9.0 Electrical Transmission Lines and Other Associated Linear Facilities

DEF will connect the generation produced by the CCC Project through both new 230- and 500-kV transmission line interconnections with existing transmission lines.

Figure 9.0.0-1 depicts the proposed transmission line interconnections. These interconnections will consist of three 500- and four 230-kV lines and will occur with existing transmission lines adjacent to the CCC Site and not require any new right-of-way. DEF already owns the property across which the interconnections will occur from the CCC Site. Construction will be limited to new transmission lines exiting the on-Site switchyard and proceeding south off the Site to the existing CREC transmission corridor immediately to the south. The CREC transmission line corridor currently contains multiple 230- and 500-kV transmission lines carrying power from the CREC switchyard east off the complex.

DEF is requesting certification of a corridor for these new transmission line interconnections as part of this SCA. Figure 9.0.0-2 depicts the general project area for this new corridor. The remainder of this chapter follows FDEP's application guidelines for associated transmission lines under the PPSA. Section 9.6 describes the other linear facilities being proposed in this SCA, consisting of:

- A cooling water makeup pipeline from the existing CREC Unit 3 water intake structure to the CCC Site.
- A flow augmentation water pipeline from the existing CREC Unit 3 water intake structure to the new proposed discharge pipeline.
- A blowdown water discharge pipeline from the CCC Site to a new discharge structure at the existing CREC discharge canal.
- A well water pipeline from an existing well water supply pipeline on the existing transmission line corridor into the CCC Site.

Since all associated off-Site linear facilities are included in one continuous corridor, all facilities will be addressed at the same time in this chapter. Because of the limited

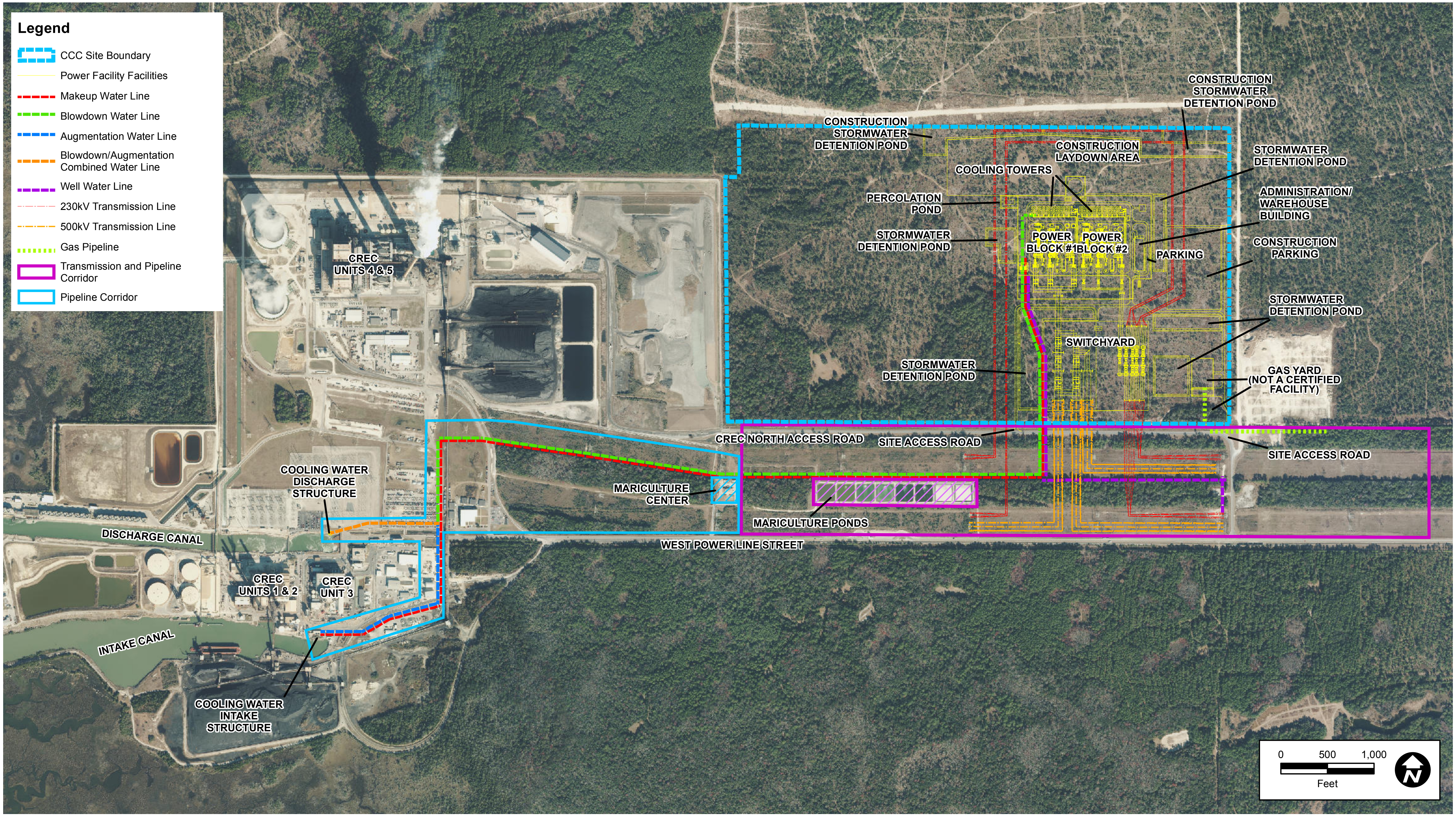

FIGURE 9.0.0-1.

AERIAL DEPICTING THE TRANSMISSION LINE AND PIPELINE INTERCONNECTIONS AND SITE PLAN

Sources: FDOT, 2011; AMEC, 2013; Burns & McDonell, 2014; ECT, 2014.

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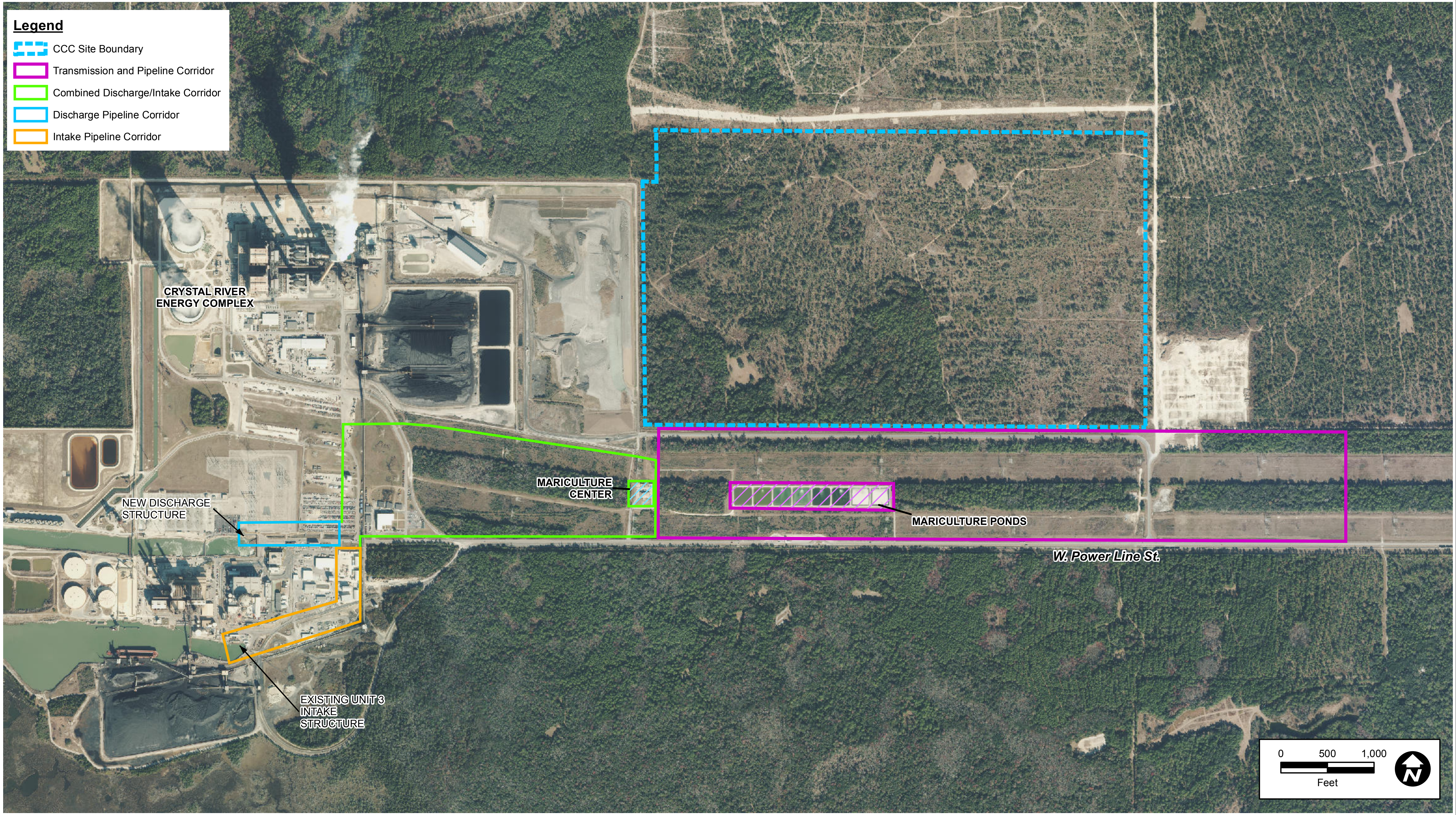

FIGURE 9.0.0-2.

PROPOSED ASSOCIATED CORRIDOR

Sources: FDOT, 2011; AMEC, 2013; Burns & McDonell, 2014; ECT, 2014.

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new construction involved with the transmission lines and pipelines, DEF is proposing to certify a variable-width corridor up to 1,240 ft in width and approximately 14,000 ft long primarily contained within its existing transmission line right-of-way and other existing CREC facilities (see Figure 9.0.0-2).

One additional linear facility, the natural gas supply pipeline, is not proposed for certification in this SCA, as it will not be owned or operated by DEF and, thus, will be permitted outside the PPSA by another entity.

9.1 Maps

Maps addressing the following appear in the section where they are referenced:

- Aerial photograph of the proposed corridor (shown previously as Figure 9.0.0-2).
- Existing land use along the proposed corridor (Figure 9.3.6-2).
- Existing zoning along the proposed corridor (Figure 9.3.6-3).
- Existing land cover/vegetation and listed species along the proposed corridor (Figure 9.3.7-1).

9.2 Project Description

9.2.1 Overview

DEF is seeking certification of transmission lines and other associated off-Site linear facilities in a corridor that will contain interconnections from the CCC Site to the existing transmission line right-of-way. Contained within this corridor will be four new 230-kV interconnections and three new 500-kV interconnections. These new transmission lines will be built on existing DEF–owned property and rights-of-way.

The new corridor will connect the CCC Site containing the proposed electrical switchyard on the Site to the existing CREC transmission grid. Total length of the corridor is only 14,000 ft, and its width is approximately 1,240 ft. The new lines are scheduled to be in service by mid-2018.

The CCC Project was designed to leverage the existing transmission assets owned and operated by DEF in the vicinity of CREC. The Site is immediately adjacent to two transmission rights-of-way containing existing transmission lines originating at CREC.

The Project as proposed will interconnect with the DEF transmission system via the following existing transmission circuits:

- CREC 500-kV to Central Florida 500-kV.
- CREC 500-kV to Brookridge 500-kV (two interconnections).
- CREC 230-kV to Crystal River East 230-kV.
- CREC 230-kV to Brookridge 230-kV.
- CREC 230-kV to Holder 230-kV Circuit #1.
- CREC 230-kV to Holder 230-kV Circuit #2.

All 500-kV circuits as listed will be reterminated at the CCC Project switchyard, including the existing Crystal River Unit 5 500-kV output line utilizing the existing adjacent transmission rights-of-way. All 230-kV circuits as listed will be looped through the proposed CCC 230-kV switchyard. To accomplish this, these circuits will be routed around the CCC Project, as shown in Figure 9.0.0-1; additionally the existing 230-kV structures within the rights-of-way shown will be modified to accommodate the interconnection. Again, all transmission lines proposed as part of this Project will be located on the CCC Site or the existing transmission line corridor to the south of the Site.

The makeup water pipeline will consist of a 30-inch pipeline connecting the CCC Site to the existing CREC Unit 3 intake structure. The blowdown (discharge) water pipeline will connect the CCC Site to the existing CREC discharge canal and will include a new discharge structure at that location. A flow augmentation water pipeline will also be constructed alongside the makeup water pipeline to convergence with the discharge pipeline. The blowdown pipeline will be 30 inches in diameter, and the augmentation water pipeline will be 30 inches in diameter. When combined, the blowdown/augmentation pipeline will be 34 to 60 inches in diameter.

The well water pipeline will consist of an up to 8-inch diameter pipeline to connect the CCC Site to an existing well water pipeline just south of the CCC Site in the existing CREC transmission corridor (see Figure 9.0.0-2 for a depiction of the anticipated pipeline right-of-way locations within the corridor on a current aerial photograph).

9.2.2 Need for the Line

The only transmission work that is necessary for the CCC Project is the switchyard and transmission lines to connect CCC with the existing DEF transmission facilities connected to DEF's transmission system and the electric power grid in Florida. One 820-MW power block of the 1,640 MW will be connected to the existing 500-kV transmission system located at CREC, effectively replacing the generation from the retired Unit 3. The other power block will be connected to the CREC 230-kV transmission system, effectively replacing CREC Units 1 and 2 generation when those coal-fired plants are retired.

9.2.3 Proposed Transmission Line Design

Since the proposed new lines will be located along existing road, 230- and 500-kV rights-of-way, or fee-simple property owned by DEF, the transmission line interconnection will consist of some new 230- and 500-kV variable structure configurations. These will consist primarily of tangent and angle structures used to connect the CCC transmission to the existing CREC transmission lines.

For the 500-kV construction, it is anticipated that a two-conductor 2,335-thousand-circular-mil (kCmil) aluminum conductor steel reinforced wire (ACSR) will be used with a maximum continuous rating of 4,455 amps. At 230-kV, a single conductor 1,590-kCmil ACSR will be used. Cross-sections/profile drawings and supporting electric and magnetic fields (EMF) calculations for all proposed modifications, including all proposed modifications that occur within existing right-of-way/transmission corridors are provided in Appendix 10.8 and summarized in Section 9.5.5. All circuits will be designed to meet current DEF transmission standards.

For the 230-kV lines, DEF proposes double-circuit tubular steel structures with davit arms and dead-end insulators. The 230-kV circuits will span an average distance of 500 ft, and, where necessary, tubular steel tangent double-circuit structures with braced post insulators will be used. At 500 kV, a combination of single-pole, tubular steel structures and dead ends with an average span of no greater than 1,300 ft will be used. If required a tubular H-frame steel structure may be installed as an intermediate structure to support the transition of the 500-kV circuits into the existing transmission corridor.

