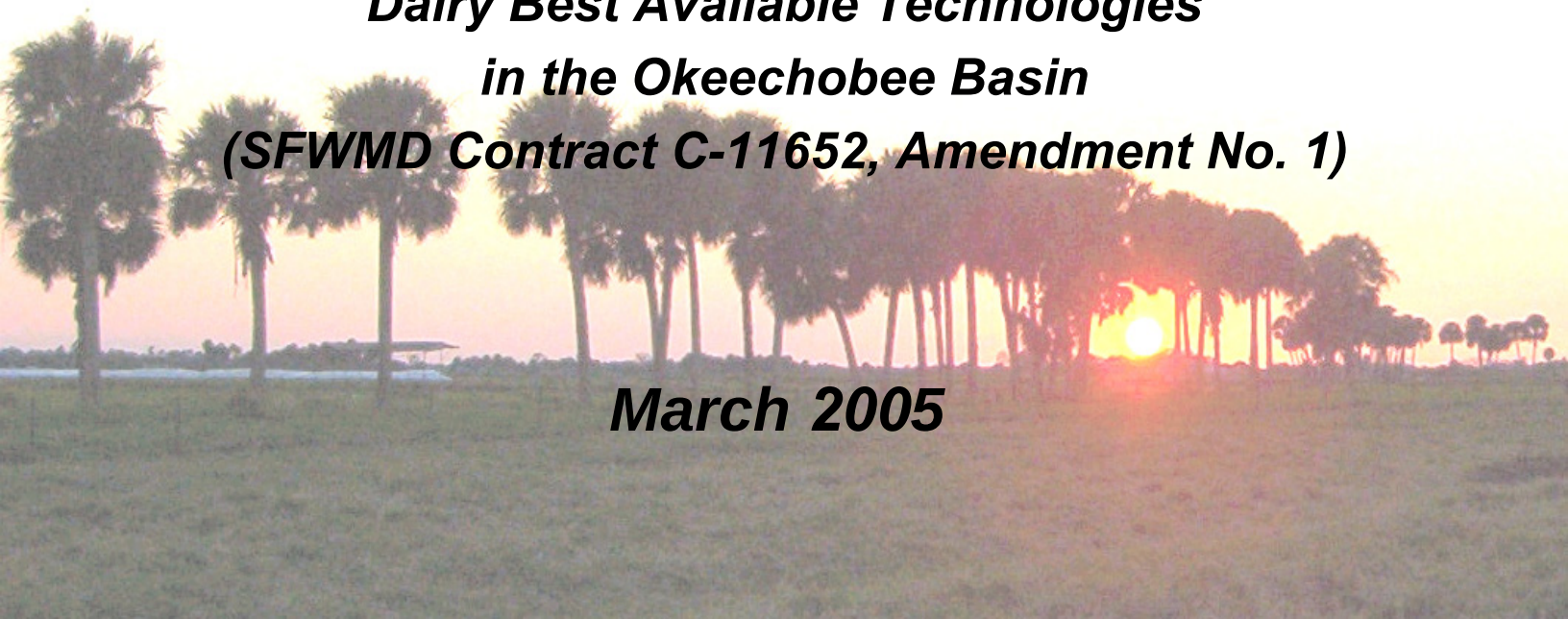
ROYAL CONSULTING SERVICES, INC.

TASK 3.7A REPORT
IMPLEMENTATION PLAN
FOR

Milking R inc

Prepared for
Soil and Water Engineering Technology, Inc.

As Part of the
Dairy Best Available Technologies
in the Okeechobee Basin
(SFWMD Contract C-11652, Amendment No. 1)



March 2005

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Section 1
Introduction

1.1 Background

The Soil and Water Engineering Technology, Inc. (SWET) Team was selected in December 2000 to complete the Dairy Best Available Technologies project (C-11652) for the South Florida Water Management District (SFWMD). The primary goal of this study is to provide an unbiased selection, implementation, and monitoring of the Best Available Technologies to significantly reduce dairy industry phosphorus exports to the Okeechobee Basin and bring about the most effective and substantial water quality improvements in the shortest possible time.

As part of this project the SWET Team completed a detailed literature review of available technologies, completed a ranking of Okeechobee dairies for participation, completed nutrient assessment for selected dairies, and ranked and selected the most appropriate technology for meeting the District's goal of a 40 parts per billion (ppb) phosphorus concentration in stormwater runoff at the edge-of-farm. Edge-of-farm treatment (impoundment, water reuse, and chemical flocculation) of runoff was found to be the highest ranked method to reduce phosphorus discharge from the farm to meet the project's goals. Based on these findings, the SFWMD Governing Board authorized SWET to contract one or more qualified design/build firms to complete the construction phase of the project. Royal Consulting Services, Inc. (RCS) was selected as a qualified design/build firm to perform these services for Milking R, Inc. in September 2003, under Amendment 1 of the original contract.

1.2 Project Objectives

The primary objectives for this project are the design and construction of an edge-of-farm treatment system capable of reducing the phosphorus discharge concentration from the site to as close to 40 ppb as possible. The basis of the final design consisted of retaining onsite runoff, the incorporation of the existing Bion System, and the treatment of offsite discharges by chemical treatment to meet the water quality goals downstream.

A conceptual design of the treatment system was provided by SWET as a basis for the final design of the treatment system (SWET, 2003). As indicated on **Figure 1-1**, the primary components for an on-site multi-stage stormwater pond with a final chemical treatment-finishing pond, consist of the following:

- System of ditches and dikes to collect and divert runoff to the treatment system.
- A large retention/detention (R/D) impoundment for reduction of offsite discharge. This R/D primarily serves as a buffer reservoir for the chemical treatment system, although it also provides constructed wetland treatment.
- A chemical treatment system consisting of a discharge pump or gravity feed structure with flocculant injection/mixing, and two settling ponds. Portions of the existing Bion system will

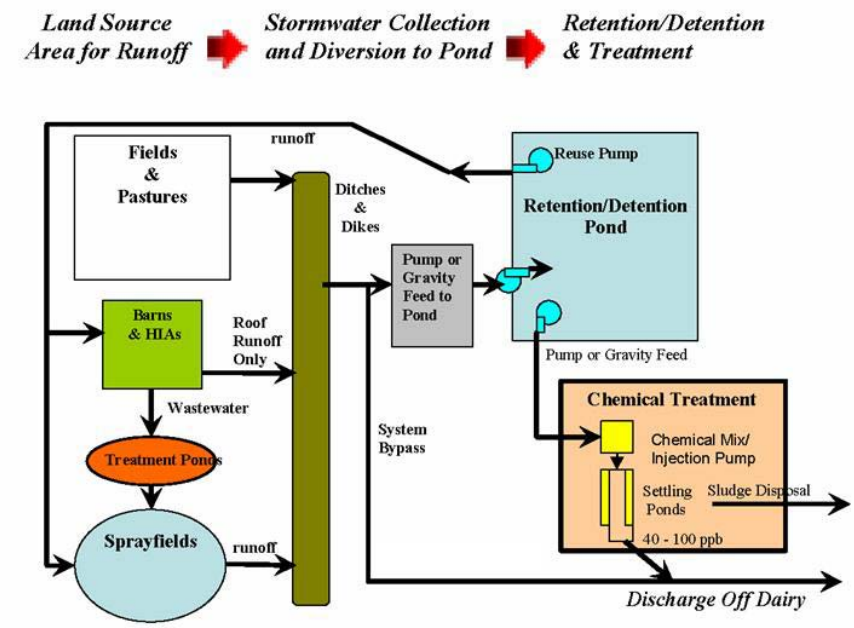

Figure No. 1-1 Conceptual Design of EOF System

be incorporated into the final design to provide pretreatment via a vegetated flow way prior to the R/D pond. The chemical treatment system will operate only when the storage capacity of the system is exceeded or to recover storage capacity prior to a subsequent storm event.

The primary design tasks for this project were to locate and size the above-described system to the site-specific conditions present at Milking R, Inc**.** The conceptual design as defined by SWET consisted of the following components:

- Interception ditches or diversion dikes for directing farm field runoff and seepage to the stormwater impoundment.
- Modification of the Bion/P Source Control Grant Project to be compatible with this Dairy BATs project.
- A bypass structure for stormwater in excess of the design capacity of the system.
- Pump station(s) to lift stormwater into impoundment(s) (5,000 to 30,000 gpm capacity range anticipated).
- Impoundment, including dikes and emergency discharge structure.
- Pump or gravity flow structure that will provide chemical mixing before delivery to the two settling ponds (0.5 to 2 ac).

- A roofed coagulant storage facility with chemical injection pump and controls.
- A settling pond for collection of flocculant prior to final discharge.
- Piping to provide reuse water from the stormwater pond to the dairies' existing waste storage ponds for sprayfield application, barn flush water systems and cooling ponds.
- Total project budget including engineering services, surveying, permitting, construction and startup not to exceed $575,000.

1.3 Site Location and Description

Milking R, Inc. (formerly known as Dry Lake Dairy – Barn #2) encompasses approximately 1,134-acres of land, and is located in Sections 23, 24, 25, 26, and 36 in Township 36 South and Range 34 East, approximately 4 miles to the northwest of Okeechobee, Florida. The property is accessed from U.S. 98 (see **Figure 1-2**).

Table 1-1 describes the land use, cover type (where applicable), and size for each delineated area on the farm. **Figure 1-3** shows the layout of the entire farm, location of each field, and land uses for each area. Hay is the only crop that is harvested on the farm. All of the sprayfields are planted in stargrass, which is a tropical bermudagrass. In a typical year, the grass is harvested 6 to 8 times for primarily haylage production and occasional hay production. All of the hay that is harvested is used on site, (EWRI, 2003).

The predominant breed of dairy cattle on the farm is Holstein. Over the past twelve months, the farm's total dairy head count has averaged 1,053, with a lactating population of 700 head. The remaining 353 head consists of approximately 80 dry cows, 164 springers, and 59 calves. The pot herd consists of approximately 50 animals. Approximately 40 head are culled each year. In addition, Milking R, Inc. runs a beef herd of approximately 530 head (EWRI, 2003).

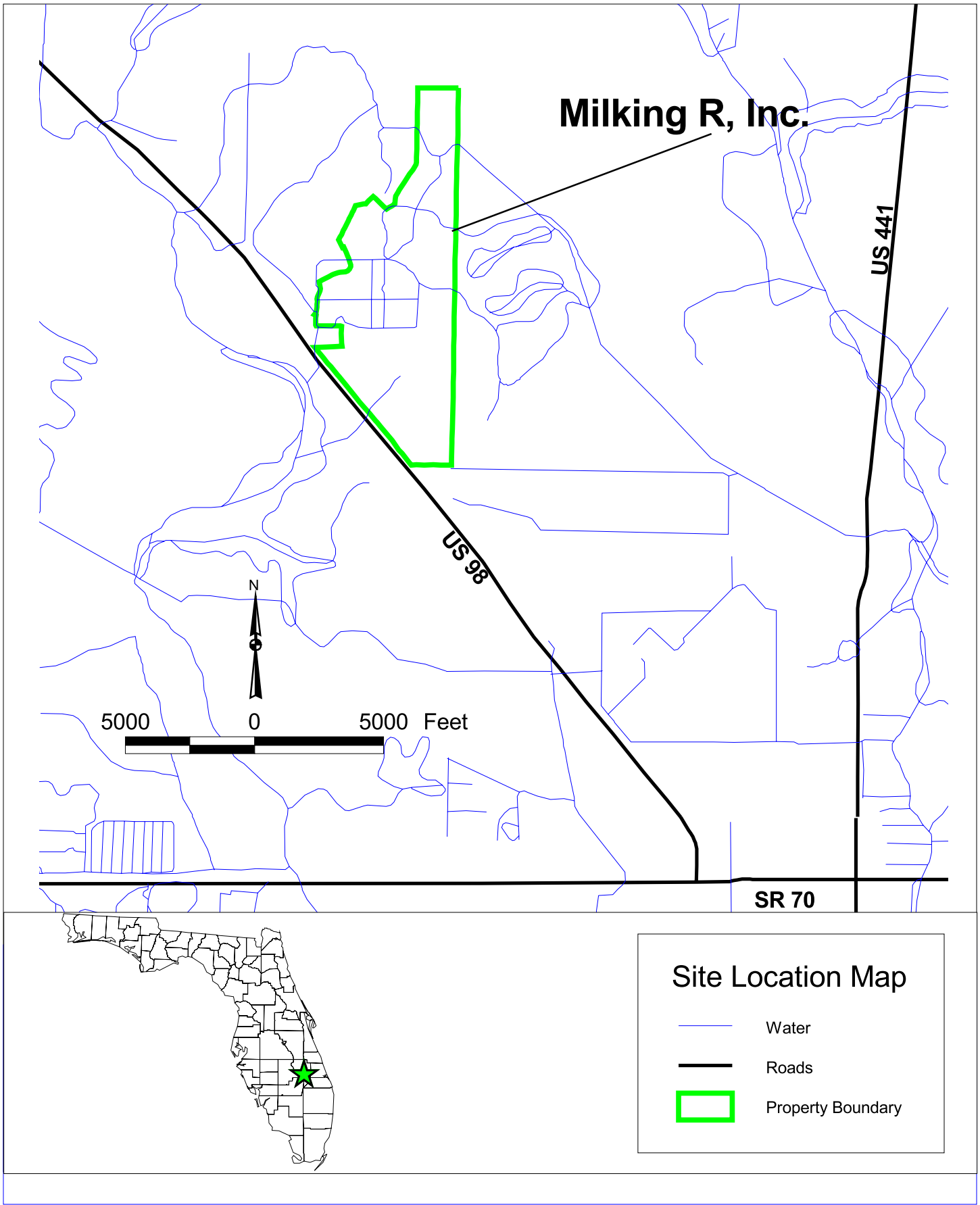

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Figure 1-2
Site Location Map

Table 1-1. Milking R, Inc. Land Use and Acreage

Field Designation	Description/ Land Use	Animal Type	Field Crop	Acres
BPF1	Beef Pasture / Forage	Beef Cattle	Stargrass	41.0
BPF2	Beef Pasture / Forage	Beef Cattle	Stargrass	59.1
BPF3	Beef Pasture / Forage	Beef Cattle	Stargrass	134.9
BP1	Beef Pasture	Beef Cattle	Stargrass	95.9
BP2	Beef Pasture	Beef Cattle	Stargrass	50.5
BP3	Beef Pasture	Beef Cattle	Stargrass	78.9
BA1	Bion Area			3.9
BULL1	Bull Pasture	Bulls	Stargrass	5.9
BULL2	Bull Pasture	Bulls	Stargrass	1.8
CB1	Calf Barn			0.2
CALF1	Calf Pasture	Calves	Stargrass	5.3
CALF2	Calf Pasture	Calves	Stargrass	7.6
CALF3	Calf Pasture	Calves	Stargrass	26.4
CALF4	Calf Pasture	Calves	Stargrass	18.4
COMM1	Commodities			12.9
DC1	Dry Cows Pasture	Dry Cows	Stargrass	50.5
CPOND1	Earthen Cooling Pond			0.4
FARM	Farm Buildings			6.9
FB1	Feed Barn			0.1
FB2	Feed Barn			0.1
FB3	Feed Barn			0.1
FD1	Fenced Ditch			4.0
FD2	Fenced Ditch			1.5
FD3	Fenced Ditch			2.5
FOR1	Forage		Stargrass	10.4
FOR2	Forage		Stargrass	20.3
FOR3	Forage		Stargrass	6.3
FOR4	Forage		Stargrass	2.3
FOR5	Forage		Stargrass	1.5
FOR6	Forage		Stargrass	25.9
FOR7	Forage		Stargrass	1.6
HAY1	Hay			13.9
HIA1	HIA	Lactating Cows		4.8
HIA2	HIA	Lactating Cows		1.9
HIA4	HIA	Lactating Cows		1.2
HIA5	HIA	Lactating Cows		1.0
HIA6	HIA	Lactating Cows		1.5
LP1	Lactating Pasture	Lactating Cows	Stargrass	29.2
LP2	Lactating Pasture	Lactating Cows	Stargrass	21.5
LP3	Lactating Pasture	Lactating Cows	Stargrass	28.0
LP4	Lactating Pasture	Lactating Cows	Stargrass	12.5
LP5	Lactating Pasture	Lactating Cows	Stargrass	27.1
LP6	Lactating Pasture	Lactating Cows	Stargrass	9.5

Field Designation	Description/ Land Use	Animal Type	Field Crop	Acres
LP7	Lactating Pasture	Lactating Cows	Stargrass	15.1
LP8	Lactating Pasture	Lactating Cows	Stargrass	8.5
LP9	Lactating Pasture	Lactating Cows	Stargrass	7.8
LP10	Lactating Pasture	Lactating Cows	Stargrass	2.3
LAG1	Lagoon			0.5
LAG2	Lagoon			2.5
MP1	Milking Parlor			0.3
OLAND1	Other Lands			10.1
OLAND2	Other Lands			12.5
OLAND3	Other Lands			1.8
OLAND4	Other Lands			1.2
OLAND5	Other Lands			0.4
OLAND6	Other Lands			8.5
OLAND7	Other Lands			1.4
POT1	Pot Herd	Pot Cows	Stargrass	2.4
SF1	Sprayfield		Stargrass/Oats	17.7
SF2	Sprayfield		Stargrass/Oats	12.6
SF3	Sprayfield		Stargrass/Oats	21.0
SF4	Sprayfield		Stargrass/Oats	29.4
SF5	Sprayfield		Stargrass/Oats	37.4
SPRING1	Springer Pasture	Springers		5.5
WSP1	Waste Storage Pond			13.5
WSP2	Waste Storage Pond			4.5
WET1	Wetlands			0.4
WET2	Wetlands			2.2
WET3	Wetlands			12.2
WET4	Wetlands			11.3
WET5	Wetlands			2.9
WET6	Wetlands			3.0
WET7	Wetlands			2.1
WET8	Wetlands			3.8
WET9	Wetlands			2.1
WET10	Wetlands			9.9
WET11	Wetlands			1.9
WET12	Wetlands			11.6
WET14	Wetlands			5.8
WET15	Wetlands			2.6
WET16	Wetlands			4.3
WET17	Wetlands			4.2
WET18	Wetlands			2.7

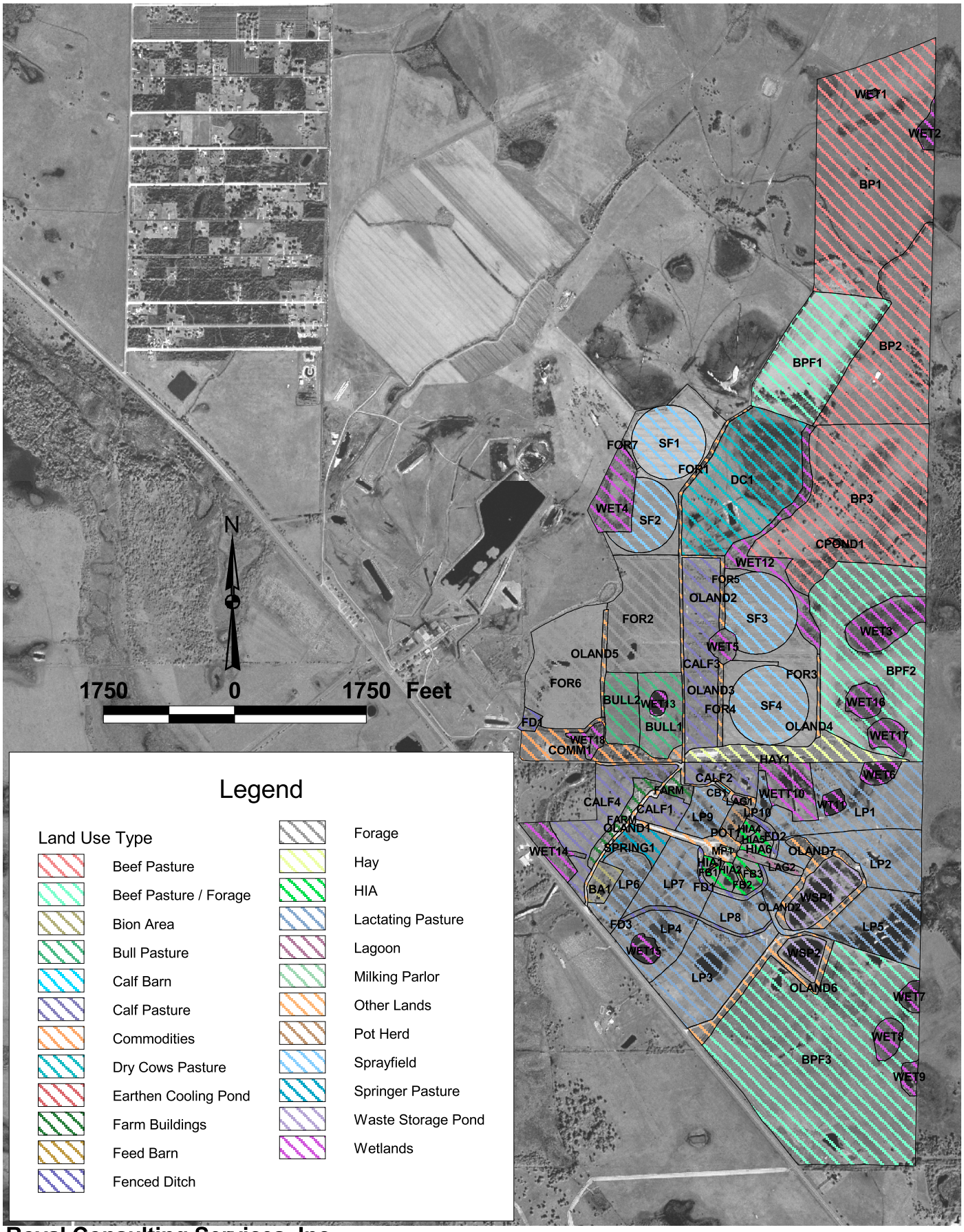

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Figure 1-3
Land Use Map for Milking R Dairy

Manure is collected in and around the barns and stored in the high intensity area for drying. It is spread, as needed, on the irrigated field, hay field, or low use pastures. The farm's records approximate that 2500 tons of manure per year is generated from the herd. Solids are not removed from the farm. The waste storage pond sediment trap is typically cleaned out once every 10 years. The sludge is placed in the manure dry storage area and is spread in hayfields or non-lactating and minimum-use pastures, when needed.

Water use records are not readily available. Given the practices used at Milking R, Inc., water use is estimated at approximately 50 gal/day/cow for drinking water, plus 100 gal/day/lactating-cow for wash down, resulting in a total water use of 122,650 gallons per day, or 44.8 million gallons per year (EWRI, 2003).

The Natural Resources and Conservation Service (NRCS) waste management system operation and maintenance plan for Milking R, Inc. was constructed in the mid 1980s. The system was designed for a population of 700 milking cows, assuming a live weight of 1,300 pounds. The design storm selected to size system components was a 24-hour 25-year storm event . Additionally, a barn wash flow of 70,000 gallons per day was assumed. System components included the following:

- A 12.8-acre high intensity area (HIA) and ditch that surrounds the barn. Barn wash water and runoff from the HIA drains via the HIA ditch to a solids separation lagoon (solids trap).
- Two waste storage ponds (a 13.5 acre WSP 1 and 4.5-acre WSP 2) designed to contain barn wash water and runoff from the high intensity area after it passes through the solids separation lagoon.
- Water from the waste storage pond is pumped to the 122-acre irrigated field.

The CNMP developed for Milking R, Inc. presents details of a proposed waste management system design that calls for an increase in lactating cow numbers from 700 to 1200 on an annual average basis, and is referred to as Phase 1. The system is designed to meet all NRCS conservative standards as well as reducing phosphorus (P) levels in the barns' waste stream and discharge waters from the dairy by 75%. The ultimate goal for the dairy is to increase cow numbers up to 1600 once the new system is fully implemented, tested, and economically feasible. This expansion is referred to in the CNMP as Phase 2, (SWET, 2002).

Section 2
Existing Site Conditions

2.1 Hydrology and Topography

Milking R, Inc. is located in both the S-154 Lower Kissimmee River Basin and the Taylor Creek Basin. Generally, the flow from the dairy drains to the southwest towards the Kissimmee River on route to Lake Okeechobee. The northern portion of the dairy drains to the east towards Taylor Creek in route to Lake Okeechobee. The region is particularly flat, with elevation changes typically on the order of three feet per mile, (SWET, 2002b). Elevations range from 34 feet NGVD on the east and south side of the farm to 38 feet NGVD to the north and west.

Milking R, Inc. is hydrologically separated from neighboring Dry Lake Dairy at the property line due to a built up farm road that has no apparent culvert connections. **Figure 2-1** shows the estimated surface water flow pattern onto and off the farm, as well as within the farm's boundaries. Basin 2 receives offsite inflows from a 300-acre property located to the north. The stormwater runoff from this basin flows easterly and exits the farm at KREA 32C into the Taylor Creek basin.

Surface runoff from Basin 4 is collected by a southerly flowing ditch system that connects to KREA 49 via 49A, which eventually discharges to the Kissimmee River. This basin includes four sprayfields, several pastures, and forage fields. Historically, Dry Lake's Basin 4 combined with surface discharge from Milking R, Inc. and exited at KREA 49A. Onsite reconnaissance revealed that the connection between the two dairies was severed at the common property line. Therefore, only Milking R's surface water runoff exits the farm at KREA 49A.

The area shown as HIA/WSP 2 in Figure 2-1 is within the HIA perimeter ditch and includes the treatment lagoon and waste storage ponds. These areas were designed to have no stormwater discharge for storm events up to and including the 25-year, 24-hour event. Water collected in this area is periodically used to spray irrigate on four sprayfields located in Basin 2.

Basin 3 runoff exits the farm in the southeast corner at KREA 33, and ultimately discharges into the Kissimmee River. There is a portion of the property east of Basin 2 that is not hydraulically connected to any discharge point. This area is comprised of isolated wetlands that typically do not drain except during extreme rainfall events. This area is part of a larger basin along the east property line where it is unclear as to which direction runoff actually flows, other than the high probability that it discharges into the Taylor Creek Basin.

Basin 4 includes Milking R's outer lactating pastures. These drain, along with the springer and pot pasture into a Bion Bioreactor system. Stormwater runoff is treated in the bioreactor in order precipitate phosphorus with the aid of Aluminum Sulfate. From there it discharges off the farm through KREA 49 and into the Kissimmee River basin (SWET, 2002b).

Hydrologic unit boundaries were delineated by assessing additional information obtained from four sources: (1) a digital aerial photograph of the region encompassing the farm, (2) topographic survey

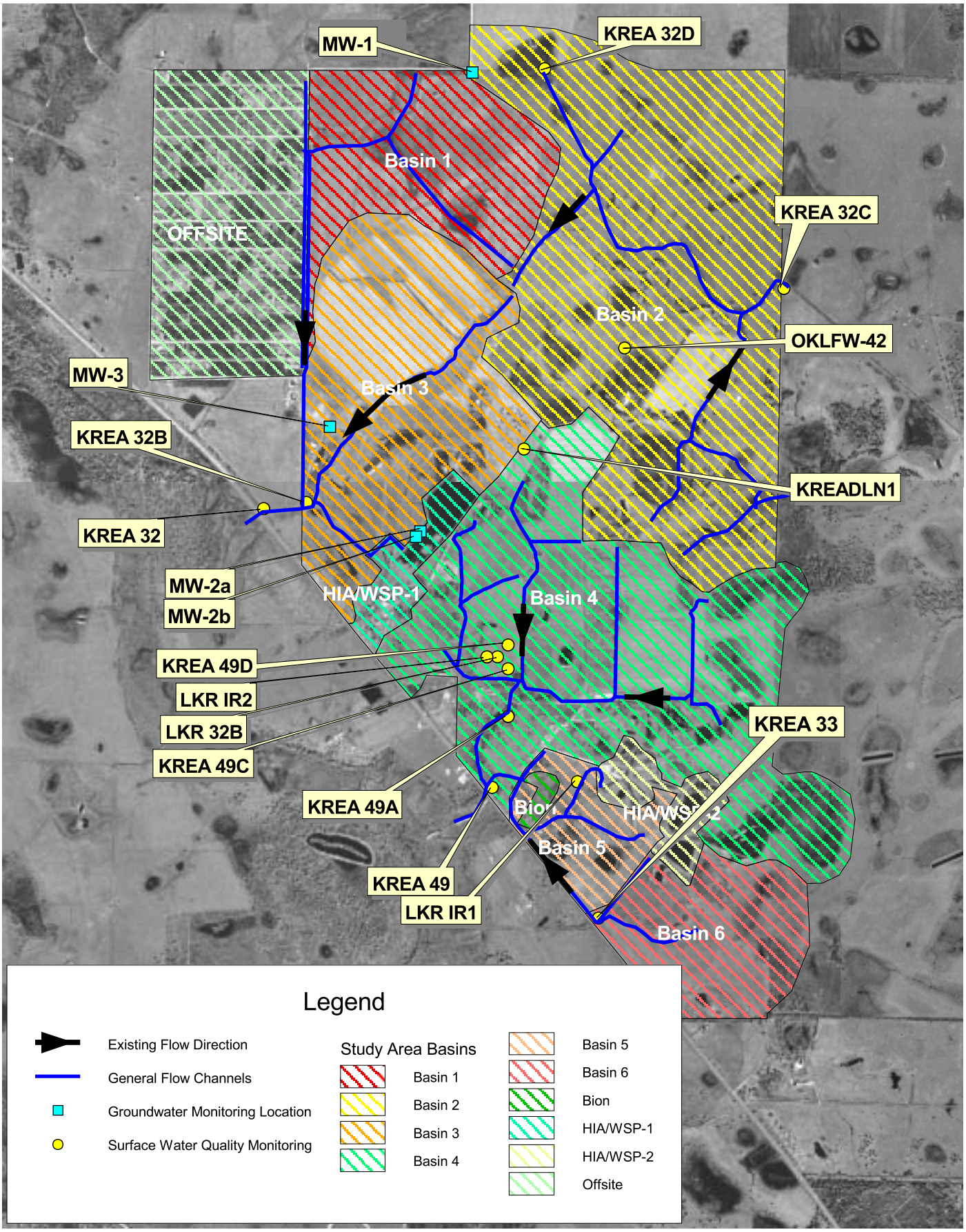

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Figure 2-1
Surface Water Basins

completed for the project, (3) information provided by SWET, and (4) conversations with the farm owner. In general, natural physical features or constructed stormwater conveyance systems that control and direct stormwater runoff to a common outfall define hydrologic units. The actual drainage basin boundaries were extremely difficult to delineate due to the naturally occurring flat terrain with numerous low-lying wetlands throughout the property. These depressions and low lands are typically drained through a series of ditches and canals that exit on the east side and southwest corner of the farm. In some cases, the flow direction is dependent upon the rainfall patterns throughout the year. For instance, the wetlands east and northeast of WSP1 are shown flowing southwest towards KREA 49, but could actually flow east to Taylor Creek during wet conditions. These wetlands can also hold a significant amount of water from nearby runoff before discharging off the farm can occur. Due to this occurrence, some of the pastures and sprayfields will generate runoff well before some of the areas around isolated wetland areas that do not have drainage ditches (SWET, 2002b).

For the purpose of this study, Milking R, Inc. was subdivided into six hydrologic units, ranging in size from 92 acres to 772 acres, as is shown on Figure 2-1. The main basin names are as follows: Basin 1, Basin 2, Basin 3, Basin 4, Basin 5, and Basin 6. Basins 2, 4, and 6 are only partly within Milking R, Inc. property boundary, and the entire Basins 1 and 3 are located outside of the dairy boundary. Only Basin 5 is completely contained within the farm boundary.

2.2 Water Quality

Phosphorus concentrations have been measured at the KREA monitoring locations identified on Figure 2-1. Data collection started in 1987, about the time that the Dairy Rule modifications were being implemented. Data presented in the Comprehensive Nutrient Management Plan Phase I Assessment For Dry Lake Dairy, Inc. (Barns 1 and 2) completed by SWET in 2001 clearly shows that the implementation of the Dairy Rule BMPs in the late 1980's dairy caused a significant reduction in P concentrations for those sites that had drainage from the barns' HIAs (KREA 32B and 49), but since the early 1990's no further improvement has occurred. The average P concentration for the five primary monitoring sites from 1996 to 2000 is presented in Table 1 below (SWET, 2001).

Table 2-1
Average Phosphorus Concentration from 1996 to 2000

Site Code	Description	TP (mg/l)
KREA 32B	Outflow of Basin 3	2.8
KREA 32C	Outflow of Basin 2	2.6
KREA 32D	Inflow to Basin 2	1.8
KREA 49	Outflow of Basins 4 and 5	5.3
KREA 33	Outflow of Basin 6	5.6

2.3 Soils

A soils map of Milking R, Inc. is provided as **Figure 2-2**. The soil map units occurring within the farm boundaries fall into two general groups: (1) soils of the flatwoods, hammocks, and sloughs, and (2) soils of depressions, low flats, and flood plains. A majority of the soils are located in group 1. Both groups of soils are nearly level, poorly drained, sandy soils with high runoff potential if not ditched. These soils typically have low phosphorus absorption potential and low cation exchange capacity, and can therefore leach phosphorus if phosphorus loading exceeds crop phosphorus uptake. Organically coated subsoil is present in some locations and some areas are subject to ponding or flooding, (EWRI, 2003).

Specific soil types located on Milking R, Inc. include: Basinger and Placid depressional (3); Basinger fine sand (2); Immokalee fine sand (11); Valkaria fine sand (5); Ft. Drum fine sand (10); Myakka fine sand (14); Parkwood fine sand (18); Floridana, Riveria, and Placid soils, depressional (7). Of these, Basinger and Placid (3), and Floridana, Riveria, and Placid (7) fine sands are generally found in depressional areas and remaining isolated wetlands. Due to the hydrologic soil class D associated with these soils, there is potential for high runoff. The upside to this is that these soils are located for the most part in low areas such as wetlands, and provide significant onsite storage that can reduce runoff. A very small percentage of this group includes Ft. Drum fine sand that has a soil class C. The effects of this type were assumed insignificant to the rest of the soils. The remaining group includes Immokalee (11), Basinger (2), Valkaria (5), Myakee (14), and Parkwood (18) have dual NRCS hydrologic soil classes of B/D, which means the soils are very poorly drained (D) and produce high runoff volume in their native state, but become moderately well drained (B) and produce less runoff if groundwater levels are controlled by a stormwater management system.

Basin 2 and 4 includes the following soil types: Basinger fine sand (2); Basinger and Placid depressional (3); Valkaria fine sand (5); Floridana, Riveria, and Placid soils, depressional (7); Ft. Drum fine sand (10); Immokalee fine sand (11); Parkwood fine sand (18). Due to a majority of the eastern side of the dairy being comprised of wetlands, there is a high potential for runoff associated with these depressional soils. Only a small portion of the dairy consists of a soil that is classified as "C" type. This area allows for moderate drainage with less runoff as compared to the other areas. Although, being an insignificant portion of the entire system, and the fact that a conservative approach was taken in this design, this soil was not considered in the surface water model. The rest of the dairy contains poor soils that add to the runoff potential of the entire system (EWRI, 2003).

2.4 Phosphorus Concentration in Soils

The Florida Department of Agriculture on Consumer Services (FDACS) provided phosphorus concentrations of onsite soil samples collected at Milking R, Inc. The samples were analyzed at the University of Florida, IFAS laboratory using the Mehlich 1 and water-soluble phosphorus extraction methods. Other miscellaneous parameters, such as pH, potassium and lime requirement were also measured. Soil samples were collected with the following frequencies:

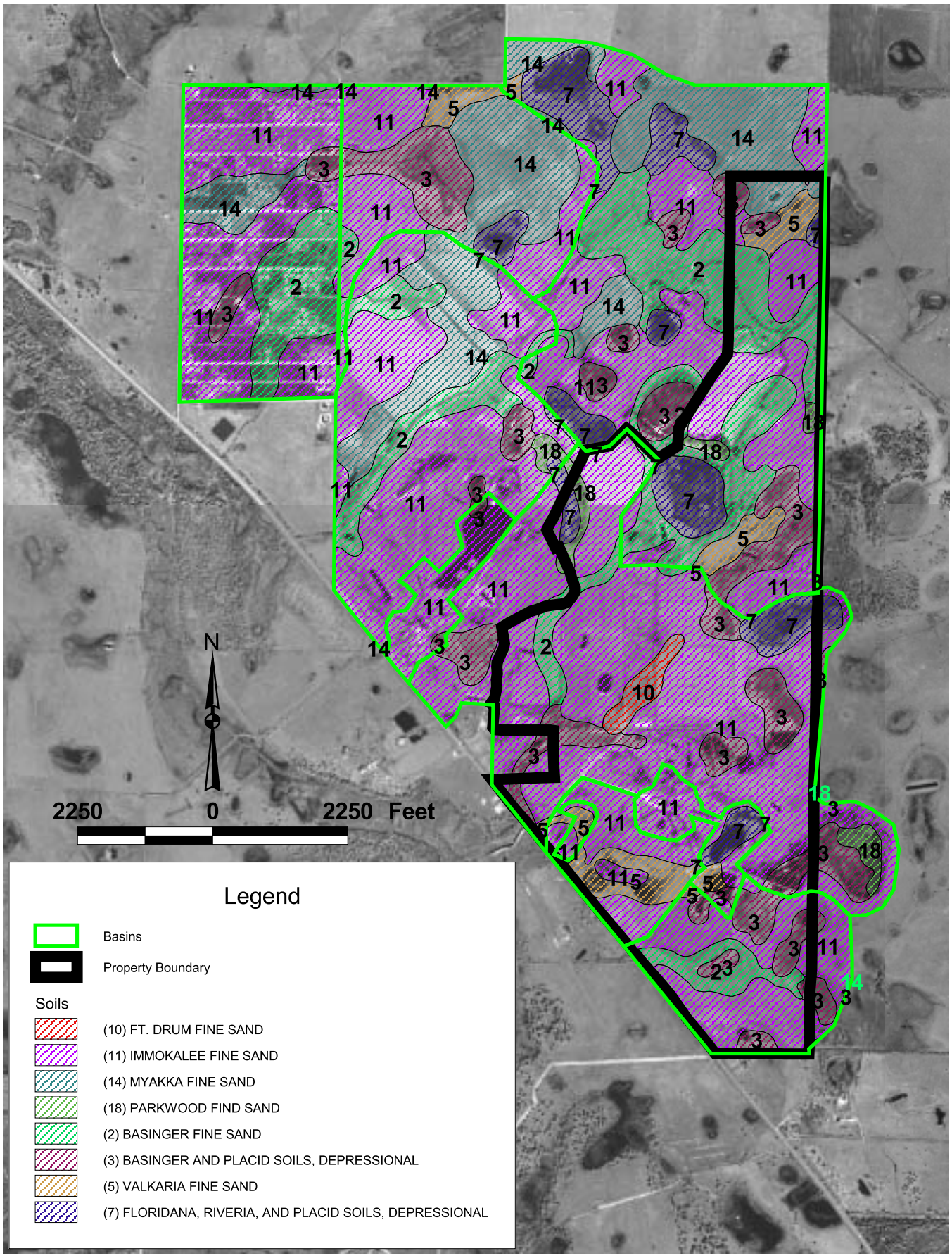

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Figure 2-2
Study Area Soil Types

- High Intensity Areas (HIAs) - 1 sample per acre
- Herd Pasture (lactating and support) - 1 sample per 5 acres
- Beef Cattle Pasture - one sample per 20 acres
- Hayfield (including sprayfields) – 1 sample per 10 acres
- HIA Ditches – 1 sample per acre

The soil samples collected were logged in the field using a global positions system (GPS) to accurately identify the sample location. **Figure 2-3** summarizes the results of the phosphorus concentrations found in the field samples.

2.5 Wetland Determination

A wetlands determination for Milking R, Inc. was completed by NRCS in 1999. The results of their finding are presented in **Appendix A.**

2.6 Preliminary T&E

In January 2004, a preliminary Threatened & Endangered species (T&E) survey was conducted by C&N Environmental Consultants, Inc. (C&N) on Milking R, Inc. The Preliminary T&E Species Survey and Literature Review Report prepared by C&N is presented in **Appendix B**. The threatened and endangered species random survey identified a total of nine (9) listed species that were observed on the site, including (See **Figure 2 in Appendix B**):

- American alligator
- Crested Caracara
- Little Blue Heron
- Snowy Egret
- Tricolored Heron
- White Ibis
- Florida American Crane
- Bald Eagle
- Wood Stork

Two (2) of these nine species (crested caracara and sandhill crane) may be affected by the construction of the proposed water management system. Approximately 46 sandhill cranes were observed onsite, congregating to eat the cattle feed. The preliminary T&E survey indicated that the site and adjacent wetlands offer favorable habitat for sandhill cranes, although no nests were observed

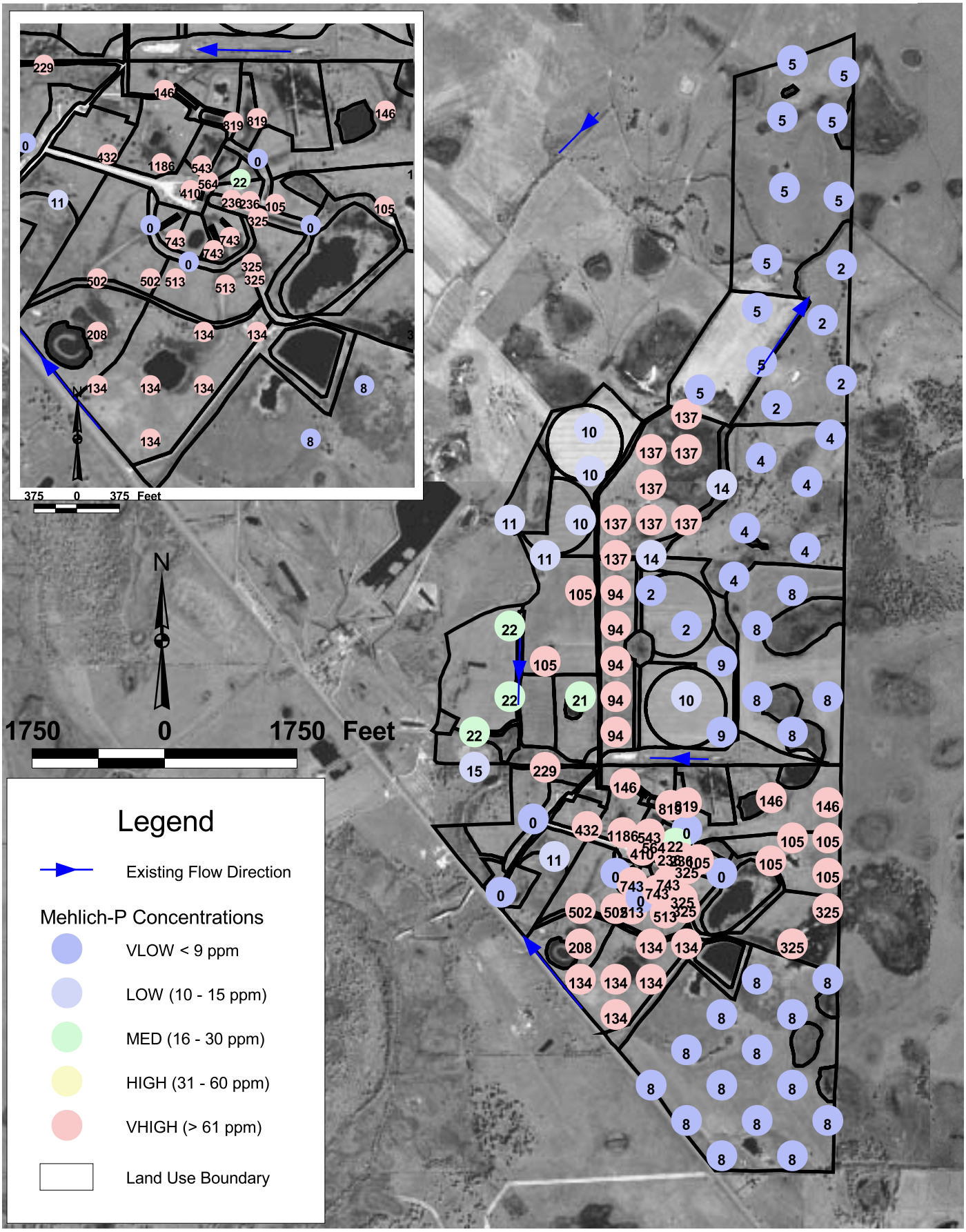

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Figure 2-3
Phosphorus Concentration in Soil

within the project site. Approximately eight (8) crested caracara were observed onsite during the survey. It may be possible that the same birds were counted more than once. However, no nests were observed, and nesting most likely does not take place onsite. Although it is unlikely that these two avian species nest on-site, preliminary data suggests that both species utilize the site for foraging and suitable habitat for nesting was identified (C&N, 2004).

The Florida Fish and Wildlife Service and Army Corp of Engineers requested that a comprehensive Crested Caracara survey be completed for the project. As a result, C&N performed a Crested Caracara survey per FFWCC recommendations of once a day for three consecutive days, repeated again in two weeks, and again in four weeks. Surveys were conducted on January 10th -12th, January 27th-29th, and March 1st – 3rd.

Only soaring Crested Caracaras were observed during this survey. A total of two Caracaras were observed during the nine survey days. One Caracara was seen on January 27, 2005 and another Caracara was observed on January 28, 2005. None of the palm trees surveyed contained any previous nesting material or new nests. The cabbage palms on the southern side of the construction area are very sparse, and probably are not good candidates for Crested Caracara nesting. Crested Caracaras are very sensitive to human disturbances especially during the nest building, incubation, and early nestling stages. Caution should be used in regards to the Crested Caracara during the construction of the storm water pond (C&N, 2005). A copy of the Crested Caracara Survey Report prepared by C&N is also presented in Appendix B.

Section 3
Conceptual Design

3.1 Conceptual Design

To cost-effectively meet the project objectives stated in Section 1, various drainage options were reviewed by the project team including RCS, SWET, & SFWMD staff and the landowner. These options investigated the collection and treatment of all or a portion of the runoff from the dairy. Anticipated limitations on capital costs, operations and management costs, landowner preferences, etc. were all considered in the development of the preliminary design.

Items of importance in choosing the most appropriate option were the following:

- Ease of incorporation into the existing farm management system
- Ability to utilize key Bion System components
- Value of land to be used as stormwater pond
- Maximizing treatment area
- Minimizing wetland impacts
- Taylor Creek (S-191) versus Lower Kissimmee River Basin (S-154) flows

As discussed in Section 2, the northern portion of the site drains to the Taylor Creek Basin (S-191), while the majority of the southern portion of the site drains to the S-154 basin. Initial treatment options investigated the treatment of these two flow areas separately through the development of two distinct treatment systems. However, this was determined to be cost prohibitive. Thus, treatment options investigating treatment of either the northern or southern portions of the dairy were investigated. However these options would leave some high phosphorus loading areas without treatment. The final options investigated consisted of rerouting a portion of the site flow currently discharging to the S-191 basin to the S-154 basin. This would be accomplished through the installation of a ditch block at the northern end of the North-South Ditch, just south of the intersection with the West-East Ditch running through the northern portion of the property. Several stormwater pond locations for this option were investigated. Locating the stormwater pond at the front of the property, along US98 was not a viable option due to the value of the land to the landowner. Thus it was decided that the stormwater pond was to be located along the eastern boundary of the property. Since the existing wetlands in this area are of poor quality, it is anticipated that the proposed retention system will help improve their quality status over their current conditions. Therefore, the SWET project manager and SFWMD staff have indicated that wetland responses should not be a limiting factor in the design and construction of the proposed system.

The preliminary stormwater treatment system option selected is presented on **Figure 3-1**. Major components of the conceptual design are discussed below.

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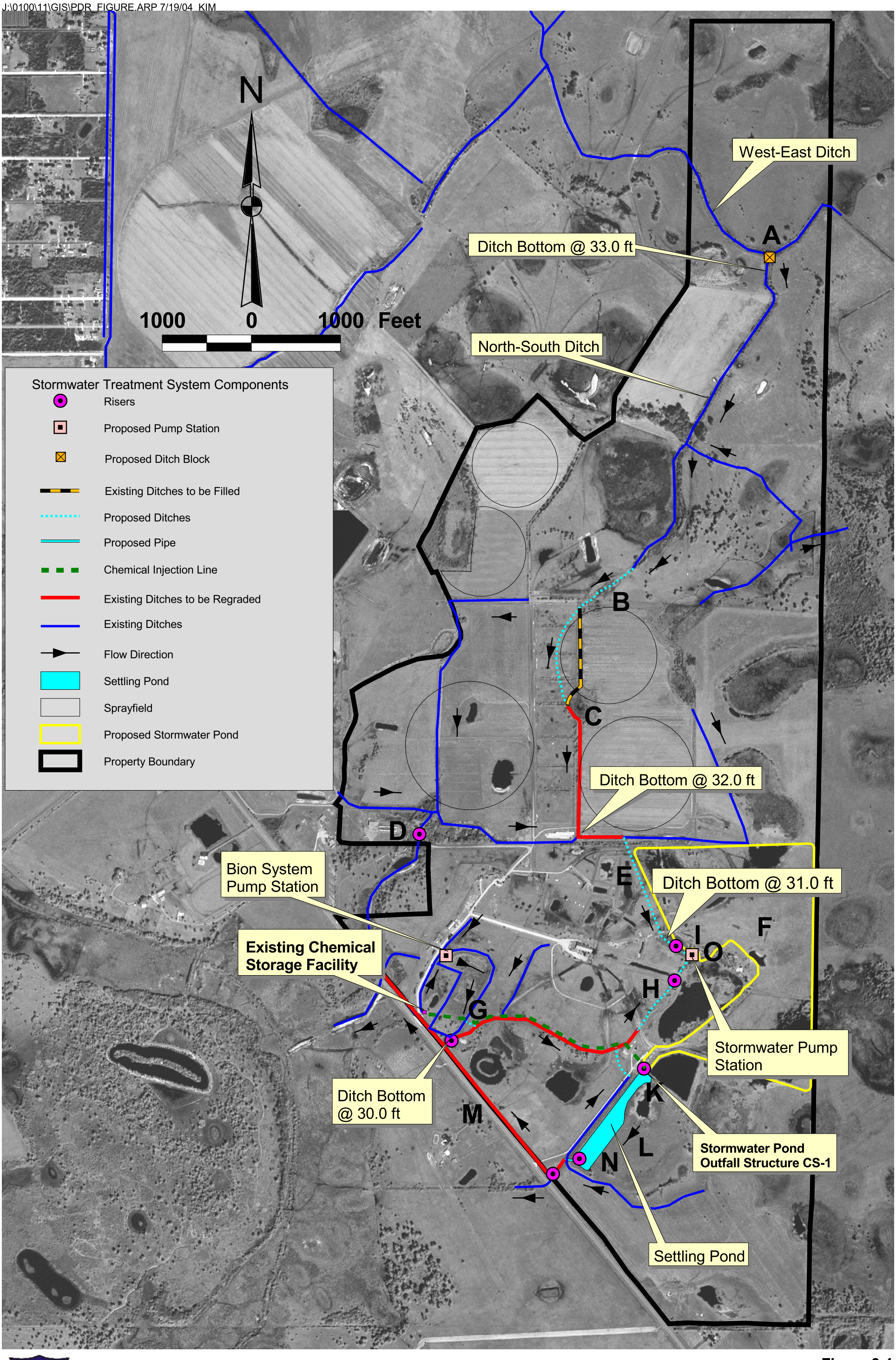

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Figure 3-1
Stormwater Treatment System Components

Northern Portion of the Project Site (Section letters correspond to labels on Figure 3-1):

A. Construction of a ditch block along the northern end of the north-south ditch, to prevent flow from the West-East Ditch from flowing south. The majority of the water from the West-East Ditch is generated outside the study area, and will be bypassed offsite to the existing outfall canal to the east to be discharged into the Taylor Creek Basin.

B. A new ditch, with a bottom elevation of 32 ft NGVD will be constructed to connect the North-South Ditch to the existing Central Ditch.

C. The existing Central Ditch running south along the center of the property will also be cleaned and regraded.

D. Boards will be inserted up to the top of bank into the existing structure located at KREA 49A located along the south end of the existing ditch that runs south along the western edge of the property. The boards will prevent flow from leaving the site, and help redirect the flow to the collection ditch running east towards the Stormwater Pond.

E. A new collection ditch will be constructed to connect the Central Ditch to the pump station; the ditch will have a bottom elevation of 31 ft NGVD.

F. A proposed 87-acre Stormwater Pond is to be constructed east of the barn areas along the eastern boundary of the property. A berm will be constructed along the perimeter of the stormwater pond at a depth of 3 feet, with 2 feet of freeboard. The berm will have 3:1 interior and exterior slopes side slopes. Water level within the berm will be controlled at an elevation of 40.0 ft NGVD.

Southern Portion of the Project Site:

G. To the south, the existing discharge from the Bion system will be eliminated. Stormwater from the pastures and road will be pumped backwards through the Bion System Wetland. Discharge from the Bion System Wetland will then be transmitted via a culvert/riser to a transmission ditch, which will then convey water north to the pump station, and eventually to the Stormwater Pond. This riser will be controlled at an elevation of 33.0 ft NGVD and will also prevent backflow.

H. A new ditch connecting this south transmission ditch to the pump station will be constructed, with a bottom elevation of 30 ft NGVD.

I. The stormwater pump station will transfer water from the collection ditch into the stormwater pond for storage at a rate of 16,500 gpm.

J. The Stormwater Pond will be controlled at an overflow elevation of 40 ft NGVD.

K. Water will exit the Stormwater Pond via 2-72" flashboard risers, be mixed with a coagulant from the chemical injection system, and will flow south to the settling pond.

L. Stormwater will be treated using a coagulant injection system with a 3.1-acre Settling Pond. Treated discharges from the Settling Pond are sent to the existing outfall canals.

M. The treated water exiting the Settling Pond will flow southwest via a proposed ditch and then northwest along US98 before exiting the farm.

N. A Drying Bed will be constructed to the northwest side of the Settling Pond. Sludge will be excavated from the Settling Pond and placed in the Drying Bed where it will dry for a given period of time.

O. The existing irrigation pump will not be modified.

Figures 3-2 & 3-3, along with their associated cross sections (**Figures 3-2A & 3-3A**) compare the existing survey elevations to the proposed construction elevations. These figures illustrate the route that the farm runoff takes through collection, transport to the stormwater pond, transport to the treatment system, and finally to offsite discharge. These figures are color coded in order for the reader to easily follow the proposed stormwater treatment system with its associated components through the farm. Each color represents a particular component of the treatment system. These components include:

- An existing ditch regraded in order to route flow southward (magenta)
- A proposed ditch connecting the major flow channel (turquoise)
- An existing ditch excavated (red)
- A stormwater pond for storage (yellow)
- Existing ditches slightly regraded for smooth flow (blue)

As shown on **Figure 3-2**, through the proposed design a majority of the runoff from the farm will be collected from the northern portion of the property and routed south through the proposed ditch system towards the pumping station located on the west side of the stormwater pond. The remaining runoff is collected from the southern portion of the property and routed north to the pumping station.

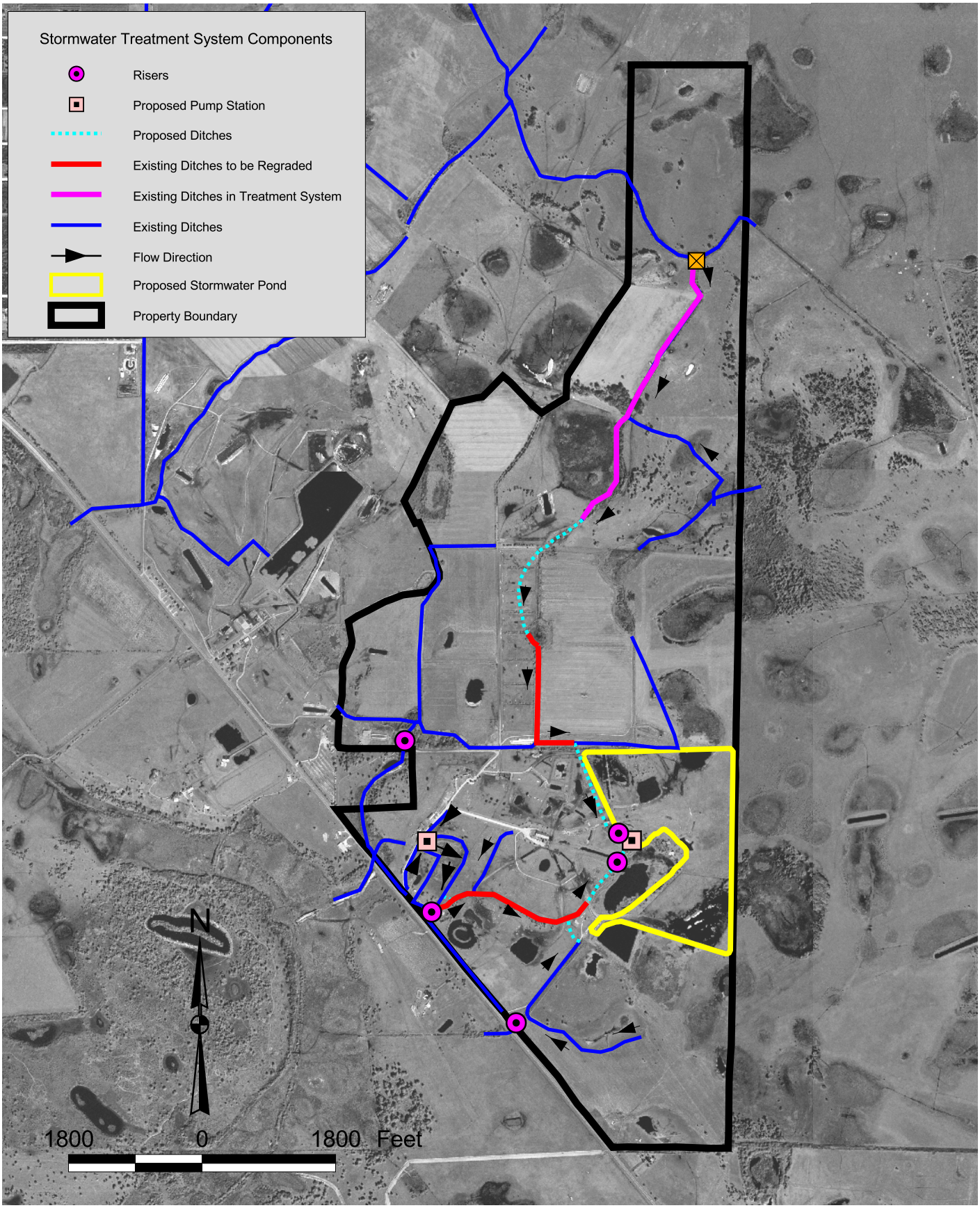

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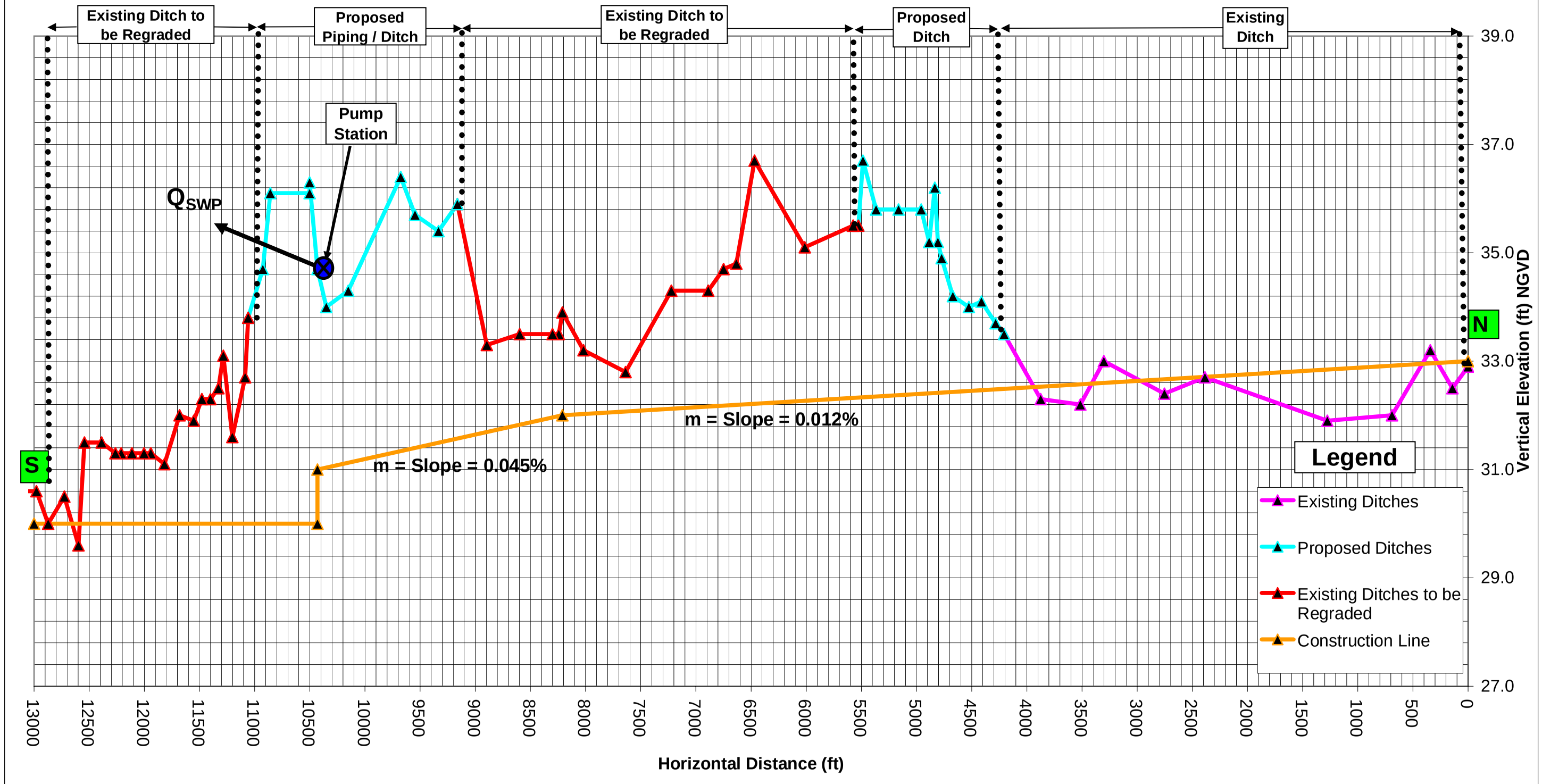
Figure 3-2
Stormwater Treatment System Components - Drainage

Cross Section of Proposed Treatment System - Drainage



NORTH TO SOUTH X-SECTION-DRAINAGE.XLS

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Figure 3-2A
Stormwater Treatment System Components - Drainage

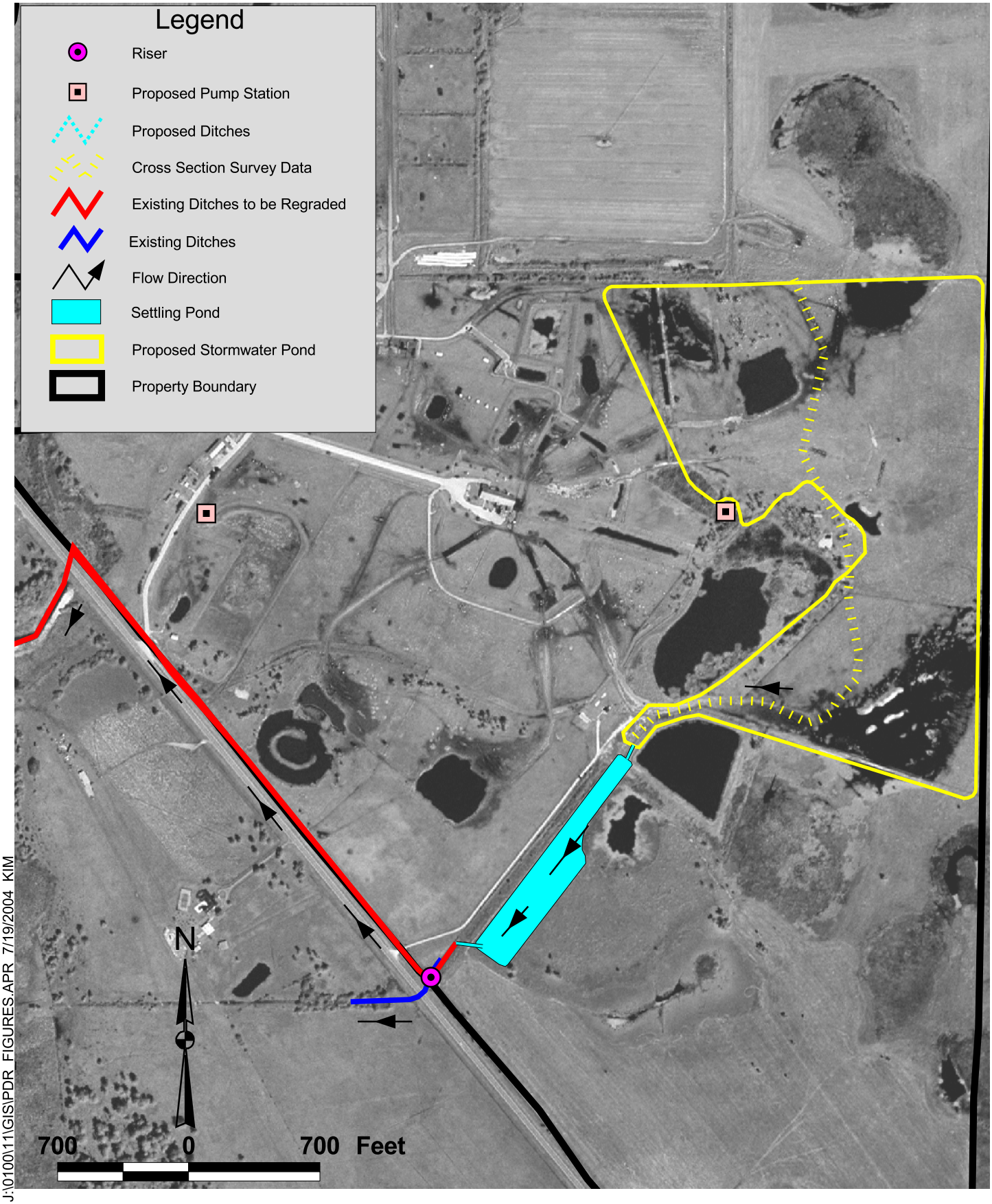

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Figure 3-3
Stormwater Treatment System Components - Discharge

Cross Section of Proposed Treatment System - Discharge

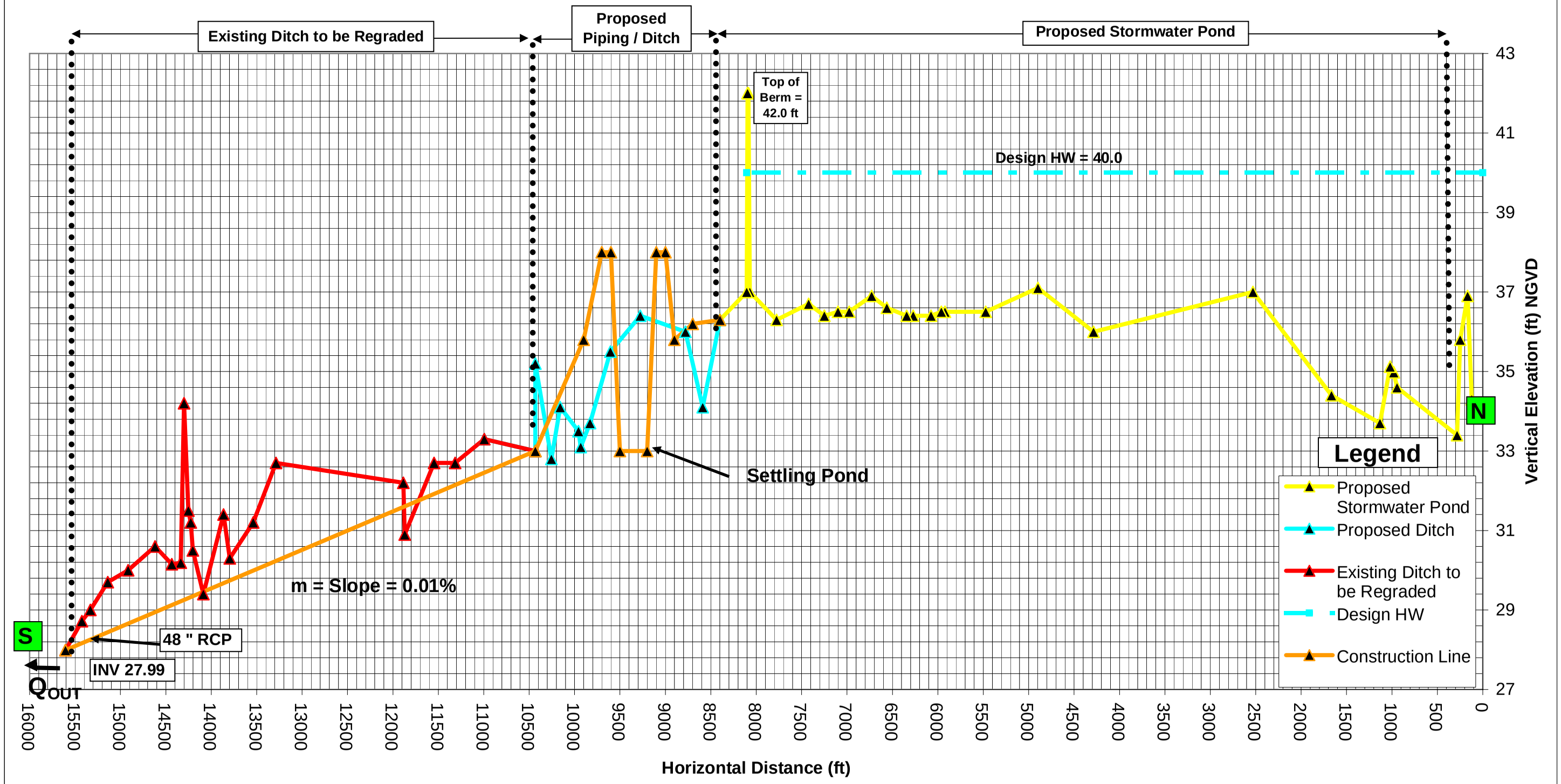

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Figure 3-3A
Stormwater Treatment System Components - Discharge

As indicated on **Figure 3-2A**, a large portion of the treatment system will be excavated in order to achieve efficient flow elevations.

