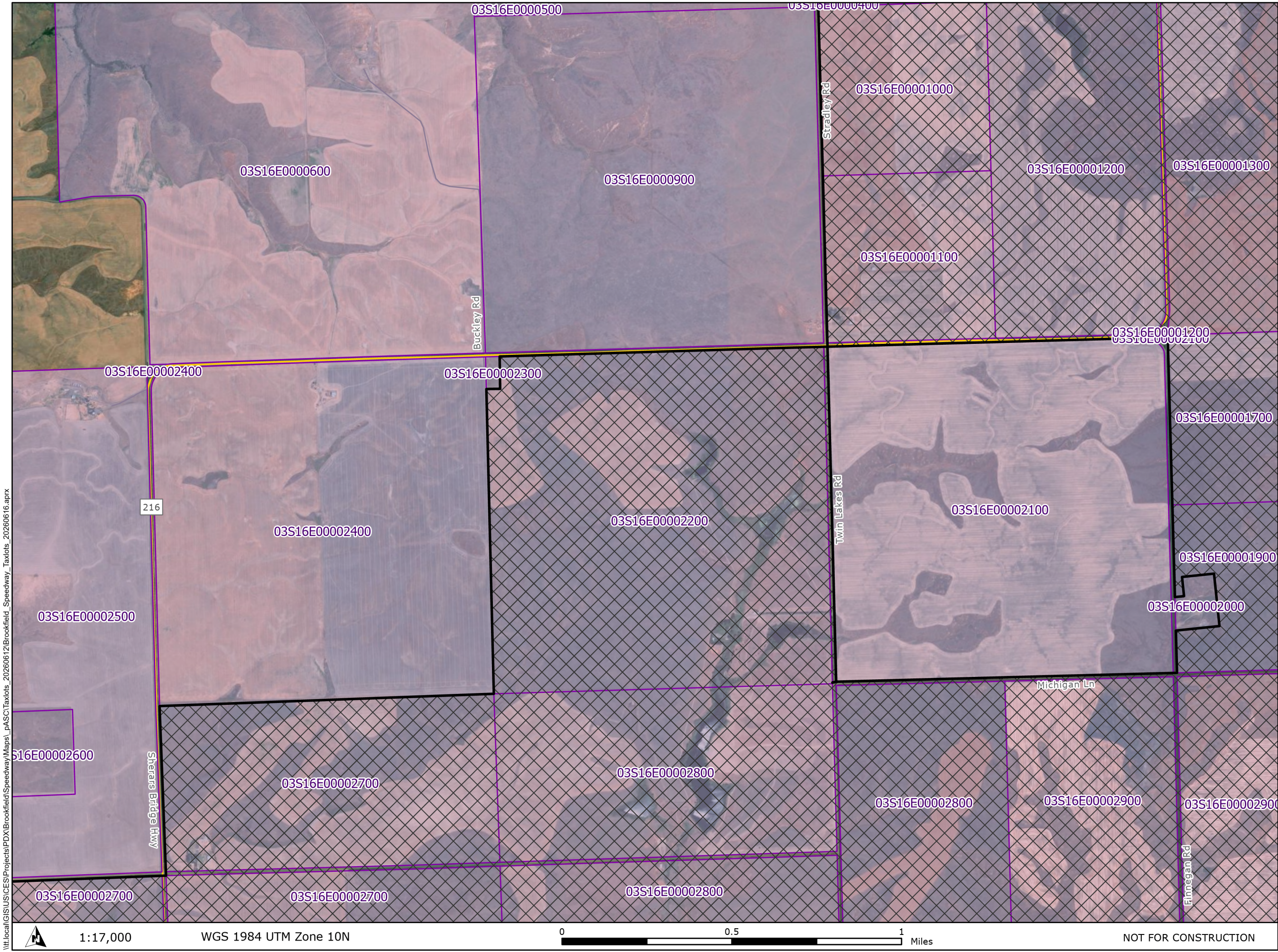


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WGS 1984 UTM Zone 10N

0 0.5 1 Miles

NOT FOR CONSTRUCTION



Speedway Energy

Figure 1.15 Taxlots

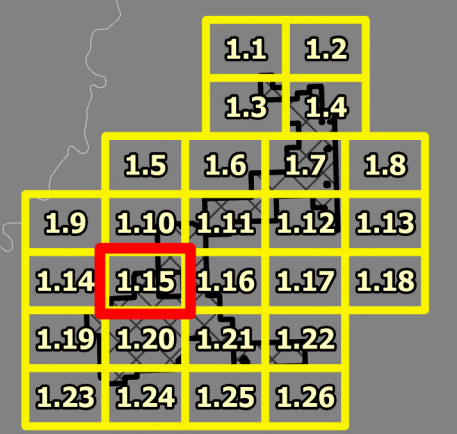
SHERMAN COUNTY, OR

- Facility Site Boundary
- Taxlot Boundary¹
- State Highway
- Local Roads

¹Data received from Sherman County
5/28/26



Reference Map



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WGS 1984 UTM Zone 10N

0 0.5 1 Miles

NOT FOR CONSTRUCTION

Speedway Energy

Figure 1.16
Taxlots

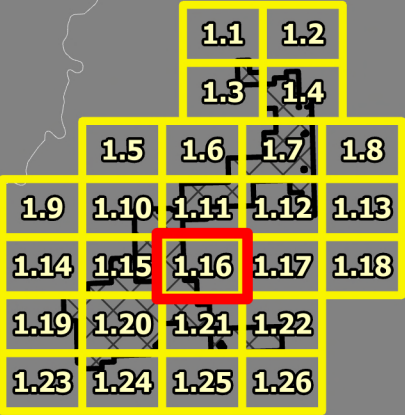
SHERMAN COUNTY, OR

-  Facility Site Boundary
-  Taxlot Boundary¹
-  US Highway
-  State Highway
-  Local Roads

¹Data received from Sherman County
5/28/26



Reference Map

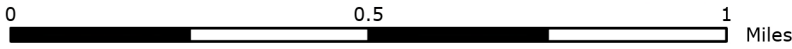


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WGS 1984 UTM Zone 10N



NOT FOR CONSTRUCTION

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Speedway Energy

Figure 1.17
Taxlots

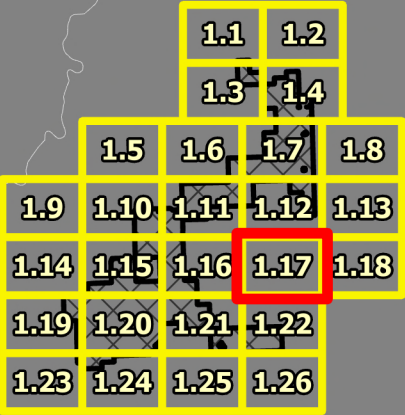
SHERMAN COUNTY, OR

- Facility Site Boundary
- Taxlot Boundary¹
- Local Roads

¹Data received from Sherman County
5/28/26

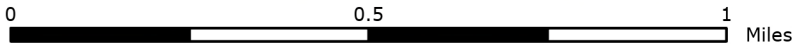


Reference Map



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WGS 1984 UTM Zone 10N



NOT FOR CONSTRUCTION

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Speedway Energy

Figure 1.18
Taxlots

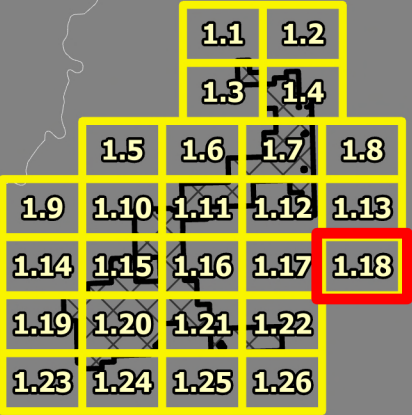
SHERMAN COUNTY, OR

- Facility Site Boundary
- Taxlot Boundary¹
- Local Roads

¹Data received from Sherman County
5/28/26



Reference Map

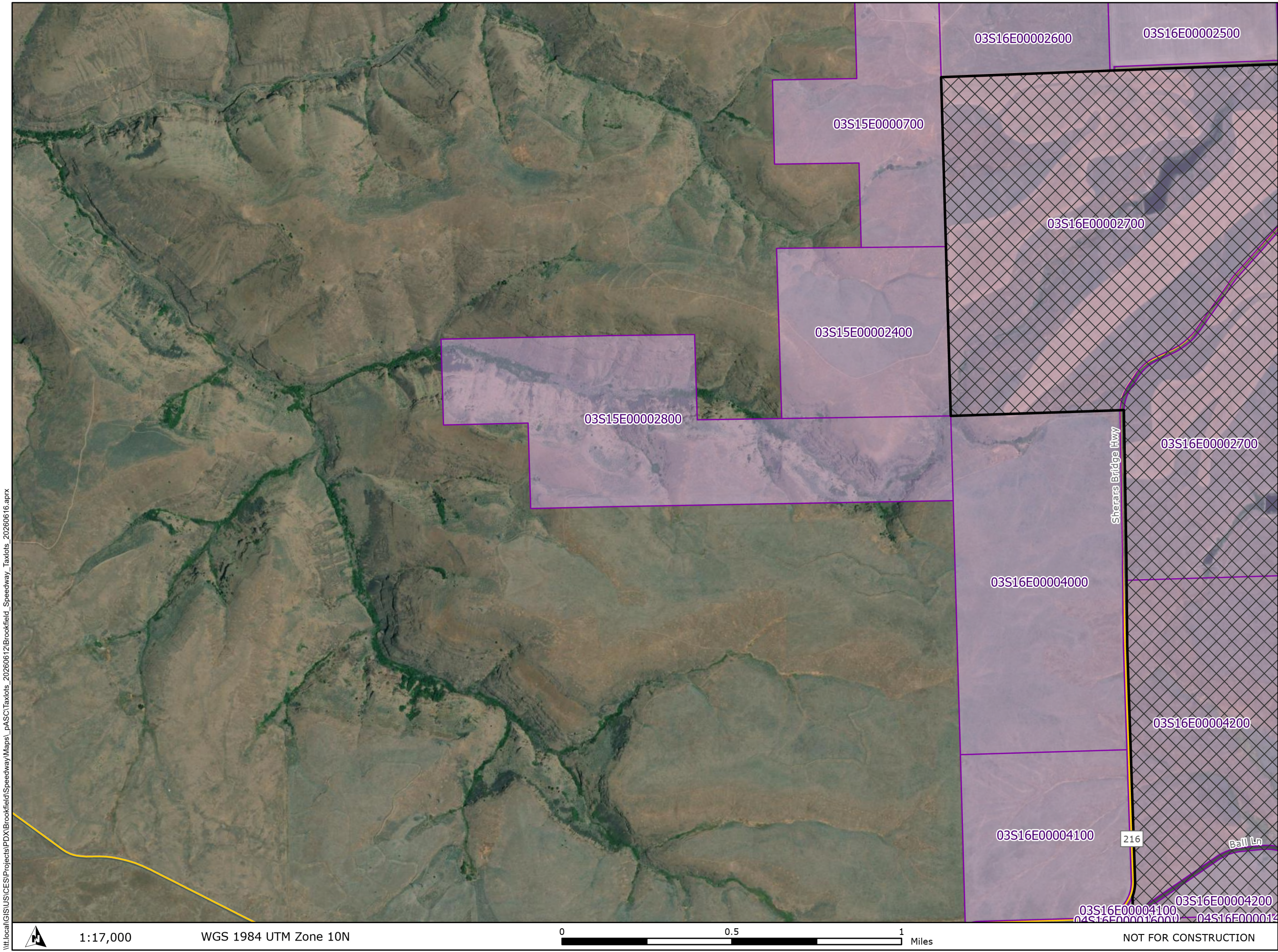


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WGS 1984 UTM Zone 10N



NOT FOR CONSTRUCTION



Speedway Energy

Figure 1.19
Taxlots

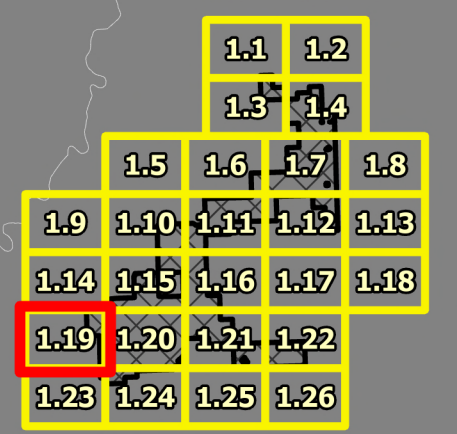
SHERMAN COUNTY, OR

-  Facility Site Boundary
-  Taxlot Boundary¹
-  State Highway
-  Local Roads

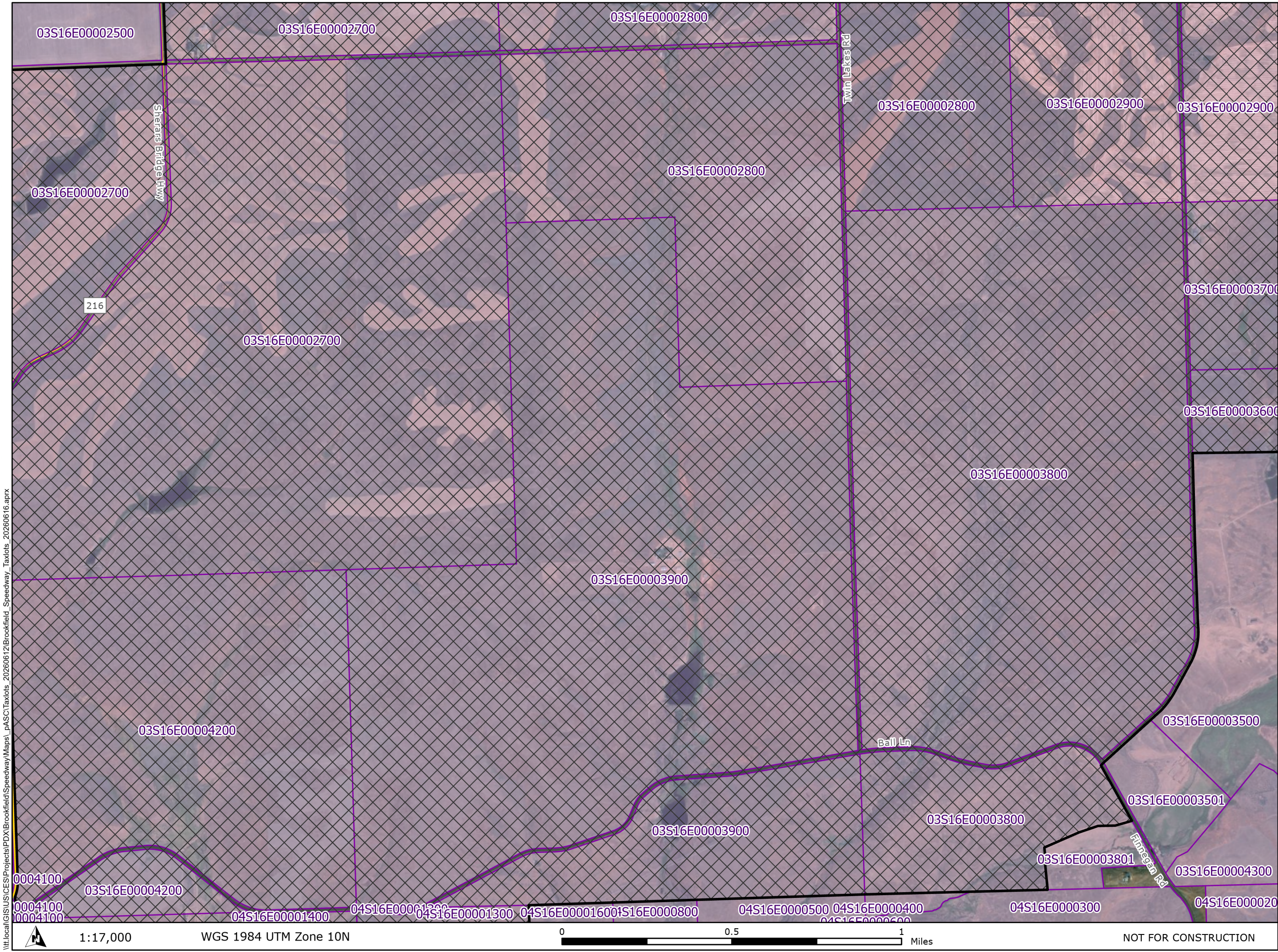
¹Data received from Sherman County
5/28/26



Reference Map



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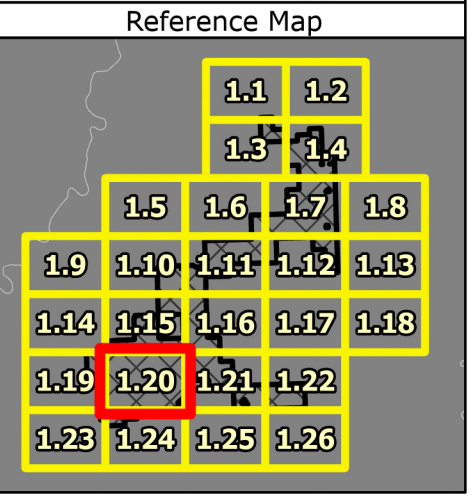
Speedway Energy