Figures 9.2.3-1 and 9.2.3-2 provide typical drawings for the 230- and 500-kV structures proposed for this Project.

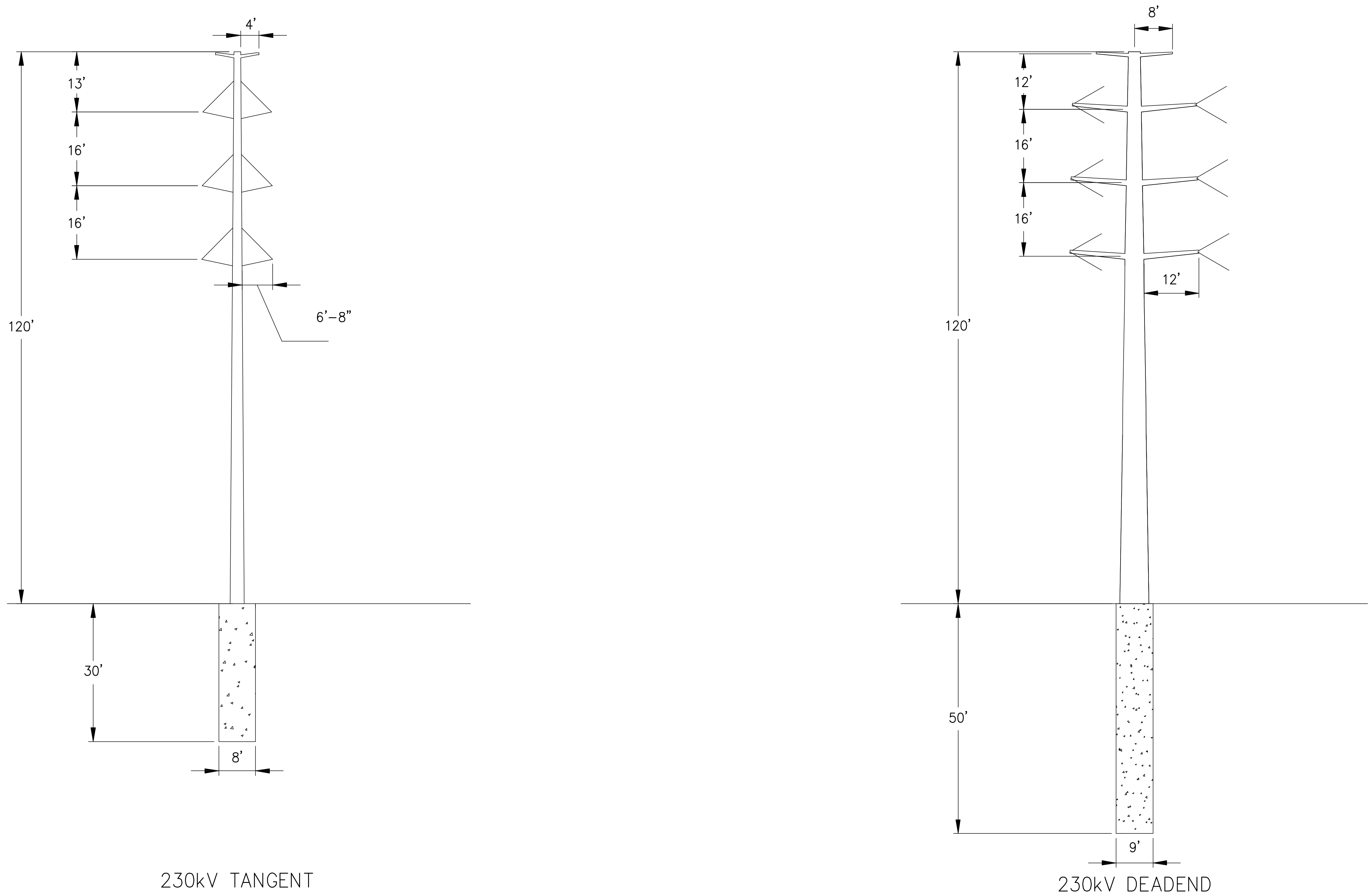

FIGURE 9.2.3-1.

TYPICAL 230-kV DOUBLE-CIRCUIT TANGENT AND DEAD-END STRUCTURES

Sources: Burns & McDonnell, 2014; ECT, 2014.

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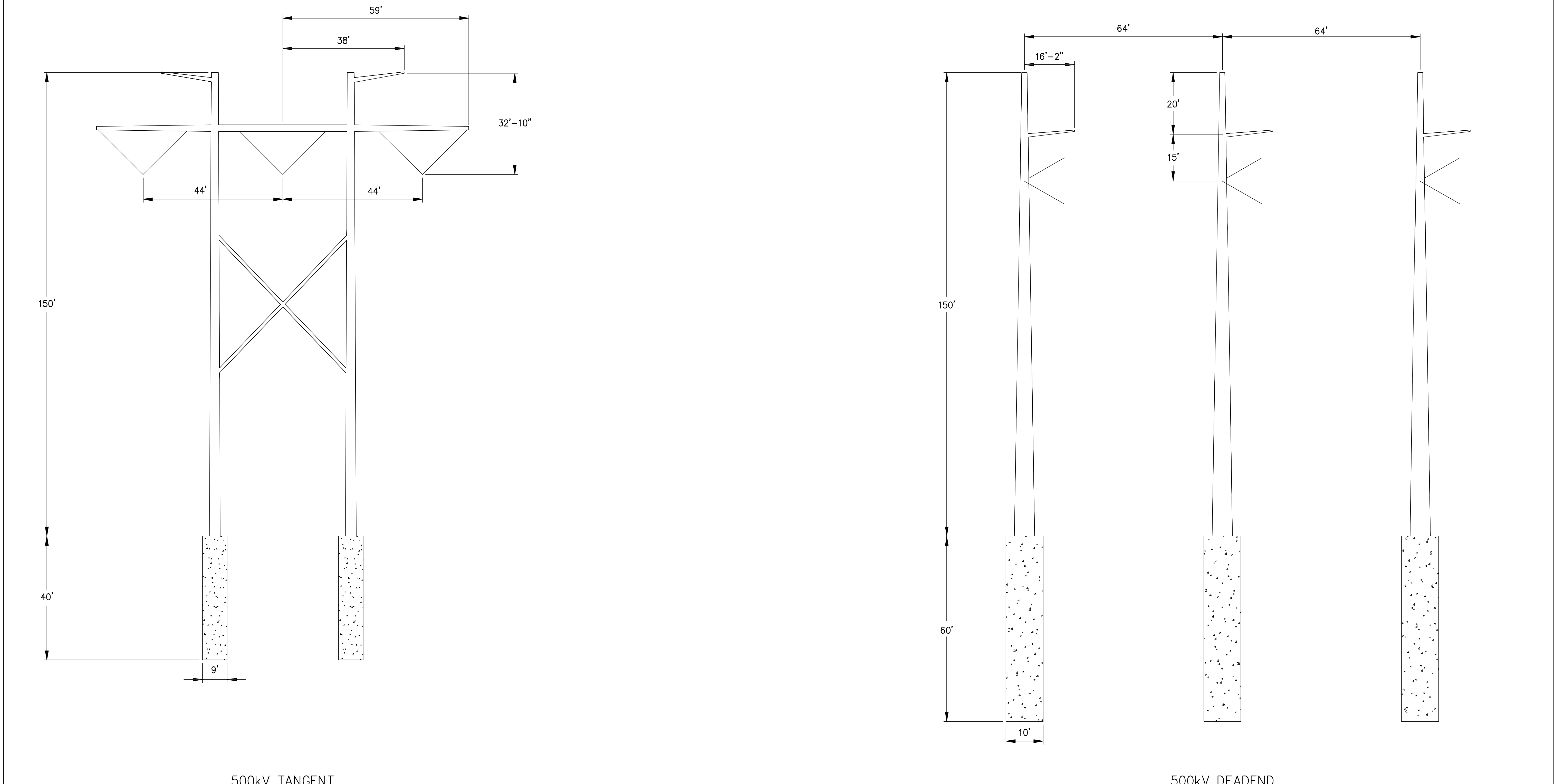

FIGURE 9.2.3-2.

TYPICAL 500-kV DOUBLE-CIRCUIT TANGENT AND DEAD-END STRUCTURES

Sources: Burns & McDonnell, 2014; ECT, 2014.

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9.2.4 Proposed Pipeline Design

The various water pipelines proposed for this Project will consist of variable diameter (up to 60 inches) high-density polyethylene (HDPE) pipe or equivalent. Figure 9.2.4-1 depicts the typical cross-sections shown for the one-, two-, or three-pipe configurations to be used in the CCC Project. Where the facilities can be located together with in the corridor, they will share a common right-of-way and trench. All pipes will be underground and will connect to the CCC Project, as depicted in Figure 9.0.0-1. Figure 9.0.0-1 shows the termination points for each pipe as well. For the discharge pipeline, it will terminate at a new discharge structure to be located at the existing CREC discharge canal. Figure 9.2.4-2 illustrates this new discharge structure.

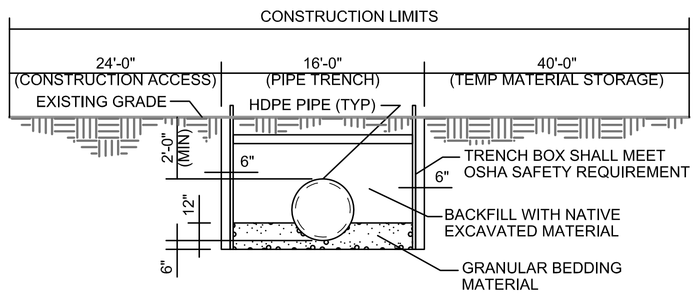
9.3 Corridor

9.3.1 Corridor Selection

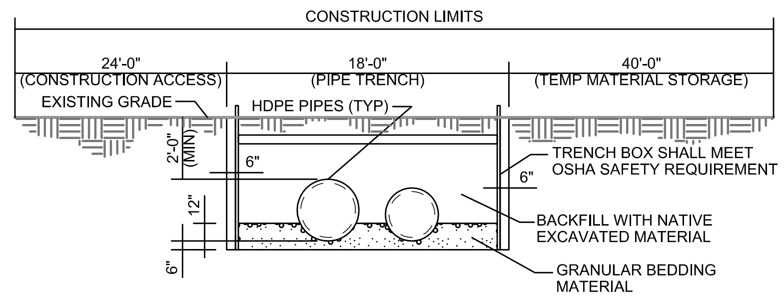
During the initial siting phase for the selection of the CCC Site, transmission corridors adjacent to the candidate sites were examined, and the potential to develop new right-of-way was considered. The selection of the proposed CCC Site was influenced by its proximity to the existing CREC transmission corridors. Based on the pending retirements of existing generation assets at CREC, it was assumed that existing right-of-way and transmission circuits would provide the lowest cost option for interconnection of the CCC Project. Additionally, it was assumed that this option would also have the least construction impact and impact on the surrounding environment, i.e. wetlands, general public, other facilities.

The new transmission lines and all water pipelines will exit the CCC Site on the south side and will immediately fall within the proposed corridor containing existing transmission lines. No new right-of-way will have to be obtained for placement of the transmission lines or water pipelines. DEF already owns the land that will contain the CCC facilities, as well as the corridor proposed for certification.

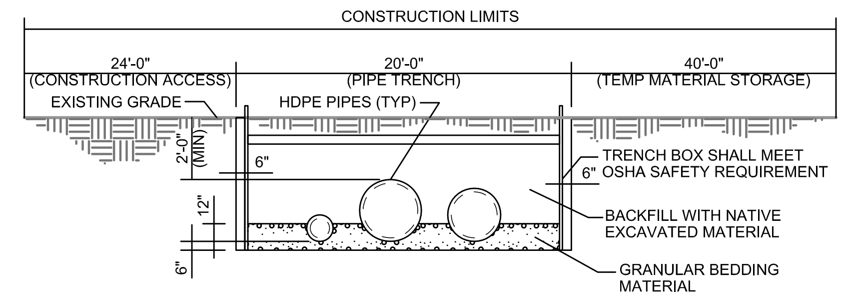
All new transmission improvements will be within the wider portion of the proposed corridor south of the Site (Figure 9.0.0-2). The well water pipeline will be contained within this wider corridor as well. Because the new discharge and intake pipelines need to traverse from the CCC Site to the existing facilities at CREC, those linear features will likewise share the transmission and pipeline corridor south of the Site and



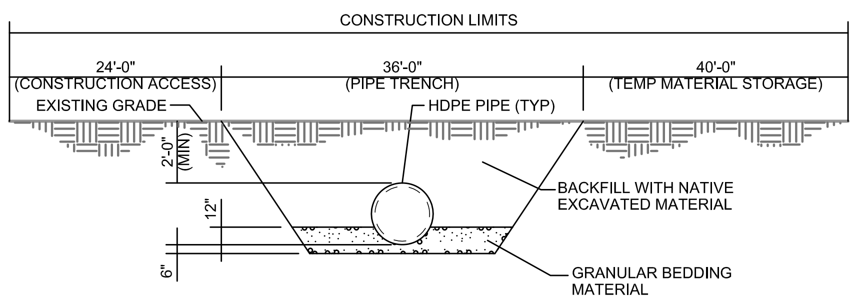
SINGLE PIPE AT WETLAND
TYPICAL CONSTRUCTION PIPE TRENCH
NOT TO SCALE



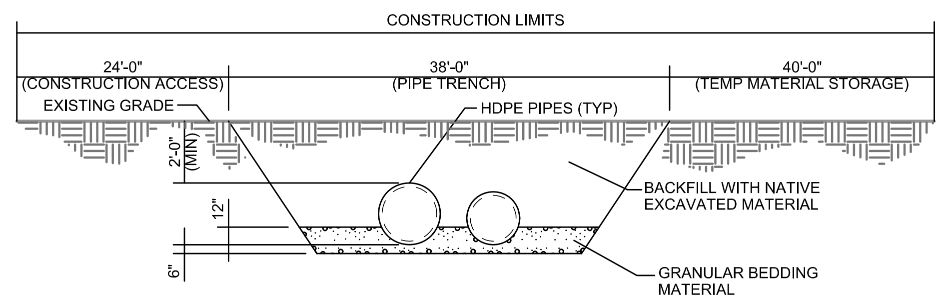
DOUBLE PIPE AT WETLAND
TYPICAL CONSTRUCTION PIPE TRENCH
NOT TO SCALE



TRIPLE PIPE AT WETLAND
TYPICAL CONSTRUCTION PIPE TRENCH
NOT TO SCALE



SINGLE PIPE
TYPICAL CONSTRUCTION PIPE TRENCH
NOT TO SCALE



DOUBLE PIPE
TYPICAL CONSTRUCTION PIPE TRENCH
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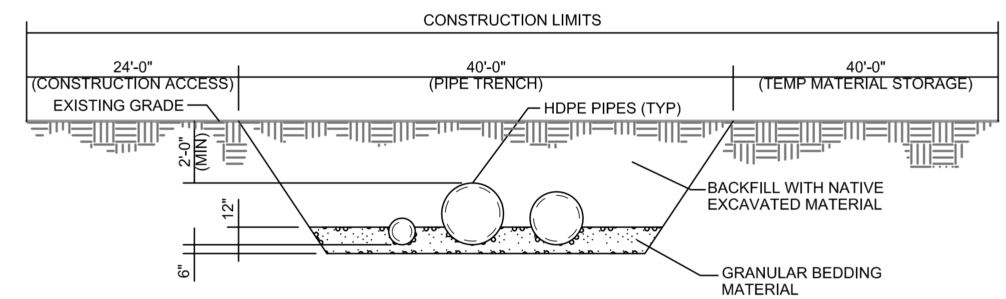

TRIPLE PIPE
TYPICAL CONSTRUCTION PIPE TRENCH
NOT TO SCALE

FIGURE 9.2.4-1.