Figure 3-3 shows the route taken by the runoff as it goes through the chemical treatment and finally exits the farm. As indicated on **Figure 3-3A**, very little excavation will need to take place in order to achieve efficient flow elevations. Also shown in this figure is the proposed stormwater pond with top of berm designed to be 42.0 ft. and design high water at 40.0 ft.

Figure 3-4 shows a close up of the proposed stormwater storage pond. This figure was color coded with **Figure 3-4A** in order to show the existing cross section between the middle of the pond and existing wetlands within the area.

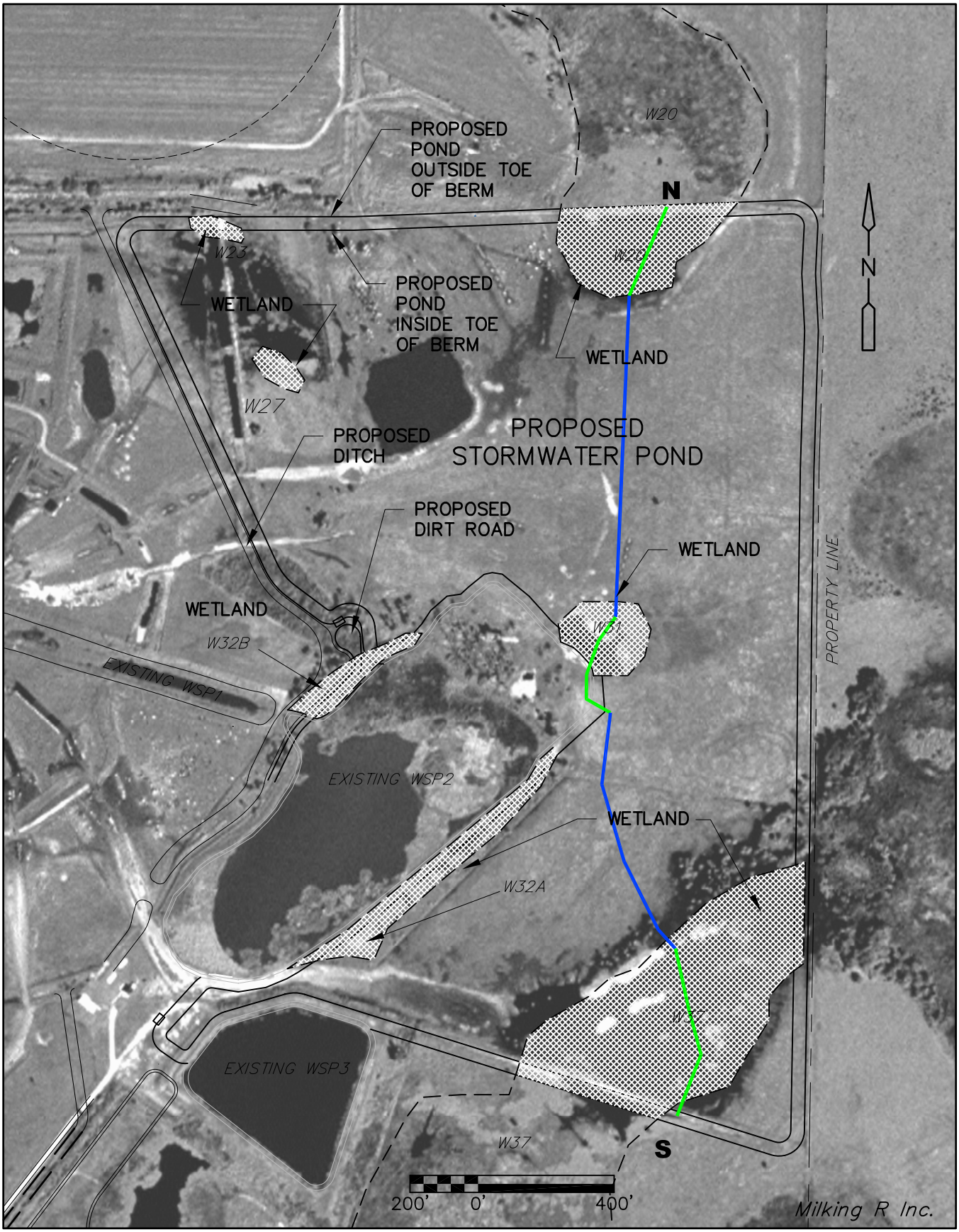

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Figure 3-4
Proposed Stormwater Pond Cross Section

Cross Section of Proposed Stormwater Pond

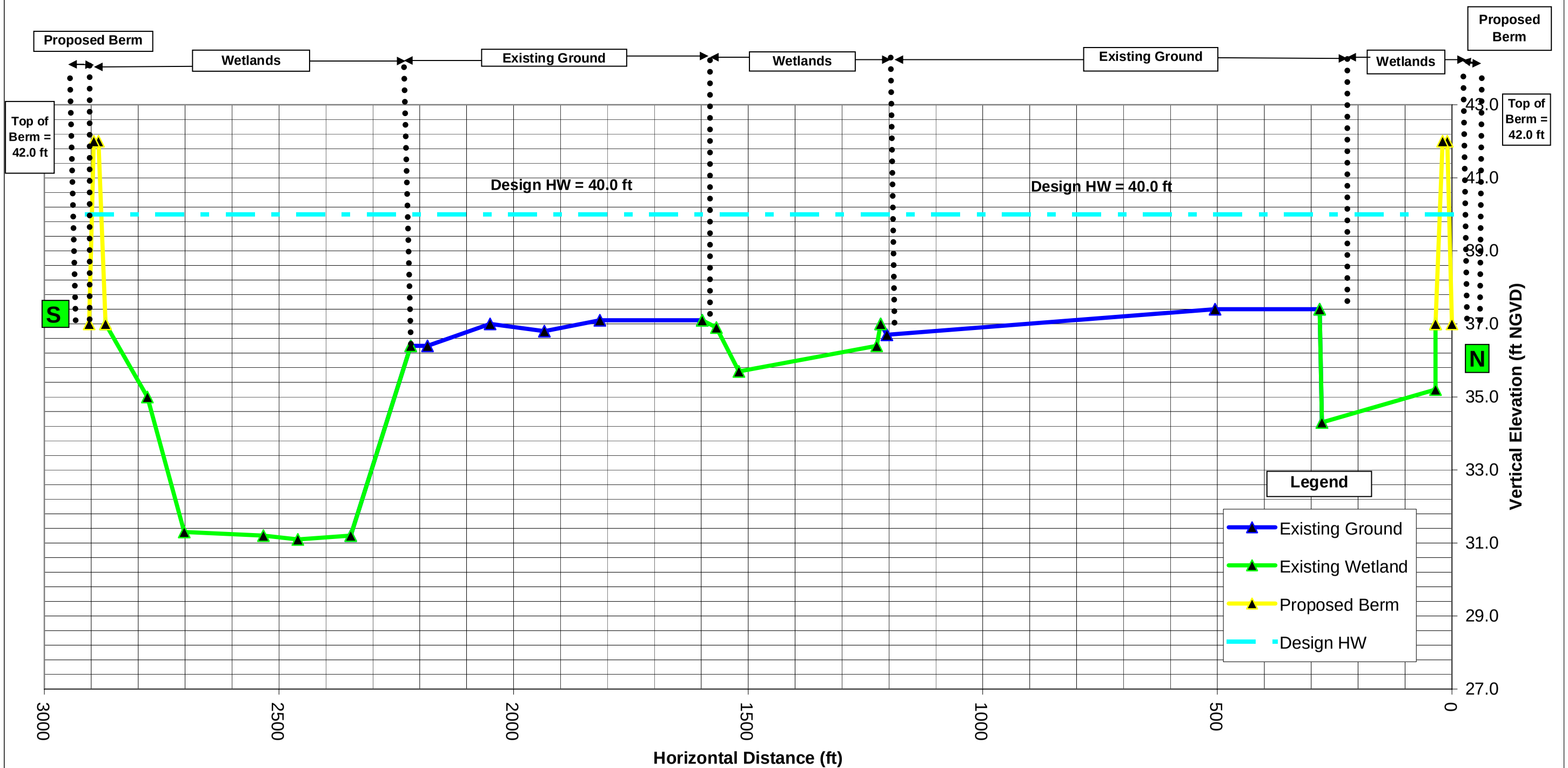

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Figure 3-4A
Proposed Stormwater Pond Cross Section

Section 4
Preliminary Design

4.1 Introduction

The development of the surface water treatment system was an iterative process of trying to balance the project objectives (see Section 1), while living with the limitations of the physical system and budgetary constraints. The physical system shown in Section 2 provided the foundation for the conceptual design presented in Section 3, and for the surface water modeling analysis of the stormwater treatment system presented below. The information gathered for this study and the surface water modeling results provided the rates, volume and anticipated water quality parameters required to design the surface water treatment system.

The surface water quality (nutrient concentrations) for post-construction is difficult to predict. Therefore, water quality from the existing discharges from the site was used to estimate and size the proposed surface water treatment system. Actual variations in water quality, coagulant feed rates, etc. will be addressed in the operationally flexible system proposed as described in the following sections.

4.2 Stormwater Treatment System Modeling

Two different modeling approaches were used to estimate the quantity of surface water runoff to be managed as part of the proposed edge-of-farm treatment system for Milking R, Inc. These models included Win TR-20, and STOWATER. The Win TR-20 model was developed to assist in sizing the stormwater pond, and in sizing the pump station upstream of the proposed stormwater pond. STOWATER was used to determine the quantity of outflow from the stormwater pond and assist in sizing the chemical treatment system. The Win TR-20 system is a batch-process single-event watershed scale surface runoff model which is public domain and was developed by the Natural Resources Conservation Service (NRCS). STOWATER is a program also developed by NRCS that routes drainage water and runoff given a DRAINMOD daily output to a storage reservoir. The program records a daily water balance considering rain, evaporation, drainage, irrigation, sub-basin flooding, reservoir storage, reservoir overflow, dry days, and irrigation deficit on a daily, monthly, and/or yearly basis. The general principles on which these models are developed on are summarized below.

Win TR-20

Win TR-20 generates hydrographs from sub-areas by means of the NRCS hydrograph generation technique using the appropriate rainfall depth (for a specific frequency), rainfall distribution, dimensionless unit hydrograph, drainage area, time of concentration (Tc), and curve number. The program uses a Muskingum-Cunge method of channel routing, and the storage-indication is then used to route structure hydrographs (NRCS, 2002).

STOWATER

STOWATER is a program developed by the NRCS that routes drainage water and runoff from multiple sub-basins given a DRAINMOD daily output file for each sub-basin area to a storage reservoir, and then routs water to multiple irrigation areas given a DRAINMOD output file for each of the irrigation fields. The program records a daily water balance based upon evaporation data. The output from the STOWATER program consist of values for rain, evaporation, drainage, irrigation, sub-basin flooding, reservoir storage, reservoir overflow, dry days, and irrigation deficit on a daily, monthly, and/or yearly basis.

STOWATER computes a daily water balance for the reservoir. Reservoir storage = External inflow + drainage sub-basin inflow (runoff and drainage) + rain on the reservoir – evaporation – irrigation outflow – any overflow. Overflow occurs when the daily inflow minus the daily outflow adds enough water to the reservoir to make the reservoir depth greater than the maximum allowable. The volume above the overflow depth is overflow and removed from the system (NRCS, 1992).

DRAINMOD was developed at North Carolina State University in the mid 1970's. It is based on a water balance in the soil profile and uses climatological records to simulate the performance of drainage and water control systems. The model was developed specifically for shallow water table soils. Approximate methods are used to quantify the hydrologic components: subsurface drainage, subirrigation, infiltration, evapotranspiration (ET) and surface runoff. Complex numerical methods are avoided by assuming a drained to equilibrium state for the soil water distribution above the water table. Inputs to the model include soil properties, weather data, crop variables and site parameters. Soil property inputs include the saturated hydraulic conductivity (by layers), the relationships between drainage volume and water table depth, and information concerning upward flux from the water table. The effective root zone depth as a function of time is also and input (Skaggs, 1999).

4.2.1 Win TR-20 Model

Basin Study Area

Of the basins presented in section 2 that are within the property boundary, Basins 2, 4 and 5 were further divided into sub basins, including Basins 2A-2G, 4A-4K, 4M-4O, 5A-5C, and 6 (**Figure 4-1).** The property boundary on the west side inhibits any flow from entering the system (SWET, 2002a). Surface water runoff from the northern pastures south of the north-south ditch has been routed south towards the stormwater pond. In addition flow from the Bion system has been routed northeast through a new collection ditch to the stormwater pond.

Rainfall Intensities and Quantities

Specified rainfall data were used to generate stormwater runoff hydrographs for each hydrologic unit in the hydrologic model. Observed rainfall data are generally characterized by an amount (depth, measured in inches), intensity (inches per hour), frequency or occurrence (return period, in years), event duration (hours), spatial distribution (local variance), and temporal distribution (time variance). Design storm events are typically named by the return period of the rainfall depth and by the event

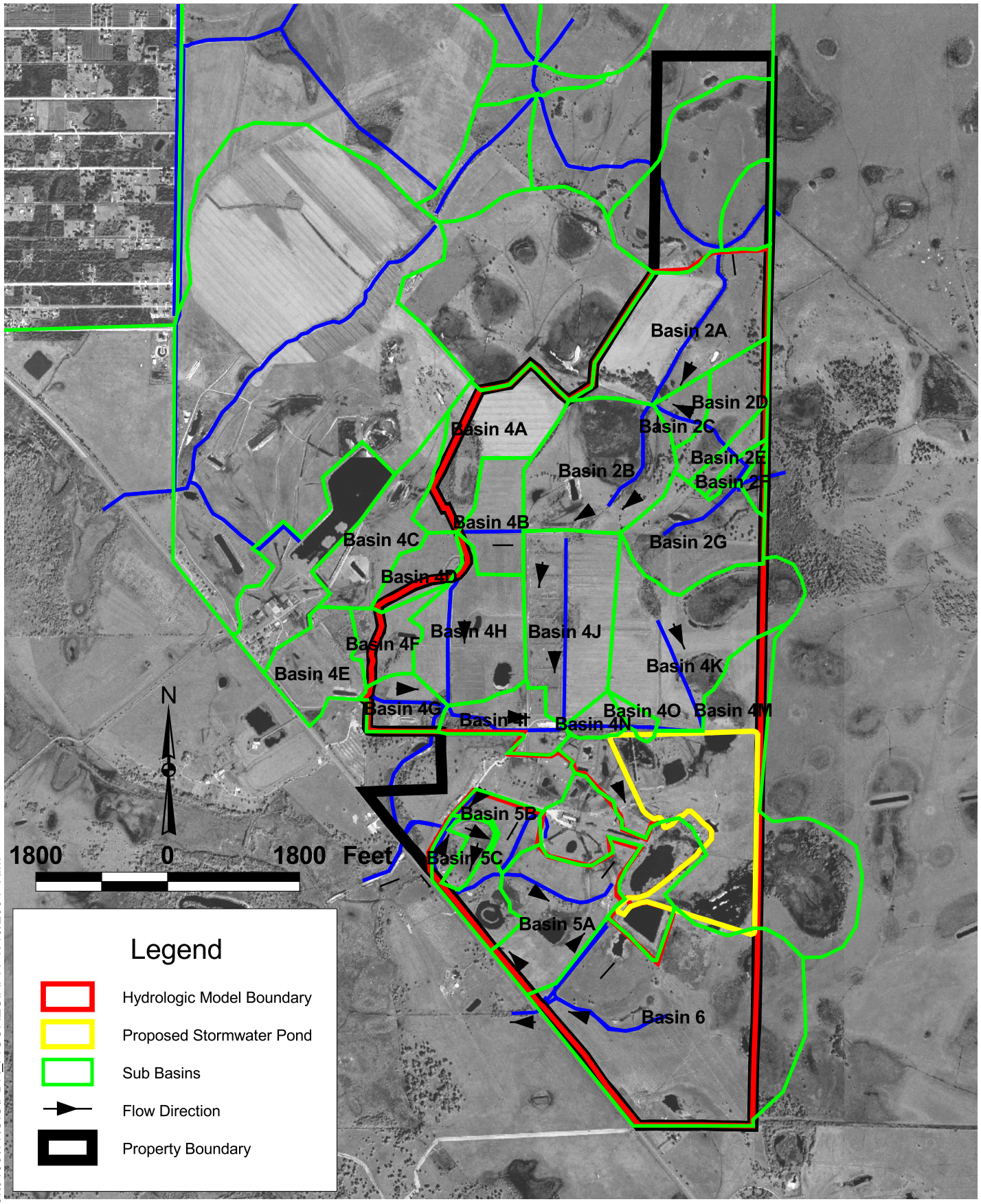

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Figure 4-1
Basin Delineation

duration. For example, a 25-year/8-hour design storm event describes a rainfall depth over an 8-hour period that has a 4-percent (1 in 25) chance of occurring at a particular location in any given year.

For this study, the 3-, 5- 10-, and 25-year design storm events using durations of 24-hours under existing land use and existing hydraulic conditions were simulated. Where available, design storm event depths were derived from rainfall curves included in the "Surface Water Design Aids" section of Volume IV of the South Florida Water Management District (SFWMD) *Environmental Resource Permit Information Manual* (2000). Storm event depths for storm durations that had no rainfall curves available were estimated from the trend shown by available SFWMD curves. Rainfall depths selected for simulations were as follows:

- 3-year return period/24-hour event duration = 4.0 inches of rainfall (SFWMD curve)
- 5-year return period/24-hour event duration = 4.5 inches of rainfall (SFWMD curve)
- 10-year return period/24-hour event duration = 5.0 inches of rainfall (SFWMD curve)
- 25-year return period/24-hour event duration = 6.5 inches of rainfall (SFWMD curve)

Overland Flow Parameters

WinTR-20 uses overland flow data in the form of hydrologic unit widths, average surface slopes, and channel cross section information to create a physically based overland flow plane that generates the stormwater runoff. The overland flow path length was calculated as the average slope over the flow path length and is calculated by dividing the difference in elevation by the hydraulic length. The length and slope data that were estimated from the topographic survey performed for the project are summarized in **Table C-1** of **Appendix C**. In addition, cross sectional data used to describe the individual channel reaches within the sub basins is presented in **Appendix C.**

The soil data presented in Section 2 was used to evaluate stormwater runoff, infiltration, and recharge potential for pervious areas. Information on soil types was obtained from the NRCS Soil Survey of Okeechobee County, Florida (NRCS, 2003). Based on its research, the NRCS has developed soil series and "hydrologic soil groups", which characterize soil types according to their drainage potential. The hydrologic soil group categories are commonly used to evaluate runoff potential from a given soil type. Soils having very high infiltration potential and low runoff potential have been assigned to Hydrologic Soil Group A. Soils with very low infiltration potential and a high runoff potential have been assigned to Hydrologic Soil Group D. Soils included in Hydrologic Soil Groups B through C have infiltration and runoff characteristics that fall somewhere between these two extremes. For the purposes of this study, dual class soil groups (e.g., B/D) were conservatively assigned to the Hydrologic Soil Group with moderate to poorly drained soils being assumed. Therefore, soils that were classified within Group B/D were assigned to Hydrologic Soil Group C.

Existing Land Use and Impervious Areas

Existing land use on Milking R Inc. study area is almost entirely pasture (improved and unimproved), grassland, or wooded area. In addition, the majority of the farm is well drained via an extensive ditch system. Impervious areas within the study area constitute a very small percentage of the total land use and consist primarily of the farm's limerock access road off of County Road 98, the milking parlor, grain silos, various feed barns, etc. Of the land use category options WinTR-20 offers, all basin areas were described as "fair pasture, grassland or range". Thus, since the soils throughout the study area were relatively similar and the majority is moderately to poorly drained, a value of 79 was chosen for the curve number.

Model Results

The hydrograph peak flows, times to peak, runoff amount and runoff volumes for each of the basin areas are presented in **Table C-2** (Appendix C). The 25-yr/24-hr storm was selected for design of the proposed edge-of-farm treatment system. As is indicated in **Table 4-1**, the model estimates that the presented peak flows will result.

As indicated in **Table 4-2**, if all of the runoff from the farm resulting from a 25-yr/24-hr storm were to be impounded, approximately 326.2 acre-feet of storage volume would be required. Similarly, the storage required to impound the runoff from the 10-yr/24-hr storm is 220.5 acre-feet. Since the basins simulated by this model are not high-intensity confined livestock areas, it is not necessary to size the system for the 25-year event. The proposed edge-of-farm treatment system will include a wet detention storage volume of approximately 260 acre-feet, which would correspond to a storm event with a return period of between 10 and 25 years.

As a comparison, according to Section 5.2.1, "Volume Requirements" of the *Basis of Review for Environmental Resource Permit Applications Within the South Florida Water Management District* (August 2000):

"Wet detention volume shall be provided for the first inch of runoff from the (entire) developed project, or the total runoff of 2.5 inches times the percentage of imperviousness, whichever is greater."

If this requirement were applied to the 1060-acre project area, the required wet detention volume would be 88.3 acre-feet.

Table 4-1 Model Results

Basin	Drainage Area (acres)	Peak Flow (cfs)			
		3 yr-24 hr	5 yr-24 hr	10 yr-24 hr	25 yr-24 hr
2A	76.16	50.09	61.19	73.25	108.71
2B	69.76	45.95	56.32	67.25	100.07
2C	10.24	10.34	12.62	14.82	22.11
2D	26.24	28.18	34.23	40.46	60.14
2E	7.04	8.82	10.74	12.71	18.79
2F	5.12	5.37	6.58	7.77	11.51
2G	46.72	39.55	48.25	57.33	85.16
4A	49.28	35.62	43.82	51.9	77.42
4B	24.96	22.83	27.96	33.17	49.29
4C	40.32	32.47	39.86	47.27	70.1
4D	17.28	8.93	11.03	13.01	19.52
4E	30.72	34.97	42.71	50.78	74.8
4F	19.2	17.16	20.97	24.91	37.0
4G	17.28	12.52	15.22	18.14	26.93
4H	55.04	23.05	28.19	33.34	50.28
4I	21.76	13.7	16.86	19.93	29.86
4J	67.2	37.01	45.23	53.91	80.08
4K	71.68	74.48	90.83	106.71	159.13
4M	26.88	33.79	41.13	48.71	72.46
4N	7.04	6.07	7.44	8.77	13.09
4O	3.84	4.04	4.96	5.87	8.66
5A	53.12	24.06	29.48	34.88	52.41
5B	14.08	8.54	10.52	12.48	18.51
5C	14.08	10.03	12.34	14.64	21.69
6	179.2	64.74	79.68	94.89	141.17

Table 4-2 Output Summary

	10-yr, 24-hr	25-yr, 24-hr
Basin Area (ac)	954.2	954.2
Peak Flow (cfs)	366.1	650.2
Time of Peak (hrs)	15.0	15.1
Runoff (in)	2.8	4.1
Runoff Volume (ac-ft)	220.5	326.2
Impoundment Area Needed (ac-ft)	220.5	326.2

4.2.2 STOWATER Model

A DRAINMOD model in conjunction with a STOWATER model was developed to quantify the outflow from the stormwater pond and assist in sizing the chemical treatment system. There are five different types of data files that are needed for STOWATER, including the following (see Appendix C):

1. Evaporation files, which includes the rain and evaporation for the site. This file was generated using rainfall and pan evaporation data obtained from the South Florida Water Management District. Rainfall data from 1960 to 2002 was obtained from the Okeechobee Field Station. Pan evaporation data from 1966 to 1992 for the S65-C station, located in Okeechobee County was used to develop this input file.

2. Drainage file, mlkdrn.sub, containing the path and file names of the daily output from DRAINMOD for the drainage sub-basins and their areas in acres. A total drainage area of 940.8 acres, corresponding to the runoff area to the treatment system was used.

3. Irrigation file, mlkrirr.sub, containing the path and file names of the daily output from DRAINMOD for the irrigation areas, the irrigation system type, irrigation depth, and irrigation efficiency for each of the irrigated areas. While this file is a necessary input for STOWATER the irrigation values were adjusted to an application rate of 0 inches. Thus, no water was exported from the pond for irrigation.

4. DRAINMOD daily output files for the drainage area, MilkR.day. A discussion of the assumptions used in the DRAINMOD simulation is discussed below.

5. DRAINMOD daily output files for the irrigated area, MilkRIrr.day. While this file is also a required input file for STOWATER values were adjusted to force irrigation to zero.

In addition to the aforementioned data files, the program also requires the following information:

1. Inflow from external sources (i.e. washwater) to the reservoir in gallons per day. There are no external sources to the pond from the washwater, etc.

2. Drainage rate from the drainage areas (i.e. pumping rate) in gallons per minute. Runoff from the drainage area is routed to the stormwater pond via open channel flow and is then transferred to the pond at a rate of 16,500 gpm via a pump station.

3. Surface area of the reservoir in acres. The total reservoir area at the control elevation was computed as 78.8 acres.

4. Overflow depth in the reservoir in feet. The design headwater elevation in the stormwater pond is 40 ft NGVD, this provides approximately 3-feet of storage in the basin. However, the reservoir volume is calculated by reservoir surface area times the height. Since the reservoir is

non-uniform, the overflow depth was adjusted from 3-ft to 2.9573-ft to account for the irregular shape of the pond in order for the total storage volume to meet the actual storage volume.

A simulation period of January 1966 to August 1992 was used. This 26.67 year time period was limited to the pan evaporation data available.

The following input data and assumptions were used in the development of the DRAINMOD model:

1. Soil Type – Immokalee (modified with a compaction layer near the surface). The soil data input file IMM36.sin developed by NRCS for Immokalee soils was used.

2. Weather data consistent with that used and described above for STOWATER was used. The same rainfall data for the Okeechobee Field station was used in the DRAINMOD model. In addition, the pan evaporation data from the S65-C station, with a pan coefficient of 0.73 (NOAA Technical Publication NWS-34) was used to develop the Potential ET input file for DRAINMOD.

3. The majority of the farm is well drained with field ditches with an average of 100 ft spacing located in the fields. Most ditches are 2.5 ft deep with 2:1 side slopes and a bottom width of 8 feet. These values were used in the development of the DRAINMOD model.

Model Results

The STOWATER models results are presented in Appendix C. The "OVERFLOW" output term from STOWATER represents the outflow from the stormwater pond, and thus the quantity of water to be treated through the proposed chemical treatment system. As indicated in the daily output file presented in Appendix C over the 26 year simulation period there are 1,159 daily overflow events from the stormwater pond, with an average outflow of 1,685 gpm, and a maximum outflow of 18,427 gpm. These values were used to determine the treatment rate for the chemical treatment system, which is discussed later on in this section.

4.2.3 Summary of Results

The results of the modeling conducted for the proposed stormwater treatment system are as follows:

1. The TR-20 model results indicate that the total runoff volume for a 25-yr/24-hr storm is 240.3 ac-ft. As discussed in Section 4 the proposed stormwater pond has a total storage volume of 260 ac-ft, more than sufficient to contain this design storm.

2. Model results from STOWATER indicate that outflow from the stormwater pond varies greatly, with a maximum outflow from the stormwater pond of 18,427 gpm, and 1,159 overflow events over the 26.67 years simulation period. Thus, the chemical treatment system should be sized to handle variable flow events, while still providing treatment for larger events.

4.3 Summary of Design Criteria and Assumptions

The design criteria and assumptions used for the design of the surface water treatment systems are listed below:

- The stormwater storage area and treatment capacity were sized based on the portion of the farm located south of the proposed northern ditch block, which is approximately 949.5 acres.
- Stormwater storage area = 80 acres
- Maximum duration of inundation of fields north of the pump station during a 25-yr/24-hr storm of 3 days
- The treatment system must allow for drying the flocculent sludge.
- The chemical treatment system must use alum as its coagulant.

4.4 Treatment Design

A chemical treatment system was designed for Milking R, Inc. based on the analyses and design criteria presented above. The design plans for the proposed system are provided in **Appendix D**, and are discussed in more detail below.

4.4.1 Pump Sizing and Selection

The stormwater pump station was sized such that the total cumulative runoff volume for a 25-yr 24-hr storm could be pumped into the stormwater pond in a three day period. Therefore, a single pump would have to pump 16,500 gallons of water per minute (GPM).

The head requirements for the pump are low, approximately 10 feet. As a result, two 20-inch axial flow pumps were selected. These pumps are inexpensive and require little to no maintenance. The electric motor for each pump was sized at 40 horsepower (HP). To decrease the startup electrical requirements, a multi-stage starter will be added to each pump. Having two pumps in the system not only provides for redundancy it also enables the system to run one pump during typical low flow conditions while having a total capacity to meet extreme events.

The pumps will be activated by float level switches. The first pump will activate on the (low on) control set point. The second pump will activate on a second higher (high on) control set point. A third even higher set point (high alarm) will activate a flashing light and alarm. The alarm system will be provided with a battery backup system that will automatically turn on during electrical failure. When both pumps shut off, the pumps will cycle between being the first and second pump. The two features, 1) rotating pumps to the first pump, and 2) allowing for two pumps to run at the same time, can be manually turned off as desired by the operator.

The initial control set points are:

Low On	= 30.5	feet NGVD
High On	= 31.5	feet NGVD
High Alarm	= 32.5	feet NGVD
Off	= 30.25	feet NGVD

The electrical service to the motors shall also have a double disconnect fused generator panel to provide the future placement of a permanent backup generator (automatic disconnect switch) or a temporary (manual disconnect switch).

4.4.2 Flocculent Feed Rates and Storage

As previously discussed the proposed stormwater treatment system will reroute a portion of the site flow currently discharging to the S-191 basin to the S-154 basin. As indicated in Table 2-1, the average P concentration of runoff to the S-154 basin at KREA33 and KREA49 is 5.6 and 5.3 mg/L, respectively. The runoff currently discharging through KREA32C has an average P concentration of 2.6 mg/L. Since the proposed design will reroute a portion of the discharge from KREA32C, south to KREA49, the average inflow P concentration used to design the chemical treatment system was assumed to be 5 mg/L. The contributing runoff area to the proposed system will differ considerably from the existing system. Therefore no jar testing was conducted since the water tested would not be representative.

Preliminary chemical dose requirements were instead computed assuming a residual P concentration after treatment of 40 ppb. In addition, a 15% reduction in P was assumed to occur through settling in the stormwater pond prior to chemical treatment. Thus the initial P concentration to be chemically treated was assumed at 4.25 mg/L P. Based on the both stoichiometric relationships and empirical data presented by the Water Environment Federation in their special publication *Biological and Chemical Systems for Nutrient Removal*, a chemical dose of 40 mg/L Aluminum would be required (WEF, 1998). This value is subject to change depending upon the results of the jar testing to be completed after construction. Other assumptions are as follows:

- Phosphorus concentration of runoff = 5 mg/l (SWET, 2001).
- Total average annual overflows from the stormwater pond equals 104 million gallons (from STOWAT modeling results)
- Alum will be purchased in liquid bulk at a delivered cost of $0.60 per gallon to be delivered in 4,000-gallon tanker trucks
- Alum density = approximately 11.14 pounds per gallon (specific gravity=1.335),
- 4.2% Aluminum in liquid alum solution

- At 40 PPM Aluminum, the alum feed rate equals 6.06 gallons per minute for each of the 8,500 gallon per minute flow from the stormwater pond discharge pipes.

The coagulant feed pumps were sized to meet the anticipated injection rate of 6.06 gallons per minute. A safety factor of 10 was used to select and size the variable speed pump required for this task. The feed pumps will inject the liquid coagulant directly into the stormwater pond control structures discharging to the settling pond. Turbulent flow in the discharge pipes will provide for excellent mixing of the coagulant.

The alum injection rate will be proportional to the amount of flow from the stormwater pond. As the elevation in the pond increases, the injection rate of alum will increase proportionally based on the rating curves of the discharge structures. The programmable injection system will allow for variable alum concentration injection.

Based on the above assumptions, the total yearly alum requirements were computed using the total yearly flow to the chemical treatment system predicted in the STOWAT modeling (See **Table 4-3**).

Table 4-3
Chemical Treatment System Design Flows

YEAR	RAIN (in)	PMP-INF (ac-in)	WSP-EVP (in)	MAX-STOR (ac-in)	OVERFLOW (Mgal)	ALUM DOSE (gal)
1966	60.2	20,812	28	2,796	486	347,024
1967	31.9	0	29	2,571	0	0
1968	62.7	15,919	28	2,796	386	275,421
1969	62.4	12,216	28	2,796	326	232,672
1970	58.2	12,958	31	2,796	341	243,512
1971	45.3	4,652	24	2,796	109	77,863
1972	33.4	1	30	2,781	0	0
1973	28.6	0	28	1,460	0	0
1974	44.1	3,125	29	2,796	13	9,313
1975	30	0	32	2,524	0	0
1976	49.6	2,403	30	2,770	0	0
1977	39.7	0	30	2,514	0	0
1978	54.1	1,604	28	2,602	0	0
1979	53.3	8,934	29	2,796	224	159,848
1980	40.3	0	29	2,597	0	0
1981	33.8	0	28	1,608	0	0
1982	54.3	1,564	27	1,655	0	0
1983	69.4	20,764	27	2,796	531	378,627
1984	33.1	895	26	2,796	20	14,046
1985	37.4	0	27	2,025	0	0
1986	47.7	405	28	1,078	0	0
1987	45.9	127	27	729	0	0
1988	46.5	5,034	28	2,796	65	46,565
1989	46.4	5	31	2,410	0	0
1990	45.6	9,225	28	2,796	205	146,565
1991	47.7	1,579	28	2,796	21	15,115
1992	46	3,640	22	2,796	84	59,695
AVG	46.2	4,662	28	2,432	104	74,306
MAX	69.4	20,812	69	2,796	531	378,627
MIN	28.6	0	22	729	0	0

Currently all the reuse needs of the farm are being provided from the existing waste storage ponds, therefore no reuse from the stormwater pond was simulated. As indicated on Table 4-3, a total of 74,306 gallons of alum are required in an average year.

The existing BION chemical storage tanks will be used in this project. Currently there are four storage tanks with a capacity of 2,100 gallons each and one 1,600-gallon tank. As such, the total chemical storage available is 10,000 gallons. A 1.25-inch schedule 40 PVC pipe will be used to convey the chemical coagulant stored in these tanks to the outlet of the stormwater pond (control structure CS-1).

4.4.3 Sizing of Settling Ponds

The sizing of the settling ponds was based on several limiting factors:

- Maintain a minimum distance of 100 feet from the wetland located east of the proposed ponds.
- The width of the pond could not exceed 106 feet from the tops of the banks. This would allow a long-arm excavator to easily remove the settled material.
- A tractor and spreader and semi-truck access to load the precipitated waste sludge limited the turning radius of the berms.
- The average velocity of the flow through the pond must be slow enough to allow for a 4 hour detention time throughout the flow profile.
- A maximum design flow from stormwater pond to the settling pond based on the discharge from the stormwater pond of a 25-yr 24-hr design storm, assuming the stormwater pond was already full. Approximately 26,000 gpm.
- A top of berm elevation of 38.5 feet NGVD. The pond shall have a maximum operational elevation of 37.5 feet NGVD, with a control elevation of 36.0 feet NGVD. The resulting operational depth of the pond under the aforementioned maximum design flow of 26,000 gpm will maintain 1 foot of freeboard.

As indicated in the design plans, the dimensions of the settling pond are 1200 feet long with an average width of 100 feet. Based on these dimensions and a maximum design elevation of 37.5 feet NGVD, outflows from the stormwater pond which are less than 11,200 gpm will have a minimum settling time of 4 hrs, with 100% treatment. Outflows from the stormwater pond greater than 11,200 gpm will have a reduced settling time proportional to the flow above this amount. For instance, at the maximum computed outflow from STOWATER of 18,427 gpm retention time is reduced to 2.4 hours. While retention time is reduced for larger outflows, they will still receive 100% treatment.

4.4.4 Flocculent Accumulation Volumes

On average a total of 104 million gallons will be treated in the settling pond, with a total alum usage of 74,306 gallons per year. Solids generation due to alum injection can be estimated as 0.13 lbs dry solids per 1 lbs liquid Alum (General Chemical, 2004). Thus, in an average year 107,616 lbs dry solids are generated due to alum injections.

In addition to the precipitates generated above, suspended solids in the treated water are also settled out with the flocculent. A common estimation of solids generation per gallon of water treated is 83lbs of dry solids generated per each 10 NTU of turbidity (Cornwall, et al., 1987). Based on water quality data for KREA49 the turbidity at the site is approximately 30 NTU. Thus solids generation is estimated at 25,896 lbs (83lbs/Mgal * 30NTU/10NTU * 104 Mgal).

Thus, a total of 133,512 lbs of dry solids are generated yearly. Based on a wet sludge composed of 2% solids, the total volume of sludge accumulated in the settling ponds is approximately 107,000 cubic feet. Thus the annual accumulation depth of sludge in the pond, on average is 7-inches, based on an average pond area of 183,094 square feet.

4.4.5 Structures

The existing pole barn structure will be used to cover the coagulant storage tanks. In addition, a new electrical panel will be placed in this structure. The pad and building size is 30 feet by 20 feet.

4.4.6 Estimated Performance of the EOF Treatment System

The contributing runoff area to the proposed system will differ considerably from the existing system, therefore no alum dosing using jar testing was conducted. Instead, preliminary chemical dose requirements and P reductions were computed based on both stoichiometric relationships and empirical data presented by the Water Environment Federation in the publication *Biological and Chemical Systems for Nutrient Removal* (WEF, 1998). In addition, a 15% reduction in P was assumed to occur through settling in the stormwater pond prior to chemical treatment. Thus the performance values presented below in Table 4-4 are estimates based on stoichiometric relationships and empirical data. These values are subject to change depending upon the results of the in-situ jar testing to be completed after construction.

As indicated in Table 4-4, for a dry year, there is no outflow expected from the stormwater pond due to the storage capacity of the pond. Thus, a 100% reduction in P concentrations would result. Under a wet and average year 100% treatment of the stormwater pond outflow will occur. According to the results from the STOWAT modeling, over the rainfall period of record, the maximum outflow from the pond was 18,427 gpm. At this outflow rate the settling time through the settling ponds will be

reduced from 4 hrs to 2.4 hrs, which is sufficient time for effective settling of solids. Thus, even under high flow events 100% treatment will occur.

Table 4-4
Estimated Performance of the EOF Treatment System for Milking R, Inc.

Year	Dry	Wet	Avg
System Information			
Inflow Volume (ac-ft/yr)	77	1910	510
Inflow Volume (Mgal/yr)	25	622	166
Inflow P Concentration (ug/L-P)[A]	5000	5000	5000
Treatment System Inflow (lbs-P/yr)	1043	25954	6927
% Treated (Less Bypassed Runoff)	100	100	100
% Water Reuse	0	0	0
P Concentration Reduction in Pond (%)	15	15	15
Total Outflow P Concentration (Bypassed + Treated)			
Stormwater Pond Outflow (ac-ft/yr)	0	1629	320
Stormwater Pond Outflow (Mgal/yr)	0	531	104
With Chemical Treatment to 40 ppb (ug/L-P)	0[B]	40	40
With Chemical Treatment to 100 ppb (ug/L-P)	0[B]	100	100
With Chemical Treatment to 40 ppb (% red.)	100%	99%	99%
With Chemical Treatment to 100 ppb (% red.)	100%	98%	98%
Treatment System Outflow @ 40 ppb (lbs-P/yr)	0[B]	177	35
Treatment System Outflow @ 100 ppb (lbs-P/yr)	0[B]	443	87
Total P Removed			
With Chemical Treatment to 40 ppb (lbs-P/yr)	1043	25777	6892
With Chemical Treatment to 100 ppb (lbs-P/yr)	1043	25511	6840

[A] Based on District dairy monitoring data
[B] No flow condition

4.5 Operations and Maintenance Considerations

4.5.1 Operation of the Treatment System

Coagulant Tanks – The coagulant tanks will need to be filled as the chemicals are used. Multiple chemical supply companies will be identified for competitive bid for the coagulant. Alum is a common chemical and is readily available from multiple locations and vendors.

Treatment Center Inspection – Weekly inspections of the stormwater storage area, control structures, and treatment pumps should be done.

4.5.2 Maintenance of the Treatment System

Since there is only one settling pond, it can not be taken out of service without affecting the design treatment capacity of the overall system. Transfer of the sludge from the bottom of the settling pond to the drying bed should take place annually as the sludge accumulates. This may be accomplished using a wet agitated PTO pump operating between the settling pond and the drying bed. A less efficient approach is to use a long-arm excavator to scrape the sludge and stockpile within the drying bed. The land owner or custom hauler will then load and spread the material, at approved agronomic rates, to his fields. The spreading of the material could be as simple as a pull-behind manure spreader, or a commercial auger-fed truck.

Based on the anticipated accumulation rates of the alum, the ponds will need to be cleaned about every 10 years. However, annual cleaning will spread the cost of alum removal over several years instead of once in 10 years. There are other potential uses or disposal options for the alum sludge, but these must be approved by FDEP prior to use. For example, the cleaned material from the bottom of the pond could be used as a road surface stabilization material or provide an excellent, low cost, soil amendment to supplement natural sands for filling of existing cooling ponds and pasture non-wetland depressional areas.

4.6 Additional Considerations

4.6.1 Design

The design of the surface water treatment system presented in this section of the report was based on information gathered from previous studies and data collected for this project. Additional data and investigations (jar testing) should be gathered to more accurately estimate the coagulant requirements of the system during actual storm events. Once the system is operational water samples will be taken to optimize the chemical treatment system.

4.6.2 O&M

An operations and maintenance manual should be prepared to assist the land owner with the operation of the system. The proposed surface water treatment system was designed specifically with low maintenance in mind. However, successful operation of the system will require regular monitoring and maintenance.

4.6.3 Permitting

Milking R, Inc. currently operates under Florida Department of Environmental Protection (FDEP) industrial waste permit (No.10-47-175927). A request to modify this permit to incorporate the changes outlined in the Comprehensive Nutrient Management Plan has been submitted to FDEP for approval.

According to conversations held with FDEP, the South Florida Water Management District and Dr. Del Bottcher, the proposed improvements to the project site outlined in the preliminary design will fall under this existing permit, with the exception of an Army Corp of Engineers Dredge and Fill permit. All other permit issues associated with the construction of this project will be addressed in future permit modifications.

When comparing the 1999 NRCS wetlands determination presented in Section 2 with the proposed improvements, it is estimated that approximately 13.39 acres of wetlands will be encompassed by the proposed stormwater pond. However, it is anticipated that the status of these existing poor quality wetlands will improve with their incorporation into the stormwater treatment area. Therefore, the SWET project manager and SFWMD staff have indicated that wetland responses should not be a limiting factor in the design and construction of the proposed system. A permit application has been submitted to the United States Army Corps of Engineers (ACOE) regarding these proposed wetland areas and has gone through a preliminary review. As part of this review process the ACOE requested that a Caracara survey be completed of the proposed project construction area.

As a result, C&N performed a Crested Caracara survey per FFWCC recommendations of once a day for three consecutive days, repeated again in two weeks, and again in four weeks. Surveys were conducted on January 10th -12th, January 27th-29th, and March 1st – 3rd. Crested Caracara nests were not observed during this survey, none of the palm trees surveyed contained any previous nesting material or new. Details on this survey are included in the Crested Caracara survey report presented in Appendix B. **Figure 4-2** shows the approximate wetland areas located within the proposed stormwater pond.

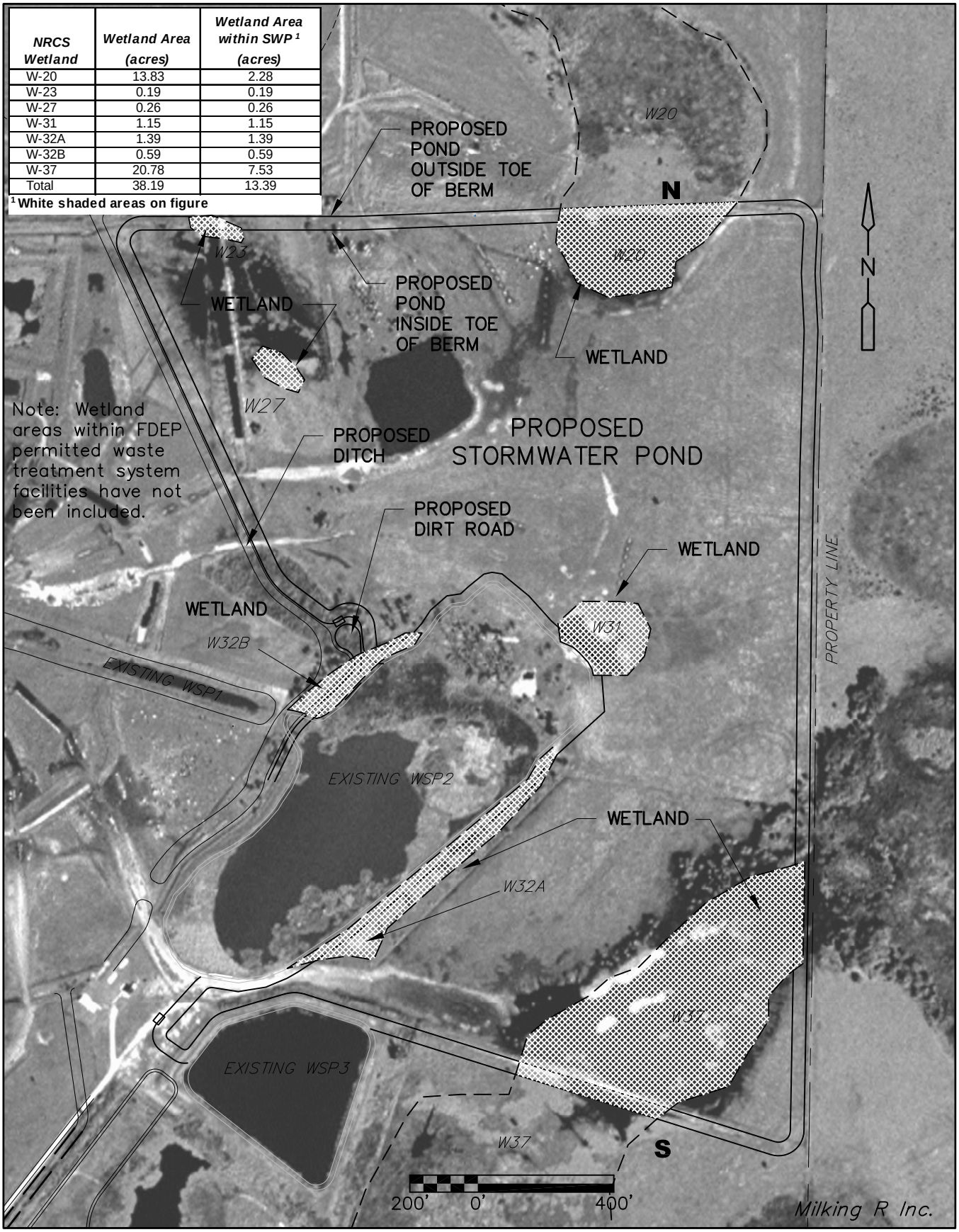

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Figure 4-2
Wetland Area within Stormwater Pond

Section 5
Cost Estimate

5.1 Cost Estimate

Table 5-1 provides a summary of the cost estimate for the construction of the proposed treatment system described in the previous sections. In order to make the proposed system more affordable, only one stormwater pump will be installed. The canopy that will cover the pump station is also not included in this estimate. The additional pump and canopy will be provided at a later date by the owner at their discretion. A detailed cost estimate is provided in **Appendix E**.

As indicated, the total construction cost is estimated at $447,500. The total project budget is not to exceed $575,000. Costs for engineering, surveying, T&E studies and permitting are estimated at $140,000, thus resulting in a project deficit of $12,500. It is anticipated that this difference will be made up by working with the various contractors using value engineering during construction.

Table 5-1
Cost Estimate

	Work Item / Descriptions	Cost ($)
1	**GENERAL REQUIREMENTS**	**$30,500.00**
	SURVEYING	
	ADMINISTRATION	
	QUALITY CONTROL	
	COMMISSIONING	
	BONDING	
2	**SITE PREPARATION**	**$6,000.00**
	DEWATERING	
3	**EARTHWORK & GRADING**	**$275,000.00**
	CLEARING AND GRUBBING	
	EXCAVATION DITCHES	
	EXCAVATION FOR BERMS	
	PLACEMENT & COMPACTION	
	GRADING AND FINISH WORK	
	SOIL/TURF STABILIZATION	
	SODDING & GRASSING	
	INSTALLATION OF CULVERTS AND RISERS	
4	**STORM WATER DRAINAGE SYSTEM**	**$59,000.00**
	CULVERT PIPES	
	CONTROL STRUCTURES / RISERS	
5	**PUMPS AND CHEMICAL TREATMENT EQUIPMENT**	**$62,000.00**
	STORMWATER PUMP TO SW POND	
	ENTRANCE ROAD STORMWATER STATION	
	CHEMICAL TREATMENT PUMPS	
	PUMP COVERS	
6	**CONCRETE**	**$15,000.00**
	ENERGY DISSIPATORS	
	CONCRETE SUMP	
	TOTAL	**$447,500.00**

5.2 Estimated Annual O&M Costs

Table 5-2 provides a summary of the estimated annual Operation and Maintenance (O&M) costs for this project.

Table 5-2
Estimated Annual Operation & Maintenance Costs

Item No.	Description of Item	Quantity			Unit	Unit Cost	Annual Cost, $/yr		
		Min	Avg	Max		$/Unit	Min	Avg	Max
1	Pump Electrical Demand	1,474	9,729	36,421	kwh	0.1	147	973	3,642
2	Alum Chemical	0	74,306	378,627	gal	0.6	0	44,584	227,176
3	Sludge Disposal (12% Solids)	0	660	3,366	yd^3	2.5	1,651	1,651	1,651
4	Labor to Operate	208	416	624	hrs	25	5,200	10,400	15,600
5	Labor for Dike Mowing	192	192	192	hrs	75	14,400	14,400	14,400
	Total Annual Cost						21,398	72,008	262,469

Note: Costs based on 2004 rates, no cost of living expenses are included.

In order to procure the alum at the best possible cost, it will be purchased in 4,000-gallon lots to be delivered by a chemical tanker truck. The existing chemical storage tank will be required for this operation.

Chemical costs are estimated at $44,584 and $227,176 for an average and maximum rainfall year, respectively. Under a minimum rainfall year it is estimated that sufficient storage will be available in the stormwater pond to contain the runoff from the site, without outflows into the chemical treatment system. Typical annual electrical costs for the operation of two 40 HP pumps, at an electrical cost of $0.10 per kilowatt hour, are estimated at $973, $3,642, and $147 for average, maximum and minimum rainfall years, respectively.

The total operation and maintenance costs associated with this design are as follows:

- Labor/machine costs for mowing containment berms = $14,400/year (16 hours/month at $75/hour).

- Labor costs for regular maintenance and operation of the chemical injection system are based on a rate of $25/hr, and an anticipated labor time of 4, 8 and 12 hours per week under minimum, average, and maximum rainfall years, respectively. The total annual labor costs are estimated at $5,200, $10,400 and $15,600, for minimum, average and maximum rainfall years, respectively.

- The flocculent removal and disposal costs is assumed to be $2.50/yd^3 of dried flocculent volume (12% solids) and assumes the dewatered flocculent is retained and land spread onsite. It is estimated that flocculent will accumulate in the settling ponds at a rate of 0.6 and 3 feet per year, under an average and maximum rainfall year, respectively. The settling pond is designed with a pond bottom elevation of 23.0 feet NGVD, settling times were computed based on 3 feet of storage, based on an average floc accumulation rate of 0.6-feet per year, it is anticipated that the pond will need to be cleaned out approximately every 10 years. The removal costs presented in Table 5-2 below are based a total disposal cost of $16,510 at the end of ten years, resulting in an annualized cost over the ten year period of $1,651 per year.

  The total estimated operation and maintenance costs for a minimum, average and maximum rainfall year are $21,398, $72,008 and $262,469, respectively.

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Section 6
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Appendix A
NRCS Wetlands Determination

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Appendix A
NRCS 1999 Wetlands Determination

Appendix B
C&N Environmental Consultants Preliminary Endangered and Threatened Species Survey and Literature Review

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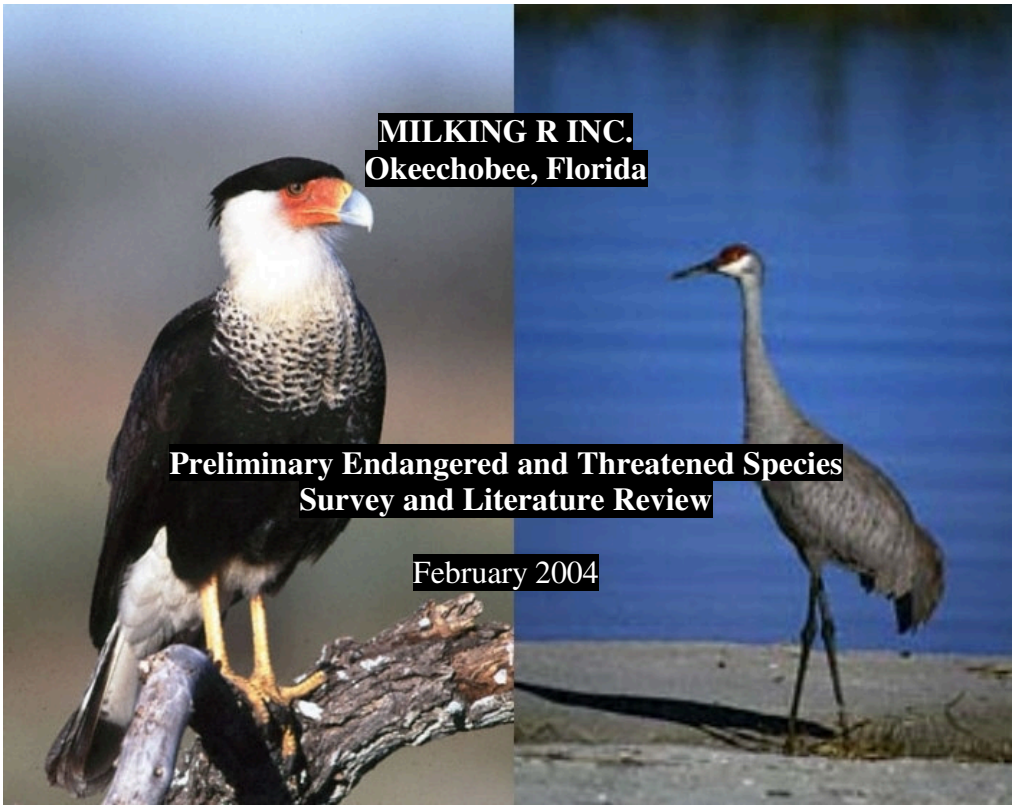
Crested Caracara Survey

Preliminary Endangered and Threatened Species Survey and Literature Review



MILKING R INC.
Okeechobee, Florida

Preliminary Endangered and Threatened Species Survey and Literature Review

February 2004

Prepared for:

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Milking R Inc.
Okeechobee County, Florida

Preliminary Endangered and Threatened Species
Survey and Literature Review

1.0 INTRODUCTION

The following report documents the findings of a preliminary survey based upon a literature review pertaining to endangered and threatened species that could potentially occur within the vicinity of the Milking R Inc. The project area for which the review was conducted includes Sections 23, 24, 25, 26, 36 Range 34E, Township 36S, Okeechobee County, Florida. A literature review and site survey has been performed to detail the possible occurrence of state and federally listed floral and faunal species at Milking R Inc as part of the design/build phase at the Dairy Best Available Technologies Project – Contract C-11652 Annual 1.

Letters were submitted to Florida Fish and Wild Conservation Commission (FFWCC), United States Fish Wildlife Services (USFWS), and Florida Natural Areas Inventory (FNAI) requesting any information regarding known or reported sightings of listed species on the proposed restoration site and surrounding areas (**Attachment 1**). Several listed species of plants and animals listed for protection could possibly occur on this site and are included in **Table 1** with a description of each species along with habitat requirements and current state and federal listing. As work proceeds, all sightings of listed species will be noted and included in the final report as will the response from the agency inquiries.

2.0 SITE DESCRIPTION

Milking R Inc. is an active dairy located approximately ±3 miles north of Okeechobee City on US 98 (**Figure 1**) and is comprised of 1134 acres. Milking R Inc. has elected to participate in the Design/Build Phase of the Dairy Best Available Technologies Project. The goal of the program is:

> An unbiased selection, implementation, and monitoring of the best available technologies to significantly reduce dairy industry phosphorus exports to the Okeechobee basin and bring about the most effective and substantial water quality improvements in the shortest possible time.

