Exhibit 18

Pump Station Nos. 1 and 2 Condition Assessment

for

Acme Improvement District

ACME IMPROVEMENT DISTRICT

prepared by

MOCK • ROOS
ENGINEERS SURVEYORS PLANNERS

June 1996

Mock, Roos & Associates, Inc., 5720 Corporate Way, West Palm Beach, FL 33407

ENGINEER'S SIGNATURE PAGE

This *Pump Station Nos. 1 and 2 Condition Assessment* report was prepared and assembled by a team of Professional Consultants. Mr. Jeffrey Hiscock of Mock, Roos & Associates, Inc. was responsible for the mechanical engineering aspects. Mr. Larry Smith of Resource Management International, Inc. was responsible for the electrical engineering aspects. Mr. Brian Rheault of Bridge Design Associates, Inc. was responsible for the structural engineering aspects. The information provided herein was based, in part, on the information that was available and obtained from Acme Improvement District and other agencies identified herein. The Engineers cannot be responsible for information added or deleted once distributed. As Professional Engineers in the State of Florida, it is our opinion that the information (relevant to the engineers' respective responsibilities) presented in this report is true and factual.

Jeffrey G. Hiscock,P.E.

7-12-96

(Engineer"s signature and seal)

Larry M. Smith, P.E.

(Engineer's signature and seal) 7-12-96

Brian C. Rheault, P.E.

7/10/96

(Engineer's signature and seal)

Exhibit 18

Table of Contents

Pump Station Nos. 1 & 2
Condition Assessment

1.0 Introduction

Acme Improvement District (Acme) authorized Mock, Roos & Associates, Inc. to conduct mechanical, structural and electrical inspections of Stormwater Pumping Station Nos. 1 and 2 for the purpose of assessing their existing condition. This assessment is intended to provide Acme with the necessary information to make informed decisions regarding the future of these pump stations.

The pump stations currently discharge stormwater from the southern half of Acme directly to Conservation Area No. 1 (CA1) which is part of the historical Florida Everglades system (see Figure 1 – Location Map). The Everglades Forever Act mandates that waters discharging to the Everglades meet certain water quality standards by the year 2006. In response, the South Florida Water Management District (SFWMD) is in the process of designing and constructing large Stormwater Treatment Areas (STAs) that will act as filters to reduce the nutrient loads discharged to the Everglades.

One such STA, STA 1E, is planned adjacent to the western boundary of Acme and is designed to accept and treat runoff from the western C-51 Basin. The southern half of Acme's drainage system was not included in the design of this STA. Discussions are currently underway with SFWMD for the inclusion of this area. Depending on the outcome of the discussions and subsequently developed treatment concepts, the pump stations may be dismantled and relocated.

If relocation of the pump stations occurs, recommendations will be needed regarding future design and reuse of existing equipment. If the pump stations remain at their current locations, recommendations will be needed to address the replacement and/or redesign of the existing facilities, due to the age of the stations which date back 23 years with many original components still in use.

2.0 Description of Facilities

2.1 Function and Operation

The function of the pump stations is to provide stormwater protection in the southern 9,230 acres (Basin B) of Acme (see Figure 1). Photographs and site plans are provided in Figures 2 through 4 for both pump stations. The stations were designed to remove 1.27 inches of stormwater runoff per day and have a total discharge capacity of 220,000 gallons per minute (gpm). The pump schedule as permitted by SFWMD is to maintain a water level of 13.0 feet NGVD (National Geodetic Vertical Datum) in the canals.

The stations are permitted by SFWMD under two separate permits. Surface Water Management Permit No. 50-00548-S authorizes operation of the stations based on the pump schedule described above. Right-of-Way Permit No. 50-00548-R authorizes drainage connections through SFWMD's L-40 Levee to CA1. The pump stations are not actually located within SFWMD's right-of-way, however they are referenced in the permit and operation is dependant on the permit. Copies of both permits are provided in Appendix A.

Each pump station consists of a building that houses three diesel engines, electrical panels and miscellaneous equipment. The stations pump stormwater from Acme canals to a small discharge canal that outlets via gravity to CA1.

Pump Station No. 1 (see Figure 5 for layout) includes a secondary pump station (Pump Station 1A) that includes its own building with one diesel engine and pump. This station is used as a backup should one of the three pumps/engines in the primary station fail or be placed out-of-service. It should be noted that Pump Stations 1 and 1A cannot (nor are they intended to) operate together at full capacity because of physical limitations downstream. A 72-inch CMP culvert under the L-40 Levee restricts flow, causing water to overflow the banks of the discharge canal if both stations (all four pumps) are running.

Pump Station No 2 (see Figure 6 for layout) includes two stormwater pumps and one two-way pump that can be used for stormwater or irrigation depending on the position of two large steel gates located on the east and west sides of the pump.

2.2 Mechanical

Pump Station No. 1 consists of three diesel engines with belt drive units that power three axial flow vertical lift pumps. The design capacity of each pump is 50,000 gpm. Each engine is rated at 275 hp. Two of the engines were manufactured by Caterpillar and the other was manufactured by Perkins.

The belts extend from the engine pulleys in a vertical configuration and are twisted to match a horizontal pulleys directly above the pumps. The pumps are located outside the building supported by a platform attached to the east face of the building. The pulleys drive lineshafts connected to the pump propellers. The pumps create a vertical lift of water, forcing it through three 54-inch diameter steel discharge pipes located under the building and extending west for approximately 60 feet to the discharge canal. Each pipe outlet is equipped with a steel flap gate that prevents water from backflowing into Acme canals.

It should be noted that there is a fourth discharge pipe associated with this station that has been bolted shut with a steel plate. This was installed in anticipation of adding another pump to the station. Mechanical and structural (building) improvements, however, would be needed to accommodate a fourth pump.

Pump Station 1A includes one Detroit Diesel engine with a similar belt drive configuration that powers one 25,000 gpm axial flow pump. The belt extends from the engine pulley in a vertical configuration and is twisted to match a 45° pulley attached to a lineshaft and pump. The pump is located outside the building and is supported by a platform attached to the east face of the building. The lineshaft extends into the water at a 45° angle and is connected to the pump propeller which lifts the water, forcing it through a steel discharge pipe buried adjacent to the building and extending north for approximately 55 feet to the

discharge canal. This pipe is also equipped with a steel flap gate that prevents water from backflowing into Acme canals.

A 10,000-gallon aboveground diesel fuel tank serves both Pump Stations 1 and 1A. This steel tank is located within a concrete containment area designed to meet DEP Rule 17-762 for secondary containment. Feed and return lines to and from the engines are located underground within a secondary containment pipe.

Pump Station No. 2 consists of three diesel engines with belt drive units, manufactured by Caterpillar. Two of the engines are used to power two axial flow vertical lift pumps that are arranged in a similar configuration as Pump Station No. 1. The design capacity of one pump is 50,000 gpm and the other is 60,000 gpm. The engines are rated at 330 hp and 275 hp, respectively. Both pumps are located outside the building and are supported by a platform attached to the east face of the building. The pumps create a vertical lift of water forcing it through 54-inch and 48-inch diameter steel discharge pipes, respectively, located under the building and extending west for approximately 25 feet to the discharge canal. Each pipe outlet is equipped with a steel flapgate that prevents water from backflowing into Acme canals.

The third engine at Pump Station No. 2 is rated at 275 hp and includes a belt drive system to operate one 60,000 gpm box pump located in the center of the building. The box pump is capable of pumping water in both directions, depending on the position of two large steel gates located on the east and west sides of the pump. For stormwater discharge, the east gate would be raised and the west gate would be lowered. The opposite gate configuration allows water to be pumped back from CA1 into Acme's canals for irrigation.

2.3 Structural

Pump Station No. 1 includes a prefabricated metal building with a concrete substructure and foundation. The fore bay and the discharge bay are lined with structural steel sheet pile headwalls.

Pump Station 1A includes a small wooden building approximately ten feet by ten feet. An external metal catwalk provides access to the door of the building and the external pump. The building has significant water and dry rot damage. The roof members and framing appear to be undersized.

Pump Station No. 2 includes a reinforced masonry building with a wood roof truss system and a concrete substructure. The concrete substructure is protected by structural steel sheeting headwalls on the fore bay and the discharge bay sides of the building.

2.4 Electrical

Pump Station No. 1 is served with 120/240-volt, single-phase, electrical power overhead from a Florida Power and Light Company (FPL) overhead, single-phase line. The main panel is served through a 100-amp, 2-pole main breaker and a 100-amp, 2-pole manual transfer switch. The manual transfer switch was used in conjunction with an emergency generator that is no longer in place. Therefore, there is currently no backup for the FPL power source. The main panel is rated 225-amp, single-phase, three-wire, 120/240-volt, with main lugs only. This panel serves three 230-volt exhaust fans, one 2-hp, 230-volt sump pump, 120-volt lighting and receptacle circuits and other miscellaneous 120-volt loads including engine battery chargers, telemetry system, etc.

Pump station No. 2 is served with 120/240 volt, single-phase, electrical power underground from a FPL overhead, single-phase line. There is currently no backup for the FPL power source. The main panel is rated 225-amp, single-phase, three-wire, 120/240-volt, with a 150-amp, 2-pole main breaker. This panel serves one 2-hp, 230-volt sump pump, a 230-volt welder receptacle, 120-volt lighting and receptacle circuits and other miscellaneous 120-volt loads including engine battery chargers, telemetry system, etc.

3.0 Condition of Facilities

3.1 Mechanical

3.1.1 Pumps

The condition of the pumps was determined with testing that was performed by MWI Couch Pump Company. The original design static head, i.e., downstream water level minus upstream water level, is not available (n/a) for the pumps in Pump Station No. 2. An appropriate static head can be estimated, however, based on the control elevation of Acme's canals (13.0 feet) and the estimated high water level of Conservation Area No. 1. The downstream water level in the Conservation Area is maintained normally during the wet season at 17.0 feet. With the exception of a major rain event, a conservative elevation to use is 18.0 feet. There may be occasions when the pumps need to run with upstream elevations that are one foot below the control elevation (to account for head loss in the canals). This results in a maximum static head of 6 feet.

The results of the testing are provided in Appendix B and are summarized below:

Pump Station No. 1	Design Head	Design Flow	Test Results at Design Head	Test Results at Max Head
Pump 1	11.5 ft	50,000 gpm	46,000 gpm	53,000 gpm
Pump 2	11.5 ft	50,000 gpm	43,000 gpm	51,000 gpm
Pump 3	8.0 ft	50,000 gpm	43,000 gpm	50,000 gpm
Pump Station No. 2				
Pump 1	n/a	60,000 gpm	n/a	50,000 gpm
Pump 2	n/a	50,000 gpm	n/a	49,500 gpm

3.1.2 Engines

The engines have been well maintained by Acme's maintenance staff. Failed engine components such as cooling systems and PTOs (Power Take-Off) have been replaced with appropriate parts that have solved previous problems. Much of the success is due to Acme's long-term employees who have maintained the stations for over twenty years and have learned through experience how to solve problems. Some engines have been in operation for 23 years.

The problems that do exist are design related and prevalent, primarily, in Pump Station No. 2. Overheating of the engines at this station has occurred in the past due to poor ventilation and the configuration of the engines. There are no louvers in the walls to allow the necessary air flow past the engines and the engines are positioned such that the cooling fan of one engine blows hot air onto another. Acme has combatted this problem by erecting deflection walls between the engines to direct air outward through opened roll-up doors. The opening of both roll-up doors (north and south sides of building) combined with a large portable fan has become standard operating procedure at this station while in operation. Even with these measures, the engines may still not be receiving adequate ventilation. Overheating of the diesel engines, even slightly, will cause excessive fuel consumption and increase engine wear over time.

The fuel systems at both stations are identical and include external, aboveground, steel tanks located within concrete secondary containment areas. Both systems are relatively new (constructed in late 80s, early 90s) and show no signs of problems. The systems on a whole, however, lack day tanks and observation ports into underground piping. Most engine manufacturers recommend that day tanks be used even when there is sufficient gravity flow from the external tank, depending on the elevation of the external tank. Their reasons relate to fuel levels which should be maintained below the fuel injection valves to prevent potential fuel bypass. A day tank in conjunction with a solenoid valve and check valves can maintain the appropriate level.

3.2 Structural

Several problems were noted at *Pump Station No. 1*. The prefabricated metal building is in very poor condition. The existing metal roofing and siding have numerous holes and fastener failures. The structural steel purloins and framing are also in poor condition with excessive amounts of corrosion on several of the main supporting members. The substructure does not appear to have any significant concrete deterioration or cracking. The steel sheeting headwalls in the fore bay and discharge bay have not been painted and have a significant amount of corrosion. The canal banks at the ends of the headwalls have washed out and soil from behind the headwalls has been washed away. Finally, the trash rack in the fore bay is partially collapsed and does not fully protect the pump intake manifolds.

The small wooden building at *Pump Station No. 1A* has significant water and dry rot damage. The roof members and framing appear to be undersized. In its existing condition, this building does not offer proper protection of the pumping equipment.

The exterior walls and concrete substructure at *Pump Station No. 2* are in good condition and do not show any signs of significant structural stress. The wood roof framing, however, has a significant amount of water damage and dry rot. The steel sheeting headwalls in the fore bay and discharge bay have not been painted and have a significant amount of corrosion. The canal banks at the ends of the headwalls have not been properly shaped and protected, and the embankment is eroding.

3.3 Electrical

At *Pump Station No. 1* the main service equipment, including the main breaker, manual transfer switch and main panel, appears to be near the end of its service life. There are six old fluorescent lighting fixtures, each with four F40T12 lamps, that provide light within the station. The engine control panels are partially functional and are approximately 25 years old. The telemetry system appears to be in good condition, however, it is currently nonfunctional.

The main service panel at *Pump Station No. 2* was installed in 1989 and is in good condition. There are six, late model, high intensity discharge (H.I.D.) lighting fixtures in place that appear to be in good condition. Two of the engine control panels are functional and in good condition. The third is approximately 25 years old and not connected. The telemetry system appears to be in good condition, however, it is currently nonfunctional.

4.0 Conclusions

4.1 Preventative Maintenance

This section is not intended to outline all of the maintenance issues related to the pump stations. Maintenance of the individual components of the stations is dependent upon the manufacturers' operation and maintenance instructions as well as recommendations by the original design engineer at the time of construction. Based on the inspections, it appears that Acme's maintenance staff has performed the necessary routine maintenance functions at these stations.

There are components, however, that are beyond normal maintenance procedures and require special maintenance from outside contractors. Specifically, the pumps should be pulled once every five to ten years and overhauled. Knowing precisely when to overhaul a pump is difficult. Two pumps at Pump Station No. 2 have exhibited minor oil leaks which indicates the need for overhauling. The pumps were flow tested to verify their condition and need for overhauling.

Based on the tests performed on the pumps, only one pump (Pump 1, Pump Station No. 2) tested significantly below the required capacity at the maximum static head. This pump, however, is one of the two pumps that had already been scheduled to be overhauled. The remainder of the pumps provide adequate capacity and are not in need of immediate attention.

All of the pumps—including the pump recently overhauled—should be overhauled within the next five years at a qualified pump manufacturing plant. The work should include replacement of seals, bearings and lubrication. The propellers and shafts should be inspected to determine if they should be reconditioned or replaced. The pumps should be cleaned and painted with a black bitumastic enamel (equal to Zophar Triple A).

The diesel engines represent another component of the stations that requires special maintenance. Testing of the engines was not in Acme's budget for this fiscal year but should be considered in the future. Full diagnostic testing should be performed by a

licensed professional mechanic on all of the older engines (20+ years) that have not been overhauled in the last 5 years.

4.2 Replacement Schedule

The pumps in both pump stations, if properly maintained, could remain operable at design capacity for another 15 to 20 years. Additionally, the engines in both pump stations, if properly maintained, could remain operable at design capacity for another 10 to 25 years depending on the age of the engine. Engines range from 8 to 23 years in age. The frequency of pump and engine overhauling will have to increase to no less than once every five years.

Based on the condition of the buildings at *Pump Station No. 1 & 1A,* the useful life of these buildings has expired as they do not offer adequate protection against a hurricane. The building at *Pump Station No. 2* could provide 15 to 20 years of additional service, however, the wood truss roof has rotted, may not withstand a hurricane and therefore should be replaced.

It is estimated that unless major modifications are made to the sheetpiling within the next few years at both pump stations, it will be beyond salvage and may fail within the next ten years. The necessary modifications include:

- Sandblasting and painting
- Adding a concrete cap or steel channel cap
- Reshaping and adding riprap to canal banks at ends of sheetpiling

The main electrical service equipment at *Pump Station No. 1* along with the lighting fixtures and associated building wiring should be replaced within the next 10–15 years. This equipment should be replaced sooner if it fails or if other major building renovations are undertaken. The engine control panels will need replacement under the same schedule.

At *Pump Station No. 2* the main electrical equipment was recently replaced. The older engine control panel should be reconnected or replaced within the next 10–15 years.