TYPICAL CROSS-SECTIONS OF WATER PIPELINE SCENARIOS

Sources: Burns & McDonnell, 2014; ECT, 2014.

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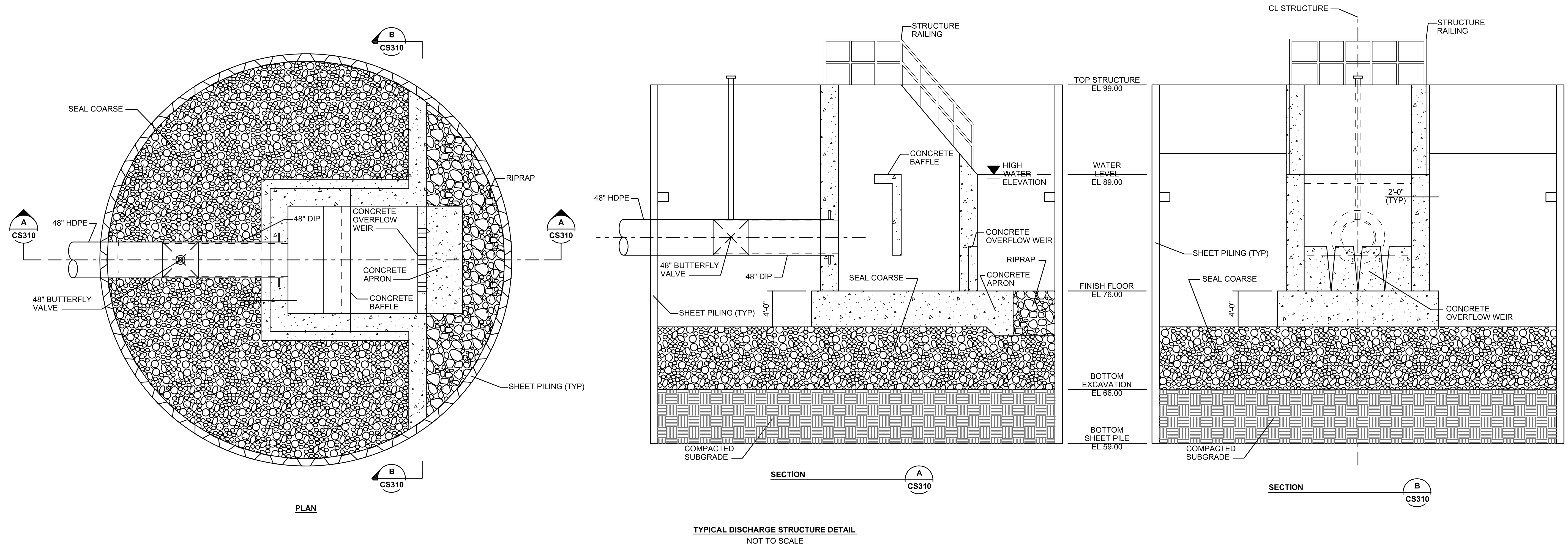

FIGURE 9.2.4-2.

TYPICAL CROSS-SECTIONS OF NEW DISCHARGE STRUCTURE

Sources: Burns & McDonnell, 2014; ECT, 2014.

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then a variable width corridor (up to 1,240 ft wide) proceeding from the existing transmission corridor near the mariculture center west to the CREC existing intake and discharge canals. As shown in Figure 9.0.0-2, this combined pipeline corridor will split and result in two smaller pipeline corridor extensions, one proceeding west to CREC's existing discharge canal and the other traversing south and then west to CREC's existing Unit 3 intake structure. The individual discharge and intake pipeline corridors are 250 and 350 ft wide, respectively, to their termination points. The water pipelines themselves will require a variable-width trench, depending on the number of pipes in the trench.

9.3.2 Corridor Description

The proposed linear facilities corridor to be certified is up to 1,240 ft wide and is a maximum total of approximately 14,000 ft long. Figure 9.3.2-1 depicts the proposed corridor on an FDOT map showing roads and major geographic features, as well as existing transmission lines 115 kV and greater that occur within 5 miles of the proposed corridor.

The proposed corridor is described in the following paragraphs and is depicted on recent aerial photographs at a scale of 1 inch equals 1,000 ft in Figure 9.0.0-2.

The corridor runs east-west along the south side of the CCC Site. Contained within this corridor are existing plant access roads, transmission lines, and other water pipelines. CREC's mariculture center is also included in the area of the corridor but is excluded from certification. No new facilities are proposed through or across that facility. The wider portion of the corridor extends to the east approximately 2,000 ft past the east edge of the CCC Site, but the proposed corridor does remain on DEF property and existing transmission line rights-of-way.

At the west end of the corridor past the mariculture center, the corridor is of variable width up to 1,240 ft wide and will contain both the water intake pipeline and water discharge pipelines for the CCC Project. This combined water pipeline corridor is approximately 3,400 ft long, before it splits into two more narrow corridors: one containing the discharge pipelines and one containing the intake water and augmentation water pipeline. The intake pipeline corridor (approximately 350 ft wide) extends south 500 ft and west 1,300 ft to the existing CREC Unit 3 intake structure, where the pipe

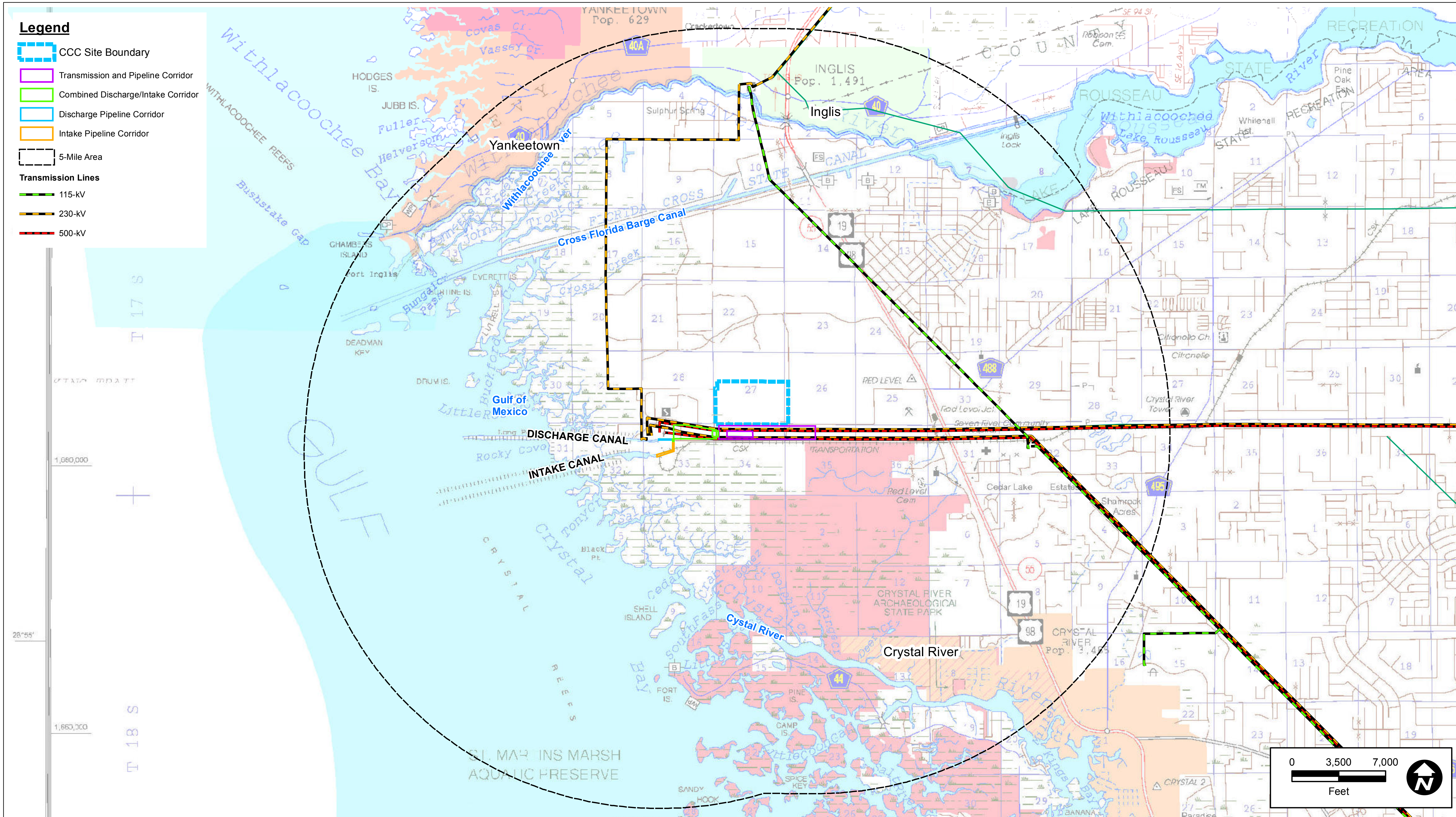

FIGURE 9.3.2-1.

EXISTING TRANSMISSION LINES 115-KV AND ABOVE WITHIN 5 MILES

Sources: FDOT, 2007; AMEC, 2013; Burns & McDonell, 2014; Citrus County, 2014; ECT, 2014.

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line corridor terminates. The discharge pipeline corridor (approximately 280 ft wide) extends west from the combined pipeline corridor approximately 1,000 ft to the existing CREC discharge canal. At the termination of this pipeline, a new discharge structure will be constructed (see Section 9.4.1).

9.3.3 Alternate Corridors

This subsection is not applicable to this SCA.

9.3.4 Access Roads

It is expected that no new transmission line access road construction will be required for this Project because of the fact the corridor uses collocation opportunities with roads and other existing transmission lines. However, existing transmission line roads may be improved to support new infrastructure or aid in transmission line maintenance activities.

For the water pipelines, where they cross wetlands, there will be trenching and backfilling associated with the pipelines. Such areas are identified in Appendix 10.4.

9.3.5 Cost Projections

Cost projections for transmission lines are based on preliminary design data and estimated costs. The cost projections are based on comparable lines of similar voltage constructed in the region and will depend on the final structure/pole location, line length, structure configuration, number and type of structures, mitigation costs, and other site-specific conditions. The exact location, number, and type of structures needed will be determined following final design of the CCC Project.

The estimated transmission interconnection cost for the CCC Project, including the on-Site switchyard, is approximately $44 million, excluding the allowance for funds during construction. These transmission costs are included in the total Project costs.

Costs may vary depending on compliance with the final COCs.

9.3.6 Social and Political Environment of the Corridor Area

9.3.6.1 Governmental Jurisdiction

The proposed corridor is located in unincorporated Citrus County. The corridor to be certified is within the general Project area described in Section 3.2.1 and shown on Figures 3.2.1-1 through 3.2.1-4 for the CCC Site. Governmental jurisdictions within 0.5 mile of the corridor are depicted in Figure 9.3.6-1. Apart from Citrus County, where the corridor is located, the only other proximal governmental jurisdiction is a large area of TIITF lands located southeast of the proposed corridor. The corridor does not traverse TIITF lands or the boundaries of any towns or cities.

Land Use Plans

The current land use plan designation of the corridor is TCU. The on-Site portions of the transmission lines and water pipelines are in an area designated EXT, as the entire Site is currently designated EXT. Figure 9.3.6-2 shows the location of the corridor in relation to the existing Citrus County land use plan. As explained in Section 3.2.2, as of the date of the filing of this SCA, the Site is not consistent with Citrus County land use plans and zoning ordinances. DEF is, however, currently pursuing the necessary land use changes to render the Site consistent. As of the date of this filing, the Citrus County BOCC has issued Resolution 14-082 unanimously authorizing transmittal of the proposed comprehensive plan amendment for the Site from EXT to TCU. While the current land use designations are shown on Figure 9.3.6-2, the proposed electrical transmission lines and water pipelines are exempt from the requirements of land use plans and zoning ordinances under Chapter 163 and Section 380.04, F.S. Appendix 10.5 includes copies of the applicable portions of the land use plan and relevant ordinances/resolutions.

Section 3.2.2.1 contains descriptions of the future land use categories crossed by the corridor.