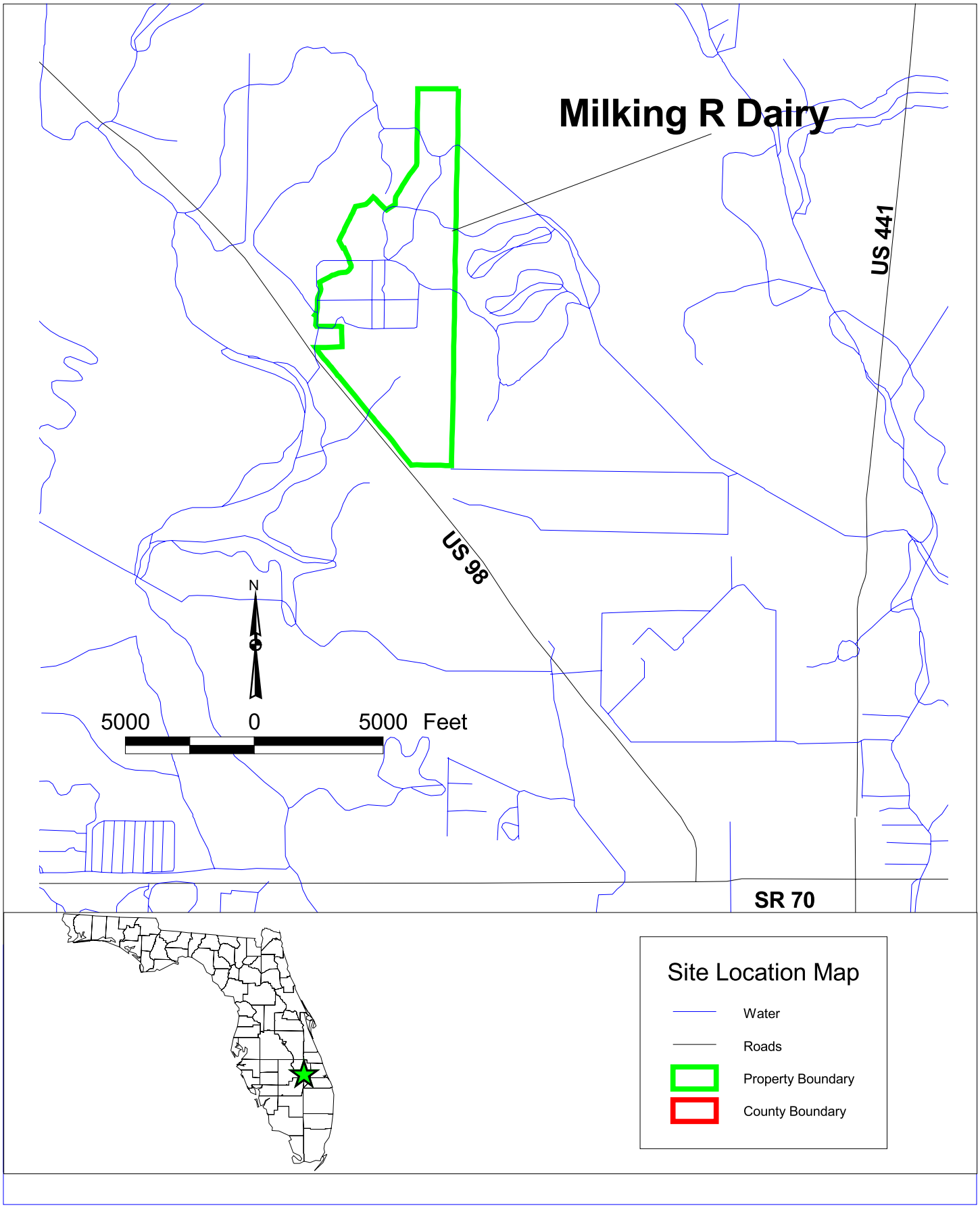

Figure 1
Site Location Map

3.0 METHODOLOGY FOR LISTED SPECIES SITE DETERMINATION

Listed species are those listed by the Florida Fish and Wildlife Conservation Commission (FFWCC), Florida Department of Agriculture and Consumer Services (FDAC), and the United States Fish and Wild Service (USFWS). The state of Florida's lists are subdivided and maintained by the FFWCC and FDAC. The state list of animals is controlled by the FFWCC, while the state plant list is controlled by the FDAC. The FFWCC lists animals in three categories: Endangered (E), Threatened (T), and Species of Special Concern (SSC). The FDAC categorizes plants as Endangered, Threatened, or Commercially (C) exploited. The USFWS maintains the list of plants and animals on a national basis and categorizes them as either Endangered or Threatened.

A list of federal and state listed species specific to Okeechobee County has been compiled by the Florida Natural Areas Inventory (FNAI) and these species are described below and found in **Table 1.** Included within the table is the likelihood of occurrence for each species. Likelihood of occurrence was based on site reconnaissance of existing natural plant communities.

On January 27, 2004, a preliminary listed species survey was conducted on-site to determine the presence/absence of any threatened or endangered species. Systematic, pedestrian, and vehicular transects were conducted throughout the site proceeding from north to south, with particular detail noted in proposed impact areas. An amphibious vehicle was used in areas with limited access. Proposed impact areas, zones of dredge and fill, were preliminarily surveyed for possibilities of nesting, roosting, rookeries, or other types wildlife utilization. Adjacent lands, which are environmentally sensitive, were also traversed for listed species. All listed species that were observed on-site can be found within **Table 1**.

4.0 LISTED SPECIES DESCRIPTIONS

AMPHIBIANS

The gopher frog (*Rana capito*) has a stubby body with short legs, a large head and mouth, and prevalent eyes. They have a light ground color and an unmarked underside. Gopher frogs are present in areas known to support gopher tortoises, with the exception of coastal islands and dunes. Of the 60 commensal species that inhabit gopher tortoise burrows, the gopher frog is the most dependent species in occurrence with the burrows. Their preferred breeding habitats include seasonally flooded grassy ponds and cypress heads, which lack fish populations. Gopher frogs need adjacent upland and wetland habitats to survive. These adjacent upland and wetland habitats are becoming rare, causing the gopher frog to be imperiled. The gopher frog is listed as SSC by the FFWCC. No gopher frogs were observed on the Milking R Inc. site, but the existence of the species could be possible.

TABLE 1 – FLORIDA'S LISTED SPECIES FOR OKEECHOBEE COUNTY		
Scientific Name	**Common Name**	**Likelihood of Occurrence**
AMPHIBIANS		
Rana capito	Gopher frog	P
REPTILES		
Alligator mississippiensis	American alligator	O
Drymarchon corais couperi	Eastern indigo snake	P
Gopherus polyphemus	Gopher tortoise	P
BIRDS		
Ammodramus savannarum floridanus	Florida grasshopper sparrow	P
Aphelocoma coerulescens	Florida scrub-jay	N
Aramus guarauna	Limpkin	V
Caracara plancus	Crested caracara	O
Egretta caerulea	Little blue heron	O
Egretta thula	Snowy egret	O
Egretta tricolor	Tricolored heron	O
Eudocimus albus	White ibis	O
Falco peregrinus	Peregrine falcon	P
Falco sparverius paulus	Southeastern American kestrel	V
Grus canadensis pratensis	Florida sandhill crane	O
Haliaeetus leucocephalus	Bald eagle	O
Mycteria Americana	Wood stork	O
Pandion haliaetus	Osprey	V
Rostrhamus sociabilis plumbeus	Snail kite	P
Speotyto cunicularia floridana	Florida burrowing owl	V
Sterna antillarum	Least tern	N
MAMMALS		
Sciurus niger shermani	Sherman's fox squirrel	N
Trichechus manatus	Manatee	N
PLANTS		
Calopogon multiflorus	Many-flowered grass-pink	N
Conradina grandiflora	Large-flowered rosemary	N
Nolina atopocarpa	Florida beargrass	N
Ophioglossum palmatum	Hand fern	P
Panicum abscissum	Cutthroat grass	P

N-NOT LIKELY P-POSSIBLE L-LIKELY V-VERY LIKELY O-OBSERVED

REPTILES

The American alligator (*Alligator mississippiensis)* is a reptile which was once abundant throughout Florida but suffered declines in population mainly due to poaching and market hunting for hides. Protection of this species has led to a reasonable recovery and has resulted in the opening of a restricted hunting harvest. Protection status of the once endangered alligator has been downgraded to SSC by the FFWCC. It is listed as threatened by USFWS due to its similarity in appearance to the endangered Florida crocodile. Four (4) alligators were observed on various portions of the property.

The eastern indigo snake (*Drymarchon corais couperi*) is the largest North American snake. An iridescent royal purple can sometimes be seen on the snake, which is where the name was given. It occurs in most of Florida and much of southern Georgia. Records show that it was once found in southeastern Mississippi, extreme southern Alabama, and southern South Carolina, but may not exist there any longer. These snakes utilize gopher tortoise burrows, stump holes, and land crab holes for shelter. The snake preys on fish, frogs, toads, lizards, snakes, small turtles, birds, and small mammals. Eastern indigos were formerly collected heavily for the pet trade because of their docile nature. All such activity has been deemed illegal, yet the snake populations have not yet returned. The indigo snake is a commensal of the gopher tortoise, of which is also a listed species. Both the FFWCC and USFWS list the eastern indigo snake as Threatened. This species of snake was not observed on the parcel, yet it is possible that the indigo snake could exist on site.

The gopher tortoise (*Gopherus polyphemus)* is indigenous to dry well-drained sandy habitats with suitable forage. Gopher tortoise burrows provide habitat for other species, called commensals, which they share with their host. Potential commensals with gopher tortoise include: the Eastern indigo snake (*Drymarchon corais couperi)* listed as Threatened (T) by FFWCC and USFWS, the gopher frog (*Rana capito)* listed as Species of Special Concern (SSC) by FFWCC and the Florida mouse (*Podomys floridanus)* listed as Species of Special Concern. The suitability of gopher tortoise habitat for development has led to their population decline and caused them to be listed as a Species of Special Concern by the FFWCC. Gopher tortoises are usually associated with FLUCCS codes 411, 427, and 321. It is possible that gopher tortoises exist on site, none were observed.

BIRDS

The Florida grasshopper sparrow (*Ammodramus savannarum floridanus*) is flat-headed, short-tailed sparrows which are about 13cm in length. Grasshopper sparrows have been established throughout the continental United States, from Mexico to Ecuador, and the West Indies. Yet the Florida grasshopper sparrow occurs in localized populations within the prairie region of south-central Florida. These birds require open areas for foraging but enough vegetation for nesting. Intensive pasture improvements have eliminated many foraging sites for the bird, and the FFWCC lists the bird as Endangered. No

grasshopper sparrows were observed on-site, yet it is possible that the bird may forage on portions of the site.

The Florida scrub jay (*Aphelocoma coerulescens)* is listed as Threatened by the FFWCC and the USFWS. Loss of habitat due to development has been the leading cause of declining numbers for this species. Scrub habitats and soils have been used by humans for agriculture and development since the early 1900's. The oak scrub habitat to which the Florida scrub jay is restricted to is a vegetation formation found only on extremely well drained sandy soils formed by old coastal dunes. No such habitat exists on the Milking R Inc. site, and therefore it is very unlikely that the bird could forage or breed within the limits of the property.

The limpkin (*Aramus guarauna)* is found primarily in Florida and a small area of southern Georgia. Locally common in swamps and wetlands, where it forages or swims in search of snails, frogs, and insects. The limpkin was nearly extirpated by hunters, but is now common in southern swamps and marshes. The limpkin is listed as a Species of Special Concern by FFWCC. The limpkin was not observed, but it is very likely that it utilizes the site on occasion.

The Audubon's crested caracara (*Polyborus plancus audubonii)* is listed as Threatened by the FFWCC and the USFWS. This bird inhabits Mexico, southern Texas and south Florida. Their habitat is dry scrubland and prairie. They eat carrion, turtles, small mammals, fish and insects. Habitat loss due to development threatens this species. The caracara was observed on-site and is further detailed later in this report.

The little blue heron (*Egretta caerulea)* is a fairly common dark heron of salt and freshwater marshes, mudflats, shallows and wooded swamps. The little blue heron breeds from New England south to Florida and along the Gulf Coast. The little blue heron is listed as a Species of Special Concern by FFWCC, and was observed throughout various wetlands.

The snowy egret (*Egretta thula)* is a gregarious medium-sized species white heron found in fresh and saltwater habitats. Snowy egrets were the target of plume hunters during the 1800s and early 1900s and numbers declined drastically. Snowy egrets breed from central California through to eastern Colorado, in the Mississippi Valley, and from Long Island south to Florida. The snowy egret is listed as a Species of Special Concern by FFWCC, and was observed on portions of the site.

The tricolored heron (*Egretta tricolor)* is found in salt and freshwater marshes, shallows and mudflats along the Atlantic and Gulf Coasts. The tricolored heron breeds along the Atlantic Coast from New Jersey to Florida, and along the Gulf Coast. The tricolored heron is listed as a Species of Special Concern by FFWCC, and was observed on-site.

The white ibis (*Eudocimus albus)* is listed as a SSC by FFWCC due to continued decreases in breeding populations in Florida. During the 1800s and early 1900s wading birds became the target of plume hunters and numbers declined drastically. Habitat

degradation, loss of major areas of feeding habitat, and disruption of normal hydro patterns have probably been the most important causes of the decreased white ibis breeding population. Presently the white ibis remains Florida s most numerous wading birds. This listed species was also observed on-site.

The peregrine falcon (*Falco peregrinus*) is a powerful and large bird of prey with long pointed wings typical of falcons. Peregrine falcons occur on all continents except Antarctica. These birds are found throughout Florida preferring areas of coastal and barrier island shorelines, lake and river margins, prairies, coastal ponds, sloughs, marshes, and urban areas with adequate prey. The peregrine falcon mainly preys upon migratory birds, which have shown to accumulate DDT from Latin America. Contamination of these birds of prey from DDT and habitat destruction has caused their populations to dwindle. The FFWCC lists the peregrine falcon as Endangered. The falcon is migratory and could potentially utilize the site. It was not observed during the survey.

The Southeastern American kestrel (SAK) subspecies (*Falco sparverius paulus)* is a permanent non-migrating resident in Florida. The reduction in nest availability may be the prime factor in reducing and limiting resident kestrel populations in Florida. The SAK is listed as Threatened by the FFWCC, and is not listed by USFWS. The kestrel was not observed on-site, yet it is very likely that the bird has and does utilize the area for foraging. The merlin (*Falco columbarius*), a species often confused with the kestrel was observed.

The Florida sandhill crane (*Grus canadensis pratensis)* is listed as Threatened by the FFWCC. The Florida sandhill crane is limited to central and south Florida. Wetland drainage, filling and degradation has altered the habitat of the crane and caused a decrease in their numbers. Manmade hazards such as fences and power lines, in which the birds get caught, have also affected their numbers. The Florida sandhill crane was observed in high numbers throughout Milking R Inc. and is described in greater detail in later sections of this report.

The bald eagle (*Haliaeetus leucocephalus)* is listed as Threatened by the FFWCC and the USFWS. The use of DDT caused the numbers of bald eagles to drastically decline. Since DDT has been banned the populations of bald eagles are recovering. Florida has the second largest population of bald eagles in the wild, with Alaska having the largest population. Bald eagles mate for life and build massive platform nests in the fork of a tree 100-180 feet high. Bald eagles mostly eat fish and birds but also eat carrion and small mammals such as rabbits. This species of bird was observed in flight over the site throughout the day of the preliminary survey. The bald eagle was not observed nesting or perched at any time on the site. Locations of local nest sites for Okeechobee County can be found at http://wildflorida.org/eagle/eaglenests/nestsearch.asp

The wood stork (*Mycteria americana)* is a gregarious species, which nests in colonies (rookeries), and roosts and feeds in flocks. Storks may fly relatively long distances either daily or between regions annually, seeking adequate food resources. Available evidence

suggests that regional declines in wood stork numbers have been largely due to loss or degradation of essential wetland habitat. The wood stork is listed as Endangered by FFWCC and the USFWS. The wood stork was observed on-site. However, the wood stork was not observed nesting, and was mainly foraging for food.

The osprey (*Pandion haliaetus*) is a large eagle-like bird of prey. While flying, a downward crook in the wings distinguishes the bird from other species. These birds spend most of their times around bodies of water searching for fish. They construct their nests in the tops of large living or dead trees. Ospreys occur worldwide, on every continent except Antarctica. They are threatened by power lines and fishing nets, which often injure them. Development of coastlines and wetlands has destroyed their nesting habitat. They are listed by the FFWCC as a Species of Special Concern. The osprey was not observed on-site, yet it is very likely that the bird utilizes the site due to the large amount of existing fish habitat.

The snail kite (*Rostrhamus sociabilis)* is listed as Endangered by the FFWCC and the USFWS. The snail kite is limited to south and southwest Florida. They live in freshwater marshes and almost exclusively eat large freshwater apple snails. Drainage of the wetlands has caused a decline the apple snail population which in turn has added to the severe decline in the snail kite population. The snail kite was not observed and it is only possible that this species of bird makes use of the site as a food source. The site does not contain the preferred habitat of the snail kite.

The Florida burrowing owl (*Speotyto cunicularia floridana*) is about the size of a soda can. The Florida burrowing owl can be found primarily in peninsular Florida, Florida keys, and in the Bahaman Islands. They usually occur in open, well-drained treeless areas where herbaceous ground cover is minimal. Cultivation and development of their habitat is the main cause of the decline in population of this species. They are listed as a Species of Special Concern by the FFWCC. The Florida burrowing owl was not observed on-site, yet it is very likely that the bird has or does utilize the area at times.

The least tern (*Sterna antillarum*) has long pointed wings and a forked tail common of all terns. These birds are ground nesting, preferring sand or gravel as a suitable substrate. Most nesting sites have vegetation covering more than 20% of the area, but this figure varies. Nesting sites have become limited due to human encroachment. Also established least tern colonies have become threatened by domestic dogs, off-road vehicles, and foot crushing. The least tern is listed as Threatened by the FFWCC, and was not observed. It is not likely that the bird has or does utilize the site at times when foraging.

MAMMALS

The Sherman s fox squirrel (*Sciurus niger shermani)* is listed as Threatened by FFWCC and is not listed by USFWS. While habitat destruction is considered to be one cause for the decline of the Sherman s fox squirrel populations, the lack of regular burning in suitable habitats has diminished the habitat quality. Fox squirrels are usually associated with FLUCCS codes 411 pine flatwoods, 416 mixed pines, and 624 cypress/pine/cabbage

palm. The fox squirrel was not observed and it is very unlikely that it has or does exist on-site, since it s preferred habitat generally doe s not exist.

PLANTS

The many-flowered grasspink (*Calopogon multiflorus*) is found in 29 counties throughout Florida. The plant is listed as Endangered by the FDAC and is not listed by the USFWS. It may be found in depressional or hydric flatwoods. The plant is classified as faculatative wet (FACW) by the Department of Enviromental Protection (DEP). The plant is identified by: petals are widest above the middle; floral bracts are 5-10mm long; and the trichomes on lip extend to the apex. The many-flowered grasspink was not observed on-site and it is unlikely that it does due to void habitat.

The large-flowered rosemary (*Conradina grandiflora*) is well suited for dry conditions. It s habitat consists of beach or scrub communities. The plant can be tech nically identified by: leaf midrib on lower surface glabrous to moderately pubescent, contrasting with the densely pubescent blade surface; lower corolla lip 9-16mm long. The plant is listed as Threatened by the FDAC, and was not observed on the Milking R Inc. parcel. It is very unlikely that the plant exists on-site due to non-suitable habitat.

Florida beargrass (*Nolina atopocarpa*) has closely set leaves with a short perennial caudex. Leaves may be erect, spreading, or reclining on the ground. The plant flowers from summer to late fall. The only significant population left in Florida is in western Franklin County. This plant is resistant to both wet and dry conditions. Its prime habitats include wet pinelands known as flatwoods. Forestry and residential development are the plant s two main threats. It is listed as Threatened by the FDAC and is unlikely to exist on-site.

The hand fern (*Ophioglossum palmatum*) is an epiphytic plant that prefers to grow within boot debris cabbage palm fronds. The plant was widely collected and is now not nearly as widespread as it once was throughout south Florida. The plant has sterile blades incised into 2-9 palmate lobes. The fronds of the hand fern are shaped like a hand. The FDAC lists the plant as Endangered. No hand ferns were observed within cabbage palms of the site. Since there is a presence of cabbage palms throughout the Milking R Inc. site, it is possible that hand fern could be found.

Cutthroat grass (*Panicum abscissum*) has been located in six (6) counties within Florida. The FDAC lists the grass as Endangered. Suitable habitat for this species of grass includes wet flatwoods and seepage areas throughout the central peninsula of Florida. The grass can be technically identified by: spikelets not warty; leaf sheaths truncate at apex, extending into broad wedge-shaped auricles. Cutthroat grass was not identified on the parcel but possibly may exist due to the adjacent existence of wet flatwoods.

5.0 NON-LISTED SPECIES

Species that are not currently listed as protected by the FFWCC and USFWS were also noted. Although not listed these species indicate a general health and wildlife value for the Milking R Inc. site. **Table 2** displays all other wildlife which were observed on the parcel during the preliminary threatened and endangered species survey.

TABLE 2 – NON-LISTED SPECIES OBSERVED

Scientific Name	Common Name
AMPHIBIANS	
Rana catesbeiana	Bullfrog
Hyla cinerea	Green Treefrog
BIRDS	
Falco columbarius	Merlin
Accipiter cooperii	Cooper s Hawk
Buteo lineatus	Red Shouldered Hawk
Himantopus mexicanus	Blackneck Stilt
Charadrius vociferus	Killdeer
Ceryle alcyon	Kingfisher
Quiscalus quiscula	Common Grackle
Troglodytes troglodytes	Common Wren
Fulica americana	American Coot
Meleagris gallopavo	Wild Turkey
Ardea alba	Great Egret
Coragyps atratus	Black Vulture
Cathartes aura	Turkey Vulture
Butorides virescens	Little Green Heron
Botaurus lentiginosus	American Bittern*
Ardea herodias	Great Blue Heron
REPTILES	
Chrysemys floridana	Florida Cooter
Chrysemys picta	Southern Turtle Painted
Chyledra serpentina	Florida Snapping Turtle
Anolis sagrei	Cuban Anole
Anolis carolinensis	Green Anole
MAMMALS	
Sus scrofa	Feral Pig
Odocoileus virginianus	Deer
Felis rufus	Bobcat
FISH	
Gambusia affinis	Mosquito Fish
OTHER SIGNS	
Canis latrans	Possible coyotes den
Procyon lotor	Raccoon footprints
Dasypus novemcinctus	Armadillo foraging holes

*observed roosting in numbers of 10-15

6.0 DISCUSSION

A total of nine (9) listed species were observed within the Milking R Inc. property boundary. Of these nine species, two (2) avian species including the sandhill crane and crested caracara should be further detailed because of their possible sensitivity to proposed work. The other seven (7) listed species most likely will not be affected by proposed work, since no roosting, nesting, or other site dependent activities were observed, other than foraging. Also one area of environmental sensitivity has been sited for further review before any other future planning takes place. See **Figure 2** for a threatened and endangered species map in relation to proposed water control structures.

6.1 Sandhill Crane

Approximately forty six (46) sandhill cranes were observed on-site during the preliminary threatened and endangered species survey. Sandhill cranes are congregating to eat cattle feed. Such numbers suggest that there would be nest sites located somewhere within the wetlands on the parcel, yet none were observed. This is most likely due to the general absence of their preferred nesting habitat.

Preferred habitat for sandhill crane nesting consists of freshwater marsh. Particularly pickerelweed, maidencane, smartweed, spikerush, sedges, and beardgrass is most favorable. Only two areas in the vicinity of the Milking R Inc. offer favorable habitat for sandhill cranes (**Figure 2**). Nests are most often built over an inundated depth of 32.6 cm. Nest sizes average 98 x 83 cm and average 13.5 cm above the water. Nests are constructed of surrounding vegetation, while the egg cup is lined with finer material.

A systematic, comprehensive survey using pedestrian transects has not been conducted on the subject parcel for sandhill crane nesting. The preliminary survey yielded that the site and adjacent wetlands offer favorable habitat, but no nests were observed within these areas. The FFWCC recommends that systematic surveys be conducted between March and June.

6.2 Crested Caracara

Approximately eight (8) crested caracara were observed on-site during the preliminary survey. It may be possible that the same birds were counted more than once, as they flew throughout the west portion of the site. Caracara were observed in several cabbage palm trees throughout the subject site. No nests were observed, and nesting most likely does not take place on site. Yet a comprehensive site survey specifically for caracara was not conducted, and results could prove otherwise.

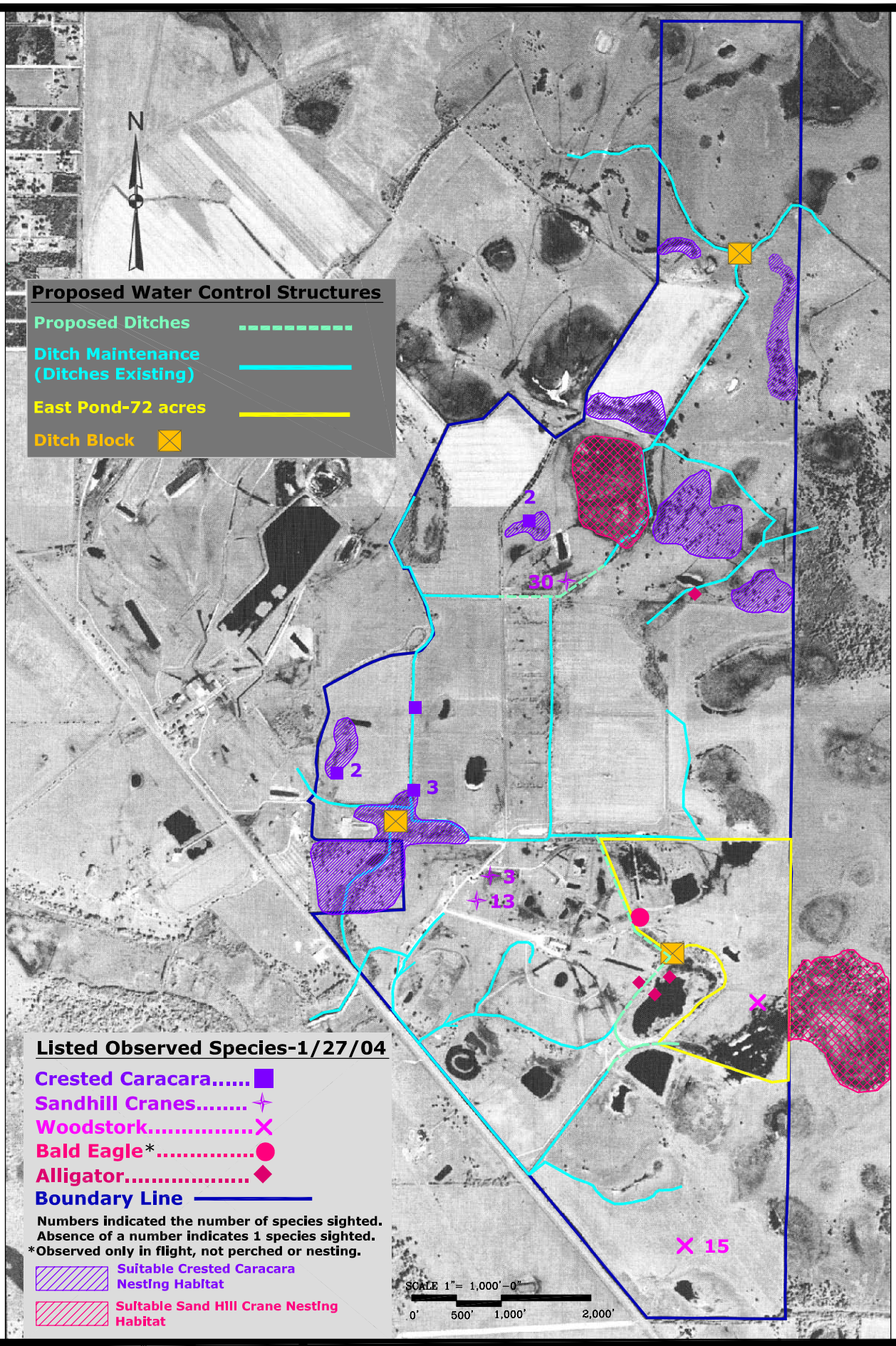

FIGURE 2

REVISIONS

DATE: 02/26/04
DRAWN BY: JDS
JOB NO.: 03-095
SCALE: AS SHOWN

NORTH

MILKING R, INC.
ROYAL CONSULTING, INC.
Unincorporated Okeechobee County, Florida

OBSERVED THREATENED & ENDANGERED SPECIES MAP

C&N ENVIRONMENTAL CONSULTANTS, INC.
612 North Orange Ave., A-10
Jupiter, Florida 33458
(561) 744- 7420
FAX (561) 744-2867
E Mail: cnenviro@bellsouth.net

Cabbage palms (most frequently utilized, >90%) and live oaks are the most essential component for caracara nesting. Nest trees are usually cabbage palms over 5 meters; have bulky full closed crowns; and are likely to be on the southeastern to southwestern edge of a group of trees. Peak breeding season extends from January to March. Nests are constructed of long, slim pieces of vines, dry stalky weeds, and other woody material. Nests typically are located at 8.8 meters above the ground, with an average diameter and depth of 71.1 cm and 38.1 cm.

Standard protocol for caracara nest surveying includes the following: first map out all freestanding palm trees, cabbage palm hammocks, or other tree groupings, then search each tree by foot or vehicle. Most often a nest can be seen from the base of the tree. Other indicators of a nest are sounds of chick begging, defensive behavior by adults, and signs of feces or other animal remains. The FFWCC recommends site surveys during January, February, March, and April.

6.3 Off-Site Adjacent Wetlands

Proposed work includes construction of a stormwater pond on the east portion of the site. The stormwater pond would have an exterior berm surrounding the entire area. It should be noted that certain impacts could occur to an adjacent wetland on the east portion of the site, and therefore could have an affect on possible listed species found within the adjacent connected wetland. Currently the adjacent wetland is directly connected to the wetland on the east portion of Milking R Inc. The adjacent wetland is considered high quality, with wildlife utilization prevalent as many species were observed. Bobcat (*Felis rufus*), wild turkey (*Meleagris gallopavo*), great blue heron (*Ardea herodias*), wood stork, little blue heron, tricolored heron, and 10-15 American bitterns (*Botaurus lentiginosus*) roosting were observed within the adjacent wetland.

If proposed work were to proceed, a proper evaluation of impacts to the adjacent wetland should be conducted. In particular change in hydrology could possibly occur, as the proposed berm would block water from entering or exiting the wetland. All measures should be considered to preserve the existing hydrology within the off-site adjacent wetland.

Installation of a berm through the wetland could also improve water quality, thereby positively affecting the wetland. The off-site adjacent wetland most likely has very high nutrient levels, resulting from cow manure. If the off-site wetland was isolated from the existing connection, water quality would most certainly improve.

7.0 SUMMARY

The Milking R Inc. site was preliminarily surveyed for possible listed species. The purpose of the preliminary site survey was to identify possible listed species which could be affected by proposed work. A total of nine (9) listed species were observed on the parcel. Two (2) of these nine species including sandhill crane and crested caracara may be affected by the construction of a new water management system. Although it is unlikely that these two avian species nest on-site, preliminary data suggests that both species utilize the site for foraging and suitable habitat for nesting was identified. Comprehensive site surveys have not been conducted for either the crested caracara or sandhill crane, yet it can be speculated that results of the comprehensive survey would match those of the preliminary site survey.

The preliminary site survey also identified one area of concern. On the east side of the parcel exists an adjacent, connected wetland. The wetland has relatively high values for hydrology, wildlife utilization, and buffers. Water quality may be of low value, although no sampling for phosphorous or nitrates was conducted. Very little exotic vegetation was observed within the wetland. Proposed work may or may not affect the functional value, including wildlife, of the adjacent wetland. Proposed secondary impacts to the adjacent wetland should be further addressed and minimized before any other proceedings of work take place.

This report documents possible listed species for the restoration site. Although these species have been known to occur in Okeechobee County in the past, most have not yet been documented as utilizing the Milking R Inc. site for habitat. All listed species observed on the site will be documented in future reports. In addition, any further information obtained from the FNAI, FFWCC, and/or USFWS will be forwarded to Royal Consulting Services, Inc. as an addendum for inclusion in this report.

8.0 REFERENCES

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ATTACHMENT 1

Agency Requests for Information

C&N Environmental Consultants, Inc.

561-744-7420 ◦ Fax: 561-744-2887
E-mail: cnenviro@bellsouth.net

March 1, 2004

U.S. Fish & Wildlife Service
1339 20th Street
Vero Beach, FL 32960-3559

RE: Milking "R" Dairy
Our File #03-085

Dear Ms. Ferrell,

Please accept this letter as a request for a database search on reported or known occurrences of threatened and endangered species and their preferred habitats within or in the vicinity of the above referenced site. The site is located in unincorporated Okeechobee County, FL. A site location map is enclosed (**Figure 1**). The following information includes the approximate latitude/longitude, as well as the section, township, and range coordinates for the site:

Latitude 27°N 19'36'' to 27°N 17'10''
Longitude 80°W 52'43'' to 80°W 53'42''
Township 36S, Range 354E, Sections 23, 24, 25, 26, and 36

The site covers ± 1,100.00 acres and is situated on the northeast side of US98.

Your response will be used in the permitting process for the United States Army Corps of Engineers, and the South Florida Water Management District. I appreciate your cooperation on this matter. If you have any questions, please feel free to contact me at (561) 744-7420.

Sincerely,
C&N Environmental Consultants, Inc.

Chris Wilson, Project Manager

Enclosure (1)

612 N. Orange Avenue ◦ Suite D-1 ◦ Jupiter, Florida 33458

C&N Environmental Consultants, Inc.

561-744-7420 ◦ Fax: 561-744-2887
E-mail: cnenviro@bellsouth.net

March 1, 2004

Florida Natural Areas Inventory
Edwin Abbey
1018 Thomasville Road, Suite 200-C
Tallahassee, Florida 32303

RE: Milking "R" Dairy
Our File #03-085

Dear Mr. Abbey,

Please accept this letter as a request for a database search on reported or known occurrences of threatened and endangered species and their preferred habitats within or in the vicinity of the above referenced site. The site is located in unincorporated Okeechobee County, FL. A site location map is enclosed (**Figure 1**). The following information includes the approximate latitude/longitude, as well as the section, township, and range coordinates for the site:

Latitude 27°N 19'36'' to 27°N 17'10''
Longitude 80°W 52'43'' to 80°W 53'42''
Township 36S, Range 354E, Sections 23, 24, 25, 26, and 36

The site covers ± 1,100.00 acres and is situated on the northeast side of US Highway 98.

Your response will be used in the permitting process for the United States Army Corps of Engineers, and the South Florida Water Management District. I appreciate your cooperation on this matter. If you have any questions, please feel free to contact me at (561) 744-7420.

Sincerely,
C&N Environmental Consultants, Inc.

Chris Wilson, Project Manager

Enclosure (1)

C&N Environmental Consultants, Inc.

561-744-7420 ◦ Fax: 561-744-2887
E-mail: cnenviro@bellsouth.net

March 1, 2004

Florida Fish and Wildlife Conservation Commission
Office of Environmental Sciences
Erika Pittman
620 S. Meridian Street
Tallahassee, FL 32399-1600

RE: Milking "R" Dairy
Our File #03-085

Dear Ms. Pittman

Please accept this letter as a request for a database search on reported or known occurrences of threatened and endangered species and their preferred habitats within or in the vicinity of the above referenced site. The site is located in unincorporated Okeechobee County, FL. A site location map is enclosed (**Figure 1**). The following information includes the approximate latitude/longitude, as well as the section, township, and range coordinates for the site:

Latitude 27°N 19'36'' to 27°N 17'10''
Longitude 80°W 52'43'' to 80°W 53'42''
Township 36S, Range 354E, Sections 23, 24, 25, 26, and 36

The site covers ± 1,100.00 acres and is situated on the northeast side of US98.

Your response will be used in the permitting process for the United States Army Corps of Engineers, and the South Florida Water Management District. I appreciate your cooperation on this matter. If you have any questions, please feel free to contact me at (561) 744-7420.

Sincerely,
C&N Environmental Consultants, Inc.

Chris Wilson, Project Manager

Enclosure (1)

ATTACHMENT 2

Agency Responses to Requests for Information

FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION

BRIAN S. BARNETT, INTERIM DIRECTOR
OFFICE OF ENVIRONMENTAL SERVICES
(850)488-6661 TDD (850)488-9542
FAX (850)922-5679

March 11, 2004

C&N ENVIRONMENTAL
RECEIVED
MAR 15 2004

Mr. Chris Wilson
C & N Environmental Consultants Inc..
612 N. Orange Avenue, Suite D-1
Jupiter, FL 33458

JOB # what job is this for? 03-085

Dear Mr. Wilson:

This letter is in response to your request for listed species occurrence records and critical habitats for your project (S23-26 & 36 T 36S R 34E) located in Okeechobee County, Florida. Records from The Florida Fish and Wildlife Conservation Commission-Office of Environmental Service's database indicate that a crested caracara location is within or adjacent to the project area. In addition, the Florida Fish and Wildlife Conservation Commission has identified a portion of the study area as mottled duck and crested caracara strategic habitat conservation area (SHCA). Enclosed are 8.5 x 11 maps showing listed species locations, biodiversity hotspots, priority wetlands for listed species, SHCA's, and land cover for the project area.

Please note that our database does not necessarily contain records of all listed species that may occur in a given area. Our data is limited to sites that we surveyed or sites that others have surveyed and provided us with their data. Also, data on certain species, such as gopher tortoises, are not entered into our database on a site-specific basis. **Therefore, one should not assume that an absence of occurrences in our database indicates that species of significance do not occur in the area.**

The Florida Natural Areas Inventory (FNAI) maintains a separate database of listed plant and wildlife species, please contact FNAI directly for specific information on the location of element occurrences within the project area. Because FNAI is funded to provide information to public agencies only, you may be required to pay a fee for this information. County-wide listed species information can be located at their website (http://www.fnai.org).

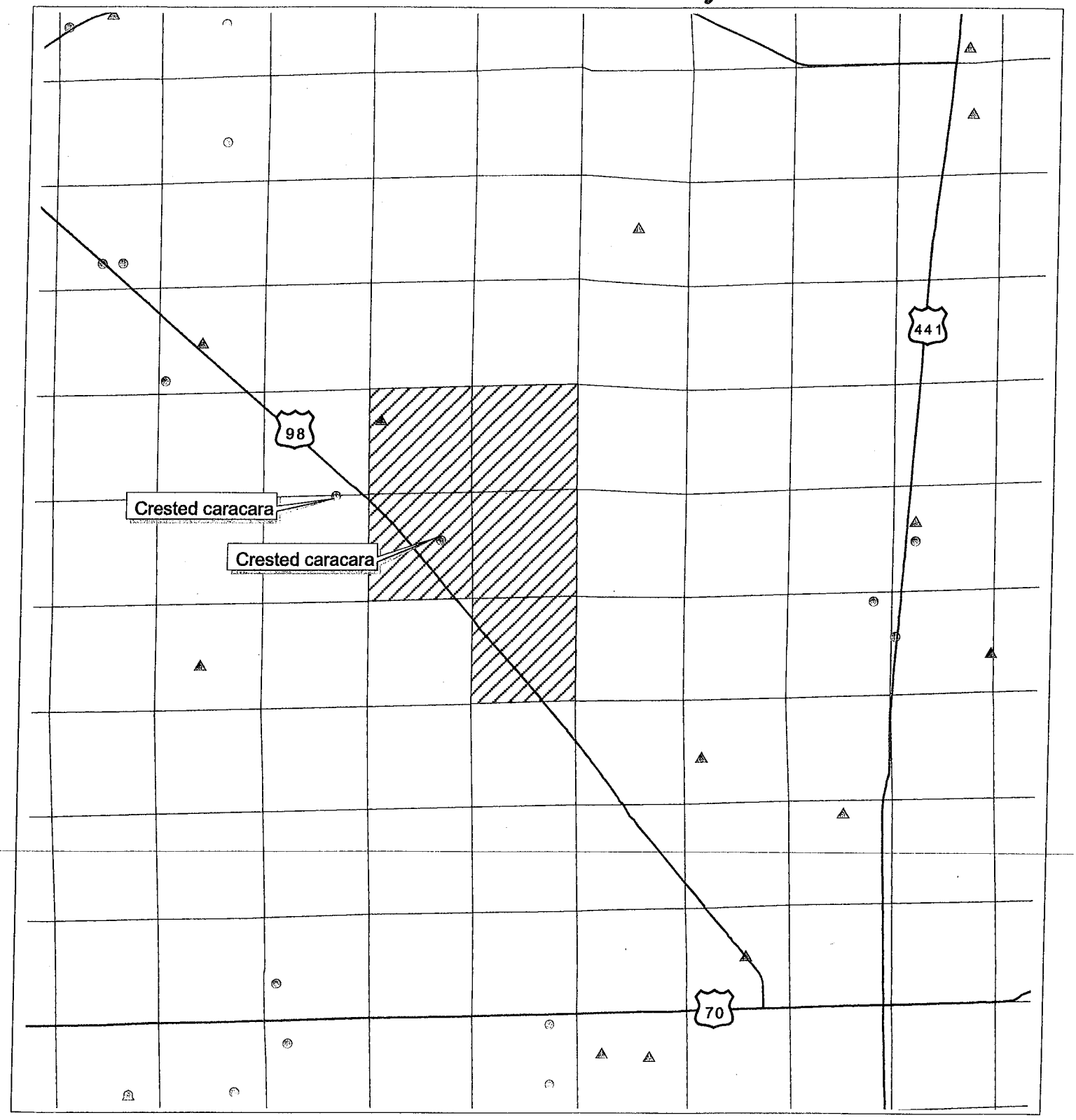
Please credit the Florida Fish and Wildlife Conservation Commission in any publication or presentation of these data. If you have any questions or further requests, please contact me at (850) 488-6661 or Erika.Pittman@fwc.state.fl.us.

Sincerely,

Erika S. Pittman
Records Technician

esp
ENV 8-7/8
2004.1097
Enclosures

S 23-26 & 36 T 36S R 34E
Okeechobee County



Legend

- Project Area
- Roads
- Occurrence Records (FNAI)
- Listed Species (FWC-OES)

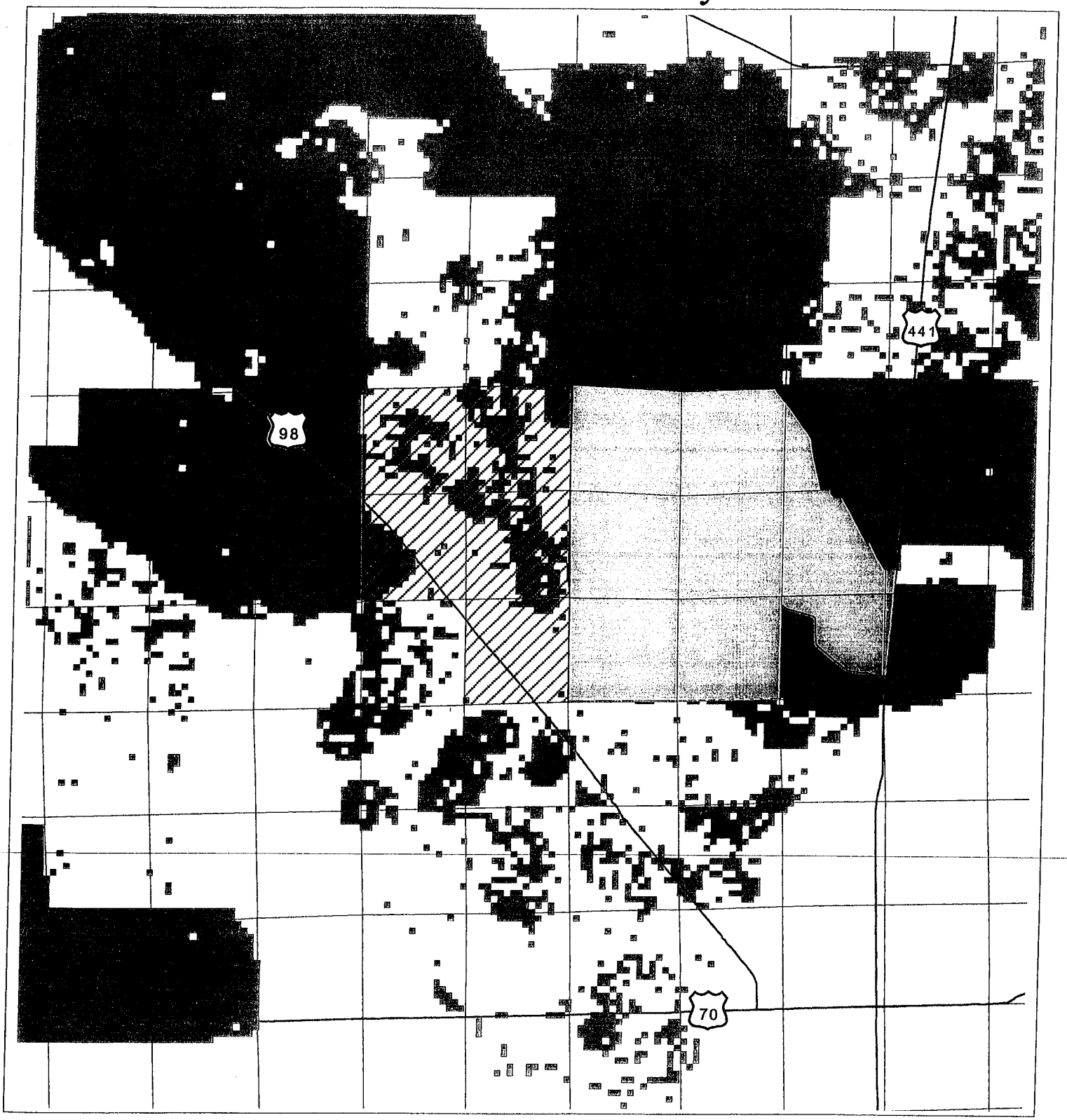
N
W E
S

1 0 1 2 Miles

MArch 10, 2004

S 23-26 & 36 T 36S R 34E
Okeechobee County

Strategic Habitat Conservation Areas



Legend

- Project Area
- Roads
- Public Lands
- SHCA's

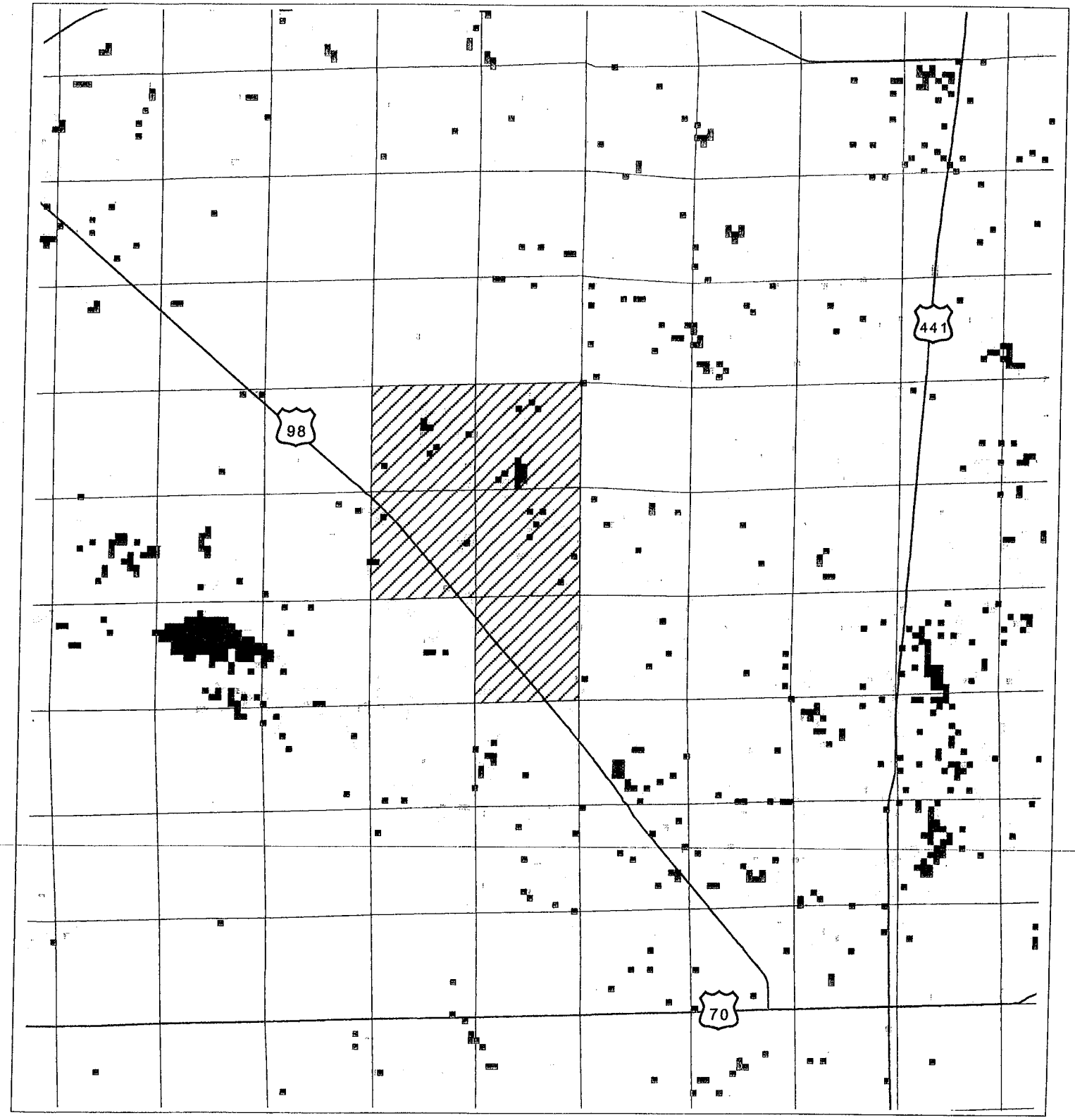
N
W E
S

1 0 1 2 3 Miles

March 11, 2004

S 23-26 & 36 T 36S R 34E
Okeechobee County

Priority Wetlands



Legend

- 1-3 Upland Species
- 4-6 Upland Species
- 1-3 Wetland Species
- 4-6 Wetland Species
- 7-9 Wetland Species
- 10-11 Wetland Species

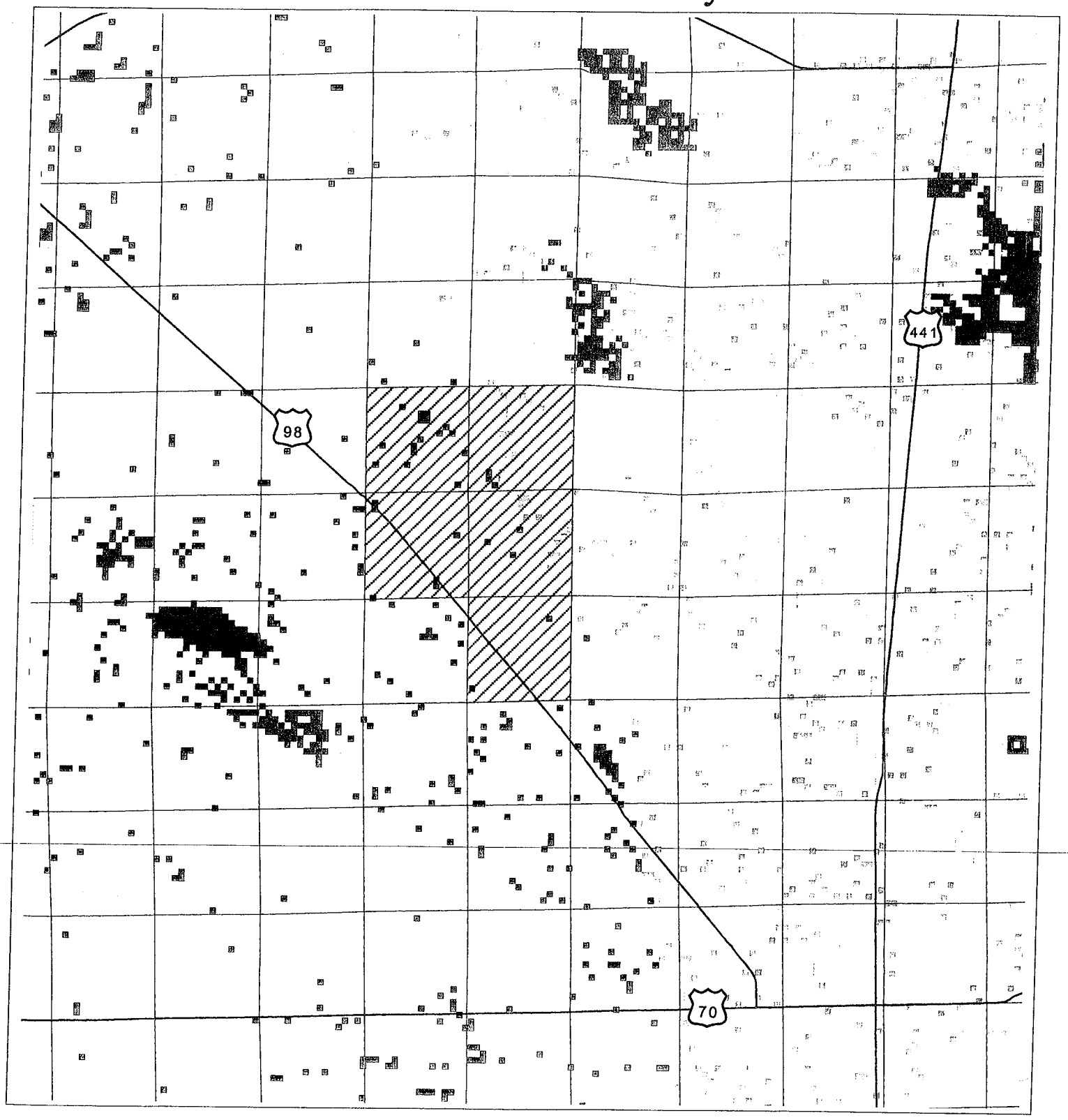
N
W E
S

1 0 1 2 3 Miles

March 11, 2004

S 23-26 & 36 T 36S R 34E
Okeechobee County

Biodiversity Hot Spots



Legend

- 3-4 species
- 5-6 species
- 7+ species

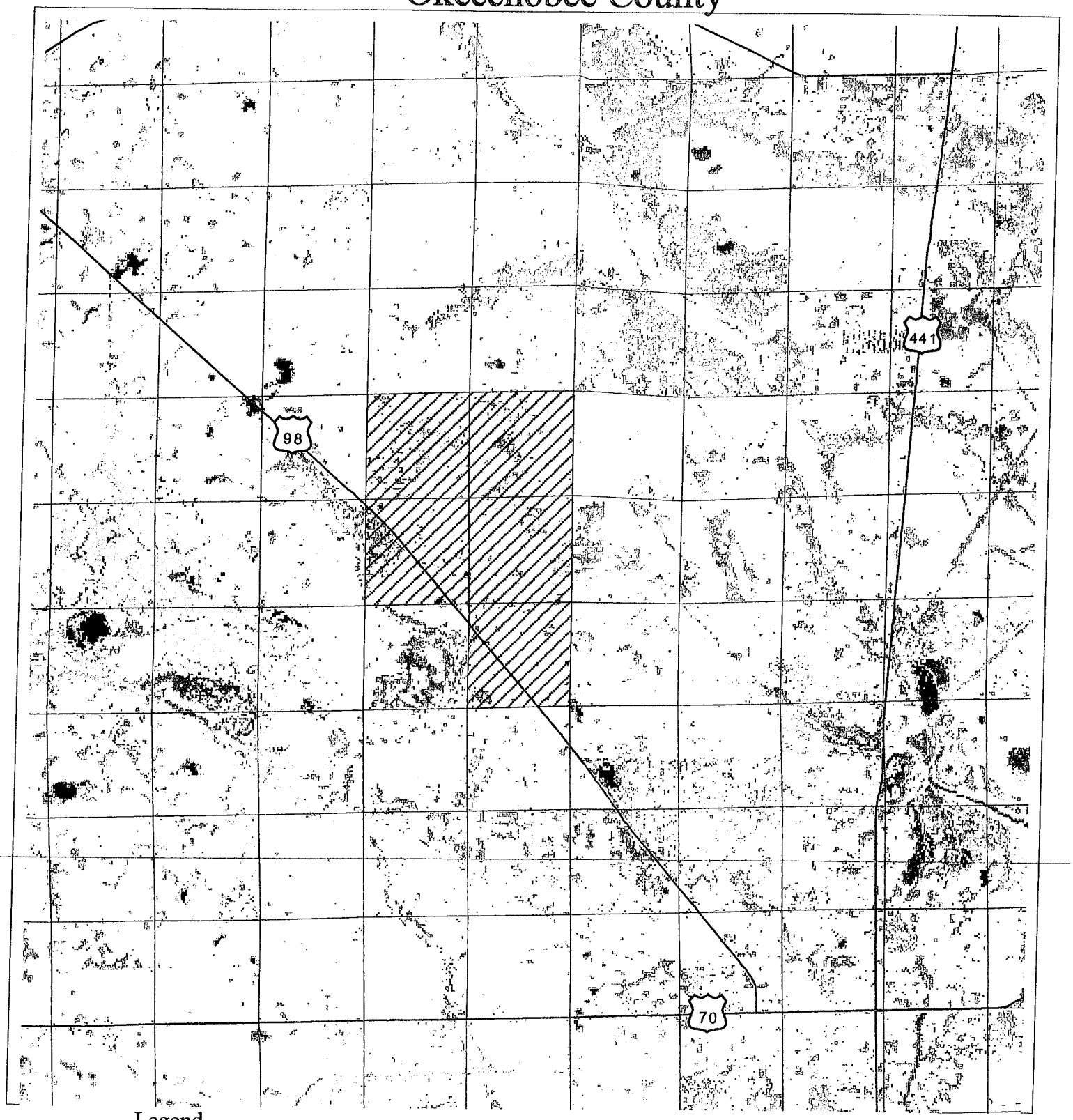
N
W E
S

1 0 1 2 3 Miles

March 11, 2004

S 23-26 & 36 T 36S R 34E
Okeechobee County

Land Cover



Legend

- Coastal Strand
- Dry Prairie
- Pinelands
- Sand Pine Scrub
- Sandhill
- Xeric Oak Scrub
- Mixed Pine-Hardwood
- Upland Hardwood
- Tropical Hardwood
- Salt Marsh
- Freshwater Marsh
- Cypress Swamp
- Hardwood Swamp
- Bay Swamp
- Shrub Swamp
- Mangrove Swamp
- Bottomland Hardwoods
- Water
- Grassland/Agriculture
- Shrub and Brush
- Exotic Plants
- Urban/Barren

N
W E
S

1 0 1 2 3 Miles

March 11, 2004

ATTACHMENT 3

South Florida Water Management Correspondence

C&N Environmental Consultants, Inc.

561-744-7420 ◦ Fax: 561-744-2887
E-mail: cnenviro@bellsouth.net

March 17, 2004

South Florida Water Management District
Department of Ecosystem Restoration
Gary E. Williams
3301 Gun Club Rd., MSC 4750
West Palm Beach, FL 33406

RE: Milking R Inc., Okeechobee, FL
Our File #03-085

Mr. Williams,

C&N Environmental Consultants, Inc. would like to thank you for your time given to us back in February, regarding the Milking R Inc. site in Okeechobee, FL. Your expertise in the Kissimmee Dry Prairie species proved to be a valuable aid in our preliminary threatened and endangered species work. Particularly the information provided by you on the crested caracara was a great help to our firm and to our client.

Thank you,

Chris Wilson, Biologist

cc: Royal Consulting Services, Inc.

612 N. Orange Avenue ◦ Suite A-10 ◦ Jupiter, Florida 33458

ATTACHMENT 4

Crested Caracara Nest Survey Methodology

DRAFT *DRAFT*

South Florida Ecological Services Office

Audubon's Crested Caracara Survey Guidelines (06/28/2002)

Adapted from: Morrison, J.L. 2001. Recommended management practices and survey protocols for Audubon's crested caracara (*Caracara cheriway audubonii*) in Florida. Technical Report No 18. Florida Fish and Wildlife Conservation Commission, Tallahassee, Florida, USA.

SURVEY PROTOCOL FOR FINDING CARACARA NESTS

As land use changes continue in south-central Florida, there is an increasing need for a standardized and effective protocol for assessing the presence of nesting caracaras. Survey techniques for caracaras must provide accurate information on territorial occupancy and breeding.

Caracaras are often not visible to a casual observer even within known nesting and foraging ranges. Roadside surveys, a common way of surveying for caracaras, underestimate occupancy rates. The probability of observing caracaras on a roadside survey in a known occupied range can be as low as 30 percent, even during the breeding season (Morrison 1995). Therefore, a more definitive protocol is necessary to maximize opportunities for finding nesting pairs and determining breeding status.

The Florida population historically occurred in dry or wet prairie areas with scattered cabbage palms or in lightly wooded areas, where scattered saw palmetto (*Serenoa repens*), scrub oaks (*Quercus* spp.), or cypress (*Taxodium* spp.) were also present. However, widespread changes in land use in many of these historic central Florida habitats have resulted in historic ranges being converted to improved or semi-improved pasture. These widespread changes appear to have altered caracara foraging and nesting profiles. Recent survey data show that caracaras are now commonly observed foraging and nesting in improved or semi-improved pastures in addition to historic habitat types. Another observed population shift is an increase in numbers of foraging and nesting adult and juvenile birds adjacent to roadways that transverse these habitats (Service 1999).

Caracaras prefer to nest in cabbage palms (*Sabal palmetto*) surrounded by open habitats with low ground cover and a low density of tall or shrubby

vegetation. They generally construct a new nest each season, often in the same tree as the previous year. The nesting season may run from September through June with the majority of the nesting activity occurring in the months of November through April.

Caracaras are nonmigratory with a home range averaging 1,200 hectares (3,000 acres) in size and represented by an area with a radius of approximately 2 kilometers (1.2 miles) (Morrison 1997a). Adult caracaras typically forage throughout their home range during both nesting and non-nesting seasons. During the nesting season, caracaras spend most of their time within a core area with a radius of approximately 1,000 meters (3,300 feet). The core area is strongly defended by the nesting pair during the nesting season (Morrison 1997a).

Caracaras, like bald eagles (*Haliaeetus leucocephalus*), have different levels of tolerance and foraging needs that vary considerably throughout the season. Nesting caracaras are susceptible to disturbances that alter the existing levels or patterns of activity present around the nest tree. Observations of nesting caracaras by Morrison (2001) note that the birds will generally flush from the nest during incubation or early nestling stages if the source of the disturbance is within 300 meters (985 feet) from the nest tree. Caracaras display visible indicators of alarm. When the bird is at rest, preening or being preened, or engaged in other non-aggressive behaviors, the facial skin is bright orange-red. When threatened, the color of the facial skin changes to a pumpkin color and finally to pale yellow. The caracara's crest provides another method for communication. When relaxed, the crest lies flat. The crest is raised when they feel threatened, frightened, or are on alert (Lyons 1984).

For purposes of assessing levels of adverse effects to nesting caracaras, two zones are recognized by the Service as being critical **for conservation and recovery of the species. These are the primary zone and the secondary zone. The primary zone radius is the 300 meter (985 feet) flushing distance from the nest. The secondary zone radius is the 2,000 meter foraging territory in which the nest is located. Restrictions in the secondary zone are necessary to minimize disturbances that might compromise the integrity of the primary zone as well as to protect key areas outside of the primary zone.**

Searching for Nests

Caracaras are very site faithful, even to particular nest trees. Nest trees are generally cabbage palms over 5 meters (16 feet) in height; have large, full closed crowns; and are typically on the southeastern to southwestern edge

of a group of trees. Nests may also be in lone, freestanding palm trees, in groups of two to ten palms, or (rarely) in tall, emergent palms in the middle of a large hammock. Oaks and cypress trees may also be used for nesting, but are likely to be used only if few palms are available within a large area of otherwise suitable pasture and wetland habitat (Morrison 1997b).