Figure 1.20
Taxlots

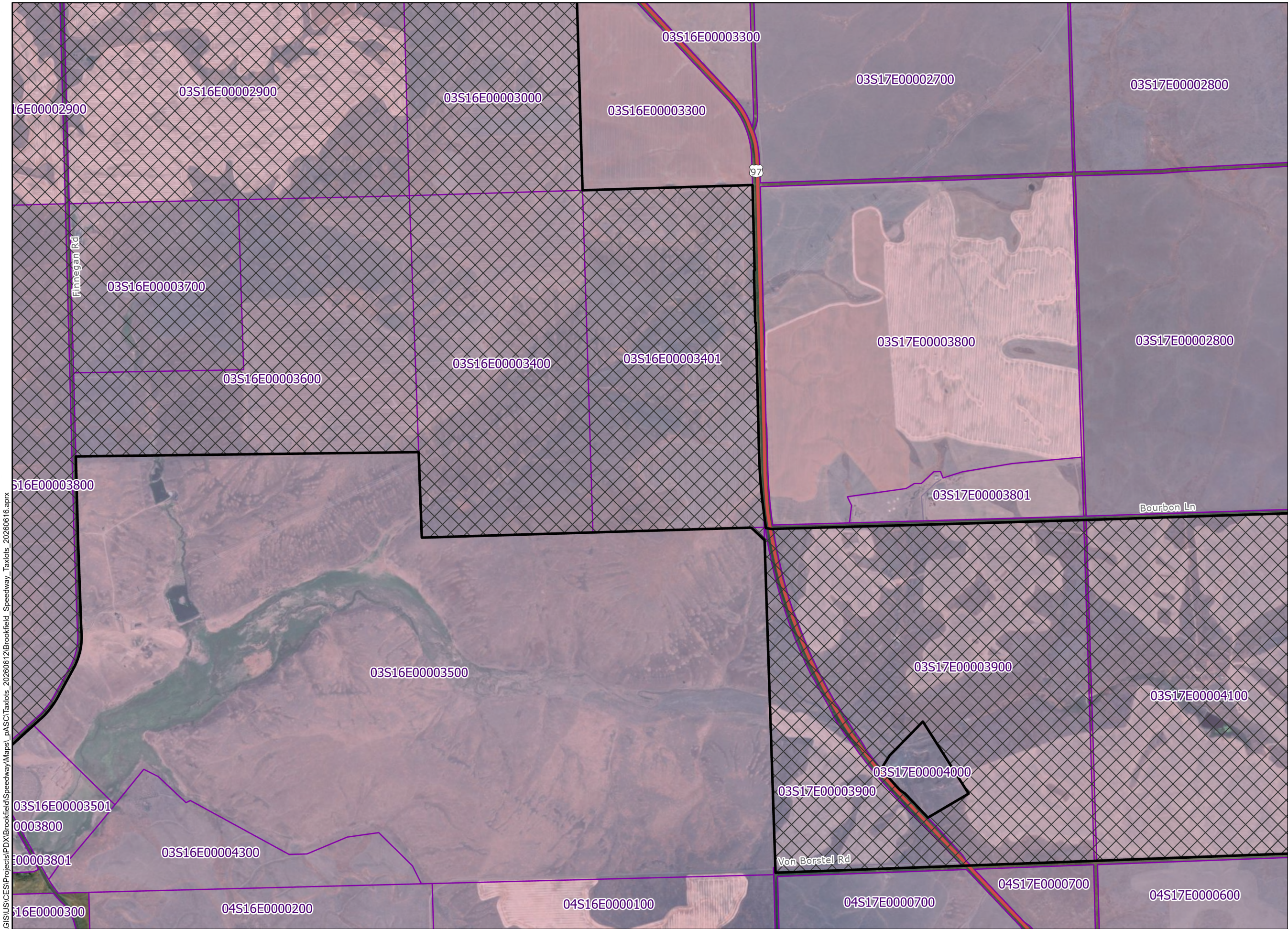
SHERMAN COUNTY, OR

- Facility Site Boundary
- Taxlot Boundary¹
- State Highway
- Local Roads

¹Data received from Sherman County
5/28/26



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Speedway Energy

Figure 1.21
Taxlots

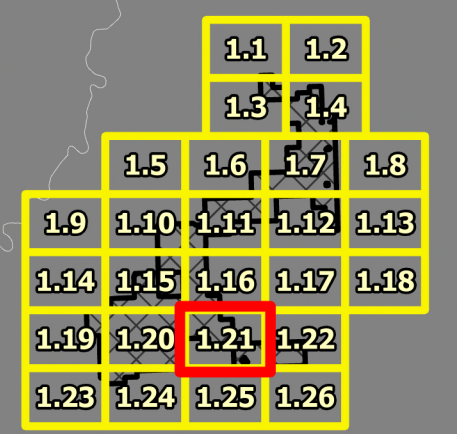
SHERMAN COUNTY, OR

- Facility Site Boundary
- Taxlot Boundary¹
- US Highway
- Local Roads

¹Data received from Sherman County
5/28/26

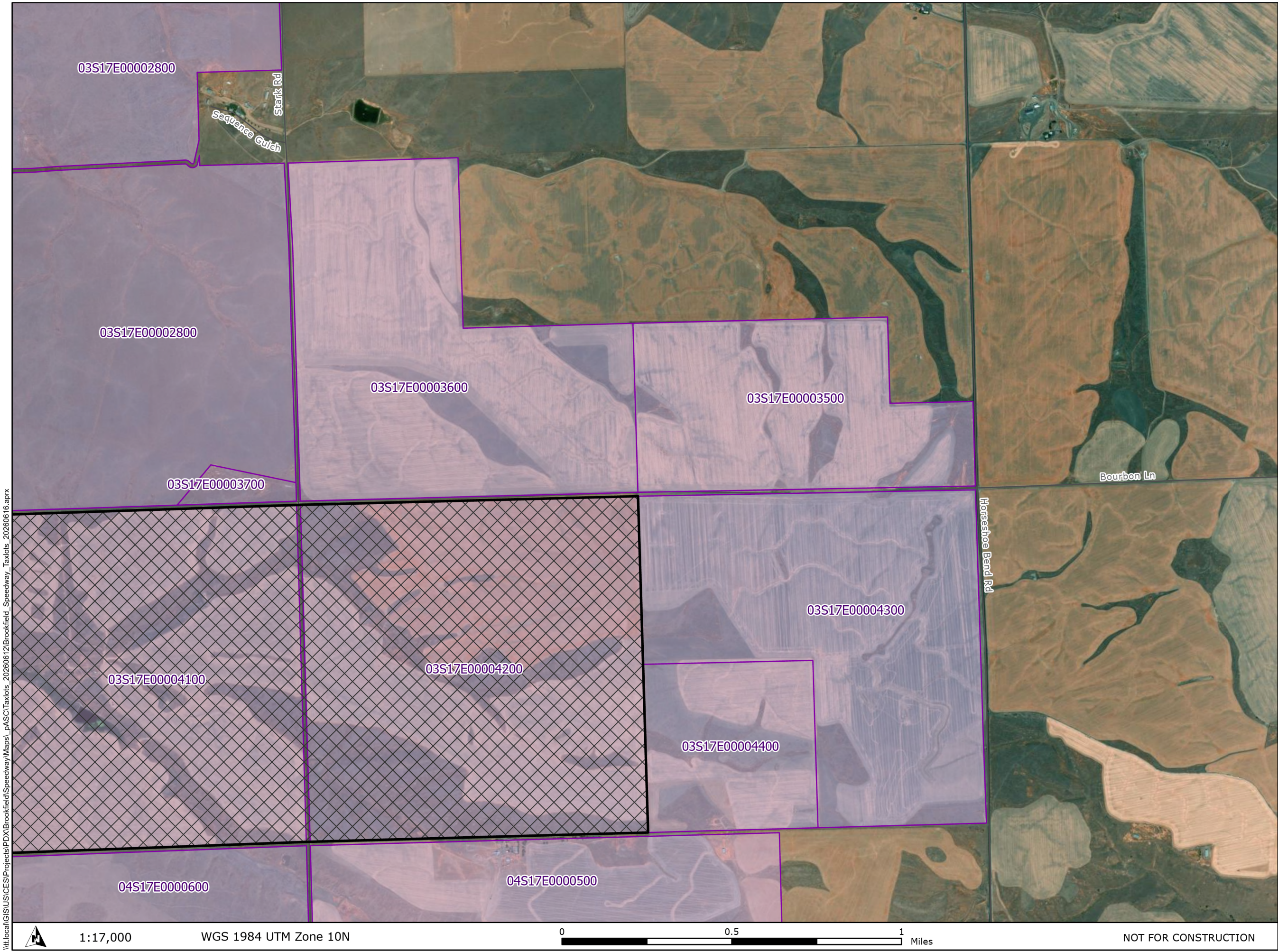


Reference Map



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Speedway Energy

**Figure 1.22
Taxlots**

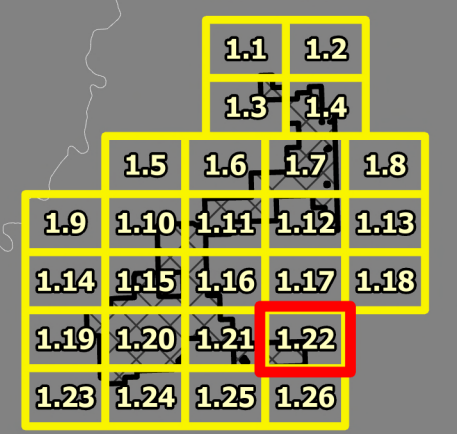
SHERMAN COUNTY, OR

-  Facility Site Boundary
-  Taxlot Boundary¹
-  Local Roads

¹Data received from Sherman County
5/28/26



Reference Map

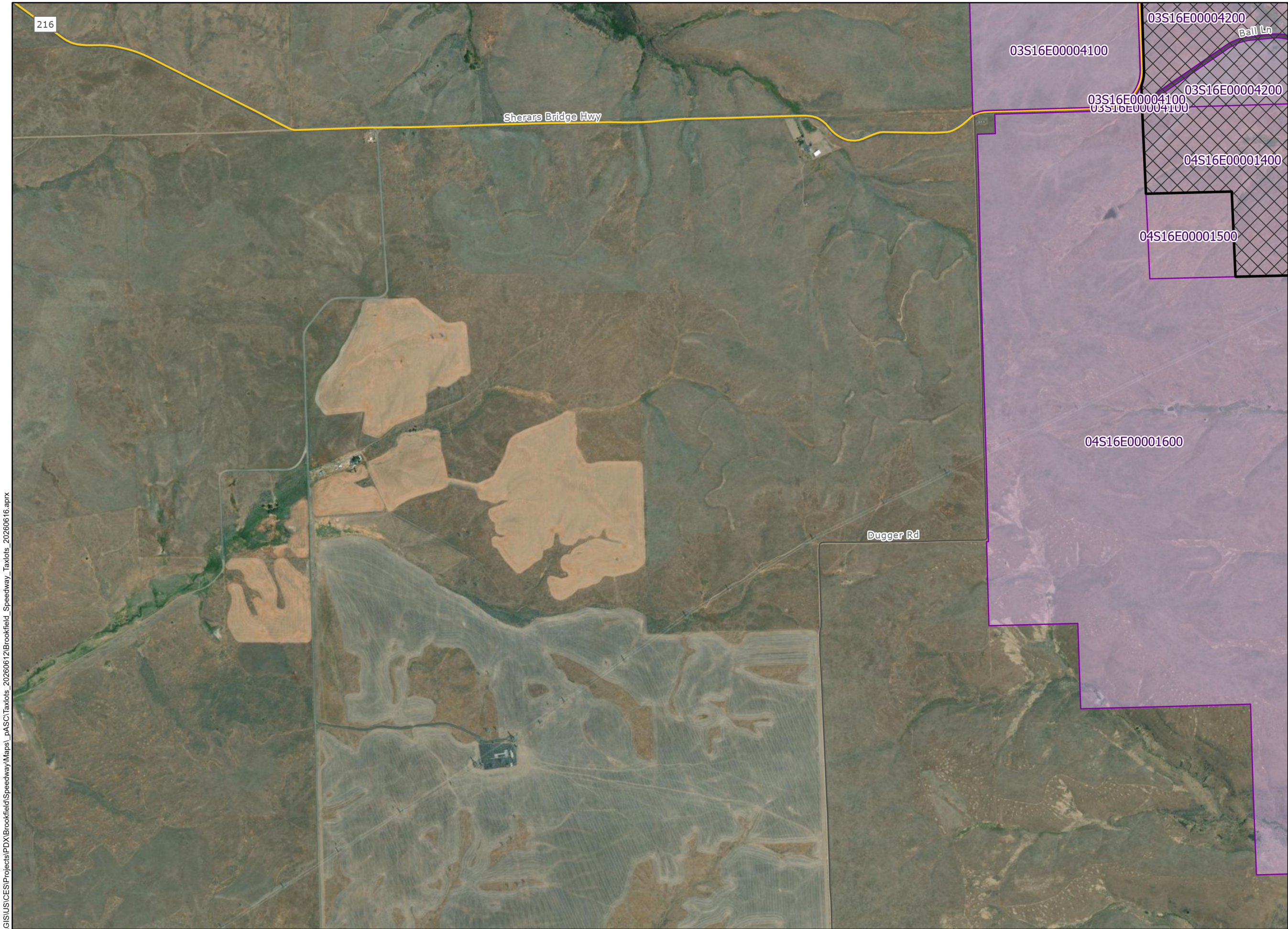


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WGS 1984 UTM Zone 10N

0 0.5 1 Miles

NOT FOR CONSTRUCTION



Speedway Energy

**Figure 1.23
Taxlots**

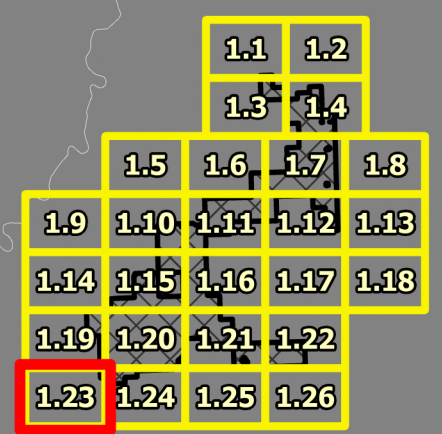
SHERMAN COUNTY, OR

- Facility Site Boundary
- Taxlot Boundary¹
- State Highway
- Local Roads

¹Data received from Sherman County
5/28/26



Reference Map

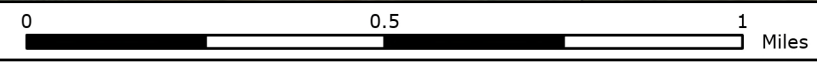


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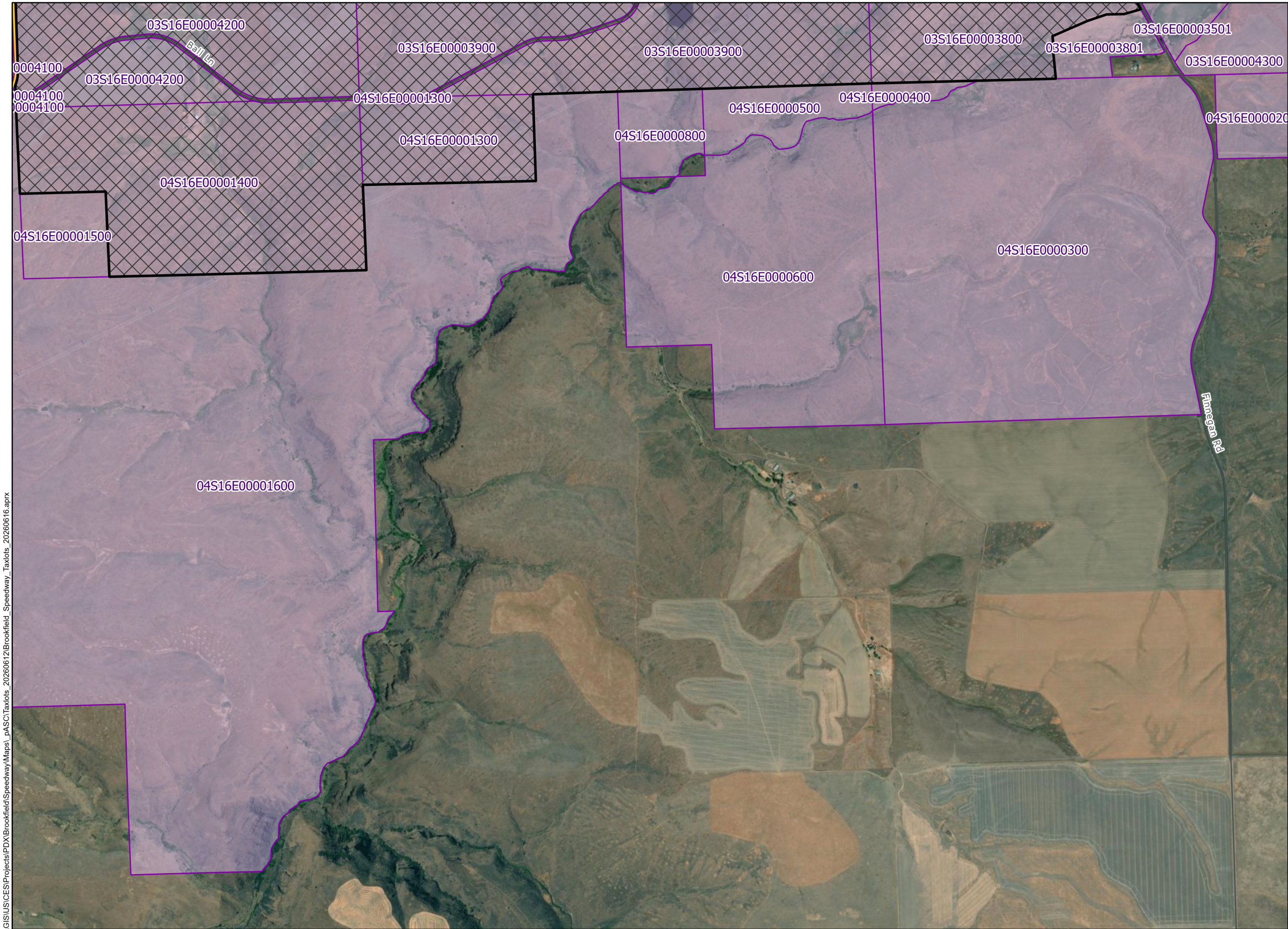


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WGS 1984 UTM Zone 10N



NOT FOR CONSTRUCTION



Speedway Energy

**Figure 1.24
Taxlots**

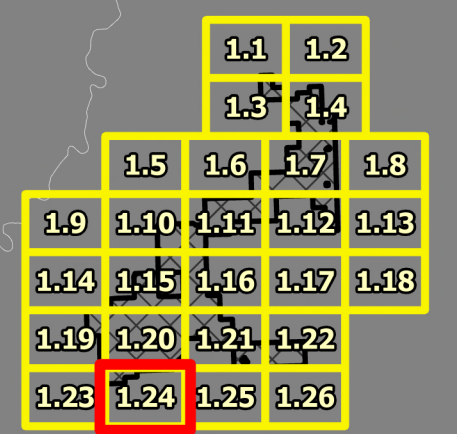
SHERMAN COUNTY, OR

- Facility Site Boundary
- Taxlot Boundary¹
- State Highway
- Local Roads

¹Data received from Sherman County
5/28/26



Reference Map



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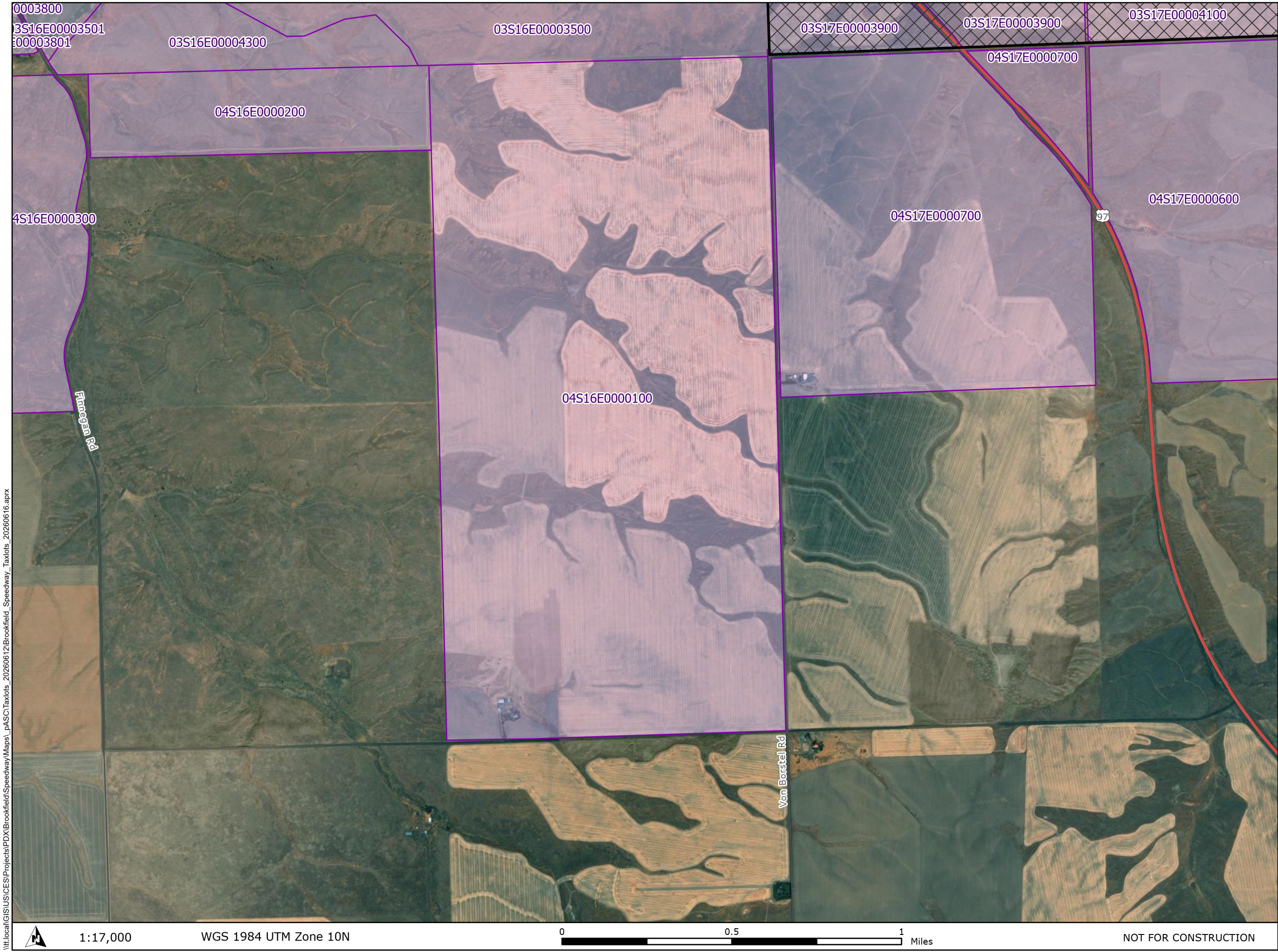


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WGS 1984 UTM Zone 10N

0 0.5 1 Miles

NOT FOR CONSTRUCTION



Speedway Energy

Figure 1.25
Taxlots

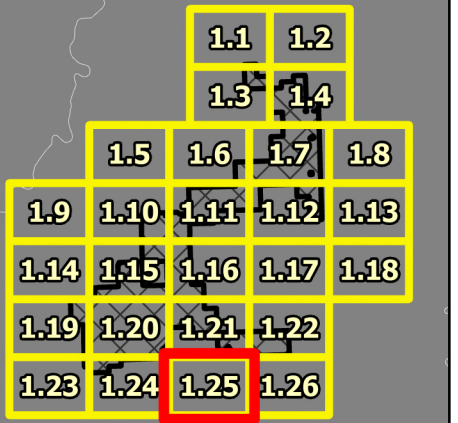
SHERMAN COUNTY, OR

- Facility Site Boundary
- Taxlot Boundary¹
- US Highway
- Local Roads

¹Data received from Sherman County
5/28/26



Reference Map



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Speedway Energy

**Figure 1.26
Taxlots**

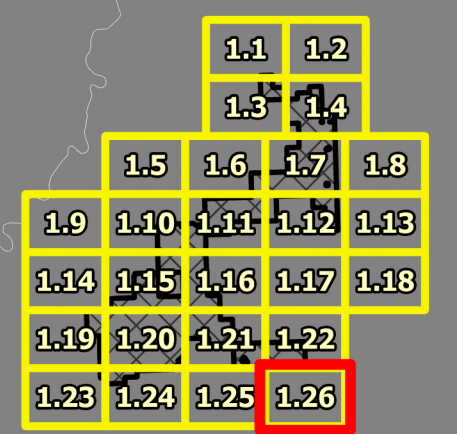
SHERMAN COUNTY, OR

- Facility Site Boundary
- Taxlot Boundary¹
- US Highway
- Local Roads

¹Data received from Sherman County
5/28/26



Reference Map



\\tt.local\GIS\US\Projects\PD\X\Brookfield\Speedway\Maps\pASC\Taxlots_20260616.aprx

**Attachment 4. Electromagnetic
Frequencies from Transmission Lines
(OAR 345-024-0090)**

Attachment 4. Electromagnetic Frequencies from Transmission Lines

Prepared for



BGTF Speedway Project LLC

Prepared by



July 2026

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Appendix A. Speedway North – Aboveground 230-kV Collector Lines
Appendix B. Speedway South – Aboveground 230-kV Collector Lines
Appendix C. Aboveground 500-kV Generation-tie Transmission Line

Acronyms and Abbreviations

Acronym/Abbreviation	Definition
AC	alternating current
ACSR	aluminum conductor steel reinforced
Applicant	BGTF Speedway Project LLC
BPA	Bonneville Power Administration
dB	decibels
EMF	electrical and magnetic fields
EMR	electromagnetic radiation
Facility	Speedway Solar Facility
FCC	Federal Communications Commission
GHz	gigahertz
KCMIL	kilo circular mils
kHz	kilohertz
kV	kilovolt
kV/m	kilovolt per meter
MHz	megahertz
MVA	megavolt amps
OAR	Oregon Administrative Rules
POI	point of interconnection

1.0 Introduction

BGTF Speedway Project LLC (Applicant) proposes construction and operation of the Speedway Energy Facility (Facility), a renewable energy facility incorporating wind, solar, and battery energy storage, located on privately owned land in unincorporated Sherman County, Oregon. The Facility's proposed point of interconnection (POI) to the regional electrical grid will be via a new Bonneville Power Administration (BPA) switchyard to be located adjacent to the existing BPA 500-kilovolt (kV) Ashe-Marion Transmission Line, which runs northeast/southwest through the site boundary.

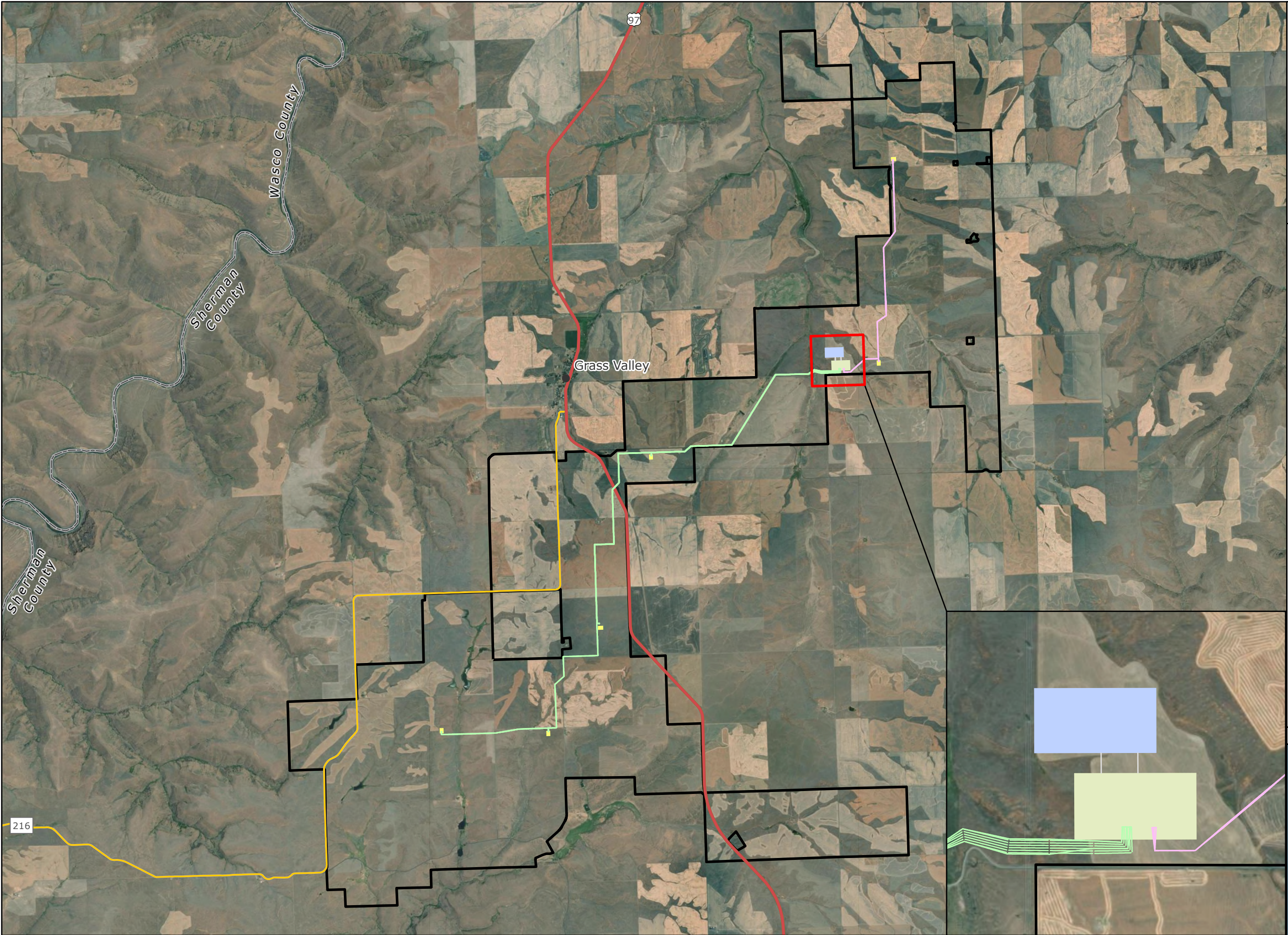
The information contained herein supports demonstration of compliance with the Specific Standards for Transmission Lines submittal requirements under Oregon Administrative Rules (OAR) 345-024-0090.

To issue a site certificate for a facility that includes any transmission line under Council jurisdiction, the Council must find that the applicant:

- (1) Can design, construct and operate the proposed transmission line so that alternating current electric fields do not exceed 9 kV per meter at one meter above the ground surface in areas accessible to the public;*
- (2) Can design, construct and operate the proposed transmission line so that induced currents resulting from the transmission line and related or supporting facilities will be as low as reasonably achievable.*
- (3) If the proposed energy facility is a transmission line or has, as a related or supporting facility, a transmission line of any size, the applicant must submit the following:*

As described in the Application for Site Certificate Background Information Exhibit, the Facility proposes aboveground 230-kV collector lines to connect the Facility's six collector substations to the one central substation. In addition, there will be a short stretch of 500-kV generation-tie (gen-tie) transmission line that spans aboveground from the central substation to the POI at the new BPA switchyard. This aboveground gen-tie transmission line will likely be connected to H-frame poles or dead-end structures within the central substation and BPA switchyard, so no support pole-structures are anticipated outside of these two facilities. Figure 1 shows that the 230-kV collector lines are proposed in one central corridor that runs between the six collector substations down the middle of the micro-siting area. Within this central corridor, there will be up to two circuits and six individual collector lines, but they will be strung on a single set of pole-structures. For the analysis provided herein, the 230-kV collector lines have been divided into Speedway North and Speedway South, based on their relative location to the central substation. See Figure 1.