Zoning

Zoning within the proposed corridor is shown at a scale of 1 inch equals 1,000 ft in Figure 9.3.6-3 (from Citrus County Land Atlas Map). The CCC on-Site linear facilities currently occur within the EXT zoning district. The proposed corridor occurs entirely within the TCU zoning district. As described in Section 3.2.2.2, DEF is seeking to amend the land atlas map to change the EXT designation for the Site to TCU. In June

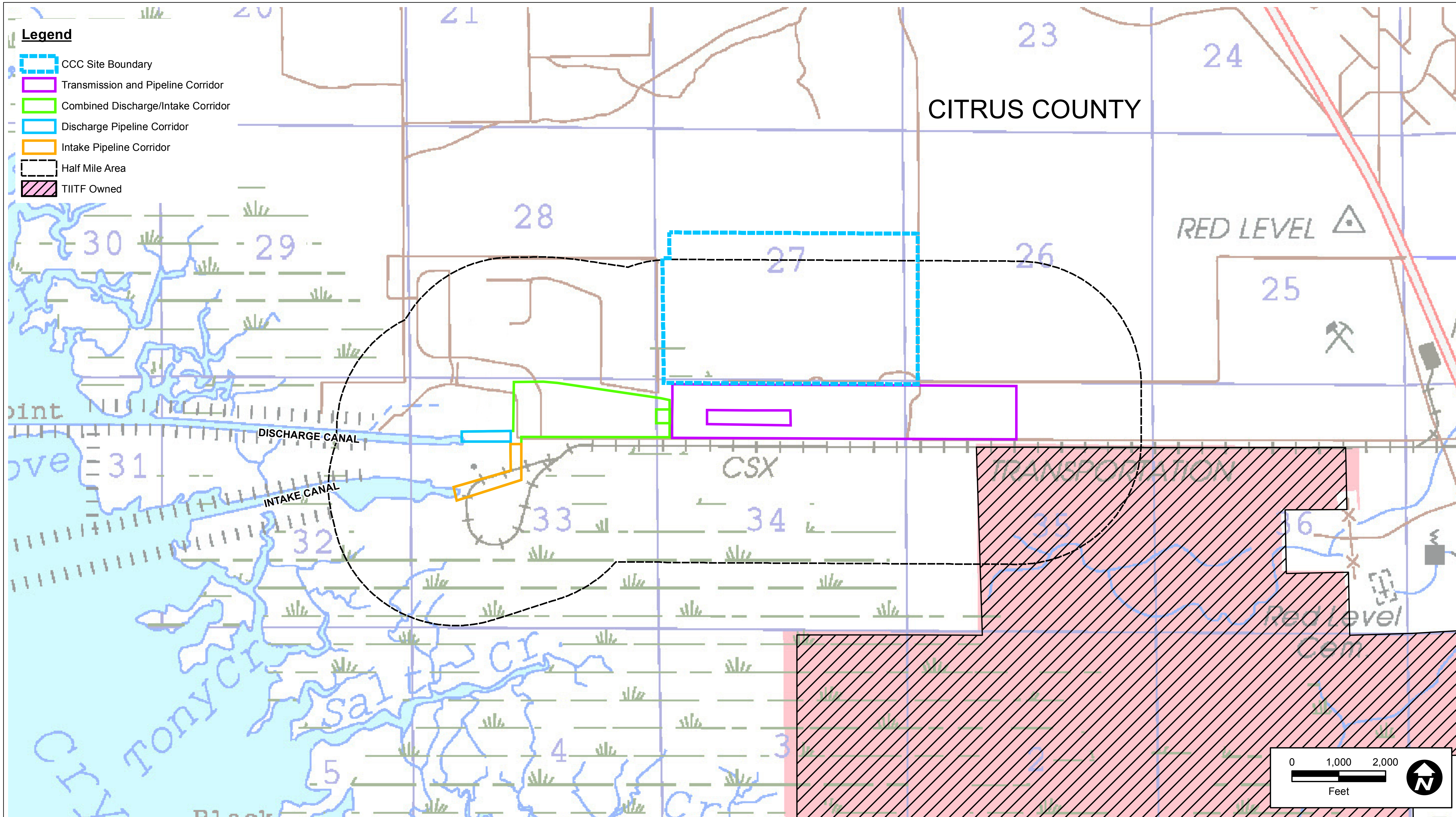

FIGURE 9.3.6-1.

GOVERNMENT JURISDICTIONS WITHIN 0.5 MILE OF CORRIDOR

Sources: FDOT, 2007; AMEC, 2013; Burns & McDonell, 2014; Citrus County, 2014; ECT, 2014.

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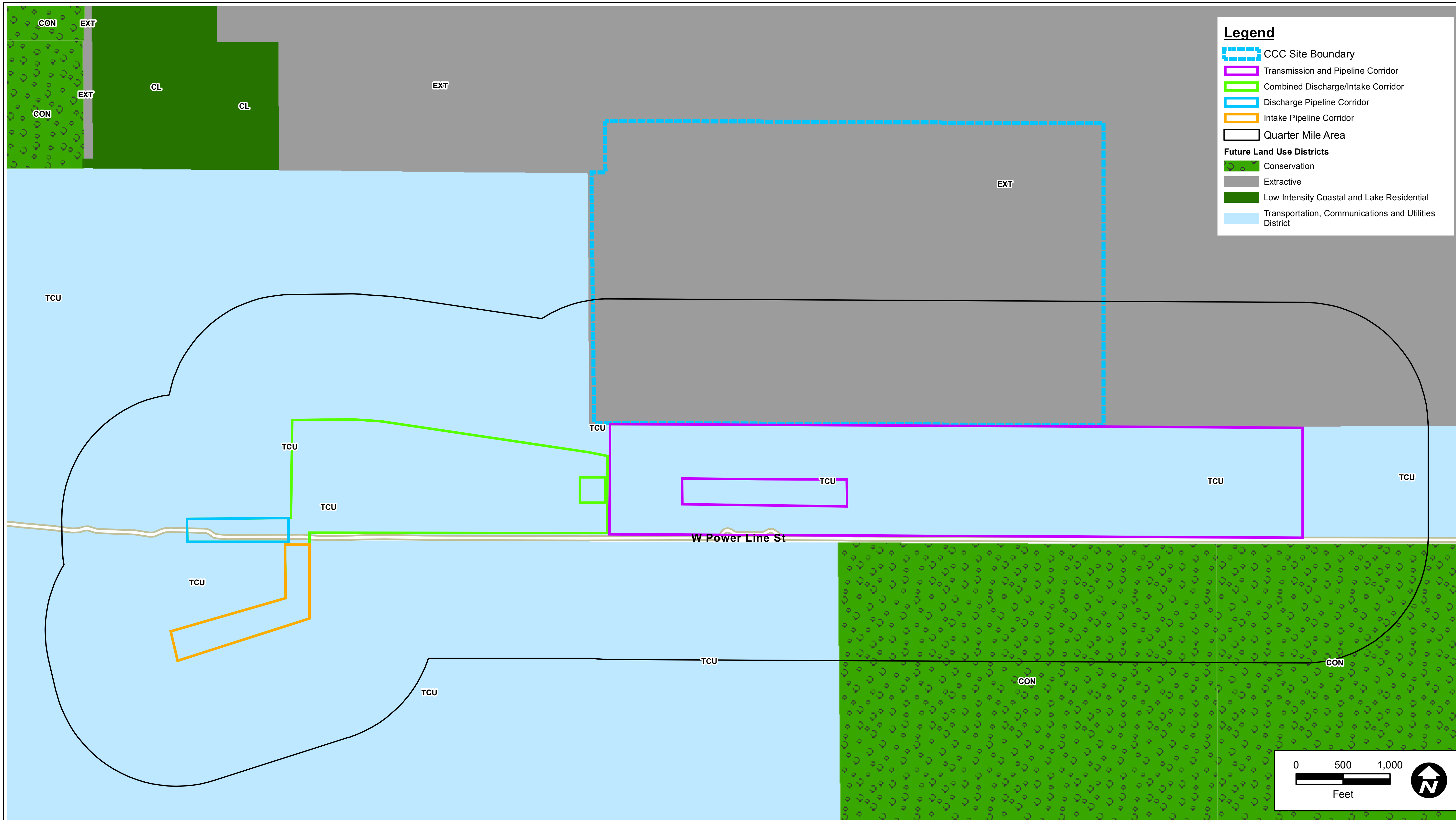

FIGURE 9.3.6-2.
CITRUS COUNTY FUTURE LAND USE

Sources: AMEC, 2013; Citrus County Land Development, 2014; Burns & McDonell, 2014; ECT, 2014.

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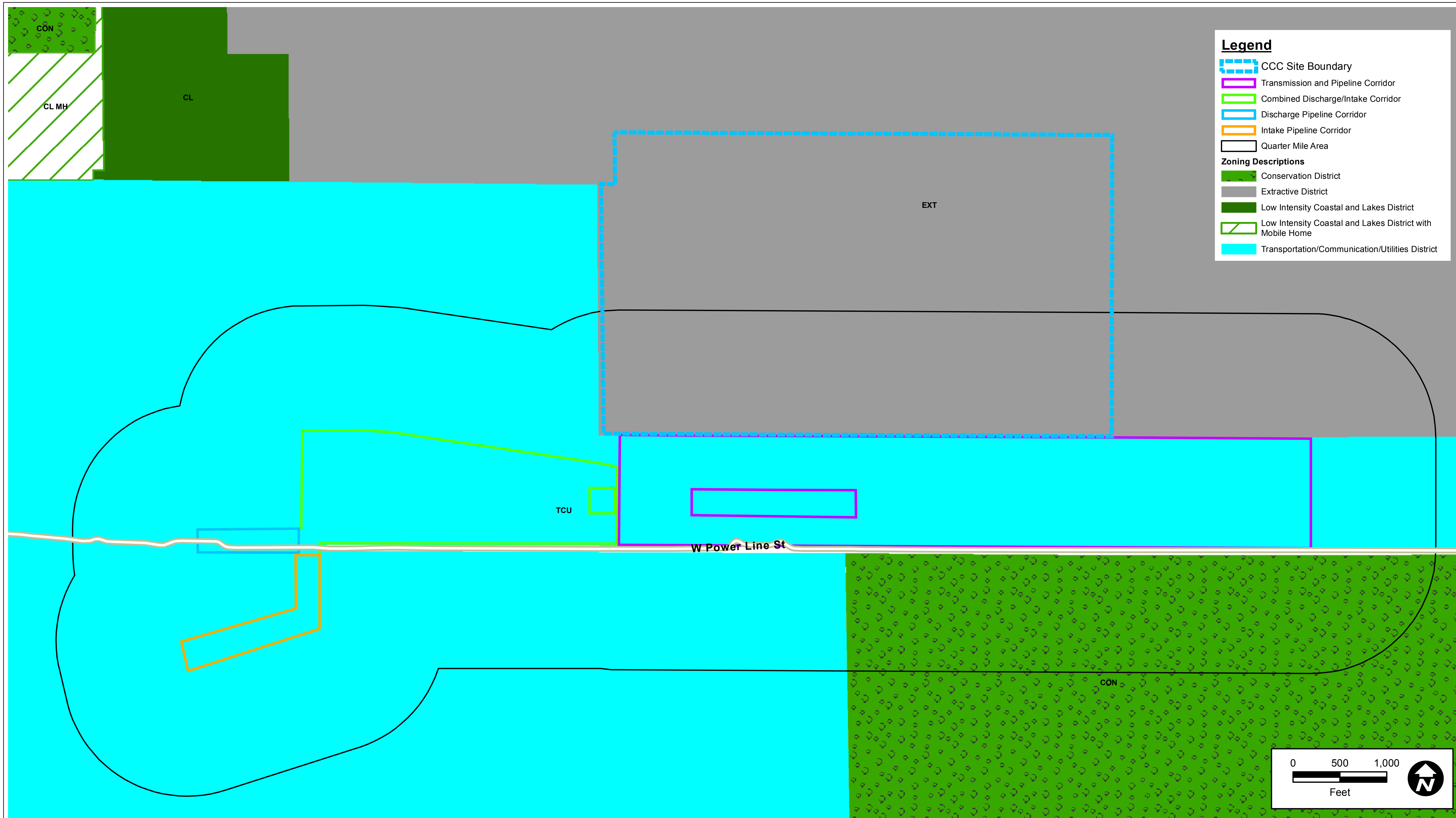


FIGURE 9.3.6-3.
CITRUS COUNTY ZONING

Sources: AMEC, 2013; Citrus County Land Development, 2014; Burns & McDonell, 2014; ECT, 2014.

2014, the Citrus County BOCC voted unanimously to approve the atlas amendment/rezoning from EXT to TCU on first reading. The adoption hearing on the atlas amendment is anticipated to be held in September 2014, with the atlas amendment effective in mid-October 2014. While the corridor is shown within the TCU zoning district on Figure 9.3.6-3, the transmission lines and water pipelines are exempt from zoning requirements under Chapter 163 and Section 380.04, F.S.

9.3.6.2 Easements, Title, Agency Works

The CCC Project will be constructed on property that DEF currently owns. No additional leases, easements, titles, or rights-of-way will be required from governmental agencies for the linear facilities. DEF is not seeking to use, connect to, or cross over any works or properties of any agency.

9.3.6.3 Vicinity Scenic, Cultural, and Natural Landmarks

Section 3.2.5 discusses the designated areas within 5 miles of the Project.

9.3.6.4 Archaeological and Historic Sites

SEARCH conducted a cultural resource assessment survey over the CCC Site and the undeveloped portions of the proposed off-Site linear facilities corridor (transmission and combined pipeline corridor). The SEARCH studies were conducted in 2014; Appendix 10.7.1 contains a copy of the report. A copy of the report has been provided to the Florida Division of Historical Resources.

No previously recorded archaeological or historical sites were known for the proposed corridor. No previously undiscovered sites were found on the corridor; therefore, no further studies are recommended. If unanticipated historical or archaeological artifacts or features are discovered at any time, DEF will notify the Florida Division of Historical Research and consult with them to determine the appropriate action to take.

9.3.7 Biological and Physical Environment of the Corridor Area

9.3.7.1 Land Use/Vegetation

The existing land use and vegetation cover types occurring within and for 0.5 mile adjacent to either side of the corridor were acquired from the current SWFWMD GIS database (2011) and, where access was allowed, field-verified by ECT in 2014. These land use/cover types were classified using FLUCFCS (FDOT, 1999) Categories II and III.