To survey a site for caracara nests, first map out all the freestanding palm trees, cabbage palm hammocks and other tree groupings, then search each of these trees on foot or by vehicle. Most of the time, a nest can be easily seen from the base of the tree. Chicks can often be heard begging, as well. Other observable signs that a nest is active include feces and prey remains below the nest tree, chicks calling from the nest, or defensive behavior by the adults when the observer is near the tree.

Other observed behaviors of adult birds can be used to find nests. During incubation, the adult not currently incubating often will perch high and visibly in a tall tree within 300 meters (985 feet) of the nest. Adult caracaras exhibit little defense behavior near their nest, but if the chicks are large (5 to 8 weeks), adults may remain close to the nest and exhibit rattle and cackle vocalizations and the head-throwback display (Morrison 1996). Nest searching using playback tapes, a technique used successfully for surveys of other raptors, is not likely to be effective for caracaras because they do not respond to such tapes.

Timing of Surveys

Breeding activity can occur from September through June with the primary season being November through April. Peak egg laying occurs from late December through early February (Morrison 1999). The post-fledging dependency period is approximately 8 weeks. Therefore, surveys for territory occupancy or to find new breeding pairs are best conducted during the months of **January, February, March, and April** when nesting within the overall population is at its peak and adults are most likely feeding nestlings (Morrison 2001). Since caracaras are most sensitive during the nest building, incubation, and early nestling stages of the nesting cycle, surveys made earlier than January, *i.e.,* December, may unduly disturb the birds and result in nest abandonment. Caracaras can also be observed in the territory after the chicks fledge from the nest. The peak of fledging for the central Florida population occurs during March and April.

Surveys are best conducted early in the morning or late in the afternoon. Caracaras are most actively nest building, foraging, or feeding young between sunrise and about 1100 hours, and again, between about 1600 hours and sunset. Caracaras are rarely active during the heat of midday, especially in the summer months. The Service does not recommend surveys in December and surveys conducted during other times of the year may be inconclusive.

Duration of Survey

When surveying for caracara nests in areas where the nest site is not known, observers should search all freestanding palm trees, cabbage palm hammocks and other tree groupings once a day for three consecutive days. The 3-day search should be repeated again in 2 weeks and again in 4 weeks. Generally, three observation periods are sufficient to assess caracaras presence and activity pattern.

Foraging Patterns

Following the nest tree searches, the observers should remain in the area for a minimum of 3 hours to observe caracara movements in the project area. Observations should be conducted from a position where a large area of suitable habitat can be viewed. The observer should note flight directions, roost trees, foraging habits, territorial aggression displays, nest building behavior, and general site disturbance levels. The emphasis in these observations is to determine the ambient conditions within the home range of the resident caracaras. Because caracaras are sensitive to human intrusions into their home ranges, the causal observations should be conducted from cover, such as a vehicle, so that disturbance to the pair can be minimized.

Reports

The key end products of this procedure include:

1. a complete count of all caracara nesting pairs within the project area; and
2. an approximate territory map or home range for each nesting pair.

A final report must be provided to the Service, which includes the following, as applicable:

A. Field data sheets that include:
   1 dates with starting and ending times of all surveys conducted;

2. weather conditions during all surveys, including average temperature, wind speed and direction, visibility, and precipitation; and
3. total number of caracara nests found and number of caracaras observed in each location.

B. An aerial photograph or vegetation map depicting:
1. the entire area of interest;
2. nest locations, primary and secondary zones;
3. habitat descriptions; and
4. locations of all caracaras seen or heard while conducting the survey or at any other time, including flight direction.

3. Biological Assessment Report

In general, the report should include a project description (proposed action and defined project area), project habitat descriptions, effects of the proposed action on the species, conservation measures to minimize effects to the species, and conclusion (effect determination). The report should also include the survey protocol, survey data sheets, and primary and secondary zones of the nesting caracaras, if caracaras are present. If habitat preservation and enhancements are proposed, the report needs to include a habitat monitoring component and a proposed land preservation conservation easement. Refer to the Service's *Outline Example for a Biological Assessment or a Biological Evaluation* (2002) for a more detailed discussion of report requirements, format, explanations of common ESA questions, and level of detail needed in the report.

Literature Cited

Humphrey, S. R. and J. L. Morrison. 1997. Habitat associations, reproduction, and foraging ecology of Audubon's crested caracaras in south-central Florida. Final report. Florida Game and Fresh Water Fish Commission (Florida Fish and Wildlife Conservation Commission) Nongame Program Project No. NG91-007 (August 8, 1997).

Lyons, J. 1984. Caracaras in captivity. Pages 69-77 in Wildlife rehabilitation, Vol. 2. Exposition Press, Inc.; Smithtown, New York.

Morrison, J. L. 2001. Recommended management practices and survey protocols for Audubon's crested caracaras (Caracara cheriway audubonii) in Florida. Technical Report No. 18. Florida Fish and Wildlife Conservation Commission, Tallahassee, Florida, USA.

Morrison, J. L. 1999. Breeding biology and productivity of the crested caracaras in Florida. Condor 101: 505-517.

Morrison, J. L. 1997a. Reproductive ecology and habitat associations of Florida's crested caracaras (Caracara plancus). Dissertation, University of Florida, Gainesville, Florida, USA.

Morrison, J. L. 1997b. Habitat associations, reproduction, and foraging ecology of Audubon's crested caracaras. Final Report. Florida Game and Fresh Water Fish Commission (Florida Fish and Wildlife Conservation Commission), Tallahassee, Florida, USA.

Morrison, J. L. 1996. Crested caracaras (Caracara plancus) in A. Poole and F. Gill, eds. The birds of North America, No. 249. The Academy of Natural Sciences, Philadelphia, PA, and The American Ornithologists Union, Washington, D. C.

Morrison, J. L. 1995. Habitat associations, reproduction, and foraging ecology of Audubon's crested caracaras. Quarterly Report. Florida Game and Fresh Water Fish Commission (Florida Fish and Wildlife Conservation Commission), Tallahassee, Florida. USA.

U. S. Fish and Wildlife Service. 2002. Outline example for a biological assessment or a biological evaluation. South Florida Ecological Services Office, Vero Beach, Florida.

U. S. Fish and Wildlife Service. 1999. South Florida multi-species recovery plan. Atlanta, Georgia.

Caracara Monitoring
Field Data Form

Date: **Start Time**_____ **Stop Time**_____ **Monitor**_____

Site Name and Location: Include latitude and longitude, section, township, and range, and county. _____

Weather Data

Time	Temp	Wind Speed/Direction	% Cloud Cover	Cloud Type	Rain
Start					
Finish					

Flight Data

#	Age A/Im	Time	Description

Nesting Data: Observed Activity
(perching, preening, courtship, feeding, nest building, incubation, head color change, head throwback, diving)

#	Age A/Im	Time	Description

General Observations
(caracara reaction to passing planes, trains, trucks, pedestrians, other birds, etc.)

#	Age A/Im	Time	Description

Crested Caracara Survey

Milking R Dairy
Okeechobee County, Florida

Crested Caracara survey

Prepared for:

Royal Consulting Services, Inc.
102 Frances Circle
Altamonte Springs, FL 32701

Prepared by:

C&N Environmental Consultants, Inc.
612 North Orange Avenue
Suite A-10
Jupiter, Florida 33458
561.744.7420 Fax 561.744.2887

1.0 INTRODUCTION

Milking R, Inc. (Milking R) is an active dairy located approximately ±3 miles north of Okeechobee City on US 98 (**Figure 1**) and is comprised of 1,134 acres. Milking R has elected to participate in the Design/Build Phase of the Dairy Best Available Technologies Project. The project area for which the review was conducted includes Sections 23, 24, 25, 26, 36 Range 34E, Township 36S, Okeechobee County, Florida. Proposed work includes construction of a Stormwater pond on the east portion of the site. (**Figure 2a**)

An endangered and threatened species survey was performed by C&N Environmental Consultants, Inc. (C&N) in January of 2004. The findings of that survey detailed the possible occurrence of state and federally listed floral and faunal species on the Milking R site as part of the design/build phase at the Dairy Best Available Technologies Project – Contract C-11652 Annual 1.

Recently, United States Fish and Wildlife Service personnel have encountered previously undocumented Crested Caracara (Caracara Plancus) nests in western Martin County in habitat similar to that found on the Milking R site. It was recommended that a Crested Caracara survey be performed on the Milking R site in the area of construction. C&N conducted a comprehensive Crested Caracara survey within the area proposed for development. The following report provides the results of this field investigation.

2.0 HABITAT

The Milking R site is primarily pasture land. There are a large number of cabbage palms which are surrounded by open habitat with low ground cover. This is ideal for Crested Caracara nesting. The habitats that exist in the area of construction on the Milking R, Inc. site include pastureland, cabbage palms (groups and freestanding), borrow pits, and wetland areas (**Figure 2b).**

3.0 METHODOLOGY

C&N performed a Crested Caracara survey per FFWCC recommendations of once a day for three consecutive days, repeated again in two weeks, and again in four weeks. Surveys were conducted on January 10^{th} -12^{th}, January 27^{th}-29^{th}, and March 1^{st} – 3^{rd}. All surveys except for one were performed in the morning. The survey on March 2, 2005 was performed in the late afternoon. . Visibility during all surveys was excellent. Please see **Attachment 1 - Data Sheets.**

Breeding activity for Crested Caracara can occur from September through June with the primary season being November through April. This survey was conducted in from January until early March, well into the peak season for Crested Caracara nesting. Since surveying occurred in areas where the nests site were not know, surveyors searched all freestanding cabbage palm trees within the construction area. Each individual survey lasted for three hours.

A vehicle was used to move between groups of trees, but the surveying of individual trees was done on foot. Each individual cabbage palm was assessed for Crested Caracara activity and/or nests. In addition, surveyors remained in stationary locations near the construction area for long periods of time looking for any Crested Caracara activity.

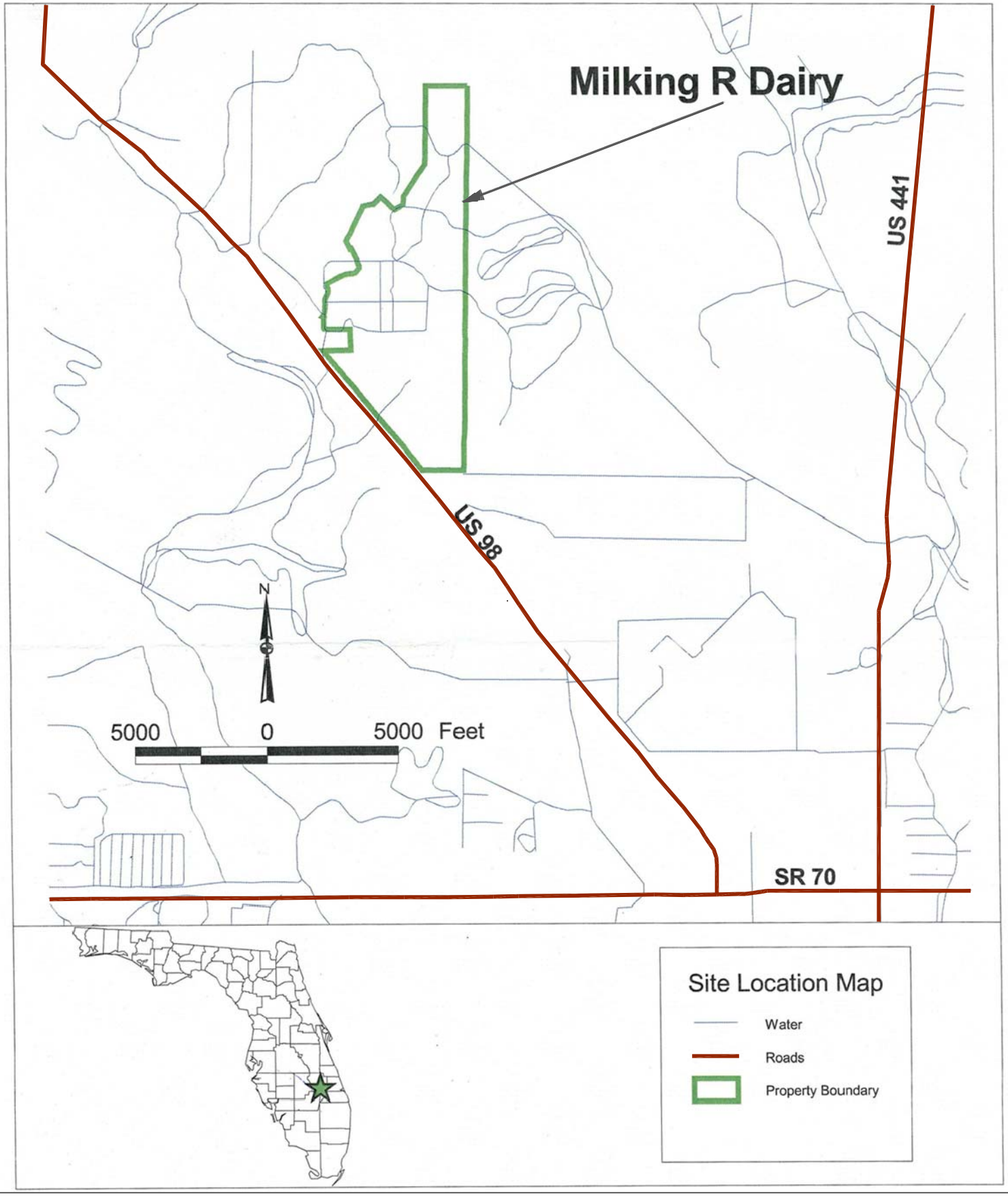


Figure 1

NORTH

MILKING R DAIRY
ROYAL CONSULTING, INC.
Okeechobee County, Florida

SITE LOCATION MAP

C&N ENVIRONMENTAL CONSULTANTS, INC.
612 North Orange Ave., A-10
Jupiter, Florida 33458
(561) 744- 7420
FAX (561) 744-0207
E Mail: cnenviro@bellsouth.net

FIGURE 2a

REVISIONS

DATE: 12/03/04
DRAWN BY: SC
JOB NO. 03-085
SCALE: 1"=1,000'

NORTH

Royal Consulting Services, Inc
Milking R, Inc.
Okeechobee, FL

Location of Construction Area

C&N ENVIRONMENTAL CONSULTANTS, INC.
612 North Orange Ave., A-10
Jupiter, Florida 33458
(561) 744- 7420
FAX (561) 744-2887
E Mail: cnenviro@bellsouth.net

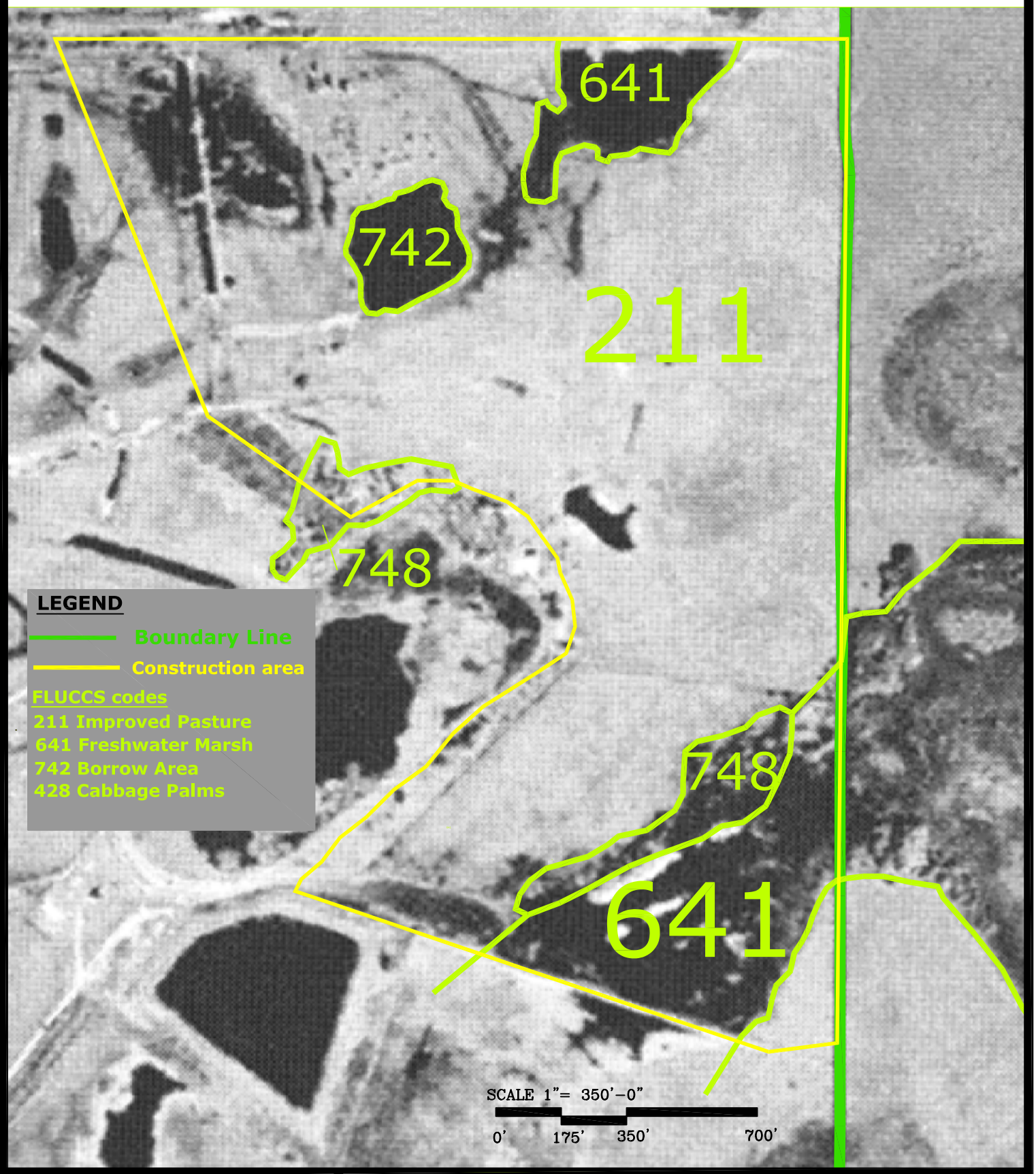


FIGURE 2b

REVISIONS

DATE: 11/08/04
DRAWN BY: SD
JOB NO. 0405
SCALE: 1"=350'

NORTH

Royal Consulting Services, Inc
Milking R, Inc.
Okeechobee, FL

FLUCCS Map of Construction Area

C&N ENVIRONMENTAL CONSULTANTS, INC.
615 North Orange Ave., A-10
Jupiter, Florida 33458
(561) 744- 7680
FAX (561) 744-9897
E Mail: cnenviro@bellsouth.net

4.0 SURVEY RESULTS

Only soaring Crested Caracaras were observed during this survey. A total of two Caracaras were observed during the nine survey days. One Caracara was seen on January 27, 2005 and another Caracara was observed on January 28, 2005. None of the palm trees surveyed contained any previous nesting material or new nests. The cabbage palms on the southern side of the construction area are very sparse, and probably are not good candidates for Crested Caracara nesting. Crested Caracaras are very sensitive to human disturbances especially during the nest building, incubation, and early nestling stages. Caution should be used in regards to the Crested Caracara during the construction of the storm water pond.

Attachment 1

Crested Caracara Survey

Data Sheets

Caracara Monitoring
Field Data Form

Date: 1/10/05 Start Time 8:00 a.m. Stop Time 11:00 a.m. Monitor _____

Site Name and Location: Include latitude and longitude, section, township, and range, and county. Milking R, Inc lat. 27.2986236/ long. -80.879668 Sections 23, 24,25,26, and 36 / Township 36 S / Range 34E

Weather Data

Time	Temp	Wind Speed/Direction	% Cloud Cover	Cloud Type	Rain
Start	65°-70°	slight out of the West	None		None
Finish	70°	Same	None		None

Flight Data

#	Age A/Im	Time	Description
0			

Nesting Data: Observed Activity
(perching, preening, courtship, feeding, nest building, incubation, head color change, head throwback, diving)

#	Age A/Im	Time	Description
0			

General Observations
(caracara reaction to passing planes, trains, trucks, pedestrians, other birds, etc.)

#	Age A/Im	Time	Description
0			

Caracara Monitoring
Field Data Form

Date: 1/11/05 Start Time 8:00 a.m. Stop Time 11:00 a.m. Monitor _____

Site Name and Location: Include latitude and longitude, section, township, and range, and county. Milking R, Inc lat. 27.2986236/ long. -80.879668 Sections 23, 24,25,26, and 36 / Township 36 S / Range 34E

Weather Data

Time	Temp	Wind Speed/Direction	% Cloud Cover	Cloud Type	Rain
Start	65°	SE 10-15 mph	15% - 20%	Cumulus	None
Finish	65°	Same	Same	Same	None

Flight Data

#	Age A/Im	Time	Description
0			

Nesting Data: Observed Activity
(perching, preening, courtship, feeding, nest building, incubation, head color change, head throwback, diving)

#	Age A/Im	Time	Description
0			

General Observations
(caracara reaction to passing planes, trains, trucks, pedestrians, other birds, etc.)

#	Age A/Im	Time	Description
0			

Caracara Monitoring
Field Data Form

Date: 1/12/05 Start Time 8:00 a.m. Stop Time 11:00 p.m. Monitor _____

Site Name and Location: Include latitude and longitude, section, township, and range, and county. Milking R, Inc lat. 27.2986236/ long. -80.879668 Sections 23, 24,25,26, and 36 / Township 36 S / Range 34E

Weather Data

Time	Temp	Wind Speed/Direction	% Cloud Cover	Cloud Type	Rain
Start	65°	10 mph out of the West	30% - 40%	Cumulus	None
Finish	65°-70°	Same	Same	Same	None

Flight Data

#	Age A/Im	Time	Description
0			

Nesting Data: Observed Activity
(perching, preening, courtship, feeding, nest building, incubation, head color change, head throwback, diving)

#	Age A/Im	Time	Description
0			

General Observations
(caracara reaction to passing planes, trains, trucks, pedestrians, other birds, etc.)

#	Age A/Im	Time	Description
0			

Caracara Monitoring
Field Data Form

Date: 1/27/05 Start Time 8:00 a.m. Stop Time 11:00 a.m. Monitor _____

Site Name and Location: Include latitude and longitude, section, township, and range, and county. Milking R, Inc lat. 27.2986236/ long. -80.879668 Sections 23, 24,25,26, and 36 / Township 36 S / Range 34E

Weather Data

Time	Temp	Wind Speed/Direction	% Cloud Cover	Cloud Type	Rain
Start	60°	Towards SE 10-15 mph	90%-100%	Cirrus	None
Finish	60-65°	Same	Same	Cirrus	None

Flight Data

#	Age A/Im	Time	Description
	A	10:45	Flew over palms and then flew away from us. Came in from the NE and flew towards the southeast direction.

Nesting Data: Observed Activity
(perching, preening, courtship, feeding, nest building, incubation, head color change, head throwback, diving)

#	Age A/Im	Time	Description
0			

General Observations
(caracara reaction to passing planes, trains, trucks, pedestrians, other birds, etc.)

#	Age A/Im	Time	Description
0			

Caracara Monitoring
Field Data Form

Date: 1/28/05 Start Time 8:00 a.m. Stop Time 11:00 a.m. Monitor _____

Site Name and Location: Include latitude and longitude, section, township, and range, and county. Milking R, Inc lat. 27.2986236/ long. -80.879668 Sections 23, 24,25,26, and 36 / Township 36 S / Range 34E

Weather Data

Time	Temp	Wind Speed/Direction	% Cloud Cover	Cloud Type	Rain
Start	55°-60°	Windy towards the S.E.	None		None
Finish	60°-65°	Same	None		None

Flight Data

#	Age A/Im	Time	Description
1	A	9:15AM	Flew over Sabal palms, did not land. Then flew towards the North until no longer visible.

Nesting Data: Observed Activity
(perching, preening, courtship, feeding, nest building, incubation, head color change, head throwback, diving)

#	Age A/Im	Time	Description
0			

General Observations
(caracara reaction to passing planes, trains, trucks, pedestrians, other birds, etc.)

#	Age A/Im	Time	Description
0			

Caracara Monitoring
Field Data Form

Date: 1/29/05 Start Time 7:45 a.m. Stop Time 10:45 a.m. Monitor _____

Site Name and Location: Include latitude and longitude, section, township, and range, and county. Milking R, Inc lat. 27.2986236/ long. -80.879668 Sections 23, 24,25,26, and 36 / Township 36 S / Range 34E

Weather Data

Time	Temp	Wind Speed/Direction	% Cloud Cover	Cloud Type	Rain
Start	55°-60°	From the North, slight breeze	None		None
Finish	60°	Same	None		None

Flight Data

#	Age A/Im	Time	Description
0			

Nesting Data: Observed Activity
(perching, preening, courtship, feeding, nest building, incubation, head color change, head throwback, diving)

#	Age A/Im	Time	Description
0			

General Observations
(caracara reaction to passing planes, trains, trucks, pedestrians, other birds, etc.)

#	Age A/Im	Time	Description
0			

Caracara Monitoring
Field Data Form

Date: 3/01/05 Start Time 8:00 a.m. Stop Time 11:00 a.m. Monitor _____

Site Name and Location: Include latitude and longitude, section, township, and range, and county. Milking R, Inc lat. 27.2986236/ long. -80.879668 Sections 23, 24,25,26, and 36 / Township 36 S / Range 34E

Weather Data

Time	Temp	Wind Speed/Direction	% Cloud Cover	Cloud Type	Rain
Start	50°	steady breeze from the west	60%	Cirrus (1/2 were cirrocumulus)	None
Finish	55-60°	steady breeze from the west	Same	Cirrus (1/2 were cirrocumulus)	None

Flight Data

#	Age A/Im	Time	Description
0			

Nesting Data: Observed Activity
(perching, preening, courtship, feeding, nest building, incubation, head color change, head throwback, diving)

#	Age A/Im	Time	Description
0			

General Observations
(caracara reaction to passing planes, trains, trucks, pedestrians, other birds, etc.)

#	Age A/Im	Time	Description
0			

Caracara Monitoring
Field Data Form

Date: 3/02/05 Start Time 4:00 p.m. Stop Time 7:00 p.m. Monitor _____

Site Name and Location: Include latitude and longitude, section, township, and range, and county. Milking R, Inc lat. 27.2986236/ long. -80.879668 Sections 23, 24,25,26, and 36 / Township 36 S / Range 34E

Weather Data

Time	Temp	Wind Speed/Direction	% Cloud Cover	Cloud Type	Rain
Start	55°	Windy 20 mph towards S.E.	25%	Stratus	None
Finish	60°	Same	40%	Stratus	None

Flight Data

#	Age A/Im	Time	Description
0			

Nesting Data: Observed Activity
(perching, preening, courtship, feeding, nest building, incubation, head color change, head throwback, diving)

#	Age A/Im	Time	Description
0			

General Observations
(caracara reaction to passing planes, trains, trucks, pedestrians, other birds, etc.)

#	Age A/Im	Time	Description
0			

Caracara Monitoring
Field Data Form

Date: 3/03/05 Start Time 8:00 a.m. Stop Time 11:00 a.m. Monitor _____

Site Name and Location: Include latitude and longitude, section, township, and range, and county. Milking R, Inc lat. 27.2986236/ long. -80.879668 Sections 23, 24,25,26, and 36 / Township 36 S / Range 34E

Weather Data

Time	Temp	Wind Speed/Direction	% Cloud Cover	Cloud Type	Rain
Start	55°	very little breeze	100% overcast	Stratus	None
Finish	60°	very little breeze	Same	Stratus	None

Flight Data

#	Age A/Im	Time	Description
0			

Nesting Data: Observed Activity
(perching, preening, courtship, feeding, nest building, incubation, head color change, head throwback, diving)

#	Age A/Im	Time	Description
0			

General Observations
(caracara reaction to passing planes, trains, trucks, pedestrians, other birds, etc.)

#	Age A/Im	Time	Description
0			

Appendix C
Selected Model Input and Output Files

Table C-1
Milking R, Inc. Treatment System

Overland Flow Parameters

Basin	Identifier	Flow Length (ft)	Slope (ft/ft)	Manning's n	Travel Time (hr)	Time of Concentration (hr)
2A	Sheet	100	0.0029	0.15	0.34	
	Shallow	300	0.0029	0.05	0.10	
	Channel	2065	0.0029	0.08	0.48	
						0.91
2B	Sheet	100	0.0029	0.15	0.34	
	Shallow	300	0.0029	0.05	0.10	
	Channel	2080	0.0029	0.08	0.48	
						0.92
2C	Sheet	100	0.0029	0.15	0.34	
	Shallow	300	0.0029	0.05	0.10	
	Channel	300	0.0029	0.08	0.07	
						0.50
2D	Sheet	100	0.0029	0.15	0.34	
	Shallow	300	0.0029	0.05	0.10	
	Channel	67	0.0029	0.08	0.03	
						0.47
2E	Sheet	100	0.0029	0.15	0.34	
	Shallow	125	0.0029	0.05	0.04	
						0.38
2F	Sheet	100	0.0029	0.15	0.34	
	Shallow	300	0.0029	0.05	0.10	
	Channel	65	0.0029	0.08	0.04	
						0.47
2G	Sheet	100	0.0029	0.15	0.34	
	Shallow	300	0.0029	0.05	0.10	
	Channel	1120	0.0029	0.08	0.23	
						0.66
4A	Sheet	100	0.0026	0.15	0.35	
	Shallow	300	0.0026	0.05	0.10	
	Channel	758	0.0026	0.08	0.35	
						0.80
4B	Sheet	100	0.0026	0.15	0.35	
	Shallow	300	0.0026	0.05	0.10	
	Channel	452	0.0026	0.08	0.14	
						0.59

Basin	Identifier	Flow Length (ft)	Slope (ft/ft)	Manning's n	Travel Time (hr)	Time of Concentration (hr)
4C	Sheet Shallow Channel	100 300 1225	0.0026 0.0026 0.0026	0.15 0.05 0.08	0.35 0.10 0.24	0.69
4D	Sheet Shallow Channel	100 300 884	0.0026 0.0026 0.0026	0.15 0.05 0.08	0.35 0.10 0.77	1.22
4E	Sheet Shallow	100 256	0.0026 0.0026	0.15 0.05	0.35 0.09 0.0	0.44
4F	Sheet Shallow Channel	100 300 754	0.0026 0.0026 0.0026	0.15 0.05 0.08	0.35 0.10 0.15	0.60
4G	Sheet Shallow Channel	100 300 767	0.0026 0.0026 0.0026	0.15 0.05 0.08	0.35 0.10 0.34	0.79
4H	Sheet Shallow Channel	100 300 1195	0.0026 0.0026 0.0026	0.15 0.05 0.08	0.35 0.10 1.20	1.65
4I	Sheet Shallow Channel	100 300 1212	0.0026 0.0026 0.0026	0.15 0.05 0.08	0.35 0.10 0.53	0.98
4J	Sheet Shallow Channel	100 300 2232	0.0036 0.0036 0.0036	0.15 0.05 0.08	0.31 0.09 0.76	1.15
4K	Sheet Shallow Channel	100 300 1410	0.0062 0.0062 0.0062	0.15 0.05 0.08	0.25 0.07 0.19	0.50
4M	Sheet Shallow Channel	100 300 454	0.0062 0.0062 0.0062	0.15 0.05 0.08	0.25 0.07 0.06	0.38
4N	Sheet Shallow Channel	100 300 525	0.002 0.002 0.002	0.15 0.05 0.08	0.39 0.12 0.12	0.63

Basin	Identifier	Flow Length (ft)	Slope (ft/ft)	Manning's n	Travel Time (hr)	Time of Concentration (hr)
4O	Sheet	100	0.002	0.15	0.39	
	Shallow	300	0.002	0.05	0.12	
	Channel	46	0.002	0.08	0.01	
						0.52
5A	Sheet	100	0.002	0.15	0.39	
	Shallow	300	0.002	0.05	0.12	
	Channel	1150	0.002	0.08	0.98	
						1.49
5B	Sheet	100	0.002	0.15	0.39	
	Shallow	300	0.002	0.05	0.12	
	Channel	600	0.002	0.08	0.51	
						1.02
5C	Sheet	100	0.002	0.15	0.39	
	Shallow	300	0.002	0.05	0.12	
	Channel	370	0.002	0.08	0.32	
						0.82
6	Sheet	100	0.002	0.15	0.39	
	Shallow	300	0.002	0.05	0.12	
	Channel	1460	0.002	0.08	1.47	
						1.98

Table C-2
Milking R, Inc. Treatment System

Win TR-20 Model Results

3 Year 24 Hour Storm Event

Basin ID	Basin Area (acres)	Runoff (in)	Time of Peak (hrs)	Peak Flow Rate (cfs)	Runoff Volume (ac-ft)
Basin 2A	76.16	1.96	12.54	50.09	12.41
Basin 2B	69.76	1.95	12.44	45.95	11.36
Basin 2C	10.24	1.73	12.2	10.34	1.47
Basin 2D	26.24	1.94	12.2	28.18	4.25
Basin 2E	7.04	1.55	12.15	8.82	0.91
Basin 2F	5.12	1.42	12.18	5.37	0.61
Basin 2G	46.72	1.95	12.33	39.55	7.60
Basin 4A	49.28	1.95	12.36	35.62	8.01
Basin 4B	24.96	1.94	12.3	22.83	4.04
Basin 4C	40.32	1.95	12.31	32.47	6.55
Basin 4D	17.28	1.91	12.77	8.93	2.75
Basin 4E	30.72	1.95	12.16	34.97	4.98
Basin 4F	19.2	1.93	12.29	17.16	3.09
Basin 4G	17.28	1.92	12.44	12.52	2.76
Basin 4H	55.04	1.94	12.92	23.05	8.91
Basin 4I	21.76	1.93	12.59	13.7	3.49
Basin 4J	67.2	1.95	12.68	37.01	10.93
Basin 4K	71.68	1.96	12.2	74.48	11.70
Basin 4M	26.88	1.95	12.13	33.79	4.36
Basin 4N	7.04	1.57	12.32	6.07	0.92
Basin 4O	3.84	1.38	12.26	4.04	0.44
Basin 5A	53.12	1.94	12.89	24.06	8.61
Basin 5B	14.08	1.90	12.6	8.54	2.23
Basin 5C	14.08	1.91	12.48	10.03	2.24
Basin 6	179.2	1.96	13.26	64.74	29.24
TOTAL	**954.24**				**153.83**

Table C-2
Milking R, Inc. Treatment System

Win TR-20 Model Results

5 Year 24 Hour Storm Event

Basin ID	Basin Area (acres)	Runoff (in)	Time of Peak (hrs)	Peak Flow Rate (cfs)	Runoff Volume (ac-ft)
Basin 2A	76.16	2.37	12.54	61.19	15.02
Basin 2B	69.76	2.37	12.44	56.32	13.76
Basin 2C	10.24	2.16	12.2	12.62	1.85
Basin 2D	26.24	2.36	12.22	34.23	5.15
Basin 2E	7.04	1.99	12.15	10.74	1.17
Basin 2F	5.12	1.80	12.2	6.58	0.77
Basin 2G	46.72	2.36	12.34	48.25	9.20
Basin 4A	49.28	2.36	12.39	43.82	9.70
Basin 4B	24.96	2.35	12.24	27.96	4.89
Basin 4C	40.32	2.36	12.35	39.86	7.93
Basin 4D	17.28	2.32	12.65	11.03	3.34
Basin 4E	30.72	2.36	12.19	42.71	6.04
Basin 4F	19.2	2.34	12.25	20.97	3.75
Basin 4G	17.28	2.33	12.36	15.22	3.36
Basin 4H	55.04	2.36	12.97	28.19	10.81
Basin 4I	21.76	2.34	12.51	16.86	4.23
Basin 4J	67.2	2.36	12.69	45.23	13.24
Basin 4K	71.68	2.37	12.2	90.83	14.16
Basin 4M	26.88	2.36	12.12	41.13	5.28
Basin 4N	7.04	1.99	12.3	7.44	1.17
Basin 4O	3.84	1.71	12.2	4.96	0.55
Basin 5A	53.12	2.36	12.88	29.48	10.44
Basin 5B	14.08	2.31	12.54	10.52	2.71
Basin 5C	14.08	2.32	12.42	12.34	2.72
Basin 6	179.2	2.37	13.18	79.68	35.39
TOTAL	**954.24**				**186.61**

Table C-2
Milking R, Inc. Treatment System

Win TR-20 Model Results

10 Year 24 Hour Storm Event

Basin ID	Basin Area (acres)	Runoff (in)	Time of Peak (hrs)	Peak Flow Rate (cfs)	Runoff Volume (ac-ft)
Basin 2A	76.16	2.79	12.48	73.25	17.73
Basin 2B	69.76	2.79	12.49	67.25	16.23
Basin 2C	10.24	2.70	12.24	14.82	2.31
Basin 2D	26.24	2.78	12.22	40.46	6.08
Basin 2E	7.04	2.43	12.15	12.71	1.43
Basin 2F	5.12	2.20	12.21	7.77	0.94
Basin 2G	46.72	2.79	12.32	57.33	10.86
Basin 4A	49.28	2.79	12.37	51.9	11.45
Basin 4B	24.96	2.78	12.24	33.17	5.77
Basin 4C	40.32	2.79	12.35	47.27	9.36
Basin 4D	17.28	2.74	12.74	13.01	3.95
Basin 4E	30.72	2.79	12.17	50.78	7.13
Basin 4F	19.2	2.76	12.25	24.91	4.42
Basin 4G	17.28	2.75	12.44	18.14	3.96
Basin 4H	55.04	2.78	12.86	33.34	12.76
Basin 4I	21.76	2.76	12.48	19.93	5.00
Basin 4J	67.2	2.79	12.59	53.91	15.62
Basin 4K	71.68	2.80	12.24	106.71	16.70
Basin 4M	26.88	2.78	12.16	48.71	6.23
Basin 4N	7.04	2.43	12.33	8.77	1.43
Basin 4O	3.84	2.09	12.2	5.87	0.67
Basin 5A	53.12	2.78	12.92	34.88	12.31
Basin 5B	14.08	2.73	12.53	12.48	3.20
Basin 5C	14.08	2.74	12.41	14.64	3.21
Basin 6	179.2	2.80	13.15	94.89	41.74
TOTAL	**954.24**				**220.49**

Table C-2
Milking R, Inc. Treatment System

Win TR-20 Model Results

25 Year 24 Hour Storm Event

Basin ID	Basin Area (acres)	Runoff (in)	Time of Peak (hrs)	Peak Flow Rate (cfs)	Runoff Volume (ac-ft)
Basin 2A	76.16	4.12	12.43	108.71	26.15
Basin 2B	69.76	4.12	12.46	100.07	23.95
Basin 2C	10.24	4.04	12.19	22.11	3.45
Basin 2D	26.24	4.11	12.21	60.14	8.98
Basin 2E	7.04	3.89	12.15	18.79	2.28
Basin 2F	5.12	3.58	12.21	11.51	1.53
Basin 2G	46.72	4.12	12.29	85.16	16.02
Basin 4A	49.28	4.12	12.39	77.42	16.90
Basin 4B	24.96	4.10	12.23	49.29	8.53
Basin 4C	40.32	4.11	12.29	70.1	13.82
Basin 4D	17.28	4.06	12.63	19.52	5.85
Basin 4E	30.72	4.11	12.19	74.8	10.52
Basin 4F	19.2	4.09	12.27	37	6.54
Basin 4G	17.28	4.08	12.34	26.93	5.87
Basin 4H	55.04	4.11	12.92	50.28	18.84
Basin 4I	21.76	4.09	12.53	29.86	7.41
Basin 4J	67.2	4.12	12.56	80.08	23.05
Basin 4K	71.68	4.12	12.19	159.13	24.63
Basin 4M	26.88	4.11	12.15	72.46	9.20
Basin 4N	7.04	3.90	12.25	13.09	2.29
Basin 4O	3.84	3.38	12.18	8.66	1.08
Basin 5A	53.12	4.11	12.85	52.41	18.19
Basin 5B	14.08	4.05	12.49	18.51	4.76
Basin 5C	14.08	4.06	12.36	21.69	4.77
Basin 6	179.2	4.12	13.21	141.17	61.57
TOTAL	**954.24**				**326.17**

Table C-3
Milking R, Inc. Treatment System

Basin Land Use and Curve Number Details

Basin	Land Use *Basin Summary*	Hydrologic Soil Group	Basin Area (ac)	Curve No.
2A	Pasture, grassland or range (fair) *Total Area / Weighted Curve Number*	B/D	76.16	79 79
2B	Pasture, grassland or range (fair) *Total Area / Weighted Curve Number*	B/D, D	79.76	79 79
2C	Pasture, grassland or range (fair) *Total Area / Weighted Curve Number*	B/D	10.24	79 79
2D	Pasture, grassland or range (fair) *Total Area / Weighted Curve Number*	B/D, D	26.24	79 79
2E	Pasture, grassland or range (fair) *Total Area / Weighted Curve Number*	B/D, D	7.04	79 79
2F	Pasture, grassland or range (fair) *Total Area / Weighted Curve Number*	B/D, D	5.12	79 79
2G	Pasture, grassland or range (fair) *Total Area / Weighted Curve Number*	B/D, D	46.72	79 79
4A	Pasture, grassland or range (fair) *Total Area / Weighted Curve Number*	B/D, D	49.28	79 79
4B	Pasture, grassland or range (fair) *Total Area / Weighted Curve Number*	B/D	24.96	79 79
4C	Pasture, grassland or range (fair) *Total Area / Weighted Curve Number*	B/D	40.32	79 79
4D	Pasture, grassland or range (fair) *Total Area / Weighted Curve Number*	B/D	17.28	79 79
4E	Pasture, grassland or range (fair) *Total Area / Weighted Curve Number*	B/D, D	30.72	79 79
4F	Pasture, grassland or range (fair) *Total Area / Weighted Curve Number*	B/D, D	19.20	79 79
4G	Pasture, grassland or range (fair) *Total Area / Weighted Curve Number*	B/D, D	17.28	79 79
4H	Pasture, grassland or range (fair) *Total Area / Weighted Curve Number*	B/D	55.04	79 79
4I	Pasture, grassland or range (fair) *Total Area / Weighted Curve Number*	B/D, C, D	21.76	79 79
4J	Pasture, grassland or range (fair) *Total Area / Weighted Curve Number*	B/D, C	67.20	79 79
4K	Pasture, grassland or range (fair) *Total Area / Weighted Curve Number*	B/D, D	71.68	79 79
4M	Pasture, grassland or range (fair) *Total Area / Weighted Curve Number*	B/D, D	26.88	79 79

Basin	Land Use *Basin Summary*	Hydrologic Soil Group	Basin Area (ac)	Curve No.
4N	Pasture, grassland or range (fair) *Total Area / Weighted Curve Number*	B/D	7.04	79 79
4O	Pasture, grassland or range (fair) *Total Area / Weighted Curve Number*	B/D, D	3.84	79 79
5A	Pasture, grassland or range (fair) *Total Area / Weighted Curve Number*	B/D	53.12	79 79
5B	Pasture, grassland or range (fair) *Total Area / Weighted Curve Number*	B/D	14.08	79 79
5C	Pasture, grassland or range (fair) *Total Area / Weighted Curve Number*	B/D	14.08	79 79
6	Pasture, grassland or range (fair) *Total Area / Weighted Curve Number*	B/D, D	179.2	79 79

TR-20 Input & Output Files

TR-20: Version 2001 0 0 0
Central portion of Milking R Dairy assuming ditch block in SW corner

SUB-AREA:

Basin 2A	2A		0.1188	79.			Y
	SHEET	100.	0.0029		E		
	SHALLOW	300.	0.0029		U		
	CHANNEL	2065.	0.0029	0.08	592.11	454.55	
Basin 2B	2B		0.1094	79.			Y
	SHEET	100.	0.0029		E		
	SHALLOW	300.	0.0029		U		
	CHANNEL	2080.	0.0029	0.08	592.11	454.55	
Basin 2C	2C		0.015625	79.			Y
	SHEET	100.	0.0029		E		
	SHALLOW	300.	0.0029		U		
	CHANNEL	300.	0.0029	0.08	133.2	98.4	
Basin 2D	2D		0.040625	79.			Y
	SHEET	100.	0.0029		E		
	SHALLOW	300.	0.0029		U		
	CHANNEL	67.	0.0029	0.08	428.33	1050.	
Basin 2E	2E		0.010938	79.			Y
	SHEET	100.	0.0029		E		
	SHALLOW	125.	0.0029		U		
Basin 2F	2F		0.007813	79.			Y
	SHEET	100.	0.0029		E		
	SHALLOW	300.	0.0029		U		
	CHANNEL	65.	0.0029	0.08	288.33	900.	
Basin 2G	2G		0.0734	79.			Y
	SHEET	100.	0.0029		E		
	SHALLOW	300.	0.0029		U		
	CHANNEL	1120.	0.0029	0.08	1883.33	1200.	
Basin 4A	4A		0.07656	79.			Y
	SHEET	100.	0.0026		E		
	SHALLOW	300.	0.0026		U		
	CHANNEL	758.	0.0026	0.08	617.	1200.2	
Basin 4B	4B		0.039	79.			Y
	SHEET	100.	0.0026		E		
	SHALLOW	300.	0.0026		U		
	CHANNEL	452.	0.0026	0.08	258.33	268.	
Basin 4C	4C		0.0625	79.			Y
	SHEET	100.	0.0026		E		
	SHALLOW	300.	0.0026		U		
	CHANNEL	1225.	0.0026	0.08	81.67	44.5	
Basin 4D	4D		0.02656	79.			Y
	SHEET	100.	0.0026		E		
	SHALLOW	300.	0.0026		U		
	CHANNEL	884.	0.0026	0.08	190.	975.	
Basin 4E	4E		0.04844	79.			Y
	SHEET	100.	0.0026		E		
	SHALLOW	256.	0.0026		U		
Basin 4F	4F		0.02969	79.			Y
	SHEET	100.	0.0026		E		
	SHALLOW	300.	0.0026		U		
	CHANNEL	754.	0.0026	0.08	81.67	44.5	
Basin 4G	4G		0.02656	79.			Y

		SHEET	100.	0.0026		E	
		SHALLOW	300.	0.0026		U	
		CHANNEL	767.	0.0026	0.08	442.	822.23
	Basin 4H	4H		0.08594	79.		Y
		SHEET	100.	0.0026		E	
		SHALLOW	300.	0.0026		U	
		CHANNEL	1195.	0.0026	0.08	514.	3250.
	Basin 4I	4I		0.03438	79.		Y
		SHEET	100.	0.0026		E	
		SHALLOW	300.	0.0026		U	
		CHANNEL	1212.	0.0026	0.08	492.65	900.2
	Basin 4J	4J		0.1047	79.		Y
		SHEET	100.	0.00355		E	
		SHALLOW	300.	0.00355		U	
		CHANNEL	2232.	0.00355	0.08	454.5	715.4
	Basin 4K	4K		0.1125	79.		Y
		SHEET	100.	0.0062		E	
		SHALLOW	300.	0.0062		U	
		CHANNEL	1410.	0.0062	0.08	833.33	487.36
	Basin 4M	4M		0.042	79.		Y
		SHEET	100.	0.0062		E	
		SHALLOW	300.	0.0062		U	
		CHANNEL	454.	0.0062	0.08	833.33	487.36
	Basin 4N	4N		0.0109	79.		Y
		SHEET	100.	0.002		E	
		SHALLOW	300.	0.002		U	
		CHANNEL	525.	0.002	0.08	587.5	352.67
	Basin 4O	4O		0.0063	79.		Y
		SHEET	100.	0.002		E	
		SHALLOW	300.	0.002		U	
		CHANNEL	46.	0.002	0.08	587.5	352.67
	Basin 5A	5A		0.083	79.		Y
		SHEET	100.	0.002		E	
		SHALLOW	300.	0.002		U	
		CHANNEL	1150.	0.002	0.08	961.	3939.4
	Basin 5B	5B		0.022	79.		Y
		SHEET	100.	0.002		E	
		SHALLOW	300.	0.002		U	
		CHANNEL	600.	0.002	0.08	961.	3939.4
	Basin 5C	5C		0.022	79.		Y
		SHEET	100.	0.002		E	
		SHALLOW	300.	0.002		U	
		CHANNEL	370.	0.002	0.08	961.	3939.4
	Basin 6	6		0.28	79.		Y
		SHEET	100.	0.002		E	
		SHALLOW	300.	0.002		U	
		CHANNEL	1460.	0.002	0.08	1059.	5541.7

STREAM REACH:

2G	2F	Sct 2G	1520.
2F	2E	Sct 2F	465.
2E	2D	Sct 2C+2E	225.
2D	2C	Sct 2D	467.
2C	2B	Sct 2C+2E	700.
2A	2B	Sct 2A+2B	2465.

2B	4J	Sct 2A+2B	2480.	
4J	4N	Sct 4J	2632.	
4N	4O	Sct 4N+4O	925.	
4O	4M	Sct 4N+4O	446.	
4M	OUTLET	Sct 4M+4K	854.	
4K	4M	Sct 4M+4K	1810.	
4I	4N	Sct 4I	1612.	
4H	4I	Sct 4H	1595.	
4B	4H	Sct 4B	852.	
	SPLIT FLOW4D			0.5
4A	4H	Sct 4A	1158.	
4G	4I	Sct 4G	1167.	
4F	4G	Sct 4ACEFI	1154.	
4E	4G	Sct 4ACEFI	356.	
4C	4F	Sct 4ACEFI	1625.	
4D	4F	Sct 4D	1284.	
5A	4M	Sct 5ABC	1450.	
5B	5A	Sct 5ABC	1000.	
5C	5A	Sct 5ABC	770.	
6	5C	Sct 6	1860.	

STORM ANALYSIS:

3YR-24HR	0.	4.	Type II	2	3.5
5YR-24HR	0.	4.5	Type II	2	3.5
10YR-24HR	0.	5.	Type II	2	3.5
25YR-24HR	0.	6.5	Type II	2	3.5

STREAM CROSS SECTION:

Sct 2A+2B	37.				
	33.5	0.	0.	0.	0.0029
	36.	50.358	42.11	25.34	
	37.	708.159	592.11	1700.	
Sct 2C+2E	37.				
	36.	0.	0.	0.	0.0029
	36.6	3.445	2.8	9.	
	37.	163.426	133.2	650.	
Sct 2D	37.				
	36.	0.	0.	0.	0.0029
	36.4	55.2	100.	388.1	
	37.	236.43	428.33	750.	
Sct 2F	37.				
	36.	0.	0.	0.	0.0029
	36.4	28.18	60.	157.14	
	37.	135.41	288.33	500.	
Sct 2G	37.				
	33.5	0.	0.	0.	0.0029
	35.	914.79	675.	547.92	
	37.	2552.39	1883.33	650.	
Sct 4ACEFI	36.85				
	32.5	0.	0.	0.	0.0026
	34.2	28.47	20.	13.	
	35.9	73.61	51.67	26.	
	36.85	116.25	81.67	35.	
Sct 4B	36.				
	33.75	0.	0.	0.	0.0026

	35.5	57.43	62.	13.	
	36.	239.28	258.33	150.	
Sct 4D	36.				
	33.75	0.	0.	0.	0.0026
	35.5	4.78	15.	13.	
	36.	60.52	190.	650.	
Sct 4G	36.				
	32.5	0.	0.	0.	0.0026
	35.	26.34	42.	25.	
	36.	277.23	442.	800.	
Sct 4H	36.				
	34.	0.	0.	0.	0.0026
	35.5	4.18	15.	17.	
	36.	150.2	540.	2000.	
Sct 4J	38.6				
	35.1	0.	0.	0.	0.0036
	37.8	28.28	34.5	30.	
	39.2	451.41	550.5	960.	
Sct 4M+4K	37.8				
	34.4	0.	0.	0.	0.0062
	37.	69.88	33.33	20.64	
	37.8	1746.88	833.33	2000.	
Sct 4L	36.5				
	33.8	0.	0.	0.	0.0037
	34.6	17.31	10.42	26.	
	35.5	59.48	35.83	37.	
	36.5	123.83	74.58	48.	
Sct 4N+4O	37.1				
	33.3	0.	0.	0.	0.002
	35.85	43.88	37.5	25.	
	37.1	687.38	587.5	850.	
Sct 4I	38.				
	32.5	0.	0.	0.	0.0026
	36.	42.95	67.6	30.42	
	38.	313.02	492.65	900.	
Sct 4A	38.				
	32.5	0.	0.	0.	0.0026
	36.	41.19	67.6	30.42	
	38.	376.35	617.	1200.	
Sct 5ABC	35.				
	31.3	0.	0.	0.	0.002
	32.9	7.96	24.5	11.	
	35.	312.33	961.	2000.	
Sct 6	35.5				
	33.7	0.	0.	0.	0.002
	34.32	3.04	11.	12.	
	35.5	292.55	1059.	3000.	

DIMENSIONLESS UNIT HYDROGRAPH:

0.	0.111	0.356	0.655	0.896
1.0	0.929	0.828	0.737	0.656
0.584	0.521	0.465	0.415	0.371
0.331	0.296	0.265	0.237	0.212

0.19	0.17	0.153	0.138	0.123
0.109	0.097	0.086	0.076	0.066
0.057	0.049	0.041	0.033	0.027
0.024	0.021	0.018	0.015	0.013
0.012	0.011	0.009	0.008	0.088
0.006	0.006	0.055	0.005	0.

GLOBAL OUTPUT:

0.5	YNNNN	YNNNNN	

VERIFICATION:

DATA PREP	Y	Y

Central portion of Milking R Dairy assuming ditch block in SW corner

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STORM 3YR-24HR

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Peak Flow Elevation (ft)	Peak Flow Time (hr)	Peak Flow Rate (cfs)	Peak Flow Rate (csm)
Basin 4B	0.039		1.940		12.30	22.83	585.31
4B	0.039	Upstream	1.940	34.45	12.30	22.83	585.31
4B	0.020	Downstream	1.795	34.01	12.54	8.59	440.73
Basin 4H	0.086		1.943		12.92	23.05	268.26
Basin 4A	0.077		1.950		12.36	35.62	465.26
4A	0.077	Upstream	1.950	35.53	12.36	35.62	465.26
4A	0.077	Downstream	1.916	34.80	13.11	27.09	353.80
4H	0.182	Upstream	1.915	35.68	13.00	57.23	314.47
4H	0.182	Downstream	1.897	35.66	14.71	51.73	284.23
Basin 4I	0.034		1.925		12.59	13.70	398.37
Basin 4C	0.063		1.949		12.31	32.47	519.59
4C	0.063	Upstream	1.949	34.35	12.31	32.47	519.59
4C	0.063	Downstream	1.933	34.22	12.78	29.08	465.23
Basin 4F	0.030		1.930		12.29	17.16	578.14
Basin 4D	0.027		1.908		12.77	8.93	336.39
4D	0.027	Upstream	1.908	35.54	12.77	8.93	336.39
4D	0.027	Downstream	1.807	35.53	14.07	7.64	287.49
4F	0.119	Upstream	1.904	34.71	12.60	42.01	353.75
4F	0.119	Downstream	1.898	34.65	12.93	40.32	339.53
Basin 4G	0.027		1.919		12.44	12.52	471.32
Basin 4E	0.048		1.947		12.16	34.97	721.87
4E	0.048	Upstream	1.947	34.44	12.16	34.97	721.87
4E	0.048	Downstream	1.933	34.36	12.28	32.85	678.14
4G	0.194	Upstream	1.909	35.18	12.60	71.66	369.84
4G	0.194	Downstream	1.903	35.16	13.26	67.46	348.20
4I	0.410	Upstream	1.898	36.40	14.23	96.35	234.92
4I	0.410	Downstream	1.896	36.38	14.89	94.72	230.94
Basin 4N	0.011		1.565		12.32	6.07	557.33
Basin 2G	0.073		1.951		12.33	39.55	538.83
2G	0.073	Upstream	1.951	33.56	12.33	39.55	538.83
2G	0.073	Downstream	1.941	33.56	12.68	36.11	491.95
Basin 2F	0.008		1.420		12.18	5.37	687.58
2F	0.081	Upstream	1.884	36.46	12.68	39.52	486.57
2F	0.081	Downstream	1.877	36.45	12.95	37.50	461.79
Basin 2E	0.011		1.551		12.15	8.82	805.97
2E	0.092	Upstream	1.837	36.69	12.95	40.71	441.76
2E	0.092	Downstream	1.836	36.69	13.04	40.61	440.68
Basin 2D	0.041		1.943		12.20	28.18	693.74
2D	0.133	Upstream	1.869	36.39	12.95	53.65	404.04
2D	0.133	Downstream	1.865	36.38	13.13	53.11	400.01
Basin 2C	0.016		1.725		12.20	10.34	661.98
2C	0.148	Upstream	1.850	36.74	13.13	57.51	387.55
2C	0.148	Downstream	1.848	36.73	13.30	57.29	386.02
Basin 2B	0.109		1.954		12.44	45.95	420.01
Basin 2A	0.119		1.955		12.54	50.09	421.66
2A	0.119	Upstream	1.955	35.99	12.54	50.09	421.66
2A	0.119	Downstream	1.944	35.70	13.15	44.32	373.10

Central portion of Milking R Dairy assuming ditch block in SW corner

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Peak Flow Elevation (ft)	Peak Flow Time (hr)	Peak Flow Rate (cfs)	Peak Flow Rate (csm)
2B	0.377	Upstream	1.906	36.13	13.17	135.14	358.84
2B	0.377	Downstream	1.903	36.13	13.66	133.71	355.03
Basin 4J	0.105		1.952		12.68	37.01	353.44
4J	0.481	Upstream	1.913	38.23	13.60	159.32	331.02
4J	0.481	Downstream	1.911	38.22	14.53	156.05	324.22
4N	0.902	Upstream	1.900	36.25	14.56	249.22	276.20
4N	0.902	Downstream	1.900	36.25	14.72	247.42	274.20
Basin 4O	0.006		1.376		12.26	4.04	641.22
4O	0.909	Upstream	1.896	36.25	14.72	247.99	272.93
4O	0.909	Downstream	1.896	36.25	14.89	247.63	272.53
Basin 4M	0.042		1.945		12.13	33.79	804.56
Basin 4K	0.112		1.958		12.20	74.48	662.04
4K	0.112	Upstream	1.958	37.00	12.20	74.48	662.04
4K	0.112	Downstream	1.953	37.00	12.47	71.35	634.18
Basin 5B	0.022		1.901		12.60	8.54	388.31
5B	0.022	Upstream	1.901	32.90	12.60	8.54	388.31
5B	0.022	Downstream	1.699	32.34	13.69	5.18	235.40
Basin 5A	0.083		1.944		12.89	24.06	289.84
Basin 6	0.280		1.958		13.26	64.74	231.21
6	0.280	Upstream	1.958	34.57	13.26	64.74	231.21
6	0.280	Downstream	1.943	34.54	15.37	57.23	204.40
Basin 5C	0.022		1.907		12.48	10.03	456.05
5C	0.302	Upstream	1.940	33.25	15.37	59.24	196.17
5C	0.302	Downstream	1.936	33.24	16.16	57.33	189.84
5A	0.407	Upstream	1.921	33.32	15.90	69.33	170.34
5A	0.407	Downstream	1.916	33.30	17.22	66.42	163.19
4M	1.470	Upstream	1.907	37.11	14.84	297.56	202.40
4M	1.470	Downstream	1.907	37.11	15.11	297.44	202.32
OUTLET	1.470		1.907		15.11	297.44	202.32

STORM 5YR-24HR

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Peak Flow Elevation (ft)	Peak Flow Time (hr)	Peak Flow Rate (cfs)	Peak Flow Rate (csm)
Basin 4B	0.039		2.349		12.24	27.96	716.85
4B	0.039	Upstream	2.349	34.60	12.24	27.96	716.85
4B	0.020	Downstream	2.255	34.07	12.48	10.56	541.54
Basin 4H	0.086		2.357		12.97	28.19	327.98
Basin 4A	0.077		2.362		12.39	43.82	572.40
4A	0.077	Upstream	2.362	36.02	12.39	43.82	572.40
4A	0.077	Downstream	2.320	35.33	13.03	33.33	435.36
4H	0.182	Upstream	2.330	35.73	12.93	70.07	384.99
4H	0.182	Downstream	2.311	35.70	14.74	63.40	348.35
Basin 4I	0.034		2.335		12.51	16.86	490.45
Basin 4C	0.063		2.361		12.35	39.86	637.69
4C	0.063	Upstream	2.361	34.63	12.35	39.86	637.69
4C	0.063	Downstream	2.343	34.46	12.72	35.44	567.07
Basin 4F	0.030		2.341		12.25	20.97	706.32
Basin 4D	0.027		2.316		12.65	11.03	415.26
4D	0.027	Upstream	2.316	35.56	12.65	11.03	415.26

Central portion of Milking R Dairy assuming ditch block in SW corner

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Peak Flow Elevation (ft)	Peak Flow Time (hr)	Peak Flow Rate (cfs)	Peak Flow Rate (csm)
4D	0.027	Downstream	2.209	35.54	13.95	9.47	356.40
4F	0.119	Upstream	2.313	35.06	12.65	51.21	431.28
4F	0.119	Downstream	2.306	34.98	12.97	49.23	414.57
Basin 4G	0.027		2.330		12.36	15.22	573.11
Basin 4E	0.048		2.359		12.19	42.71	881.81
4E	0.048	Upstream	2.359	34.74	12.19	42.71	881.81
4E	0.048	Downstream	2.339	34.63	12.25	40.02	826.10
4G	0.194	Upstream	2.317	35.24	12.65	87.23	450.21
4G	0.194	Downstream	2.314	35.23	13.14	83.03	428.53
4I	0.410	Upstream	2.309	36.55	14.28	117.83	287.30
4I	0.410	Downstream	2.307	36.54	14.93	116.09	283.05
Basin 4N	0.011		1.989		12.30	7.44	682.15
Basin 2G	0.073		2.364		12.34	48.25	657.40
2G	0.073	Upstream	2.364	33.58	12.34	48.25	657.40
2G	0.073	Downstream	2.352	33.57	12.69	44.13	601.16
Basin 2F	0.008		1.799		12.20	6.58	842.25
2F	0.081	Upstream	2.292	36.51	12.69	48.19	593.36
2F	0.081	Downstream	2.284	36.50	12.96	45.71	562.89
Basin 2E	0.011		1.990		12.15	10.74	982.24
2E	0.092	Upstream	2.247	36.72	12.96	49.51	537.22
2E	0.092	Downstream	2.246	36.71	12.96	49.32	535.22
Basin 2D	0.041		2.355		12.22	34.23	842.60
2D	0.133	Upstream	2.279	36.43	12.87	65.36	492.29
2D	0.133	Downstream	2.275	36.43	13.14	64.55	486.17
Basin 2C	0.016		2.164		12.20	12.62	807.47
2C	0.148	Upstream	2.262	36.77	13.05	69.87	470.80
2C	0.148	Downstream	2.261	36.77	13.22	69.72	469.78
Basin 2B	0.109		2.367		12.44	56.32	514.85
Basin 2A	0.119		2.367		12.54	61.19	515.10
2A	0.119	Upstream	2.367	36.02	12.54	61.19	515.10
2A	0.119	Downstream	2.357	36.01	13.15	56.52	475.76
2B	0.377	Upstream	2.320	36.18	13.05	167.37	444.43
2B	0.377	Downstream	2.317	36.17	13.66	165.31	438.96
Basin 4J	0.105		2.364		12.69	45.23	432.02
4J	0.481	Upstream	2.327	38.36	13.61	196.35	407.95
4J	0.481	Downstream	2.325	38.34	14.53	191.86	398.62
4N	0.902	Upstream	2.312	36.36	14.60	306.00	339.12
4N	0.902	Downstream	2.311	36.36	14.77	304.46	337.41
Basin 4O	0.006		1.710		12.20	4.96	786.99
4O	0.909	Upstream	2.307	36.36	14.77	305.14	335.82
4O	0.909	Downstream	2.307	36.36	14.93	304.03	334.60
Basin 4M	0.042		2.357		12.12	41.13	979.37
Basin 4K	0.112		2.370		12.20	90.83	807.36
4K	0.112	Upstream	2.370	37.01	12.20	90.83	807.36
4K	0.112	Downstream	2.366	37.01	12.47	88.28	784.75
Basin 5B	0.022		2.311		12.54	10.52	478.07
5B	0.022	Upstream	2.311	32.92	12.54	10.52	478.07
5B	0.022	Downstream	2.194	32.69	13.63	6.93	314.80
Basin 5A	0.083		2.358		12.88	29.48	355.16
Basin 6	0.280		2.370		13.18	79.68	284.58
6	0.280	Upstream	2.370	34.63	13.18	79.68	284.58
6	0.280	Downstream	2.354	34.59	15.29	69.87	249.53