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Speedway Energy Project

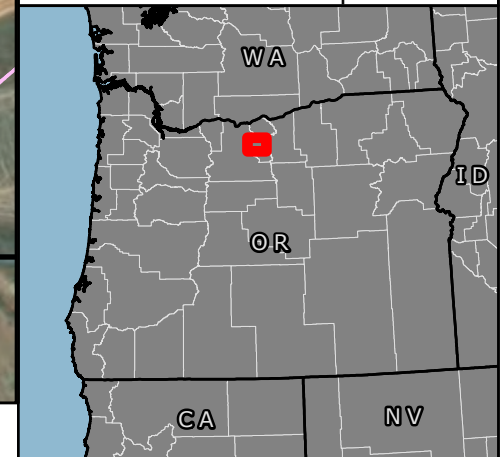
Figure 1
Aboveground 230-Kilovolt (kV) Collector Lines & 500-kV Generation-tie Transmission Line

SHERMAN COUNTY, OR

- Site Boundary
- Central Substation
- Collector Substations
- BPA Switchyard
- 230-kV Collector Lines (Speedway North)
- 230-kV Collector Lines (Speedway South)
- 500-kV Generation-Tie Transmission Line
- City/Town
- County Boundary
- US Highway
- State Highway



Reference Map



1:85,000

WGS 1984 UTM Zone 10N

0 1 2 4 6 8 Miles

NOT FOR CONSTRUCTION

2.0 Facility EMF – OAR 345-024-0090(3)(a)

(a) Information about the expected electric and magnetic fields, including:

2.1 Analysis Area – OAR 345-024-0090(3)(a)(A)(B)(C)

(A) The distance in feet from the proposed center line of each proposed transmission line to the edge of the right-of-way;

(B) The type of each occupied structure, including but not limited to residences, commercial establishments, industrial facilities, schools, daycare centers and hospitals, within 200 feet on each side of the proposed center line of each proposed transmission line;

(C) The approximate distance in feet from the proposed center line to each structure identified in (3);

The distance from the proposed centerline of the Speedway North and South aboveground collector line to the edge of the right-of-way is 62.5 feet on either side. There are permanently occupied buildings located within 1,000 feet of the proposed centerline of the aboveground collector lines modeled in this assessment. Table 1 describes their locations and approximate distance to the nearest Speedway aboveground collector line segment.

Table 1. Identified Structures

Location	Segment	Description	Approximate Distance from Centerline ^{1, 2}
45.398474°, -120.686786°	Speedway North	Steel barn	115 feet
45.379665°, -120.686202°	Speedway North	Steel structure	850 feet
45.380025°, -120.687274°	Speedway North	Steel structure	680 feet
45.379665°, -120.686202°	Speedway North	Residence	950 feet
45.285958°, -120.799186°	Speedway South	Steel structure	290 feet
45.285407°, -120.788533°	Speedway South	Residence	860 feet
45.285092°, -120.788458°	Speedway South	Steel structure	940 feet
45.343991°, -120.774200°	Speedway South	Steel structure	890 feet
45.348457°, -120.737298°	Speedway South	Residence	820 feet
45.349105°, -120.737153°	Speedway South	Steel structure	930 feet
1. Distance to closet feature.			
2. Per definition in OAR 345-024-0090(3)(a)(B), all structures listed are considered occupied.			

2.2 Modeling Results – OAR 345-024-0090(3)(a)(D)

(D) At representative locations along each proposed transmission line, a graph of the predicted electric and magnetic fields levels from the proposed center line to 200 feet on each side of the proposed center line;

Table 2 shows calculated electric field values and Table 3 shows the calculated magnetic field values for the proposed aboveground collector lines.

Table 2. Calculated Electric Field Values

Line Description	Figure	Electric Field (kV/m)		
		200 Feet Left	Peak Value	200 Feet Right
Speedway North 230-kV aboveground collector line	2,8	0.103	4.547 (12 feet left of centerline)	0.081
Speedway South 230-kV aboveground collector line	3, 9	0.034	3.53 (16 feet left and right of centerline)	0.035
500-kV gen-tie transmission line	4	0.165	3.278 (36 feet left and right of centerline)	0.175

Table 3. Calculated Magnetic Field Values

Line Description	Figure	Magnetic Field (milligauss)		
		200 Feet Left	Peak Value	200 Feet Right
Speedway North 230-kV aboveground collector line	5, 8	11.21	241.17 (12 feet left of centerline)	9.20
Speedway South 230-kV aboveground collector line	6, 9	1.00	100.56 (at centerline)	1.06
500-kV gen-tie transmission line	7	9.25	149.61 (at centerline)	9.62

The analysis results of the BPA Corona and Fields Effect Program, Version 3 (CAFE) model (BPA n.d.) presented in Table 2 demonstrate that all three of the proposed aboveground collector lines can be constructed and operated such that the AC electric field would not exceed 9 kV/m at 1 meter above the ground surface, as required by OAR 345-024-0090(1). Figures 2 through 4 show the electric field graphs and Figures 5 through 7 show the magnetic field graphs for the Facility's aboveground collector lines. The analysis results for the aboveground collector lines are provided in Appendices A through C. The modeling assumptions related to the Facility are intentionally conservative, producing worst-case electrical and magnetic field (EMF) results. EMF levels under normal operating conditions would be lower than indicated by this analysis.

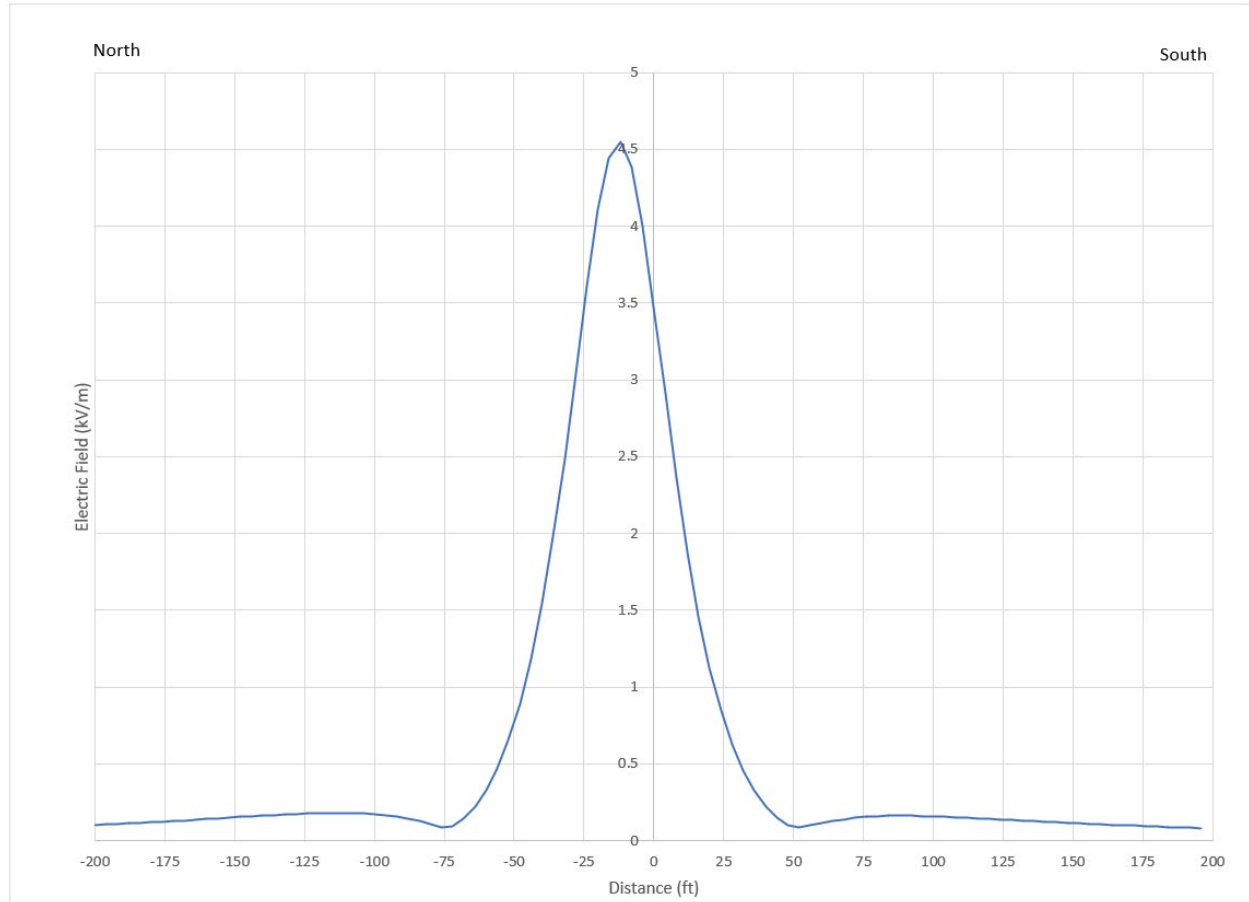


Figure 2. Speedway North Aboveground Collector Line Electric Field

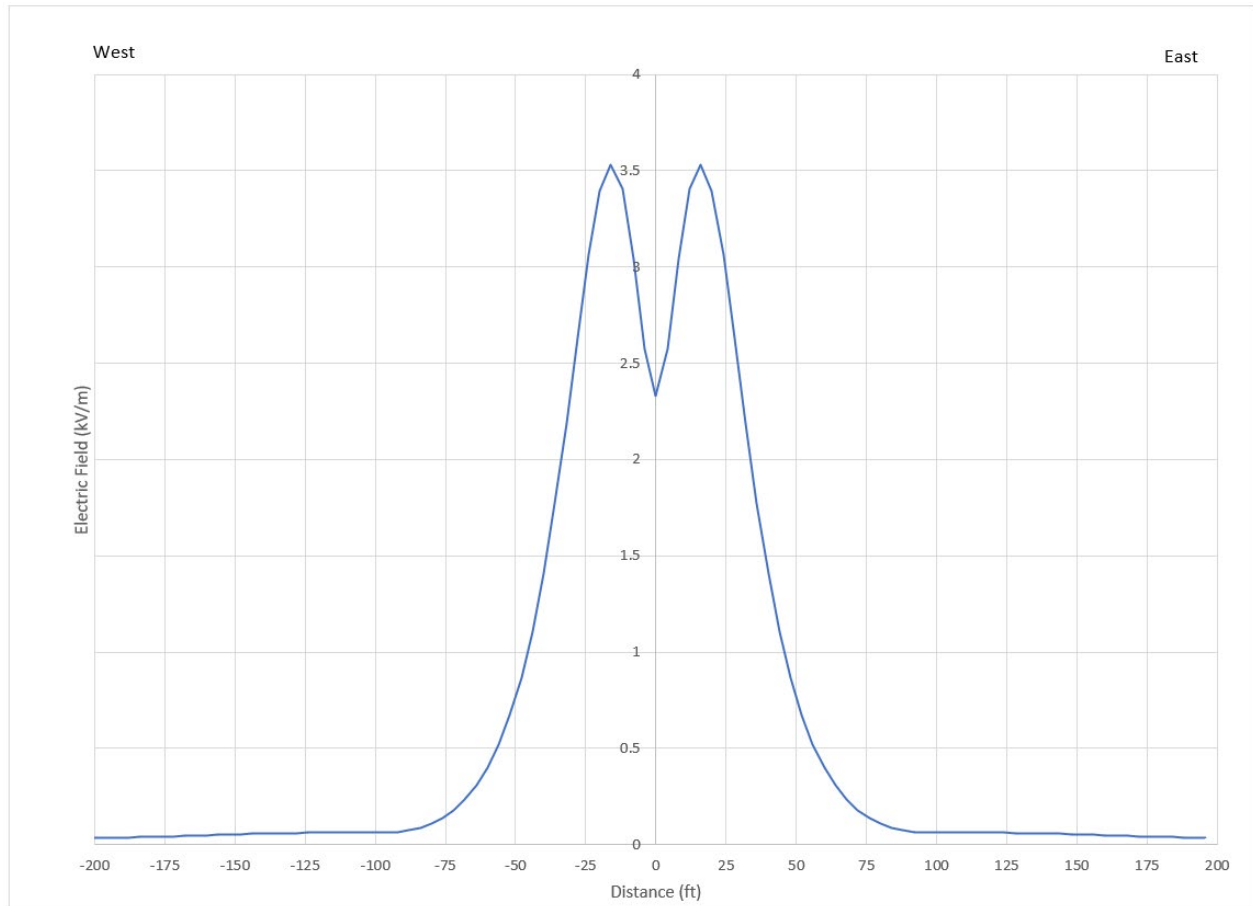


Figure 3. Speedway South Aboveground Collector Line Electric Field

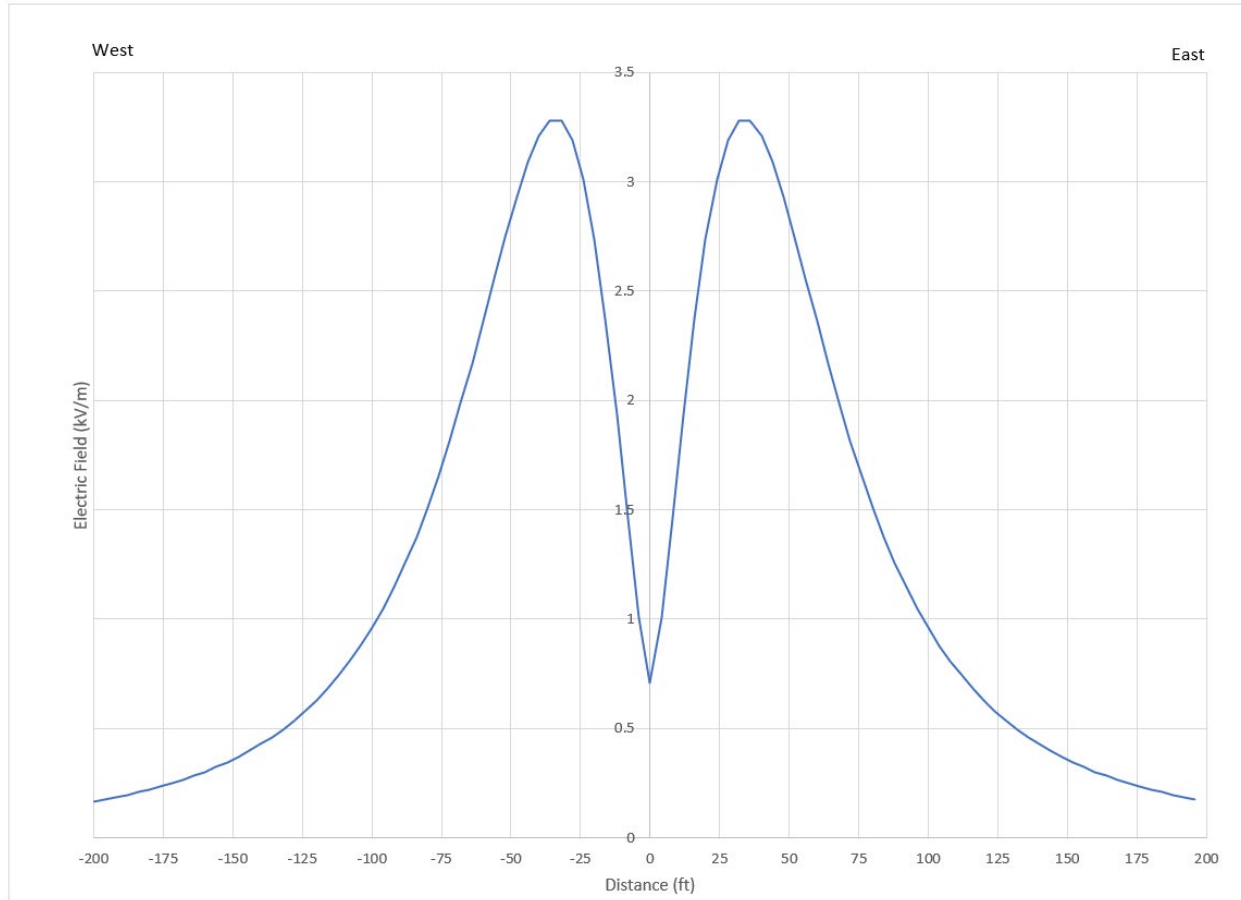


Figure 4. Speedway Gen-Tie Transmission Line Electric Field

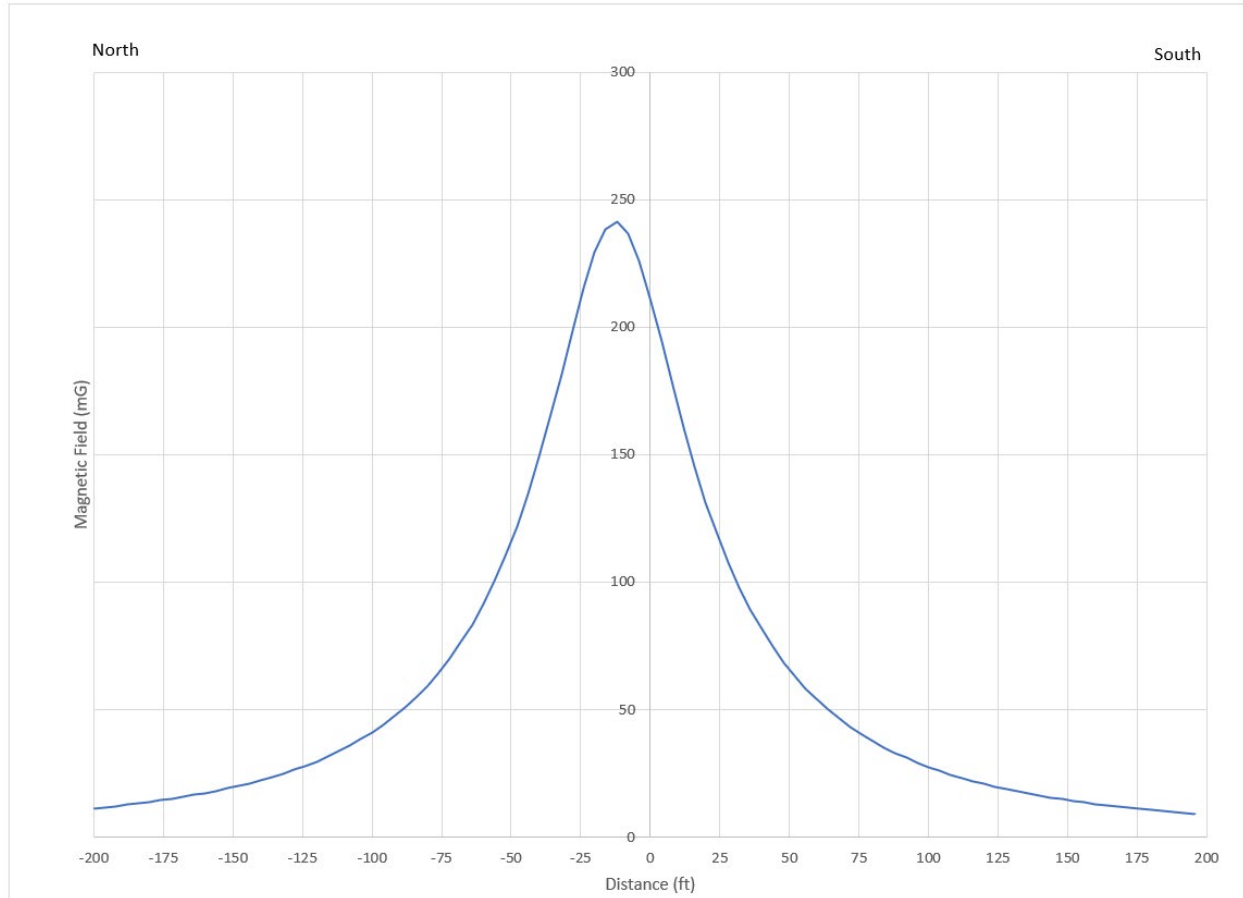


Figure 5. Speedway North Aboveground Collector Line Magnetic Field

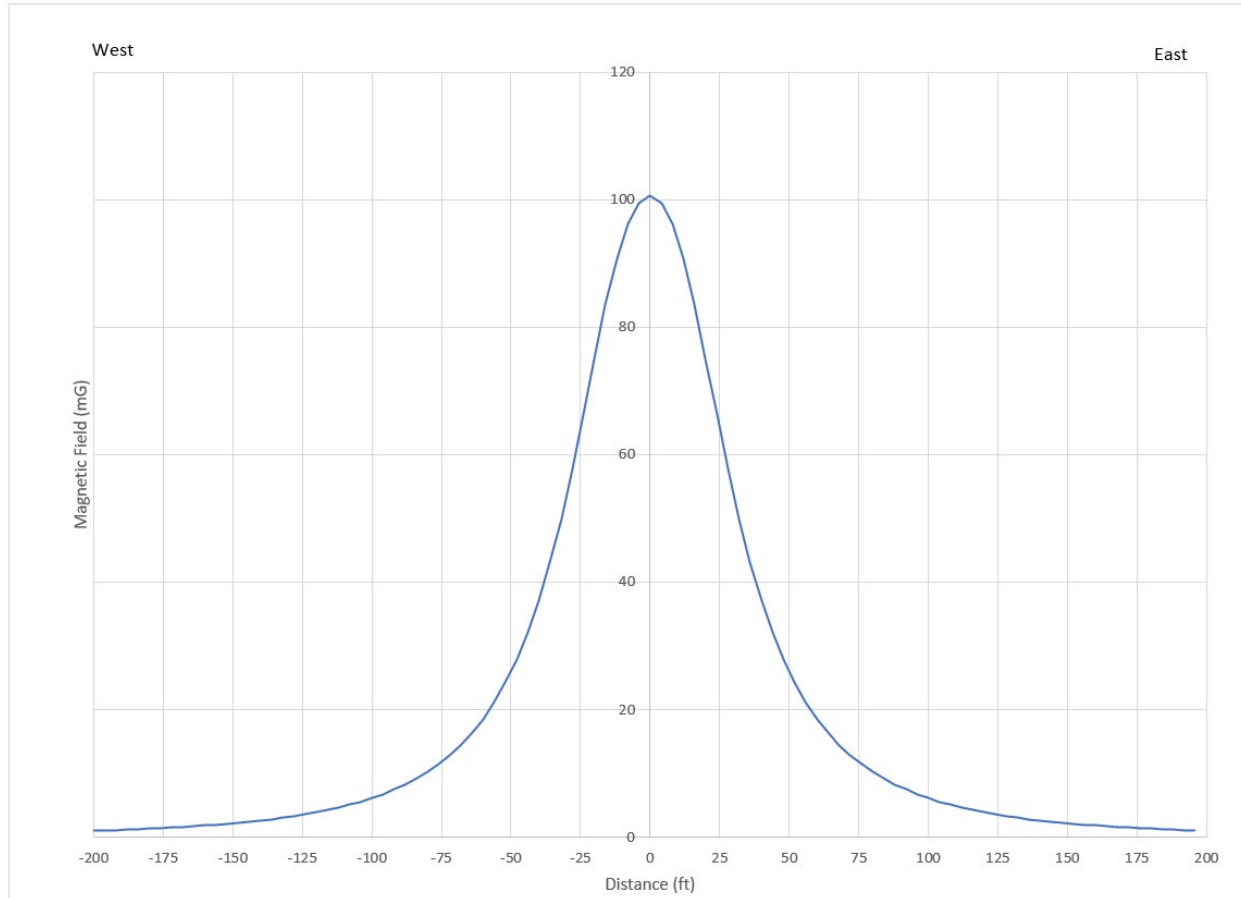


Figure 6. Speedway South Aboveground Collector Line Magnetic Field

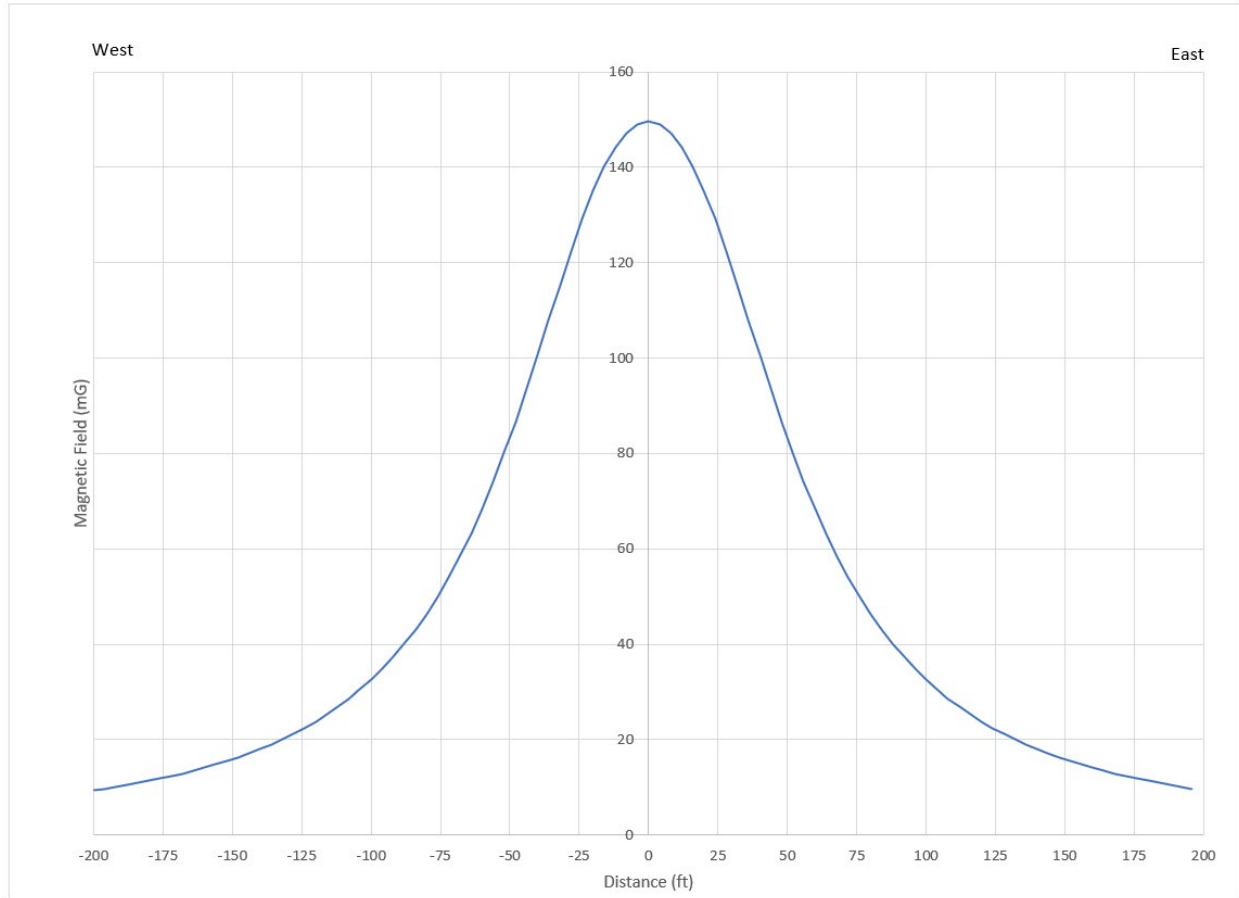


Figure 7. Speedway Gen-Tie Transmission Line Magnetic Field

2.3 EMF Calculation Methods – OAR 345-024-0090(3)(a)(F)

(F) The assumptions and methods used in the electric and magnetic field analysis, including the current in amperes on each proposed transmission line; and

The following assumptions are used for the calculation of the electric and magnetic field analysis of the aboveground collector lines. The planned 230-kV aboveground collector line configuration for Speedway North is shown in Figure 8 and Speedway South is shown in Figure 9. The planned 500-kV overhead interconnect configuration is not shown, as the conductors are connected between dead-end structures between the main substation and the POI, so there are no pole structures for this set of aboveground collector lines.

