ATTACHMENT K-1
AGRICULTURAL LANDS ASSESSMENT

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Agricultural Lands Assessment

Boardman to Hemingway Transmission Line Project

1221 West Idaho Street
Boise, Idaho 83702

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ACRONYMS AND ABBREVIATIONS

AIMP	Agricultural Impact Mitigation Plan
Amended pASC	Amended Preliminary Application for Site Certificate
AUM	Animal Unit Month
BPA	Bonneville Power Administration
CFR	Code of Federal Regulations
CRP	Conservation Reserve Program
EFSC	Energy Facility Siting Council
EFU	Exclusive Farm Use
FSA	Farm Service Agency
GIS	Geographic Information System
GPS	Global positioning system
HVF	High Value Farmland
IPC	Idaho Power Company
kV	Kilovolt
NAIP	National Agriculture Imagery Program
NASS	National Agricultural Statistics Service
NOP	National Organic Program
NRCS	Natural Resources Conservation Service
OAIN	Oregon Agricultural Information Network
OAR	Oregon Administrative Rule
ODA	Oregon Department of Agriculture
ODOE	Oregon Department of Energy
ORS	Oregon Revised Statutes
OSP	Organic System Plan
OSU	Oregon State University
Project	Boardman to Hemingway Transmission Line Project
RAI	Request for Additional Information
ROW	Right-of-way
USC	United States Code
USDA	U.S. Department of Agriculture

DEFINITIONS

Agricultural Land: Annually cultivated or rotated land used in the production of crops; land in perennial field crops, orchards, or vineyards; land used for small fruit, nursery crops, greenhouses, or Christmas trees; improved pasture/range and hayfields; land in the Conservation Reserve Program (CRP); and previously cultivated land in government-sponsored environmental or conservation programs, not including land converted to wetlands.

Agricultural Monitor: A monitor retained and funded by Idaho Power Company (IPC), reporting directly to the Oregon Department of Agriculture (ODA) and responsible for auditing IPC's compliance with the provisions of this mitigation plan.

Agricultural Specialist: A specialist retained and funded by IPC, reporting directly to IPC and responsible for providing expert advice during each phase including construction planning, construction, restoration, post-construction monitoring, and follow-up restoration.

Cropland: Includes all *agricultural land* except land used for pasture/range.

Easement: The agreement(s) and/or interest in privately owned agricultural land held by IPC by virtue of which it has the right to construct, operate, and maintain the transmission line together with such other rights and obligations as may be set forth in such agreements.

Final Clean-up: Transmission line activity that occurs after the power line has been constructed. Final clean-up activities include, but are not limited to, removal of construction debris, decompaction of soil as required, installation of permanent erosion control structures, final grading, restoration of fences, and required reseeding. Once final clean-up is finished, landowners will be contacted to settle all damage issues and will be provided a form to sign confirming final settlement.

Landowner: Person(s), or their representatives, holding legal title to agricultural land in the Proposed Corridor, from whom IPC is seeking, or has obtained, a temporary or permanent easement.

Landowner's Designee: Any person(s) legally authorized by a landowner or court of law to make decisions regarding the mitigation or restoration of agricultural impacts to such landowners' property. Any landowner's designee shall provide IPC with a written document signed by the landowner or a court with jurisdiction authorizing the designee to discuss, negotiate, and reach agreements with IPC.

Non-Agricultural Land: Any land that is not *agricultural land* as defined above.

Right-of-Way: The agricultural land included in permanent and temporary easements that IPC acquires for the purpose of constructing, operating, and maintaining the transmission line.

Tenant: Any person lawfully residing on or in possession of property and who operates a farm, has a lease, or pays rent on property for which IPC is seeking or has obtained temporary or permanent easement for from the landowner.

Tile: Artificial subsurface drainage system.

Topsoil: The uppermost part of the soil including the plow layer (Ap horizon) and other A horizons (A1, A2, etc.), but not including transition horizons (AB, AC, BA, E, etc.). It is the surface layer of the soil and generally has the darkest color and the highest content of organic matter.

1.0 OVERVIEW

Idaho Power Company (IPC) is proposing to construct, operate, and maintain a high-voltage electric transmission line between Boardman, Oregon, and the Hemingway Substation in southwestern Idaho as an extension of IPC's electric transmission system. The Project consists of approximately 296.6 miles of electric transmission line, with 272.8 miles located in Oregon and 23.8 miles in Idaho. The Project includes 270.8 miles of single-circuit 500-kilovolt (kV) transmission line, removal of 12 miles of existing 69-kV transmission line, rebuilding of 0.9 mile of a 230-kV transmission line, and rebuilding of 1.1 miles of an existing 138-kV transmission line into a new right-of-way (ROW). Overview maps of the Project location and details of the alternative routes are included as Figures 1-1 and 1-2. Refer to Exhibit B for a complete Project description and maps of the Project.

In support of its Energy Facility Siting Council (EFSC) Amended Preliminary Application for Site Certificate (Amended pASC), IPC provides this Agricultural Lands Assessment, describing agricultural crops and existing agricultural practices on agricultural lands[1] and analyzing the temporary and permanent impacts that would occur as a result of the construction and operation of the Project. The Agricultural Lands Assessment identifies all lands devoted to farm use within the site boundary and surrounding lands within 500 feet of the Site Boundary (Agricultural Assessment Area). The Site Boundary for the 500-kilovolt (kV) transmission line is a 500-foot-wide area within which IPC will locate the transmission line and is described in Exhibit C, Section 3.5, Site Boundary. The Site Boundary for the remaining Project features varies by the type of feature (see Exhibit C, Section 3.5, Table C-24).

[1] For the purposes of this document, the term "agricultural lands" is used to describe lands defined in Oregon Revised Statute (ORS) 215.203(2)(a) as "farm use lands."

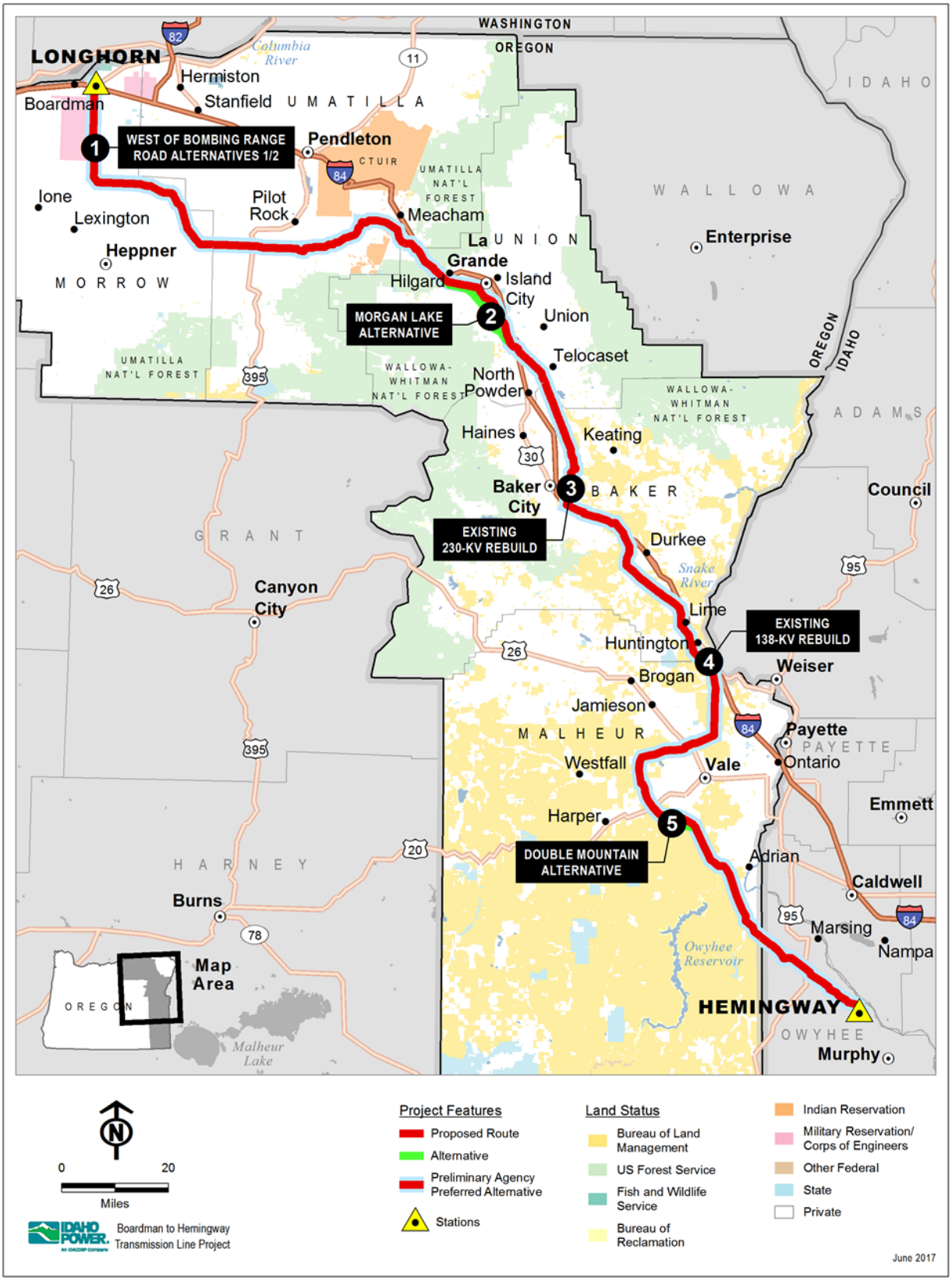

Figure 1-1. Location Map

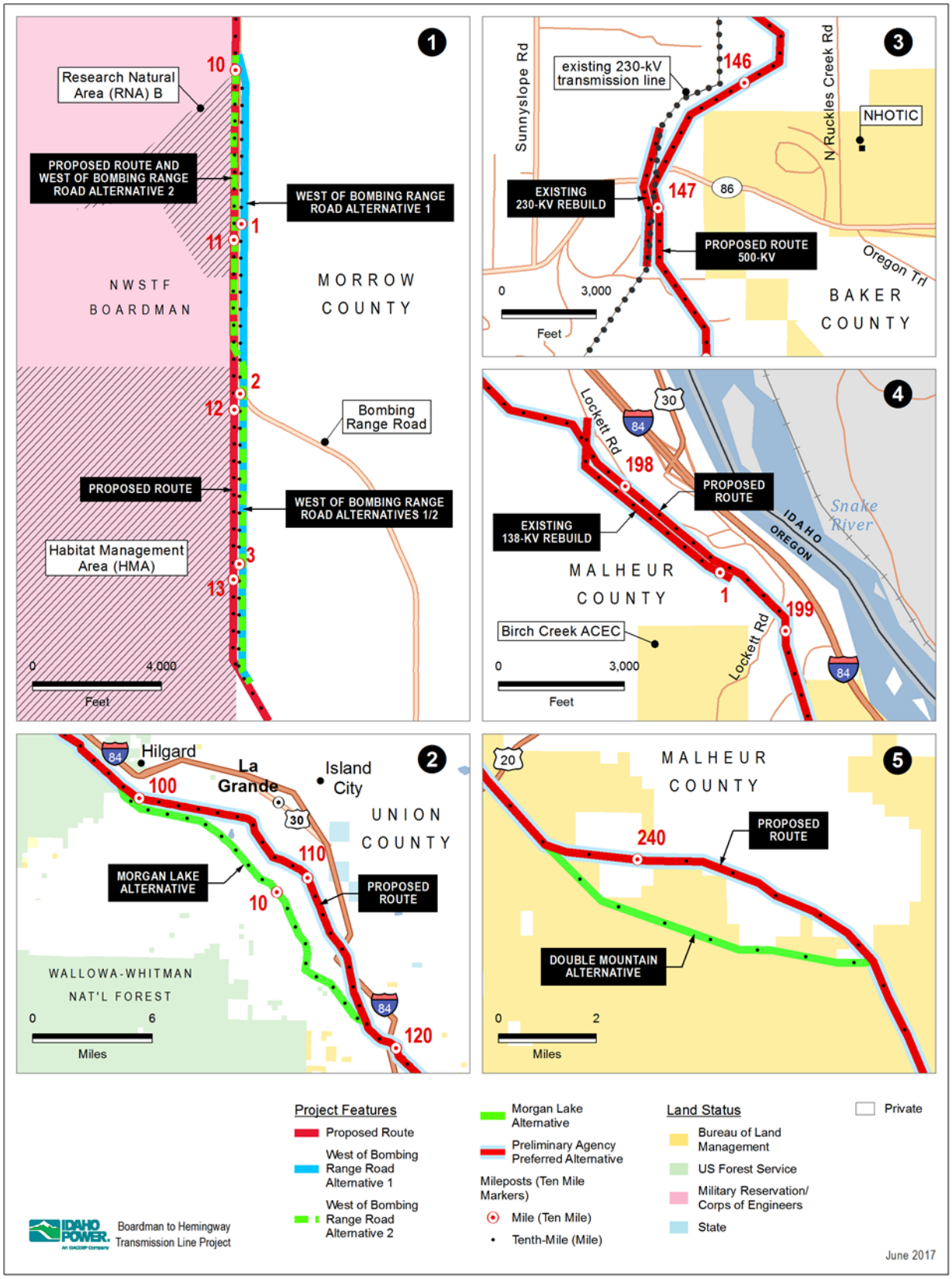

Figure 1-2. Detail of Alternatives and 230-kV and 138-kV Rebuilds

2.0 METHODOLOGY

2.1 Analysis Area

The Analysis Area for Exhibit K is defined as the "area within the site boundary and 500 feet from the site boundary." First Amended Project Order p. 25 (Dec. 22, 2014). This area is larger than the actual disturbance area as described in Section 2.2 below. IPC assessed the agricultural lands within the Analysis Area by reviewing agricultural practices within each relevant county (see Section 3.0).

2.2 Agricultural Assessment Area

The Agricultural Assessment evaluates all farm practices either observed or expected on lands within the site boundary[2] and on surrounding lands within 500 feet of the site boundary (Agricultural Assessment Area), as provided by the Oregon Department of Energy (ODOE). *See* Request for Additional Information 2 (Sept. 25, 2014) (request number K15 states that the assessment should include "surrounding lands within 500 feet of any site boundary, in addition to those lands within the site boundary").

2.3 Agricultural Lands Field Survey

Areas potentially containing agricultural lands within the Agricultural Assessment Area were visually surveyed from public roads. Prior to beginning field surveys, potential agricultural use areas were identified using aerial imagery from 2014 and 2015 National Agriculture Imagery Program and 2016 Google Earth imagery for verification. Fieldwork was conducted during October 2016. The field crew verified the presence and absence of agricultural land uses and noted, where visible from public roads, the type of crop or crops being grown and whether land was under irrigation. Data from the visual surveys were recorded using a laptop computer loaded with aerial imagery and a global positioning system (GPS). A customized data collection form allowed the crew to record information about individual field sites, discernable crop types, and irrigation practices. Crop boundaries were digitized from aerial imagery using ArcGIS. Data gathered from field surveys and landowner surveys were used to estimate the amount and type of agricultural land within the Agricultural Assessment Area. Crop boundaries and resulting acreages in this analysis were derived from ground-truthing aerial imagery and represent an estimate of actual agricultural land uses and practices.

Most of the federal lands were categorized as rangeland or rangeland/timber, except for any federally owned lands that are managed for an agricultural purpose. In those cases, the agricultural crop observed was noted.

2.4 Agricultural Landowner Survey

A survey of agricultural landowners was undertaken based on land parcels crossed by the route as planned in 2011. Landowners identified as having agricultural land uses on their parcels were sent a letter and questionnaire to complete regarding the agricultural uses of their lands. They were provided an opportunity to complete the questionnaire online or return a form. Landowners who did not complete the survey online or return a form were contacted by e-mail then by telephone to complete the survey. Of the 344 parcels identified to have agricultural land uses in

[2] The Site Boundary is defined in OAR 345-001-0010(55) as "the perimeter of the site of the proposed energy facility, its related or supporting facilities, all temporary laydown and staging areas, and all corridors and micrositing corridors proposed by the applicant."

2011, survey data were obtained on 211 (61.3 percent). Because the Amended pASC route was only recently determined, subsequent surveys of agricultural landowners were not attempted.

2.5 Identification of Conservation Reserve Program Agricultural Lands

Some of the agricultural lands within the ApASC corridor in eastern Oregon are currently under contract in U.S. Department of Agriculture (USDA) reserve programs. These programs include the Farm Service Agency's (FSA) CRP, the Natural Resources Conservation Service's (NRCS) Grassland Reserve Program, and the Wetland Reserve Program administered by the NRCS. These lands are not presently used for agriculture, but would likely revert to agricultural use if they were not part of one of the reserve programs. Section 1619 of the 2008 Food, Conservation and Energy Act, 7 United States Code (USC) 8791, limits the disclosure of information about individual landowners or the programs they participate in. IPC will obtain property specific reserve program data for landowners in advance of developing specific mitigation programs.

CRP lands undergo a lengthy certification process that does not allow for easy entry into nor exit from the program. Using several dates of aerial imagery ranging from 1996 to 2014, our analyst was able to determine whether lands recently underwent any tilling, crop cycling, or harvest. The categorization of CRP land was further bolstered by field observations of tilled soil, standing crop stubble, or other typically weedy species. Tilling and standing stubble presence are both indicators of active farming. Presence of weedy or semi-natural species coupled with no evidence of land preparation indicated CRP participation within a particular parcel.

2.6 Compilation of Agricultural Lands Data

Agricultural survey data were compiled based on four main datasets: 1) Individual parcels, 2) county boundaries, 3) field\land use boundaries, and 4) the Agricultural Assessment Area. Although the data were mostly complete for each of these datasets, the parcel data included several unaccounted for areas that coincided with road and water features. These areas appeared to be state or federally owned or federally administered areas. To account for the potential crop/land use of these areas, we returned to the data to assess what type of right-of-way (ROW) best represented these areas. Both transportation (road/transport ROW) and river/stream ROW categories were used to account for these parcel omissions coinciding with either rail-lines or roads and waterbodies.

Performing an exhaustive accounting of crop and land use from data that do not align adds potential error and complexity. Field boundaries, county boundaries, and ROWs often crossed each other within the digital GIS layers. Many of the digital boundaries did not overlap neatly to create clean intersections. For example, a field boundary (digitized from the aerial photo) may cross several parcels and a road ROW. The county line may also intersect one or more of the polygons. Each additional overlapping, but non-aligned, dataset added to gaps, slivers, and overlaps in the final dataset.

Since several areas of the Project corridor were inaccessible, photo-interpretation of crop type required reviewing multiple years of imagery. To determine whether fields were dryland farmed, wheat, or CRP required referencing multiple dates of imagery as well.

In order to account for permanent and temporary construction impacts, areas outside the corridor were assessed. While the total area was relatively small, 1,500+ polygons were examined to determine land use and presence of existing roads.

Additionally, we found it useful to differentiate between areas of rangeland, primarily composed of shrubs and grasses, and rangeland areas with timber. The rangeland timber category is only found in the Blue Mountains between Pilot Rock, Oregon, and La Grande, Oregon.

Maps depicting aerial photographs of the agricultural types in the five-county assessment area were prepared and are provided in Appendix A.

3.0 OREGON AGRICULTURE

In Oregon, gross farm and ranch sales were approximately $5.7 billion in 2014 (USDA National Agricultural Statistics Service (2015). There were approximately 2,928,680 acres harvested for agricultural crops in 2012, not including livestock range or pastureland. In the five-county study area crossed by the Project, gross farm and ranch sales accounted for $1,534,118,000 in 2012.

This section of the report provides a snapshot of Oregon agriculture for the 2012 season in the five-county study area. The crops that farmers choose to grow in any season are generally market-driven but sometimes is a matter of personal preference based on the operator's farming background and is influenced by soil quality, government programs and regulations, proximity to markets, labor availability, land values, availability of adequate irrigation water, and other factors specific to a particular area. Crop selection and planting practices tend to vary from year to year.

The information shown in Figure 3-1 and Table 3-1 was obtained from the Oregon Agricultural Information Network (OAIN) database (Oregon State University [OSU] 2013a) and shows the 2012 gross farm and ranch sales.

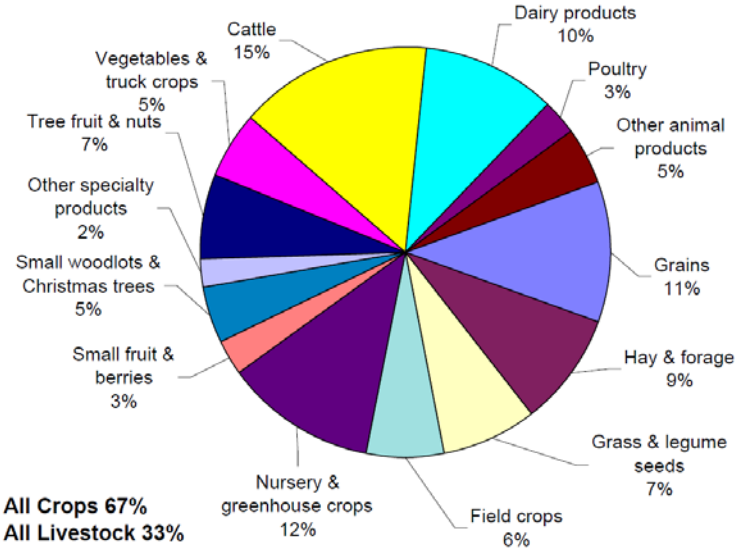

Figure 3-1. 2012 Preliminary Oregon Commodity Sales (OSU 2013a)

Table 3-1. Gross Farm and Ranch Sales by County and Rank within Oregon

County	2012 Gross Farm and Ranch Commodity Sales
Morrow	$482,379,000
Umatilla	$487,096,000
Union	$99,003,000
Baker	$92,244,000
Malheur	$373,396,000
Total for five counties	**$1,534,118,000**

Source: OSU 2013b

Table 3-2 presents acreage summaries of agricultural practices (e.g., crop types) or farm uses identified during the 2016 Agricultural Assessment field surveys. Rangeland, rangeland timber, wheat, and CRP accounted for approximately 80 percent of the total acreage observed. Field crop acreage within the Agricultural Assessment Analysis Area consisted of berries, canola, corn, grass seed, onions, peppermint, potatoes, and sugar beets. Alfalfa hay and wheat made up a major portion of the agricultural crop total and are addressed separately. Hybrid poplar farms, common in Morrow County, are identified in Table 3-2 as woody crops/wood lots. Project routing avoided Concentrated Animal Feeding Operations (CAFOs) within the Analysis Area; consequently, they are not identified in Table 3-2. The primary changes in agricultural use between 2014 and the 2016 surveys were acreage increases in field crops (alfalfa hay, corn, grapes, dry beans, potatoes, sugar beets, and wheat) in 2016 and increases in acres of rangeland and timber.

Table 3-2. Acreages of Agricultural Practices or Farm Uses in the Five-County Assessment Area during 2014 Field Surveys

Agricultural Practice/Farm Use	Temporary Use Area Plus 500-Foot Buffer (acres)	Temporary Construction Disturbance (acres)	Permanent Operations Disturbance (acres)	Total (acres)
Non-irrigated				
Rangeland	16,991.1	574.6	75.1	17,640.8
Rangeland/timber	3,259.8	29.4	7.2	3,296.4
Wheat	681.1	20.8	0.9	702.8
CRP	2,219.6	92.8	12.8	2,325.2
Fallow	275.5	6.9	1.1	283.5
Road/transport ROW	279.4	135.5	117.5	632.4
Pasture	273.7	78.5	0	352.2
Livestock	11.7	0	0	11.7
River/stream ROW	14.7	0	0	14.7
Irrigated				
Field crops	75.4	0	0	75.4
Wheat	157.0	5.0	0	162.0
Christmas trees/woody crops/wood lot	9.8	0	0	9.8
Alfalfa hay	365.2	22.9	7.8	395.9
Fallow	15.4	0	0	15.4
Irrigated pasture	199.3	34.9	0.2	234.4
Unknown	205.4	78.5	0	283.9

3.1 Morrow County

Morrow County was second highest in the state of Oregon for agricultural sales in 2012.The top reported commodities in Morrow County in 2012, in order of total sales, were wheat, potatoes, cattle, and alfalfa hay. Gross farm sales in 2012 for crops were $258 million, and livestock and poultry sales were $252 million. The harvested acreage in Morrow County in 2012 was 252,175

acres[3]. Acreage of irrigated and non-irrigated agricultural lands within the Agricultural Assessment Area in 2016 is shown in Table 3-3.

Table 3-3. Estimated Irrigated and Non-Irrigated Agricultural Acreage in the Morrow County Portion of the Agricultural Assessment Area in 2016

Agricultural Practice/Farm Use	Irrigated Lands (acres)	Non-Irrigated Lands (acres)	Total (acres)
Rangeland		8,649.2	8,649.2
Road/transport ROW		390.2	390.2
River/stream ROW		5.9	5.9
Pasture		107.1	107.1
Wheat	385.9	2,244.2	2,630.1
Alfalfa hay	207.1	7.9	215
Berries	15.9		15.9
Christmas trees/woody crops/wood lots	88.1		88.1
Corn for grain	130.2		130.2
Potatoes	66.3		66.3
Grapes	60.5		76.5
Onions	56.0		56.0
Unknown crop	12.0	8.7	20.7
Livestock		8.7	8.7
Total	**1,022.0**	**11,421.9**	**12,443.9**

3.2 Umatilla County

Umatilla County was third highest in the state of Oregon for agricultural sales in 2012.The top reported commodities in Umatilla County in 2012, in order of total sales, were wheat, cattle, potatoes, apples, and dry storage onions. Gross farm sales in 2012 for crops were $395 million, and livestock and poultry sales were $92 million. The harvested acreage in Umatilla County in 2012 was 297,125 acres[3]. Acreage of irrigated and non-irrigated agricultural lands within the Agricultural Assessment Area in 2016 is shown in Table 3-4.

Table 3-4. Estimated Irrigated and Non-Irrigated Agricultural Acreage in the Umatilla County Portion of the Agricultural Assessment Area in 2016

Agricultural Practice/Farm Use	Irrigated Lands (acres)	Non-Irrigated Lands (acres)	Total (acres)
Rangeland		9,387.0	9,387.0
Rangeland/timber		2,316.9	2,316.9
Road/transport ROW		146.1	146.1
Unknown crop		344.2	344.2
Pasture	5.5	52.0	57.5
Wheat	33.0		33.0
Alfalfa hay	6.6		6.6
Total	**54.1**	**12,246.2**	**12,300.2**

[3] The Oregon Agricultural Information Network (OAIN) no longer publishes detailed county agricultural statistics, consequently the 2012 data best reflects the value of farm sales and harvested acreage and is presented here.

3.3 Union County

The top reported commodities in Union County in 2012, in order of total sales, were wheat, cattle, peppermint for oil, potatoes, and alfalfa hay. Gross farm sales in 2012 for crops were $77 million, and livestock and poultry sales were $22 million. The harvested acreage in Union County in 2012 was 94,680 acres[3]. Acreage of irrigated and non-irrigated agricultural lands within the Agricultural Assessment Area in 2016 is shown in Table 3-5.

Table 3-5. Estimated Irrigated and Non-Irrigated Agricultural Acreage in the Union County Portion of the Agricultural Assessment Area in 2016

Agricultural Practice/ Farm Use	Irrigated Lands (acres)	Non-Irrigated Lands (acres)	Total (acres)
Rangeland		2,925.1	2,925.1
Rangeland/timber		10,700.5	10,700.5
Road/transport ROW		282.3	282.3
River/stream ROW		8.6	8.6
Pasture	47.4	78.8	126.2
Alfalfa hay	65.4		65.4
Livestock	3.6		3.6
Wheat	49.3		49.3
Unknown crop	75.3		75.3
Total	**240.9**	**13,995.3**	**14,236.2**

3.4 Baker County

The top reported commodities in Baker County in 2012, in order of total sales, were cattle, potatoes, wheat, alfalfa hay, and other hay. Gross farm sales in 2012 for crops were $38 million, and livestock and poultry sales were $55 million. The harvested acreage in Baker County in 2012 was 91,700 acres[3]. Acreage of irrigated and non-irrigated agricultural lands within the Agricultural Assessment Area in 2016 is shown in Table 3-6.

Table 3-6. Estimated Irrigated and Non-Irrigated Agricultural Acreage in the Baker County Portion of the Agricultural Assessment Area in 2016

Agricultural Practice/Farm Use	Irrigated Lands (acres)	Non-Irrigated Lands (acres)	Total (acres)
Rangeland	6.5	12,289.3	12,295.8
Rangeland/timber		5,394.2	5,394.2
Road/transport ROW		364.3	364.3
River/stream ROW		1.2	1.2
Pasture	118.1	319.3	437.4
Unknown crop	4.5		4.5
Wheat	21.4		21.4
Marijuana	3.4		3.4
Alfalfa hay	109.9	0.1	110.0
Total	**263.8**	**18,368.4**	**18,632.0**

3.5 Malheur County

Malheur County was fourth in the state of Oregon for agricultural sales in 2012. The top reported commodities in Malheur County in 2012, in order of total sales, were cattle, dry storage

onions, corn for grain, alfalfa hay, and wheat. Gross farm sales in 2012 for crops were $219 million, and livestock and poultry sales were $154 million. The harvested acreage in Malheur County in 2012 was 131,080 acres[3]. Acreage of irrigated and non-irrigated agricultural lands within the Agricultural Assessment Area in 2016 is shown in Table 3-7.

Table 3-7. Estimated Irrigated and Non-Irrigated Agricultural Acreage in the Malheur County Portion of the Agricultural Assessment Area in 2014

Agricultural Practice/ Farm Use	Irrigated Lands (acres)	Non-Irrigated Lands (acres)	Total (acres)
Rangeland	4.0	21,575.6	21,579.6
Road/transport ROW	0.1	184.2	184.3
River/stream ROW		22.1	22.1
Pasture	89.2	244.0	333.2
Wheat	35.3		35.3
Fallow	8.6		8.6
Alfalfa hay	225.5	3.8	225.5
Corn for grain	219.6		219.6
Sugar beets	156.4		156.4
Dry beans	13.6		13.6
Unknown crop	87.0		87.0
Fallow	8.6		8.6
Livestock		3.5	
Total	**847.9**	**22,033.2**	**22,872.3**

The CRP, the largest by far of the reserve programs, is a voluntary federal program for agricultural landowners that protects highly erodible cropland. The USDA is authorized to provide monetary and technical support to private landowners who reserve agricultural lands for protection of wildlife, wildlife habitat, and wetlands. Through CRP, landowners can receive annual rental payments and cost-share assistance to establish long-term, resource-conserving covers on eligible farmland. Contracts are made with landowners to set aside acreage for the reserve programs. The set-asides consist of leases that limit land use to the conservation purposes established within the programs.

In exchange for retiring highly erodible land for a 10- to 15-year period, the landowner is paid a per-acre annual rent and one-half the cost of establishing a permanent cover. The Natural Resource Conservation Service (NRCS) awards contracts based on the following factors:

- Water quality
- Air quality
- Soil erosion
- Wildlife enhancement
- Enduring benefits

Construction of the proposed transmission line could threaten compliance with a CRP contract if above-listed factors are jeopardized. In addition, CRP contracts would need to be revised to compensate for the area occupied by the tower. This area would need to be removed from the contract.

In 2011, 2,271 Oregon farms with over 551,000 acres were enrolled in CRP and received payments totaling $28,631,923 (USDA 2011). Currently the average per acre payment to landowners enrolled in CRP in Oregon is $60 per acre and CRP payments totaled approximately $35,000,000 in 2016.

According to the FSA (Loop 2012), CRP payments made on the tower footprint area will have to be repaid to the FSA at the rate specified in the CRP contract plus interest. The tower footprint area will have to be removed from the CRP contract and not be eligible for future payments. The largest tower has a footprint of about 0.05 acre; therefore, the cost will be minimal. Temporary access roads can be constructed across CRP fields for the installation of transmission towers and lines as long as a waiver is obtained from the FSA and the land is reseeded to CRP specifications immediately after the road has been decommissioned. The acreage of CRP land impacted by permanent access roads would be disqualified from the CRP program.

4.0 AGRICULTURAL CROP PRACTICES

The following information on agricultural practices information for the B2H Project was obtained through visual surveys of the route and from surveys of landowners currently farming and ranching within the Agricultural Assessment Area. This information is provided as a general description of common agricultural practices. This section also addresses the types of impacts associated with transmission lines. The agricultural practices discussed here may vary based on location, equipment types used, variety of crops being grown, seasonal weather conditions, technology, market demands, and other factors. For purposes of this Agricultural Lands Assessment, agricultural land includes annually cultivated or rotated land used in the production of crops; land in perennial field crops, orchards, or vineyards; land used for small fruit, nursery crops, greenhouses, or Christmas trees; improved pasture/range and hayfields; land in the CRP; and previously cultivated land in government-sponsored environmental or conservation programs, not including land converted to wetlands. Cropland includes all agricultural land except land used for pasture/range.

Throughout the planning process, IPC has attempted to avoid siting the transmission line on agricultural lands wherever practical and technically feasible. Public ROWs are used wherever possible to reduce the overall impact on agricultural lands. It is, however, necessary to use agricultural lands for access during construction and to site portions of the Project on agricultural lands.

Most of the agricultural lands within the Agricultural Assessment Area can be considered suitable for the production of field crops. Field crops include a variety of different crop types, and production techniques vary somewhat between each crop. Field crops include all plants grown for agricultural purposes in cultivated fields but do not include orchards, Christmas trees, vineyards, or nursery stock. The most common perennial field crops grown within the Agricultural Assessment Area are field seed and grass seed crops (multiple types), wheat, and alfalfa hay. Descriptions of practices used in production of the field crops shown in Figure 3.1 are presented in this section.

4.1 Establishment of Field Crops

Establishment of field crops includes weed control, field preparation, seed bed preparation, fertilization, and seeding or planting of the crop. Annual crops mature within one season and are replanted each year. Perennial crops live and produce for several years. Perennial crops may require one or more years of development before a crop is produced.

Herbicides may be applied prior to field cultivation where perennial weeds or a heavy sod are present. Soils are tested and analyzed to determine nutrient levels and are supplemented, if necessary, according to the nutrient requirements of the crop being planted. Fertilizer and other soil amendments, such as agricultural lime and dolomite, are applied based on soil tests and previous crop history. Depending on the crop, field preparation may include mowing or chopping of the remaining residue. A subsoiler may be used to break up compacted soils. Fertilizer can be applied with ground-based equipment, a broadcast spreader, aerially, during seed application, or by injection through irrigation lines. Field preparation includes several cultivation operations with a plow, disc, field chisel, or harrow to incorporate residue from the previous crop, control weeds, incorporate fertilizer and soil amendments, and smooth the soil surface. If present, rocks may be removed from the field. The field is cultivated with a harrow or roller to create a smooth, firm seed bed. Seed is planted into a prepared field using a seed drill, which places the proper amount of seed in rows at appropriate depths and then firms the soil around the seed.

Equipment typically used for establishing field crops includes a chopper or flail pulled by a tractor; a subsoiler pulled by a tractor to reduce soil compaction; a plow pulled by a tractor to cut and bury crop residue and weeds; a disk pulled by a tractor to cultivate the soil, cut and mix weeds, and incorporate fertilizer; a chisel plow pulled by a tractor to smooth the soil surface; a harrow pulled by a tractor to prepare a smooth seedbed; a roller pulled by a tractor to lightly compact the soil and provide a firm seedbed; a fertilizer spreader to broadcast plant nutrients or other soil amendments on the seedbed; a sprayer to apply agricultural chemicals; or a seed drill pulled by a tractor to place seed.

Details of agricultural practices associated with key field crops agricultural land uses are presented in this section.

Alfalfa Hay

Alfalfa is a perennial plant with a normal plant life of 5 years or longer. Alfalfa is usually grown in irrigated fields east of the Cascades. Its livestock value is highest of all common legume hay crops. Growers harrow the fields for early weed control. Most growers apply herbicides to control weeds only once a year. Chemical and cultural controls are available for controlling leaf and root diseases. Cultural strategies include removing infested plant debris from farm equipment; mowing dry plants; rotating with non-legume crops for 2 or more years; cutting early to reduce foliage loss; avoiding excessive irrigation; planting fully mature seed; avoiding weed spread through irrigation water or animal waste; breaking up compacted soil; and avoiding fertilization with nitrogen, which favors weed growth.

Onions

Onions are produced in the highest quality soil in the United States, and production costs are relatively higher than most vegetables because of this crop's requirements for water, pest management protection, and manual labor (in the case of fresh market onions). Product quality and volume are severely affected by extreme weather conditions during the growing and harvesting periods, as well as by the storage-to-market time period. Most commercial operations are large-scale, integrated production-processing-packing systems that have ample irrigation and processing water, as well as specialized processing and storage equipment. Many field operations, such as land preparation, planting, and harvesting, can be custom hired, and most of the equipment needed for production and processing can be used for other vegetable crops.

Specialized harvesting equipment is required for the different types of onions. For storage onion harvesting, topper/loader, topper/windrower, flailer, hand-topped, and untopped harvesting may

be employed. Storage onions are undercut by the harvesting machine, which picks them up out of the soil and moves them into the body of the machine where forced air vertically orients the onion so that the top can be cut by a moving blade. The waste material is deposited behind the machine and onto the field. For fresh market onions, harvest is far less mechanically oriented.

Standard practices in onion harvesting include undercutting the onions and allowing them to cure (air dry) for 2 to 3 days, clipping the tops and roots, bagging the onions in burlap sacks, transporting them to a warehouse, drying, grading, bagging or boxing, and shipping. Onions also need an appropriate "curing period" where the neck opening closes. Inadequate curing will lead to onion rot and loss of the bulbs; prolonging curing can lower bulb quality. Additional processing may include washing, peeling, coring, and cutting for special packaged products or ingredients for the prepared foods industry.

Berries

Berry crops are perennial and include cane fruit, blueberries, and strawberries. Cane berry crops include Marion berry, blackberry, and raspberry. Cane berries are generally planted in rows and attached to a trellis system. Land preparation for berry crops is similar to preparation for field crops. Fields are sometimes fumigated prior to planting to control pests. Cane berries and blueberries remain in production for many years. Strawberry fields are generally rotated to other crops after approximately 3 years of production because of buildup of insect pest and plant disease.

Canola

Canola can be grown under dryland or irrigated conditions. Canola seeds are usually planted with a conventional grain drill and rolled with the last tillage of the field. Winter canola is typically planted in mid-August while spring canola is planted in the spring. Canola seedlings develop quickly and complete well with annual weeds.

Livestock

Cattle and sheep are raised for commercial purposes within the Assessment Area and require intensive management. Cattle are generally raised in cow-calf operations or as feeder cattle. Feeder cattle are purchased to graze on summer pasture before being re-sold in the fall.

In cow-calf operations, cows are bred by artificial insemination or by mating with a bull usually in late spring. Bred cows usually graze in a pasture during the summer and fall months. Calves are born in the winter or early spring. Calves are vaccinated and provided supplemental feed, vitamins, and minerals as necessary. During the winter, when pastures do not provide adequate grazing, cattle are provided supplemental feed and sometimes a shelter to escape inclement weather. Calves remain with their mothers through summer until they are weaned at about 6 months in age. They are placed in a separate pen or pasture, given supplemental feed, and sold as feeder cattle, or they are raised to market size on the farm.

Sheep are generally raised in a pasture. They are bred in the fall, and lambs are born in the winter (usually December through March). After birth, lambs are raised with their mothers until at least 3 months in age. Ewes are generally shorn for wool in late spring. Lambs usually remain in a pasture and are sometimes provided supplemental feed. They are sent to market around the age of 5 to 6 months.

Poultry and other livestock such as horses and goats are raised for both personal and commercial use. All of these animals require careful management, including supplemental feed and protection from adverse weather.

Impacts to livestock from the transmission lines will primarily result from reduced access to certain fields during construction. Farmers may be required to move livestock to allow

construction crews to access their property, which may result in the need to provide supplemental feed or additional pasture space for the animals. There will be additional costs to the rancher associated with moving cattle and having to provide supplemental feed. Temporary fences may be installed during construction for the protection of livestock and Project workers. Once construction is complete, cattle will be able to use pasture land occupied by transmission towers; however, a small amount of grazable land will be lost directly within the tower footprint. Livestock may or may not need to be moved from the ROW for construction crews to perform regular maintenance.

Impacts similar to those discussed for cattle are likely to occur for sheep, bison, and horse operations. Prior to any construction, IPC together with the landowner, the landowner's designee, and/or tenant will need to schedule and coordinate activities to minimize impacts to livestock during and following construction.

Pasture and Rangeland

Pasture is used to provide feed for livestock during the growing season. Some pastures are used all year, but in some areas soils become excessively wet or snow covered in the winter. Pasture plants consist of natural grasses, seeded grass, or grass and clover combinations that are adapted to grazing and that provide nutritious livestock forage. In eastern Oregon, some pastureland is intensively managed, but in other areas, livestock are allowed to range freely across large tracts of open grass land. New pastures are allowed to fully establish and develop a vigorous root system before being grazed. In 2014, cattle and calves were identified as the top agricultural product in Oregon.

In a well-managed pasture system, livestock are permitted to graze pasture plants down to a certain height and are then moved to another pasture. Livestock are rotated between pastures, allowing the plants in each pasture to recover before the next grazing period. A well-managed pasture can be productive for decades.

Weeds are controlled with herbicides or by hand removal. Some pastures are irrigated to increase forage production. If fertilized, fertilizer is generally applied in the fall or spring to increase forage production. Pastures are routinely harrowed to break up manure piles and to smooth out mole and gopher mounds.

Marijuana

ODA does not currently include marijuana in its annual crop statistics because of federal policy regarding this plant's federal classification as an illegal substance. For outdoor cultivation in areas where it is legal, growers choose areas that receive 12 hours or more of sunlight a day. As of January 2016, 89 cities and counties had opted to prohibit the processing, wholesaling, or retail sales of medical marijuana. In the Northern Hemisphere, plants are started in mid-April, late May, or early June to provide plants a full 4 to 9 months of growth. Harvest is usually between mid-September and early October.

4.2 Pre-Harvest Period for Field Crops

Weeds, insects, plant diseases, and rodents are controlled as necessary with the use of agricultural chemicals. Row crops are cultivated to remove weeds from between plant rows. Additional fertilizer may be applied to increase crop production. Certain crops are supplemented with irrigation water pumped from a well or nearby waterbody, generally through an underground mainline. Sprinklers attached to the mainline deliver water to the crops during dry summer growing periods. Sprinkler types vary by region and crop type, but the most common types used within the Agricultural Assessment Area are center-pivot and side-roll (wheel-line) lines. Center-pivot irrigation lines propel themselves automatically in a circular pattern around

the field and result in a round field (crop circle). Side-roll or wheel-line irrigation systems are generally moved mechanically with the assistance of an operator. Other irrigation methods used within the Agricultural Assessment Area are hose/pipe and sprinkler type, drip-irrigation, and flood irrigation. Impacts to irrigated lands are discussed in Section 5.0, Potential Impacts to Irrigated Lands.

Certain field crops that produce certified seed must be inspected by ODA, or by other accredited certifiers such as Oregon Tilth, to determine eligibility for the certification program under the USDA's National Organic Program (NOP).

4.3 Harvest Period for Field Crops

Field crops are generally harvested from May to late fall, depending on the crop and annual weather conditions. Certain crops, such as alfalfa hay, may be harvested several times during the summer. Other field crops such as wheat, grass seed, and vegetables are harvested once annually. Corn may be harvested as late as December or January depending on soil moisture levels.

Cereal grain crops, including wheat, oats, and barley, are harvested directly when the grain is mature and are harvested from standing plants with a self-propelled field combine. In eastern Oregon, wheat is most commonly planted in the fall and harvested in late summer to early fall. Most dryland wheat fields are only farmed every other year, and the field is allowed to lie fallow for one crop season between plantings to help increase soil moisture. Occasionally, back-to-back crops are grown when conditions or market demand are appropriate. Some farmers use a "no-till" method where the field is sprayed with an herbicide following harvest. Crop stubble is left on the field during periods when the field is fallow. This term is commonly referred to as "chem-fallow."

Grass seed is swathed into rows at maturity and allowed to dry until the seed is sufficiently dry for safe storage. Self-propelled combines pick up the rows of cut plant material and separate the seed from the straw. The harvested seed is transferred to a nearby truck and hauled to a seed-processing and storage facility. After harvest, the straw remaining in the field is baled or burned, depending on seed type. Some grass seed fields are sanitized by propane flaming with a propane-fueled burner that is pulled slowly over the field.

Forage crops such as alfalfa hay, grass hay, and silage are harvested at a time when forage nutritional quality and crop yields are both relatively high. Hay crops are swathed by cutting the plants close to ground level and placing the material into windrows. The windrows are allowed to dry and then picked up and baled using a baling machine that is towed behind a tractor when the crop is sufficiently dry. If moisture is high, windrows may be turned and fluffed using a hay rake. If moisture levels become too low, baling may need to occur at night when dew is present. Bales are picked up mechanically or by hand and moved to a storage facility. After harvest, alfalfa fields are usually irrigated to stimulate growth for the next cutting.

Vegetable crops are harvested at maturity by hand or with specialized mechanical equipment.

Certain crops are rotated with other crops on a regular basis to increase soil fertility and to prevent establishment of certain pests and diseases. For instance, in potato cropping rotations, a crop of mustard may be grown and incorporated into the soil to suppress nematodes, weeds, and soil-borne fungal pathogens.

Many farmers now use a GPS on farm equipment to increase efficiency and to avoid over or under coverage of seed, herbicide, and other chemicals.

5.0 POTENTIAL IMPACTS TO AGRICULTURAL LANDS

5.1 Areas Potentially Impacted

The Analysis Area covers a distance of approximately 360 miles, of which 88,759 acres are considered agriculture lands. These lands include irrigated and non-irrigated cropland and also support rangeland, pasture, and CRP land.

The Agricultural Assessment Area contains approximately 2,421 acres of irrigated agricultural cropland and 78,065 acres of non-irrigated cropland. Non-irrigated pasture and rangeland occur in all five counties and account for nearly 55,628 acres of the total agricultural acreage with the largest rangeland acreage occurring in Malheur County. Tables 5-1 through 5-5 show potential impacted acreage by the major agricultural practice or farm use in each of the five counties crossed by the Project. The major agricultural practices and farm uses are summarized by irrigated versus non-irrigated status in Table 5-6.