Central portion of Milking R Dairy assuming ditch block in SW corner

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Peak Flow Elevation (ft)	Peak Flow Time (hr)	Peak Flow Rate (cfs)	Peak Flow Rate (csm)
Basin 5C	0.022		2.318		12.42	12.34	560.70
5C	0.302	Upstream	2.351	33.34	15.29	72.35	239.57
5C	0.302	Downstream	2.347	33.33	16.08	70.13	232.22
5A	0.407	Upstream	2.332	33.43	15.82	84.37	207.29
5A	0.407	Downstream	2.327	33.40	17.13	80.90	198.78
4M	1.470	Upstream	2.318	37.14	15.03	366.06	249.00
4M	1.470	Downstream	2.317	37.14	15.03	366.06	249.00
OUTLET	1.470		2.317		15.03	366.06	249.00

STORM 10YR-24HR

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Peak Flow Elevation (ft)	Peak Flow Time (hr)	Peak Flow Rate (cfs)	Peak Flow Rate (csm)
Basin 4B	0.039		2.775		12.24	33.17	850.56
4B	0.039	Upstream	2.775	34.76	12.24	33.17	850.56
4B	0.020	Downstream	2.661	34.13	12.47	12.57	644.85
Basin 4H	0.086		2.781		12.86	33.34	387.94
Basin 4A	0.077		2.789		12.37	51.90	677.86
4A	0.077	Upstream	2.789	36.06	12.37	51.90	677.86
4A	0.077	Downstream	2.755	35.99	13.01	41.12	537.09
4H	0.182	Upstream	2.756	35.78	13.01	84.76	465.74
4H	0.182	Downstream	2.739	35.75	14.72	76.24	418.92
Basin 4I	0.034		2.760		12.48	19.93	579.75
Basin 4C	0.063		2.786		12.35	47.27	756.36
4C	0.063	Upstream	2.786	34.91	12.35	47.27	756.36
4C	0.063	Downstream	2.766	34.70	12.72	41.85	669.64
Basin 4F	0.030		2.764		12.25	24.91	838.89
Basin 4D	0.027		2.741		12.74	13.01	489.79
4D	0.027	Upstream	2.741	35.57	12.74	13.01	489.79
4D	0.027	Downstream	2.648	35.56	14.05	11.41	429.66
4F	0.119	Upstream	2.739	35.46	12.63	62.03	522.36
4F	0.119	Downstream	2.733	35.37	12.91	59.61	501.94
Basin 4G	0.027		2.753		12.44	18.14	682.91
Basin 4E	0.048		2.785		12.17	50.78	1048.26
4E	0.048	Upstream	2.785	35.04	12.17	50.78	1048.26
4E	0.048	Downstream	2.761	34.90	12.22	47.15	973.36
4G	0.194	Upstream	2.743	35.31	12.55	104.17	537.64
4G	0.194	Downstream	2.738	35.29	13.18	99.40	513.05
4I	0.410	Upstream	2.738	36.72	14.32	140.14	341.70
4I	0.410	Downstream	2.735	36.71	14.97	138.17	336.90
Basin 4N	0.011		2.429		12.33	8.77	804.92
Basin 2G	0.073		2.789		12.32	57.33	781.00
2G	0.073	Upstream	2.789	33.59	12.32	57.33	781.00
2G	0.073	Downstream	2.778	33.59	12.67	52.29	712.40
Basin 2F	0.008		2.204		12.21	7.77	994.27
2F	0.081	Upstream	2.714	36.56	12.67	57.20	704.35
2F	0.081	Downstream	2.706	36.54	12.93	53.93	664.08
Basin 2E	0.011		2.431		12.15	12.71	1162.34
2E	0.092	Upstream	2.669	36.74	12.93	58.50	634.82
2E	0.092	Downstream	2.667	36.74	13.02	58.35	633.19

Central portion of Milking R Dairy assuming ditch block in SW corner

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Peak Flow Elevation (ft)	Peak Flow Time (hr)	Peak Flow Rate (cfs)	Peak Flow Rate (csm)
Basin 2D	0.041		2.780		12.22	40.46	996.02
2D	0.133	Upstream	2.701	36.47	12.85	77.04	580.23
2D	0.133	Downstream	2.698	36.47	13.11	76.13	573.39
Basin 2C	0.016		2.704		12.24	14.82	948.38
2C	0.148	Upstream	2.698	36.80	13.11	82.40	555.28
2C	0.148	Downstream	2.696	36.80	13.20	82.21	553.96
Basin 2B	0.109		2.792		12.49	67.25	614.74
Basin 2A	0.119		2.793		12.48	73.25	616.60
2A	0.119	Upstream	2.793	36.03	12.48	73.25	616.60
2A	0.119	Downstream	2.783	36.03	13.08	68.33	575.15
2B	0.377	Upstream	2.750	36.23	13.11	199.65	530.13
2B	0.377	Downstream	2.747	36.22	13.59	196.81	522.61
Basin 4J	0.105		2.790		12.59	53.91	514.94
4J	0.481	Upstream	2.756	38.48	13.52	233.56	485.27
4J	0.481	Downstream	2.754	38.46	14.44	228.19	474.12
4N	0.902	Upstream	2.741	36.47	14.59	364.36	403.80
4N	0.902	Downstream	2.741	36.47	14.75	362.65	401.91
Basin 4O	0.006		2.086		12.20	5.87	932.45
4O	0.909	Upstream	2.733	36.47	14.75	363.44	399.98
4O	0.909	Downstream	2.733	36.47	14.90	362.21	398.63
Basin 4M	0.042		2.783		12.16	48.71	1159.70
Basin 4K	0.112		2.795		12.24	106.71	948.53
4K	0.112	Upstream	2.795	37.02	12.24	106.71	948.53
4K	0.112	Downstream	2.790	37.02	12.44	104.33	927.39
Basin 5B	0.022		2.729		12.53	12.48	567.10
5B	0.022	Upstream	2.729	32.93	12.53	12.48	567.10
5B	0.022	Downstream	2.608	32.91	13.62	8.84	401.95
Basin 5A	0.083		2.782		12.92	34.88	420.24
Basin 6	0.280		2.795		13.15	94.89	338.88
6	0.280	Upstream	2.795	34.69	13.15	94.89	338.88
6	0.280	Downstream	2.779	34.65	15.26	82.96	296.30
Basin 5C	0.022		2.739		12.41	14.64	665.27
5C	0.302	Upstream	2.776	33.44	15.26	85.88	284.38
5C	0.302	Downstream	2.771	33.42	16.05	83.28	275.77
5A	0.407	Upstream	2.764	33.53	16.05	99.97	245.62
5A	0.407	Downstream	2.759	33.51	17.10	95.86	235.52
4M	1.470	Upstream	2.745	37.18	15.00	436.76	297.09
4M	1.470	Downstream	2.745	37.18	15.00	436.76	297.09
OUTLET	1.470		2.745		15.00	436.76	297.09

STORM 25YR-24HR

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Peak Flow Elevation (ft)	Peak Flow Time (hr)	Peak Flow Rate (cfs)	Peak Flow Rate (csm)
Basin 4B	0.039		4.101		12.23	49.29	1263.87
4B	0.039	Upstream	4.101	35.25	12.23	49.29	1263.87
4B	0.020	Downstream	3.951	34.32	12.47	18.79	963.69
Basin 4H	0.086		4.108		12.92	50.28	585.10
Basin 4A	0.077		4.115		12.39	77.42	1011.28
4A	0.077	Upstream	4.115	36.22	12.39	77.42	1011.28

Central portion of Milking R Dairy assuming ditch block in SW corner

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Peak Flow Elevation (ft)	Peak Flow Time (hr)	Peak Flow Rate (cfs)	Peak Flow Rate (csm)
4A	0.077	Downstream	4.094	36.15	13.03	66.03	862.43
4H	0.182	Upstream	4.084	35.93	12.92	131.14	720.54
4H	0.182	Downstream	4.066	35.88	14.74	115.85	636.52
Basin 4I	0.034		4.087		12.53	29.86	868.62
Basin 4C	0.063		4.112		12.29	70.10	1121.62
4C	0.063	Upstream	4.112	35.77	12.29	70.10	1121.62
4C	0.063	Downstream	4.090	35.44	12.76	61.44	983.08
Basin 4F	0.030		4.088		12.27	37.00	1246.30
Basin 4D	0.027		4.063		12.63	19.52	734.82
4D	0.027	Upstream	4.063	35.63	12.63	19.52	734.82
4D	0.027	Downstream	3.970	35.61	13.93	17.23	648.75
4F	0.119	Upstream	4.062	36.32	12.63	92.28	777.12
4F	0.119	Downstream	4.057	36.22	12.95	88.17	742.47
Basin 4G	0.027		4.076		12.34	26.93	1013.77
Basin 4E	0.048		4.111		12.19	74.80	1544.25
4E	0.048	Upstream	4.111	35.93	12.19	74.80	1544.25
4E	0.048	Downstream	4.083	35.76	12.25	69.92	1443.34
4G	0.194	Upstream	4.066	35.51	12.63	155.45	802.30
4G	0.194	Downstream	4.063	35.49	13.11	148.90	768.52
4I	0.410	Upstream	4.064	37.22	14.26	207.98	507.11
4I	0.410	Downstream	4.062	37.20	14.91	205.14	500.18
Basin 4N	0.011		3.896		12.25	13.09	1201.01
Basin 2G	0.073		4.116		12.29	85.16	1160.25
2G	0.073	Upstream	4.116	33.64	12.29	85.16	1160.25
2G	0.073	Downstream	4.104	33.63	12.65	77.55	1056.56
Basin 2F	0.008		3.576		12.21	11.51	1472.93
2F	0.081	Upstream	4.042	36.72	12.65	84.90	1045.37
2F	0.081	Downstream	4.033	36.69	13.00	79.68	981.09
Basin 2E	0.011		3.889		12.15	18.79	1718.04
2E	0.092	Upstream	4.008	36.81	12.91	86.26	936.10
2E	0.092	Downstream	4.006	36.81	13.00	86.03	933.62
Basin 2D	0.041		4.105		12.21	60.14	1480.46
2D	0.133	Upstream	4.036	36.59	12.91	113.60	855.59
2D	0.133	Downstream	4.033	36.59	13.09	112.01	843.64
Basin 2C	0.016		4.044		12.19	22.11	1414.76
2C	0.148	Upstream	4.032	36.89	13.00	121.36	817.75
2C	0.148	Downstream	4.030	36.89	13.18	121.12	816.19
Basin 2B	0.109		4.120		12.46	100.07	914.67
Basin 2A	0.119		4.120		12.43	108.71	915.05
2A	0.119	Upstream	4.120	36.09	12.43	108.71	915.05
2A	0.119	Downstream	4.109	36.08	13.16	103.64	872.43
2B	0.377	Upstream	4.078	36.38	13.07	298.68	793.09
2B	0.377	Downstream	4.075	36.37	13.68	294.14	781.03
Basin 4J	0.105		4.116		12.56	80.08	764.88
4J	0.481	Upstream	4.084	38.86	13.49	348.03	723.11
4J	0.481	Downstream	4.081	38.83	14.41	339.79	705.99
4N	0.902	Upstream	4.071	36.82	14.42	541.04	599.60
4N	0.902	Downstream	4.071	36.81	14.75	538.88	597.21
Basin 4O	0.006		3.376		12.18	8.66	1373.89
4O	0.909	Upstream	4.054	36.81	14.75	539.99	594.29
4O	0.909	Downstream	4.054	36.81	14.91	537.60	591.65
Basin 4M	0.042		4.108		12.15	72.46	1725.13

Central portion of Milking R Dairy assuming ditch block in SW corner

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Peak Flow Elevation (ft)	Peak Flow Time (hr)	Peak Flow Rate (cfs)	Peak Flow Rate (csm)
Basin 4K	0.112		4.123		12.19	159.13	1414.51
4K	0.112	Upstream	4.123	37.04	12.19	159.13	1414.51
4K	0.112	Downstream	4.117	37.04	12.46	156.46	1390.73
Basin 5B	0.022		4.053		12.49	18.51	841.18
5B	0.022	Upstream	4.053	32.97	12.49	18.51	841.18
5B	0.022	Downstream	3.891	32.94	13.58	14.22	646.32
Basin 5A	0.083		4.109		12.85	52.41	631.41
Basin 6	0.280		4.123		13.21	141.17	504.19
6	0.280	Upstream	4.123	34.88	13.21	141.17	504.19
6	0.280	Downstream	4.110	34.82	15.32	124.74	445.51
Basin 5C	0.022		4.062		12.36	21.69	985.73
5C	0.302	Upstream	4.106	33.73	15.32	128.74	426.29
5C	0.302	Downstream	4.101	33.70	16.11	124.44	412.05
5A	0.407	Upstream	4.091	33.87	15.84	149.02	366.15
5A	0.407	Downstream	4.086	33.83	17.16	142.79	350.83
4M	1.470	Upstream	4.069	37.28	14.79	651.07	442.87
4M	1.470	Downstream	4.069	37.28	15.05	650.18	442.26
OUTLET	1.470		4.069		15.05	650.18	442.26

Central portion of Milking R Dairy assuming ditch block in SW corner

Area or Reach Identifier	Drainage Area (sq mi)	Alternate	Peak Flow by Storm 3YR-24HR (cfs)	5YR-24HR (cfs)	10YR-24HR (cfs)	25YR-24HR (cfs)	(cfs)
Basin 2A	0.12		50.1	61.2	73.3	108.7	
Basin 2B	0.11		45.9	56.3	67.3	100.1	
Basin 2C	0.02		10.3	12.6	14.8	22.1	
Basin 2D	0.04		28.2	34.2	40.5	60.1	
Basin 2E	0.01		8.8	10.7	12.7	18.8	
Basin 2F	0.781E-02		5.4	6.6	7.8	11.5	
Basin 2G	0.07		39.6	48.3	57.3	85.2	
Basin 4A	0.08		35.6	43.8	51.9	77.4	
Basin 4B	0.04		22.8	28.0	33.2	49.3	
Basin 4C	0.06		32.5	39.9	47.3	70.1	
Basin 4D	0.03		8.9	11.0	13.0	19.5	
Basin 4E	0.05		35.0	42.7	50.8	74.8	
Basin 4F	0.03		17.2	21.0	24.9	37.0	
Basin 4G	0.03		12.5	15.2	18.1	26.9	
Basin 4H	0.09		23.1	28.2	33.3	50.3	
Basin 4I	0.03		13.7	16.9	19.9	29.9	
Basin 4J	0.10		37.0	45.2	53.9	80.1	
Basin 4K	0.11		74.5	90.8	106.7	159.1	
Basin 4M	0.04		33.8	41.1	48.7	72.5	
Basin 4N	0.01		6.1	7.4	8.8	13.1	
Basin 4O	0.630E-02		4.0	5.0	5.9	8.7	
Basin 5A	0.08		24.1	29.5	34.9	52.4	
Basin 5B	0.02		8.5	10.5	12.5	18.5	
Basin 5C	0.02		10.0	12.3	14.6	21.7	
Basin 6	0.28		64.7	79.7	94.9	141.2	
2G	0.07		39.6	48.3	57.3	85.2	
DOWNSTREAM			36.1	44.1	52.3	77.6	
2F	0.08		39.5	48.2	57.2	84.9	
DOWNSTREAM			37.5	45.7	53.9	79.7	
2E	0.09		40.7	49.5	58.5	86.3	
DOWNSTREAM			40.6	49.3	58.3	86.0	
2D	0.13		53.6	65.4	77.0	113.6	
DOWNSTREAM			53.1	64.6	76.1	112.0	
2C	0.15		57.5	69.9	82.4	121.4	
DOWNSTREAM			57.3	69.7	82.2	121.1	
2A	0.12		50.1	61.2	73.3	108.7	
DOWNSTREAM			44.3	56.5	68.3	103.6	
2B	0.38		135.1	167.4	199.6	298.7	
DOWNSTREAM			133.7	165.3	196.8	294.1	
4J	0.48		159.3	196.3	233.6	348.0	
DOWNSTREAM			156.0	191.9	228.2	339.8	
4N	0.90		249.2	306.0	364.4	541.0	
DOWNSTREAM			247.4	304.5	362.7	538.9	
4O	0.91		248.0	305.1	363.4	540.0	
DOWNSTREAM			247.6	304.0	362.2	537.6	
4M	1.47		297.6	366.1	436.8	651.1	
DOWNSTREAM			297.4	366.1	436.8	650.2	
4K	0.11		74.5	90.8	106.7	159.1	
DOWNSTREAM			71.3	88.3	104.3	156.5	
4I	0.41		96.3	117.8	140.1	208.0	
DOWNSTREAM			94.7	116.1	138.2	205.1	

Central portion of Milking R Dairy assuming ditch block in SW corner

Area or Reach Identifier	Drainage Area (sq mi)	Alternate	Peak Flow by Storm 3YR-24HR (cfs)	5YR-24HR (cfs)	10YR-24HR (cfs)	25YR-24HR (cfs)	(cfs)
4H	0.18		57.2	70.1	84.8	131.1	
DOWNSTREAM			51.7	63.4	76.2	115.8	
4B	0.02		22.8	28.0	33.2	49.3	
DOWNSTREAM			8.6	10.6	12.6	18.8	
4A	0.08		35.6	43.8	51.9	77.4	
DOWNSTREAM			27.1	33.3	41.1	66.0	
4G	0.19		71.7	87.2	104.2	155.4	
DOWNSTREAM			67.5	83.0	99.4	148.9	
4F	0.12		42.0	51.2	62.0	92.3	
DOWNSTREAM			40.3	49.2	59.6	88.2	
4E	0.05		35.0	42.7	50.8	74.8	
DOWNSTREAM			32.8	40.0	47.1	69.9	
4C	0.06		32.5	39.9	47.3	70.1	
DOWNSTREAM			29.1	35.4	41.9	61.4	
4D	0.03		8.9	11.0	13.0	19.5	
DOWNSTREAM			7.6	9.5	11.4	17.2	
5A	0.41		69.3	84.4	100.0	149.0	
DOWNSTREAM			66.4	80.9	95.9	142.8	
5B	0.02		8.5	10.5	12.5	18.5	
DOWNSTREAM			5.2	6.9	8.8	14.2	
5C	0.30		59.2	72.4	85.9	128.7	
DOWNSTREAM			57.3	70.1	83.3	124.4	
6	0.28		64.7	79.7	94.9	141.2	
DOWNSTREAM			57.2	69.9	83.0	124.7	
OUTLET	1.47		297.4	366.1	436.8	650.2	

STOWAT Input & Output Files

STOWATER 1.3 YEARLY SUMMARY

Yearly summary for Milking R Inc. Run Date 10-26-2004

Inflow from external sources, gal/day-----: 0
Pumping rate into reservoir, ac-in/day----: 874.9
Surface area of reservoir, acres ---------: 78.8
Overflow depth in reservoir, feet --------: 2.9573
Name reservoir PET file ------------------:c:\stowat\S65C.EVP
Name of drainage sub-basin file----------:c:\stowat\mlkdrn.SUB
Name of irrigation sub-basin file --------:c:\stowat\mlkrirr.sub

Drainage Sub-Basins

mlkdrn.SUB

DRAINMOD daily output filenames used in simulations	Drainage Area (Acres)
C:\stowat\milkr.day	852.0

Irrigation Sub-Basins

mlkirr.sub

DRAINMOD Daily Output Filenames used in the simulation	Irr.Area Acres	Irrg (in)	Irr. Eff%
C:\stowat\mlkrirr.day	0.01	0.00	10

YEAR	RAIN (in)	HIA-MAX (in)	PMP-INF (ac-in)	WSP-EVP (in)	IRRIG (ac-in)	MAX-STOR (ac-in)	OVERFLOW (in)	DRY DAYS	IRR-DEF (in)
1966	60.2	0.5	20812.4	27.7	0.0	2796.4	227.3	0	0.0
1967	31.9	0.0	0.0	29.1	0.0	2570.8	0.0	0	0.0
1968	62.7	0.0	15919.1	28.1	0.0	2796.4	180.4	0	0.0
1969	62.4	0.0	12216.1	27.8	0.0	2796.4	152.4	0	0.0
1970	58.2	0.0	12958.2	31.2	0.0	2796.4	159.5	0	0.0
1971	45.3	0.0	4652.1	23.6	0.0	2796.4	51.0	0	0.0
1972	33.4	0.0	0.8	30.4	0.0	2780.9	0.0	0	0.0
1973	28.6	0.0	0.0	28.3	0.0	1460.4	0.0	0	0.0
1974	44.1	0.0	3125.4	28.7	0.0	2796.4	6.1	80	0.0
1975	30.0	0.0	0.0	32.4	0.0	2524.2	0.0	0	0.0
1976	49.6	0.0	2402.8	29.6	0.0	2770.3	0.0	0	0.0
1977	39.7	0.0	0.0	30.1	0.0	2514.0	0.0	0	0.0
1978	54.1	0.0	1603.7	28.3	0.0	2601.9	0.0	0	0.0
1979	53.3	1.0	8934.1	28.5	0.0	2796.4	104.7	0	0.0
1980	40.3	0.0	0.0	29.4	0.0	2596.8	0.0	0	0.0
1981	33.8	0.0	0.0	28.1	0.0	1608.1	0.0	0	0.0
1982	54.3	0.0	1563.7	27.4	0.0	1654.7	0.0	0	0.0
1983	69.4	1.4	20764.3	27.1	0.0	2796.4	248.0	0	0.0
1984	33.1	0.0	895.0	25.6	0.0	2796.4	9.2	0	0.0
1985	37.4	0.0	0.0	27.0	0.0	2024.9	0.0	0	0.0
1986	47.7	0.0	405.2	27.9	0.0	1077.8	0.0	0	0.0
1987	45.9	0.0	126.6	27.2	0.0	728.8	0.0	33	0.0
1988	46.5	0.0	5034.3	27.8	0.0	2796.4	30.5	22	0.0
1989	46.4	0.0	4.6	31.3	0.0	2410.4	0.0	0	0.0
1990	45.6	2.1	9225.3	27.5	0.0	2796.4	96.0	0	0.0
1991	47.7	0.0	1578.6	27.6	0.0	2796.4	9.9	0	0.0
1992	46.0	0.0	3639.6	22.3	0.0	2796.4	39.1	0	0.0
AVG	46.2	0.2	4661.6	28.2	0.0	2432.5	48.7	5	0.0

STOWATER 1.3 DAILY OUTPUT

Daily output for Milking R Inc. Run Date 10-26-2004

Inflow from external sources, gal/day-----: 0
Pumping rate into reservoir, ac-in/day----: 874.9
Surface area of reservoir, acres ---------: 78.8
Overflow depth in reservoir, feet --------: 2.9573
Name reservoir PET file ------------------:c:\stowat\S65C.EVP
Name of drainage sub-basin file-----------:c:\stowat\mlkdrn.SUB
Name of irrigation sub-basin file --------:c:\stowat\mlkrirr.sub

Drainage Sub-Basins

mlkdrn.SUB

DRAINMOD daily output filenames used in simulations	Drainage Area (Acres)
C:\stowat\milkr.day	852.0

Irrigation Sub-Basins

mlkirr.sub

DRAINMOD Daily Output Filenames used in the simulation	Irr.Area Acres	Irrg (in)	Irr. Eff%
C:\stowat\mlkrirr.day	0.01	0.00	10

NOTE - ONLY OUTFLOW EVENTS ARE SHOWN

DATE	RAIN (in)	RO+DR+W (ac-in)	HIA-MAX (in)	PMP-INF (ac-in)	WSP-EVAP (ac-in)	IRRIG (ac-in)	RES-STOR (ac-in)	OVERFLOW (in)	IRR-DEF (in)	Overflow gpm
02/28/66	0	45.69	0	45.69	0.06	0	2796.42	0.5	0	743
03/01/66	0	39.45	0	39.45	0.08	0	2796.42	0.4	0	594
03/02/66	0	33.45	0	33.45	0.08	0	2796.42	0.3	0	446
03/03/66	0	28.05	0	28.05	0.08	0	2796.42	0.3	0	446
03/04/66	0	23.17	0	23.17	0.08	0	2796.42	0.2	0	297
03/05/66	1.21	38.11	0	38.11	0.08	0	2796.42	0.4	0	594
03/06/66	0	56.76	0	56.76	0.08	0	2796.42	0.6	0	892
03/07/66	0	48.2	0	48.2	0.08	0	2796.42	0.5	0	743
03/08/66	0	41.33	0	41.33	0.08	0	2796.42	0.4	0	594
03/09/66	0	35.15	0	35.15	0.08	0	2796.42	0.4	0	594
03/10/66	0	29.58	0	29.58	0.08	0	2796.42	0.3	0	446
03/11/66	0	24.55	0	24.55	0.08	0	2796.42	0.2	0	297
03/12/66	0	20.02	0	20.02	0.08	0	2796.42	0.2	0	297
03/13/66	0	15.92	0	15.92	0.08	0	2796.42	0.2	0	297
03/14/66	0	12.25	0	12.25	0.08	0	2796.42	0.1	0	149
04/07/66	0	80.64	0	80.64	0.1	0	2796.42	0.3	0	446
04/08/66	0	66.45	0	66.45	0.1	0	2796.42	0.7	0	1040
04/09/66	0	54.34	0	54.34	0.1	0	2796.42	0.6	0	892
04/10/66	0	44.91	0	44.91	0.1	0	2796.42	0.5	0	743
04/11/66	1.68	76.61	0	76.61	0.1	0	2796.42	1.5	0	2229
04/12/66	0	114.65	0	114.65	0.1	0	2796.42	1.4	0	2080
04/13/66	0	95.53	0	95.53	0.1	0	2796.42	1.1	0	1635
04/14/66	0	79.23	0	79.23	0.1	0	2796.42	0.9	0	1337
04/15/66	0	65.28	0	65.28	0.1	0	2796.42	0.7	0	1040
04/16/66	0	53.33	0	53.33	0.1	0	2796.42	0.6	0	892
04/17/66	0	44.18	0	44.18	0.1	0	2796.42	0.5	0	743
04/18/66	0	36.39	0	36.39	0.1	0	2796.42	0.4	0	594
04/19/66	0	29.52	0	29.52	0.1	0	2796.42	0.3	0	446
04/20/66	0	23.41	0	23.41	0.1	0	2796.42	0.2	0	297
04/21/66	0	18.07	0	18.07	0.1	0	2796.42	0.1	0	149
04/22/66	0	13.45	0	13.45	0.1	0	2796.42	0.1	0	149
05/06/66	0	0	0	0	0.1	0	2796.42	0.5	0	743

NOTE - ONLY OUTFLOW EVENTS ARE SHOWN

DATE	RAIN (in)	RO+DR+W (ac-in)	HIA-MAX (in)	PMP-INF (ac-in)	WSP-EVAP (ac-in)	IRRIG (ac-in)	RES-STOR (ac-in)	OVERFLOW (in)	IRR-DEF (in)	Overflow gpm
06/09/66	3.7	23.55	0	23.55	0.13	0	2796.42	0.3	0	446
06/10/66	0	84.7	0	84.7	0.1	0	2796.42	1	0	1486
06/11/66	0	68.09	0	68.09	0.13	0	2796.42	0.7	0	1040
06/12/66	0	53.43	0	53.43	0.11	0	2796.42	0.6	0	892
06/13/66	0	42.87	0	42.87	0.12	0	2796.42	0.4	0	594
06/14/66	0	34.38	0	34.38	0.1	0	2796.42	0.3	0	446
06/15/66	0	28	0	28	0.09	0	2796.42	0.3	0	446
06/16/66	0.15	22.41	0	22.41	0.1	0	2796.42	0.2	0	297
06/17/66	0	21.67	0	21.67	0.05	0	2796.42	0.2	0	297
06/18/66	0	17.7	0	17.7	0.1	0	2796.42	0.1	0	149
06/19/66	0	13.12	0	13.12	0.1	0	2796.42	0.1	0	149
06/20/66	0	9.55	0	9.55	0.06	0	2796.42	0.1	0	149
06/21/66	1.83	28.76	0	28.76	0.08	0	2796.42	1	0	1486
06/22/66	2	119.85	0	119.85	0.06	0	2796.42	2.2	0	3269
06/23/66	0	187.07	0	187.07	0.11	0	2796.42	2.3	0	3418
06/24/66	0	145.85	0	145.85	0.1	0	2796.42	1.8	0	2675
06/25/66	0	123.61	0	123.61	0.04	0	2796.42	1.5	0	2229
06/26/66	0	99.39	0	99.39	0.24	0	2796.42	1	0	1486
06/27/66	0	72.79	0	72.79	0.14	0	2796.42	0.8	0	1189
06/28/66	0	57.9	0	57.9	0.09	0	2796.42	0.6	0	892
06/29/66	0	50.65	0	50.65	0	0	2796.42	0.6	0	892
06/30/66	2.36	105.43	0	105.43	0.08	0	2796.42	2.2	0	3269
07/01/66	0	191.23	0	191.23	0.1	0	2796.42	2.7	0	4012
07/02/66	0	147.42	0	147.42	0.12	0	2796.42	1.8	0	2675
07/03/66	2.58	665.8	0	665.8	0.08	0	2796.42	8.4	0	12483
07/04/66	0	409.23	0	409.23	0.1	0	2796.42	5.1	0	7579
07/05/66	0	231.62	0	231.62	0.11	0	2796.42	2.8	0	4161
07/06/66	0	172.88	0	172.88	0.07	0	2796.42	2.1	0	3121
07/07/66	0	138.84	0	138.84	0.11	0	2796.42	1.7	0	2526
07/08/66	0	114.32	0	114.32	0.1	0	2796.42	1.3	0	1932
07/09/66	0	93.12	0	93.12	0.13	0	2796.42	1	0	1486
07/10/66	0	77.08	0	77.08	0.06	0	2796.42	0.9	0	1337
07/11/66	0.36	75.51	0	75.51	0.03	0	2796.42	1.1	0	1635
07/12/66	0	78.96	0	78.96	0.11	0	2796.42	0.9	0	1337
07/13/66	0	65.38	0	65.38	0.07	0	2796.42	0.8	0	1189
07/14/66	0	55.55	0	55.55	0.06	0	2796.42	0.6	0	892
07/15/66	0	47.2	0	47.2	0.09	0	2796.42	0.5	0	743
07/16/66	0	39.41	0	39.41	0.09	0	2796.42	0.4	0	594
07/17/66	0	32.09	0	32.09	0.11	0	2796.42	0.3	0	446
07/18/66	0	26.8	0	26.8	0.04	0	2796.42	0.3	0	446
07/19/66	0	22.94	0	22.94	0.08	0	2796.42	0.2	0	297
07/20/66	0	17.95	0	17.95	0.1	0	2796.42	0.1	0	149
07/21/66	0.42	17.66	0	17.66	0.04	0	2796.42	0.4	0	594
07/22/66	3.02	87.21	0	87.21	0.09	0	2796.42	2.2	0	3269
07/23/66	0	184.05	0	184.05	0.13	0	2796.42	2.2	0	3269
07/24/66	0.1	140.68	0	140.68	0.11	0	2796.42	1.7	0	2526
07/25/66	0	123.81	0	123.81	0.07	0	2796.42	1.5	0	2229
07/26/66	0.01	100.33	0	100.33	0.18	0	2796.42	1.1	0	1635
07/27/66	3.52	916.1	0.05	874.9	0.09	0	2796.42	12.4	0	18427
07/28/66	1.48	1255.52	0.5	874.9	0.04	0	2796.42	11.6	0	17238
07/29/66	0	407.88	0	829.71	0.1	0	2796.42	10.4	0	15455
07/30/66	0	234.33	0	234.33	0.08	0	2796.42	2.9	0	4310
07/31/66	0.7	214.68	0	214.68	0.08	0	2796.42	2.9	0	4310
08/01/66	0	235.37	0	235.37	0.1	0	2796.42	2.9	0	4310
08/02/66	0	176.57	0	176.57	0.07	0	2796.42	2.2	0	3269
08/03/66	0	142.73	0	142.73	0.09	0	2796.42	2.7	0	4012
08/04/66	0.03	118.41	0	118.41	0.09	0	2796.42	1.4	0	2080
08/05/66	0.05	103.41	0	103.41	0.05	0	2796.42	1.3	0	1932
08/06/66	0.06	92.01	0	92.01	0.09	0	2796.42	1.1	0	1635
08/07/66	0.05	78.69	0	78.69	0.13	0	2796.42	0.9	0	1337
08/08/66	0.74	89.16	0	89.16	0.08	0	2796.42	1.1	0	1635
08/09/66	0	102.47	0	102.47	0.06	0	2796.42	1.2	0	1783
08/10/66	0.03	86.91	0	86.91	0.09	0	2796.42	1	0	1486
08/11/66	1.74	131.62	0	131.62	0.07	0	2796.42	2.3	0	3418
08/12/66	0.94	256.14	0	256.14	0.08	0	2796.42	3.5	0	5201
08/13/66	0	306.95	0	306.95	0.06	0	2796.42	3.8	0	5647
08/14/66	0	214.34	0	214.34	0.08	0	2796.42	2.6	0	3864
08/15/66	0	163.62	0	163.62	0.11	0	2796.42	2	0	2972
08/16/66	0	129.74	0	129.75	0.11	0	2796.42	1.5	0	2229

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DATE	RAIN (in)	RO+DR+W (ac-in)	HIA-MAX (in)	PMP-INF (ac-in)	WSP-EVAP (ac-in)	IRRIG (ac-in)	RES-STOR (ac-in)	OVERFLOW (in)	IRR-DEF (in)	Overflow gpm
08/17/66	0	107.54	0	107.54	0.09	0	2796.42	1.3	0	1932
08/18/66	0	90.57	0	90.57	0.08	0	2796.42	1.1	0	1635
08/19/66	0	76.55	0	76.55	0.08	0	2796.42	0.9	0	1337
08/20/66	0	63.97	0	63.97	0.09	0	2796.42	0.7	0	1040
08/21/66	2.8	142.52	0	142.53	0.1	0	2796.42	2.8	0	4161
08/22/66	0	295.92	0	295.92	0.06	0	2796.42	3.7	0	5498
08/23/66	0	205.96	0	205.96	0.11	0	2796.42	2.5	0	3715
08/24/66	0.7	190.63	0	190.63	0.07	0	2796.42	2.6	0	3864
08/25/66	0	214.44	0	214.44	0.07	0	2796.42	2.6	0	3864
08/26/66	0.9	218.57	0	218.57	0.09	0	2796.42	3	0	4458
08/27/66	0	254.89	0	254.9	0.08	0	2796.42	3.2	0	4755
08/28/66	0	183.62	0	183.62	0.13	0	2796.42	2.2	0	3269
08/29/66	0	140.41	0	140.41	0.12	0	2796.42	1.7	0	2526
08/30/66	0	114.15	0	114.15	0.11	0	2796.42	1.3	0	1932
08/31/66	0.1	94.93	0	94.93	0.07	0	2796.42	1.2	0	1783
09/01/66	0.25	96.81	0	96.81	0.05	0	2796.42	1.2	0	1783
09/02/66	0	91.74	0	91.74	0.13	0	2796.42	1	0	1486
09/03/66	0	74.77	0	74.77	0.09	0	2796.42	0.9	0	1337
09/04/66	0	62.39	0	62.39	0.09	0	2796.42	0.7	0	1040
09/05/66	0	51.62	0	51.62	0.09	0	2796.42	0.6	0	892
09/06/66	0	43.17	0	43.17	0.09	0	2796.42	0.5	0	743
09/07/66	0	35.99	0	35.99	0.09	0	2796.42	0.4	0	594
09/08/66	0	29.61	0	29.61	0.09	0	2796.42	0.6	0	892
09/09/66	0	24.63	0	24.63	0.06	0	2796.42	0.3	0	446
09/10/66	0	20.89	0	20.89	0.06	0	2796.42	0.2	0	297
09/11/66	0	17.77	0	17.77	0.04	0	2796.42	0.2	0	297
09/12/66	1.35	32.87	0	32.87	0.06	0	2796.42	0.9	0	1337
09/13/66	0	56.86	0	56.86	0.06	0	2796.42	0.7	0	1040
09/14/66	0	49.44	0	49.44	0.06	0	2796.42	0.6	0	892
09/15/66	0	43.57	0	43.57	0.05	0	2796.42	0.5	0	743
09/16/66	0	38.78	0	38.78	0.05	0	2796.42	0.4	0	594
09/17/66	0	33.98	0	33.98	0.06	0	2796.42	0.4	0	594
09/18/66	1.5	57.19	0	57.19	0.08	0	2796.42	1.2	0	1783
09/19/66	0	88.79	0	88.79	0.09	0	2796.42	1	0	1486
09/20/66	0	74.97	0	74.97	0.07	0	2796.42	0.9	0	1337
09/21/66	0.12	62.63	0	62.63	0.09	0	2796.42	0.7	0	1040
09/22/66	0	58.1	0	58.1	0.07	0	2796.42	0.7	0	1040
09/23/66	0	49.64	0	49.64	0.07	0	2796.42	0.6	0	892
09/24/66	0	43.2	0	43.2	0.06	0	2796.42	0.5	0	743
09/25/66	0	39.04	0	39.04	0.02	0	2796.42	0.5	0	743
09/26/66	0	35.35	0	35.35	0.06	0	2796.42	0.4	0	594
09/27/66	0	30.28	0	30.28	0.08	0	2796.42	0.3	0	446
09/28/66	0.58	33.85	0	33.85	0.06	0	2796.42	0.6	0	892
09/29/66	0	42.7	0	42.7	0.04	0	2796.42	0.5	0	743
09/30/66	0	38.04	0	38.04	0.06	0	2796.42	0.4	0	594
10/01/66	0	32.44	0	32.44	0.09	0	2796.42	0.4	0	594
10/02/66	0	27.05	0	27.05	0.06	0	2796.42	0.3	0	446
10/03/66	0	22.71	0	22.71	0.07	0	2796.42	0.2	0	297
10/04/66	0.28	23.07	0	23.07	0.09	0	2796.42	0.2	0	297
10/05/66	0	25.21	0	25.21	0.07	0	2796.42	0.2	0	297
10/06/66	1.61	45.45	0	45.45	0.07	0	2796.42	1.1	0	1635
10/07/66	0.55	96.74	0	96.74	0.06	0	2796.42	1.4	0	2080
10/08/66	0.68	123.81	0	123.81	0.06	0	2796.42	1.8	0	2675
10/09/66	0.41	156.51	0	156.51	0.07	0	2796.42	2.1	0	3121
10/10/66	0	163.32	0	163.32	0.05	0	2796.42	2	0	2972
10/11/66	0	136.22	0	136.22	0.08	0	2796.42	1.6	0	2378
10/12/66	0	115.35	0	115.36	0.08	0	2796.42	1.4	0	2080
10/13/66	1.4	143.6	0	143.6	0.05	0	2796.42	2.3	0	3418
10/14/66	0	201.23	0	201.23	0.07	0	2796.42	2.5	0	3715
10/15/66	0	160.87	0	160.87	0.07	0	2796.42	2	0	2972
10/16/66	0	134.31	0	134.31	0.07	0	2796.42	1.6	0	2378
10/17/66	0	115.22	0	115.22	0.07	0	2796.42	1.4	0	2080
10/18/66	0	98.92	0	98.92	0.07	0	2796.42	1.2	0	1783
10/19/66	0	82.65	0	82.65	0.12	0	2796.42	0.9	0	1337
10/20/66	0	67.52	0	67.52	0.08	0	2796.42	0.8	0	1189
10/21/66	0	58.03	0	58.03	0.04	0	2796.42	0.7	0	1040
10/22/66	0	52.19	0	52.19	0.02	0	2796.42	0.6	0	892
10/23/66	0	47.5	0	47.5	0.05	0	2796.42	0.6	0	892
10/24/66	0.2	42.26	0	42.26	0.05	0	2796.42	0.6	0	892

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DATE	RAIN (in)	RO+DR+W (ac-in)	HIA-MAX (in)	PMP-INF (ac-in)	WSP-EVAP (ac-in)	IRRIG (ac-in)	RES-STOR (ac-in)	OVERFLOW (in)	IRR-DEF (in)	Overflow gpm
10/25/66	0	43.67	0	43.67	0.07	0	2796.42	0.5	0	743
10/26/66	0	37.84	0	37.84	0.06	0	2796.42	0.4	0	594
10/27/66	0	33.39	0	33.39	0.05	0	2796.42	0.4	0	594
10/28/66	0	29.06	0	29.06	0.07	0	2796.42	0.3	0	446
10/29/66	0	24.38	0	24.38	0.07	0	2796.42	0.2	0	297
10/30/66	0	20.1	0	20.1	0.07	0	2796.42	0.2	0	297
10/31/66	0	16.59	0	16.59	0.06	0	2796.42	0.2	0	297
11/01/66	0	13.72	0	13.72	0.05	0	2796.42	0.1	0	149
11/02/66	0	11.22	0	11.22	0.06	0	2796.42	0.1	0	149
07/03/68	0.9	118.74	0	118.74	0.09	0	2796.42	1	0	1486
07/04/68	0	142.52	0	142.53	0.09	0	2796.42	1.7	0	2526
07/05/68	1.7	214.81	0	214.81	0.08	0	2796.42	2.9	0	4310
07/06/68	1.38	879.5	0.01	874.9	0.14	0	2796.42	11.5	0	17089
07/07/68	0.63	595.39	0	600	0.06	0	2796.42	7.8	0	11591
07/08/68	0	362.94	0	362.94	0.11	0	2796.42	4.5	0	6687
07/09/68	0.38	255.4	0	255.4	0.08	0	2796.42	3.3	0	4904
07/10/68	0	238.56	0	238.56	0.08	0	2796.42	2.9	0	4310
07/11/68	0	177.48	0	177.48	0.11	0	2796.42	2.1	0	3121
07/12/68	0	139.77	0	139.77	0.1	0	2796.42	1.7	0	2526
07/13/68	0	116.63	0	116.63	0.09	0	2796.42	1.4	0	2080
07/14/68	0	98.92	0	98.92	0.07	0	2796.42	1.2	0	1783
07/15/68	0.45	94.39	0	94.39	0.06	0	2796.42	1.3	0	1932
07/16/68	0	104.45	0	104.45	0.06	0	2796.42	1.3	0	1932
07/17/68	0	90.23	0	90.23	0.06	0	2796.42	1.1	0	1635
07/18/68	0	77.12	0	77.12	0.08	0	2796.42	0.9	0	1337
07/19/68	0	65.34	0	65.34	0.07	0	2796.42	0.8	0	1189
07/20/68	0	55.98	0	55.98	0.06	0	2796.42	0.7	0	1040
07/21/68	0	47.87	0	47.87	0.09	0	2796.42	0.5	0	743
07/22/68	0.22	40.08	0	40.08	0.1	0	2796.42	0.5	0	743
07/23/68	0.48	51.25	0	51.25	0.11	0	2796.42	0.7	0	1040
07/24/68	0	56.72	0	56.72	0.07	0	2796.42	0.7	0	1040
07/25/68	0	47.6	0	47.6	0.11	0	2796.42	0.5	0	743
07/26/68	0	39.51	0	39.51	0.08	0	2796.42	0.4	0	594
07/27/68	0	32.93	0	32.93	0.09	0	2796.42	0.3	0	446
07/28/68	0	26.46	0	26.46	0.1	0	2796.42	0.2	0	297
07/29/68	0	19.79	0	19.79	0.15	0	2796.42	0.1	0	149
07/30/68	0	14.12	0	14.12	0.09	0	2796.42	0.1	0	149
07/31/68	0.57	16.49	0	16.49	0.07	0	2796.42	0.4	0	594
08/01/68	0	23.03	0	23.03	0.07	0	2796.42	0.2	0	297
08/02/68	0	18.47	0	18.47	0.09	0	2796.42	0.1	0	149
08/03/68	0.63	21.56	0	21.56	0.09	0	2796.42	0.2	0	297
08/04/68	0	29.8	0	29.8	0.09	0	2796.42	0.3	0	446
08/05/68	0	20.56	0	20.56	0.29	0	2796.42	0.6	0	892
08/09/68	0.84	8.73	0	8.73	0.04	0	2796.42	0.4	0	594
08/10/68	0	18.31	0	18.31	0.03	0	2796.42	0.2	0	297
08/11/68	0	15.24	0	15.24	0.09	0	2796.42	0.1	0	149
08/12/68	0.5	18.39	0	18.39	0.08	0	2796.42	0.3	0	446
08/13/68	0	22.42	0	22.42	0.11	0	2796.42	0.2	0	297
08/14/68	0	16.93	0	16.93	0.1	0	2796.42	0.1	0	149
08/15/68	0.32	16.52	0	16.52	0.08	0	2796.42	0.3	0	446
08/16/68	0	18.83	0	18.83	0.11	0	2796.42	0.1	0	149
08/17/68	0	13.81	0	13.81	0.1	0	2796.42	0.1	0	149
08/27/68	0.93	6.22	0	6.22	0.08	0	2796.42	0.1	0	149
08/28/68	0	16.9	0	16.9	0.1	0	2796.42	0.1	0	149
08/29/68	0	12.87	0	12.87	0.06	0	2796.42	0.1	0	149
08/30/68	0.63	16.39	0	16.39	0.06	0	2796.42	0.4	0	594
08/31/68	0	24.9	0	24.9	0.06	0	2796.42	0.3	0	446
09/01/68	0	20.32	0	20.32	0.1	0	2796.42	0.2	0	297
09/02/68	0	15.45	0	15.45	0.09	0	2796.42	0.1	0	149
09/03/68	0	11.32	0	11.32	0.09	0	2796.42	0.3	0	446
09/09/68	1.05	5.04	0	5.04	0.09	0	2796.42	0.1	0	149
09/10/68	1.41	33.25	0	33.25	0.06	0	2796.42	0.9	0	1337
09/11/68	0.6	74.03	0	74.03	0.07	0	2796.42	1.1	0	1635
09/12/68	1.78	148.23	0	148.23	0.03	0	2796.42	2.6	0	3864
09/13/68	0.2	224.71	0	224.71	0.05	0	2796.42	2.9	0	4310
09/14/68	0	200.72	0	200.72	0.07	0	2796.42	2.5	0	3715
09/15/68	0	158.73	0	158.73	0.08	0	2796.42	1.9	0	2823
09/16/68	0.71	155.37	0	155.37	0.11	0	2796.42	2.1	0	3121
09/17/68	0	179.25	0	179.26	0.07	0	2796.42	2.2	0	3269

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09/18/68	0	145.21	0	145.21	0.08	0	2796.42	1.8	0	2675
09/19/68	0	119.51	0	119.51	0.13	0	2796.42	1.4	0	2080
09/20/68	0	99.15	0	99.15	0.07	0	2796.42	1.2	0	1783
09/21/68	0	83.49	0	83.49	0.1	0	2796.42	1	0	1486
09/22/68	0	68.93	0	68.93	0.1	0	2796.42	0.8	0	1189
09/23/68	0.2	55.65	0	55.65	0.11	0	2796.42	0.7	0	1040
09/24/68	1.62	93.99	0	93.99	0.11	0	2796.42	1.7	0	2526
09/25/68	0.1	140.95	0	140.95	0.07	0	2796.42	1.8	0	2675
09/26/68	0	127.87	0	127.87	0.05	0	2796.42	1.6	0	2378
09/27/68	1.25	162.58	0	162.58	0.07	0	2796.42	2.5	0	3715
09/28/68	0	205.08	0	205.08	0.08	0	2796.42	2.5	0	3715
09/29/68	0	159.93	0	159.93	0.09	0	2796.42	1.9	0	2823
09/30/68	0	130.18	0	130.18	0.09	0	2796.42	1.6	0	2378
10/01/68	0	109.59	0	109.59	0.09	0	2796.42	1.3	0	1932
10/02/68	0	92.61	0	92.61	0.08	0	2796.42	1.1	0	1635
10/03/68	0	78.32	0	78.32	0.08	0	2796.42	0.9	0	1337
10/04/68	0	65.95	0	65.95	0.08	0	2796.42	0.8	0	1189
10/05/68	0	55.41	0	55.41	0.07	0	2796.42	0.6	0	892
10/06/68	0	47.5	0	47.5	0.06	0	2796.42	0.5	0	743
10/07/68	0	41.06	0	41.06	0.07	0	2796.42	0.5	0	743
10/08/68	0.55	44.81	0	44.81	0.06	0	2796.42	0.7	0	1040
10/09/68	1.55	91.91	0	91.91	0.06	0	2796.42	1.1	0	1635
10/10/68	0	133.64	0	133.64	0.07	0	2796.42	1.6	0	2378
10/11/68	0.35	125.85	0	125.85	0.07	0	2796.42	1.7	0	2526
10/12/68	0	125.95	0	125.96	0.1	0	2796.42	1.5	0	2229
10/13/68	0	104.25	0	104.25	0.11	0	2796.42	1.2	0	1783
10/14/68	0.1	87.35	0	87.35	0.06	0	2796.42	1.1	0	1635
10/15/68	0.22	79.09	0	79.1	0.1	0	2796.42	1	0	1486
10/16/68	0.67	93.95	0	93.95	0.04	0	2796.42	1.4	0	2080
10/17/68	1.2	160.74	0	160.74	0.05	0	2796.42	2.5	0	3715
10/18/68	0.9	263.08	0	263.08	0.07	0	2796.42	3.6	0	5350
10/19/68	0	309.17	0	309.17	0.03	0	2796.42	3.9	0	5796
10/20/68	0	218.2	0	218.2	0.09	0	2796.42	2.7	0	4012
10/21/68	0.22	168.55	0	168.56	0.06	0	2796.42	2.2	0	3269
10/22/68	0	160.07	0	160.07	0.07	0	2796.42	2	0	2972
10/23/68	0	135.01	0	135.01	0.04	0	2796.42	1.7	0	2526
10/24/68	2.7	718.16	0	718.16	0.04	0	2796.42	10.1	0	15009
10/25/68	0.3	488.72	0	488.73	0.09	0	2796.42	6.2	0	9213
10/26/68	0	314.5	0	314.5	0.08	0	2796.42	3.9	0	5796
10/27/68	0	218.53	0	218.53	0.06	0	2796.42	2.7	0	4012
10/28/68	0.1	171.98	0	171.98	0.07	0	2796.42	2.2	0	3269
10/29/68	0	149.7	0	149.7	0.07	0	2796.42	1.8	0	2675
10/30/68	0	126.19	0	126.19	0.06	0	2796.42	1.5	0	2229
10/31/68	0	109.02	0	109.02	0.07	0	2796.42	1.3	0	1932
11/01/68	0	94.19	0	94.19	0.07	0	2796.42	1.1	0	1635
11/02/68	0	81.78	0	81.78	0.06	0	2796.42	1	0	1486
11/03/68	0	71.72	0	71.72	0.05	0	2796.42	0.9	0	1337
11/04/68	0	62.19	0	62.19	0.07	0	2796.42	0.7	0	1040
11/05/68	0	53.43	0	53.43	0.06	0	2796.42	0.6	0	892
11/06/68	1.8	90.33	0	90.33	0.06	0	2796.42	1.1	0	1635
11/07/68	0	143.3	0	143.3	0.04	0	2796.42	1.8	0	2675
11/08/68	0	124.11	0	124.11	0.07	0	2796.42	1.5	0	2229
11/09/68	0	106.06	0	106.06	0.08	0	2796.42	1.9	0	2823
11/10/68	0	92.51	0	92.51	0.03	0	2796.42	1.1	0	1635
11/11/68	0	81.88	0	81.88	0.06	0	2796.42	1	0	1486
11/12/68	0.45	79.4	0	79.4	0.07	0	2796.42	1.1	0	1635
11/13/68	0	90.2	0	90.2	0.06	0	2796.42	1.1	0	1635
11/14/68	0	79.36	0	79.36	0.04	0	2796.42	1	0	1486
11/15/68	0	70.81	0	70.81	0.03	0	2796.42	0.9	0	1337
11/16/68	0	63.26	0	63.26	0.04	0	2796.42	0.8	0	1189
11/17/68	0	55.82	0	55.82	0.05	0	2796.42	0.7	0	1040
11/18/68	0	48.3	0	48.3	0.08	0	2796.42	0.5	0	743
11/19/68	0	40.92	0	40.92	0.09	0	2796.42	0.4	0	594
11/20/68	0	34.85	0	34.85	0.06	0	2796.42	0.4	0	594
11/21/68	0	30.23	0	30.23	0.06	0	2796.42	0.3	0	446
11/22/68	0	26.24	0	26.24	0.05	0	2796.42	0.3	0	446
11/23/68	0	22.76	0	22.76	0.06	0	2796.42	0.2	0	297
11/24/68	0	19.53	0	19.53	0.05	0	2796.42	0.2	0	297
11/25/68	0	16.14	0	16.14	0.07	0	2796.42	0.1	0	149

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11/26/68	0	12.93	0	12.93	0.05	0	2796.42	0.1	0	149
11/27/68	0	10.89	0	10.89	0.03	0	2796.42	0.1	0	149
11/28/68	0	9.23	0	9.23	0.04	0	2796.42	0.1	0	149
11/29/68	0	7.57	0	7.57	0.04	0	2796.42	0.1	0	149
08/11/69	3.6	116.53	0	116.53	0.09	0	2796.42	1.2	0	1783
08/12/69	0	270.26	0	270.26	0.09	0	2796.42	3.3	0	4904
08/13/69	0	192.87	0	192.87	0.09	0	2796.42	2.4	0	3566
08/14/69	0.73	197.44	0	197.44	0.09	0	2796.42	2.7	0	4012
08/15/69	1.2	362.27	0	362.27	0.09	0	2796.42	5	0	7430
08/16/69	0	378.7	0	378.7	0.09	0	2796.42	4.7	0	6984
08/17/69	0	229.4	0	229.4	0.09	0	2796.42	2.8	0	4161
08/18/69	1.26	280.32	0	280.32	0.09	0	2796.42	4	0	5944
08/19/69	0.08	334.16	0	334.16	0.09	0	2796.42	4.2	0	6241
08/20/69	0	230.88	0	230.88	0.09	0	2796.42	2.8	0	4161
08/21/69	0	173.55	0	173.55	0.09	0	2796.42	2.1	0	3121
08/22/69	0	138.94	0	138.94	0.09	0	2796.42	1.7	0	2526
08/23/69	0	116.09	0	116.09	0.09	0	2796.42	1.4	0	2080
08/24/69	0	97.34	0	97.34	0.09	0	2796.42	1.1	0	1635
08/25/69	0.1	81.04	0	81.04	0.09	0	2796.42	1	0	1486
08/26/69	1.2	110.86	0	110.86	0.09	0	2796.42	1.8	0	2675
08/27/69	0	137.49	0	137.49	0.09	0	2796.42	1.7	0	2526
08/28/69	0	114.99	0	114.99	0.09	0	2796.42	1.4	0	2080
08/29/69	0	96.4	0	96.4	0.09	0	2796.42	1.1	0	1635
08/30/69	0	80.54	0	80.54	0.09	0	2796.42	0.9	0	1337
08/31/69	0	66.85	0	66.85	0.09	0	2796.42	0.8	0	1189
09/01/69	0	55.48	0	55.48	0.08	0	2796.42	0.7	0	1040
09/02/69	0.15	46.79	0	46.79	0.08	0	2796.42	0.5	0	743
09/03/69	0	44.95	0	44.95	0.08	0	2796.42	0.5	0	743
09/04/69	0	38.07	0	38.07	0.08	0	2796.42	0.4	0	594
09/05/69	0	31.92	0	31.92	0.08	0	2796.42	0.3	0	446
09/06/69	0	26.37	0	26.38	0.08	0	2796.42	0.3	0	446
09/07/69	0	21.39	0	21.39	0.08	0	2796.42	0.2	0	297
09/08/69	0.82	28.3	0	28.3	0.08	0	2796.42	0.6	0	892
09/09/69	0	39.68	0	39.68	0.08	0	2796.42	0.4	0	594
09/10/69	0.14	33.35	0	33.35	0.08	0	2796.42	0.4	0	594
09/11/69	0.1	31.85	0	31.85	0.08	0	2796.42	0.4	0	594
09/12/69	0	29.21	0	29.21	0.08	0	2796.42	0.3	0	446
09/13/69	0	23.94	0	23.94	0.08	0	2796.42	0.2	0	297
09/14/69	0	19.21	0	19.21	0.08	0	2796.42	0.2	0	297
09/15/69	1.04	29.49	0	29.49	0.08	0	2796.42	0.7	0	1040
09/16/69	0.61	56.29	0	56.29	0.08	0	2796.42	0.9	0	1337
09/17/69	0.15	67.52	0	67.52	0.08	0	2796.42	0.8	0	1189
09/18/69	0.08	63.63	0	63.63	0.08	0	2796.42	0.8	0	1189
09/19/69	0.3	65.74	0	65.74	0.08	0	2796.42	0.9	0	1337
09/20/69	0	67.69	0	67.69	0.08	0	2796.42	0.8	0	1189
09/21/69	0	56.69	0	56.69	0.08	0	2796.42	0.6	0	892
09/22/69	0.16	47.66	0	47.67	0.08	0	2796.42	0.6	0	892
09/23/69	0	46.16	0	46.16	0.08	0	2796.42	0.5	0	743
09/24/69	0.21	39.08	0	39.08	0.08	0	2796.42	0.5	0	743
09/25/69	0	39.61	0	39.61	0.08	0	2796.42	0.4	0	594
09/26/69	0	33.3	0	33.3	0.08	0	2796.42	0.3	0	446
09/27/69	0	27.62	0	27.62	0.08	0	2796.42	0.3	0	446
09/28/69	0	22.51	0	22.51	0.08	0	2796.42	0.2	0	297
09/29/69	1.33	37.13	0	37.13	0.08	0	2796.42	0.9	0	1337
09/30/69	0	60.88	0	60.88	0.08	0	2796.42	0.7	0	1040
10/01/69	0	51.19	0	51.19	0.07	0	2796.42	0.6	0	892
10/02/69	0	43.87	0	43.87	0.07	0	2796.42	0.5	0	743
10/03/69	0.64	47.7	0	47.7	0.07	0	2796.42	2	0	2972
10/04/69	0	59.71	0	59.71	0.07	0	2796.42	0.7	0	1040
10/05/69	0	50.48	0	50.48	0.07	0	2796.42	0.6	0	892
10/06/69	0.21	43.17	0	43.17	0.07	0	2796.42	0.6	0	892
10/07/69	0	43.94	0	43.94	0.07	0	2796.42	0.5	0	743
10/08/69	0	37.5	0	37.5	0.07	0	2796.42	0.4	0	594
10/09/69	0	31.7	0	31.71	0.07	0	2796.42	0.3	0	446
10/10/69	0	26.47	0	26.47	0.07	0	2796.42	0.3	0	446
10/11/69	0	21.75	0	21.75	0.07	0	2796.42	0.2	0	297
10/12/69	0	17.48	0	17.48	0.07	0	2796.42	0.1	0	149
10/13/69	0	13.64	0	13.64	0.07	0	2796.42	0.1	0	149
10/14/69	0	10.26	0	10.26	0.07	0	2796.42	0.1	0	149

NOTE - ONLY OUTFLOW EVENTS ARE SHOWN

DATE	RAIN (in)	RO+DR+W (ac-in)	HIA-MAX (in)	PMP-INF (ac-in)	WSP-EVAP (ac-in)	IRRIG (ac-in)	RES-STOR (ac-in)	OVERFLOW (in)	IRR-DEF (in)	Overflow gpm
10/20/69	1.28	6.68	0	6.68	0.07	0	2796.42	0.3	0	446
10/21/69	0	19.69	0	19.69	0.07	0	2796.42	0.2	0	297
10/22/69	0	15.63	0	15.63	0.07	0	2796.42	0.1	0	149
10/23/69	0.95	22.26	0	22.26	0.07	0	2796.42	0.6	0	892
10/24/69	1.46	69.53	0	69.54	0.07	0	2796.42	1.4	0	2080
10/25/69	0	101.9	0	101.9	0.07	0	2796.42	1.2	0	1783
10/26/69	0	86.88	0	86.88	0.07	0	2796.42	1	0	1486
10/27/69	0.9	96.81	0	96.81	0.07	0	2796.42	1.5	0	2229
10/28/69	0	119.65	0	119.65	0.07	0	2796.42	1.4	0	2080
10/29/69	0.44	113.11	0	113.11	0.07	0	2796.42	1.5	0	2229
10/30/69	1.87	218.27	0	218.27	0.07	0	2796.42	3.4	0	5053
10/31/69	0.4	413.59	0	413.59	0.07	0	2796.42	5.3	0	7876
11/01/69	0	333.45	0	333.45	0.06	0	2796.42	4.2	0	6241
11/02/69	0	226.01	0	226.01	0.06	0	2796.42	2.8	0	4161
11/03/69	0	177.17	0	177.18	0.06	0	2796.42	2.4	0	3566
11/04/69	0	143.46	0	143.46	0.11	0	2796.42	1.7	0	2526
11/05/69	0	120.59	0	120.59	0.05	0	2796.42	1.5	0	2229
11/06/69	0	105.16	0	105.16	0.07	0	2796.42	1.3	0	1932
11/07/69	0	90.83	0	90.84	0.06	0	2796.42	1.1	0	1635
11/08/69	0.21	79.43	0	79.43	0.04	0	2796.42	1	0	1486
11/09/69	0	82.89	0	82.89	0.02	0	2796.42	1	0	1486
11/10/69	0	74.37	0	74.37	0.05	0	2796.42	0.9	0	1337
11/11/69	0	64.74	0	64.74	0.06	0	2796.42	0.8	0	1189
11/12/69	0	56.12	0	56.12	0.05	0	2796.42	0.7	0	1040
11/13/69	0	50.38	0	50.38	0.02	0	2796.42	0.6	0	892
11/14/69	1.46	81.41	0	81.41	0.02	0	2796.42	1.6	0	2378
11/15/69	0	116.39	0	116.4	0.06	0	2796.42	1.4	0	2080
11/16/69	0	103.08	0	103.08	0.02	0	2796.42	1.3	0	1932
11/17/69	1.01	124.18	0	124.18	0.03	0	2796.42	1.9	0	2823
11/18/69	0	148.8	0	148.8	0.07	0	2796.42	1.8	0	2675
11/19/69	0	125.65	0	125.65	0.07	0	2796.42	1.5	0	2229
11/20/69	0	106.26	0	106.27	0.1	0	2796.42	1.2	0	1783
11/21/69	0	90.94	0	90.94	0.04	0	2796.42	1.1	0	1635
11/22/69	0	79.67	0	79.67	0.07	0	2796.42	0.9	0	1337
11/23/69	0	69.23	0	69.23	0.04	0	2796.42	0.8	0	1189
11/24/69	0	59.4	0	59.41	0.09	0	2796.42	0.7	0	1040
11/25/69	0	50.28	0	50.28	0.06	0	2796.42	0.6	0	892
11/26/69	0.03	44.91	0	44.91	0.04	0	2796.42	0.5	0	743
11/27/69	0	41.79	0	41.79	0.04	0	2796.42	0.5	0	743
11/28/69	0	37.67	0	37.67	0.04	0	2796.42	0.4	0	594
11/29/69	0	33.85	0	33.85	0.04	0	2796.42	0.4	0	594
11/30/69	1.96	70.17	0	70.17	0.04	0	2796.42	1.6	0	2378
12/01/69	0	117.2	0	117.2	0.08	0	2796.42	1.4	0	2080
12/02/69	0.43	110.59	0	110.59	0.02	0	2796.42	1.4	0	2080
12/03/69	0	117.13	0	117.13	0.1	0	2796.42	1.4	0	2080
12/04/69	0	99.25	0	99.25	0.06	0	2796.42	1.2	0	1783
12/05/69	0	86.24	0	86.24	0.06	0	2796.42	1	0	1486
12/06/69	0	75.87	0	75.87	0.04	0	2796.42	0.9	0	1337
12/07/69	0	66.58	0	66.58	0.06	0	2796.42	0.8	0	1189
12/08/69	0	58	0	58	0.05	0	2796.42	0.8	0	1189
12/09/69	0	50.68	0	50.68	0.06	0	2796.42	0.6	0	892
12/10/69	0.04	44.24	0	44.24	0.06	0	2796.42	0.5	0	743
12/11/69	1.99	86.37	0	86.37	0.05	0	2796.42	1.8	0	2675
12/12/69	0	141.02	0	141.02	0.06	0	2796.42	1.7	0	2526
12/13/69	0	120.92	0	120.92	0.07	0	2796.42	1.5	0	2229
12/14/69	0	105.86	0	105.86	0.04	0	2796.42	1.3	0	1932
12/15/69	0	91.67	0	91.67	0.09	0	2796.42	1.1	0	1635
12/16/69	0	79.36	0	79.36	0.03	0	2796.42	1	0	1486
12/17/69	0	71.65	0	71.65	0.03	0	2796.42	0.9	0	1337
12/18/69	0	63.36	0	63.36	0.06	0	2796.42	0.7	0	1040
12/19/69	0	55.98	0	55.98	0.03	0	2796.42	0.7	0	1040
12/20/69	0	50.62	0	50.62	0.04	0	2796.42	0.6	0	892
12/21/69	0	45.72	0	45.72	0.04	0	2796.42	0.5	0	743
12/22/69	0.26	46.36	0	46.36	0.02	0	2796.42	0.7	0	1040
12/23/69	0	47.97	0	47.97	0.06	0	2796.42	0.6	0	892
12/24/69	0	42.3	0	42.3	0.06	0	2796.42	0.5	0	743
12/25/69	0	37.6	0	37.6	0.04	0	2796.42	0.4	0	594
12/26/69	0	33.95	0	33.95	0.04	0	2796.42	0.4	0	594
12/27/69	0	30.44	0	30.44	0.04	0	2796.42	0.3	0	446