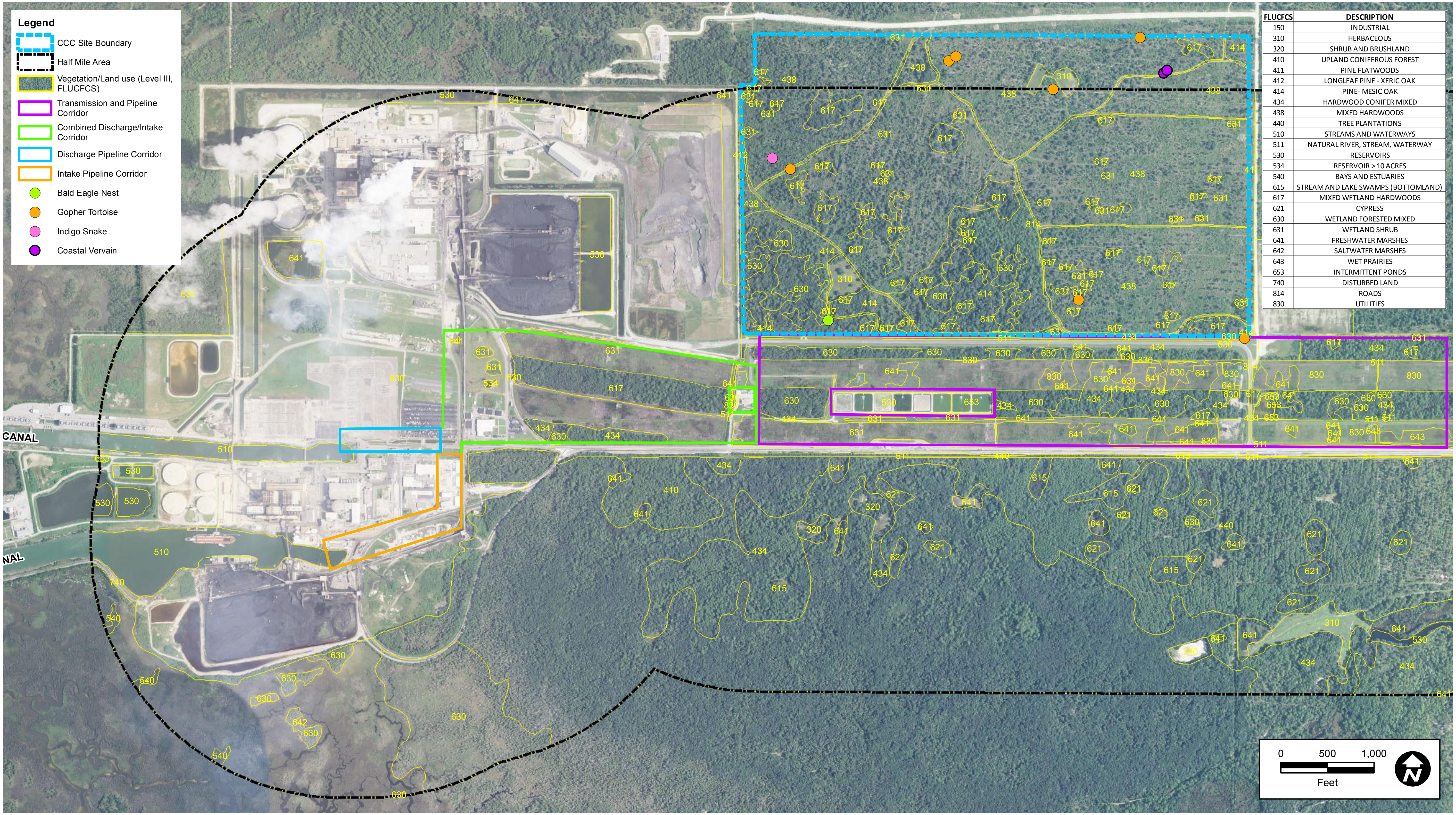
Figure 9.3.7-1 shows the various land use/vegetation types along the corridor (land cover/vegetation maps), and the following subsections provide descriptions of the major land use and vegetation cover classes along the proposed corridor. Although the data provided by SWFWMD were originally generated in 2000, the vegetation/land use covers depicted are representative of the current resources. Figure 9.3.7-1 also shows known listed species locations occurring within 0.5 mile of the proposed corridor.

Land Use

Land uses mapped along the route consist primarily of utilities and transportation features. According to FLUCFCS, these categories include utilities (FLUCFCS code 830). The utilities classification includes much of the existing CREC boundary, including its associated transmission line and water pipeline facilities. The FLUCFCS code of 814 includes paved roads and dirt roads/trails found in the vicinity of the proposed corridor. One area designated as 150, industrial land use, occurs just north of the proposed corridor. It does not contain any structures and consists of cleared land. Another area with land use classification of disturbed land (740) occurs well south of the proposed corridor and appears to be a result of silvicultural activities.

Vegetation

The proposed corridor will be located mostly within or adjacent to existing road and transmission line rights-of-way or developed power plant facilities. Therefore, a majority of the corridor is maintained grassy areas, or paved roadway, parking lot, or other developed surfaces. In addition to the mowed rights-of-way/corridor, a variety of some natural communities will be traversed or are located in the proposed corridor. These vegetation cover classes include hardwood conifer mixed forest (434), streams and waterways (510/511), reservoir less than 10 acres (534), mixed wetland hardwoods (617), wetland forested mixed (630), wetland shrub (631), freshwater marsh (641), and wet prairie (643). Not within the corridor but adjacent to it, other vegetation communities found include herbaceous/dry prairie (310), shrub and brushland (320), pine flatwoods (411), mixed hardwoods (438), longleaf pine-xeric oak (412), tree plantations (440), bays and estuaries (540), streams and lake swamps (615), cypress (621), and saltwater marshes (642). The mariculture center, which is excluded from the corridor to be certified, contains reservoirs (530) and intermittent ponds (653).



FLUCFCS	DESCRIPTION
150	INDUSTRIAL
310	HERBACEOUS
320	SHRUB AND BRUSHLAND
410	UPLAND CONIFEROUS FOREST
411	PINE FLATWOODS
412	LONGLEAF PINE - XERIC OAK
414	PINE- MESIC OAK
434	HARDWOOD CONIFER MIXED
438	MIXED HARDWOODS
440	TREE PLANTATIONS
510	STREAMS AND WATERWAYS
511	NATURAL RIVER, STREAM, WATERWAY
530	RESERVOIRS
534	RESERVOIR > 10 ACRES
540	BAYS AND ESTUARIES
615	STREAM AND LAKE SWAMPS (BOTTOMLAND)
617	MIXED WETLAND HARDWOODS
621	CYPRESS
630	WETLAND FORESTED MIXED
631	WETLAND SHRUB
641	FRESHWATER MARSHES
642	SALTWATER MARSHES
643	WET PRAIRIES
653	INTERMITTENT PONDS
740	DISTURBED LAND
814	ROADS
830	UTILITIES

FIGURE 9.3.7-1. (SHEET 1 OF 2)

EXISTING LAND COVER/VEGETATION AND LISTED SPECIES WITHIN 0.5 MILE OF CORRIDOR

Sources: SWFWMD, 2011; FNAI, 1999; NAIP, 2013; AMEC, 2013; Burns & McDonnell, 2014; ECT, 2014.

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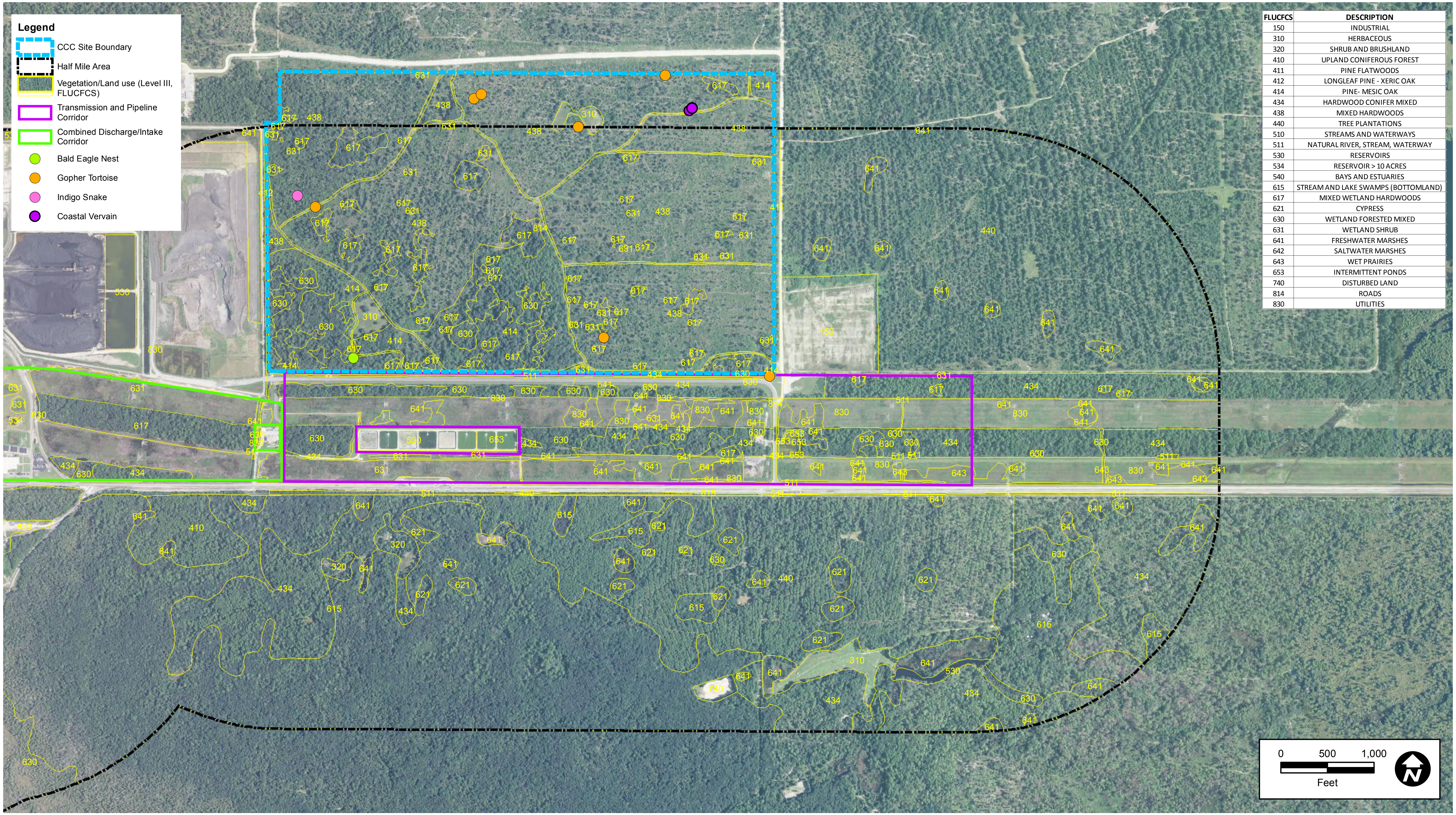

FLUCFCS	DESCRIPTION
150	INDUSTRIAL
310	HERBACEOUS
320	SHRUB AND BRUSHLAND
410	UPLAND CONIFEROUS FOREST
411	PINE FLATWOODS
412	LONGLEAF PINE - XERIC OAK
414	PINE- MESIC OAK
434	HARDWOOD CONIFER MIXED
438	MIXED HARDWOODS
440	TREE PLANTATIONS
510	STREAMS AND WATERWAYS
511	NATURAL RIVER, STREAM, WATERWAY
530	RESERVOIRS
534	RESERVOIR > 10 ACRES
540	BAYS AND ESTUARIES
615	STREAM AND LAKE SWAMPS (BOTTOMLAND)
617	MIXED WETLAND HARDWOODS
621	CYPRESS
630	WETLAND FORESTED MIXED
631	WETLAND SHRUB
641	FRESHWATER MARSHES
642	SALTWATER MARSHES
643	WET PRAIRIES
653	INTERMITTENT PONDS
740	DISTURBED LAND
814	ROADS
830	UTILITIES

FIGURE 9.3.7-1. (SHEET 2 OF 2)

EXISTING LAND COVER/VEGETATION AND LISTED SPECIES WITHIN 0.5 MILE OF CORRIDOR

Sources: SWFWMD, 2011; FNAI, 1999; NAIP, 2013; AMEC, 2013; Burns & McDonnell, 2014; ECT, 2014.

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Upland Communities within the Proposed Corridor

There is only one dominant upland community within the proposed corridor: hardwood conifer mixed forest (434).

This forest community comprises several areas along the proposed corridor. It is not dominated by either pines or hardwoods; rather both comprise a significant component of the canopy. Most temperate hardwood species do not inhabit the forested communities of Central Florida, so the hardwood component of the canopy is primarily live oak (*Quercus virginiana*), water oak (*Q. nigra*), and laurel oak (*Q. laurifolia*). Cabbage palm (*Sabal palmetto*), sweetgum (*Liquidambar styraciflua*), hackberry (*Celtis laevigata*), red maple (*Acer rubrum*), and common persimmon (*Diospyros virginiana*) also may occur here. Slash pine (*Pinus elliottii*), sand pine (*Pinus clausa*), and/or longleaf pine (*Pinus palustris*) are usually intermixed. Shrubs typically consist of saw palmetto (*Serenoa repens*), wax myrtle (*Morella cerifera*), groundsel tree (*Baccharis halimifolia*), and/or American beautyberry (*Callicarpa americana*). The understory can contain saw palmetto, hog plum (*Ximenia americana*), sand blackberry (*Rubus cuneifolius*), Virginia creeper (*Parthenocissus quinquefolia*), grape (*Vitis rotundifolia*), and various scrub oaks (*Quercus* spp.).

Upland Communities adjacent to the Proposed Corridor

In addition to the hardwood conifer mixed forest land use type, there are five other dominant upland community types adjacent to the proposed corridor. These communities consist of both natural and altered states of forest and rangeland.

Herbaceous Dry Prairie (310)—Herbaceous dry prairie is typically vegetated with a variety of herbaceous species like bahiagrass (*Paspalum notatum*), carpet grass (*Axonopus furcatus*), broomsedge (*Andropogon* spp.), frogfruit (*Phyla nodiflora*), black-eyed Susan (*Rudbeckia hirta*), sensitive partridge pea (*Chamaecrista nictitans*), beak rushes (*Rhynchospora* spp.), Leavenworth's tickseed (*Coreopsis leavenworthii*), dog fennel (*Eupatorium capillifolium*), and occasional cutleaf evening primrose (*Oenothera laciniata*). Scattered clumps of blackberry, Virginia creeper, grape, and a few slash pine saplings may also be present.

Shrub and Brushland (320)—Shrub and brushland community is dominated by shrub cover, often has a distinct ground stratum similar to the herbaceous dry prairie, and lacks a predominance of tree canopy cover. Typical shrub species include saw palmetto, wax myrtle, groundsel tree, and winged sumac (*Rhus copallinum*). Small pine (*Pinus* spp.), oak, or cabbage palm trees may be scattered throughout this upland community.

Pine Flatwoods (411)—The upland pine flatwoods community is characterized by a prevalence of pine trees that may vary in age. The dominant pine tree in central Florida is slash pine. Occasional stands or individuals of sand pine or longleaf pine may also be present. In addition to the pines, cabbage palm, saw palmetto, wax myrtle, gallberry (*Ilex glabra*), staggerbush (*Lyonia* spp.), netted pawpaw (*Asimina reticulata*), and a variety of flatwoods grasses are typically present.

Mixed Hardwoods (438)—This classification describes the areas that used to be managed for timber that have since been allowed to recruit a variety of oak species and a few patches reseeding with slash pine. Dominant canopy species for this land use type include live oak, laurel oak, and sand live oak (*Quercus geminata*). Other canopy species commonly observed include cabbage palm, pignut hickory (*Carya glabra*), slash pine, and southern magnolia (*Magnolia grandiflora*). Understory and ground cover species include younger cabbage palm, saw palmetto, winged sumac, wax myrtle, groundsel tree, broomsedge, and vines.

Pine Plantations (440)—This forest type consists mainly of slash pine being planted for the purpose of timber production. These pine plantations can be easily distinguished from native woods due to the uniform appearance of the even rows of pine trees all growing at the same height. Other canopy/subcanopy species can include live oaks, water oaks, laurel oaks, and cabbage palms. In most pine plantations, the understory layers are cleared prior to planting.

Wetland Communities within the Proposed Corridor

Wetlands are present within the proposed corridor, which is to be expected considering the prevalence of wetlands in Central Florida. Five wetland community types and two surface water features have been identified within the proposed corridor.