Table 5-1. Estimated Temporary and Permanent Impact Acreage by Agricultural Practice or Farm Use in the Morrow County Portion of the Agricultural Assessment Area

Agricultural Practice/Farm Use	Irrigated Lands (acres)	Non-Irrigated Lands (acres)	Total (acres)
Rangeland		8,649.2	8,649.2
Road/transport ROW		390.2	390.2
Pasture		107.1	107.1
Livestock		8.6	8.6
Wheat	385.9	2,244.2	2,630.1
Alfalfa hay	207.1	7.9	215.0

Table 5-2. Estimated Temporary and Permanent Impact Acreage by Agricultural Practice or Farm Use in the Umatilla County Portion of the Agricultural Assessment Area

Agricultural Practice/Farm Use	Irrigated Lands (acres)	Non-Irrigated Lands (acres)	Total (acres)
Rangeland		9,387.0	9,387.0
Rangeland/timber		2,316.9	2,316.9
Road/transport ROW		146.1	146.1
Pasture	5.5	52.0	57.5
Wheat	33.0		33.0
Alfalfa hay	6.6		6.6

Table 5-3. Estimated Temporary and Permanent Impact Acreage by Agricultural Practice or Farm Use in the Union County Portion of the Agricultural Assessment Area

Agricultural Practice/Farm Use	Irrigated Lands (acres)	Non-Irrigated Lands (acres)	Total (acres)
Rangeland		2,925.1	2,925.1
Rangeland/timber		10,700.5	10,700.5
Road/transport ROW		282.2	282.2
Pasture	49.4	78.8	128.2
Wheat	49.3		49.3
Alfalfa hay	65.4		65.4

Table 5-4. Estimated Temporary and Permanent Impact Acreage by Agricultural Practice or Farm Use in the Baker County Portion of the Agricultural Assessment Area

Agricultural Practice/Farm Use	Irrigated Lands (acres)	Non-Irrigated Lands (acres)	Total (acres)
Rangeland		124.4	124.4
Rangeland/timber		5,394.2	5,394.2
Road/transport ROW		364.3	364.3
Pasture	118.1	319.3	437.4
Wheat	21.4		
Alfalfa hay	109.9	0.1	110.0

Table 5-5. Estimated Temporary and Permanent Impact Acreage by Agricultural Practice or Farm Use in the Malheur County Portion of the Agricultural Assessment Area

Agricultural Practice/Farm Use	Irrigated Lands (acres)	Non-Irrigated Lands (acres)	Total (acres)
Rangeland	4.0	21,575.6	21,579.6
Road/transport ROW	0.1	184.2	184.3
Pasture	89.2	244.0	333.2
Wheat	35.3		35.3
Fallow	8.6		8.6
Alfalfa hay	225.5	3.8	229.3

Table 5-6. Summary Table of Acres of Temporary (Construction) and Permanent (Operations) Impacts by Agricultural Practice or Farm Use for the Five-County Area

Agricultural Practice/Farm Use	Irrigated Lands (acres)	Non-Irrigated Lands (acres)	Total (acres)
Rangeland	4.0	42,661.3	42,665.3
Rangeland/timber		18,411.6	18,411.6
Road/transport ROW	0.1	1,367.0	1,367.1
Pasture	262.2	801.2	1,063.4
Wheat	524.9	2,244.2	2,769.1
Fallow	8.6		8.6
Alfalfa hay	614.5	11.8	626.3

Project features proposed within the site boundary and the size of their projected disturbance area are presented in Table 5-7.

Table 5-7. Site Boundary and Average Temporary/Permanent Disturbance Areas by Project Component

Component	Length or Count	Site Boundary[1]	Construction Disturbance	Operations Disturbance
Transmission Lines				
Single-Circuit 500-kV	270.8 miles (Proposed)/ 33.3 miles (Alternatives)	500 feet (width)	–[2]	–[2]
Single-Circuit 230-kV	0.9 mile (Proposed)	500 feet (width)	–[2]	–[2]
Single-Circuit 138-kV	1.1 miles (Proposed)	500 feet (width)	–[2]	–[2]
Transmission Structures				
500-kV Lattice	1,085 (Proposed)/ 118 (Alternative)	–[3]	250 x 250 feet (1.4 acres)	50 x 50 feet (0.06 acre)
500-kV H-Frame (NWSTF area)	73 (Proposed)/ 34 (Alternative)	–[3]	250 x 90 feet (0.5 acres) on NWSTF / 250 x 150 feet (0.9 acres) off NWSTF	10 x 40 feet (0.001 acre)
500-kV H-Frame (Birch Creek area)	6 (Proposed)	–[3]	250 x 250 feet (1.4 acre)	10 x 40 feet (0.001 acre)
500-kV Y-Frame	8 (Alternative)	–[3]	Varies (0.4 acres)	8 x 8 feet (0.001 acre)
500-kV 3-Pole Dead-end (NWSTF area)	1 (Proposed)/ 2 (Alternative)	–[3]	250 x 90 feet (0.5 acre)	10 x 90 feet (0.02 acre)
500-kV 3-Pole Dead-end (Birch Creek area)	3 (Proposed)	–[3]	250 x 250 feet (1.4 acre)	10 x 90 feet (0.02 acre)
500-kV H-Frame Dead-end (NWSTF area)	3 (Alternative)	–[3]	250 x 90 feet (0.5 acre)	10 x 50 feet (0.01 acre)

Component	Length or Count	Site Boundary[1]	Construction Disturbance	Operations Disturbance
230-kV H-Frame	5 (Proposed)	–[3]	250 x 100 feet (0.6 acre)	25 x 5 feet (0.01 acre)
230-kV H-Frame (Removal)	9 (Proposed)	–[3]	150 x 100 feet (0.3 acre)	–[4]
230-kV 3-Pole Dead-end	4 (Proposed)	–[3]	250 x 150 feet (0.6 acre)	40 x 130 feet (0.1 acre)
138-kV H-Frame	8 (Proposed)	–[3]	150 x 250 feet (0.9 acre)	16.5 x 5 feet (0.001 acre)
138-kV H-Frame (Removal)	10 (Proposed)	–[3]	100 x 100 feet (0.2 acre)	–[4]
138-kV 3-Pole Dead-end	3 (Proposed)	–[3]	250 x 150 feet (0.9 acre)	30 x 130 feet (0.09 acre)
69-kV H-Frame (Removal)	94 (Proposed)	–[3]	90 x 90 feet (0.2 acre)	–[4]
Stations				
Longhorn	1	188.9 acres	24.4 acres	19.6 acres
Access Roads[5]				
Existing Road, Moderate Improvements (21-70%)	148.8 miles (Proposed)/ 13.2 miles (Alternatives)	100 feet (width)	16 feet (width)	14 feet (width)
Existing Road, Extensive Improvements (71-100%)	73.4 miles (Proposed)/ 6.3 miles (Alternatives)	100 feet (width)	30 feet (width)	14 feet (width)
New, Bladed	88.8 miles (Proposed)/ 12.8 miles (Alternatives)	200 feet (width)	35 feet (width)	14 feet (width)
New, Primitive	117.5 miles (Proposed)/ 12.8 miles (Alternatives)	200 feet (width)	16 feet (width)	10 feet (width)
Permanent Facilities				
Communication Station	10 (Proposed)/ 2 (Alternative)	–[2]	100 x 100 feet (0.2 acre)	75 x 75 feet (0.1 acre)
Distribution Power Lines to Communication Station[7]	7 (Proposed)/ 2 (Alternative)	50 feet (width)	25 feet (width)	14 feet (width)
Temporary Facilities				
Multi-use Areas	31 (Proposed)/ 4 (Alternative)	Mapped Area Outside of Transmission Line Site Boundary	23 acres	–
Light Duty Fly Yards	4 (Proposed)	Mapped Area Outside of Transmission Line Site Boundary	5 acres	–

Component	Length or Count	Site Boundary[1]	Construction Disturbance	Operations Disturbance
Pulling and Tensioning Sites	299 (Proposed)/ 32 (Alternative)	Mapped Area Outside of Transmission Line Site Boundary	4 acres	–

[1] Site Boundary size may be less than indicated in specific areas to avoid impacts to protected areas or for other reasons.
[2] No temporary or permanent disturbance expected along centerline, other than for specific Project features indicated below.
[3] Component will be sited entirely within centerline site boundary.
[4] No permanent disturbance expected once existing towers are removed.
[5] See the Road Classification Guide and Access Control Plan (Exhibit B, Attachment B-5) for more information about road types.
[6] Existing roads with no substantial improvements are defined as existing roads that require improvements along 20% or less of the entire road segment. These roads have minimal to no temporary or permanent disturbance impacts beyond their existing road surface/profile, are not included in site boundary.
[7] IPC will construct distribution lines to communication stations within their service territory.

Table 5-8 shows the acres of potential site boundary and temporary and permanent disturbance for each Project component. The locations of these features are shown in Exhibit C, Attachments C-1 and C-2.

Table 5-8. Acres of Temporary and Permanent Impacts to Agricultural Areas by Project Component

Component	Site Boundary (acres)	Agricultural Assessment Area Including 500-Foot Buffer (acres)	Temporary Disturbance (acres)	Permanent Disturbance (acres)
Transmission Structures				
Tower Single-circuit 500-kV lattice	70.3	–	–	70.3
Tower Single-circuit 500-kV H-frame	19.2	–	–	19.2
Tower Single-circuit 500-kV 3-Pole Deadend	0.19	–	–	0.19
Tower Single-circuit 230-kV 3-Pole Deadend	0.45	–	–	0.45
Tower Single-circuit 138-kV H-frame	0.1	–	–	0.1
Tower Single-circuit 138-kV 3-Pole Deadend	0.2	–	–	0.2
Stations				
Longhorn	188.9	–	24.4	19.6
Access roads				
New and existing roads	1,323.5	–	553.0	770.5

Component	Site Boundary (acres)	Agricultural Assessment Area Including 500-Foot Buffer (acres)	Temporary Disturbance (acres)	Permanent Disturbance (acres)
Permanent facilities				
Communication sites	2.1	–	–	–
Distribution power lines to communication sites	5.1	–	–	5.1
Temporary facilities				
Multi-use areas	1,072.4	–	805.0	–
Light duty fly yards	20.0	–	5	–
Pulling and tensioning sites	1,275.2	–	1,275.2	–
Structure work areas	1,838.1	–	1,838.1	–

5.2 Potential Impacts

Potential impacts of the Project include temporary (construction) and permanent (operational) disturbances, as well as the indirect impacts associated with these disturbances and the type of agricultural use disturbed. Indirect impacts may include growth-inducing effects caused by the Project but that occur later in time or farther removed in distance. Indirect impacts may include changes in the pattern of land use, population density or growth rate, and the related effects of those changes on agriculture. The area affected by the Project will be smaller than the site boundary and will be based on the specific locations of towers, access roads, laydown areas, pulling and tensioning areas, structure work areas, and fly pads. Impacts described in the following sections are examples of the most common impacts likely to occur as a result of the Project and do not constitute an absolute list of all possible impacts.

5.3 Temporary Direct and Indirect Impacts to Field Crops from Transmission Line Construction

It is estimated that transmission line construction will occur over the course of 2 to 3 months in a particular area, depending on weather conditions and other factors. Disruption of agricultural practices near Project construction will generally be short term. Temporary impacts to field crops during construction may include the following:

- Dust during construction
- Loss or damage to standing crops if access is needed prior to harvest
- Temporary access restrictions for farm equipment and livestock during construction
- Temporary disruptions to irrigation equipment
- Disruptions to farm practices including harvest, field preparation, spraying, and fertilization through temporary direct impacts from construction equipment and staging areas.

Some grading may be needed to provide a narrow construction zone that will allow unobstructed passage of line construction equipment. Poles and other material are transported to the construction site where arms, braces, and other items will be attached to the poles while

they are lying horizontally on the ground. Holes will be augured or drilled, reinforced-concrete foundations will be poured, and the towers will be set vertically and plumbed. After the towers and support structures are installed, workers will install insulators and suspension hardware and stringing blocks. Transmission wire will then be pulled in, tightened, and attached to the suspension hardware.

For agricultural land within the construction area, topsoil will be segregated and placed in a separate storage area. It will be replaced in the agricultural areas followed by cleanup and restoration work, where applicable. This will occur primarily where temporary access roads are built for construction but are then removed and the site reclaimed following construction.

Temporary direct impacts from Project construction equipment and staging areas would result in approximately 601 acres of impact to farmland. More than half of this acreage is classified as rangeland, agriculture-related roadways, CRP, and non-irrigated pasture. Temporary construction impacts include temporary facilities such as multi-use areas, light-duty fly yards, and pulling and tensioning sites.

5.4 Permanent Impacts to Field Crops from Transmission Line Construction

In both the construction area and the permanent ROW, most types of agriculture will resume after construction. IPC will provide landowners with information regarding safe operation of equipment and practices around transmission lines and towers. There are not likely to be limitations placed on the type of field crops raised directly below and within a certain distance of the transmission line; however, certain practices and types of equipment may be restricted from operating under or around the transmission line or towers. For example, equipment taller than 15 feet off the ground will not be allowed directly beneath the lines, and field burning of grass seed crops will not be allowed within the ROW. Most modern tractors and equipment, including combines, are less than 15 feet tall, but certain implements, accessories, booms, or antennas may extend to heights greater than 15 feet during normal operation. Irrigation equipment (including center-pivot irrigation equipment) will be allowed to operate under the lines as long as no portion of the equipment is greater than 15 feet tall and the equipment is properly grounded. Water cannot be directed at the line or the towers. Maintenance of irrigation equipment will not be allowed directly beneath the lines.

Permanent impacts to agricultural land as a result of the Project are likely to include the following:

- Loss of farmable acreage due to direct impacts from permanent access roads and transmission line towers
- Loss of farmable acreage due to indirect impacts from access roads and transmission line towers (due to maneuverability issues with farm equipment)
- Soil compaction
- Damage to drainage systems (drain tiles)
- Restricted range of irrigation systems
- Soil erosion
- Distribution of noxious weeds
- Movement of soil-borne pathogens
- Dust from vehicles during maintenance activities
- Restrictions on crop types that can be grown and equipment that can be used

- Safety issues for farmers and ranchers
- Yield loss due to water restrictions

Overall, permanent direct impacts from Project operations would result in impacts to 863 acres of agricultural land in the five-county area.

5.5 Impacts to Use of Aircraft for Farming Activities

Farmers frequently use helicopters and/or airplanes to aerially apply chemicals to a crop rather than using traditional ground-based equipment for application. Aerial application can be used to apply chemicals to a field as a method of avoiding crop or soil damage when soils are too wet or crops are too close to maturity to be accessed by heavy equipment. The presence of transmission lines prevents aerial access to crops directly beneath the lines, potentially decreasing crop yields. Transmission lines may also indirectly impede aerial application of chemicals to other portions of the field depending on orientation, wind direction, and other factors. Some crops receive aerial applications of chemicals up to five or six times per year. In addition, herbicides that control weeds around the base of the towers may need to be applied by hand, potentially increasing costs to the farmer. Costs could include acquisition of specialized equipment and chemicals and increased labor costs.

Farmers are increasingly using unmanned aircraft (drones) equipped with relatively low-cost sensors and cameras to survey their lands and to increase the precision of their farming activities. Drones can identify irrigation problems and pest and fungal infestations not apparent from eye level. They can also collect infrared data highlight to differences between healthy and distressed plants. In addition, drone imagery can be used in a time-series manner to show crop changes and trouble spots. Drones have the capability to easily fly both above and below transmission lines; consequently, Project impacts on drone use is expected to be minor.

The construction of the transmission line could have a minor effect on crop spraying when applicators need to modify spraying patterns on the unaffected portion of a cultivated field or adjacent fields. The presence of construction workers in the area could delay applications.

The presence of a transmission line increases the risk to aerial applicators. However, large high-voltage transmission lines like those proposed are easier to see and provide more clearance than smaller distribution lines. The Project is not proposing the use of tower guy wires, which is a safety advantage to aerial applicators because guy wires are difficult to see and cover a larger ground space than towers without them. Aerial spraying near hills and ridges can cause downdrafts and updrafts, which means increased risks to the applicator if transmission lines are located near that type of terrain. Spray coverage uniformity could be affected by the presence of transmission lines. In order to fly safely, a safe distance between the aircraft and the line must be maintained, which may result in less-than-optimal coverage or application rate. Adverse effects on the ability of aerial applicators to provide uniform coverage could increase costs by reducing efficiency and decreasing crop yields.

Transmission lines located along the edges of fields, existing roadways, or natural boundaries, rather than through existing fields, will result in less risk to the applicator and more efficiency to the producer.

The construction of the transmission line could have a minor effect on crop spraying when applicators need to modify spraying patterns on the unaffected portion of a cultivated field or adjacent fields. The presence of construction workers in the area could delay applications.

5.6 Impacts to Field Burning

Crop residues remaining after harvest of certain grass seed or wheat on eastern Oregon irrigated land have historically been burned to control diseases and weeds, stimulate yield, remove large volumes of straw and stubble that might interfere with crop management operations, and recycle nutrients into the soil. Field burning of grass seed crops has been reduced substantially in Oregon over the past two decades. In cases where a field is intersected by a power line, the landowner is required to register the crop as two separate fields and perform burning at two separate times, when wind and other conditions are appropriate. Burning is not allowed within a 150-foot-wide strip directly beneath the lines. This rule was established to protect large power lines (greater than 230 kV) by controlling the burning and reducing the possibility that smoke would impact the transmission lines. For safety reasons, IPC will not allow field burning within the ROW.

Transmission lines are already present in some fields within the site boundary where field burning is performed. Landowners have indicated that the cost increases dramatically and efficiency is reduced when field burning is carried out around transmission lines. The land within the no-burn area beneath the lines does not produce yields comparable to the adjacent areas that are burned. To date, no suitable alternative method to burning has been developed to produce desired yields for these grass seed species. Some landowners have switched to farming other crops as a result of previous transmission line projects. Landowners that lease their land to grass seed farmers growing species that require burning may lose their tenants if the cost of burning outweighs the benefits of farming the parcel. In addition, the amount of rent received by the owner from the tenant may be reduced if perceived land value is reduced because of the presence of the transmission line. Farming operations with specialized equipment and established infrastructure to produce certain crops may suffer as a result of additional transmission lines bisecting their crop lands.

5.7 Impacts to Crop Production and Irrigation

Mechanical irrigation, automated farming methods, and farming equipment with large spans (up to 100 feet) are all affected by overhead conductors and support structures. Acreages are taken out of production around the base of support structures, and the support structures are in the way of all equipment. Production costs increase as farmers need to divert their equipment around structures, make additional passes, take additional time to maneuver, skip acres, or re-treat acres. Micrositing the transmission line will avoid crossing most agricultural fields. If crossing a field is necessary, structures will be placed on the outside edges of the field or parallel to the rows and will avoid diagonal field crossings. It should be noted that in areas of dense agricultural activity, such as Morrow County, the opportunity for micrositing is reduced because center-pivot irrigation circles are close to each other. In some cases, the diamond-shaped areas between pivot circles are being used by landowners to produce specialty crops. Recent (January 2015) actions by the FSA make it possible for farm operators to enroll these unirrigated corners of center-pivot crop fields in the CRP.

In currently cultivated farmland, existing crops could be damaged by transmission line construction requiring entry to fields during the active growing season. Irrigation schedules could be impacted by interruptions in power or the need to shut off the irrigation for safety purposes even if there are no direct damages to crops. Proper coordination between IPC and farm operators can help to segregate and protect topsoil and reduce potential impacts associated with ingress and egress to the ROW, damage to irrigation systems, and compaction.

Center pivots operate most efficiently when they complete the entire circle and continue in the same direction on a permanent basis. Imbalanced application of irrigation could affect crop

production. Extraordinary effort was put into routing the location of the transmission line to avoid irrigated areas. Micrositing will be used to the maximum extent possible to minimize the interference of transmission structures on irrigation systems.

A tower located near the outer perimeter of a center pivot could result in the pivot being shortened and thereby reducing the total acres covered by the pivot for its entire circumference. A 100-foot reduction in the length of a quarter-section pivot will reduce the area covered by 18 acres. A common solution to deal with an immovable obstacle like a transmission tower is to use a corner machine so the last section of the pivot folds back to avoid the structure. Wheel-line irrigation systems cannot be adjusted if a structure is placed in its path. If a tower is placed in its path, the line must be partially disassembled, moved around the tower, then reassembled for continued operation, resulting in permanent inconvenience and increased labor costs.

There is an additional loss of production when structures are set close to the edge of a field such that farm equipment cannot fit between the structure and the edge of the field. It is difficult to achieve uniformity of application of pesticides and fertilizer around towers when using ground application around towers. After a ground application is made around a tower, it is difficult on the next pass for the operator to determine where the outer edge of the spray application was made and align the sprayer to avoid overlapping; consequently, double spraying is likely to occur. Depending on the product, this could result in crop damage. A transmission line crossing a field at an odd angle will also make it more difficult to maintain a uniform application. When crossing a cultivated field is necessary, effects can be minimized in some cases by placing structures parallel to the rows, avoiding diagonal field crossings, and placing structures on edges of fields.

Approximately 104 of a total of 993 parcels within the site boundary are irrigated using a variety of methods. The remaining 889 parcels are currently non-irrigated.

Twenty-six of the proposed 1,461 towers are sited within the irrigated portion of an agricultural field. The most common irrigation method within these fields is the center-pivot style (Figure 5-1). Some towers are likely to interfere with current irrigation practices and will likely result in a reduction in overall crop yield. Proposed tower locations are only preliminary, and IPC will work with landowners to locate towers in areas that have the least impact to agricultural operations where feasible.

Placing a transmission tower in a location that obstructs the range of irrigation equipment can have a greater impact to a crop than just the footprint of the tower itself. Towers placed within a field using center-pivot–style irrigation require the irrigation line to stop and reverse direction when it reaches the tower. This irrigation practice results in a pie-shaped wedge of the field not receiving water and being effectively removed from production (Figure 5-2). Installing reversers on the center pivot incurs an additional cost. Some center-pivot–style systems have booms or sprinklers that are elevated greater than 15 feet above the ground surface. Systems in excess of 15 feet above the ground surface will not be allowed to operate under the transmission lines.

Figure 5-1. Example of a Center-Pivot–Style Irrigation System in Morrow County

Figure 5-2. Aerial Photograph Showing Reduced Farmable Acreage within a Center-Pivot–Irrigated Parcel Resulting from the Placement of a Transmission Line Tower (approximately 2 acres of this 40-acre field are lost to production because of the presence of a transmission line tower)

Side-roll or wheel-line irrigation (Figure 5-3) impacts are similar to those of center-pivot–style systems. Although more common in western Oregon, some eastern Oregon farmers use this method as well. Placement of a tower in the middle of a side-roll–irrigated field will isolate the irrigation equipment on one side of the field leaving the remainder un-irrigated. The farmer would be required to either install an additional set of irrigation equipment lines, dismantle and re-assemble the lines more frequently, switch the crop being grown to a type not requiring irrigation, or alter the method of irrigation. Placing transmission towers along the edge of a field would allow for irrigation equipment to travel the full length of the field, but its extent would likely need to be shortened, reducing the coverage of the irrigation water and overall crop yield.

Most irrigated parcels have underground water mainlines that deliver the water to the sprinklers. Placement of a transmission line over or adjacent to these mainlines may cause damage to the lines or make accessing the buried lines for maintenance difficult.

Figure 5-3. Example of Wheel-Line–Style Irrigation Equipment

Occasionally, induced voltage from the lines to nearby metal objects occurs and can deliver a small shock to humans or livestock if the object is not grounded. Cathodic protection on buried or above-ground irrigation supply or delivery lines may be required. Water can also conduct electricity; therefore, a continuous stream of water should never be sprayed onto a line or tower.

Irrigation equipment (including center pivots) will be allowed to operate under the lines as long as no portion of the equipment is greater than 15 feet tall and the equipment is properly grounded. Water cannot be directed at the line or the towers. For safety reasons, maintenance on the irrigation equipment will not be allowed directly beneath the lines.

5.7.1 Farming Around Tower Structures

The amount of agricultural land acquired for the transmission line ROW is greater than the amount of farmable land lost to agricultural production. A large proportion of the ROW may remain available for normal cultivation; however, a portion of agricultural land may become unproductive because of the difficulty of moving farm machinery around structures. The amount of crop acreage lost to cultivation within the Proposed Corridor varies based on several factors, as follows:

- Type of tower structures used
- Crop type and the type of equipment and machinery used
- Location of the tower structures and access roads within a given field
- Orientation of the transmission lines in relation to the crop

Based on conversations with landowners who currently have transmission line towers in their fields, it appears that some tower locations within a field can create a loss in farmable acreage greater than the actual footprint of the tower itself. Towers located in a field headland (the area at the edge of a field required to turn the tractors and farm equipment around) hinder the maneuverability of the equipment and can expand the headland by up to four times the normal size. Towers located on steep slopes may also result in a larger un-farmable area around the base of the tower if equipment is only able to approach from one angle (Figure 5-4). Farming around towers generally results in increased time and effort. This increases the cost to the farmer and lowers his profit. Farms operating equipment over 15 feet will lose farmable acreage under the lines unless they can convert their operation and use smaller equipment.

There has been some concern about transmission lines interfering with GPS equipment used on tractors and equipment. There is no evidence to suggest that transmission lines interfere with GPS satellite signals.

Figure 5-4. Photograph Showing a Harvested Wheat Field with existing Transmission Line Structures Present within the Field. Towers located on hillsides may result in less farmable acreage compared to placement on flat ground because of reduced equipment maneuverability.

5.8 Impacts to Livestock Operations

Impacts to livestock from the transmission lines will primarily result from reduced access to certain fields during construction. Ranchers may be required to move livestock to allow construction crews to access their property, which may result in the need to provide supplemental feed or additional pasture space for the animals. There will be additional costs to the rancher associated with moving cattle and having to provide supplemental feed. Temporary fences may be installed during construction for the protection of livestock and Project workers. Once construction is complete, cattle will be able to use pastureland occupied by transmission towers; however, a small amount of grazable land will be lost directly within the tower footprint.

Livestock may or may not need to be moved from the ROW for construction crews to perform regular maintenance.

The construction of the transmission line could affect livestock grazing. Temporary loss of forage areas and disruption to grazing activities may occur during construction. Depending on access control, additional access could result in the harassment of livestock or allow livestock to access areas they may not have had access to previously (for example, if an access road crosses a ravine that livestock had previously been unable to cross or if a fence is cut or a gate left open). Transmission line construction is linear in nature, with intervals of activity and intervals of little or no activity. IPC will require construction contractors to maintain all fences and gates to allow normal activities to occur as much as possible. Nevertheless, during intense construction periods, some areas will be off limits to livestock or ranchers.

During operations and maintenance, pasture and rangelands will be removed from grazing when they are occupied by support structures, substations, communication stations, or access roads. Other operations and maintenance activities will not affect livestock grazing.

Impacts similar to those discussed for cattle are likely to occur for sheep, bison, and horse operations. Prior to any construction, IPC, together with the landowner, the landowner's designee, and/or tenant, will need to schedule and coordinate activities to minimize impacts to livestock during and following construction.

5.9 Impacts to Pasture/Rangeland

Pasture is used to provide feed for livestock during the growing season. Some pastures are used all year, but in some areas, soils become excessively wet or snow covered in the winter. Pasture plants consist of natural grasses, seeded grass, or grass and clover combinations that are adapted to grazing and provide nutritious livestock forage. In eastern Oregon, some pastureland is intensively managed, but in other areas, livestock are allowed to range freely across large tracts of open grass land. New pastures are allowed to fully establish and develop a vigorous root system before being grazed.

In a well-managed pasture system, livestock are permitted to graze pasture plants down to a certain height and are then moved to another pasture. Livestock are rotated between pastures, allowing the plants in each pasture to recover before the next grazing period. A well-managed pasture can be productive for decades.

Weeds are controlled with herbicides or by hand removal. Some pastures are irrigated to increase forage production. Fertilizer is generally applied in the fall or spring to increase forage production. Pastures are routinely harrowed to break up manure piles and to smooth out mole and gopher mounds.

Temporary and permanent impacts to pastureland will be similar to those discussed above for livestock.

5.10 Impacts to Fencing

Constructing fences within the ROW is generally discouraged because of safety concerns and access issues for maintenance crews. Generally, it is preferred that fences be located at least 50 feet away from tower structures. Barbed wire and woven wire fences insulated from ground on wooden posts have the potential to assume an induced voltage when located near power lines. The fences may require grounding at each end and every 200 feet or more with a metal post. Electric fences may require a filter that is installed to remove voltages induced by the power lines. IPC will assist landowners in determining the best ways to safely ground permanent and/or temporary fences if problems arise.

5.11 Impacts to Organic Farming

Organic farms occurs within the Agricultural Assessment Area. Practices employed by organic farms are similar to conventional farming and livestock husbandry but typically do not use pesticides, herbicides, fertilizers (non-organic), or other chemicals in their operations unless they are properly certified for use. Organic operations generally cost more to operate on a per-unit-yield basis, and the products usually command higher market prices. These operations can be especially sensitive to impacts from construction activities such as introduction of noxious weeds from road building, dust from construction equipment, and soil compaction. A specialized Organic Systems Plan will be developed between IPC and each organic farm landowner to identify site-specific construction practices that will minimize the potential for decertification as a result of construction activities. Possible practices may include equipment cleaning, planting a deep-rooted cover crop in lieu of mechanical decompaction, applying composted manure or rock phosphate, preventing the introduction of disease vectors from tobacco use, restoring and replacing beneficial bird and insect habitat, maintaining organic buffer zones, and using organic seeds for any cover crop.

5.12 Impacts to Agricultural Workers

Agricultural workers performing duties and operating equipment near and under transmission lines are at risk of electrical shock. IPC is committed to educating landowners (which may include landowners' employees and/or tenants) about these risks and safe working practices. Some farm employees must also adhere to certain U.S. Department of Labor, Occupational Safety and Health Administration (OSHA) rules while working around transmission lines.

5.13 Impacts from Helicopter Operations Related to Transmission Line Construction

Transmission line construction involves ROW access, staging and laydown areas, grading areas, tower/pole installation, and conductor installation. Any of these activities may involve the use of helicopters which may be staged out of multi-use areas or light-duty fly yards. Specific Project construction activities potentially involving the use of helicopters may include: delivery of construction laborers, equipment, and materials to structure sites; structure placement; hardware installation; and wire stringing operations. The use of helicopter construction methods will not change the length of access road required for the Project because vehicle access is required for each tower site regardless of the construction method used.

Helicopter operations have the potential to affect adjacent agricultural and livestock operations through:

- Blow down of tall crops, such as corn, from rotor wash.
- Spread of weed seeds and/or insect pests to other fields. This potential impact is of particular importance if helicopters are to be used in close proximity to organic farming operations.
- Noise impacts from helicopters on livestock.
- Temporary reduction in the area of pasture/range available to livestock during line construction.

Estimated acreage of agricultural lands surrounding multi-use areas and light-duty fly yards is presented in Table 5-9.

Table 5-9. Estimated Agricultural Acreage and Associated Crops near Helicopter Operations

Helipad Location	Acres of Agricultural Lands within 500 feet of Helipad	Crops Grown on Relevant Agricultural Lands
LDFY BA-01	0.0	
LDFY MA-01	0.0	
LDFY MA-02	0.0	
LDFY UM-01	0.0	
MU BA-01	0.0	
MU BA-02	0.0	Unknown Crop
MU BA-03	4.5	
MU BA-04	0.0	Alfalfa hay
MU BA-05	3.3	
MU BA-06	0.0	Marijuana
MU MA-01	3.0	
MU MA-02	0.0	
MU MA-03	0.0	
MU MA-04	0.0	
MU MA-05	0.0	
MU MA-06	0.0	
MU MA-07	0.0	Alfalfa hay
MU MA-08	7.1	Alfalfa hay
MU MA-09	16.6	
MU MO-01	0.0	Corn; Onions
MU MO-02	21.9	Wheat
MU MO-03	18.2	Alfalfa hay; Wheat
MU MO-04	11.4	
MU MO-05	0.0	
MU OW-01	0.0	
MU OW-02	0.0	
MU OW-03	0.0	
MU OW-04	0.0	
MU OW-05	0.0	Alfalfa hay; Unknown Crop
MU UM-01	4.6	Corn (for grain)
MU UM-02	9.0	
MU UM-03	0.0	
MU UM-04	0.0	Unknown Crop; Wheat
MU UM-05	12.6	Alfalfa hay
MU UM-06	4.3	
MU UM-07	0.0	Unknown Crop
MU UN-01	3.9	Alfalfa hay; Unknown Crop; Wheat
MU UN-02	256.6	
MU UN-03	0.0	Alfalfa hay; Potatoes; Unknown Crop
MU UN-04	23.7	Alfalfa hay; Unknown Crop

5.14 Impacts to Future Development, Crops, and Practices

Agriculture in Oregon is subject to rapidly changing market conditions as well as to changes in crop rotation cycles. Agricultural practices also change alongside changes in crop type and available technology. Agricultural land currently used for one purpose may be converted to crop land or pastureland in the future depending on its associated costs and benefits. Farm practices or equipment may also change in the future. Land that is currently used as pastureland/rangeland or dryland wheat could be converted to higher value crops if irrigation water and infrastructure become available. IPC will work with landowners during the siting process to identify potential impacts that may arise in the future.

6.0 ECONOMIC IMPACTS TO AGRICULTURAL OPERATIONS

6.1 Production Values

If the crop or pastureland/rangeland is rented or leased by the landowner to a tenant, the value of the land to the landowner is different than the value of the crop or the value to the tenant. Actual net income derived from crops and livestock is often much less than the market value of the crop produced as a result of production costs, many of which vary from year to year.

6.2 Crop Production Values

Some crops, such as vegetables, require intensive management and incur high production costs. Conversely some crops, such as hay, require less maintenance and management between crop establishment and harvest.

Annual variation in crop yield contributes to variations in crop value and net income generated by the crops. Crop yields can vary based on factors such as geographic location, climatic conditions, soil type and quality, soil moisture, elevation, topography, seed variety, disease and pest outbreaks, noxious weed infestations, and other factors. Annual yields and prices can vary greatly between years. Crop yields, prices, and values in the Proposed Corridor would be expected to be different at the time of implementation than the crop selection and market conditions researched in 2012 and visually surveyed in 2016.

6.3 Pastureland/Rangeland Production Values

Much of the pastureland/rangeland within the Proposed Corridor and alternate corridor segments is rented or leased to neighboring ranchers for cattle or sheep grazing. Pastureland/rangeland rental rates can be calculated on a per-acre, a cow-calf, per-head, or per–animal unit month (AUM) basis. An AUM is the amount of forage needed to sustain one cow and calf, one horse, or five sheep or goats for 1 month. The most common methods for determining pasture rental rates are on a per-acre or AUM basis. On a per-acre basis, the livestock producer pays the landowner either a monthly or annual fee based on the number of acres used for grazing. On an AUM basis, the producer pays the landowner based on the number of AUMs used. Rental rates vary widely based on factors such as forage quality, location and proximity to roads, the availability of stock water, pasture size, lease term (long- or short-term), and other factors.

For livestock production, factors such as annual climatic conditions can have severe implications on the forage production and stocking rate of a parcel of pastureland/rangeland, influencing the amount and quality of livestock that can be produced. Prices for livestock fluctuate similarly to prices of crops discussed above, but they can also vary greatly based on the quality of the livestock produced.

6.4 Crop Production Costs

Production expenses include both operating and fixed costs. Operating costs include those incurred in the production process during the course of the crop year and include tillage, planting, irrigating, spraying, fertilizing, and harvesting. Fixed costs are those that are incurred regardless of production. They include insurance, a charge for machinery and equipment depreciation, interest, and housing, plus a charge for land.

Costs to the landowners in this Project will include both one-time costs that will occur during the construction period and annual costs that will continue indefinitely after the construction is completed. The one-time costs will vary within each crop depending on when construction commences within the crop production cycle and how many operating costs have been incurred up to that point. The total cost to the landowner will depend on the month construction commences and the value of the crop being grown.

Annual costs will continue indefinitely after construction is completed because of the possible placement of towers within the field. Additional costs will result from both the lack of crops in the tower footprint and the extra cost of traversing around the tower for specific field operations.

Dryland pasture yields and available replacement forage vary greatly depending on location, soil types, and varying precipitation from year to year. If no replacement pastures are available, the only alternative for feed substitutes is to purchase replacement hay for the land removed from production by the power line area. This would be for a 2-year period: one for construction and one for pasture re-establishment.

Weed control around towers would likely require two applications per year separate from weed-control measures undertaken during the regular field operations.

Land other than that located in the tower footprint may be removed from production with the installation of a power line. Examples would be roadways or land that may be unreachable by the irrigation system because of tower interference. Added per-acre annual costs would include fixed costs, lost profit, and a charge for weed-control measures.

Planting and harvesting certain row crops such as potatoes, onions, and corn around towers can be difficult because of the large equipment size and, if necessary, the need to lift the equipment out of the ground after stopping at the tower. It may require up to 40 feet on both ends to allow for ample maneuvering and 10 feet for each side to allow for safe traversing of the equipment around the tower. This will result in a tower footprint for row crops of 0.193 acre in the middle of the field and 0.165 acre on the field edge. The width of planting machinery can make it difficult to get close to the side of the tower. Spraying and fertilizing equipment can more easily traverse around a tower base without stopping just as with the other crops.

The crop loss from edge structures is less than crop loss from structures placed in the middle of the field because irrigation lines cannot encircle the tower and equipment must maneuver around the structure. Compaction caused by the additional maneuvering plus the overlap of the fertilizer and chemicals could result in a reduction of crop yield.

6.4.1 Intangible Impacts

Many scenarios could occur that would affect crop production in agricultural fields transected by a transmission line. Determining actual damages depends on the nature and frequency of the occurrence. Destructive plant diseases or insect outbreaks may require aerial applications on a regular basis. The placement of a tower in a field will affect future aerial applications necessary to combat various production problems. Ground spraying could be considered in lieu of aerial

spraying if field conditions allow. Tillage such as disking in specific isolated areas in the field of an infected crop may be considered in some extreme situations. These types of occurrences would vary within the Project area and would have to be handled on an individual basis.

It should be noted that costs and returns are constantly changing and their future levels cannot be accurately predicted. Consequently, any future economic considerations that refer to the economic data in this report should be adjusted to reflect changes in conditions.

In assessing the economic impact on a specific property, the components included are as follows:

- One-time costs per disturbed/impacted acre to include roadways and the actual construction area
- Annual costs including the fixed costs, lost profit, and weed control in the tower footprint area plus the duplication of operations for the extra costs of farming around the tower or towers
- Annual per-acre costs for land taken out of production other than that in the tower footprint area, including roadways and land unable to be irrigated because of field obstructions
- Costs associated with the disruption of CRP programs where applicable
- The costs of reorganizing irrigation systems, including the added investment increased labor requirements

6.4.2 Hybrid Poplars

Farms producing hybrid poplars occur in the Agricultural Assessment Area and are being considered separately in this plan. If a planting is interrupted by a powerline, there would be no opportunity for replanting the impacted area, which would result in permanent lost production. It takes 10 years after planting for hybrid poplars to reach harvestable size with no income derived during that period.

Additional costs include fixed and variable costs required to produce a marketable crop. If crop removal is undertaken, there would be an indefinite period of no production whereby the landowner would incur annual costs. These would be fixed and would include water assessment fees, land charges, weed control, lost opportunity for profit, a management fee, and general overhead costs.

The approximately 25,000-acre hybrid poplar tree farm in Morrow County was sold in early 2016 and will gradually transition to dairy and more traditional irrigated agricultural crops.

7.0 EFFORTS TO MINIMIZE IMPACTS TO AGRICULTURAL LANDS

IPC estimates that most agricultural impacts will be temporary; however, impacts to certain portions of agricultural lands will be permanent. Where possible, a perpetual easement and associated temporary workspace will be purchased on private lands by means of a negotiated settlement, and payment will be based on a certified appraisal. Land used during construction of the transmission line will be restored, as nearly as possible, to former productivity. Crop reestablishment, where permissible, and crop production are expected to resume following construction. Agricultural structures such as drainage systems, irrigation systems, and fences will be repaired, or landowners will be compensated to make repairs. Damage to cropland and pasturelands/rangelands due to construction of the transmission line will be assessed, and compensation will be paid at fair market rates.

Specific construction practices will be implemented to mitigate construction impacts on soil productivity. A post-construction monitoring plan will identify remaining soil and agricultural impacts associated with construction that require additional mitigation. IPC will implement follow-up mitigation as necessary. These actions are outlined in Section 7.3. Prior to any construction, IPC, together with the landowner and/or the landowner's designee (which may include employees, tenants, or other representatives), will strive to schedule activities to minimize impacts and identify reasonable measures to restore agricultural land to its original productivity.

7.1 Purpose of Agricultural Mitigation Plan

This Agricultural Impact Mitigation Plan identifies measures that IPC will take to avoid, mitigate, repair, and/or provide compensation for impacts that may result from the construction or operation of the Project on privately owned agricultural land. The construction standards and policies in this plan apply only to construction and operations activities occurring on privately owned agricultural land.

Activities occurring entirely on public ROWs, railroad ROWs, publicly owned land, or private land that is not agricultural land may be subject to other standards and policies. IPC will, however, adhere to the same construction standards relating to the repair of agricultural drainage tile when tiles are encountered on public highway ROWs, railroad ROWs, or publicly or privately owned land.

Section 13.0 applies only to Organic Agricultural Land as described in the NOP Rules, 7 Code of Federal Regulations (CFR) Parts 205.100, 205.101 and 205.202.

7.2 General Provisions

- IPC will approach the landowner to engage in discussions regarding mitigation measures and compensation for impacts on privately-owned agricultural land. If the landowner has tenants, lessees, employees, agents, or others with whom IPC may or should engage in such discussions, it is the landowner's responsibility to inform IPC. In such cases, the landowner must provide appropriate consent, authorization(s), and/or release(s) before IPC will formally engage in discussions with non-owners (i.e., agents, employees, lessees, tenants, etc.) serving as a landowner's designee.
- Upon request, IPC will provide a copy of this mitigation plan to any landowner or landowner's designee prior to obtaining a ROW.
- The mitigation actions are subject to change by landowner or landowner's designee, when changes are negotiated with and acceptable to IPC.
- Unless otherwise specified, IPC will retain qualified contractors to execute mitigation actions. However, IPC may be willing to negotiate mitigation actions to be performed by the landowner or landowner's designee or others.
- Mitigation actions employed by IPC pursuant to this mitigation plan, unless otherwise specified in this mitigation plan or other agreement negotiated with an individual landowner, will be implemented within 45 days following completion of final cleanup on an affected property, or as conditions allow. Temporary repairs will be made by IPC during construction or operation as needed to minimize the risk of additional property damage or interference with access to or use of the property that may result from an extended time period needed to implement mitigation actions.
- IPC will implement the mitigation actions contained in this mitigation plan as required by all applicable permit conditions for the Project. This mitigation plan shall impose

requirements upon IPC only to the extent that such requirements are imposed as conditions of the Energy Facility Siting Council Site Certificate.

- IPC will implement the mitigation actions contained in this mitigation plan to the extent that they:
  - do not conflict with the requirements of any applicable federal, state, or local rules or regulations,
  - do not conflict with the requirements of other permits and approvals that are obtained by IPC for the Project, and
  - are not determined to be unenforceable by reason of other requirements of federal, state, or local permits or authorizations issued for the Project. To the extent a mitigation action required by this agreement is determined to be unenforceable in the future due to requirements of other federal, state, or local permits or authorizations issued for the Project, IPC will inform the landowner and will work to develop a reasonable alternative mitigation action.
- Prior to construction, IPC will provide each landowner and landowner's designee with a telephone number and address that can be used to contact IPC regarding the agricultural impact mitigation work that is performed on the landowner's property. IPC will respond to Project inquiries and correspondence within a reasonable time.
- IPC will use good-faith efforts to obtain a written acknowledgement from each landowner or landowner's designee upon the completion of Final Cleanup on landowner's respective properties.
- IPC will communicate with landowners and designees regarding safe practices while working around transmission lines.
- Nothing in this document is intended to grant or suggest State jurisdiction over remedies for property compensation resolved in accordance with law.

7.3 Mitigation Actions

IPC's negotiations for an easement are exclusively with the landowner and/or landowner's designee. IPC will require landowner consent regarding the use of the ROW. To the maximum extent practical, IPC will reasonably restore the land to its former condition or compensate each landowner, as appropriate, for damages and/or impacts to agricultural operations caused as a result of Project construction, and as outlined in this plan. The decision to restore land or provide compensation will be made by IPC after discussion with the landowner and/or landowner's designee. The following mitigation actions apply to private agricultural land where applicable, unless otherwise mutually agreed upon by IPC and the landowner.

7.3.1 Tower Placement

During Project design, IPC's engineering, ROWs, and permitting staff will work with landowners to address tower placement, where feasible. Sensitive areas such as those with the potential to interrupt irrigation equipment and other areas identified by landowners will be avoided, where feasible. When the preliminary design is complete, the land rights agents will review the staked tower locations with landowners. In general, towers will be located along field boundaries. Placement in field headlands or in the middle of fields will be avoided to the maximum extent possible.

7.3.2 Construction Scheduling

IPC will contact landowners as soon as possible once construction time frames have been developed. IPC will consult with landowners when planning the construction schedule to

minimize impacts on soils, crops, harvesting, and other activities. Landowners might prefer to slightly alter cropping practices to decrease the potential for soil damage if they know in advance that construction crews would be working on their land.

7.3.3 Helicopter Operations

Impacts from helicopter operations will be minimized or avoided by:

A. Siting multi-use areas and light-duty fly yards in areas free from tall agricultural crops and livestock.
B. Coordinating with landowners to avoid conflicts with crops and livestock.
C. Avoiding take-offs/landings in close proximity to organic agriculture operations to reduce the potential for transfer of weed seeds and/or insect pests.
D. Avoiding flying in certain areas where tall crops are susceptible to blow down from rotor wash.

