OPERATIONS PERMIT APPLICATION FOR DRILLING AND PRODUCTION AT THE NOBLES GRADE AND TAMIAMI PROSPECTS, BIG CYPRESS NATIONAL PRESERVE

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EXECUTIVE SUMMARY

Burnett Oil Company, Inc. ("BOCI" or "Burnett") submits this Operations Permit Application (Application) to the United States Department of Interior - National Park Service ("USDOI-NPS") for proposed drilling and production operations in the Big Cypress National Preserve ("BCNP" or the "Preserve") for the purpose of accessing privately-owned oil prospects. This document constitutes Burnett's application for an operations permit as provided in 36 CFR § 9.80, and contains the information required by 36 CFR § 9.82 and related sections of the National Park Service's ("NPS") regulations.

This document provides detailed information related to Burnett's proposed drilling and production operations on two separate prospects – the Nobles Grade Prospect and the Tamiami Prospect. The Nobles Grade Prospect is located approximately three miles southwest of the Florida Department of Transportation (FDOT) rest area on I-75/Alligator Alley at mile marker 63, and the Tamiami Prospect is located approximately 1.2 miles east of Pad 3 at the existing Raccoon Point oil and gas production area. Burnett selected the precise location for both prospects based upon the interpretation of previously acquired 3-D seismic data, publicly available well log data, and other proprietary geologic data.

Burnett proposes to conduct conventional drilling and production operations; there would be no hydraulic fracturing. The facilities for both prospects will be similar to those that exist at Raccoon Point: small limestone pads will be built at each site where the wells will be located, and the pads will be accessed by single-lane limestone roads. The pads and roads will be located where they minimize the harm to natural resources and interference with other Preserve users. Each prospect will have a single well pad with directionally drilled wells. The Nobles Grade Prospect will have three directionally drilled wells and the Tamiami Prospect will have four directionally drilled wells. By drilling directional wells from single pads, the Operations Permit Application avoids the need to construct separate pads at the various prospective formations. There will be no permanent structures on the pads or roads, and the well pumps will be located below the ground. To limit production vehicle traffic, small 4-inch pipelines will be laid next to the access roads within the road right of way to convey the oil offsite, similar to what exists at the existing Racoon Point facilities. Upon completion of the drilling program, activities will transition into production operations if commercially-viable quantities of oil are located, at which time there will be little noise and limited personnel at the sites on any given time.

This proposed Operations Permit Application is designed to minimize environmental impacts. Oil and gas activities have existed in the Preserve for decades without causing any significant harm. Congress expressly authorized those activities when it created the Preserve. The NPS has extensively studied the effects of oil and gas activities and has formulated stipulations designed to minimize impacts on natural resources and other Preserve users. Burnett has incorporated the stipulations in the Preserve's Minerals Management Plan into its proposed Operations Permit Application. Key environmental effects are as follows:

- Total wetland impacts will be small. The plan calls for 21.49 acres of fill for the pad, access road and loading facility for the Nobles Grade Prospect, and 10.78 acres of fill for the pad and access road for the Tamiami Prospect. In the event that the Tamiami Loading Facility is utilized instead of the existing pipeline, it would increase the amount of wetland impacts by approximately one acre and the total acreage would then be 11.93 acres of fill for the pad, access road and loading facility for the Tamiami Prospect. Placed in context, there are approximately 729,000 acres in the Preserve, and 201.82 acres of wetlands were traversed by vehicles during the Nobles Grade

seismic survey. Upon completion of drilling and production operations, the pads, roads, and facilities will be removed.

- The number of personnel present at the facilities will be limited. The pads and access roads will be closed to public access, like at Raccoon Point. A speed limit will be set on all access roads so that vehicles drive at very slow speeds. There will be no hunting or recreational access from the facilities. Similar facilities and procedures have existed at Raccoon Point for decades with no apparent adverse effects on panthers or other wildlife.

- The visibility of the facilities to other Preserve users will be small. Burnett's personnel and equipment would access the pads on nonpublic roads not used by other visitors. There will be no new highway access for the Tamiami Prospect, because it will connect to the existing Raccoon Point roadways. The access road to the Nobles Grade Prospect will use the existing I-75 highway off-ramps at the mile marker 63 and the limestone access road would be located away from resting motorists and visitors accessing the Florida Trail.

This Operations Permit Application is the least damaging, technologically feasible method of extracting the privately-owned oil resources at these two prospects. A typical drilling plan would have pads located directly over each prospect, and access roads would follow the most direct route available to the pads. Such a plan would result in more acres of wetland impact and would cross especially sensitive vegetative communities. Burnett therefore is proposing to create centralized single pads at each site, from which wells could be drilled directionally to the individual prospects. Burnett also seeks to route the access roads along existing trails where possible and will otherwise locate them to minimize wetland impacts and avoid important resource areas. As a result, Burnett's proposed Operations Permit Application allows for the extraction of these privately-owned minerals while minimizing impacts to the Preserve.

To facilitate the distinction between the Nobles Grade and Tamiami Prospects, each section of this document is noted either by the letter "N" or "T". Sections with the letter "N" pertain solely to the Nobles Grade Prospect, and sections with the letter "T" pertain solely to the Tamiami Prospect. The following table shows where each relevant requirement in the 36 CFR Part 9B is addressed in this document:

36 CFR Subpart B References	Summary Description	Relevant Sections in this Application for Nobles Grade Prospect	Relevant Sections in this Application for Tamiami Prospect
§9.83(a)	Documentation demonstrating operator's right to conduct drilling operations	I.N.C	I.T.C
§9.83(b)(1) §9.83(b)(3)	Names, addresses, and other contact information for the operator and its agents	I.N.B	I.T.B
§9.83(b)(2)	Names, addresses, and other contact information for the surface and mineral owner	I.N.A	I.T.A
§9.83(d)	Reclamation Plan	VII.N.B	

			VII.T.B
§9.83(e)(1)	Use of water – groundwater	V.N.B.3	V.T.B.3
§9.83(e)(2)	Use of water –wastewater	II.N.C V.N.C.6 V.N.C.8	II.T.C V.N.C.6 V.T.C.8
§9.84(a)(1)-(3)	Maps clearly depicting (1) the boundaries of operator's oil or gas rights in relation to the proposed operations and the relevant System unit boundary; (2) natural features; and (3)location of existing roads, trails, pads and other disturbed areas	II.N.A II.N.B Appendix A Appendix B	II.T.A II.T.B Appendix A Appendix C
§9.84(a)(4)	Maps clearly depicting structures that the operations will affect	N/A	N/A
§9.84(b)	Geologic conditions in their natural state and under the proposed operating conditions	IV.N	IV.T
§9.84(c)(1)-(2)	Maps depicting (1) the proposed area of operations, boundaries of new surface disturbances and proposed access routes; and (2) the proposed location of all support facilities	II.N.B II.N.C II.N.D Appendix A Appendix B	II.T.B II.T.C II.T.D Appendix A Appendix C
§9.84(c)(3)	Methods and diagrams of any proposed pad construction, road construction, cut-and-fill areas, and surface maintenance	V.N.A Appendix B	V.T.A Appendix C
§9.84(c)(4)	Equipment and vehicles	V.N.A V.N.B.1	V.T.A V.T.B.1
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§9.85(c)(2)	Discussion of all alternative technologically feasible, least damaging methods of operations	XI.N.E	XI.T.E
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§9.88(c)	Drilling program	V.N.B.6	V.T.B.6
§9.88(d)	Proposed drilling depth and the estimated depths and names of usable water, brine, hydrocarbon, geothermal or other mineral-earing zones	V.N.B.6	V.T.B.6
§9.88(e)	Proposed mud system	V.N.B.7	V.T.B.7
§9.88(f)	Casing program	V.N.B.8	V.T.B.8
§9.88(g)	Cementing program	V.N.B.9	V.T.B.9
§9.88(h)	Minimum specifications for pressure control equipment function, and pressure testing frequency, and the blowout preventer stack arrangement	V.N.B.5	V.T.B.5
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§9.88(j)	Completion program	V.N.B.11	V.T.B.11
§9.88(k)	Well plugging	VII.N.A	VII.T.A
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9B, 9B Regulations – Nonfederal Oil and Gas Rights Regulations (36 CFR Part 9 Subpart B)
ANSI – American National Standard Institute
Application – Operations Permit Application
ARPA – Archeological Resources Protection Act
BCNP – Big Cypress National Preserve
BOCI – Burnett Oil Company, Inc.
BOP – Blowout preventer
CFR – Code of Federal Regulations
CEQ – Council on Environmental Quality
CWA – Clean Water Act
EA – Environmental Assessment
EIS – Environmental Impact Statement
ENP – Everglades National Park
EPA – Environmental Protection Agency
ERP – Environmental Resource Permit
ESA – Endangered Species Act
FAC – Florida Administrative Code
FDACS - Florida Department of Agriculture and Consumer Services
FDEP – Florida Department of Environmental Protection
FDOT – Florida Department of Transportation
FMSF – Florida Master Site File
FLUCCS - Florida Land Use Cover and Forms Classification System
FNAI – Florida Natural Areas Inventory
FONSI – Finding of No Significant Impact
FPNWR – Florida Panther National Wildlife Refuge
FR – Federal Register
FS – Florida Statute
FWC – Florida Fish and Wildlife Conservation Commission
GMP – General Management Plan
LiDAR – Light Detection and Ranging
MBTA – Migratory Bird Treaty Act
MMP – Minerals Management Plan
NAGPRA – Native American Graves Protection and Repatriation Act
NEPA – National Environmental Policy Act
NHPA – National Historic Preservation Act
NMFS – National Marine Fisheries Service
NPS – National Park Service
NRHP – National Register of Historic Places
NPS/SEAC – National Park Service Southeast Archeological Center
ORV – Off-road vehicle
ROD – Record of Decision
SFWMD – South Florida Water Management District
SHPO – State Historic Preservation Office
SWD – Saltwater disposal well
TVD – True vertical depth
UIC – Underground injection control
USACE – U.S. Army of Corps of Engineers
USC – U.S. Code
USDA – U.S. Department of Agriculture
USFWS – U.S. Fish and Wildlife Service

USGS – U.S. Geological Survey
VCSF - Vegetation Classification System for South Florida Natural Areas
WERP – Western Everglades Restoration Project
§ – section (this symbol is commonly used when citing laws and regulations)

INTRODUCTION/OVERVIEW

The BCNP is a National Preserve. National Preserves are distinct from National Parks in that many public and private activities are allowed to occur in National Preserves that typically are not permitted in National Parks. The USDOI-NPS describes the National Preserve designation as follows: "National Preserves are areas having characteristics associated with National Parks, but in which Congress has permitted continued public hunting, trapping, oil/gas exploration and extraction." (USDOI-NPS 2020) The 1974 enabling legislation for BCNP and the 1988 legislation for the BCNP Addition explicitly provide for the conducting of oil and gas exploration and production activities within the BCNP. As the updated final rule for non-federal oil and gas rights (81 FR 77973) explains:

> Non-federal oil and gas rights exist within System units in situations where the United States does not own the oil and gas interest, either because: the United States acquired the property from a grantor that did not own the oil and gas interest; or the United States acquired the property from a grantor that reserved the oil and gas interest from the conveyance.
>
> Non-federal oil and gas interests can be held by individuals; nonprofit organizations; corporations; or state and local governments. Interests in non-federal oil and gas are property rights that may only be taken for public use with payment of just compensation in accordance with the Fifth Amendment of the U.S. Constitution.
>
> Accordingly, from their initial promulgation, the 1978 Regulations at 36 CFR 9.30(a) have stated that they are "not intended to result in the taking of a property interest, but rather to impose reasonable regulations on activities that involve and affect federally owned lands." This rule includes this same provision.

Oil and gas deposits were first discovered in Southwest Florida nearly 70 years ago, and oil and gas production has occurred within the boundary of the present-day BCNP for nearly 50 years. The recent Environmental Assessment for the Nobles Grade 3-D seismic survey (USDOI – NPS 2015) summarized the history and recent operations related to oil and gas exploration and production within the local area:

> Oil and gas activities in the greater Big Cypress Swamp predate the creation of the Preserve. Discovery of oil and gas in southwest Florida dates back to the early 1940s. The first producing wells were drilled in 1943, and there have been producing oil and gas wells in the region ever since. Several oil production facilities have been installed in areas that are now within the boundaries of the Preserve. Specifically, oil production within the Preserve includes Exxon's Bear Island field (discovered in 1972) with 23 wells on 9 pads and Exxon's Raccoon Point field (discovered in 1978), which included 17 wells on 5 pads (NPS 1992 GMP).

This Application provides detailed information related to proposed drilling and production operations for the Nobles Grade Prospect and the Tamiami Prospect, as described below and throughout the document. In

accordance with 36 CFR §9.31, the operator will utilize the appropriate technologically feasible, least damaging methods to access mineral resources.

NATIONAL PARK SERVICE UNIT/AREA OF OPERATIONS

The proposed operations at the Nobles Grade Prospect and the Tamiami Prospect occur within the existing boundaries of the BCNP. The Tamiami Prospect is located within the original Preserve boundary as established in 1974, while the Nobles Grade Prospect is located within the Northeast Addition boundary as established in 1988.

The area of operations for the proposed Nobles Grade Prospect is located within the Northeast Addition lands south of Interstate 75 (I-75, or Alligator Alley), southwest of the eastbound Florida Department of Transportation (FDOT) rest area at mile marker 63. The Tract/Lease Boundary Map for the prospect is provided as **Exhibit A.1**, and the proposed area of operations is depicted on the Operation Location Map (**Exhibit B.1.a**). This area of operations is located within lands that have been proposed for wilderness designation pursuant to the BCNP Addition Final General Management Plan / Wilderness Study / Off-Road Vehicle Management Plan / Environmental Impact Statement (2010) (Addition GMP), described below. The Addition GMP states that "[o]il and gas operations in the Addition are allowed under all Addition management scenarios. None of the actions included in the General Management Plan would result in changes to oil and gas exploration or the extraction of new resources from the Addition." The Record of Decision finalizing the Addition GMP states "Nothing in the selected action will affect the existing legal rights of mineral operators or change the approved plans and practices of operators."

The Tamiami Prospect is located within the Raccoon Point area of BCNP, extending generally eastward from the existing Pad 3. **Exhibit A.2** depicts the Tract/Lease Boundary Map, and the proposed area of operations is shown on **Exhibit B.2.a** (Operation Location Map).

BIG CYPRESS LEGISLATIVE BACKGROUND AND REGULATORY OVERSIGHT

The text within this section was excerpted from the Environmental Assessment for A Proposed Oil and Gas Operations Permit Application: Nobles Grade 3-D Seismic Survey (USDOI-NPS 2016, 6). Minor changes to the text have been made to delete obsolete references and conform to the updated 36 CFR Part 9 Subpart B regulations (or simply "9B regulations" or "9B") that were implemented in 2016 (81 FR 77972), and to provide explanatory notes relative to this Application.

LAWS, REGULATIONS, AND POLICIES

OIL, GAS, AND MINERAL RIGHTS

The federal government did not acquire most of the private oil and gas rights when the Preserve was created. To the contrary, Congress authorized the NPS to acquire land without the subsurface estate. *See, e.g.,* Public Law (PL) No. 93-440, §1(c), 88 Stat. 1257 (Oct. 14, 1974) ("The Secretary may, if he determines that the acquisition of any other subsurface estate is not needed for the purposes of the Preserve, exclude such interest in acquiring any lands within the Preserve.").

Congress specifically authorized the NPS to publish regulations governing "exploration for and extraction of oil, gas, and other minerals." PL No. 93-440, § 4(b)(1) (now codified as amended at 16 USC § 698i). In the 1988 statute creating the Addition, Congress provided that "[s]uch [oil and gas] activities shall be permitted to occur if such activities conform to requirements established by the NPS under authority of law," PL No. 100-301, § 8, 102 Stat. 443 (April 29, 1988) (now codified at 16 USC § 698m-4(c)).

The NPS generally manages non-federal oil and gas rights pursuant to regulations set forth in 36 CFR Part 9, Subpart B. Under those regulations, non-federal oil and gas operators are required to submit an Operations Permit Application to the NPS with all information that will enable the NPS to fully evaluate the proposal. *Id.* §§9.82 through 9.90. The regulations set forth procedures for the NPS to review the proposed activities, time frames for plan review, and substantive criteria for approval of proposed plans. *Id.* §§9.100 through 9.105.

In 1988, Congress authorized the enactment of specific procedures for oil and gas activities in the Preserve and Addition at 16 USC § 698m-4, wherein the NPS was authorized to promulgate "rules and regulations governing the exploration for and development and production of non-Federal interests in oil and gas located within the boundaries of the Big Cypress National Preserve and Addition." *Id.* § 698m-4(a). In 1992, as part of its General Management Plan for the original Preserve, the NPS developed a Minerals Management Plan to guide its review of oil and gas activities in the original Preserve.

Some of the primary examples of these legal and regulatory constraints and bounds follow.

NATIONAL PARK SERVICE

National Park Service Organic Act (1916)

The National Park Service Organic Act (1916) (54 USC § 100101(a)) created the NPS with the direction to:

… conserve the scenery, natural and historic objects, and wildlife in the System units and to provide for the enjoyment of the scenery, natural and historic objects, and wildlife in such manner and by such means as will leave them unimpaired for the enjoyment of future generations."

General Authorities Act (1970)

The purpose of the General Authorities Act (1970) (54 USC § 100101(b)(1)(B) and (C)) was

to include all areas administered by the NPS in one national park system and to clarify the authorities applicable to the system. Concerning areas of the national park system, the act states that:

"(B) these areas, though distinct in character, are united through their interrelated purposes and resources into one National Park System as cumulative expressions of a single national heritage;

(C) individually and collectively, these areas derive increased national dignity and recognition of their superb environmental quality through their inclusion jointly with each other in one System preserved and managed for the benefit and inspiration of all the people of the United States; …"

Redwood National Park Act (1978)

The Redwood National Park Act (54 USC § 100101(b)(2)) reasserted the system-wide standard of protection prescribed by Congress in the original Organic Act. It states:

"Congress reaffirms, declares, and directs that the promotion and regulation of the various System units shall be consistent with and founded in the purpose established by subsection (a), to the common benefit of all the people of the United States. The authorization of activities shall be construed and the protection, management, and administration of the System units shall be conducted in light of the high public value and integrity of the System and shall not be exercised in derogation of the values and purposes for which the System units have been established, except as directly and specifically provided by Congress."

Big Cypress National Preserve Establishment Act (1974) and Addition Act (1988)

When the Preserve was created in 1974, Congress directed the NPS to administer the Preserve "in a manner which will assure their natural and ecological integrity in perpetuity in accordance with the provisions of sections 698f to 698m-4 of this title [the Preserve Establishment Act] and with the provisions of sections 1, 2, 3, and 4 of this title [the NPS Organic Act], as amended and supplemented." 16 USC § 698i(a). The Preserve Establishment Act recognizes the continuation of certain preexisting uses subject to NPS oversight and control, including oil and gas exploration, development and production. *See, e.g.,* 16 USC § 698m-4.

National Park Service Director's Order 12 (2001)

Director's Order 12: *Conservation Planning, Environmental Impact Analysis, and Decision- Making* and the associated NEPA handbook lay the groundwork for how the NPS complies with NEPA. Director's Order 12 and the handbook set forth a planning process for incorporating scientific and technical information and establishing a solid administrative record for NPS projects (NPS 2001, NPS 2011*a*).

Director's Order 12 requires that impacts to the Preserve's resources be analyzed in terms of their context, duration, and intensity. It is crucial for the public and decision-makers to understand implications of those impacts in the short and long-term, cumulatively, and in context, based on an understanding and interpretation by resource professionals and specialists.

OTHER FEDERAL LAWS AND EXECUTIVE ORDERS

National Environmental Policy Act (1969)

Section 102(2) (c) of the National Environmental Policy Act (NEPA) (42 USC § 4332) requires that an environmental impact statement be prepared for proposed major federal actions significantly affecting the quality of the human environment. The National Environmental Policy Act is implemented through regulations of the CEQ (40 CFR §§ 1500-1508), USDOI (43CFR Part 46), and Departmental Manual 516. The NPS has, in turn, adopted procedures to comply with the statute and the CEQ regulations, as found in Director's Order 12 and its accompanying NEPA handbook (NPS 2015).

Endangered Species Act (1973)

The Endangered Species Act (ESA) (16 USC §§ 1531- 1543) requires all federal agencies to consult with the Secretary of the Interior on all projects and proposals with the potential to impact federally endangered or threatened plants and animals. It also requires federal agencies to use their authority in furtherance of the purposes of the ESA by carrying out programs for the conservation of endangered and threatened species and to ensure that any agency action authorized, funded, or carried out by the agency is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of designated critical habitat.

Migratory Bird Treaty Act (1918)

The Migratory Bird Treaty Act (MBTA) (16 USC §§ 703– 712), as amended, implements various treaties and conventions between the U.S. and Canada, Japan, Mexico, and the former Soviet Union for the protection of migratory birds. Under the Act, taking, killing, or possessing migratory birds is unlawful, except as permitted by regulation.

Migratory birds, parts, eggs, and nests are all included in the protection afforded by this act. This act was reviewed in the development of this EA for potential impacts to migratory birds found in the Preserve.

National Historic Preservation Act (1966)

The National Historic Preservation Act (NHPA) (16 USC § 470) was enacted to preserve historical and archeological sites in the U.S. The NPS defines the term "site" as "location of a significant event, a prehistoric or historic occupation or activity, or a building or structure, whether standing, ruined, or vanished, where the location itself possesses historic cultural, or archeological value regardless of the value of any existing structure" (National Register Bulletin, *How to Complete the National Register Bulletin Form,* Appendix IV:1). This act created the National Register of Historic Places (NRHP), the list of National Historic Landmarks, and the State Historic Preservation Offices. The National Historic Preservation Act requires federal agencies to consider the effects of their undertakings on properties listed or potentially eligible for

listing on the NRHP. In accordance with this act, coordination was conducted with the State Historic Preservation Officer (SHPO) for the proposed project.

Archaeological Resources Protection Act (1979)

The Archaeological Resources Protection Act of 1979 (ARPA) (16 USC §§ 470aa-mm) protects prehistoric, historic, or archeological data on federal lands, and requires issuance of a permit for the excavation or removal of archeological resources.

Native American Graves Protection and Repatriation Act (1990)

The Native American Graves Protection and Repatriation Act of 1990 (NAGPA) (25 USC §§ 3001 note) assigns ownership and control of Native American cultural items, human remains, and associated funerary objects to Native Americans; it also establishes requirements for the treatment of Native American human remains and sacred or cultural objects found on federal land.

Wilderness Act (1964)

The Wilderness Act of 1964(16 USC §§ 1131- 1136) established a National Wilderness Preservation System, “administered for the use and enjoyment of the American people in such manner as would leave them unimpaired for future use and enjoyment as wilderness, and so as to provide for the protection of these areas, the preservation of their wilderness character, and for the gathering and dissemination of information regarding their use and enjoyment as wilderness.” Lands identified as being suitable for wilderness designation, wilderness study areas, proposed wilderness, and recommended wilderness (including potential wilderness) are generally managed to preserve their wilderness character and values in the same manner as “designated wilderness” until Congress has acted on the recommendations (NPS 2011*a*). However, the Wilderness Act provides that “[n]othing in this chapter shall modify the statutory authority under which units of the National Park System are created.” 16 USC § 1133(a)(3). NPS guidance documents confirm that “[v]alid private rights in wilderness must be administered in keeping with the specific conditions and requirements of the valid right,” and “must be managed pursuant to existing NPS regulations, policies, and procedures (See 36 CFR Part 9, Subpart A, for mineral development on mining claims; 36 CFR Part 9, Subpart B, for nonfederal oil and gas development; and 43 CFR Parts 3100 and 3500 for federal mineral leasing).” NPS Management Policies, §§6.4.6, 6.4.9 (2006*a*).

STATE LAWS AND EXECUTIVE ORDERS

Florida Endangered and Threatened Species Act

The State of Florida regulates the protection of threatened and endangered species through the Florida Endangered and Threatened Species Act (Florida Statute (FS) § 379.2291-379.231). This act is the primary

regulation in the state and sets the policy to conserve and wisely manage these resources, as well as provide for research and management to conserve and protect these species as a natural resource. This act also emphasizes coordination with state agencies and outlines annual reporting requirements.

Endangered Species Protection Act

The Endangered Species Protection Act (FS § 372.0725) prohibits the intentional wounding or killing of any fish or wildlife species designated by the Florida Fish and Wildlife Conservation Commission (FWC) as endangered, threatened, or of special concern. This prohibition also extends to the intentional destruction of the nests or eggs of any such species.

Preservation of Native Flora of Florida Act

The protection of endangered, threatened, or commercially exploited plants is addressed in the Preservation of Native Flora of Florida Act (FS § 581.185). Commercially exploited plants are defined as species native to the state which are subject to being removed in substantial numbers from native habitats in the state and sold or transported for sale. This act sets the policy for the state of Florida relating to these species and includes several prohibitions covering the “willful destroying or harvesting” of such plants. It also contains an exemption for agricultural and silviculture uses.

Florida Statutes, Ch. 377, Part I

The State of Florida regulates the exploration and production of oil and gas resources. Drilling operations require permits from the Florida Department of Environmental Protection, and Florida Statutes have provisions designed to protect natural resources and avoid pollution.

RELATIONSHIP TO OTHER PLANS, POLICIES, AND ACTIONS

National Park Service Plans, Policies, and Actions

General Management Plan/Mineral Management Plan/Environmental Impact Statement (1992). The General Management Plan (GMP) completed in 1992 for the original Preserve. This document guides visitor use, natural and cultural resource management, and general development in the original Preserve. It provides a clearly defined direction for resource management and preservation as well as appropriate visitor use and interpretation of the resources within the original Preserve boundaries. The GMP also includes a Mineral Management Plan (MMP), which identifies measures to mitigate potential adverse environmental impacts associated with oil and gas activities. These measures or operating “stipulations” as named in the MMP, address special areas of protection as well as an overall limit on activity influence. The 1992 GMP/MMP was prepared with an Environmental Impact Statement (EIS), which analyzed the potential environmental effects of oil and gas activities in the Preserve, including exploration and production activities.

Addition Final General Management Plan/Wilderness Study/Off-Road Vehicle Management Plan/Environmental Impact Statement (2010). The purpose of the Addition GMP, completed in 2010, is "to provide a comprehensive direction for resource preservation and visitor use and a basic foundation for decision-making for the Addition for the next 15 to 20 years" (NPS 2010*a*). Among other things, the Addition GMP considered the wilderness eligibility of the land in the Addition, which resulted in 47,067 acres of the Addition being proposed for wilderness designation. The Addition GMP states that "[n]one of the actions included in the General Management Plan would result in changes to oil and gas exploration or extraction of new resources from the Addition," and the Record of Decision (ROD) for the Addition GMP states "[n]othing in the selected action will affect the existing legal rights of mineral owners or change the approved exploration plans and practices of operators."

Superintendent's Compendium. This document outlines specific regulatory provisions established for the proper management and protection of resources and the public use of the Preserve. Regulations outlined in the *Superintendent's Compendium* include those pertaining to closures and public use limits; permits; preservation of natural, cultural, and archeological resources; wildlife protection; and recreational uses and limitations.

Final Environmental Impact Statement and South Florida and Caribbean Parks Exotic Plant Management Plan (2010). This plan outlines the management of nonnative plants in nine south Florida and Caribbean parks, including the Preserve. The plan promotes restoration of native plant communities and habitat conditions in ecosystems that have been invaded by nonnative plants and protects resources, values, visitors, staff, and area residents from adverse effects resulting from nonnative plant presence and control activities. The plan takes a collaborative approach to managing nonnative plants across the nine parks, improving effectiveness and efficiency and providing a consistent management framework for responding to this threat. The plan also seeks to establish plant and treatment location priorities, reduce new nonnative plant introductions, and reduce the number of individually targeted plants to protect natural resources (NPS 2010*b*).

Long-Range Interpretive Plan (2002). This plan provides the vision for visitor experiences in the Preserve based on the purpose, significance, and mission put forth in the "Preserve's Strategic Plan." The *Interpretive Plan* proposes both development and management activities to satisfy current visitor demands and identifies a media and activity action plan to meet future visitor needs. The interpretive plan was meant to guide the Preserve's interpretation direction for 10 years (NPS 2002*a*).

Recreational Off-Road Vehicle Management Plan/Environmental Impact Statement (2000). This plan is called for and directed by the 1992 GMP. Off-road vehicle (ORV) use is allowed in the original Preserve by the enabling legislation in a manner that is compatible with resource preservation.

The ORV plan outlines the management of recreational ORV use in the original 582,000 acres of the Preserve. It specifies that recreational ORV travel is facilitated by a system of designated access points and trails; that sensitive areas be closed; that temporal and seasonal closures be instituted; and that permits and education be required to operate off-road vehicles in the original Preserve.

Hunting Management Plan/Environmental Assessment (2014). Both the GMP and the Addition GMP articulate the need to manage hunting within the Preserve. While public hunting has been allowed in the Preserve, the Addition was not historically open to public hunting. In 2014, NPS adopted a Hunting

Management Plan for managing hunting in the Preserve, including the Addition. The Hunting Management Plan creates a framework to develop hunting opportunities in the Preserve. It calls for NPS and FWC, in consultation with USFWS, to address the uncertainties associated with allowing hunting throughout the Preserve. The plan calls for implementation of hunting regulations, adaptive management objectives, baseline management actions, adaptive management triggers, supplemental management actions, and public involvement.

Backcountry Access Plan (in preparation). NPS is in the process of preparing a Backcountry Access Plan that will develop a management approach for ORV secondary trails, non-ORV trails, and camping and that will develop hiking opportunities. While this plan will be tied to the 2000 Off-Road Vehicle Management Plan and the Addition GMP, the Backcountry Access Plan will further clarify the Preserve's management approach as related to secondary trails, camping, and other backcountry opportunities.

Big Cypress National Preserve Fire Management Plan (2010). The BCNP Fire Management Plan addresses the role and control of fire with respect to ecosystem management and the protection of life and property. Minor updates to the Fire Management Plans for BCNP and the Florida Panther National Wildlife Refuge (FPNWR) subject to an EA in 2016 which concluded that neither alternative to the existing plans would have measurable impacts to oil and gas operations in BCNP.

National Park Service Management Policies (2006). The NPS Management Policies (USDOI-NPS 2006) provide a collected set of policies designed to manage a variety of resources within units of the national park system. Compliance with NPS management policies for natural resources such as biological resources, water resources, air resources, geologic resources, and cultural resources are addressed in detail within this document. The proposed activities and operational details for the Nobles Grade and Tamiami Prospects are consistent with other recent oil and gas exploration activities within BCNP, which have demonstrated compliance with policies for Soundscape Management and Lightscape Management. The use of motorized equipment to conduct the proposed activities will adhere to NPS policies for motor vehicles and will utilize the least impacting equipment, vehicles, and transportation systems consistent with the project purpose, employee safety, and public safety.

I. OWNERSHIP & CONTACT INFORMATION

I.N NOBLES GRADE PROSPECT

The Nobles Grade Prospect is located on the following property:

T-50-S, R-32-E, Collier County, Florida
Section 2: S/2 S/2 SW/4;
Section 3: W/2; S/2 SE/4;
Section 4: E/2;
Section 9: E/2 E/2 NE/4; NE/4 NE/4 SE/4
Section 10: N/2; N/2 N/2 SW/4;
Section 11: NW/4

I.N.A.1 Surface Owner(s) Other Than USDOI-NPS

USDOI-NPS is the only surface owner within the Nobles Grade Prospect.

I.N.A.2 Lessor (Mineral Owner)

Collier Resources Company
2600 Golden Gate Parkway, Suite 112
Naples, FL 34105-3200

I.N.B.1 Lessee and Operator

Burnett Oil Company
Burnett Plaza – Suite 1500
801 Cherry St. – Unit #9
Fort Worth, Texas 76102
(817) 332-5108

I.N.B.2 Field Representative

Contact: Wesley Hanna
Burnett Oil Company
Burnett Plaza – Suite 1500
801 Cherry St. – Unit #9
Fort Worth, TX 76102
(817) 332-5108

I.N.B.3 Contact Person in Case of Spill or Other Emergency

Kevin Vermillion
Burnett Oil Company
Burnett Plaza – Suite 1500
801 Cherry St. – Unit #9
Fort Worth, TX 76102
(817) 332-5108

I.N.C.1 Operator's Right to Conduct Operations

36 CFR § 9.83(a) requires evidence of the operator's right to conduct the drilling operations addressed in this plan. The mineral ownership of Collier Resources Company, LLC, in the mineral estate underlying the Nobles Grade Prospect dates back to 1911 when Barron G. Collier began purchasing over one million acres of land in Florida. Eventually, the Florida legislature established Collier County in 1923 after Barron Collier pledged to build a highway connecting Tampa to Miami through today's Everglades. In 1974, Congress approved the establishment of the BCNP, and in 1976 the Collier family conveyed over 76,000 surface acres to the United States. The Colliers, however, retained the mineral estate. All pertinent documentation evidencing the Colliers' mineral ownership in the Nobles Grade Prospect have been previously furnished to the USDOI-NPS. As said documentation has been previously provided to the NPS and Department of Interior Solicitor's Office, BOCI refers the Service to that submittal pursuant to 36 CFR § 9.81(a).

BOCI acquired the right to explore and produce oil and gas in the Nobles Grade Prospect pursuant to that certain Paid Up Oil and Gas Lease by and between Collier Resources Company, LLC, and Collier Enterprise Management, Inc., Lessor, and Burnett Oil Co., Inc., Lessee, effective February 14, 2019, a Memorandum of which is recorded in Volume 5655, Page 578, Official Public Records of Collier County, Florida. See **Appendix A Exhibit I.C.1.1**.

I.T TAMIAMI PROSPECT

The Tamiami Prospect is located on the following property:

T-52-S, R-34-E, Collier County, Florida
Section 1: E/2

T-51-S, R-34-E, Collier County, Florida
Section 36: All

I.T.A.1 Surface Owner(s) Other Than USDOI-NPS

USDOI-NPS owns all of the surface within the Tamiami Prospect, save and except the following two tracts:

- The NW/4 SW/4 NE/4 of Section 36 is owned by:
  Board of Trustees of the Internal Improvement Fund for the State of Florida
  c/o Florida Dept. of Environmental, Division of State Lands
  3900 Commonwealth Blvd., Mail Station 115
  Tallahassee, FL 32399-3000

- The West 3/5ths of the N/2 NW/4 NW/4 NW/4 of Section 36 is owned by:
  Two Story Camp, LLC
  15391 SW 210th Street
  Miami, FL 33187

I.T.A.2 Lessor (Mineral Owner)

Collier Resources Company
2600 Golden Gate Parkway, Suite 112
Naples, FL 34105-3200

I.T.B.1 Lessee and Operator

Burnett Oil Company
Burnett Plaza – Suite 1500
801 Cherry St. – Unit #9
Fort Worth, TX 76102-6881
(817) 332-5108

I.T.B.2 Field Representative

Contact: Wesley Hanna
Burnett Oil Company
Burnett Plaza – Suite 1500
801 Cherry St. – Unit #9
Fort Worth, TX 76102

(817) 332-5108

I.T.B.3 Contact Person in Case of Spill or Other Emergency

Kevin Vermillion
Burnett Oil Company
Burnett Plaza – Suite 1500
801 Cherry St. – Unit #9
Fort Worth, TX 76102
(817) 332-5108

I.T.C.1 Operator's Right to Conduct Operations

36 CFR § 9.83(a) requires evidence of the operator's right to conduct the drilling operations addressed in this plan. The mineral ownership of Collier Resources Company, LLC, in the mineral estate underlying the Tamiami Prospect dates back to 1911 when Barron G. Collier began purchasing over one million acres of land in Florida. Eventually, the Florida legislature established Collier County in 1923 after Barron Collier pledged to build a highway connecting Tampa to Miami through today's Everglades. In 1974, Congress approved the establishment of the BCNP, and in 1976 the Collier family conveyed over 76,000 surface acres to the United States. The Colliers, however, retained the mineral estate. All pertinent documentation evidencing the Colliers' mineral ownership in the Tamiami Prospect have been previously furnished to the USDOI-NPS. As said documentation has been previously provided to the NPS and Department of Interior Solicitor's Office, BOCI refers the Service to that submittal pursuant to 36 CFR § 9.81(a).

BOCI acquired the right to explore and produce oil and underlying the Tamiami Prospect pursuant to that certain Oil and Gas Lease dated January 11, 2019, by and between Collier Resources Company, LLC, and Collier Enterprises Management, Inc., Lessor, and Burnett Oil Company, Lessee, a Memorandum of which is recorded in Volume 5655, Page 582, Official Public Records of Collier County, Florida. See **Exhibit I.C.2.1**.

II. MAPS & PLATS

The purpose of this section is to graphically show the operator's mineral tract(s) and the area of operations in relation to the Preserve. The area of operations includes proposed new surface disturbance associated with the operations such as the well pad, access road, and any other planned surface use. The scaled location plats are intended to clearly and accurately define the area that the operator has available for conducting well operations and to identify the area that the operator is responsible for reclaiming.

The following subsections provide a brief description of each map or plat, and an accompanying figure. Smaller-scale figures are included as **numbered exhibits in Appendix A** while large-scale (24"x36") construction plans can be found in **Appendix B (Nobles Grade Prospect) and Appendix C (Tamiami Prospect)**.

II.N NOBLES GRADE PROSPECT

II.N.A Tract/Lease Boundary Map

Exhibit A.1 depicts the lease boundary and drilling unit boundaries for the Nobles Grade Prospect in relation to the proposed operations area.

II.N.B Operation Location Map

Exhibit B.1.a depicts the Operation Location Map overview for the Nobles Grade Prospect, including the following features: BCNP boundary; lease boundary; drilling unit boundaries; and the proposed access road, wellpad, and loading facility. The flowlines/pipelines for the Nobles Grade Prospect are depicted on the Construction Drawings in Appendix B. Flowlines/pipelines will run parallel to the access road within the road right of way. There are no existing flowline/pipelines within the project area.

Exhibit B.1.b depicts a detailed view of the well pad area including the following features: proposed oil/gas well(s) and production facilities; proposed access road; and proposed flowlines/pipelines originating at the well pad.

Exhibit B.1.c depicts a wide view extent of the well pad area including the following features: BCNP boundary; lease boundary; drilling unit boundaries; proposed access road, well pad, and loading facility; and all existing wells within a 1-mile radius of the area of operations (potable water, disposal, producing, shut-in, exploratory, and abandoned).

All the fill/borrow material for the Nobles Grade Prospect proposed road, well pad, and loading facility will be sourced from outside the BCNP.

II.N.C Operation Plats for Access Road, Well Pad & Drilling Rig

The large-scale construction plan set for the Nobles Grade Prospect area of operations is provided in **Appendix B**. This plan set includes details of proposed access road, well pad and loading facility including cross sections, spillways, hydrological controls, pad layout, electrical, flowline, etc.

The proposed access road and pad designs utilized long-term hydrologic data from the Everglades Depth Estimation Network (EDEN) gage station closest to the area of operations and south of I-75, along with hydrobiological indicators as noted in the field. The designs are based upon a combination of average wet season water depths, seasonal high water (SHW) levels, and extreme water-level events (i.e., Hurricane Irma, the highest water levels recorded within BCNP between 1991-2020). For Nobles Grade, average seasonal (above ground surface) water levels reflect median/mean values of approximately 11 inches above ground surface, based on measurements from the EDEN BCA-13 gage station (https://sofia.usgs.gov/eden/stationlist-area.php?area=BCNP). Seasonal high water hydrobiological indicators are inconsistent at Nobles Grade, but the professionally GPS-surveyed field estimates of 1.6-1.8 feet above natural ground surface tracks well with the long-term seasonal high-water gage data from BCA-13. The highest water level recorded at station BCA-13 between 1991-2020 was 12.95 feet (NAVD88), or a depth of 2.45 feet above the natural ground surface (Hurricane Irma, 9/11/2017).