Streams and Waterway (510)—This category broadly includes rivers, creeks, canals, and other linear water bodies. Within the proposed corridor, this land use mainly refers to roadside ditches (511), which are often located adjacent to roads, and are typically vegetated with a mixture of nuisance/exotic species, such as cattail (*Typha latifolia*), parrot feather (*Myriophyllum aquaticum*), and torpedo grass (*Panicum repens*), as well as native species including arrowhead (*Sagittaria lancifolia*), water spangles (*Salvinia minima*), and mosquitofern (*Azolla caroliniana*).

Reservoirs Less than 10 Acres (534)—This classification is reserved to describe artificial impoundments of water less than 10 acres in size and having a variety of uses, which may include flood control, irrigation, water control structures, etc.

Mixed Wetland Hardwoods (617)—Forested wetlands that contain a variety of hardwood tree species are designated as mixed wetland hardwood forests. Laurel oak, red maple, black gum (*Nyssa sylvatica* var. *biflora*), and sweetgum are the dominant canopy species. Subcanopy species include stiff dogwood (*Cornus foemina*), myrtle dahoon (*Ilex myrtifolia*), and cabbage palms. Shrubs include wax myrtle, gallberry, and buttonbush (*Cephalanthus occidentalis*). Herbaceous strata typically consists of smallfruit primrose-willow (*Ludwigia microcarpa*), sawgrass (*Cladium jamaicense*), and Dixie iris (*Iris hexagona*) among others.

Wetland Forested Mixed (630)—Forested wetland communities in which neither conifers not hardwoods comprise 66 percent of the canopy cover are put in this category. Dominant canopy and subcanopy species for this cover type include laurel and live oak, loblolly bay (*Gordonia lasianthus*), black gum, sweet gum, and scattered slash pine. The shrub and groundcover consists of dwarf palmetto (*Sabel minor*), pickerelweed (*Pontederia cordata*), St. Johns wort (*Hypericum fasciculatum*), royal fern (*Osmunda regalis*), sawgrass, and scattered lizard's tail (*Saururus cernuus*).

Wetland Shrub (631)—A few small isolated wetlands along the corridor are classified as nonforested wetlands dominated by shrubs. The dominant species include button bush, St. Johns wort, soft rush (*Juncus effusus*), dollarweed (*Hydrocotyle umbellate*), cat and saw greenbriers (*Smilax glauca* and *bonanox*), sand blackberry (*Rubus cuneifolius*), dog fennel, and carpet grass.

Freshwater Marsh (641)—Freshwater marshes typically exhibit a distinct vegetation zonation pattern based largely on the depth and duration of flooding. Typical species along the upper rim of the wetland include sand cordgrass (*Spartina bakeri*), soft rush, spike rushes (*Eleocharis* spp.), maidencane (*Panicum hemitomon*), and various sedges, among others. In the center of the wetland, where water is deeper and present for a longer duration, vegetation species such as sawgrass, fireflag (*Thalia geniculata*), pickerelweed, bladderworts (*Utricularia* spp.), and arrowheads dominate. Occasional shrubs of Carolina willow (*Salix caroliniana*) and wax myrtle can be found in and around these wetlands.

Wet Prairie (643)—Wet prairies are similar to freshwater marshes with the exception that they usually do not flood as deeply nor exhibit as long a hydroperiod as do freshwater marshes. Typically, wet prairies are dominated by grasses and sedges including sand cordgrass, sawgrass, fall panicgrass (*Panicum dichotomiflorum*), redtop panicum (*Panicum rigidulum*), bluejoint panicum (*Panicum tenerum*), yellow-eyed grasses (*Xyris* spp.), doll's daisy (*Boltonia apalachicolensis*), love grasses (*Eragrostis* spp.), and torpedo grass.

Wetland Communities Adjacent to the Proposed Corridor

There are many wetlands present adjacent to the proposed corridor, as expected, considering the prevalence of wetlands in Central Florida. Other than the wetland communities already described occurring within the corridor, three wetland community types and two surface water features have been identified adjacent to the corridor.

Reservoirs (530)/Intermittent Ponds (653)—These categories refer to artificial impoundments of water and ponds. For mapping purposes, both of these classifications have been used for the mariculture center ponds.

Bays and Estuaries (534)—This land use category is reserved to describe areas of sea that extend inland and occurs west of the proposed corridor. Bays and estuaries are characterized by having brackish water and hence supporting uniquely adapted plant and animal species.

Stream and Lake Swamps (615)—This bottomland community is dominated by hardwood tree species such as laurel oak, pop ash (*Fraxinus caroliniana*), elm (*Ulmus americana*), American hornbeam (*Carpinus caroliniana*), water hickory *(Carya aquatica*), black gum, red maple, cabbage palm, swamp bay (*Persea palustris*), and sweet bay (*Magnolia virginiana*), among others. Common shrub/small tree species include Carolina willow, elder (*Sambucus nigra*), stiff dogwood, buttonbush, American snowbell (*Styrax americanus*), and dahoon holly (*Ilex cassine*). A variety of sedges, rushes, ferns, and epiphytes are also important components of this swamp type.

Cypress (621)—These wetlands typically occur in depressions in the landscape. Dome or pond cypress wetlands occupy circular depressions, and strands occur in linear depressions formed from slow water flow. These wetlands usually are seasonally to semi-permanently flooded. Typical vegetation species include bald cypress (*Taxodium distichum*), pond cypress (*Taxodium ascendens*), black gum, slash pine, cabbage palm, swamp bay, red maple, dahoon holly, Carolina willow, greenbriers (*Smilax* spp.), swamp fern (*Blechnum serrulatum*), fireflag, and various bromeliads, among others.

Saltwater Marshes (642)—Saltwater marshes consist of nonwoody, salt-tolerant plant species such as needlerush (*Juncus roemerianus*), bushy seaside oxeye (*Borrichia frutescens*), saltmeadow and saltmarsh cordgrass (*Spartina patens* and *S. alternifolia*), and glassworts (*Salicornia* sp.). Vegetation composition and extent of a saltwater marsh is influenced by salinity, tidal range and duration, wave energy, and relief.

9.3.7.2 Affected Waters and Wetlands

With the exception of the roadside drainage ditch on the north side of North Access Road, no surface water bodies are crossed by the proposed corridor according to 1:24,000 USGS topographic maps, National Wetlands Inventory (NWI) maps, SWFWMD land use/cover maps, and recent aerial photographs (2013). The discharge and intake pipeline portions of the corridor terminate at the existing CREC discharge and intake canals, which connect to the Gulf of Mexico.

Pursuant to the provisions of Section 62-302.400, F.A.C., the majority of surface waters and wetlands crossed by the corridor would be classified as Class III waters, recreation, propagation, and maintenance of healthy, well-balanced population of fish and wildlife. The proposed corridor does not include any OFWs.

Water Bodies

The proposed corridor terminates at the intake and discharge canals, which connect to the Gulf of Mexico. Only the discharge structure at the terminus of the pipeline will require work within the discharge canal.

Wetlands

Given the shallow groundwater table in places, flat topography, and varying soil conditions, there are various types of wetlands within or adjacent to the proposed corridor. The hydrologic regime of these wetlands varies from semipermanently flooded to seasonally flooded, depending on their landscape position and the extent of drainage improvements within the immediate area. Any impacts due to new transmission line or pipeline construction are addressed in the joint ERP/404 application contained in Appendix 10.4. All impacts will be fully mitigated at an approved off-Site mitigation bank.

Because the proposed corridor follows along existing transmission rights-of-way, many of the wetlands that will be crossed have already been impacted by previous activities, such as filling or culverting at the proposed point of crossing. This will minimize disturbance associated with new construction, because the area has already been impacted. However, limited construction for the placement of new poles and pipelines will be required in jurisdictional wetlands.

9.3.7.3 Ecology

An area including the proposed corridor and at least 0.5 mile beyond either edge of the corridor was evaluated for the potential presence of listed plant or wildlife species. Listed species include those with a designation of endangered, threatened, species of special concern, or commercially exploited that are regulated by USFWS, FDACS, or FWC.

Listed species were included for discussion based on the lists addressed for the CCC Site and found previously in Section 3.3.6.

The probability of occurrence of these species was based on known locations for such species, recent and historical reports of occurrence in the scientific literature, and the presence of suitable habitat as shown on land use and land cover maps, NWI maps, and recent aerial photographs. FNAI's database (2014) was also used to identify known occurrences of such species. Field visits were conducted by ESI (2013) and ECT (2014), which also confirmed presence of some listed species. Since the specific locations of many plant species are not known or mapped, and most vertebrates, particularly birds, have extensive ranges and show significant daily and/or seasonal movement and distribution patterns, this ecology section addresses their probability of occurrence in the proposed corridor primarily based on suitable habitat and range. This represents a conservative approach resulting in more diverse species inventories than solely depending on field observations and inclusion of species that may not occur within the confines of the proposed corridor.

In addition to the probability for occurrence, the potential for impacts due to right-of-way clearing, construction, and maintenance or other concerns such as the presence of ecologically unique or valuable habitats were evaluated for the species identified as potentially occurring in or adjacent to the proposed corridor. Section 3.3.6 presents individual discussions of the species, and the following subsections present additional information relative to the corridor.

Plant Species

The potential listed plants that could occur in the region were also addressed in Section 3.3.6, and those same species would have similar if not less likelihood of occurrence on the proposed corridor, since much of it is disturbed already because of transmission line maintenance and existing CREC facilities.

Wildlife Species

The potential list of protected wildlife species that could occur in the region were also addressed in Section 3.3.6, and those species would have the same likelihood of occurrence, if not less, because much of the corridor is disturbed already. The existing active bald eagle nest on the CCC Site is within 200 ft of the northern edge of the corridor, but construction for the pipeline and transmission line facilities will not occur within the recommended eagle buffer guidelines of 660 ft from the nest. One active gopher tortoise burrow exists at the CCC Site entrance within the proposed corridor. No other listed species were confirmed as being present within the corridor.

9.4 Effects of Right-of-Way Preparation and Transmission Line/Pipeline Construction

9.4.1 Construction Techniques

Construction activities, including clearing and transmission line and pipeline construction, in these existing rights-of-way will be performed in accordance with all regulatory requirements to minimize potential impacts on human populations, water bodies, archaeological and historical sites, vegetation, and wildlife.

Construction techniques discussed in this section describe the common practices of DEF in the types of environments identified. In general, transmission line construction activities will include erosion control, right-of-way preparation, construction and placement of foundations, assembly and erection of structures, and installation of conductors. Pipeline construction will consist of erosion control, right-of-way preparation, trench excavation, pipe-laying, and restoration. Each of these stages of construction is described in more detail in the following subsections.

9.4.1.1 Erosion Control

Construction activities will be planned to minimize disturbance to natural ground cover to the greatest extent practicable. In areas where soil is anticipated to be disturbed, erosion control measures will be implemented. Construction plans and drawings will depict the erosion control measures required. Measures may include turbidity screens, temporary culverts, and silt fences.

With the exception of work areas around the structures, low-lying vegetation will remain. These types of ground cover reestablish themselves quickly and will assist in reducing erosion at the work areas.

Following construction activities, disturbed areas will be restored. Right-of-way restoration includes removal of construction equipment and supplies, grading of the right-of-way, if needed, and planting or seeding of the disturbed area. Erosion control measures will be removed at the conclusion of Project construction after the right-of-way has been stabilized with ground cover.

9.4.1.2 Clearing Techniques

General Clearing

Clearing will be necessary in the areas of the existing right-of-way that have not been cleared. In general, the entire width of the rights-of-way will be completely cleared except in wetlands. Clearing will be performed in accordance with the descriptions shown in the following paragraphs and will be determined by existing conditions, environmental constraints, and transmission line and pipeline design requirements.

Clearing in Upland Areas

Vegetation in upland areas will be cleared to ground level. Stumps will either be cut or ground down to natural grade and treated with an approved herbicide to prevent regrowth, or the entire stump and root mat will be grubbed to 6 inches below grade. All holes resulting from the removal of stumps will be refilled to natural grade. Chipping material will be spread along the right-of-way unless restrictions require it be removed and disposed off-site. Limbs, brush, stumps, and cleared debris may be piled and burned within the limits of the right-of-way in compliance with the appropriate state and local regulations.

For the transmission lines, pruning along the right-of-way edge will be performed to remove overhanging or encroaching branches in the right-of-way. Required tree pruning will conform to the latest approved edition of ANSI Practices Z133, Safety Standards, and A-300, Plant Maintenance, and Occupational Safety and Health Administration (OSHA) Standard 1910.269 at a minimum to assure safety and industry standards are maintained.

Hazard trees are described as dead, diseased, damaged, or leaning trees standing outside the right-of-way that may interfere with or endanger transmission lines and related facilities. Hazard trees will be removed in accordance with the previously listed ANSI and OSHA guidelines, except in wetlands, where the wetland tree removal guidelines described in the following subsection will be followed.

Clearing in Wetland Areas

For the transmission lines, vegetation in wetland areas will be cleared using restrictive clearing techniques. Restrictive wetland clearing will be done by hand, usually with chain saws or with low-ground-pressure shear or rotary machines to reduce soil compaction and damage to vegetation. These methods may be used alone or in combination, as may be necessary for specific sites. Restrictive clearing will consist of the cutting and removal of all trees and growth with a mature height greater than 12 ft, leaving other vegetation in the right-of-way. Stumps may be left in place for the transmission lines to preserve the root mat and treated with an approved herbicide to prevent regrowth.

The right-of-way in wetland areas will be cleared as described in the previous paragraph and maintained in an herbaceous state. Tree stumps under the transmission conductors and in the cleared work areas at the structure sites will be removed, sheared, or ground to 6 inches below the ground line to allow general travel and related construction activities.

For the area over the pipelines, stumps will be removed. Trees and debris will be removed from the right-of-way and disposed of in upland areas or off-Site. The cut material will be removed from the wetland using either low-ground-pressure equipment or temporary construction mats. Care will be taken at all times to minimize rutting and disturbance of the root mat.

Herbicides

Herbicides used on the transmission line and water pipeline rights-of-way will include only those registered by EPA that have state approval. Herbicide application rates and concentrations will be in accordance with label directions and will be carried out by a licensed applicator, meeting all federal, state, and local regulations.

9.4.1.3 Construction for Transmission Lines

The types of transmission line foundations that may be used on this Project will vary based on the structure types and load capacity required. In general, direct embedded, steel vibratory-cased, cast-in-place concrete pile foundations or monolithic slab-and-pier will be used.

With the exception of steel vibratory-cased and monolithic slab-and-pier-type foundations, all installation requires the excavation of a hole, drilled vertically and of varying depths depending on subsurface soil conditions. Typical foundation diameters will vary between 4 and 12 ft. The foundation holes will be drilled using a truck-mounted hydraulic auger machine.

Depending on the type of subsurface soil conditions, a mixture of water and additive may be used to maintain the cylindrical shape of the open shaft and prevent soil destabilization or cave-in. Containment barriers will be used to control runoff of liquids and silts during the drilling operations as required. The natural earth material excavated from the hole may be spread in upland areas as allowed by the COCs.