4.3 Upgrade Potential

There are two potential scenarios that could result from the discussions with SFWMD (see Section 1.0). If relocation of the pump stations occurs, recommendations will be needed regarding future design and reuse of existing equipment. If the pump stations remain at their current locations, recommendations are also needed to address the replacement and/or redesign of the existing facilities.

In the case of the *relocation scenario*, the fuel tanks, all of the pumps (with exception of the Pump Station No. 1A pump) and only those engines that are less than 10 years old could be reused. Based on the structural and electrical assessment, all other equipment and facilities should be demolished and removed. Modifications to the engines and pumps will be necessary to incorporate automation. These modifications would include replacing the belt drives with line shafts, centrifugal clutches and right angle gear drives.

If three-phase power is available at the new location, then a cost comparison of utilizing electric submersible pumps should be made. Electric submersible pumps provide more reliable automation, less maintenance and less noise. The number of diesel engines would be reduced to one per station to serve an emergency generator.

Pump Station Nos. 1 and 1A should be completely demolished. Pump Station No. 2, however, could remain for irrigation by utilizing the existing box pump. Since the pump would no longer be used for stormwater, the west sluice gate would be raised and the east gate would remain in the lowered position.

In the case of the *existing location scenario*, the Pump Station No. 1 building should be replaced with a building that can withstand hurricane-force winds. The buildings at both stations should include improved ventilation and noise control which will required major modifications to the building at Pump Station No. 2. The substructure at both pump

stations can be reused. Three-phase power is not currently available at the existing locations. Therefore, a conversion to electric submersible pumps would be difficult and expensive depending on the location of ta three-phase power source.

The existing pumps and most of the engines can be reused. The belt drives, however, should be replaced with line shafts, centrifugal clutches and right angle gear drives to facilitate automation. Under either scenario, the control panels at both stations should be designed to alternate the operation of the pumps to provide a roughly even distribution of run-times per pump. The existing telemetry system should also be utilized for remote monitoring and operation.

Pump Station No. 1A can be removed completely. Pump Station No. 1 includes one pump more than is permitted by SFWMD. That pump should serve as a backup pump.

5.0 Recommendations

5.1 Interim Improvements

The potential pump station design upgrades described in the previous section reflect long-term scenarios depending on the outcome of discussions with SFWMD. In the interim, there are some improvements that should be performed to keep the stations operating and providing the required level of protection during a major storm event. The list that follows includes recommended interim improvements accompanied by rough estimates of probable construction costs for budget purposes.

- Replace Pump Station No. 1 building ($65,000)
- Replace Pump Station No. 2 roof ($26,000)
- Sandblast and paint sheetpiling ($32,000)
- Add structural reinforcement to sheetpiling in the form of a steel channel or concrete cap ($12,000)
- Perform canal slope improvements including earthwork and riprap ($9,000)
- Overhaul one pump per year
- Overhaul one engine per year

5.2 Long-term Improvements

In the case of the *relocation scenario*, it is recommended that a conversion to electric submersible pumps be examined. It may turn out, however, that the existing equipment should be used. It is pointed out in Section 4.3 that the pumps and most of the diesel engines can be reused. The necessary recommended improvements associated with a "diesel power" design concept are as follow:

- Construct new pump station buildings and substructures
- Replace two 23-year-old diesel engines in Pump Station No. 1
- Replace belt drives with line shafts, centrifugal clutches and right angle gear drives
- Design new control panel to alternate the pumps' operation
- Add total automation and relocate and integrate existing telemetry equipment
- Demolish Pump Station Nos. 1 and 1A
- Rough construction cost estimate is $800,000 per station

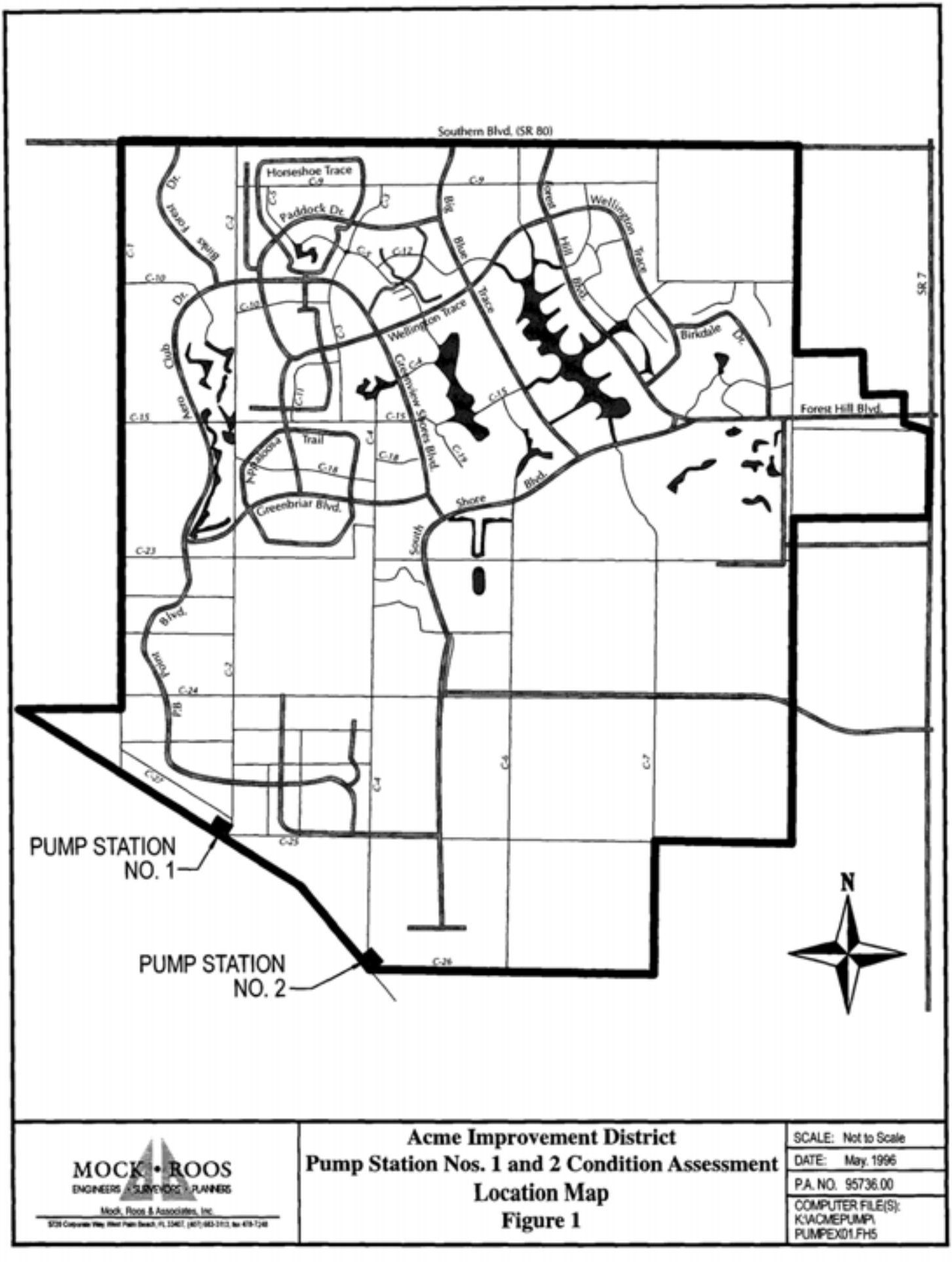
In the case of the *existing location scenario* (which is unlikely, based on current politics), a conversion to electric submersible pumps is not recommended because three-phase power is not available at these sites. A similar "diesel power" design concept as discussed in the relocation scenario is recommended which would include the reuse of existing equipment as well as the existing substructure. The necessary recommended improvements associated with this design concept are as follow:

- Replace Pump Station No. 1 building (if not already replaced as an interim improvement)
- Modify Pump Station No. 2 building to incorporate adequate ventilation and noise reduction
- Replace two 23-year-old diesel engines in Pump Station No. 1
- Replace belt drives with line shafts, centrifugal clutches and right angle gear drives
- Replace all electrical equipment and design control panel to alternate the operation of the pumps

- Add total automation and integrate existing telemetry
- Replace sheetpiling (if not cleaned, painted and reinforced as an interim improvement)
- Demolish Pump Station No. 1A
- Rough construction cost estimates are $550,000 and $450,000 for Pump Station Nos. 1 and 2, respectively

A preliminary study to develop more detailed conceptual designs and construction cost estimates should be performed based on the outcome of discussions with SFWMD and the recommendations presented in this Condition Assessment Report. It should be noted that the relocation scenario may include a single combined pump station or several smaller stations depending on future requirements and Acme's best interests for water management.

Exhibit 18



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Acme Improvement District
Pump Station Nos. 1 and 2 Condition Assessment
Location Map
Figure 1

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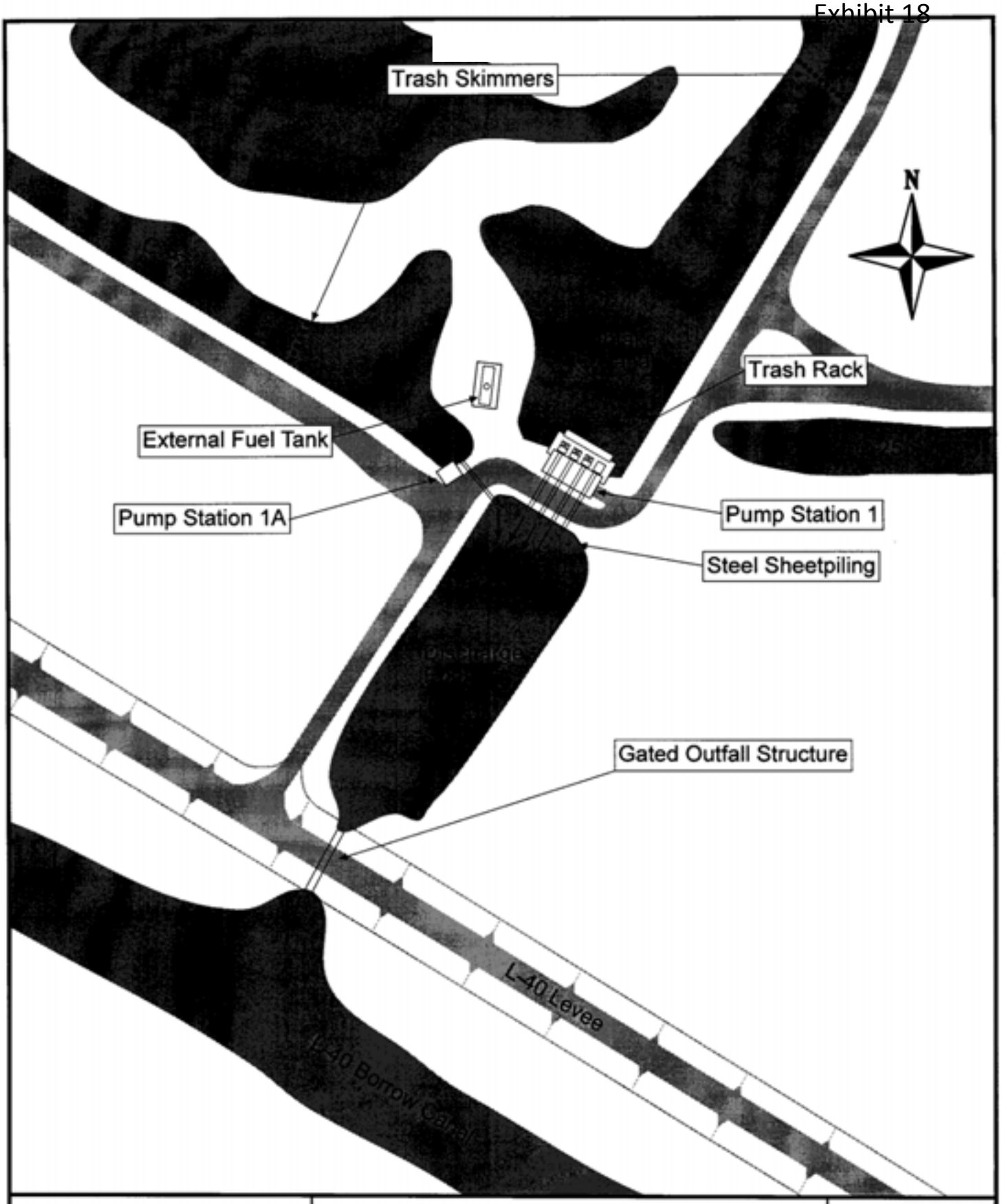

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Acme Improvement District
Pump Station Nos. 1 and 2 Condition Assessment
Pump Station No. 1 & 1A - Site Plan
Figure 3

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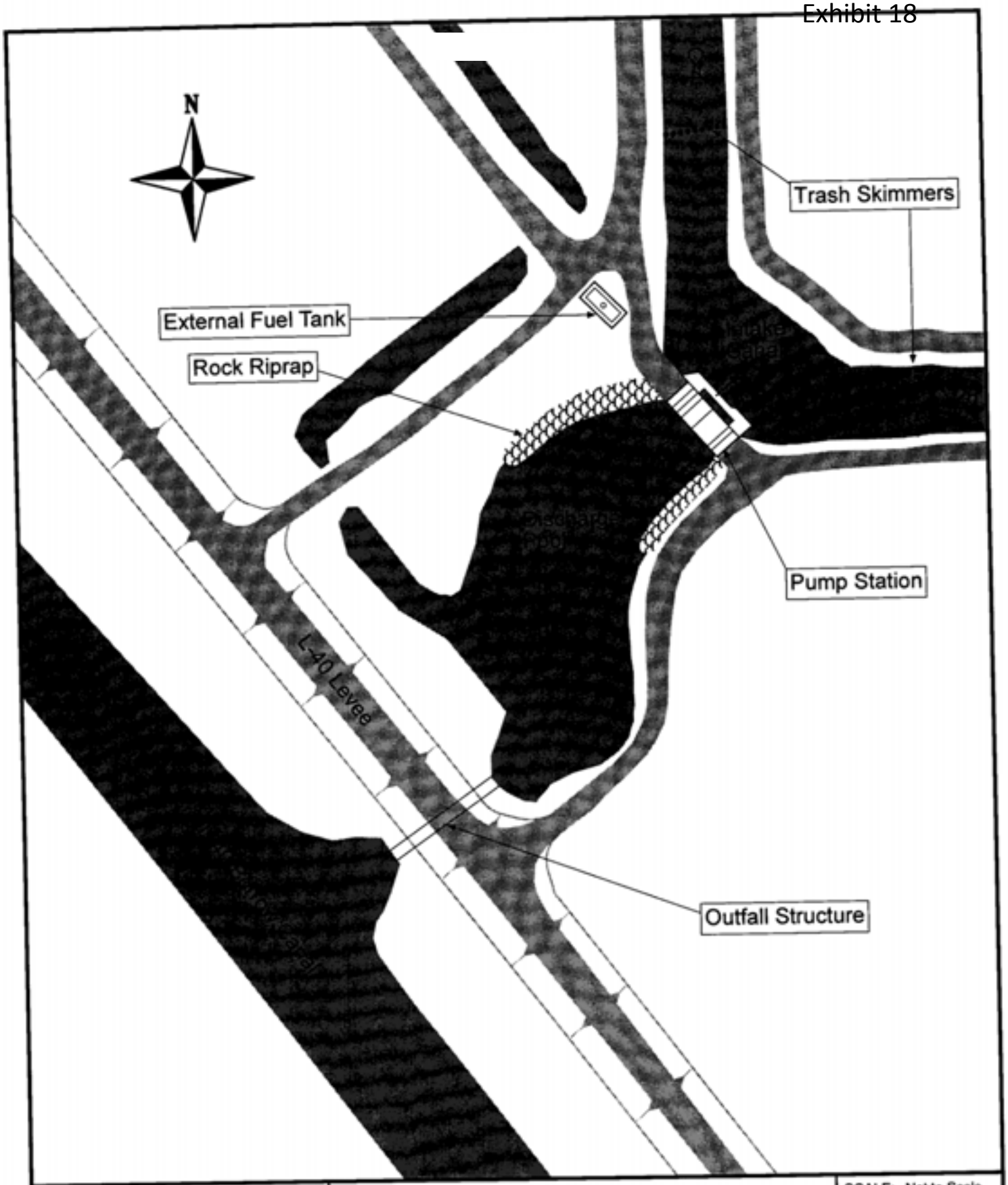
Exhibit 18



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Acme Improvement District
Pump Station Nos. 1 and 2 Condition Assessment
Pump Station No. 2 - Site Plan
Figure 4