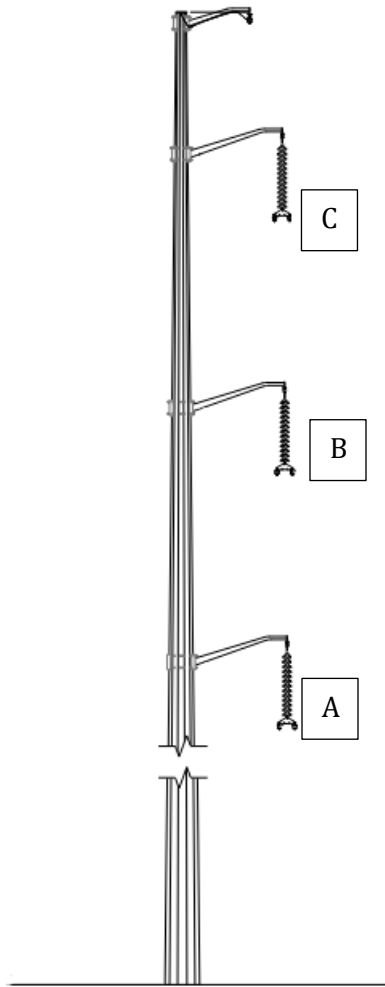


Figure 8. Modeled 230-kV Speedway North Aboveground Collector Line with Conductor Phasing

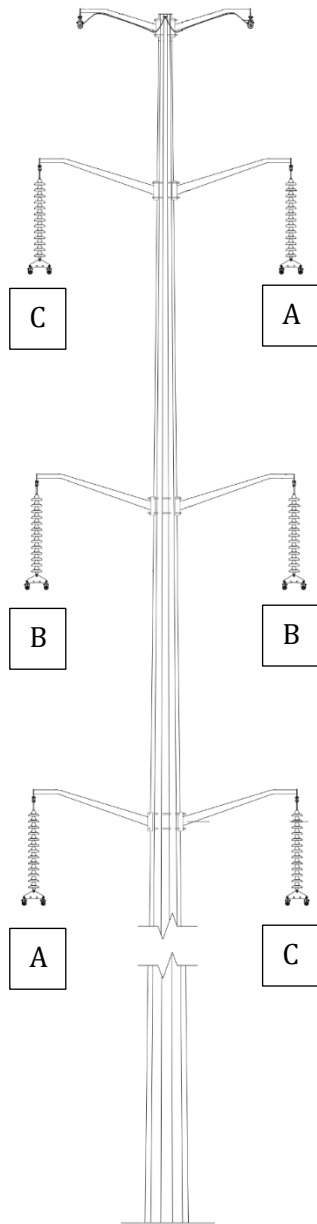


Figure 9. Modeled 230-kV Speedway South Aboveground Collector Line with Conductor Phasing

Assumptions for modeling are as follows:

- Environmental parameters – 1 inch of precipitation per hour, 2 miles per hour wind speed (for modeling wet-weather conditions).
- Height for both electrical and magnetic field measurements – 1 meter above ground.
- 230-kV northern aboveground collector line (Speedway North) information:
 - Line amperage – 1506.1 amps maximum, as calculated by maximum load current assuming 600 megavolt amps (MVA) and single circuit configuration (maximum amperage)
 - Line voltage – 230-kV phase/phase or 132.8-kV phase/ground
 - Conductor type – Bundled 1272 kilo circular mils (KCMIL) aluminum conductor steel reinforced (ACSR) “Bittern” conductor, 1.345 inches in diameter as shown in Figure 8. Two conductors per phase are used as a bundle, and conductors are separated by 18 inches.
 - Ground wire – one optical ground wire, 0.646 inches in diameter, as shown in Figure 8. Lowest height from ground is estimated at 103 feet, and 2 feet left of center (to the north).
 - Phase locations (as shown in Figure 8):
 - A phase (at estimated minimum height to conductor) is located on the lower arm of the transmission structure at 28 feet (estimated) and 12.5 feet left of center (to the north).
 - B phase (at same location as estimated minimum height to conductor) is located on the central arm of the transmission structure at 53 feet (estimated) and 12.5 feet left of center (to the north).
 - C phase (at the same location as estimated minimum height to conductor) is located on the upper arm of the transmission structure at 78 feet (estimated) and 12.5 feet left of center (to the north).
 - Average elevation – 2,200 feet.
- 230-kV southern aboveground collector line (Speedway South) information:
 - Line amperage – 627.6 amps maximum, as calculated by maximum load current assuming 500 MVA and double circuit configuration (maximum amperage)
 - Line voltage – 230-kV phase/phase or 132.8-kV phase/ground
 - Conductor type – Bundled 1272 KCMIL ACSR “Bittern” conductor, 1.345 inches in diameter as shown in Figure 9. Two conductors per phase are used as a bundle, and conductors are separated by 18 inches.

- Ground wire – two optical ground wires, 0.646 inches in diameter, as shown in Figure 9. Lowest height from ground is estimated at 91 feet, 6 inches, and 6 feet left and right of center.
- Phase locations (as shown in Figure 9, conductors arranged in such a manner to minimize electrical and magnetic field generation):
 - A phase, circuit 1 (at estimated minimum height to conductor) is located on the lower arm of the transmission structure at 28 feet (estimated) and 12.5 feet left of center (to the west).
 - B phase, circuit 1 (at same location as estimated minimum height to conductor) is located on the central arm of the transmission structure at 53 feet (estimated) and 12.5 feet left of center (to the west).
 - C phase, circuit 1 (at the same location as estimated minimum height to conductor) is located on the upper arm of the transmission structure at 78 feet (estimated) and 12.5 feet left of center (to the west).
 - C phase, circuit 2 (at the same location as estimated minimum height to conductor) is located on the upper arm of the transmission structure at 28 feet (estimated) and 12.5 feet right of center (to the east).
 - B phase, circuit 2 (at the same location as estimated minimum height to conductor) is located on the central arm of the transmission structure at 53 feet (estimated) and 12.5 feet right of center (to the east).
 - A phase, circuit 2 (at the same location as estimated minimum height to conductor) is located on the lower arm of the transmission structure at 78 feet (estimated) and 12.5 feet right of center (to the east).
- Average elevation – 2,300 feet.
- 500-kV gen-tie transmission line (Speedway Gen-Tie Transmission Line) information:
 - Line amperage – 1,700.9 amps maximum, as calculated by maximum load current assuming 1,473 MVA and single circuit configuration (maximum amperage).
 - Line voltage – 500-kV phase/phase or 288.7-kV phase/ground
 - Conductor type – Bundled 1590 KCMIL ACSR “Falcon” conductor, 1.590 inches in diameter. Two conductors per phase are used as a bundle, and conductors are separated by 18 inches.
 - Ground wire – none noted.
 - Phase locations (the conductors are connected between dead-end structures between the main substation and the POI, so there are no pole structures for this set of aboveground collector lines):

- A phase (at estimated minimum height to conductor) is located at 50 feet off the ground and 20 feet left of centerline (to the west).
- B phase, at same location, is located at 50 feet off the ground and on the centerline.
- C phase, at same location, is located at 50 feet off the ground and 20 feet right of centerline (to the east).
- Average elevation – 2,300 feet.

3.0 EMF Mitigation Measures – OAR 345-024-0090(3)(a)(E)

(E) Any measures the applicant proposes to reduce electric or magnetic field levels;

The Applicant will comply with Site Certificate conditions to limit EMF impacts once assigned by EFSC. These conditions may include the following, and may be modified by EFSC at the time of issuing the Site Certificate:

- Constructing all aboveground 230-kV collector lines with a minimum clearance of 28 feet from the ground.
- Developing and implementing a program that provides reasonable assurance that all fences, gates, cattle guards, trailers, irrigation systems, or other objects or structures of a permanent nature that could become inadvertently charged with electricity are grounded or bonded throughout the life of the line (OAR 345-027-0023(4)).
- Designing and maintaining the aboveground 230-kV collector lines and 500-kV gen-tie transmission line so that alternating current electric fields do not exceed 9 kV per meter at 1 meter above the ground surface in areas accessible to the public.

4.0 EMF Monitoring Program – OAR 345-024-0090(3)(a)(G)

(G) The applicant's proposed monitoring program, if any, for actual electric and magnetic field levels.

No program for monitoring actual EMF levels before or after construction is proposed at this time.

5.0 Radio and TV Interference – OAR 345-024-0090(3)(b)

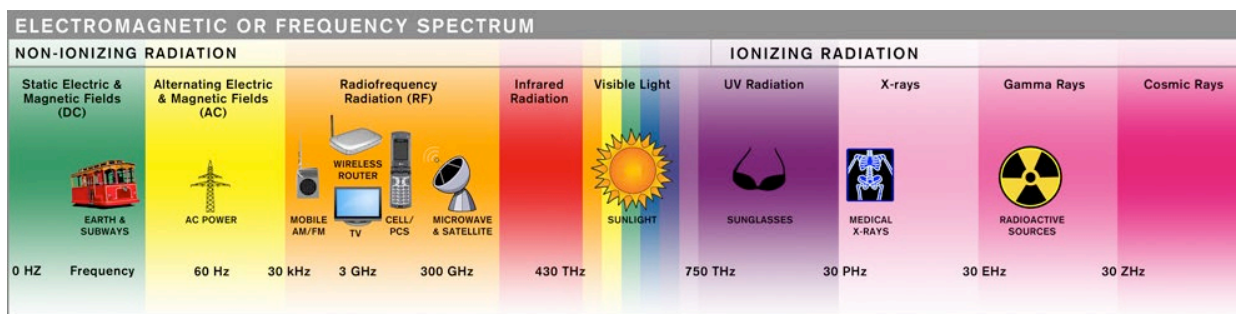
(b) An evaluation of alternate methods and costs of reducing radio interference likely to be caused by the transmission line in the primary reception area near interstate, U.S. and state highways.

5.1 Background

5.1.1 Electromagnetic Interference

Electromagnetic interference from power transmission systems in the U.S. is governed by the Federal Communications Commission (FCC) Rules and Regulations (FCC 1988). A power transmission line is categorized by the FCC as an “incidental radiation device.” It is defined as “a device that radiates radio frequency energy during the course of its operation although the device is not intentionally designed to generate radio frequency energy.” Such a device “shall be operated so that the radio frequency energy that is emitted does not cause harmful interference. In the event that harmful interference is caused, the operator of the device shall promptly take steps to eliminate the harmful interference.” In this case, “harmful interference” is defined as “any emission, radiation or induction which endangers the functioning of a radio navigation service or of other safety services or seriously degrades, obstructs or repeatedly interrupts a radio communication service operating in accordance with this chapter” (FCC 1988). Oregon does not have regulatory standards for either radio or TV interference.

Modern communications systems all rely on electromagnetic radiation (EMR) to transmit information. AM and FM radio, TV, shortwave radio, cellular telephones, radar, GPS devices and satellite communications, cordless telephones, Bluetooth, and wireless computer networks such as Wi-Fi or wireless local area network all utilize a region of the electromagnetic spectrum known as “radio frequency” EMR, which extends from a low-frequency at about 30 kilohertz (kHz) to the high-frequency microwave range at about 300 gigahertz (GHz). Each type of technology uses a specific segment of the electromagnetic frequency spectrum; older technology such as AM radio is at the low-frequency end, while newer technologies such as GPS and Wi-Fi utilize high-frequency signals. Figure 10 provides a visual representation of typical communications frequencies.



Source: EMF & Radio Frequency Solutions. Available at: <http://www.emfrf.com/index.php/emf-rf/emf-overview/electromagnetic-spectrum-or-frequency-spectrum.html>.

Figure 10. Communications Frequency Spectrum

The level of interference can be partially determined by how similar or different the signal frequency is compared to the noise frequency. In general, there is very little interaction between

signals of differing frequency; radio signals, TV signals, cellular phone signals, and GPS signals can all coexist in the same space and time without interfering with each other. For interference to occur, frequencies must be similar.

EMR and resulting interference can be an indirect product of electric transmission lines. EMR arises not from the lines themselves, but from the interaction of the strong electric field at the surface of the conductors and other energized components with the surrounding air. Two types of interactions may occur that create electromagnetic interference: corona discharge and gap discharge.

5.1.1.1 Corona Discharge

High-voltage power transmission lines generate a strong electric field at the surface of the conductor, which can be strong enough to split the surrounding air molecules, resulting in the emission of electromagnetic energy in the form of ultraviolet and near-ultraviolet light and broadband radio frequency EMR (corona discharge also produces audible sound; audible sound is not discussed further in this attachment). The former can sometimes be seen by humans under the right conditions or with specialized equipment, while the latter can sometimes be heard as electronic “noise,” or interference with radio signal reception. Broadband corona EMR discharge typically occurs in the frequency spectrum from below 100 kHz to approximately 1,000 megahertz (MHz), which overlaps with the frequencies used for AM and FM radio and some TV signals. With sufficient corona activity, low-frequency radio and TV interference can be noticeable within a few hundred feet of the transmission line. These effects are most pronounced directly underneath the line conductors and decrease with distance from the transmission line.

Corona on a transmission line conductor depends on several factors such as operating voltage, conductor diameter, overall line geometry, weather conditions, and altitude. Conductor size, line voltage and line geometry are taken into consideration when designing a transmission line so that the electric fields at the conductor surface are minimized. However, for a high-voltage line, any incidental irregularities on the conductor surface (for example, water droplets, dust, debris, and nicks or scratches in the conductor) act as points where the electric field may be intensified sufficiently to produce corona. Thus, the level of corona activity is elevated during foul weather when raindrops on the conductor surface act as points producing corona.

5.1.1.2 Gap Discharge

A gap discharge occurs when current arcs across a gap between two conductive objects. Gap discharges can produce radio noise in the lower frequencies (AM radio frequencies) and well into the microwave range (analog TV frequencies). These discharges can be produced by loose connections, a problem that more commonly occurs on low-voltage distribution lines but rarely occurs on high-voltage transmission lines (Trinh 2012). Unlike corona discharge, which may occur anywhere along a high-voltage transmission line conductor, gap discharge occurs at mechanical connectors and components that are used to hold the conductors in place. Gap discharge is controlled through proper construction and maintenance practices to ensure all mechanical

connectors and components are properly assembled. Because gap discharge is an intermittent, temporary, and readily resolved problem, and results only in localized electrical interference issues, the potential for interference with TV signals or higher-frequency communications is not considered a significant problem.

5.1.2 Radio Interference Effects

The corona-induced broadband EMR from transmission lines can produce interference to AM signals, such as a commercial AM radio audio signal (i.e., radio noise) or the video portion of an older analog broadcast TV station (i.e., TV noise). Technologies that use frequency modulation, such as FM radio stations and the audio portion of older analog broadcast TV signals, are generally not affected by noise from a transmission line. As digital signal processing has been integrated into these communication systems, the potential interference impact of corona-generated radio noise has decreased.

The level of interference caused by radio noise from a transmission line to the reception of a radio signal depends on the location of the radio transmitter, the radio receiver, and the transmission line. A transmission line that is directly between a radio transmitter and a listener's receiver may be more likely to interfere with that listener's reception, whereas a transmission line behind or beside the listener in relation to the transmitter will not necessarily cause interference, depending on the radio receiver's antennae. The radio noise generated by a transmission line is very low in power and decreases rapidly as distance from the line increases. It is experienced only when near the transmission line.

In general, complaints related to corona-generated interference are infrequent. Moreover, the advent of cable and satellite TV service, and the federally-mandated conversion to digital TV broadcast in June 2009 have greatly reduced the occurrence of corona-generated interference. Low-frequency corona-induced EMR does not interact with the higher-frequency satellite signals or with wired communication systems, while digital TV receivers are equipped with systems to filter out interference. Many radio stations also broadcast in digital, reducing the likelihood of corona-induced EMR interference.

Radio noise is measured in units of decibels (dB) based on its field strength referenced to a signal level of 1 microvolt per meter (IEEE 1986). Corona-induced radio noise during fair weather is calculated to be approximately 40 dB (dB-1 microvolt per meter [$1 \mu\text{V/m}$]) at the edge of the right-of-way. This is considered an acceptable level (IEEE 1971). When the transmission line is in proximity to roadways (for example, interstate, U.S., and state highways), such as when it passes over these roadways, radio interference may be experienced for short distances while in proximity to the line. Interference may be more noticeable near the line particularly during foul weather, when corona activity is elevated.

5.1.3 Interference with Other Electronic Communications

Wireless computer network systems, cell phones, GPS units, and satellite receivers operate at high frequencies in the tens to hundreds of MHz or even GHz. These systems also often use FM or digital coding of the signals so they are relatively immune to electromagnetic interference from transmission line corona. GPS units are used in a wide range of activities, including several important agricultural activities such as monitoring pivot irrigation, tracking wheeled and tracked equipment movements during farming operation, and checking the orientation of aerial spraying aircraft. GPS units operate in the frequency range of 1.2 to 1.6 GHz. Satellite receivers operate at frequencies of 3.4 GHz to 7 GHz and have shown no effect from transmission lines unless the receiver was trying to view the satellite through the transmission tower or conductor bundle of the transmission line (Chartier et al. 1986). Repositioning the receiver by a few feet was sufficient to eliminate the obstruction and reduced signal. Mobile phones operate in the radiofrequency range of about 800 MHz to 1,900 MHz or higher. As a result of the high frequencies used by these devices, modulation and processing techniques, and the typically lower-frequency corona-induced EMR, effects from interference are unlikely.

The voltages and currents associated with the transmission line have the potential to induce voltage and current in nearby conductors (e.g., ungrounded metal fences and ungrounded metal irrigation systems). This effect is more likely where ungrounded fences or irrigation systems are parallel and long (1 mile or more). These induced voltages could result in a “nuisance” shock to anyone who touches such a fence or irrigation system. These shocks are known as nuisance or “startle” shocks as they will not physically harm someone but may be noticed by some people and provoke a startle reaction. An example of an ungrounded metal irrigation system would be a center pivot system on rubber tires. By contrast, the Vermeer-type metal irrigation system is grounded through its metal wheels and therefore presents less of a shock hazard.

A GPS unit in farming equipment should work properly within the vicinity of a transmission line. GPS devices continually pull signals from a number of satellites, not just one, and may also utilize a fixed base station. A signal may be blocked temporarily if the transmission structure is between the receiver and a weak signal, but it will return as the farm equipment moves past the structure. It is also common for GPS receivers to drop and pick up signals even in the absence of transmission lines and structures. If the base station signal is weak or blocked, additional or alternate locations may improve the signal and performance.

Signal interference occurs when other signals at the same frequency as the satellite signal are present. Multipath occurs when objects such as buildings, structures, or tractor parts reflect a GPS satellite signal, causing the satellite signal to arrive at the receiver later than it would have if it followed a straight line from the satellite. A study commissioned by EPRI found that signal interference is “unlikely” based on the design of GPS receivers and their ability to separate the GPS signal from background noise (Silva and Olsen 2002). Another study compared the accuracy of real-time kinematic GPS receivers at different locations to transmission lines and towers (Gibbins et al. 2001). This study concluded that multipath from transmission towers could result in GPS-initialization errors (e.g., the system reports the wrong starting location) 1.1 percent to 2.3 percent

of the time. This study also reported that GPS software was able to identify and correct these initialization errors within the normal startup time. This study reported initialization errors caused by electromagnetic interference from energized aboveground collector lines when the GPS receiver was located outside the vehicle, but concluded that “most, if not all of this effect can be eliminated by shielding the receiver and cables.” Placing the receiver inside the vehicle significantly reduced initialization errors.

5.2 Evaluation of Alternate Methods and Costs to Reduce Interference

Design options for reducing the radio noise from the transmission line include use of larger diameter conductors, or use of more conductors within the conductor bundles. Increasing the distance between phases of the lines (conductor bundles) may also result in a decrease in the radio noise. These line design options have been employed to minimize the generation of radio noise to acceptable levels.

6.0 Conclusion

The Background Information Exhibit demonstrates the Facility will ensure public health and safety with respect to EMFs. Also, this Exhibit demonstrates that the Facility’s AC electric fields and induced currents will comply with the Specific Standards for Transmission Lines under OAR 345-024-0090.

7.0 References

- BPA (Bonneville Power Administration). n.d. “Corona and Field Effects” Computer Program – Public Domain Software. Bonneville Power Administration, Vancouver, WA.
- Chartier, V., R. Sheridan, J. DiPlacido, and M. Loftness. 1986. Electromagnetic Interference Measurements at 900 MHz on 230 kV and 500 kV Transmission Lines. IEEE Transactions on Power Systems, PWRD-1: 140-149.
- FCC (Federal Communications Commission). 1988. Federal Communications Commission Rules and Regulations. 10-1-88 ed. Vol. II part 15, 47 CFR, Ch. 1.
- Gibbings, P., B. Manuel, R. Penington, and K. McDougall. 2001. Assessing the Accuracy and Integrity of RTK GPS Beneath High-voltage Power Lines. In: 42nd Australian Surveyors Congress 2001: A Spatial Odyssey, 25-28 Sep 2001, Brisbane, Australia.
- IEEE (Institute of Electrical and Electronics Engineers). 1971. Radio Noise Design Guide for High Voltage Transmission Lines. IEEE Radio Noise Subcommittee Report-Working Group No. 3. Paper 70TP631-PWR.
- IEEE. 1986. IEEE Standard Procedures for Measurement of Radio Noise from Overhead Power Lines and Substations. ANSI/IEEE Std. 430-1986, New York, NY.

- Silva, M., and R. Olsen. 2002. Use of Global Positioning System (GPS) Receivers Under Power-Line Conductors. *IEEE Transactions on Power Delivery* 17: 938–944.
- Trinh, G.N. 2012. Chapter 16, Corona and Noise. In: *Electric Power Generation, Transmission, and Distribution*. 3rd Edition edited by Leonard L. Grigsby. CRC Press, Taylor & Francis Group LLC, Boca Raton, FL. ISBN: 9781439856284.