7.3.4 Damaged and Adversely Affected Drainage Tile

IPC will contact affected landowners and designees for their knowledge of tile locations prior to construction. IPC will make every attempt to probe for tile if the landowner does not know whether tile is located near a proposed tower location. Tile that is damaged, cut, or removed as a result of this probe will be repaired. The repair will be reported to the inspector. If tile is damaged by construction activities, it will be repaired in a manner that restores the tile's operating condition. If tiles on or adjacent to transmission line construction areas are adversely affected by construction, IPC will restore the function of the tiles, including the relocation, reconfiguration, and replacement of existing tiles. Landowners may negotiate to make repairs in fair settlement with IPC. In the event the landowner chooses to take on this responsibility, IPC will not be responsible for correcting tile repairs after completion of the Project. Where damaged tiles are repaired by IPC, the following standards and policies will apply:

A. On excessively wet soils, IPC will restrict the operation of vehicles and heavy equipment or will take appropriate action where deep rutting might damage drain tiles. Damaged tiles will be repaired with materials of the same or better quality as those that were damaged. If water is flowing through a damaged tile, temporary repairs will be promptly installed and maintained until permanent repairs can be made.
B. Before completing permanent tile repairs, tiles will be examined within the work area to check for damage by construction equipment. If tiles are found to be damaged, they will be repaired to pre-construction conditions.
C. Taking into account weather and soil conditions, IPC will make efforts to complete permanent tile repairs for which it is responsible within a reasonable time frame after Final Cleanup.
D. The tile repairs will be performed by a qualified contractor or by the landowner at the landowner's discretion.
E. IPC will be responsible for correcting and repairing tile breaks or other damages to tile systems that are discovered in the ROW, to the extent that such breaks are the result of Project construction. These damages are usually discovered after the first significant rain event. IPC will not be responsible for tile repairs IPC has paid the landowner or landowner's designee to perform.

7.3.5 Installation of Additional Tiles

IPC will be responsible for installing such additional tile and other drainage measures as are necessary to properly drain wet areas in the ROW caused by construction of the Project.

7.3.6 Construction Debris

Project-related construction debris and material will be removed from the landowner's property.

7.3.7 Compaction, Rutting, Fertilization, and Soil Restoration

A. Compaction will be alleviated on agricultural land traversed by construction equipment. Agricultural land that has been compacted will be restored to its original condition using appropriate tillage equipment, and will be performed during suitable weather conditions, as determined by the Agricultural Monitor.
B. IPC will restore rutted land as much as is practical to its pre-construction condition.
C. If there is a dispute between the landowner and IPC, the Agricultural Monitor's opinion will be considered by IPC.
D. Decompaction and soil fertility restoration will be performed by a qualified contractor using methods and equipment suitable for the site, as approved by the Agricultural Monitor.

7.3.8 Damaged Soil Conservation Practices

Soil conservation practices, such as terraces and grassed waterways that are damaged by the Project construction will be restored as nearly as possible to their pre-construction condition.

7.3.9 Weed Control

A. On permanent ROW areas where IPC has control of the surface use of the land such as towers, access roads, or substations, IPC will provide for weed control in a manner that does not allow the spread of weeds to adjacent lands used for agriculture. Herbicide application on such areas will be conducted by an applicator licensed by the State of Oregon, in a manner mutually agreed upon with the landowner or landowner's designee.
B. To prevent the introduction of weeds from other geographic regions, IPC will require contractors to thoroughly clean construction equipment with high-pressure washing prior to the initial move of those units to the Project construction site.
C. Construction equipment will also be cleaned periodically, especially when operating in areas with an abundance of noxious weeds, prior to moving equipment to the next construction location.
D. IPC will make reasonable efforts to obtain straw bales for erosion control and straw for mulch that are certified free of noxious and nuisance weed contamination.
E. When available, IPC will use Oregon-certified seed or equivalent for revegetation.
F. IPC will monitor the construction areas for infestations of noxious weeds and treat new infestations resulting from construction activities.

7.3.10 Irrigation Systems

A. If Project construction or temporary work areas intersect a spray irrigation system, IPC will establish with the landowner and/or landowner's designee an acceptable amount of time during which the irrigation system may be out of service.
B. For crops that are being irrigated during the construction period, the maximum time that application of irrigation water can be interrupted will be 24 hours, unless otherwise agreed upon with the landowner or landowner's designee.
C. If Project construction activities cause an interruption in irrigation which results in crop damages, appropriate compensation will be determined as described in this mitigation plan.
D. If it is feasible and mutually acceptable to IPC and the landowner, temporary measures will be implemented to allow an irrigation system to continue to operate across land on

which the transmission line is also being constructed. IPC will work with the landowner and/or landowner's designee to identify preferable construction timeframes.

E. To avoid damaging the pipes or creating difficult access to the irrigation lines for maintenance, IPC will work with landowners to identify the location of underground water lines to avoid siting the towers above or adjacent to buried lines.

F. If irrigation lines or access to those lines for maintenance are adversely affected by the construction of the Project, IPC will restore the function of the irrigation lines, including the relocation, reconfiguration, and replacement of existing lines. The affected landowner may negotiate to undertake the responsibility for repair, relocation, reconfiguration, or replacement of damaged lines in fair settlement with IPC. In the event the landowner chooses to take on this responsibility, IPC will not be responsible for correcting repairs after construction is complete.

7.3.11 Ingress and Egress Routes

A. IPC will seek a mutually acceptable agreement with the landowner on the proposed corridor that will be used for entering and leaving the construction area prior to initiation of construction.

B. Where access ramps or pads from a road or highway to the construction area are required in agricultural fields, an underlayment of durable geotextile matting will be placed over the soil surface prior to the installation of temporary rock access fill material. The geotextile matting will be sufficiently strong to prevent rock from becoming embedded in the soil and to withstand removal of the rock without tearing. Rock and geotextile matting will be completely removed upon completion of the Project, unless otherwise agreed upon by a mutually acceptable agreement with the landowner.

7.3.12 Temporary Roads

The location of temporary roads to be used for construction purposes are identified in Exhibit C, but will also require agreement with the landowner and/or landowner's designee.

A. Temporary roads will be designed to not impede proper drainage and will be built to mitigate soil erosion on or near the temporary roads.

B. IPC will attempt to identify existing farm lanes as preferred temporary access roads for construction.

C. Upon abandonment, temporary roads may be left intact through mutual agreement of the landowner and IPC.

D. If a temporary road is to be removed, the agricultural land upon which it is constructed will be returned to its previous use and restored as nearly as possible to the condition that existed prior to construction.

7.3.13 Topsoil Separation and Storage

Prior to construction, topsoil will be removed and stored separately at segregated locations within Project staging areas. Once construction is complete, topsoil will be replaced in the proper sequence and the disturbed area will be reclaimed, unless otherwise specified in an agreement with the landowner.

7.3.14 Excess Rock

Rock contained in any material brought to the construction area will be removed from agricultural land and used or disposed of within the Project Construction site, unless otherwise specified in an agreement with the landowner.

7.3.15 Construction in Wet Conditions

A. On excessively wet soils, IPC will restrict certain construction activities so that soil productivity is preserved or restored.

B. As feasible, IPC will schedule construction activities to avoid the months of greatest precipitation.

C. Damages that result from construction that occurs in wet conditions will be restored as determined by the Agricultural Monitor described in Section 7.0.

7.3.16 Dust Control

IPC will:

A. Control excessive dust generated during construction by controlling vehicle speed, by wetting the construction area, or by other means.

B. Coordinate with farm operators to provide adequate dust control in areas where specialty crops are susceptible to damage from dust.

7.3.17 Prevention of Soil Erosion

IPC will:

A. Implement erosion prevention and sediment control measures during construction in accordance with all applicable permit conditions.

B. Coordinate with the local Natural Resources Conservation Service soil conservation experts.

C. Following construction, cultivated agricultural land will generally be reseeded or replanted by the landowner. IPC will reseed and mulch non-cultivated agricultural land such as pastures and perennial grass hayfields in consultation with landowners, or will make arrangements with landowners who prefer to conduct the reseeding of these areas. IPC will reseed and mulch non-agricultural land in accordance with the Vegetation Management Plan found in Exhibit P1.

D. Follow best management practices set forth in approved stormwater and erosion control plans for the Project, which may include applying temporary mulch in the event of a seasonal shutdown, if construction or restoration activity is interrupted or delayed for an extended period, or if permanent seeding of non-cultivated areas is not completed during the recommended seeding period prior to the winter season. Temporary straw mulch may be applied to bare soil surfaces, including topsoil piles, at the rate of 4,000 pounds per acre. Interim seeding of a cover crop may be used in lieu of temporary mulching in some areas.

E. Work with the landowner or landowner's designee to prevent erosion on cultivated agricultural lands in instances where the area disturbed by construction cannot be planted before the first winter season.

F. Excess soil and rock will be disposed of at an approved upland site within the Project construction site. IPC and the landowner may negotiate placement of fill material on site (within the Project construction site) on a case-by-case basis.

7.3.18 Induced Voltage

A. Very rarely, barbed wire or other metal fences paralleling transmission lines may acquire induced voltage. Electric fences around livestock enclosures may also acquire an increase in voltage levels. Cathodic protection may be required to prevent excessive corrosion of irrigation distribution lines as a result of induced voltage.

B. IPC will assist landowners in determining the best ways to safely ground permanent or temporary fences if problems arise. IPC will compensate landowners for any additional materials needed to properly ground or protect fences or irrigation equipment from induced voltage, as provided in any applicable easement or access agreement between IPC and the landowner.

7.3.19 Livestock Operations

A. IPC will work with the landowner or landowner's designee to coordinate and schedule construction activities to minimize impacts to livestock operations. IPC will also construct temporary fences and gates during construction, as necessary. The Agricultural Monitor will ensure that construction activities follow guidelines established with the landowner and/or landowner's designee to protect livestock and livestock operations.

B. Any fences, gates, cattle guards, or corrals damaged by construction will be repaired or replaced. The affected landowner may negotiate to undertake the responsibility for repair, relocation, reconfiguration, or replacement of damaged fences, or other livestock-related infrastructure in fair settlement with IPC. In the event the landowner chooses to take on the responsibility for repair, relocation, reconfiguration, or replacement of damaged infrastructure, IPC will not be responsible for correcting the repairs after completion of the Project.

C. In the event livestock must be relocated temporarily, or supplemental feed is necessary, IPC will reimburse the reasonable cost incurred for the transport of livestock, acquisition of temporary pastureland and/or additional supplemental feed during construction and restoration activities.

8.0 PROCEDURES FOR DETERMINING CONSTRUCTION-RELATED DAMAGES AND PROVIDING COMPENSATION

A. IPC will establish a procedure for processing claims for construction-related damages. The procedure will standardize and minimize concerns in the recovery of damages and provide a degree of certainty and predictability for landowners, others, and IPC.

B. Prior to construction, IPC together with the landowner or the landowner's designee will examine each affected property to inventory crops, livestock, fences, irrigation systems, drain tiles, roads, etc.

C. Negotiations between IPC and any affected landowner and/or landowner's designee will be voluntary and no party is obligated to follow any particular method for computing the amount of loss for which compensation is sought or paid. Landowner or landowner's designee may elect to settle damages with IPC in advance of construction on a mutually acceptable basis or settle after construction based on a mutually agreeable determination of actual damages.

D. If construction- or operation-related damages occur or are expected to occur, IPC and the landowner or landowner's designee may agree to monetary or other compensation in lieu of implementing the mitigation actions set forth in Section 4.0 above.

9.0 ADVANCE NOTICE OF ACCESS TO PRIVATE PROPERTY

Once an agreement has been reached between IPC and the landowner and scheduling of construction activities has been discussed, IPC will provide the landowner or landowner's designee advance notice before beginning construction on the property. Prior notice will consist

of a personal contact, email, letter, or a telephone contact informing the landowner or landowner's designee of IPC's intent to access the land.

A. Where feasible, IPC will coordinate its activities to provide access for farm equipment and livestock to fields otherwise isolated by construction activities.

B. IPC will construct temporary fences and gates across the construction area, as necessary.

10.0 AGRICULTURAL SPECIALISTS

IPC will retain qualified agricultural specialists on each work phase including construction planning, construction, restoration, post-construction monitoring, and follow-up restoration. During construction and initial restoration, IPC will designate an inspector to serve as an Agricultural Monitor. The Agricultural Monitor will provide technical assistance to construction managers, other inspectors, and construction inspectors to facilitate the effective implementation of agricultural mitigation measures.

10.1 Qualifications and Selection of Agricultural Monitor

The Agricultural Monitor will have a bachelor's degree in agronomy or soil science or equivalent work experience and/or practical experience with electric transmission line construction and restoration on agricultural land. The Agricultural Monitor will also have demonstrated practical experience in animal and range management.

10.2 Role of the Agricultural Monitor

IPC's Agricultural Monitor will:

A. Be a full-time member of the inspection team;

B. Be responsible for verifying compliance with provisions of this mitigation plan during construction;

C. Work collaboratively with other inspectors, ROW agents, and other Project personnel in achieving compliance with this mitigation plan;

D. Observe construction activities on agricultural land regularly;

E. Have the authority to stop construction activities that are determined to be out of compliance with provisions of this mitigation plan;

F. Document instances of noncompliance and work with construction personnel to identify and implement appropriate corrective actions as needed;

G. Provide construction personnel with training on provisions of this mitigation plan before construction begins; and

H. Provide construction personnel with field training on specific topics as needed.

11.0 IMPACTS TO CONSERVATION RESERVE PROGRAM LANDS

IPC will work with the local USDA/FSA with jurisdiction over the CRP lands that may be impacted. CRP programs on affected areas will require special attention. Costs may include rental payments plus interest, cost share payments plus interest, CRP-Signup Incentive Payment plus interest, Conservation Practice-Wetland Restoration (CP23), one time Wetland Restoration Incentive payment plus interest and liquidated damages and any penalties for early termination of contract, if applicable, according to paragraph 577 of USDA Handbook 2-CRP.

Generally, the placement of transmission line towers within CRP fields does not reduce the payments a landowner will receive due to loss of acreage within the tower footprint.

Temporary access roads will require a waiver from the FSA as long as the road is decommissioned and reseeded to FSA specifications. New permanent access roads that impact CRP land will require coordination with the FSA, and IPC will be required to refund money to the FSA at a rate specified in the CRP for the acreage impacted from the footprint of the new road. IPC will compensate the landowner for the lost payment resulting from the reduction of those acres enrolled in the CRP contract according to the procedures for determining construction-related damages and providing compensation stated above. Since the land removed from CRP will no longer be eligible for future enrollment in CRP or for the production of crops, these factors will be considered when developing appropriate compensation.

12.0 IMPACTS TO LANDOWNERS REGARDING LAND USE AND TAX ISSUES

Landowners may be enrolled in certain county, state, or federal programs that influence taxes or land use on their property. Land that is used exclusively for farm use, but is located outside of an Exclusive Farm Use (EFU) zone, can qualify for tax reductions through the *Farm Use Special Assessment* if it meets certain criteria and can demonstrate that a certain amount of gross income is generated through farm use. The amount of income required to qualify for the state program varies by acreage: parcels over 30 acres must demonstrate a minimum annual gross income of $3,000 from farming; parcels between 6.5 and 30 acres must demonstrate gross income of at least $100 per acre annually; and parcels less than 6.5 acres must demonstrate gross income of $650 annually. These income requirements must be met in 3 of the 5 previous years. At the time of enrollment, the land must be under current farm use and have been used for the 2 previous years exclusively for farm use. Land within an EFU zone can qualify for the Special Assessment, but the landowner must demonstrate that the land is currently used and was used during the previous year exclusively for farm use. If the Project affects a parcel of farmland receiving the *Special Assessment* to the degree that the farm could not meet the requirements of the program, the landowner's annual property taxes may increase and they may be responsible for paying back taxes if the land is used for something incompatible with farm use.

13.0 MITIGATION ACTIONS FOR ORGANIC AGRICULTURAL LAND

IPC recognizes that organic agricultural land is a unique feature of the landscape and will treat this land with the same level of care as other sensitive environmental features. The provisions of this section identify mitigation measures that apply specifically to farms that are Organic Certified or farms that are in active transition to become Organic Certified, and are intended to address the unique management and certification requirements of these operations. All protections provided in this mitigation plan will also be provided to organic agricultural land, in addition to the provisions of this section.

13.1 Organic System Plan

IPC recognizes the importance of the individualized Organic System Plans (OSPs) to the Organic Certification process. IPC will work with the landowner or landowner's designee and a mutually acceptable third-party organic consultant to identify site-specific construction practices that will minimize the potential for decertification as a result of construction activities. Possible practices may include, but are not limited to: equipment cleaning, planting a deep-rooted cover

crop in lieu of mechanical decompaction, applications of composted manure or rock phosphate, preventing the introduction of disease vectors from tobacco use, restoration and replacement of beneficial bird and insect habitat, maintenance of organic buffer zones, use of organic seeds for any cover crop, or similar measures. IPC recognizes that some OSPs may be proprietary in nature and will respect the need for confidentiality, as appropriate.

13.2 Prohibited Substances

IPC will avoid the application of prohibited substances onto organic agricultural land. No herbicides, pesticides, fertilizers, or seeds will be applied unless requested and approved by the landowner. Likewise, no refueling, fuel or lubricant storage, or routine equipment maintenance will be allowed on organic agricultural land. Equipment will be checked prior to entry to make sure that fuel, hydraulic, and lubrication systems are in good working order before working on organic agricultural land. If prohibited substances are used on land adjacent to organic agricultural land, these substances will be used in such a way as to prevent them from entering organic agricultural land.

13.3 Temporary Road Impacts

Topsoil and subsoil layers that are removed during construction on organic agricultural land for road construction will be stored separately and replaced in the proper sequence after construction. Unless otherwise specified in the site-specific plan described above, IPC will not use this soil for other purposes, including creating access ramps at road crossings. No topsoil or subsoil (other than incidental amounts) may be removed from organic agricultural land. Likewise, organic agricultural land will not be used for storage of soil from nonorganic agricultural land.

13.4 Erosion Control

On organic agricultural land, IPC will, to the extent feasible, implement erosion control methods that are consistent with the then-current, applicable version of the OSP during construction and restoration efforts. On land adjacent to organic agricultural land, IPC's erosion control procedures will be designed so that sediment from adjacent non-organic agricultural land will not flow along the ROW and be deposited on organic agricultural land.

13.5 Weed/Pest Control

On organic agricultural land, IPC will, to the extent feasible, implement weed and pest control methods during its construction and/or restoration efforts that are consistent with the then current, applicable version of the OSP. No prohibited substances will be used in weed or pest control on organic agricultural land. In addition, IPC will not use prohibited substances in weed or pest control on land adjacent to organic agricultural land in such a way as to allow these materials to drift onto organic agricultural land. An integrated pest management plan will be developed in accordance with current, applicable OSP and will establish appropriate methods for controlling pests within organic agricultural land during construction of the Project.

13.6 Monitoring

In addition to the responsibilities of the Agricultural Monitor described in the mitigation plan, the following will apply:

A. The Agricultural Monitor will monitor construction and restoration activities on organic agricultural land for compliance with the provisions of this section and will document any activities that may result in decertification.

B. Instances of noncompliance will be documented according to Independent Organic Inspectors Association protocol, consistent with the then-current, applicable OSP, and will be made available to the ODA, the landowner and/or landowner's designee, the Utility Inspector, and to IPC. The Agricultural Monitor is responsible for monitoring activities on organic agricultural land and will be trained in organic inspection by the Independent Organic Inspectors Association.

13.7 Compensation for Construction Damages

The settlement of damages will be based on crop yield and/or crop quality determination and the need for additional restoration measures. Unless the landowner of organic agricultural land or landowner's designee and IPC agree otherwise, a mutually agreed upon professional agronomist will make crop yield and quality determinations. If the crop yield or crop quality determinations indicate the need for soil testing, the testing will be conducted by a commercial laboratory that is properly certified to conduct the necessary tests and is mutually agreeable to IPC and the landowner or landowner's designee. Fieldwork for soil testing will be conducted by a professional Soil Scientist or licensed Professional Engineer. IPC will be responsible for sampling, testing, and additional restoration activities, if needed. Landowner and/or landowner's designee may elect to settle damages with IPC in advance of construction on a mutually acceptable basis, or to settle after construction based on a mutually agreeable determination of actual damages.

13.8 Compensation for Damages Due to Decertification

Should any portion of organic agricultural land be decertified as a result of construction activities, the settlement of damages will be based on the difference between revenue generated from the land affected before decertification and after decertification so long as a good-faith effort is made by the landowner, tenant, or other personnel to regain certification.

13.9 Definitions

In the event of a conflict between this section and the mitigation plan with respect to definitions, the definition provided in this section will prevail but only to the extent such conflicting terms are used in this section. The definition provided for the defined words used herein shall apply to all forms of the words.

Apply: To intentionally or inadvertently spread or distribute any substance onto the exposed surface of the soil.

Certifying Agent: As defined by the NOP Standards, 7 CFR Part 205.2.

Decertified or Decertification: Loss of Organic Certification.

Organic Agricultural Land: Farms or portions thereof described in 7 CFR Parts 205.100,24 205.202, and 205.101.

Organic Buffer Zone: As defined by the NOP Standards, 7 CFR Part 205.2.

Organic Certification or Organic Certified: As defined by the NOP Standards, 7 CFR Part 205.100 and 7 CFR Part 205.101.

Organic System Plan: As defined by the NOP Standards, 7 CFR Part 205.2.

Prohibited Substance: As defined by the NOP Standards, 7 CFR Part 205.600 through 7 CFR 205.605 using the criteria provided in 7 USC 6517 and 7 USC 6518.

14.0 CONCLUSIONS

The proposed Project Route crosses a total of 272.8 miles of irrigated and non-irrigated farmland in Oregon. This total consists of 4.5 miles of irrigated farmland and 277.3 miles of non-irrigated farmland. The Agricultural Assessment Area, which is larger than the Proposed Corridor for the Project, includes approximately 80,486 acres of agricultural land of which 2,421 acres are irrigated lands. Within the site boundary, agricultural lands subject to temporary impacts through construction disturbance are estimated to be 553 acres. Permanent impacts to agricultural lands related to Project operations are estimated to be approximately 771 acres. IPC estimates the potential temporary construction impact to all agricultural lands, including a 500-foot buffer around all temporary use areas outside of the site boundary, to be approximately 996 acres of irrigated land and 24,007 of non-irrigated land.

- Temporary impacts to field crops discussed in Section 5.3 will be mitigated by the measures described in Sections 7.3.2 and 7.3.6–7.3.16 of the impact mitigation section.
- Permanent impacts to field crops discussed in Section 5.4 will be mitigated by the measures presented in Sections 7.3.1–7.3.18.
- Impacts to use of aircraft for farming activities (Section 5.5) will be mitigated by the measures presented in Section 7.3.3.
- Impacts associated with field burning (Section 5.6) will be mitigated by the measures presented in Section 7.2.
- Impacts to crop production and irrigation discussed in Section 5.7 will be mitigated through the measures presented in Section 7.3.10.
- Impacts to farming activities around tower structures (Section 5.7.1) will be mitigated by the measures presented in Section 7.3.1.
- Impacts to livestock operations discussed in Section 5.8 will be mitigated through the measures presented in Section 7.3.19.
- Impacts to pastureland/rangeland are discussed in Section 5.9. Impacts to these lands will be mitigated through the actions presented in Sections 7.3.6, 7.3.8, 7.3.10, 7.3.11, and 7.3.16.
- Certain fences within the ROW will have to be re-located to reduce the potential for assumption of induced voltage from power lines. Measures to address these impacts are addressed in Sections 7.3.18 and 7.3.19.
- Although specific impacts to organic agricultural lands are not anticipated based on current Project routing, protections are discussed in Section 10.0 of this document.
- Impacts to agricultural workers and measures to mitigate those impacts are discussed in Section 5.12.
- Impacts to future development, crops, and practices and measures to mitigate those impacts are discussed in Section 5.14.
- Potential economic impacts to agricultural operations are discussed in Sections 6.1–6.4. Procedures for mitigating economic impacts are addressed in Section 8.0.

Based on the results of the agricultural survey and analysis of the potential impacts and efforts to minimize and mitigate for Project impacts, the Project will not cause 1) a substantial change

in accepted farming practices; or 2) a marked increase in the cost of accepted farm practices on either lands to be directly impacted by the Project or on surrounding lands devoted to farm use.

15.0 REFERENCES

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USDA (U.S. Department of Agriculture). 2014. National Agricultural Statistics Service. CropScape Cropland Data Layer. Available online at http://nassgeodata.gmu.edu/CropScape/

Wysocki, D. 2014. Personal communication with D. Wysocki, Soil Scientist, Oregon State University Extension Service. Pendleton, Oregon. December 12, 2014.

APPENDIX A
MAPS SHOWING AGRICULTURAL TYPES WITHIN THE ANALYSIS AREA

0 4,000 Feet

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

June 2017

Project Features
- Site Boundary

Routes
- Proposed Route

Mileposts
- Mile
- Tenth

Agricultural Assessment
- Analysis Area

Agricultural Type
- Irrigated Agriculture
- Other

IDAHO POWER
An IDACORP Company

Boardman to Hemingway Transmission Line Project

ATTACHMENT K-1, APPENDIX A
Agricultural Types

Map 1

0 4,000 Feet

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

June 2017

Project Features
- Site Boundary

Mileposts
- Mile
- Tenth

Agricultural Assessment
- Analysis Area

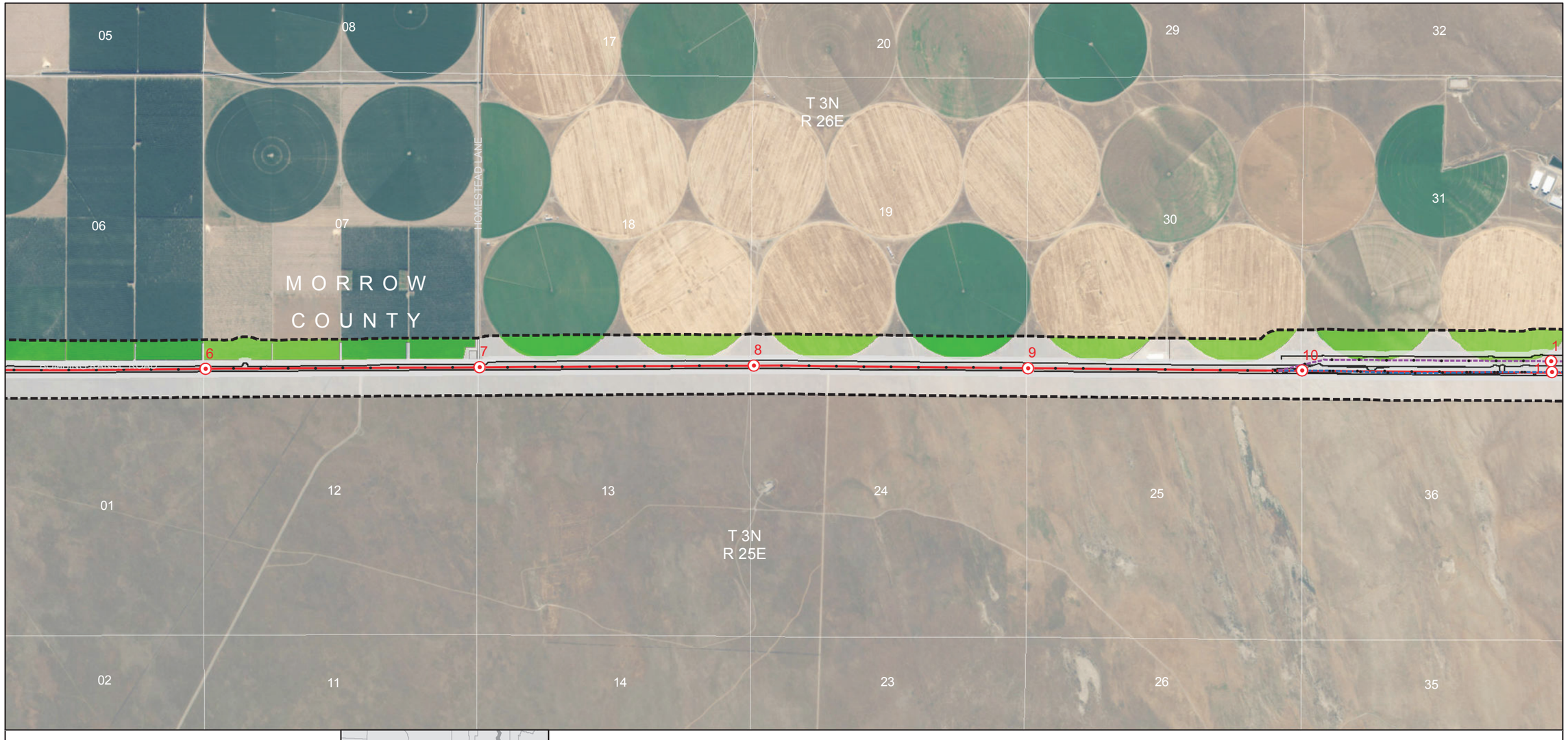
Agricultural Type
- Irrigated Agriculture
- Other

IDAHO POWER
An IDACORP Company

Boardman to Hemingway Transmission Line Project

ATTACHMENT K-1, APPENDIX A
Agricultural Types

Map 2



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Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

June 2017

Project Features
- Site Boundary

Routes
- Proposed Route
- West of Bombing Range Road Alternative 1
- West of Bombing Range Road Alternative 2

Mileposts
- Mile
- Tenth

Agricultural Assessment
- Analysis Area

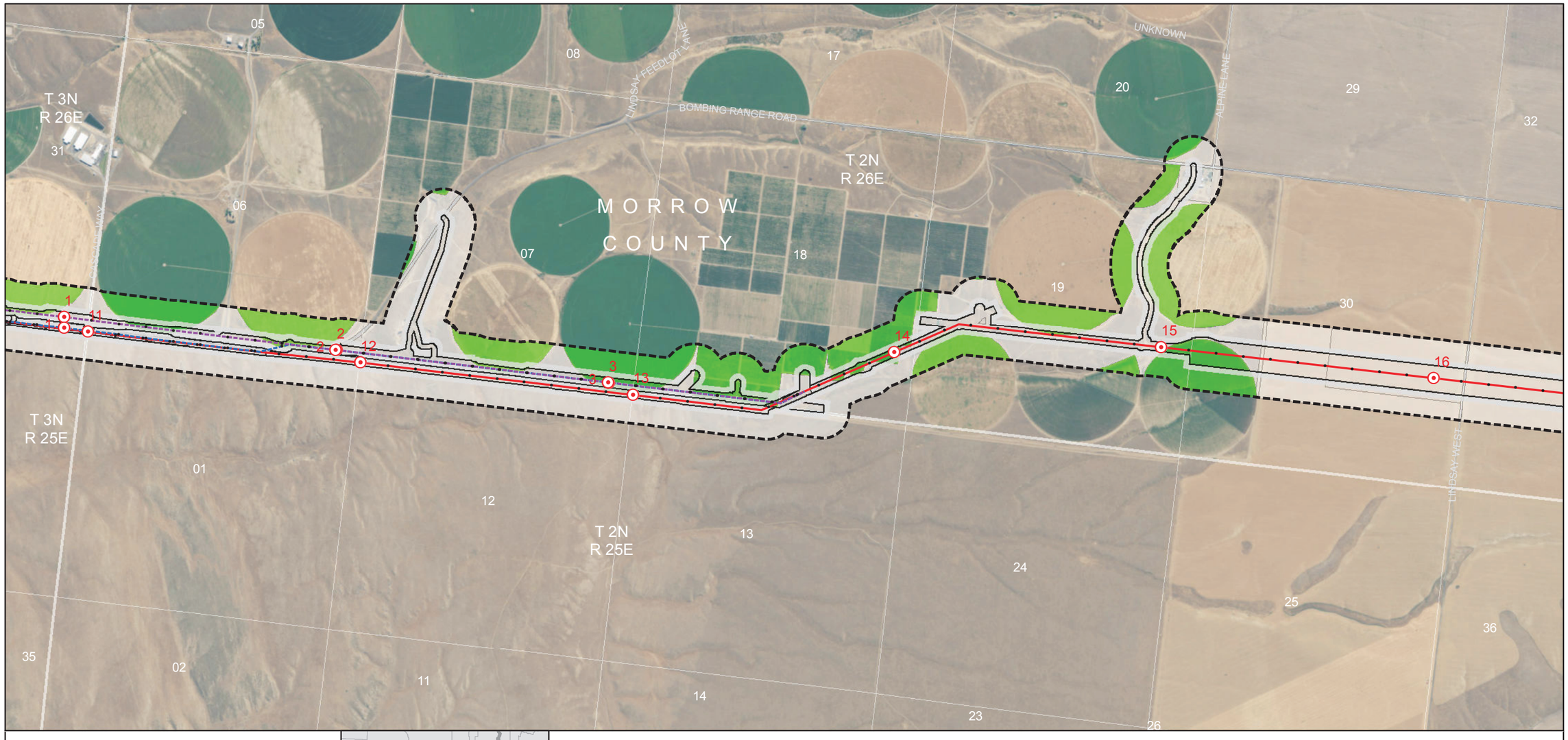
Agricultural Type
- Irrigated Agriculture
- Other

IDAHO POWER
An IDACORP Company

Boardman to Hemingway Transmission Line Project

ATTACHMENT K-1, APPENDIX A
Agricultural Types

Map 3



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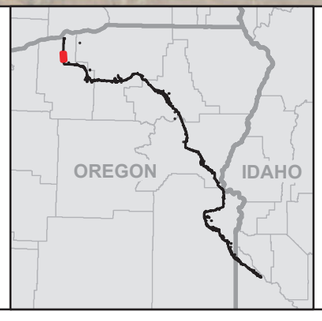
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

June 2017



Project Features
- Site Boundary

Routes
- Proposed Route
- West of Bombing Range Road Alternative 1
- West of Bombing Range Road Alternative 2

Mileposts
- Mile
- Tenth

Agricultural Assessment
- Analysis Area

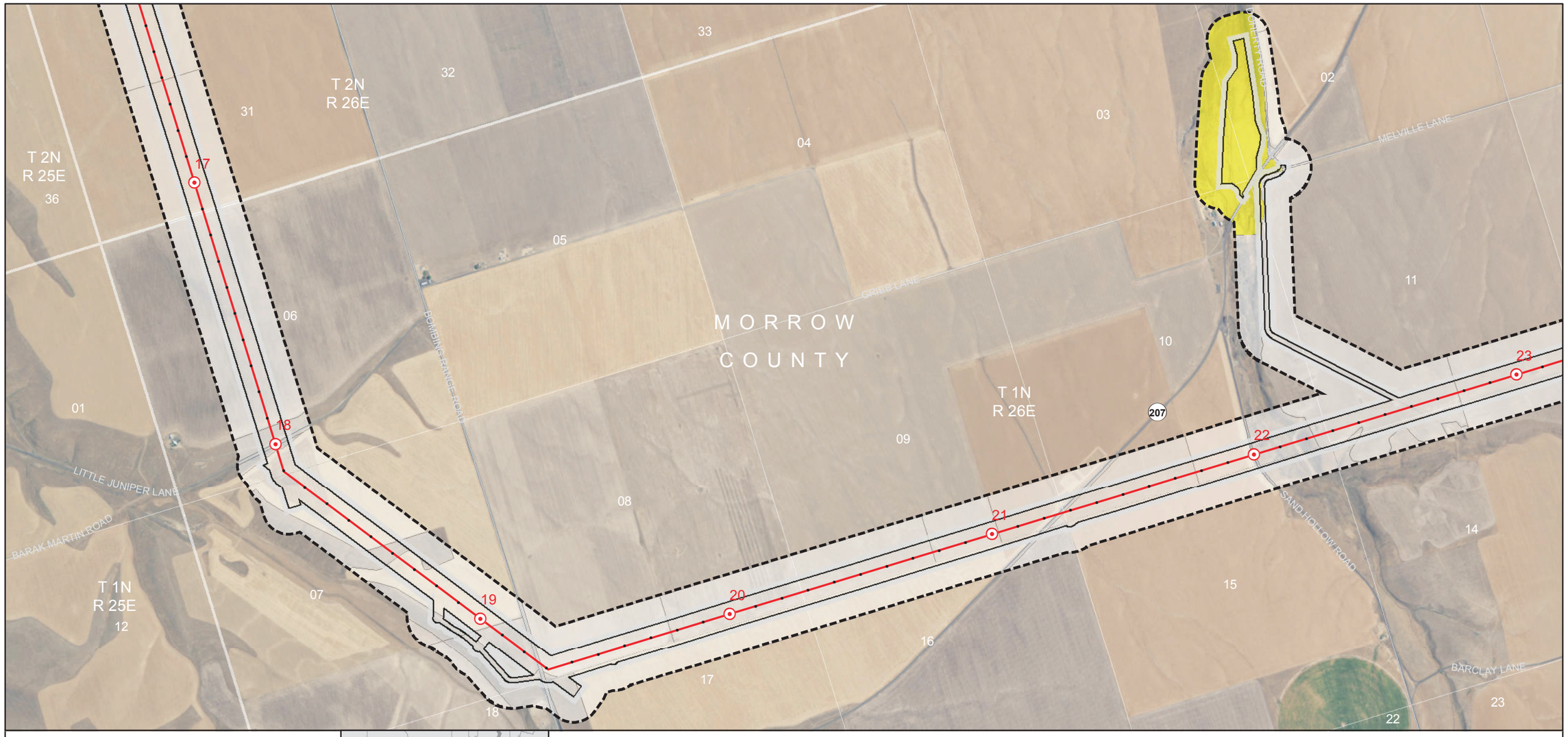
Agricultural Type
- Irrigated Agriculture
- Other

IDAHO POWER
An IDACORP Company

Boardman to Hemingway Transmission Line Project

ATTACHMENT K-1, APPENDIX A
Agricultural Types

Map 4



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Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

June 2017

Project Features
- Site Boundary

Routes
- Proposed Route

Mileposts
- Mile
- Tenth

Agricultural Assessment
- Analysis Area

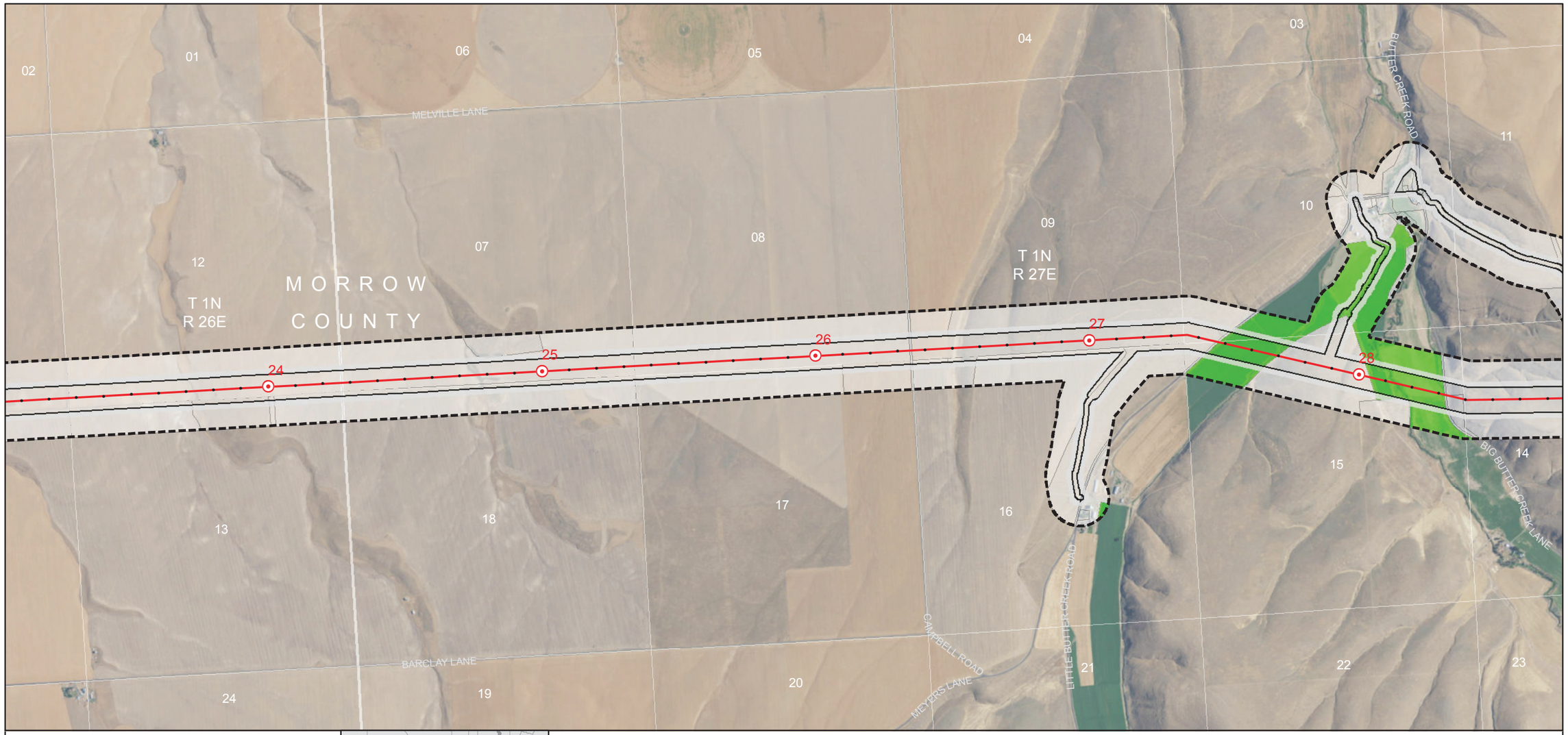
Agricultural Type
- Pasture/Hay
- Other

IDAHO POWER
An IDACORP Company

Boardman to Hemingway Transmission Line Project

ATTACHMENT K-1, APPENDIX A
Agricultural Types

Map 5



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Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

June 2017

Project Features
- Site Boundary

Routes
- Proposed Route

Mileposts
- Mile
- Tenth

Agricultural Assessment
- Analysis Area

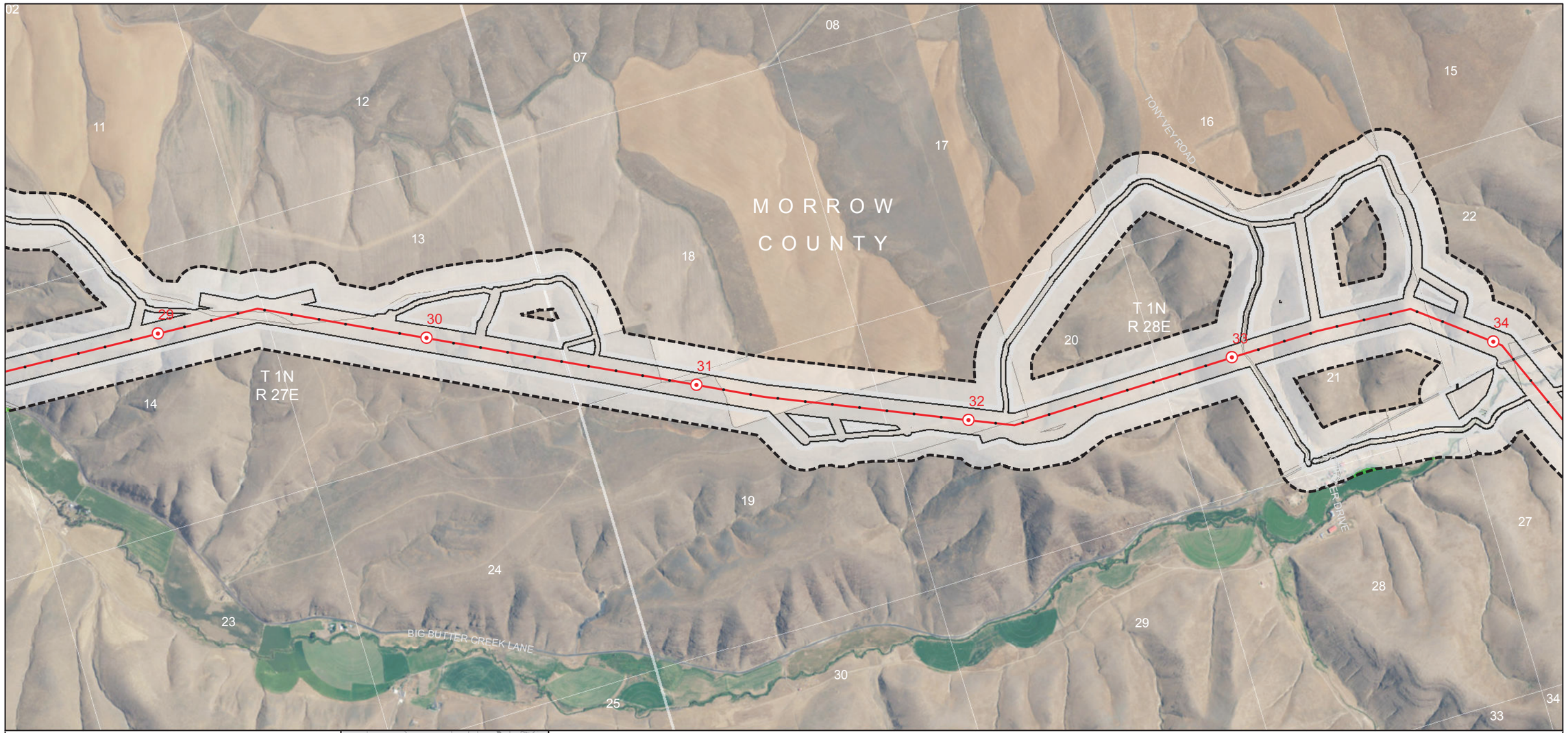
Agricultural Type
- Irrigated Agriculture
- Other

IDAHO POWER
An IDACORP Company

Boardman to Hemingway Transmission Line Project

ATTACHMENT K-1, APPENDIX A
Agricultural Types

Map 6



0 4,000 Feet

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

June 2017

Project Features
- Site Boundary

Routes
- Proposed Route

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- Mile
- Tenth

Agricultural Assessment
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- Irrigated Agriculture
- Other

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Boardman to Hemingway Transmission Line Project