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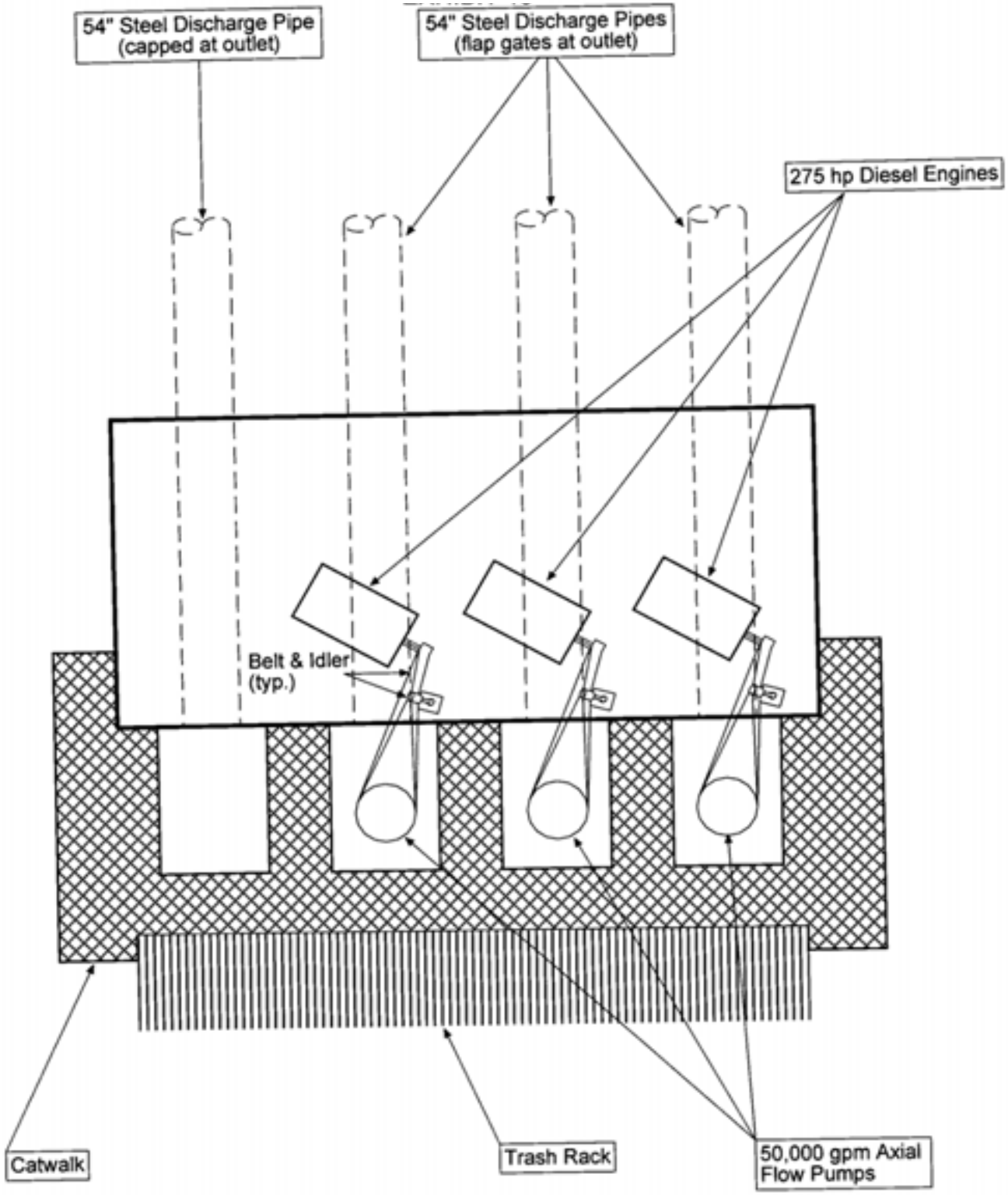

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Acme Improvement District
Pump Station Nos. 1 and 2 Condition Assessment
Pump Station No. 1 - Existing Layout
Figure 5

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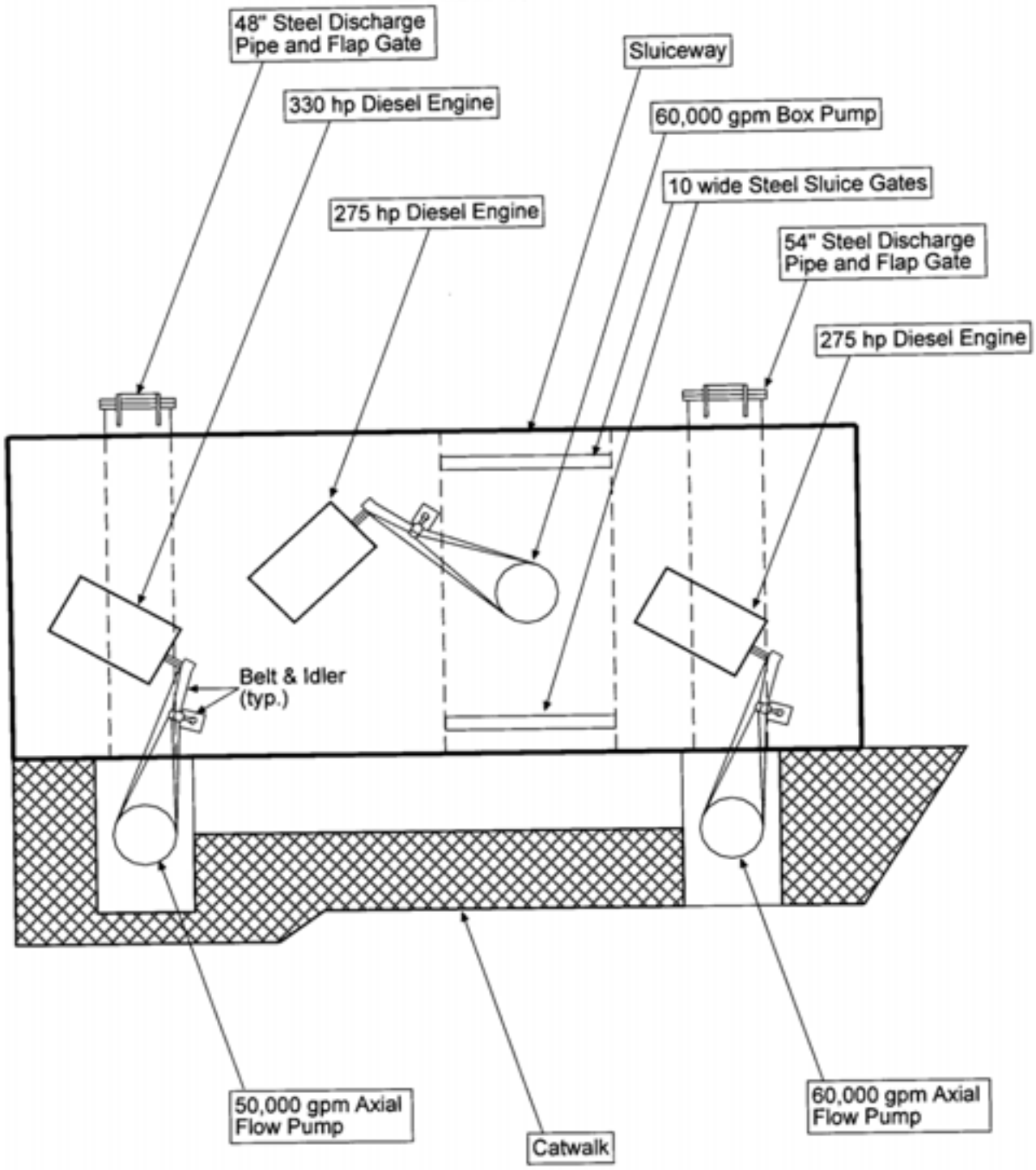

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Pump Station Nos. 1 and 2 Condition Assessment
Pump Station No. 2 - Existing Layout
Figure 6

SCALE:	Not to Scale
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P.A. NO.	95736.00
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Exhibit 18

South Florida
Water Management District

SURFACE WATER MANAGEMENT PERMIT NO. 50-00548-S

(NON-ASSIGNABLE)

DATE ISSUED: March 16, 1978

AUTHORIZING:

CONSTRUCTION AND OPERATION OF A WATER MANAGEMENT SYSTEM SERVING 18,200 ACRES OF RESIDENTIAL/AGRICULTURAL LANDS BY CANALS, LAKES, 1-100,000 GPM AND 1-120,000 GPM PUMP STATIONS DISCHARGING INTO L-40 BORROW CANAL AND 2-60,000 GPM PUMP STATIONS DISCHARGING INTO C-51.

LOCATED IN: PALM BEACH COUNTY, SECTION --- TWP. 43/44S RGE. 40/41E

ISSUED TO:

Acme Improvement District
P. O. Box 248
Loxahatchee, Florida 33470

This Permit is issued pursuant to Application for Permit No. 27833 dated February 27, 1976 09227-B dated September 20, 19 77. Permittee agrees to hold and save the South Florida Water Management District and its successors harmless from any and all damages, claims, or liabilities which may arise by reason of the construction, operation, maintenance, or use of any work or structure involved in the Permit. Said application, including all plans and specifications attached thereto, is by reference made a part hereof.

This Permit may be revoked or modified at anytime pursuant to the appropriate provisions of Chapter 373, Florida Statutes.

This Permit does not convey to Permittee any property rights or privileges other than those specified herein, nor relieve the Permittee from complying with any law, regulation, or requirement affecting the rights of other bodies or agencies. All structures and works installed by Permittee hereunder shall remain the property of the Permittee.

Within thirty (30) days after the completion of the construction of any work or structure relative to this permit, the Permittee shall file with the District a written statement of completion on the appropriate form provided by the Board.

SPECIAL CONDITIONS ARE AS FOLLOWS:

SPECIAL CONDITIONS ON ATTACHED SHEET ARE A PART OF THIS DOCUMENT.

SPECIAL CONDITIONS ARE AS FOLI

1. THE MAINTAINED STAGE IN UNIT OF DEVELOPMENT #1 SHALL BE +11.0' MSL WITH DISCHARGE BEGINNING AT +12.0' MSL DURING THE WET SEASON AND +12.0' MSL WITH DISCHARGE BEGINNING AT +13.0' MSL DURING THE WET SEASON.

2. THE MAINTAINED STAGE IN UNIT OF DEVELOPMENT #2 SHALL CONTINUE TO BE +13.0' MSL. ANY PROPOSED CHANGE IN THIS STAGE AT A FUTURE DATE SHALL REQUIRE THE MODIFICATION OF THIS PERMIT.

3. THE MINIMUM FINISHED FLOOR ELEVATION IN UNIT OF DEVELOPMENT #1 SHALL BE +17.5' MSL. THE MINIMUM FINISHED FLOOR ELEVATION IN UNIT OF DEVELOPMENT #2 IS +17.0' MSL.

4. THE MINIMUM ROAD GRADE ELEVATION SHALL BE +16.0' MSL IN UNIT OF DEVELOPMENT #1 AND +16.0' MSL IN UNIT OF DEVELOPMENT #2.

5. THE OPERATION PHASE OF THIS PERMIT SHALL NOT BECOME EFFECTIVE UNTIL A FLORIDA REGISTERED PROFESSIONAL ENGINEER CERTIFIES THAT ALL FACILITIES HAVE BEEN CONSTRUCTED IN ACCORDANCE WITH THE DESIGN APPROVED BY THE DISTRICT. UPON COMPLETION OF CONSTRUCTION OF THE DRAINAGE SYSTEM, THE DISTRICT MUST BE NOTIFIED FOR INSPECTION AND APPROVAL OF THE FACILITIES.

6. WATER QUALITY DATA SHALL BE SUBMITTED TO THE DISTRICT. UPON ISSUANCE OF THIS PERMIT, THE PERMITTEE SHALL CONTACT DISTRICT STAFF TO ARRANGE FOR THE FREQUENCY, LOCATION, AND METHODS OF SAMPLING, AND SPECIFIC PARAMETERS TO BE MONITORED. WITHIN 60 DAYS OF THE ISSUANCE OF THIS PERMIT THE PERMITTEE SHALL SUBMIT TO THE DISTRICT THE DETAILS OF A SUITABLE MONITORING PROGRAM. UPON ACCEPTANCE BY THE STAFF THE MONITORING PROGRAM SHALL BECOME THE RESPONSIBILITY OF THE PERMITTEE, ACME IMPROVEMENT DISTRICT.

7. RECEIPT OF THIS PERMIT DOES NOT EXEMPT THE PROJECT FROM OTHER PERTINENT GOVERNMENTAL REGULATIONS. PERMITS FROM OTHER AGENCIES MAY BE REQUIRED.

8. THE PROPOSED LAND USE IN UNIT OF DEVELOPMENT #1 IS MIXED DENSITY RESIDENTIAL. THE PROPOSED LAND USE IN UNIT OF DEVELOPMENT #2 IS 5 ACRE ESTATE RESIDENTIAL. ANY CHANGE IN LAND USE SHALL REQUIRE MODIFICATION OF THIS PERMIT. THE REMAINDER OF THE DISTRICT SHALL REMAIN IN ITS PRESENT USE OR SHALL REQUIRE THE PRIOR MODIFICATION OF THIS PERMIT BEFORE CHANGE.

SURFACE WATER MANAGEMENT STAFF REVIEW SUMMARY

APPLICATION NO: 27833 & 09227-8

PROJECT NAME: Acme Improvement District

LOCATION: Palm Beach County

DEVELOPER:

ENGINEER: Gee & Jensen

1.	Suitability of land for proposed use	GOOD	(FAIR)	POOR	NOT APPLICABLE
2.	Water Quantity Impacts	(GOOD)	FAIR	POOR	NOT APPLICABLE
3.	Water Quality Impacts	GOOD	(FAIR)	POOR	NOT APPLICABLE
4.	Environmental Impacts	(GOOD)	FAIR	POOR	NOT APPLICABLE
5.	Water Conservation	GOOD	(FAIR)	POOR	NOT APPLICABLE
6.	Flood Protection	GOOD	(FAIR)	POOR	NOT APPLICABLE
7.	Relief from rainstorm inconvenience	(GOOD)	FAIR	POOR	NOT APPLICABLE
8.	System Maintainability	(GOOD)	FAIR	POOR	NOT APPLICABLE
9.	Overall use of land with respect to water resource	GOOD	(FAIR)	POOR	NOT APPLICABLE
10.	Water management system with respect to feasible alternatives	GOOD	(FAIR)	POOR	NOT APPLICABLE

Application Nos. 27833 & 09227-B for Surface Water Management Permit

Acme Improvement District - Palm Beach County

S T A F F R E P O R T

ABSTRACT

The applicant, Acme Improvement District has presented Application Nos. 27833 and 09227-B for the purpose of obtaining a Surface Water Management Permit for the Acme Improvement District's Unit of Development #1 (primarily Wellington PUD) Unit of Development #2, and the continued management of existing agricultural lands. The entire Acme Improvement District is comprised of a total of 18,200 acres of which 7,400 acres is Unit of Development #1, 1500 acres is Unit of Development #2, and 9300 acres which will be retained in agricultural use. The District is located west of State Road 7, south of State Road 80 and east of Conservation Area #1 in Palm Beach County. Surface water management is by means of canals, lakes, and discharge pump stations. Pump capacity consists of 1-100,000 GPM pump station and 1-120,000 GPM pump station discharging to the L-40 Borrow Canal and to Conservation Area #1 and 2-60,000 GPM pump stations discharging to C-51. Water is also conveyed to C-51 by means of 1-56" x 84" corrugated metal arch pipe and open channel connection to C-51. The staff recommends that conceptual approval be granted for the master drainage plan submitted and that Surface Water Management Permits be issued for Units of Development #1 and #2 (see Figure 1).

THE APPLICATION

A. Purpose of Application

Acme Improvement District has presented a request by means of Application Nos. 27833 and 09227-B for the issuance of a Surface Water Management

Permit for Units of Development #1 and #2, and the continued surface water management of the remaining agricultural lands within the District. The District encompasses all of Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 33, 34 and those parts of Sections 30, 31, 32 lying north of Levee L-49 right of way being in Township 44 South, Range 41 East and those portions of Sections 31, 32, 33, 34, 35 lying south of the West Palm Beach Canal right of way being in Township 43 South, Range 41 East and that portion of Section 25 lying north of Levee L-40 right of way being in Township 44 South, Range 40 East, all in Palm Beach County, Florida. Discharge from the district will be by means of pumps, open channel connections and culverts to C-51 and Conservation Area No. 1, via L-40 Borrow Canal.

B. Existing Conditions of Acme Improvement District

Acme Improvement District was formed in 1953 and has developed an extensive water management system serving a mixture of agricultural and residential lands by means of internal lakes and canals with pumped and gravity outfalls to C-51 and L-40 Borrow Canal. In operation the district is segregated into two basins; Basin "A" being 8990 acres discharging to C-51 and Basin "B" being 9210 acres discharging to L-40 Borrow Canal. At this time a large portion of the facilities to be provided within the District are existing. These include the two pump stations through L-40, the two pump stations to C-51, the gravity connection to C-51, a dike around the entire District at elevation +19.0 msl, Lake Wellington and various conveyance canals in Unit of Development #1 and Unit of Development #2. At this time approximately 25% of Unit #1 (Wellington) is either constructed or under construction. The remainder of Unit #1 is presently in agricultural use or sitting idle. Unit of Development #2 and the remainder of the District is presently in agricultural use or sitting idle.