Appendices

Appendix A. Speedway North – Aboveground 230-kV Collector Lines

[illegible]

INPUT DATA LIST

```

        6/30/2026          13:42:48
SPEEDWAY NORTH 230-KV BUCK HOLLOW
RUN 3 06/30/26
1,0, 3, 4,0.0, 2.00, 1.00,2200.00

```

(ENGLISH UNITS OPTION)

(GRADIENTS ARE COMPUTED BY PROGRAM)

PHYSICAL SYSTEM CONSISTS OF 4 CONDUCTORS, OF WHICH 3 ARE ENERGIZED PHASES

OPTIONS: MF,EF,AN

4.921, '230A .000	6.562, , 'A',	9.842, -12.50,	.000, 28.00,	1.000, 2,	75.000, 1.345,	3.280, 18.000,	6.700, 132.800,	3.280 .000,	1.506,
'230B .000	, 'A',	-12.50,	53.00,	2,	1.345,	18.000,	132.800,	-120.000,	1.506,
'230C .000	, 'A',	-12.50,	78.00,	2,	1.345,	18.000,	132.800,	120.000,	1.506,
'G .000	, 'A',	-2.00,	103.00,	1,	.646,	.000,	.000,	.000,	.000,

100 -200.0 4.0

1AUDIBLE NOISE CALCULATION - RAIN

DIST FROM REFERENCE (FEET)	TOTALS				
	L5 (DBA)	L50 (DBA)	230A	230B	230C
-200.0	20.7	17.2	12.9	13.8	9.1
-196.0	20.8	17.3	13.1	13.9	9.2
-192.0	20.9	17.4	13.2	14.0	9.3
-188.0	21.0	17.5	13.3	14.1	9.4
-184.0	21.1	17.6	13.4	14.2	9.5
-180.0	21.2	17.7	13.5	14.3	9.6
-176.0	21.3	17.8	13.6	14.4	9.7
-172.0	21.4	17.9	13.7	14.5	9.8
-168.0	21.5	18.0	13.9	14.7	9.9
-164.0	21.6	18.1	14.0	14.8	10.0

-160.0	21.8	18.3	14.1	14.9	10.1
-156.0	21.9	18.4	14.2	15.0	10.3
-152.0	22.0	18.5	14.4	15.1	10.4
-148.0	22.1	18.6	14.5	15.3	10.5
-144.0	22.3	18.8	14.7	15.4	10.6
-140.0	22.4	18.9	14.8	15.5	10.7
-136.0	22.6	19.1	15.0	15.7	10.8
-132.0	22.7	19.2	15.1	15.8	10.9
-128.0	22.8	19.3	15.3	16.0	11.1
-124.0	23.0	19.5	15.5	16.1	11.2
-120.0	23.2	19.7	15.6	16.3	11.3
-116.0	23.3	19.8	15.8	16.4	11.4
-112.0	23.5	20.0	16.0	16.6	11.6
-108.0	23.7	20.2	16.2	16.7	11.7
-104.0	23.8	20.3	16.4	16.9	11.8
-100.0	24.0	20.5	16.6	17.1	12.0
-96.0	24.2	20.7	16.8	17.3	12.1
-92.0	24.4	20.9	17.0	17.4	12.2
-88.0	24.6	21.1	17.3	17.6	12.4
-84.0	24.8	21.3	17.5	17.8	12.5
-80.0	25.0	21.5	17.8	18.0	12.6
-76.0	25.2	21.7	18.0	18.2	12.8
-72.0	25.4	21.9	18.3	18.4	12.9
-68.0	25.7	22.2	18.6	18.6	13.0
-64.0	25.9	22.4	18.9	18.8	13.2
-60.0	26.2	22.7	19.3	19.0	13.3
-56.0	26.4	22.9	19.6	19.2	13.4
-52.0	26.7	23.2	20.0	19.4	13.5
-48.0	27.0	23.5	20.4	19.6	13.6
-44.0	27.3	23.8	20.8	19.8	13.7
-40.0	27.6	24.1	21.2	20.0	13.8
-36.0	27.9	24.4	21.6	20.2	13.9
-32.0	28.2	24.7	22.0	20.3	14.0
-28.0	28.4	24.9	22.4	20.5	14.1
-24.0	28.7	25.2	22.8	20.6	14.1
-20.0	28.9	25.4	23.1	20.6	14.1
-16.0	29.0	25.5	23.3	20.7	14.2
-12.0	29.1	25.6	23.4	20.7	14.2
-8.0	29.0	25.5	23.3	20.7	14.2
-4.0	28.8	25.3	23.0	20.6	14.1
.0	28.6	25.1	22.7	20.5	14.1
4.0	28.4	24.9	22.3	20.4	14.0
8.0	28.1	24.6	21.9	20.3	14.0
12.0	27.8	24.3	21.5	20.1	13.9
16.0	27.5	24.0	21.1	20.0	13.8
20.0	27.2	23.7	20.7	19.8	13.7
24.0	26.9	23.4	20.3	19.6	13.6
28.0	26.6	23.1	19.9	19.4	13.5
32.0	26.4	22.9	19.5	19.2	13.4
36.0	26.1	22.6	19.2	19.0	13.3

40.0	25.9	22.4	18.8	18.8	13.1
44.0	25.6	22.1	18.5	18.5	13.0
48.0	25.4	21.9	18.2	18.3	12.9
52.0	25.2	21.7	18.0	18.1	12.7
56.0	24.9	21.4	17.7	18.0	12.6
60.0	24.7	21.2	17.4	17.8	12.5
64.0	24.5	21.0	17.2	17.6	12.3
68.0	24.3	20.8	17.0	17.4	12.2
72.0	24.1	20.6	16.8	17.2	12.1
76.0	24.0	20.5	16.5	17.0	11.9
80.0	23.8	20.3	16.3	16.9	11.8
84.0	23.6	20.1	16.1	16.7	11.7
88.0	23.4	19.9	15.9	16.5	11.5
92.0	23.3	19.8	15.8	16.4	11.4
96.0	23.1	19.6	15.6	16.2	11.3
100.0	23.0	19.5	15.4	16.1	11.2
104.0	22.8	19.3	15.2	15.9	11.0
108.0	22.7	19.2	15.1	15.8	10.9
112.0	22.5	19.0	14.9	15.6	10.8
116.0	22.4	18.9	14.8	15.5	10.7
120.0	22.2	18.7	14.6	15.4	10.6
124.0	22.1	18.6	14.5	15.2	10.4
128.0	22.0	18.5	14.3	15.1	10.3
132.0	21.9	18.4	14.2	15.0	10.2
136.0	21.7	18.2	14.1	14.9	10.1
140.0	21.6	18.1	14.0	14.7	10.0
144.0	21.5	18.0	13.8	14.6	9.9
148.0	21.4	17.9	13.7	14.5	9.8
152.0	21.3	17.8	13.6	14.4	9.7
156.0	21.2	17.7	13.5	14.3	9.6
160.0	21.0	17.5	13.4	14.2	9.5
164.0	20.9	17.4	13.2	14.1	9.4
168.0	20.8	17.3	13.1	14.0	9.3
172.0	20.7	17.2	13.0	13.9	9.2
176.0	20.6	17.1	12.9	13.8	9.1
180.0	20.5	17.0	12.8	13.7	9.0
184.0	20.4	16.9	12.7	13.6	8.9
188.0	20.3	16.8	12.6	13.5	8.9
192.0	20.2	16.7	12.5	13.4	8.8
196.0	20.2	16.7	12.4	13.3	8.7

1AUDIBLE NOISE CALCULATION - FAIR

DIST FROM REFERENCE (FEET)	TOTALS L5 (DBA)	L50 (DBA)	230A	230B	230C
-200.0	-4.3	-7.8	-12.1	-11.2	-15.9
-196.0	-4.2	-7.7	-11.9	-11.1	-15.8

-192.0	-4.1	-7.6	-11.8	-11.0	-15.7
-188.0	-4.0	-7.5	-11.7	-10.9	-15.6
-184.0	-3.9	-7.4	-11.6	-10.8	-15.5
-180.0	-3.8	-7.3	-11.5	-10.7	-15.4
-176.0	-3.7	-7.2	-11.4	-10.6	-15.3
-172.0	-3.6	-7.1	-11.3	-10.5	-15.2
-168.0	-3.5	-7.0	-11.1	-10.3	-15.1
-164.0	-3.4	-6.9	-11.0	-10.2	-15.0
-160.0	-3.2	-6.7	-10.9	-10.1	-14.9
-156.0	-3.1	-6.6	-10.8	-10.0	-14.7
-152.0	-3.0	-6.5	-10.6	-9.9	-14.6
-148.0	-2.9	-6.4	-10.5	-9.7	-14.5
-144.0	-2.7	-6.2	-10.3	-9.6	-14.4
-140.0	-2.6	-6.1	-10.2	-9.5	-14.3
-136.0	-2.4	-5.9	-10.0	-9.3	-14.2
-132.0	-2.3	-5.8	-9.9	-9.2	-14.1
-128.0	-2.2	-5.7	-9.7	-9.0	-13.9
-124.0	-2.0	-5.5	-9.5	-8.9	-13.8
-120.0	-1.8	-5.3	-9.4	-8.7	-13.7
-116.0	-1.7	-5.2	-9.2	-8.6	-13.6
-112.0	-1.5	-5.0	-9.0	-8.4	-13.4
-108.0	-1.3	-4.8	-8.8	-8.3	-13.3
-104.0	-1.2	-4.7	-8.6	-8.1	-13.2
-100.0	-1.0	-4.5	-8.4	-7.9	-13.0
-96.0	-.8	-4.3	-8.2	-7.7	-12.9
-92.0	-.6	-4.1	-8.0	-7.6	-12.8
-88.0	-.4	-3.9	-7.7	-7.4	-12.6
-84.0	-.2	-3.7	-7.5	-7.2	-12.5
-80.0	.0	-3.5	-7.2	-7.0	-12.4
-76.0	.2	-3.3	-7.0	-6.8	-12.2
-72.0	.4	-3.1	-6.7	-6.6	-12.1
-68.0	.7	-2.8	-6.4	-6.4	-12.0
-64.0	.9	-2.6	-6.1	-6.2	-11.8
-60.0	1.2	-2.3	-5.7	-6.0	-11.7
-56.0	1.4	-2.1	-5.4	-5.8	-11.6
-52.0	1.7	-1.8	-5.0	-5.6	-11.5
-48.0	2.0	-1.5	-4.6	-5.4	-11.4
-44.0	2.3	-1.2	-4.2	-5.2	-11.3
-40.0	2.6	-.9	-3.8	-5.0	-11.2
-36.0	2.9	-.6	-3.4	-4.8	-11.1
-32.0	3.2	-.3	-3.0	-4.7	-11.0
-28.0	3.4	-.1	-2.6	-4.5	-10.9
-24.0	3.7	.2	-2.2	-4.4	-10.9
-20.0	3.9	.4	-1.9	-4.4	-10.9
-16.0	4.0	.5	-1.7	-4.3	-10.8
-12.0	4.1	.6	-1.6	-4.3	-10.8
-8.0	4.0	.5	-1.7	-4.3	-10.8
-4.0	3.8	.3	-2.0	-4.4	-10.9
.0	3.6	.1	-2.3	-4.5	-10.9
4.0	3.4	-.1	-2.7	-4.6	-11.0

8.0	3.1	-.4	-3.1	-4.7	-11.0
12.0	2.8	-.7	-3.5	-4.9	-11.1
16.0	2.5	-1.0	-3.9	-5.0	-11.2
20.0	2.2	-1.3	-4.3	-5.2	-11.3
24.0	1.9	-1.6	-4.7	-5.4	-11.4
28.0	1.6	-1.9	-5.1	-5.6	-11.5
32.0	1.4	-2.1	-5.5	-5.8	-11.6
36.0	1.1	-2.4	-5.8	-6.0	-11.7
40.0	.9	-2.6	-6.2	-6.2	-11.9
44.0	.6	-2.9	-6.5	-6.5	-12.0
48.0	.4	-3.1	-6.8	-6.7	-12.1
52.0	.2	-3.3	-7.0	-6.9	-12.3
56.0	-.1	-3.6	-7.3	-7.0	-12.4
60.0	-.3	-3.8	-7.6	-7.2	-12.5
64.0	-.5	-4.0	-7.8	-7.4	-12.7
68.0	-.7	-4.2	-8.0	-7.6	-12.8
72.0	-.9	-4.4	-8.2	-7.8	-12.9
76.0	-1.0	-4.5	-8.5	-8.0	-13.1
80.0	-1.2	-4.7	-8.7	-8.1	-13.2
84.0	-1.4	-4.9	-8.9	-8.3	-13.3
88.0	-1.6	-5.1	-9.1	-8.5	-13.5
92.0	-1.7	-5.2	-9.2	-8.6	-13.6
96.0	-1.9	-5.4	-9.4	-8.8	-13.7
100.0	-2.0	-5.5	-9.6	-8.9	-13.8
104.0	-2.2	-5.7	-9.8	-9.1	-14.0
108.0	-2.3	-5.8	-9.9	-9.2	-14.1
112.0	-2.5	-6.0	-10.1	-9.4	-14.2
116.0	-2.6	-6.1	-10.2	-9.5	-14.3
120.0	-2.8	-6.3	-10.4	-9.6	-14.4
124.0	-2.9	-6.4	-10.5	-9.8	-14.6
128.0	-3.0	-6.5	-10.7	-9.9	-14.7
132.0	-3.1	-6.6	-10.8	-10.0	-14.8
136.0	-3.3	-6.8	-10.9	-10.1	-14.9
140.0	-3.4	-6.9	-11.0	-10.3	-15.0
144.0	-3.5	-7.0	-11.2	-10.4	-15.1
148.0	-3.6	-7.1	-11.3	-10.5	-15.2
152.0	-3.7	-7.2	-11.4	-10.6	-15.3
156.0	-3.8	-7.3	-11.5	-10.7	-15.4
160.0	-4.0	-7.5	-11.6	-10.8	-15.5
164.0	-4.1	-7.6	-11.8	-10.9	-15.6
168.0	-4.2	-7.7	-11.9	-11.0	-15.7
172.0	-4.3	-7.8	-12.0	-11.1	-15.8
176.0	-4.4	-7.9	-12.1	-11.2	-15.9
180.0	-4.5	-8.0	-12.2	-11.3	-16.0
184.0	-4.6	-8.1	-12.3	-11.4	-16.1
188.0	-4.7	-8.2	-12.4	-11.5	-16.1
192.0	-4.8	-8.3	-12.5	-11.6	-16.2
196.0	-4.8	-8.3	-12.6	-11.7	-16.3

1ELECTRIC FIELD CALCULATIONS

SPEEDWAY NORTH 230-KV BUCK HOLLOW
 RUN 3 06/30/26

	DIST. FROM REFERENCE FEET	HEIGHT FEET	MAXIMUM GRADIENT (KV/CM)	SUBCON. DIAM. (IN)	NO. OF SUBCON.	PHASE ANGLE (DEGREES)
230A	-12.50	28.00	9.41	1.35	2	.0
230B	-12.50	53.00	9.59	1.35	2	-120.0
230C	-12.50	78.00	8.80	1.35	2	120.0
G	-2.00	103.00	3.96	.65	1	.0

SENSOR HT. = 3.3 FEET

DIST FROM REFERENCE THETAX FEET (DEGREES)	E-FIELD SPACE POTENTIAL (KV/METER) (VOLTS)	THETA (DEGREES)	EY-FIELD (KV/METER)	THETAY (DEGREES)	EX-FIELD (KV/METER)
-200.0	.103	88.5	.102	-33.2	.003
-27.4	102.5				
-196.0	.106	88.5	.106	-33.0	.003
-26.8	105.8				
-192.0	.109	88.5	.109	-32.8	.003
-26.2	109.2				
-188.0	.113	88.5	.113	-32.6	.003
-25.6	112.7				
-184.0	.116	88.5	.116	-32.4	.003
-24.9	116.3				
-180.0	.120	88.5	.120	-32.1	.003
-24.1	120.0				
-176.0	.124	88.5	.124	-31.8	.003
-23.2	123.9				
-172.0	.128	88.5	.128	-31.6	.003
-22.2	127.9				
-168.0	.132	88.5	.132	-31.2	.003
-21.1	132.0				
-164.0	.136	88.5	.136	-30.9	.004
-19.8	136.1				
-160.0	.140	88.6	.140	-30.6	.004
-18.4	140.4				
-156.0	.145	88.6	.145	-30.2	.004
-16.7	144.7				
-152.0	.149	88.6	.149	-29.7	.004
-14.8	149.1				
-148.0	.154	88.7	.154	-29.3	.004
-12.5	153.5				
-144.0	.158	88.7	.158	-28.8	.004
-9.7	157.8				

-140.0	.162	88.8	.162	-28.2	.004
-6.3	162.1				
-136.0	.166	88.9	.166	-27.6	.004
-2.0	166.2				
-132.0	.170	89.0	.170	-26.9	.004
3.5	170.1				
-128.0	.174	89.1	.174	-26.1	.003
10.8	173.6				
-124.0	.177	89.3	.177	-25.2	.003
20.6	176.7				
-120.0	.179	89.5	.179	-24.2	.003
33.7	179.1				
-116.0	.181	89.7	.181	-23.1	.003
50.3	180.8				
-112.0	.182	90.0	.182	-21.8	.004
68.9	181.3				
-108.0	.181	90.4	.181	-20.2	.005
86.3	180.6				
-104.0	.179	90.9	.179	-18.4	.006
100.6	178.1				
-100.0	.174	91.6	.174	-16.1	.008
111.5	173.4				
-96.0	.167	92.5	.167	-13.3	.011
119.9	166.1				
-92.0	.157	93.7	.157	-9.5	.014
126.5	155.5				
-88.0	.143	95.4	.143	-4.3	.019
131.9	141.2				
-84.0	.126	97.7	.125	3.6	.024
136.5	122.9				
-80.0	.105	100.2	.104	16.9	.032
140.6	102.0				
-76.0	.087	97.8	.086	41.1	.041
144.3	85.0				
-72.0	.092	74.5	.090	77.9	.052
147.8	90.5				
-68.0	.142	67.3	.132	108.8	.067
151.2	134.2				
-64.0	.221	69.4	.207	126.5	.085
154.4	211.7				
-60.0	.330	71.8	.314	137.0	.109
157.6	320.1				
-56.0	.473	73.7	.454	143.9	.138
160.6	462.3				
-52.0	.657	75.1	.635	149.1	.174
163.6	645.0				
-48.0	.890	76.2	.864	153.4	.218
166.4	876.5				
-44.0	1.182	77.1	1.152	157.0	.270
169.1	1166.4				

-40.0	1.543	77.9	1.509	160.1	.329
171.5	1523.9				
-36.0	1.978	78.8	1.940	162.9	.390
173.6	1954.7				
-32.0	2.484	79.9	2.446	165.3	.443
175.4	2455.7				
-28.0	3.043	81.2	3.007	167.4	.469
176.9	3007.4				
-24.0	3.608	83.0	3.581	169.1	.447
178.1	3565.0				
-20.0	4.107	85.1	4.092	170.3	.354
178.8	4055.2				
-16.0	4.446	87.6	4.442	171.0	.187
179.2	4387.8				
-12.0	4.547	90.3	4.546	171.2	.027
1.5	4486.7				
-8.0	4.384	93.0	4.378	170.8	.233
-.4	4327.2				
-4.0	3.999	95.4	3.981	169.9	.383
-1.1	3949.4				
.0	3.478	97.4	3.448	168.6	.457
-2.0	3436.8				
4.0	2.910	99.1	2.874	166.8	.465
-3.2	2877.4				
8.0	2.364	100.3	2.326	164.6	.429
-4.8	2337.9				
12.0	1.877	101.3	1.841	162.0	.374
-6.7	1855.8				
16.0	1.463	102.1	1.431	159.1	.313
-8.9	1445.9				
20.0	1.123	102.8	1.095	155.7	.255
-11.4	1108.2				
24.0	.848	103.6	.824	151.9	.205
-14.1	835.7				
28.0	.630	104.5	.610	147.5	.163
-17.0	619.1				
32.0	.458	105.7	.441	142.0	.129
-20.0	448.6				
36.0	.325	107.1	.311	134.8	.102
-23.1	316.3				
40.0	.223	108.8	.212	124.6	.080
-26.3	215.8				
44.0	.149	109.8	.141	108.5	.063
-29.6	143.7				
48.0	.102	104.9	.100	82.9	.049
-33.0	100.3				
52.0	.088	88.8	.088	51.2	.038
-36.6	87.3				
56.0	.098	82.5	.097	26.3	.030
-40.4	95.8				

60.0	.113	83.2	.113	11.0	.023
-44.6	111.2				
64.0	.128	84.9	.127	1.5	.018
-49.3	126.0				
68.0	.139	86.4	.139	-4.8	.014
-54.6	138.2				
72.0	.148	87.5	.148	-9.2	.010
-61.1	147.5				
76.0	.155	88.4	.155	-12.6	.008
-69.0	154.0				
80.0	.159	89.0	.159	-15.3	.006
-78.9	158.3				
84.0	.161	89.5	.161	-17.4	.005
-91.4	160.7				
88.0	.162	89.9	.162	-19.2	.004
-106.4	161.6				
92.0	.162	90.2	.162	-20.7	.003
-122.6	161.2				
96.0	.160	90.5	.160	-22.1	.003
-138.1	160.0				
100.0	.158	90.7	.158	-23.2	.003
-151.3	158.0				
104.0	.156	90.8	.156	-24.2	.003
-161.7	155.4				
108.0	.153	91.0	.153	-25.1	.003
-169.8	152.4				
112.0	.149	91.1	.149	-25.9	.003
-176.0	149.1				
116.0	.146	91.2	.146	-26.6	.003
179.0	145.6				
120.0	.142	91.2	.142	-27.2	.003
175.1	141.9				
124.0	.138	91.3	.138	-27.8	.003
171.9	138.2				
128.0	.135	91.3	.134	-28.3	.003
169.2	134.4				
132.0	.131	91.4	.131	-28.8	.003
166.9	130.7				
136.0	.127	91.4	.127	-29.3	.003
165.0	126.9				
140.0	.123	91.4	.123	-29.7	.003
163.3	123.2				
144.0	.120	91.4	.120	-30.1	.003
161.9	119.5				
148.0	.116	91.4	.116	-30.4	.003
160.6	116.0				
152.0	.113	91.4	.113	-30.7	.003
159.5	112.5				
156.0	.109	91.4	.109	-31.0	.003
158.4	109.1				

160.0	.106	91.4	.106	-31.3	.003
157.5	105.8				
164.0	.103	91.4	.103	-31.6	.003
156.7	102.6				
168.0	.100	91.4	.100	-31.8	.003
155.9	99.6				
172.0	.097	91.4	.097	-32.0	.002
155.3	96.6				
176.0	.094	91.4	.094	-32.3	.002
154.6	93.7				
180.0	.091	91.4	.091	-32.5	.002
154.1	90.9				
184.0	.088	91.4	.088	-32.7	.002
153.5	88.2				
188.0	.086	91.4	.086	-32.8	.002
153.0	85.6				
192.0	.083	91.4	.083	-33.0	.002
152.6	83.1				
196.0	.081	91.4	.081	-33.2	.002
152.1	80.7				

1MAGNETIC FIELD CALCULATIONS

SENSOR HT. = 3.3 FEET

DIST FROM REFERENCE FEET	B-FIELD (GAUSS)	THETA	BY-FIELD (GAUSS)	THETAY	BX-FIELD (GAUSS)	THETAX
-200.0	.01121166	-150.8	.00550791	143.8	.00979867	153.4
-196.0	.01166638	-150.3	.00583542	143.8	.01013817	153.5
-192.0	.01214856	-149.6	.00618859	143.9	.01049339	153.7
-188.0	.01266041	-149.0	.00656990	144.0	.01086511	153.9
-184.0	.01320434	-148.4	.00698212	144.1	.01125409	154.0
-180.0	.01378301	-147.7	.00742832	144.2	.01166112	154.2
-176.0	.01439934	-147.0	.00791192	144.3	.01208697	154.4
-172.0	.01505657	-146.2	.00843678	144.5	.01253240	154.6
-168.0	.01575827	-145.4	.00900720	144.6	.01299815	154.9
-164.0	.01650840	-144.6	.00962798	144.7	.01348489	155.1
-160.0	.01731137	-143.8	.01030457	144.9	.01399319	155.4
-156.0	.01817207	-142.9	.01104305	145.0	.01452353	155.7
-152.0	.01909593	-141.9	.01185029	145.2	.01507621	156.0
-148.0	.02008905	-141.0	.01273401	145.4	.01565131	156.3
-144.0	.02115821	-139.9	.01370294	145.6	.01624859	156.7
-140.0	.02231102	-138.9	.01476698	145.8	.01686744	157.1
-136.0	.02355606	-137.7	.01593727	146.0	.01750672	157.6
-132.0	.02490292	-136.6	.01722648	146.3	.01816463	158.0
-128.0	.02636246	-135.3	.01864893	146.6	.01883852	158.6
-124.0	.02794693	-134.0	.02022090	146.9	.01952461	159.2