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12/28/69	0	27.17	0	27.17	0.04	0	2796.42	0.3	0	446
12/29/69	0.2	24.36	0	24.36	0.03	0	2796.42	0.4	0	594
12/30/69	0	27.18	0	27.18	0.05	0	2796.42	0.3	0	446
12/31/69	0	23.12	0	23.12	0.07	0	2796.42	0.2	0	297
01/01/70	0.05	19.49	0	19.49	0.04	0	2796.42	0.2	0	297
01/02/70	0	18.79	0	18.79	0.02	0	2796.42	0.4	0	594
01/03/70	1.03	30.81	0	30.81	0.04	0	2796.42	0.8	0	1189
01/04/70	0	46.96	0	46.96	0.03	0	2796.42	0.6	0	892
01/05/70	0	42.43	0	42.43	0.05	0	2796.42	0.5	0	743
01/06/70	1.46	69.23	0	69.23	0.09	0	2796.42	1.4	0	2080
01/07/70	0	102.91	0	102.91	0.05	0	2796.42	1.3	0	1932
01/08/70	0	92.41	0	92.41	0.01	0	2796.42	1.2	0	1783
01/09/70	0	83.19	0	83.19	0.06	0	2796.42	1	0	1486
01/10/70	0	73.16	0	73.16	0.04	0	2796.42	0.9	0	1337
01/11/70	0	63.06	0	63.06	0.09	0	2796.42	0.7	0	1040
01/12/70	0	54.07	0	54.07	0.04	0	2796.42	0.6	0	892
01/13/70	0	49.21	0	49.21	0.02	0	2796.42	0.6	0	892
01/14/70	0	45.05	0	45.05	0.04	0	2796.42	0.5	0	743
01/15/70	1.6	73.02	0	73.02	0.05	0	2796.42	1.5	0	2229
01/16/70	0	116.13	0	116.13	0.05	0	2796.42	1.4	0	2080
01/17/70	0.08	99.86	0	99.86	0.09	0	2796.42	1.2	0	1783
01/18/70	0	92.71	0	92.71	0.01	0	2796.42	1.2	0	1783
01/19/70	0	82.99	0	82.99	0.07	0	2796.42	1	0	1486
01/20/70	0	70.54	0	70.54	0.08	0	2796.42	0.8	0	1189
01/21/70	0	59.81	0	59.81	0.07	0	2796.42	0.7	0	1040
01/22/70	0	52.8	0	52.8	0.02	0	2796.42	0.7	0	1040
01/23/70	0	48.3	0	48.3	0.04	0	2796.42	0.6	0	892
01/24/70	0	42.7	0	42.7	0.07	0	2796.42	0.5	0	743
01/25/70	0	38.31	0	38.31	0.01	0	2796.42	0.5	0	743
01/26/70	0	35.66	0	35.66	0.04	0	2796.42	0.4	0	594
01/27/70	0	31.88	0	31.88	0.05	0	2796.42	0.4	0	594
01/28/70	0	28.21	0	28.21	0.04	0	2796.42	0.3	0	446
01/29/70	0	24.34	0	24.34	0.07	0	2796.42	0.2	0	297
01/30/70	0	19.84	0	19.84	0.08	0	2796.42	0.2	0	297
01/31/70	0	16.29	0	16.29	0.04	0	2796.42	0.2	0	297
02/01/70	0	14.04	0	14.04	0.04	0	2796.42	0.2	0	297
02/02/70	0	11.56	0	11.56	0.06	0	2796.42	0.1	0	149
02/03/70	2.36	40.99	0	40.99	0.06	0	2796.42	1.4	0	2080
02/04/70	0	93.55	0	93.55	0.06	0	2796.42	1.1	0	1635
02/05/70	0.07	81.28	0	81.28	0.05	0	2796.42	1	0	1486
02/06/70	0	75.37	0	75.37	0.05	0	2796.42	0.9	0	1337
02/07/70	0	65.61	0	65.61	0.06	0	2796.42	0.8	0	1189
02/08/70	0	55.65	0	55.65	0.08	0	2796.42	0.6	0	892
02/09/70	0.01	47.7	0	47.7	0.06	0	2796.42	0.6	0	892
02/10/70	0	42.83	0	42.83	0.05	0	2796.42	0.5	0	743
02/11/70	0	37.53	0	37.53	0.07	0	2796.42	0.4	0	594
02/12/70	0	31.49	0	31.49	0.09	0	2796.42	0.3	0	446
02/13/70	0	26.6	0	26.6	0.04	0	2796.42	0.3	0	446
02/14/70	0	23.48	0	23.48	0.04	0	2796.42	0.3	0	446
02/15/70	0	19.46	0	19.46	0.1	0	2796.42	0.1	0	149
02/16/70	0.15	14.8	0	14.8	0.09	0	2796.42	0.2	0	297
02/17/70	0.01	14.48	0	14.48	0.07	0	2796.42	0.1	0	149
02/18/70	0	11.44	0	11.44	0.07	0	2796.42	0.1	0	149
03/11/70	0.8	9	0	9	0.08	0	2796.42	0.2	0	297
03/12/70	0.52	25.28	0	25.28	0.08	0	2796.42	0.4	0	594
03/13/70	0.04	30.97	0	30.97	0.07	0	2796.42	0.3	0	446
03/14/70	0	27.02	0	27.02	0.08	0	2796.42	0.3	0	446
03/15/70	0	21.45	0	21.45	0.11	0	2796.42	0.2	0	297
03/16/70	0	16.22	0	16.22	0.09	0	2796.42	0.1	0	149
03/17/70	0	12.16	0	12.16	0.08	0	2796.42	0.1	0	149
03/25/70	2.95	39.98	0	39.98	0.06	0	2796.42	1.5	0	2229
03/26/70	1.83	175.97	0	175.97	0.08	0	2796.42	2.9	0	4310
03/27/70	0	269.65	0	269.65	0.11	0	2796.42	3.3	0	4904
03/28/70	0	189.99	0	189.99	0.1	0	2796.42	2.3	0	3418
03/29/70	0	148.66	0	148.66	0.1	0	2796.42	1.8	0	2675
03/30/70	0	121.33	0	121.33	0.11	0	2796.42	1.4	0	2080
03/31/70	0	99.15	0	99.15	0.12	0	2796.42	1.1	0	1635
04/01/70	0	81.64	0	81.64	0.09	0	2796.42	0.9	0	1337
04/02/70	0	67.66	0	67.66	0.1	0	2796.42	0.8	0	1189

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04/03/70	0	55.28	0	55.28	0.09	0	2796.42	0.7	0	1040
04/04/70	0	45.69	0	45.69	0.1	0	2796.42	0.5	0	743
04/05/70	0	38	0	38	0.08	0	2796.42	0.4	0	594
04/06/70	0.16	31.87	0	31.87	0.08	0	2796.42	0.4	0	594
04/07/70	0	30.22	0	30.22	0.11	0	2796.42	0.3	0	446
04/08/70	0	23.61	0	23.61	0.1	0	2796.42	0.2	0	297
04/09/70	0	18.31	0	18.31	0.09	0	2796.42	0.1	0	149
04/10/70	0	13.52	0	13.52	0.11	0	2796.42	0.1	0	149
07/10/70	0	54.31	0	54.31	0.09	0	2796.42	0.2	0	297
07/11/70	0	45.28	0	45.28	0.09	0	2796.42	0.5	0	743
07/12/70	0.15	37.37	0	37.37	0.11	0	2796.42	0.4	0	594
07/13/70	0	35.42	0	35.42	0.07	0	2796.42	0.4	0	594
07/14/70	0	29.22	0	29.22	0.11	0	2796.42	0.3	0	446
07/15/70	0.79	35.49	0	35.49	0.11	0	2796.42	0.6	0	892
07/16/70	0	45.52	0	45.52	0.11	0	2796.42	0.5	0	743
07/17/70	0.17	36.9	0	36.9	0.11	0	2796.42	0.4	0	594
07/18/70	0	34.45	0	34.45	0.11	0	2796.42	0.3	0	446
07/19/70	0	27.11	0	27.11	0.11	0	2796.42	0.2	0	297
07/20/70	0.63	29.65	0	29.65	0.11	0	2796.42	0.5	0	743
07/21/70	1.7	78.63	0	78.63	0.11	0	2796.42	1.6	0	2378
07/22/70	0.04	118.17	0	118.17	0.09	0	2796.42	1.4	0	2080
07/23/70	0.52	121.22	0	121.23	0.09	0	2796.42	1.7	0	2526
07/24/70	0	124.78	0	124.78	0.11	0	2796.42	1.5	0	2229
07/25/70	0	102.94	0	102.94	0.11	0	2796.42	1.2	0	1783
07/26/70	0.65	103.11	0	103.11	0.11	0	2796.42	1.5	0	2229
07/27/70	0	115.52	0	115.52	0.11	0	2796.42	1.4	0	2080
07/28/70	0.6	114.42	0	114.42	0.11	0	2796.42	1.6	0	2378
07/29/70	0	123	0	123	0.12	0	2796.42	1.4	0	2080
07/30/70	0	100.5	0	100.5	0.11	0	2796.42	1.2	0	1783
07/31/70	0	81.85	0	81.85	0.11	0	2796.42	0.9	0	1337
08/01/70	0	66.01	0	66.01	0.11	0	2796.42	0.7	0	1040
08/02/70	0	53.47	0	53.47	0.09	0	2796.42	0.6	0	892
08/03/70	0	44.44	0	44.44	0.1	0	2796.42	0.5	0	743
08/04/70	0	36.23	0	36.23	0.11	0	2796.42	0.3	0	446
08/05/70	0.15	28.89	0	28.89	0.1	0	2796.42	0.3	0	446
08/06/70	0	26.48	0	26.48	0.11	0	2796.42	0.8	0	1189
08/07/70	1.19	36.66	0	36.66	0.11	0	2796.42	0.8	0	1189
08/08/70	3.04	175.77	0	175.77	0.11	0	2796.42	3.3	0	4904
08/09/70	0.83	685.29	0	685.29	0.1	0	2796.42	8.9	0	13226
08/10/70	0	413.25	0	413.25	0.08	0	2796.42	5.2	0	7727
08/11/70	0.15	236.68	0	236.68	0.1	0	2796.42	3	0	4458
08/12/70	0.96	289.95	0	289.95	0.11	0	2796.42	3.9	0	5796
08/13/70	0	299.44	0	299.44	0.11	0	2796.42	3.7	0	5498
08/14/70	0.34	229.27	0	229.27	0.11	0	2796.42	2.9	0	4310
08/15/70	0	210.11	0	210.12	0.11	0	2796.42	2.6	0	3864
08/16/70	0	157.45	0	157.45	0.12	0	2796.42	1.9	0	2823
08/17/70	0	125.55	0	125.55	0.11	0	2796.42	1.5	0	2229
08/18/70	0	103.82	0	103.82	0.1	0	2796.42	1.2	0	1783
08/19/70	0	86.04	0	86.04	0.1	0	2796.42	1	0	1486
08/20/70	1.37	108.95	0	108.95	0.1	0	2796.42	1.8	0	2675
08/21/70	0.1	147.62	0	147.62	0.11	0	2796.42	1.8	0	2675
08/22/70	0.03	126.63	0	126.63	0.11	0	2796.42	1.5	0	2229
08/23/70	0	106.73	0	106.73	0.11	0	2796.42	1.2	0	1783
08/24/70	0	87.95	0	87.95	0.1	0	2796.42	1	0	1486
08/25/70	0	71.98	0	71.98	0.11	0	2796.42	0.8	0	1189
08/26/70	0.03	57.9	0	57.9	0.11	0	2796.42	0.6	0	892
08/27/70	0	48.13	0	48.13	0.11	0	2796.42	0.5	0	743
08/28/70	0.3	46.32	0	46.32	0.11	0	2796.42	0.6	0	892
08/29/70	0.01	47.77	0	47.77	0.11	0	2796.42	0.5	0	743
08/30/70	0.05	39.31	0	39.31	0.11	0	2796.42	0.4	0	594
08/31/70	0	32.94	0	32.94	0.11	0	2796.42	0.3	0	446
09/01/70	0	26.51	0	26.51	0.08	0	2796.42	0.3	0	446
09/02/70	0.45	26.6	0	26.6	0.08	0	2796.42	0.3	0	446
09/03/70	0	33.61	0	33.61	0.08	0	2796.42	0.3	0	446
09/04/70	0	27.9	0	27.9	0.08	0	2796.42	0.3	0	446
09/05/70	0	22.77	0	22.77	0.08	0	2796.42	0.3	0	446
09/06/70	0.25	22.98	0	22.98	0.08	0	2796.42	0.3	0	446
09/07/70	0	24.03	0	24.03	0.08	0	2796.42	0.2	0	297
09/08/70	0.08	19.39	0	19.39	0.08	0	2796.42	0.2	0	297

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09/09/70	0.08	17.07	0	17.07	0.08	0	2796.42	0.2	0	297
09/10/70	0	14.81	0	14.81	0.08	0	2796.42	0.1	0	149
09/11/70	0	11.11	0	11.11	0.08	0	2796.42	0.1	0	149
09/14/70	1.67	20.08	0	20.08	0.08	0	2796.42	0.8	0	1189
09/15/70	0.02	45.95	0	45.95	0.08	0	2796.42	0.5	0	743
09/16/70	0.07	39.68	0	39.68	0.08	0	2796.42	0.5	0	743
09/17/70	0.04	35.59	0	35.59	0.08	0	2796.42	0.4	0	594
09/18/70	0.04	30.92	0	30.92	0.08	0	2796.42	0.3	0	446
09/19/70	0	26.6	0	26.6	0.08	0	2796.42	0.3	0	446
09/20/70	0.05	21.68	0	21.68	0.08	0	2796.42	0.2	0	297
09/21/70	0.15	18.45	0	18.45	0.08	0	2796.42	0.2	0	297
09/22/70	0	17.8	0	17.8	0.08	0	2796.42	0.1	0	149
09/23/70	0	13.72	0	13.72	0.08	0	2796.42	0.1	0	149
09/24/70	0.5	16.97	0	16.97	0.08	0	2796.42	0.3	0	446
09/25/70	0.2	21.57	0	21.58	0.08	0	2796.42	0.3	0	446
09/26/70	0.01	22.23	0	22.23	0.08	0	2796.42	0.2	0	297
09/27/70	0	17.84	0	17.85	0.08	0	2796.42	0.1	0	149
09/28/70	0.01	13.86	0	13.86	0.08	0	2796.42	0.1	0	149
09/29/70	1.19	23.57	0	23.57	0.08	0	2796.42	0.7	0	1040
09/30/70	0.68	54.04	0	54.04	0.08	0	2796.42	0.9	0	1337
10/01/70	0	69	0	69	0.07	0	2796.42	0.8	0	1189
10/02/70	0	56.86	0	56.86	0.11	0	2796.42	0.8	0	1189
10/03/70	0.56	59.3	0	59.3	0.11	0	2796.42	0.9	0	1337
10/04/70	0	67.29	0	67.29	0.11	0	2796.42	0.7	0	1040
10/05/70	0	54.14	0	54.14	0.11	0	2796.42	0.6	0	892
10/06/70	0.75	62.56	0	62.56	0.11	0	2796.42	1	0	1486
10/07/70	0.58	91.71	0	91.71	0.08	0	2796.42	1.3	0	1932
10/08/70	0	100.36	0	100.36	0.11	0	2796.42	1.2	0	1783
10/09/70	0	82.28	0	82.28	0.11	0	2796.42	0.9	0	1337
10/10/70	0.03	66.62	0	66.62	0.11	0	2796.42	0.7	0	1040
10/11/70	0	55.14	0	55.15	0.11	0	2796.42	0.6	0	892
10/12/70	0.03	44.91	0	44.91	0.11	0	2796.42	0.5	0	743
10/13/70	0.05	37.43	0	37.43	0.11	0	2796.42	0.4	0	594
10/14/70	0	31.37	0	31.37	0.1	0	2796.42	0.3	0	446
10/15/70	0.42	30.64	0	30.64	0.11	0	2796.42	0.4	0	594
10/16/70	0.53	47.23	0	47.23	0.1	0	2796.42	0.7	0	1040
10/17/70	0.48	68.19	0	68.19	0.1	0	2796.42	1	0	1486
10/18/70	0	72.25	0	72.25	0.1	0	2796.42	0.8	0	1189
10/19/70	0	58.8	0	58.8	0.1	0	2796.42	0.6	0	892
10/20/70	0.01	47.9	0	47.9	0.1	0	2796.42	0.5	0	743
10/21/70	0.18	40.39	0	40.39	0.07	0	2796.42	0.5	0	743
10/22/70	0	40.99	0	40.99	0.05	0	2796.42	0.5	0	743
10/23/70	0	36.13	0	36.13	0.06	0	2796.42	0.4	0	594
10/24/70	0	30.83	0	30.83	0.08	0	2796.42	0.3	0	446
10/25/70	0	25.4	0	25.4	0.08	0	2796.42	0.2	0	297
10/26/70	0	20.39	0	20.39	0.09	0	2796.42	0.2	0	297
10/27/70	0	15.73	0	15.73	0.09	0	2796.42	0.1	0	149
10/28/70	0	11.57	0	11.57	0.09	0	2796.42	0.1	0	149
10/29/70	0.55	14.28	0	14.28	0.09	0	2796.42	0.3	0	446
10/30/70	2.15	54.91	0	54.91	0.11	0	2796.42	1.4	0	2080
10/31/70	0	107.41	0	107.41	0.11	0	2796.42	1.3	0	1932
11/01/70	0	88.49	0	88.49	0.1	0	2796.42	1	0	1486
11/02/70	0	72.92	0	72.92	0.1	0	2796.42	0.8	0	1189
11/03/70	0	61.79	0	61.79	0.05	0	2796.42	0.7	0	1040
11/04/70	0	54.04	0	54.04	0.06	0	2796.42	0.6	0	892
11/05/70	0	47.43	0	47.43	0.06	0	2796.42	0.5	0	743
11/06/70	0	42.13	0	42.13	0.04	0	2796.42	0.5	0	743
11/07/70	0	37.2	0	37.2	0.07	0	2796.42	0.4	0	594
11/08/70	0	31.62	0	31.62	0.08	0	2796.42	0.3	0	446
11/09/70	0	26.37	0	26.38	0.07	0	2796.42	0.3	0	446
11/10/70	0	21.68	0	21.68	0.08	0	2796.42	0.2	0	297
11/11/70	0	17.08	0	17.08	0.09	0	2796.42	0.1	0	149
11/12/70	0	12.68	0	12.68	0.1	0	2796.42	0.1	0	149
09/12/71	2.76	169.16	0	169.16	0.07	0	2796.42	1.9	0	2823
09/13/71	0.25	396.48	0	396.48	0.08	0	2796.42	5.1	0	7579
09/14/71	0.09	283.44	0	283.44	0.08	0	2796.42	3.6	0	5350
09/15/71	0	219.71	0	219.71	0.04	0	2796.42	2.7	0	4012
09/16/71	0	177.01	0	177.01	0.05	0	2796.42	2.2	0	3269
09/17/71	0	147.52	0	147.52	0.06	0	2796.42	1.8	0	2675

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09/18/71	0	126.52	0	126.53	0.06	0	2796.42	1.5	0	2229
09/19/71	0	110.49	0	110.49	0.05	0	2796.42	1.4	0	2080
09/20/71	0	96.4	0	96.4	0.07	0	2796.42	1.2	0	1783
09/21/71	0	83.96	0	83.96	0.05	0	2796.42	1	0	1486
09/22/71	0.08	73.26	0	73.26	0.06	0	2796.42	0.9	0	1337
09/23/71	0.07	67.86	0	67.86	0.05	0	2796.42	0.8	0	1189
09/24/71	0.03	62.29	0	62.29	0.06	0	2796.42	0.7	0	1040
09/25/71	0	54.88	0	54.88	0.07	0	2796.42	0.6	0	892
09/26/71	0	47.5	0	47.5	0.07	0	2796.42	0.5	0	743
09/27/71	0	41.22	0	41.22	0.07	0	2796.42	0.5	0	743
09/28/71	0	35.22	0	35.22	0.07	0	2796.42	0.4	0	594
09/29/71	0	29.92	0	29.92	0.07	0	2796.42	0.3	0	446
09/30/71	0.06	25.29	0	25.3	0.07	0	2796.42	0.3	0	446
10/01/71	0	22.91	0	22.91	0.06	0	2796.42	0.2	0	297
10/02/71	0.06	19.26	0	19.26	0.07	0	2796.42	0.2	0	297
10/03/71	0	16.49	0	16.49	0.09	0	2796.42	0.1	0	149
10/04/71	0	12.41	0	12.41	0.08	0	2796.42	0.1	0	149
10/07/71	0.23	4.36	0	4.36	0.09	0	2796.42	0.1	0	149
10/08/71	1.04	17.17	0	17.17	0.09	0	2796.42	0.5	0	743
10/09/71	0.43	35.76	0	35.76	0.09	0	2796.42	0.5	0	743
10/10/71	0.52	53.97	0	53.97	0.09	0	2796.42	0.8	0	1189
10/11/71	0.02	60.68	0	60.68	0.08	0	2796.42	0.7	0	1040
10/12/71	0	51.32	0	51.32	0.1	0	2796.42	0.6	0	892
10/13/71	0.01	42.7	0	42.7	0.09	0	2796.42	0.5	0	743
10/14/71	0	36.19	0	36.19	0.07	0	2796.42	0.4	0	594
10/15/71	0	30.67	0	30.67	0.07	0	2796.42	0.3	0	446
10/16/71	0.21	25.42	0	25.42	0.09	0	2796.42	0.3	0	446
10/17/71	0.35	31.26	0	31.26	0.09	0	2796.42	0.4	0	594
10/18/71	0.07	35.46	0	35.46	0.07	0	2796.42	0.4	0	594
10/19/71	0.2	32.32	0	32.32	0.07	0	2796.42	0.4	0	594
10/20/71	0	32.94	0	32.94	0.09	0	2796.42	0.3	0	446
10/21/71	0	27.4	0	27.4	0.07	0	2796.42	0.3	0	446
10/22/71	0.3	27.78	0	27.78	0.07	0	2796.42	0.4	0	594
10/23/71	0	30.37	0	30.37	0.07	0	2796.42	0.3	0	446
10/24/71	0	25.52	0	25.52	0.07	0	2796.42	0.3	0	446
10/25/71	0	21.3	0	21.3	0.07	0	2796.42	0.2	0	297
10/26/71	0	17.01	0	17.01	0.09	0	2796.42	0.1	0	149
10/27/71	0	12.84	0	12.84	0.09	0	2796.42	0.1	0	149
10/28/71	1.03	22.02	0	22.02	0.09	0	2796.42	0.6	0	892
10/29/71	0	35.42	0	35.42	0.08	0	2796.42	0.4	0	594
10/30/71	0.05	29.78	0	29.78	0.07	0	2796.42	0.3	0	446
10/31/71	0.72	39.18	0	39.18	0.07	0	2796.42	0.7	0	1040
11/01/71	0	48.07	0	48.07	0.07	0	2796.42	0.5	0	743
11/02/71	0	41.02	0	41.02	0.08	0	2796.42	0.5	0	743
11/03/71	0.35	40.55	0	40.55	0.04	0	2796.42	0.5	0	743
11/04/71	0	45.92	0	45.92	0.04	0	2796.42	0.5	0	743
11/05/71	1.37	68.19	0	68.19	0.04	0	2796.42	1.4	0	2080
11/06/71	0	104.52	0	104.52	0.04	0	2796.42	1.3	0	1932
11/07/71	0	92.34	0	92.34	0.06	0	2796.42	1.1	0	1635
11/08/71	0	81.28	0	81.28	0.04	0	2796.42	1	0	1486
11/09/71	0	71.35	0	71.35	0.06	0	2796.42	0.8	0	1189
11/10/71	0.01	62.05	0	62.06	0.05	0	2796.42	0.7	0	1040
11/11/71	0	55.92	0	55.92	0.03	0	2796.42	0.7	0	1040
11/12/71	0	49.71	0	49.71	0.06	0	2796.42	0.6	0	892
11/13/71	0	43.81	0	43.81	0.05	0	2796.42	0.5	0	743
11/14/71	0	39.01	0	39.01	0.05	0	2796.42	0.4	0	594
11/15/71	0	34.92	0	34.92	0.04	0	2796.42	0.4	0	594
11/16/71	0	31.47	0	31.47	0.04	0	2796.42	0.4	0	594
11/17/71	0	28.01	0	28.01	0.05	0	2796.42	0.3	0	446
11/18/71	0	24.51	0	24.51	0.05	0	2796.42	0.3	0	446
11/19/71	0	21.41	0	21.41	0.04	0	2796.42	0.2	0	297
11/20/71	0	18.8	0	18.8	0.04	0	2796.42	0.2	0	297
11/21/71	0	16.28	0	16.28	0.05	0	2796.42	0.2	0	297
11/22/71	0	13.69	0	13.69	0.05	0	2796.42	0.1	0	149
11/23/71	0	11.39	0	11.39	0.04	0	2796.42	0.1	0	149
11/24/71	0	9.57	0	9.57	0.03	0	2796.42	0.1	0	149
11/25/71	0	7.81	0	7.81	0.05	0	2796.42	0.1	0	149
12/24/71	0.05	6.73	0	6.73	0.04	0	2796.42	0.1	0	149
09/13/74	0	37.53	0	37.53	0.08	0	2796.42	0.3	0	446

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09/14/74	0.1	31.44	0	31.44	0.08	0	2796.42	0.4	0	594
09/15/74	0	28.83	0	28.83	0.08	0	2796.42	0.3	0	446
09/16/74	0	23.6	0	23.6	0.08	0	2796.42	0.2	0	297
09/17/74	0	18.9	0	18.9	0.08	0	2796.42	0.2	0	297
09/18/74	0	14.7	0	14.7	0.08	0	2796.42	0.1	0	149
09/19/74	0	11.01	0	11.01	0.08	0	2796.42	0.1	0	149
09/30/74	2	26.25	0	26.25	0.08	0	2796.42	0.9	0	1337
10/01/74	0	58.23	0	58.23	0.07	0	2796.42	0.7	0	1040
10/02/74	0	49.31	0	49.31	0.07	0	2796.42	0.6	0	892
10/03/74	0.06	42.2	0	42.2	0.07	0	2796.42	0.5	0	743
10/04/74	0	37.97	0	37.97	0.07	0	2796.42	0.4	0	594
10/05/74	0	32.12	0	32.12	0.07	0	2796.42	0.3	0	446
10/06/74	0	26.85	0	26.85	0.07	0	2796.42	0.8	0	1189
10/07/74	0	22.08	0	22.08	0.07	0	2796.42	0.2	0	297
10/08/74	0	17.79	0	17.79	0.07	0	2796.42	0.2	0	297
10/09/74	0	13.92	0	13.92	0.07	0	2796.42	0.1	0	149
10/10/74	0	10.47	0	10.47	0.07	0	2796.42	0.1	0	149
01/31/79	0	16.95	0	16.95	0.06	0	2796.42	0.2	0	297
02/01/79	0	13.61	0	13.61	0.06	0	2796.42	0.1	0	149
02/02/79	0	10.5	0	10.5	0.07	0	2796.42	0.1	0	149
02/04/79	0.7	11.41	0	11.41	0.06	0	2796.42	0.1	0	149
02/05/79	0	21.01	0	21.01	0.06	0	2796.42	0.2	0	297
02/06/79	0	17.19	0	17.19	0.07	0	2796.42	0.1	0	149
02/07/79	0	13.92	0	13.92	0.06	0	2796.42	0.1	0	149
02/08/79	0	11.59	0	11.59	0.04	0	2796.42	0.1	0	149
02/09/79	0	9.77	0	9.77	0.04	0	2796.42	0.1	0	149
02/10/79	0	8.07	0	8.07	0.04	0	2796.42	0.1	0	149
09/04/79	0.6	385.41	0	385.41	0.08	0	2796.42	0.9	0	1337
09/05/79	0	349.18	0	349.19	0.05	0	2796.42	4.4	0	6539
09/06/79	0	228.87	0	228.87	0.1	0	2796.42	2.8	0	4161
09/07/79	0	172.75	0	172.75	0.08	0	2796.42	2.1	0	3121
09/08/79	0.2	136.02	0	136.02	0.14	0	2796.42	1.7	0	2526
09/09/79	1.2	185.66	0	185.66	0.06	0	2796.42	2.8	0	4161
09/10/79	0.4	254.39	0	254.39	0.11	0	2796.42	3.3	0	4904
09/11/79	0.2	240	0	240	0.08	0	2796.42	3	0	4458
09/12/79	1.7	699.38	0	699.38	0.04	0	2796.42	9.5	0	14117
09/13/79	2	1691.58	0.96	874.9	0.07	0	2796.42	11.8	0	17535
09/14/79	0.2	480.34	0.5	874.9	0.08	0	2796.42	11.1	0	16495
09/15/79	0.2	258.72	0	680.85	0.06	0	2796.42	8.7	0	12929
09/16/79	0	222.26	0	222.26	0.08	0	2796.42	2.7	0	4012
09/17/79	0.1	170.23	0	170.23	0.08	0	2796.42	2.1	0	3121
09/18/79	0	145.21	0	145.21	0.11	0	2796.42	1.7	0	2526
09/19/79	0	120.02	0	120.02	0.08	0	2796.42	1.4	0	2080
09/20/79	0	101.07	0	101.07	0.1	0	2796.42	1.2	0	1783
09/21/79	0.7	102	0	102.01	0.11	0	2796.42	1.5	0	2229
09/22/79	0.3	131.46	0	131.46	0.07	0	2796.42	1.7	0	2526
09/23/79	0.7	152.99	0	152.99	0.11	0	2796.42	2.1	0	3121
09/24/79	0.1	174.09	0	174.09	0.08	0	2796.42	2.2	0	3269
09/25/79	0.3	167.01	0	167.01	0.09	0	2796.42	2.2	0	3269
09/26/79	0.2	156.61	0	156.61	0.11	0	2796.42	2	0	2972
09/27/79	0.1	142.29	0	142.29	0.09	0	2796.42	1.8	0	2675
09/28/79	0.1	126.49	0	126.49	0.07	0	2796.42	1.6	0	2378
09/29/79	0	115.59	0	115.59	0.07	0	2796.42	1.4	0	2080
09/30/79	1.2	145.28	0	145.28	0.04	0	2796.42	2.3	0	3418
10/01/79	0	178.92	0	178.92	0.07	0	2796.42	2.2	0	3269
10/02/79	0	146.75	0	146.75	0.05	0	2796.42	1.8	0	2675
10/03/79	0	125.15	0	125.15	0.08	0	2796.42	1.5	0	2229
10/04/79	0	106.3	0	106.3	0.08	0	2796.42	1.3	0	1932
10/05/79	0	90.37	0	90.37	0.07	0	2796.42	1.1	0	1635
10/06/79	0	76.68	0	76.68	0.08	0	2796.42	0.9	0	1337
10/07/79	0	65.17	0	65.17	0.06	0	2796.42	0.8	0	1189
10/08/79	0	55.28	0	55.28	0.08	0	2796.42	0.6	0	892
10/09/79	0	46.89	0	46.89	0.07	0	2796.42	0.5	0	743
10/10/79	0	41.06	0	41.06	0.04	0	2796.42	0.5	0	743
10/11/79	0.2	35.32	0	35.32	0.1	0	2796.42	0.3	0	446
10/12/79	0	35.22	0	35.22	0.06	0	2796.42	0.4	0	594
10/13/79	0	30.25	0	30.25	0.07	0	2796.42	0.3	0	446
10/14/79	0	26.9	0	26.9	0.02	0	2796.42	0.3	0	446
10/15/79	0	23.63	0	23.63	0.08	0	2796.42	0.2	0	297

NOTE - ONLY OUTFLOW EVENTS ARE SHOWN

DATE	RAIN (in)	RO+DR+W (ac-in)	HIA-MAX (in)	PMP-INF (ac-in)	WSP-EVAP (ac-in)	IRRIG (ac-in)	RES-STOR (ac-in)	OVERFLOW (in)	IRR-DEF (in)	Overflow gpm
10/16/79	0.1	19.21	0	19.21	0.07	0	2796.42	0.2	0	297
10/17/79	0.1	18.15	0	18.15	0.06	0	2796.42	0.2	0	297
10/18/79	0	17.18	0	17.18	0.07	0	2796.42	0.1	0	149
10/19/79	0	13.68	0	13.68	0.06	0	2796.42	0.1	0	149
02/11/83	0	73.26	0	73.26	0.03	0	2796.42	0.9	0	1337
02/12/83	0.6	79.23	0	79.23	0.06	0	2796.42	1.2	0	1783
02/13/83	1.1	124.01	0	124.01	0.06	0	2796.42	1.9	0	2823
02/14/83	0	156.01	0	156.01	0.08	0	2796.42	1.9	0	2823
02/15/83	0	129.31	0	129.31	0.07	0	2796.42	1.6	0	2378
02/16/83	1	149.57	0	149.57	0.05	0	2796.42	2.2	0	3269
02/17/83	0.1	176.84	0	176.84	0.06	0	2796.42	2.2	0	3269
02/18/83	0	153.39	0	153.39	0.08	0	2796.42	1.9	0	2823
02/19/83	0	129.17	0	129.18	0.05	0	2796.42	1.6	0	2378
02/20/83	0	113.74	0	113.75	0.04	0	2796.42	1.4	0	2080
02/21/83	0.1	97.85	0	97.85	0.09	0	2796.42	1.2	0	1783
02/22/83	0.1	89.43	0	89.43	0.05	0	2796.42	1.1	0	1635
02/23/83	0	84.36	0	84.36	0.05	0	2796.42	1	0	1486
02/24/83	0	72.86	0	72.86	0.08	0	2796.42	0.8	0	1189
02/25/83	0	61.82	0	61.82	0.07	0	2796.42	0.7	0	1040
02/26/83	0	53.37	0	53.37	0.06	0	2796.42	0.6	0	892
02/27/83	1.2	76.71	0	76.71	0.09	0	2796.42	1.4	0	2080
02/28/83	0	102.54	0	102.54	0.06	0	2796.42	1.2	0	1783
03/01/83	0	87.28	0	87.28	0.09	0	2796.42	1.1	0	1635
03/02/83	0	71.98	0	71.98	0.11	0	2796.42	0.8	0	1189
03/03/83	0	58.73	0	58.73	0.09	0	2796.42	0.7	0	1040
03/04/83	0	49.78	0	49.78	0.06	0	2796.42	0.6	0	892
03/05/83	0	42.97	0	42.97	0.09	0	2796.42	0.5	0	743
03/06/83	0	35.96	0	35.96	0.08	0	2796.42	0.4	0	594
03/07/83	0.1	29.92	0	29.92	0.09	0	2796.42	0.3	0	446
03/08/83	0.2	27.06	0	27.06	0.09	0	2796.42	0.3	0	446
03/09/83	0	27.96	0	27.96	0.05	0	2796.42	0.3	0	446
03/10/83	0.8	36.26	0	36.26	0.11	0	2796.42	0.4	0	594
03/11/83	0	48.37	0	48.37	0.06	0	2796.42	0.6	0	892
03/12/83	0	42.16	0	42.16	0.07	0	2796.42	0.5	0	743
03/13/83	0	35.79	0	35.79	0.09	0	2796.42	0.4	0	594
03/14/83	0	30.1	0	30.11	0.07	0	2796.42	0.3	0	446
03/15/83	0.1	26.04	0	26.04	0.04	0	2796.42	0.3	0	446
03/16/83	0.1	26.28	0	26.28	0.02	0	2796.42	0.4	0	594
03/17/83	0.5	34.75	0	34.75	0.04	0	2796.42	0.6	0	892
03/18/83	0	39.55	0	39.55	0.09	0	2796.42	0.4	0	594
03/19/83	0	32.63	0	32.63	0.09	0	2796.42	0.3	0	446
03/20/83	0	26.71	0	26.71	0.08	0	2796.42	0.3	0	446
03/21/83	0.8	33.91	0	33.91	0.12	0	2796.42	0.6	0	892
03/22/83	0	43.87	0	43.87	0.13	0	2796.42	0.4	0	594
03/23/83	0	35.86	0	35.86	0.07	0	2796.42	0.4	0	594
03/24/83	1	48.47	0	48.47	0.07	0	2796.42	0.9	0	1337
03/25/83	0	62.56	0	62.56	0.16	0	2796.42	0.6	0	892
03/26/83	0	49.51	0	49.51	0.07	0	2796.42	0.6	0	892
03/27/83	0.2	42.23	0	42.23	0.08	0	2796.42	0.5	0	743
03/28/83	0	42.77	0	42.77	0.06	0	2796.42	0.5	0	743
03/29/83	0	36.8	0	36.8	0.07	0	2796.42	0.4	0	594
03/30/83	0	30.94	0	30.94	0.08	0	2796.42	0.3	0	446
03/31/83	0.4	30.88	0	30.88	0.09	0	2796.42	0.5	0	743
04/01/83	0	36.46	0	36.46	0.08	0	2796.42	0.4	0	594
04/02/83	0	29.67	0	29.67	0.11	0	2796.42	0.3	0	446
04/03/83	0	24.08	0	24.08	0.06	0	2796.42	0.3	0	446
04/04/83	0.3	25	0	25	0.1	0	2796.42	0.2	0	297
04/05/83	0	27.46	0	27.46	0.08	0	2796.42	0.3	0	446
04/06/83	0	22.36	0	22.36	0.08	0	2796.42	0.2	0	297
04/07/83	0	17.79	0	17.79	0.08	0	2796.42	0.1	0	149
04/08/83	0	13.63	0	13.63	0.09	0	2796.42	0.1	0	149
04/10/83	0	6.4	0	6.4	0.1	0	2796.42	0.3	0	446
07/03/83	0.1	20.2	0	20.2	0.1	0	2796.42	0.2	0	297
07/04/83	0	17.74	0	17.74	0.08	0	2796.42	0.1	0	149
07/05/83	0	13.27	0	13.27	0.11	0	2796.42	0.1	0	149
07/06/83	0.3	12.95	0	12.95	0.11	0	2796.42	0.2	0	297
07/07/83	0.1	14.71	0	14.71	0.13	0	2796.42	0.1	0	149
07/08/83	0	11.83	0	11.83	0.09	0	2796.42	0.1	0	149
07/29/83	3.1	38.71	0	38.71	0.09	0	2796.42	0.8	0	1189

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07/30/83	0	109.65	0	109.65	0.06	0	2796.42	1.3	0	1932
07/31/83	0	94.56	0	94.56	0.08	0	2796.42	1.1	0	1635
08/01/83	0	80.74	0	80.74	0.06	0	2796.42	1	0	1486
08/02/83	0.2	67.69	0	67.69	0.1	0	2796.42	0.8	0	1189
08/03/83	1.3	101.47	0	101.47	0.08	0	2796.42	1.7	0	2526
08/04/83	0	135.62	0	135.62	0.07	0	2796.42	1.7	0	2526
08/05/83	0.1	114.62	0	114.62	0.09	0	2796.42	1.4	0	2080
08/06/83	0	104.05	0	104.05	0.06	0	2796.42	1.3	0	1932
08/07/83	0.1	89.63	0	89.63	0.07	0	2796.42	1.1	0	1635
08/08/83	2	155.74	0	155.74	0.05	0	2796.42	2.7	0	4012
08/09/83	3	2033.39	1.36	874.9	0.06	0	2796.42	12.2	0	18130
08/10/83	0	413.25	0.82	874.9	0.08	0	2796.42	11	0	16346
08/11/83	0	242.11	0.08	874.9	0.07	0	2796.42	11	0	16346
08/12/83	0	184.72	0	248.79	0.07	0	2796.42	3.1	0	4607
08/13/83	0.1	148.39	0	148.4	0.08	0	2796.42	1.8	0	2675
08/14/83	0	130.48	0	130.48	0.09	0	2796.42	1.6	0	2378
08/15/83	0	110.12	0	110.12	0.08	0	2796.42	1.3	0	1932
08/16/83	0.8	118.98	0	118.98	0.08	0	2796.42	1.7	0	2526
08/17/83	0.5	161.31	0	161.31	0.06	0	2796.42	2.2	0	3269
08/18/83	0.9	211.86	0	211.86	0.08	0	2796.42	3	0	4458
08/19/83	0.1	248.76	0	248.76	0.06	0	2796.42	3.1	0	4607
08/20/83	0	202.03	0	202.03	0.07	0	2796.42	2.5	0	3715
08/21/83	0	160.57	0	160.57	0.08	0	2796.42	2	0	2972
08/22/83	0.5	156.98	0	156.98	0.09	0	2796.42	2.1	0	3121
08/23/83	0	159.26	0	159.26	0.07	0	2796.42	2	0	2972
08/24/83	0	132.83	0	132.83	0.07	0	2796.42	1.6	0	2378
08/25/83	0.1	113.98	0	113.98	0.07	0	2796.42	1.4	0	2080
08/26/83	0	104.76	0	104.76	0.06	0	2796.42	1.3	0	1932
08/27/83	0	90	0	90	0.08	0	2796.42	1.1	0	1635
08/28/83	0.2	75.57	0	75.57	0.09	0	2796.42	1	0	1486
08/29/83	0.9	96.67	0	96.67	0.07	0	2796.42	1.5	0	2229
08/30/83	0	119.21	0	119.21	0.08	0	2796.42	1.4	0	2080
08/31/83	0	102	0	102.01	0.06	0	2796.42	1.2	0	1783
09/01/83	0	88.62	0	88.62	0.06	0	2796.42	1.1	0	1635
09/02/83	0	78.22	0	78.22	0.04	0	2796.42	1	0	1486
09/03/83	0.1	69.94	0	69.94	0.03	0	2796.42	0.9	0	1337
09/04/83	0.03	66.18	0	66.18	0.07	0	2796.42	0.8	0	1189
09/05/83	0	57.66	0	57.66	0.07	0	2796.42	0.7	0	1040
09/06/83	0	49.04	0	49.04	0.07	0	2796.42	0.6	0	892
09/07/83	0	41.93	0	41.93	0.09	0	2796.42	0.4	0	594
09/08/83	0	35.62	0	35.62	0.06	0	2796.42	0.4	0	594
09/09/83	0	31.32	0	31.32	0.04	0	2796.42	0.4	0	594
09/10/83	0	27.47	0	27.47	0.07	0	2796.42	0.3	0	446
09/11/83	0	23.07	0	23.07	0.07	0	2796.42	0.2	0	297
09/12/83	0.14	18.8	0	18.8	0.08	0	2796.42	0.2	0	297
09/13/83	1.85	46.39	0	46.39	0.07	0	2796.42	1.2	0	1783
09/14/83	0.25	97.54	0	97.54	0.02	0	2796.42	1.3	0	1932
09/15/83	0	95.6	0	95.6	0.07	0	2796.42	1.1	0	1635
09/16/83	1.55	131.46	0	131.46	0.05	0	2796.42	2.2	0	3269
09/17/83	0	188.45	0	188.45	0.05	0	2796.42	2.3	0	3418
09/18/83	0.8	199.05	0	199.05	0.05	0	2796.42	2.8	0	4161
09/19/83	0.5	269.75	0	269.76	0.05	0	2796.42	3.6	0	5350
09/20/83	0	252.38	0	252.38	0.06	0	2796.42	3.1	0	4607
09/21/83	0	191.36	0	191.36	0.07	0	2796.42	2.4	0	3566
09/22/83	0.05	151.85	0	151.85	0.09	0	2796.42	1.9	0	2823
09/23/83	0.56	153.46	0	153.46	0.08	0	2796.42	2.1	0	3121
09/24/83	1.2	254.29	0	254.29	0.07	0	2796.42	3.6	0	5350
09/25/83	0	292.93	0	292.93	0.1	0	2796.42	3.6	0	5350
09/26/83	0	199.28	0	199.28	0.11	0	2796.42	2.4	0	3566
09/27/83	0	154.67	0	154.67	0.08	0	2796.42	1.9	0	2823
09/28/83	0	129.07	0	129.07	0.07	0	2796.42	1.6	0	2378
09/29/83	0	110.93	0	110.93	0.07	0	2796.42	1.3	0	1932
09/30/83	0	93.85	0	93.85	0.09	0	2796.42	1.1	0	1635
10/01/83	0.06	78.83	0	78.83	0.07	0	2796.42	0.9	0	1337
10/02/83	0	71.75	0	71.75	0.04	0	2796.42	0.9	0	1337
10/03/83	0	62.73	0	62.73	0.07	0	2796.42	0.7	0	1040
10/04/83	0	53.7	0	53.7	0.06	0	2796.42	0.6	0	892
10/05/83	0	47.63	0	47.63	0.04	0	2796.42	0.6	0	892
10/06/83	0	41.93	0	41.93	0.08	0	2796.42	0.4	0	594

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10/07/83	0	35.52	0	35.52	0.07	0	2796.42	0.4	0	594
10/08/83	0	30.2	0	30.2	0.07	0	2796.42	0.3	0	446
10/09/83	0	25.41	0	25.41	0.07	0	2796.42	0.2	0	297
10/10/83	0	21.03	0	21.03	0.06	0	2796.42	0.2	0	297
10/11/83	0.05	17.28	0	17.28	0.07	0	2796.42	0.2	0	297
10/12/83	0	15	0	15	0.06	0	2796.42	0.1	0	149
10/13/83	0	12.26	0	12.26	0.05	0	2796.42	0.1	0	149
10/14/83	2.51	47.83	0	47.83	0.03	0	2796.42	1.6	0	2378
10/15/83	0.4	115.25	0	115.25	0.06	0	2796.42	1.6	0	2378
10/16/83	1.1	164.8	0	164.8	0.07	0	2796.42	2.5	0	3715
10/17/83	0.4	231.25	0	231.25	0.06	0	2796.42	3	0	4458
10/18/83	0.63	277.2	0	277.2	0.04	0	2796.42	3.7	0	5498
10/19/83	0.03	272.64	0	272.64	0.11	0	2796.42	3.4	0	5053
10/20/83	0	197.9	0	197.91	0.07	0	2796.42	2.4	0	3566
10/21/83	0	159.23	0	159.23	0.06	0	2796.42	2	0	2972
10/22/83	0.9	170.06	0	170.06	0.06	0	2796.42	2.4	0	3566
10/23/83	1.9	858.71	0	858.71	0.07	0	2796.42	11.6	0	17238
10/24/83	0	424.99	0	424.99	0.04	0	2796.42	5.4	0	8025
10/25/83	0.01	253.52	0	253.52	0.06	0	2796.42	3.2	0	4755
10/26/83	0	193.34	0	193.34	0.07	0	2796.42	2.4	0	3566
10/27/83	0	157.15	0	157.15	0.05	0	2796.42	1.9	0	2823
10/28/83	0	131.99	0	131.99	0.08	0	2796.42	1.6	0	2378
10/29/83	0	113.48	0	113.48	0.06	0	2796.42	1.4	0	2080
10/30/83	0	98.42	0	98.42	0.07	0	2796.42	1.2	0	1783
10/31/83	0	84.43	0	84.43	0.07	0	2796.42	1	0	1486
11/01/83	0	72.49	0	72.49	0.07	0	2796.42	0.9	0	1337
11/02/83	0.01	60.98	0	60.98	0.09	0	2796.42	0.7	0	1040
11/03/83	0.32	59.37	0	59.37	0.04	0	2796.42	0.8	0	1189
11/04/83	0	63.2	0	63.2	0.06	0	2796.42	0.7	0	1040
11/05/83	0	54.78	0	54.78	0.05	0	2796.42	0.6	0	892
11/06/83	0	48	0	48	0.06	0	2796.42	0.5	0	743
11/07/83	0.18	42.03	0	42.03	0.06	0	2796.42	0.5	0	743
11/08/83	0.22	42.94	0	42.94	0.06	0	2796.42	0.6	0	892
11/09/83	0.11	45.82	0	45.82	0.03	0	2796.42	0.6	0	892
11/10/83	0	45.45	0	45.45	0.04	0	2796.42	0.5	0	743
11/11/83	0	41.02	0	41.02	0.04	0	2796.42	0.5	0	743
11/12/83	0	37.1	0	37.1	0.04	0	2796.42	0.4	0	594
11/13/83	0	33.78	0	33.78	0.03	0	2796.42	0.4	0	594
11/14/83	0	30.75	0	30.75	0.04	0	2796.42	0.4	0	594
11/15/83	0	27.48	0	27.48	0.04	0	2796.42	0.3	0	446
11/16/83	0.25	28.65	0	28.65	0.06	0	2796.42	0.4	0	594
11/17/83	0.01	29.52	0	29.52	0.09	0	2796.42	0.3	0	446
11/18/83	0	25.19	0	25.19	0.04	0	2796.42	0.3	0	446
11/19/83	0	22.05	0	22.05	0.05	0	2796.42	0.2	0	297
11/20/83	0.2	19.09	0	19.09	0.04	0	2796.42	0.3	0	446
11/21/83	0	21.44	0	21.44	0.06	0	2796.42	0.2	0	297
11/22/83	0	18.44	0	18.44	0.04	0	2796.42	0.2	0	297
11/23/83	0	15.7	0	15.7	0.06	0	2796.42	0.1	0	149
11/24/83	0	13.24	0	13.24	0.04	0	2796.42	0.1	0	149
11/25/83	0	10.91	0	10.91	0.06	0	2796.42	0.1	0	149
11/27/83	0	6.21	0	6.21	0.03	0	2796.42	0.1	0	149
12/17/83	1.3	8.13	0	8.13	0.02	0	2796.42	0.3	0	446
12/18/83	0.2	23.56	0	23.56	0.03	0	2796.42	0.4	0	594
12/19/83	0	27.04	0	27.04	0.03	0	2796.42	0.3	0	446
12/20/83	0.2	24.15	0	24.15	0.05	0	2796.42	0.3	0	446
12/21/83	0	27.17	0	27.17	0.02	0	2796.42	0.3	0	446
12/22/83	0.02	24.82	0	24.82	0.03	0	2796.42	0.3	0	446
12/23/83	0	23.22	0	23.22	0.02	0	2796.42	0.3	0	446
12/24/83	0	21.65	0	21.65	0.01	0	2796.42	0.3	0	446
12/25/83	0	19.27	0	19.27	0.07	0	2796.42	0.2	0	297
12/26/83	0	16.05	0	16.05	0.05	0	2796.42	0.2	0	297
12/27/83	0	13.48	0	13.48	0.05	0	2796.42	0.1	0	149
12/28/83	0	11.5	0	11.5	0.03	0	2796.42	0.1	0	149
12/29/83	0	10.02	0	10.02	0.03	0	2796.42	0.1	0	149
12/30/83	0.86	17.2	0	17.2	0.06	0	2796.42	0.5	0	743
12/31/83	0.2	30.16	0	30.16	0.01	0	2796.42	0.4	0	594
01/01/84	0	33.91	0	33.91	0.04	0	2796.42	0.4	0	594
01/02/84	0	30.55	0	30.55	0.04	0	2796.42	0.4	0	594
01/03/84	0	27.42	0	27.43	0.04	0	2796.42	0.3	0	446

NOTE - ONLY OUTFLOW EVENTS ARE SHOWN

DATE	RAIN (in)	RO+DR+W (ac-in)	HIA-MAX (in)	PMP-INF (ac-in)	WSP-EVAP (ac-in)	IRRIG (ac-in)	RES-STOR (ac-in)	OVERFLOW (in)	IRR-DEF (in)	Overflow gpm
01/04/84	0.1	24.21	0	24.21	0.05	0	2796.42	0.3	0	446
01/05/84	0	24.14	0	24.14	0.03	0	2796.42	0.3	0	446
01/06/84	0	21.62	0	21.62	0.04	0	2796.42	0.2	0	297
01/07/84	0	18.9	0	18.9	0.05	0	2796.42	0.2	0	297
01/08/84	0	16.11	0	16.11	0.05	0	2796.42	0.2	0	297
01/09/84	0	13.74	0	13.74	0.04	0	2796.42	0.1	0	149
01/10/84	0	12.09	0	12.09	0.02	0	2796.42	0.1	0	149
01/11/84	0	10.79	0	10.79	0.03	0	2796.42	0.1	0	149
01/12/84	0	8.97	0	8.97	0.06	0	2796.42	0.1	0	149
01/13/84	0	7.36	0	7.36	0.02	0	2796.42	0.1	0	149
02/28/84	1.19	20.47	0	20.47	0.11	0	2796.42	0.6	0	892
02/29/84	0	38.91	0	38.91	0.07	0	2796.42	0.4	0	594
03/01/84	0	33.68	0	33.68	0.05	0	2796.42	0.4	0	594
03/02/84	0	29.59	0	29.59	0.06	0	2796.42	0.3	0	446
03/03/84	0	25.55	0	25.55	0.06	0	2796.42	0.3	0	446
03/04/84	0	20.9	0	20.9	0.1	0	2796.42	0.2	0	297
03/05/84	1.41	34.65	0	34.65	0.06	0	2796.42	0.4	0	594
03/06/84	0	60.98	0	60.98	0.09	0	2796.42	0.7	0	1040
03/07/84	0	51.22	0	51.22	0.07	0	2796.42	0.6	0	892
03/08/84	0	44.41	0	44.41	0.06	0	2796.42	0.5	0	743
03/09/84	0	38.57	0	38.57	0.07	0	2796.42	0.4	0	594
03/10/84	0	33.15	0	33.15	0.07	0	2796.42	0.3	0	446
03/11/84	0	28.6	0	28.6	0.05	0	2796.42	0.3	0	446
03/12/84	0	23.92	0	23.92	0.1	0	2796.42	0.2	0	297
03/13/84	0	19.23	0	19.23	0.06	0	2796.42	0.7	0	1040
03/14/84	0	15.35	0	15.35	0.09	0	2796.42	0.1	0	149
08/14/88	0	410.57	0	410.57	0.09	0	2796.42	0.7	0	1040
08/15/88	0.1	234.6	0	234.6	0.09	0	2796.42	2.9	0	4310
08/16/88	0	187.57	0	187.57	0.09	0	2796.42	2.3	0	3418
08/17/88	0.21	147.52	0	147.52	0.09	0	2796.42	1.9	0	2823
08/18/88	0.03	140.48	0	140.48	0.03	0	2796.42	1.8	0	2675
08/19/88	0.12	123.64	0	123.64	0.08	0	2796.42	1.5	0	2229
08/20/88	0.9	142.32	0	142.32	0.1	0	2796.42	2.1	0	3121
08/21/88	0.3	190.96	0	190.96	0.1	0	2796.42	2.4	0	3566
08/22/88	0	179.89	0	179.89	0.07	0	2796.42	2.2	0	3269
08/23/88	0	144.94	0	144.94	0.09	0	2796.42	1.7	0	2526
08/24/88	0	120.35	0	120.35	0.09	0	2796.42	1.4	0	2080
08/25/88	0	100.43	0	100.43	0.1	0	2796.42	1.2	0	1783
08/26/88	0.05	84.39	0	84.39	0.07	0	2796.42	1	0	1486
08/27/88	0	76.28	0	76.28	0.05	0	2796.42	0.9	0	1337
08/28/88	0	66.89	0	66.89	0.06	0	2796.42	0.8	0	1189
08/29/88	0	57.66	0	57.66	0.07	0	2796.42	0.7	0	1040
08/30/88	0	48.94	0	48.94	0.08	0	2796.42	0.5	0	743
08/31/88	0	41.29	0	41.29	0.09	0	2796.42	0.4	0	594
09/01/88	0	34.88	0	34.89	0.06	0	2796.42	0.8	0	1189
09/02/88	0.1	29.9	0	29.9	0.07	0	2796.42	0.3	0	446
09/03/88	0	28.73	0	28.73	0.05	0	2796.42	0.3	0	446
09/04/88	0	24.15	0	24.15	0.09	0	2796.42	0.2	0	297
09/05/88	0.2	19.04	0	19.04	0.09	0	2796.42	0.2	0	297
09/06/88	0	19.67	0	19.67	0.07	0	2796.42	0.2	0	297
09/07/88	0.06	16.14	0	16.14	0.07	0	2796.42	0.2	0	297
09/08/88	0.01	14.43	0	14.43	0.06	0	2796.42	0.1	0	149
09/09/88	0.82	21.79	0	21.79	0.08	0	2796.42	0.5	0	743
09/10/88	0	32.17	0	32.17	0.09	0	2796.42	0.3	0	446
09/11/88	0	25.9	0	25.9	0.1	0	2796.42	0.2	0	297
09/12/88	0	20.13	0	20.13	0.1	0	2796.42	0.2	0	297
09/13/88	0	15.11	0	15.11	0.1	0	2796.42	0.1	0	149
09/15/88	0.26	10.05	0	10.05	0.07	0	2796.42	0.2	0	297
09/16/88	0.09	11.48	0	11.48	0.07	0	2796.42	0.1	0	149
08/29/90	1.34	800.68	0	800.68	0.09	0	2796.42	5.9	0	8768
08/30/90	0	410.57	0	410.57	0.09	0	2796.42	5.1	0	7579
08/31/90	0	235.74	0	235.74	0.09	0	2796.42	2.9	0	4310
09/01/90	4.23	2665	2.1	874.9	0.08	0	2796.42	11.6	0	17238
09/02/90	0.1	413.25	1.56	874.9	0.08	0	2796.42	11.1	0	16495
09/03/90	0.3	292.33	0.88	874.9	0.08	0	2796.42	11.1	0	16495
09/04/90	0	248.69	0.14	874.9	0.08	0	2796.42	11	0	16346
09/05/90	0	185.09	0	304.78	0.08	0	2796.42	3.8	0	5647
09/06/90	0.07	147.66	0	147.66	0.08	0	2796.42	1.8	0	2675
09/07/90	0	128.54	0	128.54	0.08	0	2796.42	1.6	0	2378

NOTE - ONLY OUTFLOW EVENTS ARE SHOWN

DATE	RAIN (in)	RO+DR+W (ac-in)	HIA-MAX (in)	PMP-INF (ac-in)	WSP-EVAP (ac-in)	IRRIG (ac-in)	RES-STOR (ac-in)	OVERFLOW (in)	IRR-DEF (in)	Overflow gpm
09/08/90	0	109.15	0	109.15	0.08	0	2796.42	1.3	0	1932
09/09/90	0	92.58	0	92.58	0.08	0	2796.42	1.1	0	1635
09/10/90	0	78.29	0	78.29	0.08	0	2796.42	0.9	0	1337
09/11/90	0	65.91	0	65.91	0.08	0	2796.42	0.8	0	1189
09/12/90	0.37	63.8	0	63.8	0.08	0	2796.42	0.9	0	1337
09/13/90	0	69.3	0	69.3	0.08	0	2796.42	0.8	0	1189
09/14/90	0	58.1	0	58.1	0.08	0	2796.42	0.7	0	1040
09/15/90	0.1	48.74	0	48.74	0.08	0	2796.42	0.6	0	892
09/16/90	1.3	74.87	0	74.87	0.08	0	2796.42	1.4	0	2080
09/17/90	0	105.73	0	105.73	0.08	0	2796.42	1.3	0	1932
09/18/90	0	89.63	0	89.63	0.08	0	2796.42	1.1	0	1635
09/19/90	1.1	106.43	0	106.43	0.08	0	2796.42	1.7	0	2526
09/20/90	0.1	134.47	0	134.48	0.08	0	2796.42	1.7	0	2526
09/21/90	0.6	142.06	0	142.06	0.08	0	2796.42	2	0	2972
09/22/90	0.2	153.02	0	153.02	0.08	0	2796.42	1.9	0	2823
09/23/90	0	142.32	0	142.32	0.08	0	2796.42	1.7	0	2526
09/24/90	0	119.85	0	119.85	0.08	0	2796.42	1.4	0	2080
09/25/90	0	101.74	0	101.74	0.08	0	2796.42	1.2	0	1783
09/26/90	0	86.21	0	86.21	0.08	0	2796.42	1	0	1486
09/27/90	0	72.76	0	72.76	0.08	0	2796.42	0.8	0	1189
09/28/90	0	61.12	0	61.12	0.08	0	2796.42	0.7	0	1040
09/29/90	0	51.22	0	51.22	0.08	0	2796.42	0.6	0	892
09/30/90	0	43.54	0	43.54	0.08	0	2796.42	0.5	0	743
10/01/90	0	36.93	0	36.93	0.07	0	2796.42	2.1	0	3121
10/02/90	0	31.21	0	31.21	0.07	0	2796.42	0.3	0	446
10/03/90	0.05	26.04	0	26.04	0.07	0	2796.42	0.3	0	446
10/04/90	0.03	22.73	0	22.73	0.07	0	2796.42	0.2	0	297
10/05/90	0	19.09	0	19.09	0.07	0	2796.42	0.2	0	297
10/06/90	0	15.08	0	15.08	0.07	0	2796.42	0.1	0	149
10/07/90	0	11.51	0	11.51	0.07	0	2796.42	0.1	0	149
10/10/90	0.1	4.35	0	4.35	0.07	0	2796.42	0.9	0	1337
10/06/91	1	64.74	0	64.74	0.04	0	2796.42	0.9	0	1337
10/07/91	0.29	94.69	0	94.69	0.19	0	2796.42	1.1	0	1635
10/08/91	0.02	96.07	0	96.07	0.04	0	2796.42	1.2	0	1783
10/09/91	0	83.69	0	83.69	0.1	0	2796.42	1	0	1486
10/10/91	0	69.03	0	69.03	0.09	0	2796.42	0.8	0	1189
10/11/91	0.07	58.94	0	58.94	0.04	0	2796.42	0.7	0	1040
10/12/91	0	55.65	0	55.65	0.04	0	2796.42	0.7	0	1040
10/13/91	0	48.24	0	48.24	0.09	0	2796.42	0.5	0	743
10/14/91	0	41.43	0	41.43	0.06	0	2796.42	0.5	0	743
10/15/91	0	36.49	0	36.5	0.05	0	2796.42	0.4	0	594
10/16/91	0.24	37.27	0	37.27	0.12	0	2796.42	0.4	0	594
10/17/91	0	38.27	0	38.27	0.06	0	2796.42	0.4	0	594
10/18/91	0	34.18	0	34.18	0.03	0	2796.42	0.4	0	594
10/19/91	0	29.22	0	29.22	0.11	0	2796.42	0.3	0	446
10/20/91	0	23.05	0	23.05	0.08	0	2796.42	0.2	0	297
10/21/91	0	18.4	0	18.4	0.08	0	2796.42	0.2	0	297
10/22/91	0	14.34	0	14.34	0.07	0	2796.42	0.1	0	149
10/23/91	0	10.92	0	10.92	0.07	0	2796.42	0.1	0	149
10/24/91	0	8.26	0	8.26	0.05	0	2796.42	0.1	0	149
07/07/92	1.19	66.78	0	66.78	0.09	0	2796.42	0.8	0	1189
07/08/92	0	96.91	0	96.91	0.09	0	2796.42	1.1	0	1635
07/09/92	0	78.49	0	78.49	0.15	0	2796.42	0.9	0	1337
07/10/92	0	60.11	0	60.11	0.15	0	2796.42	0.6	0	892
07/11/92	0.1	45.85	0	45.85	0.16	0	2796.42	0.5	0	743
07/12/92	0	38.11	0	38.11	0.13	0	2796.42	0.4	0	594
07/13/92	0.02	30.52	0	30.52	0.09	0	2796.42	0.3	0	446
07/14/92	0.06	25.55	0	25.55	0.08	0	2796.42	0.3	0	446
07/15/92	0.21	21.25	0	21.25	0.14	0	2796.42	0.2	0	297
07/16/92	0.19	19.39	0	19.39	0.13	0	2796.42	0.2	0	297
07/17/92	0	18.43	0	18.43	0.06	0	2796.42	0.2	0	297
07/18/92	0.47	19.18	0	19.18	0.08	0	2796.42	0.3	0	446
07/19/92	0	23.89	0	23.89	0.21	0	2796.42	0.1	0	149
07/20/92	0.2	16.54	0	16.54	0.07	0	2796.42	0.2	0	297
07/21/92	0.52	24.19	0	24.19	0.07	0	2796.42	0.4	0	594
07/22/92	0	30.43	0	30.43	0.05	0	2796.42	0.3	0	446
07/23/92	0.45	31.37	0	31.37	0.14	0	2796.42	0.4	0	594
07/24/92	0.04	39.58	0	39.58	0.04	0	2796.42	0.5	0	743
07/25/92	0	35.66	0	35.66	0.09	0	2796.42	0.4	0	594

NOTE - ONLY OUTFLOW EVENTS ARE SHOWN

DATE	RAIN (in)	RO+DR+W (ac-in)	HIA-MAX (in)	PMP-INF (ac-in)	WSP-EVAP (ac-in)	IRRIG (ac-in)	RES-STOR (ac-in)	OVERFLOW (in)	IRR-DEF (in)	Overflow gpm
07/26/92	0.03	28.68	0	28.68	0.13	0	2796.42	0.2	0	297
07/27/92	0	22.32	0	22.32	0.1	0	2796.42	0.2	0	297
07/28/92	0	18.01	0	18.01	0.05	0	2796.42	0.2	0	297
08/12/92	0.96	16.48	0	16.48	0.08	0	2796.42	0.5	0	743
08/13/92	0.51	36.13	0	36.13	0.11	0	2796.42	0.5	0	743
08/14/92	0.02	41.02	0	41.02	0.1	0	2796.42	0.4	0	594
08/15/92	0.1	34.92	0	34.92	0.06	0	2796.42	0.4	0	594
08/16/92	0.05	32.2	0	32.2	0.11	0	2796.42	0.3	0	446
08/17/92	0.12	27.1	0	27.1	0.07	0	2796.42	0.3	0	446
08/18/92	0	26.52	0	26.52	0.04	0	2796.42	0.3	0	446
08/19/92	0.9	35.09	0	35.09	0.17	0	2796.42	0.6	0	892
08/20/92	0	50.95	0	50.95	0.06	0	2796.42	0.6	0	892
08/21/92	0.12	42.26	0	42.26	0.17	0	2796.42	0.4	0	594
08/22/92	1.5	68.33	0	68.33	0.14	0	2796.42	1.3	0	1932
08/23/92	0.25	113.85	0	113.85	0.03	0	2796.42	1.5	0	2229
08/24/92	1.17	148.93	0	148.93	0.02	0	2796.42	2.3	0	3418
08/25/92	1.09	289.48	0	289.48	0.08	0	2796.42	4	0	5944
08/26/92	0	327.78	0	327.79	0.14	0	2796.42	4	0	5944
08/27/92	0	207.57	0	207.57	0.09	0	2796.42	2.5	0	3715
08/28/92	0	162.95	0	162.95	0.06	0	2796.42	2	0	2972
08/29/92	0.05	130.32	0	130.32	0.16	0	2796.42	1.5	0	2229
08/30/92	1.8	191.87	0	191.87	0.05	0	2796.42	3.1	0	4607
08/31/92	0	290.65	0	290.65	0.09	0	2796.42	3.6	0	5350

Maximum outflow from stormwater pond = 18,427

Average outflow from stormwater pond = 1,685

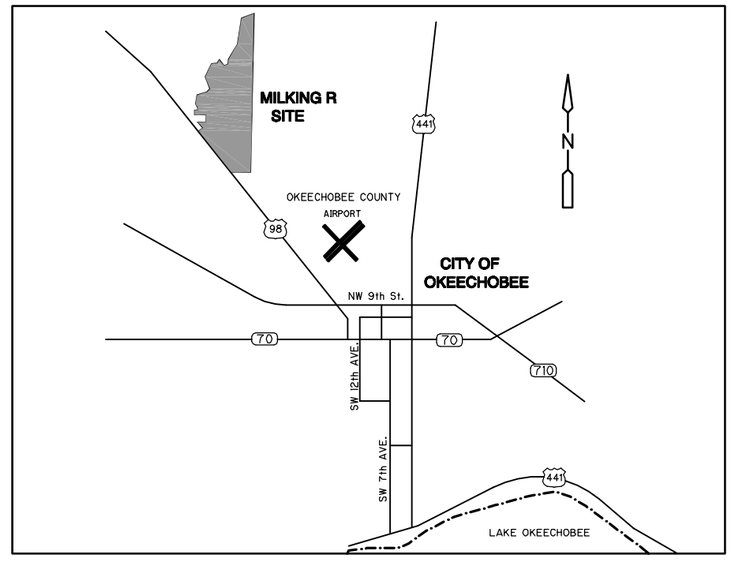
No. of Daily Outflows = 1,159

Appendix D
Final Design Plans

DESIGN/BUILD PHASE OF THE DAIRY BEST AVAILABLE TECHNOLOGIES PROJECT - SFWMD CONTRACT C-11652, AMENDMENT No.1

Milking R inc

VICINITY PLAN
NTS



SECTIONS 23, 24, 25, 26 AND 36 TOWNSHIP 36 SOUTH, RANGE 34 EAST

LOCATION MAP
NTS

FEBRUARY 2005

100% SUBMITTAL

PRELIMINARY
BIDDING PURPOSES ONLY

ROYAL CONSULTING SERVICES, INC.