C. Proposed Facilities

Unit of Development #1

Facilities proposed for Unit of Development #1 include ± 150 acres of additional lake and canal section, various roadways, and tertiary drainage facilities for the individually platted areas. The canal sections to be provided will have bottom widths varying between 4' and 10'; have a bottom elevation between +2.0' msl and +8.0' msl and side slopes of 2 horizontal to 1 vertical. Unit of Development #1 will be served as an integral part of Basin "A: by pump stations #3 and #4. The minimum proposed road grade is +16.0' msl. The minimum proposed finished floor elevation in each of the individually platted areas is +17.5' msl. Land use in Unit of Development #1 will be a mixture of single, family, single family estate, duplex and multi-family residential; with open space and public use areas and commercial service areas (see Figures 2, 3, 4 and 5).

Unit of Development #2

Facilities for Unit of Development #2 will be a combination of canals, swales, culverted structures and roadways to provide drainage and access for the 5 acre estate residential development planned. The plan is to use existing agricultural canals where possible and to supplement with swales or canals where necessary. The swales will have side slopes of 1 vertical to 6 horizontal typical. The canals will have this same side slope down to elevation +12.0 msl and 1 vertical to 2 horizontal side slope below. The bottom width and bottom elevation of both the proposed canals and swales varies and is shown in Figure 6. A total of 4.2 miles of new canal and swale section is proposed for Unit of Development #2. The area will be served as an integral part of Basin "B"

by pump station #1. The minimum proposed road grade elevation is +16.0' msl. The minimum proposed finished floor elevation is +17.0' (see Figures 2, 3, 4 and 6).

EVALUATION

A. Hydraulic Design

Acme Improvement District is enclosed by a dike at elevation +19.0 and is pumped to both C-51 and Conservation Area #1. Internally the District is divided into Basin "A" and Basin "B". Basin "A" is served by two pump stations discharging to C-51 having a total capacity of 120,000 GPM resulting in a removal rate of .71 inches per day over the 8990 acres of the basin. Basin "B" is served by two pump stations discharging to Conservation Area 1 having a total capacity of 220,000 GPM resulting in a removal rate of 1.27 inches per day over the 9230 acres of the basin. These internal basins are separated by an existing road at elevation +17.0' msl. Overflow structures are proposed through the road to allow water levels to equalize in the basin during severe rainstorm events. The proposed crest elevation of the structures is +13.0' msl (see Figure 3). Estimates of runoff for both Basin "A" and Basin "B" were developed by the SCS "CN Method" as outlined in TR#55. A summary of the hydraulic and hydrologic design characteristics is presented in Appendix A. The proposed regulation stage schedule within Basin "A" is +11.0' msl during the wet season and +12.0' msl during the dry season. Discharge in Basin "A" will begin at elevation +12.0' msl during the wet season and +13.0' msl during the dry season. The regulation stage in Basin "B" will be +13.0' msl during both the wet and dry season.

B. Water Quality

Runoff from Unit of Development #1 will be routed through a series of

canals and retention lakes before being discharged to C-51. Pump operation will be such that the stage must rise in the system 1.0' before discharge begins. This accounts for the retention of approximately 340 acre-feet of water or approximately 0.5" over the entire unit. Consideration should be given to providing more retention area for water quality (and flood storage area) purposes in future development in the unit. It is felt that the provision of at least .5" of runoff along with the platting of significant areas at low densities and the provision of open space (parks, etc.) should provide adequate water quality treatment of the runoff from Unit of Development #1. Unit of Development #2 is expected to generate only limited quantities of runoff due to the nature of typical development in 5 acre parcels. The quality of the runoff is expected to be improved over that generated from agricultural use. No application of fertilizers is expected and there will not longer be significant areas exposed to erosion as between crop rows in agricultural use.

C. Environmental Considerations

It is the opinion of District staff that based on available data, the potential for environmental impact by the proposed Units of Development #1 and #2, is not considered to be significant. Most of the areas involved are abandoned agricultural lands and have been influenced by artifical drainage facilities over an extensive period of time. The exception is an existing ± 90 acre cypress stand within Unit of Development #1 known as "Big Blue". The stand will be preserved in its existing state and bounded by a 50' wide preservation buffer.

D. Water Supply and Wastewater Treatment

Water supply and wastewater treatment services for the platted areas

in Unit of Development #1 will be by a variety of sources depending on the individual plat. Water supply for Unit of Development #2 will be by individual wells. Wastewater treatment service will be by individual septic tanks.

E. Land Use Information

The 7400 acres that comprises Unit of Development #1 is a PUD known as Wellington. Individual subdivisions within the development are at various stages of the platting process. A summary of the individual plats is given in Appendix "B".

The remainder of the District is zoned agricultural including that area in Unit of Development #2. The zoning is consistent with the continued agricultural uses and with 5 acre estate tracts in Unit of Development #2.

F. System Operation

Operation and maintenance of the surface water management system will be the responsibility of the Acme Improvement District.

CONCLUSIONS

A. The surface water management system as designed should offer adequate protection for the roads from the three year storm in Units of Development #1 and #2.

B. The surface water management system as proposed for Unit of Development #1 should be adequate to protect the receiving body (C-51) from adverse water quality impacts due to the discharge of excess storm water runoff. The change in land use from agricultural to residential 5 acre estate development in Unit of Development #2 should result in no greater potential

for degradation of the water quality of the receiving body (Conservation Area #1) than the continued agricultural use of the unit.

C. The drainage system as designed should be adequate to prevent adverse impact to the receiving bodies due to the quantities of water being discharged.

D. The surface water management system as designed should offer adequate protection from the 100 year storm if the minimum finished floor elevation is +17.5' msl in Unit of Development #1 and +17.0' msl in Unit of Development #2.

RECOMMENDATIONS

It is the recommendation of District staff that based on considerations of discharge, environmental impact, and flood protection, a Surface Water Management Permit be issued for the construction and operation of Unit of Development #1 and Unit of Development #2 and the continued agricultural use of the remaining parcels within the District.

It is further recommended that this permit be subject to the following special conditions:

1. THE MAINTAINED STAGE IN UNIT OF DEVELOPMENT #1 SHALL BE +11.0' MSL WITH DISCHARGE BEGINNING AT +12.0' MSL DURING THE WET SEASON: AND +12.0' MSL WITH DISCHARGE BEGINNING AT +13.0' MSL DURING THE WET SEASON.

2. THE MAINTAINED STAGE IN UNIT OF DEVELOPMENT #2 SHALL CONTINUE TO BE +13.0' MSL. ANY PROPOSED CHANGE IN THIS STAGE AT A FUTURE DATE SHALL REQUIRE THE MODIFICATION OF THIS PERMIT.

3. THE MINIMUM FINISHED FLOOR ELEVATION IN UNIT OF DEVELOPMENT #1 SHALL BE +17.5' MSL. THE MINIMUM FINISHED FLOOR ELEVATION IN UNIT OF DEVELOPMENT #2 IS +17.0' MSL.

4. THE MINIMUM ROAD GRADE ELEVATION SHALL BE +16.0' MSL IN UNIT OF DEVELOPMENT #1 AND +16.0' MSL IN UNIT OF DEVELOPMENT #2.

5. THE OPERATION PHASE OF THIS PERMIT SHALL NOT BECOME EFFECTIVE UNTIL A FLORIDA REGISTERED PROFESSIONAL ENGINEER CERTIFIES THAT ALL FACILITIES HAVE BEEN CONSTRUCTED IN ACCORDANCE WITH THE DESIGN APPROVED BY THE DISTRICT. UPON COMPLETION OF CONSTRUCTION OF THE DRAINAGE SYSTEM, THE DISTRICT MUST BE NOTIFIED FOR INSPECTION AND APPROVAL OF THE FACILITIES.

6. WATER QUALITY DATA SHALL BE SUBMITTED TO THE DISTRICT. UPON ISSUANCE OF THIS PERMIT, THE PERMITTEE SHALL CONTACT DISTRICT STAFF TO ARRANGE FOR THE FREQUENCY, LOCATION, AND METHODS OF SAMPLING, AND SPECIFIC PARAMETERS TO BE MONITORED. WITHIN 60 DAYS OF THE ISSUANCE OF THIS PERMIT THE PERMITTEE SHALL SUBMIT TO THE DISTRICT THE DETAILS OF A SUITABLE MONITORING PROGRAM. UPON ACCEPTANCE BY THE STAFF THE MONITORING PROGRAM SHALL BECOME THE RESPONSIBILITY OF THE PERMITTEE, ACME IMPROVEMENT DISTRICT.

7. RECEIPT OF THIS PERMIT DOES NOT EXEMPT THE PROJECT FROM OTHER PERTINENT GOVERNMENTAL REGULATIONS. PERMITS FROM OTHER AGENCIES MAY BE REQUIRED.

8. THE PROPOSED LAND USE IN UNIT OF DEVELOPMENT #1 IS MIXED DENSITY RESIDENTIAL. THE PROPOSED LAND USE IN UNIT OF DEVELOPMENT #2 IS 5 ACRE ESTATE RESIDENTIAL. ANY CHANGE IN LAND USE SHALL REQUIRE MODIFICATION OF THIS PERMIT. THE REMAINDER OF THE DISTRICT SHALL REMAIN IN ITS PRESENT USE OR SHALL REQUIRE THE PRIOR MODIFICATION OF THIS PERMIT BEFORE CHANGE.

Exhibit 18

Appendix A

Basin "A"

Total Area	8,990 Acres
Pump Capacity	120,000 GPM
Removal Rate	.71 inches/day
Schedule of Stages	+11.0' msl wet season +12.0' msl dry season

Rainfall Event Summary

3 Year 24 Hour Storm	+15.5' msl
25 Year 5 Day Storm	+17.2' msl
100 Year 5 Day Storm	+17.48' msl
Minimum Existing Road Grade	+15.0' msl
Minimum Proposed Road Grade	+16.0' msl
Minimum Proposed Finished Floor	+17.5' msl

Basin "B"

Total Area	9,230 Acres
Pump Capacity	220,000 GPM
Removal Rate	1.27 inches/day
Schedule of Stages	+13.0' msl wet season- +13.0' msl dry season-

Rainfall Event Summary

3 Year 24 Hour Storm	+14.2' msl
25 Year 5 Day Storm	+15.5' msl
100 Year 5 Day Storm	+15.91' msl
Minimum Proposed Road Grade	+16.0' msl
Minimum Proposed Finished Floor	+17.0' msl

Exhibit 18

APPENDIX B

Name of Project	Number of Acres	Density
Greenview Shores No. 1	116.693	2.536
Greenview Shores No. 2	948.47	.518
Eastwood	99.679	1.85
Eastwood No. 2	59.359	2.88
Paddock Park No. 1	422.38	.60
Paddock Park No. 2	479.34	.37
Palm Beach Little Ranch East	137.707	.25
Pinewood	190.876	.7
Pinewood East	112.77	.76
Saddle Trail Park	647.01	.37
South Shore No. 1	209.94	6.29
South Shore No. 2	132.532	2.4
South Shore No. 3	69.802	1.3
Sugar Pond Manor	793.230	2.47