-120.0	.02967022	-132.6	.02196081	147.2	.02021775	159.8
-116.0	.03154806	-131.1	.02388960	147.5	.02091097	160.5
-112.0	.03359842	-129.5	.02603104	147.9	.02159505	161.3
-108.0	.03584175	-127.9	.02841200	148.3	.02225786	162.3
-104.0	.03830143	-126.1	.03106295	148.8	.02288361	163.3
-100.0	.04100432	-124.2	.03401825	149.3	.02345189	164.4
-96.0	.04398123	-122.2	.03731658	149.8	.02393649	165.8
-92.0	.04726772	-120.1	.04100123	150.4	.02430393	167.3
-88.0	.05090489	-117.8	.04512032	151.1	.02451177	169.2
-84.0	.05494026	-115.4	.04972663	151.8	.02450668	171.4
-80.0	.05942903	-112.8	.05487725	152.6	.02422281	174.0
-76.0	.06443527	-110.0	.06063223	153.5	.02358110	177.4
-72.0	.07003335	-107.0	.06705200	154.5	.02249277	181.7
-68.0	.07630958	-103.7	.07419273	155.5	.02087520	187.8
-64.0	.08336339	-100.1	.08209781	156.7	.01870704	196.7
-60.0	.09130833	-96.2	.09078357	157.9	.01621357	211.3
-56.0	.10027150	-91.9	.10021490	159.3	.01443650	235.9
-52.0	.11039020	-87.2	.11026520	160.7	.01600574	269.6
-48.0	.12180310	-82.0	.12065190	162.1	.02321237	-62.4
-44.0	.13463080	-76.3	.13083600	163.7	.03597263	-45.3
-40.0	.14893800	-69.8	.13987650	165.2	.05404785	-34.9
-36.0	.16466640	-62.5	.14624310	166.7	.07767417	-28.0
-32.0	.18152450	-54.2	.14763630	168.1	.10694920	-23.1
-28.0	.19883390	-45.0	.14097310	169.3	.14105400	-19.5
-24.0	.21536760	-34.6	.12285680	170.4	.17734730	-16.9
-20.0	.22930330	-23.3	.09091817	171.1	.21070460	-15.1
-16.0	.23849500	-11.1	.04592722	171.6	.23407390	-14.1
-12.0	.24116990	1.6	.00671025	-8.3	.24107740	-13.8
-8.0	.23675370	14.2	.05818322	-8.5	.22956360	-14.3
-4.0	.22618000	26.2	.10023080	-9.0	.20301040	-15.5
.0	.21139740	37.3	.12862530	-9.9	.16830520	-17.5
4.0	.19452080	47.4	.14358360	-11.0	.13217980	-20.3
8.0	.17723300	56.4	.14791140	-12.3	.09912179	-24.2
12.0	.16061170	64.4	.14501360	-13.7	.07123271	-29.5
16.0	.14522280	71.5	.13779540	-15.2	.04902091	-37.1
20.0	.13128620	77.8	.12835190	-16.7	.03228655	-48.8
24.0	.11882140	83.4	.11804760	-18.2	.02086688	-68.2
28.0	.10774450	88.5	.10770660	-19.7	.01512672	261.1
32.0	.09792785	93.0	.09779202	-21.1	.01469642	228.6
36.0	.08923181	97.2	.08853967	-22.4	.01683356	206.9
40.0	.08152108	101.0	.08004835	-23.6	.01929587	194.1
44.0	.07467175	104.5	.07233727	-24.7	.02133239	186.1
48.0	.06857385	107.7	.06538153	-25.8	.02281163	180.5
52.0	.06313131	110.7	.05913349	-26.7	.02377983	176.4
56.0	.05826100	113.5	.05353532	-27.6	.02432402	173.3
60.0	.05389121	116.0	.04852631	-28.3	.02453130	170.8
64.0	.04996025	118.4	.04440470	-29.1	.02447748	168.7
68.0	.04641494	120.7	.04004131	-29.7	.02422521	166.9
72.0	.04320946	122.8	.03645756	-30.3	.02382488	165.4
76.0	.04030418	124.7	.03324885	-30.8	.02331653	164.1

80.0	.03766482	126.6	.03037309	-31.3	.02273167	163.0
84.0	.03526160	128.3	.02779270	-31.8	.02209495	162.0
88.0	.03306859	129.9	.02547434	-32.2	.02142550	161.1
92.0	.03106317	131.5	.02338845	-32.6	.02073812	160.3
96.0	.02922555	132.9	.02150899	-32.9	.02004415	159.6
100.0	.02753837	134.3	.01981291	-33.2	.01935220	159.0
104.0	.02598637	135.6	.01827997	-33.5	.01866873	158.4
108.0	.02455609	136.9	.01689227	-33.8	.01799854	157.9
112.0	.02323565	138.0	.01563407	-34.0	.01734507	157.4
116.0	.02201452	139.1	.01449147	-34.3	.01671075	157.0
120.0	.02088338	140.2	.01345220	-34.5	.01609721	156.6
124.0	.01983391	141.2	.01250544	-34.7	.01550544	156.2
128.0	.01885872	142.2	.01164162	-34.8	.01493594	155.9
132.0	.01795119	143.1	.01085227	-35.0	.01438886	155.6
136.0	.01710542	144.0	.01012987	-35.2	.01386406	155.3
140.0	.01631609	144.8	.00946777	-35.3	.01336120	155.1
144.0	.01557846	145.6	.00886006	-35.4	.01287977	154.8
148.0	.01488824	146.4	.00830147	-35.6	.01241917	154.6
152.0	.01424155	147.1	.00778731	-35.7	.01197870	154.4
156.0	.01363493	147.8	.00731340	-35.8	.01155762	154.2
160.0	.01306521	148.5	.00687601	-35.9	.01115518	154.0
164.0	.01252954	149.2	.00647179	-36.0	.01077059	153.8
168.0	.01202532	149.8	.00609776	-36.1	.01040307	153.7
172.0	.01155020	150.4	.00575122	-36.2	.01005185	153.5
176.0	.01110203	151.0	.00542977	-36.3	.00971617	153.4
180.0	.01067886	151.5	.00513124	-36.3	.00939529	153.2
184.0	.01027890	152.1	.00485367	-36.4	.00908851	153.1
188.0	.00990052	152.6	.00459530	-36.5	.00879512	153.0
192.0	.00954224	153.1	.00435454	-36.5	.00851448	152.9
196.0	.00920266	153.6	.00412994	-36.6	.00824596	152.8

Appendix B. Speedway South – Aboveground 230-kV Collector Lines

[illegible]

INPUT DATA LIST

6/30/2026

15:19:44

SPEEDWAY SOUTH 230-KV

RUN 2 06/30/26

1,0, 6, 8,0.0, 2.00, 1.00,2300.00

(ENGLISH UNITS OPTION)

(GRADIENTS ARE COMPUTED BY PROGRAM)

PHYSICAL SYSTEM CONSISTS OF 8 CONDUCTORS, OF WHICH 6 ARE ENERGIZED PHASES

OPTIONS: MF,EF,AN

4.921, '230A .000	6.562, , 'A',	9.842, -12.50,	.000, 28.00,	1.000, 2,	75.000, 1.345,	3.280, 18.000,	6.700, 132.800,	3.280 .000,	
.000 '230B .000	, 'A',	-12.50,	53.00,	2,	1.345,	18.000,	132.800,	120.000,	.627,
.000 '230C .000	, 'A',	-12.50,	78.00,	2,	1.345,	18.000,	132.800,	-120.000,	.627,
.000 '230D .000	, 'A',	12.50,	28.00,	2,	1.345,	18.000,	132.800,	-120.000,	.627,
.000 '230E .000	, 'A',	12.50,	53.00,	2,	1.345,	18.000,	132.800,	120.000,	.627,
.000 '230F .000	, 'A',	12.50,	78.00,	2,	1.345,	18.000,	132.800,	.000,	.627,
.000 'G1 .000	, 'A',	-6.00,	91.50,	1,	.646,	.000,	.000,	.000,	.000,
.000 'G2 .000	, 'A',	6.00,	91.50,	1,	.646,	.000,	.000,	.000,	.000,

100 -200.0 4.0

1AUDIBLE NOISE CALCULATION - RAIN

DIST FROM REFERENCE (FEET)	TOTALS L5 (DBA)	L50 (DBA)	230A	230B	230C	230D	230E	230F
-200.0	25.7	22.2	16.1	11.1	15.4	15.5	10.5	14.8
-196.0	25.8	22.3	16.2	11.2	15.5	15.6	10.6	14.9

-192.0	25.9	22.4	16.3	11.3	15.6	15.7	10.7	15.0
-188.0	26.0	22.5	16.4	11.4	15.6	15.8	10.8	15.1
-184.0	26.1	22.6	16.5	11.5	15.7	15.9	10.9	15.2
-180.0	26.2	22.7	16.6	11.6	15.8	16.0	11.0	15.3
-176.0	26.3	22.8	16.8	11.7	15.9	16.1	11.0	15.3
-172.0	26.4	22.9	16.9	11.8	16.0	16.2	11.1	15.4
-168.0	26.5	23.0	17.0	11.9	16.1	16.3	11.2	15.5
-164.0	26.6	23.1	17.1	12.0	16.3	16.4	11.4	15.6
-160.0	26.7	23.2	17.3	12.2	16.4	16.5	11.5	15.7
-156.0	26.8	23.3	17.4	12.3	16.5	16.6	11.6	15.8
-152.0	26.9	23.4	17.5	12.4	16.6	16.7	11.7	15.9
-148.0	27.0	23.5	17.7	12.5	16.7	16.8	11.8	16.0
-144.0	27.2	23.7	17.8	12.7	16.8	17.0	11.9	16.1
-140.0	27.3	23.8	18.0	12.8	16.9	17.1	12.0	16.2
-136.0	27.4	23.9	18.1	12.9	17.0	17.2	12.1	16.3
-132.0	27.6	24.1	18.3	13.1	17.2	17.3	12.3	16.4
-128.0	27.7	24.2	18.4	13.2	17.3	17.5	12.4	16.6
-124.0	27.8	24.3	18.6	13.4	17.4	17.6	12.5	16.7
-120.0	28.0	24.5	18.8	13.5	17.5	17.8	12.6	16.8
-116.0	28.1	24.6	18.9	13.7	17.7	17.9	12.8	16.9
-112.0	28.3	24.8	19.1	13.8	17.8	18.1	12.9	17.0
-108.0	28.4	24.9	19.3	14.0	17.9	18.2	13.1	17.1
-104.0	28.6	25.1	19.5	14.2	18.0	18.4	13.2	17.3
-100.0	28.7	25.2	19.7	14.4	18.2	18.5	13.3	17.4
-96.0	28.9	25.4	19.9	14.5	18.3	18.7	13.5	17.5
-92.0	29.1	25.6	20.2	14.7	18.4	18.9	13.6	17.6
-88.0	29.3	25.8	20.4	14.9	18.6	19.1	13.8	17.8
-84.0	29.5	26.0	20.7	15.1	18.7	19.3	14.0	17.9
-80.0	29.6	26.1	20.9	15.3	18.9	19.5	14.1	18.0
-76.0	29.8	26.3	21.2	15.5	19.0	19.7	14.3	18.1
-72.0	30.0	26.5	21.5	15.7	19.1	19.9	14.5	18.3
-68.0	30.3	26.8	21.8	15.9	19.3	20.1	14.7	18.4
-64.0	30.5	27.0	22.1	16.1	19.4	20.3	14.8	18.6
-60.0	30.7	27.2	22.4	16.3	19.5	20.6	15.0	18.7
-56.0	30.9	27.4	22.7	16.5	19.6	20.8	15.2	18.8
-52.0	31.2	27.7	23.1	16.7	19.7	21.1	15.4	19.0
-48.0	31.5	28.0	23.5	16.9	19.9	21.4	15.6	19.1
-44.0	31.7	28.2	23.9	17.1	20.0	21.7	15.8	19.2
-40.0	32.0	28.5	24.3	17.3	20.1	22.0	16.0	19.4
-36.0	32.3	28.8	24.7	17.4	20.1	22.3	16.2	19.5
-32.0	32.6	29.1	25.2	17.6	20.2	22.7	16.4	19.6
-28.0	32.9	29.4	25.6	17.7	20.3	23.0	16.6	19.7
-24.0	33.2	29.7	25.9	17.8	20.3	23.4	16.8	19.8
-20.0	33.4	29.9	26.2	17.9	20.4	23.8	17.0	19.9
-16.0	33.6	30.1	26.4	18.0	20.4	24.2	17.2	20.0
-12.0	33.8	30.3	26.5	18.0	20.4	24.6	17.4	20.1
-8.0	33.9	30.4	26.4	17.9	20.4	25.1	17.6	20.2
-4.0	33.9	30.4	26.2	17.9	20.3	25.5	17.7	20.3
.0	33.9	30.4	25.9	17.8	20.3	25.9	17.8	20.3
4.0	33.9	30.4	25.5	17.7	20.3	26.2	17.9	20.3

8.0	33.9	30.4	25.1	17.6	20.2	26.4	17.9	20.4
12.0	33.8	30.3	24.6	17.4	20.1	26.5	18.0	20.4
16.0	33.6	30.1	24.2	17.2	20.0	26.4	18.0	20.4
20.0	33.4	29.9	23.8	17.0	19.9	26.2	17.9	20.4
24.0	33.2	29.7	23.4	16.8	19.8	25.9	17.8	20.3
28.0	32.9	29.4	23.0	16.6	19.7	25.6	17.7	20.3
32.0	32.6	29.1	22.7	16.4	19.6	25.2	17.6	20.2
36.0	32.3	28.8	22.3	16.2	19.5	24.7	17.4	20.1
40.0	32.0	28.5	22.0	16.0	19.4	24.3	17.3	20.1
44.0	31.7	28.2	21.7	15.8	19.2	23.9	17.1	20.0
48.0	31.5	28.0	21.4	15.6	19.1	23.5	16.9	19.9
52.0	31.2	27.7	21.1	15.4	19.0	23.1	16.7	19.7
56.0	30.9	27.4	20.8	15.2	18.8	22.7	16.5	19.6
60.0	30.7	27.2	20.6	15.0	18.7	22.4	16.3	19.5
64.0	30.5	27.0	20.3	14.8	18.6	22.1	16.1	19.4
68.0	30.3	26.8	20.1	14.7	18.4	21.8	15.9	19.3
72.0	30.0	26.5	19.9	14.5	18.3	21.5	15.7	19.1
76.0	29.8	26.3	19.7	14.3	18.1	21.2	15.5	19.0
80.0	29.6	26.1	19.5	14.1	18.0	20.9	15.3	18.9
84.0	29.5	26.0	19.3	14.0	17.9	20.7	15.1	18.7
88.0	29.3	25.8	19.1	13.8	17.8	20.4	14.9	18.6
92.0	29.1	25.6	18.9	13.6	17.6	20.2	14.7	18.4
96.0	28.9	25.4	18.7	13.5	17.5	19.9	14.5	18.3
100.0	28.7	25.2	18.5	13.3	17.4	19.7	14.4	18.2
104.0	28.6	25.1	18.4	13.2	17.3	19.5	14.2	18.0
108.0	28.4	24.9	18.2	13.1	17.1	19.3	14.0	17.9
112.0	28.3	24.8	18.1	12.9	17.0	19.1	13.8	17.8
116.0	28.1	24.6	17.9	12.8	16.9	18.9	13.7	17.7
120.0	28.0	24.5	17.8	12.6	16.8	18.8	13.5	17.5
124.0	27.8	24.3	17.6	12.5	16.7	18.6	13.4	17.4
128.0	27.7	24.2	17.5	12.4	16.6	18.4	13.2	17.3
132.0	27.6	24.1	17.3	12.3	16.4	18.3	13.1	17.2
136.0	27.4	23.9	17.2	12.1	16.3	18.1	12.9	17.0
140.0	27.3	23.8	17.1	12.0	16.2	18.0	12.8	16.9
144.0	27.2	23.7	17.0	11.9	16.1	17.8	12.7	16.8
148.0	27.0	23.5	16.8	11.8	16.0	17.7	12.5	16.7
152.0	26.9	23.4	16.7	11.7	15.9	17.5	12.4	16.6
156.0	26.8	23.3	16.6	11.6	15.8	17.4	12.3	16.5
160.0	26.7	23.2	16.5	11.5	15.7	17.3	12.2	16.4
164.0	26.6	23.1	16.4	11.4	15.6	17.1	12.0	16.3
168.0	26.5	23.0	16.3	11.2	15.5	17.0	11.9	16.1
172.0	26.4	22.9	16.2	11.1	15.4	16.9	11.8	16.0
176.0	26.3	22.8	16.1	11.0	15.3	16.8	11.7	15.9
180.0	26.2	22.7	16.0	11.0	15.3	16.6	11.6	15.8
184.0	26.1	22.6	15.9	10.9	15.2	16.5	11.5	15.7
188.0	26.0	22.5	15.8	10.8	15.1	16.4	11.4	15.6
192.0	25.9	22.4	15.7	10.7	15.0	16.3	11.3	15.6
196.0	25.8	22.3	15.6	10.6	14.9	16.2	11.2	15.5

1AUDIBLE NOISE CALCULATION - FAIR

DIST FROM REFERENCE (FEET)	TOTALS L5 (DBA)	L50 (DBA)	230A	230B	230C	230D	230E	230F
-200.0	.7	-2.8	-8.9	-13.9	-9.6	-9.5	-14.5	-10.2
-196.0	.8	-2.7	-8.8	-13.8	-9.5	-9.4	-14.4	-10.1
-192.0	.9	-2.6	-8.7	-13.7	-9.4	-9.3	-14.3	-10.0
-188.0	1.0	-2.5	-8.6	-13.6	-9.4	-9.2	-14.2	-9.9
-184.0	1.1	-2.4	-8.5	-13.5	-9.3	-9.1	-14.1	-9.8
-180.0	1.2	-2.3	-8.4	-13.4	-9.2	-9.0	-14.0	-9.7
-176.0	1.3	-2.2	-8.2	-13.3	-9.1	-8.9	-14.0	-9.7
-172.0	1.4	-2.1	-8.1	-13.2	-9.0	-8.8	-13.9	-9.6
-168.0	1.5	-2.0	-8.0	-13.1	-8.9	-8.7	-13.8	-9.5
-164.0	1.6	-1.9	-7.9	-13.0	-8.7	-8.6	-13.6	-9.4
-160.0	1.7	-1.8	-7.7	-12.8	-8.6	-8.5	-13.5	-9.3
-156.0	1.8	-1.7	-7.6	-12.7	-8.5	-8.4	-13.4	-9.2
-152.0	1.9	-1.6	-7.5	-12.6	-8.4	-8.3	-13.3	-9.1
-148.0	2.0	-1.5	-7.3	-12.5	-8.3	-8.2	-13.2	-9.0
-144.0	2.2	-1.3	-7.2	-12.3	-8.2	-8.0	-13.1	-8.9
-140.0	2.3	-1.2	-7.0	-12.2	-8.1	-7.9	-13.0	-8.8
-136.0	2.4	-1.1	-6.9	-12.1	-8.0	-7.8	-12.9	-8.7
-132.0	2.6	-.9	-6.7	-11.9	-7.8	-7.7	-12.7	-8.6
-128.0	2.7	-.8	-6.6	-11.8	-7.7	-7.5	-12.6	-8.4
-124.0	2.8	-.7	-6.4	-11.6	-7.6	-7.4	-12.5	-8.3
-120.0	3.0	-.5	-6.2	-11.5	-7.5	-7.2	-12.4	-8.2
-116.0	3.1	-.4	-6.1	-11.3	-7.3	-7.1	-12.2	-8.1
-112.0	3.3	-.2	-5.9	-11.2	-7.2	-6.9	-12.1	-8.0
-108.0	3.4	-.1	-5.7	-11.0	-7.1	-6.8	-11.9	-7.9
-104.0	3.6	.1	-5.5	-10.8	-7.0	-6.6	-11.8	-7.7
-100.0	3.7	.2	-5.3	-10.6	-6.8	-6.5	-11.7	-7.6
-96.0	3.9	.4	-5.1	-10.5	-6.7	-6.3	-11.5	-7.5
-92.0	4.1	.6	-4.8	-10.3	-6.6	-6.1	-11.4	-7.4
-88.0	4.3	.8	-4.6	-10.1	-6.4	-5.9	-11.2	-7.2
-84.0	4.5	1.0	-4.3	-9.9	-6.3	-5.7	-11.0	-7.1
-80.0	4.6	1.1	-4.1	-9.7	-6.1	-5.5	-10.9	-7.0
-76.0	4.8	1.3	-3.8	-9.5	-6.0	-5.3	-10.7	-6.9
-72.0	5.0	1.5	-3.5	-9.3	-5.9	-5.1	-10.5	-6.7
-68.0	5.3	1.8	-3.2	-9.1	-5.7	-4.9	-10.3	-6.6
-64.0	5.5	2.0	-2.9	-8.9	-5.6	-4.7	-10.2	-6.4
-60.0	5.7	2.2	-2.6	-8.7	-5.5	-4.4	-10.0	-6.3
-56.0	5.9	2.4	-2.3	-8.5	-5.4	-4.2	-9.8	-6.2
-52.0	6.2	2.7	-1.9	-8.3	-5.3	-3.9	-9.6	-6.0
-48.0	6.5	3.0	-1.5	-8.1	-5.1	-3.6	-9.4	-5.9
-44.0	6.7	3.2	-1.1	-7.9	-5.0	-3.3	-9.2	-5.8
-40.0	7.0	3.5	-.7	-7.7	-4.9	-3.0	-9.0	-5.6
-36.0	7.3	3.8	-.3	-7.6	-4.9	-2.7	-8.8	-5.5
-32.0	7.6	4.1	.2	-7.4	-4.8	-2.3	-8.6	-5.4
-28.0	7.9	4.4	.6	-7.3	-4.7	-2.0	-8.4	-5.3

-24.0	8.2	4.7	.9	-7.2	-4.7	-1.6	-8.2	-5.2
-20.0	8.4	4.9	1.2	-7.1	-4.6	-1.2	-8.0	-5.1
-16.0	8.6	5.1	1.4	-7.0	-4.6	-.8	-7.8	-5.0
-12.0	8.8	5.3	1.5	-7.0	-4.6	-.4	-7.6	-4.9
-8.0	8.9	5.4	1.4	-7.1	-4.6	.1	-7.4	-4.8
-4.0	8.9	5.4	1.2	-7.1	-4.7	.5	-7.3	-4.7
.0	8.9	5.4	.9	-7.2	-4.7	.9	-7.2	-4.7
4.0	8.9	5.4	.5	-7.3	-4.7	1.2	-7.1	-4.7
8.0	8.9	5.4	.1	-7.4	-4.8	1.4	-7.1	-4.6
12.0	8.8	5.3	-.4	-7.6	-4.9	1.5	-7.0	-4.6
16.0	8.6	5.1	-.8	-7.8	-5.0	1.4	-7.0	-4.6
20.0	8.4	4.9	-1.2	-8.0	-5.1	1.2	-7.1	-4.6
24.0	8.2	4.7	-1.6	-8.2	-5.2	.9	-7.2	-4.7
28.0	7.9	4.4	-2.0	-8.4	-5.3	.6	-7.3	-4.7
32.0	7.6	4.1	-2.3	-8.6	-5.4	.2	-7.4	-4.8
36.0	7.3	3.8	-2.7	-8.8	-5.5	-.3	-7.6	-4.9
40.0	7.0	3.5	-3.0	-9.0	-5.6	-.7	-7.7	-4.9
44.0	6.7	3.2	-3.3	-9.2	-5.8	-1.1	-7.9	-5.0
48.0	6.5	3.0	-3.6	-9.4	-5.9	-1.5	-8.1	-5.1
52.0	6.2	2.7	-3.9	-9.6	-6.0	-1.9	-8.3	-5.3
56.0	5.9	2.4	-4.2	-9.8	-6.2	-2.3	-8.5	-5.4
60.0	5.7	2.2	-4.4	-10.0	-6.3	-2.6	-8.7	-5.5
64.0	5.5	2.0	-4.7	-10.2	-6.4	-2.9	-8.9	-5.6
68.0	5.3	1.8	-4.9	-10.3	-6.6	-3.2	-9.1	-5.7
72.0	5.0	1.5	-5.1	-10.5	-6.7	-3.5	-9.3	-5.9
76.0	4.8	1.3	-5.3	-10.7	-6.9	-3.8	-9.5	-6.0
80.0	4.6	1.1	-5.5	-10.9	-7.0	-4.1	-9.7	-6.1
84.0	4.5	1.0	-5.7	-11.0	-7.1	-4.3	-9.9	-6.3
88.0	4.3	.8	-5.9	-11.2	-7.2	-4.6	-10.1	-6.4
92.0	4.1	.6	-6.1	-11.4	-7.4	-4.8	-10.3	-6.6
96.0	3.9	.4	-6.3	-11.5	-7.5	-5.1	-10.5	-6.7
100.0	3.7	.2	-6.5	-11.7	-7.6	-5.3	-10.6	-6.8
104.0	3.6	.1	-6.6	-11.8	-7.7	-5.5	-10.8	-7.0
108.0	3.4	-.1	-6.8	-11.9	-7.9	-5.7	-11.0	-7.1
112.0	3.3	-.2	-6.9	-12.1	-8.0	-5.9	-11.2	-7.2
116.0	3.1	-.4	-7.1	-12.2	-8.1	-6.1	-11.3	-7.3
120.0	3.0	-.5	-7.2	-12.4	-8.2	-6.2	-11.5	-7.5
124.0	2.8	-.7	-7.4	-12.5	-8.3	-6.4	-11.6	-7.6
128.0	2.7	-.8	-7.5	-12.6	-8.4	-6.6	-11.8	-7.7
132.0	2.6	-.9	-7.7	-12.7	-8.6	-6.7	-11.9	-7.8
136.0	2.4	-1.1	-7.8	-12.9	-8.7	-6.9	-12.1	-8.0
140.0	2.3	-1.2	-7.9	-13.0	-8.8	-7.0	-12.2	-8.1
144.0	2.2	-1.3	-8.0	-13.1	-8.9	-7.2	-12.3	-8.2
148.0	2.0	-1.5	-8.2	-13.2	-9.0	-7.3	-12.5	-8.3
152.0	1.9	-1.6	-8.3	-13.3	-9.1	-7.5	-12.6	-8.4
156.0	1.8	-1.7	-8.4	-13.4	-9.2	-7.6	-12.7	-8.5
160.0	1.7	-1.8	-8.5	-13.5	-9.3	-7.7	-12.8	-8.6
164.0	1.6	-1.9	-8.6	-13.6	-9.4	-7.9	-13.0	-8.7
168.0	1.5	-2.0	-8.7	-13.8	-9.5	-8.0	-13.1	-8.9
172.0	1.4	-2.1	-8.8	-13.9	-9.6	-8.1	-13.2	-9.0