RCS PROJECT NO. 0100-11-ES

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PROFESSIONAL ENGINEER
STATE OF FLORIDA

GENERAL CIVIL MECHANICAL	Brian L. Roy, P.E. No. 45366
ELECTRICAL INSTRUMENTATION	Richard A. Jones, P.E. No. 31118

LEGEND

M.H. SAN. S.	STORM SEWER
IRR	EXISTING SANITARY SEWER W/ MANHOLE
T	EXISTING IRRIGATION LINE
P	EXISTING BURIED TELEPHONE
E.	EXISTING POWER DUCTS OR CABLES
C.B. 15" S.S.	OVERHEAD ELECTRIC
□ or ○ P.P.	EXISTING STORM SEWER W/CATCH BASIN
□ or ○ L.P.	EXISTING POWER POLE
	EXISTING LIGHT POLE
	R/W – RIGHT OF WAY
	℄ – PROPERTY LINE
	JURISDICTIONAL BOUNDARY
	LIMITS OF CONSTRUCTION
	EASEMENTS
	WATER ELEVATION
	BASE LINE
	PROPOSED SILT FENCE
	STORMSEWER TO BE CONST. UNDER EXISTING UTILITY
	STORMSEWER TO BE CONST. OVER EXISTING UTILITY
	BENCH MARK
	EXISTING BARBED WIRE FENCE
	NEW BARBED WIRE FENCE
12.00	EXISTING CONTOUR
12.00	PROPOSED CONTOUR
× 12.00	EXISTING SPOT ELEVATION
51.32	PROPOSED SPOT ELEVATION
X-8	DRAINAGE STRUCTURE ID
	DITCH BOTTOM INLET
	STORMWATER MANHOLE

ABBREVIATIONS

ADJUSTABLE	ADJ
AHEAD OF STATION	AH
ALUMINUM	AL, ALUM
ANGLE	<
BACK OF STATION	BK
BALL VALVE	BAV
BASELINE OF SURVEY	℄
BELOW	BEL
BENCHMARK	BM
BETWEEN	BTWN
BITUMINOUS COATED CORRUGATED METAL PIPE	BCCMP
BURIED TELEPHONE	BT
CENTER LINE OF CONSTRUCTION	℄
CENTER TO CENTER	CC
CONCRETE	CONC
CONCRETE BOX CULVERT	CBC
CONSTRUCT	CONST
CORRUGATED METAL PIPE	CMP
CENTER (ED)	CTR
CROSS SECTION	X-SEC
DEMOLITION	DEMO
DIAMETER	DIA, DIAM
DIAGONAL	DIAG
DIMENSION	DIM
DOWNSTREAM	D/S
DISCHARGE	DISCH
DITCH BOTTOM INLET	DBI
DRAWING	DWG
DUCTILE IRON PIPE	DIP
DUCTILE IRON	DI
EACH	EA
ELEVATION	EL, ELEV
EDGE OF PAVEMENT	EOP, EP
EXISTING	EXIST
FIBERGLASS REINFORCED PIPE	FRP
FINISH	FIN
FLANGE	FLG
FLARED END SECTION	FES
FLOOR	FL
FURNISHED BY OTHERS	FBO
FEET/FOOT	FT
GALVANIZED STEEL PIPE	GSP
HEIGHT	HT
HIGH POINT	HP
INSTALL	INST
LEFT	L, LT
LOW POINT	LP
MATERIAL	MTL
MANHOLE	MH
MAXIMUM	MAX
MECHANICAL	MECH
METAL	MET
MINIMUM	MIN
MITERED END SECTION	MES
MOUNTED	MTD
NOMINAL	NOM
NOT IN CONTRACT	NIC
NOT TO SCALE	NTS
NUMBER	NO
ON CENTER	OC
OPPOSITE	OPP
OPTION	OPT
OPENING	OPNG
OR EQUAL	O/E
PAVEMENT	PVMT, PAVT
PERFORATED	PERF
POINT OF CURVATURE	POC
POINT OF TANGENCY	POT
POINT	PT
POLYETHYLENE PIPE	PP
POLYVINYL CHLORIDE	PVC
POUND(S)	LB(S)
PLATE	PL
PRECAST	PRCST
PROFILE GRADE LINE	PGL
RADIUS	RAD, R
REINFORCED CONCRETE PIPE	RCP
REQUIRED	REQ'D
RESTRAINED JOINT	RJ
RIGHT	RT, R
RIGHT OF WAY	R/W, ROW
SANITARY SEWER	SAN, S
SECTION	SEC
SHEET	SH, SHT
SIDEWALK	SDWK, S/W
SLIP-ON JOINT	SJ
SQUARE FEET	SQ. FT., SF
STAINLESS STEEL	SS
STANDARD	ST'D
STATION	STA
STEEL	STL
STEEL PIPE	SP
STORM SEWER	SS, STORM
SYMMETRICAL	SYMM
TANGENT TO CURVE	TC
TEMPORARY CONSTRUCTION EASEMENT	TCE
THICK	THK
TIED JOINT	TJ
TOP OF CURB	TOC
TYPICAL	TYP
TEMPORARY	TEMP
UPSTREAM	U/S
UTILITY EASEMENT	UE
VERIFIED VERTICAL ELEVATION AND HORIZONTAL LOCATION	Vvh, VVH
VERTICAL	VERT
VERTICAL CURVE	VC
WATER	WTR
WATER LEVEL	WL
WATER MAIN	WM
WEATHERPROOF	WPF
WEST	W
WITH	W/

EROSION CONTROL NOTES

IT IS THE CONTRACTOR'S RESPONSIBILITY TO IMPLEMENT THE EROSION AND TURBIDITY CONTROLS AS SHOWN ON THE EROSION AND TURBIDITY CONTROL PLAN. IT IS ALSO THE CONTRACTOR'S RESPONSIBILITY TO ENSURE THESE CONTROLS ARE PROPERLY INSTALLED, MAINTAINED AND FUNCTIONING PROPERLY TO PREVENT TURBID OR POLLUTED WATER FROM LEAVING THE PROJECT SITE. THE CONTRACTOR WILL ADJUST THE EROSION AND TURBIDITY CONTROLS SHOWN ON THE EROSION AND TURBIDITY CONTROL PLAN AND ADD ADDITIONAL CONTROL MEASURES, AS REQUIRED,TO ENSURE THE SITE MEETS ALL FEDERAL, STATE AND LOCAL EROSION AND TURBIDITY CONTROL REQUIREMENTS. THE FOLLOWING BEST MANAGEMENT PRACTICES WILL BE IMPLEMENTED BY THE CONTRACTOR AS REQUIRED BY THE EROSION AND TURBIDITY CONTROL PLAN AND AS REQUIRED SITE BY THE REGULATORY AGENCIES.

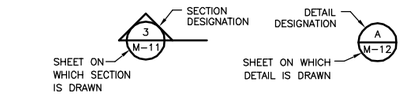
1. SEDIMENT BASINS AND TRAPS, PERIMETER DITCHES, SEDIMENT BARRIERS AND OTHER MEASURES INTENDED TO TRAP SEDIMENT SHALL BE CONSTRUCTED AS A FIRST STEP BEFORE ANY LAND-DISTURBING TAKES PLACE TO MEET THE EROSION AND TURBIDITY REQUIREMENTS IMPOSED ON THE PROJECT.
2. ALL SEDIMENT CONTROL MEASURES ARE TO BE ADJUSTED TO MEET FIELD CONDITIONS AT THE TIME OF CONSTRUCTION AND BE CONSTRUCTED PRIOR TO ANY GRADING OR DISTURBANCE OF EXISTING SURFACE MATERIAL ON BALANCE OF SITE. PERIMETER SEDIMENT BARRIERS SHALL BE CONSTRUCTED TO PREVENT SEDIMENT OR TRASH FROM FLOWING OR FLOATING ONTO ADJACENT PROPERTIES.
3. DURING CONSTRUCTION OF THE PROJECT. SOIL STOCK PILES SHALL BE STABILIZED OR PROTECTED WITH SEDIMENT TRAPPING MEASURES. THE CONTRACTOR IS RESPONSIBLE FOR THE TEMPORARY PROTECTION AND PERMANENT STABILIZATION OF ALL SOIL STOCKPILES ON SITE AS WELL AS SOIL INTENTIONALLY TRANSPORTED FROM THE PROJECT SITE.
4. AFTER ANY SIGNIFICANT RAINFALL, SEDIMENT CONTROL STRUCTURES WILL BE INSPECTED FOR INTEGRITY. ANY DAMAGED DEVICES SHALL BE REPAIRED IMMEDIATELY.
5. CONCENTRATED RUNOFF SHALL NOT FLOW DOWN CUT OR FILL SLOPES UNLESS CONTAINED WITHIN AN ADEQUATE TEMPORARY OR PERMANENT CHANNEL FLUME OR SLOPE DRAIN STRUCTURE.
6. WHENEVER WATER SEEPS FROM A SLOPE FACE ADEQUATE DRAINAGE OR OTHER PROTECTION SHALL BE PROVIDED.
7. SEDIMENT WILL BE PREVENTED FROM ENTERING ANY STORM DRAIN SYSTEM, DITCH, OR CHANNEL. ALL STORM SEWER INLETS THAT ARE MADE OPERABLE DURING CONSTRUCTION SHALL BE PROTECTED SO THAT SEDIMENT-LADEN WATER CANNOT ENTER THE CONVEYANCE SYSTEM WITHOUT FIRST BEING FILTERED OR OTHERWISE TREATED TO REMOVE SEDIMENT. GRATE INLETS AND CURB INLETS SHALL BE PROTECTED WITH GRATE INLET PROTECTION PCD-1000 AND CURB INLET PROTECTION PRODUCED BY SUNTREE ISLES, INC., OR APPROVED EQUAL.
8. BEFORE TEMPORARY OR NEWLY CONSTRUCTED STORMWATER CONVEYANCE CHANNELS ARE MADE OPERATIONAL, ADEQUATE OUTLET PROTECTION AND ANY REQUIRED TEMPORARY OR PERMANENT CHANNEL LINING SHALL BE INSTALLED IN BOTH THE CONVEYANCE CHANNEL AND RECEIVING CHANNEL.
9. WHEN WORK IN A LIVE WATERCOURSE IS PERFORMED, PRECAUTIONS SHALL BE TAKEN TO MINIMIZE ENRICHMENT. CONTROL SEDIMENT TRANSPORT AND STABILIZE THE WORK AREA TO THE GREATEST EXTENT POSSIBLE DURING CONSTRUCTION. NONERODIBLE MATERIAL SHALL BE USED FOR THE CONSTRUCTION OF CAUSEWAYS AND COFFERDAMS. EARTHEN FILL MAY BE USED FOR THESE STRUCTURES IF ARMORED BY NONERODIBLE COVER MATERIALS.
10. STOCKPILING MATERIAL: NO EXCAVATED MATERIAL SHALL BE STOCKPILED IN SUCH A MANNER AS TO DIRECT RUNOFF DIRECTLY OFF THE PROJECT SITE INTO ANY ADJACENT WATER BODY OR STORMWATER COLLECTION FACILITY.
11. EXPOSED AREA LIMITATION: THE SURFACE AREA OF OPEN, RAW ERODIBLE SOIL EXPOSED BY CLEARING AND GRUBBING OPERATIONS OR EXCAVATION AND FILLING OPERATIONS SHALL NOT EXCEED 5 ACRES. IF THE TOTAL AREA TO BE CLEARED IS EQUAL TO, OR EXCEEDS FIVE (5) ACRES, THEN THE CONTRACTOR WILL BE RESPONSIBLE FOR PREPARING A STORMWATER POLLUTION PREVENTION PLAN (SWPPP) IN ACCORDANCE WITH EPA'S NPDES REGULATIONS. THE CONTRACTOR WILL BE RESPONSIBLE FOR SUBMITTING FDEP'S NOTICE ON INTENT (NOI) TO EPA FORTH-EIGHT (48) HOURS PRIOR TO COMMENCING CONSTRUCTION.
12. TEMPORARY SEEDING: AREAS OPENED BY CONSTRUCTION OPERATIONS AND THAT ARE NOT ANTICIPATED TO BE RE-EXCAVATED OR DRESSED AND RECEIVE FINAL GRASSING TREATMENT WITHIN 30 DAYS SHALL BE SEEDED WITH A QUICK GROWING GRASS SPECIES WHICH WILL PROVIDE AN EARLY COVER DURING THE SEASON IN WHICH IT IS PLANTED AND WILL NOT LATER COMPETE WITH THE PERMANENT GRASSING.
13. TEMPORARY SEEDING AND MULCHING: SLOPES STEEPER THAN 6:1 THAT FALL WITHIN THE CATEGORY ESTABLISHED IN PARAGRAPH 12 ABOVE, A SUFFICIENT AMOUNT OF MULCH MATERIAL SHALL BE CUT INTO THE SOIL OF THE SEEDED AREA ADEQUATE TO PREVENT MOVEMENT OF SEED AND MULCH.
14. TEMPORARY GRASSING: THE SEEDED OR SEEDED AND MULCHED AREA(S) SHALL BE ROLLED AND WATERED OR HYDROMULCHED OR OTHER SUITABLE METHODS IF REQUIRED TO ASSURE OPTIMUM GROWING CONDITIONS FOR THE ESTABLISHMENT OF A GOOD GRASS COVER. TEMPORARY GRASSING SHALL BE THE SAME MIX & AMOUNT REQUIRED FOR PERMANENT GRASSING IN THE CONTRACT SPECIFICATIONS.
15. TEMPORARY REGRASSING : IF, AFTER 14 DAYS FROM SEEDING, THE TEMPORARY GRASSED AREAS HAVE NOT ATTAINED A MINIMUM OF 75 PERCENT GOOD GRASS COVER, THE AREA WILL BE REWORKED AND ADDITIONAL SEED APPLIED SUFFICIENT TO ESTABLISH THE DESIRED VEGETATIVE COVER.
16. MAINTENANCE: ALL FEATURES OF THE PROJECT DESIGNED AND CONSTRUCTED TO PREVENT EROSION AND SEDIMENT SHALL BE MAINTAINED DURING THE LIFE OF THE CONSTRUCTION SO AS TO FUNCTION AS THEY WERE ORIGINALLY DESIGNED AND CONSTRUCTED.
17. PERMANENT EROSION CONTROL: THE EROSION CONTROL FACILITIES OF THE PROJECT SHOULD BE DESIGNED TO MINIMIZE THE IMPACT ON THE OFFSITE FACILITIES.
18. PERMANENT SEEDING: ALL AREAS WHICH HAVE BEEN DISTURBED BY CONSTRUCTION WILL, AS A MINIMUM, BE SEEDED. THE SEEDING MIX MUST PROVIDE BOTH LONG-TERM VEGETATION AND RAPID GROWTH SEASONAL VEGETATION. SLOPES STEEPER THAN 4:1 SHALL BE SEEDED AND MULCHED OR SODDED.

INDEX OF SHEETS

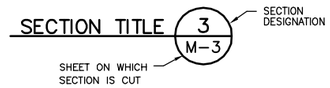
GENERAL NOTES

1. ALL ELEVATIONS ARE REFERRED TO NATIONAL GEODETIC VERTICAL DATUM OF 1929.
   HORIZONTAL CONTROL/COORDINATES SHOWN HEREON REFER TO STATE PLANE COORDINATE SYSTEM OF 1983 WITH THE 1990 ADJUSTMENT FOR FLORIDA EAST ZONE
2. LOCATIONS, ELEVATIONS, AND DIMENSIONS OF EXISTING UTILITIES, STRUCTURES, AND OTHER FEATURES ARE SHOWN ACCORDING TO THE BEST INFORMATION AVAILABLE AT THE TIME OF PREPARATION OF THESE PLANS, BUT DO NOT PURPORT TO BE ABSOLUTELY CORRECT. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL VERIFY AND AGREE TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY HIS FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL EXISTING UTILITIES, STRUCTURES, AND OTHER FEATURES AFFECTING HIS WORK.
3. THE CONTRACTOR SHALL NOTIFY THE APPROPRIATE UTILITY COMPANY SEVENTY-TWO (72) HOURS IN ADVANCE OF ANY EXCAVATION INVOLVING ITS UTILITIES SO THAT A COMPANY REPRESENTATIVE CAN BE PRESENT. THE LOCATION OF THE UTILITIES SHOWN IN THE PLANS ARE APPROXIMATE ONLY. THE EXACT LOCATION SHALL BE DETERMINED BY THE CONTRACTOR DURING CONSTRUCTION.
4. THE CONTRACTOR SHALL BE RESPONSIBLE TO VERIFY IF OTHER UTILITIES (NOT SHOWN IN THE PLANS) EXIST WITHIN THE AREA OF CONSTRUCTION. SHOULD THERE BE OTHER UTILITIES, THE CONTRACTOR SHALL NOTIFY THE APPROPRIATE UTILITY OWNERS TO RESOLVE UTILITY CONFLICTS AND UTILITY ADJUSTMENTS, AS REQUIRED. THE CONTRACTOR IS RESPONSIBLE FOR PROTECTION OF ALL UTILITIES TO REMAIN IN PLACE.
5. TOPOGRAPHIC SURVEY WAS PERFORMED BY:
   F.R.S. & ASSOCIATES, INC.
   GARY P. WILLIAMS, R.L.S.
   901 NORTHOINT PARKWAY, SUITE 301
   WEST PALM BEACH, FLORIDA 33407
   PHONE: 561-478-7178
   FAX: 561-478-7922
6. THE CONTRACTOR SHALL CONTACT THE ENGINEER'S OFFICE IMMEDIATELY UPON FINDING ANY CONFLICTS DURING CONSTRUCTION ON ANY IMPROVEMENTS SHOWN ON THE DRAWINGS.
7. EROSION CONTROL AND SEDIMENTATION CONTROL DEVICES SHALL BE IN PLACE PRIOR TO BEGINNING OF ANY CLEARING, GRUBBING, DEMOLITION OR CONSTRUCTION. THEY SHALL BE INSTALLED TO THE LIMITS SHOWN IN THE DRAWING, AS REQUIRED IN THE SPECIFICATIONS AND IN ACCORDANCE WITH ALL REGULATORY AGENCY REQUIREMENTS (SEE EROSION CONTROL NOTES)
8. THE CONTRACTOR SHALL REPLACE ANY MONUMENTS, FENCES, ETC. WITH THE SAME TYPE OF MATERIAL THAT WAS REMOVED DURING CONSTRUCTION.
9. ALL STATIONING AND OFFSET REFERS TO CONSTRUCTION BASELINE UNLESS OTHERWISE NOTED ON PLANS.
10. EXISTING UTILITIES AND FACILITIES SHOWN ON THE DRAWINGS WERE LOCATED FROM THE UTILITY OWNER'S RECORDS OF UNDERGROUND FACILITIES. GUARANTEE IS NOT MADE THAT ALL EXISTING FACILITIES ARE SHOWN NOR THAT THOSE FACILITIES SHOWN ARE ENTIRELY ACCURATE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE COORDINATION / RELOCATION OF THE EXISTING UTILITIES.
11. THE LIMITS OF CONSTRUCTION SHOWN ON THE PLANS SHALL BE STRICTLY OBSERVED BY THE CONTRACTOR. ALL INGRESS, EGRESS AND TRAFFIC PATTERNS ON THE SITE SHALL BE WITHIN THE LIMITS OF CONSTRUCTION SHOWN ON THE DRAWINGS.
12. DURING CONSTRUCTION OF THE IMPROVEMENTS, THE CONTRACTOR IS RESPONSIBLE FOR REMOVAL, PROTECTION, AND REPLACEMENT OF ITEMS ON PRIVATE PROPERTY AND PUBLIC RIGHTS OF WAY SUCH AS SPRINKLERS, FENCES, SOD, SHRUBS, TREES, SURVEYING MARKERS, ETC.
13. PRIOR TO EXCAVATING , THE CONTRACTOR SHALL NOTIFY THE EXISTING UTILITIES COMPANIES OWNERS IN ACCORDANCE WITH THE REQUIREMENTS OF FLORIDA STATUTES, PROTECTION OF UNDERGROUND PIPELINES F.S. 553.851, CH 17-143.
14. INSTALLATION OF ALL STORM SEWERS, INLETS, MANHOLES, BOX CULVERTS AND APPURTENANCES SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE APPLICABLE SECTIONS OF FLORIDA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS, OR AS INDICATED ON THE DRAWINGS.
15. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE LOCATION AND PROTECTION OF ALL UTILITIES THAT MAY EXIST, ABOVE OR BELOW GROUND.
16. ALL BRUSH, STRIPPINGS OR UNSUITABLE MATERIAL SHALL BE DISPOSED OF ON-SITE AT THE CONTRACTOR'S EXPENSE UNDER THE DIRECTION OF THE ENGINEER.
17. STATION OFFSETS SHOWN ON PLANS ARE FROM CENTERLINE TO CENTERLINE OF STRUCTURE.
18. ALL PRIVATE AND PUBLIC PROPERTY AFFECTED BY THIS WORK SHALL BE RESTORED TO A CONDITION EQUAL TO OR BETTER THAN THE CONDITION EXISTING PRIOR TO COMMENCING CONSTRUCTION UNLESS SPECIFICALLY EXEMPTED BY THE PLANS. COSTS TO BE INCIDENTAL TO OTHER CONSTRUCTION AND NO EXTRA COMPENSATION TO BE ALLOWED.
19. SITE PREPARATION:
   A. DEWATERING MAY BE NEEDED PRIOR TO ANY EARTHWORK OPERATIONS.
   B. THE CONTRACTOR SHALL SUBMIT ANY MODIFICATIONS TO THE MAINTENANCE OF TRAFFIC FOR APPROVAL BY HIGHLANDS COUNTY BEFORE CONSTRUCTION BEGINS.
   C. EXISTING TRAFFIC CONTROL SIGNS SHALL BE MAINTAINED OPERATIONAL AT ALL TIMES.
20. REMOVE & REPLACE EXISTING FENCING PER DIRECTION OF ENGINEER. ALL FENCES SHALL MEET N.R.C.S. STANDARDS AND SPECIFICATIONS FOR FENCING CODE 382 FOR 5 STRANDED BARB WIRE. LINE POSTS SHALL BE 4" DIAMETER OR LARGER.
21. CONTRACTOR SHALL COMPLY AND MEET ALL STANDARD PRACTICES DEFINED BY N.R.C.S. AT CONTRACTOR'S EXPENSE.
22. THE CONTRACTOR IS REQUIRED TO PREPARE AND SUBMIT A POLLUTION PREVENTION PLAN PER F.D.E.P. AT THE CONTRACTOR'S EXPENSE, WHERE REQUIRED.
23. CONTRACTOR SHALL OBTAIN A PERMIT FOR BURNING FROM THE DEPARTMENT OF FORESTRY (863-462-5160)

SECTION AND DETAIL NUMBERING SYSTEM



SECTION CUT TARGET DETAIL CALL OUT TARGET



SECTION TITLE TARGET

DETAIL TITLE TARGET

PRELIMINARY BIDDING PURPOSES ONLY

BRIAN L. ROY
NO. 45366

JOB NO.	0100-11-ES
SCALE:	AS NOTED
DATE	2/4/05
DESIGN	B.L.R.
DRAWN	J.R.R.
CHECKED	R.A.J.
APPROVED	

NO.	DATE	REVISION

MILKING R, INC.
SFWMD CONTRACT C-11652,
AMENDMENT No.1
OKEECHOBEE COUNTY FLORIDA

INDEX, ABBREVIATIONS
GENERAL NOTES & LEGEND

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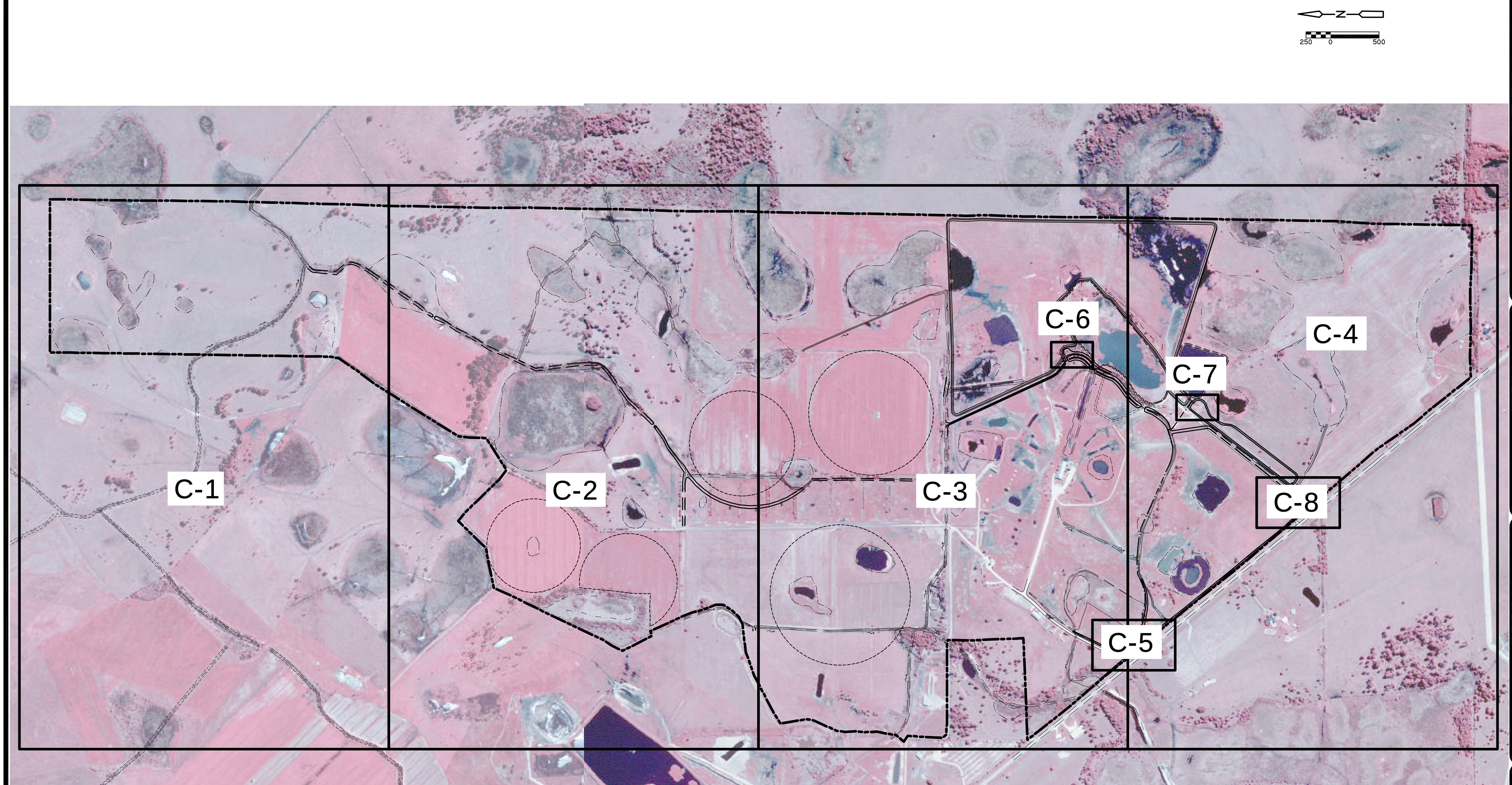

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MILKING R, INC.
SFWMD CONTRACT C-11652,
AMENDMENT No.1
OKEECHOBEE COUNTY FLORIDA

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JOB NO.0100-11-ES
SCALE: AS NOTED
DATE 2/4/05
DESIGN B.L.R.
DRAWN J.R.R.
CHECKED R.A.J.
APPROVED

NO.	DATE	REVISION

MILKING R, INC.
SFWMD CONTRACT C-11652,
AMENDMENT No.1
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BRIAN L. ROY
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SHEET
C-1

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N

100 0 200

EXISTING SPRAYFIELD

EXISTING WETLAND

PROPERTY LINE

EXISTING WETLAND

EXISTING WETLAND

EXISTING SPRAYFIELD

EXISTING DITCH
TOB EL=36.40
INV. EL=31.90

EXISTING WETLAND

EXIST. 12" CMP
(TO BE CLEANED)
INV. EL=34.08 (N)
INV. EL= 34.17 (S)

EXIST. 12" CMP
(TO BE CLEANED)
INV. EL=34.26 (N)
INV. EL= 34.16 (S)

MAINTAIN CONTINUOUS POSITIVE
SLOPE ALONG COLLECTION DITCH

2
XS-1

DITCH CLEANING

EXISTING DITCH
TOB EL=37.60
INV. EL=32.70

PROPERTY LINE

EXISTING DITCH
(TO REMAIN)

EXISTING DITCH
TOB EL=36.30
INV. EL=32.40

EXISTING WETLAND

EXISTING DITCH
TOB EL=35.50
INV. EL=33.00

EXISTING WETLAND

3
XS-1

EXISTING DITCH
TOB EL=35.30
INV. EL=32.20

DITCH
CLEANING

EXISTING DITCH
TOB EL=36.10
INV. EL=32.30

EXISTING DITCH

EXISTING WETLAND

EXISTING DITCH
TOB EL=38.30
INV. EL=35.20

EXIST. 12" CMP
(TO BE CLEANED)
INV. EL=33.87 (NE)
INV. EL=33.96 (SW)

EXISTING DITCH
TOB EL=38.10
INV. EL=35.80

END DITCH CLEANING
BEGIN PROPOSED DITCH
INV. EL=32.41

EXISTING DITCH
TOB EL=36.50
INV. EL=34.10

C/L DITCH
INV. EL=32.38

C/L R=820'

4
XS-1

EXISTING DITCH

FILL EXISTING DITCH

EXISTING SPRAYFIELD

EXISTING DITCH
TOB EL=35.00
INV. EL=33.90

EXISTING DITCH
TOB EL=39.00
INV. EL=35.10

PROPOSED DITCH

MAINTAIN CONTINUOUS POSITIVE
SLOPE ALONG COLLECTION DITCH

18" CMP
INV. EL=33.60 (N)
INV. EL= 33.70 (S)

C/L DITCH
INV. EL=32.31

EXISTING WETLAND

PROPERTY LINE

EXISTING WETLAND

JOB NO.0100-11-ES
SCALE: AS NOTED
DATE 2/4/05
DESIGN B.L.R.
DRAWN J.R.R.
CHECKED R.A.J.
APPROVED

NO.	DATE	REVISION

MILKING R, INC.
SFWMD CONTRACT C-11652,
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PRELIMINARY
BIDDING PURPOSES ONLY

BRIAN L. ROY
NO. 45366

SHEET
C-2

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N

100 0 200

PROPERTY LINE

EXISTING WETLAND

EXISTING DITCH TOB EL=35.70 INV. EL=32.70

EXISTING SPRAYFIELD

E CD-1 PROPOSED DITCH

FILL EXISTING DITCH

EXISTING WETLAND

EXISTING SPRAYFIELD

EXISTING WETLAND

D CD-1 BEGIN DITCH REGRADING C/L INV. EL=32.23

EXISTING DITCH TOB EL=37.60 INV. EL=34.30

EXISTING WETLAND

EXISTING DITCH TOB EL=37.90 INV. EL=36.80

MAINTAIN CONTINUOUS POSITIVE SLOPE ALONG COLLECTION DITCH

EXISTING SPRAYFIELD

EXISTING WETLAND

5 XS-1

D CD-1 DITCH REGRADING C/L INV. EL=32.13

EXISTING DITCH TOB EL=36.80 INV. EL=35.60

PROPERTY LINE

EXISTING DITCH

EXISTING DITCH TOB EL=36.20 INV. EL=32.80

EXISTING DITCH TOB EL=37.80 INV. EL=36.60

EXISTING DITCH TOB EL=35.00 INV. EL=30.30

24" CMP INV. EL=33.04 (N) INV. EL=32.99 (S)

REGRADE EXISTING DITCH DITCH INVERT EL=32.05

EXISTING WETLAND

24" CMP INV. EL=32.97 (W) INV. EL=32.95 (E)

EXISTING DITCH TOB EL=37.20 INV. EL=32.50

CONNECT EXISTING DITCH

EXISTING DITCH TOB EL=35.80 INV. EL=33.40

CWNA1

EXISTING WETLAND

INSERT BOARDS IN EXISTING RISER TO TOP OF BANK

W20

EXISTING DITCH TOB EL=34.60 INV. EL=30.60

DITCH INTERSECTION TOP EL=38.50 INV. EL=33.50

W34

18" HDPE INV. EL=34.98 (W) INV. EL=35.12 (E)

W23

W27

EXIST. 18" HDPE (TO BE REMOVED) INV. EL=33.80 (N) INV. EL=33.73 (S)

REGRADE EXISTING DITCH DITCH INVERT EL=31.74

W25

EXISTING POND

EXISTING WETLAND

EXISTING DITCH

6 XS-1

MAINTAIN CONTINUOUS POSITIVE SLOPE ALONG COLLECTION DITCH

PROPERTY LINE

E CD-1 PROPOSED DITCH

EXIST. 18" CMP (TO BE REMOVED) INV. EL=33.93 (N) INV. EL=33.88 (S)

STORMWATER MANAGEMENT POND C CD-1

CS-6 CONSTRUCT RISER

– E-2 – C-6 A CD-1

EXISTING DITCH TOB EL=35.80 INV. EL=34.00

STORMWATER PUMP STATION WITH INTAKE VAULT

PROPOSED DIRT ROAD

24" CMP INV. EL=30.81 (W) INV. EL=30.74 (E)

24" CMP INV. EL=29.72 (W) INV. EL=29.62 (E)

EXISTING DITCH

SEE ENLARGED PLAN – C-5 A CD-3 – E-1

EXISTING POND

PROPOSED DITCH INVERT EL=31.0

WETLAND IMPACTS (TYP.)

EXISTING WETLAND

EXTEND EXISTING CULVERT W/ 56 LF 24" H.D.P.E

C C-7 9 XS-2

PROPOSED DITCH INVERT EL=30.0

W31

CS-7 CONSTRUCT RISER

A CD-1 – C-6

MATCH EXISTING DITCH INVERT EL=29.00

18" RCP INV. EL=28.72 (NE) INV. EL=27.99 (SW)

EXISTING WETLAND

24" CMP CONTROL WIER TOP EL. = 34.61 INV. EL. = 30.74

EXISTING DITCH

W33

CONNECT TO EXISTING ROAD

8 XS-7

EXISTING DITCH

E CD-1 PROPOSED DITCH

W32

67 LF (2) 36" H.D.P.E. @ 0.00%

C C-7

EXISTING DITCH

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JOB NO. 0100-11-ES
SCALE: AS NOTED
DATE 2/4/05
DESIGN B.L.R.
DRAWN J.R.R.
CHECKED R.A.J.
APPROVED

NO.	DATE	REVISION

MILKING R, INC.
SFWMD CONTRACT C-11652,
AMENDMENT No.1
OKEECHOBEE COUNTY FLORIDA

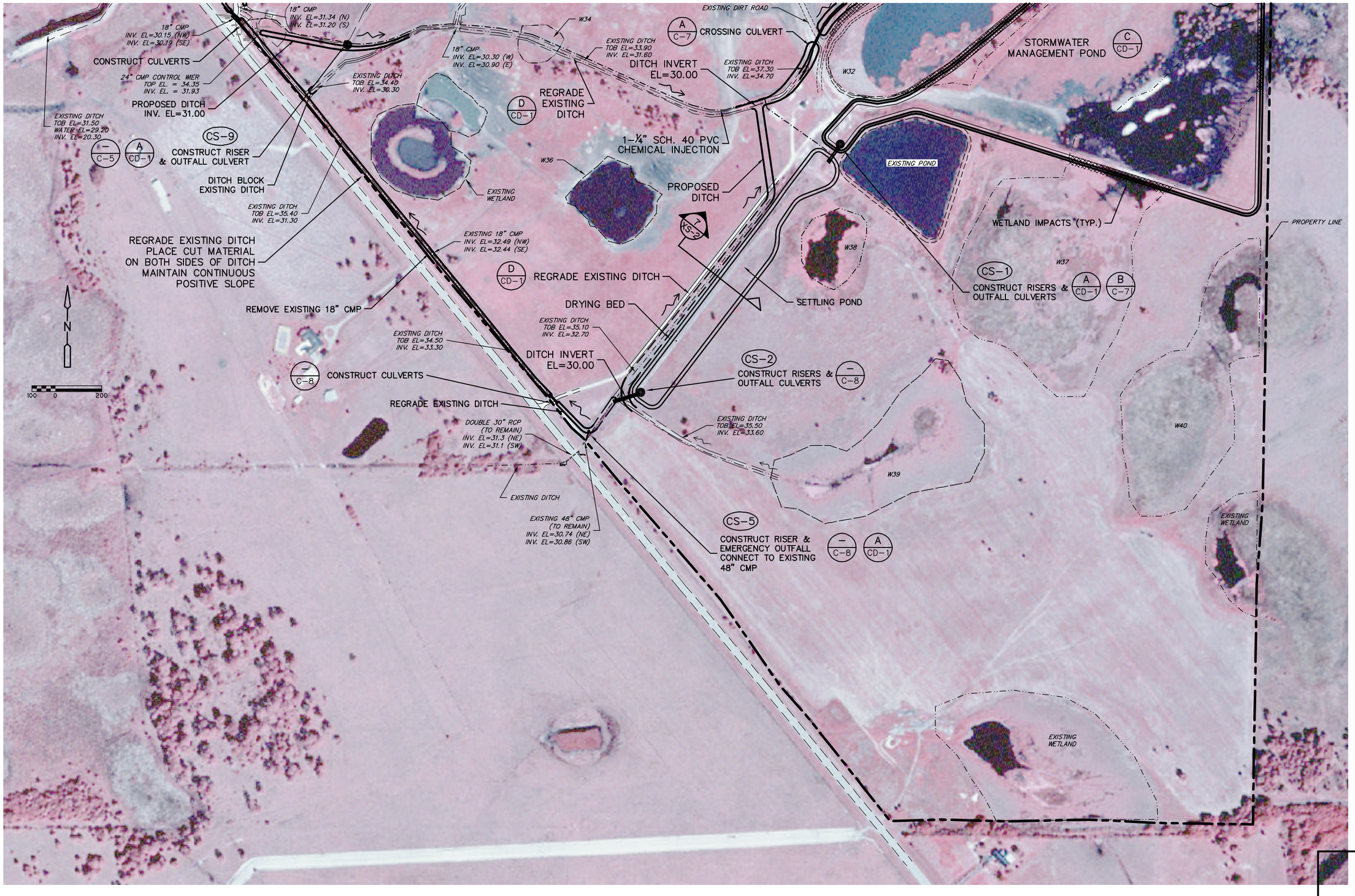
SITE PLAN

Royal Consulting Services, Inc.
211 West Warren Avenue
Longwood, FL 32750
(407) 830-7956 Phone
(407) 831-5056 fax
www.royalconsulting.com
FL COA No. 7290

PRELIMINARY BIDDING PURPOSES ONLY

BRIAN L. ROY
NO. 45366

SHEET C-3



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NO. 45366

SHEET C-4

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REMOVE ALL EXISTING STRUCTURES

SUMP PUMP & DISCHARGE (A / CD-3)

DITCH INVERT EL=30.00

EXISTING WETLAND

N

25 0 50

MATCH EXISTING DITCH EL=29.00

REGRADE EXISTING DITCH MAINTAIN CONTINUOUS POSITIVE SLOPE ALONG COLLECTION DITCH PLACE CUT MATERIALS ON BOTH BANKS

DITCH EL=29.15

REGRADE EXISTING DITCH AT LEVEL GRADE

DITCH INVERT EL=30.00

(2) 36" INVERT EL=29.30

DITCH INVERT EL=30.00

60 LF (2) 36" HDPE @ 0.17%

(2) 36" INVERT EL=29.40

EXISTING CHEMICAL STORAGE FACILITY (A / CD-4)

MATCH EXISTING DITCH

DITCH INVERT EL=29.30

REMOVE ALL EXISTING STRUCTURES

DITCH INVERT EL=29.40

TOP OF BANK EL=33.50
INVERT EL=30.00

(A / CD-1) CONSTRUCT 21" RISER (CS-9)

1 ¼" SCH. 40 PVC CHEMICAL INJECTION LINE

REGRADE EXISTING DITCH

35 LF 12" HDPE @ 0.86%

12" INV. EL=30.60

PROPOSED DITCH

REGRADE EXISTING DITCH MAINTAIN CONTINUOUS POSITIVE SLOPE ALONG COLLECTION DITCH PLACE CUT MATERIALS ON BOTH BANKS

U.S. HIGHWAY 98

CONSTRUCT DITCH BLOCK (B / CD-1)

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NO. 45366

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SHEET
C-5

STORMWATER MANAGEMENT POND

TOP OF BANK EL=42.00

BOTTOM EL=31.00

MATCH EXISTING

ED-1

CONCRETE SPILLWAY W/ ENERGY DISSIPATOR (D / CD-2)

INSTALL PUMP CONTROL RACK FOR TWO 40 HP PUMPS SEE ELECTRICAL DETAILS

(A / CD-2)

44 LF (2) 20" DISCHARGE LINE

CS-6

(A / CD-1) CONSTRUCT RISERS & OUTFALL CULVERTS

20 LF (2) 36" HDPE @ 1.00%

(2) 36" INV EL=30.80

(C / CD-2) STORMWATER PUMPS

12'x12' CONCRETE VAULT

(2) 36" INV EL=29.30

34 LF (2) 36" HDPE @ 0.59%

(A / -) 12'x 12' PRE-FAB METAL CANOPY

CS-7

(A / CD-1) CONSTRUCT RISERS & OUTFALL CULVERTS

480'-2" PVC COND. 36" MIN DEPTH 3#2-0 AND 1#4G

DISCHARGE PIPE

MATCH EXISTING

CIRCULAR ACCESS DRIVE

BOTTOM EL=30.00

TOP OF BANK EL=42.00

LIMITS OF SHELL BASE ACCESS ROAD

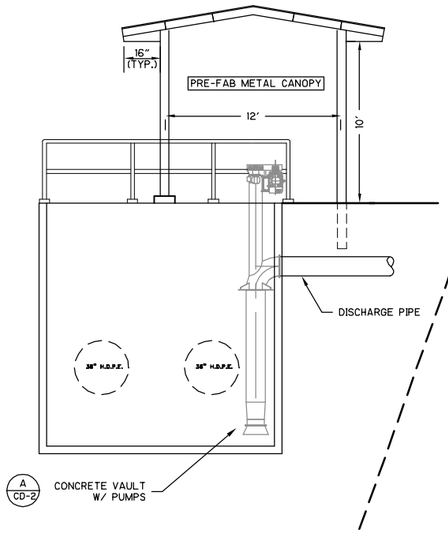
37 38 39 40 41 42

R10' R10' R10' R57' R50'

15' 12' 12' 10' 10' 20'

×34.00 ×35.80 ×35.10 ×35.60 ×35.90 ×34.20 ×35.30 ×40.50

NOTE: SECOND PUMP AND CANOPY TO BE PROVIDED AT A LATER DATE BY THE OWNER AT THEIR DISCRETION



CANOPY DETAIL (A / -) N.T.S.

N

5 0 10

JOB NO. 0100-11-ES
SCALE: AS NOTED
DATE 2/4/05
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SHEET C-6

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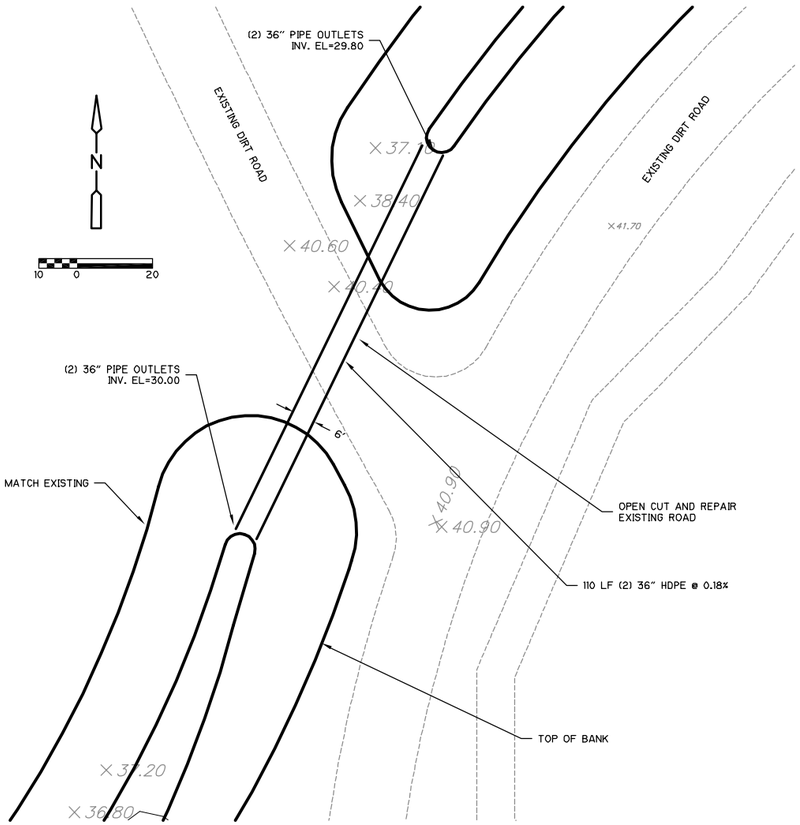
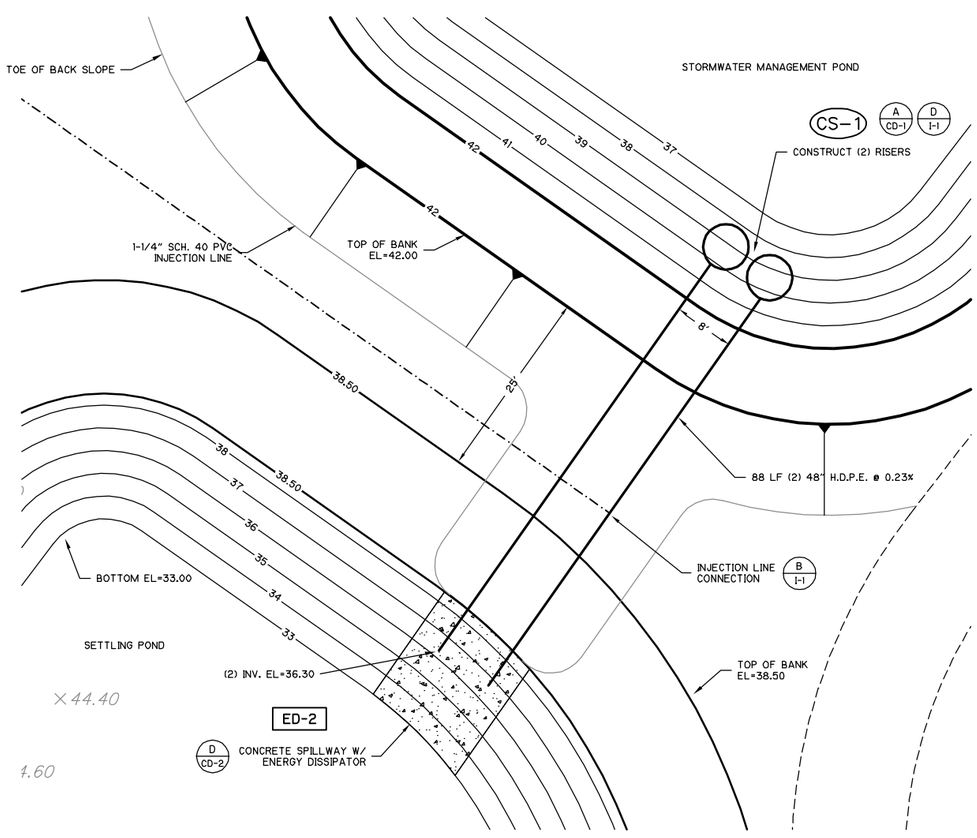
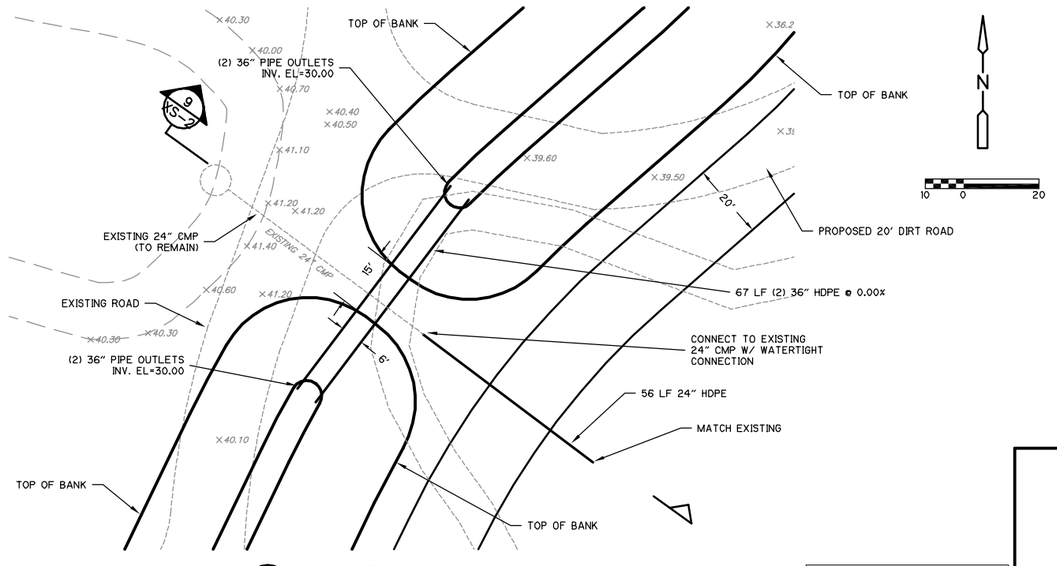


A C-4 CULVERT CROSSING



B C-4 ENLARGED SITE PLAN



C C-3 CULVERT CROSSING

PRELIMINARY
BIDDING PURPOSES ONLY

BRIAN L. ROY
NO. 45366

JOB NO.	0100-11-ES
SCALE:	AS NOTED
DATE	2/4/05
DESIGN	B.L.R.
DRAWN	J.R.R.
CHECKED	R.A.J.
APPROVED	

NO.	DATE	REVISION

MILKING R, INC.
SFWMD CONTRACT C-11652,
AMENDMENT No.1
OKEECHOBEE COUNTY FLORIDA

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SHEET
C-7

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EXISTING DITCH
TOB EL=34.50
INV. EL=33.30

REGRADE EXISTING DITCH
MAINTAIN CONTINUOUS POSITIVE
SLOPE ALONG COLLECTION DITCH

EXISTING DIRT ROAD

(2) 36" PIPE OUTLET
INV. EL=29.80

OPEN CUT AND REPAIR
EXISTING DIRT ROAD

DITCH INVERT
EL=29.80

55 LF (2) 36" H.D.P.E. @ 0.18%

(2) 36" PIPE OUTLET
INV. EL=29.90

DITCH INVERT
EL=29.90

N

10 0 20

REGRADE EXISTING DITCH

EXISTING DIRT ROAD

EXISTING DITCH
TOB EL=35.10
INV. EL=32.70

BOTTOM EL=33.00

TOP OF BANK
EL=38.50

SETTLING POND

CS-2 (A/CD-1)

CONSTRUCT (3) RISERS

(3) 36" PIPE OUTLET
INV. EL=29.80

DITCH INVERT
EL=30.10

SIGNAGE (4)

PIPE CROSSING
DO NOT EXCAVATE

120 LF (3) 36" H.D.P.E. @ 0.17%

TOP OF BANK
EL=38.50

REGRADE EXISTING DITCH
MAINTAIN CONTINUOUS POSITIVE
SLOPE ALONG COLLECTION DITCH

REGRADE EXISTING DITCH

DITCH INVERT
EL=30.00

EXISTING DITCH
TOB EL=35.50
INV. EL=33.60

CS-5 (A/CD-1)

CONSTRUCT EMERGENCY
OVERFLOW RISER

EXISTING 48" CMP
(TO REMAIN)
INV. EL=30.74 (NE)
INV. EL=30.86 (SW)

40 LF 48" H.D.P.E. @ 0.40%

CONNECT TO EXISTING 48" CMP
W/ FILTER FABRIC JACKET

DOUBLE 30" RCP
(TO REMAIN)
INV. EL=31.3 (NE)
INV. EL=31.1 (SW)

EXISTING DITCH

JOB NO. 0100-11-ES
SCALE: AS NOTED
DATE 2/4/05
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BRIAN L. ROY
NO. 45366

SHEET
C-8

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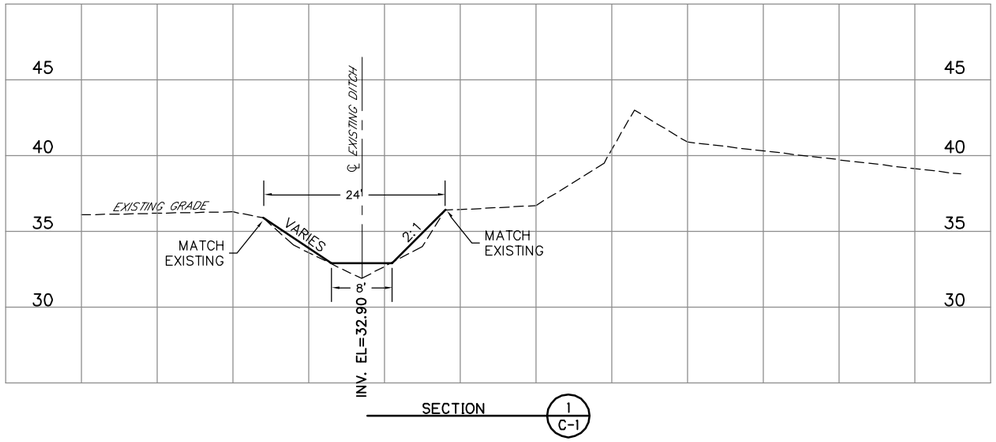
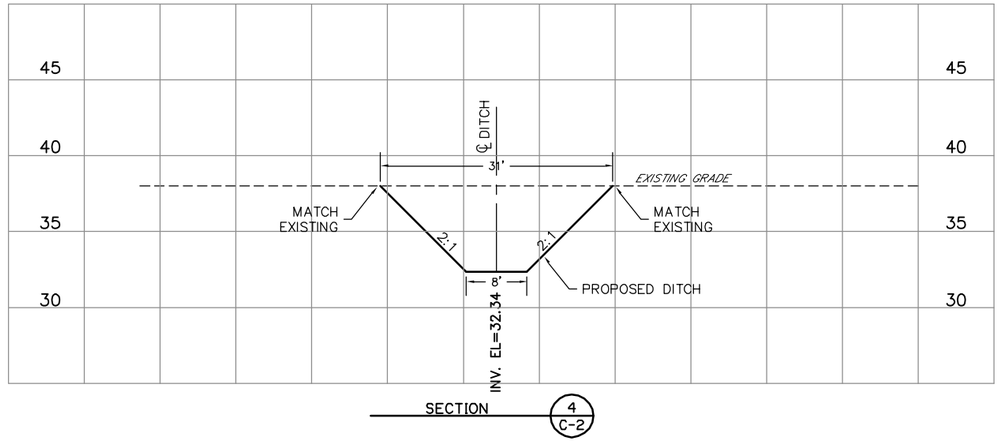
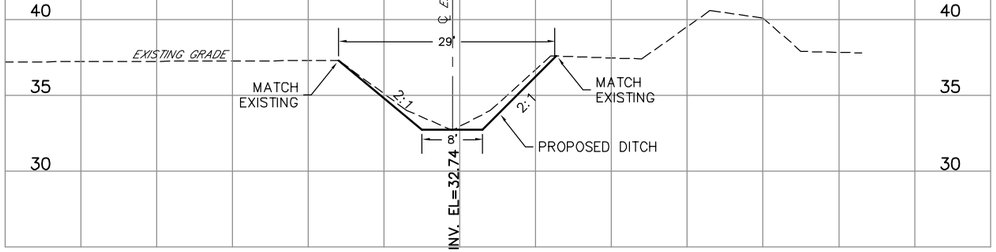


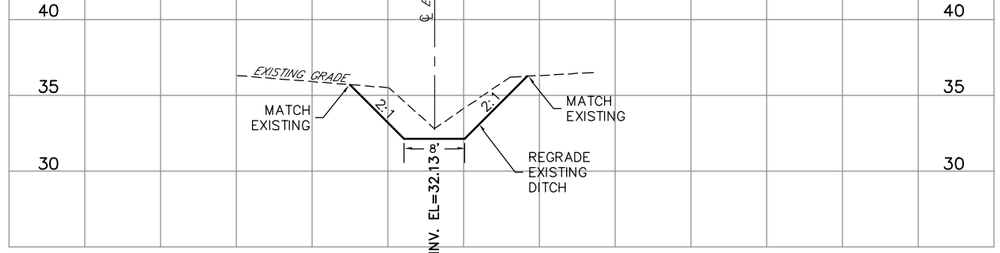
SECTION 1 C-1



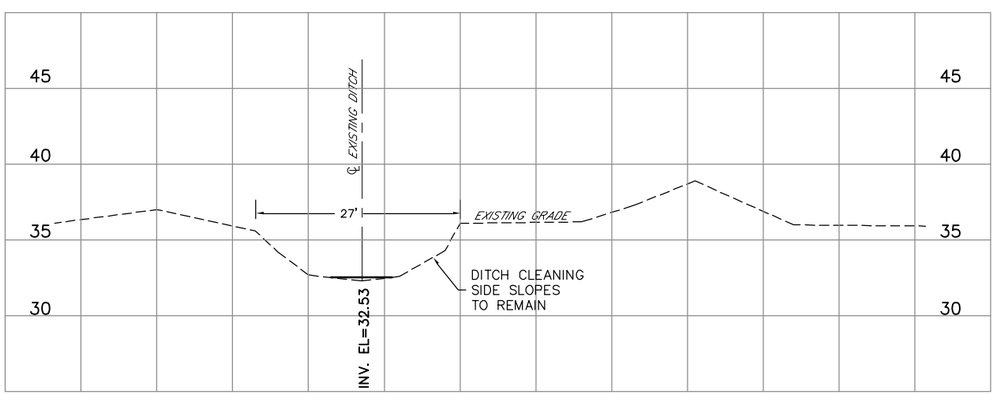
SECTION 4 C-2



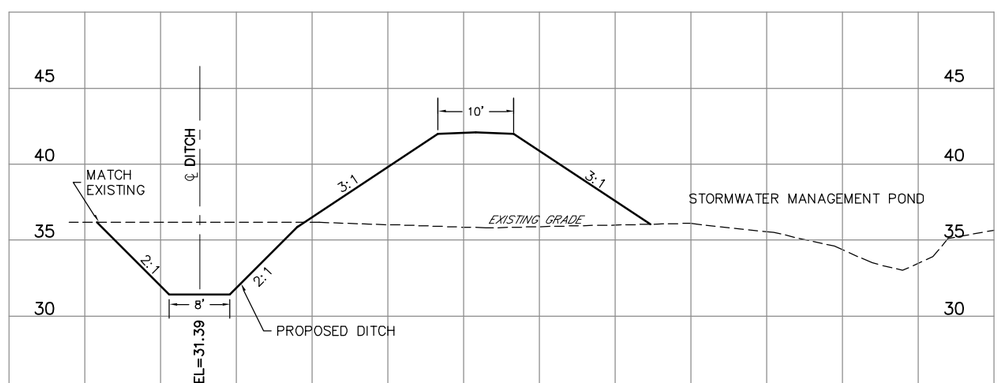
SECTION 2 C-2



SECTION 5 C-3



SECTION 3 C-2



SECTION 6 C-3

THIS PLAN MAY HAVE BEEN REDUCED IN SIZE
VERIFY BEFORE SCALING DIMENSIONS

PRELIMINARY
BIDDING PURPOSES ONLY

BRIAN L. ROY
NO. 45366

SCALE: 1"=20' HZ.
1"=10' VT.