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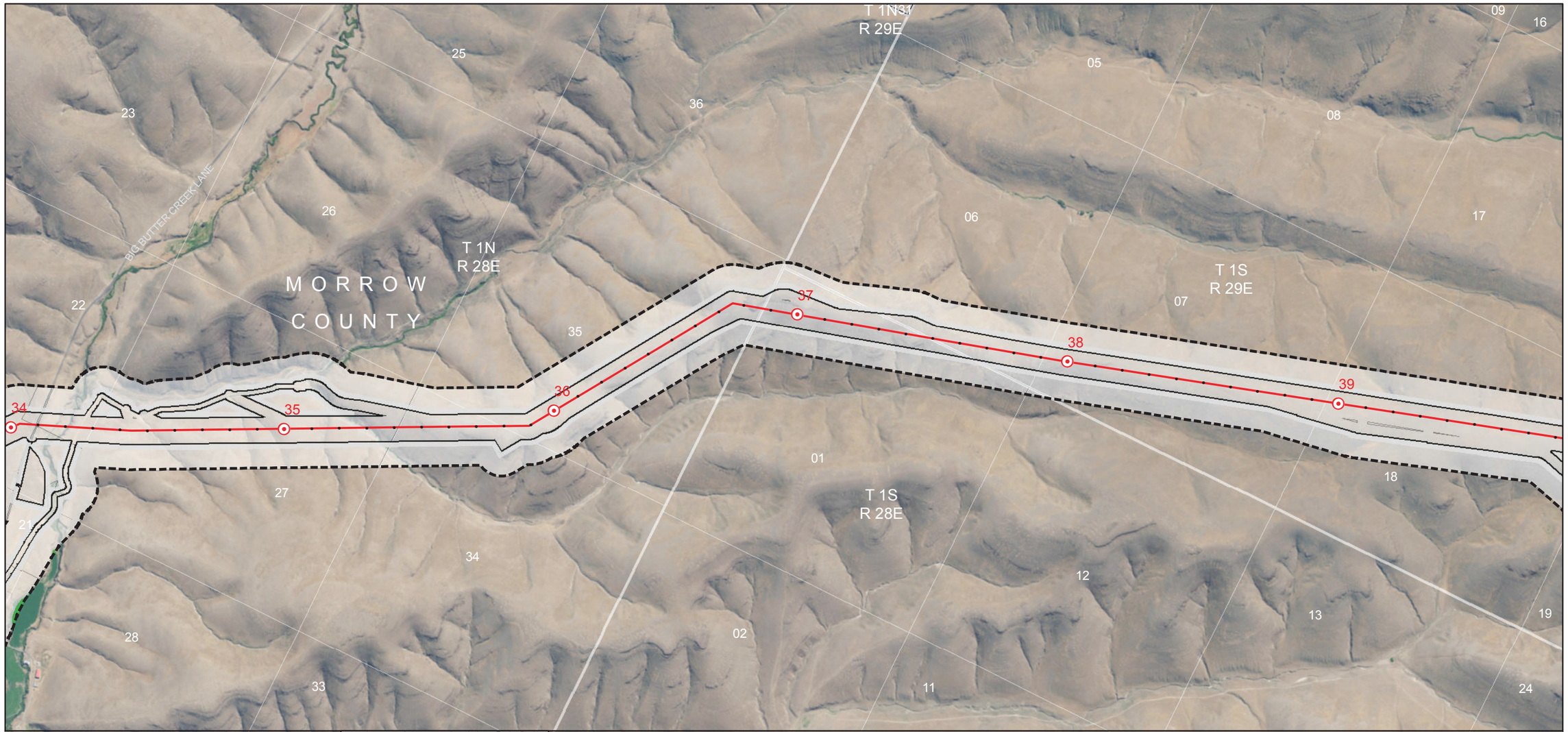
Map 7



0 4,000 Feet

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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- Site Boundary

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- Proposed Route

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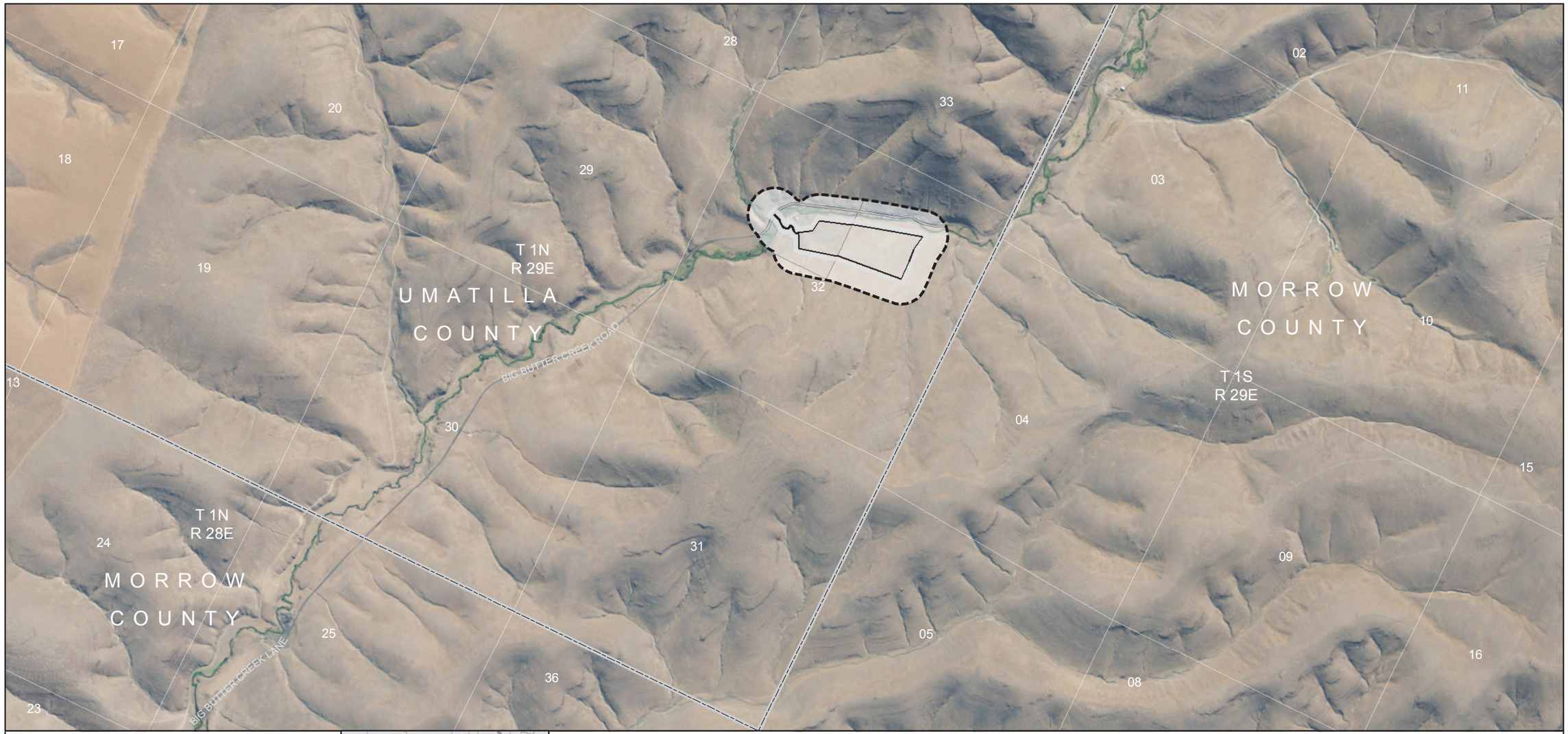
Agricultural Types

Map 8



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Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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Mile

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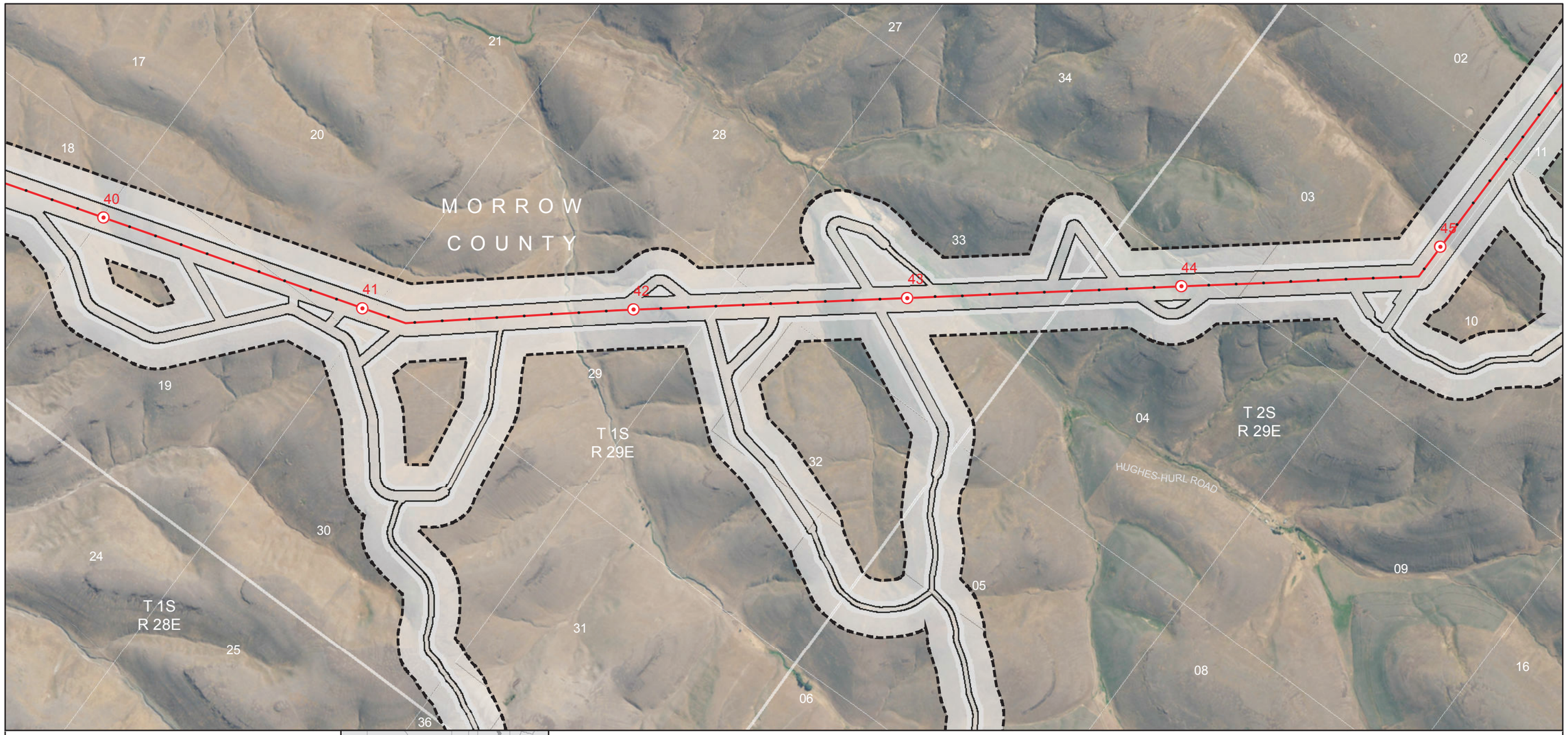
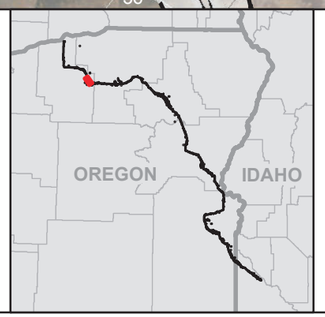
Map 9





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Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

June 2017

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- Site Boundary

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Agricultural Type
- Other

IDAHO POWER
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Boardman to Hemingway Transmission Line Project

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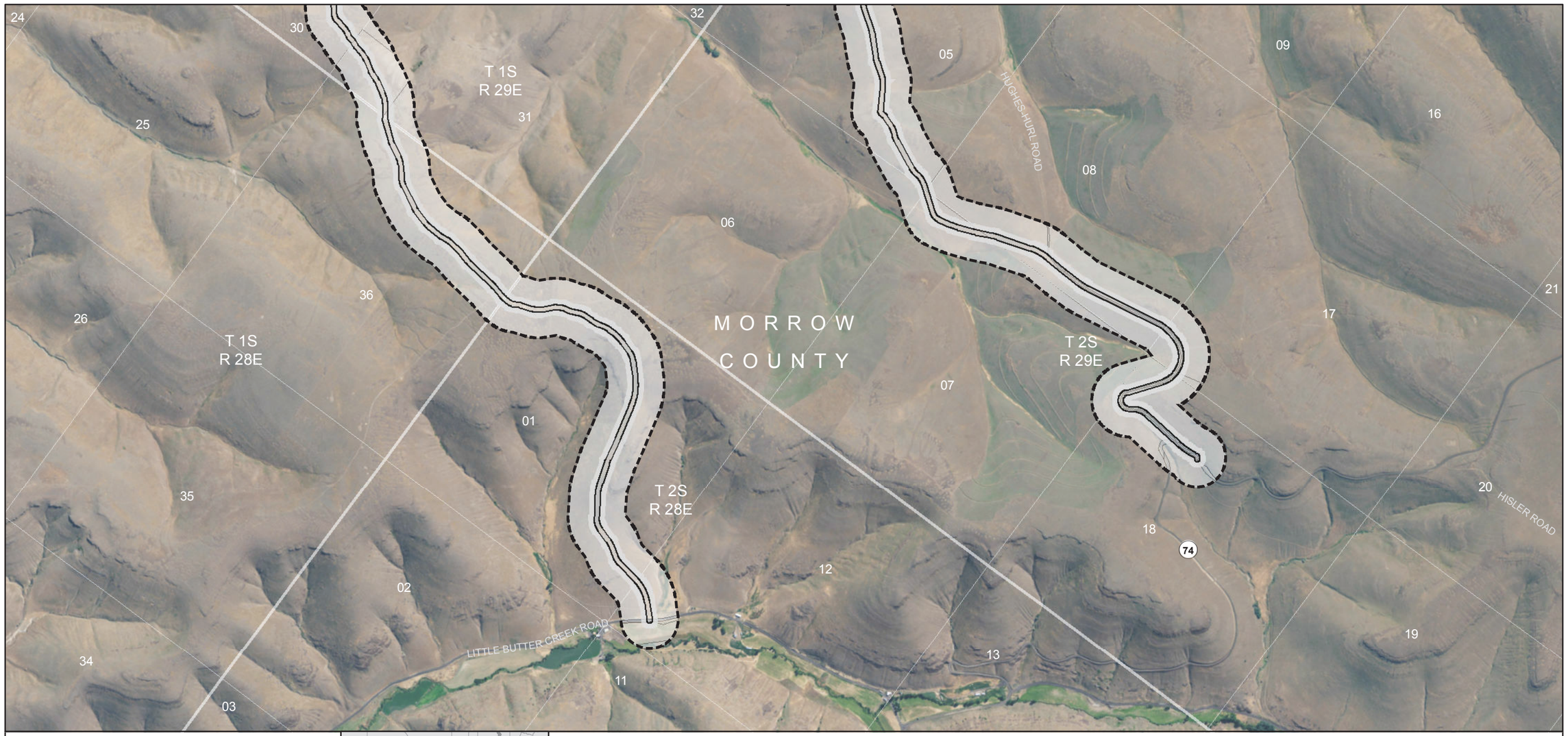
Agricultural Types

Map 10



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Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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Project Features

- Site Boundary

Mileposts

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- Other

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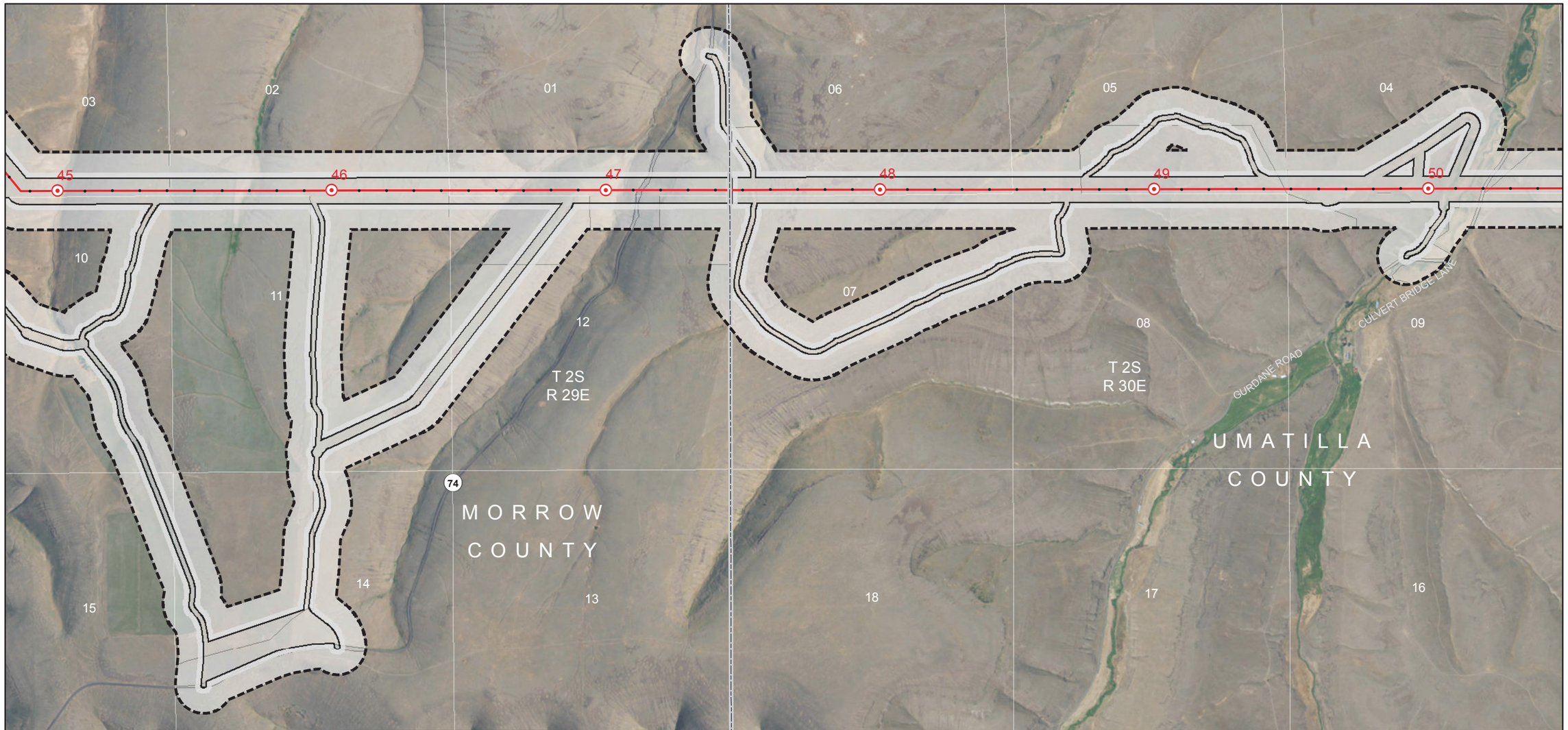
Map 11



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Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

June 2017

Project Features
- Site Boundary

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- Proposed Route

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- Mile
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- Other

IDAHO POWER
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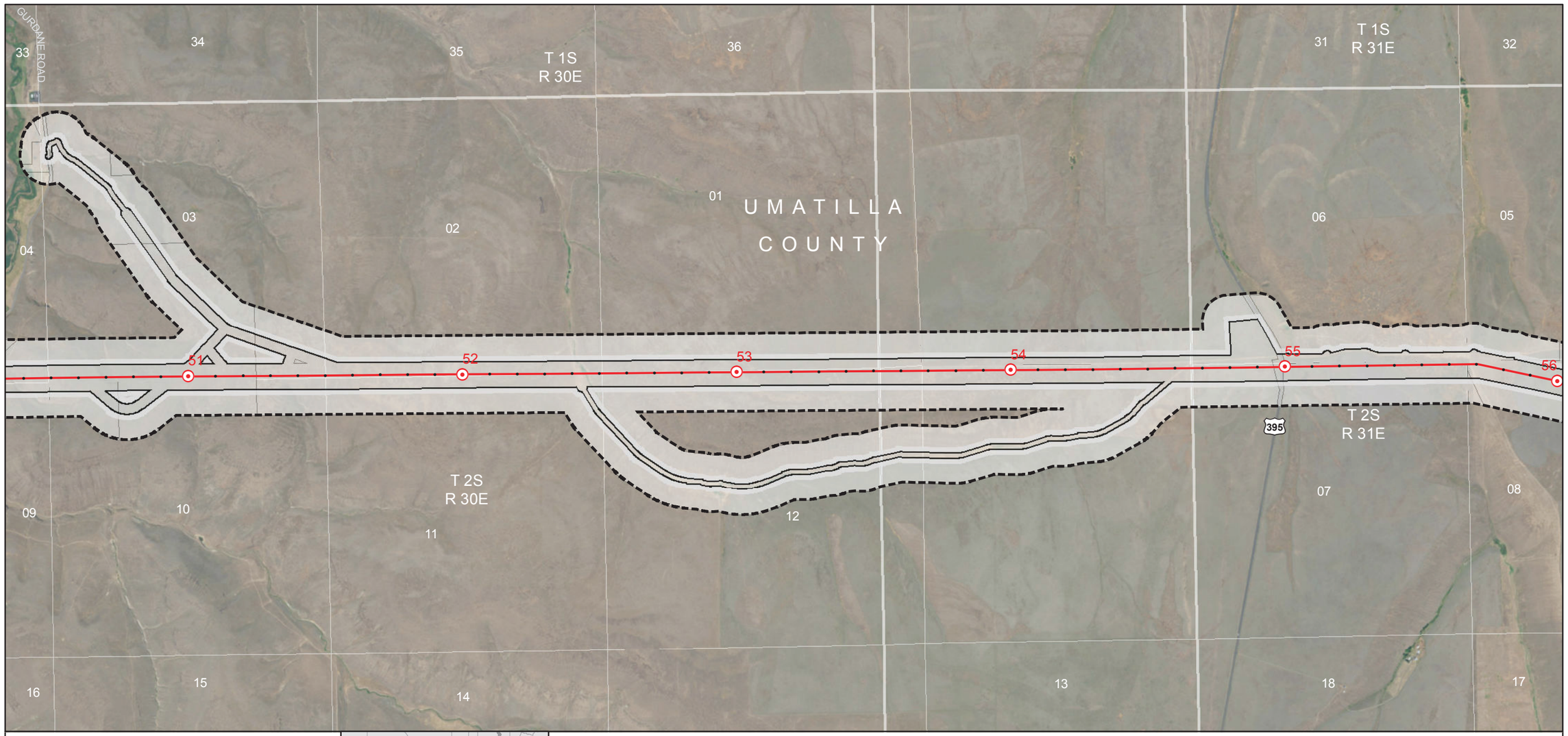
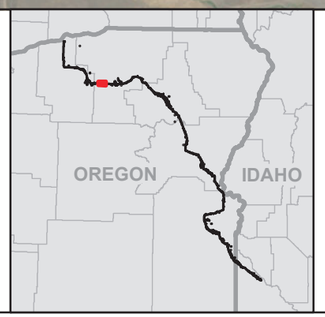
Map 12





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Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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Project Features
- Site Boundary

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Agricultural Type
- Other

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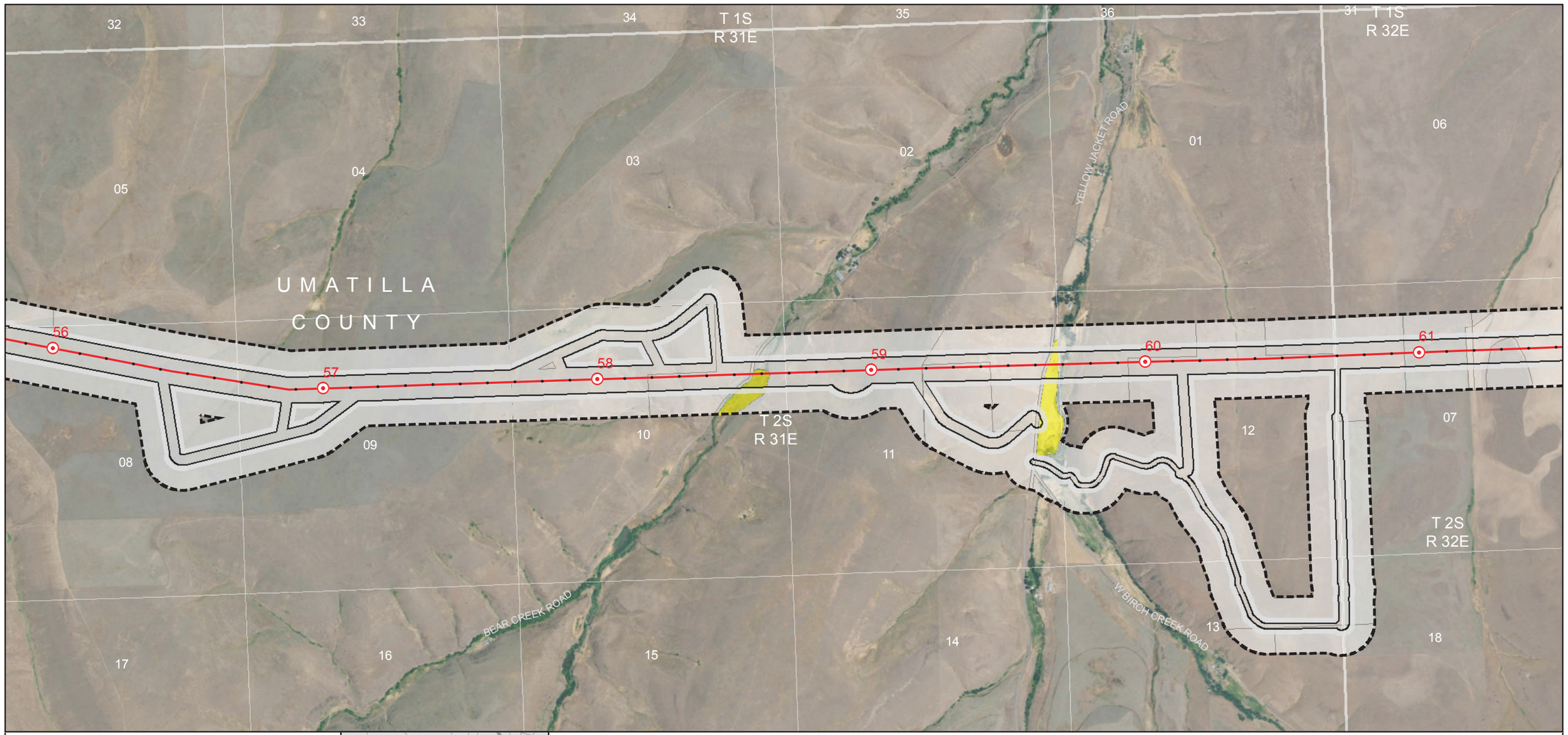
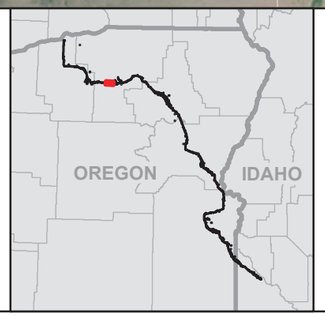
Map 13





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Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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Project Features
- Site Boundary

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- Mile
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Agricultural Type
- Pasture/Hay
- Other

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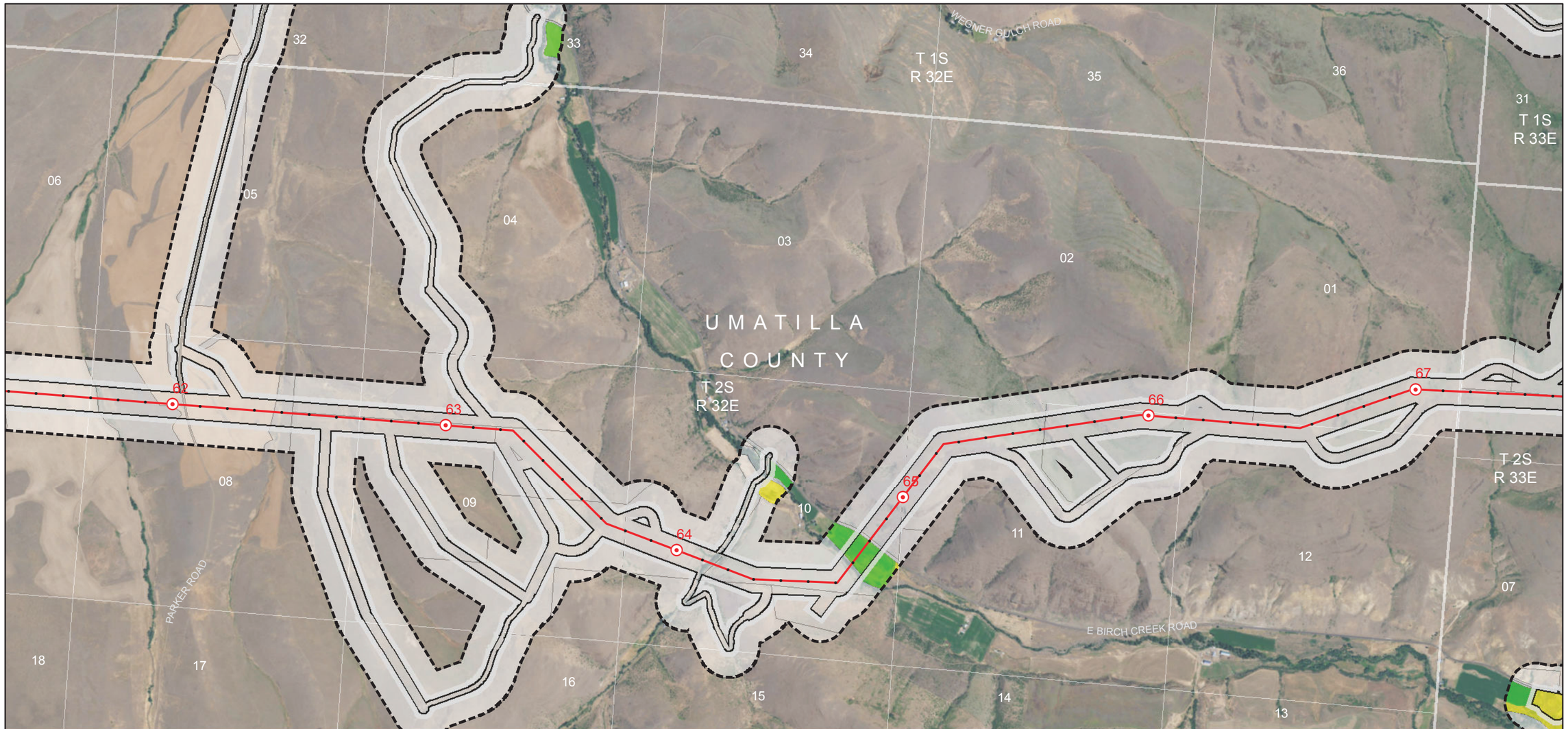
Map 14



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Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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Project Features
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Routes
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- Other

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Boardman to Hemingway Transmission Line Project

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Map 15

0 4,000 Feet

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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Project Features
- Site Boundary

Mileposts
- Mile
- Tenth

Agricultural Assessment
- Analysis Area

Agricultural Type
- Irrigated Agriculture
- Other

IDAHO POWER
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Boardman to Hemingway Transmission Line Project

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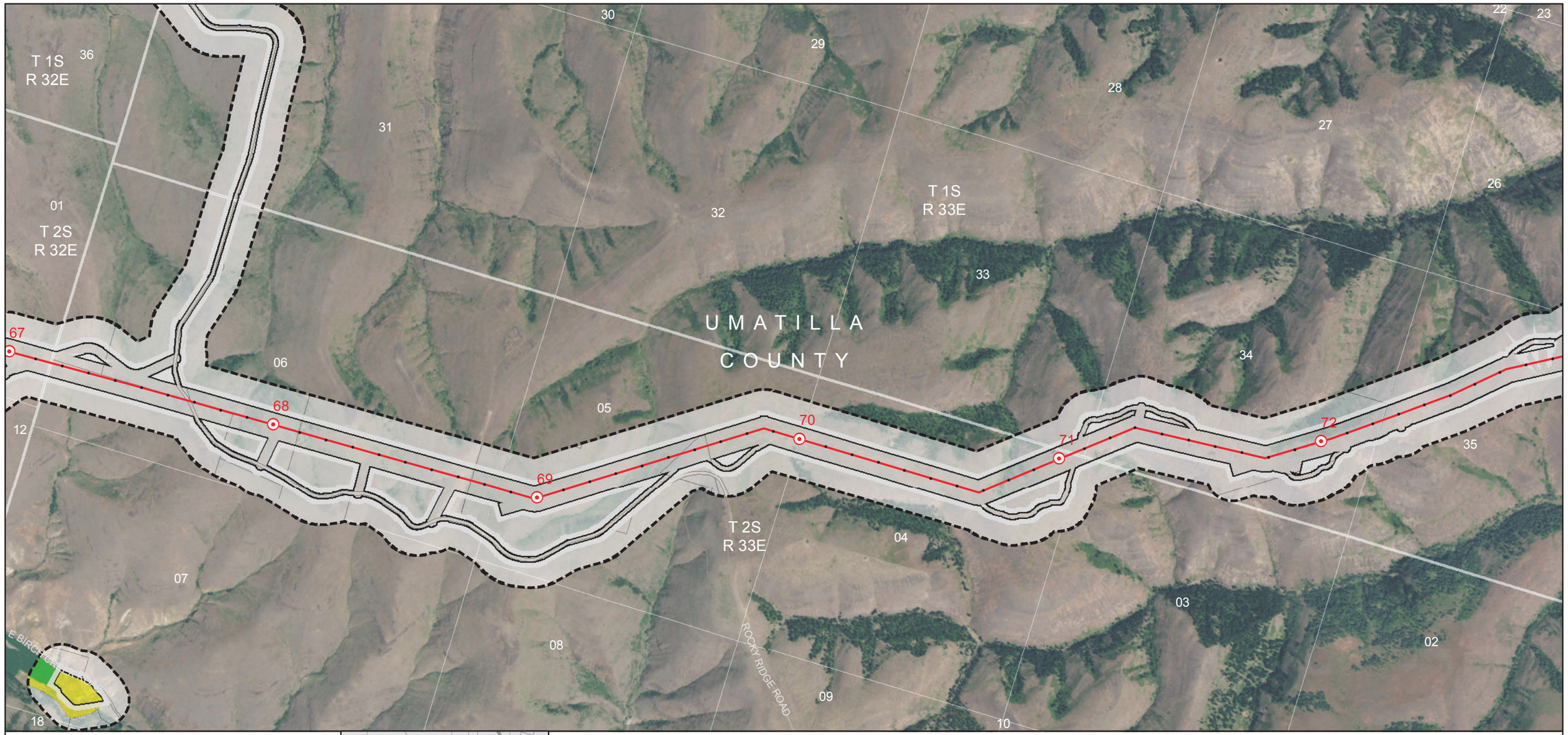
Map 16



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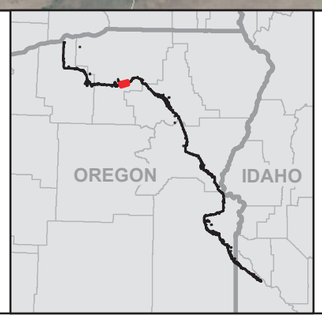
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

June 2017



Project Features
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Mileposts
- Mile
- Tenth

Agricultural Assessment
- Analysis Area

Agricultural Type
- Irrigated Agriculture
- Pasture/Hay
- Other

IDAHO POWER
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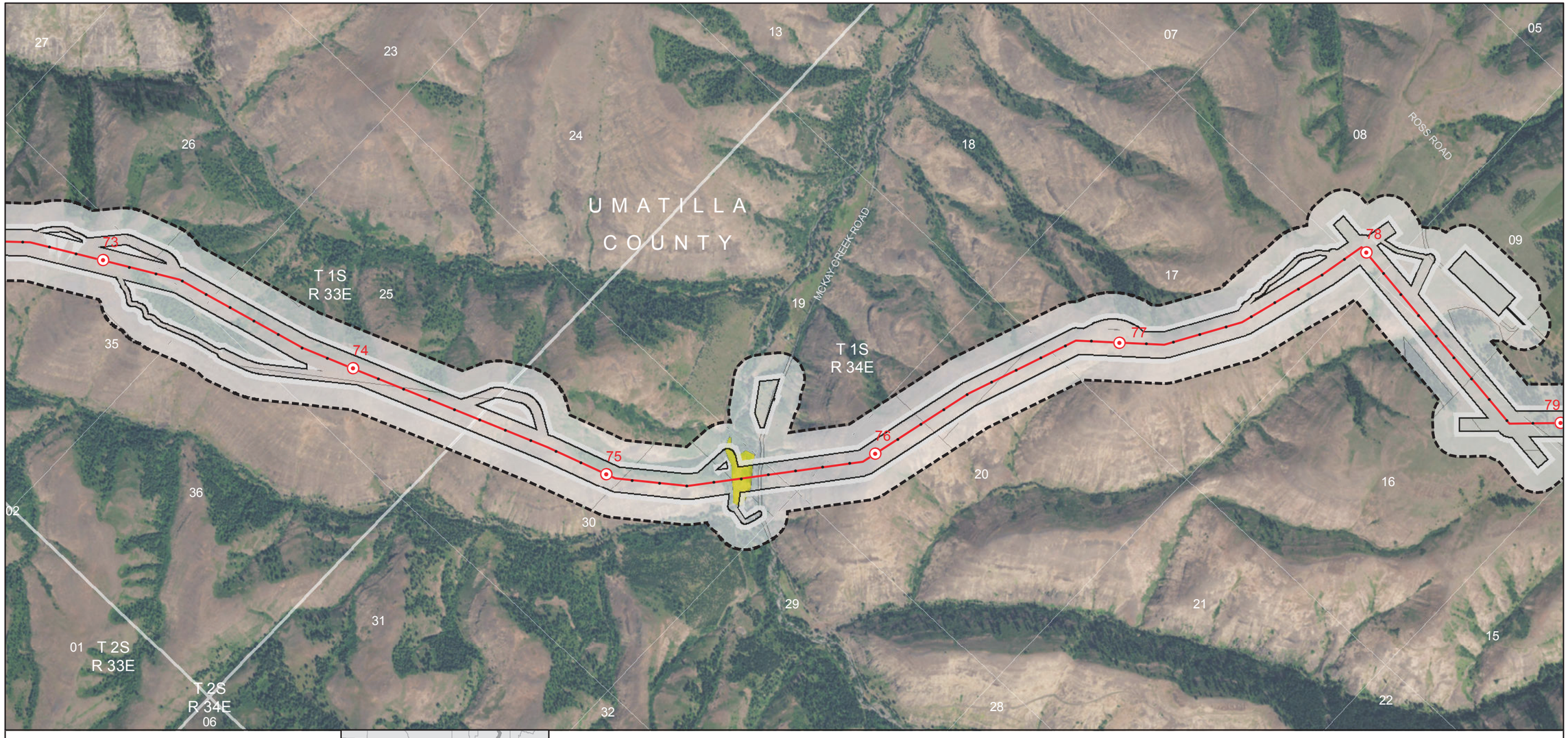
Map 17



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Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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Project Features
- Site Boundary

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- Proposed Route

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Agricultural Assessment
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Agricultural Type
- Pasture/Hay
- Other

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Map 18

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Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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- Proposed Route

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Agricultural Type
- Other

IDAHO POWER
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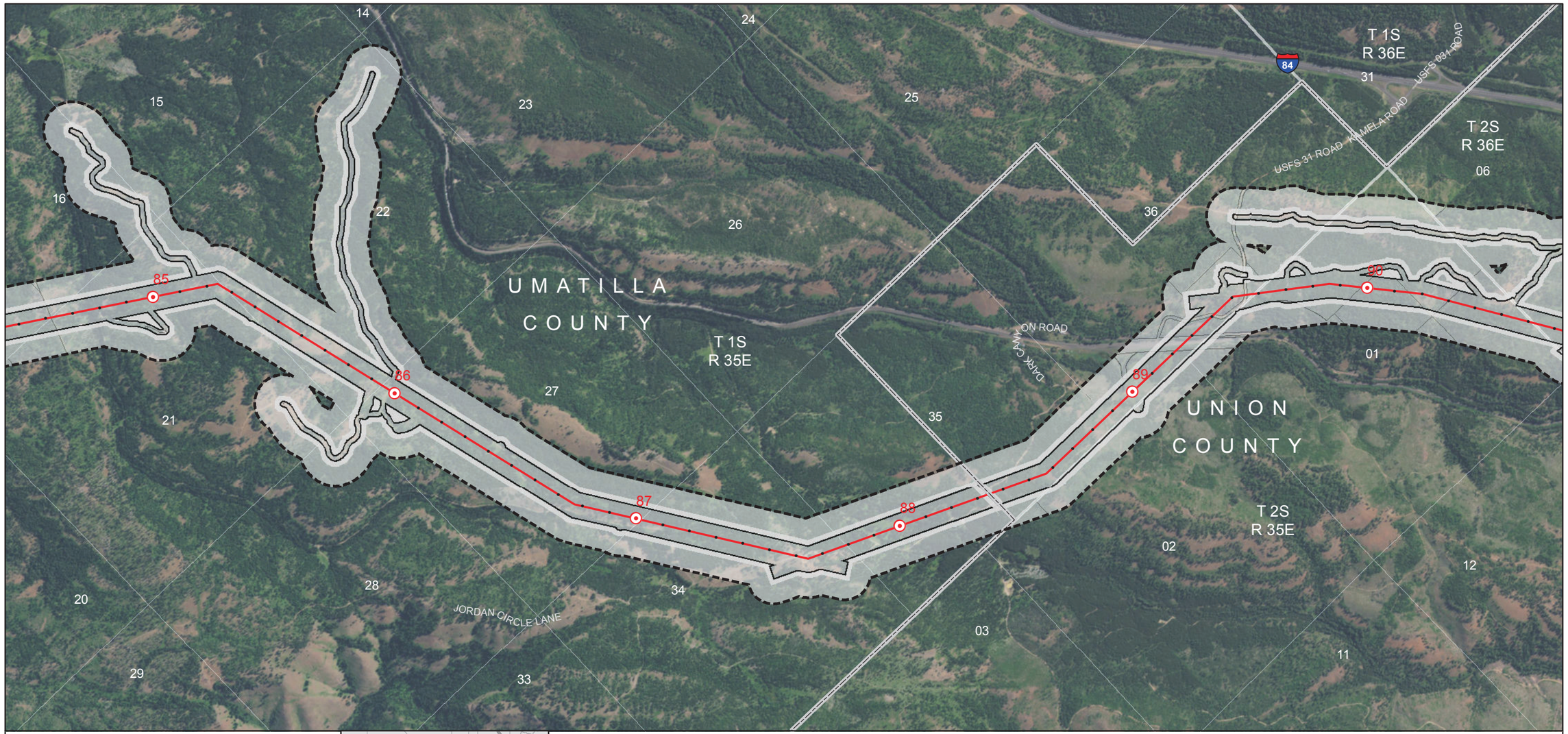
Map 19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USFS 031 ROAD
15
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25
USFS 31 ROAD
KIMMELA ROAD
T 2S
R 36E
06
16
22
36
26
85
86
UMATILLA
COUNTY
T 1S
R 35E
DARK CANYON ROAD
27
89
01
21
35
UNION
COUNTY
87
88
T 2S
R 35E
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JORDAN CIRCLE LANE
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Feet
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
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Site Boundary
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Mileposts
Mile
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Other
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Map 20

0 4,000 Feet

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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Routes
- Proposed Route

Mileposts
- Mile
- Tenth

Agricultural Assessment
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Agricultural Type
- Other

IDAHO POWER
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Boardman to Hemingway Transmission Line Project

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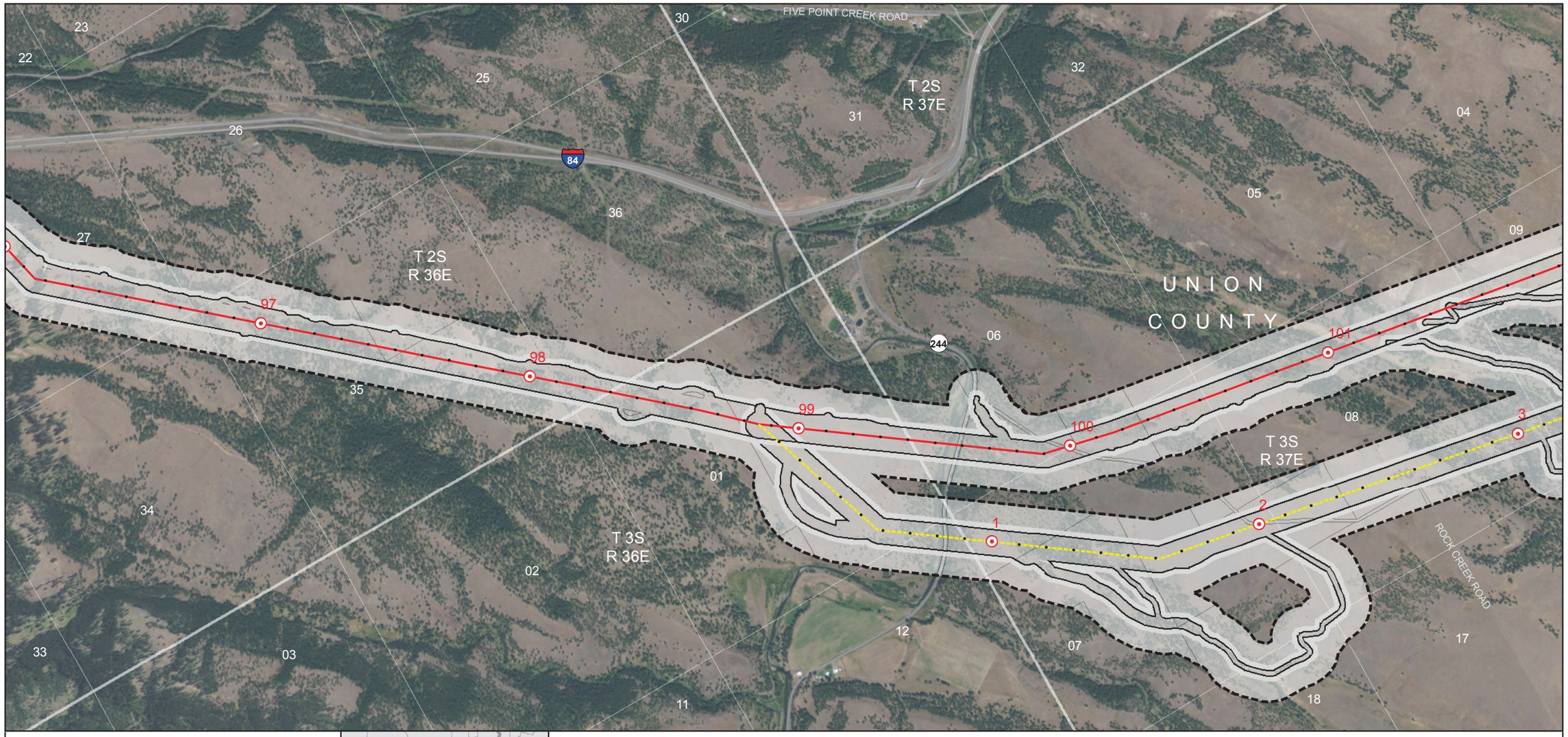
Agricultural Types