176.0	1.3	-2.2	-8.9	-14.0	-9.7	-8.2	-13.3	-9.1
180.0	1.2	-2.3	-9.0	-14.0	-9.7	-8.4	-13.4	-9.2
184.0	1.1	-2.4	-9.1	-14.1	-9.8	-8.5	-13.5	-9.3
188.0	1.0	-2.5	-9.2	-14.2	-9.9	-8.6	-13.6	-9.4
192.0	.9	-2.6	-9.3	-14.3	-10.0	-8.7	-13.7	-9.4
196.0	.8	-2.7	-9.4	-14.4	-10.1	-8.8	-13.8	-9.5

1ELECTRIC FIELD CALCULATIONS

SPEEDWAY SOUTH 230-KV

RUN 2 06/30/26

	DIST. FROM REFERENCE FEET	HEIGHT FEET	MAXIMUM GRADIENT (KV/CM)	SUBCON. DIAM. (IN)	NO. OF SUBCON.	PHASE ANGLE (DEGREES)
230A	-12.50	28.00	9.98	1.35	2	.0
230B	-12.50	53.00	9.08	1.35	2	120.0
230C	-12.50	78.00	9.90	1.35	2	-120.0
230D	12.50	28.00	9.98	1.35	2	-120.0
230E	12.50	53.00	9.08	1.35	2	120.0
230F	12.50	78.00	9.90	1.35	2	.0
G1	-6.00	91.50	3.15	.65	1	.0
G2	6.00	91.50	3.15	.65	1	.0

SENSOR HT. = 3.3 FEET

DIST FROM REFERENCE THETAX FEET (DEGREES)	E-FIELD SPACE POTENTIAL (KV/METER) (VOLTS)	THETA (DEGREES)	EY-FIELD (KV/METER)	THETAY (DEGREES)	EX-FIELD (KV/METER)
-200.0	.034	88.3	.034	47.0	.001
23.4	33.6				
-196.0	.035	88.3	.035	46.1	.001
21.8	34.8				
-192.0	.036	88.3	.036	45.1	.001
20.0	36.1				
-188.0	.037	88.3	.037	44.1	.001
18.1	37.5				
-184.0	.039	88.3	.039	43.1	.001
16.0	38.9				
-180.0	.040	88.3	.040	42.0	.001
13.8	40.3				
-176.0	.042	88.3	.042	40.9	.001
11.3	41.8				
-172.0	.043	88.3	.043	39.7	.001
8.6	43.3				
-168.0	.045	88.3	.045	38.4	.002
5.6	44.9				

-164.0	.046	88.4	.046	37.1	.002
2.3	46.5				
-160.0	.048	88.4	.048	35.7	.002
-1.5	48.1				
-156.0	.050	88.5	.050	34.1	.002
-5.7	49.7				
-152.0	.051	88.5	.051	32.5	.002
-10.4	51.3				
-148.0	.053	88.6	.053	30.8	.002
-15.8	52.9				
-144.0	.055	88.7	.055	28.9	.002
-21.8	54.5				
-140.0	.056	88.8	.056	26.8	.002
-28.6	56.0				
-136.0	.058	88.9	.058	24.6	.002
-36.2	57.4				
-132.0	.059	89.0	.059	22.0	.002
-44.4	58.7				
-128.0	.060	89.2	.060	19.2	.003
-53.2	59.8				
-124.0	.061	89.4	.061	16.0	.003
-62.3	60.7				
-120.0	.062	89.6	.062	12.2	.004
-71.3	61.4				
-116.0	.062	89.9	.062	7.9	.004
-80.1	61.7				
-112.0	.062	90.1	.062	2.7	.005
-88.4	61.8				
-108.0	.062	90.3	.062	-3.5	.006
-96.1	61.6				
-104.0	.062	90.2	.062	-11.2	.008
-103.2	61.3				
-100.0	.062	89.8	.062	-20.7	.009
-109.7	61.2				
-96.0	.062	88.7	.062	-32.3	.012
-115.7	62.2				
-92.0	.066	86.6	.065	-46.2	.015
-121.3	65.4				
-88.0	.073	83.6	.072	-61.6	.018
-126.5	72.5				
-84.0	.086	80.7	.085	-77.0	.023
-131.5	85.4				
-80.0	.107	78.7	.105	-91.2	.029
-136.3	106.1				
-76.0	.138	77.7	.135	-103.3	.036
-140.9	136.1				
-72.0	.180	77.4	.175	-113.6	.045
-145.4	177.2				
-68.0	.235	77.3	.229	-122.2	.057
-149.9	231.9				

-64.0	.307	77.4	.300	-129.5	.073
-154.2	303.3				
-60.0	.400	77.6	.391	-136.0	.092
-158.5	395.5				
-56.0	.519	77.8	.508	-141.8	.117
-162.6	513.8				
-52.0	.672	78.0	.657	-147.1	.148
-166.7	664.9				
-48.0	.865	78.2	.847	-152.0	.185
-170.6	856.6				
-44.0	1.108	78.6	1.086	-156.6	.230
-174.3	1097.2				
-40.0	1.408	79.0	1.383	-160.9	.280
-178.1	1394.2				
-36.0	1.770	79.7	1.741	-164.8	.330
178.2	1751.1				
-32.0	2.186	80.7	2.157	-168.5	.370
174.0	2161.5				
-28.0	2.634	82.1	2.609	-172.0	.383
168.4	2601.5				
-24.0	3.062	84.1	3.046	-175.4	.348
159.0	3020.3				
-20.0	3.392	86.7	3.387	-179.0	.268
137.3	3338.7				
-16.0	3.530	90.0	3.530	176.8	.246
86.9	3464.2				
-12.0	3.408	93.7	3.401	170.9	.416
49.2	3332.8				
-8.0	3.041	97.2	3.018	161.3	.642
36.3	2967.2				
-4.0	2.575	97.7	2.553	144.8	.812
31.8	2530.5				
.0	2.328	90.0	2.328	120.0	.873
30.0	2321.6				
4.0	2.575	82.3	2.553	95.2	.812
28.2	2530.5				
8.0	3.041	82.8	3.018	78.7	.642
23.7	2967.2				
12.0	3.408	86.3	3.401	69.1	.416
10.8	3332.8				
16.0	3.530	90.0	3.530	63.2	.246
-26.9	3464.2				
20.0	3.392	93.3	3.387	59.0	.268
-77.3	3338.7				
24.0	3.062	95.9	3.046	55.4	.348
-99.0	3020.3				
28.0	2.634	97.9	2.609	52.0	.383
-108.4	2601.5				
32.0	2.186	99.3	2.157	48.5	.370
-114.0	2161.5				

36.0	1.770	100.3	1.741	44.8	.330
-118.2	1751.1				
40.0	1.408	101.0	1.383	40.9	.280
-121.9	1394.2				
44.0	1.108	101.4	1.086	36.6	.230
-125.7	1097.2				
48.0	.865	101.8	.847	32.0	.185
-129.4	856.6				
52.0	.672	102.0	.657	27.1	.148
-133.3	664.9				
56.0	.519	102.2	.508	21.8	.117
-137.4	513.8				
60.0	.400	102.4	.391	16.0	.092
-141.5	395.5				
64.0	.307	102.6	.300	9.5	.073
-145.8	303.3				
68.0	.235	102.7	.229	2.2	.057
-150.1	231.9				
72.0	.180	102.6	.175	-6.4	.045
-154.6	177.2				
76.0	.138	102.3	.135	-16.7	.036
-159.1	136.1				
80.0	.107	101.3	.105	-28.8	.029
-163.7	106.1				
84.0	.086	99.3	.085	-43.0	.023
-168.5	85.4				
88.0	.073	96.4	.072	-58.4	.018
-173.5	72.5				
92.0	.066	93.4	.065	-73.8	.015
-178.7	65.4				
96.0	.062	91.3	.062	-87.7	.012
175.7	62.2				
100.0	.062	90.2	.062	-99.3	.009
169.7	61.2				
104.0	.062	89.8	.062	-108.8	.008
163.2	61.3				
108.0	.062	89.7	.062	-116.5	.006
156.1	61.6				
112.0	.062	89.9	.062	-122.7	.005
148.4	61.8				
116.0	.062	90.1	.062	-127.9	.004
140.1	61.7				
120.0	.062	90.4	.062	-132.2	.004
131.3	61.4				
124.0	.061	90.6	.061	-136.0	.003
122.3	60.7				
128.0	.060	90.8	.060	-139.2	.003
113.2	59.8				
132.0	.059	91.0	.059	-142.0	.002
104.4	58.7				

136.0	.058	91.1	.058	-144.6	.002
96.2	57.4				
140.0	.056	91.2	.056	-146.8	.002
88.6	56.0				
144.0	.055	91.3	.055	-148.9	.002
81.8	54.5				
148.0	.053	91.4	.053	-150.8	.002
75.8	52.9				
152.0	.051	91.5	.051	-152.5	.002
70.4	51.3				
156.0	.050	91.5	.050	-154.1	.002
65.7	49.7				
160.0	.048	91.6	.048	-155.7	.002
61.5	48.1				
164.0	.046	91.6	.046	-157.1	.002
57.7	46.5				
168.0	.045	91.7	.045	-158.4	.002
54.4	44.9				
172.0	.043	91.7	.043	-159.7	.001
51.4	43.3				
176.0	.042	91.7	.042	-160.9	.001
48.7	41.8				
180.0	.040	91.7	.040	-162.0	.001
46.2	40.3				
184.0	.039	91.7	.039	-163.1	.001
44.0	38.9				
188.0	.037	91.7	.037	-164.1	.001
41.9	37.5				
192.0	.036	91.7	.036	-165.1	.001
40.0	36.1				
196.0	.035	91.7	.035	-166.1	.001
38.2	34.8				

1MAGNETIC FIELD CALCULATIONS

SENSOR HT. = 3.3 FEET

DIST FROM REFERENCE FEET	B-FIELD (GAUSS)	THETA	BY-FIELD (GAUSS)	THETAY	BX-FIELD (GAUSS)	THETAX
-200.0	.00099799	-139.1	.00079135	243.7	.00084806	182.2
-196.0	.00105585	-138.4	.00084313	243.0	.00089206	181.5
-192.0	.00111820	-137.6	.00089934	242.2	.00093903	180.7
-188.0	.00118545	-136.8	.00096044	241.4	.00098919	180.0
-184.0	.00125809	-135.9	.00102697	240.6	.00104282	179.2
-180.0	.00133667	-135.0	.00109950	239.8	.00110020	178.3
-176.0	.00142179	-134.1	.00117868	239.0	.00116166	177.4
-172.0	.00151413	-133.2	.00126527	238.1	.00122755	176.5

-168.0	.00161445	-132.2	.00136009	237.3	.00129826	175.5
-164.0	.00172361	-131.2	.00146409	236.4	.00137422	174.4
-160.0	.00184259	-130.1	.00157834	235.4	.00145591	173.3
-156.0	.00197249	-129.0	.00170405	234.5	.00154387	172.1
-152.0	.00211456	-127.8	.00184261	233.5	.00163869	170.8
-148.0	.00227021	-126.6	.00199557	232.4	.00174104	169.4
-144.0	.00244106	-125.3	.00216474	231.4	.00185168	168.0
-140.0	.00262897	-124.0	.00235214	230.3	.00197146	166.4
-136.0	.00283604	-122.6	.00256010	229.1	.00210136	164.7
-132.0	.00306472	-121.2	.00279129	227.9	.00224248	162.9
-128.0	.00331780	-119.7	.00304878	226.7	.00239610	160.9
-124.0	.00359851	-118.1	.00333608	225.4	.00256372	158.8
-120.0	.00391061	-116.5	.00365721	224.0	.00274709	156.6
-116.0	.00425846	-114.7	.00401682	222.6	.00294827	154.1
-112.0	.00464714	-112.9	.00442029	221.1	.00316974	151.5
-108.0	.00508259	-111.0	.00487377	219.5	.00341446	148.6
-104.0	.00557182	-108.9	.00538442	217.9	.00368608	145.5
-100.0	.00612307	-106.8	.00596046	216.2	.00398908	142.0
-96.0	.00674610	-104.5	.00661142	214.3	.00432907	138.3
-92.0	.00745253	-102.1	.00734826	212.4	.00471311	134.3
-88.0	.00825622	-99.6	.00818360	210.3	.00515027	129.9
-84.0	.00917383	-96.9	.00913186	208.1	.00565235	125.1
-80.0	.01022540	-94.0	.01020934	205.7	.00623488	119.9
-76.0	.01143522	-91.0	.01143419	203.2	.00691875	114.2
-72.0	.01283277	-87.7	.01282594	200.6	.00773246	108.1
-68.0	.01445399	-84.1	.01440451	197.7	.00871567	101.4
-64.0	.01634272	-80.2	.01618792	194.7	.00992423	94.2
-60.0	.01855243	-75.9	.01818799	191.4	.01143749	86.5
-56.0	.02114806	-71.2	.02040255	188.0	.01336781	78.4
-52.0	.02420769	-66.0	.02280197	184.2	.01587163	70.0
-48.0	.02782353	-60.2	.02530747	180.2	.01915891	61.4
-44.0	.03210063	-53.6	.02775857	175.7	.02349380	53.0
-40.0	.03715126	-46.2	.02987205	170.6	.02917268	44.9
-36.0	.04308006	-37.7	.03121043	164.3	.03645592	37.5
-32.0	.04995365	-28.1	.03123247	155.7	.04541847	30.8
-28.0	.05774713	-17.2	.02966229	142.3	.05568533	25.0
-24.0	.06626777	-4.8	.02781906	119.7	.06607197	20.1
-20.0	.07508139	8.9	.03083751	87.2	.07431795	15.8
-16.0	.08350748	23.8	.04348730	59.9	.07734800	11.8
-12.0	.09075763	39.7	.06259809	44.7	.07246172	7.1
-8.0	.09618733	56.3	.08178786	36.9	.05916548	-.6
-4.0	.09947403	73.1	.09558731	32.7	.04110210	-17.9
.0	.10056390	90.0	.10056390	30.0	.03044769	-60.0
4.0	.09947403	106.9	.09558731	27.3	.04110213	257.9
8.0	.09618733	123.7	.08178785	23.1	.05916551	240.6
12.0	.09075765	140.3	.06259809	15.3	.07246175	232.9
16.0	.08350749	156.2	.04348729	.1	.07734802	228.2
20.0	.07508142	171.1	.03083750	-27.2	.07431798	224.2
24.0	.06626781	-175.2	.02781907	-59.7	.06607201	219.9
28.0	.05774715	-162.8	.02966230	-82.3	.05568536	215.0

32.0	.04995367	-151.9	.03123248	264.3	.04541849	209.2
36.0	.04308009	-142.3	.03121043	255.7	.03645595	202.5
40.0	.03715128	-133.8	.02987207	249.4	.02917270	195.1
44.0	.03210065	-126.4	.02775858	244.3	.02349382	187.0
48.0	.02782355	-119.8	.02530748	239.8	.01915893	178.6
52.0	.02420772	-114.0	.02280199	235.8	.01587164	170.0
56.0	.02114808	-108.8	.02040257	232.0	.01336782	161.6
60.0	.01855245	-104.1	.01818801	228.6	.01143750	153.5
64.0	.01634273	-99.8	.01618793	225.3	.00992424	145.8
68.0	.01445401	-95.9	.01440453	222.3	.00871568	138.6
72.0	.01283279	-92.3	.01282596	219.4	.00773247	131.9
76.0	.01143524	-89.0	.01143421	216.8	.00691875	125.8
80.0	.01022542	-86.0	.01020936	214.3	.00623488	120.1
84.0	.00917384	-83.1	.00913187	211.9	.00565235	114.9
88.0	.00825623	-80.4	.00818362	209.7	.00515027	110.1
92.0	.00745254	-77.9	.00734827	207.6	.00471310	105.7
96.0	.00674611	-75.5	.00661143	205.7	.00432906	101.7
100.0	.00612309	-73.2	.00596048	203.8	.00398908	98.0
104.0	.00557183	-71.1	.00538443	202.1	.00368608	94.5
108.0	.00508260	-69.0	.00487379	200.5	.00341446	91.4
112.0	.00464715	-67.1	.00442030	198.9	.00316973	88.5
116.0	.00425846	-65.3	.00401683	197.4	.00294827	85.9
120.0	.00391062	-63.5	.00365722	196.0	.00274709	83.4
124.0	.00359852	-61.9	.00333609	194.6	.00256372	81.2
128.0	.00331780	-60.3	.00304879	193.3	.00239610	79.1
132.0	.00306473	-58.8	.00279131	192.1	.00224247	77.1
136.0	.00283605	-57.4	.00256011	190.9	.00210136	75.3
140.0	.00262898	-56.0	.00235215	189.7	.00197146	73.6
144.0	.00244107	-54.7	.00216475	188.6	.00185168	72.0
148.0	.00227021	-53.4	.00199558	187.6	.00174104	70.6
152.0	.00211456	-52.2	.00184262	186.5	.00163869	69.2
156.0	.00197250	-51.0	.00170406	185.5	.00154386	67.9
160.0	.00184260	-49.9	.00157835	184.6	.00145591	66.7
164.0	.00172362	-48.8	.00146410	183.6	.00137421	65.6
168.0	.00161446	-47.8	.00136010	182.7	.00129825	64.5
172.0	.00151413	-46.8	.00126528	181.9	.00122755	63.5
176.0	.00142180	-45.9	.00117869	181.0	.00116166	62.6
180.0	.00133668	-45.0	.00109950	180.2	.00110020	61.7
184.0	.00125810	-44.1	.00102698	179.4	.00104282	60.8
188.0	.00118545	-43.2	.00096045	178.6	.00098919	60.0
192.0	.00111820	-42.4	.00089935	177.8	.00093903	59.3
196.0	.00105586	-41.6	.00084314	177.0	.00089206	58.5

Appendix C. Aboveground 500-kV Generation-tie Transmission Line

[illegible]

INPUT DATA LIST

6/30/2026

15:34:10

SPEEDWAY INTERCONNECT EMF

Run 2 Analysis 2026/6/30

1,0, 3, 3,0.0, 2.00, 1.00,2200.00

(ENGLISH UNITS OPTION)

(GRADIENTS ARE COMPUTED BY PROGRAM)

PHYSICAL SYSTEM CONSISTS OF 3 CONDUCTORS, OF WHICH 3 ARE ENERGIZED PHASES

OPTIONS: EF,MF,AN

4.921,	6.562,	9.842,	1.000,	75.000,	7.000,	3.280,	6.700,	3.280	
'500A	','A',	-20.00,	50.00,	2,	1.590,	18.000,	288.700,	.000,	1.700,
.000									
'500B	','A',	.00,	50.00,	2,	1.590,	18.000,	288.700,	120.000,	1.700,
.000									
'500C	','A',	20.00,	50.00,	2,	1.590,	18.000,	288.700,	240.000,	1.700,
.000									
100	-200.0	4.0							

1AUDIBLE NOISE CALCULATION - RAIN

DIST FROM REFERENCE (FEET)	TOTALS				
	L5 (DBA)	L50 (DBA)	500A	500B	500C
-200.0	59.9	56.4	49.6	54.3	48.6
-196.0	60.0	56.5	49.7	54.4	48.7
-192.0	60.1	56.6	49.8	54.5	48.8
-188.0	60.2	56.7	49.9	54.6	48.9
-184.0	60.3	56.8	50.0	54.7	49.0
-180.0	60.4	56.9	50.1	54.8	49.1
-176.0	60.5	57.0	50.2	54.9	49.2
-172.0	60.6	57.1	50.4	55.0	49.3
-168.0	60.7	57.2	50.5	55.1	49.4
-164.0	60.8	57.3	50.6	55.2	49.5
-160.0	60.9	57.4	50.7	55.3	49.6
-156.0	61.0	57.5	50.9	55.4	49.7

-152.0	61.1	57.6	51.0	55.6	49.8
-148.0	61.3	57.8	51.1	55.7	49.9
-144.0	61.4	57.9	51.3	55.8	50.0
-140.0	61.5	58.0	51.4	55.9	50.1
-136.0	61.6	58.1	51.6	56.1	50.2
-132.0	61.8	58.3	51.7	56.2	50.4
-128.0	61.9	58.4	51.9	56.3	50.5
-124.0	62.1	58.6	52.0	56.5	50.6
-120.0	62.2	58.7	52.2	56.6	50.7
-116.0	62.4	58.9	52.3	56.8	50.9
-112.0	62.5	59.0	52.5	56.9	51.0
-108.0	62.7	59.2	52.7	57.1	51.1
-104.0	62.8	59.3	52.9	57.2	51.3
-100.0	63.0	59.5	53.1	57.4	51.4
-96.0	63.2	59.7	53.3	57.6	51.6
-92.0	63.3	59.8	53.4	57.7	51.7
-88.0	63.5	60.0	53.6	57.9	51.9
-84.0	63.7	60.2	53.9	58.1	52.0
-80.0	63.9	60.4	54.1	58.3	52.2
-76.0	64.1	60.6	54.3	58.5	52.3
-72.0	64.3	60.8	54.5	58.7	52.5
-68.0	64.5	61.0	54.7	58.9	52.7
-64.0	64.7	61.2	54.9	59.1	52.9
-60.0	64.9	61.4	55.1	59.3	53.1
-56.0	65.1	61.6	55.4	59.5	53.3
-52.0	65.3	61.8	55.6	59.7	53.4
-48.0	65.5	62.0	55.8	59.9	53.6
-44.0	65.7	62.2	56.0	60.1	53.9
-40.0	65.9	62.4	56.1	60.4	54.1
-36.0	66.1	62.6	56.3	60.6	54.3
-32.0	66.3	62.8	56.4	60.8	54.5
-28.0	66.5	63.0	56.5	61.0	54.7
-24.0	66.7	63.2	56.6	61.2	54.9
-20.0	66.8	63.3	56.6	61.3	55.1
-16.0	66.9	63.4	56.6	61.5	55.4
-12.0	67.0	63.5	56.5	61.6	55.6
-8.0	67.1	63.6	56.4	61.7	55.8
-4.0	67.2	63.7	56.3	61.8	56.0
.0	67.2	63.7	56.1	61.8	56.1
4.0	67.2	63.7	56.0	61.8	56.3
8.0	67.1	63.6	55.8	61.7	56.4
12.0	67.0	63.5	55.6	61.6	56.5
16.0	66.9	63.4	55.4	61.5	56.6
20.0	66.8	63.3	55.1	61.3	56.6
24.0	66.7	63.2	54.9	61.2	56.6
28.0	66.5	63.0	54.7	61.0	56.5
32.0	66.3	62.8	54.5	60.8	56.4
36.0	66.1	62.6	54.3	60.6	56.3
40.0	65.9	62.4	54.1	60.4	56.1
44.0	65.7	62.2	53.9	60.1	56.0