Access Road

Generally, the roads are proposed to be constructed of lime rock over imported fill with a 15 foot wide roadway width. Reference **sheet C-501 and C-502 of Appendix B** (the construction plans) for typical road cross sections.

The turnouts are shown and numbered on the master plan and roadway site plans. The turnouts have been provided at approximately 0.5-mile intervals and, in addition to siting the turnouts by separation, an effort has been made to place the turnouts adjacent to curves in the road and areas with lower natural resource values. At each of the turnout locations, temporary impacts are proposed to allow for a turnaround for vehicles during the construction process. Following the completion of the roadway construction, the fill for the temporary turnarounds will be removed and the areas will be reclaimed.

Well Pad & Loading Facility Pad

The well and loading facility pads will be filled with imported fill material and stabilized with lime rock. Reference **sheet C-501 and C-502 of Appendix B** (the construction plans) for typical pad cross sections. The well pads are proposed to be filled and there are no ditches or sumps proposed around the pads.

Drilling Operations

The various stages of the drilling rig and equipment layout are shown on **sheet C-132 and C-133 of Appendix B** (the construction plans). The rig and equipment layouts are shown at the various stages of the drilling operation in the construction plans. Reference **sheet C-133 of Appendix B** (the construction plans) for the locations of the equipment.

While the drilling rig is in operation, 12 mil plastic liner will be placed under diesel tank(s), mud pumps, mud tanks and any other tanks with the potential to release any fluids other than untreated fresh water. This equipment is show in **Appendix B**, **sheet C-133**.

The temporary living quarters will be trailers located on the well pads. Reference **sheet C-132** of the construction plans (**Appendix B**) for the locations of the trailers. Properly maintained sanitary facilities will consist of portable toilets located adjacent to the temporary living quarters. All temporary facilities will be removed after all completion operations have ended. (see **sheet C-132** of **Appendix B**).

The well pad will be graded to have overland flow from the pad directed to dry detention areas. In addition to the stormwater dry detention areas, the well pad is proposed to have a two-foot containment berm around the entire perimeter of the pad.

Production Operations & Equipment

Well Pad dimensions can be found on **sheet C-132** of **Appendix B**

Example diagrams of wellhead configurations can be found in **Appendix A**. **Exhibit II.C.1.6.i** depicts a flowing producing well. **Exhibit II.C.1.6.ii** shows the wellhead configuration for after the well has been converted to electric submersible pump (ESP). Finally, **Exhibit II.C.1.6.iv** depicts a typical saltwater disposal (SWD) wellhead. Reference **sheet C-132 of Appendix B** for the location of the well heads.

The facility diagrams depict the basic flow process and show the evolution of the facility from accommodating one well, as shown in **Exhibit V.C.1.5ii**, to accommodating multiple wells, as shown in **Exhibit V.C.1.5.i**. Individual well flowlines will be buried on the pad and take the most direct route possible between their respective connection points.

The wells at Nobles Grade will initially be powered by natural gas generators located close to the production facilities (reference **Appendix B**). Noise impacts for each generator can be located in **Appendix A, Exhibit II.C.1.6.c**. At full development, three 350 kW (Mesa 22L or equivalent) will be installed to support the load. The generators will use produced gas as their primary source of fuel, and there will be supplemental LNG or CNG in place as a backup fuel source. If the area power grid can support the load and construction is economically feasible, underground powerlines will be run from the existing facilities at the FDOT MM63 rest area on the roadway backslope. The three phase underground powerlines will be built and operated by Lee County Electric Cooperative (LCEC). The operating voltage will be designated by LCEC engineers to support the load at both the well pad and loading facility.

Reference Cross Section B on **sheet C-501**, **Appendix B** for the proposed two-foot containment berm around the entire perimeter of the well pad. The finished grade of the roads and pads was selected based upon the anticipated high-water elevations in the preserve; contours showing the anticipated high-water elevations within the project limits are shown on sheet C-002 of **Appendix B**. The high-water elevations are based on the peak stage data resulting from Hurricane Irma in September 2017.

The location of the proposed produced saltwater disposal well (SWD) is shown in **Appendix B** on **sheet C-132**. The pump will be located within the confines of the tank containment and the flowline will be buried. It will take the most direct route possible and will stay within the confines of the well pad.

There are no plans for any secondary or tertiary recovery operations for this field. The reservoir has natural pressure support and would not benefit from a waterflood.

II.N.D Topographic Plans for Nobles Grade Prospect

The well pad dimensions, including contours, are shown on **sheet C-132 of Appendix B** and the typical pad cross section is included as Cross Section B on **sheet C-501 of Appendix B**. The existing contours are shown on the roadway plan sheets of **Appendix B**. Contours were derived from the Western Everglades Restoration Project (WERP) LiDAR data (USACE 2018). The flowline is proposed to be installed on the road backslope as shown in **Appendix B**.

II.T TAMIAMI PROSPECT

II.T.A Tract/Lease Boundary Map

Exhibit A.2 depicts the lease boundary and drilling unit boundaries for the Tamiami Prospect in relation to the proposed operations area.

II.T.B Operation Location Map

Exhibit B.2.a depicts the Operation Location Map overview for the Tamiami Prospect, including the following features: BCNP boundary; lease boundary; drilling unit boundaries; and the proposed access road, well pad and loading facility. The flowlines/pipelines for the Tamiami Prospect are depicted on the Construction Drawings in Appendix B. Flowlines/pipelines will run parallel to the access road within the road right of way. **Exhibit B.2.b** depicts a detailed view of the well pad area including the following features: proposed oil/gas well(s) and production facilities; proposed access road; and proposed flowlines/pipelines originating at the well pad.

Exhibit B.2.c depicts a wide view extent of the well pad area including the following features: BCNP boundary; lease boundary; drilling unit boundaries; proposed access road, well pad, and loading facility; and all existing wells within a 1-mile radius of the area of operations (potable water, disposal, producing, shut-in, exploratory, and abandoned).

All the fill/borrow material for the Tamiami Prospect proposed road, well pad, and loading facility will be sourced from outside the BCNP.

II.T.C Operation Plats for Access Road, Well Pad & Drilling Rig

The large-scale construction plan set for the Tamiami Prospect area of operations is provided in **Appendix C**. This plan set includes details of proposed access road, well pad and loading facility including cross sections, spillways, hydrological controls, pad layout, flowline,etc.

The proposed access road and pad designs (well and loading facility) utilized long-term hydrologic data from the Everglades Depth Estimation Network (EDEN) gage station closest to the area of operations and south of I-75, along with hydrobiological indicators as noted in the field. The designs are based upon a combination of average wet season water depths, seasonal high water (SHW) levels, and extreme water-level events (i.e., Hurricane Irma, the highest water levels recorded within BCNP between 1991-2020). For the Tamiami site, the average seasonal (above ground surface) water levels reflect median/mean values of approximately 9 inches above ground surface, based on measurements from the EDEN6 gage station (https://sofia.usgs.gov/eden/stationlist-area.php?area=BCNP).

High water hydrobiological indicators at the Tamiami site were professionally GPS-surveyed at elevations 2.2-2.4 above natural ground, which correlates to the Hurricane Irma storm event and not typical seasonal high-water levels. The highest water level recorded at station EDEN6 between 2006-2020 was 12.95 feet (NAVD88), or a depth of 2.41 feet above the natural ground surface (Hurricane Irma, 9/11/2017). The extremely slow drop in water levels after that storm overprinted any normal seasonal high-water indicators in this area. Data from the EDEN6 station indicate that the typical seasonal high-water levels are 1.4-1.7 feet above natural ground surface.

Access Road

Generally, the roads are proposed to be constructed of lime rock over imported fill with a 15-foot-wide roadway width. Reference **sheet C-501 and C-502 of Appendix C** (the construction plans) for typical road cross sections.

The turnouts are shown and numbered on the master plan and roadway site plans. The turnouts have been provided at approximately 0.5-mile intervals and, in addition to siting the turnouts by separation, an effort has been made to place the turnouts adjacent to curves in the road and areas that with lower natural resource values. At each of the turnout locations, temporary impacts are proposed to allow for a turnaround for vehicles during the construction process. Following the completion of the roadway construction, the fill for the temporary turnarounds will be removed and the areas will be reclaimed.

Well Pad & Loading Facility

The well and loading facility pads will be filled with imported fill material and stabilized with lime rock. Reference **sheet C-501 and C-502 of Appendix C** (the construction plans) for typical pad cross sections. The well pads are proposed to be filled and there are no ditches or sumps proposed around the pads.

Drilling Operations

The various stages of the drilling rig and equipment layout are shown on sheets **C-125 and C-126 of Appendix C** (the construction plans). The rig and equipment layouts are shown at the various stages of the drilling operation in the construction plans. Reference **sheet C-125** of the construction plans (**Appendix C**) for the location of the equipment.

While the drilling rig is in operation, 12 mil plastic liner will be placed under diesel tank(s), mud pumps, mud tanks and any other tanks with the potential to release any fluids other than untreated fresh water. This equipment is show in **Appendix C, sheet C-126**.

The temporary living quarters will be trailers located on the well pads. Reference **sheet C-12**5 of the construction plans (**Appendix C**) for the locations of the trailers. Properly maintained sanitary facilities will consist of portable toilets located adjacent to the temporary living quarters. All temporary facilities will be removed after all completion operations have ended. (see **sheet C-125** of **Appendix C**).

The well pad will be graded to have overland flow from the pad directed to dry detention areas. In addition to the stormwater dry detention areas, the well pad is proposed to have a two-foot containment berm around the entire perimeter of the pad.

Production Operations & Equipment

Well Pad dimensions can be found on **sheet C-125 of Appendix C**. Example diagrams of wellhead configurations can be found in **Appendix A**. **Exhibit II.C.1.6.i** depicts a flowing producing well. **Exhibit II.C.1.6.ii** shows the wellhead configuration for after the well has been converted to electric submersible pump (ESP). Finally, **Exhibit II.C.1.6.iv** depicts a typical saltwater disposal (SWD) wellhead. Reference sheets **C-125 and C-126 of Appendix C** for the location of the well heads.

The facility diagrams depict the basic flow process and show the evolution of the facility from accommodating one well, as shown in **Exhibit V.C.2.5ii**, to accommodating multiple wells, as shown in

Exhibit V.C.2.5.i. Individual well flowlines will be buried on the pad and take the most direct route possible between their respective connection points.

There are currently no plans to build powerlines to the Tamiami pad. Generators at the pad site will be utilized for power on location. At full development, three 350 kW (Mesa 22L or equivalent) will be installed to support the load. Noise impacts for each generator can be located in **Appendix A, Exhibit II.C.1.6.c.** The Tamiami wells and facilities will be powered by generators located near the production facilities, as shown in **Appendix C, sheet C-125**. The generators will use produced gas as their primary source of fuel, and there will be supplemental LNG or CNG in place as a backup fuel source. Reference Cross Section B on **sheet C-501, Appendix C** for the proposed two-foot containment berm around the entire perimeter of the well pad. The finished grade of the roads and pads was selected based upon the anticipated high-water elevations in the preserve; contours showing the anticipated high-water elevations within the project limits are shown on sheet C-002 of **Appendix C**. The high-water elevations are based on the peak stage data resulting from Hurricane Irma in September 2017.

The location of the proposed produced water disposal well (SWD) is shown on **sheet C-125 of Exhibit C**. The pump will be located within the confines of the tank containment and the flowline will be buried. It will take the most direct route possible and will stay within the confines of the well pad.

There are no plans for any secondary or tertiary recovery operations for this field. The reservoir has natural pressure support and would not benefit from a waterflood.

II.T.D Topographic Plans

The well pad dimensions, including contours, are shown on sheet **C-125 of Appendix C** and the typical pad cross section is included as Cross Section B on **sheet C-501 of Appendix C**. The existing contours are shown on the roadway plan sheets of **Appendix C**. Contours were derived from the 3D Elevation Program (3DEP) LiDAR data published by the USGS (2019). The flowline is proposed to be installed on the road backslope as shown in **Appendix C**.

III. TIMELINE FOR OPERATIONS – NOBLES GRADE & TAMIAMI PROSPECTS

The operational timelines are contingent upon gaining all necessary federal, state, and local permits and approvals required to initiate construction. Construction activities will be scheduled for the dry season, normally the period November through April, unless otherwise authorized by the superintendent. Table 3-1 outlines the major operational tasks and the expected timelines for each.

Table 3-1. Operational Timelines

Operation/Task	Dates and/or Days

Date to Begin Site Preparation and Construction	Dependent on date of permit issuance.
Date to Spud Well(s)	Nobles Grade: TBD* Tamiami: TBD* *Dependent on date of permit issuance.
Days to Drill to Total Depth	11 Weeks
Days to Test/Complete Well and Start Production	12 Weeks
Anticipated Longevity of Operation	+/- 30 years
Date to Begin Reclamation	Year 2052
Time to Complete Reclamation	Year 2057

IV. DESCRIPTION OF WELL GEOLOGY

- The surface formation in the Nobles Grade Prospect is the Tamiami Formation which includes sandy limestones, sands, clays, marls with a variable phosphate and fossil content. G*eologic Map of Collier County, Florida* (Duncan 1993).

- The surface formation in the Tamiami Prospect is undifferentiated Quaternary sediments of the Caloosahatchee, Ft. Thompson, and Nashua Formations. *Geologic Map of Collier County, Florida* (Duncan 1993).

- The Sunniland Formation is an interval of limestones, dolomites, and anhydrites of early Cretaceous Age. The Sunniland Trend produces from porous zones within biohermal, rudistid mounds, generally within the upper 60 feet of the formation. The mounds have vugular to pinpoint porosity. The top reservoir seal is the dense grey limestone and anhydrite of the Lake Trafford Formation while the lower reservoir seal is the Punta Gorda Anhydrite.

IV.N NOBLES GRADE PROSPECT

IV.N.A Area of Operations

Total Depth of Oil/Gas Well(s), Producing Zone and Formation

- Total Vertical Depth of well(s): 11,900 feet true vertical depth
- Anticipated Producing Zone Depth: 11,370 feet true vertical depth
- Producing Formation: Sunniland Formation

Depth of Usable Quality Water Zone(s) (Aquifers)

- Surficial Aquifer System Base: 150 feet below sea level
- Intermediate Aquifer System Base: 700 feet below sea level

Depth(s) of Known Brine Zones and Other Minerals

- Floridian Aquifer System*: 700 – 4000 feet below sea level

  *known brackish to brine zones

Depth(s) Abnormal Pressure or Other Geologic Hazards

- Boulder Zone – Potential Lost Circulation Interval between 2,350’ – 2,850’ TVD
- Trinity Flow Zone – Potential Water Flow zone 11,240’ - 11,270’ TVD

Burnett plans to set casing strings to cover both the Boulder Zone (9-5/8” Intermediate) and Trinity Flow Zone (7” Production) prior to drilling below both intervals.

IV.T TAMIAMI PROSPECT

IV.T.A Area of Operations

Total Depth of Oil/Gas Well(s), Producing Zone and Formation

- Total Vertical Depth of Well(s): 11,800 feet true vertical depth
- Anticipated Producing Zone Depth: 11,340 feet true vertical depth
- Producing Formation: Sunniland Formation

Depth of Usable Quality Water Zone(s) (Aquifers)

- Surficial Aquifer System Base: 150 feet below sea level

- Intermediate Aquifer System Base: 800 feet below sea level

Depth(s) of Known Brine Zones and Other Minerals

- Floridian Aquifer System*: 700 – 4000 feet below sea level

  *known brackish to brine zones

Depth(s) of Abnormal Pressure or Other Geologic Hazards

- Boulder Zone – Potential Lost Circulation Interval between 2,450' – 2,950' TVD
- Trinity Flow Zone – Potential Water Flow zone 11,240' - 11,270' TVD

Burnett plans to set casing strings to cover both the Boulder Zone (9-5/8" Intermediate) and Trinity Flow Zone (7" Production) prior to drilling below both intervals.

V. DESCRIPTION OF OPERATIONS

V.N NOBLE GRADE PROSPECT

V.N.A New Access Road and Pad Construction

All construction activities will be scheduled for the dry season, unless otherwise authorized by the Superintendent. Appropriate notice will be given to NPS and required regulatory agencies prior to the commencement of all construction activities. Total fill amounts will be determined once final pad and access road are approved. The road and pad construction will utilize clean fill material from the existing mine at Ave Maria. The fill material will be mined from a depth of approximately 30 feet below the ground surface and therefore will not contain an exotic seed source. The roadway backslopes will be stabilized with gravel rock laid over top of filter fabric.

The anticipated inventory of equipment to be used (following silt fence installation) during construction will consist of an excavator for clearing operations, dozers, rollers, and a tub grinder for mulching cleared hardwood. It is not anticipated that "off-road" dump trucks will be required.

New Access Road Construction

The access road alignment and construction details are shown in the construction plans included as **Appendix B**.

The road is anticipated to be entirely constructed from imported fill placed upon the cleared ground elevation. Due to the need to fill the entire roadway corridor to create a roadway above the wet season water table elevation, it is not anticipated that soils will be removed as a part of the construction activities. As such the storage and management of the in-situ soils will not be required. If unsuitable / muck soils are encountered within the alignment of the roadway, the ground surface is proposed to be stabilized with an

engineered cellular confinement system to provide a stable foundation for the imported fill. The roadway is proposed to be constructed from imported fill material that will serve as a suitable base for a driving surface / roadway consisting of an eight-inch-thick compacted lime rock road. All of the fill material for the construction of the roadways will be from the existing earth mine at Ave Maria. The mine is located on the north side of Oil Well Road in the southern portion of the Ave Maria community. The route for fill trucks to the Nobles Grade road will be from Ave Maria via SR 29 southbound to I-75 eastbound with entrance to BCNP at the Mile Marker 63 rest area.

The roadway plans (included as **Appendix B**) depict the locations of culverts and overflow weirs along the road alignment. Generally, the design consists of a series of intermittently spaced culverts to provide conveyance of sheet flow in typical flow conditions and a series of high-water crossings in which the road is proposed to be stabilized and lowered in grade to allow for conveyance in high water conditions. Turnouts will be constructed every half mile from beginning of road to the well pad. All roads will be constructed as per current state and federal regulations. Roads will have signs indicating maximum speed limits, ORV crossings and curves.

New Pad Construction

The surface runoff from the pads will be directed to dry detention areas that will have bottom elevations above the wet season water table elevation.

The cellar will be constructed of either lumber or corrugated pipe, depending on availability and preference of the rig contractor. Cement from the first casing string will cover the bottom of the cellar. The mousehole and rathole will be drilled just prior to the rig moving in, and they will be filled in shortly after the rig moves off the hole.

Typical liner is 12-mil liner and will be placed under equipment that has the potential to release fluids other than untreated fresh water. This includes, but is not limited to, diesel tanks, steel mud pits, and mud pumps.

The pads are proposed to have a two-foot tall containment berm around the perimeter of the pad that will prevent release of spills into the surrounding lands / waters. In addition to the containment berm, the pads are proposed to be graded to direct all surface runoff to the proposed dry detention area on the pad. In the unlikely event of a spill of a duration and rate severe enough to reach the dry detention area, the proposed stormwater control structure can be plugged to prevent discharge to downstream areas and the dry soil removed and replaced to provide remediation for the spill.

If results of the discovery well deem the project commercial, additional modifications will be made to the pad as outlined in the plan set. The pad will be regraded, and the permanent dry retention area constructed. This will occur after the disposal well is drilled. Production facilities will also be constructed at this time.

V.N.B DRILLING OPERATIONS

V.N.B.1 Mobilization of Equipment

Rapad Rig 33 or equivalent will be mobilized to location from their yard or last drill location using a third-party rig moving service. One crane will be used to aid in rig up operations. Several of the trucks will be permit loads. The trucking company will be responsible for obtaining the necessary permits. Trucks will be brought into location on lime rock roads to be built prior to drilling operations. NPS and FDEP will be notified prior to the commencement of all drilling and completion activities. All equipment used in the drilling and completion of the wells will be removed from the location once it is no longer needed.

V.N.B.2 Site Security and Public Safety

In coordination with the National Park Service, Burnett Oil Co., Inc. will implement a variety of measures to control access to drill sites and ensure the safety of the public and wildlife. These measures will include personnel onsite 24-hours to control access to the road leading to the drilling location in addition to a lockable road gate. All gates and fenced in sites will include the appropriate warning signs approved by the NPS in advance.

Windsocks will be placed on tank batteries to reference in the event H_2S is present in levels exceeding 10 ppm. All personnel and contractors will be required to wear personal H_2S monitors at all times.

Speed limit signs and CB protocols will be used on the access road to the Nobles Grade Pad to minimize the risk of vehicle accidents on the narrow road. Safety signage will be installed at all road/trail crossings to alert all parties utilizing the roads and trails of potential commercial and visitor interactions at these intersections.

Noise levels for drilling and completion operations will be evaluated and sound barriers utilized if required by NPS.

Work crews will be prohibited from carrying firearms while working in the preserve.

No dogs will be permitted at residential camps or the site of operations.

V.N.B.3 Fresh Water Quantity, Source, Transport and Storage

Burnett Oil Co., Inc. has contracted with a professional hydrogeological firm to secure water use permits from the South Florida Water Management District (SFWMD) for drilling water and potable water needs and will commission a licensed Florida water well drilling contractor to obtain the necessary well construction permits from Collier County to drill the needed water supply wells. A small diameter well targeting the Lower Tamiami Aquifer is proposed for a limited use potable supply well and a larger diameter well targeting the Lower Hawthorn Producing Zone of the Upper Floridan Aquifer (UFA) is proposed for the drilling water supply well. Data from Reese and Cunningham (2000) indicate that the Lower Tamiami Aquifer occurs between 65 and 115 feet below land surface. Data from Reese and Richardson (2008) indicate that the Lower Hawthorn Producing Zone of the UFA occurs between 797 and 840 feet below land surface near the proposed Nobles Grade pad. The wells will be located on the same pad location and will be drilled in compliance with appropriate State of Florida water laws and regulations. The potable supply well will be drilled to approximately 80-100 feet below land surface and provide fresh water for drinking

water supply. The drilling water supply well will be drilled to approximately 850 feet below land surface and will supply slightly brackish water for drilling and completion operations. Published data on the Lower Tamiami Aquifer (aka Gray Limestone) for this area identifies a thick semi-confining unit between this aquifer and the surficial water table. FDEP well information indicates that the freshwater wells at the Alligator Alley MM63 rest area shown on Exhibit B.1.C. were drilled into the Intermediate Aquifer that lies below the Gray Limestone Aquifer, with at least one confining unit between the Intermediate Aquifer and the Gray Limestone unit. The proposed pad is 3 miles downgradient from the rest area wells.

Published data indicate that the Lower Tamiami Aquifer has a chloride concentration around 150 mg/l which would classify it as fresh. The potable supply is expected to require a single 4-inch diameter well and water withdrawals of less than 10,000 gallons per day (gpd). The UFA at this location is expected to have a chloride concentration of around 800 mg/l which is considered slightly brackish. The drilling supply well will require a capacity of up to 1 MGD of water for some drilling operations. The Lower Tamiami Aquifer provides the freshwater needed for the relatively small demand for drinking water supply while the mildly brackish Lower Hawthorn/UFA provides for a high capacity supply with no potential for water level drawdowns in sensitive surficial environments. The use of a relatively shallow freshwater aquifer for a relatively low demand potable supply and the deeper slightly brackish aquifer for the higher demand drilling water supply is the most technologically appropriate and least impactful method for obtaining suitable water quality and quantities for drilling and completion operations. Alternative methods would require increased truck traffic into the Preserve and could create severe operational issues.

Water will be stored in mobile heavy gauge steel storage tanks on location. Storage requirements or the amount of mobile heavy gauge steel storage tanks to be utilized will depend on the amount of water being supplied by the water well(s) in conjunction with the amount needed to sustain constant drilling operations. Water will be pumped from the water well(s) through poly pipe(s) to the tanks on location. These tanks will be rented and will be returned after drilling and completion operations are complete.

V.N.B.4 Stormwater Management

The stormwater management system components are shown on the construction plans included as **Appendix B.** As previously described, the proposed construction will include cross drains and lowered sections in the roadway to maintain the sheet flow from upstream and downstream sides of the road. The proposed pads will include dry retention areas to provide storage and treatment of stormwater prior to release to the downstream receiving areas.

V.N.B.5 Blowout Preventers and Other Pressure Control Equipment

Rapad Rig 33 is equipped with a Hydril 13-5/8” 5000# annular and a 10,000# bottom flange, Cameron Type U 13-5/8” single and double ram preventors. The 13-5/8” drilling spool has 4-1/16” 10,000# outlets. Exact equipment may vary, depending on the final rig selection for each well. This is an example of what would typically be used for this operation. A larger annular section will be utilized for the surface hole, as outlined in the table below. The table below outlines the BOP program for each hole section. **Exhibit V.B.1.5** shows the schematic of the blowout preventer (BOP) stack to be utilized in drilling these wells.

Minimum Specifications and Pressure Ratings

Hole Size	Casing Size	Size/Pressure (Annular/Rams)	Bottom to Top Arrangement	Low/High Test Pressures Rams/Annular

17 1/2"	13 3/8" 54.5# J-55	21 3/4" 2M	A	N/A
12 1/4"	9 5/8" 36# J-55	13 5/8" 5M/10M	P/S/B/A	250-3500/250-2500
8 3/4"	7" 26# L-80	13 5/8" 5M/10M	P/S/B/A	250-3500/250-2500
6 1/8"	5 1/2" FJ 17# L-80	13 5/8" 5M/10M	P/S/B/A	250-3500/250-2500

P-pipe rams, S-spool, B-blind rams, A-annular

Testing Procedures and Frequencies

Pressure testing of the BOP equipment shall adhere to Florida Administrative Code (FAC) 62C-27.006. Per rule 62C-27.006 (2): Blowout preventers and related well-control equipment shall be pressure-tested when installed, before drilling out after each string of casing is set, not less than once each week while drilling, following repairs that require disconnecting a pressure seal in the assembly, and at such other times as prescribed by the Department. A required weekly test while drilling may be deferred up to one week to avoid unnecessary tripping of the drill string or conditions that would endanger the hole. Blowout preventer tests shall be recorded on the driller's log. Deferral of weekly tests will be done in consultation with the Florida Department of Environmental Protection (FDEP) and NPS. Any additional tests will be conducted at the direction of NPS and FDEP. Rams will be tested to 250 psi (low side) and 3500 psi (high side). Annular will be tested to 250 psi (low side) and 2500 psi (high side).

V.N.B.6 Drilling Program

Total Depth and Directional Program

Directional plans and anti-collision plots for each well are located in **Appendix A**. The exhibits are as follows:

- Well NG 3-3 #1 **- Exhibits V.B.1.6.i** and **V.B.1.6.i.a**
- Well NG 10-1 #1 **- Exhibits V.B.1.6.ii** and **V.B.1.6.ii.a**
- Well NG 10-2 #1 **- Exhibits V.B.1.6.iii** and **V.B.1.6.iii.a**

Hole Size for Each Casing String

- Conductor: 20" conductor driven to approximately 250' or first refusal depth
- Surface: 17-1/2" hole with 13 3/8" 54.5# J-55 surface casing to be set at approximately 2250' to protect all fresh water bearing zones.
- Intermediate: 12-1/4" hole with 9 5/8" 36# J-55 intermediate casing to be set below the top of the Borelis formation at approximately 4000' to cover the Boulder interval.
- Production:
- 8-3/4" hole with 7" 26# L-80HC production casing to be set at approximately 11,300' TVD just above the pay zones that comprise the Sunniland trend.
- 6-1/8" hole with 5 1/2" 17# L-80HC flush joint liner to be set at approximately 11,600' TVD to cover the potential pay zones. The size of the liner may vary to accommodate the desired well completion, based on open-hole log data that will be obtained.

- Hole sizes and casing specifications may vary due to pipe availability. The weights and grades listed exceed the minimum pressure and tensile strength requirements and could be substituted with pipe that exceeds the specifications of these listed.

V.N.B.7 Mud Program

A closed loop system will be utilized to process cuttings in the drilling mud returns. The system will utilize the rig shaker, drying shakers, a centrifuge, cuttings catch tank, minimum of (2) 300 bbl cuttings tanks, and a trac hoe to manage cuttings separation and disposal. All drill cuttings will be transported to and disposed at an off-site state-approved disposal facility. Remaining drilling fluids from the first well drilled on the pad will be stored in tanks and injected into the subsequent BOCI operated disposal well to be drilled immediately following the drilling of the discovery well or transported to an existing BOCI operated disposal well at Tamiami. If a disposal well is already present on-site, then the drilling fluids will be incorporated into the existing disposal system. If none of these options are available due to lack of commercial viability, then the fluids will be transported to a commercial disposal facility. The mud or drilling fluid program is outlined in **Appendix A Exhibit V.B.1.7.**

V.N.B.8 Casing Program

Approximate Set Depth, ft TVD	Hole Size, in	Casing OD, in	Weight, #/ft	Grade	Thrd	Drift ID, in	Coupling OD, in	Collapse, psi	Burst, psi
250	26	20	94.0	J-55	ST&C	18.936	14.375	520	2110
2250	17 1/2	13 3/8	54.5	J-55	BT&C	12.459	21.000	1130	2730
4000	12 1/4	9 5/8	36.0	J-55	LT&C	8.765	10.625	2020	3520
11300	8 3/4	7	26.0	L-80HC	Premium	6.151	7.875	6370	7250
11600	6 1/8	5 1/2 UFJ	17.0	L-80HC	Premium	4.767	5.500	7230	7740

Notes:

- Burnett will attempt to drive conductor pipe. If not successful, we will set and cement in 26 in. hole.
- The 13-3/8” surface casing will be set below the Oldsmar top to cover all freshwater strata.
- The intermediate string (9-5/8”) will be set just below the Borelis base to cover the Boulder zone. Approximately 1500’ of the bottom of the 9-5/8” intermediate string will be externally coated to protect against potential corrosion that could be encountered from contact with the Boulder disposal zone.
- The 7” production casing will be set just a few feet within the Lake Trafford anhydrite.
- The 5-1/2” UFJ liner will be set from TD to 500’ above the 7” casing shoe. Burnett may utilize either a smaller diameter liner (4-1/2” OD) with open hole packers or a larger diameter expandable liner instead, if open hole log data suggests an alternative completion (open-hole versus cased & cemented) is favorable.

V.N.B.9 Cementing Program & Procedures

The cementing program for each casing string is outlined in **Appendix A Exhibit V.B.1.9**. Cement slurry volumes for each individual well will be adjusted based on actual measured depths, casing set points and caliper log data (when available). Cement additives may be varied based on individual well conditions and observed past well results. Cementing techniques and procedures may be varied based on individual well conditions and observed past well results. **Appendix A Exhibit V.N.B.9** outlines the calculations used to demonstrate the mechanical integrity of the aforementioned casing strings with respect to the differential

pressures that will be encountered during cementing operations. The following table outlines the target cement tops for the designs used to calculated estimated cement volumes for the production wells:

Target Top of Cement for Each Casing String		
Casing String	**Diameter**	**Est. TOC**
Surface	13-3/8"	Surface
Intermediate	9-5/8"	2500'***
Production	7"	5000'
Liner	5-1/2"	Liner Top

***Cement top shown is used for volume calculations. However, we do not expect cement to cover the Boulder zone, based on historical well data in the area.

V.N.B.10 Testing/Evaluation Program

Well logs to be run include array induction, spectral gamma, dipole sonic, formation micro imager, compensated neutron, and bulk density. Additional log suites may also be considered. Side wall cores will be taken for porosity, permeability, and fluid saturations. If drill stem tests are performed, fluids will be produced into steel pits.

After the well is completed, the well will be tested to determine commercial viability. The testing phase will be conducted prior to construction of any pipeline infrastructure or tank battery construction. A temporary impermeable containment liner will be placed on the well pad. Temporary storage tanks will be set over top of the containment area, then a temporary berm will be built around the lined area. A portable three-phase separator (referred to as a “test vessel” going forward) with meters for oil, water and gas will be set on the pad, along with a combustor. The wellhead will be plumbed to the test vessel, which will meter all phases after separation. The oil and water will be piped to the temporary tanks, and the gas will be sent to the combustor. Burnett intends to test the discovery well for approximately 30 days to determine whether it is capable of producing commercial quantities of oil and gas. After the testing phase, the well will be shut in and temporary equipment will be removed. If the well is deemed commercial, the construction of more permanent facilities and infrastructure will commence, as described in the Production Operations section of this permit application.

Oil that is produced during the testing phase will be hauled by tanker truck to sales. Trucking of oil from the Preserve shall only be done during daylight hours, and tanker trucks shall not carry more than 500 barrels of crude oil total. Burnett will have personnel on location 24 hours per day, 7 days per week monitoring tank levels and trucking of oil. They will also monitor all equipment for potential leaks and be trained to respond to any issues as outlined in the attached Spill Prevention and Emergency Preparedness Plan.

V.N.B.11 Completion Program

Well(s) will be perforated using wireline conveyed perforating guns. A pulling unit and swab unit will be utilized in the completion of this well. The wellhead will be equipped with a rental BOP for well control. Prior to the completion, cased hole neutron and cement bond logs will be obtained. Perforating guns will be deployed with a lubricator assembly rigged up on top of the BOP for well control purposes. The hole will be loaded with either treated produced water or fresh water with 2% KCl. If there is pressure on the well after

perforating, a packer with a pump out plug will be deployed via wireline using the lubricator assembly. This will act as a temporary plug and allow for tubing to be run into the hole. Otherwise, the packer will be run in on tubing to a specified depth above the perforations within the production liner section. We will attempt to produce the well under a packer, assuming it will flow on its own initially. Once the well no longer flows, artificial lift will be installed as described in **Section V.N.C.3. Exhibit V.B.1.11** depicts what the well could look like on production after lift is installed. If log data suggests that an open-hole completion is a more viable option, then a different liner size may be utilized in the completion. One option is to plug back or abandon most of the 6-1/8" hole section with cement and sidetrack around the plugged section. In that case, an expandable liner or same 5-1/2" UFJ liner shoe will be set just above the known pay zone, then a smaller open hole section will be drilled below the shoe into the pay interval. This will allow production from the Sunniland formation without any skin damage caused by cementing. Another option would be to set a smaller OD 4-1/2" liner in the original 6-1/8" pilot hole section with open hole packers and a DV tool, allowing for cement to be placed above and below the desired producing interval. The desired completion of the well and associated cement volumes will be discussed with NPS and FDEP prior to completing the well.

V.N.C PRODUCTION OPERATIONS

V.N.C.1 Site Security and Public

In coordination with the National Park Service, Burnett will implement measures to limit access to production facilities and to ensure the safety of the public and wildlife. All vehicle access points to the facilities road will be secured by a gate with a combination lock. In order to access these roads, authorized personnel will be provided with a combination. Gates will be locked and appropriate NPS approved warning signs will be installed. The gates will have a mechanical combination lock, the combination of which will be provided to the NPS. The gates will be installed at road entrance points in consultation with NPS.

Windsocks will be placed on tank batteries to reference in the event H_2S is present in levels exceeding 10 ppm. All personnel and contractors will be required to wear personal H_2S monitors at all times. Fixed gas monitoring devices will be placed at tank batteries and enclosed spaces or buildings to alert personnel of both potential H2S exposure and fire hazards.

Speed limit signs and CB protocols will be used on the access road to the Nobles Grade Pad to minimize the chance of vehicle accidents on the narrow road.

Work crews will be prohibited from carrying firearms while working in the preserve.

No dogs will be permitted at residential camps or the site of operations.

V.N.C.2 Stormwater Management

The stormwater management system design and permitting will include operational criteria for the site stormwater management system components and inspection requirements for the stabilization of filled surfaces. Stormwater Management Design and Plan will be developed per state and federal regulations.

V.N.C.3 Artificial Lift Equipment

The primary method of artificial lift that will be utilized are submersible pumps. If production targets or other factors warrant a different lift type, we will consider jet pump or progressive cavity pumps in lieu of submersible pumps. Submersible pumps would be installed and would be connected to variable speed drives, or VSDs. The VSDs would allow for adjustment of pump rate. Since this is a water drive reservoir, production will be closely monitored and regulated to prevent coning of water. If it is determined at some point that the pump intake needs to be placed closer to the completion interval within the liner section, we would most likely utilize one of the other lift methods. Another factor that could affect lift selection criteria is power availability. Jet pump systems and progressive cavity pumps do not require as much horsepower as submersible pumps. Noise levels from production equipment will be minimal. Pumps and other drive equipment will be powered by electric motors.

V.N.C.4 Pressure and Flow Control Equipment

The following wellhead program will be used:

- Surface Casing Head: C-22, 13-5/8” 5k x 13-3/8” SOW w/ (2) 2-1/16” 5k SSOs, w/ (1) 2k Ball Valve, 2-1/16” 5k FE. 1-1/2” V.R. plug prep on both sides.
- Intermediate Casing Spool: C-22, 13-5/8” 5k x 11” 5k w/ (2) 2-1/16” 5k SSOs, w/ (1) 2k Ball Valve, 2-1/16” 5k FE on each side. 1-1/2” V.R. plug prep on both sides.
- Tubing Head: TCM, 11” 5k x 7-1/16” 5k w/ (2) 2-1/16” 5k SSOs, w/ (1) 5k Ball Valve, 2-1/16” 5k FE on each side. 1-1/2” V.R. plug prep on both sides.

Both tubing and casing will be equipped with chokes or backpressure regulators to assist in pressure and flow control. All valves and fittings downstream of these chokes or regulators will be rated to a minimum of 2000 psi. Pressure monitoring of the tubing, casing and flowline (downstream of chokes, regulators) will be conducted using transducers. These devices will be connected to the associated local programmable logic controller (PLC) and will shut down pumps to prevent overpressure or a low-pressure scenario that could indicate a leak. Sensors will be tested upon initial deployment to ensure functionality. The flowline will be hydrotested with fresh water prior to bringing production online to ensure no leaks are present.

V.N.C.5 Treating and Separating Process and Equipment

As shown in **Appendix A, Exhibits V.C.1.5.i and V.C.1.5.ii**, the amount of separation equipment will depend on how many wells are currently operating and the amount of water the well(s) produce. Initially, a heater treater will be used to separate oil, water, gas from the first well. If water production increases to a point the heater treater cannot effectively separate fluids, a free water knockout (FWKO) will be set to remove the bulk of free water from the production stream. Prior to water reaching the storage tanks, it will enter a gun barrel tank to allow for any oil carryover to accumulate and be recovered. Once multiple wells are brought online, individual well testing will be carried out on a scheduled basis using a similar train of equipment. The well being tested will be produced through a smaller FWKO, which will send oil to a dedicated heater treater and water to the gun barrel tank. The second heater treater will also be available

to support the bulk production stream should the main heater treater require maintenance. Oil from the heater treater will flow through a 30' tall flash tower before gravity feeding to the storage tanks, and flash gas from the tower will be recovered by a VRU. All gas will pass through a scrubber. The function of the scrubber is to prevent any liquid carryover through the gas stream. It will be equipped with a high-level liquid sensor that can shut off the pump in the event there is excessive liquid carryover into the gas stream. This will be crucial to both spill and fire prevention. The produced gas will be used to generate power at the location by the natural gas generators. The generators will use produced gas as their primary source of fuel, and there will be supplemental LNG or CNG in place as a backup fuel source. A relief system will be installed to handle any excess gas during upset conditions or in the rare event the produced gas stream exceeds the amount needed to operate the generators. The relief system will utilize a combustor, which is an enclosed unit that does not have a visible flame.

V.N.C.6 Produced Water Storage and Disposal

Produced water will be stored in 500 bbl fiberglass tanks. The tanks will be equipped with lightning and static protection to deter any static or lightning events. Water will be pumped from the tanks with an electric motor driven above ground transfer pump to an injection well for disposal. This is the most technologically feasible and least damaging method for disposing produced water during drilling and completion operations. Alternative methods would require increased truck traffic into the preserve and could create severe operational issues. Pumps, pumping units, etc. will be powered by electric motors.