Map 21



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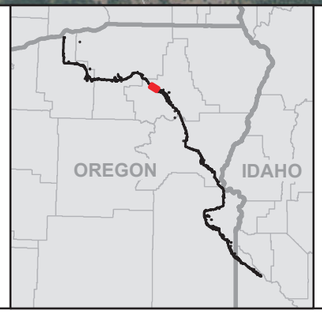
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

June 2017



Project Features
- Site Boundary

Routes
- Proposed Route
- Morgan Lake Alternative

Mileposts
- Mile
- Tenth

Agricultural Assessment
- Analysis Area

Agricultural Type
- Other

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Map 22

0 4,000 Feet

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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Project Features
- Site Boundary

Routes
- Proposed Route
- Morgan Lake Alternative

Mileposts
- Mile
- Tenth

Agricultural Assessment
- Analysis Area

Agricultural Type
- Other

IDAHO POWER
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Boardman to Hemingway Transmission Line Project

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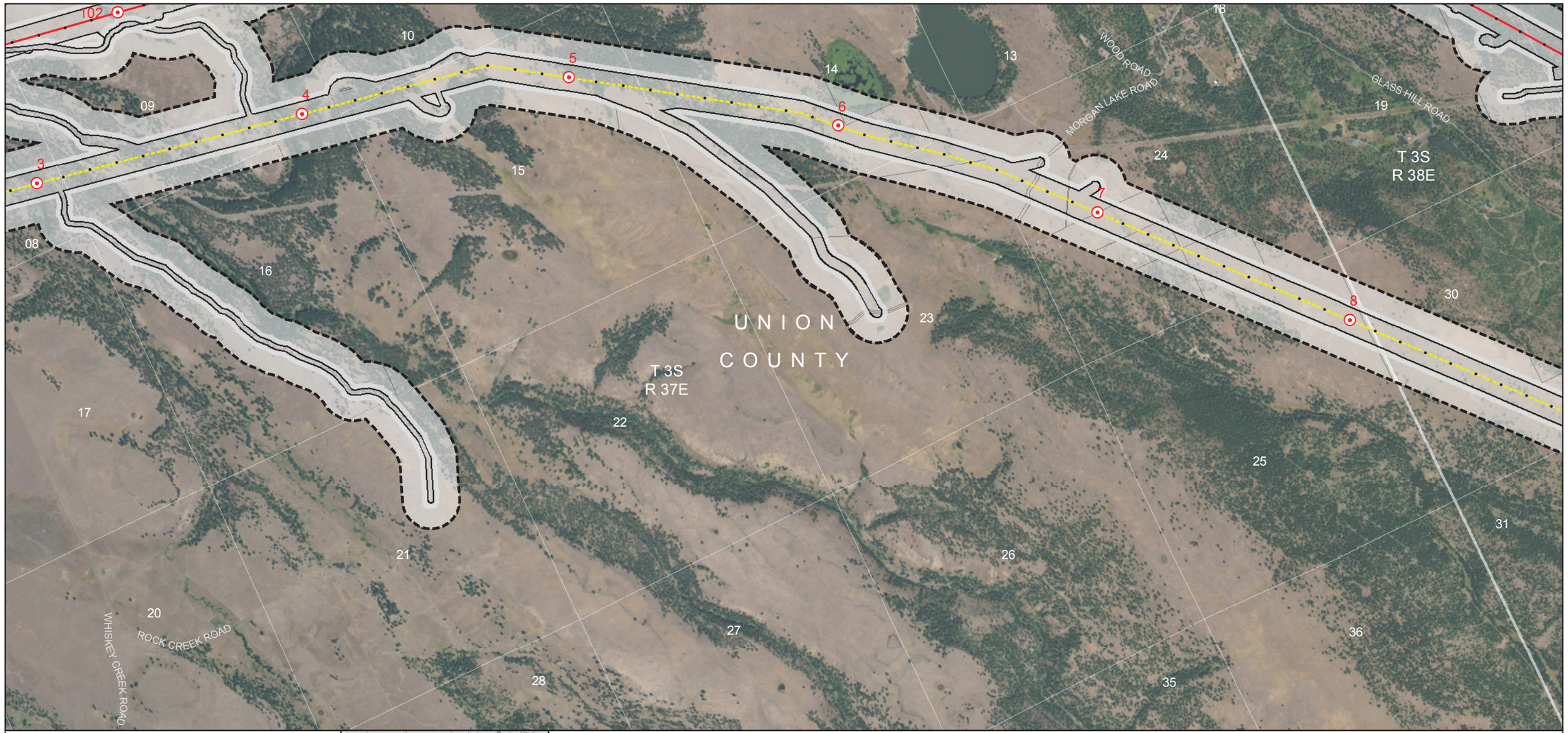
Map 23



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Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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Project Features
- Site Boundary

Routes
- Proposed Route
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Mileposts
- Mile
- Tenth

Agricultural Assessment
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Agricultural Type
- Other

IDAHO POWER
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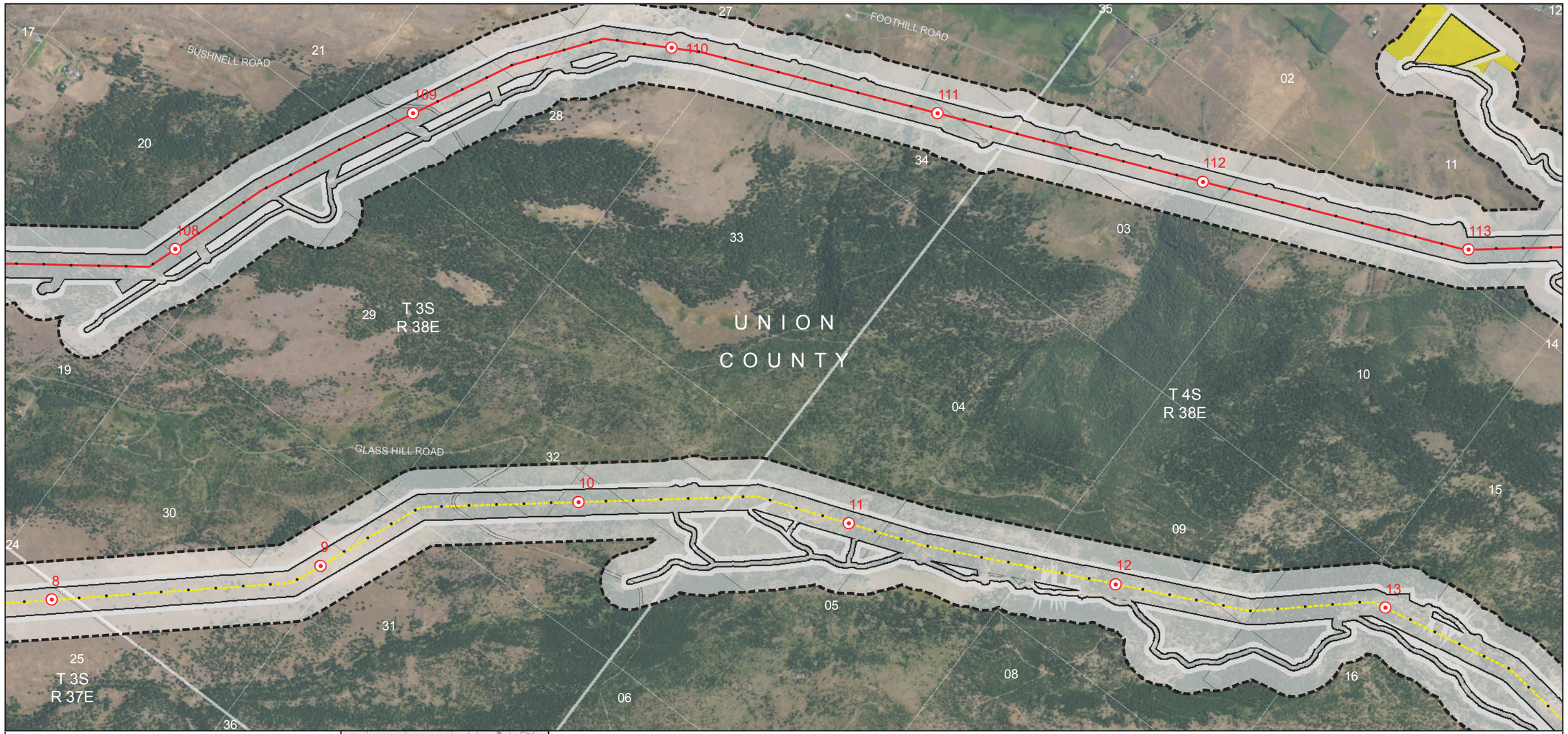
Map 24



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Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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Project Features
- Site Boundary

Routes
- Proposed Route
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Mileposts
- Mile
- Tenth

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Agricultural Type
- Pasture/Hay
- Other

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Map 25

0 4,000 Feet

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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Project Features
- Site Boundary

Mileposts
- Mile
- Tenth

Agricultural Assessment
- Analysis Area

Agricultural Type
- Irrigated Agriculture
- Pasture/Hay
- Other

IDAHO POWER
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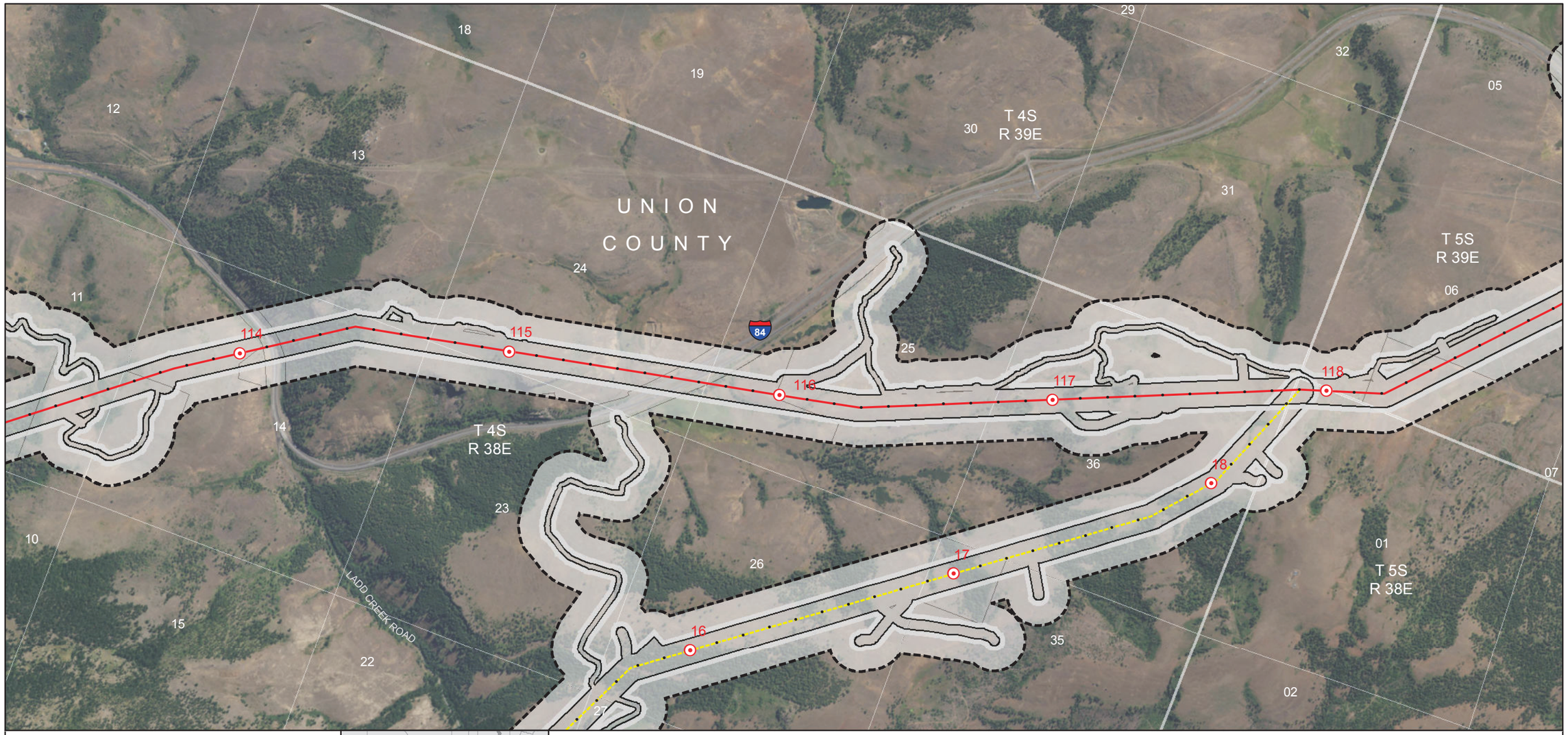
Agricultural Types

Map 26



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Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

June 2017

Project Features
- Site Boundary

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- Mile
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Agricultural Type
- Other

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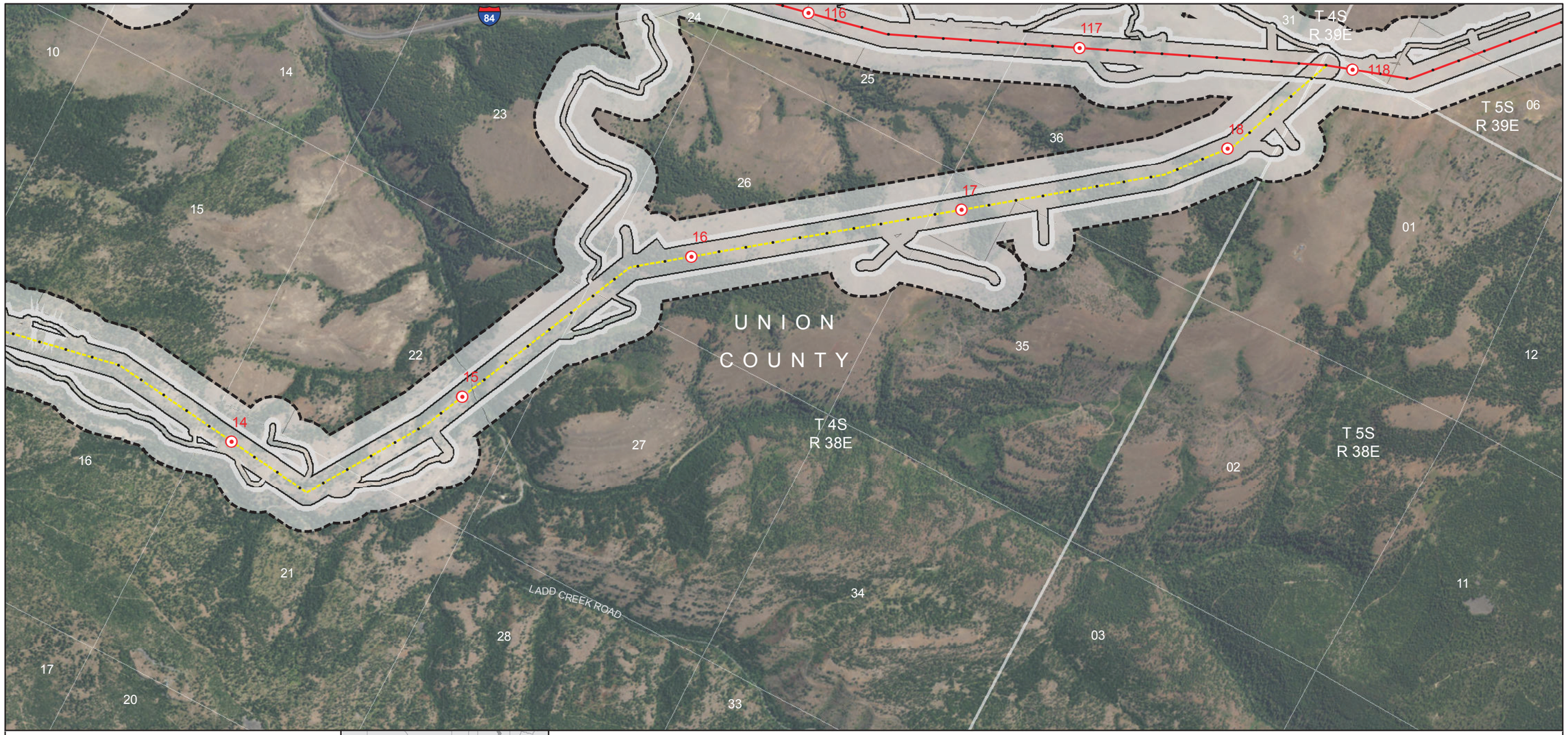
Map 27



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Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

June 2017

Project Features
- Site Boundary

Routes
- Proposed Route
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Agricultural Type
- Other

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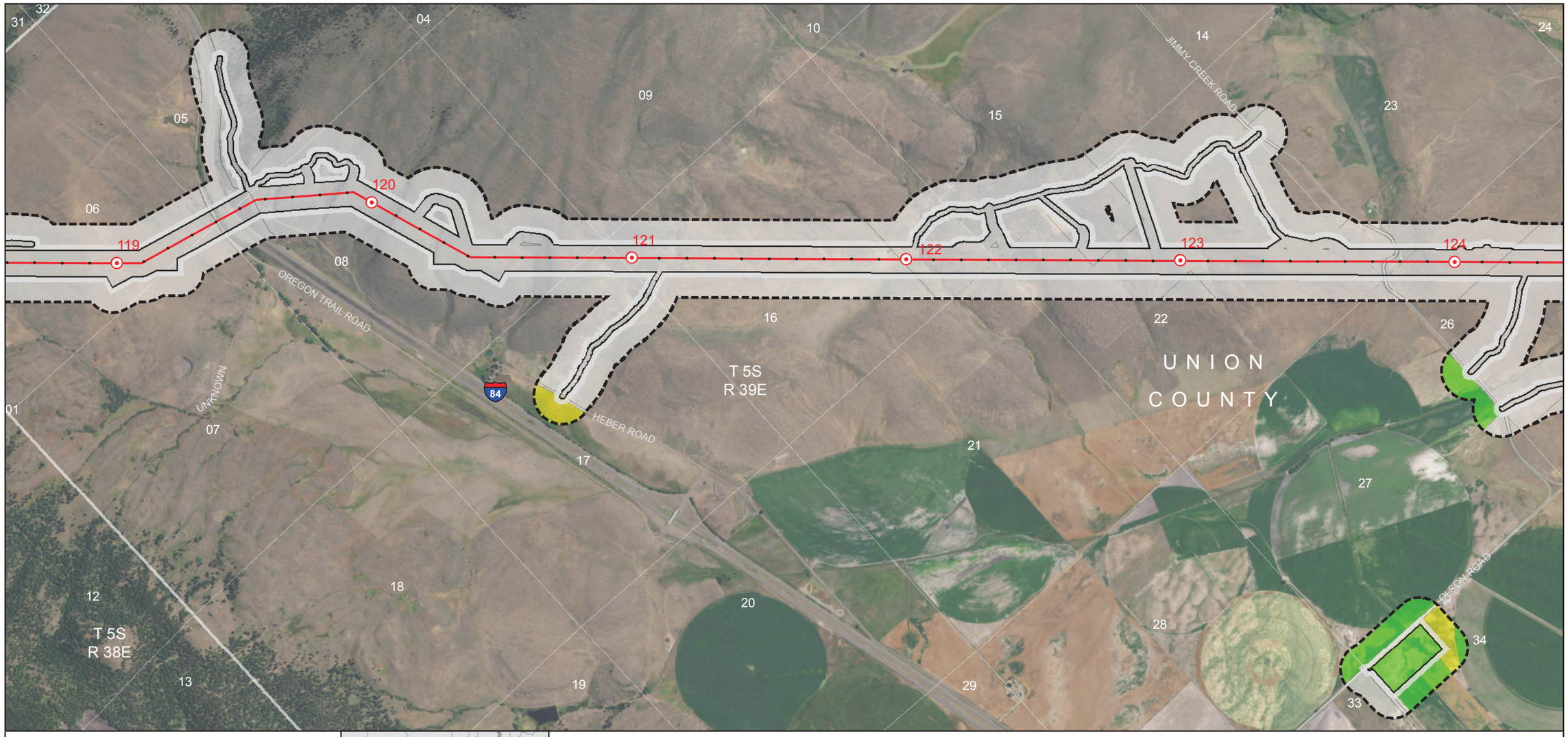
Map 28



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Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

June 2017

Project Features
- Site Boundary

Routes
- Proposed Route

Mileposts
- Mile
- Tenth

Agricultural Assessment
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Agricultural Type
- Irrigated Agriculture
- Pasture/Hay
- Other

IDAHO POWER
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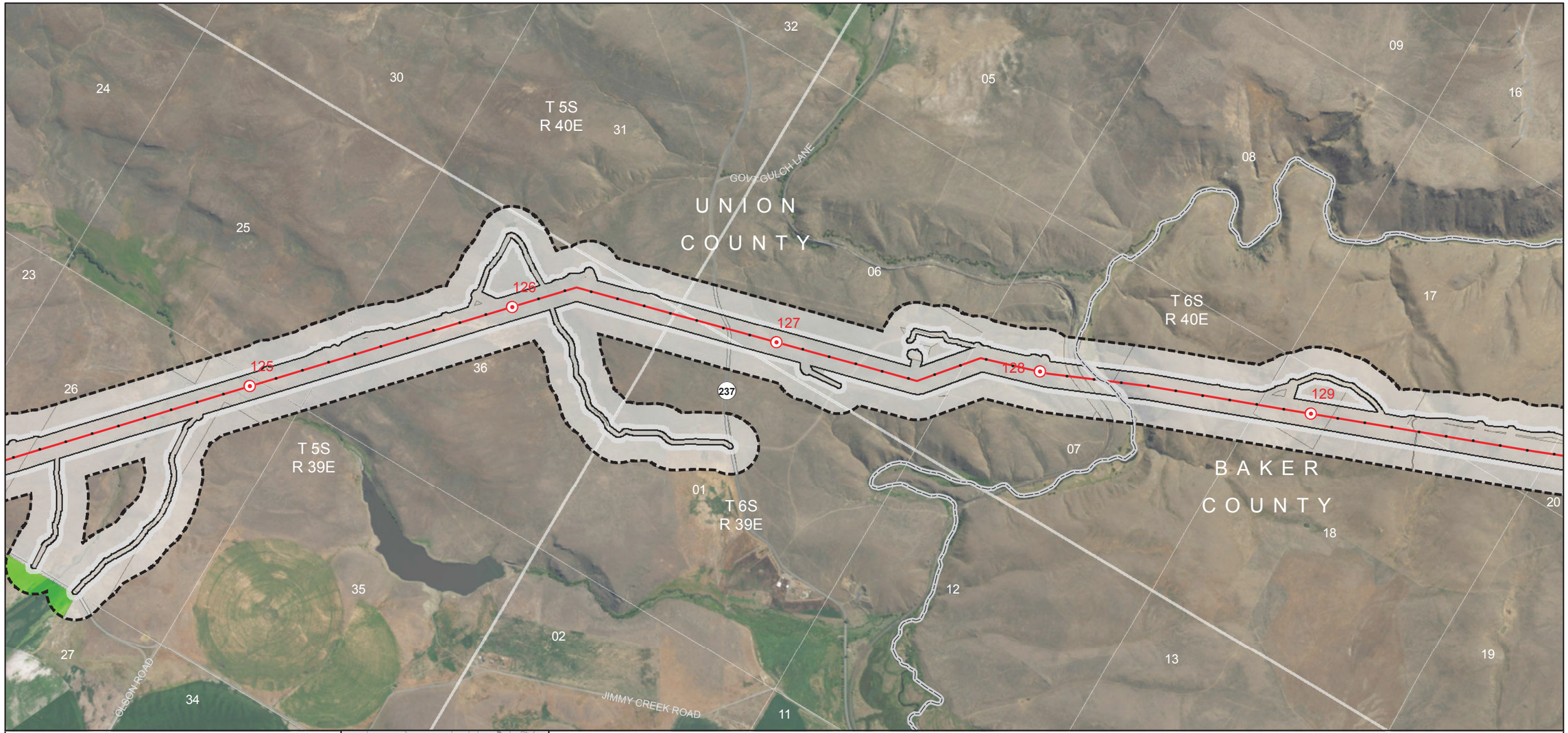
Map 29



0 4,000 Feet

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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Project Features
- Site Boundary

Routes
- Proposed Route

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- Mile
- Tenth

Agricultural Assessment
- Analysis Area

Agricultural Type
- Irrigated Agriculture
- Other

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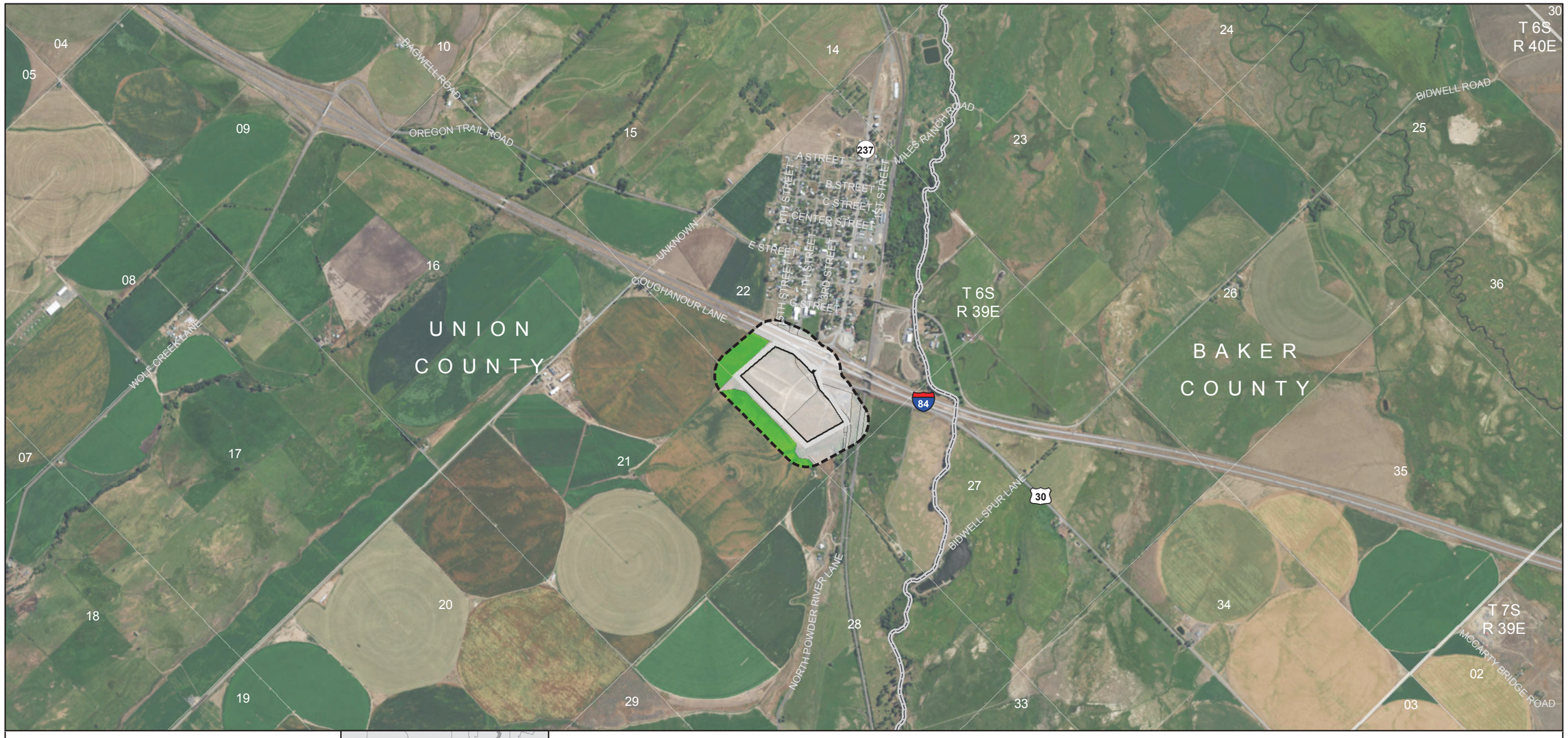
Map 30



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Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

June 2017

Project Features
- Site Boundary

Mileposts
- Mile
- Tenth

Agricultural Assessment
- Analysis Area

Agricultural Type
- Irrigated Agriculture
- Other

IDAHO POWER
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Boardman to Hemingway Transmission Line Project

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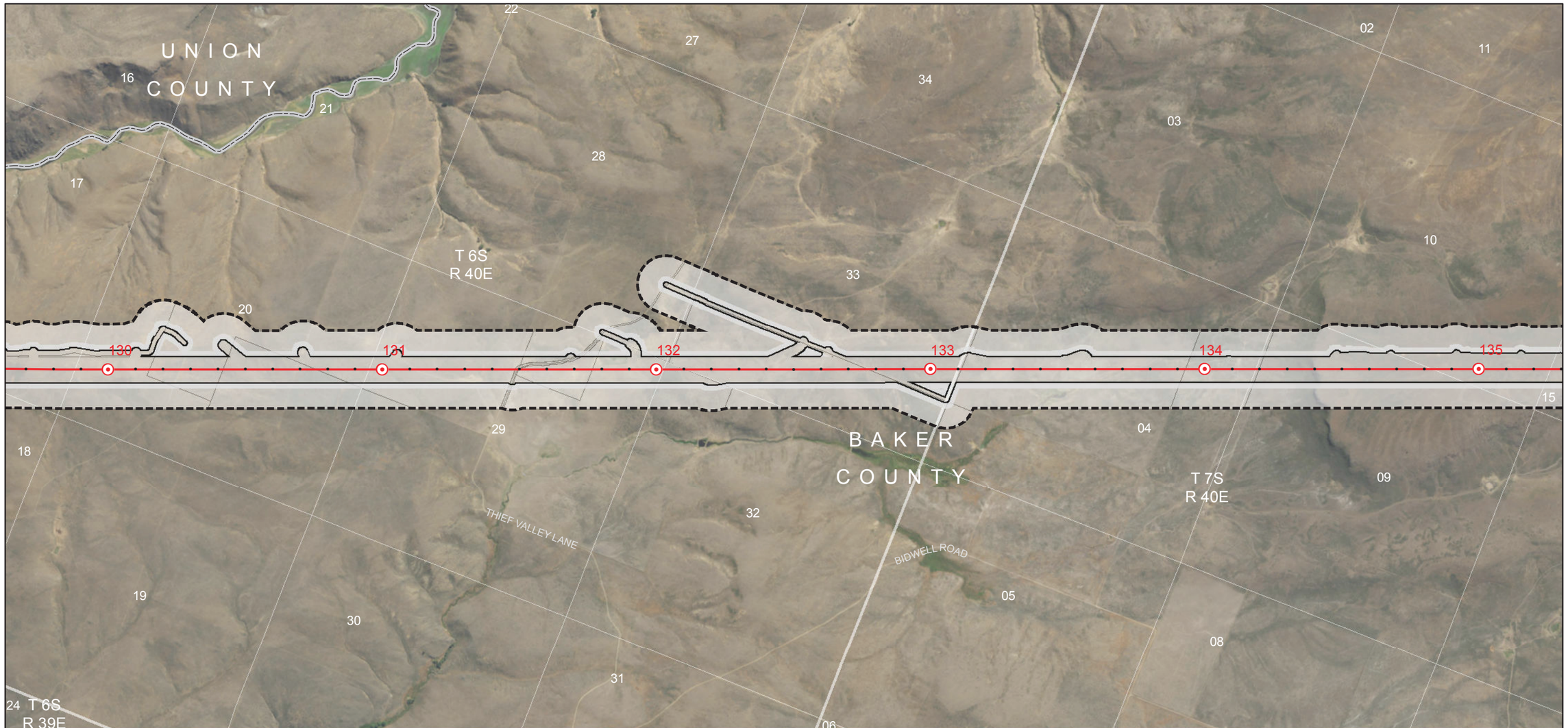
Map 31



0 4,000 Feet

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

June 2017

Project Features
- Site Boundary

Routes
- Proposed Route

Mileposts
- Mile
- Tenth

Agricultural Assessment
- Analysis Area

Agricultural Type
- Other

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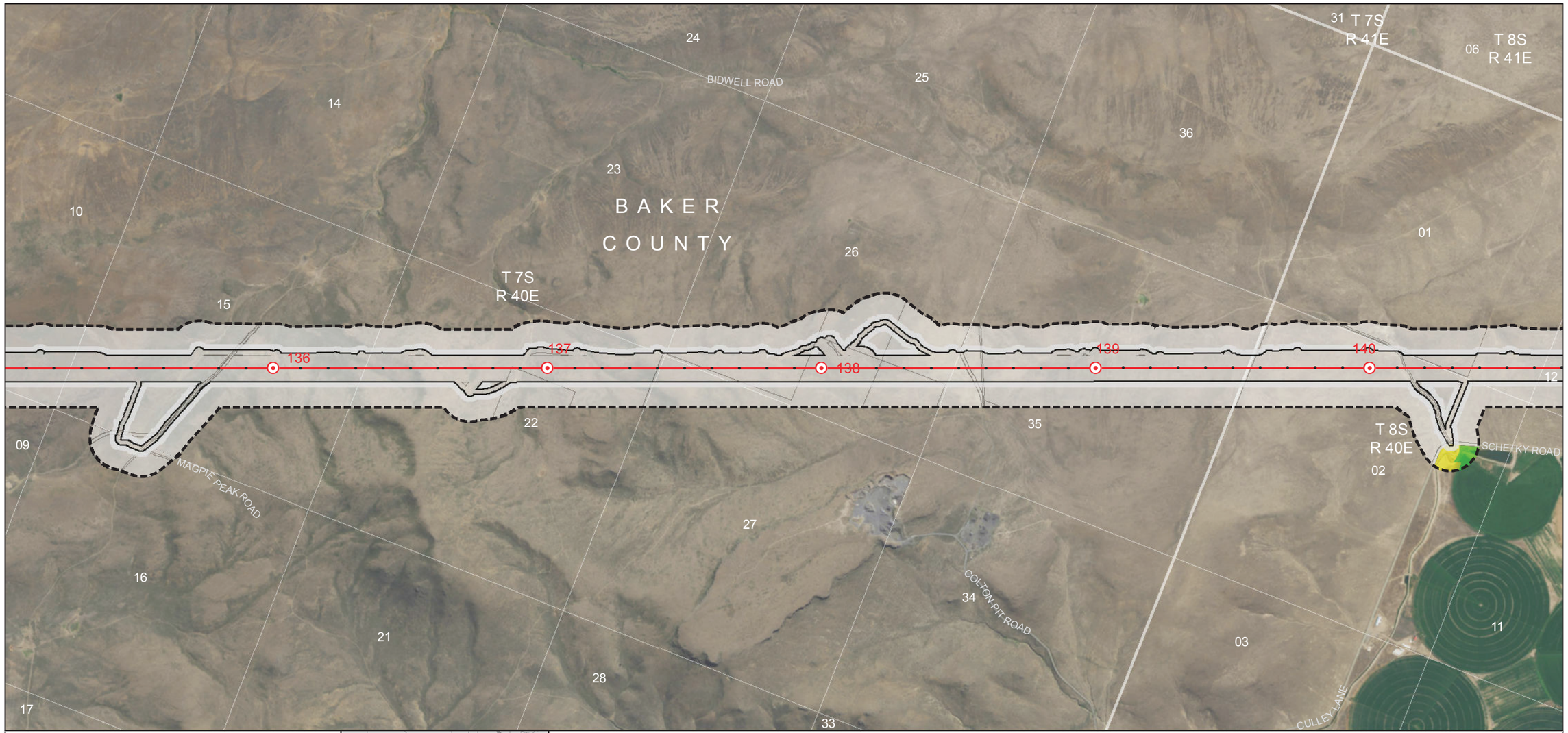
Map 32



0 4,000 Feet

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

June 2017

Project Features

- Site Boundary

Routes

- Proposed Route

Mileposts

- Mile
- Tenth

Agricultural Assessment

- Analysis Area

Agricultural Type

- Irrigated Agriculture
- Pasture/Hay
- Other

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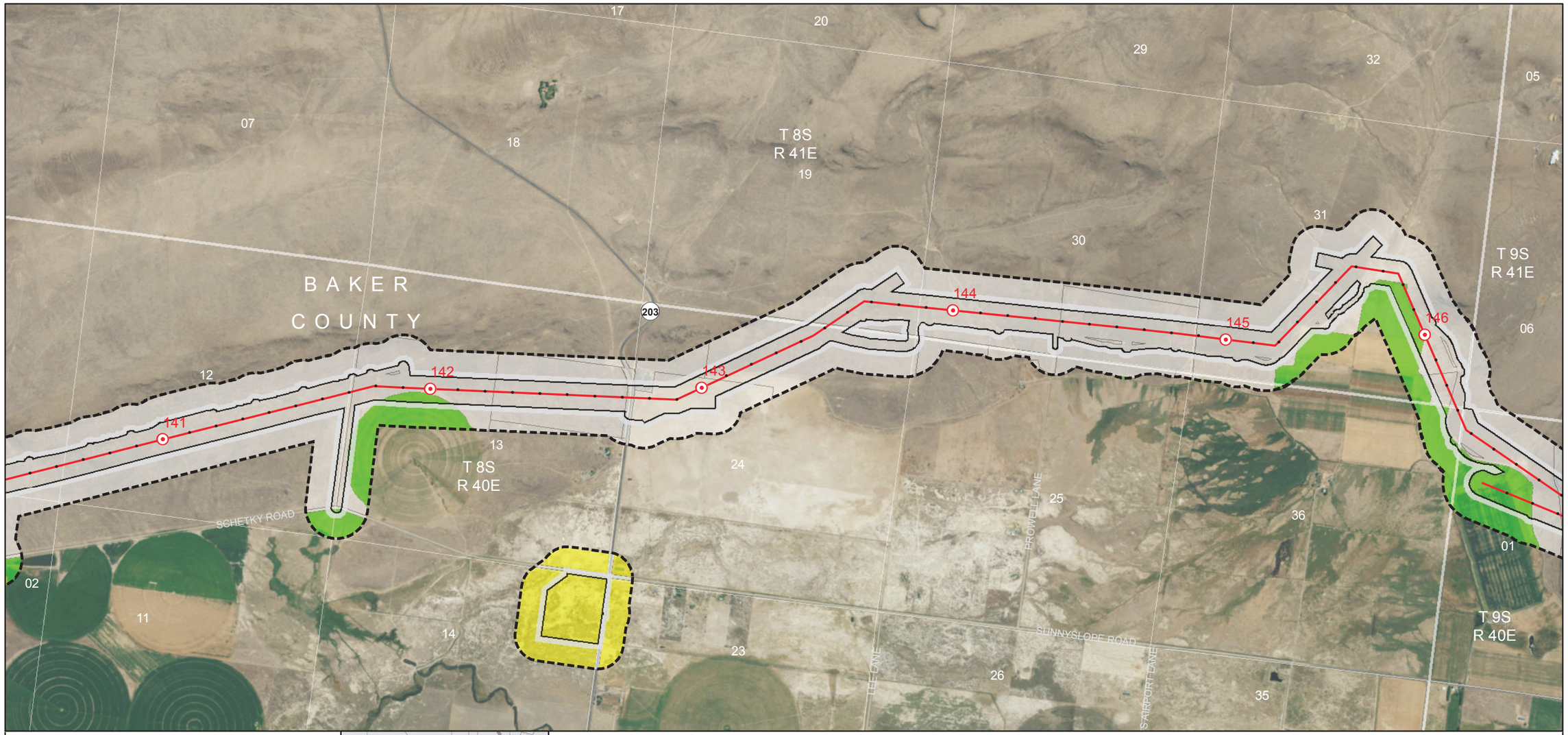
Agricultural Types

Map 33



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Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

June 2017

Project Features
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- Tenth

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Agricultural Type
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- Pasture/Hay
- Other

IDAHO POWER
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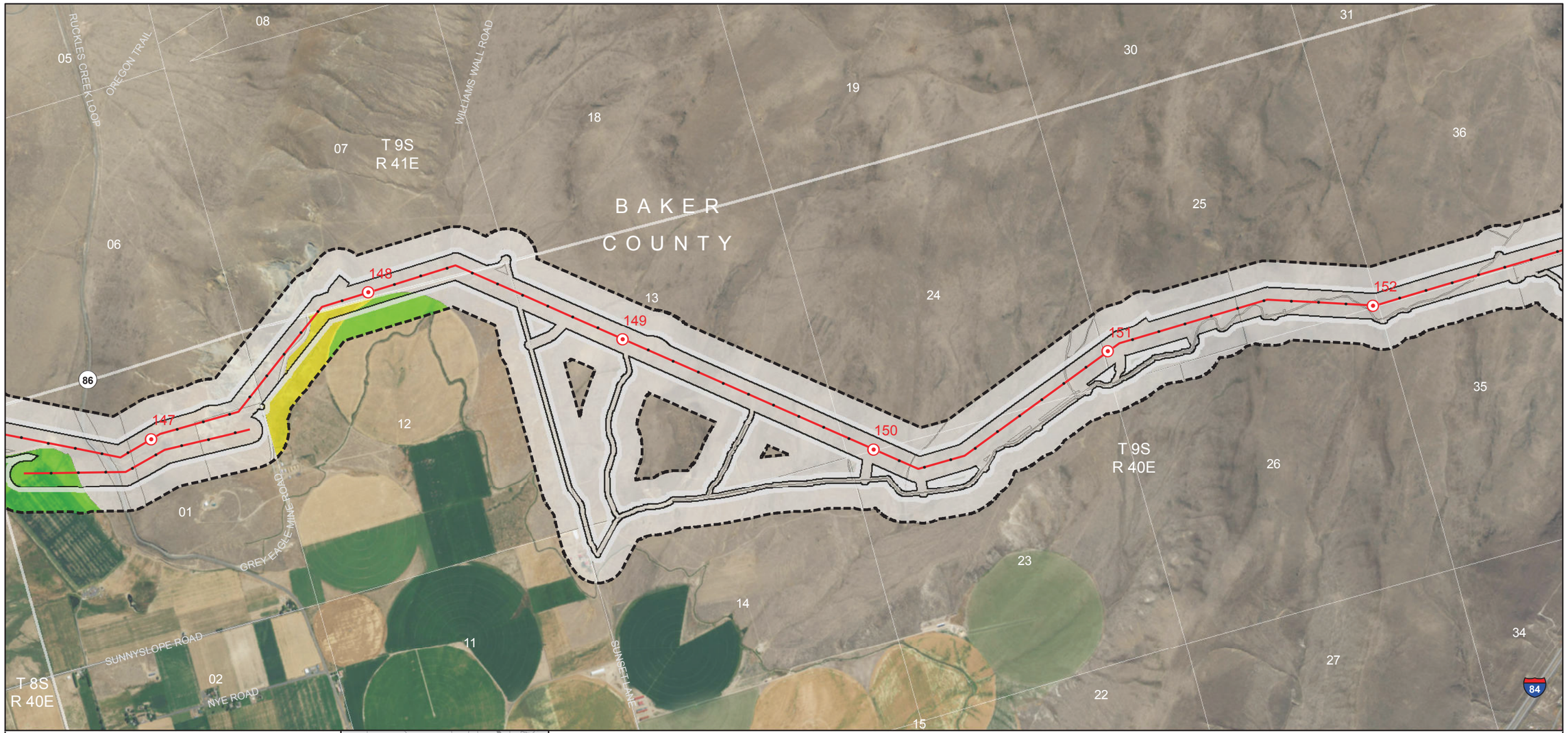
Map 34



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Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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Project Features
- Site Boundary

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- Other

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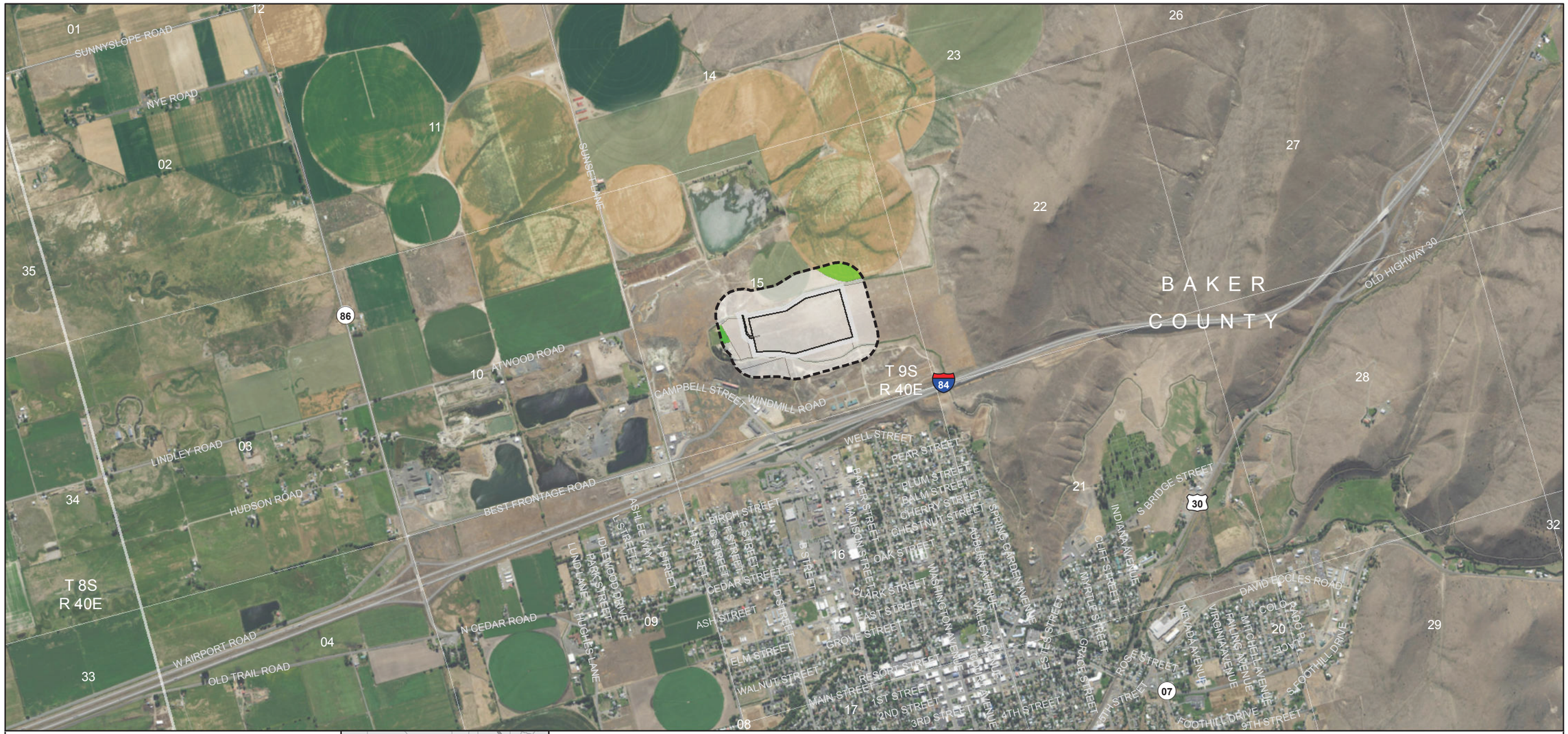
Map 35