Typical equipment used in the construction and placement of foundations includes but is not limited to cranes, water trucks, concrete trucks, bucket trucks, semi-trailer trucks, front-end loaders, backhoes, dump trucks, and support vehicles.

Direct Embedded Foundations

Direct embedded foundations will be installed following the drilling operation. For direct embedded foundations, the base section of the pole for multipiece poles or the entire pole for single-piece poles is picked up by a crane, raised vertically, and then lowered into the hole. Once centered in the hole at the required depth, concrete or rock backfill is hauled to the site and placed uniformly around the entire annulus of the embedded portion of the pole. The backfill will be compacted and/or vibrated into place.

Steel Vibratory-Cased Foundations

Steel vibratory-cased foundations use cylindrical steel casings of specified length, thickness, and diameter that are driven into natural earth using a vibratory hammer. This method may be used when soil conditions are loose and rock or clay substrata do not prevent full embedment of the casing.

The steel casing is designed to allow the vibratory hammer to clamp to the sides of the casing at one end. The casing is then raised vertically, centered over the proposed foundation location, lowered to rest upon the ground, and aligned vertically. Once the casing is aligned, the hydraulic hammer is activated, and the casing is driven downward into the soil to the specified depth.

The vibratory hammer equipment generally consists of a diesel motor-driven hydraulic pump connected to the vibratory hammer using long hydraulic hoses.

Cast-In-Place Concrete Pile Foundations

Cast-in-place concrete pile foundations are also referred to as reinforced concrete drilled piers and consist of a system of rebar, concrete, and anchor bolt cage. The rebar cage provides the method for transferring the anchor bolt loads from the structure to the surrounding soil. The anchor bolt cage attaches to the structure and transfers the structure loads to the rebar cage. The rebar cage consists of many rebar of uniform length and spacing oriented vertically and tied together through horizontal rings to form a cylindrical shaft of the required diameter and length. The anchor bolt cage is constructed in a similar fashion and is generally 6 inches smaller in diameter than the rebar cage and shorter in length. The rebar cage and anchor bolt cages are assembled separately on the ground prior to excavation of the foundation hole.

Once the augured hole is drilled, a short steel sleeve is placed over the hole and used to form the foundation cap above the ground. This sleeve will provide a uniform shape and finish. The rebar cage is then lifted and set into the hole to the desired depth and secured. The anchor bolt cage is lifted and placed inside the rebar cage with the top bolts extending above the steel sleeve approximately 12 inches and secured in place. Concrete is hauled to the site and placed uniformly in the hole around the rebar and anchor bolt and rebar cages. Concrete is poured from the bottom up and is rodded or vibrated into place during the installation process. When complete, the top of the anchor bolt cage is exposed to receive the structure base plate.

Monolithic Slab-and-Pier Foundations

Monolithic slab-and-pier foundations are also referred to as spread footings and are suitable for locations that require dissipation of large vertical loads. This application is typical for running angle and dead-end structures, which use guys and anchors to provide support. The application involves excavation into the top soil layers using mechanized equipment and placement of a stable supporting fill base. A precast or cast-in-place-type concrete or steel grillage foundation is hauled to the site, installed on top of the stabilized base, and backfilled with natural earth or other suitable material. The size of the excavation and foundation is dependent on the subsurface soil and load capacity requirements. Typical equipment used is a front-end loader or backhoe. This method typically requires only the top 6 to 10 ft of soil around the structure base to be disturbed. The excess natural earth material excavated from the hole may be spread in upland areas as allowed by the COCs.

Assembly and Erection of Structures

Transmission structures are generally delivered to the site using semi-trailer trucks with open trailers and are assembled on-site as close as possible to the foundation. Typically the structures are framed with the structure arms, insulator assemblies, climbing attachments, etc., while lying on the ground. Multipiece structures are typically assembled on the ground prior to lifting into place, but they may be installed in the air one section at a time with a crane. During the assembly process, poles are maneuvered into place using cranes and other lifting equipment to facilitate connections. Cribbing is used to maintain a level working surface to prevent excess stress on components and connections. Once assembled, the structures are ready for final placement on the foundation. When ready, a crane is used to pick up the structure. Tag lines may be used to facilitate the proper orientation and control of the structure until placed in the hole or on the base section, casing, or foundation, as appropriate.

The upper portions of direct embedded poles are generally attached to the embedded base section via a slip fit or bolted flange connection. Structures attached to vibratory-cased foundations are generally bolted or slip fit to the top of the embedded casing. Structures using cast-in-place concrete pile foundations or monolithic slab-and-pier foundations are attached to the embedded anchor bolts via the structure base plate.

Guys and anchors may be required depending on the structure type and the applied load. Anchors will typically consist of a multihelix screw-in type, slug type, or other engineered solutions. Multihelix anchors are installed using mechanized equipment designed to screw the anchor into the ground to a specified length or torque that meets design requirements. Slug anchors are designed to provide high strength applications by burying a mass of material, typically reinforced concrete, a specified depth into natural earth. The slug is then backfilled with a suitable material or concrete to obtain the desired strength. A rod is attached to the slug and extends above ground for connection to the guy wire. When required, an engineered solution may be needed to meet the environmental constraints or physical limits of each location. These applications may require the drilling and installation of a concrete cast-in-place anchor system. Guy wires are used to attach the anchor to the structure. Guys typically consist of high strength steel wire, typically 0.5 inch in diameter or larger. The guy wire is connected to the structure and anchor rods using preformed or adjustable guy grips. Typical equipment used in this operation includes but is not limited to a crane, helicopter, bucket trucks, flatbed trucks, semi-trailer trucks, front-end loaders, and support vehicles.

Installation of Conductors

After the structures are erected, conductor installation commences. The process of installing conductors involves stringing a lead line into each structure stringing block to form a continuous connection between stringing end points. The lead line is used to pull the final conductor into position. The conductor is tensioned to design specifications, transferred to the support clamp, and then clipped into final position. This operation is performed on all overhead ground wires and conductors for the line.

Typical equipment used in the conductor installation operation includes but is not limited to bucket trucks, wire-pulling equipment, guard structures, wire reels trailers, tensioners, helicopters, and support vehicles.

9.4.1.4 Construction of Pipelines

The pipeline right-of-way will vary in width for each of the three scenarios of pipe configurations (see Figure 9.2.4-1):

- A single pipe will require up to 100 ft for the pipe trench, construction area, and temporary material storage. The pipe trench itself will generally be 36 ft wide. However, in wetland areas, these dimensions will be reduced. The construction limits will be 80 ft wide, and the pipe trench will be 16 ft wide constructed in a trench box.
- Two pipes in a trench will require up to a 102-ft-wide construction right-of-way with a pipe trench of 38 ft. In wetlands, the construction limits will be reduced to 82 ft wide, and the trench will be 18 ft wide constructed in a trench box.
- For the portion of the corridor, where three pipes will be located in the same right-of-way, the construction limits will be 104 ft wide with a pipe

trench of 40 ft wide. In wetlands, the construction limits will be reduced to 84 ft wide, and the pipes will be placed in a trench box 20 ft in width.

Pipelines will be constructed of varying diameter (up to 60 inches) HDPE or equivalent pipe. To provide for soil stability around the pipe construction area, the trench in uplands will be sloped while pipes are laid. Generally, 12 inches of granular bedding material will be placed at the bottom of the trench, and the pipes to be laid in this material. Once the pipes are assembled and laid, the trench is backfilled with the native excavated material to grade.

In wetlands, trench boxes will be used to minimize the width of the trench and for side slope stability and safety when working in the trench in accordance with OSHA requirements. The trench boxes will be removed after the pipes are laid. As before, the pipes will be laid in at least 12 inches of bedding material. Once pipes are laid, the trench box will be backfilled with the excavated native materials.

Once the pipe trench has been backfilled, the construction access and temporary materials storage areas of the right-of-way will no longer be needed and will be allowed to revegetate. The area over the pipe trench may be seeded with native grasses until natural recruitment of vegetation occurs. For pipe integrity, deep-rooted vegetation will be kept out of the area over the trench.

9.4.2 Environmental Resource Permit

Appendix 10.4.1 contains a copy of the joint ERP/Section 404 application information for the CCC Site and associated linear facilities.

Impacts to water bodies and wetlands will be as generally described in the following subsections.

New transmission structures needed to make the interconnections with existing transmission lines may impact some wetland areas. Wetland impacts were avoided and minimized through use of the existing CREC utilities corridor. The wetlands within the proposed corridor have been previously impacted by existing transmission lines, pipelines, or roads. Further, impacts to these wetlands will be minimized, to the extent possible, by limiting construction to an existing cleared right-of-way, using existing transmission line access roads, or locating the new pipeline rights-of-way within already impacted areas or in an existing cleared right-of-way so only supplemental clearing is needed. It is DEF's intent to use existing cleared wetland areas where practicable rather than create new clearings through wetlands.

Water quality along and adjacent to construction areas will be preserved by the implementation of appropriate BMPs to control the quantity and quality of runoff from the construction site.

Section 9.4.1 describes land clearing activities. To the extent possible, native vegetation will be left in place to reduce erosion. However, some vegetation will be disturbed by the construction of the transmission line structures and new pipelines. Disturbed areas will be allowed to revegetate as each section of the corridor is completed. Upon completion of construction, disturbed areas may be seeded and mulched to control erosion (e.g., at ditch crossings).

The construction of the transmission lines is not expected to require any groundwater withdrawals, dewatering, or relocation of any water bodies. Construction of the pipelines may require some localized dewatering. Any effects of dewatering will be localized and of limited duration.

Some in-water activities will occur on DEF-owned submerged lands landward of the bulkhead line for construction of the new discharge structure. The modification of the intake structure will occur landward of the existing intake canal. Because this work will occur on the existing CREC plant site behind a control point with restricted public access to and from the Gulf of Mexico, there will be no impacts to navigation.

As noted in previous sections, the Project area has characteristically flat to rolling terrain with little topographic relief. The predominant conveyance in this and similarly situated regions is typically via man-made drainage swales, small tributaries, and sheetflow interconnected to natural wetlands and sloughs. No access roads, culvert, or pad construction is anticipated. Once pipeline construction is complete, the right-of-way will be fully restored to preconstruction conditions. Therefore, no adverse impacts to area drainage patterns are anticipated.

9.4.3 Solid Wastes

Solid waste generated from right-of-way clearing and transmission line and water pipeline construction typically consists of cleared vegetation and construction debris. Where practicable, DEF may mulch or chip vegetation on-Site, which then may be spread on-Site or removed for use elsewhere. Alternatively, cleared vegetation may be burned on-Site. Applicable state and local fire-related regulations will be followed. The quantity of wastes generated will depend on the site-specific characteristics of the area being cleared.

Any nonvegetative solid waste will be collected and removed for off-Site disposal at the existing Citrus County landfill in compliance with all applicable regulations.

9.4.4 Changes to Vegetation, Wildlife, and Aquatic Life

Generally, impacts on terrestrial and aquatic systems and species associated with transmission line and pipeline rights-of-way preparation and construction depend primarily on the location of the selected right-of-way and, to a lesser degree, on clearing and construction techniques. In the case of the CCC Project off-Site linear facilities though, minimal new clearing is required, and access road/pad construction is also limited due to existing facilities already in place.

9.4.4.1 Vegetation

Minor changes to vegetation structure will occur, so there will be a minimal change to wildlife habitat. It is anticipated that no more than 15.2 acres of wetlands will be impacted by construction of the off-Site portions of the transmission lines and pipelines. Of those impacts, 11.02 acres will be temporary impacts. For instance, the construction of the pipelines through herbaceous wetlands will not eliminate any wetland acreage. With no impacts to hydrology, herbaceous wetlands will reestablish over the pipelines. Herbaceous wetlands under transmission lines will also be allowed to remain. Where forested wetlands are removed for linear facility construction, herbaceous wetlands will form in their place after construction, thus resulting in a conversion of wetland type and function. Appendix 10.4 provides more specific information regarding potential wetland impacts. All wetland impacts will be fully mitigated at an approved off-Site mitigation bank.

9.4.4.2 Wildlife

The construction activities will result in some temporary disturbance to local wildlife; however, when construction is complete, wildlife species that used the corridor before should continue to use the corridor again.

The active bald eagle nest discussed in Section 3.6 is located at least 1,800 ft from the closest new transmission line structure and at least 800 ft from the closest pipeline to be constructed. The bald eagle was recently delisted by USFWS and FWC. USFWS and FWC have proposed new management guidelines to protect active nests, and these guidelines have buffer areas ranging from 330 to 660 ft from the nest. The buffer is based on existing similar development present and type of development proposed near the nest. The nest is sufficient distance from the closest construction of any linear facility to avoid impacts to the nest and still comply with federal and state guidelines.

9.4.4.3 Aquatic Life

No adverse impacts on aquatic systems and species are expected, because no water bodies other than the ditch adjacent to the north side of North Access Road will be crossed by the transmission lines or pipelines. Existing wetlands have already been impacted by existing transmission lines. For any work in or near wetlands, there is a possibility of turbidity and silt deposition. Such impacts will be local and temporary and are not expected to adversely affect aquatic resources. Appropriate control measures, such as silt curtains, will minimize or eliminate siltation resulting from stormwater runoff. As needed, erosion control methods will be used to minimize any significant disruption to the aquatic ecosystem or resultant changes in species composition.

A new discharge structure will be required in CREC's existing discharge canal. This new structure will be the termination point of the discharge pipeline corridor. No significant impacts to off-Site aquatic resources are expected to occur as a result of associated linear facility construction. Minor, temporary effects to water column and benthic biota may occur during installation of the new discharge structure for the Project cooling tower blowdown. No discernible effects to aquatic resources are likely to occur from operations, as the discharge is projected to meet applicable water quality standards at the point of discharge

Marine species, such as sea turtles and manatees, will not be impacted by construction of the intake and discharge structures. Any modifications to the existing intake structure along the intake canal will not involve in-water activities, so no impacts to aquatic resources are expected. Construction of the new discharge structure will not affect aquatic species, because the construction will be of limited duration and localized in nearshore areas. DEF will utilize manatee observers, as necessary.

9.4.5 Impact on Human Populations

There will be no impacts to human populations, because construction for the transmission lines and pipelines will be contained on property owned by DEF, and no residences exist in the vicinity of the corridor.

9.4.6 Impact on Regional Scenic, Cultural, and Natural Landmarks

As discussed in Section 3.2.1, there will be no impacts to regional scenic, cultural, or natural landmark resources within 5 miles of the Project.

9.4.7 Impact on Archaeological and Historic Sites

As discussed in Section 9.3.6.5, SEARCH conducted a cultural resources assessment survey of the CCC Site and the associated proposed corridor and found no known or new cultural resource features. Their report is included as Appendix 10.7.1 to this application. Because there are no known or anticipated cultural, archaeological, or historical resources within the corridor, construction and operation of the associated linear facilities are not anticipated to adversely impact any such resources.