At Nobles Grade, a saltwater disposal well will be drilled on the pad as shown in **Appendix B, sheets C-125 and C-126. Exhibit V.N.C.6** depicts the proposed construction details of this well. The target depths will be based off formation top data from the previously drilled discovery well. Open hole log data will be acquired, as outlined in the disposal well's UIC and FDEP permit applications. Surface casing will be set at the same approximate depth as the producing well. The final casing string will be set just above the Boulder zone with the minimum cement top located above the surface casing shoe. However, the volume pumped will be enough to bring the cement back to surface, if possible.

Once casing is set, approximately 500' of open hole will be drilled through but not past the Boulder zone. This will be the disposal interval. Injection tubing will be installed with a packer to isolate the casing from injected fluids. Daily disposal volumes will depend on current water production rates of the wells. Based on current type curve projections, a single well could produce over 5 million barrels of water in a 30 year lifespan. The formation injectivity will be monitored with rate and pressure. The casing and injection packer seal integrity will be monitored using periodic mechanical integrity tests under direction of FDEP regulations.

The Boulder zone is ideal for disposal of produced water due to its high transmissivity. Surface pressures are generally very low (<30 psi). The chance for interference or overpressure is not likely. At nearby Raccoon Point field, there are disposal wells that operate within close proximity to one another without interference.

Water produced during testing operations will be put in the steel tanks until well is turned to the lease tank battery. All produced water will be disposed of through one of our approved disposal methods.

V.N.C.7 Tank Battery

The tank batteries will be set within a firewall constructed of 24-gauge steel that is 36" in height. The inside area of the firewall will be lined with a 60 mil polyurea liner that has a 10 oz. geotextile backing. The individual tank volumes and firewall dimensions are as follows:

As depicted in **Appendix A, Exhibit V.C.1.5.i**, the Nobles Grade facility will have a total of (12) 500 bbl, 16 foot steel oil tanks and (12) 500 bbl, 16 foot fiberglass water tanks. There will also be a 1000 bbl, 30 foot fiberglass gun barrel tank inside the containment. In calculating the volume requirements for secondary containment, the largest tank will be considered the 12 produced water tanks since they will be communicated for an effective volume of 6000 bbls. The proposed tank containment dimensions are 135' x 150' x 3' and will hold 10,819 bbls in total. This exceeds the 1.5 times requirement of 9000 bbls. The actual tank containment dimensions may vary, but the same capacity requirements will be met or exceeded.

Tank level sensors will be installed and will be incorporated into all well shut down logic controls. They will also have alarm limits set to notify field personnel of an issue. A fixed H_2S alarm with audible and lighted siren will be installed near the production equipment to alert personnel of levels greater than 10 ppm.

NPS has selected Carlsbad Canyon (refer to BLM color chart) as their preliminary preferred paint color for production equipment. BOCI will confirm the desired paint color with NPS staff prior to painting production equipment.

V.N.C.8 Removal/Disposal of Precipitation Within Tank Battery Firewall

Precipitation collected inside of tank battery firewalls will be left to evaporate on its own. Personnel will be required to wear rubber boots. Should the amount of rain be excessive, BOCI will consult with NPS personnel on best course of action to remove excess stormwater from tank battery containment.

V.N.C.9 Flowline and Pipelines

Construction

Flowlines will be constructed of schedule 80 steel pipe (seamless) up to 4 inches in diameter. The steel pipe will be externally epoxy coated and buried a minimum of 18 inches below ground. Each well flowline will be 200 to 300 feet in length, depending on the distance from the wellhead to the header. All three-phase flowlines and water injection flowlines will travel within the constraints of the well pad.

Pipelines will be constructed of a spooled high-pressure composite pipe, known as FlexPipe Linepipe (Shawcor) or equivalent. The pipelines will meet ANSI 900 operating pressure standards and will be up to 4 inches in diameter. The thermoplastic inner and outer liners protect against corrosion and the structural layers provide pressure support. This product has undergone rigorous fire testing and has proven to maintain its integrity after a fire; however, the affected piping does have to be replaced. The pipelines will be placed above ground and follow the roadways from the initial production facility to the loading station or third-party connection point. At Nobles Grade, there will be one pipeline transporting crude oil from the tank battery located at the well pad to the loading facility. Pipelines will be buried at all ORV trail and road crossings and secured with coated rebar or similar bracing on above ground surfaces.

Inspection and Testing

Flowlines will be buried and will not be visible for inspection. Pressure monitoring devices will be utilized to prevent overpressure and detect leaks. If flowlines are inactive for more than 30 days, they will be flushed with fresh water and pressure tested to 300 psi prior to returning to service. Flowlines will also be hydrotested with fresh water prior to deployment.

Pipelines will be visually inspected daily. Pressure monitoring devices will be utilized to prevent overpressure and detect leaks. Pressure testing of pipelines will be done prior to deployment and on an as needed basis since lines will be above ground.

Flow Rate

Individual well flowlines will move an estimated average of 1,000 bbls of fluid per day, with a maximum estimated average of 2,000 bbls of fluid per day. The produced water injection flowlines will move a estimated average of 2,000 bbls of water per day and maximum estimated average of 8,000 bbls of produced water per day.

The oil pipeline will move an estimated average of 2,000 bbls of fluid per day and a maximum estimated average of 4,000 bbls of fluid per day.

The flow rates will be dependent upon the number of active wells and how the wells are being produced with respect to the current reservoir conditions.

Operating Pressure

Three-phase individual well flowlines will operate at approximately 100 psi on average. The max pressure a flowline will be subject to is 300 psi, which will signal a shutdown of the artificial lift with a pressure monitoring device. Water injection flowlines will be subject to a maximum permitted pressure, which will be much less than the pipe's rated working pressure. The average operating pressure of the water injection flowline will depend on wellbore injectivity and established rate.

Pipelines will be operated well under the max ANSI 900 operating pressure rating of the pipe. Actual operating pressures will be dependent upon connection point of the line and pump rate. Where engineering design allows, BOCI pipelines will be connected to centrifugal pumps that will be designed to not exceed the pipeline burst pressure at maximum pump operating or "dead-head" pressure. All pipeline pumps will be equipped with automatic pressure limit shutdowns.

Cathodic Protection Methods

Flowlines will be short runs and will be directly connected to the wellheads and subsequent casing strings. The use and design of a cathodic protection system will be evaluated in conjunction with the tank battery facility grounding system. If a system can be engineered to be effective in preventing corrosion for these short pipe runs without adversely affecting the subsequent network of equipment, it will be deployed at both sites. Pipelines are constructed of a composite material and will not benefit from cathodic protection.

Pig Launching/Retrieving Station(s)

Flowline runs will be short and will not have any type of pig launchers/receivers installed.

Pipelines will not initially have any pig launchers or receivers installed. If operating conditions warrant the use of pigging in the future, plumbing changes will be implemented to accommodate either permanent or portable pig launchers/receivers.

If installed, pig launchers and receivers will be simple in design. A three-valve manifold will be put in place at both ends to allow for easy operation and installation of the pig launcher and receiver. The launcher/receiver combination will allow for use of foam pigs or equivalent. Whether the installation is portable or not, plastic lining or some other form of containment will be utilized to prevent any drips that could occur from deploying or retrieving the pig from the devices. A vacuum truck may also be used to catch fluids, sludge, paraffin, or other that are encountered during the pigging operation. A pump truck may also be used to push the pig in the event the well stream pressure cannot be used.

Vegetation Management

Flowlines will be buried on pad and not require vegetation management.

Pipelines will be set above ground and vegetation will be cleared on an as needed basis to allow for clear daily inspection of pipelines.

V.N.C.10 Metering Points

Turbine or magnetic flow meters will be used to measure all produced water, as well as individual well test volumes of produced water. Metering points shown in **Appendix A, Exhibit V.C.1.5.i**.

Oil will be metered or measured by tank gauge. If an agreement with the purchaser specifies the use of a truck lease automatic custody transfer unit (LACT) at the sales point, those volumes will also be figured into daily production. Individual wells tests will be conducted through use of isolated test tank(s).

Gas volumes will be measured with orifice plate meters. All gas volumes, total produced gas, and individual well tests will be conducted using the metering points shown in **Appendix A, Exhibit V.C.1.5.i.**

Oil will be removed from loading facility utilizing oil tanker trucks. The number of trucks will be dependent upon volume of oil produced. At anticipated peak production levels, we anticipate 10-12 truckloads each day.

V.N.C.11 Sales Point (if on Lease)

Nobles Grade facilities will transfer oil to Burnett operated off-lease loading station in Section 1, T50S, R32E. **Appendix A Exhibit V.C.1.11** shows the layout of this facility. BOCI may set “truck LACT” skids at the loading station (not pictured in the diagram) to aid the metering and transfer of oil into tanker trucks, if needed. Gas will not be sold due to low volumes and lack of sales options. The loading station will be constructed as part of this Operations Permit Application. It will consist of four 500 bbl storage tanks, like those used in the tank battery construction. The tanks will be placed in a 65’ x 90’ x 3’ impermeable containment, which will hold 3,125 bbls. A transfer pump will move the oil from the tanks at the well pad to

the tanks at the loading facility via the above ground pipeline. This exceeds the 1.5 times storage requirement of 3,000 bbls. The loading facility will be connected to the Lee Co. Electric Cooperative (LCEC) grid via buried powerline. (Please refer to Appendix B Construction Drawing for location of the facility)

V.N.C.12 Tanker Pick-up Points (if on Lease)

Oil will be transferred to off-lease loading stations via pipelines as described in previous sections. Prior to construction of facilities, oil produced from testing of the exploratory well may be trucked to sales in an amount not to exceed 500 bbls per truck load. All trucking of oil will be conducted during daylight hours during the testing phase.

V.N.C.13 Gas Compressor, Including Type and Size, if Applicable

Gas sales will not be available and will not warrant the need for large booster compressors for sales. Smaller boosters may be used for vapor recovery if it can assist in supplying more fuel for power generation. These vapor recovery units (VRUs) would have electric motors.

V.N.C.14 Enhanced Recovery Methods and Equipment

Secondary and tertiary recovery methods will not be needed. This is not a depletion drive reservoir.

V.N.C.15 Vegetation Management

The road and pad will be maintained to prevent vegetation growth within the limits of the lime rock pad and road. Chemical treatment and blading will be used on an as needed basis to maintain them. Only NPS approved chemicals will be used for treatment.

V.N.C.16 Anticipated Recompletion, Stimulation, Workover, and Well Plugging

BOCI does not plan to stimulate the Sunniland formation by means of hydraulic fracturing. A small acid cleanout utilizing a blend of hydrochloric acid may be used to remove any skin damage created by the drilling and cementing process. Similar acid blends may be used periodically in the future to remove any scale or damage that develops while the well is being produced. The use of such acid washes is typical in conventional oil and gas production. The proposed cleanout is pumped at pressures well below the formation fracture gradient and removes damage from the near wellbore area. BOCI will log and record treating and annular pressures during any pumping operations to ensure the integrity of all casing strings are maintained throughout the job. Recompletions, such as sidetracks or exploitation of behind pipe pay will be evaluated based on well logs, and they will be approved by NPS prior to commencement. Well plugging will be carried out as outlined in **Section VII.N.A.**

Prevention of oil, brine, chemicals, etc. from reaching the ground will be achieved by placing liners under certain pieces of equipment during rig operations. Steel pits will be used to catch any fluid or solids from the wellbore. Disposal of any solids will take place in state approved facilities located outside of the Preserve. Fluids will be disposed of via on-site disposal system.

NPS and FDEP will be notified prior to any non-routine well intervention activities (i.e. workovers, plugging, etc.).

V.N.D DAY TO DAY OPERATIONS

V.N.D.1 Access

NPS, DEP and all regulatory agencies shall have necessary access to well pads and associated production facilities for the purpose of performing all necessary inspections. All contractors will be made aware of agency access. All personnel accessing the well pad and/or production facilities shall have the required PPE.

V.N.D.2 Well Pad and Production Facility Maintenance

The well pad will be maintained to allow for proper drainage into dry detention areas. Berms will be maintained regularly as part of the pad maintenance program.

The production facilities will be inspected daily by field personnel. In-depth monthly facility checks will be conducted to ensure all gaskets, seals, connections, etc. are free from drips or wear. Safety equipment will also be inspected during these checks. Containments will be monitored for holes, rips, tears, etc.

Excess pipe or equipment stored on the pad location will be maintained in an organized fashion, outside of the flow of traffic. For example, pipe will be placed on racks or beams so that it is off the ground and can be easily picked up.

Monitoring wells will be put in place for monthly sample collection and analysis. Location, construction and monitoring of these wells will be carried out by an approved contractor to satisfy NPS requirements. Specific description of the monitoring wells and sampling procedures can be found in **Appendix A, Exhibit V.N.D.2.**

V.N.D.3 Access Road Maintenance

The access road will be constructed and maintained in a way that will prevent soil erosion and accommodate all weather traffic in accordance with NPS guidelines.

V.N.D.4 Waste Disposal

Trash, wastepaper, garbage and junk will be placed in a portable bear-proof, screened trash container on location. All trash and debris will be transported to an authorized off-lease disposal station within thirty (30) days following the completion activities and on a regular basis for monthly operations. A properly maintained Porto-john will be provided for the crews during drilling and completion operations. All will be removed after all completion operations have ended.

V.N.D.5 Reporting

Daily Drilling reports and Monthly Production reports will be sent to NPS and DEP as required. Monthly sample reports from monitoring wells will be sent to NPS as required.

V.N.D.6 Vegetation Monitoring and Control

In consultation with NPS, BOCI will develop a vegetation monitoring and control plan for areas of disturbance to include well pad, loading facility, access road, and pipeline right of way. Only NPS approved chemicals will be used.

V.T TAMIAMI PROSPECT

V.T.A NEW ACCESS ROAD AND PAD CONSTRUCTION

All construction activities will be scheduled for the dry season, unless otherwise authorized by the superintendent. Appropriate notice will be given to NPS and required regulatory agencies prior to the commencement of all construction activities. Total fill amounts will be determined once final pad and utilize clean fill material from the existing mine at Ave Maria. The fill material will be mined from a depth of approximately 30 feet below the ground surface and therefore will not contain an exotic seed source. The roadway backslopes will be stabilized with gravel rock laid over top of filter fabric. .

The anticipated inventory of equipment to be used (following silt fence installation) during construction will consist of an excavator for clearing operations, dozers, rollers, and a tub grinder for mulching cleared hardwood. It is not anticipated that "off-road" dump trucks will be required.

New Access Road Construction

The access road alignment and construction details are shown in the construction plans included as **Appendix C**.

The road is anticipated to be entirely constructed from imported fill placed upon the cleared ground elevation. Due to the need to fill the entire roadway corridor to create a roadway above the wet season water table elevation, it is not anticipated that soils will be removed as a part of the construction activities. As such the storage and management of the in-situ soils will not be required. If unsuitable / muck soils are encountered within the alignment of the roadway, the ground surface is proposed to be stabilized with an engineered cellular confinement system to provide a stable foundation for the imported fill. The roadway is proposed to be constructed from imported fill material that will serve as a suitable base for a driving surface / roadway consisting of an eight-inch-thick compacted limerock road. All fill material for the construction of the roadways will be from the existing earth mine at Ave Maria or other location approved by NPS. The preferred mine is located on the north side of Oil Well Road in the southern portion of the Ave Maria community. The route for fill trucks to the Tamiami road will be from Ave Maria via SR 29 southbound to US 41 eastbound with entrance to BCNP at the Eleven Mile Road.

The roadway plans (included as **Appendix C**) depict the locations of culverts and overflow weirs along the road alignment. Generally, the design consists of a series of intermittently spaced culverts to provide conveyance of sheet flow in typical flow conditions and a series of high-water crossings in which the road is proposed to be stabilized and lowered in grade to allow for conveyance in high water conditions. All roads will be constructed as per current state and federal regulations. Roads will have signs indicating maximum speed limits, ORV crossings and curves.

Private landowners who utilize the Maverick oilfield roads to access their properties will utilize approximately quarter-mile section of the new Burnett road built on top of the ORV trail coming off Maverick's pad 3. At a point where the original ORV trail diverges from the Burnett road, Burnett will construct the access gate for the road continuing to the Tamiami pad. By constructing the gate at this point, only those with approved access will be able to access any Burnett facility. **Refer to Appendix C**.

New Pad Construction

The surface runoff from the pads will be directed to dry retention areas that will have bottom elevations above the wet season water table elevation.

The cellar will be constructed of either lumber or corrugated pipe, depending on availability and preference of the rig contractor. Cement from the first casing string will cover the bottom of the cellar. The mousehole and rathole will be drilled just prior to the rig moving in, and they will be filled in shortly after the rig moves off the hole.

Typical liner is 12-mil liner and will be placed under equipment that has the potential to release fluids other than untreated fresh water. This includes, but is not limited to, diesel tanks, steel mud pits, and mud pumps.

The pads are proposed to have a two-foot tall containment berm around the perimeter of the pad that will prevent release of spills into the surrounding lands / waters. In addition to the containment berm, the pads are proposed to be graded to direct all surface runoff to the proposed dry detention area on the pad. In the unlikely event of a spill of a duration and rate severe enough to reach the dry detention area, the proposed stormwater control structure can be plugged to prevent discharge to downstream areas and the dry soil removed and replaced to provide remediation for the spill.

If results of the discovery well deem the project commercial, additional modifications will be made to the pad as outlined in the plan set. The pad will be regraded, and the permanent dry retention area constructed. This will occur after the disposal well is drilled. Production facilities will also be constructed at this time.

V.T.B DRILLING OPERATIONS

V.T.B.1 Mobilization of Equipment

Rapad Rig 33 or equivalent will be mobilized to location from their yard or last drill location using a third-party rig moving service. One crane will be used to aid in rig up operations. Several of the trucks will be permit loads, which the trucking company will be responsible for obtaining the necessary permits. Trucks will be brought into location on lime rock roads to be built prior to drilling operations. NPS and FDEP will be notified prior to the commencement of all drilling and completion activities. All equipment used in the drilling and completion of the wells will be removed from the location once it is no longer needed. Ingress of 11 Mile Road will be evaluated prior to moving in the rig, and any trimming or pruning of existing trees along the route will be done in coordination with NPS personnel.

V.T.B.2 Site Security and Public Safety

In coordination with the National Park Service, Burnett Oil Co., Inc. will implement a variety of measures to control access to drill sites and ensure the safety of the public and wildlife. These measures will include

personnel onsite 24-hours to control access to the road leading to the drilling location in addition to a lockable road gate. All gates and fenced in sites will include the appropriate warning signs approved by the NPS in advance.

Windsocks will be placed on tank batteries to reference in the event H_2S is present in levels exceeding 10 ppm. All personnel and contractors will be required to wear personal H_2S monitors at all times.

Speed limit signs and CB protocols will be used on the access road to the Tamiami Pad to minimize the risk of vehicle accidents on the narrow road. Safety signage will be installed at all road/trail crossings to alert all parties utilizing the roads and trails of potential commercial and visitor interactions at these intersections.

Noise levels for drilling and completion operations will be evaluated and sound barriers utilized if required by NPS.

Work crews will be prohibited from carrying firearms while working in the preserve.

No dogs will be permitted at residential camps or the site of operations.

V.T.B.3 Freshwater Quantity, Source, Transport, and Storage

Burnett Oil Co., Inc. has contracted with a professional hydrogeological firm to secure water use permits from the South Florida Water Management District (SFWMD) for drilling water and potable water needs and will commission a licensed Florida water well drilling contractor to obtain the necessary well construction permits from Collier County to drill the needed water supply wells. A small diameter well targeting the Lower Tamiami Aquifer is proposed for a limited use potable supply well and a larger diameter well targeting the Lower Hawthorn Producing Zone of the Upper Floridan Aquifer (UFA) is proposed for the drilling water supply well. Data from Reese and Cunningham (2000) indicate that the Lower Tamiami Aquifer occurs between 52 and 109 feet below land surface. Data from Reese and Richardson (2008) indicate that the Lower Hawthorn Producing Zone of the UFA occurs between 950 and 982 feet below land surface near the proposed Tamiami pad. The wells will be located on the same pad location and will be drilled in compliance with appropriate State of Florida water laws and regulations. The potable supply well will be drilled to approximately 80-100 feet below land surface and provide fresh water for drinking water supply. The drilling water supply well will be drilled to approximately 980 feet below land surface and will supply slightly brackish water for drilling and completion operations.

Published data on the Lower Tamiami Aquifer (aka Gray Limestone) for this area identifies a thick semi-confining unit between this aquifer and the surficial water table. The data indicate that the Lower Tamiami Aquifer has a chloride concentration around 245 mg/l which would classify it as fresh. The potable supply is expected to require a single 4-inch diameter well and water withdrawals of less than 10,000 gallons per day (gpd). The UFA at this location is expected to have a chloride concentration of around 630 mg/l which is considered slightly brackish. The drilling supply well will require a capacity of up to 1 million gallons per day (MGD) of water for some drilling operations. The Lower Tamiami Aquifer provides the freshwater needed for the relatively small demand for drinking water supply while the mildly brackish Lower Hawthorn/UFA provides for a high capacity supply with no potential for water level drawdowns in sensitive surficial environments. The use of a relatively shallow freshwater aquifer for a relatively low demand potable supply and the deeper slightly brackish aquifer for the higher demand drilling water supply is the most technologically appropriate and least impactful method for obtaining suitable water quality and

quantities for drilling and completion operations. Alternative methods would require increased truck traffic into the Preserve and could create severe operational issues.

Water will be stored in mobile heavy gauge steel storage tanks on location. Storage requirements or the amount of mobile heavy gauge steel storage tanks to be utilized will depend on the amount of water being supplied by the water well(s) in conjunction with the amount needed to sustain constant drilling operations. Water will be pumped from the water well(s) through poly pipe(s) to the tanks on location. These tanks will be rented and will be returned after drilling and completion operations are complete.

V.T.B.4 Stormwater Management

The stormwater management system components are shown on the construction plans included as **Appendix C.** As previously described, the proposed construction will include cross drains and lowered sections in the roadway to maintain the sheetflow from upstream and downstream sides of the road. The proposed pads will include dry retention areas to provide storage and treatment of stormwater prior to discharge to the downstream receiving areas.

V.T.B.5 Blowout Preventers and Other Pressure Control Equipment

Rapad Rig 33 is equipped with a Hydril 13-5/8" 5000# annular and a 10,000# bottom flange, Cameron Type U 13-5/8" single and double ram preventors. The 13-5/8" drilling spool has 4-1/16" 10,000# outlets. Exact equipment may vary, depending on the final rig selection for each well. This is an example of what would typically be used for this operation. A larger annular section will be utilized for the surface hole. The table below outlines the BOP program for each hole section. **Exhibit V.B.1.5** shows the schematic of the BOP stack to be utilized in drilling these wells.

Minimum Specifications and Pressure Ratings

Hole Size	Casing Size	Size/Pressure (Annular/Rams)	Bottom to Top Arrangement	Low/High Test Pressures Rams/Annular
17 1/2"	13 3/8" 54.5# J-55	21 3/4" 2M	A	N/A
12 1/4"	9 5/8" 36# J-55	13 5/8" 5M/10M	P/S/B/A	250-3500/250-2500
8 3/4"	7" 26# L-80	13 5/8" 5M/10M	P/S/B/A	250-3500/250-2500
6 1/8"	5 1/2" FJ 17# L-80	13 5/8" 5M/10M	P/S/B/A	250-3500/250-2500

P-pipe rams, S-spool, B-blind rams, A-annular

Testing Procedures and Frequencies

Pressure testing of the BOP equipment shall adhere to FAC 62C-27.006. Per rule 62C-27.006 (2): Blowout preventers and related well-control equipment shall be pressure-tested when installed, before drilling out after each string of casing is set, not less than once each week while drilling, following repairs that require disconnecting a pressure seal in the assembly, and at such other times as prescribed by the Department. A required weekly test while drilling may be deferred up to one week to avoid unnecessary tripping of the drill string or conditions that would endanger the hole. Blowout preventer tests shall be recorded on the driller's log. Deferral of weekly tests will be done in consultation with the FDEP and NPS. Any additional

tests will be conducted at the direction of NPS and FDEP. Rams will be tested to 250 psi (low side) and 3500 psi (high side). Annular will be tested to 250 psi (low side) and 2500 psi (high side).

V.T.B.6 Drilling Program

Total Depth and Directional Program

Directional plans and anti-collision plots for each well are located in **Appendix A**. The exhibits are as follows:

- Well 1-1 #1 **- Exhibits V.B.2.6.i** and **V.B.2.6.i.a**
- Well 1-4 #1 **- Exhibits V.B.2.6.ii** and **V.B.2.6.ii.a**
- Well 36-1 #1 **- Exhibits V.B.2.6.iii** and **V.B.2.6.iii.a**
- Well 36-3 #1 **- Exhibits V.B.2.6.iv** and **V.B.2.6.iv.a**

Hole Size for Each Casing String

- Conductor: 20” conductor driven to approximately 250’ or first refusal depth
- Surface: 17-1/2” hole with 13 3/8” 54.5# J-55 surface casing to be set at approximately 2250’ to protect all fresh water bearing zones.
- Intermediate: 12-1/4” hole with 9 5/8” 36# J-55 intermediate casing to be set below the top of the Borelis formation at approximately 4000’ to cover the Boulder interval.
- Production:
  - 8-3/4” hole with 7” 26# L-80HC production casing to be set at approximately 11,300’ TVD just above the pay zones that comprise the Sunniland trend.
  - 6-1/8” hole with 5 1/2” 17# L-80HC flush joint liner to be set at approximately 11,600’ TVD to cover the potential pay zones. The size of the liner may vary to accommodate the desired well completion, based on open-hole log data that will be obtained.
- Hole sizes and casing specifications may vary due to pipe availability. The weights and grades listed exceed the minimum pressure and tensile strength requirements and could be substituted with pipe that exceeds the specifications of these listed.

V.T.B.7 Mud Program

A closed loop system will be utilized to process cuttings in the drilling mud returns. The system will utilize the rig shaker, drying shakers, a centrifuge, cuttings catch tank, minimum of (2) 300 bbl cuttings tanks, and a trac hoe to manage cuttings separation and disposal. All drill cuttings will be transported and disposed of at an off-site state approved disposal facility. Remaining drilling fluids from the first well drilled on the pad will be stored in tanks and injected into the subsequent BOCI operated disposal well to be drilled immediately following the drilling of the discovery well. If a disposal well is already present on-site, then the drilling fluids will be incorporated into the existing disposal system. If none of these options are available

due to lack of commercial viability, then the fluids will be transported to a commercial disposal facility. The mud or drilling fluid program is outlined in **Appendix A, Exhibit V.B.1.7**

V.T.B.8 Casing Program

Approximate Set Depth, ft TVD	Hole Size, in	Casing OD, in	Weight, #/ft	Grade	Thread	Drift ID, in	Coupling OD, in	Collapse, psi	Burst, psi
250	26	20	94.0	J-55	ST&C	18.936	14.375	520	2110
2250	17 1/2	13 3/8	54.5	J-55	BT&C	12.459	21.000	1130	2730
4000	12 1/4	9 5/8	36.0	J-55	LT&C	8.765	10.625	2020	3520
11300	8 3/4	7	26.0	L-80HC	Premium	6.151	7.875	6370	7250
11600	6 1/8	5 1/2 UFJ	17.0	L-80HC	Premium	4.767	5.500	7230	7740

Notes:

- Burnett will attempt to drive conductor pipe. If not successful, we will set and cement in 26 in. hole.
- The 13-3/8" surface casing will be set below the Oldsmar top to cover all freshwater strata.
- The intermediate string (9-5/8") will be set just below the Borelis base to cover the Boulder zone. Approximately 1500' of the bottom of the 9-5/8" intermediate string will be externally coated to protect against potential corrosion that could be encountered from contact with the Boulder disposal zone.
- The 7" production casing will be set just a few feet within the Lake Trafford anhydrite.
- The 5-1/2" UFJ liner will be set from TD to 500' above the 7" casing shoe. Burnett may utilize either a smaller diameter liner (4-1/2" OD) with open hole packers or a larger diameter expandable liner instead, if open hole log data suggests an alternative completion (open-hole versus cased & cemented) is favorable.

V.T.B.9 Cementing Program & Procedures

The cementing program for each casing string is outlined in **Appendix A, Exhibit V.B.1.9**. Cement slurry volumes for each well will be adjusted based on actual measured depths, casing set points and caliper log data (when available). Cement additives may be varied based on individual well conditions and observed past well results. Cementing techniques and procedures may be varied based on individual well conditions and observed past well results. **Appendix A Exhibit V.N.B.9** outlines the calculations used to demonstrate the mechanical integrity of the aforementioned casing strings with respect to the differential pressures that will be encountered during cementing operations. The following table outlines the target cement tops for the designs used to calculated estimated cement volumes for the production wells:

Target Top of Cement for Each Casing String		
Casing String	**Diameter**	**Est. TOC**
Surface	13-3/8"	Surface
Intermediate	9-5/8"	2500'***
Production	7"	5000'
Liner	5-1/2"	Liner Top

***Cement top shown is used for volume calculations. However, we do not expect cement to cover the Boulder zone, based on historical well data in the area.

V.T.B.10 Testing/Evaluation Program

Well logs to be run include array induction, spectral gamma, dipole sonic, formation micro imager, compensated neutron, and bulk density. Additional log suites may also be considered. Side wall cores will be taken for porosity, permeability, and fluid saturations. If drill stem tests are performed, fluids will be produced into steel pits.

After the well is completed, the well will be tested to determine commercial viability. The testing phase will be conducted prior to construction of any pipeline infrastructure or tank battery construction. A temporary impermeable containment liner will be placed on the well pad. Temporary storage tanks will be set over top of the containment area, then a temporary berm will be built around the lined area. A portable three-phase separator (referred to as a “test vessel” going forward) with meters for oil, water and gas will be set on the pad, along with a combustor. The wellhead will be plumbed to the test vessel, which will meter all phases after separation. The oil and water will be piped to the temporary tanks, and the gas will be sent to the combustor. Burnett intends to test the discovery well for approximately 30 days to determine whether it is capable of producing commercial quantities of oil and gas. After the testing phase, the well will be shut in and temporary equipment will be removed. If the well is deemed commercial, the construction of more permanent facilities and infrastructure will commence, as described in the Production Operations section of this permit application.

Oil that is produced during the testing phase will be hauled by tanker truck to sales. Trucking of oil from the Preserve shall only be done during daylight hours, and tanker trucks shall not carry more than 500 barrels of crude oil total. Burnett will have personnel on location 24 hours per day, 7 days per week monitoring tank levels and trucking of oil. They will also monitor all equipment for potential leaks and be trained to respond to any issues as outlined in the attached Spill Prevention and Emergency Preparedness Plan.

V.T.B.11 Completion Program

The wells will be perforated using wireline conveyed perforating guns. A workover rig will be utilized in the completion of this well. A pulling unit and swab unit will be utilized in the completion of this well. The wellhead will be equipped with a rental BOP for well control. Prior to the completion, cased hole neutron and cement bond logs will be obtained. Perforating guns will be deployed with a lubricator assembly rigged up on top of the BOP for well control purposes. The hole will be loaded with either treated produced water or fresh water with 2% KCl. If there is pressure on the well after perforating, a packer with a pump out plug will be deployed via wireline using the lubricator assembly. This will act as a temporary plug and allow for tubing to be ran in the hole. Otherwise, the packer will be run in on tubing to a specified depth above the perforations within the production liner section. We will attempt to produce the well under a packer, assuming it will flow on its own initially. Once the well no longer flows, artificial lift will be installed as described in **Section V.T.C.3**. **Appendix A, Exhibit V.B.1.11** depicts what the well could look like on production after lift is installed.

If log data suggests that an open-hole completion is a more viable option, then a different liner size may be utilized in the completion. One option is to plug back or abandon most of the 6-1/8" hole section with cement and sidetrack around the plugged section. In that case, an expandable liner or same 5-1/2" UFJ liner shoe will be set just above the known pay zone, then a smaller open hole section will be drilled below the shoe into the pay interval. This will allow production from the Sunniland formation without any skin damage caused by cementing. Another option would be to set a smaller OD 4-1/2" liner in the original 6-1/8" pilot hole section with open hole packers and a DV tool, allowing for cement to be placed above and below the desired producing interval. The desired completion of the well and associated cement volumes will be discussed with NPS and FDEP prior to completing the well.

V.T.C PRODUCTION OPERATIONS

V.T.C.1 Site Security and Public Safety

In coordination with the National Park Service, Burnett will implement measures to limit access to production facilities and to ensure the safety of the public and wildlife. All vehicle access points to the facilities road will be secured by a gate with a combination lock. In order to access these roads, authorized personnel will be provided with a combination. Gates will be locked and appropriate NPS approved warning signs will be installed. The gates will have a mechanical combination lock, the combination of which will be provided to the NPS. The gates will be installed at road entrance points in consultation with NPS.

Windsocks will be placed on tank batteries to reference in the event H_2S is present in levels exceeding 10 ppm. All personnel and contractors will be required to wear personal H_2S monitors at all times. Fixed gas monitoring devices will be placed at tank batteries and enclosed spaces or buildings to alert personnel of both potential H2S exposure and fire hazards.

Speed limit signs and CB protocols will be used on the access road to the Tamiami Pad to minimize the chance of vehicle accidents on the narrow road. Burnett will work with NPS to determine location for placing safety signage on the access road where there is mixed use on the existing ORV trail to ensure safety of all users.

Work crews will be prohibited from carrying firearms while working in the preserve.

No dogs will be permitted at residential camps or the site of operations.

V.T.C.2 Stormwater Management

The stormwater management system design and permitting will include operational criteria for the site stormwater management system components and inspection requirements for the stabilization of filled surfaces. Stormwater Management Design and Plan will be developed per state and federal regulations.

V.T.C.3 Artificial Lift Equipment

The primary method of artificial lift that will be utilized are submersible pumps. If production targets or other factors warrant a different lift type, we will consider jet pump or progressive cavity pumps in lieu of submersible pumps. Submersible pumps would be installed and would be connected to variable speed drives, or VSDs. The VSDs would allow for adjustment of pump rate. Since this is a water drive reservoir, production will be closely monitored and regulated to prevent coning of water. If it is determined at some point that the pump intake needs to be placed closer to the completion interval within the liner section, we would most likely utilize one of the other lift methods. Another factor that could affect lift selection criteria is power availability. Jet pump systems and progressive cavity pumps do not require as much horsepower as submersible pumps. Noise levels from production equipment will be minimal. Pumps and other drive equipment will be powered by electric motors.

V.T.C.4 Pressure and Flow Control Equipment

The following wellhead program will be used:

- Surface Casing Head: C-22, 13-5/8” 5k x 13-3/8” SOW w/ (2) 2-1/16” 5k SSOs, w/ (1) 2k Ball Valve, 2-1/16” 5k FE. 1-1/2” V.R. plug prep on both sides.
- Intermediate Casing Spool: C-22, 13-5/8” 5k x 11” 5k w/ (2) 2-1/16” 5k SSOs, w/ (1) 2k Ball Valve, 2-1/16” 5k FE on each side. 1-1/2” V.R. plug prep on both sides.
- Tubing Head: TCM, 11” 5k x 7-1/16” 5k w/ (2) 2-1/16” 5k SSOs, w/ (1) 5k Ball Valve, 2-1/16” 5k FE on each side. 1-1/2” V.R. plug prep on both sides.

Both tubing and casing will be equipped with chokes or backpressure regulators to assist in pressure and flow control. All valves and fittings downstream of these chokes or regulators will be rated to a minimum of 2000 psi. Pressure monitoring of the tubing, casing and flowline (downstream of chokes, regulators) will be conducted using transducers. These devices will be connected to the associated local programmable logic controller (PLC) and will shut down pumps to prevent overpressure or a low-pressure scenario that could indicate a leak. Sensors will be tested upon initial deployment to ensure functionality. The flowline will be hydrotested with fresh water prior to bringing production online to ensure no leaks are present.

V.T.C.5 Treating and Separating Process and Equipment

As shown in **Appendix A, Exhibits V.C.2.5.i** and **V.C.2.5.ii**, the amount of separation equipment will depend on how many wells are currently operating and the amount of water the well(s) produce. Initially, heater treater will be used to separate oil, water, gas from the first well. If water production increases to a point the heater treater cannot effectively separate fluids, a free water knockout (FWKO) will be set to remove the bulk of free water from the production stream. Prior to water reaching the storage tanks, it will enter a gun barrel tank to allow for any oil carryover to accumulate and be recovered. Once multiple wells are brought online, individual well testing will be carried out on a scheduled basis using a similar train of equipment. The well being tested will be produced through a smaller FWKO, which will send oil to a dedicated heater treater and water to the gun barrel tank. The second heater treater will also be available to support the bulk production stream should the main heater treater require maintenance. Oil from the

heater treater will flow through a 30' tall flash tower before gravity feeding to the storage tanks, and flash gas from the tower will be recovered by a VRU. All gas will pass through a scrubber. This scrubber is to prevent any liquid carryover through the gas stream. It will be equipped with a high-level liquid sensor that can shut off the pump in the event there is excessive liquid carryover into the gas stream. This will be crucial to both spill and fire prevention. The produced gas will be used to generate power at the location by the natural gas generators. The generators will use produced gas as their primary source of fuel, and there will be supplemental LNG or CNG in place as a backup fuel source. A relief system will be installed to handle any excess gas during upset conditions or in the rare event the produced gas stream exceeds the amount needed to operate the generators. The relief system will utilize a combustor, which is an enclosed unit that does not have a visible flame.

V.T.C.6 Produced Water Storage and Disposal

Produced water will be stored in 500 bbl fiberglass tanks. The tanks will be equipped with lightning and static protection to deter any static or lightning events. Water will be pumped from the tanks with an electric motor driven above ground transfer pump to an injection well for disposal.

If an agreement can be reached between both operators, the Tamiami facility will transfer water to the neighboring Maverick disposal system via above ground flowline. If Maverick's disposal capacity will not accommodate the subsequent water volumes or an agreement cannot be reached, then BOCI will drill a saltwater disposal well on the Tamiami pad as shown in **Appendix C, sheet C-126**. **Exhibit V.T.C.6** depicts the proposed construction details of this well. The target depths will be based off formation top data from the previously drilled discovery well. Open hole log data will be acquired, as outlined in the disposal well's UIC and FDEP permit applications. Surface casing will be set at the same approximate depth as the producing well. The final casing string will be set just above the Boulder zone with the minimum cement top located above the surface casing shoe. However, the volume pumped will be enough to bring the cement back to surface, if possible.

Once casing is set, approximately 500' of open hole will be drilled through but not past the Boulder zone. This will be the disposal interval. Injection tubing will be installed with a packer to isolate the casing from injected fluids. Daily disposal volumes will depend on current water production rates of the wells. Based on current type curve projections, a single well could produce over 5 million barrels of water in a 30 year lifespan. The formation injectivity will be monitored with rate and pressure. The casing and injection packer seal integrity will be monitored using periodic mechanical integrity tests under direction of FDEP regulations.

The Boulder zone is ideal for disposal of produced water due to its high transmissivity. Surface pressures are generally very low (<30 psi). The chance for interference or overpressure is not likely. At nearby Raccoon Point field, there are disposal wells that operate within close proximity to one another without interference.

Water produced during testing operations will be put in the steel tanks until well is turned to the lease tank battery. All produced water will be disposed of through one of our approved disposal methods.

V.T.C.7 Tank Battery

The tank batteries will be set within a firewall constructed of 24-gauge steel that is 36" in height. The inside area of the firewall will be lined with a 60 mil polyurea liner that has a 10 oz. geotextile backing. The individual tank volumes and firewall dimensions are as follows:

As depicted in **Appendix A, Exhibit V.C.2.5.i**, the Tamiami facility will have a total of (8) 500 bbl, 16-foot steel oil tanks and (8) 500 bbl 16 foot fiberglass water tanks. There will also be a 1000 bbl, 30 foot fiberglass gun barrel tank inside the containment. In calculating the volume requirements for secondary containment, the largest "tank" will be considered the 8 produced water tanks since they will be communicated for an effective volume of 4000 bbls. The proposed tank containment dimensions are 220' x 70' x 3', and it will hold 8,227 bbls in total. This exceeds the 1.5 times requirement of 6000 bbls. The actual tank containment dimensions may vary, but the same capacity requirements will be met or exceeded.