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Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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- Site Boundary

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- Other

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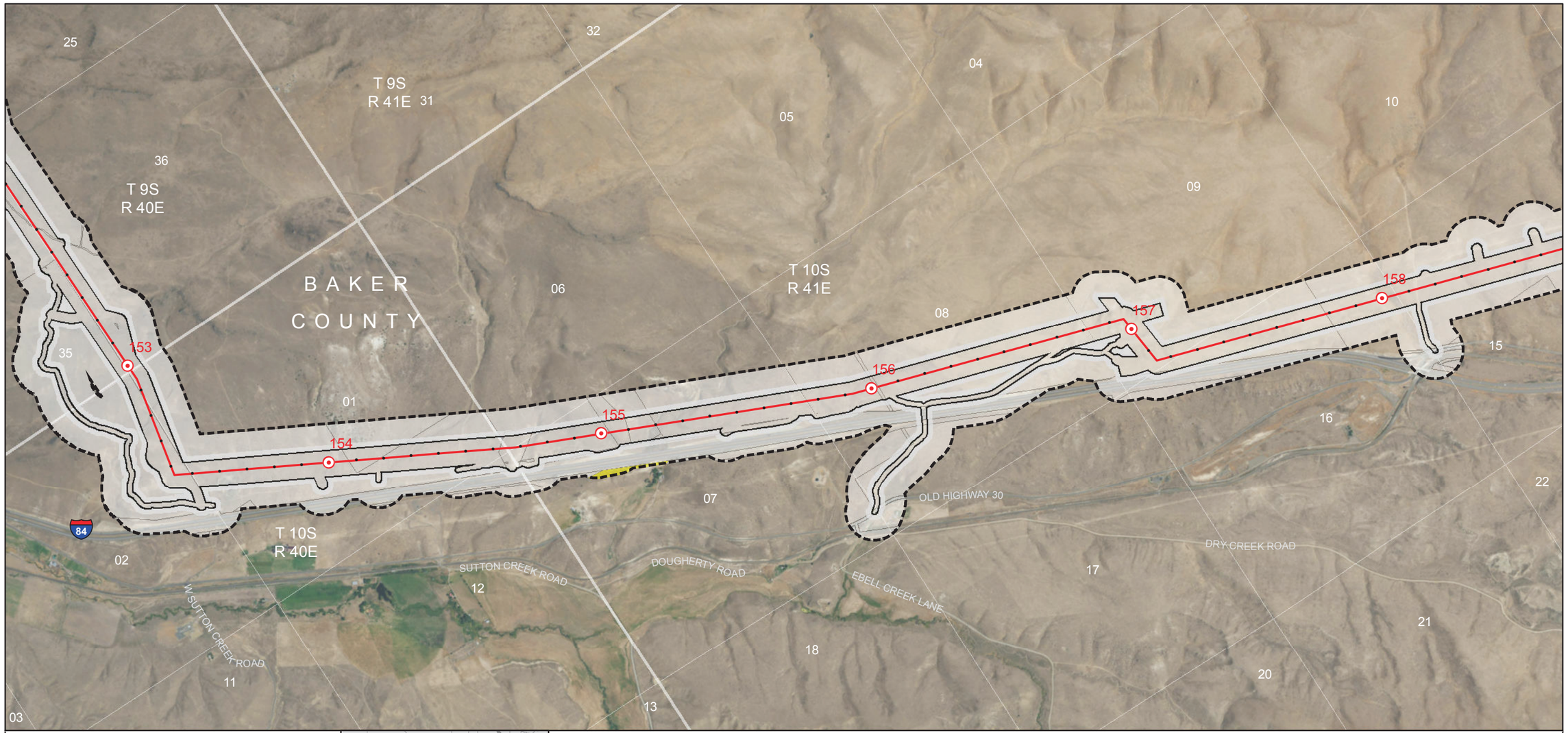
Map 36



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Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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- Site Boundary

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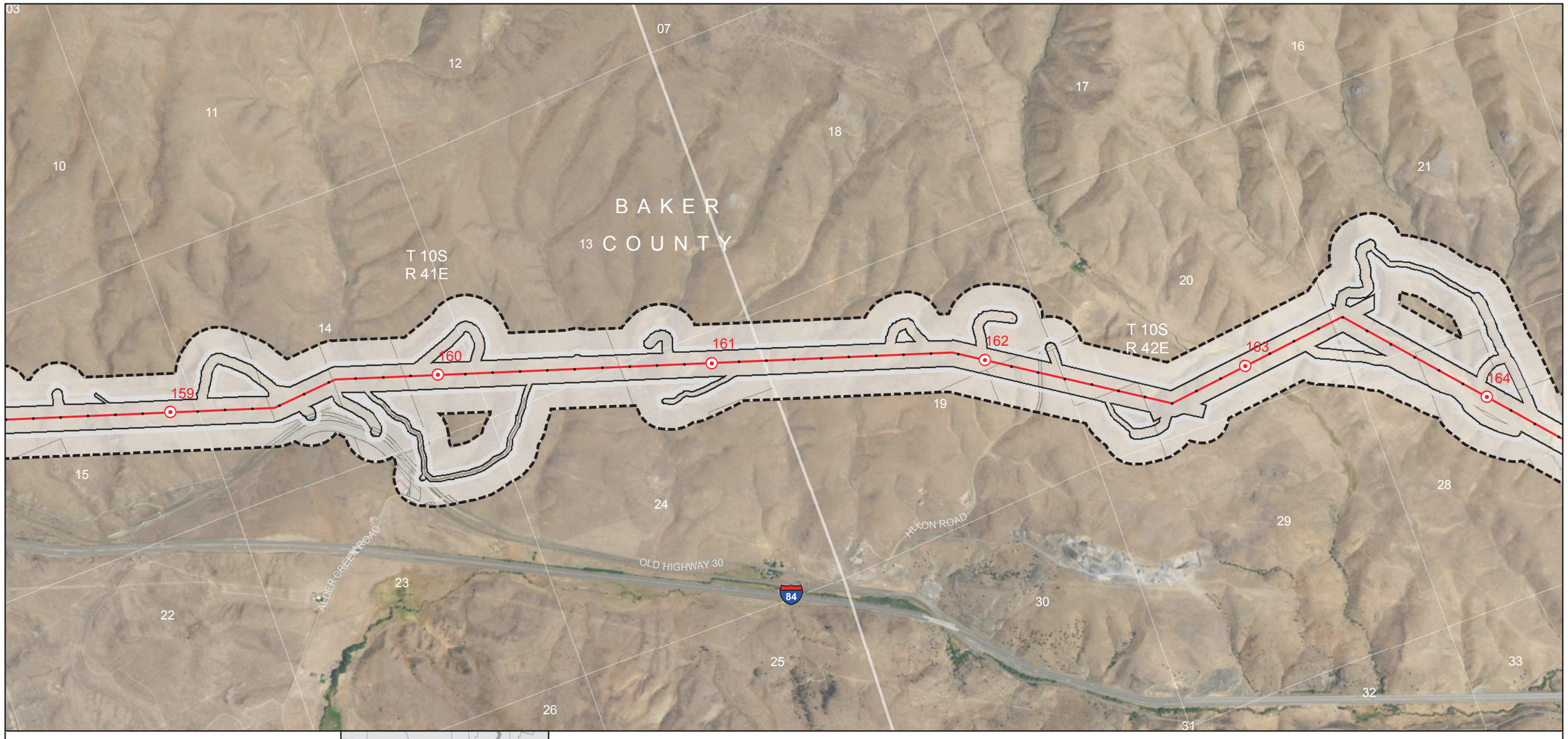
Map 37



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Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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- Other

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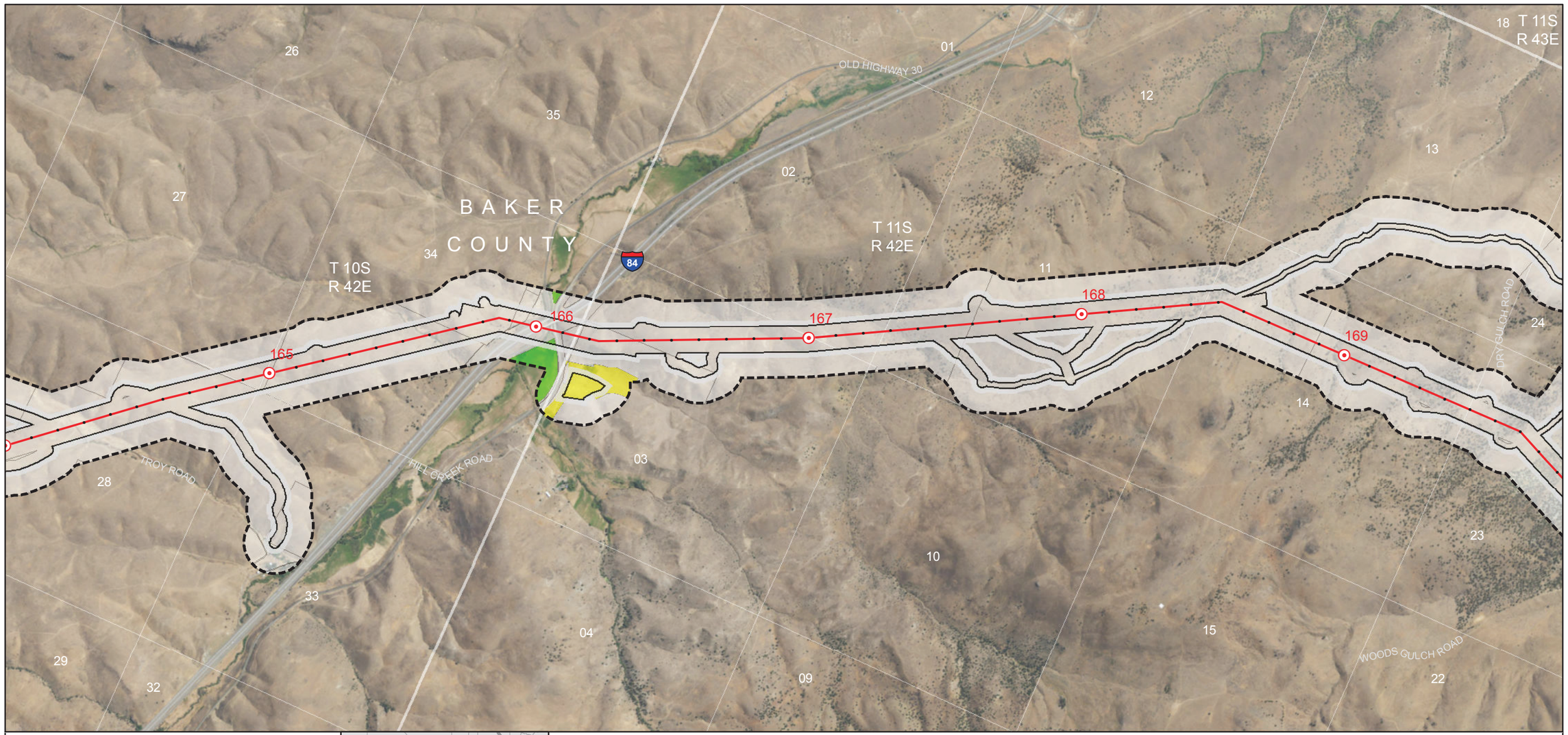
Map 38



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Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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- Other

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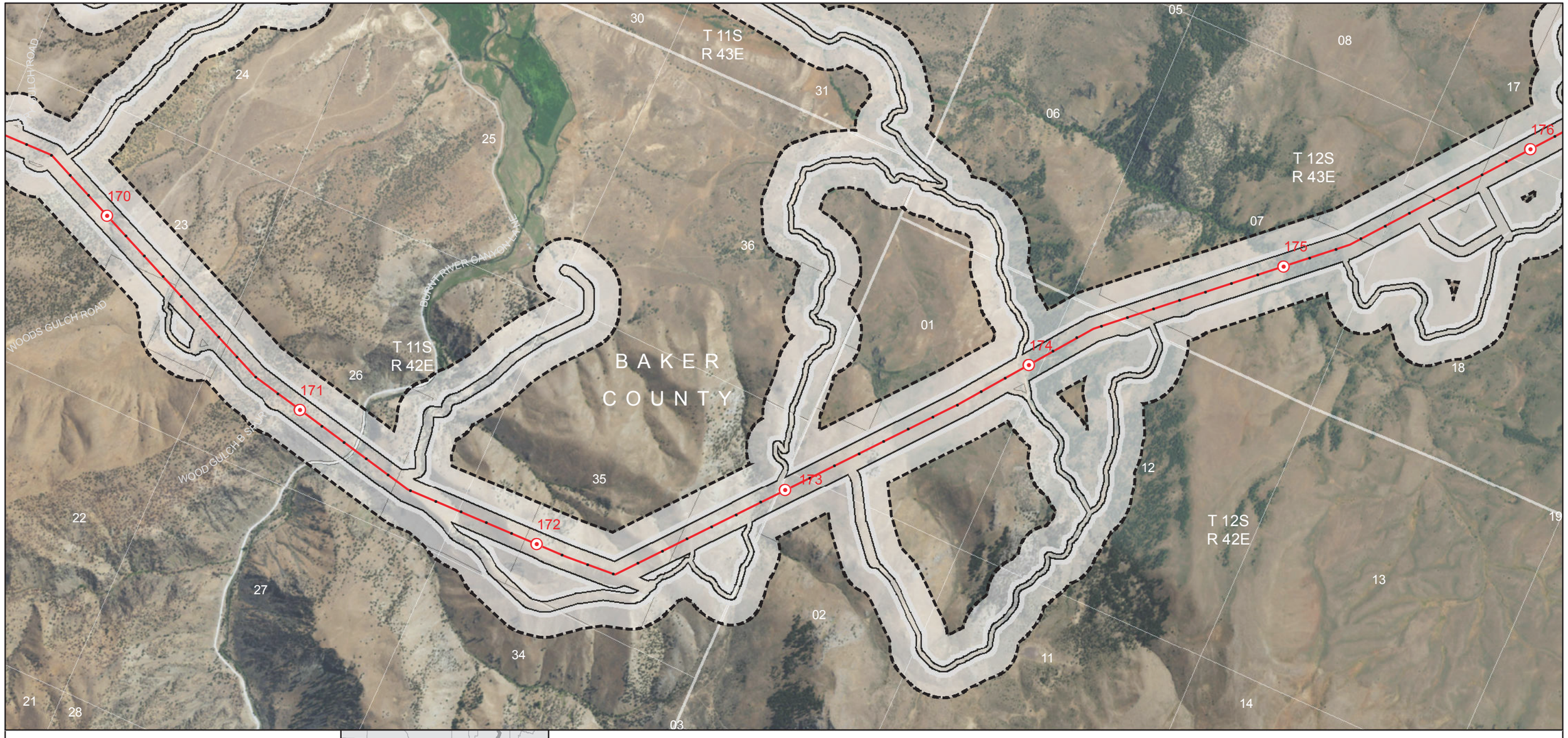
Map 39



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Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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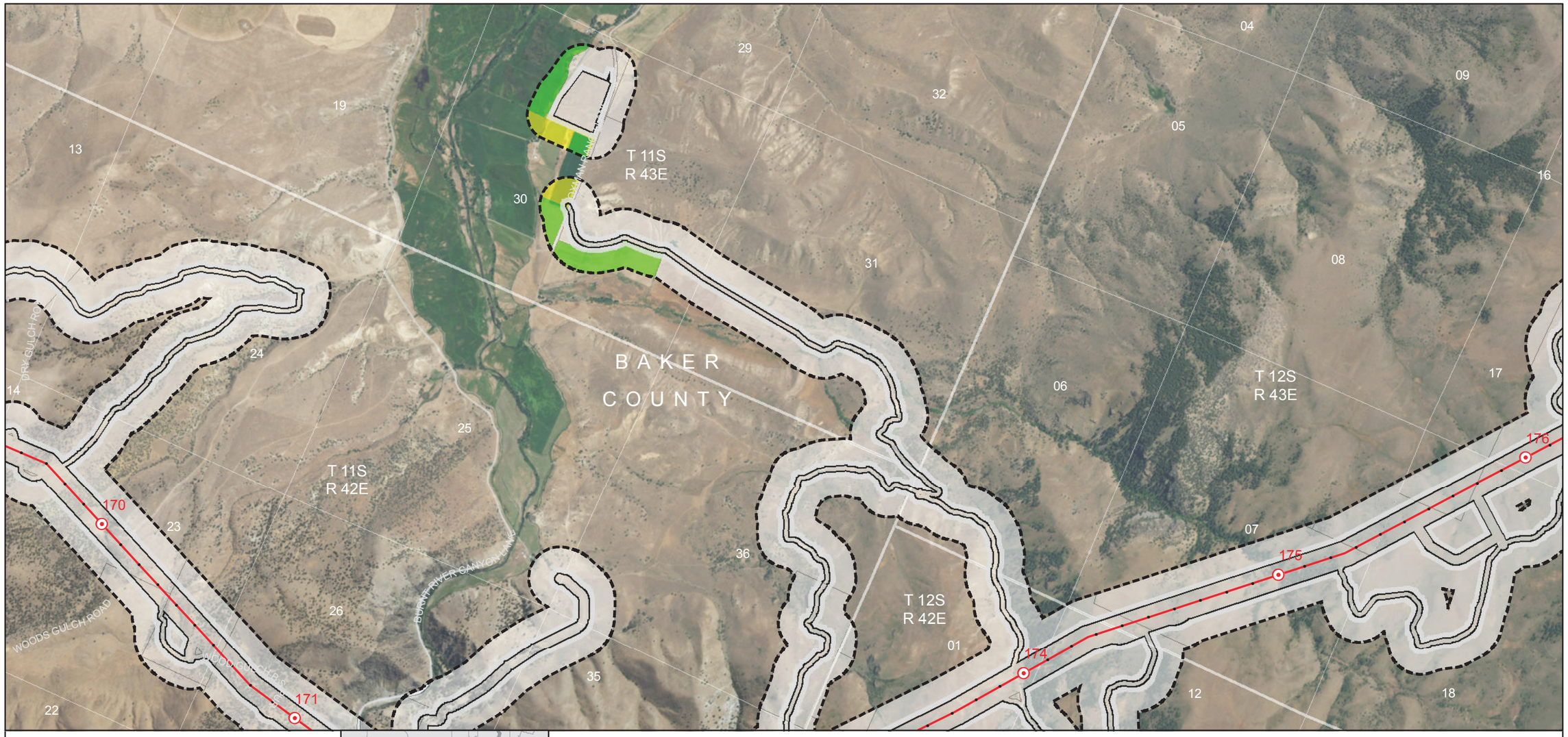
Map 40



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Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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Project Features
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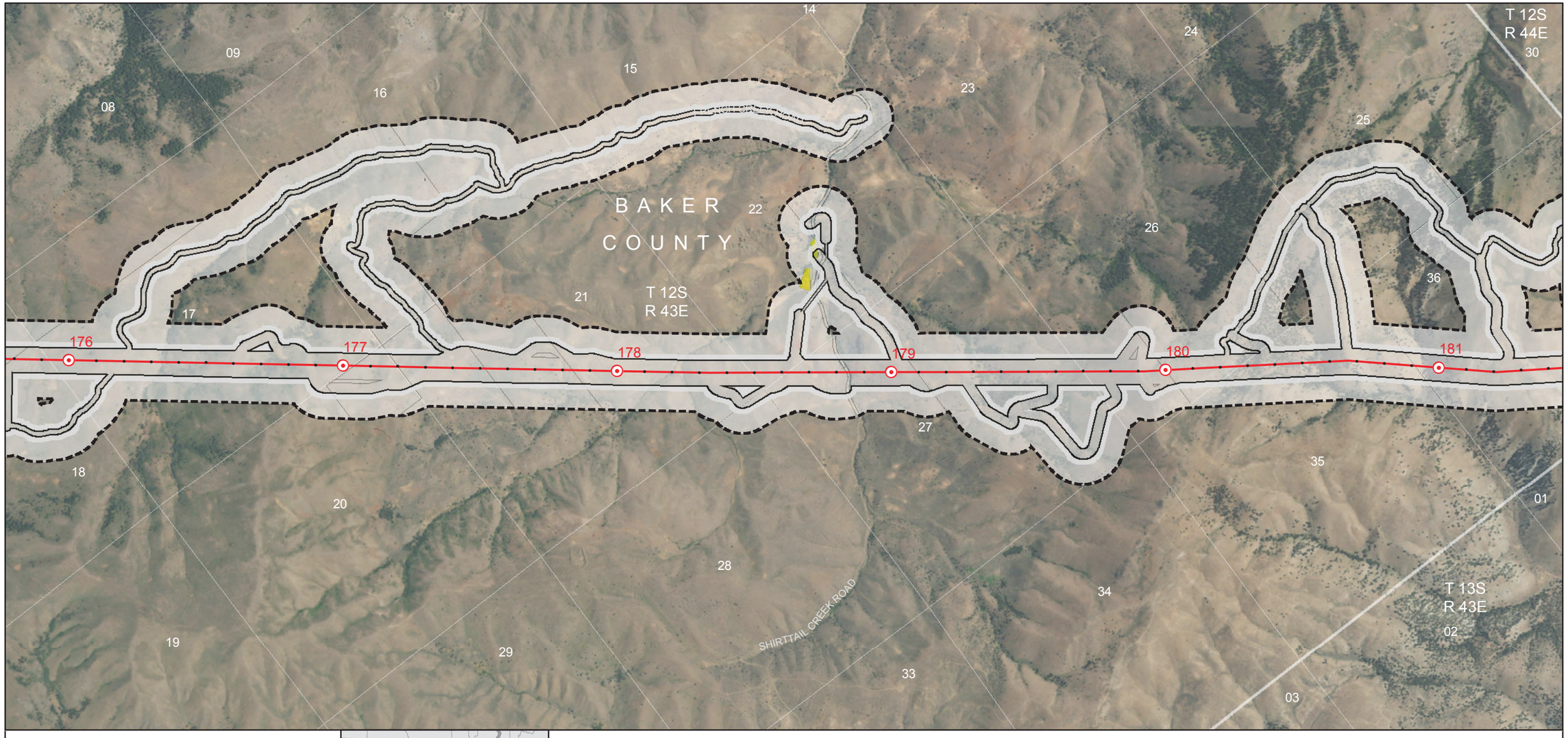
Map 41



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Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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Project Features
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- Other

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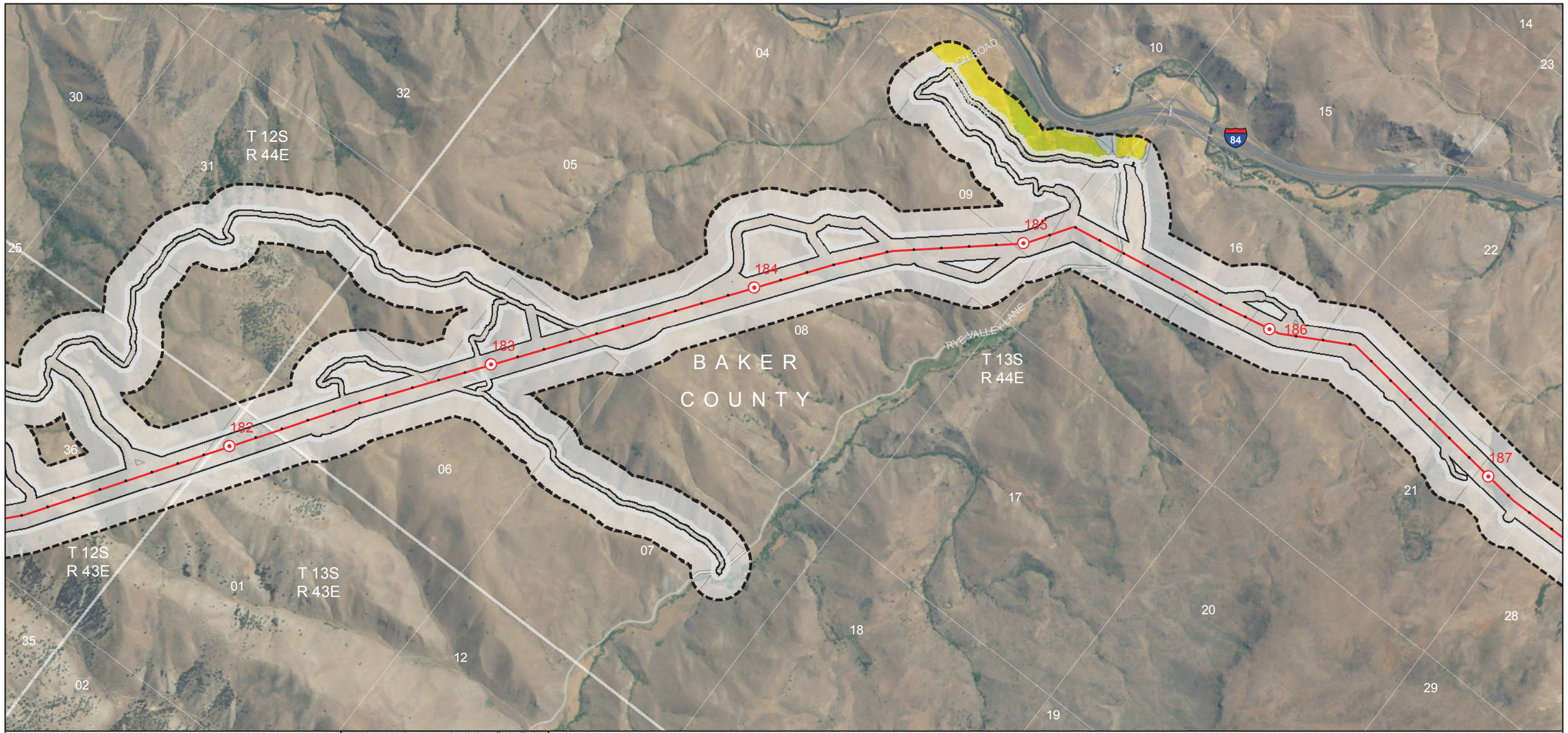
Map 42



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Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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Project Features
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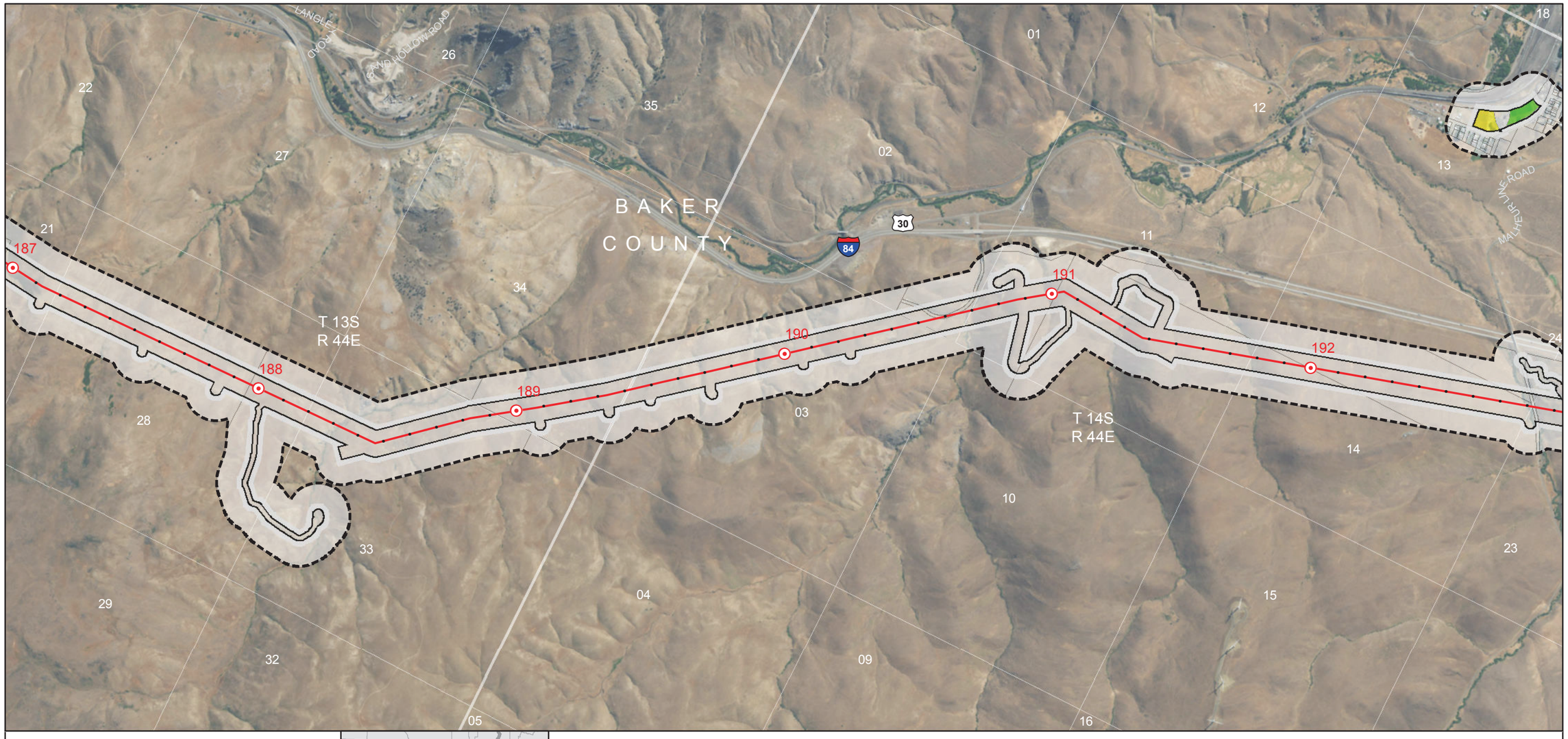
Map 43



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Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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- Other

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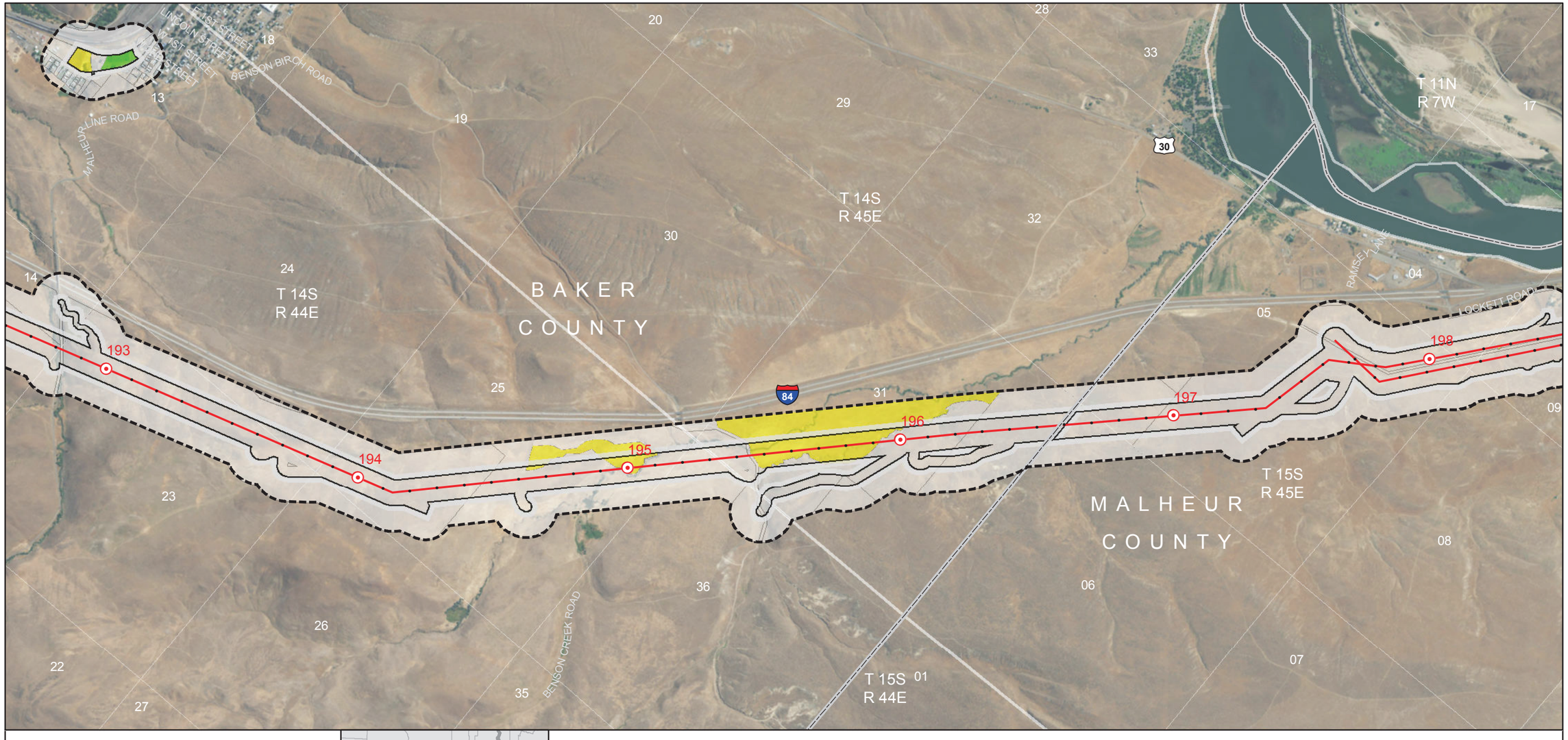
Map 44



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Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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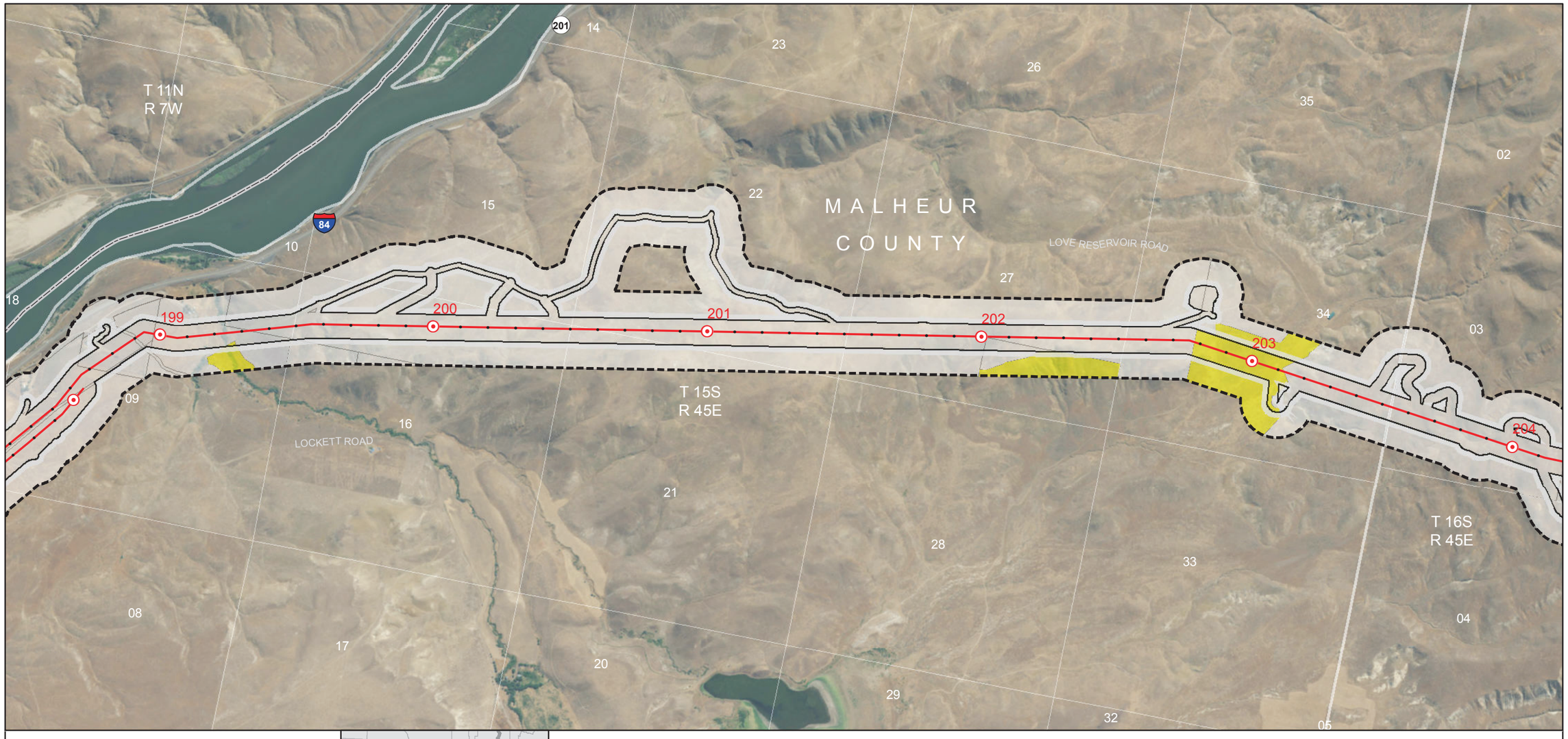
Map 45



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Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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Project Features
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- Other

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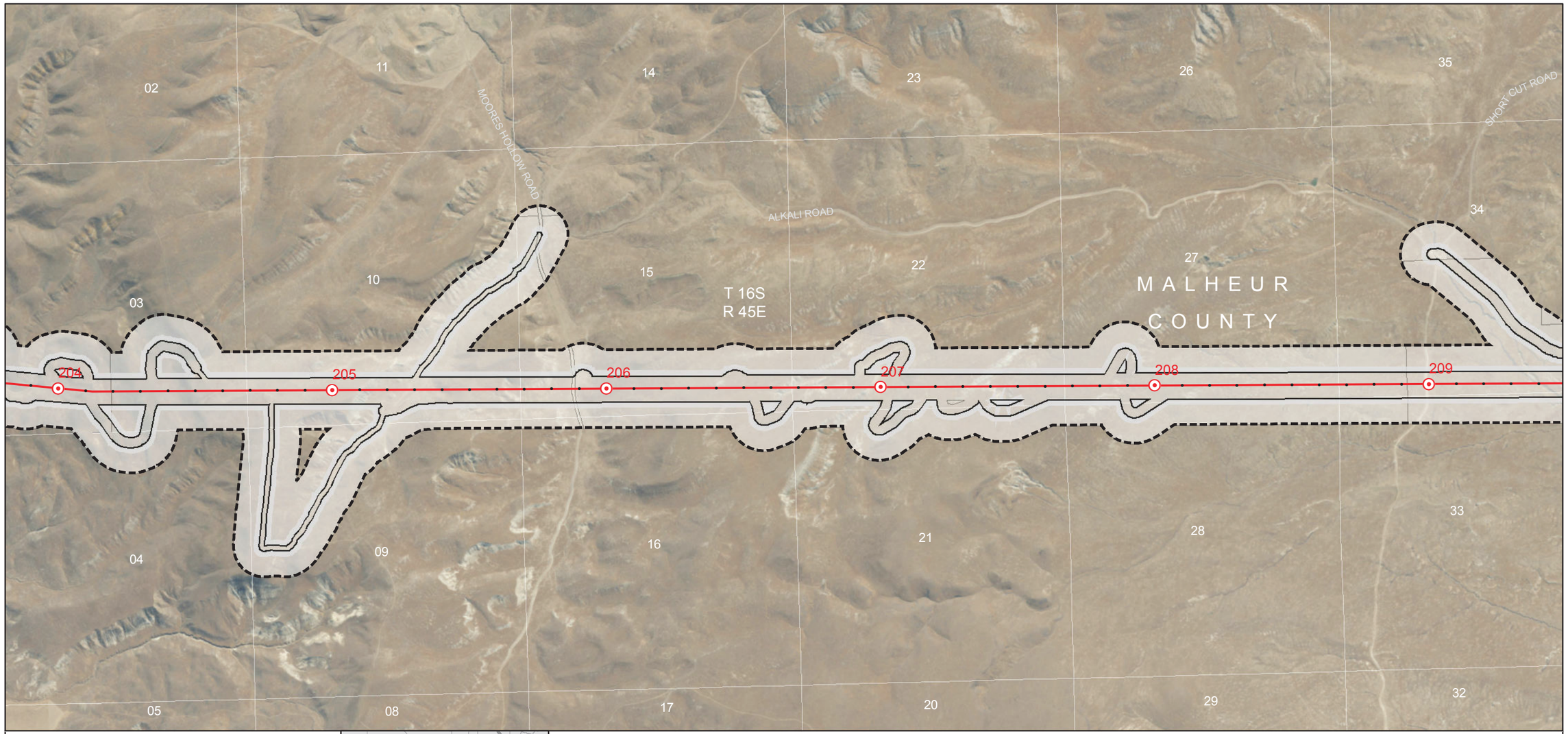
Map 46



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Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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Project Features
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Agricultural Type
- Other

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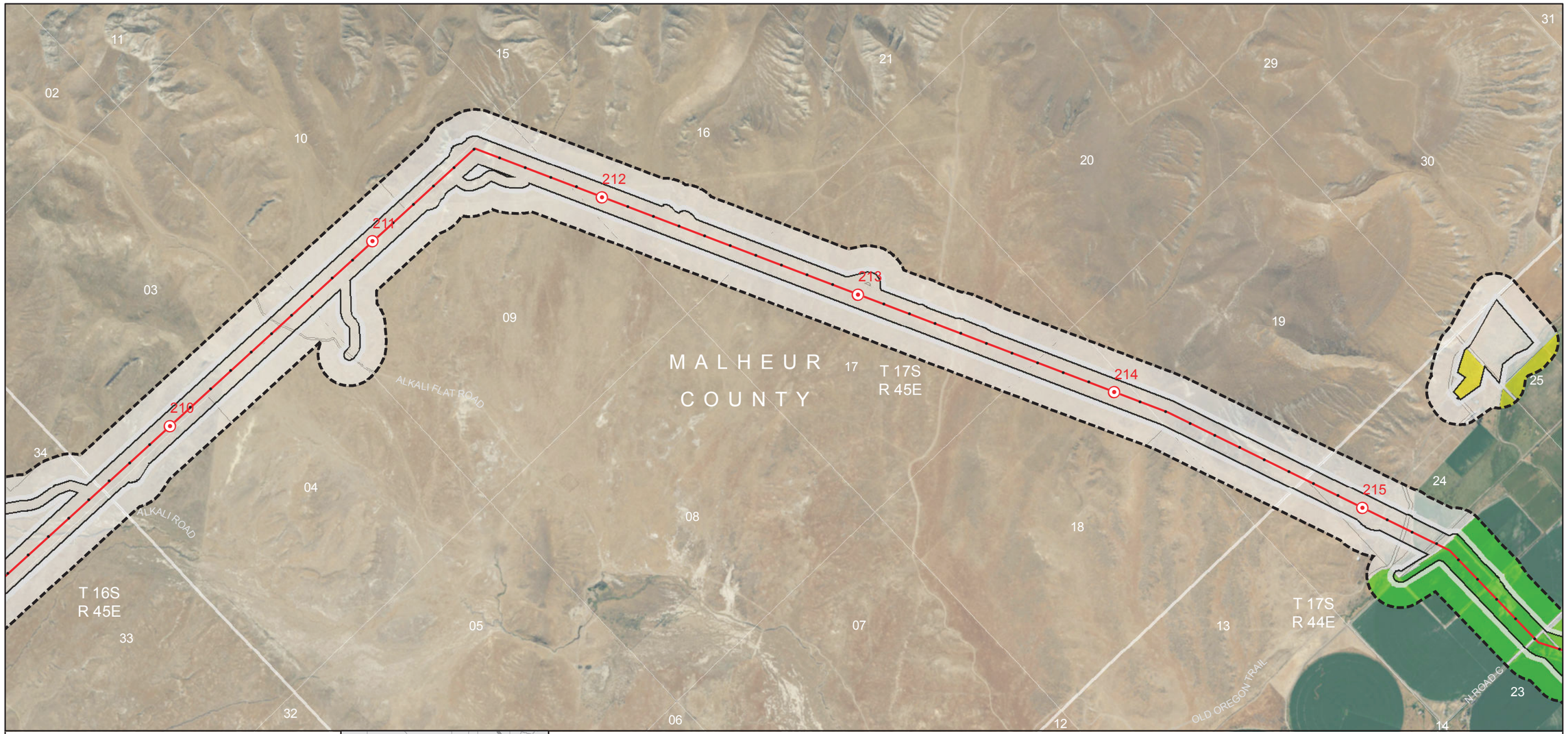
Map 47



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Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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Project Features
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- Other