9.5 Postconstruction Impacts and Effects of Maintenance

9.5.1 Maintenance Techniques

Maintenance activities for the transmission lines will consist of preventive and corrective measures. Although transmission lines normally require minimal maintenance, DEF will conduct annual inspections to ensure the safe and reliable operation using ground or aerial means. In general, maintenance of the transmission line rights-of-way will consist of mowing, pruning, and danger and other tree removal, as well as herbicide treatments. Maintenance of the right-of-way will be consistent with the right-of-way clearing described in Section 9.4.1. Using these same restrictive clearing practices will allow right-of-way maintenance in wetlands areas to be performed, while encouraging the growth of low-growing woody and herbaceous vegetation that will not exceed 12 ft in height at maturity, to the greatest extent practicable. Care will be taken to avoid unnecessary damage to vegetation in these environmentally sensitive areas. Herbicides used on the transmission line right-of-way will include only those registered by EPA and approved by the state. Herbicide application rates and concentrations will be in accordance with label directions and will be carried out by a licensed applicator, meeting all federal, state, and local regulations.

The exact manner in which maintenance will be performed on the electrical transmission line will depend on the location, type of terrain, and surrounding environment. Each area of the right-of-way will be addressed based on site-specific vegetation and habitat. Endangered or threatened species, if present, will be considered and accommodated in the maintenance program. Maintenance of the transmission line will be performed using various types of equipment. This equipment may consist of helicopters, bucket trucks, cranes, semi-trailer trucks, and support vehicles. Typical line maintenance operations may include insulator replacements, conductor repairs, shield wire repairs, grounding, and other activities associated with structures, conductors, and foundations. In general, DEF crews or authorized contractors will mobilize in-line trucks capable of supporting various operations. Once at the certified area, the crew will establish a safe working area and perform the required repair. When maintenance is required in environmentally sensitive areas where access and fill pads do not exist, temporary matting may be employed to minimize damage to the areas during repairs.

Maintenance for the pipelines will consist of keeping the right-of-way over the pipes free from deep-rooted woody vegetation that may affect pipe integrity. Right-of-way maintenance will otherwise be consistent with the maintenance plan being implemented on the existing transmission line right-of-way where much of the pipeline route is located. Vegetation maintenance will be conducted by either mechanical or chemical means. If herbicides are used, they will be used as described in previous paragraphs for transmission lines.

Potential operation impact from intake water and discharge water on aquatic life was detailed previously in Section 6.1.2. Included in that discussion are special provisions and agency requirements for sea turtle and manatee protection. In summary, the potential for adverse effects to federally listed species has been carefully evaluated by the relevant agencies and has either been discounted or resulted in agency-approved control plans. The proposed addition of the CCC Project will not change the status of the listed species' protection measures or require a change in any incidental take statements.

9.5.2 Multiple Uses

Multiple uses within DEF's transmission line rights-of-way typically can include agricultural operations (e.g., grazing and row crops), controlled landscaping, and other activities that do not interfere with DEF's use of the right-of-way for the safe and reliable operation and maintenance of the transmission lines. Based on the location of these proposed transmission line modifications, it is unlikely that the existing corridor will be used for any other purpose than electric utility service and the existing roadways. No other uses will be allowed other than the existing mariculture center.

DEF currently maintains a right-of-way utilization program that will consider future requests for multiple uses. This program reviews requests for such multiple uses to assure that the proposed use of the right-of-way is compatible with safe line operation and maintenance.

9.5.3 Changes in Species Populations

Changes in local species populations are not expected as a result of the new transmission line or pipelines' presence or maintenance. Displacement of individuals from the immediate right-of-way area that may occur during construction activities will be temporary. These displaced species are expected to reinhabit the right-of-way areas after construction. Habitat use will decline during actual construction due to noise and human presence. Such avoidance behavior will enable wildlife to escape direct impacts from construction activities, although some losses of individual vertebrates (e.g., rodents, amphibians) may occur during right-of-way clearing. The previously addressed active eagle's nest within 0.5 mile of the corridor will not be affected, because it already occurs in proximity to several existing transmission lines and other power generation facilities. Foraging habitat for the eagle will not be diminished by the Project. No animal or plant species are expected to be permanently displaced out of the CCC Project area as a result of these transmission line or pipeline operations. Habitats will remain similar to those that are there now because of the fact that all new off-Site linear facilities are proposed to be located with existing maintained utility right-of-way or developed power generation property.

Section 6.1.2 addresses the potential operation effects on aquatic organisms due to the new discharge structure.

9.5.4 Effects of Public Access

The only vehicular traffic permitted on the transmission line and pipeline rights-of-way will be that necessary for DEF to perform routine maintenance activities. In areas where the newly proposed transmission lines and pipeline will be located either adjacent to or in proximity of existing transmission line right-of-way, the degree of public access is anticipated to be limited. Current roadways are expected to continue to be capable of handling all existing and new off-Site linear facility construction, operation, and maintenance access. No new roadways are proposed to support the off-Site linear facilities.

9.5.5 Other Postconstruction Effects

9.5.5.1 Electric and Magnetic Fields

Like all electric power lines, the 230- and 500-kV transmission lines will produce EMF. The electric field strength is dependent upon the voltage impressed on the transmission line conductors. The magnetic field strength is a function of the amount of current flowing on the transmission line. The voltage on a transmission line is held relatively constant (usually within 5 percent), but the current flowing on the conductors varies depending on the power needs of the customers ultimately served by a line. Because of these characteristics, the electric field near transmission lines is relatively constant over time, but the magnetic field fluctuates depending on load requirements.

The major cause of variation in electric field strength at various locations along the transmission line right-of-way is the variation in the height of the conductors above the ground. The conductors are securely attached to the support structures at the end of each span but sag somewhat between structures. Consequently, they are usually closest to the ground midway between the structures. This point halfway between the structures is called mid-span. Increases in conductor temperature resulting from high current in the conductors and from extreme weather conditions result in temporary elongation of the conductors and additional sag at mid-span. The extent to which the conductors sag is carefully designed to ensure that adequate safety clearance is maintained between the conductors and ground for all extremes of electrical load and weather conditions. Since the extreme conditions of electrical load and weather conditions are infrequent, the actual mid-span height of the transmission line conductors is usually considerably higher than their design minimum mid-span clearance.

At points other than mid-span, the conductors are even higher, reaching their greatest height above ground at the structures. Directly beneath the transmission line, the electric field strength is strongly influenced by the conductor height. The electric field is greatest at the point where the conductors are closest to ground. Consequently, the maximum electric field occurs at mid-span when load and weather conditions cause the transmission line conductors to sag to their minimum height above ground. At all other times and at all other locations along the span, the conductors are higher above ground and the electric field is less than the maximum value. At locations other than those directly beneath the conductors, such as at the edge of the right-of-way or beyond, the electric field is less dependent on conductor height and will increase or decrease depending on location, line design, shielding by vegetation or other structures, and other factors.

Magnetic field strength varies depending on load current and on conductor height. The highest magnetic field occurs at mid-span, when the current in the transmission line is at its maximum value and load and existing weather conditions cause the conductors to sag to their minimum height above the ground. At all other times and at all other locations, the magnetic field will be considerably less than the maximum. As with electric fields, magnetic fields directly beneath the transmission line are most strongly dependent on conductor height. At other locations such as at the edge of the right-of-way and beyond, increased conductor height leads to lower magnetic fields at ground level, but the effect is slight.

FDEP regulates EMF from electrical transmission lines under the authority of Sections 403.061(30) and 403.523(10), F.S. The transmission lines comply with FDEP EMF regulations found in Rule 62-814.450(3), F.A.C. FDEP EMF standards applicable to these transmission lines provide:[1]

- Maximum electric field at the edge of the transmission line right-of- way and at the substation's property boundaries will not exceed 2 kilovolts per meter (kV/m).
- Maximum electric field on the transmission line right-of-way will not exceed 10 kV/m.
- Maximum magnetic field at the edge of the transmission line right-of-way and at the substation's property boundaries will not exceed 200 milliGauss (mG).

EMF associated with the transmission lines was calculated using the EzEMF software program developed through the Florida Electric Power Coordinating Group and accepted by FDEP as a methodology for verifying compliance with the FDEP EMF rule. The EzEMF software was developed using the Bonneville Power Administration Corona and Field Effects Program as the source for the EMF calculations.

Table 9.5.5-1 presents the maximum calculated EMF that can be produced by the transmission lines under maximum normal operating conditions consistent with Chapter 62-814, F.A.C. These fields comply with FDEP rule requirements for new transmission lines.

The detailed design of the transmission line will start after the corridor is certified, during which a specific right-of-way within the corridor will be selected. DEF will submit EMF calculations for all configurations used in the final detailed design to FDEP at least 90 days prior to the start of construction, as required by the FDEP EMF rule.

9.5.5.2 Corona Effects

The electric field at the surface of transmission line conductors, under some conditions, results in localized ionization of the air near the conductors. This phenomenon is called corona. Corona activity at the surface of transmission line conductors

[1] Where calculations under this section indicate operation of existing electrical facilities on an existing right-of-way produces EMF at levels higher than the limits specified for new facilities in Rule 62-814.450, F.A.C., a new electrical facility may be constructed and operated on that existing right-of-way provided the new facility does not increase EMFs above the maximum field values created by the existing lines (see Rule 62-814.470[1][c], F.A.C.).

Table 9.5.5-1. Summary of Results for EMF Calculations

Cross-Section	Maximum Magnetic Field (mG) of Right-of-Way		Maximum Electric Field (kV/m) of Right-of-Way		
	Left Edge	Right Edge	Left Edge	Maximum on Right-of-Way	Right Edge
1 – Existing corridor east of CCC Site	45.81	16.51	0.18	7.65	0.03
2 – Proposed corridor west of CCC Site	42.83	6.09	0.18	7.65	0.04
3A – New configuration running north on west side of plant	0.15	52.41	0.00	5.02	0.18
3B – New configuration running east on north side of plant	189.27	3.07	0.25	5.02	0.01
3C – New configuration running south on east side of plant	4.69	52.41	0.02	5.02	0.18
4 – New configuration entering station near plant access road	0.54	5.34	0.00	7.52	0.00
FDEP EMF rule standards	200.00	200.00	2.00	10.00	2.00

Note: EMF calculations were performed based on the following assumptions:

1. All currents flow in the same direction for all circuits.
2. Conductors for 500-kV are two 2,335-kCmil ACAR per phase. The existing and proposed 230-kV conductors are one 1,590-kcmil ACSR per phase.
3. Maximum continuous ratings for the two conductor sizes are:
   a. Two 2,335-kCmil ACAR = 4,455 amps.
   b. One 1,590-kCmil ACSR = 1,980 amps.
4. Existing phasing for all was provided for all circuits except the double-circuit 230-kV tower on the south side of the right-of-way. The same phasing was assumed for these circuits as what is listed for the double-circuit 230-kV towers on the north side of the right-of-way.
5. Phasing for the proposed configurations has been assumed.
6. Conductor height above ground has been assumed to be the minimum design clearance. For 500-kV, this value is 40 ft; for 230-kV, the value is 28 ft.
7. Calculated EMF reported at 1 meter above ground.
8. Proposed tubular steel structures have a pole diameter of 4 ft.

Source: Burns & McDonnell, 2014.

produces low levels of acoustic and radio frequency electric energy that, under some conditions, can result in audible noise and radio or television interference. Any corona effect will be limited to DEF-owned property. Therefore, the electrical transmission lines are not anticipated to have any adverse impacts, including radio or television interference, on neighboring parcels or off-Site land users.

9.5.5.3 Induced or Conducted Ground Currents

Objects located near a transmission line can become electrically charged due to their presence in the lines' electric field. This charge results in a current that flows through the object to the ground. The current is called "induced," because there is no direct connection between the line and the object. The induced current can also flow to the ground through the body of a person who touches the object. An object that is insulated from the ground can actually store an electrical charge, becoming what is called "capacitively charged." A person standing on the ground and touching a capacitively charged vehicle or a fence receives an electrical shock due to the sudden discharge of the capacitive charge through the person's body to the ground. After the initial discharge, a steady-state current can develop, the magnitude of which depends on several factors, including the following:

- The strength of the electric field which, in turn, depends on the voltage of the transmission line as well as its height and geometry.
- The size of the object on the ground.
- The extent to which the object is grounded.

Touching the object at a point remote from an electrical ground can result in a shock. Induced currents produced by the proposed transmission lines will be limited to safe levels by meeting the DEP EMF standards on the right-of-way and at the edge of the right-of-way. Electric field limits guard against startle shocks that can occur when contacting other objects beneath the transmission line. Also, minimum clearances for the transmission lines will meet the National Electrical Safety Code requirements for 5 milliamperes or less of short-circuit current (induced current due to electric field) when the largest anticipated vehicle of equipment is situated directly under the transmission line. To further minimize these induced ground currents and distribute ground fault currents, each structure will be grounded. Each structure will have an electrical connection between the shield wire and ground lead that will be connected to ground rods. Ground resistance tests will be made at each structure before the shield wire is electrically connected to the ground lead. Sufficient ground rods will be installed to reduce the resistance to 10 ohms or less under normal atmospheric conditions. In addition, DEF standards require that fences and gates either crossing or parallel to and within the transmission line right-of-way be grounded to mitigate shock hazards. Grounding of these structures will be provided as part of DEF's construction activities.

9.5.5.4 Audible Noise

As discussed previously in Section 9.5.5.2, any audible noise produced will be within property owned by DEF. Therefore, the associated linear facilities are not anticipated to have any impacts to neighboring parcels or off-Site land users.

9.5.5.5 Radio and Television Interference

As discussed previously in Section 9.5.5.2, any potential for radio or television interference produced by the operation of the electrical transmission lines will be within property owned by DEF. Therefore, the transmission lines are not anticipated to have any impacts to neighboring parcels or off-Site land users.

9.5.5.6 Safety

As required by the Florida PSC in Section 25-6.0345, F.A.C., the proposed transmission lines will comply with all requirements of the National Electrical Safety Code (2012 edition). The purpose of this code, among other things, is to ensure the practical safeguarding of persons during installation, operation, and maintenance of the transmission lines and associated equipment.

As discussed in Section 9.5.5.3, DEF will properly ground any fences or gates crossing the right-of-way to reduce the potential for induced shock. Additionally, DEF will adhere to the listed safety requirements and codes including, but not limited to:

- OSHA rules pertaining to construction requirements.
- American Society of Civil Engineers codes and manuals.
- FDOT (2010) Utility Accommodation Manual.
- DEF's standard construction and operational protocols.

9.6 Other Associated Linear Facilities

The proposed off-Site associated linear facilities to be constructed by DEF have been previously discussed in this chapter. The fuel supply (natural gas) will require a new natural gas pipeline and on-Site meter/regulating station, both to be permitted, owned, constructed, and operated by Sabal Trail. DEF is not seeking certification of that pipeline or the gas metering station in this SCA.