Tank level sensors will be installed and will be incorporated into all well shut down logic controls. They will also have alarm limits set to notify field personnel of an issue. A fixed H_2S alarm with audible and lighted siren will be installed near the production equipment to alert personnel of levels greater than 10 ppm.

NPS has selected Carlsbad Canyon (refer to BLM color chart) as their preliminary preferred paint color for production equipment. BOCI will confirm the desired paint color with NPS staff prior to painting production equipment.

V.T.C.8 Removal/Disposal of Precipitation in Tank Battery Firewall

Precipitation collected inside of tank battery firewalls will be left to evaporate on its own. Personnel will be required to wear rubber boots. Should the amount of rain be excessive, BOCI will consult with NPS personnel on best course of action to remove excess stormwater from tank battery containment.

V.T.C.9 Flowline and Pipelines

Construction

Flowlines will be constructed of schedule 80 steel pipe (seamless) up to 4 inches in diameter. The steel pipe will be externally epoxy coated and buried a minimum of 18 inches below ground. Each well flowline will be 200 to 300 feet in length, depending on the distance from the wellhead to the header. All three-phase flowlines and water injection flowlines will travel within the constraints of the well pad.

Pipelines will be constructed of a spooled high-pressure composite pipe, known as FlexPipe Linepipe (Shawcor) or equivalent. The pipelines will meet ANSI 900 operating pressure standards and will be up to 4 inches in diameter. The thermoplastic inner and outer liners protect against corrosion and the structural layers provide pressure support. This product has undergone rigorous fire testing and has proven to maintain its integrity after a fire; however, the affected piping does have to be replaced. The pipelines will be placed above ground and follow the roadways from the initial production facility to the loading station or

third-party connection point. At Tamiami, these pipelines will be transporting crude oil and produced water to Maverick's facilities at Racoon Point. Each product will have a dedicated pipeline. Pipelines will be buried at all ORV trail and road crossings and secured with coated rebar or similar bracing on above ground surfaces.

Inspection and Testing

Flowlines will be buried and will not be visible for inspection. Pressure monitoring devices will be utilized to prevent overpressure and detect leaks. If flowlines are inactive for more than 30 days, they will be flushed with fresh water and pressure tested to 300 psi prior to returning to service. Flowlines will also be hydrotested with fresh water prior to deployment.

Pipelines will be visually inspected daily. Pressure monitoring devices will be utilized to prevent overpressure and detect leaks. Pressure testing of pipelines will be done prior to deployment and on an as needed basis since lines will be above ground.

Flow Rate

Individual well flowlines will move an estimated average of 1,000 bbls of fluid per day, with a maximum estimated average of 2,000 bbls of fluid per day. The produced water injection flowlines will transport between an estimated average of 2,000 bbls of produced water per day to a maximum estimated average of 8,000 bbls of produced water per day.

The oil pipelines will move an estimated average of 2,000 bbls of fluid per day and a maximum estimated average of 4,000 bbls of fluid per day. The produced water pipeline would move the equivalent volume of the produced water injection flowline.

The flow rates will all be dependent upon the number of active wells and how the wells are being produced with respect to the current reservoir conditions.

Operating Pressure

Three-phase individual well flowlines will operate at approximately 100 psi on average. The max pressure a flowline will be subject to is 300 psi, which will signal a shutdown of the artificial lift system with a pressure monitoring device. Water injection flowlines will be subject to a maximum permitted pressure, which will be much less than the pipe's rated working pressure. The average operating pressure of the water injection flowline will depend on wellbore injectivity and established rate.

Pipelines will be operated well under the max ANSI 600 operating pressure rating of the pipe. Actual operating pressures will be dependent upon connection point of the line and pump rate. Where engineering design allows, BOCI pipelines will be connected to centrifugal pumps that will be designed to not exceed the pipeline burst pressure at maximum pump operating or "dead-head" pressure. All pipeline pumps will be equipped with automatic pressure limit shutdowns.

Cathodic Protection Methods

Flowlines will be short runs and will be directly connected to the wellheads and subsequent casing strings. The use and design of a cathodic protection system will be evaluated in conjunction with the tank battery facility grounding system. If a system can be engineered to be effective in preventing corrosion for these short pipe runs without adversely affecting the subsequent network of equipment, it will be deployed at both sites. Pipelines are constructed of a composite material and will not benefit from cathodic protection.

Pig Launching/Retrieving Station(s)

Flowline runs will be short and will not have any type of pig launchers/receivers installed.

Pipelines will not initially have any pig launchers or receivers installed. If operating conditions warrant the use of pigging in the future, plumbing changes will be implemented to accommodate either permanent or portable pig launchers/receivers.

If installed, pig launchers and receivers will be simple in design. A three-valve manifold will be put in place at both ends to allow for easy operation and installation of the pig launcher and receiver. The launcher/receiver combination will allow for use of foam pigs or equivalent. Whether the installation is portable or not, plastic lining or some other form of containment will be utilized to prevent any drips that could occur from deploying or retrieving the pig from the devices. A vacuum truck may also be used to catch fluids, sludge, paraffin, or other that are encountered during the pigging operation. A pump truck may also be used to push the pig in the event the well stream pressure cannot be used.

Vegetation Management

Flowlines will be buried on pad and not require vegetation management.

Pipelines will be set above ground and vegetation will be cleared on an as needed basis to allow for clear daily inspection of pipelines.

V.T.C.10 Metering Points

Turbine or magnetic flow meters will be used to measure all produced water, as well as individual well test volumes of produced water. Metering points shown in **Appendix A, Exhibit V.C.2.5.i**.

Oil is currently proposed tobe metered through a lease automated custody transfer unit (LACT), as shown in **Appendix A, Exhibit V.C.2.5.i**. The oil will be transported to market for truck sale via an existing Maverick operated pipeline currently utilized for Racoon Point field. The measurement specifications may differ slightly, depending on the final agreement between Burnett and Maverick.
Gas volumes will be measured with orifice plate meters. All gas volumes, total produced gas, and individual well tests will be conducted using the metering points shown in **Appendix A, Exhibit V.C.2.5.i**.

V.T.C.11 Sales Point (if on Lease)

BOCI proposes to transfer oil from the Tamiami facilities to an established pipeline in Racoon Point (the “Raccoon Point Pipeline”), currently operated by Maverick Oil & Gas. The Raccoon Point Pipeline transfers

oil from the Racoon Point field to an off-lease loading station, known as the Devil's Garden Loading Facility, which is also operated by Maverick and located within the Miccosukee Reservation. Pursuant to the permit approving the construction of the Racoon Pipeline, the operator of the pipeline must transport third party production on a ratable basis at such time as other production is developed within the area served by the Racoon Point Pipeline. For Maverick to transport BOCI's production, the connection point would be established in a later agreement. Oil volumes transferred from Burnett Tamiami facility are currently proposed to be metered through a LACT unit. Gas will not be sold due to low volumes and lack of sales options. In addition to obtaining the required federal and state permits, BOCI will need the approval of the Miccosukee Tribe for the use of the Devil's Garden Loading Facility. To date, BOCI has been unable to engage in negotiations with the Miccosukee Tribe.

If BOCI is unsuccessful in obtaining approval from the Miccosukee Tribe for the use of the Devil's Garden Loading Facility, BOCI will need to lay their own above-ground pipeline from the Tamiami pad to a BOCI operated loading facility that will be constructed near US 41 near the entrance of 11 mile road in Section 17, T53S, R34E. The loading facility will consist of four 500 bbl storage tanks, like those used in the tank battery construction. The tanks will be placed in a 65' x 90' x 3' impermeable containment, which will hold 3,125 bbls. This exceeds the 1.5 times storage requirement of 3,000 bbls. A transfer pump will move the oil from the tanks at the well pad to the tanks at the loading facility via the above ground pipeline. BOCI may set "truck LACT" skids at the loading station (not pictured in the diagram) to aid the metering and transfer of oil into tanker trucks, if needed. **Exhibit V.T.C.11** in Appendix A shows the layout of this facility. The loading facility will be connected to the Lee Co. Electric Cooperative (LCEC) grid via buried powerline. The location of the proposed loading facility is shown in Appendix C.

V.T.C.12 Tanker Pick-Up Points (if on Lease)

Oil will be transferred to off-lease loading stations via pipelines as described in previous sections. Prior to construction of facilities, oil produced from testing of the exploratory well may be trucked from the well pad to sales in an amount not to exceed 500 bbls per truck load. All trucking of oil will be conducted during daylight hours during the testing phase.

V.T.C.13 Gas Compressor, Including Type and Size, if Applicable

Gas sales will not be available and will not warrant the need for large booster compressors for sales. Smaller boosters may be used for vapor recovery if it can assist in supplying more fuel for power generation. These vapor recovery units (VRUs) would have electric motors.

V.T.C.14 Enhanced Recovery Methods and Equipment

Secondary and tertiary recovery methods will not be needed. This is not a depletion drive reservoir.

V.T.C.15 Vegetation Management

The road and pad will be maintained to prevent vegetation growth within the limits of the lime rock pad and road. Chemical treatment and blading will be used on an as needed basis to maintain them. Only NPS approved chemicals will be used for treatment.

V.T.C.16 Anticipated Recompletion, Stimulation, Workover, and Well Plugging Activities

BOCI does not plan to stimulate the Sunniland formation by means of hydraulic fracturing. A small acid cleanout utilizing a blend of hydrochloric acid maybe used to remove any skin damage created by the drilling and cementing process. Similar acid blends may be used periodically in the future to remove any scale or damage that develops while the well is being produced. The use of such acid washes is typical in conventional oil and gas production. The proposed cleanout is pumped at pressures well below the formation fracture gradient and removes damage from the near-wellbore area. BOCI will log and record treating and annular pressures during any pumping operations to ensure the integrity of all casing strings are maintained throughout the job. Recompletions, such as sidetracks or exploitation of behind pipe pay will be evaluated based on well logs, and they will be approved by NPS prior to commencement. Well plugging will be carried out as outlined in **Section VII.T.A.**

Prevention of oil, brine, chemicals, etc. from reaching the ground will be achieved by placing liners under certain pieces of equipment during rig operations. Steel pits will be used to catch any fluid or solids from the wellbore. Disposal of any solids will take place in state approved facilities located outside of the Preserve. Fluids will be disposed of via the on-site disposal system.

NPS and FDEP will be notified prior to any non-routine well intervention activities (i.e. workovers, plugging, etc.).

V.T.D DAY TO DAY OPERATIONS

V.T.D.1 Access

NPS, DEP and all regulatory agencies shall have necessary access to well pads and associated production facilities for the purpose of performing all necessary inspections. All personnel accessing the well pad and/or production facilities shall have the required PPE.

V.T.D.2 Well Pad and Production Facility Maintenance

The well pad will be maintained to allow for proper drainage into dry detention areas. Berms will be maintained regularly as part of the pad maintenance program.

The production facilities will be inspected daily by field personnel. In-depth monthly facility checks will be conducted to ensure all gaskets, seals, connections, etc. are free from drips or wear. Safety equipment will also be inspected during these checks. Containments will be monitored for holes, rips, tears, etc.

Excess pipe or equipment stored on the pad location will be maintained in an organized fashion, outside of the flow of traffic. For example, pipe will be placed on racks or beams so that it is off the ground and can be easily picked up.

Monitoring wells will be put in place for monthly sample collection and analysis. Location, construction and monitoring of these wells will be carried out by an approved contractor to satisfy NPS requirements. Specific description of the monitoring wells and sampling procedures can be found in **Appendix A, Exhibit V.N.D.2.**

V.T.D.3 Access Road Maintenance

The access road will be constructed and maintained in a way that will prevent soil erosion and accommodate all weather traffic in accordance with NPS guidelines.

In accordance with NPS request to reduce impacts on the Preserve, Burnett will work in conjunction with Maverick, or other operators who use Eleven Mile Road, to jointly maintain the road in accordance with NPS guidelines. Upon reaching an agreement on the joint use of Eleven Mile Road, this Application will be amended to reflect the details of said agreement. The agreement will detail Burnett's obligation to jointly maintain and reclaim the road to NPS satisfaction.

V.T.D.4 Waste Disposal

Trash, wastepaper, garbage and junk will be placed in a portable bear-proof, screened trash container on location. All trash and debris will be transported to an authorized off-lease disposal station within thirty (30) days following the completion activities and on a regular basis for monthly operations. A properly maintained Porto-john will be provided for the crews during drilling and completion operations. All will be removed after all completion operations have ended.

V.T.D.5 Reporting

Daily Drilling reports and Monthly Production reports will be sent to NPS and DEP as required. Monthly sample reports from monitoring wells will be sent to NPS as required.

V.T.D.6 Vegetation Monitoring and Control

In consultation with NPS, BOCI will develop a vegetation monitoring and control plan for areas of disturbance to include well pad, loading facility, access road, and pipeline right of way. Only NPS approved chemicals will be used.

VI. SPILL CONTROL PLAN & EMERGENCY PREPAREDNESS PLAN (W/WO SPCC PLAN)

A complete Spill Control and Emergency Preparedness Plan for the Nobles Grade Prospect and the Tamiami Prospect is provided in **Appendix D**.

VII. WELL PLUGGING AND RECLAMATION PLAN

VII.N NOBLES GRADE PROSPECT

VII.N.A PLUGGING PROGRAM

After the well is no longer commercial, the well is to be plugged or plugged back to accommodate the parameters listed below. NPS and FDEP will be notified prior to the commencement of any plugging and reclamation activities.

Exact proposed plug depths and volumes will be determined by exact wellbore construction and actual cement tops. Final plugging and abandonment designs will be drafted and submitted to the Florida DEP and NPS for approval prior to plugging the well(s). **Appendix A, Exhibit VII.A.1.1** illustrates the potential plugging design, based on the ideal wellbore design.

Where possible, casing will be cut above the known top of cement and pulled. Existing perforations will be isolated with a plug set within 100 feet of the top perforation. If there is casing left in the wellbore that is not cemented in place, it will be perforated and cement will be squeezed using a packer or cement retainer. Most cement plugs will be balanced plugs, spotted through tubing.

Below is an outline of the potential plug types and footages. Amount of cement pumped will be determined by depth and hole size, as well as the conditions.

- CIBP + 50’ cement plug above perforated interval(s).
- 100’ cement plugs centered across all casing shoes.
- 100’ cement plug centered on liner top.
- 100’ cement plugs centered across all casing cuts. If casing cannot be pulled from that depth, a packer or retainer will be used to squeeze cement behind pipe through the cut. Any plugs above that where casing is not recoverable will utilize the perforate and squeeze technique.
- 100’ (min.) cement plugs will be spotted throughout surface casing interval to cover any water bearing zones that are identified during the initial drilling process.
- 100’ cement surface plug will be spotted and wellhead will be cut off 4’ below ground level.

A steel plate will be welded on to surface casing 4’ below ground level and will be marked with the well name.

VII.N.B RECLAMATION PLAN FOR NOBLES GRADE PROSPECT

Consistent with 36 CFR §9.116, and the guidelines provided in Stipulation #39 of the Mineral Management Plan, BOCI will take steps to reclaim the natural conditions and processes existing prior to the start of drilling operations, or to such other condition agreed to by BOCI and the Regional Director and Superintendent in an approved Operations Permit Application, when production activities are completed. In the event that drilling operations result in damage to Preserve lands or resources adjacent to the survey area, those lands and resources will also be reclaimed as described below.

Clean-up and restoration crews will be available and working concurrently with drilling operations. Post-operational restoration activities and any necessary monitoring requirements will be addressed by BOCI and State and Federal agencies within 30 days of the completion of drilling operations. Performance bonds will remain in place until such restoration efforts, if needed, meet required standards.

VII.N.B.1 Reclamation Goals, Procedures & Timeline

In accordance with Stipulation #39 of the Mineral Management Plan (MMP), prior to commencing drilling operations, BOCI will document the pre-disturbance conditions of the Nobles Grade Prospect. The process of documenting the pre-disturbance condition will include taking photographs, establishing ground elevations and associated hydrology, and collecting data pertaining to soil. This documentation will establish a baseline for BOCI's reclamation goals. As stated in the MMP, "the process of reclamation begins with the documentation of pre-disturbance conditions as a baseline, continues through operations, and requires certain follow-up actions after reclamation actions have been completed."

BOCI intends to begin reclamation work within six months of abandonment of a drilling pad on which all wells have been plugged and abandoned. The timing of the commencement of the reclamation work would depend on seasonal considerations. All reclamation work will be scheduled for the dry season, unless otherwise authorized by the Superintendent. BOCI will return disturbed areas to the natural condition and processes that existed before the operations began, or to such other condition agreed to by BOCI and NPS. BOCI will ensure that the land is returned to a condition that provides safe use of the area by wildlife and Preserve visitors; plant growth native to the area; and normal surface and subsurface water flow.

The following reclamation activities will be conducted as needed consistent with 36 CFR §9.116, and Stipulation #39 of the Mineral Management Plan guidelines.

- Data collection within and adjacent to the impact areas will be collected prior to the impacts so that targets for reclamation are based on the actual habitats in place prior to the impacts. Sampling stations locations will be identified prior to any construction activities to obtain accurate information on vegetation composition and elevations before the impacts occur;
- All oil wells on the Nobles Grade Prospect will be plugged consistent with **Section VII.N.A.** of this Application, and all water wells will be plugged and abandoned according to the rules of the South Florida Water Management District and NPS regulations;
- All above ground equipment, structures, debris and materials, including well pad and pad material will be removed;
- Any contaminating substances will be removed or neutralized. If there is reason to suspect soils or groundwater have been contaminated, BOCI will collect and test samples to verify that contaminating substances have been removed or neutralized;
- Buried pipes will be purged and removed;
- Surface disturbance will be returned to pre-construction topographic contours, and all depressions, holes, ditches, and other excavations will be filled and graded to the approximate original contour;

- Control of exotic species will be considered throughout the reclamation of disturbed sites. Proactive control measures during operations will reduce the overall control problems during restoration. Steps will be taken to prevent the colonization of exotic species at abandoned oil and gas site as well as sites with active operations. Any method used for the control of exotic species will be approved by NPS prior to its application;
- BOCI will provide conditions where the ecological processes typical of the ecological zone will reestablish themselves; and
- Wetland areas will be returned to their preexisting elevations.

In addition to its reclamation requirements, BOCI will provide compensatory wetland mitigation in accordance with applicable requirements and consistent with the NPS's guidance in the Procedural Manual #77-1: Wetland Protection. Florida law and the federal Clean Water Act (to the extent applicable) also provide for compensatory wetland mitigation.

VII.N.B.2 Reclamation Cost Estimate

Anticipated reclamation costs are part of a sub-contracting package that cannot be finalized prior to plan approval. Predictions of reclamation costs are difficult to make at this point in time, because they will occur on an as needed basis as the activity progresses. For these reasons, estimates of a more detailed reclamation plan and an accurate reclamation cost estimate are not feasible at this time. Nonetheless, BOCI's consultants are currently working on determining reclamation costs based on all available information at this time.

BOCI will post a bond equal to the necessary costs of reclaiming any wells, well pads, and access roads, in accordance with the NPS Performance Bond Cost Calculation Worksheet formulated by NPS. (**Refer to APPENDIX A, EXHIBIT VII.N.B.2)** This bond amount is separate and in addition to the bond requirements of other state, federal and local agencies. BOCI is aware that the USDOI-NPS bond amount is not necessarily the limit of liability for damage to Preserve resources. Under the 36 CFR Subpart 9B regulations the Operator is responsible for damages to park resources resulting from the Operator's failure to comply with the approved Operations Permit Application. Depending upon the type of substance, damage and/or incident, the Operator may also be held liable under other statutes that might be deemed applicable including the System Unit Resource Protection Act 54 (U.S.C. § 100721), Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Resource Conservation and Recovery Act (RCRA), and the Oil Pollution Act (OPA).

VII.T TAMIAMI PROSPECT

VII.T.A PLUGGING PROGRAM

After the well is no longer commercial, the well is to be plugged or plugged back to accommodate the parameters listed below. NPS and FDEP will be notified prior to the commencement of any plugging and reclamation activities.

Exact proposed plug depths and volumes will be determined by exact wellbore construction and actual cement tops. Final plugging and abandonment designs will be drafted and submitted to the Florida DEP and NPS for approval prior to plugging the well(s). **Appendix A Exhibit VII.A.1.1** illustrates the potential plugging design, based on the ideal wellbore design.

Where possible, casing will be cut above the known top of cement and pulled. Existing perforations will be isolated with a plug set within 100 feet of the top perforation. If there is casing left in the wellbore that is not cemented in place, it will be perforated and cement will be squeezed using a packer or cement retainer. Most cement plugs will be balanced plugs, spotted through tubing.

Below is an outline of the potential plug types and footages. Amount of cement pumped will be determined by depth and hole size, as well as the conditions.

- CIBP + 50' cement plug above perforated interval(s).
- 100' cement plugs centered across all casing shoes.
- 100' cement plug centered on liner top.
- 100' cement plugs centered across all casing cuts. If casing cannot be pulled from that depth, a packer or retainer will be used to squeeze cement behind pipe through the cut. Any plugs above that where casing is not recoverable will utilize the perforate and squeeze technique.
- 100' (min.) cement plugs will be spotted throughout surface casing interval to cover any water bearing zones that are identified during the initial drilling process.
- 100' cement surface plug will be spotted and wellhead will be cut off 4' below ground level.

A steel plate will be welded on to surface casing 4' below ground level and will be marked with the well name.

VII.T.B RECLAMATION PLAN FOR TAMIAMI PROSPECT

Consistent with 36 CFR §9.116, and the guidelines provided in Stipulation #39 of the Mineral Management Plan, BOCI will take steps to reclaim the natural conditions and processes existing prior to the start of drilling operations, or to such other condition agreed to by BOCI and the Regional Director and Superintendent in an approved Application, when production activities are completed. In the event that drilling operations result in damage to Preserve lands or resources adjacent to the survey area, those lands and resources will also be reclaimed as described below.

Clean-up and restoration crews will be available and working concurrently with drilling operations. Post-operational restoration activities and any necessary monitoring requirements will be addressed by BOCI and State and Federal agencies within 30 days of the completion of drilling operations. Performance bonds will remain in place until such restoration efforts, if needed, meet required standards.

VII.T.B.1 Reclamation Goals, Procedures & Timeline

In accordance with Stipulation #39 of the Mineral Management Plan (MMP), prior to commencing drilling operations, BOCI will document the pre-disturbance conditions of the Tamiami Prospect. The process of documenting the pre-disturbance condition will include taking photographs, establishing ground elevations and associated hydrology, and collecting data pertaining to soil. This documentation will establish a baseline for BOCI's reclamation goals. As stated in the MMP, "the process of reclamation begins with the

documentation of pre-disturbance conditions as a baseline, continues through operations, and requires certain follow-up actions after reclamation actions have been completed."

BOCI intends to begin reclamation work within six months of abandonment of a drilling pad on which all wells have been plugged and abandoned. The timing of the commencement of the reclamation work would depend on seasonal considerations. All reclamation work will be scheduled for the dry season, unless otherwise authorized by the superintendent. BOCI will return disturbed areas to the natural condition and processes that existed before the operations began, or to such other condition agreed to by BOCI and NPS. BOCI will ensure that the land is returned to a condition that provides safe use of the area by wildlife and Preserve visitors; plant growth native to the area; and normal surface and subsurface water flow.

The following reclamation activities will be conducted as needed consistent with 36 CFR §9.116, and Stipulation #39 of the Mineral Management Plan guidelines.

- Data collection within and adjacent to the impact areas will be collected prior to the impacts so that targets for reclamation are based on the actual habitats in place prior to the impacts. Sampling stations locations will be identified prior to any construction activities to obtain accurate information on vegetation composition and elevations before the impacts occur;
- All oil wells on the Tamiami Prospect will be plugged consistent with **Section VII.T.A** of this Application, and all water wells will be plugged and abandoned according to the rules of the South Florida Water Management District and NPS regulations;
- All above ground equipment, structures, debris and materials, including well pad and pad material will be removed;
- Any contaminating substances will be removed or neutralized. If there is reason to suspect soils or groundwater have been contaminated, BOCI will collect and test samples to verify that contaminating substances have been removed or neutralized;
- Buried pipes will be purged and removed;
- Surface disturbance will be returned to pre-construction topographic contours, and all depressions, holes, ditches, and other excavations will be filled and graded to the approximate original contour. Final grades will be certified by a professional land surveyor;
- Control of exotic species will be considered throughout the reclamation of disturbed sites. Proactive control measures during operations will reduce the overall control problems during restoration. Steps will be taken to prevent the colonization of exotic species at abandoned oil and gas site as well as sites with active operations. Any method used for the control of exotic species will be approved by NPS prior to its application;
- BOCI will provide conditions where the ecological processes typical of the ecological zone will reestablish themselves; and
- Wetland areas will be returned to their preexisting elevations.

In addition to its reclamation requirements, BOCI will provide compensatory wetland mitigation in accordance with applicable requirements and consistent with the NPS's guidance in the Procedural Manual #77-1: Wetland Protection. Florida law and the federal Clean Water Act (to the extent applicable) also provide for compensatory wetland mitigation.

VII.T.B.2 Reclamation Cost Estimate

Anticipated reclamation costs are part of a sub-contracting package that cannot be finalized prior to plan approval. Predictions of reclamation costs are difficult to make at this point in time, because they will occur on an as needed basis as the activity progresses. For these reasons, estimates of a more detailed reclamation plan and an accurate reclamation cost estimate are not feasible at this time. Nonetheless, BOCI's consultants are currently working on determining reclamation costs based on all available information at this time.

BOCI will post a bond equal to the necessary costs of reclaiming any wells, well pads, and access roads, in accordance with the NPS Performance Bond Cost Calculation Worksheet formulated by NPS. (**Refer to APPENDIX A, EXHIBIT VII.N.B.2**) This bond amount is separate and in addition to the bond requirements of other state, federal and local agencies. BOCI is aware that the USDOI-NPS bond amount is not necessarily the limit of liability for damage to Preserve resources. Under the 36 CFR Subpart 9B regulations the Operator is responsible for damages to park resources resulting from the Operator's failure to comply with the approved Operations Permit Application. Depending upon the type of substance, damage and/or incident, the Operator may also be held liable under other statutes that might be deemed applicable including the System Unit Resource Protection Act 54 (U.S.C. § 100721), Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Resource Conservation and Recovery Act (RCRA), and the Oil Pollution Act (OPA).

VIII. COMPLIANCE WITH OPERATING STANDARDS

Proposed operations occurring within NPS System units must comply with the current regulations at 36 CFR §§9.110-9.118 that define the USDOI-NPS operating standards. This Application proposes activities that fully comply with these operating standards.

A. GENERAL FACILITY DESIGN AND MANAGEMENT STANDARDS

The operating standards state that, "You must not conduct operations within 500 feet of surface water, including an intermittent or ephemeral watercourse, or wetland…The Superintendent may increase or decrease this distance consistent with the need to protect federally owned or administered lands, water, or resources of System units, visitor uses or experiences, or visitor or employee health and safety while ensuring that you have reasonable access to your non-Federal oil and gas rights." (36 CFR §9.111) This permit application outlines the operation in detail and the safeguards being put in place to protect surface waters; however, a 500 foot buffer would require unnecessary additional disturbance to surrounding wetlands. BOCI intends to minimize the amount of impact with their operation.

As discussed in section XI of this Application, the access to these oil and gas rights necessarily passes through wetland areas. Aside from NPS approval of this Application, the Florida Department of Environmental Protection (FDEP) will review standard permit applications under section 404 of the Clean Water Act (CWA) to the extent that the proposal might result in a discharge to the navigable waters. The 404 regulations require that the project purpose be defined clearly, an alternatives analysis be conducted, and that wetland impacts be avoided and minimized to the maximum extent practicable. The configuration and design of the proposed well pads and access roads minimizes wetland impacts and surface disturbance while balancing those impacts with considerations for wildlife habitat and historic/cultural resources.

The proposed access road alignments and pad locations were determined in consultation with NPS staff and have been designed to minimize impacts and maintain ecological connectivity. The alignments have been routed in a configuration that avoids, to the greatest extent practicable, impacts to those natural resource features that are rare and/or take longest to regenerate. The design incorporates the proper spacing and sizing of culverts necessary to maintain sheet flow at a variety of hydrologic stages and provide for movement of aquatic organisms underneath the road.

As documented in Appendix A, BOCI will install and maintain secondary containment materials and structures for all equipment and facilities using or storing contaminating substances. Waste will be temporarily stored in the smallest feasible area and confined in a manner appropriate to prevent escape.

Within the area of operations, engines will adhere to applicable Federal and State emission standards. The use of a compacted 8-inch lime rock base on the access roads and well pads will minimize fugitive dust.

Gas volumes will be measured with orifice plate meters. All gas volumes, total produced gas, and individual well tests will be conducted using the metering points shown in **Appendix A, Exhibit V.C.1.5.i.**

The operations will be implemented in a manner that avoids or minimizes impacts to sensitive wildlife, including timing and location of operations. The specific terms and conditions for minimizing impacts to wildlife will be determined through consultation with the US Fish & Wildlife Service (USFWS) during the CWA 404 permitting process. Invasions of exotic plant or animal species will be controlled from project initiation through the final reclamation activities.

B. HYDROLOGIC STANDARDS

Connectivity between surface water and groundwater will be maintained within the area of operations. There are no activities proposed in this Application that disrupt hydrologic connectivity between surface and groundwater.

The engineering designs for the well pads and access roads (see Appendices B, and C) minimize the potential for degradation of surface water and/or groundwater. The natural sheet flow of surface water will be maintained through the use of road culverts that are appropriately located, sized, and spaced, based on high-resolution LiDAR data and topographic contouring. The roadway cross drains are conceptually proposed to be 12 inch by 18 inch elliptical RCP and have been proposed on approximately 200 lf spacing. The invert of the ERCP will be at the existing ground elevation with a six-inch rip rap sump placed in front of each of the pipe ends. In addition to the cross drains, high water spillways have been proposed at areas of more concentrated flow to provide relief in significant storm events. Following the selection of the final

roadway alignment, the final hydrologic design will be performed as a part of the FDEP ERP application review.

As a part of the FDEP ERP review, the final hydraulic design will be performed to determine the impact of the proposed road on the upstream and downstream natural communities. The final hydraulic design will provide sufficient conveyance capacity under the road to not be detrimental to pre-existing natural conditions. The proposed roadway alignment has been selected based upon environmental constraints and other constraints and has been oriented parallel to the sheet flow patterns.

The applicant has reviewed the preliminary results of the WERP RSM and will incorporate the proposed flows into the final hydraulic design for the project. The road and culvert designs will be reviewed by the BCNP hydrologist, along with USACE and FDEP.

C. SAFETY STANDARDS

The operator will maintain site security, structures, facilities, improvements, and equipment in a safe and professional manner in order to provide a safe environment for park resources, park visitors, and NPS employees, free from exposure to physical and chemical hazards.

As detailed in section V of this Application and Appendix D, the operator will maintain the area of operations in a manner that avoids or minimizes the cause or spread of fires and does not intensify fires originating outside the operations area.

D. LIGHTING AND VISUAL STANDARDS

The operator will utilize no artificial lighting on access roads, and only the minimum artificial light necessary at the well pads for safety and security. Best management practices will be implemented that support the NPS Dark Skies initiative to reduce light pollution while ensuring operational safety standards are met. BOCI will follow the recommendations provided by NPS, which can be found in **Appendix A Exhibit VIII.D**. The only exception to this will be during drilling operations, where drilling rig lighting will be kept unaltered to ensure personnel safety.

The visual contrast in the landscape is minimized by the location of the operation areas away from visitor use areas, and the use of NPS approved colors for facilities. The access roads and well pad lime rock materials will be similar in composition to soils in surrounding profiles.

E. NOISE REDUCTION STANDARDS

The operator will utilize appropriate noise reduction equipment to minimize noise production during the construction of access roads and well pads, during drilling and completion operations and normal operations of well pad equipment.

F. RECLAMATION AND PROTECTION STANDARDS

The reclamation plan detailed in section VII of this Application is consistent with the operating standards specified in 36 CFR §9.116.

BOCI commits to protect all survey monuments, witness corners, reference monuments, and bearing trees against destruction, obliteration, or damage from operations. Should any damage occur during the course of operations, BOCI will be responsible for reestablishing, restoring, and referencing any monuments, corners, and bearing trees that are destroyed, obliterated, or damaged by the operations.

G. OPERATING STANDARDS FOR DRILLING AND PRODUCTION OPERATIONS

The drilling and production operations detailed in section **V.N.B, V.T.B, V.N.C**, and **V.T.C** are consistent with the operating standards specified in 36 CFR §9.118. The well plugging program detailed in section **VII.N.A**. and **VII.T.A**. also meets those regulatory operating standards.. As per 36 CFR §9.111(e), all equipment will meet Federal and State emissions standards. This is demonstrated in Appendix I.

IX. AFFIDAVITS AND STATEMENTS

A. AFFIDAVIT OF COMPLIANCE

Appendix F provides an affidavit of compliance affirming that this Application is and will continue to be in compliance with all applicable federal, state, and local laws and regulations.

X. OTHER APPLICABLE PERMITS

A. OVERVIEW

This Application constitutes BOCI's application for an operations permit to USDOI-NPS for proposed drilling operations within the BCNP System unit. In addition to this operations permit, a variety of other federal, state, and local permits and regulatory approvals must be secured before the operations can commence. The subsections below briefly describe the other permits and approvals required and the issuing agency.

B. FDEP – CLEAN WATER ACT SECTION 404 PERMIT

Under section 404 of the Clean Water Act (CWA), it will be necessary to obtain a permit from the FDEP before discharging any dredged or fill material into "waters of the United States." The term "waters of the United States" is broadly defined to include various types of surface waters, including wetlands. The operator will secure a 404 standard permit (formerly known as an individual permit).

C. FDEP/EPA – UNDERGROUND INJECTION CONTROL (UIC) PERMIT

The drilling and production operations described in this Application will require a Class II Underground Injection Control (UIC) Permit, for the disposal of fluids that accompany oil and gas production ("produced water"). These fluids consist primarily of brines (saltwater) that are in the oil reservoir and are extracted

with the oil and gas. These fluids are separated from the oil and gas and are injected deep underground where they do not interact with drinking water supplies. The wells subject to UIC permitting will inject fluids into the Boulder Zone strata at a true vertical depth of 2,600 feet or deeper. Within these areas of BCNP, massive anhydrite strata estimated to be >1,000 feet thick serve as confining beds below the Boulder Zone. Above the Boulder Zone, relatively thin hydrostratigraphic units of the deepest Lower Florida aquifer are interlayered with confining units, which are overlain by >600 feet of the Middle Confining Unit (Reese and Richardson 2008).

D. FDEP – OIL AND GAS PROGRAM PERMITTING

The Florida Department of Environmental Protection (FDEP) administers the Oil and Gas Program that is the permitting authority for oil and gas activities within the state of Florida. The program requires separate applications for a permit to drill and a permit to operate oil and gas wells.

E. FDEP – ENVIRONMENTAL RESOURCE PERMIT (ERP) – WETLANDS

In Florida, Environmental Resource Permits (ERPs) are required for activities where dredging and filling occurs within wetland areas and other waters of the state. FDEP administers ERP permitting for activities involving oil and gas drilling and production.

F. SFWMD – CONSUMPTIVE WATER USE PERMIT

Freshwater supplies will be needed during the well drilling and completion operations as described in sections **V.N.B.3** and **V.T.B.3**. This will require a consumptive water use permit from the South Florida Water Management District (SFWMD). In addition to the water use permit, the regulations require the securing of a Water Well Construction permit prior to construction, repair, or abandonment of any consumptive water use wells.

G. FDEP – AIR CONSTRUCTION PERMIT

As required by the Florida Division of Air Resource Management (DARM), an Air Construction Permit is required prior to the construction of a tank battery. Tank batteries at both the Nobles Grade and Tamiami prospects will be constructed in compliance with the Florida Administrative Code (FAC) and EPA NSPS Subparts OOOO and OOOOa, NESHAP Subpart ZZZZ and NSPS Subpart JJJJ and NESHAP Subpart HH.

H. STATE OF FLORIDA/FDOT – ACCESS PERMIT FOR COLLIER REST STOP ROW

Following submission of the Operations Permit Application to the National Park Service, Burnett will work with the State of Florida and/or Florida Department of Transportation (FDOT) regarding access roads and infrastructure for the Nobles Grade well location. Burnett will work with the appropriate agency to satisfy any state permit requirements. In the event that an agreement cannot be reached with FDOT for a loading facility, BOCI will work with NPS to determine an alternate location.

XI. BACKGROUND ENVIRONMENTAL INFORMATION

XI.N NOBLES GRADE PROSPECT

XI.N.A DESCRIPTION OF NATURAL RESOURCES

XI.N.A.1 Soil Type(s) and Engineering Properties

A soil survey of the current BCNP area was completed by the US Department of Agriculture (USDA) in 1942 and published in 1954 (Leighty et al. 1954). A modern soil survey of the Collier County Area (Liudahl et al. 1998) did not include the BCNP or ENP, and the soil map units depicted I n **Figure 11-1** represent digitized map data based on the 1954 publication (Jones 2006). Soil scientists from the United States Department of Agriculture, Natural Resources Conservation Service (USDA-NRCS) are currently performing soil mapping of BCNP with modern soil classifications and mapping standards.

Older (pre-1960s) soil mapping conventions often mapped soil-vegetation associations rather than soil map units based solely on soil properties. **Figure 11-1** depicts three soil map units within the proposed operations area (in order of predominance): Ochopee fine sandy marl, shallow phase – cypress cover (Ob5); Cypress swamp (Cf); and Ochopee fine sandy marl, shallow phase – cover unspecified (Ob). These soil map units share the following characteristics: shallow depth to limestone caprock (typically 6-12 inches for Ochopee map units, and typically less than 60 inches for Cypress swamp units); very poorly drained; siliciclastic sand with mixed calcareous materials; and relatively high pH (neutral to alkaline).

These soil map units can be correlated with soil map units from the modern soil survey (Liudahl et al. 1998) based upon soil morphology, parent materials, and soil reaction (pH). The most extensive soil at the Nobles Grade proposed operations area is the Ochopee fine sandy marl shallow phase (Ob and Ob5), which corresponds to the Ochopee fine sandy loam (soil map units 51 and 50, respectively) in the 1998 soil survey. The Cypress swamp (Cf) soil map unit corresponds most closely to the Boca, Riviera, limestone substratum, and Copeland fine sands, depressional (soil map unit 25) in the 1998 survey. These correlations allow for use of the soil characterization descriptions and data from the modern survey. Descriptions of these three map units are as follows:

Ochopee fine sandy marl shallow phase, unspecified cover vegetation (Ob): these soils are level, poorly drained, and associated with prairies. Depth to caprock is less than 20 inches, and field observations along the proposed Nobles Grade road alignment (at 50-100 foot intervals) typically encountered caprock at depths of 6-12 inches below the soil surface with sporadic solution cavities extending down 36 inches or more. The predominant soil texture is fine sandy loam, with siliciclastic sands and calcareous materials intermixed. Reported values for bulk density are 1.3-1.5 g/cc, corresponding to a porosity of 43-51 percent. The permeability of the soils is 2.0-6.0 inches per hour, the erosion potential is low, the shrink-swell potential is low, and the plasticity index is low to medium. Field observations along the entire length of the Nobles Grade proposed road alignment, and the proposed pad area, revealed the consistent presence of shallow caprock at depths of less than 12 inches wherever dwarf (scrub) cypress predominates. Small areas with taller cypress trees may have caprock at depths exceeding 20 inches. (Published data taken from Liudahl, 1998, Tables 11 and 12)

Ochopee fine sandy marl shallow phase, cypress cover vegetation (Ob5): these soil map units comprise the greatest areal extent within the Nobles Grade proposed operations area. The characteristics

of these map units are identical to the general description for Ochopee soils (above) but are specifically associated with dwarf (scrub) cypress vegetation communities. The predominance of dwarf cypress vegetation in this area was consistently (without exception) associated with caprock at a depth of 0-15 inches below ground surface.