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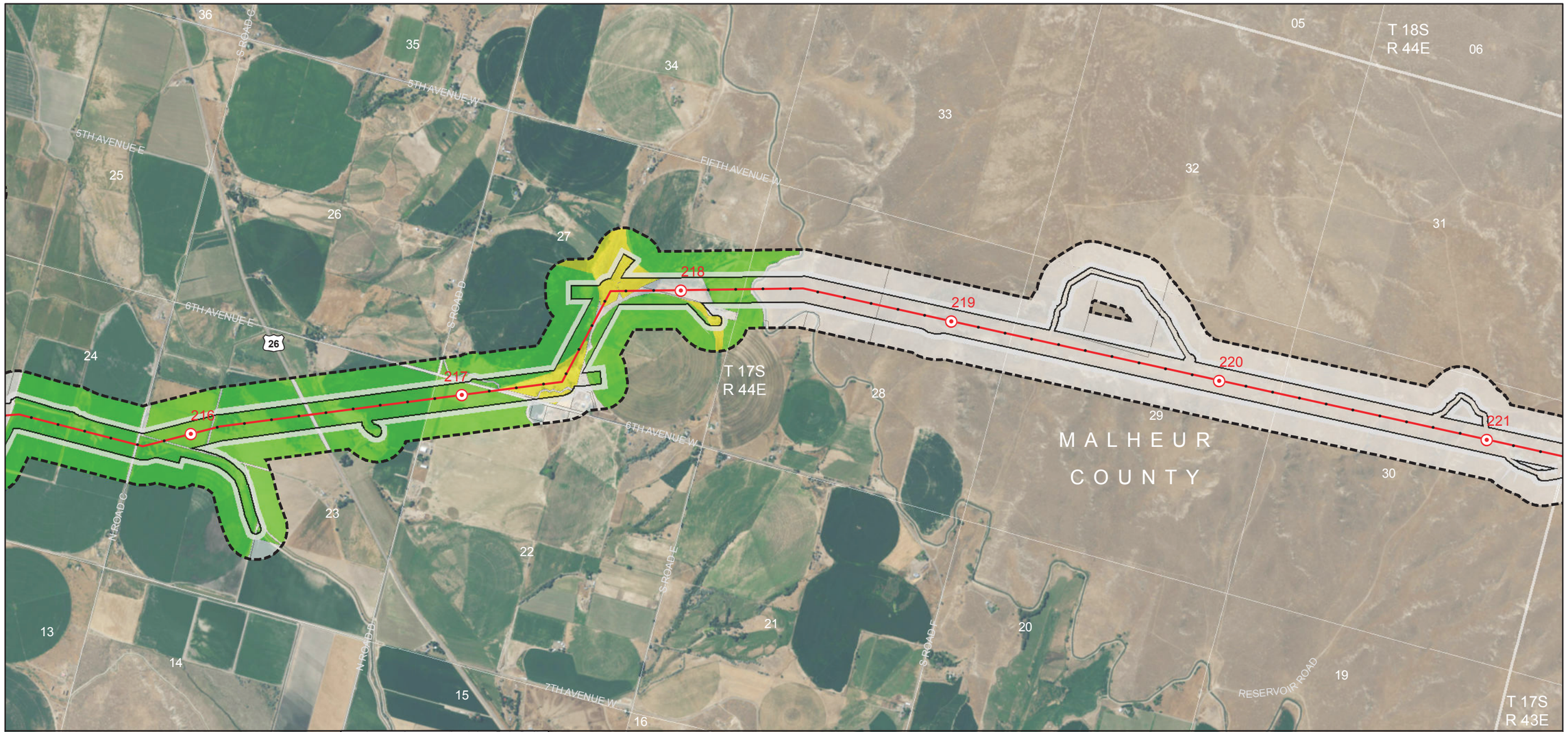
Map 48



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Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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Project Features
- Site Boundary

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- Other

IDAHO POWER
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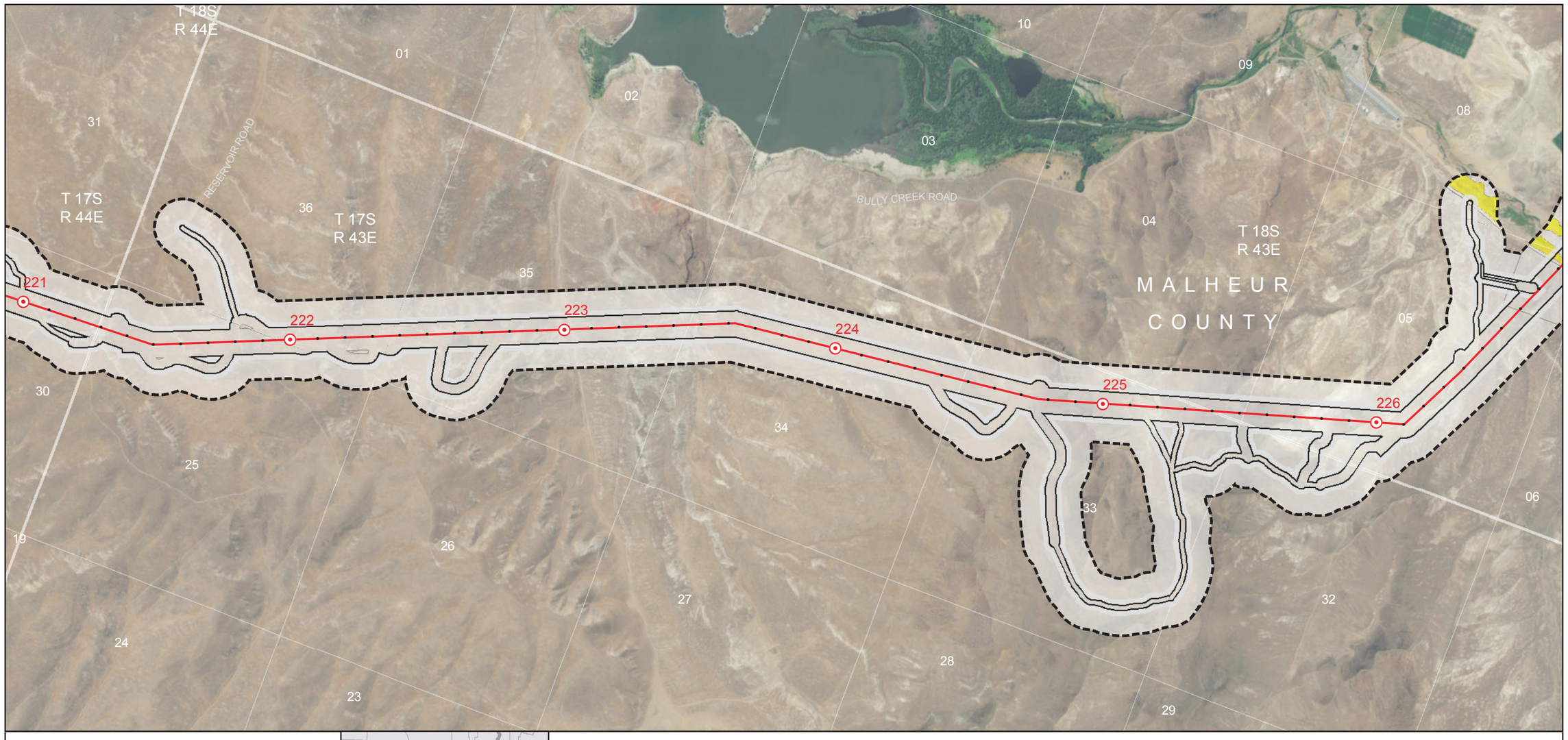
Map 49



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Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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Project Features
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- Other

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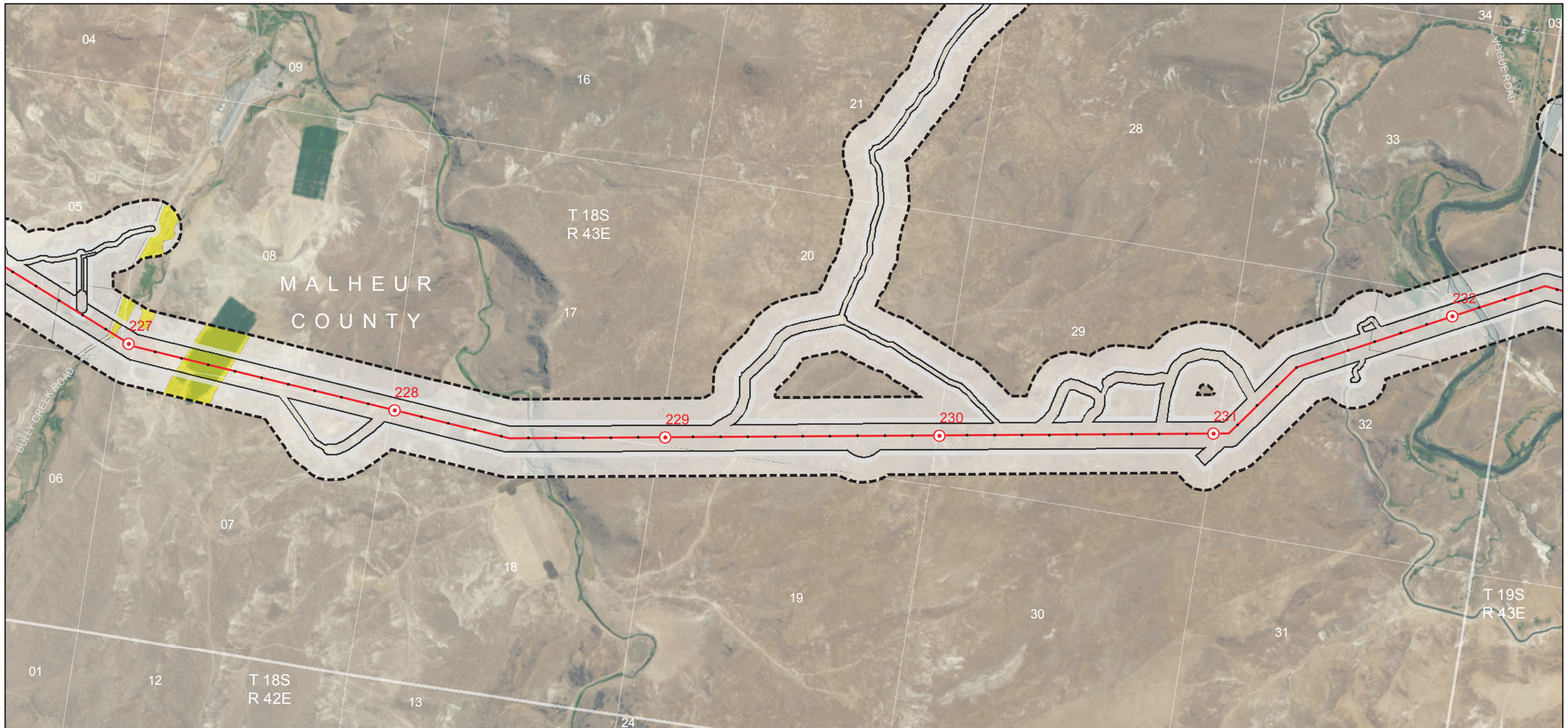
Map 50



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Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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Map 51

0 4,000 Feet

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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Mileposts
- Mile
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Agricultural Assessment
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- Other

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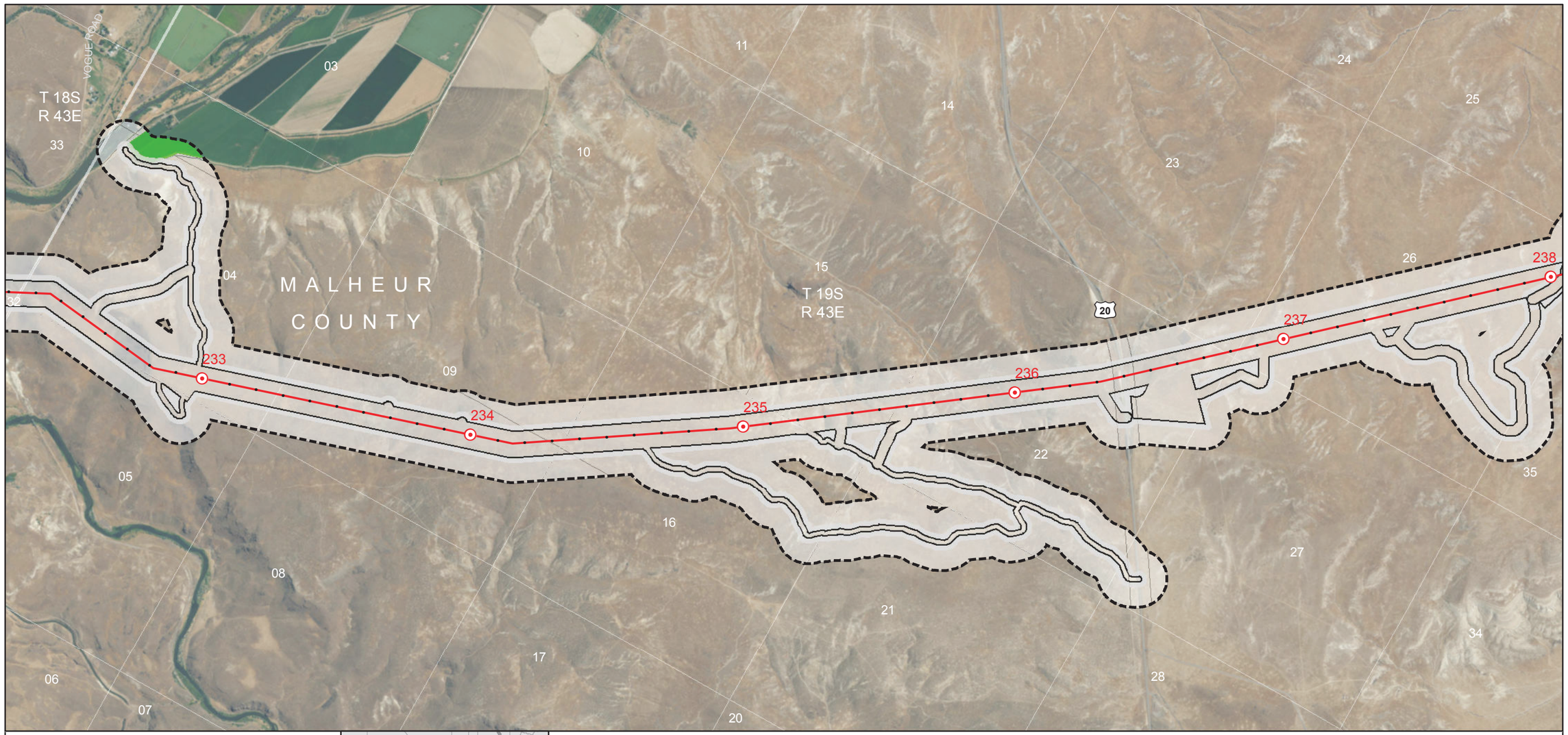
Map 52



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Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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- Other

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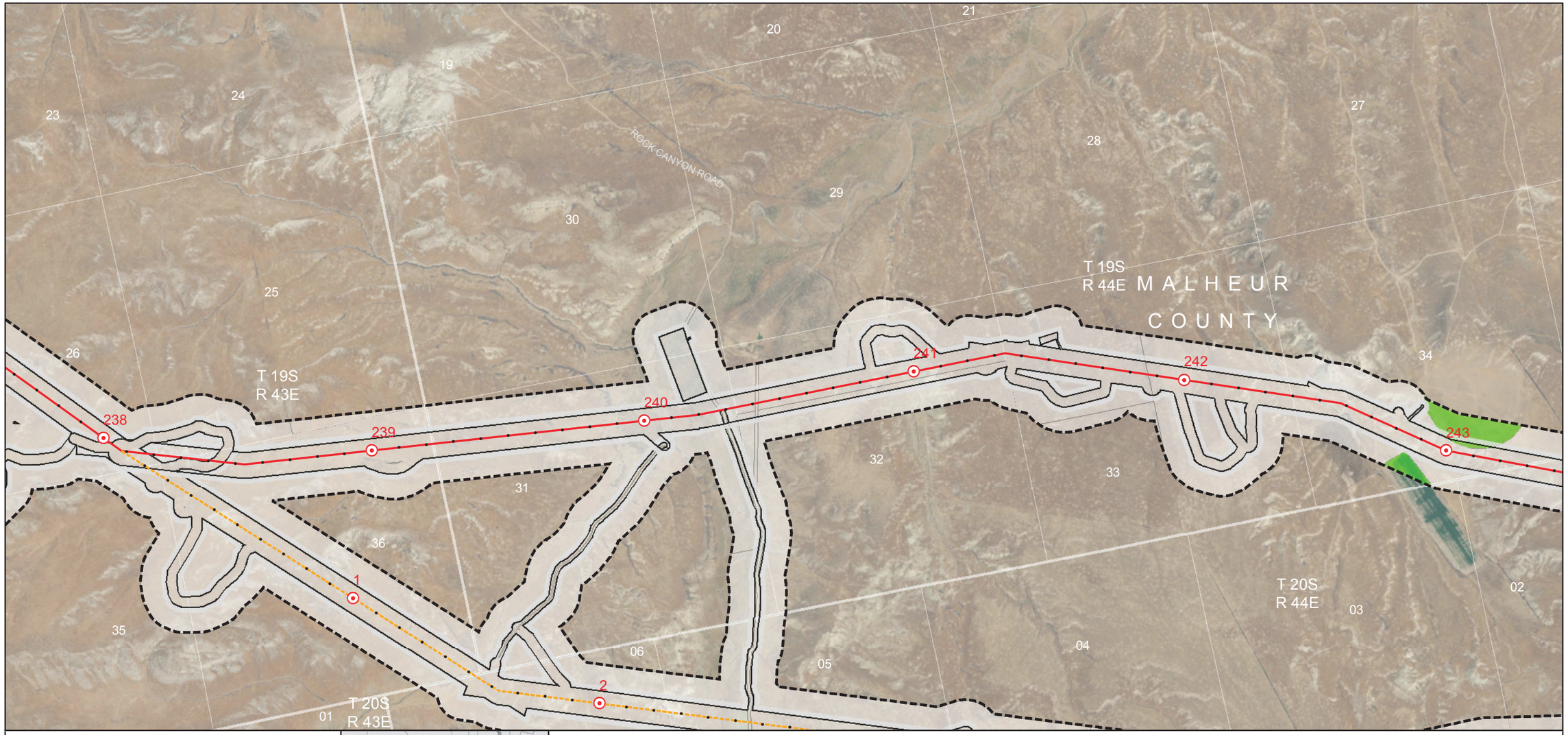
Map 53



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Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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Project Features
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- Other

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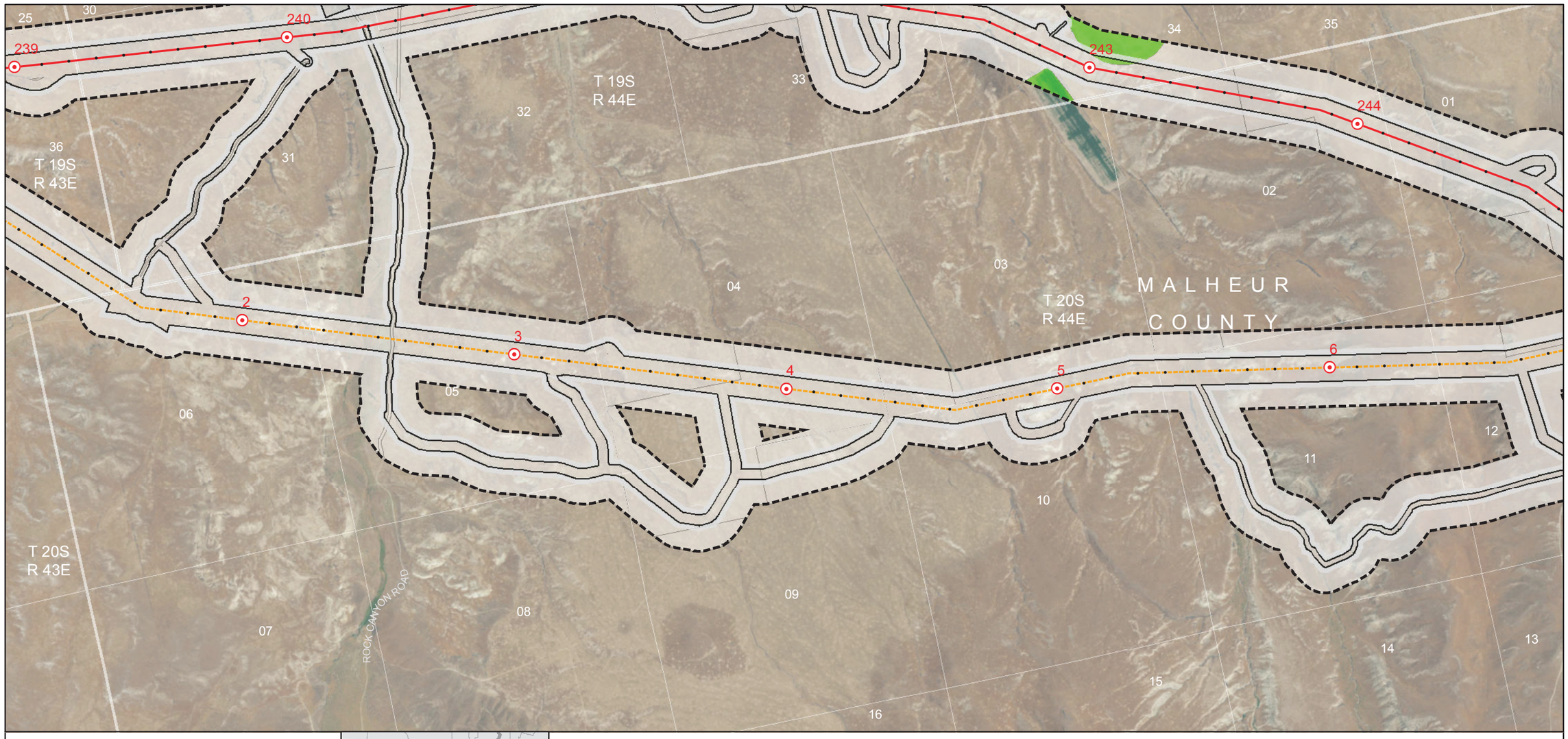
Map 54



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Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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Project Features
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- Other

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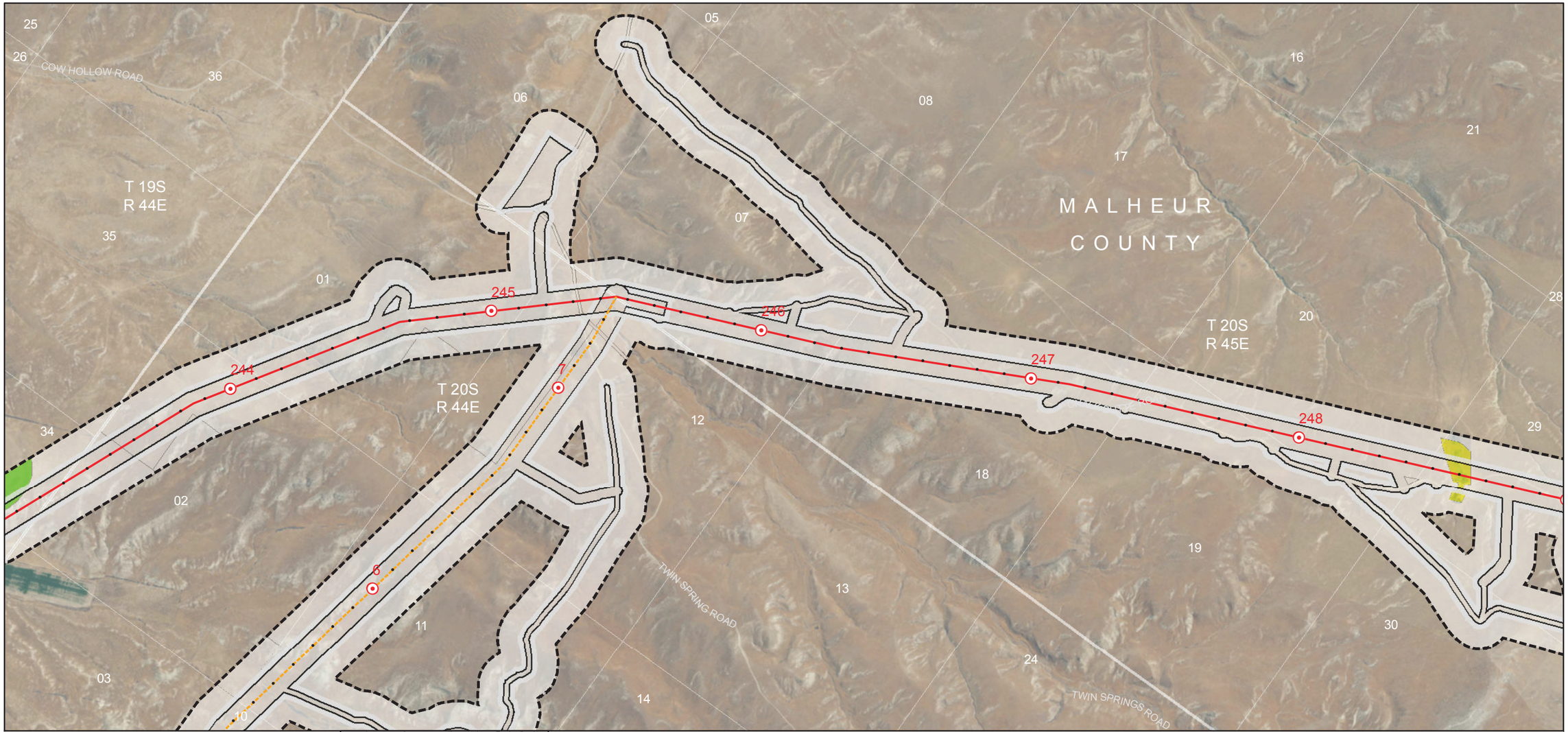
Map 55



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Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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Project Features
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- Other

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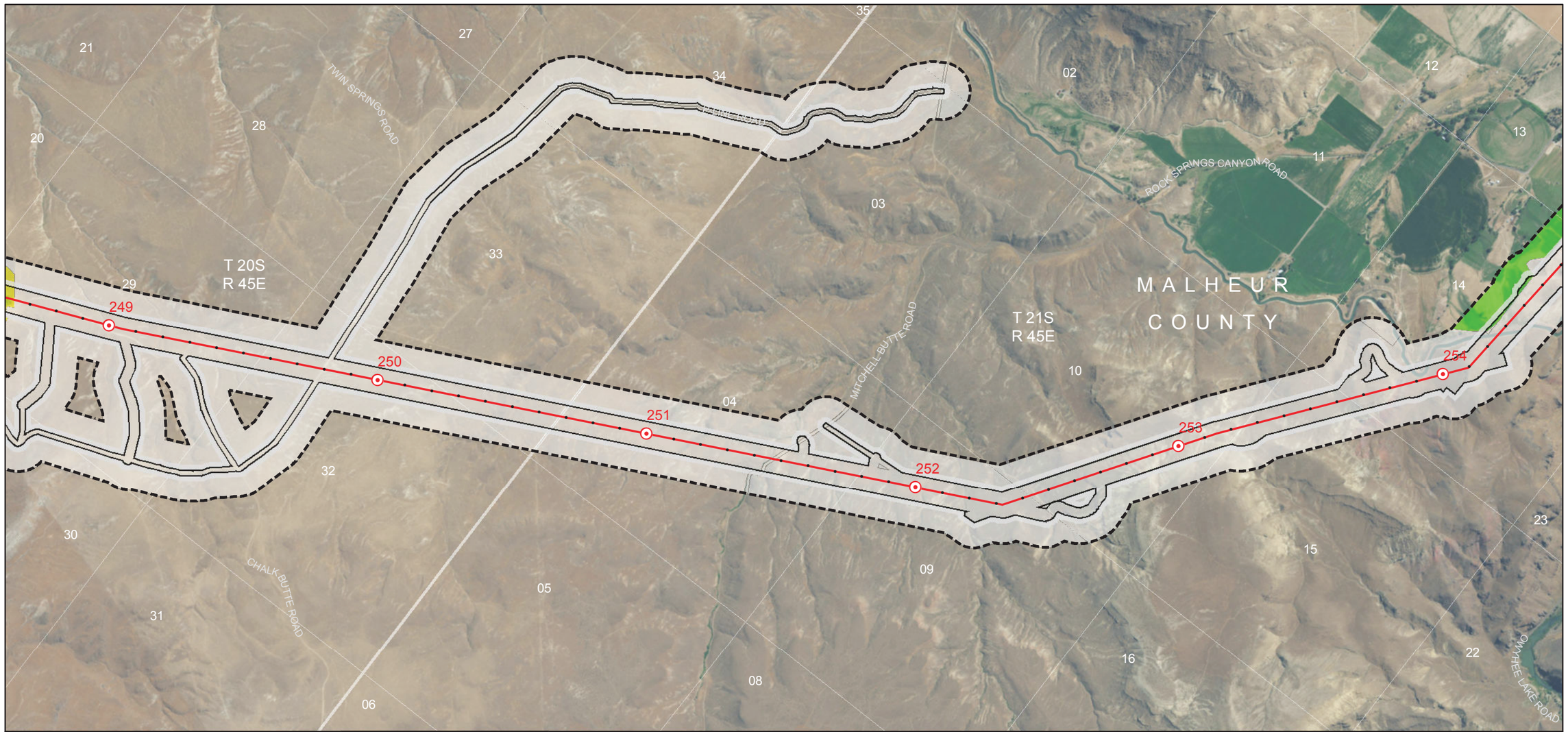
Map 56



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Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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- Other

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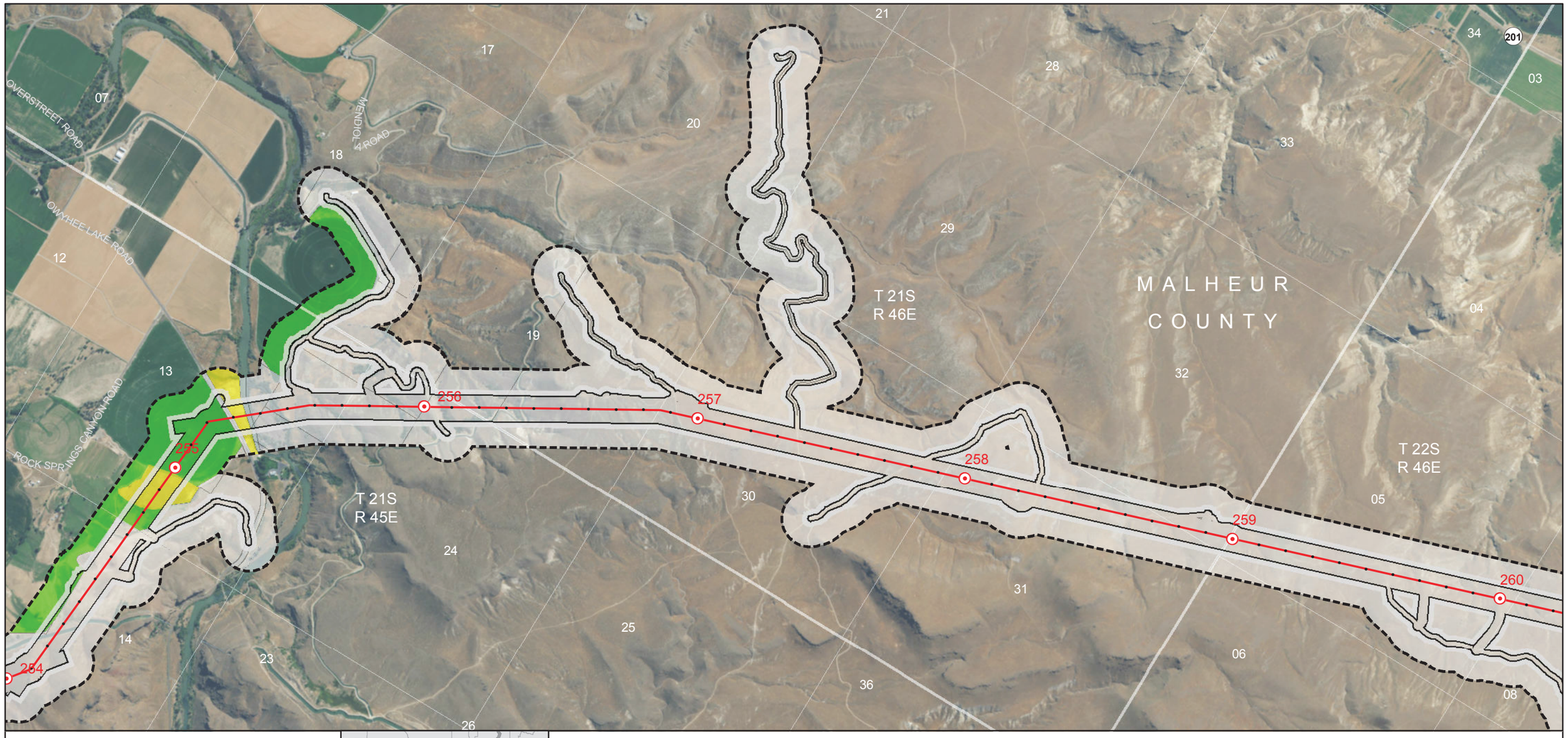
Map 57



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Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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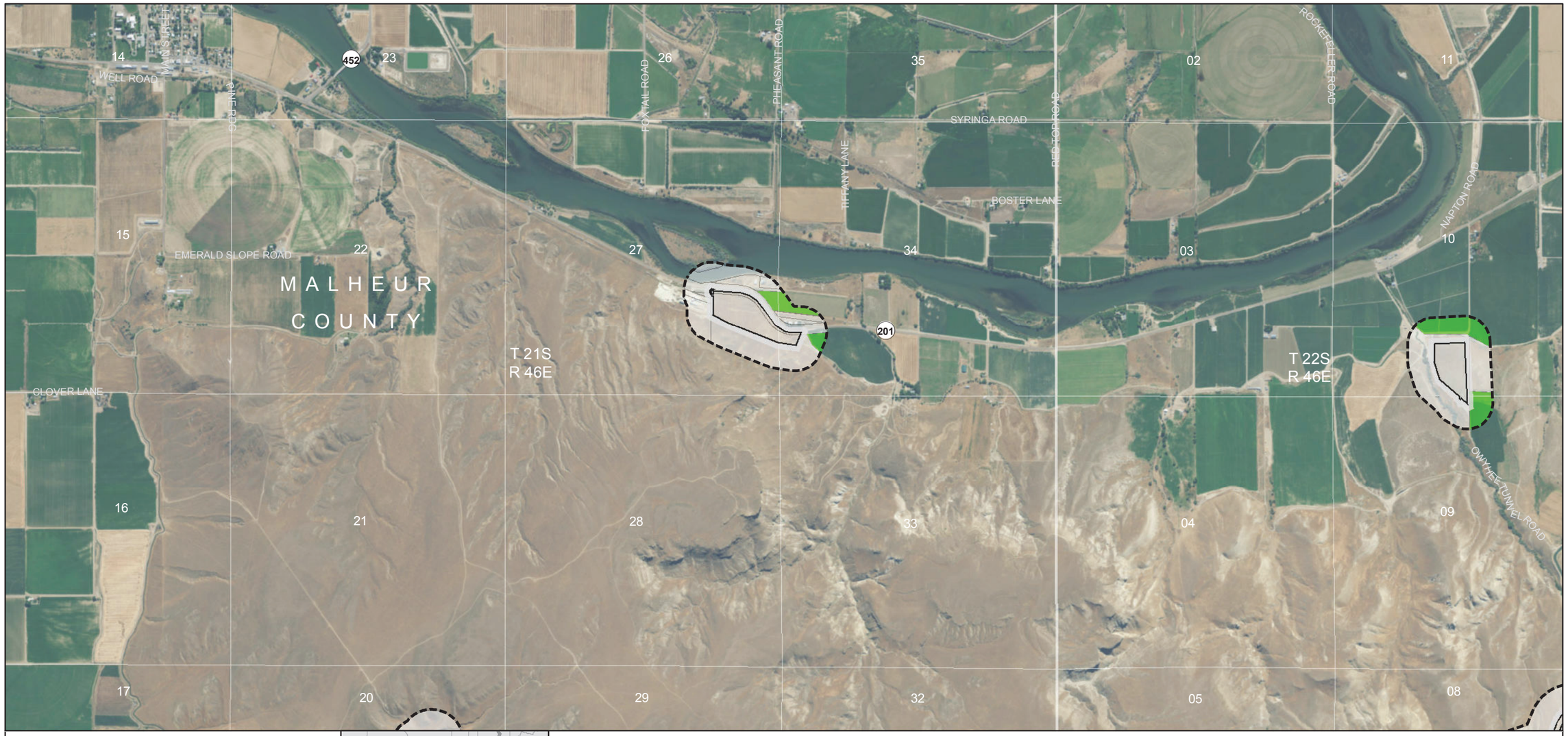
Map 58



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Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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Project Features
- Site Boundary

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- Other

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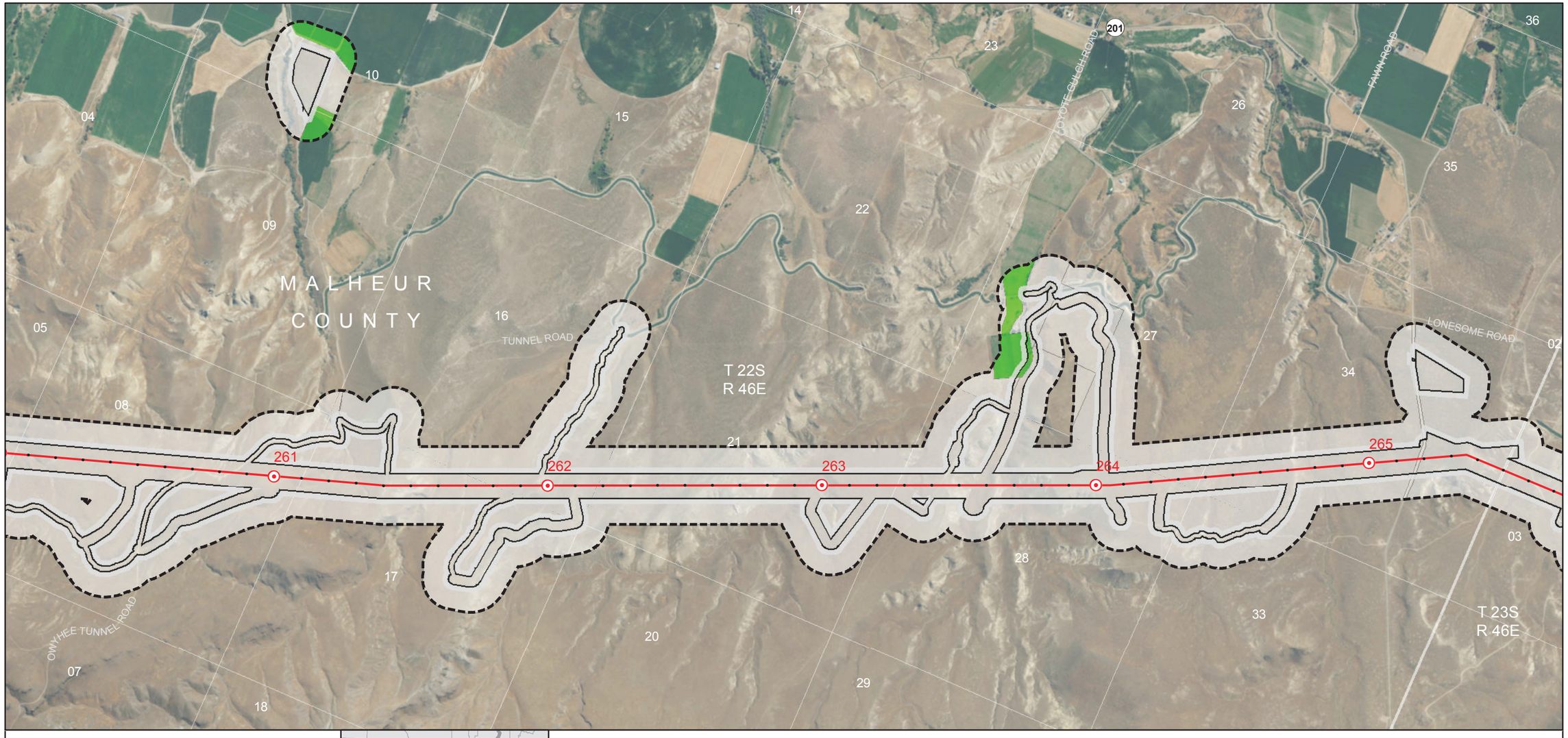
Map 59



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Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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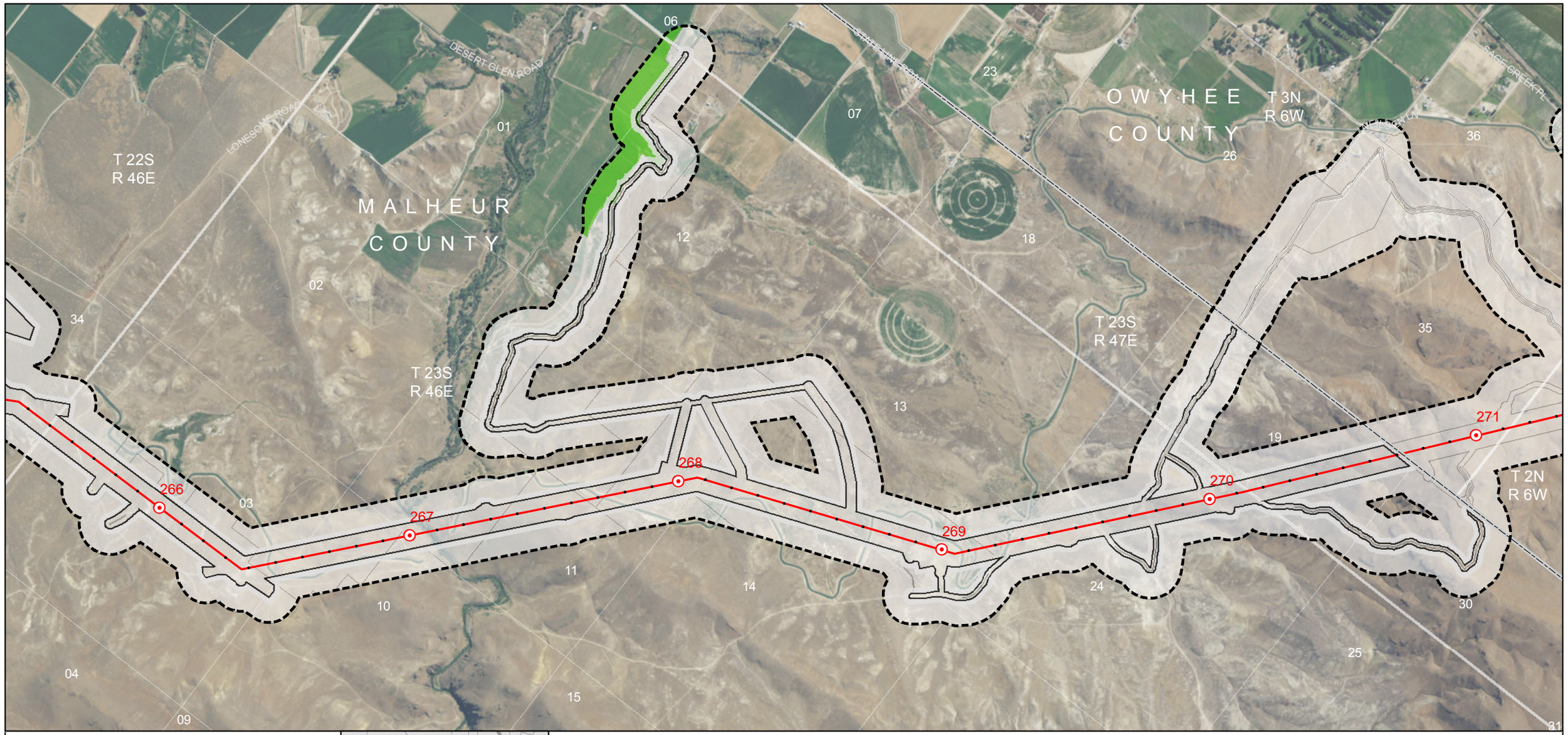
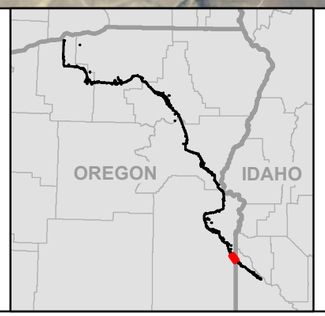
Map 60





0 4,000 Feet

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

June 2017

Project Features
- Site Boundary

Routes
- Proposed Route

Mileposts
- Mile
- Tenth

Agricultural Assessment
- Analysis Area

Agricultural Type
- Irrigated Agriculture
- Other

IDAHO POWER
An IDACORP Company

Boardman to Hemingway Transmission Line Project

ATTACHMENT K-1, APPENDIX A
Agricultural Types

Map 61

ATTACHMENT K-2
RIGHT-OF-WAY CLEARING ASSESSMENT

Attachment K-2
Right-of-Way Clearing Assessment

Boardman to Hemingway Transmission Line Project

1221 West Idaho Street
Boise, Idaho 83702

June 2017

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ACRONYMS AND ABBREVIATIONS

ASL	above sea level
AUM	Animal Unit Month
BLM	Bureau of Land Management
EFSC	Energy Facility Siting Council
GIS	Geographic Information System
IPC	Idaho Power Company
kV	kilovolt
NAIP	National Agriculture Imagery Program
OAR	Oregon Administrative Rule
ODOE	Oregon Department Of Energy
Project	Boardman to Hemingway Transmission Line Project
ROW	Right of Way
TVES	Terrestrial Visual Encounter Survey
USFS	U.S. Forest Service

1.0 INTRODUCTION

Idaho Power Company (IPC) is proposing to construct, operate, and maintain a high-voltage electric transmission line between Boardman, Oregon, and the Hemingway Substation in southwestern Idaho as an extension of IPC's electric transmission system. The Project consists of approximately 296.6 miles of electric transmission line, with 272.8 miles located in Oregon and 23.8 miles in Idaho. The Project includes 270.8 miles of single-circuit 500-kilovolt (kV) transmission line, removal of 12 miles of existing 69-kV transmission line, rebuilding of 0.9 mile of a 230-kV transmission line, and rebuilding of 1.1 miles of an existing 138-kV transmission line into a new right-of-way (ROW).

This ROW Clearing Assessment provides an assessment of forested lands in the Project area, including existing farm and forestry practices adjacent to forested lands and any impacts to those practices that may occur as a result of the construction and operation of the Project, in support of Exhibit K of IPC's Application for a Site Certificate with the Oregon Department of Energy (ODOE) for the Energy Facility Siting Council (EFSC) review. The ROW Clearing Assessment identifies all forested lands and associated farm and forest practices within the site boundary and surrounding lands within 500 feet of the site boundary. It describes the timber harvesting and associated activities that are required to prepare the rights of way to construct and subsequently maintain the Project. And it describes the impacts the Project will have on the relevant farm and forest practices within the forested lands.

2.0 APPLICABLE RULES

Oregon Administrative Rule (OAR) 660-006-0025(5) provides that transmission lines may be allowed in Goal 4 Forestlands provided the following requirements, among others, or their equivalent are met:

> *(a) The proposed use will not force a significant change in, or significantly increase the cost of, accepted farming or forest practices on agriculture or forest lands; . . . .*

3.0 ANALYSIS

3.1 Analysis Area

The analysis area for Exhibit K is the Site Boundary and one-half mile from the Site Boundary (see Amended Project Order, p.25). For purposes of this ROW Clearing Assessment, IPC analyzed the forested portion of the Site Boundary and adjacent farm and forest practices within 500 feet of the Site Boundary (the "Forested Lands Analysis Area").[1]

3.2 Maps of Forested Lands

The forested portion of the transmission line corridor is relatively contiguous and extends from east of Pendleton, Oregon, near Dead Man's Pass (mile 79 on the Project) to just east of La Grande, Oregon, at mile 120. The remainder of the transmission line corridor traverses prairie or agricultural lands, with only scattered patches of trees. The analysis presented in this ROW Clearing Assessment focuses on the contiguous forested area between Pendleton and La Grande.