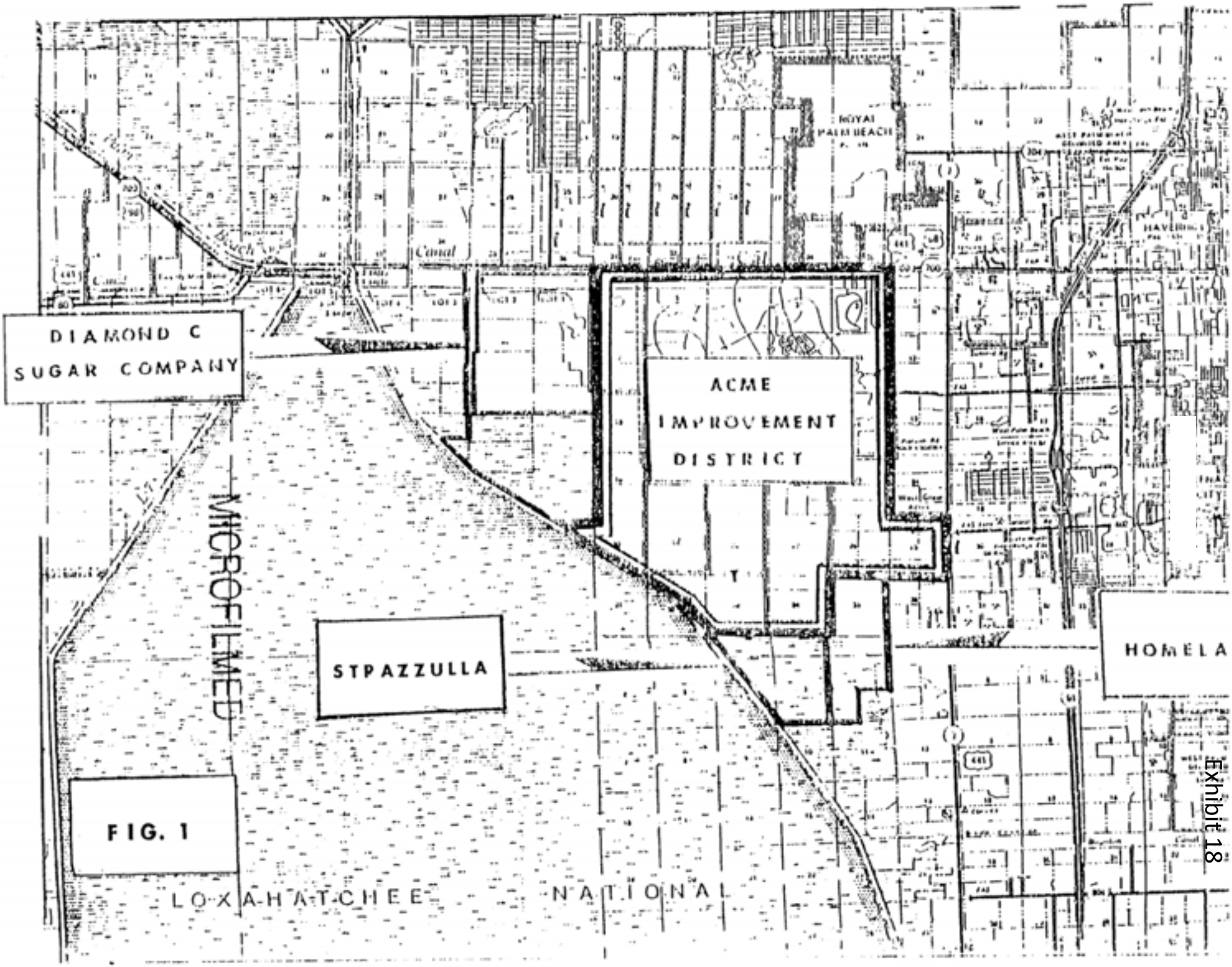


FIG. 1

Exhibit 18

Exhibit 18

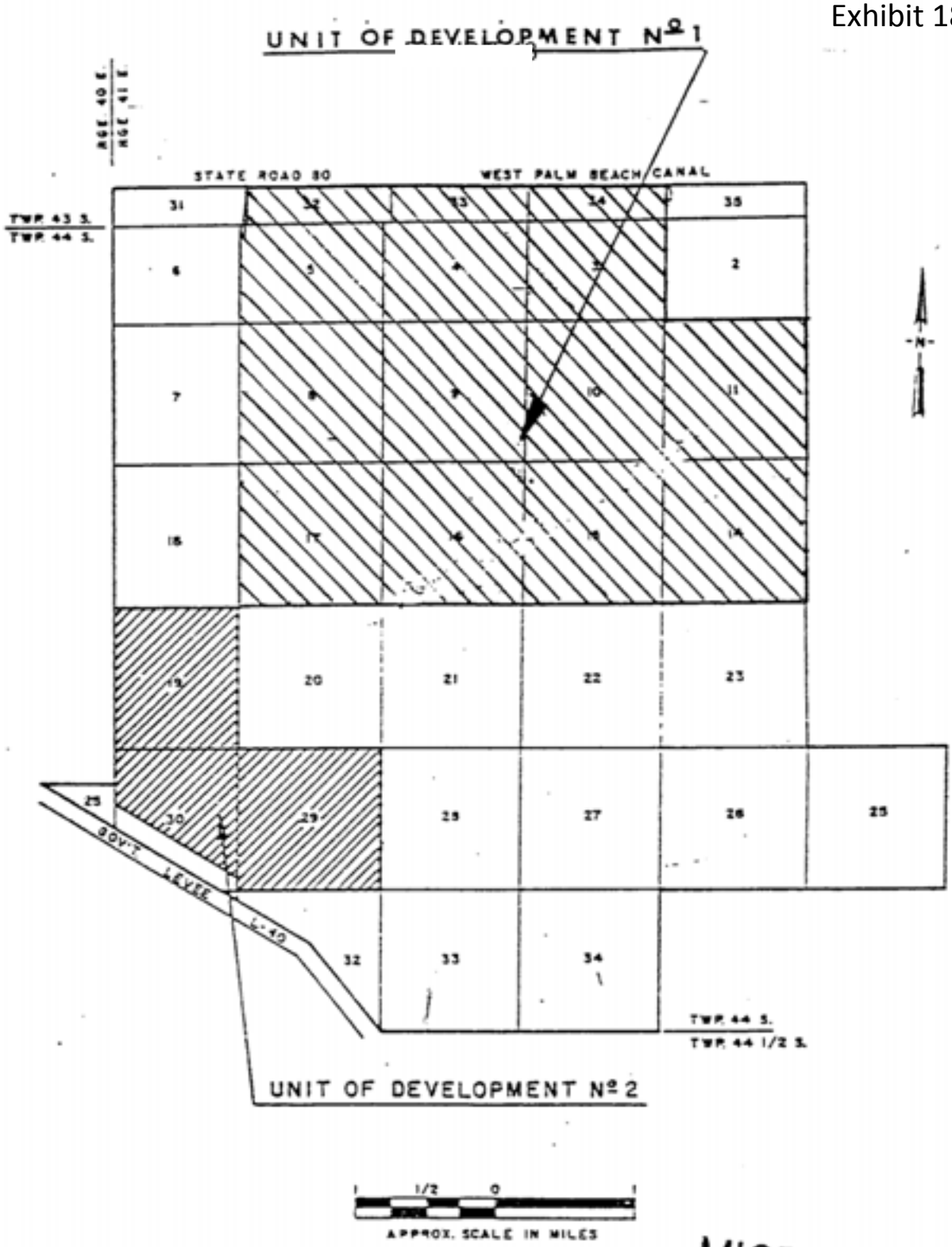
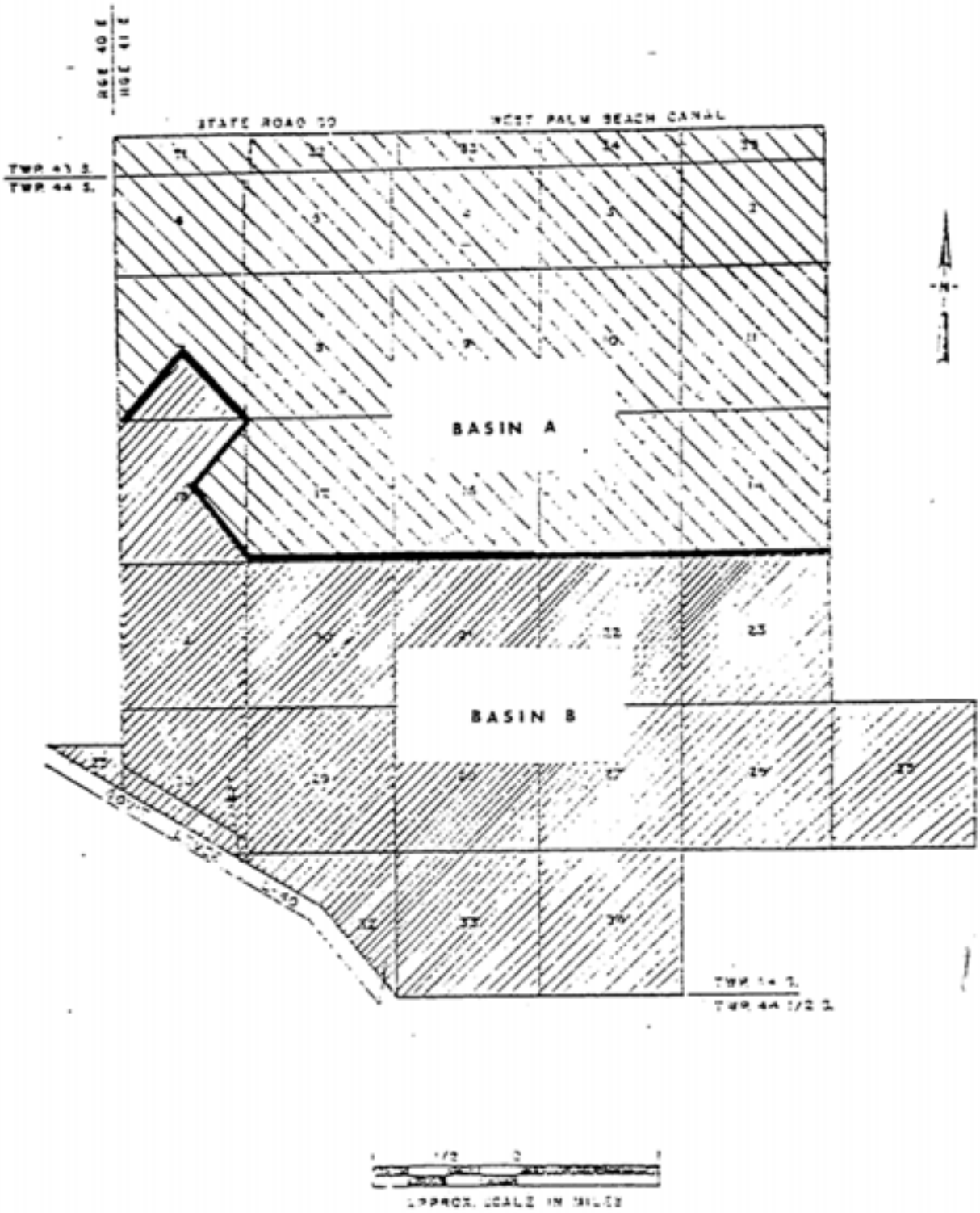


FIG. 2

LOCATION MAP
ACME IMPROVEMENT DISTRICT

Exhibit 18

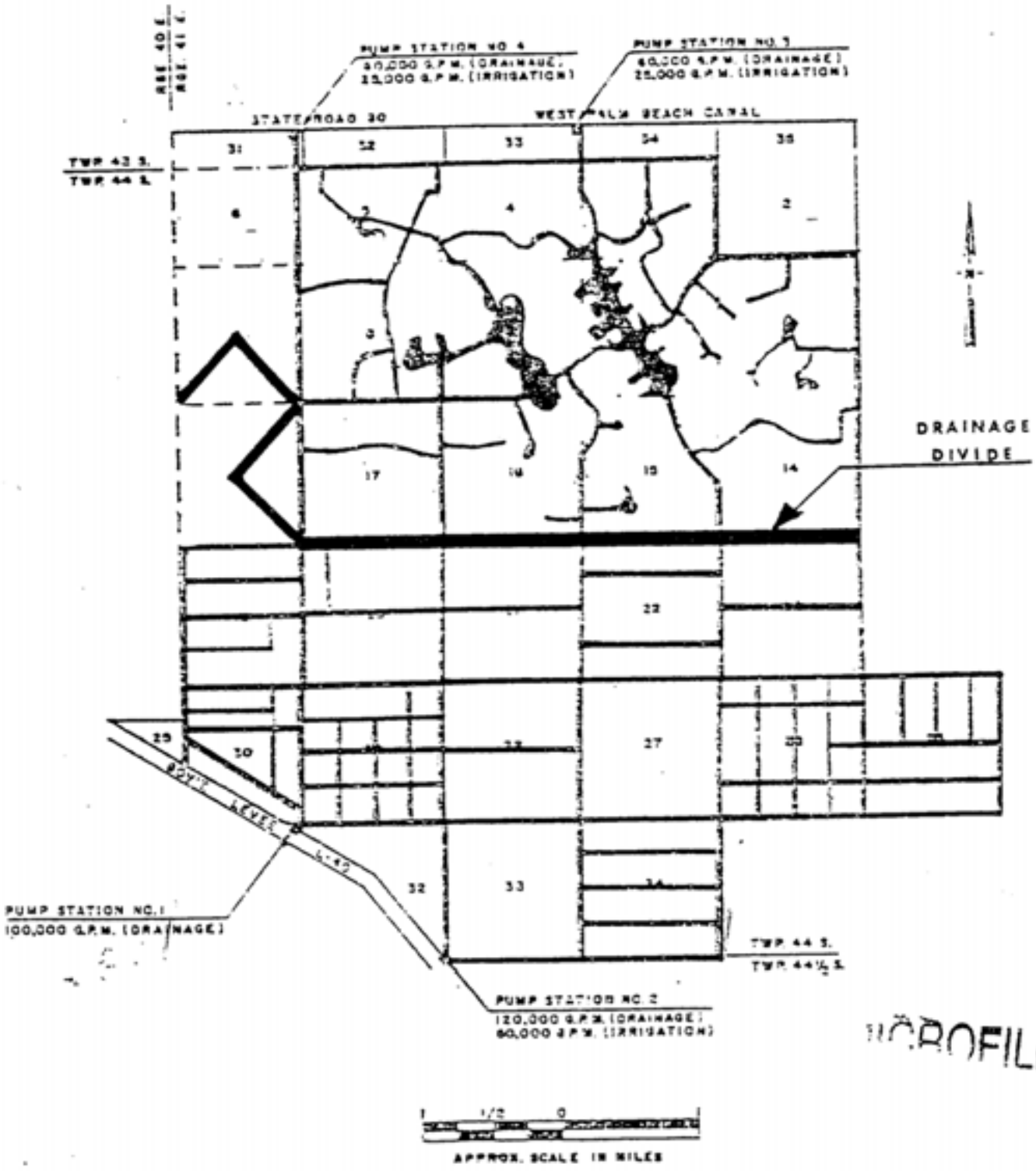


MICROFILMED

FIG. 3

LOCATION MAP
ACME IMPROVEMENT DISTRICT

Exhibit 18



CANALS, LAKES AND MAJOR PUMPING FACILITIES

IN

ACME IMPROVEMENT DISTRICT FIG. 4

Exhibit 18

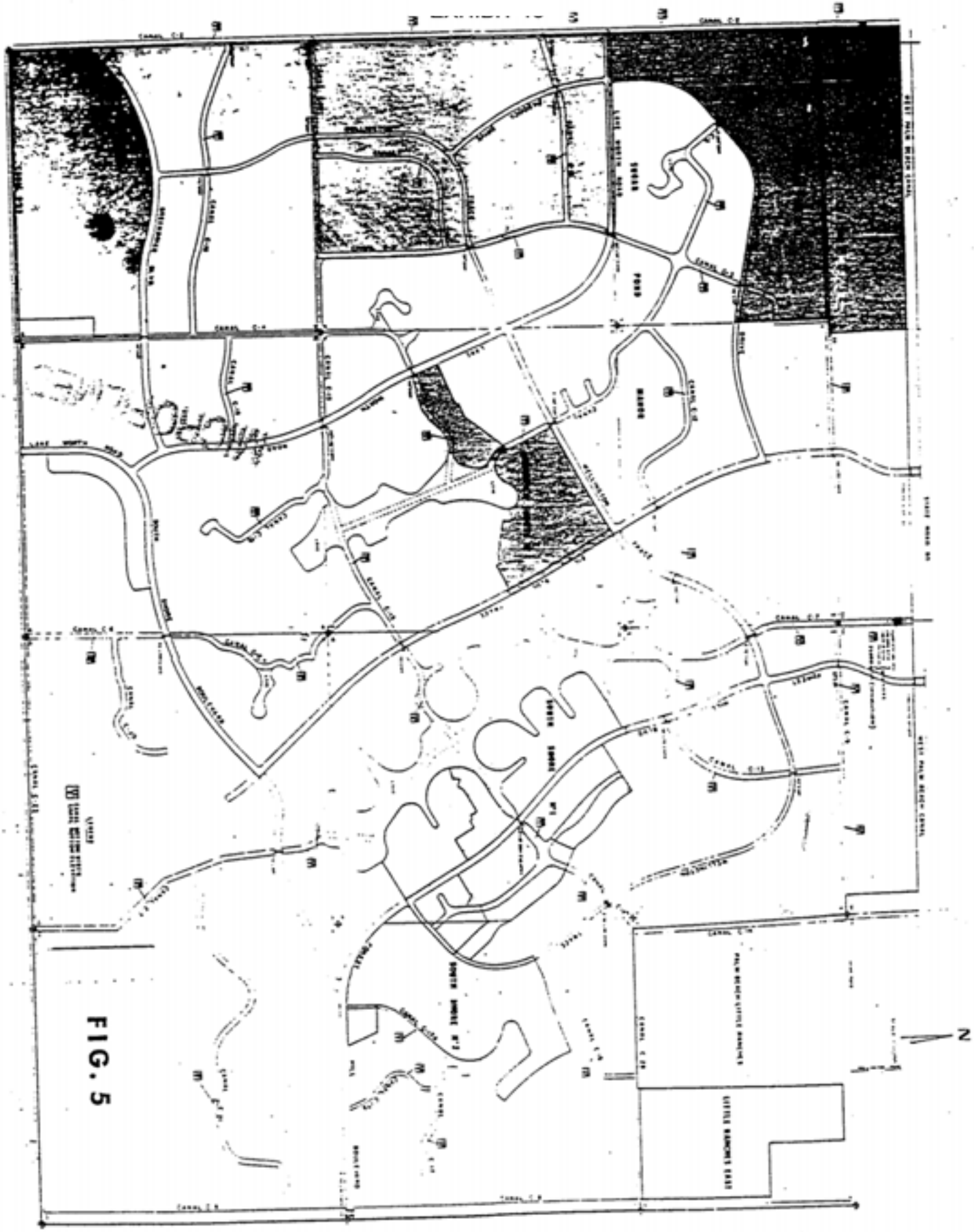
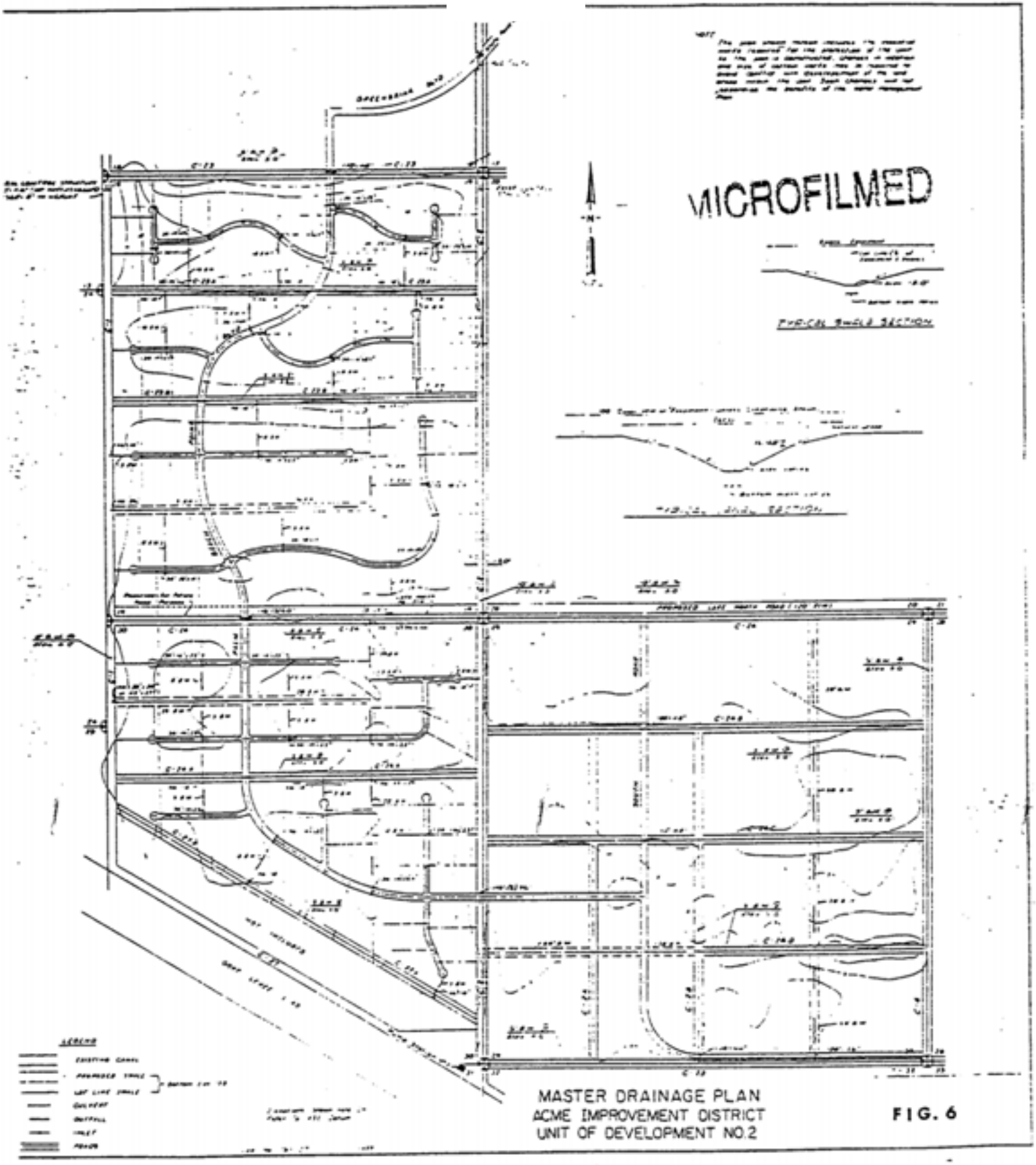


FIG. 5

Exhibit 18



MASTER DRAINAGE PLAN
ACME IMPROVEMENT DISTRICT
UNIT OF DEVELOPMENT NO.2

FIG. 6

FORM 507
Rev 5/77

SFWMD PERMIT NO. 50-00543-P

(NON-ASSIGNABLE)

March 16, 1978 DATE ISSUED

AUTHORIZING: 4-OPEN CHANNEL CONNECTIONS THROUGH C-51 SOUTH RIGHT-OF-WAY; 70' WEST OF OUSLEY ROAD BRIDGE (PUMP STATION NO. 4 AT STATION 260+60), 1150' WEST OF FOREST HILL BOULEVARD BRIDGE (PUMP STATION NO. 3 AT STATION 370+20), 1840' WEST OF WELLINGTON ROAD BRIDGE (STATION 422+90), AND 3475' EAST OF WELLINGTON ROAD BRIDGE (STATION 476+00). 1-72" CMP THROUGH L-40 EASTERLY RIGHT-OF-WAY (STATION 1142+50) WITH FOREBAY AND TIE-BACK LEVEES SERVICING PUMP STATION NO. 1, AND A FOREBAY AND TIE-BACK LEVEES CONNECTING TO L-40 S-1 SERVICING PUMP STATION NO. 2 (STATION 1059+50).