JOB NO.0100-11-ES
SCALE: AS NOTED
DATE 2/4/05
DESIGN B.L.R.
DRAWN J.R.R.
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SHEET XS-1

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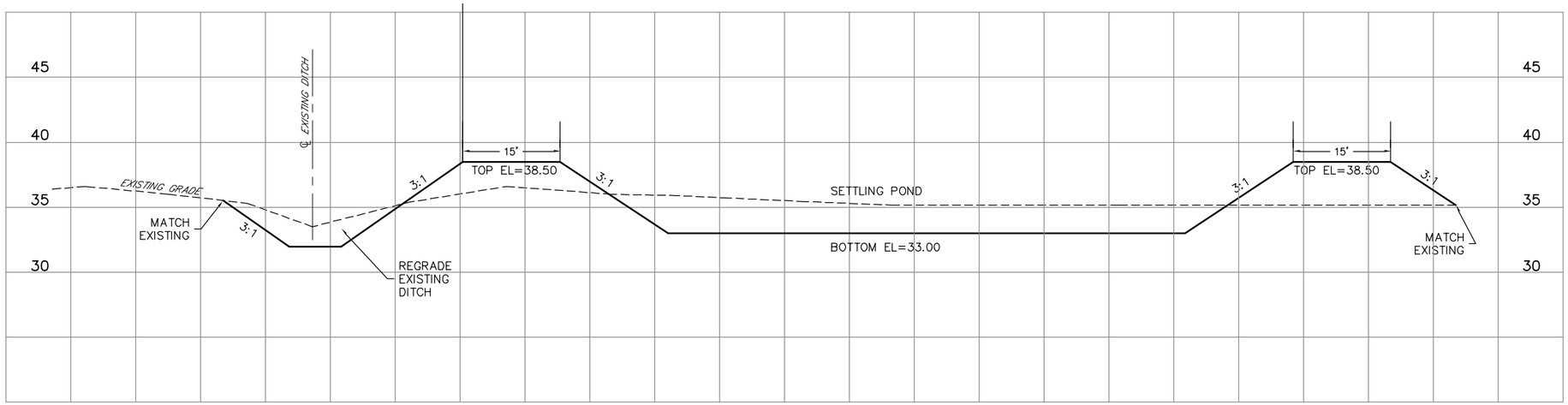
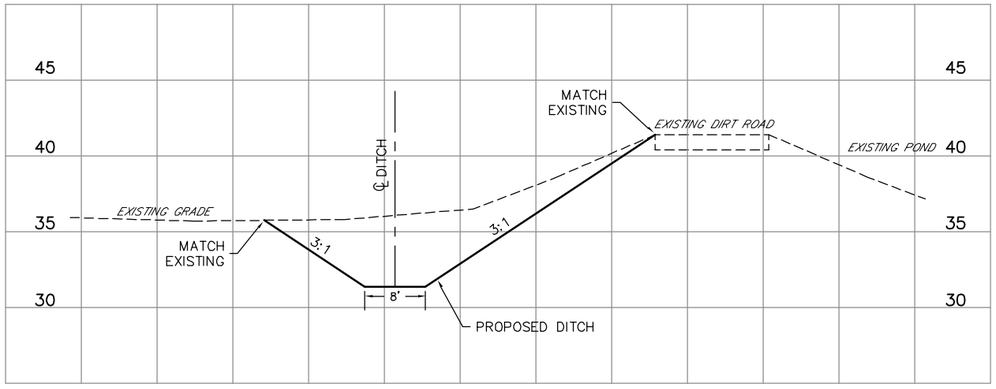
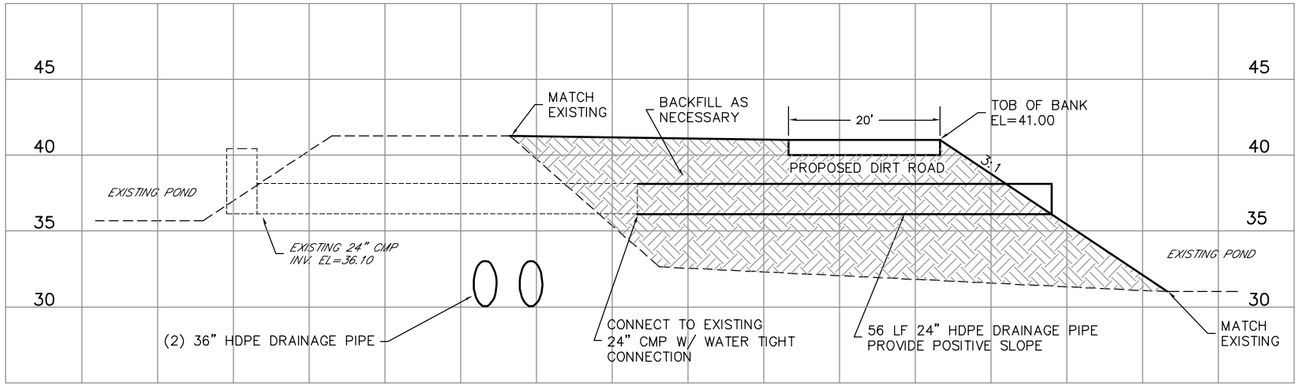


SECTION 7 C-4



SECTION 8 C-3



SECTION 9 C-7

THIS PLAN MAY HAVE BEEN REDUCED IN SIZE
VERIFY BEFORE SCALING DIMENSIONS

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BRIAN L. ROY
NO. 45366

SCALE: 1"=20' HZ.
1"=10' VT.

JOB NO. 0100-11-ES
SCALE: AS NOTED
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DRAWN J.R.R.
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APPROVED

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SHEET
XS-2

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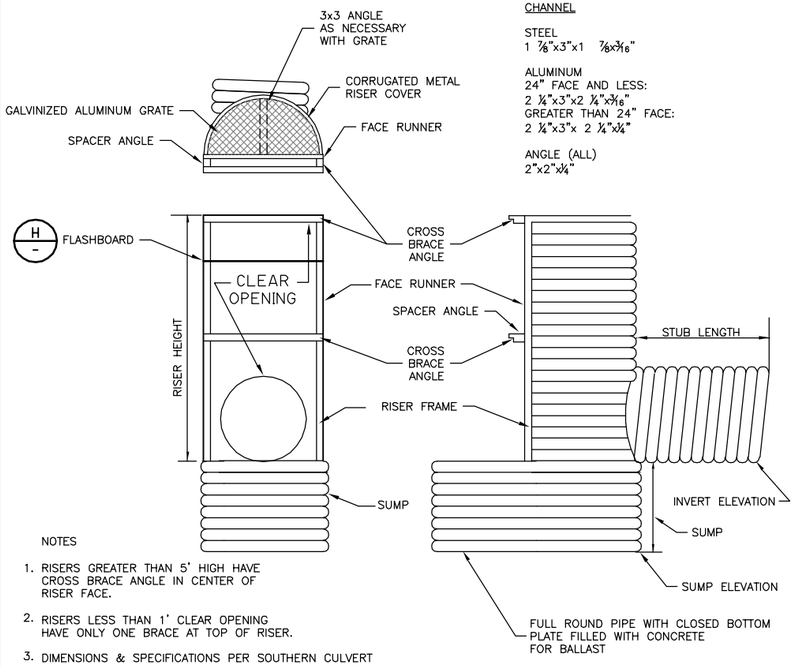


CHANNEL

STEEL
1 ⅞"x3"x1 ⅞x3/16"

ALUMINUM
24" FACE AND LESS:
2 ¼"x3"x2 ¼"x3/16"
GREATER THAN 24" FACE:
2 ¼"x3"x 2 ¼"x¼"

ANGLE (ALL)
2"x2"x¼"

NOTES

1. RISERS GREATER THAN 5' HIGH HAVE CROSS BRACE ANGLE IN CENTER OF RISER FACE.
2. RISERS LESS THAN 1' CLEAR OPENING HAVE ONLY ONE BRACE AT TOP OF RISER.
3. DIMENSIONS & SPECIFICATIONS PER SOUTHERN CULVERT OR APPROVED EQUAL.

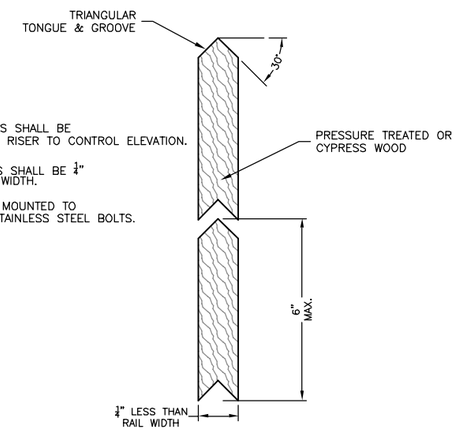
SINGLE FACE RISER
N.T.S.

ALUMINUM RISER DETAIL (A) N.T.S.

PIPE STUB. DIA.	STUB. GA.	RISER COVER FACE WIDTH	RISER COVER GA.	RISER COVER MIN. HEIGHT
12"	16	21"	14	2'
15"	16	24"	14	2'
18"	16	27"	14	2'
21"	16	30"	14	2'
24"	14	36"	12	2'
30"	14	42"	12	3'
36"	12	48"	12	3'
42"	12	60"	10	4'
48"	12	72"	10	4'
54"	12	84"	8	5'
60"	10	84"	8	5'
72"	10	96"	8	6'
17"x13"	16	24"	14	–
21"x15"	16	27"	14	–
24"x18"	16	30"	14	–
28"x20"	16	36"	12	–
36"x24"	14	42"	12	–
42"x29"	14	48"	10	–

STRUCTURE No.	No. OF STRUCTURES	PIPE DIA.	TOP RISER ELEV.	INVERT ELEV.	WEIR ELEV.	SUMP ELEV.	COWLING TOP ELEV.	COWLING BOTTOM ELEV.	STUB LENGTH
CS-1	2	48"	40.50	36.50	40.00	35.00	40.50	38.00	10' MIN.
CS-2	3	36"	37.50	30.00	36.00	27.00	–	–	10' MIN.
CS-5	1	48"	34.00	31.00	34.00	29.75	–	–	10' MIN.
CS-6	2	36"	34.00	31.00	33.50	29.75	34.00	32.50	10' MIN.
CS-7	2	36"	33.00	29.50	33.00	28.25	33.00	31.00	10' MIN.
CS-9	1	12"	33.50	30.90	33.00	29.90	33.50	31.00	10' MIN.

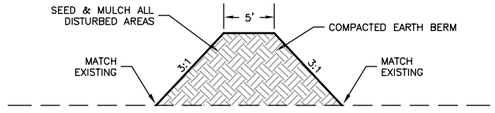
(G)



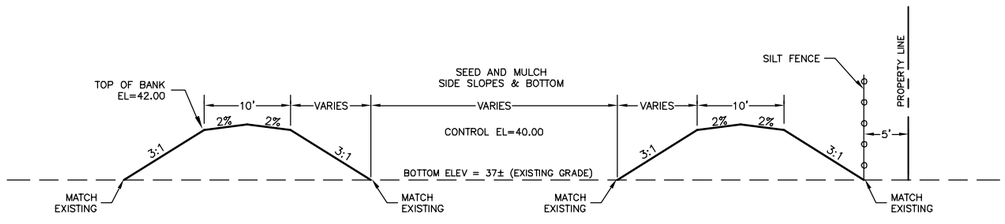
NOTE:

1. NUMBER OF BOARDS SHALL BE SUFFICIENT TO FILL RISER TO CONTROL ELEVATION.
2. LENGTH OF BOARDS SHALL BE ¼" LESS THAN FRAME WIDTH.
3. BOARDS SHALL BE MOUNTED TO FRAME USING ¼" STAINLESS STEEL BOLTS.

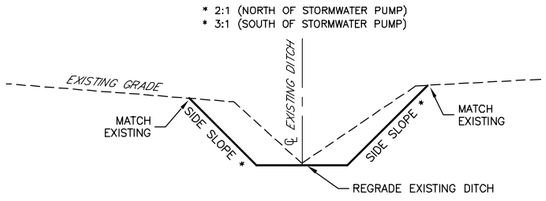
FLASHBOARD DETAIL (H) N.T.S.



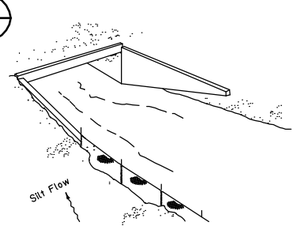
TYPICAL DITCH BLOCK (B) N.T.S.



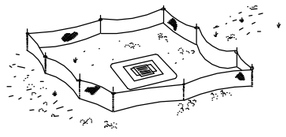
TYPICAL POND SECTION (C) N.T.S.



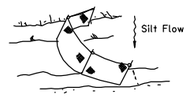
DITCH REGRADING (D) N.T.S.



Type III Silt Fence



Type III Silt Fence Protection Around Ditch Bottom Inlets.

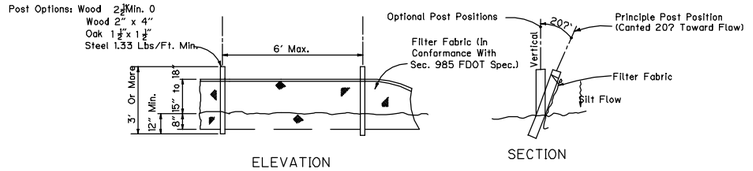


Note: Spacing for Type ---- Fence to be in accordance with Chart –, Sheet 1 of 3 and ditch installations at drainage structures Sheet 2 of 3.

Type III Silt Fence

Do not deploy in a manner that silt fences will act as a dam across permanent flowing watercourses. Silt fences are to be used at upland locations and turbidity barriers used at permanent bodies of water.

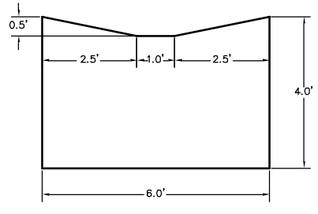
SILT FENCE APPLICATIONS



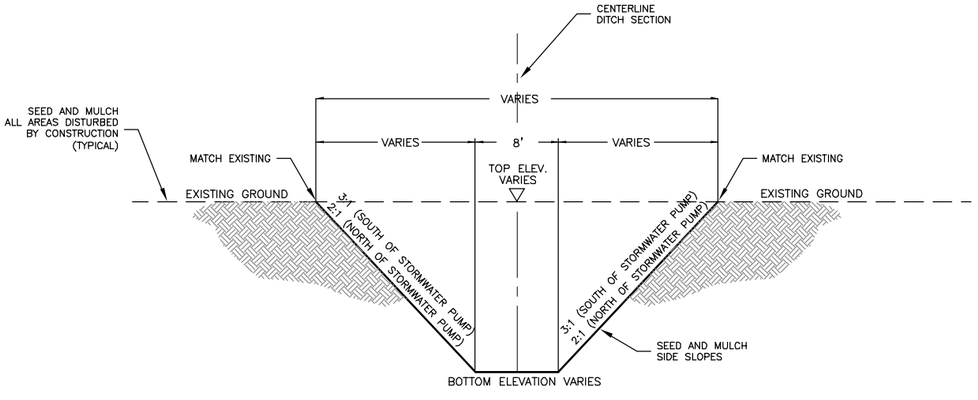
Note: Silt Fence to be paid for under the contract unit price for Staked Silt Fence (LF).

TYPE III SILT FENCE
(F.D.O.T. INDEX No. 102)

SILT FENCE DETAIL (F) N.T.S.



WEIR PLATE DETAIL (G) N.T.S.



TYPICAL DITCH SECTION (E) N.T.S.

JOB NO. 0100-11-ES
SCALE: AS NOTED
DATE 2/4/05
DESIGN B.L.R.
DRAWN J.R.R.
CHECKED R.A.J.
APPROVED

NO.	DATE	REVISION

MILKING R, INC.
SFWMD CONTRACT C-11652,
AMENDMENT No.1
OKEECHOBEE COUNTY FLORIDA

MISCELLANEOUS DETAILS

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FL COA No. 7290

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BRIAN L. ROY
NO. 45366

SHEET CD-1

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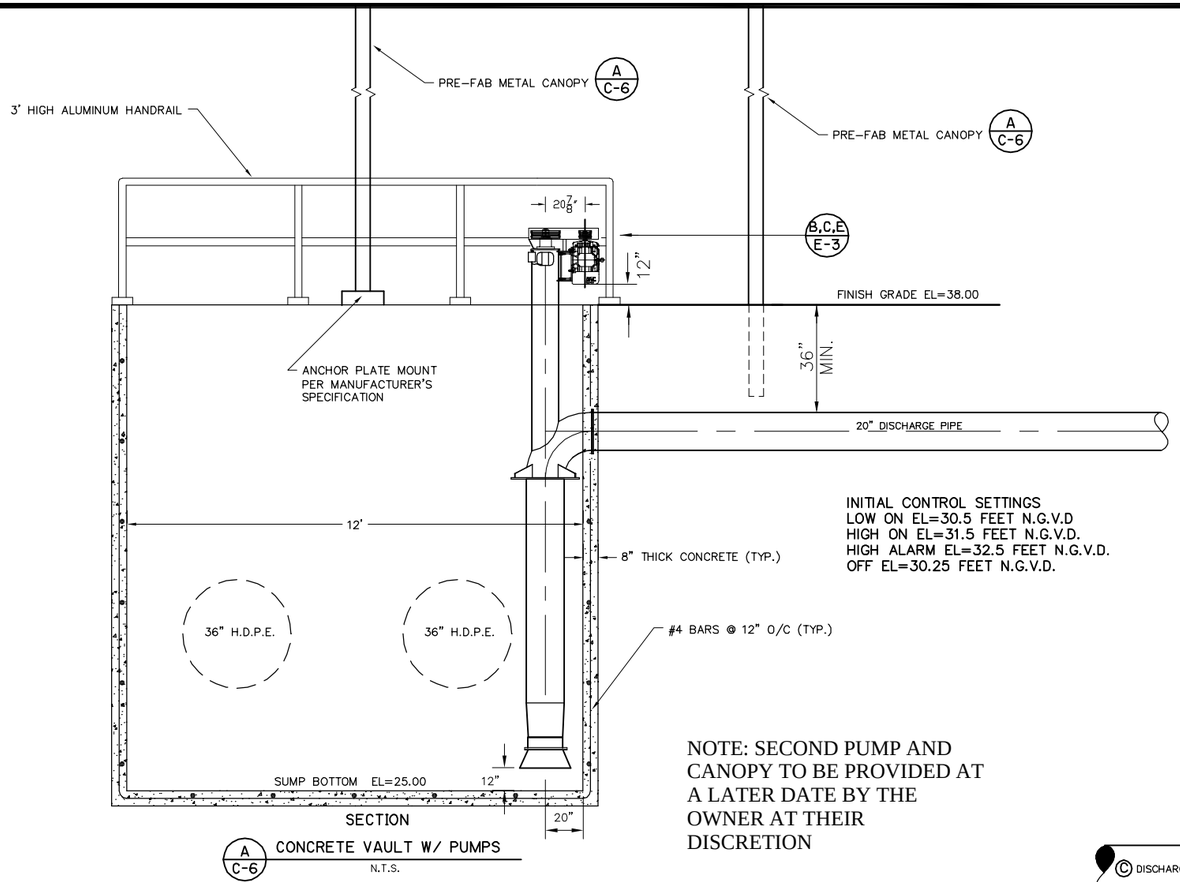
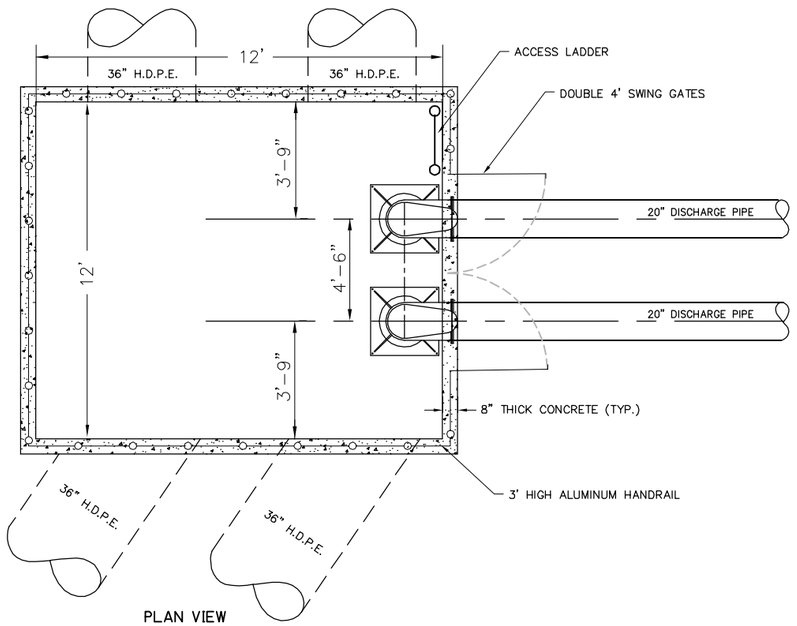


A C-6 CONCRETE VAULT W/ PUMPS
N.T.S.

INITIAL CONTROL SETTINGS
LOW ON EL=30.5 FEET N.G.V.D
HIGH ON EL=31.5 FEET N.G.V.D.
HIGH ALARM EL=32.5 FEET N.G.V.D.
OFF EL=30.25 FEET N.G.V.D.

NOTE: SECOND PUMP AND CANOPY TO BE PROVIDED AT A LATER DATE BY THE OWNER AT THEIR DISCRETION



B C-6 CONCRETE VAULT W/ PUMPS
N.T.S.

PUMP DATA:

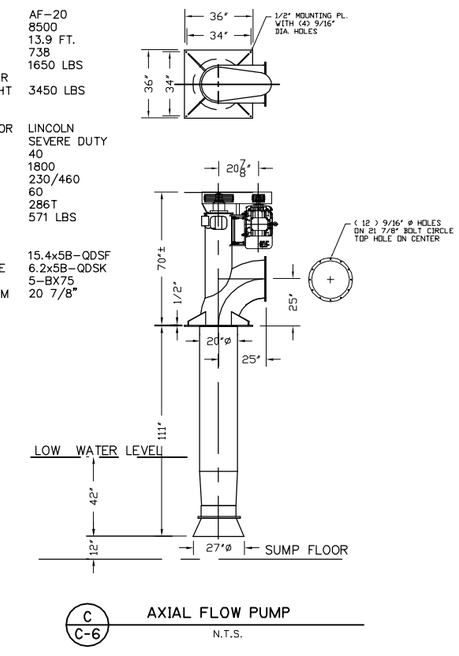
MODEL NO.	AF-20
GPM	8500
TDH	13.9 FT.
RPM	738
PUMP WEIGHT	1650 LBS
PUMP + WATER +MOTOR WEIGHT	3450 LBS

DRIVE DATA:

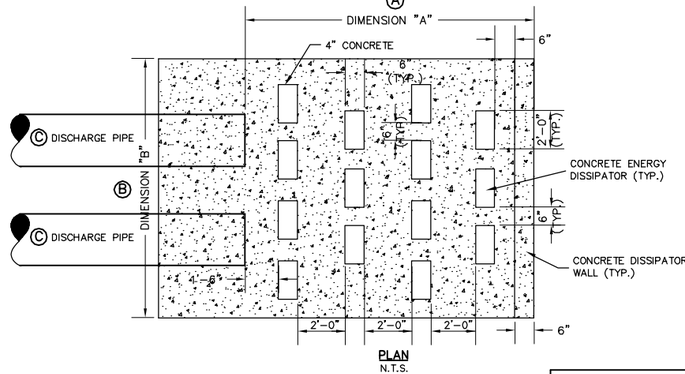
ELECTRIC MOTOR	LINCOLN SEVERE DUTY
HORSEPOWER	40
RPM	1800
VOLTS	230/460
HZ	60
FRAME	286T
WEIGHT	571 LBS

BELT DRIVE

PUMP SHEAVE	15.4x5B-QDSF
MOTOR SHEAVE	6.2x5B-QDSK
BELTS	5-BX75
CENTERLINE DIM	20 7/8"

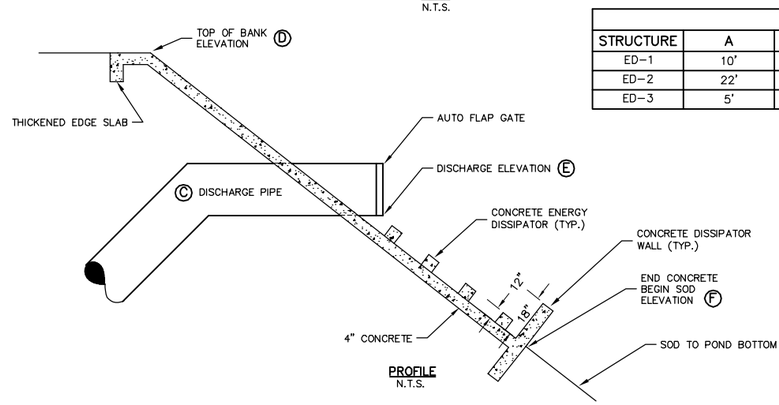


C C-6 AXIAL FLOW PUMP
N.T.S.



PLAN
N.T.S.

ENERGY DISSIPATOR DIMENSIONS						
STRUCTURE	A	B	C	D	E	F
ED-1	10'	10.5'	20"	42.00	39.00	37.00
ED-2	22'	15'	48"	42.00	36.30	35.00
ED-3	5'	5'	2"	34.00	32.50	31.30



D - OUTLET ENERGY DISSIPATOR
N.T.S.

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NO. 45366

JOB NO. 0100-11-ES
SCALE: AS NOTED
DATE 2/4/05
DESIGN B.L.R.
DRAWN J.R.R.
CHECKED R.A.J.
APPROVED

NO.	DATE	REVISION

MILKING R, INC.
SFWMD CONTRACT C-11652,
AMENDMENT No.1
OKEECHOBEE COUNTY FLORIDA

MISCELLANEOUS DETAILS

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SHEET CD-2

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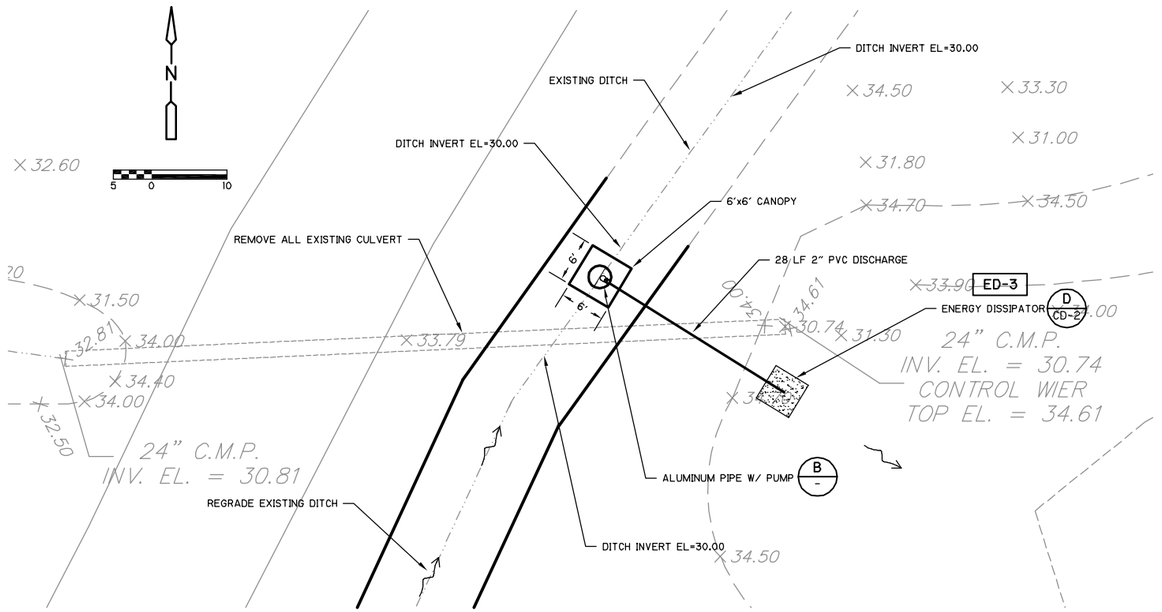
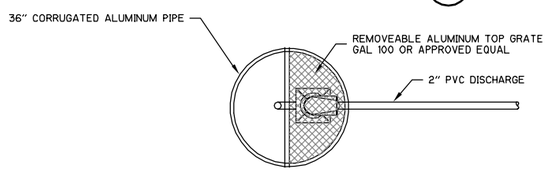
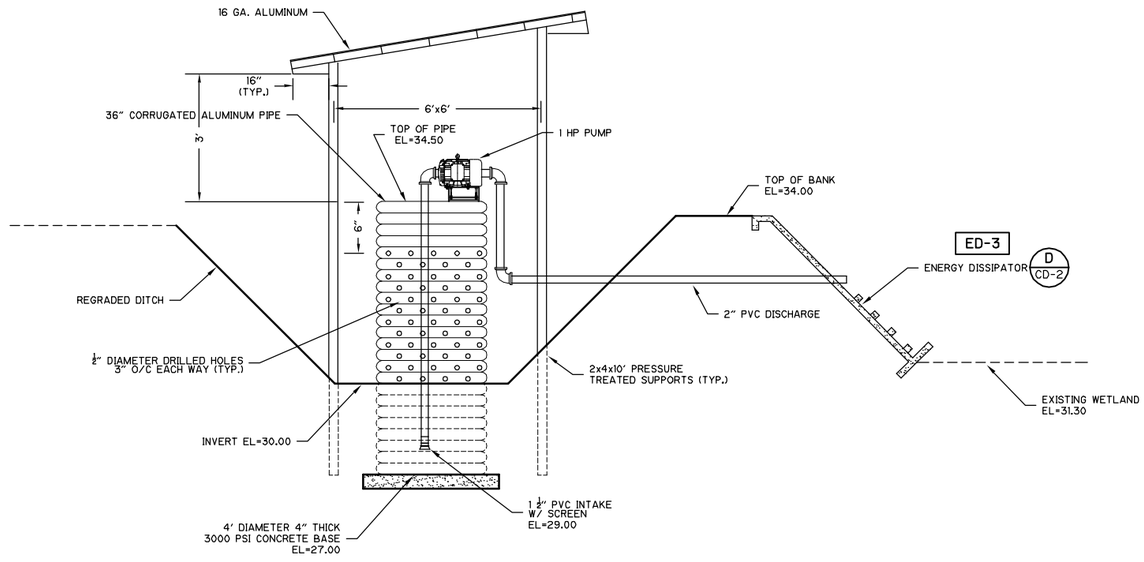


ENLARGED SITE PLAN A



PLAN



SECTION

ALUMINUM PIPE W/ PUMP DETAIL B
N.T.S.

JOB NO.	0100-11-ES
SCALE:	AS NOTED
DATE	2/4/05
DESIGN	B.L.R.
DRAWN	J.R.R.
CHECKED	R.A.J.
APPROVED	

REVISION

NO.	DATE

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NO. 45366

SHEET
CD-3

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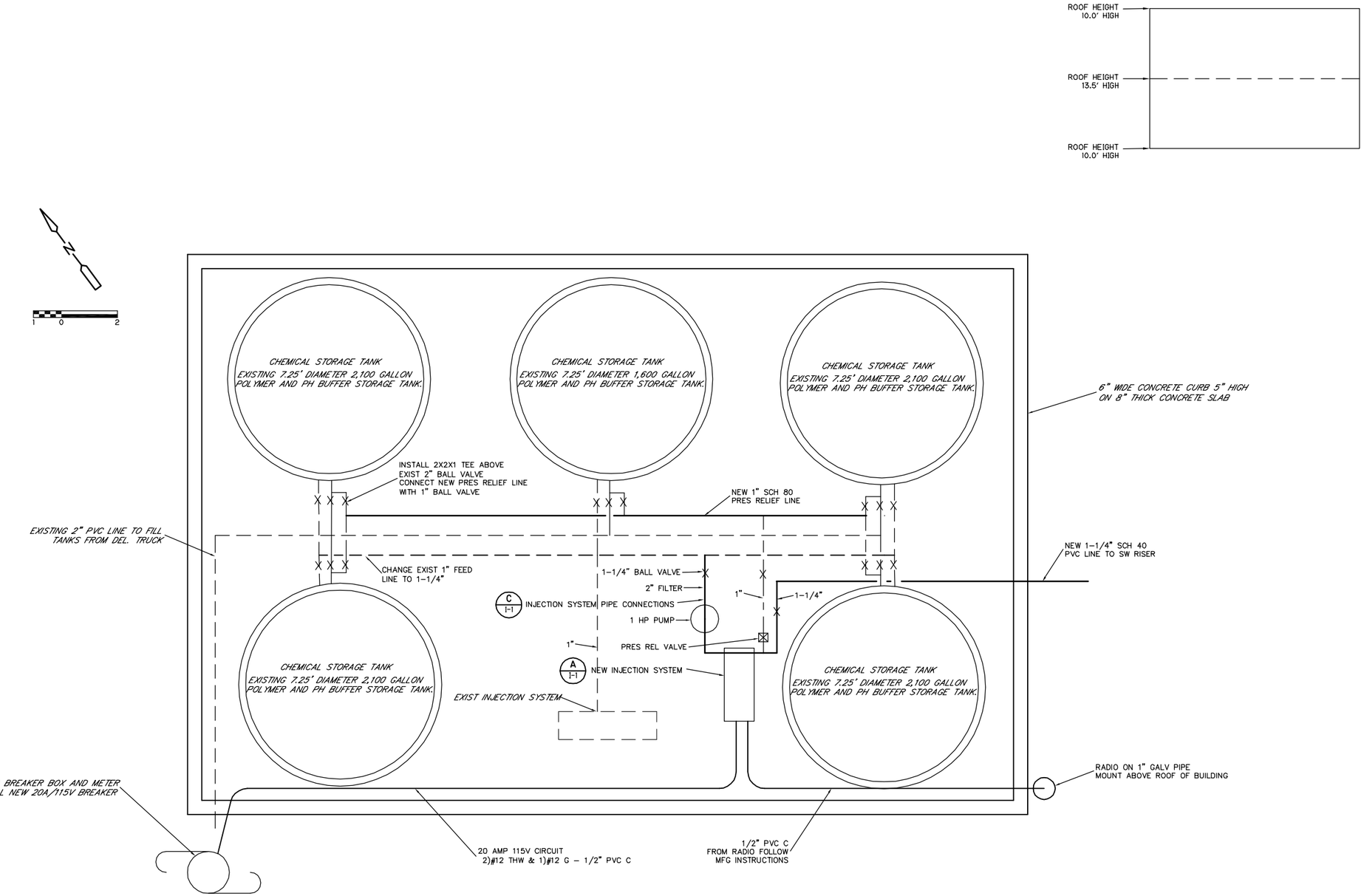

JOB NO. 0100-11-ES
SCALE: AS NOTED
DATE 2/4/05
DESIGN B.L.R.
DRAWN J.R.R.
CHECKED R.A.J.
APPROVED

NO.	DATE	REVISION

MILKING R, INC.
SFWMD CONTRACT C-11652,
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OKEECHOBEE COUNTY FLORIDA

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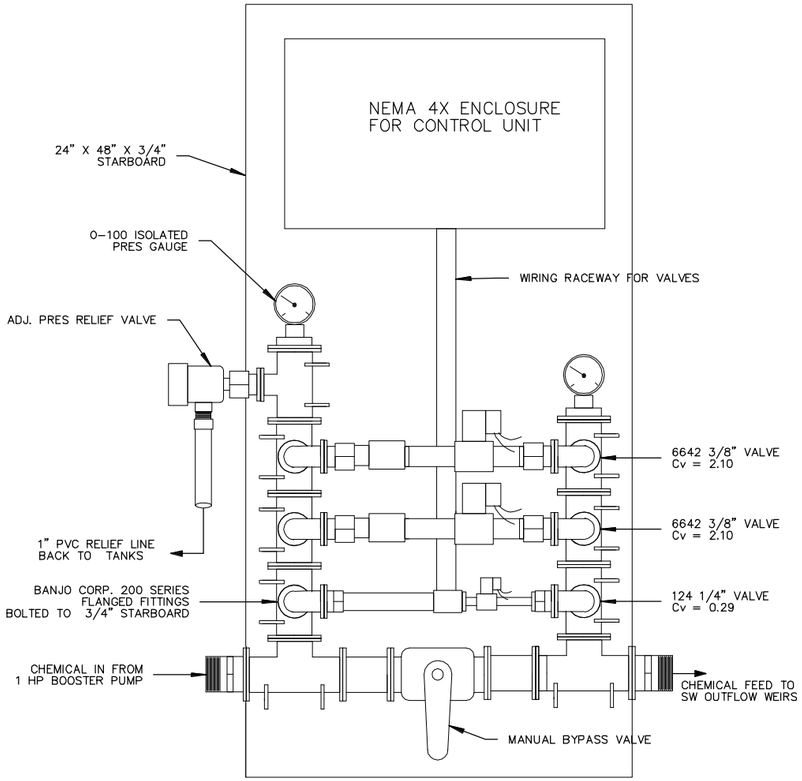
BRIAN L. ROY
NO. 45366

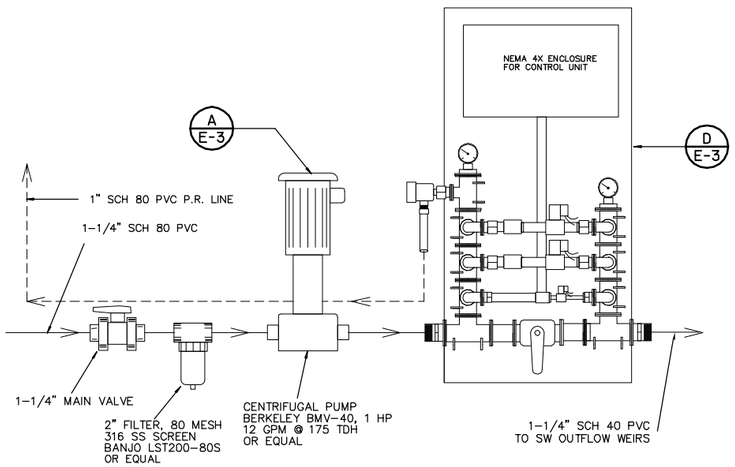
SHEET
CD-4

F:\CG\Dwg\ROYAL\0100_11_ES\Cstndet4.dwg 2/3/2005 11:22:50 AM EST



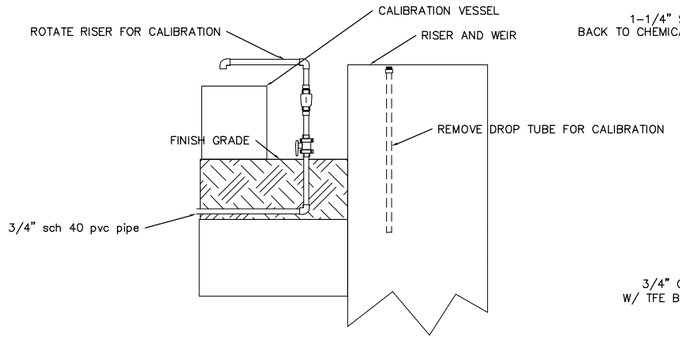
A / CD-4 **ALUM INJECTOR DETAIL**

N.T.S.



C / CD-4 **INJECTION SYSTEM PIPE CONNECTIONS**

N.T.S.

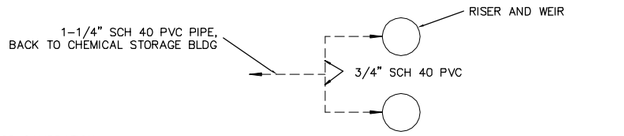


CALIBRATION PROCEDURES

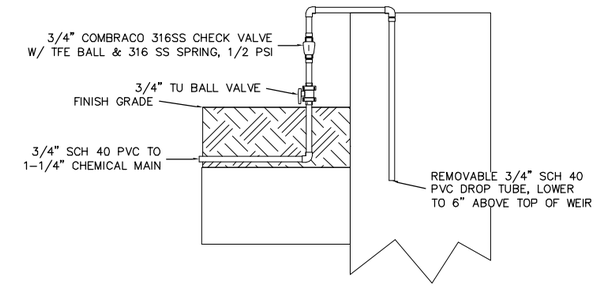
1. Remove drop tube and rotate riser over calibration vessel.
2. Calibrate using water first, then adjust findings by running tests as necessary w/ chemical.
3. Fill 1–1/4" pipe by opening bypass valve on injector. Remove all air from the line.
4. Operate injection valves for 1–14 secs as described below. Catch and measure the discharge. Measurement should be made with accurate volumetric vessels.
5. Operate the valves as follows: 1/4" valve alone, a 3/8" valve alone, two 3/8" valves together and one 3/8" and 1/4" together. Operate combination for a time period of 1 through 14 seconds.
6. Record and report results to engineer.

B / C-7 **CALIBRATION PROCEDURE**

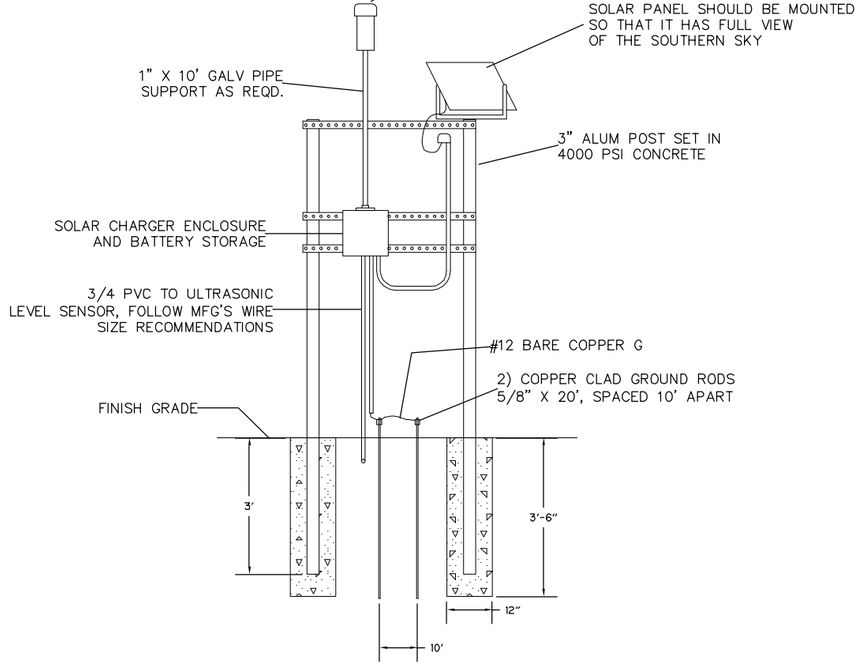
N.T.S.



ELEV. VIEW INJECTION POINTS



INJECTION POINT PLAN VIEW



D / C-7 **REMOTE RADIO STATION**

N.T.S.

JOB NO. 0100-11-ES
SCALE: AS NOTED
DATE 2/5/05
DESIGN R.A.J.
DRAWN J.R.R.
CHECKED B.L.R.
APPROVED

NO.	DATE	REVISION

MILKING R, INC.
SFWMD CONTRACT C-11652,
AMENDMENT No.1
OKEECHOBEE COUNTY FLORIDA

INSTRUMENTATION DETAILS

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FL COA No.: 7290

PRELIMINARY
BIDDING PURPOSES ONLY

RICHARD A. JONES
NO. 31118

SHEET
I-1

CONNECT TO EXISTING POWER SERVICE

2" PVC ELECTRICAL CONDUIT 36" MIN. COVER

SUMP PUMP & DISCHARGE (A / CD-3)

EXISTING WETLAND

EXISTING CHEMICAL STORAGE FACILITY (A / CD-4)

1 ¼" SCH. 40 PVC CHEMICAL INJECTION LINE

U.S. HIGHWAY 98

N

25 0 50

JOB NO. 0100-11-ES
SCALE: AS NOTED
DATE 2/5/05
DESIGN R.A.J.
DRAWN J.R.R.
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NO.	DATE	REVISION

MILKING R, INC.
SFWMD CONTRACT C-11652,
AMENDMENT No.1
OKEECHOBEE COUNTY FLORIDA

SITE ELECTRICAL PLAN

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(407) 831-5095 fax
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FL COA No. 7290

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RICHARD A. JONES
NO. 31118

SHEET E-1

F:\CG\Dwg\ROYAL\0100_11_ES\E-1.dwg 2/2/2005 8:42:42 AM EST

NOTE: SECOND PUMP AND CANOPY TO BE PROVIDED AT A LATER DATE BY THE OWNER AT THEIR DISCRETION

N

10 0 20

INSTALL PUMP CONTROL RACK FOR TWO 40 HP PUMPS SEE ELECTRICAL DETAILS

480'-2" PVC COND. 36" MIN DEPTH 3#2-0 AND 1#4G

CONNECT TO EXISTING 400A, 480V SERVICE, SEE ELECTRICAL DETAILS

EXISTING 24" CMP

PRELIMINARY BIDDING PURPOSES ONLY

RICHARD A. JONES NO. 31118

JOB NO.	0100-11-ES
SCALE:	AS NOTED
DATE	2/5/05
DESIGN	R.A.J.
DRAWN	J.R.R.
CHECKED	B.L.R.
APPROVED	

NO.	DATE	REVISION

MILKING R, INC.
SFWMD CONTRACT C-11652,
AMENDMENT No.1
OKEECHOBEE COUNTY FLORIDA

SITE ELECTRICAL PLAN

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Longwood, FL 32750
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(407) 331-3095 fax
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SHEET E-2

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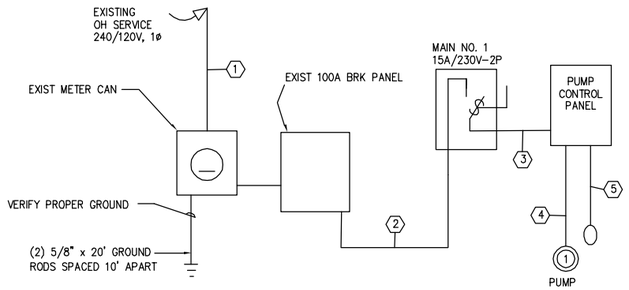


N.T.S.

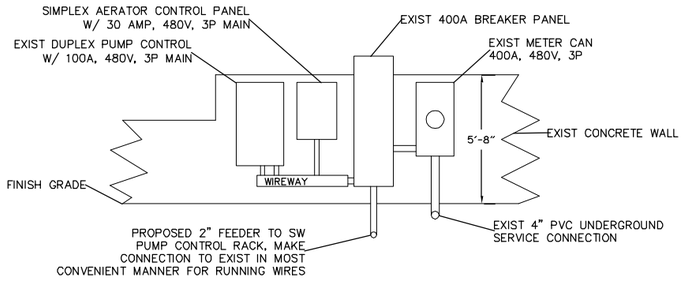
NOTES: ALL EQUIPMENT SHALL BE RATED 22,000 AIC MINIMUM.
MAIN & PUMP CONTROL CAN BE IN ONE ENCLOSURE

CONDUIT AND WIRE NOTES:

1. EXISTING RISER
2. 2#14 & 1#14G-1/2" C (PVC), 70'
3. 2#14 & 1#14G-1/2" C
4. 2#13 & 1#14G-1/2 C, (PVC), FLEX AT PUMP
5. MERCURY CONTACT LEVEL SWITCH

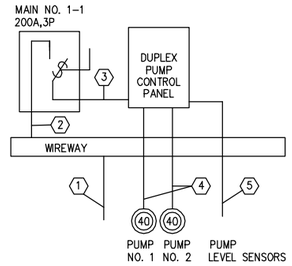
A I-1 1 HP PUMP ELECTRICAL SERVICE DIAGRAM

N.T.S.



B CD-2 EXISTING SERVICE FOR SW PUMPS

N.T.S.



NOTE: ALL EQUIPMENT SHALL BE RATED 22,000 AIC MINIMUM.

CONDUIT AND WIRE NOTES:

1. 3#2/0 & 1#4G-2"C (PVC)
2. 3#2/0 & 1#4G-2"C
3. 3#2/0 & 1#4G-2"C
4. 3#4 & 1#8G-1"C (PVC)
5. FOLLOW SENSOR SPECS - 3/4" C (PVC)

C CD-2 STORMWATER PUMPS CONTROL DIAGRAM

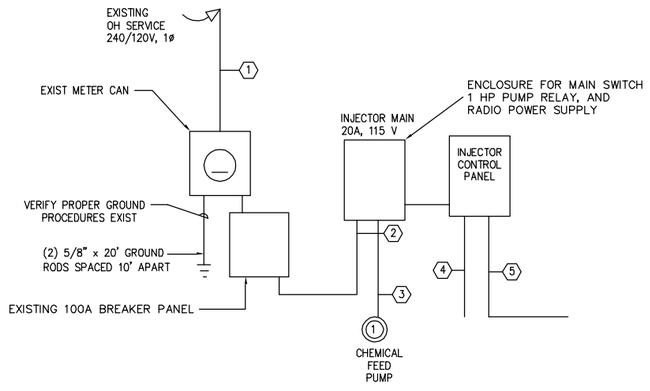
N.T.S.

GENERAL NOTES

1. IT IS THE CONTRACTOR'S RESPONSIBILITY TO COORDINATE WITH ALL LOCAL UTILITIES, AND TO MEET ALL OF THEIR INSTALLATION REQUIREMENTS. ALL LABOR, EQUIPMENT OR MATERIALS NECESSARY TO MEET THESE REQUIREMENTS IS TO BE INCLUDED IN THE PROPOSAL. THE CONTRACTOR SHALL OBTAIN, DELIVER AND INSTALL ALL CONDUITS, PULL-BOXES AND EQUIPMENT AS REQUIRED BY THE UTILITIES TO THEIR SPECIFICATIONS.
2. THE INSTALLATION SHALL MEET ALL REQUIREMENTS OF THE LATEST EDITION OF THE NATIONAL ELECTRICAL CODE (NEC) AND ALL CODES HAVING JURISDICTION.
3. AN EQUIPMENT GROUND WIRE SIZED PER THE NEC SHALL BE PULLED IN ALL ELECTRICAL CONDUITS, POWER & CONTROL, WHETHER OR NOT INDICATED ON PLANS.
4. ALL EQUIPMENT AND MATERIALS SHALL BE NEW AND UNUSED AND U.L. LISTED.
5. ALL EQUIPMENT FURNISHED AND INSTALLED BY THE CONTRACTOR SHALL BE GUARANTEED AGAINST DEFECTS IN MATERIALS AND WORKMANSHIP FOR A PERIOD OF ONE YEAR FROM DATE OF ACCEPTANCE UNLESS OTHERWISE SPECIFIED.
6. DO NOT SCALE THE ELECTRICAL DRAWINGS. COORDINATE ALL EQUIPMENT LOCATIONS WITH THE ENGINEER AND MECHANICAL CONTRACTOR BEFORE ANY INSTALLATION. ALL EQUIPMENT DIMENSIONS AND CONDUIT OPENINGS SHALL BE VERIFIED WITH THE MANUFACTURER'S APPROVED SHOP DRAWINGS PRIOR TO FORMING CONCRETE WORK.
7. THE DRAWINGS ARE NOT INTENDED TO SHOW THE EXACT LOCATION OF EQUIPMENT OR CONDUIT RUNS. THESE ARE TO BE COORDINATED WITH THE OTHER TRADES SO THAT CONFLICTS ARE AVOIDED.

ELECTRICAL SPECIFICATIONS

1. ALL UNDERGROUND CONDUIT SHALL BE SCHEDULE 40 PVC. ABOVE GRADE CONDUIT SHALL BE SCHEDULE 80 PVC BEGINNING WITH THE UNDERGROUND ELBOW.
2. ALL WIRING SHALL BE COPPER, 600V, TYPE XHHW-2, UNLESS SPECIFIED ON PLANS.
3. FUSIBLE DISCONNECT SWITCHES SHALL BE HEAVY-DUTY, QUICK-MAKE, QUICK-BREAK, VISIBLE BLADES WITH FULL COVER INTERLOCK. ALL CURRENT CARRYING PARTS SHALL BE COPPER. ENCLOSURE TYPE SHALL BE NEMA-3R, PAINTED STEEL, WITH STAINLESS STEEL MOUNTING HARDWARE. DISCONNECT SWITCHES SHALL BE HORSEPOWER RATED AS MANUFACTURED BY THE SQUARE-D COMPANY, CLASS 3110, TYPE H, OR APPROVED EQUAL.
4. SURGE ARRESTORS SHALL BE INSTALLED WHERE REQUIRED. SURGE ARRESTORS SHALL BE AS MANUFACTURED BY THE GENERAL ELECTRIC COMPANY, TRANQUELL SERIES, MODEL 9L15 OR APPROVED EQUAL.
5. SUBMIT SHOP DRAWINGS FOR ALL EQUIPMENT AND MATERIALS.



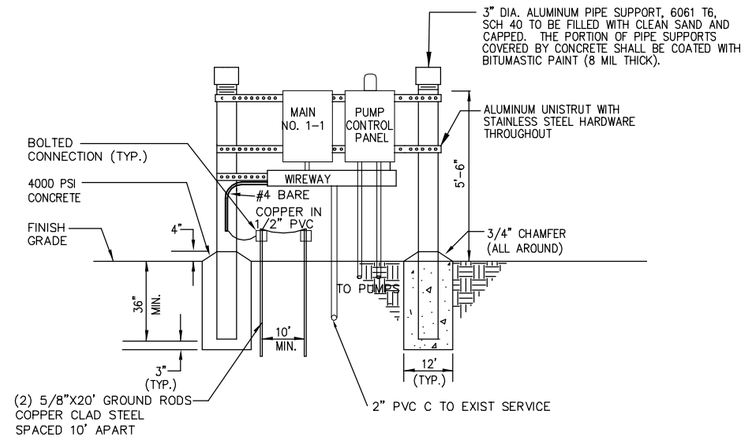
NOTE: ALL EQUIPMENT SHALL BE RATED 22,000 AIC MINIMUM.
ALL ELEC BOXES, HARDWARE & COND MUST BE PVC, FBGLS, OR SS

CONDUIT AND WIRE NOTES:

1. EXISTING POWER DROP
2. 2)#12 THN & 1)#12 G - 1/2" C (PVC)
3. 2)#14 THN & 1)#14 G - 1/2" C (PVC)
4. SOLENOID VALVE WIRING
5. RADIO SIGNAL AND POWER WIRES

D I-1 INJECTOR ELECTRICAL SERVICE DIAGRAM

N.T.S.



E CD-2 STORMWATER PUMPS CONTROL RACK DETAIL

N.T.S.

JOB NO. 0100-11-ES
SCALE: AS NOTED
DATE 2/5/05
DESIGN R.A.J.
DRAWN J.R.R.
CHECKED B.L.R.
APPROVED

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MILKING R, INC.
SFWMD CONTRACT C-11652,
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OKEECHOBEE COUNTY FLORIDA

ELECTRICAL DETAILS

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RICHARD A. JONES
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SHEET
E-3

F:\CG\Dwg\ROYAL\0100_11_ES\E-3.dwg 2/3/2005 11:21:48 AM EST

Appendix E
Detailed Cost Estimate

Table E-1
Milking R., Inc. Treatment System

Detailed Cost Estimate

WBS	ITEM DESCRIPTIONS	QNTY	UNIT MSR	UNIT PRICE	ITEM COST	WBS Total
1	GENERAL REQUIREMENTS	1.00	LSUM			$ 30,500.00
	SURVEYING					
	construction layout & staking	30.00	crhrs	77.64	2,329.24	
	as-built drawing (red-line)	1.00	lsum	1,026.89	1,026.89	
	ADMINISTRATION					
	project management and coordination	1.00	mnth	4,050.86	4,050.86	
	travel and subsistence	2.00	mnth	675.14	1,350.29	
	field personnel, superintendent	2.00	mnth	1,687.86	3,375.72	
	postal box	2.00	mnth	16.88	33.76	
	initial schedule expense	2.00	mnth	67.51	135.03	
	monthly schedule updates	2.00	mnth	101.27	202.54	
	progress photographs	2.00	mnth	30.38	60.76	
	QUALITY CONTROL	0.00				
	material testing	1.00	lsum	337.57	337.57	
	soil testing and analysis	1.00	lsum	810.17	810.17	
	field density tests	1.00	each	1,350.29	1,350.29	
	pollution prevention plan	1.00	lsum	1,687.86	1,687.86	
	COMMISSIONING					
	pumps & chemical feed start-up	1.00	lsum	675.14	675.14	
	temporary power	1.00	lsum	573.87	573.87	
	BONDING					
	bonding	1.00	lsum	12,500.00	12,500.00	
2	SITE PREPARATION	1.00	LSUM	-	-	$ 6,000.00
	DEWATERING			-	-	
	dewatering	2.00	mnth	3,000.00	6,000.00	
3	EARTHWORK & GRADING	1.00	LSUM			$ 275,000.00
	CLEARING AND GRUBBING					
	clearing and grubbing	0.60	acres	2,270.64	1,362.38	
	open burn on-site	1.00	days	603.32	603.32	
	EXCAVATION DITCHES					
	all excavation	19,500.00	cuyd	1.88	36,738.95	
	EXCAVATION FOR BERMS					
	excavate required borrow for berm @ containment pond	46,330.05	cuyd	1.00	46,211.33	
	excavate required borrow for berm @ settlement pond	13,225.00	cuyd	1.00	13,191.11	
	PLACEMENT & COMPACTION					
	ditch spoil - spread on-site	19,500.00	cuyd	0.78	15,127.80	
	construct containment pond berm, grading and compaction	46,330.05	cuyd	2.31	107,239.84	
	construct settlement pond berm, grading and compaction	13,225.00	cuyd	2.53	33,466.33	
	construct ditch block	400.00	cuyd	2.73	1,093.49	
	GRADING AND FINISH WORK					
	misc. finish grade settling pond & discharge areas	2,500.00	sqyd	0.81	2,031.82	
	finish grade berm (10% repair work for seeding)	5,000.00	sqyd	0.81	4,063.63	
	SOIL/TURF STABILIZATION					
	land-loc 450 turf reinforcement	950.00	sqyd	2.10	1,995.00	
	SODDING AND GRASSING					
	bahai sod	1,500.00	sqyd	1.25	1,875.00	
	INSTALLATION OF CULVERTS AND RISERS					
	installation of culverts and risers	1.00	lsum	10,000.00	10,000.00	

Table E-1
Milking R., Inc. Treatment System

Detailed Cost Estimate

WBS	ITEM DESCRIPTIONS	QNTY	UNIT MSR	UNIT PRICE	ITEM COST	WBS Total
4	STORM WATER DRAINAGE SYSTEM	1.00	LSUM			$ 59,000.00
	CULVERT PIPES					
	12" hdpe pipe	40.00	lnft	4.73	189.02	
	24" hdpe pipe	60.00	lnft	13.22	793.26	
	36" hdpe pipe	1,000.00	lnft	27.51	27,505.25	
	48" hdpe pipe	200.00	lnft	47.02	9,403.98	
	CONTROL STRUCTURES / RISERS					
	48" HI aluminum riser w/ 1.5' ballast can	2.00	each	2,802.41	5,604.82	
	36" HI aluminum riser w/ 3' ballast can	3.00	each	1,534.62	4,603.87	
	48" HI aluminum riser w/ 1.25' ballast can	1.00	each	2,770.22	2,770.22	
	36" HI aluminum riser w/ 1.25' ballast can	2.00	each	1,438.48	2,876.96	
	36" aluminum std riser w/1.25' ballast can	2.00	each	1,438.48	2,876.96	
	12" aluminum std riser w/1' ballast can	1.00	each	500.99	500.99	
	48" 4'W Band w/gasket	1.00	each	257.50	257.50	
	36" 2'W Band w/gasket	7.00	each	144.22	1,009.52	
	12" 2'W Band w/gasket	1.00	each	28.26	28.26	
	48" 2'W Band w/gasket	3.00	each	193.13	579.38	
5	PUMPS AND CHEMICAL TREATMENT EQUIPMENT	1.00	LSUM			$ 62,000.00
	STORMWATER PUMPS TO SW POND					
	40 hp axial flow pump w/starter	1.00	each	34,497.99	34,497.99	
	ENTRANCE ROAD STORMWATER STATION					
	pump and riser	1.00	each	4,451.05	4,451.05	
	CHEMICAL TREATMENT PUMPS					
	chemical injection system	1.00	each	22,714.53	22,714.53	
	PUMP COVERS					
	pump covers	1.00	each	336.42	336.42	
6	CONCRETE	1.00	LSUM			$ 15,000.00
	ENERGY DISSIPATORS					
	energy dissipators	455.00	sqft	11.29	5,137.32	
	CONCRETE SUMP					
	8" concrete vault 12x12x13	1.00	each	9,862.68	9,862.68	
END OF ESTIMATE						$ 447,500.00