Cypress swamp (Cf): this vegetation association was associated in the 1954 soil survey with soils similar to the Ochopee soil map units, but with a deeper depth to caprock (correlated with the Boca, Riviera, limestone substratum, and Copeland fine sands, depressional in the 1998 Collier County Area soil survey). These deeper soil depths are associated with greater cypress tree heights and the occurrence of cypress domes, cypress strands, and mixed wetland hardwoods. Depth to caprock varies from 30-54 inches or more, and field observations confirmed these depths where cypress domes and strands were encountered, with deeper soils near the center of domes and strands. The predominant soil texture is fine sand. Reported values for bulk density are 1.3-1.7 g/cc, corresponding to a porosity of 36-51 percent. The permeability of the soils is 6.0-20 inches per hour in the surface horizons with lower permeability (0.6-2.0) in the subsoil. The erosion potential is low, the shrink-swell potential is low, and the soils are non-plastic. (Published data taken from Liudahl, 1998, Tables 11 and 12)

Small areas of upland soils within this general area are associated with upland hammocks (see section X.A.1.5 for a vegetation description). These upland areas were carefully avoided when planning the proposed road alignment and are not located within the proposed operations area, primarily because they serve as upland refugia for wildlife species and have a higher probability of cultural or historical significance.

XI.N.A.2 Baseline Soil Chemical Analysis

The proposed well pad location at Nobles Grade is subject to review and approval by NPS, and detailed geochemical analyses for a specific site are premature until NPS approves the well pad site selection. General geochemical data are available for a profile of the Ochopee soil series, sampled within BCNP just west of Turner River Rd., approximately 9.3 miles north of US-41. Table 11-1 reports the geochemical data from the USDA-NRCS National Cooperative Soil Survey (NSSC, 2020; Pedon ID S2006FL021-003).

Table 11-1. Selected Geochemical Data from an Ochopee Soil Series Profile within BCNP

Depth (cm)	pH (H2O)	As (mg/kg)	Ba (mg/kg)	Cd (mg/kg)	Cr (mg/kg)	Pb (mg/kg)	Hg (mg/kg)	Se (mg/kg)	Ag (mg/kg)	Zn (mg/kg)
0-13	7.8	1.86	22.11	0.13	11.17	6.32	-	241.77	-	5.58
13-25	8.2	6.20	11.71	0.04	13.73	4.57	-	206.96	-	3.31
25-31	8.3	13.12	14.38	0.05	29.27	6.18	-	139.14	0.32	4.54

The electrical conductivity for the three horizons was 1.56 dSm^{-1} for 0-13 cm; 0.86 dSm^{-1} for 13-25 cm; and 0.68 dSm^{-1} for the 25-31 cm depth. No data was available for mercury (Hg), sodium absorption ratio, and exchangeable sodium percentage.

When the well pad location has been reviewed and approved by NPS, the applicant will work with NPS to determine the soil sampling protocol and the specific chemical analyses to be performed as part of the baseline soil chemistry characterization.

XI.N.A.3 Paleontological Resources

The geologic formations exposed at the land surface within BCNP have been altered by acidic rainwater and groundwater that is undersaturated with respect to calcium carbonate, resulting in dissolution and recrystallization of the carbonate rocks (Thornberry-Ehrlich 2008). These processes are associated with surface exposures of "caprock," which contain solution holes or cavities.

A 2006 letter from the Florida Geological Survey noted that "The Big Cypress area of southern Florida contains no significant occurrences of fossils in naturally occurring exposures. In the subsurface, fossil mollusk faunas are common in the Plio-Pleistocene sediments and are normally exposed only by mining activities (Florida Geological Survey 2006). A copy of this letter is provided as **Appendix E**.

XI.N.A.4 Hydrology and Water Quality

The portions of the BCNP surrounding the proposed Nobles Grade operations area are topographically flat, with gradients of 5-10 inches of vertical change per mile. Within this general setting, a shift from wet prairie and cypress vegetation communities to isolated pine flatwoods and hardwood hammocks signifies topographic high areas with only a rise of 0.5-2 feet above the surrounding wetland grade (see Section II.D.1.2 for elevation contours). Natural ground elevations within the proposed area of operations vary from 13 feet to 11 feet NAVD 88 (USACE 2018). During the rainy season (late May-October), rainfall normally exceeds evapotranspiration and creates a shallow inundation across most of BCNP. This water slowly moves as "sheetflow" across most of the land surface, except for small isolated areas of higher ground, or where manmade structures (canals, roads, bridges, culverts) concentrate flow.

The major flow direction across this area is generally from northwest to southeast. On a landscape scale, flows are influenced by bedrock topography. Local microtopography influences sheet flow patterns at lower flow stages (NPS 2010). In terms of proximity to surface water bodies (streams, rivers, canals, ponds, lakes), the closest water feature to the proposed operations area is the I-75 canal 0.5 mile to the northwest.

Wetlands (marshes, prairies, cypress) typically exhibit water depths of 1-3 feet during the wet season. Pine flatwoods are transitional communities where portions may be hydric flatwoods and higher areas mesic flatwoods. Hardwood hammocks typically have little to no surface water. During the dry season, when evapotranspiration and seepage cause water levels to drop, water recedes down to average ground and into depressional areas as the drawdown continues (NPS 2010).

The unconfined surficial aquifer interacts directly with surface waters due to the high porosity, permeability, and solution features within the carbonate rocks (Thornberry-Ehrlich 2008). Depth to groundwater is therefore above ground during the wet season months, and retreats below the ground surface during the dry season. In most areas, groundwater is rarely more than a few feet below the wetland ground surface and slightly deeper under pine flatwoods and hardwood hammocks. Although solution features are commonly observed within the surficial geologic formations, sinkholes are rare within Collier County. The southernmost sinkhole in Florida is located at Deep Lake in the western portion of the Preserve, which formed an estimated 6,000 years before present. The FDEP maintains a database of "Subsidence Incident Reports" for sinkholes, and the closest report in the database is from the town of Immokalee. No sinkhole reports exist in the database for the Preserve. The potential for "cover-collapse" sinkholes appears to be low within BCNP, but the construction engineering for the proposed activities will include geotechnical investigations of the subsurface.

The thickness of the surficial aquifer in the Nobles Grade area was estimated at approximately 15 meters (50 feet) thick (Weedman et al. 1999; Reese and Cunningham 2000; NPS 2010).

The water quality is characterized as good (relatively unpolluted) for surface flows near the proposed operations area. An analysis of long-term (1959-2000) water quality data within BCNP and ENP revealed that long-term changes in water quality were not pronounced with BCNP, but that water quality varies seasonally as a result of biological and geochemical cycling, oxidation/reduction reactions, and dilution or concentration of constituents due to variations in water levels (Miller et al. 2003).

The water quality sampling station closest to the proposed operations area is BCAWQ21, which is located approximately 4 miles southeast of the I-75 rest stop at mile marker 63. Water quality data was collected at this station 2-6 times per year from 2005-2011. The ranges for selected water quality constituents are provided in Table 11-2 (SFWMD 2020).

Table 11-2. Water Quality Data Ranges from Station BCAWQ21, 2005-2011 (Source: SFWMD)

pH (units)	N (total) (mg/L)	NO_2+NO_3 (mg/L)	Phosphate (total) (mg/L)	Na (mg/L)	Cl (mg/L)	SO_4 (mg/L)	Specific Conductivity (uS/cm)
7.1-7.7	0.65-1.41	0.006-0.010	0.003-0.008	6.1-18.5	8.2-33.9	0.1-2.1	183.6-405.6

Nearly the entire Nobles Grade area south of I-75 consists of wetlands, with small sporadic upland pine and hardwood hammock areas. As noted, these small upland areas were avoided within the proposed operations area due to their function as wildlife refugia and due to the potential for cultural/historic sites. The only upland/wetland interface within the proposed operations area is at the northern end near the I-75 rest area at mile marker 63. All the area is considered to be within the 100-year floodplain (USDOI-NPS 2016).

XI.N.A.5 Vegetation Species Composition

This section lists and describes each of the vegetation communities found within the proposed operations area, utilizing the Florida Land Use Cover and Forms Classification System (FLUCCS) categories that best correspond to each community. Each FLUCCS code is listed followed by the name of the category and a listing of the plant species present in each vegetative stratum within each FLUCCS code. **Figure 11-2** depicts the occurrence of these vegetation communities at Nobles Grade.

Tropical Hardwoods (FLUCCS 426) – This vegetation community can also be referred to as a tropical hammock due to the presence of many species found only in subtropical climates. This community is primarily associated with higher elevations within the wetlands and most are small (<5 acres). Species present include gumbo limbo (Bursera simaruba), stopper species (Eugenia spp.), strangler fig (Ficus aurea), poisonwood (Metopium toxiferum), false tamarind (Lysiloma latisiliquum), and pigeon plum (Coccoloba diversifolia). Laurel oaks (Quercus laurifolia) and scattered pines (Pinus elliottii var densa) were also observed on several of these larger hammocks. Many species of tree snails can be found in these hammocks due to the unique habitat provided. Tree snails or shells of dead snails were observed in two hammocks during this survey. These areas correspond to the Temperate Hardwood Hammock (FHT) vegetation class in the Vegetation Classification System for South Florida Natural Areas (VCSF; Ruiz et al.

2019). The margins of some hammocks have areas of Hardwood Swamp Forest (FSH). The Operations Permit Application is designed to avoid impacts to these types of areas.

Western Everglades Hardwoods (FLUCCS 433) – These communities contain a mix of red maple (*Acer rubrum*), laurel oak (*Quercus laurifolia*), swamp bay (*Persea palustris*), red bay (*Persea borbonia*) and scattered cypress (*Taxodium distichum* and *T. ascendens*). Sparse slash pine (*Pinus elliottii* var. *densa*) may also be present in these habitats. These communities are considered to be transitional habitats due to the mixture of plant species. There is frequently a dense shrub presence dominated by coco-plum (*Chrysobalanus icaco*) and (to a lesser degree) wax myrtle (*Morella cerifera*) and corkwood (*Stillingia aquatica*). Groundcover is sparse and consisted of broomsedge (*Andropogon virginicus*), Muhly grass (*Muhlenbergia capillaris*), wiregrass (*Aristida stricta*), various sedges and carpetgrass (*Axonopus fissifolius*). These habitats are scattered throughout the general area on small mounds at higher elevation than the dominant cypress communities. In the vicinity of the proposed operations area these communities were too small to map (<1 acre). These areas correspond to the Hardwood Swamp Forest (FSH) vegetation class in the Vegetation Classification System for South Florida Natural Areas (VCSF; Ruiz et al. 2019). The Operations Permit Application is designed to avoid impacts to these types of areas.

Cypress (FLUCCS 621) – This category includes communities with a tree canopy dominated by mature cypress (*Taxodium distichum* and *T. ascendens*). These communities could be large mono-specific strands of mature cypress trees, or small cypress dome communities with deeper central ponds. Pond apple trees (*Annona glabra*) were often present in the deeper central ponds within some of these systems. The subcanopy contained widely scattered coco-plum (*Chrysobalanus icaco*) and wax myrtle (*Morella cerifera*). The groundcover contained sawgrass (*Cladium jamaicense*), sweetscent (*Pluchea odorata*), maidencane (*Panicum hemitomon*), false nettle (*Boehmeria cylindrica*), and tapegrass (*Vallisneria americana*). These areas correspond to the Cypress Forest (FSt) and Cypress Forest-Dome (FStD) vegetation classes in the Vegetation Classification System for South Florida Natural Areas (VCSF; Ruiz et al. 2019). The Operations Permit Application is designed to avoid impacts to these types of areas.

Hat-rack (Dwarf) Cypress (FLUCCS 621-H) – This community is forested but contains few canopy-sized trees. The cypress trees are dwarf or “hat-rack” cypress trees (3-6 feet in height), with some variability due to irregular depths to shallow caprock. These systems vary in the density of the trees per acre, with some areas having trees on 5 -10 foot centers while other areas have trees on 1-2 foot centers. Tree densities and presence/absence of groundcover produce lighter or darker tones on aerial imagery. The dominant vegetation is hat-rack cypress (*Taxodium ascendens*). Other species present include wax myrtle (*Morella cerifera*), coco-plum (*Chrysobalanus icaco*), red bay (*Persea borbonia*), strangler fig (*Ficus aurea*), dahoon holly (*Ilex cassine*), and myrsine (*Myrsine cubana*). The groundcover contains sawgrass (*Cladium jamaicense*), starrush whitetop (*Rhynchospora colorata*), maidencane (*Panicum hemitomon*), sweetscent (*Pluchea odorata*), red ludwigia (*Ludwigia repens), swamp fern* (*Telmatoblechnum serrulatum*), Asiatic coinwort (*Centella asiatica*), musky mint (*Hyptis alata*), Queen’s delight (*Stillingia sylvatica*), love vine (*Cassytha filiformis*), bladderwort (*Utricularia macrorhiza*), greenbrier (*Smilax bona-nox*), and floating heart (*Nymphoides pelata*). Airplants included reflexed wild pine (*Tillandsia balbisinia*), cardinal airplant *(Tillandsia fasciculata*), and twisted airplant (*Tillandsia flexuosa*). Orchids observed included butterfly orchid (*Encyclia tampensis*), rigid epidendrum (*Epidendrum rigidum*), night-scented orchid (*Epidendrum nocturnum*), and grass pink orchid (*Calopogon tuberosus*). The complex assemblage of algae, cyanobacteria, macroinvertebrates, their secretions, and detritus known as periphyton was abundant throughout these communities. These areas correspond most closely to the Cypress Scrub-Graminoid Marsh (CStG) vegetation classes in the Vegetation Classification System for South Florida Natural Areas (VCSF; Ruiz et al. 2019).

Mixed Wetland Hardwoods (FLUCCS 617) – This category contains a mixed species canopy consisting of cypress (*Taxodium distichum* and *T. ascendens*), cabbage palm (*Sabal palmetto*), pond apple (*Annona glabra*), red maple (*Acer rubrum*), laurel oak (*Quercus laurifolia*), and scattered slash pine (*Pinus elliottii* var. *densa*). The sub-canopy contains slash pine, cypress, cabbage palm, myrsine (*Myrsine cubana*), wax myrtle (*Morella cerifera*), buttonbush (*Cephalanthus occidentalis*), strangler fig (*Ficus aurea*), coco-plum (*Chrysobalanus icaco*), saltbush (*Baccharis* spp.) and scattered laurel oak. The groundcover contains swamp fern (*Telmatoblechnum serrulatum*), and canna lily (*Canna flaccida*), numerous sedge species, bushy broomsedge (*Andropogon glomeratus*), and carpetgrass (*Axonopus fissifolius*). These areas correspond most closely to the Cypress Forest-Monotypic (FStM) vegetation classes in the Vegetation Classification System for South Florida Natural Areas (VCSF; Ruiz et al. 2019). The Operations Permit Application is designed to avoid impacts to these types of areas

Cypress-Pine-Cabbage Palm (FLUCCS 624) – This category contains a canopy consisting of slash pine (*Pinus elliottii* var. *densa*), cypress (*Taxodium distichum* and *T. ascendens*), and cabbage palm (*Sabal palmetto*). Scattered pond apple (*Annona glabra*), red maple (*Acer rubrum*) and laurel oak (*Quercus laurifolia*) are also present in the canopy. The sub-canopy contains slash pine, cypress, cabbage palm, myrsine (*Myrsine cubana*), wax myrtle (*Morella cerifera*), saltbush (*Baccharis* spp.), and scattered laurel oak. The groundcover contained scattered swamp fern (*Telmatoblechnum serrulatum*), canna lily (*Canna flaccida*), swamp flatsedge (*Cyperus ligularis*), broomsedge (*Andropogon virginicus*), and ragweed (*Ambrosia artemisiifolia*). These habitat types occurred at a slightly higher ground elevation than the immediately surrounding cypress habitats. Most of these habitats are very small in size and occur as islands in the cypress-dominated landscape. These areas correspond most closely to the Cypress-Pine Forest (FStp) vegetation classes in the Vegetation Classification System for South Florida Natural Areas (VCSF; Ruiz et al. 2019). The Operations Permit Application is designed to avoid impacts to these types of areas.

Vegetated, Non-Forested Wetlands (FLUCCS 640) – These areas were dominated by a mixture of herbaceous species with grasses and sedges abundant. There were few if any trees or shrubs in these habitats primarily due to the thin soils overlying higher elevation limestone caprock. When present, trees included widely scattered cypress (*Taxodium distichum* and *T. ascendens*) and pond apple (*Annona glabra*). Widely scattered amounts of shrubs were present and included wax myrtle (*Morella cerifera*), corkwood (*Stillingia sylvatica*) and coco-plum (*Chrysobalanus icaco*). Dominant herbaceous species included sweetscent (*Pluchea odorata*), frog fruit (*Phyla nodiflora*), broomsedge (*Andropogon virginicus*), swamp fern (*Telmatoblechnum serrulatum*), bulrush (*Schoenoplectus americanus*), sawgrass (*Cladium jamaiecense*), blue flag iris (*Iris virginica*), carpetgrass (*Axonopus affinis*), yellowtops (*Flaveria linearis*), Gulf muhly (*Muhlenbergia capillaris*), bushy broomsedge (*Andropogon glomeratus*), starrush whitetop (*Rhynchospora colorata*), swamp flatsedge (*Cyperus ligularis*), knotgrass (*Paspalum distichum*), saltmarsh umbrellasedge (*Fuirena breviseta*), love vine (*Cassytha filiformis*), and swamp lily (*Crinum americanum*). These areas correspond most closely to the Graminoid Freshwater Prairie (MFGP) vegetation classes in the Vegetation Classification System for South Florida Natural Areas (VCSF; Ruiz et al. 2019). The Operations Permit Application is designed to avoid impacts to these types of areas

The proposed operations area was field-delineated through the hat-rack (dwarf) cypress communities wherever possible, due to the lower impact on mature cypress trees and habitat for listed species. These areas also have caprock within 15 inches of the ground surface (typically at 6-12 inches), providing a firm engineering subgrade for the proposed road and well pad.

XI.N.A.6 Wildlife Species Composition

As part of the environmental surveys performed within and around the proposed operations area, ecologists recorded observations of wildlife signs including direct observations of wildlife; tracks; scat; feeding signs; vocalizations; and other signs that confirm the presence of specific wildlife species. These observations were part of a general survey for wildlife and plants, in order to characterize the area and to identify any listed wildlife or plant species that may occur (see section XI.A.1.7). The general wildlife surveys were performed in conjunction with vegetation mapping and land surveying activities within the Nobles Grade operations area on 9/6/19; 9/10/19; 9/12/19 10/1/19; and 6/24/20, throughout the day beginning at approximately 0800 and concluding by 1400 hours (8 hours in field per day). Additional surveys specific to Florida bonneted bats (FBB) and red-cockaded woodpeckers (RCW) were conducted between 2/25/21 and 4/26/21.

Table 11-3 summarizes the wildlife species observed within and around the Nobles Grade proposed operations area.

Table 11-3. Wildlife Observations at the Nobles Grade Proposed Operations Area

BIRDS	
Blue-winged teal	*Anas discors*
Anhinga	*Anhinga*
Cormorant	*Phalacrocorax auritus*
Great blue heron	*Ardea herodias*
Cattle egret	*Bubulcus ibis*
Red shouldered hawk	*Buteo lineatus*
Great egret	*Casmerodius albus*
Belted kingfisher	*Ceryle alcyon*
Rock dove	*Columba livia*
Little blue heron (State-designated Threatened)	*Egretta caerulea*
Snowy egret	*Egretta thula*
White ibis	*Eudocimus albus*
Wood stork (Federally-designated Threatened)	*Mycteria americana*
Wild turkey	*Meleagris gallopavo*
Osprey	*Pandion haliaetus*
Common grackle	*Quiscalus quiscula*
Boat tailed grackle	*Quiscalis major*
American crow	*Corvus brachyrhynchos*
Barred owl	*Strix varia*
Northern cardinal	*Cardinalis*
Carolina wren	*Thryothorus ludovicianus*
Tufted titmouse	*Baeolophus bicolor*
Eastern kingbird	*Tyrannus tyrannus*
Barn swallow	*Hirundo rustica*
American bittern	*Botaurus lentiginosus*
Limpkin	*Aramus guarana*

Black vulture	*Coragyps atratus*
REPTILES	
American alligator (Federally-designated Threatened; Similarity of Appearance)	*Alligator mississippiensis*
Striped mud turtle)	*Kinosternon baurii*
Eastern cottonmouth (water moccasin)	*Agkistrodon piscivorus*
Green banded water snake	*Nerodia cyclopion*
Burmese python (invasive)	*Python molurus bivittatus*
Carolina anole	*Anolis carolinensis*
Brown anole	*Anolis sagrei*
MAMMALS	
White-tailed deer	*Odocoileus virginianus*
Feral hog	*Sus scrofa*
Florida panther (tracks) (Federally-designated Endangered)	*Puma concolor coryi*
Florida black bear (tracks, scat)	*Ursus americanus floridanus*
Raccoon (tracks, scat)	*Procyon lotor*
Opossum (tracks, scat)	*Didelphis virginiana*
Big brown bat (calls)	*Eptesicus fuscus*
Florida bonneted bat (calls) (Federally-designated Endangered)	*Eumops floridanus*
Northern yellow bat (calls)	*Lasiurus intermedius*
Seminole bat (calls)	*Lasiurus seminolus*
Evening bat (calls)	*Nycticeius humeralis*
Tri-colored bat (calls)	*Perimyotis subflavus*
Mexican free-tailed bat (calls)	*Tadarida brasiliensis*
AMPHIBIANS	
Southern leopard frog	*Rana spenocephala*
Cricket frog	*Acris crepitans*
Green tree frog	*Hyla cinerea*
Oak toad	*Anaxyrus quercicus*
Pig frog	*Rana grylio*
CRUSTACEANS	
Crayfish	*Decapoda* sp.
Freshwater shrimp	*Palaemonetes paludosus*
FISHES	
Mosquitofish	*Gambusia affinis*
Walking catfish	*Clarias batrachus*
Bluegill	*Lepomis macrochirus*
MOLLUSKS	
Florida apple snail	*Pomacea paludosa*
Exotic apple snail	*Pomacea insularum*
Florida shiny spike mussel	*Elliotio buckeyi*
Florida paper pondshell mussel	*Utterbackia imbecillis*
Ramshorn snail	*Marisa cornuarietis*
Florida tree snail	*Liguus fasciatus*

XI.N.A.7 Federal or State Threatened/Endangered Plan or Wildlife Species

The potential for occurrence of listed wildlife and plant species within and around the proposed operation area was initially evaluated through searches of online information sources. These sources included USFWS (Vero Beach and Jacksonville); the United States Fish & Wildlife Service (USFWS) Information for Planning and Consultation (IPaC) tool; Florida Fish and Wildlife Conservation Commission (FWC) species profiles; and the Florida Natural Area Inventory (FNAI) "Biodiversity Matrix" data viewer. Senior ecologists with decades of experience in South Florida, credentialed as Certified Senior Ecologists by the Ecological Society of America, evaluated the information prior to performing field work and general species surveys.

As part of the section 7 consultation process for federal permitting, USFWS will determine which species require species-specific surveys (e.g., RCW; FBB). NPS has prepared and submitted a Biological Assessment to the USFWS as part of their official interagency consultation process.

Figures 11-3 through 11-6 depict occurrence data for listed wildlife species within the BCNP and surrounding areas, whenever occurrence data were available. **Figure 11-3** depicts nearly 40 years of Florida panther telemetry data within and around BCNP. **Figure 11-4** provides a localized view of the same telemetry data for the Nobles Grade Prospect operations area. Occurrence data for wood stork colonies and their associated core foraging areas are depicted in **Figure 11-5**.

Red-cockaded woodpecker (RCW) clusters are depicted on **Figure 11-6**, and the operations area is approximately 5 miles from the nearest cluster. No suitable RCW habitat occurs within or adjacent to the area of operations. The closest potential RCW habitat south of I-75 is greater than 1.5 miles from the proposed access road alignment but no RCW occurrences have been documented within that habitat.

Although the bald eagle is no longer federally listed, it retains protection under the Bald and Golden eagle Protection Act (BGEPA). **Figure 11-7** depicts the location of bald eagle nests, the nearest of which is over 10 miles from the Nobles Grade Prospect operations area.

Figure 11-3 depicts Florida panther telemetry data within and around the BCNP, while **Figure 11-4** provides the same data in a more localized view near the Nobles Grade Prospect operations area. Florida panthers are wide-ranging and utilize a wide variety of habitats within BCNP, and because of this the effect of the proposed project on panthers is anticipated to be only in the form of temporary disturbance during project construction.

The general species surveys consisted of 2-3 ecologists performing pedestrian transects along the entire length of the proposed operations area and surrounding areas, including sections of alternate routings that required in-field evaluation. Combined with occurrence data from USFWS, FWC, and FNAI, **Table 11-4** provides a thorough accounting for federal and state listed wildlife species that could be present within the operations area.

Table 11-4. Listed Wildlife Species Documented or Potentially Occurring at/near the Nobles Grade Proposed Operations Area

Common Name	Scientific Name	FWC	USFWS	Observed?
AMPHIBIANS & REPTILES				
American alligator	*Alligator mississippiensis*		FT (S/A)	Y
Eastern indigo snake	*Drymarchon corais couperi*		FT	
BIRDS				
Bald eagle	*Haliaeetus leucocephalus*		NL	
Everglade snail kite	*Rostrhamus sociabilis plumbeus*		FE	
Wood stork	*Mycteria americana*		FT	
Red-cockaded woodpecker	*Picoides borealis*		FE	
Northern caracara	*Caracara cheriway*		FT	
Florida sandhill crane	*Grus canadensis pratensis*	ST	NL	
Roseate spoonbill	*Platalea ajaja*	ST	NL	
Little blue heron	*Egretta caerulea*	ST	NL	Y
Tricolored heron	*Egretta tricolor*	ST	NL	
MAMMALS				
Big Cypress fox squirrel	*Sciurus niger avicennia*	ST	NL	
Florida panther	*Felis concolor coryi*		FE	Y*
Florida bonneted bat	*Eumops floridanus*	ST	FE	
Everglades mink	*Neovison vison evergladensis*	ST	NL	

FWC = Florida Fish and Wildlife Conservation Commission
USFWS = United States Fish & Wildlife Service
FE = Federally-designated Endangered
ST = State-designated Threatened
FT = Federally-designated Threatened
NL = Not listed
* = documented during acoustic survey

While performing the field surveys, ecologists also searched for plant species listed by the Florida Department of Agriculture and Consumer Services (FDACS) and USFWS that may be present within the Nobles Grade proposed operation area.

The agencies have categorized the various listed plant species based upon their relative abundance in natural communities. Under the Endangered Species Act, it is prohibited to remove and reduce to possession or maliciously damage or destroy endangered plants on federal lands. For state-listed plant species the state categorizations include “Endangered;” “Threatened,” and “Commercially Exploited.” “Endangered” signifies species of native plants that are in imminent danger of extinction within the State, the survival of which is unlikely if the causes of a decline in the number of plants continue, and includes all species determined to be endangered or threatened, pursuant to the Federal Endangered Species Act of 1973, as amended, Public Law No. 93-205 (87 Stat. 884). “Threatened” means species native to the State that are in rapid decline in number of plants within the State, but which have not decreased in such number

as to cause them to be endangered. "Commercially exploited" means species native to the State which are subject to removal in significant numbers from native habitats in the State and sold or transported for sale.

The protection afforded plants listed by FDACS entails restrictions on harvesting or destroying plants found on private lands of another, or public lands, without permission and/or a permit from FDACS. These provisions are found in Section 581.185 FAC under State law. **Table 11-5** reports the protected plant species that could potentially occur within the Nobles Grade proposed operations area. (USDOI-NPS 2010). **Table 11-6** reports the protected plant species that were actually observed in the area. The locations of observed protected plant species were recorded with a sub-meter backpack GPS so impacts to the species could be avoided or minimized within the constraints of the general proposed alignment.

The proposed alignment and pad location seek to avoid and minimize impacts to natural resources to the extent practicable, with the acknowledgement that multiple resources must be considered simultaneously. In an effort to avoid and minimize impacts to areas with more mature stands of trees, relative rare communities (e.g., hammocks), and/or areas where listed wildlife species have a higher probability of occurrence, the alignments were directed toward dwarf cypress areas because they represent the least damaging alternative when considering multiple resources. State-listed epiphytic species are common within the extensive dwarf cypress communities throughout the Nobles Grade area (e.g., *Tillandsia* spp.) and the proposed impacts within the 30-foot wide access road corridor would be highly unlikely to affect these species within the broader area outside of the project footprint. For epiphytic species that are rarer and occur as single specimens or small groups of specimens, careful translocation of the species can be performed to remove them from the construction footprint. Orchid species require expert handling but can be successfully translocated and/or propagated. Pre-construction surveys during the alignment and pad staking provide opportunities for in-field adjustments to the alignment and/or epiphyte translocations

No federally listed plants were observed during field surveys within and around the proposed project area.

Table 11-5. Protected Plants Potentially Occurring Within the Nobles Grade Project Area

Common Name	Scientific Name	FDACS	USFWS
Paurotis palm	Acoelorraphe wrightii	T	
Golden leather fern	Acrostichum aureum	T	
Brittle maidenhair	Adiantum tenerum	E	
Sensitive joint-vetch	Aeschynomene pratensis	E	
White colic-root	Aletris bracteata	E	
Pineland-allamanda	Angadenia berteroi	T	
Eared spleenwort	Asplenium erosum	E	
Bird's-nest fern	Asplenium serratum	E	
Pinepink	Bletia purpurea	T	
Fakahatchee bluethread	Burmannia flava	E	
Manyflowered grasspink	Calopogon multiflorus	E	
Spicewood, pale lidflower	Calyptranthes pallens	T	
Leafless bentspur orchid	Campylocentrum pachyrrhizum	E	
Narrow strap fern	Campyloneurum angustifolium	E	
Tailed strap fern	Campyloneurum costatum	E	
Powdery strap airplant	Catopsis berteroniana	E	

Florida strap airplant	Catopsis floribunda	E	
Southern Florida sandmat	Chamaesyce pergamena	T	
Porter's sandmat	Chamaesyce porteriana	E	
Satinleaf	Chrysophyllum oliviforme	T	
Coffee colubrina, greenheart	Colubrina arborescens	E	
Butterflybush, Curacao bush	Cordia globosa	E	
Quailberry, Christmasberry	Crossopetalum ilicifolium	T	
Pepperbush	Croton humilis	E	
Florida tree fern	Ctenitis sloanei	E	
Blodgett's swallowwort	Cynanchum blodgettii	T	
Cowhorn orchid, cigar orchid	Cyrtopodium punctatum	E	
Florida prairie-clover	Dalea carthagenensis var. floridana	E	E
Ghost orchid, palmplolly	Dendrophylax lindenii	E	
Threadroot orchid	Dendrophylax porrectus	T	
Caribbean crabgrass	Digitaria filiformis var. dolichophylla	T	
Florida pineland crabgrass	Digitaria pauciflora	E	T
Guiana-plum	Drypetes lateriflora	T	
Clamshell orchid	Encyclia cochleata	E	
Florida butterfly orchid	Encyclia tampensis	CE	
Dingy-flowered star orchid	Epidendrum anceps	E	
Acuna's star orchid	Epidendrum blancheanum	E	
Umbrella star orchid	Epidendrum floridense	E	
Night-scented orchid	Epidendrum nocturnum	E	
Stiff-flower star orchid	Epidendrum rigidum	E	
Sanibel Island love grass	Eragrostis tracyi	E	
Beach verbena	Glandularia maritima	E	
Wild cotton	Gossypium hirsutum	E	
West Indian tufted airplant	Guzmania monostachia	E	
Snowy orchid	Habenaria nivea	T	
Needleroot airplant orchid	Harrisella porrecta	T	
Poeppig's rosemallow	Hibiscus poeppigii	E	
Hanging club-moss	Huperzia dichotoma	E	
Delicate violet orchid	Ionopsis utricularioides	E	
Rockland morningglory	Ipomoea tenuissima	E	
Pineland clustervine	Jacquemontia curtissi	T	
Skyblue clustervine	Jacquemontia pentanthos	E	
West coast lantana	Lantana depressa var. sanibelensis	E	
Catesby's lily	Lilium catesbaei	T	
Small's flax	Linum carteri var. smallii	E	
Pantropical widelip orchid	Liparis nervosa	E	
Nodding club-moss	Lycopodiella cernua	CE	
Hidden orchid	Maxillaria crassifolia	E	
Pineland blackanthers	Melanthera parvifolia	T	
Climbing vine fern	Microgramma heterophylla	E	

Simpson's stopper	Myrcianthes fragrans var. simpsonii	T	
Giant sword fern	Nephrolepis biserrata	T	
Wild basil	Ocimum campechianum	E	
Florida dancinglady orchid	Oncidium ensatum	E	
Hand fern	Ophioglossum palmatum	E	
Erect pricklypear	Opuntia stricta	T	
Royal fern	Osmunda regalis var. spectabilis	CE	
Pineland passionflower	Passiflora pallens	E	
Comb polypody	Pecluma ptilota var. bourgeauana	E	
Cypress peperomia	Peperomia glabella	E	
Florida peperomia	Peperomia obtusifolia	E	
Yerba linda	Peperomia rotundifolia	E	
Southern fogfruit	Phyla stoechadifolia	E	
Greater yellowspike orchid	Polystachya concreta	E	
Bahama ladder brake	Pteris bahamensis	T	
Swartz's snoutbean	Rhynchosia swartzii	E	
Royal palm	Roystonea regia	E	
Leafless beaked ladiestresses	Sacoila lanceolata var. lanceolata	T	
Ray fern	Schizaea pennula	E	
Florida Keys nutrush	Scleria lithosperma	E	
Everglades bully	Sideroxylon reclinatum subsp. austrofloridense	E	T
Mullein nightshade	Solanum verbascifolium	T	
Everglades Keys false buttonweed	Spermacoce terminalis	T	
Texas ladiestresses	Spiranthes brevilabris	E	
Lacelip ladiestresses	Spiranthes laciniata	T	
Longlip ladiestresses	Spiranthes longilabris	T	
Southern ladiestresses	Spiranthes torta	E	
West Indian mahogany	Swietenia mahagoni	T	
Broad halbard fern	Tectaria heracleifolia	T	
Curtiss' hoarypea	Tephrosia angustissima var. curtissii	E	
Lattice-vein fern	Thelypteris reticulata	E	
Northern needleleaf	Tillandsia balbisiana	T	
Stiff-leaved wild-pine	Tillandsia fasciculata var. densispica	E	
Twisted airplant	Tillandsia flexuosa	T	
Fuzzywuzzy airplant	Tillandsia pruinosa	E	
Giant airplant	Tillandsia utriculata	E	
Soft-leaved wild-pine	Tillandsia variabilis	T	
Chiggery grapes	Tournefortia hirsutissima	E	
Entire-winged bristle fern	Trichomanes holopterum	E	
Hoopvine	Trichostigma octandrum	E	
Florida mock gamagrass	Tripsacum floridanum	T	
Leafy vanilla	Vanilla phaeantha	E	
Redmargin zephyrlily	Zephyranthes simpsonii	T	

FDACS = Florida Department of Agriculture and Consumer Services
USFWS = United States Fish & Wildlife Service
SE = State-designated Endangered
ST = State-designated Threatened
CE = State-designated Commercially Exploited

Table 11-6. Protected Plants Observed Within the Nobles Grade Operations Area

Common Name	Scientific Name	FDACS	USFWS
Pine pink orchid	Bletia purpea	T	
Long strap fern	Campyloneurum costatum	E	
Cigar orchid	Cyrtopodium punctatum	E	
Butterfly orchid	Encyclia tampensis	CE	
Night blooming orchid	Epidendrum nocturnum	E	
Rigid epidendrum	Epidendrum rigidum	E	
Simpson's stopper	Myrcianthes fragrans var. simpsonii	T	
Royal fern	Osmunda regalis var. spectabilis	CE	
Common wild pine	Tillandsia fasciculata	T	
Northern needleleaf	Tillandsia balbisiana	T	
Twisted airplant	Tillandsia flexuosa	T	
Fuzzywuzzy airplant	Tillandsia pruinosa	T	

FDACS = Florida Department of Agriculture and Consumer Services
USFWS = United States Fish & Wildlife Service
SE = State-designated Endangered
ST = State-designated Threatened
CE = State-designated Commercially Exploited

XI.N.A.8 Air Quality

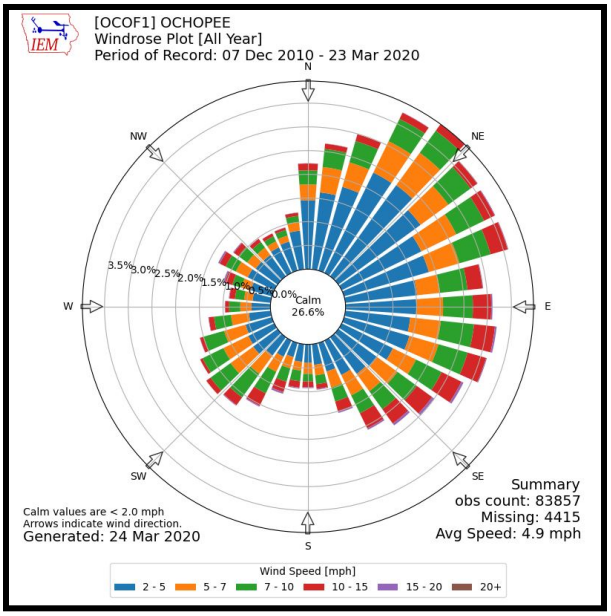
A recent NPS Natural Resource Report (Sullivan 2016) provides air quality data and trends for the BCNP and the South Florida/Caribbean region. Specifically, the report summarizes information for atmospheric emissions and deposition; acidification; nitrogen enrichment; ozone; visibility; and toxic airborne contaminants within the region. The overall air quality within BCNP is primarily influenced by urban centers within 50 miles of the preserve (Miami, Fort Lauderdale, Naples, and Key West). Air quality is also affected by local sources such as prescribed burns, wildfires, and auto emissions along I-75 (Alligator Alley). More recent data for air quality and trends can be found at: https://www.nps.gov/subjects/air/park-conditions-trends.htm (USDOI-NPS 2019).

As stated above, regional air quality and background levels of pollutants are influenced by existing anthropogenic activities such as prescribed burns and traffic-related emissions from the I-75 corridor and the rest station located to the north of the Nobles Grade site. Background levels are also influenced by natural events such as wildfires and soil erosion. **Table 11-7** provides a summary of expected air pollutant contributions from the existing (background) sources.

Table 11-7a. Potential Air Pollutants from Existing Sources

Source	Pollutants	Comments
Traffic on I-75	$PM_{2.5}$ Polycyclic aromatic hydrocarbons (PAHs) Carbon monoxide Volatile organic compounds (VOCs)	Emissions include products of combustion, as well as fine dust generated by tire and brake depletion
I-75 Rest Station	$PM_{2.5}$ Polycyclic aromatic hydrocarbons (PAHs) Carbon monoxide Volatile organic compounds (VOCs)	Emissions include products of combustion. Potential for higher localized emissions due to idling vehicles
Prescribed Burns	$PM_{2.5}$ Polycyclic aromatic hydrocarbons (PAHs) Carbon monoxide Volatile organic compounds (VOCs)	Anticipated contribution of pollutants from these activities are expected to be higher than traffic-related contributions (Shen, *et.al.* 2011)
Wildfires	$PM_{2.5}$ Polycyclic aromatic hydrocarbons (PAHs) Carbon monoxide Volatile organic compounds (VOCs)	
Calusa Ranch Airport (approximately 6.5 miles southeast of Nobles Grade location)	$PM_{2.5}$ Polycyclic aromatic hydrocarbons (PAHs) Carbon monoxide Volatile organic compounds (VOCs)	Approximately 2,000 ft. dirt runway. Not expected to contribute significant levels of pollutants due to anticipated infrequent use by single/twin prop aircraft and helicopters.