LOCATED IN PALM BEACH COUNTY, SECTION ---- TWP. 43/44S RGE. 40/41E

ISSUED TO:
(owner)

Acme Improvement District
P. O. Box 248
Loxahatchee, Florida 33470

This permit is issued pursuant to Application for Permit No. 27833 Feb. 27, 1978 09227-Dated Sept. 20 19 77 and permittee's agreement to hold and save the South Florida Water Management District and its successors harmless from any and all damages, claims, or liabilities which may arise by reason of the construction, operation, maintenance, or use of the work or structure involved in the permit. Said application, including all plans and specifications attached thereto, is by reference made a part hereof. This permit may be cancelled upon thirty (30) days written notice to the permittee or under emergency circumstances as set forth in the District's Rules with which permittee is put on notice. Permittee shall comply with all laws and rules administered by the District. This permit does not convey to permittee andy property rights nor any rights or priveleges other than those specified herein, nor relieve the permittee from complying with any law, regulation or requirement affecting the rights of other bodies or agencies. All structures and works installed by permittee hereunder shall remain the property of the permittee.

WORK PROPOSED, WILL BE COMPLETED ON OR BEFORE ___/19___ otherwise, this permit is voided and all rights thereunder are automatically cancelled unless an extension to the construction period is applied for and granted.

SPECIAL CONDITIONS ARE AS FOLLOWS:

1. THIS PERMIT REPRESENTS APPROVAL OF THE PROJECT ONLY TO THE EXTENT OF THE DISTRICT'S INTEREST IN THE PROJECT WORKS RIGHT OF WAY. ANY ADDITIONAL APPROVAL OR PERMITS WHICH MAY BE REQUIRED ARE THE SOLE RESPONSIBILITY OF THE PERMITTEE AND MUST BE OBTAINED PRIOR TO COMMENCEMENT OF CONSTRUCTION.
2. THIS PERMIT REPLACES DISTRICT PERMITS 895,81,2333,2678 AND 5392 WHICH ARE ATTACHED HERETO, AND BY REFERENCE MADE A PART HEREOF.

SOUTH FLORIDA WATER MANAGEMENT DISTRICT, BY ITS GOVERNING BOARD

Original Signed
By: By John R. Marlow
Secretary

Exhibit 18

901 EVERNIA STREET, P. O. BOX V, WEST PALM BEACH, FLA. 33402
TELEPHONE (305) 655-3411

FCD
FORM 627
APR. 1974

APPLICATION NO. 27833
APPLICATION CLASS
CATEGORY NO.
DATE FILED

APPLICANT

Acme Improvement District — Name applicant or user
P. O. Box 248 — P. O. Box or Street Address
Loxahatchee — City
Palm Beach — County
Florida — State
33470 — Zip Code
305/793-0866 — Telephone No.
Name and address of owner if other than applicant

QUANTITY

Maximum quantity of water applied for: 138,700 [illegible] 380 [illegible]
Installed Capacity 110,000 Gallons per min. Area To Be Served 18,220 Acres
Maximum period for which application is made Indefinite [illegible]

TYPE

PERMIT FOR THE USE, DIVERSION OR WITHDRAWAL OF WATER

PERMIT FOR OCCUPANCY OF PROJECT WORKS

SOURCE

GROUNDWATER: Well ☐
Other (Specify)
SURFACE WATER: Pump or Culvert Connection to:
Lake ☐ River ☐ Stream ☐ Spring ☐
Other (Specify) C-51 Canal & Conservation

Drainage Connection ☒ Bulkhead-Seawall ☐
Utility Crossing ☐ Beautification ☐
Boat Dock ☐ Fence ☐ Bridge ☐
Other (Specify)

LOCATION

County Palm Beach Section Township Range
Block Lot Subdivision

USE

Private Water Supply ☐ Public Water Supply ☐ Industrial ☐
Agricultural Irrigation ☒ Drainage ☒ Livestock ☐
Mining ☐ Recreational (Swimming Pool, Golf Course) ☐
Other (Specify)

SIX DRAWINGS 8 ½ x14 ARE REQUIRED

SUPPORT DATA

Appropriate summary sheet, on a form as provided by the District, covering pertinent data attached: YES ☐ NO ☒

*Comprehensive "Engineering Report" attached: YES ☒ NO ☐

** Required for Public Water Supply Use.*

In compliance with provisions of Ch. 373, Fla. Statutes, 1973 and applicable rules and regulations of the Central and Southern Florida Flood Control District, application is hereby made for a permit as identified above, and in accordance with support data and incidental information filed with this application and made a part hereof.

MICROFILMED

Applicant's Name (Please type or print)

Applicant's Signature Date

If person other than applicant has completed this form, that person must certify by signature as follows:

In providing this information and making this application I am acting as authorized agent of the applicant.

Gee & Jenson, Engineers-Architects-Planners, Inc.
West Palm Beach, Florida

Signature P.E. 2/27/76
Date

PLEASE DO NOT WRITE IN BLOCKS BELOW

PUBLIC NOTICE

Advertised in Name of newspaper on Date of first notice and Date of second notice
Public Hearing On (if required) Date Time Place

PROCESSING

DEPARTMENT OF HEALTH AND REHABILITATIVE SERVICES
Approved ☐ Disapproved ☐
Report Attached Date
By Name Title

	Reviewed	Approved
Permit Processing		
Technical Section		
Chief of Permits		
Dir. Reg. Div.		

PERMIT ISSUED
NO.
DATE

PART C

Right of Way Occupancy Evaluation

Authorization: Four open channel connections through C-51 south right of way; 70' west of Wellington Road Bridge (Pump Station No. 4 at Station 260+60), 1150' west of Forest Hill Blvd. Bridge (Pump Station No. 3 at Station 370+20), 1840' west of Oliver Wellington Bridge (Station 422+90), and 3475' east of Oliver Wellington Bridge (Station 476+00). One 72" CMP through L-40 easterly right of way (Station 1142+50) with forebay and tie-back levees servicing Pump Station No. 1, and a forebay and tie-back levees connecting to L-40 S-1 servicing Pump Station No. 2 (Station 1059+50).

Performance Bond: ☐ Required ☒ Not Required

Insurance: ☐ Required ☒ Not Required

Processor [signature] Date 3-2-78

Reviewer [signature] Date 3-2-76

SPECIAL CONDITION:

This Permit replaces former District Permit Nos. 81, 2333, 2678, and 5392 which by reference are made a part hereof.

It is the recommendation of District staff that a Right of Way Occupancy Permit be issued to include the occupancy of District right of way by Pump Station #1 having a discharge capacity of 100,000 GPM and Pump Station #2 having a discharge capacity of 120,000 GPM and an irrigation capability of 60,000 GPM both through L-40, and Pump Stations #3 and #4 having identical capacities of 60,000 GPM discharge and 25,000 irrigation for a total capacity of 120,000 GPM discharge and 50,000 GPM irrigation respectively through the south right of way of C-51. It is further recommended that Permit Nos. 895, 2333, 2678 and 5392 be superceded with the issuance of this permit.

Prepared: M. L. Slater

Checked: S. Hallaway

Approved: Richard A. Rogers
Richard A. Rogers, Director
Resource Control Department

Date: 2/27/78

bar

MICROFILMED

Exhibit 18

PROJECT WELLINGTON COUNTRY PLACE APPLICATION NUMBER MOD 50-00545R

STANDARD DISTRIBUTION

- X Applicant
- X Applicant's Consultant
- X Pete Rhoads
- X Legal
- X Inspection
- X Engineer, County of PALM BEACH
- X Reviewer

INTERNAL DISTRIBUTION

- X Hall
- X Gleason
- X Goodrick
- Brannen
- J.B. Jackson
- X Wodraska
- Winter (PWS wells only)

DEPARTMENT OF ENVIRONMENTAL REGULATION

- X W.P.B.
- Ft. Myers
- Orlando
- Tallahassee
- Ft. Pierce
- Other

EXTERNAL DISTRIBUTION

- Engineer, City of
- Applicant's Agent
- Local Drainage Districts
- Jack Harper, Lee Co. Div. of E.P.S.
- Don Landers, Collier Co. Ag. Agent
- Fred Vidzes, B. C. Basin
- Robert Padrick
- Kissimmee River Coordinating Council
- Dade County DERM
- X see Attached Sheet

EXHIBIT

Brian Barnett
Fresh Water Game Comm.
P. O. Box 1840
Vero Beach, FL 32960

Richard B. Binkley
Palm Beach County Executive Com.
Sierra Club
3627 Avenue De Gien
Delray Beach, FL 33445

Nancy Brown
Tropical Audubon Society
9220 S. W. 166th Street
Miami, FL 33157

Department of Environmental Regulation
P. O. Box 3858
West Palm Beach, FL 33402

Department of Natural Resources
Information Director
202 Blount Street
Tallahassee, FL 32304

Hal Scott
Florida Audubon Society
P. O. Drawer 7
Maitland, FL 32751

L. F. Gainey
Regional Manager
Florida Game & Fresh Water Fish Commission
551 N. Military Trail
West Palm Beach, FL 33406

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U. S. Fish Wildlife Service
P. O. Box 95067
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4080 N. Haverhill Road
West Palm Beach, FL 33407

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U. S. Fish & Wildlife
1323 - 21st Street
Vero Beach, FL 32960
PH: 562-3909

Thomas Martin
Loxahatchee National Wildlife Refuge

Delray Beach, FL 33445
PH: 732-3684

Exhibit 18

Exhibit 18

ACME IMPROVEMENT DISTRICT

COUCH PUMP COMPANY

REPAIR & MAINTENANCE DIVISION

7775 S.W. 9th Street
Vero Beach, Florida 32968
Phone: (407) 770-0002
Fax: (407) 770-1096

FIELD TEST PROCEDURE *for* PUMP CURVE CALIBRATION

PUMP MAINTENANCE

Prior to testing a pump, a visual inspection is made of the pump, pump station, and sump to determine if conditions exist that would adversly effect the test. Fluid levels are checked on the engine and electrical boxes are visually inspected for possible damage prior to startup. During the test procedure, engineering personnel are vigilant for excessive vibration, oil/fuel leaks, noises emanating from the pump, etc. After the test is completed, a final visual inspection is made.

A. MEASUREMENTS USING A PITOT TUBE

1. PROCEDURE FOR DIESEL/NATURAL GAS ENGINE DRIVEN PUMPS

The pitot tube is inserted through a 1" coupling welded to the top of the discharge pipe. The position of the coupling along the pipe is chosen based on site conditions, accessibility, convenience, etc. A "U" tube water manometer is connected to the pitot tube to measure the differential pressure. The pump is started and the pitot tube, manometer, and tubing are purged of air. Engine speed is set for maximum throttle or about 20% over design speed, whichever is less. Speed of the pump is measured using a hand-held photo tach. The water flow is measured using the pitot tube and taking 10 readings across the diameter of the pipe. If the pipe is not full at the pitot tube position, the air gap height is measured. The static water pressure is determined by measuring the height of the static pitot tube line above the sump water surface level. The pump speed is dropped about 10% and the measurements are taken again. This procedure is repeated with the pump running at five different speeds. The flow and total head for each separate speed are calculated. Using the affinity laws the points at different speeds are adjusted to a single speed, usually the design speed. These adjusted points are then plotted and a curve drawn through the five points.

2. PROCEDURE FOR ELECTRIC MOTOR DRIVEN PUMPS

The procedure is very similar to the diesel driven version except that points are not taken at different speeds. They are done at different heads. Only three points are taken because it is usually not practical to get five different heads. Since the points are done at a constant speed, adjustments using the affinity laws are not required.

B. MEASUREMENTS USING A WEIR

When a pitot tube can not be used, normally on a box style pump, then a weir is used. If the pump is engine driven, then different speeds are used for the five points. If the pump is motor driven, then the weir is adjusted to create different static heads.

EXHIBIT 13

EXPLANATION OF DISCHARGE EQUATION

From previous pump manufacturing research, development, and testing, a typical axial pump curve would have a profile similar to figure 1.

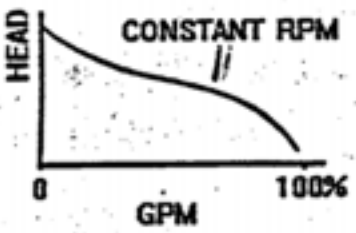


FIGURE 1.

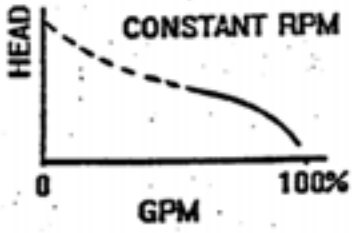


FIGURE 2.

Figure 2 shows the useful, non self-destructive, reasonably efficient range for the pump at normal speed. For operating conditions that fall in this range a second order polynomial equation can be used. For operating pumps at very low speeds (50%) a higher order equation is required to include the dotted portion of figure 2. The third order polynomial is a function of HEAD where the independent variable is HEAD, and the dependent variable GM. The equation includes adjustments for RPM by incorporating the affinity laws:

$$Q1 = \frac{N1}{N} Q \quad \text{, and} \quad H1 = \left(\frac{N1}{N}\right)^2 H$$

The developed equation takes the form:

$$B\left(\frac{N}{RPM}\right) \; A - \left[\left(\frac{RPM}{N}\right)^2 H - C\right]^{\frac{1}{3}} = GPM$$

Since most calculators and computers can not return the cube root of a negative number the equation becomes:

$$B\left(\frac{N}{RPM}\right)\left[A - \frac{\left(\frac{RPM}{N}\right)^2 H - C}{\left|\left(\frac{RPM}{N}\right)^2 H - C\right|}\right]\left[\left|\left(\frac{RPM}{N}\right)^2 H - C\right|\right]^{\frac{1}{3}} = GPM$$

, where

RPM = original pump / engine curve speed,
N = actual pump / engine curve speed,
H = head input to equation,
A = constant value,
B = constant value, and
C = constant value.

GPM = (N/RPM)(A-(((RPM/N)^2*H-C)/ABS((RPM/N)^2*H-C))*(ABS((RPM/N)^2*H-C))^.333)*B

RPM = ORIGINAL PUMP/ENGINE CURVE SPEED

N = ACTUAL PUMP/ENGINE SPEED

H = HEAD INPUT TO EQUATION

A = CONSTANT VALUE

B = CONSTANT VALUE

C = CONSTANT VALUE

RE-ARRANGED: $$B\left(\frac{N}{RPM}\right)\left(A-\left[\frac{\left(\frac{RPM}{N}\right)^2 H-C}{\left|\left(\frac{RPM}{N}\right)^2 H-C\right|}\right]\sqrt[3]{\left|\left(\frac{RPM}{N}\right)^2 H-C\right|}\right)=GPM$$

IF THE TERM UNDER THE RADICAL, (RPM/N)^2*H-C , EQUALS 0, THEN THE EQUATION WILL RETURN AN ERROR OR 0. THEREFORE AVOID THE SITUATION OF $\left(\frac{RPM}{N}\right)^2 H-C=0$ OR $H=C\left(\frac{N}{RPM}\right)^2$.