Detailed maps of the forested lands affected by the Project are provided in Exhibit BB, Attachment BB-1, Appendix A Estimated Forest Disturbance Map Book. Figures 1 through 3 below provide an overview and details of the Project location.

[1] Analyzing forest practices within 500 feet, and not one-half mile, of the Site Boundary is consistent with the direction ODOE provided in Request for Additional Information 2-K15 for analyzing agricultural practices.

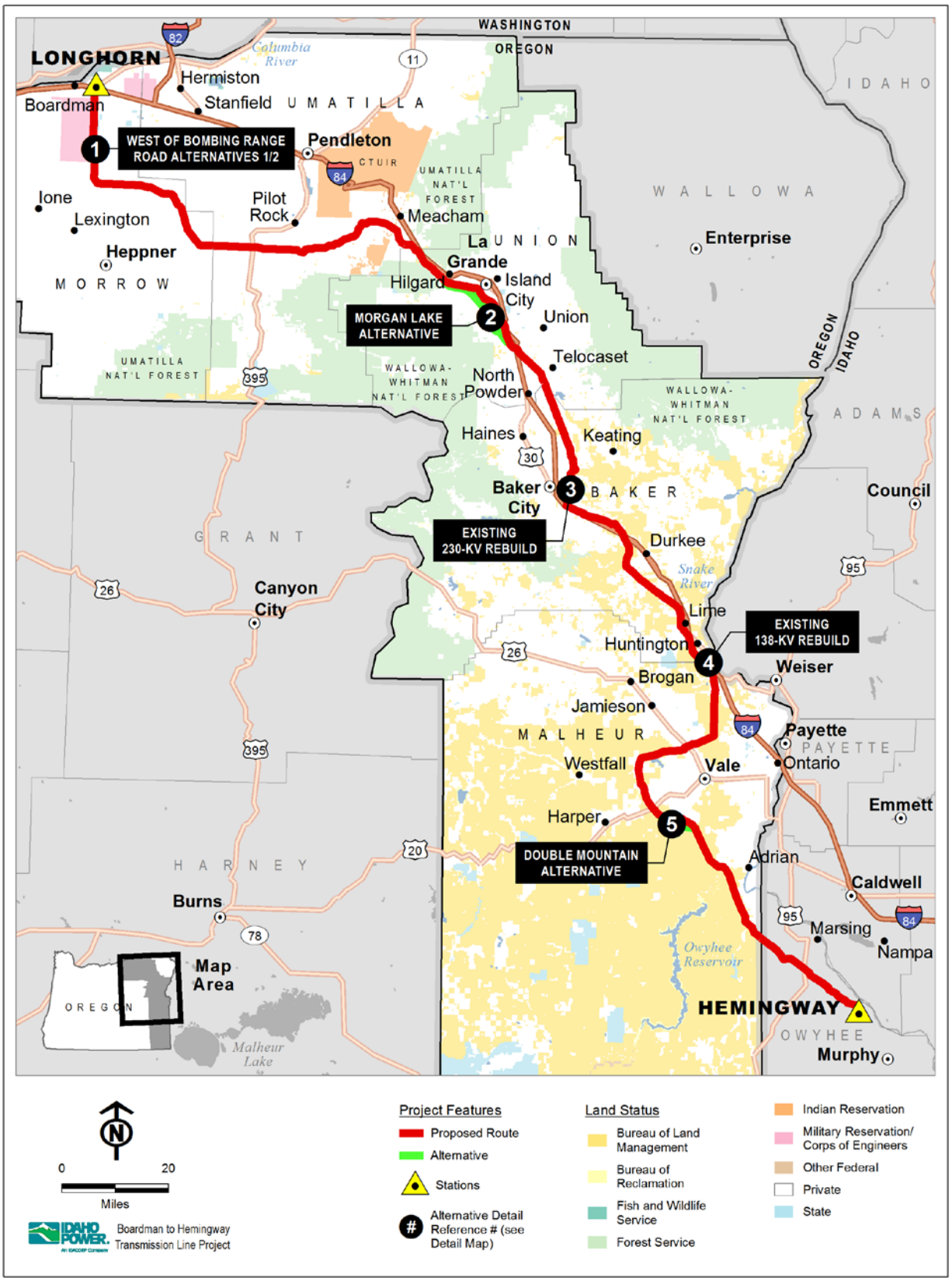

Figure 1. Location Map

Figure 2. Portion of Site Boundary in Forested Land

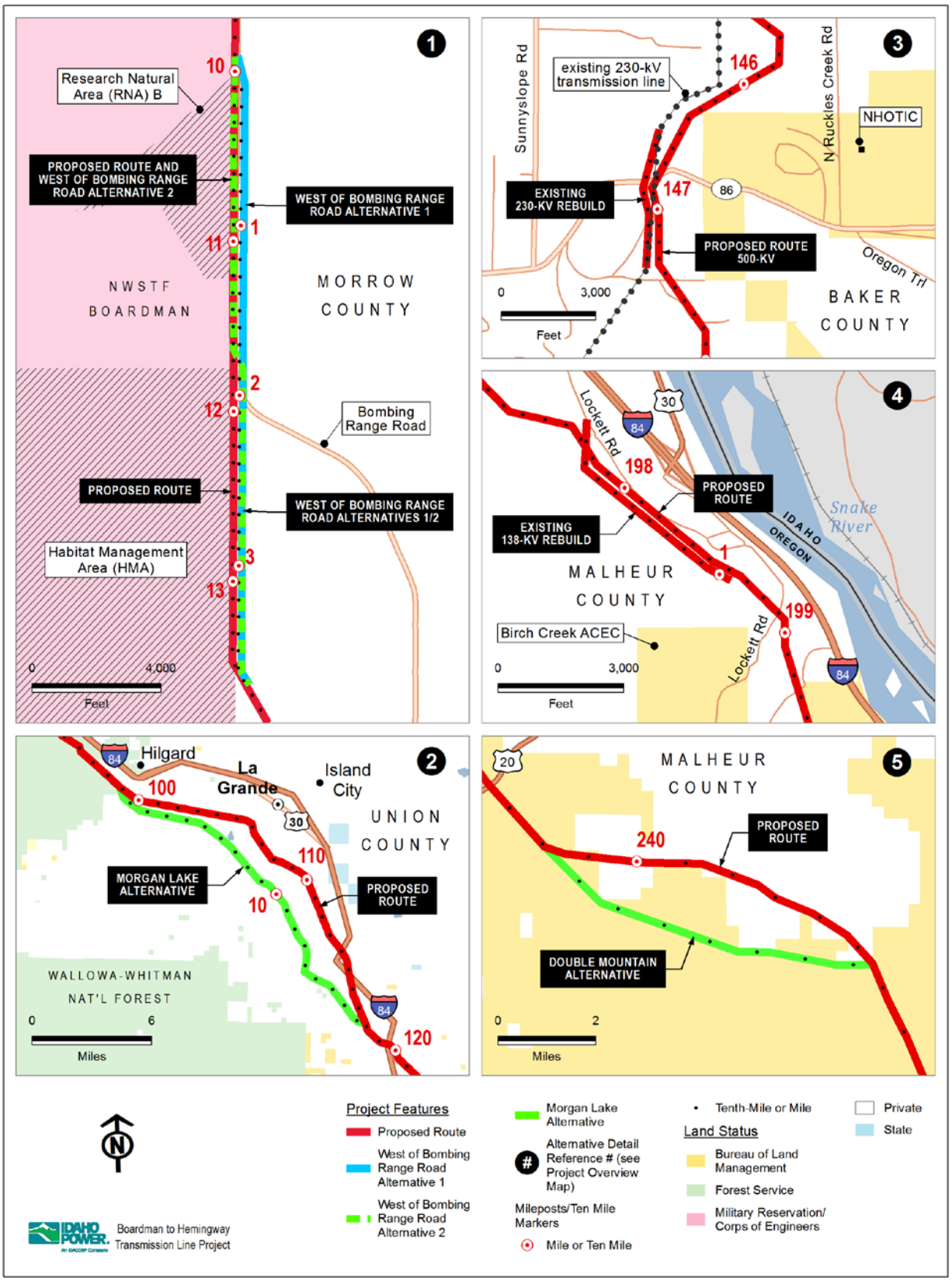

Figure 3. Detail of Alternatives and 230-kV and 138-kV Rebuilds

3.3 Methods

IPC identified existing forestry use areas by a combination of ground survey and aerial photo interpretation using 2013 National Agriculture Imagery Program (NAIP) aerial hotography.

The certified forester verified (ground-truthed) the presence and typing of forested land versus the other land uses that are not forestry.

The baseline forest cover data were field collected using the Terrestrial Visual Encounter Survey (TVES) software across the Project area. One of the goals of the TVES was to define the ecological systems (forest cover types) within the Project Boundary and describe those systems with a "habitat category." The habitat category code given to each forest cover type depended on the presence of forest cover in the field, along with the species and size of trees encountered in the forest cover type. Where right-of-entry was denied to acquire TVES survey data, IPC reviewed aerial photography and habitat categorization values assigned to adjacent polygons during TVES to assign a forest cover type classification and habitat category to areas of no access.

Data from the ground surveys were then mapped using an ArcGIS application on the aerial imagery layer with the transmission line route overlain.

To field verify the ground and aerial imagery assessments and determine the logging systems necessary to harvest timber on the corridor, IPC's certified forester did reconnaissance of the forested portion of the Forested Lands Analysis Area.

In December 2016, IPC mailed landowner survey questionnaires to owners of forested parcels in the Project area. Of the 60 surveys mailed out, IPC received 19 responses. IPC reviewed the survey responses to confirm the results of the field surveys and geographic information system (GIS) surveys.

The resulting forest and non-forest acreages in this analysis were derived from the ArcGIS mapping of the forest cover types. Range and pasture lands were segregated from the forest lands. There was no tilled cropland on this portion of the Project.

3.4 Analysis

3.4.1 Baseline

3.4.1.1 Forest Cover Types

The forest cover in the Forested Lands Analysis Area transitions from a shrub-steppe plant community on either side of the forested lands assessment area to an upland forest community with at least two forest zones including:

- *Abies grandis zone* (Grand fir) (58%); and
- *Pinus ponderosa* zone (Ponderosa pine) (37%).

The Grand fir forest zone dominates the study route. This zone includes Douglas-fir (*Pseudotsuga menziesii*) and other species. The Ponderosa pine zone also includes lodgepole pine (*Pinus contorta*) and other species, with mixed transitional zones across the broad ridge tops and valleys of the forested portion of the transmission line corridor. The forest transitions are due mainly to changes in elevation, soil type and aspect. In some cases, they may be influenced by or due to fire, land management activity, or other some other disturbance.

The forest cover was stratified across the study area by species composition size and density for the purpose of description. The forest cover types cross all of the above zones. Table 1 summarizes the forest cover types and approximate acreage in the Forested Lands Analysis Area.

Table 1. Summary of Analysis Area by Land Ownership and Forest Cover Type

County	Landowner	Forest Cover Type	Forested Acres
Umatilla	Private	Forested Other	32
Umatilla	Private	Douglas-fir/Mixed Grand fir	160
Umatilla	Private	Ponderosa Pine	55
Union	BLM	Douglas-fir/Mixed Grand fir	5
Union	Private	Forested Other	14
Union	Private	Douglas-fir/Mixed Grand fir	175
Union	U.S. Forest Service (USFS)	Douglas-fir/Mixed Grand fir	77
Union	Private	Ponderosa Pine	157
Union	USFS	Ponderosa Pine	101
	Forested Acreage		**776**
	Range - Non-Forest Acreage		**473**
	Total Area of Corridor		**1,249**

The forest within the corridor is predominantly small sawtimber (74%), with lesser acres of pole-sized trees (20%) and reproduction (6%). The balance (473 acres) is non-forest (rangeland) acreage. Table 2 describes the stand size classes of the forest cover within the Forested Land Analysis Area.

Table 2. Forested Areas by Stand Size Classes and Stocking Class Across the Analysis Area

Stocking Class	Stand Size Classes[1]				Sum	Percentage
	Reprod 1 to 4”	Poles 5 to 8”	Small Sawtimber 9 to 20”	Non-Forest		
	Acres					
Rangeland				473	473	37.9%
<10% Stocking	1	48	7		56	4.5%
10-39%	44	61	115		220	17.6%
40-69%		39	267		306	24.5%
>70%		10	184		194	15.5%
Sum	45	158	573	473	1,249	100.0%
% of Total ROW Area	**3.6%**	**12.7%**	**45.9%**	**37.9%**	**100.0%**	

[1] There were no stands with 21”+ average stand DBH (diameter at 4.5 feet above the groundline.

3.4.1.2 Land Ownership

The forested area of the Project is predominantly (85.3%) privately held land surrounded by federal lands including the Umatilla National Forest, the Wallowa-Whitman National Forest, and the Bureau of Land Management (BLM).

Table 3. Land Ownership within the Analysis Area

Landowner	Acreage	%
Private	1,066	85.3%
U.S. Forest Service	178	14.3%
BLM	5	<1%
Sum	**1,249**	

3.4.1.3 Farm and Forest Practices

Forestry is the predominant land use in the Forested Lands Analysis Area, most of which appears to be managed for long-term forest management. Over 62 percent of the corridor is classified as forest land with the balance being rangeland. Some lands are used for both forestry and grazing as well as recreation. There is no tilled cropland within the 776 acres of the Forested Lands Analysis Area, and only 473 acres of rangeland, which includes a very small acreage of managed pastureland.

3.4.1.4 Topography

The Forested Lands Analysis Area of the Project transitions from the shrub-steppe zone at about 3,000 feet above sea level (ASL) to a high of about 4,500 feet ASL in the forest zone. The proposed corridor crosses a broad, gently rolling ridge top (summit) crossing over the Grande Ronde River and a number of smaller, seasonal streams and normally dry drainages. The slopes are gentle, ranging from 0 to 30 percent, and occasional slopes that are steep for short distances, up to 70 percent. With the exception of the small number of short, steep slopes, timber harvesting operations will be ground-based.

3.4.1.5 Soils

The underlying parent material in the study area is Columbia River Basalt. It is capped by dark brown fine sandy loams or silt loam soils with a depth of 0.5 to 1 meter. Occasional areas of cobbly silt loams occur. These are well-drained soils that support year-round timber harvesting, but may be wet following significant rain events. Existing permanent roads may need to be surfaced with gravel. Temporary roads may support light use during dry season without gravel. It is not uncommon for roads to have only seasonal use (called summer roads) with no gravel surfacing in this area.

3.4.1.6 Aspect

The aspects in the rolling hills of the Project area are quite variable. Where northerly and easterly aspects occur, they are typically forested. Harsh, steep southerly exposures tend to be less densely stocked with trees or support rangeland vegetation. Soils tend to be thinner, with more rock, and lower in tree productivity on the south and sometimes the west facing slopes.

3.5 Project Activities Potentially Affecting Forested Lands

3.5.1 Right of Way Clearing

3.5.1.1 Timber Felling for Construction and Maintenance Hazard Trees

The timber on the right of way corridor will be directionally felled using mechanized machines on the lesser slopes, with oversized trees and trees on steeper slopes being directionally hand-felled. Trees off the right of way corridor that would be hazardous to the new transmission line would be cut by the feller-buncher if it can reach the tree, or hand-felled it the machine cannot reach the tree.

- Feller-buncher: Most trees on the right of way where slopes are 35 percent and less can be felled with a feller-buncher. This is a tracked machine with a felling head on a short boom. Trees are cut above the root flare and placed in turns (piles) for the skidder or shovel to yard to the landing. Disturbance of vegetation and soil compaction is low since the machine normally only passes over the ground once or twice as it moves from tree to tree. Understory vegetation may be uprooted as the machine turns, however many shrubs will simply resprout from roots or broken stems and resume growth. Use of the feller-buncher improves yarding efficiency since trees are placed in piles, eliminating the skidder's need to accumulate individual trees.
- Hand-falling: Used on slopes or where trees are too large to be cut with a feller-buncher. The upper size limits varies by type of machine and the head, with the upper limit that a feller-buncher can cut normally being in the range of 22 to 28 inches diameter. On slopes, the hand falling operations typically fall the timber parallel to the slope to avoid breakage. In some cases, it will be beneficial to fell the timber at an angle toward the right of way center to facilitate access for yarding by the shovel. This may causes some loss of timber volume, but will minimize site disturbance.

3.5.1.2 Ground Based Logging

The majority of the timber harvesting on the Project will be suitable for ground-based timber harvesting systems. Where slopes exceed 35 percent, directional felling of timber on this the 250 foot wide ROW coupled with the long-reach of a shovel (38-42 feet in many cases and sometimes add a long choker), timber can be removed without the need to use a cable harvesting system. A ground based system typically includes a feller-buncher, skidder or grapple cat, a shovel, and a log processor.

- Rubber-tired skidder: These are articulated 4-wheel-drive machines equipped with a grapple on the back, a blade on the front, and a cable winch. They are used for yarding individual trees or turns (piles) of trees or logs to the landing. They are fast and often used when yarding distances are long, such as on a new power line corridor. Yarding distances are normally limited to 1,000 to 1,200 feet. The machines are kept on skid trails to limit vegetation disturbance and soil compaction, leaving the skid trails only to back up to piles of trees or logs. Soil compaction on the skid trails can be high, but normally returns to pre-logging levels in approximately 6 years depending on the soil type and level of compaction. In some cases, ripping skid trails coupled with waterbarring and erosion control seeding when necessary will speed the restoration of soil productivity. The rubber-tired skidder will likely be used on most portions of the corridor that has slopes less than 35 percent.
- Grapple cat: The grapple cat is a high-tracked dozer with a grapple on the back, a blade on the front and a winch on the back. While much slower than the rubber-tired skidder,

the grapple cat can access turns and pull more logs, with less ground pressure and soil compaction that the rubber-tired machine. Yarding distances are normally less than a rubber-tired machine due to the slower nature of the machine. This may require the use of more landings.

- Shovel: Shovel logging is normally limited to about 2 tree lengths on either side of the logging road or skid trail. This tracked machine, with its reach of 38 to 42 feet simply reaches out and grabs the felled trees or piles of trees and drags them the length of its reach. It normally requires 2 or 3 "throws" to get the trees/logs to the edge of the road. For distances greater than 300 feet or so, the skidder or grapple cat is normally used. The shovel is a tracked machine with low ground pressure. Soil disturbance is typically low and understory vegetation is normally broken down, but most is not uprooted, so it will recover and continue to grow. Soil compaction is low since the machine is low ground pressure, and is not going back over its tracks more than once or twice. This machine is also used on the landing to sort logs and load the log trucks.
- Log processor: A log processor is a computer based head that dangles off the boom of a log shovel. It normally has 2 saws, and is used to remove branches, buck log butts flush, measure log lengths and diameters, and buck the top of the log at the appropriate length. The processor head is mounted on the end of the boom of a log shovel. It can be used to fell timber, but is less efficient than a feller-buncher.

3.5.1.3 Cable-Based Logging Systems

There will be short slopes where ground based mechanized felling and yarding cannot be used. In these cases cable yarding systems will need to be used to remove the timber from the slope. Small, mobile cable yarding systems will be used since log size and log volumes in each area will be small.

Using a cable yarding system, the butt end of the tree or log is suspended with the tree top or small end of the log touching the ground as it is pulled up or down the slope. On short slopes, understory vegetation disturbance will be minimal, as will soil disturbance. Little to no soil compaction will occur. On longer slopes, yarding "trails" will develop as multiple trees or logs are yarded up the hill. The understory vegetation is often scarified in these narrow "trails," with intact vegetation between the trails.

A cable setting will normally include timber that is hand-felled, the trees or logs are yarded with the Yoder or a small high-lead tower, a shovel with processor head on the landing to make the logs, and shovel on the landing. In some cases, trucks may be loaded with the shovel with processor head, though this is less efficient. Given the small volumes, it is likely that the shovel with the processor will be used to load the logs to avoid use of another machine.

- Yoder: This cable harvesting system gets its name because it is a combination of a log loader (shovel) and a yarder. The log loader is equipped with drums and cables that with the boom extended can provide adequate lift to cable yard trees and logs on short slopes. It is also faster and easier to set up than the normal high lead cable yarding system. Given the small acreage and short slopes in this project, along with the availability of these machines in Oregon, this will likely be the machine of choice to complete the cable yarding.
- High Lead: Small high-lead towers are also available with truck mounts. These shorter towers can be set up quickly and since they are truck mounted, can be easily moved from site to site. The height of the towers varies, but these machines are available in many sizes. Availability is less certain since some of the new machines are just being

put into service. There will be no need for the larger yarding towers or helicopters for yarding logs.

3.5.1.4 Log Landing Locations

Log landing locations will depend on the type of logging system that is in use. Typically on ground based harvest systems, landings will be spaced no more than 2,000 feet apart along the right of way when rubber-tired skidders are used. If the right of way is being shovel logged, the logs are thrown to the logging road at the center of the right of way, skidded to a landing, or loaded directly onto log trucks from the road edge.

Where a cable system is required, the tower will be situated at the top or base of the slope and logs will be yarded to that point, and then loaded on a log truck. These landing locations, logging system, and other decisions will be made during preparation of the written logging plan for the Forest Practices permit applications.

After harvest, landing restoration will occur. The logging debris at the landing should be haystacked and burned during the appropriate season. Burning permits will be required and are obtained from the Oregon Department of Forestry for private lands and public lands other than U.S. Forest Service (USFS). Pile burning in USFS lands will be permitted by that agency.

3.5.2 Road Construction, Repair, and Use

The level of improvement and maintenance required on existing logging roads used to access the right of way depends on the easement agreement with the landowner as well as regulatory requirements and engineering needs. If these existing logging roads do not meet standards required in OAR Chapter 629, Division 625, then they will need to be improved to meet this road standard. Roads improved to support log hauling and other forest practices will be satisfactory for line construction activity. All roads used in the project will be assessed, and prescriptions prepared for improvement of the vegetation clearances on the road shoulders, and for surface, drainage, culverts and water protection needs. Necessary repair or erosion control work will then be done in the appropriate season prior to the start of operations.

Similar to road improvement, new road construction will meet the OAR Chapter 629, Division 625 road construction standards. Standards on USFS lands will be similar to Oregon Department of Forestry standards. Roads constructed for the logging operations will be used for line construction as well.

Following construction, all roads are expected to be used for future maintenance and inspection of the transmission line, vegetation management access, and line maintenance. Roads will be seeded with erosion control seed mix and mulched as necessary at the end of operations, or when otherwise necessary. Waterbars or other water control structures will be installed as needed after line construction is complete, but will be designed to allow pick-ups to traverse the structure for patrol and maintenance access.

Erosion control seeding, mulching, straw wattles, and other erosion control measures should be completed according to the schedule of activity in the prescription for the work. For newly constructed road, all measures should be completed during construction. For log landings and road betterment after logging, then the erosion control measures should be completed after logging, log hauling, and slash abatement activity is completed.

3.5.2.1 Existing Access Roads

Harvested logs will likely be delivered to La Grande and Elgin, Oregon, to the east of the forested zone. The timber harvesting operations will utilize Interstate 84, state highways, and

improved and unimproved county roads. These roads will support the operations with no easements, additional fees, or maintenance required. USFS and private roads, both existing and newly constructed will likely require easements, road-use fees, and require betterment before and at the end of the logging and line construction.

3.5.2.2 New Access Roads

- Logging roads and standards for construction are detailed in the Oregon Forest Practices regulations Division 625: Road Construction and Maintenance. All new road construction must meet these requirements.
- Maintenance during operations: Once an existing logging road is improved at the start of the operations, little additional work will need to be done to maintain the road during operations. Newly constructed roads often will normally require additional rock during the operations to patch or repair fills or soft spots in the road surface.
- Post-harvest betterment: An assessment of the road conditions should be made at the end of the line construction operations, and necessary repairs made.
- Post-harvest put-to-bed: Logging roads that are intending to be temporary to facilitate logging, but are not to be used for line construction should be put-to-bed. This includes grading to smooth ruts, installation of water bars where required, and seeding with an erosion control seed mix. Mulching may be necessary on slopes. In most cases, these roads will be used for line construction and maintenance of the line and vegetation in the future, and should be left in a condition that can be accessed with a line truck, a pick-up, or at the least, an all-terrain vehicle.
- Post-harvest abandonment: If any roads require post-harvest or post-construction abandonment, the surface of the road is scarified, waterbars are installed, the road is seeded with an erosion control seed mix, and mulched as required. Care should be used in decision making—do not abandon roads that are necessary for patrol and line maintenance. Abandonment procedures should follow Oregon Forest Practices regulations.

3.5.3 Slash Abatement

The abatement of slash will be similar across all public and private land ownerships and will comply with OAR Chapter 629, Division 615.

- Logging operations
    - Pile and burn: Landings and fuel concentrations
        - Treatment of slash is required for protection of adjacent lands from the risk of fire and to minimize the potential for materials to enter a stream.
        - Filing of a “smoke management plan” (OAR 629-048-0001) and obtaining a burn permit for landing or pile burning may be required. Special restrictions for the pile size and site will be provided on the burn permit.
    - Mower mastication: This option may be used where slash (fuel) loads are moderate to heavy. A brush mower is used to break up fuel concentrations and cause them to be in contact with the soil. This will cause increased moisture content of the fuel and speeds decomposition, while reducing the fire hazard. The typical machine used for mower mastication includes a small track loader such as a Takeuchi equipped with a Fecon type mowing head on the front. This machine would be used in gentle topography. A second type of machine would

be an excavator equipped with a “Slashbuster" or “Fecon” type head. Either machine will work, with the track loader being the faster machine where terrain permits. Both machines can be used to mow non-merchantable brush that has a projected mature height of over 15 feet. The disturbance with the tracks of either machine is similar to a log loader. The mowing operation breaks down the logging slash and cuts understory shrubs that are intermingled. These shrubs typically restock the right of way quickly.

  - Lop and scatter: This slash abatement method is typically used where fuel loads are light, or on slopes too steep for mowers. The branches are lopped by hand into lengths of 3 feet or shorter using chainsaws, so that they lay on the soil surface or close to the soil surface. Downed wildlife logs are similarly cut, usually in longer length, but so the log is on the soil surface to facilitate decay.

- Forest, but no logging operations: In forest cover types that are sparse or young, with no merchantable logs and thus no logging, tall growing tree and brush species would be hand slashed or mowed using either the track loader with the mower head, or the larger excavator with a mowing head (described above), or on steeper slopes the slash will be treated by hand using lop and scattering methods.

  - Mowing: In most cases, the mower will follow the logging operations to mow undesirable brush and break up fuel concentrations. Stump heights of the mowed material are typically 6 inches or so, but may be higher if rocks, larger stumps, uneven soil surface, or other materials prevent mowing lower. Soil disturbance should be minimized with these mowing operations to prevent creating a seedbed for pioneer tree species (all are incompatible with power lines) and invasive weeds. Where fuel concentrations are high, piling and burning will likely be the slash abatement practice of choice.

  - Lop and scatter: Used on steeper slopes in areas where slash is light, or slopes too steep for the mowing machines.

  - Pile and burn: To be used in logged areas where fuel concentrations are moderate to heavy and contiguous. The slash would be piles with the log shovel for burning at the appropriate time.

  - Chipping of slash: To be used only in residential settings or road crossings where other treatments methods are not appropriate.

3.6 Potential Impacts to Forested Lands

3.6.1 Impacts to Surrounding Forestry Practices

Installation of a new corridor with electrical transmission lines has the potential to impact the operations on adjacent forest and farming operations. In this case, the farming activity mostly appears to be grazing, in addition to the forestry operations. The following are potential impacts to the current land use practices associated with the logging operations for the new transmission corridor and associated with permanent removal of trees from the ROW:

- Land on the corridor may need to be converted from forestry to agriculture. Tree heights will be limited to 15 feet on the edges (border zone), and 3 feet in the wire zone making long-term forest management impractical. This is the most significant aspect of this line placement. There is potential for Christmas tree production in the border zone, as long as tree heights do not exceed 15 feet.

- Future timber harvesting operations of trees within a tree length of the power line will have a higher risk factor. IPC may need to provide timber harvesting assistance for removal of trees within the minimum approach distances for non-qualified electrical workers. Often this is necessary for only select edge trees, however if the entire right of way is cleared and the line situated in the center, then forestry logging operators should have adequate clearances and be able to cut the timber safely.
- There may be some loss in tree volume along the new edges of the power line corridor, since windthrow of some edge trees is inevitable due to exposure from tree removal on the corridor and sunburn/decay often occurs to newly exposed bark.
- The risk of wildfire may be increased since powerlines are an incendiary source if a tree falls on the lines, or there is an equipment failure.
- Additional roads allow access to more area for authorized and unauthorized users of the land. Risk of wildfire, dumping, timber theft, and vandalism may increase., but not significantly. Strategic placement of gates will help to control this potential increased risk.
- Roads constructed for logging and line construction access could prove useful to the underlying landowner, reducing necessary road construction on their part for their forestry operations.
- Well-maintained powerline corridors can serve as a fire break in the case of a wildfire, or may provide a strategic point of wildfire defense due to access and lack of aerial fuels.
- For discussion regarding impacts of ROW clearing on wildlife, please see Exhibits P1, P2, and P3.

3.6.2 Impacts to Surrounding Agricultural Operations

For discussion of impacts to surrounding agricultural operations, please see discussion of impacts to rangeland in the Agricultural Lands Assessment, Attachment K-1.

3.7 Permits Required for Impacts

3.7.1 Timber Harvest

Timber harvesting on federal lands will require permits from the USFS. Timber harvesting on all other private, state, tribal, or public lands will require a forest practices permit from the State of Oregon as per the Oregon Department of Forestry Forest Practice Administrative Rules and Forest Practices Act Chapter 629 – Forest Practices. Each ownership crossed will require a separate forest practices permit. Consistent with the plan for alternate practice, the IPC will request an exemption from the reforestation requirement and request that alternate land use be approved, which may result in a change from forestry to agricultural uses within the right of way on each land ownership.

3.7.2 Hydraulic Permits

There are no additional permits required for stream crossings with permanent or temporary logging roads – all are covered under the Oregon Forest Practices permit with a written or potentially an alternate plan. Streams outside the area of permitted forest practices will be covered by the local jurisdictions.

3.7.3 Forest Road Easements

Haul roads used to move forest products over private and public lands will require separate easements or road use agreements. These easements or agreements typically are acquired

and paid for based on the board foot volume hauled across the road, and include stipulations that the roads are left in as good or better condition compared with the condition of the road prior to the use. For new roads over private or public lands, the condition of the road after the project is complete will need to be negotiated with the landowner. In most cases, the roads should be stabilized or put-to-bed, but still kept in a condition to provide pick-up or line truck access for patrols and maintenance of the line.

4.0 MINIMIZATION AND MITIGATION OF IMPACTS TO FORESTED LANDS

The conversion of the forested portions of the rights-of-way to a powerline corridor is permanent, since tall growing trees are not compatible with transmission of power. Where possible, a perpetual easement and associated temporary workspace will be purchased on private lands by means of a negotiated settlement, and payment will be based on a certified appraisal. Prior to any construction, IPC or its agent, together with the landowner and/or the landowner's designee (which may include employees, tenants, or other representatives), will strive to schedule activities to minimize impacts to forest practices.

4.1 Efforts to Minimize and Mitigate Impacts to Forested Lands During Logging Operations and Construction of the Project

4.1.1 Logging Best Management Practices

Due to the gently sloping nature of the topography across most of the forested area and since most land uses currently are long-term forest management, there should be limited restrictions to logging operations. Some restrictions that are likely to impact logging operations include:

- Seasonal restrictions
    - Fire season – typically the late summer and early fall time period brings restrictions on the hours of operation for timber harvesting, the need for water trailers or trucks on site, the need for fire watches after operations, and in some cases all spark emitting operations are shut down.
    - Freeze-thaw conditions may limit road use during the spring, but the duration is normally short. Use of a road during the spring thaw will cause significant damage and reconstruction costs.
- Wildlife habitat restrictions – Nesting seasons for threatened and endangered wildlife species may impact the season or the hours of operation when logging occurs near a nest site, or within their habitat. If any of these species are present, the Oregon Department of Forestry and/or the USFS will provide information regarding locations of nests and limitations on operations. This information should be available early on in the design process.
- Riparian – Critical areas, buffers, and other restrictions
    - Stream crossings – In many cases, it is not possible to maintain timber (tall growing tree species) in stream buffers on powerline corridors due to necessary under clearance requirements of FAC-003-03, the North American Electric Reliability Corporation *Transmission Vegetation Management Program* standard, the provisions of which were adopted by the Federal Energy Regulatory Commission. Selective removal that leaves tree and shrub species with mature heights of 3 feet or lower within the wire zone, and 15 feet or lower in the border zone, is often the

only solution to maintaining canopy along these streams (see Figure 4). Crown reduction may be possible for some tall growing conifer trees, but is not desirable for deciduous trees.

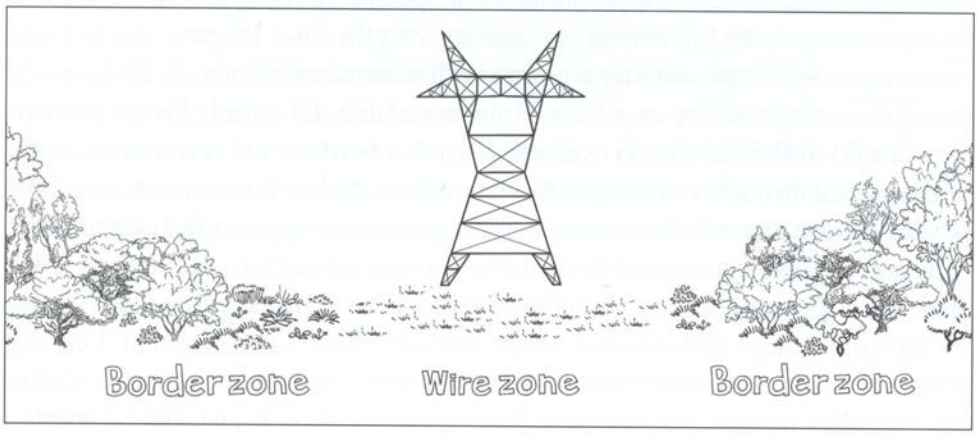

Figure 4. Wire Zone-Border Zone Illustration for Vegetation Management on Transmission Rights of Ways (*Source:* International Society of Arboriculture 2014)

- Slash created in a stream buffer should be removed to prevent smothering of desirable shrubs, grass and forb species. However, the degree of removal should be limited to 80 percent or less, to provide habitat for wildlife and to restore nutrients to the forest floor. Removal of trees and slash from buffers should be done using cable yarding systems or with equipment sitting outside of the required buffer unless other provisions are made with the regulatory authority. All desirable understory vegetation in the buffer should be protected as much as possible. Breaking branches or stems on shrub species is not a serious concern, since all will likely resprout and produce viable, new growth. This new growth is often preferred forage for wildlife species.

- Other resources of the state – there may be restrictions on other resources of the state. These will be identified by the USFS and/or the Oregon Department of Forestry during the permitting process, and adjustments can be made to the prescriptions for timber harvesting. Examples may include archeological sites, springs, well-heads, endangered or threatened plants, or other unusual features.

4.1.2 Survey Marking of Access and ROW Clearing Limits – Flagging and Painting

It is important to be consistent in initial survey staking and flagging across the entire project. This will limit the potential for confusion on the part of a logging or line contractor that results in violations of the permits. The following are the suggested color flagging for the survey work.

- Property lines – Fluorescent pink
- Road centerlines – Pink/black striped
- Clearing limits/ right of way corridor delineation – Fluorescent orange
- Critical area delineation – Fluorescent blue

- Log landing delineation – Pink/Black striped and Orange (double flagging)
- Off-ROW hazard tree designation – Orange aerospot tree marking paint with a dot at eye level and a dot on the stump. If tree is hard to spot from new ROW due to brush, hang orange/black striped flagging at edge of right of way.

4.1.3 Hazardous Materials during Logging

Logging operations use motor fuel, hydraulic oil, and lubricants in all of the equipment on the logging side. As the equipment moves around the logging unit, there is potential for leakage during operation and refueling, or repairs and maintenance. The logging operations are required to observe the Oregon Department of Forestry regulations regarding hazardous materials (OAR Chapter 629, Division 620 – Chemical and other Petroleum Product Rules). These rules will be observed across all land ownerships.

4.1.4 Forest Herbicides

Treatment of brushy or tall growing tree species that have a mature height of over 3-15 feet is necessary to tailor the right of way to low growing, compatible plant species. This improves the safety of the powerline by reducing outages and their potential to cause fires, reduces entries by vegetation management crews that potentially could cause disturbance of plant communities, wildlife and soils. This is a critical component of any integrated vegetation management (IVM) program.

- Stump treatments – deciduous tree species that are mowed or handcut on a right of way need to be treated with an approved herbicide to prevent resprouting. This allows desirable low growing shrubs and other plants to colonize that growing space, providing long-term weed control. Stump treatments are typically applied using a backpack sprayer equipped with a Spraying Systems 5500 wand and a Y-3 tip. The product typically used is Garlon 4 Ultra mixed at 25 percent herbicide with 75 percent canola oil or a refined mineral oil. Pathfinder II, a similar formulation that is ready-to-use could also be used. Within 10 feet of a stream or other type of water, the product of choice is Garlon 3A mixed 50 percent herbicide with water and applied to the cambial region of the freshly cut stump. Rodeo could also be used at the same formulation with water.
- Low Volume Foliar – foliar applications are typically used where undesirable stem densities are light to moderate (less than 300 stems/acre). The applications are made during the growing season when the deciduous tree species are in full leaf. Applications in late May or June are preferred, when the waxy cuticle on the leaves or needles of conifers is less well developed. The formulation used depends on the species and will be developed in the prescriptions that are site specific.
- High Volume Foliar – where undesirable tree or brush species are moderate to dense (more than 300 stems/acre), the use of high volume foliar applications are prescribed. This could be from a tank on a truck, skidder, farm tractor or other 4x4 rig. The applications could be made using a handgun or with a boomless nozzle system. Target trees or brush are normally shorter than 8 feet tall for this application. Where taller trees occur, they are typically cut or mowed prior to a stump treatment. The formulations would be developed during the prescriptive phase of the right of way management plan on a site specific basis.

4.1.5 Fire Protection during Logging Operations

Forest fire control rules are included in OAR 629. All logging operations shall be required to comply with these regulations, with recognition of the limitations of the specific wildfire hazard zone (OAR 629-044-0200). The activities to comply with include, but are not limited to:

- Fire equipment requirements on the landing which include observation of current industrial fire precaution levels, the required tools for the type of operation, no smoking while in an operation area, and fire watch when required.
- Treatment of slash for protection of adjacent lands from the risk of fire and to minimize the potential for materials to enter a stream.
- Filing of a "smoke management plan" (OAR 629-048-0001) and obtaining a burn permit for landing burning. Special restrictions for the pile size and site will be provided on the burn permit.

4.1.6 Existing Access Road Protection

- Improvement – Existing farm or graveled logging roads used for log hauling and line construction may require improvement as per Oregon Forest Practices Act - OAR 629-625-0600, and depending on the road use agreement with the landowner.
- Maintenance – Best Management Practices are detailed in *The Forest Practices Notes* (No. 4, 1999 – Oregon Department of Forestry).
- Post-harvest betterment – the responsibility for betterment depends on the easement or road-use agreement with the landowner. However, as a rule, the road should be left in as good or better condition as it was when use was started. Improvement of gravel roads to meet forest practices standards will speed turn-around times for log delivery, while reducing wear and tear on equipment.

This maintenance may include cleaning of ditches and culverts, grading to eliminate potholes, wash boarding and to improve surface drainage, daylighting to assist in melting of ice and snow and drying of the surface, and mowing road shoulders to improve visibility and safety.

4.1.7 Logging Worker Safety

Safety on all logging operations is regulated by the Oregon Occupational Safety and Health Administration for all employees.

- OAR Chapter 437, Division 7 covers forest activities. This division has guide books related to all aspects of these logging operations.
- A logging safety plan will be required for each operator as per OAR Chapter 437, Division 7.
- Where the corridor crosses electrical distribution or transmission facilities of other utilities, these operations need to be in compliance with regulations related to working around electrical lines. These regulations are addressed in the following code: OAR 436-007-0230 and OSHA 1910.266 and 1910.269.

4.1.8 Erosion Control

The highest potential for erosion from these operations is from the roads. Road construction and maintenance is regulated by Oregon Forest Practices regulations (OAR Chapter 629, Division 625) or the USFS. The greatest potential for erosion outside of the roads is on landings. Properly managed logging jobs have low potential soil erosion outside of the roads and landings.

4.2 Efforts to Minimize and Mitigate Impacts to Forested Lands During Operation of the Project

During operation of the Project, IPC expects to access the forest portion of the Project infrequently, approximately once or twice a year as needed for routine inspection and maintenance. IPC will perform vegetation maintenance as needed and will ensure removal of danger trees. Upon request by a timber harvest operator adjacent to the Project, IPC will provide timber harvesting assistance for removal of trees on the edge of the right of way within the minimum approach distances for non-qualified electrical workers. IPC will use gates to minimize the risk of unauthorized access to access roads in forested lands (see also Exhibit P, discussing access control).

5.0 HELICOPTOR USE IN THE PROJECT FORESTRY OPERATIONS

The topography in the Forested Lands Analysis Area is flat to gently rolling with short sections of slopes up to 70 percent. Ground-based timber harvesting systems are expected to be used for the entire operations including shovel, tracked and rubber-tired skidders, and cable yarding (on the slopes greater than 30 percent). No helicopter logging is anticipated.

If any helipcopter use is required, then the landings will all be within the logged corridor, and the helicopters will operate from the “light duty fly yards” planned for use during line construction. The forest cover type analysis includes all of the light duty fly yards.

The use of helicopters whether for logging or line construction will have no impacts to the forestry or rangeland use on the lands adjacent to the Project in the short or long term. No ROW maintenance operations will utilize helicopters after the initial construction is complete. Helicopters will be used annually for patrols of the line.

6.0 LANDOWNER COSTS OF THE PROJECT

6.1 Rights-of-Way Forest Lands

Use of the forestry lands within the 250-foot-wide cleared corridor of the Project will have an easement acquired to allow IPC to build and operate the new Project. The timber on the corridor and on any necessary new roads across the landowners property will be purchased at stumpage values, and the lost opportunity cost of growing timber for a new 80-year rotation will be negotiated.

In most cases, these forestry lands will simply be converted to range land, similar to that which exists on 38 percent of the Forested Lands Analysis Area. The landowner will continue to own the land and could benefit from the grazing, wildlife, and recreational uses that the range land provides.

6.2 Adjacent Forest Land Impacts

Forest lands adjacent to the new Project will have only minor impacts to the future forest management operations. The negative impacts are primarily limited to:

- Loss of forest land, but this is compensated for in the easement negotiations.
- Forest harvest units may be broken into smaller sizes or shapes when timber is harvested adjacent to the corridor.

- Edge trees will require more care during cutting to prevent loss of a tree onto the powerline. Given the 250-foot-wide corridor and wide clearance between the line and the tree edge, this should be of little concern during harvesting.
- Helicopters are rarely used in forest timber harvests, plantation maintenance, or reconnaissance in the Blue Mountains, so breaking up the unit size should have no impact to future management operations.
- Invasive weeds will need to be controlled periodically, similar to the existing range lands in the area.
- No impacts are expected to water runoff or water quality, since the corridor will continue to be stocked with vegetation and all stream riparian management zones will be protected during and after project construction.

The positive impacts of the Project corridor through forest lands outweigh the negative impacts:

- Most access roads constructed by IPC for logging and construction of the lines will be retained and maintained in a passable condition. These roads can be used by landowners for future forest harvesting and forest management activity, and forest recreation access in the future. Gates can be installed where necessary to limit access to the landowner and IPC.
- The cleared corridor provides a firebreak in the case of forest fires.
- The cleared corridor and roads also provide access for fire suppression efforts in case of a fire.
- The vegetation on the new corridor will be grasses, forbs, shrubs, and small trees (<10 feet mature height). It is well documented that wildlife useage of a powerline corridor increases dramatically with created of new vegetation including pioneer tree and shrub species (Bramble 1992; Yahner 2001, 2004). Songbirds, small and large mammals, and other wildlife usage will benefit from the diverse and layered vegetation growing on the powerline corridor.

6.3 Agricultural Impacts of the Project to Adjacent Landowners

The lands that the Project will cross within the Forested Lands Analysis Area only almost exclusively include rangelands. Only a very small area of managed pasture exists on one ownership. No tilled cropland occurs today on the corridor area within the Forested Lands Analysis Area.

There are no negative impacts to existing agricultural lands within the Forested Lands Analysis Area of the Project. The positive impacts are the potential to gain range or pasture land, or achieve a portion of the land clearing costs for conversion to agricultural uses by the landowner. Once the line is constructed, the landowner can use the land for most agricultural uses excluding the very small amount of land under the towers.

7.0 COUNTY COSTS OF THE PROJECT WITHIN THE FORESTED LANDS ANALYSIS AREA

Forest lands in Umatilla County cover 715,000 acres (35%) of the 2,058,00 land base (Oregon Forest Resources Institute 2013). Conversion of of 245.6 acres of forestland to agriculture or range, removes only 0.0034 percent of this land base, which will not be lost but will still be productive for agricultural and range use. The economic impact to forest sector jobs in Umatilla

County is approximately $120,000, again partially offset by agriculture or rangeland uses after the conversion.

Union County has 899,000 acres (69%) of forest land out of a total land area of 1,303,000 acres. Conversion of 530.1 acres to agriculture or range is a loss of 0.00059 percent of the forest land base, but again, the lands will still have value and be productive as agriculture or range lands. The economic impact to forest sector jobs in Union County is approximately $97,000, which will be partially offset by agriculture or range land uses after the conversion.

8.0 CONCLUSIONS

The Forested Lands Analysis Area includes approximately 1,249 acres of forest and range lands; however, the forested acreage subject to permanent impact by conversion is substantially less (approximately 776 acres). Based on the results of the forested lands survey and analysis of the potential impacts and efforts to minimize and mitigate for project impacts, the Project will not cause (1) a substantial change in accepted forest of farm practices; or (2) a significant increase in the cost of accepted forest or farm practices on either lands to be directly impacted by the Project or on surrounding lands devoted to farm use.

9.0 REFERENCES

Best Management Practices - Integrated Vegetation Management, International Society of Arboriculture, Champaign, IL (2d. Ed. 2014).

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