Transport of airborne pollutants in the region is influenced by prevailing wind patterns. Figure 11-11 below shows the windrose from a station located in Ochopee, FL[1]. According to the windrose, prevailing winds are from the northeast (majority of wind clusters in the N-E quadrant), followed by winds from the east-southeast. Predominant wind speed seems to be within the 2-7 miles per hour range.



[1] Windrose data from https://mesonet.agron.iastate.edu/sites/site.php?station=OCOF1&network=FL_DCP. Retrieved on March 30, 2020.

Figure 11-11 – Ochopee Station Windrose

Prevailing wind patterns would suggest that background pollutant levels at the location selected for the Nobles Grade project would be affected mostly by contributions from wild and prescribed fires in the Everglades Wildlife Management Area, as well as traffic-generated emissions from the I-75 corridor. In addition, it is anticipated that any emissions resulting from the proposed operations of the Nobles Grade facility would mainly drift to the south-southwest into sparsely populated areas.

Table 11-8 provides estimates for sulfur and nitrogen deposition at BCNP from 2001-2011, using a combination of air quality monitoring data and modeling. Based on these estimates, the total atmospheric sulfur and nitrogen deposition levels decreased over the decade, with the only estimated increase occurring for reduced nitrogen (NH_3).

A screening for acid pollutant exposure and ecosystem sensitivity to acidification was assessed by Sullivan (2011). BCNP has a high estimated acid pollutant exposure, but the presence of limestone near or at the ground surface, soils with calcareous weathering products, and relatively high pH surface waters buffers

In most freshwater wetland systems, phosphorus is the most limiting nutrient in terms of eutrophication. Additionally, wetland soils are associated with reducing conditions and denitrification when saturated and soluble carbon is available for microbial activity. Data from 2017 (USDOI-NPS 2019) indicate that nitrogen deposition in BCNP for 2017 3.7 kg/ha/yr, which exceeds a “poor” threshold of 3.0 kg/ha/yr, but is lower than the values reported in Table 11-8 for 2001 and 2011 (Sullivan 2016).

Table 11-8 (excerpted from Sullivan 2016). Average changes in S and N deposition between 2001 and 2011 across park grid cells at BCNP.

Parameter	2001 Average (kg/ha/yr)	2011 Average (kg/ha/yr)	Absolute Change (kg/ha/yr)	Percent Change	2011 Minimum (kg/ha/yr)	2011 Maximum (kg/ha/yr)	2011 Range (kg/ha/yr)
Total S	4.98	3.82	-1.15	-23.1%	3.52	4.07	0.55
Total N	6.79	5.04	-1.75	-24.7%	4.42	5.52	1.10
Oxidized N	5.33	3.40	-1.93	-35.1%	2.80	3.83	1.03
Reduced N	1.45	1.64	0.18	13.0%	1.43	1.78	0.35

Ozone is a pollutant that can injure sensitive plant species. Two different cumulative ozone exposure indices calculated for ozone exposures at BCNP resulted in values of 6.48 and 7.48 ppm-hour, with both values considered as “low” for an ozone risk ranking (Sullivan 2016, Table 5). Ozone levels in 2017 were reported as 61.4 ppb (6.14 ppm) based on data interpolated from more distant ozone monitoring stations, and ozone concentrations for vegetation health were rated as “good” or a low risk of plant damage from ozone (USDOI-NPS 2019).

Visibility degradation, like nitrogen and sulfur depositions, is largely a function of regional air quality conditions. Sulfate and organic compounds (natural and anthropogenic) are the largest contributors to haze production and visibility degradation. Ammonium sulfate is the biggest anthropogenic contributor to haze in BCNP and ENP. The ambient haze levels in BCNP and ENP decreased steadily from 2003-2010 for the 20% haziest days, with an overall decrease of approximately 25 percent (Sullivan 2016, Figure 2a). Trends for the 20% clearest days and average days exhibit small decreases over the same period. The 2017 visibility/haze index for BCNP was evaluated as fair with a relatively unchanging trend (USDOI-NPS 2019).

In terms of toxic airborne contaminants, Sullivan (2016 p.24) states, "...there are no available data to suggest that atmospheric contributions of pesticides constitute an important part of the total pesticide loading to sensitive surface waters in this network." The other major toxic pollutant of concern, mercury, is associated with regional atmospheric deposition and conversion in the natural environment to methyl-mercury. Estimates from USGS show all of South Florida as having very high estimated methyl-mercury levels between 0.14-1.3 ng/L (Sullivan 2016, Map 9).

The following excerpts from the March 2016 Revised Environmental Assessment for the Nobles Grade 3-D Seismic Survey (USDOI-NPS 2016) apply to the current Operations Permit Application.

> The Preserve is located in an air quality attainment area and not subject to restrictions for development activities under state air quality regulation programs. Ongoing air quality impacts associated with known air pollution sources in the vicinity of the survey area (ambient air impacts) and anticipated program-generated air pollution impacts (program-generated air impacts) have been evaluated.
>
> The primary air emission source in the survey area is the motor vehicle traffic of I-75. By 2015, when Permit activities are anticipated to occur, it is projected by Florida Department of Transportation studies that approximately 23,250 automobiles and trucks will traverse the I-75 (CDM Smith 2010) portion daily. Based on this traffic volume, 15,525 gallons of gasoline and diesel fuel can be expected to be consumed every 24 hours within the 10-mile, I-75 portion of the project.
>
> Prescribed burns are a resource management tool employed by the NPS to control vegetation and fuel loads in the Preserve. Prescribed burns generate particulates (smoke) and a variety of combustion products, predominantly carbon monoxide. In addition to prescribed burns, wildfires are sparked from various sources including lightning strikes, discarded smoking materials and unattended campfires. These sources contribute combustion products and particulates into the air on an intermittent basis.

The most recent data for average annual daily traffic (AADT) for I-75 at mile marker 63 is 22,000 trips per day (FDOT, 2020). Assuming that the AADT of 22,000 reflects current conditions and fuel consumption is proportional to AADT data, 14,690 gallons of gasoline and diesel fuel can be expected to be consumed every 24 hours along the 10-mile I-75 segment north of the proposed operations area.

Anticipated emission sources from construction, drilling, completion and operations activities at the Nobles Grade prospect, as well as applicable emissions factors (EFs) or emissions calculations approaches and anticipated sources of emissions and usage during these phases have been included in **Appendix I.** Burnett Oil plans to calculate detailed emissions projections from all phases of the project as part of the environmental review process.

As part of the environmental review process, Burnett Oil engaged a third party air quality expert to analyze emission levels from drilling and production equipment as per NPS, EPA and State of Florida guidance and regulations. Please refer to APPENDIX I for the full Air Quality Impacts Assessment report.

XI.N.A.9 General Description of Baseline Sound Levels

The authoritative reference for baseline ambient noise levels within BCNP is the *Baseline Ambient Sound Levels in Big Cypress National Preserve* report (Lee and MacDonald 2012). Figures 5 and 7 of that report depicts the baseline ambient (L_{50}) decibel for the summer and winter seasons, where L_{50} describes the sound level that was exceeded 50 percent of a specified time period. The baseline ambient map (L_{50}) at the proposed operations area for the summer season was 40 to <45 decibels (dBA) and 30 to <35 dBA for the winter season.

The following information for baseline noise levels is excerpted from the March 2016 Revised Environmental Assessment for the Nobles Grade 3-D Seismic Survey (USDOI-NPS 2016):

> The NPS Natural Sounds Program differentiates between the use of *sound* and *noise*, since these definitions have been used inconsistently in the literature (NPS 2011*c*). Humans perceive *sound* as an auditory sensation created by pressure variations that move through a medium such as water or air and is measured in terms of amplitude and frequency (Harris 1998; Templeton and Sacre 1997). Although *noise* is sometimes incorrectly used as a synonym for sound, the NPS defines noise as “an unwanted or undesired sound, often unpleasant in quality, intensity or repetition” (NPS 2000*b*).
>
> Ambient noise in the vicinity of the survey area, generated primarily from I-75 traffic, has been studied extensively. Based upon local I-75 traffic volumes at interstate highway speeds, the Federal Highway Administration traffic noise prediction model indicates that automobiles, SUVs and trucks will generate peak noise levels of 75-78 dB(A) at a distance of 50 feet from the roadway, which will attenuate to 50-55 dB(A) at a distance of 1,000 feet from the roadway. To an observer at a distance of 1,000 feet, traffic noise will begin to blend with other natural background noise so that traffic will usually be audible only intermittently. At distances of several miles an observer can hear, in still air, specific noise sources such as loud, poorly muffled truck exhaust. Within the Preserve, dense vegetation between the observer and a source will cause higher-frequency (shorter wavelengths) noise to attenuate more rapidly, while low-frequency noise (longer wavelengths) will be audible for greater distances.

The information cited above applied to the Nobles Grade area and the proposed operations area for this plan. No conditions have changed since the Lee and MacDonald (2012) study and the 2016 Environmental Assessment that would significantly alter baseline noise levels. Burnett Oil plans to conduct monitoring and testing to assess background levels of noise and various pollutants prior to start of operations. As part of that effort, Burnett will prepare a sampling plan which considers the potential pollutants discussed in this write up, as well as the nature of anticipated emissions from the proposed operations.

In terms of noise propagation, Burnett Oil has made a preliminary evaluation of construction noise based on a simple propagation equation. The equation assumes a drop of 6 decibels per each doubling of distance

from the source. This approach does not consider variables such as existing barriers (e.g. vegetation, structures, etc.) or meteorological parameters (moisture, wind speed and direction, etc.). **See Appendix J.**
.
As part of the environmental review process, Burnett Oil engaged a third party expert to analyze noise levels from drilling and production equipment as per NPS guidance and regulation. Please refer to **Appendix J** for the full Noise Impact Assessment and Noise Survey report.

XI.N.B CULTURAL RESOURCE DESCRIPTION

XI.N.B.1 Background Information on Archeological and Historical Resources

The following information is quoted from the March 2016 Revised Environmental Assessment for the Nobles Grade 3-D Seismic Survey (USDOI-NPS 2016):

According to the NPS/SEAC and the Florida Master Site File (FMSF) databases, there are more than 400 recorded archeological sites in the Preserve. In addition, currently there is no available database for ethnographic resources such as cultural IRA's in the Preserve, and SEAC anticipates that there are several hundred unrecorded sites in the Preserve, some of which would be included in the survey area. Recorded sites and anticipated cultural resources may include prehistoric habitation areas, burial areas, special use camps, 19th Century military camps, fortifications, trails, and historic Seminole or Miccosukee camps and sacred areas, as well as 20th century hunting and lumber camps. Many of the recorded resources are associated with discrete environmental features within the Preserve's vast expanse of wetlands, sloughs, strands and hammocks. Many habitation sites, especially black dirt middens, are recorded in hardwood hammocks, rising above the surrounding terrain, often near deep sloughs, strands and vast marshlands.

A Cultural Avoidance Model was prepared by Archeological Consultants Inc. (ACI) in 2014 for BOCI and was submitted to NPS (USDOI-NPS 2016). According to the model, the proposed operations area has a very low probability of encountering sites or artifacts of cultural/historic significance, due to the fact that the entire operations area is located on soils that are very shallow to caprock and are inundated for approximately 6 months per year on average. The proposed operations area avoided areas of higher elevation that contain hardwood hammock and similar vegetation, where cultural and/or historic resources are much more likely to occur.

XI.N.B.2 Cultural Resources Survey

Burnett's project is designed to avoid affecting historical, cultural or archeological resources. In accordance with the National Park Service's obligation to comply with Section 106 of the National Historic Preservation Act (NHPA) of 1966 (Public Law 89-665, as amended), as implemented by 36 CFR 800 -- Protection of Historic Properties (incorporating amendments effective August 5, 2004) and Chapters 267 and 373, Florida Statutes, a Cultural Resource Assessment Survey ("CRAS") has been conducted to evaluate Burnett's proposed actions. All access road alternatives and well pads for the Nobles Grade Prospect were the subject of a desktop analysis. Subsequently, field investigations were conducted for one access road alternative and well pad. The objective of the CRAS was to identify cultural resources within the project's Area of Potential Effects ("APE") and assess their eligibility for listing in the National Register according to the criteria set forth in 36 CFR Section 60.4. No archeological or historical sites were identified within the APE. Based on the desktop analysis, consisting of background research and literature review, in conjunction with pertinent environmental variables, most of the project APE has low archaeological site

potential. The project area is within low, flat cypress wetlands that under natural conditions are covered with water for most of the year. Hammock vegetation is limited only to several small and discrete areas within the project APE. The project area avoids most of the hammocks and all the previously recorded archaeological sites in the vicinity of the project area. The archaeological field survey included a pedestrian survey and visual inspection of the project APE to look for evidence of hammocks or other vegetation that would indicate natural higher ground. A total of 12 shovel tests were performed within the Nobles Grade Prospect APE.

The NPS has initiated consultation with the State of Florida Historic Preservation Office (SHPO).

XI.N.C IDENTIFICATION AND PROXIMITY OF PRESERVE VISITOR USE AREAS

The proposed operations area begins at the access road associated with the FDOT I-75 rest area at mile marker 63 and terminates at the proposed well pad approximately 3.2 miles southwest of the rest area. The Florida National Scenic Trail (FNST) crosses I-75 from north to south at the rest area and continues south from the eastern end of the rest are parking lot.

The access road is proposed to be situated at a location that minimizes interaction with visitor use areas. Burnett proposes to work closely with the NPS and FDOT to fine tune the location to minimize visibility to other visitors. The proposed operations area may be visible for the first 0.3-0.4 mile of the FNST as visitors hike south from the rest area. Beyond that point the vegetation communities, distance, and orientation of the proposed road will prevent a direct line of sight between the FNST and the operations area. From this vantage point on the FNST 0.3-0.4 mile south of the rest area, portions of the rest area, water treatment plant, fire station and other facilities are still visible to visitors. As visitors hike more than 0.5 mile south of the rest area, neither the proposed operations area nor the rest area will be visible, except for the communications tower located within the rest area itself.

Regarding potential noise related to the proposed activities, the March 2016 Revised Environmental Assessment for the Nobles Grade 3-D Seismic Survey (USDOI-NPS 2016) characterized peak ambient noise levels of 75-78 dB(A) at 50 feet from the I-75 roadway, attenuating to 50-55 dB(A) at a distance of 1,000 feet from the roadway (USDOI-NPS 2016, 78). The Federal Highway Administration (FHWA) *Construction Noise Handbook* (Knauer et al. 2006) reported measured L_{max} values for standard construction equipment (e.g., bulldozers, excavators, dump trucks, graders) at levels between 76-84 dB(A) at 50 feet. The nearest distance between the FNST and the proposed activities (i.e., the loading facility) is approximately 1,400 feet, and the proposed access road alignment trends southwest away from the FNST. At that nearest distance, the inverse square law for sound propagation would estimate sound levels to be between 47-55 dB(A), similar to the ambient noise levels from I-75. The applicant will perform in-field sound measurements to measure actual decibel levels, but these estimates suggest that trail users should not experience general noise levels above background highway noise levels.

XI.N.D ANTICIPATED DIRECT, INDIRECT AND CUMULATIVE EFFECTS OF THE PROPOSED OPERATION

This section summarizes the likely environmental effects of the proposed operations. Other sections of this document address the existing conditions and/or likely effects of the proposed operations on specific issues. The NPS also has prepared Environmental Impact Statements that address the effects of oil and gas operations, including the Final Environmental Impact Statement for Revision of 9B Regulations Governing Non-Federal Oil and Gas Activities (2016), and the Final Environmental Impact Statement for Big Cypress National Preserve General Management Plans for the original Preserve (1992) and the Addition (2010). To minimize the effects of the proposed operations, BOCI will implement the stipulations contained in the Preserve's Mineral Management Plan.

The direct effects of the proposed operations will be limited. The primary effect would be the filling of 12.09 acres of wetland areas to accommodate the wellpad, access road, and loading facility within the Nobles Grade Prospect area of operations. The construction of the roads and pads will have minor effects on water quality, due to their design and best management practices, and will be built with culverts to minimize effects on surface water flow. Road and pad construction will require the removal of vegetation (primarily dwarf cypress trees and wetland groundcover) in the footprint of the roads and pads, but not elsewhere. There will be minor effects on the experience of other Preserve visitors, principally the fact that a portion of the Nobles Grade Prospect access road might be visible to hikers along a 0.3-0.4 miles segment of the Florida Trail, but there likely will be no effect on other visitors or the scenic views in the Preserve. No direct effects on cultural resources are expected, as there were no cultural resources found within the footprint of the proposed facilities. Socioeconomic effects are likely to be positive to the extent that the proposed operations generate jobs and revenue in the local economy. The proposed operations will result in some transitory noise impacts during construction and drilling operations. There also will be some emissions of air pollutants associated with the operation of equipment associated with the facility, but those emissions would not result in the violation of any air quality standards. There likely will be temporary direct effects related to temporary wetland impacts for turnaround areas during road construction, water turbidity in construction areas (contained by silt fencing), and other impacts associated with drilling activities.

Indirect effects of the operation might include incidental disturbance of wildlife (primarily birds) within localized areas during road and well pad construction, and intermittent disturbance of wildlife if the drilling operation converts to a production operation and occasional vehicle traffic occurs within the area of operations. The NPS found in its Finding of No Significant Impact for the Nobles Grade 3-D Seismic Survey that such avoidance behaviors by wildlife are short-term and insignificant, and this is consistent with experience at the existing Raccoon Point facilities, where wildlife has become used to the facilities and continues to use the area. The operations would be located to avoid impacts to roosting areas of the Florida bonneted bat, or other locations actually used by the relevant species. The construction of the access road and well pad is not expected to create an indirect effect for other future oil and gas drilling operations in the area that would not otherwise occur, because those operations would be tied to geologic prospecting efforts independent from the proposed operations. The proposed operations would extract oil and gas resources that would be used in locations outside the Preserve, and which could result in the emission of greenhouse gases at some other location. The total amount of those emissions would be de minimis in the context of global emissions.

The estimated cumulative effects of the proposed operations are expected to be minor. The primary effect would be the filling of approximately 12 acres of wetlands, and impacts associated with that filling. Even when combining those effects with the effects of other similar locations in the Preserve, the cumulative effect would be small in the context of the 729,000-acre Preserve. The cumulative Area of Influence of all oil and gas activities in the Preserve would remain below 10% of the overall Preserve, as identified in the Preserve's Mineral Management Plan, which limits the cumulative impact of oil and gas activities. There are no other oil and gas facilities within five miles of the Nobles Grade Prospect. Between 1972-1988, seven non-producing exploratory oil and gas wells were drilled within five miles of the proposed area of operations, with no similar operations occurring since 1988. The lack of any nearby facilities means that, the cumulative effects of the operation are expected to be minimal over the next several decades.

XI.N.E DESCRIPTION OF ALL REASONABLE TECHNOLOGICALLY FEASIBLE ALTERNATIVE METHODS OF OPERATION AND ASSOCIATED ENVIRONMENTAL IMPACTS

This section discusses potential alternatives to the proposed operations. An alternative is a different way to achieve a project's purpose. The purpose of the proposed operations is to extract privately-owned oil and gas resources located beneath the Preserve. The only way to achieve that purpose is to drill wells and build associated facilities to extract the oil and gas. Therefore, the evaluation of alternatives is limited to identifying different locations where drilling pads and access roads could be located, and evaluating whether any other locations would be technologically feasible and be less environmentally damaging.

Location of Drilling Pad. The general location of the drilling site at the Nobles Grade Prospect is dictated by interpretation of the 3-D seismic data and other existing geologic data for locating potentially productive oil reservoirs. In order to reach the subsurface locations where the oil reservoirs are most likely to be productive, three wells are proposed to be drilled. Conventional operations would construct three separate well pads to access the oil reservoir with three vertical wells.

The proposed alternative will utilize directional drilling from a single well pad, which is the most efficient and reasonable technologically feasible method for achieving the project purpose and minimizing environmental impacts. This alternative will result in approximately one-third of the direct well pad impacts as compared to conventional drilling from three well pads, and it will eliminate the need for additional access road impacts between three separate well pads. The cost of the proposed centralized pad would be more than building separate pads, because it is more expensive to drill longer directional wells than to drill shorter, straighter wells from pads directly above the prospect. The use of a single well pad for the directional drilling of three wells tightly constrains the location of the Nobles Grade well pad to its proposed location.

Access Road Alignments. The route of the proposed access road from I-75/Alligator Alley to the proposed well pad allows for multiple potential alternative routes. The major alternatives for the routing of the access road include: a direct route travelling north to I-75 (which would require a new I-75 access point); a straight-line route from the FDOT rest area to the well pad; a potential route initially identified by NPS staff during a site visit with BOCI staff in March 2019; and a modification of the recommended route that shortens the overall road distance and follows existing trails where feasible.

A direct route travelling north from the well pad to I-75 is not feasible. The creation of a new access point on I-75 would require approval of the U.S. Congress, which would be a lengthy process with a doubtful outcome. Additionally, in the unlikely event that the access point could be approved, the need for a properly designed offramp and onramp would require approximately 14 acres of additional wetland impacts beyond the road itself, greatly increasing total wetland impacts and making it more environmentally damaging. Furthermore, the access point would be located only two miles from the turnout lane for the eastbound FDOT rest area, creating significant safety issues as trucks would be accelerating onto the interstate near the same location where drivers are decelerating for the rest area. This potential alternative, as well as causing greater environmental and safety impacts, would also cost substantially more than other access alternatives because it would require construction of a new I-75 interchange.

The most feasible access road alternatives connect to the existing FDOT rest area at mile marker 63. Use of this existing rest area avoids the need to fill wetlands to build new onramps and offramps to I-75, and avoids the safety concerns associated with adding the ramps. From this starting point, a straight-line alternative from the rest area to the well pad would result in the minimum possible road distance and wetland impact area. However, this alternative would route the access road directly through the largest upland hammock in the local area, which provides habitat and high-water refugia for listed wildlife and plant species and also may have significant historical/cultural value. The alternative therefore does not balance minimization of wetland impacts with minimization of impacts to other important BCNP resources. This alternative, however, would cost less than the other road access alternatives because it minimizes the acres needed to be filled.

The route traversed by NPS and BOCI staff in March 2019 avoided important resource areas and is a feasible alternative for routing the proposed access road. Further review of this route revealed a similar alternative that also avoided important resources areas but shortened the overall road length by more than 0.5 mile and utilized a greater length of existing trails. That optimized route is proposed in this Application as the alternative that best minimized environmental impacts while achieving the project purpose. This alternative would cost more than the straight-line alternative, because the roadway would be longer.

BOCI has considered the option of using a temporary access road during the drilling of the initial well, and it has determined that it is not the least damaging, technologically feasible method of accessing the pad during drilling operations. The use of matting is not a feasible alternative due to the anticipated water levels relative to the existing ground elevation. The use of mats in lieu of a filled road would require that vehicles traverse the submerged ground and would potentially result in excess turbidity by the multiple trips over the submerged surface. Most importantly, however, this would create a safety hazard for BOCI's employees, NPS employees, and visitors of the Preserve, as road access could be obstructed by rising water levels above the matted road. For these reasons, BOCI does not propose utilizing a temporary access road.

The road construction itself will be performed in stages, beginning at the rest area. The dimensions of the road are the minimum necessary to allow for safe one-way travel, with turnout locations to allow for vehicle passing every 0.5 mile (as constructed for the existing Eleven Mile Road to the Tamiami Prospect). The road will be built from itself and extended sequentially, with small 50x50 feet temporary impacts areas to allow for vehicle turnarounds during construction operations. Burnett believes that this is the most reasonable technologically feasible method for performing road construction and minimizing environmental impacts.

XI.T TAMIAMI PROSPECT

XI.T.A DESCRIPTION OF NATURAL RESOURCES

XI.T.A.1 Soil Type(s) and Engineering Properties

A soil survey of the current BCNP area was completed by the US Department of Agriculture (USDA) in 1942 and published in 1954 (Leighty et al. 1954). A modern soil survey of the Collier County Area (Liudahl et al. 1998) did not include the BCNP or ENP, and the soil map units depicted in **Figure 11-8** for the Tamiami Prospect represent digitized map data based on the 1954 publication (Jones 2006). Soil scientists from the United States Department of Agriculture, Natural Resources Conservation Service (USDA-NRCS) are currently performing soil mapping of BCNP with modern soil classifications and mapping standards.

Older (pre-1960s) soil mapping conventions often mapped soil-vegetation associations rather than soil map units based solely on soil properties. Figure 11-8 depicts five soil map units within the proposed operations area (in order of predominance): Ochopee fine sandy marl, shallow phase – cypress cover (Ob5); Cypress swamp (Cf); Rockland (Ra); Copeland fine sand – shallow phase (Ce) and Broward-Ochopee complex (Be). These soil map units share the following characteristics: shallow depth to limestone caprock (typically 6-12 inches for Ochopee map units, and typically less than 60 inches for Cypress swamp units); very poorly drained; siliciclastic sand with mixed calcareous materials; and relatively high pH (neutral to alkaline). The Copeland fine sand (shallow phase) typically exhibits depths of 3-12 inches to caprock, while Rockland map units have caprock at the surface with soil found in solution cavities or depressions.

These soil map units can be correlated with soil map units from the modern soil survey (Liudahl et al. 1998) based upon soil morphology, parent materials, and soil reaction (pH). The most extensive soil at the Tamiami Prospect proposed operations area is the Ochopee fine sandy marl shallow phase (Ob5), which corresponds to the Ochopee fine sandy loam (soil map units 50 and 51) in the 1998 soil survey. The Cypress swamp (Cf) soil map unit corresponds most closely to the Boca, Riviera, limestone substratum, and Copeland fine sands, depressional (soil map unit 25) in the 1998 survey. The Copeland fine sand and the Broward-Ochopee complex soil map units from the 1954 survey correlate with the Ochopee fine sandy loam (soil map units 50 and 51) in the 1998 soil survey. These correlations allow for use of the soil descriptions and soil characterization data from the 1998 survey. Descriptions of these four map units are as follows, in order of predominance within the proposed operations area (Rockland units are simply caprock at the surface and do not have a corresponding map unit description):

Ochopee fine sandy marl shallow phase, cypress cover vegetation (Ob5): these soils are level, poorly drained, and associated with prairies. Depth to caprock is less than 20 inches, and field observations along the entire proposed Tamiami Prospect road alignment (at 50-100 foot intervals) typically encountered caprock at depths of 6-12 inches below the soil surface with sporadic solution cavities extending down 36 inches or more. The predominant soil texture is fine sandy loam, with siliciclastic sands and calcareous materials intermixed. Reported values for bulk density are 1.3-1.5 g/cc, corresponding to a porosity of 43-51 percent. The permeability of the soils is 2.0-6.0 inches per hour, the erosion potential is low, the shrink-swell potential is low, and the plasticity index is low to medium. These soil map units are consistently associated with dwarf (scrub) cypress vegetation communities. (Published data taken from Liudahl, 1998, Tables 11 and 12).

Cypress swamp (Cf): this vegetation association was associated in the 1954 soil survey with soils similar to the Ochopee soil map units, but with a deeper depth to caprock (correlated with the Boca, Riviera,

limestone substratum, and Copeland fine sands, depressional in the 1998 Collier County Area soil survey). These deeper soil depths are associated with greater cypress tree heights and the occurrence of cypress domes, cypress strands, and mixed wetland hardwoods. Depth to caprock varies from 30-54 inches or more, and field observations confirmed these depths where cypress domes and strands were encountered, with deeper soils near the center of domes and strands. The predominant soil texture is fine sand. Reported values for bulk density are 1.3-1.7 g/cc, corresponding to a porosity of 36-51 percent. The permeability of the soils is 6.0-20 inches per hour in the surface horizons with lower permeability (0.6-2.0) in the subsoil. The erosion potential is low, the shrink-swell potential is low, and the soils are non-plastic. (Published data taken from Liudahl, 1998, Tables 11 and 12).

Copeland fine sand – shallow phase (Ce): As described in the 1954 soil survey, this map unit is highly similar to the Ochopee soils, except that it has a sandy surface texture and shallower depth to caprock (3-12 inches).

Broward-Ochopee complex (Be): These soil map units are similar to Ochopee soil map units, with intermixed areas of slightly higher elevation where a 1-2 inch layer of clay loam may overlie caprock.

Small areas of upland soils within this general area are associated with upland hammocks. Areas transitional between the wetland soils and upland hammocks support hydric to mesic pine flatwood vegetation (see section X.A.2.5 for vegetation descriptions). These upland areas were carefully avoided when planning the proposed road alignment and are not located within the proposed operations area, primarily because they serve as upland refugia for wildlife species and have a higher probability of cultural or historical significance.

XI.T.A.2 Baseline Soil Chemical Analysis

The proposed well pad location for the Tamiami Prospect is subject to review and approval to NPS, and detailed geochemical analyses for a specific site are premature until NPS approves the well pad site selection. General geochemical data are available for a profile of the Ochopee soil series, sampled within BCNP just west of Turner River Rd., approximately 9.3 miles north of US-41. Table 11-1 reports the geochemical data from the USDA-NRCS National Cooperative Soil Survey (NSSC, 2020; Pedon ID S2006FL021-003).

The electrical conductivity for the three horizons was 1.56 dSm^{-1} for 0-13 cm; 0.86 dSm^{-1} for 13-25 cm; and 0.68 dSm^{-1} for the 25-31 cm depth. No data were available for mercury (Hg), sodium absorption ratio, and exchangeable sodium percentage.

When the well pad location has been reviewed and approved by NPS, the applicant will work with NPS to determine the soil sampling protocol and the specific chemical analyses to be performed as part of the baseline soil chemistry characterization.

XI.T.A.3 Paleontological Resources

The geologic formations exposed at the land surface within BCNP have been altered by acidic rainwater and groundwater that is undersaturated with respect to calcium carbonate, resulting in dissolution and recrystallization of the carbonate rocks (Thornberry-Ehrlich 2008). These processes are associated with surface exposures of “caprock,” which contain solution holes or cavities.

A 2006 letter from the Florida Geological Survey noted that "The Big Cypress area of southern Florida contains no significant occurrences of fossils in naturally occurring exposures. In the subsurface, fossil mollusk faunas are common in the Plio-Pleistocene sediments and are normally exposed only by mining activities (Florida Geological Survey 2006). A copy of this letter is provided as **Appendix E**.

XI.T.A.4 Hydrology and Water Quality

The portions of the BCNP surrounding the proposed Tamiami operations area are topographically flat, with regional gradients of 5-10 inches of vertical change per mile. Natural ground elevations within the proposed area of operations vary from 10 feet to 8.5 feet NAVD 88 (USGS 2019). Within this general setting, a shift from wet prairie and cypress vegetation communities to isolated pine flatwoods and hardwood hammocks signifies topographic high areas with only a rise of 0.5-2 feet above the surrounding wetland grade (see Section II.D.2.2 for elevation contours). During the rainy season (late May-October), rainfall normally exceeds evapotranspiration and creates a shallow inundation across most of BCNP. This water slowly moves as "sheetflow" across most of the land surface, except for small isolated areas of higher ground, or where manmade structures (canals, roads, bridges, culverts) concentrate flow.

The major flow direction across the Tamiami Prospect area is generally from north to south. On a landscape scale, flows are influenced by bedrock topography. Local microtopography influences sheetflow patterns at lower flow stages (NPS 2010). In terms of proximity to surface water bodies (streams, rivers, canals, ponds, lakes), the closest water feature is the L-28 Tieback Canal 1.2 miles to the northeast.

Wetlands (marshes, prairies, cypress) typically exhibit water depths of 1-3 feet during the wet season. Pine flatwoods are transitional communities where portions may be hydric flatwoods and higher areas mesic flatwoods. Hardwood hammocks typically have little to no surface water. During the dry season, when evapotranspiration and seepage cause water levels to drop, water recedes down to average ground and into depressional areas as the drawdown continues (NPS 2010).

The unconfined surficial aquifer interacts directly with surface waters due to the high porosity, permeability, and solution features within the carbonate rocks (Thornberry-Ehrlich 2008). Depth to groundwater is therefore above ground during the wet season months, and retreats below the ground surface during the dry season. In most areas, groundwater is rarely more than a few feet below the wetland ground surface and slightly deeper under pine flatwoods and hardwood hammocks. Although solution features are commonly observed within the surficial geologic formations, sinkholes are rare within Collier County. The southernmost sinkhole in Florida is located at Deep Lake in the western portion of the Preserve, which formed an estimated 6,000 years before present. The FDEP maintains a database of "Subsidence Incident Reports" for sinkholes, and the closest report in the database is from the town of Immokalee. No sinkhole reports exist in the database for the Preserve. The potential for "cover-collapse" sinkholes appears to be low within BCNP, but the construction engineering for the proposed activities will include geotechnical investigations of the subsurface.

The thickness of the surficial aquifer in the Tamiami Prospect area was estimated at approximately 20 feet thick A confining unit with low hydraulic conductivity occurs between depths of 20-52 feet below the land surface, below which is the Gray Limestone Aquifer (Reese and Cunningham 2000). The water quality is characterized as good (relatively unpolluted) for surface flows near the proposed operations area. An analysis of long-term (1959-2000) water quality data within BCNP and ENP revealed that long-term changes in water quality were not pronounced with BCNP, but that water quality varies seasonally as a

result of biological and geochemical cycling, oxidation/reduction reactions, and dilution or concentration of constituents due to variations in water levels (Miller et al. 2003).

The water quality sampling station closest to the proposed operations area is BCAWQ5, which is located approximately 2 miles southwest of Raccoon Point Pad 3. Water quality data was collected at this station 2-5 times per year from 1994-2011. The ranges for selected water quality constituents are provided in **Table 11-9** (SFWMD 2020).

Table 11-9. Water Quality Data Ranges from Station BCAWQ5, 1994-2011 (Source: SFWMD)

pH (units)	N (total) (mg/L)	NO_2+NO_3 (mg/L)	Phosphate (total) (mg/L)	Na (mg/L)	Cl (mg/L)	SO_4 (mg/L)	Specific Conductivity (uS/cm)
6.3-8.1	0.57-3.82	0.004-0.129	0.002-0.052	0.2-13.0	3.4-22.9	0.1-3.9	137.2-432.0

Most of the landscape surrounding the Tamiami Prospect proposed operations area consists of wetlands, with small sporadic upland pine and hardwood hammock areas. As noted, these small upland areas were avoided within the proposed operations area due to their function as wildlife refugia and also due to the potential for cultural/historic sites. The proposed operations area occurs entirely within wetlands, and the only upland/wetland interface is at the western end where the proposed access road meets Pad 3. All of the area is considered to be within the 100-year floodplain (USDOI-NPS 2016).

XI.T.A.5 Vegetation Species Composition

This section lists and describes each of the vegetation communities found within the proposed Tamiami Prospect operations area, utilizing the Florida Land Use Cover and Forms Classification System (FLUCCS) categories that best correspond to each community. Each FLUCCS code is listed followed by the name of the category and a listing of the plant species present in each vegetative stratum within each FLUCCS code. **Figure 11-9** depicts the occurrence of these vegetation communities in the Tamiami Prospect area.

Tropical Hardwoods (FLUCCS 426) – This vegetation community can also be referred to as a tropical hammock due to the presence of many species found only in subtropical climates. This community is primarily associated with higher elevations within the wetlands and most are small in size (<5 acres). Species present include gumbo limbo (*Bursera simaruba*), stopper species (*Eugenia* spp.), strangler fig (*Ficus aurea*), poisonwood (*Metopium toxiferum*), false tamarind (*Lysiloma latisiliquum*), and pigeon plum (*Coccoloba diversifolia*). Laurel oaks (*Quercus laurifolia*), cabbage palms (*Sabal palmetto*), and scattered pines (*Pinus elliottii* var *densa*) were also observed on several of these larger hammocks. Many species of tree snails can be found in these hammocks due to the unique habitat provided. Tree snails or shells of dead snails were observed in two hammocks during this survey. These areas correspond to the Temperate Hardwood Hammock (FHT) vegetation class in the Vegetation Classification System for South Florida Natural Areas (VCSF; Ruiz et al. 2019). The margins of some hammocks have areas of Hardwood Swamp Forest (FSH). The Operations Permit Application is designed to avoid impacts to these types of areas.

Cypress (FLUCCS 621) – This category includes communities with a tree canopy dominated by mature cypress (*Taxodium distichum* and *T. ascendens*). These communities could be large mono-specific strands of mature cypress trees, or small cypress dome communities with deeper central ponds. Pond apple trees (*Annona glabra*) were often present in the deeper central ponds within some of these systems. The subcanopy contained widely scattered coco-plum (*Chrysobalanus icaco*) and wax myrtle (*Morella cerifera*).

The groundcover contained sawgrass (*Cladium jamaicense*), sweetscent (*Pluchea odorata*), maidencane (*Panicum hemitomon*), false nettle (*Boehmeria cylindrica*), and tapegrass (*Vallisneria americana*). These areas correspond to the Cypress Forest (FSt) and Cypress Forest-Dome (FStD) vegetation classes in the Vegetation Classification System for South Florida Natural Areas (VCSF; Ruiz et al. 2019).). The Operations Permit Application is designed to avoid impacts to these types of areas.

Hat-rack (Dwarf) Cypress (FLUCCS 621-H) – This community is forested but contains few canopy-sized trees. The cypress trees are dwarf or "hat-rack" cypress trees (3-6 feet in height), with some variability due to irregular depths to shallow caprock. These systems vary in the density of the trees per acre, with some areas having trees on 5 -10 foot centers while other areas have trees on 1-2 foot centers. Tree densities and presence/absence of groundcover produce lighter or darker tones on aerial imagery. The dominant vegetation is hat-rack cypress (*Taxodium ascendens*). Other species present include wax myrtle (*Morella cerifera*), coco-plum (*Chrysobalanus icaco*), red bay (*Persea borbonia*), strangler fig (*Ficus aurea*), dahoon holly (*Ilex cassine*), and myrsine (*Myrsine cubana*). The groundcover contains sawgrass (*Cladium jamaicense*), starrush whitetop (*Rhynchospora colorata*), maidencane (*Panicum hemitomon*), sweetscent (*Pluchea odorata*), red ludwigia (*Ludwigia repens),* swamp fern (*Telmatoblechnum serrulatum*), Asiatic coinwort (*Centella asiatica*), musky mint (*Hyptis alata*), Queen's delight (*Stillingia sylvatica*), love vine (*Cassytha filiformis*), bladderwort (*Utricularia macrorhiza*), greenbrier (*Smilax bona-nox*), and floating heart (*Nymphoides pelata*). Airplants included reflexed wild pine (*Tillandsia balbisinia*), cardinal airplant *(Tillandsia fasciculata*), and twisted airplant (*Tillandsia flexuosa*). Orchids observed included butterfly orchid (*Encyclia tampensis*), rigid epidendrum (*Epidendrum rigidum*), night-scented orchid (*Epidendrum nocturnum*), and grass pink orchid (*Calopogon tuberosus*). The complex assemblage of algae, cyanobacteria, macroinvertebrates, their secretions, and detritus known as periphyton was abundant throughout these communities. These areas correspond most closely to the Cypress Scrub-Graminoid Marsh (CStG) vegetation classes in the Vegetation Classification System for South Florida Natural Areas (VCSF; Ruiz et al. 2019).