BY ADJUSTING H SLIGHTLY BY ADDING OR SUBTRACTING AN INSIGNIFICANT AMOUNT. EXAMPLE: $H=4.330\,ft=C\left(\frac{N}{RPM}\right)^2$

now $H=4.331\,ft$

Exhibit 18

Exhibit 18

ACME IMPROVEMENT DISTRICT
STATION # 1
UNIT # 1

SERIAL # 4814
EXHIBIT 13 11 JUL 95

PIPE INSIDE DIA 48 INCHES
ENGINE SPEED FOR CURVE 1573 RPM

DESIGN POINT
443 RPM
50000 GPM
13.5 FT

STATIC HEAD (INCHES)		TEST PUMP SPEED (RPM)		TEST ENG SPEED (RPM)	
70		426		1512	
74		386		1370	
73		347		1232	
73		305		1083	
70		274		973	
MANOMETER READINGS (INCHES)	19.0	18.0	9.0	7.5	4.0
	19.0	17.5	9.0	8.0	3.9
	18.5	16.3	9.3	8.0	3.8
	18.2	11.5	9.5	6.0	3.5
	16.3	11.0	8.5	5.5	3.5
	14.5	10.5	8.3	4.8	3.8
	13.0	9.0	7.0	4.1	2.2
	12.8	9.0	7.0	3.3	3.0
	12.0	8.0	5.2	0.0	0.0
	10.8	8.0	4.2	0.0	0.0
AVG VEL (FT/SEC)	9.05	7.89	6.38	5.57	4.29
AIR GAP IN TOP OF PIPE (INCHES)	0.0	0.0	0.0	12.0	12.0
FRACTION OF TOTAL PIPE AREA	1.00	1.00	1.00	0.80	0.80
TEST FLOW RATE (GPM)	51041	44514	35996	25257	19487
TEST HEAD (FT)	7.1	7.1	6.7	6.6	6.1

SPEED TO BE USED FOR CURVE 443 RPM

POINTS TO PLOT ON CURVE
DEVELOPED FROM AFFINITY LAWS

SPEED (RPM)	HEAD (FT)	FLOW (GPM)	ST HEAD (FT)	FLOW (GPM)
426	7.1	51041	6.3	53078
386	7.1	44514	8.1	51087
347	6.7	35996	9.9	45955
305	6.6	25257	13.2	36685
274	6.1	19487	15.5	31506

EQUATION COEFFICIENTS

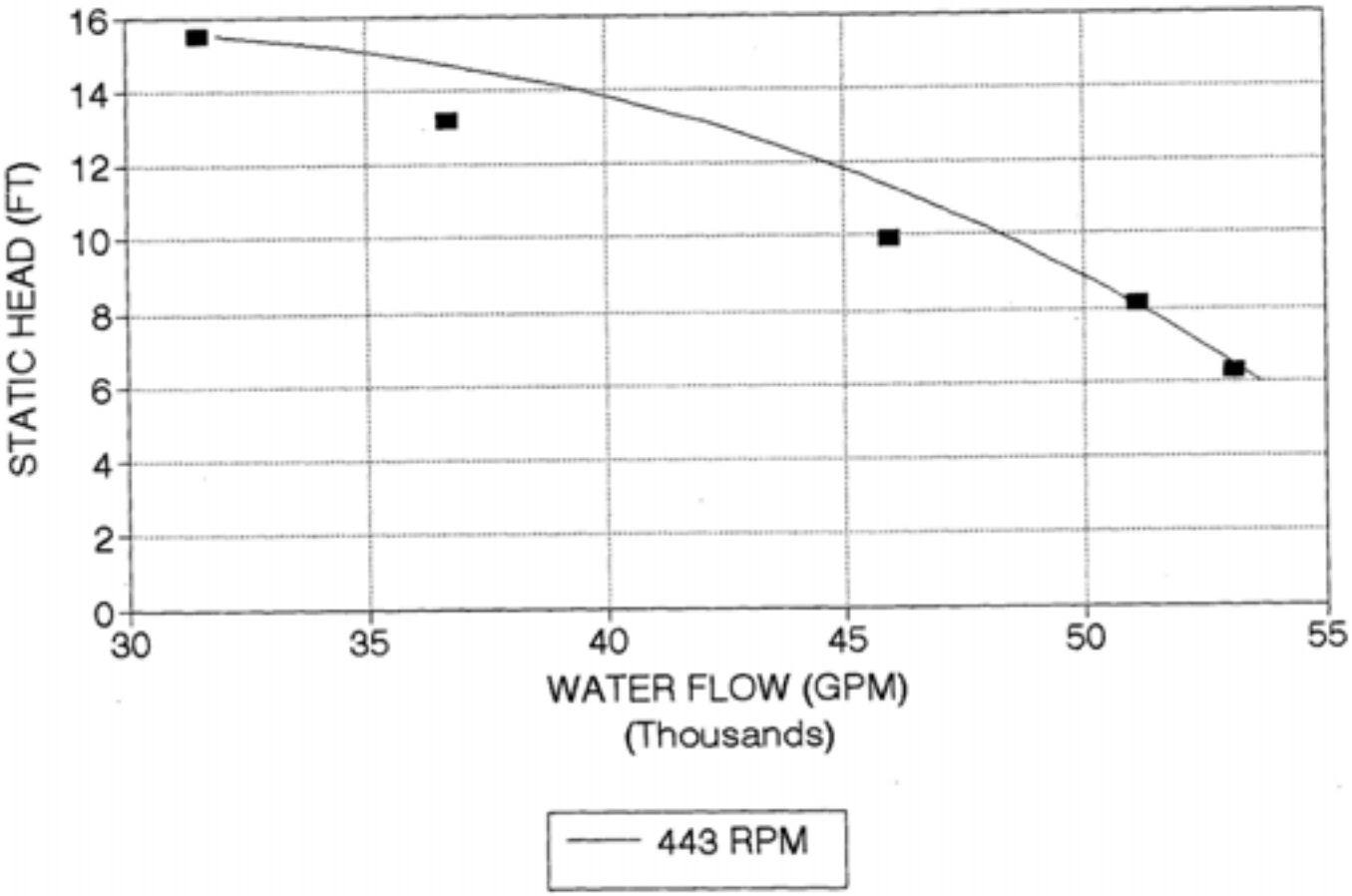
A =	1.2	C =	16
B =	16000	N =	443

M & V PUMP CORPORATION
33 N. W. 2nd STREET
DEERFIELD BEACH
FLORIDA 33441
U. S. A.
ESTABLISHED 1926

SITE-SPECIFIC FIELD TEST PERMORMANCE CURVE

STATION No.1 PUMP No.1

S/N4814 24-APR-96



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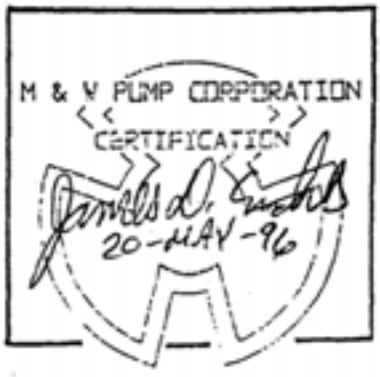


Exhibit 18

ACME IMPROVEMENT DISTRICT SERIAL # 4815
STATION # 1 24 APR 96
UNIT # 2

PIPE INSIDE DIA 48 INCHES
ENGINE SPEED FOR CURVE 1573 RPM

DESIGN POINT
443 RPM
50000 GPM
13.5 FT

	STATIC HEAD (INCHES)	TEST PUMP SPEED (RPM)		TEST ENG SPEED (RPM)	
	79	465		1651	
	78	444		1576	
	76	394		1399	
	73	375		1331	
	73	343		1218	
MANOMETER READINGS (INCHES)	24.0	20.0	15.1	10.7	7.1
	24.0	20.0	15.5	13.3	7.0
	25.0	20.0	14.1	12.0	8.0
	23.8	17.0	12.0	10.0	9.0
	12.8	14.6	11.0	9.5	8.5
	15.5	12.0	10.0	6.7	9.5
	13.6	10.4	9.3	7.8	7.8
	12.5	11.1	8.0	7.5	6.6
	11.0	10.9	9.1	7.0	5.1
	11.6	11.4	9.0	7.0	4.6
AVG VEL (FT/SEC)	9.53	8.82	7.74	6.96	6.23
AIR GAP IN TOP OF PIPE (INCHES)	0.0	0.0	0.0	0.0	0.0
FRACTION OF TOTAL PIPE AREA	1.00	1.00	1.00	1.00	1.00
TEST FLOW RATE (GPM)	53750	49728	43661	39248	35149
TEST HEAD (FT)	8.0	7.7	7.3	6.8	6.7

SPEED TO BE USED FOR CURVE 443 RPM

POINTS TO PLOT ON CURVE
DEVELOPED FROM AFFINITY LAWS

SPEED (RPM)	HEAD (FT)	FLOW (GPM)	ST HEAD (FT)	FLOW (GPM)
465	8.0	53750	6.0	51207
444	7.7	49728	6.5	49616
394	7.3	43661	8.0	49091
375	6.8	39248	8.5	46365
343	6.7	35149	10.1	45397

EQUATION COEFFICIENTS

A = 1.2 C = 15
B = 15500 N = 443

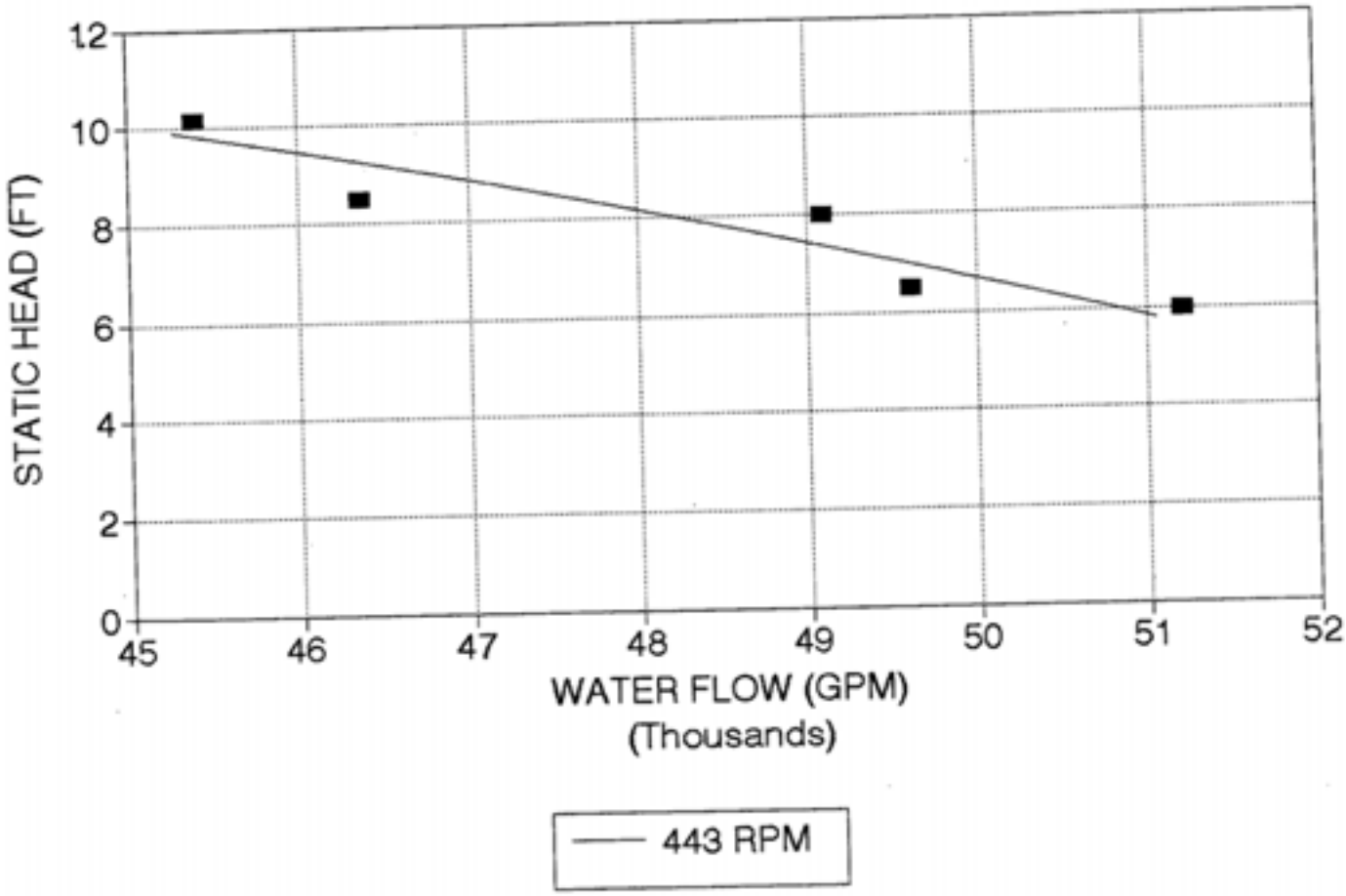
Exhibit 18

M & W PUMP CORPORATION
33 N. W. 2nd STREET
DEERFIELD BEACH
FLORIDA 33441
U. S. A.
ESTABLISHED 1926

SITE SPECIFIC FIELD TEST PERMORMANCE CURVE

STATION No.1 PUMP No.2

S/N4815 24-APR-96



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M & W PUMP CORPORATION
CERTIFICATION
James D. Eads
20-MAY-96

Exhibit 18

ACME IMPROVEMENT DISTRICT SERIAL # AB0487
STATION # 1 DATE 24 APR 96
UNIT # 3

PIPE INSIDE DIA 48 INCHES

DESIGN POINT
318 RPM
50000 GPM
10 FT

ENGINE SPEED FOR CURVE 1590 RPM

STATIC HEAD (INCHES)	TEST PUMP SPEED (RPM)	TEST ENG SPEED (RPM)
73	349	1745
72	320	1600
71.5	300	1500
71	280	1400
70	260	1300

MANOMETER READINGS (INCHES)	10.0	9.4	8.5	7.5	6.5
	22.0	20.0	16.2	9.6	9.1
	24.0	22.5	13.0	13.0	10.0
	22.1	20.0	11.5	12.4	10.1
	24.0	17.0	10.6	8.7	5.9
	22.0	14.3	14.2	7.0	6.8
	20.1	13.0	9.5	5.9	5.7
	18.0	10.6	9.0	5.7	4.0
	17.0	11.5	8.7	4.7	4.0
	17.2	11.7	8.5	5.0	4.5
AVG VEL (FT/SEC)	10.20	8.88	7.62	6.44	5.90
AIR GAP IN TOP OF PIPE (INCHES)	0.0	0.0	0.0	0.0	0.0
FRACTION OF TOTAL PIPE AREA	1.00	1.00	1.00	1.00	1.00
TEST FLOW RATE (GPM)	57541	50084	42998	36297	33255
TEST HEAD (FT)	7.7	7.2	6.9	6.6	6.4

SPEED TO BE USED FOR CURVE 318 RPM

POINTS TO PLOT ON CURVE
DEVELOPED FROM AFFINITY LAWS

SPEED (RPM)	HEAD (FT)	FLOW (GPM)	ST HEAD (FT)	FLOW (GPM)
349	7.7	57541	5.1	52430
320	7.2	50084	5.9	49771
300	6.9	42998	6.7	45578
280	6.6	36297	7.6	41223
260	6.4	33255	8.7	40674