48.0	65.5	62.0	53.6	59.9	55.8
52.0	65.3	61.8	53.4	59.7	55.6
56.0	65.1	61.6	53.3	59.5	55.4
60.0	64.9	61.4	53.1	59.3	55.1
64.0	64.7	61.2	52.9	59.1	54.9
68.0	64.5	61.0	52.7	58.9	54.7
72.0	64.3	60.8	52.5	58.7	54.5
76.0	64.1	60.6	52.3	58.5	54.3
80.0	63.9	60.4	52.2	58.3	54.1
84.0	63.7	60.2	52.0	58.1	53.9
88.0	63.5	60.0	51.9	57.9	53.6
92.0	63.3	59.8	51.7	57.7	53.4
96.0	63.2	59.7	51.6	57.6	53.3
100.0	63.0	59.5	51.4	57.4	53.1
104.0	62.8	59.3	51.3	57.2	52.9
108.0	62.7	59.2	51.1	57.1	52.7
112.0	62.5	59.0	51.0	56.9	52.5
116.0	62.4	58.9	50.9	56.8	52.3
120.0	62.2	58.7	50.7	56.6	52.2
124.0	62.1	58.6	50.6	56.5	52.0
128.0	61.9	58.4	50.5	56.3	51.9
132.0	61.8	58.3	50.4	56.2	51.7
136.0	61.6	58.1	50.2	56.1	51.6
140.0	61.5	58.0	50.1	55.9	51.4
144.0	61.4	57.9	50.0	55.8	51.3
148.0	61.3	57.8	49.9	55.7	51.1
152.0	61.1	57.6	49.8	55.6	51.0
156.0	61.0	57.5	49.7	55.4	50.9
160.0	60.9	57.4	49.6	55.3	50.7
164.0	60.8	57.3	49.5	55.2	50.6
168.0	60.7	57.2	49.4	55.1	50.5
172.0	60.6	57.1	49.3	55.0	50.4
176.0	60.5	57.0	49.2	54.9	50.2
180.0	60.4	56.9	49.1	54.8	50.1
184.0	60.3	56.8	49.0	54.7	50.0
188.0	60.2	56.7	48.9	54.6	49.9
192.0	60.1	56.6	48.8	54.5	49.8
196.0	60.0	56.5	48.7	54.4	49.7

1AUDIBLE NOISE CALCULATION - FAIR

DIST FROM REFERENCE (FEET)	TOTALS L5 (DBA)	L50 (DBA)	500A	500B	500C
-200.0	34.9	31.4	24.6	29.3	23.6
-196.0	35.0	31.5	24.7	29.4	23.7
-192.0	35.1	31.6	24.8	29.5	23.8
-188.0	35.2	31.7	24.9	29.6	23.9

-184.0	35.3	31.8	25.0	29.7	24.0
-180.0	35.4	31.9	25.1	29.8	24.1
-176.0	35.5	32.0	25.2	29.9	24.2
-172.0	35.6	32.1	25.4	30.0	24.3
-168.0	35.7	32.2	25.5	30.1	24.4
-164.0	35.8	32.3	25.6	30.2	24.5
-160.0	35.9	32.4	25.7	30.3	24.6
-156.0	36.0	32.5	25.9	30.4	24.7
-152.0	36.1	32.6	26.0	30.6	24.8
-148.0	36.3	32.8	26.1	30.7	24.9
-144.0	36.4	32.9	26.3	30.8	25.0
-140.0	36.5	33.0	26.4	30.9	25.1
-136.0	36.6	33.1	26.6	31.1	25.2
-132.0	36.8	33.3	26.7	31.2	25.4
-128.0	36.9	33.4	26.9	31.3	25.5
-124.0	37.1	33.6	27.0	31.5	25.6
-120.0	37.2	33.7	27.2	31.6	25.7
-116.0	37.4	33.9	27.3	31.8	25.9
-112.0	37.5	34.0	27.5	31.9	26.0
-108.0	37.7	34.2	27.7	32.1	26.1
-104.0	37.8	34.3	27.9	32.2	26.3
-100.0	38.0	34.5	28.1	32.4	26.4
-96.0	38.2	34.7	28.3	32.6	26.6
-92.0	38.3	34.8	28.4	32.7	26.7
-88.0	38.5	35.0	28.6	32.9	26.9
-84.0	38.7	35.2	28.9	33.1	27.0
-80.0	38.9	35.4	29.1	33.3	27.2
-76.0	39.1	35.6	29.3	33.5	27.3
-72.0	39.3	35.8	29.5	33.7	27.5
-68.0	39.5	36.0	29.7	33.9	27.7
-64.0	39.7	36.2	29.9	34.1	27.9
-60.0	39.9	36.4	30.1	34.3	28.1
-56.0	40.1	36.6	30.4	34.5	28.3
-52.0	40.3	36.8	30.6	34.7	28.4
-48.0	40.5	37.0	30.8	34.9	28.6
-44.0	40.7	37.2	31.0	35.1	28.9
-40.0	40.9	37.4	31.1	35.4	29.1
-36.0	41.1	37.6	31.3	35.6	29.3
-32.0	41.3	37.8	31.4	35.8	29.5
-28.0	41.5	38.0	31.5	36.0	29.7
-24.0	41.7	38.2	31.6	36.2	29.9
-20.0	41.8	38.3	31.6	36.3	30.1
-16.0	41.9	38.4	31.6	36.5	30.4
-12.0	42.0	38.5	31.5	36.6	30.6
-8.0	42.1	38.6	31.4	36.7	30.8
-4.0	42.2	38.7	31.3	36.8	31.0
.0	42.2	38.7	31.1	36.8	31.1
4.0	42.2	38.7	31.0	36.8	31.3
8.0	42.1	38.6	30.8	36.7	31.4
12.0	42.0	38.5	30.6	36.6	31.5

16.0	41.9	38.4	30.4	36.5	31.6
20.0	41.8	38.3	30.1	36.3	31.6
24.0	41.7	38.2	29.9	36.2	31.6
28.0	41.5	38.0	29.7	36.0	31.5
32.0	41.3	37.8	29.5	35.8	31.4
36.0	41.1	37.6	29.3	35.6	31.3
40.0	40.9	37.4	29.1	35.4	31.1
44.0	40.7	37.2	28.9	35.1	31.0
48.0	40.5	37.0	28.6	34.9	30.8
52.0	40.3	36.8	28.4	34.7	30.6
56.0	40.1	36.6	28.3	34.5	30.4
60.0	39.9	36.4	28.1	34.3	30.1
64.0	39.7	36.2	27.9	34.1	29.9
68.0	39.5	36.0	27.7	33.9	29.7
72.0	39.3	35.8	27.5	33.7	29.5
76.0	39.1	35.6	27.3	33.5	29.3
80.0	38.9	35.4	27.2	33.3	29.1
84.0	38.7	35.2	27.0	33.1	28.9
88.0	38.5	35.0	26.9	32.9	28.6
92.0	38.3	34.8	26.7	32.7	28.4
96.0	38.2	34.7	26.6	32.6	28.3
100.0	38.0	34.5	26.4	32.4	28.1
104.0	37.8	34.3	26.3	32.2	27.9
108.0	37.7	34.2	26.1	32.1	27.7
112.0	37.5	34.0	26.0	31.9	27.5
116.0	37.4	33.9	25.9	31.8	27.3
120.0	37.2	33.7	25.7	31.6	27.2
124.0	37.1	33.6	25.6	31.5	27.0
128.0	36.9	33.4	25.5	31.3	26.9
132.0	36.8	33.3	25.4	31.2	26.7
136.0	36.6	33.1	25.2	31.1	26.6
140.0	36.5	33.0	25.1	30.9	26.4
144.0	36.4	32.9	25.0	30.8	26.3
148.0	36.3	32.8	24.9	30.7	26.1
152.0	36.1	32.6	24.8	30.6	26.0
156.0	36.0	32.5	24.7	30.4	25.9
160.0	35.9	32.4	24.6	30.3	25.7
164.0	35.8	32.3	24.5	30.2	25.6
168.0	35.7	32.2	24.4	30.1	25.5
172.0	35.6	32.1	24.3	30.0	25.4
176.0	35.5	32.0	24.2	29.9	25.2
180.0	35.4	31.9	24.1	29.8	25.1
184.0	35.3	31.8	24.0	29.7	25.0
188.0	35.2	31.7	23.9	29.6	24.9
192.0	35.1	31.6	23.8	29.5	24.8
196.0	35.0	31.5	23.7	29.4	24.7

1ELECTRIC FIELD CALCULATIONS

SPEEDWAY INTERCONNECT EMF

Run 2 Analysis 2026/6/30

	DIST. FROM REFERENCE FEET	HEIGHT FEET	MAXIMUM GRADIENT (KV/CM)	SUBCON. DIAM. (IN)	NO. OF SUBCON.	PHASE ANGLE (DEGREES)
500A	-20.00	50.00	17.57	1.59	2	.0
500B	.00	50.00	19.42	1.59	2	120.0
500C	20.00	50.00	17.57	1.59	2	240.0

SENSOR HT. = 3.3 FEET

DIST FROM REFERENCE THETAX FEET (DEGREES)	E-FIELD SPACE POTENTIAL (KV/METER) (VOLTS)	THETA (DEGREES)	EY-FIELD (KV/METER)	THETAY (DEGREES)	EX-FIELD (KV/METER)
-200.0	.165	87.4	.165	-170.6	.007
-167.6	165.4				
-196.0	.175	87.4	.175	-170.4	.008
-167.5	174.8				
-192.0	.185	87.3	.185	-170.3	.009
-167.5	184.9				
-188.0	.196	87.3	.196	-170.1	.009
-167.4	195.8				
-184.0	.208	87.2	.207	-170.0	.010
-167.4	207.5				
-180.0	.220	87.2	.220	-169.8	.011
-167.3	220.2				
-176.0	.234	87.1	.234	-169.7	.012
-167.3	234.0				
-172.0	.249	87.1	.249	-169.5	.013
-167.2	248.9				
-168.0	.265	87.0	.265	-169.4	.014
-167.2	265.1				
-164.0	.283	87.0	.282	-169.2	.015
-167.2	282.7				
-160.0	.302	86.9	.301	-169.1	.016
-167.1	301.8				
-156.0	.323	86.8	.322	-169.0	.018
-167.1	322.6				
-152.0	.346	86.8	.345	-168.8	.020
-167.1	345.4				
-148.0	.370	86.7	.370	-168.7	.021
-167.1	370.3				
-144.0	.398	86.6	.397	-168.6	.023
-167.0	397.5				
-140.0	.428	86.6	.427	-168.5	.026
-167.0	427.3				
-136.0	.460	86.5	.459	-168.4	.028

-167.0	460.1				
-132.0	.496	86.4	.495	-168.3	.031
-167.0	496.1				
-128.0	.536	86.3	.535	-168.2	.034
-167.0	535.8				
-124.0	.580	86.3	.579	-168.1	.038
-167.0	579.5				
-120.0	.628	86.2	.627	-168.0	.042
-167.0	627.8				
-116.0	.682	86.1	.680	-167.9	.046
-167.0	681.2				
-112.0	.741	86.1	.739	-167.9	.051
-166.9	740.3				
-108.0	.806	86.0	.804	-167.8	.056
-166.9	805.8				
-104.0	.879	85.9	.877	-167.7	.063
-166.9	878.3				
-100.0	.960	85.9	.957	-167.6	.069
-166.8	958.7				
-96.0	1.049	85.8	1.046	-167.6	.077
-166.7	1047.9				
-92.0	1.148	85.7	1.145	-167.5	.085
-166.6	1146.7				
-88.0	1.257	85.7	1.254	-167.4	.094
-166.5	1256.0				
-84.0	1.378	85.7	1.374	-167.3	.104
-166.2	1376.7				
-80.0	1.511	85.7	1.507	-167.2	.114
-166.0	1509.4				
-76.0	1.657	85.7	1.652	-167.1	.125
-165.6	1654.9				
-72.0	1.816	85.7	1.811	-166.9	.135
-165.1	1813.1				
-68.0	1.987	85.8	1.982	-166.8	.145
-164.4	1983.6				
-64.0	2.169	86.0	2.164	-166.5	.153
-163.4	2165.0				
-60.0	2.360	86.2	2.355	-166.2	.158
-162.1	2354.8				
-56.0	2.555	86.4	2.550	-165.9	.160
-160.1	2548.6				
-52.0	2.748	86.8	2.743	-165.4	.155
-157.2	2740.0				
-48.0	2.929	87.3	2.926	-164.7	.143
-152.6	2920.0				
-44.0	3.088	87.9	3.086	-163.9	.122
-144.5	3076.7				
-40.0	3.210	88.6	3.209	-162.9	.095
-128.0	3195.8				
-36.0	3.278	89.5	3.278	-161.6	.076

-92.2	3261.0				
-32.0	3.277	90.7	3.277	-159.9	.099
-47.4	3255.7				
-28.0	3.191	92.0	3.189	-157.6	.160
-23.1	3165.3				
-24.0	3.011	93.7	3.005	-154.7	.238
-10.7	2979.8				
-20.0	2.735	95.7	2.721	-150.9	.319
-2.6	2696.4				
-16.0	2.370	98.3	2.345	-145.7	.394
4.0	2322.0				
-12.0	1.934	101.8	1.894	-138.4	.457
10.2	1873.9				
-8.0	1.461	106.7	1.402	-126.7	.503
16.5	1384.4				
-4.0	1.005	112.7	.940	-104.6	.530
23.2	923.0				
.0	.709	90.0	.709	-60.0	.540
30.0	691.7				
4.0	1.005	67.3	.940	-15.4	.530
36.8	923.0				
8.0	1.461	73.3	1.402	6.7	.503
43.5	1384.4				
12.0	1.934	78.2	1.894	18.4	.457
49.8	1873.9				
16.0	2.370	81.7	2.345	25.7	.394
56.0	2322.0				
20.0	2.735	84.3	2.721	30.9	.319
62.6	2696.4				
24.0	3.011	86.3	3.005	34.7	.238
70.7	2979.8				
28.0	3.191	88.0	3.189	37.6	.160
83.1	3165.3				
32.0	3.277	89.3	3.277	39.9	.099
107.4	3255.7				
36.0	3.278	90.5	3.278	41.6	.076
152.2	3261.0				
40.0	3.210	91.4	3.209	42.9	.095
-172.0	3195.8				
44.0	3.088	92.1	3.086	43.9	.122
-155.5	3076.7				
48.0	2.929	92.7	2.926	44.7	.143
-147.4	2920.0				
52.0	2.748	93.2	2.743	45.4	.155
-142.8	2740.0				
56.0	2.555	93.6	2.550	45.9	.160
-139.9	2548.6				
60.0	2.360	93.8	2.355	46.2	.158
-137.9	2354.8				
64.0	2.169	94.0	2.164	46.5	.153

-136.6	2165.0				
68.0	1.987	94.2	1.982	46.8	.145
-135.6	1983.6				
72.0	1.816	94.3	1.811	46.9	.135
-134.9	1813.1				
76.0	1.657	94.3	1.652	47.1	.125
-134.4	1654.9				
80.0	1.511	94.3	1.507	47.2	.114
-134.0	1509.4				
84.0	1.378	94.3	1.374	47.3	.104
-133.8	1376.7				
88.0	1.257	94.3	1.254	47.4	.094
-133.5	1256.0				
92.0	1.148	94.3	1.145	47.5	.085
-133.4	1146.7				
96.0	1.049	94.2	1.046	47.6	.077
-133.3	1047.9				
100.0	.960	94.1	.957	47.6	.069
-133.2	958.7				
104.0	.879	94.1	.877	47.7	.063
-133.1	878.3				
108.0	.806	94.0	.804	47.8	.056
-133.1	805.8				
112.0	.741	93.9	.739	47.9	.051
-133.1	740.3				
116.0	.682	93.9	.680	47.9	.046
-133.0	681.2				
120.0	.628	93.8	.627	48.0	.042
-133.0	627.8				
124.0	.580	93.7	.579	48.1	.038
-133.0	579.5				
128.0	.536	93.7	.535	48.2	.034
-133.0	535.8				
132.0	.496	93.6	.495	48.3	.031
-133.0	496.1				
136.0	.460	93.5	.459	48.4	.028
-133.0	460.1				
140.0	.428	93.4	.427	48.5	.026
-133.0	427.3				
144.0	.398	93.4	.397	48.6	.023
-133.0	397.5				
148.0	.370	93.3	.370	48.7	.021
-132.9	370.3				
152.0	.346	93.2	.345	48.8	.020
-132.9	345.4				
156.0	.323	93.2	.322	49.0	.018
-132.9	322.6				
160.0	.302	93.1	.301	49.1	.016
-132.9	301.8				
164.0	.283	93.0	.282	49.2	.015

-132.8	282.7				
168.0	.265	93.0	.265	49.4	.014
-132.8	265.1				
172.0	.249	92.9	.249	49.5	.013
-132.8	248.9				
176.0	.234	92.9	.234	49.7	.012
-132.7	234.0				
180.0	.220	92.8	.220	49.8	.011
-132.7	220.2				
184.0	.208	92.8	.207	50.0	.010
-132.6	207.5				
188.0	.196	92.7	.196	50.1	.009
-132.6	195.8				
192.0	.185	92.7	.185	50.3	.009
-132.5	184.9				
196.0	.175	92.6	.175	50.4	.008
-132.5	174.8				

1MAGNETIC FIELD CALCULATIONS

SENSOR HT. = 3.3 FEET

DIST FROM REFERENCE FEET	B-FIELD (GAUSS)	THETA	BY-FIELD (GAUSS)	THETAY	BX-FIELD (GAUSS)	THETAX
-200.0	.00925281	-63.4	.00827507	207.2	.00414145	25.4
-196.0	.00961716	-62.9	.00856047	207.2	.00438457	25.3
-192.0	.01000307	-62.3	.00885938	207.2	.00464671	25.2
-188.0	.01041223	-61.8	.00917249	207.1	.00492973	25.2
-184.0	.01084649	-61.1	.00950053	207.1	.00523570	25.1
-180.0	.01130792	-60.5	.00984425	207.1	.00556693	25.0
-176.0	.01179875	-59.9	.01020439	207.0	.00592600	24.9
-172.0	.01232148	-59.2	.01058171	207.0	.00631583	24.8
-168.0	.01287885	-58.5	.01097695	207.0	.00673967	24.7
-164.0	.01347390	-57.7	.01139083	206.9	.00720117	24.6
-160.0	.01410999	-56.9	.01182401	206.9	.00770448	24.5
-156.0	.01479086	-56.1	.01227708	206.9	.00825424	24.4
-152.0	.01552063	-55.2	.01275050	206.9	.00885570	24.3
-148.0	.01630394	-54.3	.01324456	206.9	.00951483	24.2
-144.0	.01714590	-53.4	.01375933	206.8	.01023835	24.0
-140.0	.01805228	-52.3	.01429459	206.8	.01103391	23.9
-136.0	.01902946	-51.3	.01484965	206.8	.01191015	23.8
-132.0	.02008463	-50.1	.01542330	206.9	.01287695	23.7
-128.0	.02122581	-49.0	.01601359	206.9	.01394545	23.5
-124.0	.02246202	-47.7	.01661759	206.9	.01512838	23.4
-120.0	.02380334	-46.3	.01723115	207.0	.01644013	23.3
-116.0	.02526112	-44.9	.01784849	207.1	.01789704	23.1
-112.0	.02684809	-43.4	.01846174	207.2	.01951760	23.0

-108.0	.02857852	-41.8	.01906035	207.3	.02132264	22.9
-104.0	.03046840	-40.1	.01963029	207.5	.02333553	22.7
-100.0	.03253559	-38.2	.02015317	207.8	.02558228	22.6
-96.0	.03480001	-36.2	.02060501	208.1	.02809157	22.5
-92.0	.03728374	-34.1	.02095480	208.5	.03089454	22.3
-88.0	.04001109	-31.8	.02116286	209.1	.03402428	22.2
-84.0	.04300858	-29.3	.02117887	209.9	.03751484	22.1
-80.0	.04630468	-26.7	.02093993	210.9	.04139952	22.0
-76.0	.04992945	-23.8	.02036921	212.3	.04570805	22.0
-72.0	.05391360	-20.7	.01937607	214.4	.05046226	22.0
-68.0	.05828715	-17.3	.01786173	217.5	.05566984	22.0
-64.0	.06307743	-13.6	.01574040	222.5	.06131534	22.1
-60.0	.06830591	-9.6	.01301459	231.5	.06734814	22.2
-56.0	.07398409	-5.3	.01007299	250.0	.07366715	22.5
-52.0	.08010809	-.7	.00875785	-73.1	.08010293	22.8
-48.0	.08665211	4.4	.01220539	-34.1	.08639956	23.4
-44.0	.09356128	9.9	.01996036	-13.7	.09220049	24.1
-40.0	.10074510	15.7	.03052787	-3.6	.09704594	25.2
-36.0	.10807320	22.0	.04329279	2.3	.10039120	26.6
-32.0	.11537570	28.7	.05783097	6.3	.10165520	28.4
-28.0	.12245030	35.7	.07360233	9.5	.10030260	30.9
-24.0	.12907680	43.0	.08987675	12.3	.09595284	34.3
-20.0	.13503760	50.5	.10576320	15.0	.08849709	38.8
-16.0	.14013920	58.3	.12030300	17.7	.07820300	45.0
-12.0	.14423000	66.1	.13259110	20.6	.06581666	54.0
-8.0	.14720650	74.1	.14188380	23.6	.05276018	67.5
-4.0	.14901000	82.0	.14765730	26.8	.04167361	89.0
.0	.14961350	90.0	.14961350	30.0	.03697748	120.0
4.0	.14901000	98.0	.14765730	33.2	.04167360	151.0
8.0	.14720650	105.9	.14188380	36.4	.05276019	172.5
12.0	.14423000	113.9	.13259110	39.4	.06581667	186.0
16.0	.14013920	121.7	.12030300	42.3	.07820300	195.0
20.0	.13503760	129.5	.10576320	45.0	.08849710	201.2
24.0	.12907680	137.0	.08987674	47.7	.09595285	205.7
28.0	.12245030	144.3	.07360233	50.5	.10030260	209.1
32.0	.11537570	151.3	.05783097	53.7	.10165520	211.6
36.0	.10807320	158.0	.04329279	57.7	.10039120	213.4
40.0	.10074510	164.3	.03052787	63.6	.09704594	214.8
44.0	.09356127	170.1	.01996035	73.7	.09220049	215.9
48.0	.08665211	175.6	.01220539	94.1	.08639956	216.6
52.0	.08010808	-179.3	.00875785	133.1	.08010292	217.2
56.0	.07398409	-174.7	.01007298	170.0	.07366715	217.5
60.0	.06830591	-170.4	.01301460	188.5	.06734814	217.8
64.0	.06307743	-166.4	.01574040	197.5	.06131535	217.9
68.0	.05828715	-162.7	.01786172	202.5	.05566984	218.0
72.0	.05391359	-159.3	.01937607	205.6	.05046226	218.0
76.0	.04992945	-156.2	.02036921	207.7	.04570805	218.0
80.0	.04630469	-153.3	.02093993	209.1	.04139952	218.0
84.0	.04300858	-150.7	.02117887	210.1	.03751485	217.9
88.0	.04001110	-148.2	.02116287	210.9	.03402428	217.8

92.0	.03728374	-145.9	.02095481	211.5	.03089453	217.7
96.0	.03480001	-143.8	.02060501	211.9	.02809157	217.5
100.0	.03253559	-141.8	.02015317	212.2	.02558228	217.4
104.0	.03046840	-139.9	.01963029	212.5	.02333553	217.3
108.0	.02857852	-138.2	.01906035	212.7	.02132264	217.1
112.0	.02684809	-136.6	.01846174	212.8	.01951760	217.0
116.0	.02526112	-135.1	.01784849	212.9	.01789704	216.9
120.0	.02380334	-133.7	.01723116	213.0	.01644013	216.7
124.0	.02246201	-132.3	.01661759	213.1	.01512837	216.6
128.0	.02122581	-131.0	.01601359	213.1	.01394545	216.5
132.0	.02008463	-129.9	.01542330	213.1	.01287694	216.3
136.0	.01902946	-128.7	.01484965	213.2	.01191016	216.2
140.0	.01805227	-127.7	.01429459	213.2	.01103390	216.1
144.0	.01714590	-126.6	.01375933	213.2	.01023835	216.0
148.0	.01630393	-125.7	.01324455	213.1	.00951483	215.8
152.0	.01552063	-124.8	.01275049	213.1	.00885570	215.7
156.0	.01479085	-123.9	.01227708	213.1	.00825424	215.6
160.0	.01410999	-123.1	.01182401	213.1	.00770448	215.5
164.0	.01347390	-122.3	.01139084	213.1	.00720117	215.4
168.0	.01287885	-121.5	.01097696	213.0	.00673967	215.3
172.0	.01232148	-120.8	.01058171	213.0	.00631583	215.2
176.0	.01179875	-120.1	.01020439	213.0	.00592600	215.1
180.0	.01130792	-119.5	.00984425	212.9	.00556693	215.0
184.0	.01084649	-118.9	.00950053	212.9	.00523570	214.9
188.0	.01041223	-118.2	.00917249	212.9	.00492973	214.8
192.0	.01000308	-117.7	.00885938	212.8	.00464671	214.8
196.0	.00961716	-117.1	.00856047	212.8	.00438457	214.7