Mixed Wetland Hardwoods (FLUCCS 617) – This category contains a mixed species canopy consisting of cypress (*Taxodium distichum* and *T. ascendens*), cabbage palm (*Sabal palmetto*), pond apple (*Annona glabra*), red maple (*Acer rubrum*), laurel oak (*Quercus laurifolia*), and scattered slash pine (*Pinus elliottii* var *densa*). The sub-canopy contains slash pine, cypress, cabbage palm, myrsine (*Myrsine cubana*), wax myrtle (*Morella cerifera*), buttonbush (*Cephalanthus occidentalis*), strangler fig (*Ficus aurea*), coco-plum (*Chrysobalanus icaco*), saltbush (*Baccharis* spp.) and scattered laurel oak. The groundcover contains swamp fern (*Telmatoblechnum serrulatum*), and canna lily (*Canna flaccida*), numerous sedge species, bushy broomsedge (*Andropogon glomeratus*), and carpetgrass (*Axonopus fissifolius*). These areas correspond most closely to the Cypress Forest-Monotypic (FStM) vegetation classes in the Vegetation Classification System for South Florida Natural Areas (VCSF; Ruiz et al. 2019).). The Operations Permit Application is designed to avoid impacts to these types of areas.

Cypress-Pine-Cabbage Palm (FLUCCS 624) – This category contains a canopy consisting of slash pine (*Pinus elliottii* var *densa*), cypress (*Taxodium distichum* and *T. ascendens*), and cabbage palm (*Sabal palmetto*). Scattered pond apple (*Annona glabra*), red maple (*Acer rubrum*) and laurel oak (*Quercus laurifolia*) are also present in the canopy. The sub-canopy contains slash pine, cypress, cabbage palm, myrsine (*Myrsine cubana*), wax myrtle (*Morella cerifera*), saltbush (*Baccharis* spp.), and scattered laurel oak. The groundcover contained scattered swamp fern (*Telmatoblechnum serrulatum*), canna lily (*Canna flaccida*), swamp flatsedge (*Cyperus ligularis*), broomsedge (*Andropogon virginicus*), and ragweed (*Ambrosia artemisiifolia*). These habitat types occurred at a slightly higher ground elevation than the immediately surrounding cypress habitats. Most of these habitats are very small in size and occur as

islands in the cypress-dominated landscape. These areas correspond most closely to the Cypress-Pine Forest (FStp) vegetation classes in the Vegetation Classification System for South Florida Natural Areas (VCSF; Ruiz et al. 2019). The Operations Permit Application is designed to avoid impacts to these types of areas

Hydric-Pine Flatwoods (FLUCCS 625) – This category contains a canopy consisting of slash pine (*Pinus elliottii* var *densa*) and cabbage palm (*Sabal palmetto*) with scattered cypress (*Taxodium distichum* and *T. ascendens*). The sub-canopy contained cypress, wax myrtle (*Morella cerifera*), cabbage palm, myrsine (*Myrsine cubana*), and red bay (*Persea borbonia*). The groundcover contains starrush whitetop (*Rhynchospora colorata*), sweetscent (*Pluchea odorata*), swamp fern (*Telmatoblechnum serrulatum*), musky mint (*Hyptis alata*), false nettle (*Boehmeria cylindrica*), sprouting slash pine seedlings, tickseed (*Coreopsis leavenworthii*), climbing hempvine (*Mikania scandens),* hairgrass *(Eleocharis baldwinii),* foxtail (*Seteria* spp.), and dog fennel (*Eupatorium capillifolium).* These habitats were found in areas with slightly higher ground elevation). The Operations Permit Application is designed to avoid impacts to these types of areas.

Figure 11-9 also depicts Pad 3 as FLUCCS code 1640, which corresponds to an “Oil and Gas Field” land cover type. The area consists of short grasses, bare soil, and caprock.

The proposed operations area (access road and pad) was field-delineated through the hat-rack (dwarf) cypress communities wherever possible, due to the lower impact on mature cypress trees and habitat for listed species. These areas also have caprock within 15 inches of the ground surface (typically at 6-12 inches), providing a firm engineering subgrade for the proposed road and well pad.

XI.T.A.6 Wildlife Species Composition

As part of the environmental surveys performed within and around the proposed operations area, ecologists recorded observations of wildlife signs including direct observations of wildlife; tracks; scat; feeding signs; vocalizations; and other signs that confirm the presence of specific wildlife species. These observations were part of a general survey for wildlife and plants, in order to characterize the area and to identify any listed wildlife or plant species that may occur (see section XI.A.2.7). The general wildlife surveys were performed in conjunction with vegetation mapping within the Tamiami operations area on 8/21/19; 8/22/19; 8/28/19; 10/3/19; and 6/26/20, throughout the day beginning at approximately 0800 and concluding by 1400 hours (8 hours in field per day). Additional surveys specific to Florida bonneted bats (FBB) and red-cockaded woodpeckers (RCW) were conducted between 3/12/21 and 4/28/21.

Table 11-10 summarizes the wildlife species observed within and around the Tamiami Prospect proposed operations area.

Table 11-10. Wildlife Observations at the Tamiami Proposed Project Area

BIRDS	
Roseate spoonbill (State Designated as Threatened)	*Ajaia ajaja*
Anhinga	*Anhinga anhinga*
Cormorant	*Phalacrocorax auritus*
Red shouldered hawk	*Buteo lineatus*
Green-backed heron	*Butorides striatus*
Great egret	*Casmerodius albus*

Belted kingfisher	*Ceryle alcyon*
Killdeer	*Charadrius vociferus*
Rock dove	*Columba livia*
Little blue heron (State-designated Threatened)	*Egretta caerulea*
Snowy egret	*Egretta thula*
Tricolored heron (State-designated Threatened)	*Egretta tricolor*
White ibis	*Eudocimus albus*
Wood stork (Federally-designated Threatened)	*Mycteria americana*
Wild turkey	*Meleagris gallopavo*
Osprey	*Pandion haliaetus*
Glossy Ibis	*Plegadis falcinellus*
Common grackle	*Quiscalus quiscula*
Boat tailed grackle	*Quiscalis major*
American crow	*Corvus brachyrhynchos*
Barred owl	*Strix varia*
Lesser yellowlegs	*Tringa flavipes*
Everglade snail kite (Federally Endangered)	*Rostrhamus sociabilis plumbeus*
Northern cardinal	*Cardinalis cardinalis*
Carolina wren	*Thryothorus ludovicianus*
Tufted titmouse	*Baeolophus bicolor*
Eastern kingbird	*Tyrannus tyrannus*
Barn swallow	*Hirundo rustica*
American bittern	*Botaurus lentiginosus*
Limpkin	*Aramus guarana*
Pileated woodpecker	*Dryocopus pileatus*
Downy woodpecker	*Picoides pubescens*
Northern flicker	*Colaptes auratus*
Red-bellied woodpecker	*Melanerpes carolinus*
Black vulture	*Coragyps atratus*
REPTILES	
American alligator (Federally-designated Threatened; Similarity of Appearance)	*Alligator mississippiensis*
Florida softshell snapping turtle	*Apalone ferox*
Florida cooter	*Pseudemys floridana*
Striped mud turtle)	*Kinosternon baurii*
Eastern cottonmouth (water moccasin)	*Agkistrodon piscivorus*
Eastern racer	*Coluber constrictor*
Green banded water snake	*Nerodia cyclopion*
Carolina anole	*Anolis carolinensis*
Brown anole	*Anolis sagrei*
MAMMALS	
White-tailed deer	*Odocoileus virginianus*
Feral hog	*Sus scrofa*
Florida panther (tracks) (Federally-designated Endangered)	*Puma concolor coryi*

Florida bonneted bat (calls) (Federally-designated Endangered)	*Eumops floridanus*
Big brown bat (calls)	*Eptesicus fuscus*
Northern yellow bat (calls)	*Lasiurus intermedius*
Seminole bat (calls)	*Lasiurus seminolus*
Evening bat (calls)	*Nycticeius humeralis*
Tri-colored bat (calls)	*Perimyotis subflavus*
Mexican free-tailed bat (calls)	*Tadarida brasiliensis*
Raccoon (tracks, scat)	*Procyon lotor*
AMPHIBIANS	
Southern leopard frog	*Rana spenocephala*
Green tree frog	*Hyla cinerea*
CRUSTACEANS	
Crayfish	*Decapoda* sp.
Freshwater shrimp	*Palaemonetes paludosus*
FISHES	
Mosquitofish	*Gambusia affinis*
Walking catfish	*Clarias batrachus*
Bluegill	*Lepomis macrochirus*
Sailfin molly	*Poecilia latipinna*
Armored catfish	*Hoplosternum litorale*
Mayan cichlid	*Cichlasoma urophthalmus*
Blue tilapia	*Oreochromis aureus*
Suckermouth catfish	*Hypostomusp plecostomus*
MOLLUSKS	
Florida apple snail	*Pomacea paludosa*
Exotic apple snail	*Pomacea insularum*
Ramshorn snail	*Marisa cornuarietis*
Florida tree snail	*Liguus fasciatus*

XI.T.A.7 Federal or State Threatened/Endangered Plan or Wildlife Species

The potential for occurrence of listed wildlife and plant species within and around the proposed operation area was initially evaluated through searches of online information sources. These sources included USFWS (Vero Beach and Jacksonville); the United States Fish & Wildlife Service (USFWS) Information for Planning and Consultation (IPaC) tool; Florida Fish and Wildlife Conservation Commission (FWC) species profiles; and the Florida Natural Area Inventory “Biodiversity Matrix” data viewer. Senior ecologists with decades of experience in South Florida evaluated the information prior to performing field work and general species surveys.

As part of the section 7 consultation process for federal permitting, USFWS will determine which species require species-specific surveys (e.g., RCW; FBB). NPS has prepared and submitted a Biological Assessment to the USFWS as part of their official interagency consultation process.

The following figures depict occurrence data for listed wildlife species within the BCNP and surrounding areas, whenever occurrence data were available. Occurrence data for wood stork colonies and their associated core foraging areas are depicted on **Figure 11-5**. Three wood stork colonies within 20 miles of the project site were documented as active within the last5 years. The nearest colony is located 6.5 miles to the southeast from the Tamiami Prospect operations area (colony WCA13, located along the L-28 interceptor canal). Two other colonies, Jet Port and JetportSouth, are approximately 8 miles and 12.5 miles from the Tamiami Prospect, respectively.

The closest known red-cockaded woodpecker (RCW) clusters to the project site occur approximately 1.5 miles to the northwest and southwest (**Figure 11-6**). The proposed access road alignment is adjacent to, but does not directly impact, areas with potential RCW habitat.

Although the bald eagle is no longer federally listed, it retains protection under the Bald and Golden eagle Protection Act (BGEPA). **Figure 11-7** depicts the location of bald eagle nests, the nearest of which is over 6 miles from the Tamiami Prospect operations area.

Figure 11-3 depicts Florida panther telemetry data within and around the BCNP, while **Figure 11-10** provides the same data in a more localized view near the Tamiami Prospect operations area. Florida panthers are wide-ranging and utilize a wide variety of habitats within BCNP, and because of this the effect of the proposed project on panthers is anticipated to be only in the form of temporary disturbance during project construction.

The general species surveys consisted of 2-3 ecologists performing pedestrian transects along the entire length of the proposed operations area and surrounding areas, including sections of alternate routings that required in-field evaluation. Combined with occurrence data from USFWS, FWC, and FNAI, **Table 11-11** provides a thorough accounting for federal and state listed species that could be present within the operations area.

Table 11-11. Listed Wildlife Species Documented or Potentially Occurring at/near the Tamiami Proposed Project Area

Common Name	Scientific Name	FWC	USFWS	Observed?
AMPHIBIANS & REPTILES				
American alligator	*Alligator mississippiensis*		FT (S/A)	Y
Eastern indigo snake	*Drymarchon corais couperi*		FT	
BIRDS				
Everglade snail kite	*Rostrhamus sociabilis plumbeus*		FE	
Wood stork	*Mycteria americana*		FT	Y
Red-cockaded woodpecker	*Picoides borealis*		FE	
Northern caracara	*Caracara cheriway*		FT	
Florida sandhill crane	*Grus canadensis pratensis*	ST	NL	
Roseate spoonbill	*Platalea ajaja*	ST	NL	Y
Little blue heron	*Egretta caerulea*	ST	NL	Y
Tricolored heron	*Egretta tricolor*	ST	NL	Y
MAMMALS				
Big Cypress fox squirrel	*Sciurus niger avicennia*	ST	NL	
Florida panther	*Felis concolor coryi*		FE	Y
Florida bonneted bat	*Eumops floridanus*	ST	FE	
Everglades mink	*Neovison vison evergladensis*	ST	NL	
Sherman's short-tailed shrew	*Blarina carolinensis shermani*	ST	NL	

FWC = Florida Fish and Wildlife Conservation Commission
USFWS = United States Fish & Wildlife Service
FE = Federally-designated Endangered
ST = State-designated Threatened
FT = Federally-designated Threatened
NL = Not listed

While performing the field surveys, ecologists also searched for plant species listed by the Florida Department of Agriculture and Consumer Services (FDACS) and USFWS that may be present within the Tamiami proposed project area.

The agencies have categorized the various listed plant species based upon their relative abundance in natural communities. Under the Endangered Species Act, it is prohibited to remove and reduce to possession or maliciously damage or destroy endangered plants on federal lands. For state-listed plant species the state categorizations include “Endangered;” “Threatened,” and “Commercially Exploited.” “Endangered” signifies species of native plants that are in imminent danger of extinction within the State, the survival of which is unlikely if the causes of a decline in the number of plants continue, and includes all species determined to be endangered or threatened, pursuant to the Federal Endangered Species Act of 1973, as amended, Public Law No. 93-205 (87 Stat. 884). “Threatened” means species native to the State that are in rapid decline in number of plants within the State, but which have not decreased in such number as to cause them to be endangered. “Commercially exploited” means species native to the State which are subject to removal in significant numbers from native habitats in the State and sold or transported for sale.

The protection afforded plants listed by FDACS entails restrictions on harvesting or destroying plants found on private lands of another, or public lands, without permission and/or a permit from FDACS. These provisions are found in Section 581.185 FAC under State law. **Table 11-12** reports the protected plant species that could potentially occur within the Tamiami Prospect proposed operations area. **Table 11-13** reports the protected plant species that were actually observed in the area. The locations of observed protected plant species were recorded with a sub-meter backpack GPS so impacts to the species could be avoided or minimized within the constraints of the general proposed alignment.

The proposed alignment and pad location seek to avoid minimize impacts to natural resources to the extent practicable, with the acknowledgement that multiple resources must be considered simultaneously. In an effort to avoid and minimize impacts to areas with more mature stands of trees, relative rare communities (e.g., hammocks), and/or areas where listed wildlife species have a higher probability of occurrence, the alignments were directed toward dwarf cypress areas because they represent the least damaging alternative when considering multiple resources. State-listed epiphytic species are common within the extensive dwarf cypress communities throughout the Tamiami area (e.g., *Tillandsia* spp.) and the proposed impacts within the 30-foot wide access road corridor would be highly unlikely to affect these species within the broader area outside of the project footprint. For epiphytic species that are rarer and occur as single specimens or small groups of specimens, careful translocation of the species can be performed to remove them from the construction footprint. Orchid species require expert handling but can be successfully translocated and/or propagated. Pre-construction surveys during the alignment and pad staking provide opportunities for in-field adjustments to the alignment and/or epiphyte translocations

No federally listed plants were observed during field surveys within and around the proposed operations area.

Table 11-12. Protected Plants Potentially Occurring Within the Tamiami Project Area

Common Name	Scientific Name	FDACS	USFWS
Paurotis palm	*Acoelorraphe wrightii*	T	
Golden leather fern	*Acrostichum aureum*	T	
Brittle maidenhair	*Adiantum tenerum*	E	
Sensitive joint-vetch	*Aeschynomene pratensis*	E	
White colic-root	*Aletris bracteata*	E	
Pineland-allamanda	*Angadenia berteroi*	T	
Eared spleenwort	*Asplenium erosum*	E	
Bird's-nest fern	*Asplenium serratum*	E	
Pinepink	*Bletia purpurea*	T	
Fakahatchee bluethread	*Burmannia flava*	E	
Manyflowered grasspink	*Calopogon multiflorus*	E	
Spicewood, pale lidflower	*Calyptranthes pallens*	T	
Leafless bentspur orchid	*Campylocentrum pachyrrhizum*	E	
Narrow strap fern	*Campyloneurum angustifolium*	E	
Tailed strap fern	*Campyloneurum costatum*	E	
Powdery strap airplant	*Catopsis berteroniana*	E	
Florida strap airplant	*Catopsis floribunda*	E	
Southern Florida sandmat	*Chamaesyce pergamena*	T	
Porter's sandmat	*Chamaesyce porteriana*	E	
Satinleaf	*Chrysophyllum oliviforme*	T	
Coffee colubrina, greenheart	*Colubrina arborescens*	E	
Butterflybush, Curacao bush	*Cordia globosa*	E	
Quailberry, Christmasberry	*Crossopetalum ilicifolium*	T	
Pepperbush	*Croton humilis*	E	
Florida tree fern	*Ctenitis sloanei*	E	
Blodgett's swallowwort	*Cynanchum blodgettii*	T	
Cowhorn orchid, cigar orchid	*Cyrtopodium punctatum*	E	
Florida prairie-clover	*Dalea carthagenensis* var. *floridana*	E	E
Ghost orchid, palmplolly	*Dendrophylax lindenii*	E	
Threadroot orchid	*Dendrophylax porrectus*	T	
Caribbean crabgrass	*Digitaria filiformis* var. *dolichophylla*	T	
Florida pineland crabgrass	*Digitaria pauciflora*	E	T
Guiana-plum	*Drypetes lateriflora*	T	
Clamshell orchid	*Encyclia cochleata*	E	
Florida butterfly orchid	*Encyclia tampensis*	CE	
Dingy-flowered star orchid	*Epidendrum anceps*	E	
Acuna's star orchid	*Epidendrum blancheanum*	E	
Umbrella star orchid	*Epidendrum floridense*	E	
Night-scented orchid	*Epidendrum nocturnum*	E	
Stiff-flower star orchid	*Epidendrum rigidum*	E	
Sanibel Island love grass	*Eragrostis tracyi*	E	
Beach verbena	*Glandularia maritima*	E	

Wild cotton	*Gossypium hirsutum*	E	
West Indian tufted airplant	*Guzmania monostachia*	E	
Snowy orchid	*Habenaria nivea*	T	
Needleroot airplant orchid	*Harrisella porrecta*	T	
Poeppig's rosemallow	*Hibiscus poeppigii*	E	
Hanging club-moss	*Huperzia dichotoma*	E	
Delicate violet orchid	*Ionopsis utricularioides*	E	
Rockland morningglory	*Ipomoea tenuissima*	E	
Pineland clustervine	*Jacquemontia curtissi*	T	
Skyblue clustervine	*Jacquemontia pentanthos*	E	
West coast lantana	*Lantana depressa* var. *sanibelensis*	E	
Catesby's lily	*Lilium catesbaei*	T	
Small's flax	*Linum carteri* var. *smallii*	E	
Pantropical widelip orchid	*Liparis nervosa*	E	
Nodding club-moss	*Lycopodiella cernua*	CE	
Hidden orchid	*Maxillaria crassifolia*	E	
Pineland blackanthers	*Melanthera parvifolia*	T	
Climbing vine fern	*Microgramma heterophylla*	E	
Simpson's stopper	*Myrcianthes fragrans*	T	
Giant sword fern	*Nephrolepis biserrata*	T	
Wild basil	*Ocimum campechianum*	E	
Florida dancinglady orchid	*Oncidium ensatum*	E	
Hand fern	*Ophioglossum palmatum*	E	
Erect pricklypear	*Opuntia stricta*	T	
Royal fern	*Osmunda regalis* var. *spectabilis*	CE	
Pineland passionflower	*Passiflora pallens*	E	
Comb polypody	*Pecluma ptilota* var. *bourgeauana*	E	
Cypress peperomia	*Peperomia glabella*	E	
Florida peperomia	*Peperomia obtusifolia*	E	
Yerba linda	*Peperomia rotundifolia*	E	
Southern fogfruit	*Phyla stoechadifolia*	E	
Greater yellowspike orchid	*Polystachya concreta*	E	
Bahama ladder brake	*Pteris bahamensis*	T	
Swartz's snoutbean	*Rhynchosia swartzii*	E	
Royal palm	*Roystonea regia*	E	
Leafless beaked ladiestresses	*Sacoila lanceolata* var. *lanceolata*	T	
Ray fern	*Schizaea pennula*	E	
Florida Keys nutrush	*Scleria lithosperma*	E	
Everglades bully	*Sideroxylon reclinatum subsp. austrofloridense*	E	T
Mullein nightshade	*Solanum verbascifolium*	T	
Everglades Keys false buttonweed	*Spermacoce terminalis*	T	
Texas ladiestresses	*Spiranthes brevilabris*	E	
Lacelip ladiestresses	*Spiranthes laciniata*	T	

Longlip ladiestresses	*Spiranthes longilabris*	T	
Southern ladiestresses	*Spiranthes torta*	E	
West Indian mahogany	*Swietenia mahagoni*	T	
Broad halbard fern	*Tectaria heracleifolia*	T	
Curtiss' hoarypea	*Tephrosia angustissima* var. *curtissii*	E	
Lattice-vein fern	*Thelypteris reticulata*	E	
Northern needleleaf	*Tillandsia balbisiana*	T	
Stiff-leaved wild-pine	*Tillandsia fasciculata* var. *densispica*	E	
Twisted airplant	*Tillandsia flexuosa*	T	
Fuzzywuzzy airplant	*Tillandsia pruinosa*	E	
Giant airplant	*Tillandsia utriculata*	E	
Soft-leaved wild-pine	*Tillandsia variabilis*	T	
Chiggery grapes	*Tournefortia hirsutissima*	E	
Entire-winged bristle fern	*Trichomanes holopterum*	E	
Hoopvine	*Trichostigma octandrum*	E	
Florida mock gamagrass	*Tripsacum floridanum*	T	
Leafy vanilla	*Vanilla phaeantha*	E	
Redmargin zephyrlily	*Zephyranthes simpsonii*	T	

FDACS = Florida Department of Agriculture and Consumer Services
USFWS = United States Fish & Wildlife Service
SE = State-designated Endangered
ST = State-designated Threatened
CE = State-designated Commercially Exploited

Table 11-13. Protected Plants Observed Within the Tamiami Prospect Project Area

Common Name	Scientific Name	FDACS	USFWS
Pine pink orchid	*Bletia purpea*	T	
Long strap fern	*Campyloneurum costatum*	E	
Cigar orchid	*Cyrtopodium punctatum*	E	
Butterfly orchid	*Encyclia tampensis*	CE	
Night blooming orchid	*Epidendrum nocturnum*	E	
Rigid epidendrum	*Epidendrum rigidum*	E	
Simpson's stopper	*Myrcianthes fragrans* var. *simpsonii*	T	
Royal fern	*Osmunda regalis var. spectabilis*	CE	
Common wild pine	*Tillandsia fasciculata*	T	
Northern needleleaf	*Tillandsia balbisiana*	T	
Twisted airplant	*Tillandsia flexuosa*	T	
Fuzzywuzzy airplant	*Tillandsia pruinosa*	T	

FDACS = Florida Department of Agriculture and Consumer Services
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XI.T.A.8 Air Quality

A recent NPS Natural Resource Report (Sullivan 2016) provides air quality data and trends for the BCNP and the South Florida/Caribbean region. Specifically, the report summarizes information for atmospheric emissions and deposition; acidification; nitrogen enrichment; ozone; visibility; and toxic airborne contaminants within the region. The overall air quality within BCNP is primarily influenced by urban centers within 50 miles of the preserve (Miami, Fort Lauderdale, Naples, and Key West). Air quality is also affected by local sources such as prescribed burns, wildfires, and auto emissions along I-75 (Alligator Alley). More recent data for air quality and trends can be found at: https://www.nps.gov/subjects/air/park-conditions-trends.htm (USDOI-NPS 2019).

As stated above, regional air quality and background levels of pollutants are influenced by existing anthropogenic activities such as prescribed burns and traffic-related emissions from the I-75 corridor located to the northwest of the Tamiami site. Background levels are also influenced by natural events such as wildfires and soil erosion. **Table 11-7b** provides a summary of expected pollutant contributions from the existing (background) sources.

Table 11-7b – Potential Pollutants from Existing Sources

Source	Pollutants	Comments
Traffic on I-75	$PM_{2.5}$ Polycyclic aromatic hydrocarbons (PAHs) Carbon monoxide Volatile organic compounds (VOCs)	Not deemed significant due to distance and prevailing wind patterns.
Prescribed Burns	$PM_{2.5}$ Polycyclic aromatic hydrocarbons (PAHs) Carbon monoxide Volatile organic compounds (VOCs)	Significant due to location of the site in relation to the Everglades Wildlife Management Area and prevailing wind patterns. Anticipated contribution of pollutants from these activities are expected to be higher than traffic-related contributions (Shen, *et.al.* 2011)
Wildfires	$PM_{2.5}$ Polycyclic aromatic hydrocarbons (PAHs) Carbon monoxide Volatile organic compounds (VOCs)	
Dade-Collier Training and Transition Airport (approximately 8.5 miles south of Tamiami location)	$PM_{2.5}$ Polycyclic aromatic hydrocarbons (PAHs) Carbon monoxide Volatile organic compounds (VOCs)	Approximately 10,000 ft. paved runway.
Romor Ranch Airport (approximately 10 miles west of Tamiami location)	$PM_{2.5}$ Polycyclic aromatic hydrocarbons (PAHs) Carbon monoxide Volatile organic compounds (VOCs)	Approximately 1,500 ft. dirt runway. Not expected to contribute significant levels of pollutants due to anticipated infrequent use by single/twin prop aircraft and helicopters.
Minor airstrips (Lost Horn Ranch, Little Deer, and Calusa Ranch)	$PM_{2.5}$ Polycyclic aromatic hydrocarbons (PAHs) Carbon monoxide Volatile organic compounds (VOCs)	Not expected to contribute significant levels of pollutants due to anticipated infrequent use by single/twin prop aircraft and helicopters.

Transport of airborne pollutants in the region is influenced by prevailing wind patterns. **Figure 11-11** (section XI.N.A.8) shows the windrose from a station located in Ochopee, FL[2]. According to the windrose, prevailing winds are from the northeast (majority of wind clusters in the N-E quadrant), followed by winds from the east-southeast. Predominant wind speed seems to be within the 2-7 miles per hour range.

Prevailing wind patterns would suggest that background pollutant levels at the location selected for the Tamiami project would be affected mostly by contributions from wild and prescribed fires in the Everglades Wildlife Management Area. In addition, it is anticipated that any emissions resulting from the proposed operations of the Tamiami facility would mainly drift to the south-southwest into sparsely populated areas.

Table 11-8 (section XI.A.1.8) provides estimates for sulfur and nitrogen deposition at BCNP from 2001-2011, using a combination of air quality monitoring data and modeling. Based on these estimates, the total atmospheric sulfur and nitrogen deposition levels decreased over the decade, with the only estimated increase occurring for reduced nitrogen (NH_3).

A screening for acid pollutant exposure and ecosystem sensitivity to acidification was assessed by Sullivan (2011). BCNP has a high estimated acid pollutant exposure, but the presence of limestone near or at the ground surface, soils with calcareous weathering products, and relatively high pH surface waters buffers the ecosystem. The estimated ecosystem sensitivity to acidification was therefore considered very low.

In most freshwater wetland systems, phosphorus is the most limiting nutrient in terms of eutrophication. Additionally, wetland soils are associated with reducing conditions and denitrification when saturated and soluble carbon is available for microbial activity. Data from 2017 (USDOI-NPS 2019) indicate that nitrogen deposition in BCNP for 2017 3.7 kg/ha/yr, which exceeds a “poor” threshold of 3.0 kg/ha/yr, but is lower than the values reported in Table 11-8 for 2001 and 2011 (Sullivan 2016).

Ozone is a pollutant that can injure sensitive plant species. Two different cumulative ozone exposure indices calculated for ozone exposures at BCNP resulted in values of 6.48 and 7.48 ppm-hour, with both values considered as “low” for an ozone risk ranking (Sullivan 2016, Table 5). Ozone levels in 2017 were reported as 61.4 ppb (6.14 ppm) based on data interpolated from more distant ozone monitoring stations, and ozone concentrations for vegetation health were rated as “good” or a low risk of plant damage from ozone (USDOI-NPS 2019).

Visibility degradation, like nitrogen and sulfur depositions, is largely a function of regional air quality conditions. Sulfate and organic compounds (natural and anthropogenic) are the largest contributors to haze production and visibility degradation. Ammonium sulfate is the biggest anthropogenic contributor to haze in BCNP and ENP. The ambient haze levels in BCNP and ENP decreased steadily from 2003-2010 for the 20% haziest days, with an overall decrease of approximately 25 percent (Sullivan 2016, Figure 2a). Trends for the 20% clearest days and average days exhibit small decreases over the same period. The 2017 visibility/haze index for BCNP was evaluated as fair with a relatively unchanging trend (USDOI-NPS 2019).

In terms of toxic airborne contaminants, Sullivan (2016 p.24) states, “...there are no available data to suggest that atmospheric contributions of pesticides constitute an important part of the total pesticide

[2] Windrose data from https://mesonet.agron.iastate.edu/sites/site.php?station=OCOF1&network=FL_DCP Retrieved on March 30, 2020.

loading to sensitive surface waters in this network." The other major toxic pollutant of concern, mercury, is associated with regional atmospheric deposition and conversion in the natural environment to methyl-mercury. Estimates from USGS show all of South Florida as having very high estimated methyl-mercury levels between 0.14-1.3 ng/L (Sullivan 2016, Map 9).

The Preserve is located in an air quality attainment area and not subject to restrictions for development activities under state air quality regulation programs. Ongoing air quality impacts associated with known air pollution sources in the vicinity of the survey area (ambient air impacts) and anticipated program-generated air pollution impacts (program-generated air impacts) have been evaluated.

Prescribed burns are a resource management tool employed by the NPS to control vegetation and fuel loads in the Preserve. Prescribed burns generate particulates (smoke) and a variety of combustion products, predominantly carbon monoxide. In addition to prescribed burns, wildfires are sparked from various sources including lightning strikes, discarded smoking materials and unattended campfires. These sources contribute combustion products and particulates into the air on an intermittent basis.

The proposed operations area for the Tamiami Prospect is located approximately 13 miles from I-75 (Alligator Alley) and 10 miles from relatively low-volume traffic on US-41. At these distances, vehicle emissions from these sources are reflected in the regional ambient air quality described in this section.

Anticipated emission sources from construction, drilling, completion and operations activities at the Tamiami prospect, as well as applicable emissions factors (EFs) or emissions calculations approaches and anticipated sources of emissions and usage during these phases have been included in **Appendix I**. Burnett Oil plans to calculate detailed emissions projections from all phases of the project as part of the environmental review process.

As part of the environmental review process, Burnett Oil engaged a third party air quality expert to analyze emission levels from drilling and production equipment as per NPS, EPA and State of Florida guidance and regulations. Please refer to APPENDIX I for the full Air Quality Impacts Assessment report.

XI.T.A.9 General Description of Baseline Sound Levels

The authoritative reference for baseline ambient noise levels within BCNP is the *Baseline Ambient Sound Levels in Big Cypress National Preserve* report (Lee and MacDonald 2012). Figures 5 and 7 of that report depicts the baseline ambient (L_{50}) decibel for the summer and winter seasons, where L_{50} describes the sound level that was exceeded 50 percent of a specified time period. The baseline ambient map (L_{50}) at the proposed operations area for the summer season was 40 to <45 decibels (dBA) and 30 to <35 dBA for the winter season.

In addition, the following information for baseline noise levels is excerpted from the March 2016 Revised Environmental Assessment for the Nobles Grade 3-D Seismic Survey (USDOI-NPS 2016):

> The NPS Natural Sounds Program differentiates between the use of *sound* and *noise*, since these definitions have been used inconsistently in the literature (NPS 2011*c*). Humans perceive *sound* as an auditory sensation created by pressure variations that move through a medium such as water or air and is measured in terms of amplitude and frequency (Harris 1998; Templeton and Sacre 1997). Although *noise* is sometimes incorrectly used as a synonym for sound, the NPS defines noise as "an unwanted or undesired sound, often unpleasant in quality, intensity or repetition" (NPS 2000*b*).

> Ambient noise in the vicinity of the survey area, generated primarily from I-75 traffic, has been studied extensively. Based upon local I-75 traffic volumes at interstate highway speeds, the Federal Highway Administration traffic noise prediction model indicates that automobiles, SUVs and trucks will generate peak noise levels of 75-78 dB(A) at a distance of 50 feet from the roadway, which will attenuate to 50-55 dB(A) at a distance of 1,000 feet from the roadway. To an observer at a distance of 1,000 feet, traffic noise will begin to blend with other natural background noise so that traffic will usually be audible only intermittently. At distances of several miles an observer can hear, in still air, specific noise sources such as loud, poorly muffled truck exhaust. Within the Preserve, dense vegetation between the observer and a source will cause higher-frequency (shorter wavelengths) noise to attenuate more rapidly, while low-frequency noise (longer wavelengths) will be audible for greater distances.

The information cited above applied to the Nobles Grade area. The proposed operations area for the Tamiami Prospect is 10 miles from US-41, which has low traffic volumes, and 13 miles from I-75. Noise from traffic is completely attenuated at these distances. No conditions have changed since the Lee and MacDonald (2012) study and the 2016 Environmental Assessment that would significantly alter baseline noise levels. Burnett Oil plans to conduct monitoring and testing to assess background levels of noise and various pollutants prior to start of operations. As part of that effort, Burnett will prepare a sampling plan which considers the potential pollutants discussed in this write up, as well as the nature of anticipated emissions from the proposed operations.

As part of the environmental review process, Burnett Oil engaged a third party expert to analyze noise levels from drilling and production equipment as per NPS guidance and regulation. Please refer to APPENDIX J for the full Noise Impact Assessment and Noise Survey report.

XI.T.B CULTURAL RESOURCE DESCRIPTION

XI.T.B.1 Background Information on Archeological and Historical Resources

The following information is quoted from the March 2016 Revised Environmental Assessment for the Nobles Grade 3-D Seismic Survey (USDOI-NPS 2016):

> According to the NPS/SEAC and the Florida Master Site File (FMSF) databases, there are more than 400 recorded archeological sites in the Preserve. In addition, currently there is no available database for ethnographic resources such as cultural IRA's in the Preserve, and SEAC anticipates that there are several hundred unrecorded sites in the Preserve, some of which would be included in the survey area. Recorded sites and anticipated cultural resources may include prehistoric habitation areas, burial areas, special use camps, 19th Century military camps, fortifications, trails, and historic Seminole or Miccosukee camps and sacred areas, as well as 20th century hunting and lumber camps. Many of the recorded resources are associated with discrete environmental features within the Preserve's vast expanse of wetlands, sloughs, strands and hammocks. Many habitation sites, especially black dirt middens, are recorded in hardwood hammocks, rising above the surrounding terrain, often near deep sloughs, strands and vast marshlands.

A Cultural Avoidance Model was prepared by Archeological Consultants Inc. (ACI) in 2014 for BOCI in the Nobles Grade area and was submitted to NPS (USDOI-NPS 2016). According to the model, the proposed Tamiami Prospect operations area has a very low probability of cultural/historic significance, due to the fact that the entire operations area is located on soils that are very shallow to caprock and are inundated for approximately 6 months per year on average. The proposed operations area avoided areas of higher elevation that contain hardwood hammock and similar vegetation, where cultural and/or historic resources are much more likely to occur.

XI.T.B.2 Results of Cultural Resources Survey

Burnett's project is designed to avoid affecting historical, cultural or archeological resources. In accordance with the National Park Service's obligation to comply with Section 106 of the National Historic Preservation Act (NHPA) of 1966 (Public Law 89-665, as amended), as implemented by 36 CFR 800 -- Protection of Historic Properties (incorporating amendments effective August 5, 2004) and Chapters 267 and 373, Florida Statutes, a Cultural Resource Assessment Survey ("CRAS") has been conducted to evaluate Burnett's proposed actions. All access road alternatives and well pads for the Tamiami Prospect were the subject of a desktop analysis. Subsequently, field investigations were conducted for one access road alternative and well pad. The objective of the CRAS was to identify cultural resources within the project's Area of Potential Effects ("APE") and assess their eligibility for listing in the National Register according to the criteria set forth in 36 CFR Section 60.4. No archeological or historical sites were identified within the APE. Based on the desktop analysis, consisting of background research and literature review, in conjunction with pertinent environmental variables, most of the project APE has low archaeological site potential. The project area is within low, flat cypress wetlands that under natural conditions are covered with water for most of the year. Hammock vegetation is limited only to several small and discrete areas within the project APE. The project area avoids most of the hammocks and all the previously recorded archaeological sites in the vicinity of the project area. The archaeological field survey included a pedestrian survey and visual inspection of the project APE to look for evidence of hammocks or other vegetation that would indicate natural higher ground. A total of 17 shovel tests were performed within the Tamiami Prospect APE.

The NPS has initiated consultation with the State of Florida Historic Preservation Office (SHPO).

XI.T.C IDENTIFICATION AND PROXIMITY OF PRESERVE VISITOR USE AREAS

The Tamiami Prospect is located approximately 10 miles from US-41 and can only be reached via a restricted access road (Eleven Mile Road). Three ORV trails within the Corn Dance Unit occur within the vicinity of the Tamiami Prospect.. The North Raccoon Point ORV trail passes near the northern boundary of the proposed well pad area. Approaching the well pad from either direction, the well pad should not be visible until trail users are within 0.1 mile. The proposed access road alignment will be co-located with the North Raccoon Point trail from the pad area to the intersection of the North Raccoon Point and Jetport trails for a distance of approximately 0.6 mile, in order to minimize new road impacts in the area. The proposed access road alignment will cross the Pipeline Bypass Trail just east of its midpoint.

The proposed access road should not be visible until trail users approach within a distance of less than 0.1 mile.

The Rock Road trail crosses Eleven Mile Road approximately 2 miles southwest of Pad 3, outside of the proposed operations area. However, trail users may encounter increased traffic and heavy equipment during the construction phase of the project.

Regarding potential noise related to the proposed activities, ORV trail users at the Tamiami Prospect should not be impacted by construction noise due to the loudness of their own vehicle (up to 60 dB(A) at 50 feet, which equates to approximately 80 decibels at the vehicle). The Federal Highway Administration (FHWA) *Construction Noise Handbook* (Knauer et al. 2006) reported measured L_{max} values for standard construction equipment (e.g., bulldozers, excavators, dump trucks, graders) at levels between 76-84 dB(A) at 50 feet. The nearest distance between the FNST and the proposed construction activities (i.e., Pad 3) is approximately 4.7 miles, and the 10 Mile Camp is 5.5 miles away. At those distances, the inverse square law for sound propagation would estimate sound levels from an 84-decibel construction vehicle to be between 28-30 dB(A) in open space. With the amount of forest cover between those features the actual sound levels should be considerably less. The applicant will perform in-field sound measurements to measure actual decibel levels, but these estimates suggest that trail users or hikers on the FNST should not experience general noise levels above their ambient noise levels.

XI.T.D ANTICIPATED DIRECT, INDIRECT AND CUMULATIVE EFFECTS OF THE PROPOSED OPERATION

This section summarizes the likely environmental effects of the proposed operations. Other sections of this document address the existing conditions and/or likely effects of the proposed operations on specific issues. The NPS also has prepared Environmental Impact Statements that address the effects of oil and gas operations, including the Final Environmental Impact Statement for Revision of 9B Regulations Governing Non-Federal Oil and Gas Activities (2016), and the Final Environmental Impact Statement for Big Cypress National Preserve General Management Plans for the original Preserve (1992) and the Addition (2010). To minimize the effects of the proposed operations, BOCI will implement the stipulations contained in the Preserve's Mineral Management Plan.

The direct effects of the proposed operations will be limited. The primary effect would be the filling of 6.85 acres of wetland areas to accommodate the well pad, access road, and loading facility within the Tamiami Prospect area of operations. The construction of the roads and pads will have minor effects on water quality, due to their design and best management practices, and will be built with culverts to minimize effects on surface water flow. Road and pad construction will require the removal of vegetation (primarily dwarf cypress trees and wetland groundcover) in the footprint of the roads and pads, but not elsewhere. There will be no effects on the experience of other Preserve visitors, because the facilities would be accessed using the existing nonpublic roads servicing the Raccoon Point facilities. No direct effects on cultural resources are expected, as there were no cultural resources found within the footprint of the proposed facilities Socioeconomic effects are likely to be positive to the extent that the proposed operations generate jobs and revenue in the local economy. The proposed operations will result in some transitory noise impacts during construction and drilling operations. There also will be some emissions of air pollutants associated with the operation of equipment associated with the facility, but those emission would not result in the violation of any air quality standards. There likely will be temporary direct effects related to temporary

wetland impacts for turnaround areas during road construction, water turbidity in construction areas (contained by silt fencing), and other impacts associated with drilling activities.

Indirect effects of the operation might include incidental disturbance of wildlife (primarily birds) within localized areas during road and wellpad construction, and intermittent disturbance of wildlife if the drilling operation converts to a production operation and occasional vehicle traffic occurs within the area of operations. The NPS found in its Finding of No Significant Impact for the Nobles Grade 3-D Seismic Survey that such avoidance behaviors by wildlife are short-term and insignificant, and this is consistent with experience at the existing Raccoon Point facilities, where wildlife has become used to the facilities and continues to use the area. The operations would be located to avoid impacts to roosting areas of the Florida bonneted bat, or other locations actually used by the relevant species. The construction of the access road and wellpad is not expected to create an indirect effect for other future oil and gas drilling operations in the area that would not otherwise occur, because those operations would be tied to geologic prospecting efforts independent from the proposed operations. The proposed operations would extract oil and gas resources that would be used locations outside of the Preserve, and which could result in the emission of greenhouse gases at some other location. The total amount of those emissions would be de minimis in the context of global emissions.

The estimated cumulative effects of the proposed operations are expected to be minor. The primary effect would be the filling of approximately 6.85 acres of wetlands, and impacts associated with that filling. Even when combining those effects with the effects of other similar locations in the Preserve, the cumulative effect would be small in the context of the 729,000-acre Preserve. During the 1970s and 1980s, five well pads were constructed at Raccoon Point within five miles of the proposed area of operations, with no similar operations occurring since 1987. The proposed facilities at the Tamiami Prospect would add to this complex, but the incremental effect would be small (less than seven acres of new roads and pads). The cumulative Area of Influence of all oil and gas activities in the Preserve would remain below 10% of the overall Preserve, as identified in the Preserve's Minerals Management Plan, which limits the cumulative impact of oil and gas activities. Therefore, the cumulative effects of the operation are expected to be minimal over the next several decades.

XI.T.E DESCRIPTION OF ALL REASONABLE TECHNOLOGICALLY FEASIBLE ALTERNATIVE METHODS OF OPERATION AND ASSOCIATED ENVIRONMENTAL IMPACTS

This section discusses potential alternatives to the proposed operations. An alternative is a different way to achieve a project's purpose. The purpose of the proposed operations is to extract privately-owned oil and gas resources located beneath the Preserve. The only way to achieve that purpose is to drill wells and build associated facilities to extract the oil and gas. Therefore, the evaluation of alternatives is limited to identifying different locations where drilling pads and access roads could be located, and evaluating whether any other locations would be technologically feasible and be less environmentally damaging.

Location of Drilling Pad. The general location of the drilling site at the Tamiami Prospect was dictated by interpretation of the 3-D seismic data and other existing geologic data for locating potentially productive oil reservoirs. In order to reach the subsurface locations where the oil reservoirs are most likely to be

productive, four wells are proposed to be drilled. Conventional operations would construct four separate wellpads to access the oil reservoir with three vertical wells.

The proposed alternative will utilize directional drilling from a single wellpad, which is the most efficient and reasonable technologically feasible method for achieving the project purpose and minimizing environmental impacts. This alternative will result in approximately one-fourth of the direct wellpad impacts as compared to conventional drilling from four wellpads, and it will eliminate the need for additional access road impacts between four separate wellpads. The cost of the proposed centralized pad would be more than building separate pads, because it is more expensive to drill longer directional wells than to drill shorter, straighter wells from pads directly above the prospect. The use of a single wellpad for the directional drilling of four wells tightly constrains the location of the Tamiami wellpad to its proposed location.

Location of Access Roads. The route of the proposed access road from the existing Pad 3 at Raccoon Point to the proposed wellpad allows for multiple alternative routes. The major alternatives for the routing of the access road include: a straight-line route from Pad 3 to the wellpad; a route initially recommended by NPS staff during a site visit with BOCI staff in March 2019; and a slight modification of the recommended route that results in approximately the same total road length but made in-field adjustments to avoid potential Florida bonneted bat roost trees along the route.

The access road alternatives for the Tamiami Prospect all begin at Pad 3. From this starting point, a straight line alternative from Pad 3 to the wellpad would result in the minimum possible road distance (approximately 1.2 miles) and wetland impact area. However, this alternative would route the access road where it would impinge on a large upland hammock adjacent to Pad 3, which provides habitat and high-water refugia for listed wildlife and plant species, and also may have significant historical/cultural value. This alternative would also traverse areas of mature pine flatwood and mature cypress forest that would directly impact potential roost trees for the Florida bonneted bat. The alternative therefore does not balance minimization of wetland impacts with minimization of impacts to other important BCNP resources. However, this alternative would cost less than the other alternative routes because it would minimize the miles of road that would need to be built.

The route traversed by NPS and BOCI staff in March 2019 (approximately 1.4 miles in length) avoided important resource areas and is a feasible alternative for routing the proposed access road. Further review of this route during field surveys in September-October 2020 slightly modified the original route to avoid potential Florida bonneted bat roost trees, which were located in-field with GPS to sub-meter precision. That slightly modified route was proposed in this Application as the alternative that best minimized environmental impacts while achieving the project purpose. This alternative would cost more than the straight-line route because it would require construction of a longer road.

BOCI has considered the option of using a temporary access road during the drilling of the initial well, and it has determined that it is not the least damaging, technologically-feasible method for accessing the pad during drilling operations. The use of matting is not a feasible alternative due to the anticipated water levels relative to the existing ground elevation. The use of mats in lieu of a filled road would require that vehicles traverse the submerged ground and would potentially result in excess turbidity by the multiple trips over the submerged surface. Most importantly, however, this would create a safety hazard for BOCI's employees, NPS employees, and visitors of the Preserve, as road access could be obstructed by rising water levels above the matted road. For these reasons, BOCI does not propose utilizing a temporary access road.

The road construction itself will be performed in stages, beginning at Pad 3. The dimensions of the road are the minimum necessary to allow for safe one-way travel, with turnout locations to allow for vehicle passing every 0.5 mile (as constructed for the existing Eleven Mile Road). The road will be built from itself and extended sequentially, with small 50x50 feet temporary impacts areas to allow for vehicle turnarounds during construction operations. Burnett believes that this is the most reasonable technologically feasible method for performing road construction and minimizing environmental impacts.

XII. RELATIONSHIP TO BCNP PLANNING DOCUMENTS

The following subsections discuss how the proposed operations described in this Permit relate to relevant BCNP planning documents, in terms of considering and integrating operational measures described in this Application with achieving BCNP management objectives.

A. BCNP GENERAL MANAGEMENT PLAN (GMP)

The BCNP General Management Plan (GMP) covered only the original Preserve and thus did not include the 147,000 acres of the Addition lands added in 1988. The 1992 GMP notes that with regard to oil and gas operations (USDOI-NPS 1992):

> Oil and gas exploration and production operations would be managed so that no more than 10 percent of the preserve would be influenced by these activities at any one time. Regulated geophysical exploration would be allowed in all units, subject to applicable resource protection stipulations. Surface occupancy for exploratory drilling and production operations would be permitted only outside vegetation communities and cultural sites identified as important resource areas. (USDOI-NPS 1992, iv)
>
> Under the proposed action geophysical activities, exploratory drilling, and production operations would be permitted throughout the preserve, in accordance with the applicable stipulations defined in the "Minerals Management Plan" (see appendix C} and subject to the regulations at 36 CFR 9B. Stipulations that would apply to proposed oil and gas operations in all units of the preserve include the protection of important resource areas and only 10 percent of the preserve could be influenced by oil and gas operations at any given time. In addition, at least one-to-one mitigation (that is, acre for acre) would be required for all proposed operations subject to compliance with section 404 (dredge and fill requirements) of the Clean Water Act. (USDOI-NPS 1992, 60-61)

The proposed operations described in this Application document are consistent with GMP provisions, including the Minerals Management Plan (MMP) as noted below.

B. BCNP MINERALS MANAGEMENT PLAN (MMP)

The BCNP Minerals Management Plan (MMP) was concurrently developed with the 1992 GMP and was included as “Appendix C” to that document. The MMP detailed many of the general provisions described in

the GMP and provided guidance for operators in the preparation of an Operations Permit Application. The overall process was described as follows:

> The permitting process for nonfederal oil and gas activities in Big Cypress is a complex sequence of procedures. Operators must file a Operations Permit Application with the preserve superintendent, and the plan must be approved by the regional director before work commences. The Operations Permit Application must describe all proposed operations for nonfederal oil and gas exploration, production, development, and required access. As a management tool, the plan provides a means for analyzing how proposed activities would affect preservation, use, and management of preserve resources. (USDOI-NPS 1992, 350)

The MMP also prescribed a list of detailed stipulations for all phases of oil and gas exploration, production and reclamation. The proposed operations described in this Application are consistent with the stipulations in the MMP, and the current 36 CFR 9B regulations.

C. USDOI-NPS BCNP-ADDITION FINAL GENERAL MANAGEMENT PLAN

The *Big Cypress National Preserve – Addition Final General Management Plan/Wilderness Study/Off-Road Vehicle Management Plan/ Environmental Impact Statement* (USDOI-NPS 2010) covered the management guidelines for the 174,000 acres of Addition lands that were not included in the 1992 GMP. The Final EIS for the plan noted:

> The Addition Act and its legislative history identify the following six categories of use that are allowed within the Addition, subject to reasonable regulation:
>
> - uses associated with "improved properties"
> - exercise of rights associated with oil and gas
> - hunting
> - fishing
> - trapping
> - certain Indian rights

The Addition area, which includes the area of operations for the Nobles Grade Prospect, is now included in the Preserve-wide oil and gas management plan, consistent with the current 36 CFR 9B regulations. The Final EIS for the BCNP-Addition GMP also noted:

> The Addition's enabling legislation permits oil and gas exploration and development by mineral owners. Consequently, oil and gas operations in the Addition are allowed under all Addition management scenarios. None of the actions included in the *General Management Plan* would result in changes to oil and gas exploration or the extraction of new resources from the Addition.

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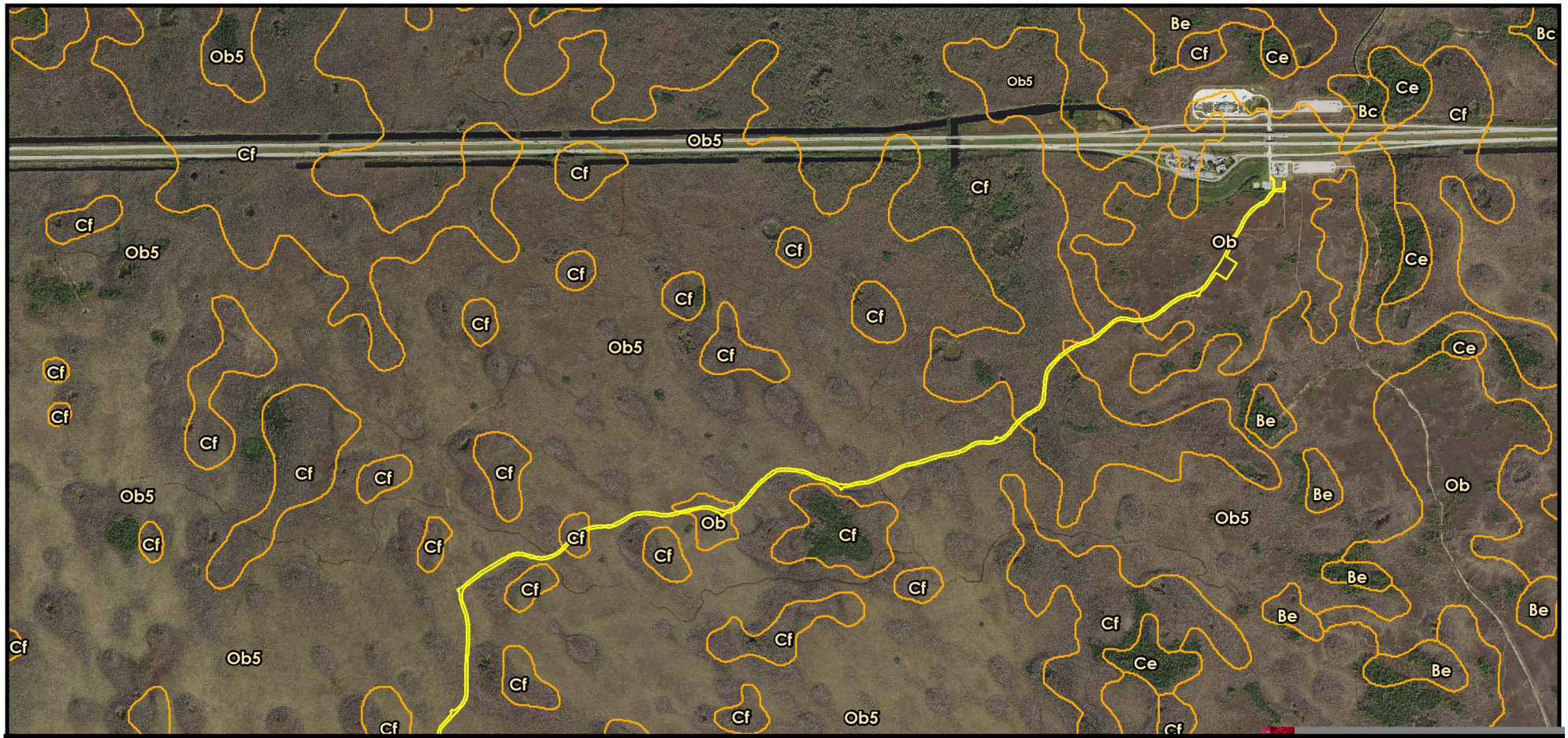

11-1 Nobles Grade Soils

July 2021

Notes:
1. Coordinate System: NAD 1983 2011 StatePlane Florida East FIPS 0901 Ft US
2. Source data: Peninsula Engineering, NRCS Web Soil Survey
3. Imagery: Collier County, 2020 Imagery

1,000 0 1,000 Feet

Prepared by: JW 06/18/21
Technical Review by: JW 06/18/21
Independent Review by: BW 06/18/21

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LEGEND

- Proposed Nobles Grade Road And Pad
- 3200 : Upland Shrub and Brushland
- 3210 : Palmetto Prairies
- 3300 : Mixed Rangeland
- 4110 : Pine Flatwoods
- 4200 : Upland Hardwood Forests
- 4270 : Live Oak
- 4280 : Cabbage Palm
- 4340 : Upland Mixed Coniferous / Hardwood
- 5120 : Channelized Waterways, Canals
- 6170 : Mixed Wetland Hardwoods
- 6200 : Wetland Coniferous Forests
- 6210 : Cypress
- 6250 : Wet Pinelands Hydric Pine
- 6410 : Freshwater Marshes / Graminoid Prairie - Mars
- 6430 : Wet Prairie
- 8140 : Roads and Highways

11-2 Land Cover

Nobles Grade Prospect

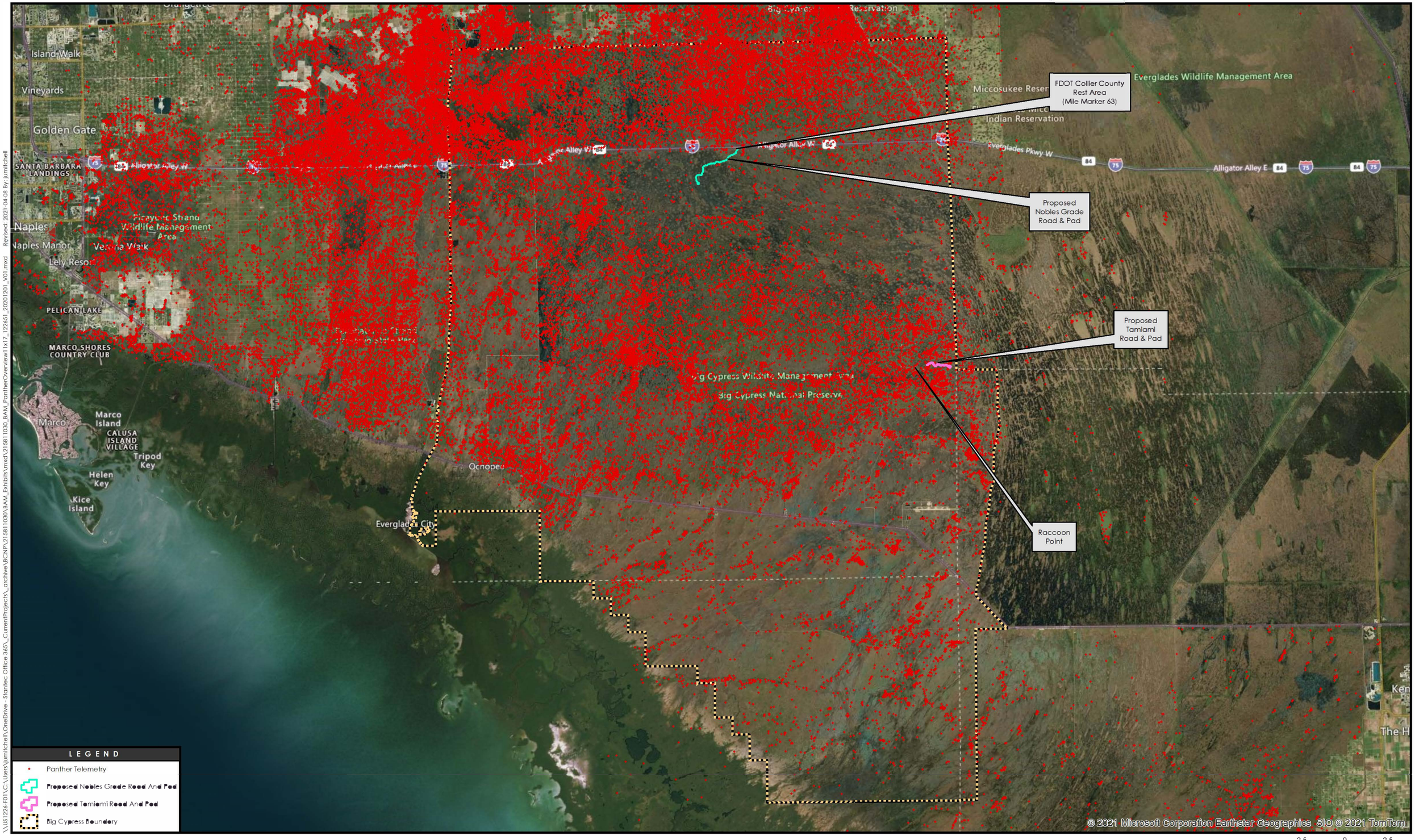
April 2021

Notes:
1. Coordinate System: NAD 1983 StatePlane Florida East FIPS 0901 Feet
2. Source data: Stantec Staff, 2016 FLUCCS (SFWMD GIS Portal)
3. Imagery: Collier County 2020 imagery

1,000 0 1,000 Feet

N

Prepared by: JM 04/01/21
Technical Review by: JW 04/01/21
Independent Review by: BW 04/01/21



11-3 Panther Telemetry Data

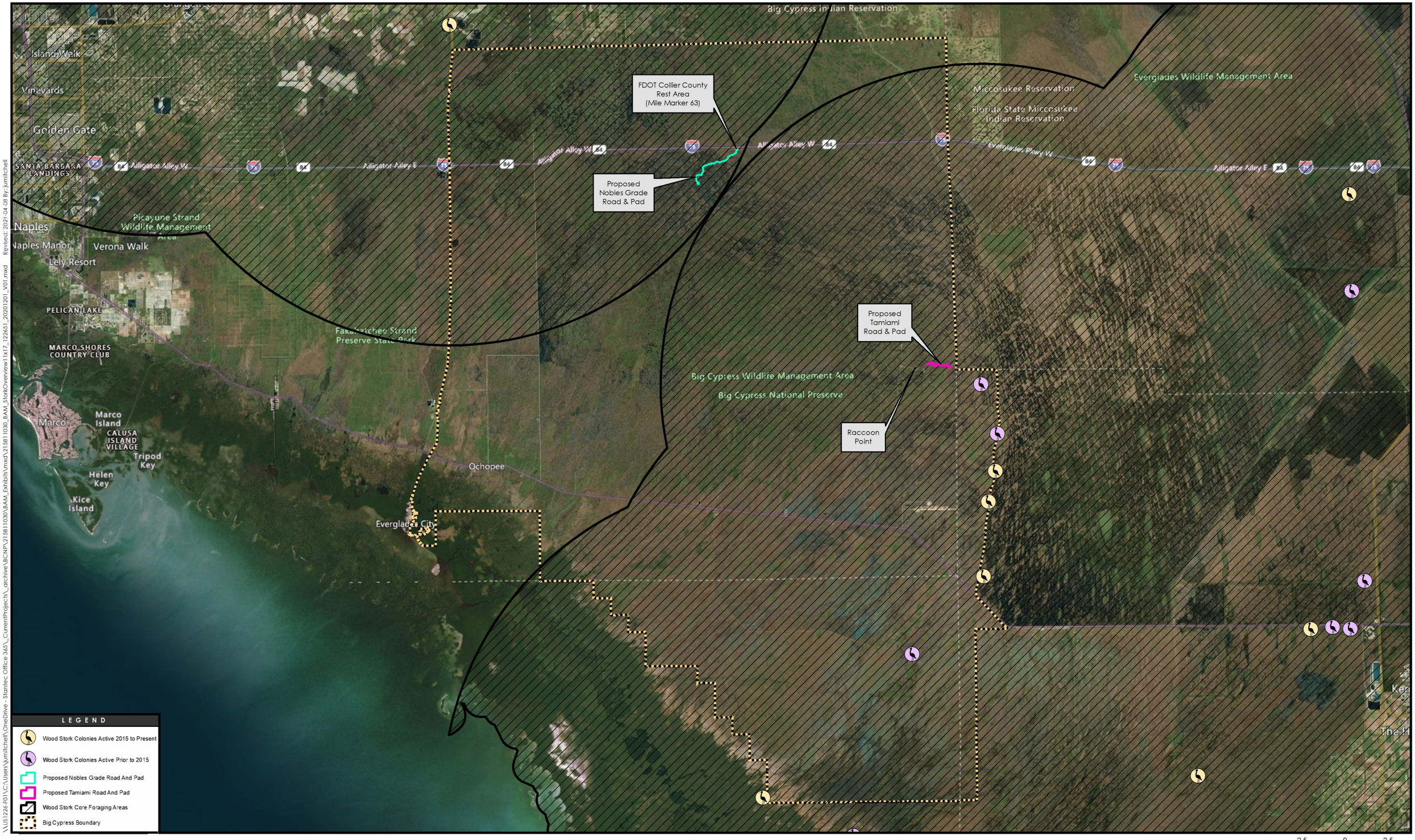
April 2021

Notes:
1. Coordinate System: NAD 1983 StatePlane Florida West FIPS 0902 Feet
2. Source data: Stantec Staff, FWC Panther Telemetry
3. Imagery: Bing Hybrid Basemap

N

2.5 0 2.5 Miles

Prepared by: JM 12/01/20
Technical Review by: JW 12/01/20
Independent Review by: BW 12/01/20



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11-5 Wood Stork Colonies and Core Foraging Areas

April 2021

Notes:
1. Coordinate System: NAD 1983 StatePlane Florida West FIPS 0902 Feet
2. Source data: Stantec Staff, FWC Wood Stork Data
3. Imagery: Bing Hybrid Basemap

N

2.5 0 2.5 Miles

Prepared by: JM 12/01/20
Technical Review by: JW 12/01/20
Independent Review by: BW 12/01/20

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LEGEND

Panther Telemetry

Proposed Nobles Grade Road And Pad

11-4 Panther Telemetry Data

Nobles Grade Prospect

April 2021

N

1,000 0 1,000 Feet

Prepared by: JM 04/01/21
Technical Review by: JW 04/01/21
Independent Review by: BW 04/01/21

Notes:
1. Coordinate System: NAD 1983 StatePlane Florida East FIPS 0901 Feet
2. Source Data: Stantec Staff, FWC Panther Telemetry Data
3. Imagery: Collier County 2020 Imagery

11-6 Red-Cockaded Woodpecker Observations

April 2021

FDOT Collier County Rest Area (Mile Marker 63)

Proposed Nobles Grade Road & Pad

Proposed Tamiami Road & Pad

Raccoon Point

Big Cypress Indian Reservation

Miccosukee Reservation

Florida State Miccosukee Indian Reservation

Everglades Wildlife Management Area

Big Cypress National Preserve

Fakahatchee Strand Preserve State Park

Picayune Strand Wildlife Management Area

Island Walk

Vineyards

Golden Gate

Naples

Naples Manor

Verona Walk

Lely Resort

PELICAN LAKE

MARCO SHORES COUNTRY CLUB

Marco

Marco Island

CALUSA ISLAND VILLAGE

Tripod Key

Helen Key

Kice Island

Ochopee

Everglades City

Alligator Alley W

Alligator Alley E

Everglades Pkwy W

84

75

LEGEND

- Red-Cockaded Woodpecker Locations
- Proposed Nobles Grade Road And Pad
- Proposed Tamiami Road And Pad
- Big Cypress Boundary

Notes:
1. Coordinate System: NAD 1983 StatePlane Florida West FIPS 0902 Feet
2. Source Data: Stantec Staff, FWC RCW Data
3. Imagery: Bing Hybrid Basemap

N

2.5 0 2.5 Miles

Prepared by: JM 12/01/20
Technical Review by: JW 12/01/20
Independent Review by: BW 12/01/20

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Big Cypress Indian Reservation

MIRASOL

Vineyards

Golden Gate

Florida Panther National Wildlife Ref

Miccosukee Indian Reservation

Florida State Miccosukee Indian Reservation

Nobles Grade Proposed Well Pad & Road

NAPLES NATIONAL GOLF CLUB

Lely

Picayune Strand State Forest

Lely Resort

SILVER LAKES

MARCO SHORES COUNTRY CLUB

Big Cypress National Preserve

Everglades Wildlife Management Area

Tamiami Proposed Well Pad & Road

Ten Thousand Is National Wildlife Ref

CALUSA ISLAND VILLAGE

Horrs Island

Tripod Key

Shell Key

Helen Key

Ochopee

Indian Key Pass

Rabbit Key Pass

Lopez River

LEGEND

Eagle Nest

Big Cypress Boundary

Notes:
1. Coordinate System: NAD 1983 StatePlane Florida West FIPS 0902 Feet
2. Source data: http://geodata.myfwc.com/datasets/eagle-nesting As Of: 02/25/20
3. Imagery: Bing Aerial Imagery

11-7 Bald Eagle Nests

Big Cypress National Preserve

May 2020

Stantec Consulting Services Inc.
6900 Professional Pkwy E.
Sarasota, FL 34240
tel 941.907.6900
fax 941.907.6910

N

0 5 Miles

Prepared by:	JW 04/30/20
Technical Review by:	NA 02/25/20
Independent Review by:	BJ 04/30/20

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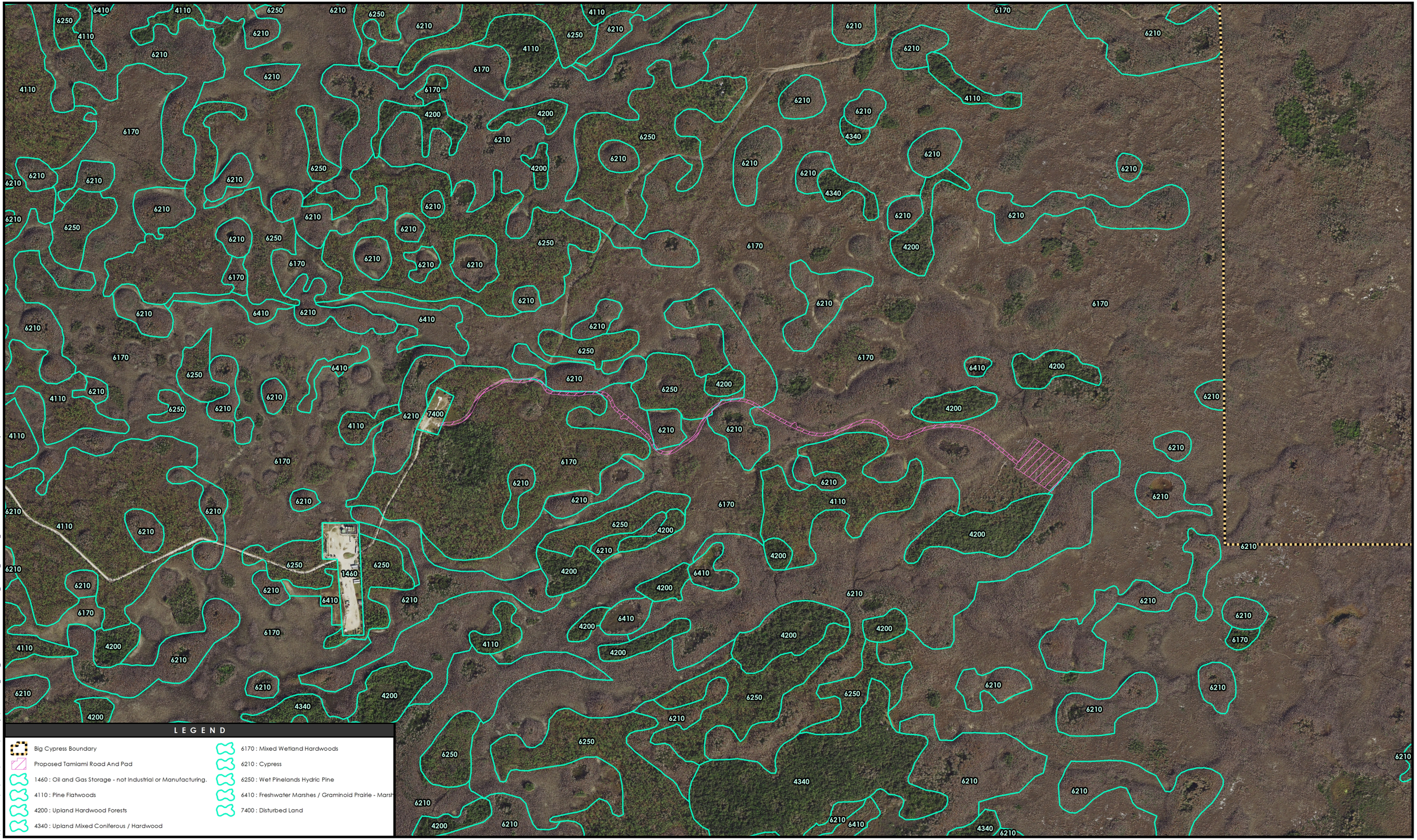

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11-9 SFWMD Land Cover

Tamiami Prospect

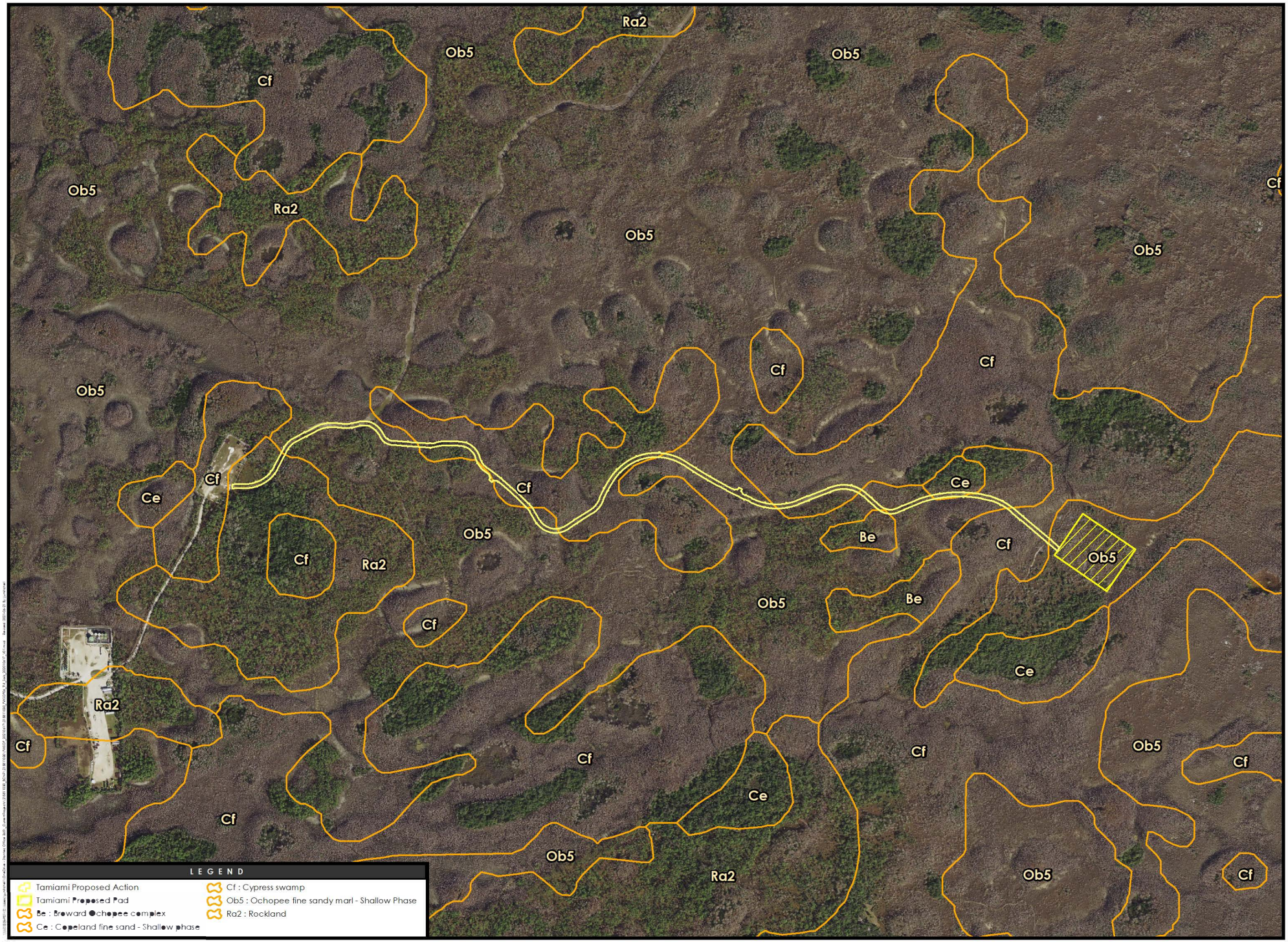
January 2022

Notes:
1. Coordinate System: NAD 1983 StatePlane Florida West FIPS 0902 Feet
2. Source data: Stantec Staff, 2016 FLUCCS (SFWMD GIS Portal)
3. Imagery: Collier County 2020 Imagery

N

0 500 1,000 Feet

Prepared by: JM 12/01/20
Technical Review by: JW 12/01/20
Independent Review by: BW 12/01/20



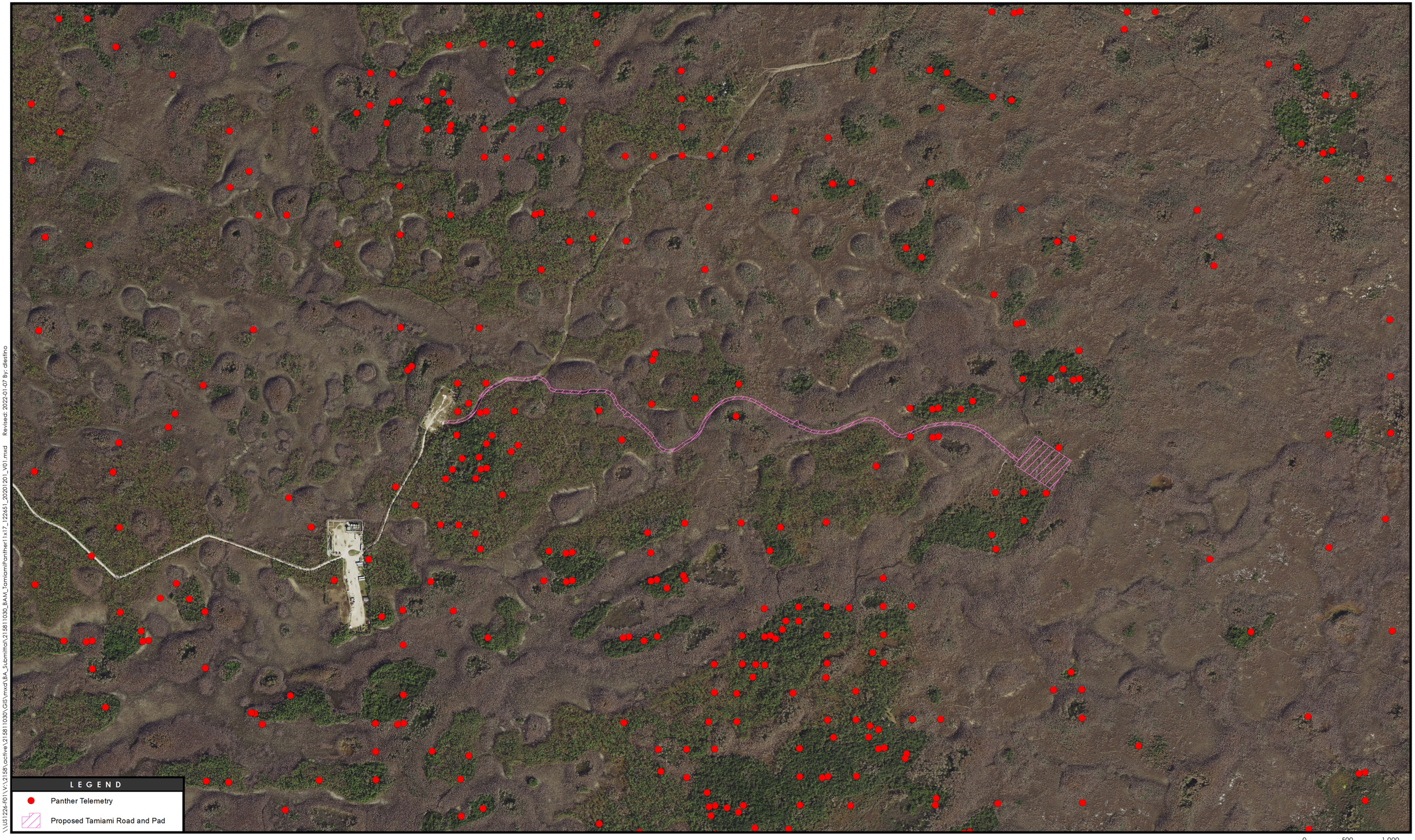
11-8 Soils

Tamiami Prospect

June 2021

Notes:
1. Coordinate System: NAD 1983 2011 StatePlane Florida East FIPS 0901 Ft US
2. Source data: Peninsula Engineering, NCS Web Soil Survey
3. Imagery: Collier County, 2020 Imagery

Prepared by: JM 06/18/21
Technical Review by: JW 06/18/21
Independent Review by: BW 06/18/21



11-10 Panther Telemetry Data

Tamiami Prospect

January 2022

N

0 500 1,000 Feet

Prepared by: JM 12/01/20
Technical Review by: JW 12/01/20
Independent Review by: BW 12/01/20

Notes:
1. Coordinate Systems: NAD 1983 StatePlane Florida West FIPS 0902 Feet
2. Source data: Stantec Staff, FWC Panther Telemetry
3. Imagery: Collier County 2020 Imagery

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