EQUATION COEFFICIENTS

A =	1.2	C =	9.7
B =	18100	N =	318

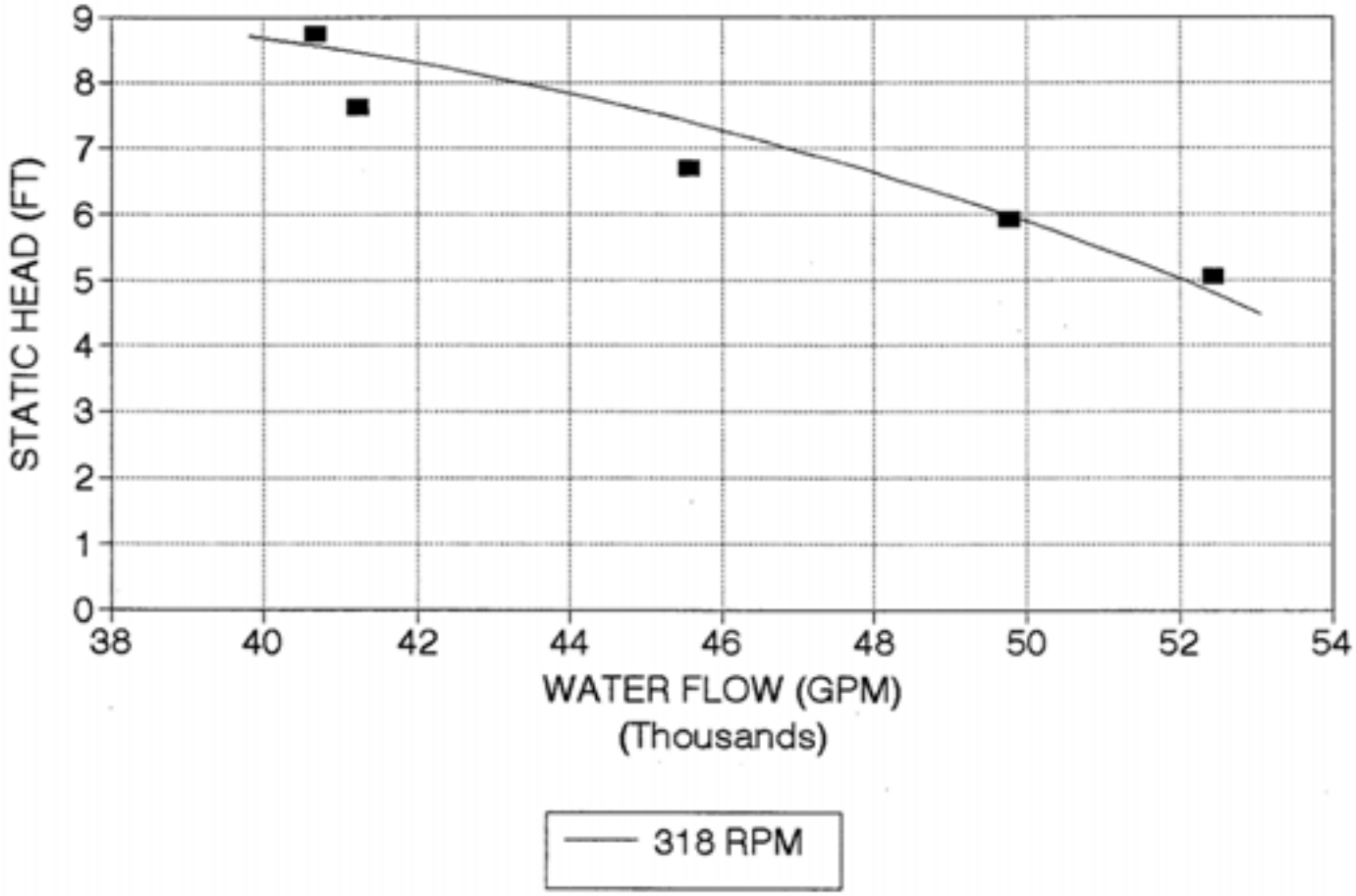
Exhibit 18

M & W PUMP CORPORATION
33 N. W. 2nd STREET
DEERFIELD BEACH
FLORIDA 33441
U. S. A.
ESTABLISHED 1926

SITE SPECIFIC FIELD TEST PERMORMANCE CURVE

STATION No.1 PUMP No.3

S/N AB0487 24-APR-96



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M & W PUMP CORPORATION
CERTIFICATION
20-MAY-96

Exhibit 18

ACME IMPROVEMENT DISTRICT SERIAL # ****
STATION # 2 EXHIBIT 13 DATE 25 APR 96
UNIT # 1

PIPE INSIDE DIA 54 INCHES

DESIGN POINT
320 RPM
60000 GPM
0 FT

ENGINE SPEED FOR CURVE 1376 RPM

STATIC HEAD (INCHES)	TEST PUMP SPEED (RPM)	TEST ENG SPEED (RPM)
54	328	1410
60	299	1286
58	277	1191
56	250	1075
50	226	972

MANOMETER READINGS (INCHES)	14.0	12.0	7.0	4.5	2.5
	13.5	12.1	7.5	4.3	2.0
	14.5	11.3	7.3	4.1	2.0
	15.0	11.0	5.5	3.8	2.1
	15.5	10.5	5.0	4.0	1.9
	11.2	9.8	3.0	3.1	1.0
	11.0	7.2	3.2	2.5	0.0
	9.3	5.0	3.0	1.8	0.0
	9.0	3.5	0.0	0.0	0.0
	8.2	1.2	0.0	0.0	0.0
AVG VEL (FT/SEC)	8.02	6.46	5.19	4.30	3.18
AIR GAP IN TOP OF PIPE (INCHES)	0.0	0.0	8.0	8.0	16.0
FRACTION OF TOTAL PIPE AREA	1.00	1.00	0.91	0.91	0.75
TEST FLOW RATE (GPM)	57234	46100	33621	27865	17072
TEST HEAD (FT)	5.5	5.6	5.3	5.0	4.3

SPEED TO BE USED FOR CURVE 320 RPM

POINTS TO PLOT ON CURVE
DEVELOPED FROM AFFINITY LAWS

SPEED (RPM)	HEAD (FT)	FLOW (GPM)	ST HEAD (FT)	FLOW (GPM)
328	5.5	57234	4.3	55838
299	5.6	46100	5.7	49337
277	5.3	33621	6.5	38840
250	5.0	27865	7.7	35668
226	4.3	17072	8.5	24173

EQUATION COEFFICIENTS

A = 0.8 C = 8.6
B = 22800 N = 320

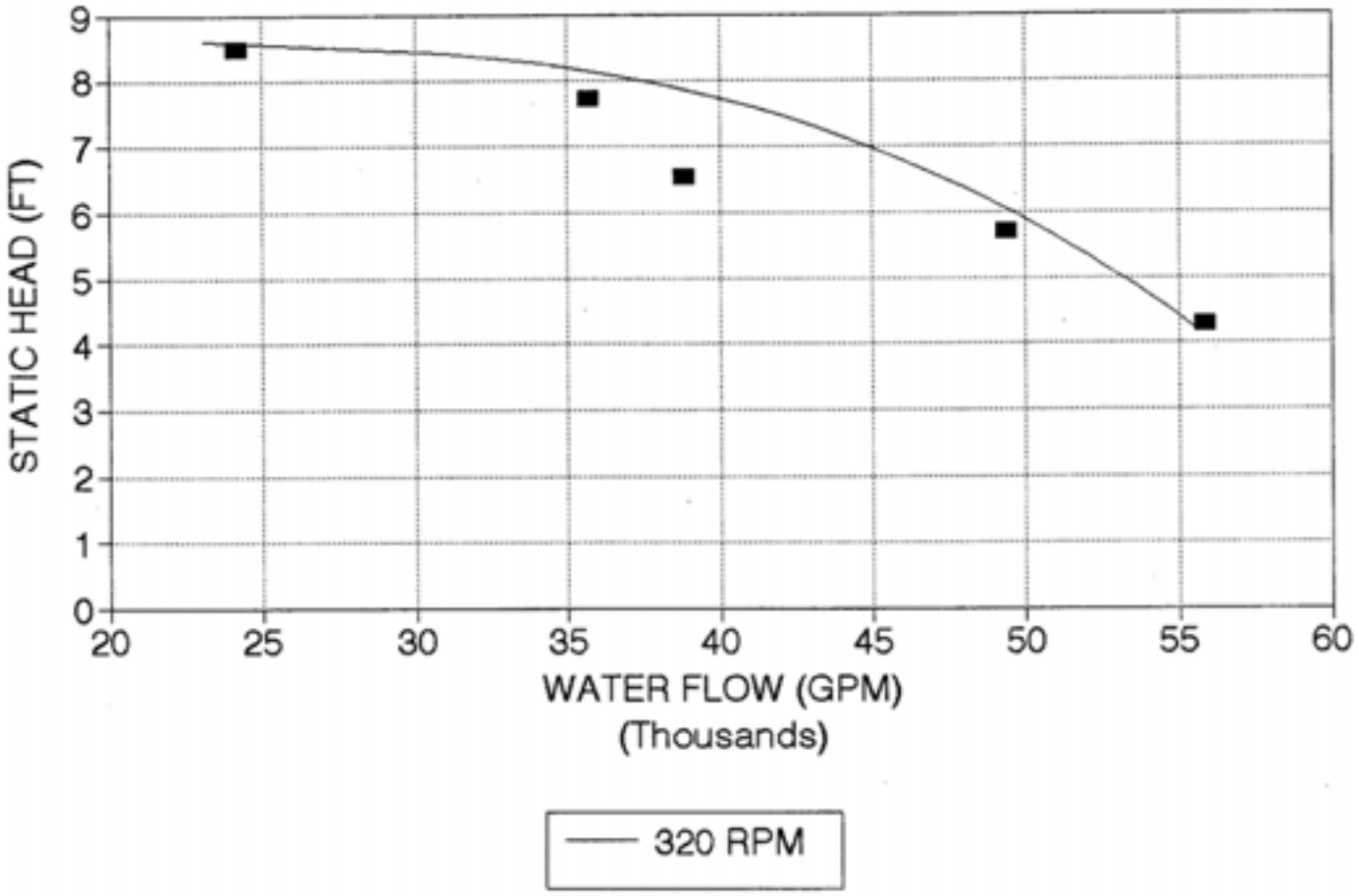
Exhibit 18

M & W PUMP CORPORATION
33 N. W. 2nd STREET
DEERFIELD BEACH
FLORIDA 33441
U. S. A.
ESTABLISHED 1926

SITE SPECIFIC FIELD TEST PERMORMANCE CURVE

STATION No.2 PUMP No.1

NORTH PUMP 25-APR-96



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M & W PUMP CORPORATION
CERTIFICATION
20-MAY-96

Exhibit 18

ACME IMPROVEMENT DISTRICT
STATION # 2
UNIT # 2

SERIAL # FARMERS AK1549
EXHIBIT 13 25 APR 96

PIPE INSIDE DIA 47.5 INCHES
ENGINE SPEED FOR CURVE 1440 RPM

DESIGN POINT
320 RPM
0 GPM
0 FT

STATIC HEAD (INCHES)	TEST PUMP SPEED (RPM)	TEST ENG SPEED (RPM)
73	331	1489
70	307	1381
65	287	1291
60	264	1188
54	244	1098

MANOMETER READINGS (INCHES)	17.5	10.8	8.0	6.0	4.0
	17.8	11.8	10.0	7.5	6.0
	16.5	13.0	11.0	9.0	6.2
	15.5	13.5	11.0	8.0	5.0
	16.5	12.8	9.2	8.8	5.5
	17.0	12.2	7.8	9.0	6.0
	17.0	12.8	10.0	9.0	5.8
	16.0	13.0	9.8	9.5	4.0
	15.3	13.5	7.0	9.0	2.0
	15.0	13.5	6.2	0.0	0.0
AVG VEL (FT/SEC)	9.38	8.25	6.92	6.71	5.09
AIR GAP IN TOP OF PIPE (INCHES)	0.0	0.0	0.0	8.0	8.0
FRACTION OF TOTAL PIPE AREA	1.00	1.00	1.00	0.89	0.89
TEST FLOW RATE (GPM)	51813	45555	38230	32935	25010
TEST HEAD (FT)	7.4	6.9	6.2	5.7	4.9

SPEED TO BE USED FOR CURVE 320 RPM

POINTS TO PLOT ON CURVE
DEVELOPED FROM AFFINITY LAWS

SPEED (RPM)	HEAD (FT)	FLOW (GPM)	ST HEAD (FT)	FLOW (GPM)
331	7.4	51813	5.7	50091
307	6.9	45555	6.3	47485
287	6.2	38230	6.7	42626
264	5.7	32935	7.6	39921
244	4.9	25010	7.9	32799

EQUATION COEFFICIENTS

A =	1.2	C =	8.1
B =	20000	N =	320

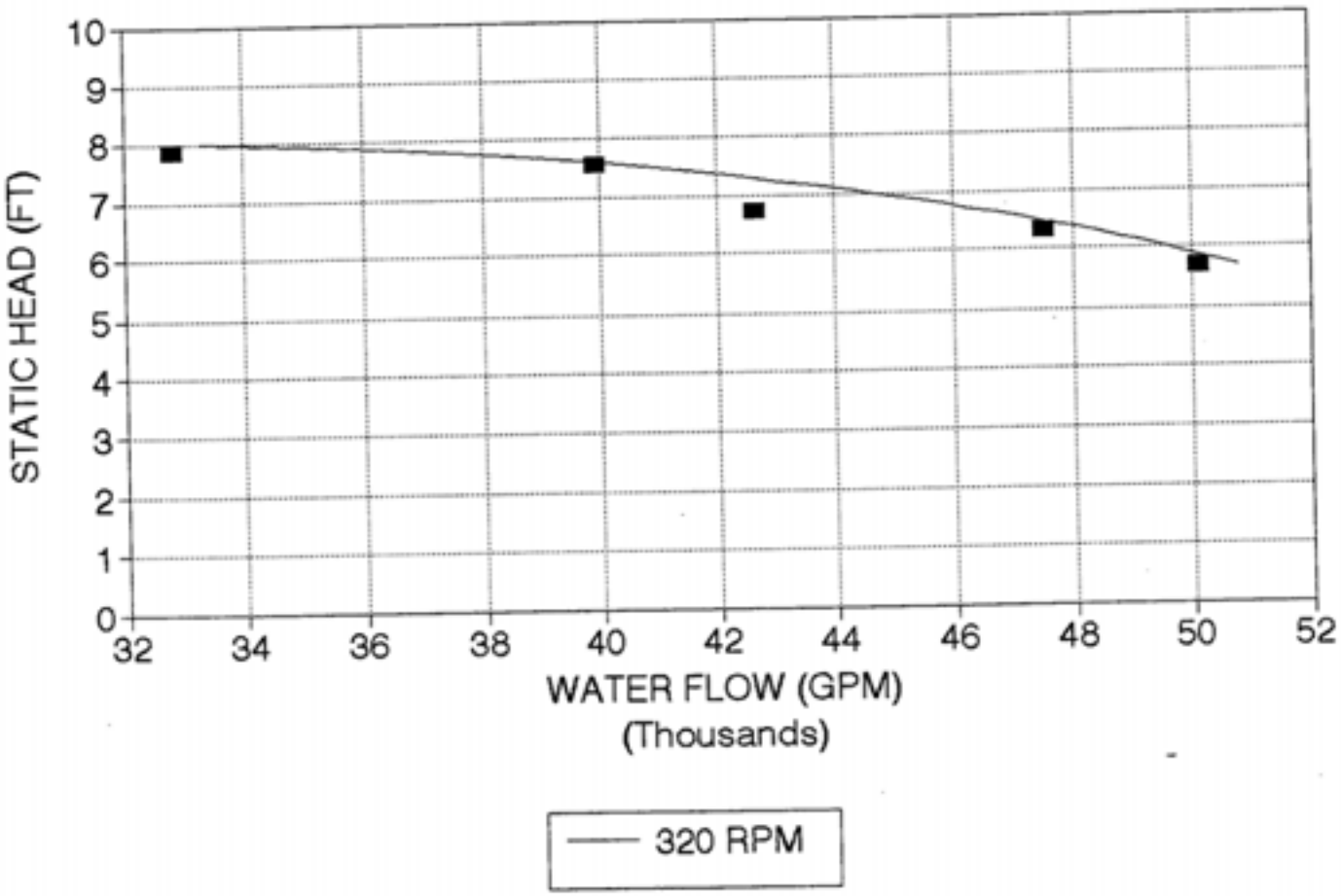
Exhibit 18

M & W PUMP CORPORATION
33 N. W. 2nd STREET
DEERFIELD BEACH
FLORIDA 33441
U. S. A.
ESTABLISHED 1926

SITE SPECIFIC FIELD TEST PERMORMANCE CURVE

STATION No.2 PUMP No.2

SOUTH PUMP 25-APR-96



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M & W PUMP CORPORATION
CERTIFICATION
20-MAY-96

Exhibit 18

ACME IMPROVEMENT DISTRICT SERIAL # 2754
STATION # 3 EXHIBIT 3 24 APR 96
UNIT # 1

PIPE INSIDE DIA 54 INCHES

DESIGN POINT
280 RPM
60000 GPM
7 FT

ENGINE SPEED FOR CURVE 1680 RPM

STATIC HEAD (INCHES)	TEST PUMP SPEED (RPM)	TEST ENG SPEED (RPM)
65.2	248	1488
63.9	229	1374
64.3	212	1272
63	193	1158
65	178	1068

MANOMETER READINGS (INCHES)	14.0	11.7	9.0	8.0	5.0
	21.0	17.0	14.5	8.0	5.2
	18.0	17.5	15.0	8.0	4.8
	15.2	14.5	12.0	7.5	5.8
	11.5	13.5	11.0	7.1	5.0
	9.7	10.7	8.5	6.0	4.0
	10.0	8.5	6.5	4.1	3.3
	9.5	6.5	5.0	3.8	3.0
	9.9	5.0	4.0	3.0	3.0
	7.2	4.1	3.5	3.0	3.5
AVG VEL (FT/SEC)	8.12	7.46	6.73	5.51	4.75
AIR GAP IN TOP OF PIPE (INCHES)	0.0	0.0	0.0	0.0	0.0
FRACTION OF TOTAL PIPE AREA	1.00	1.00	1.00	1.00	1.00
TEST FLOW RATE (GPM)	57953	53258	48012	39318	33905
TEST HEAD (FT)	6.5	6.2	6.1	5.7	5.8

SPEED TO BE USED FOR CURVE 280 RPM

POINTS TO PLOT ON CURVE
DEVELOPED FROM AFFINITY LAWS

SPEED (RPM)	HEAD (FT)	FLOW (GPM)	ST HEAD (FT)	FLOW (GPM)
248	6.5	57953	6.9	65431
229	6.2	53258	8.0	65119
212	6.1	48012	9.3	63412
193	5.7	39318	11.0	57042
178	5.8	33905	13.4	53334

EQUATION COEFFICIENTS

A = 1.2 C = 16.5
B = 20000 N = 280

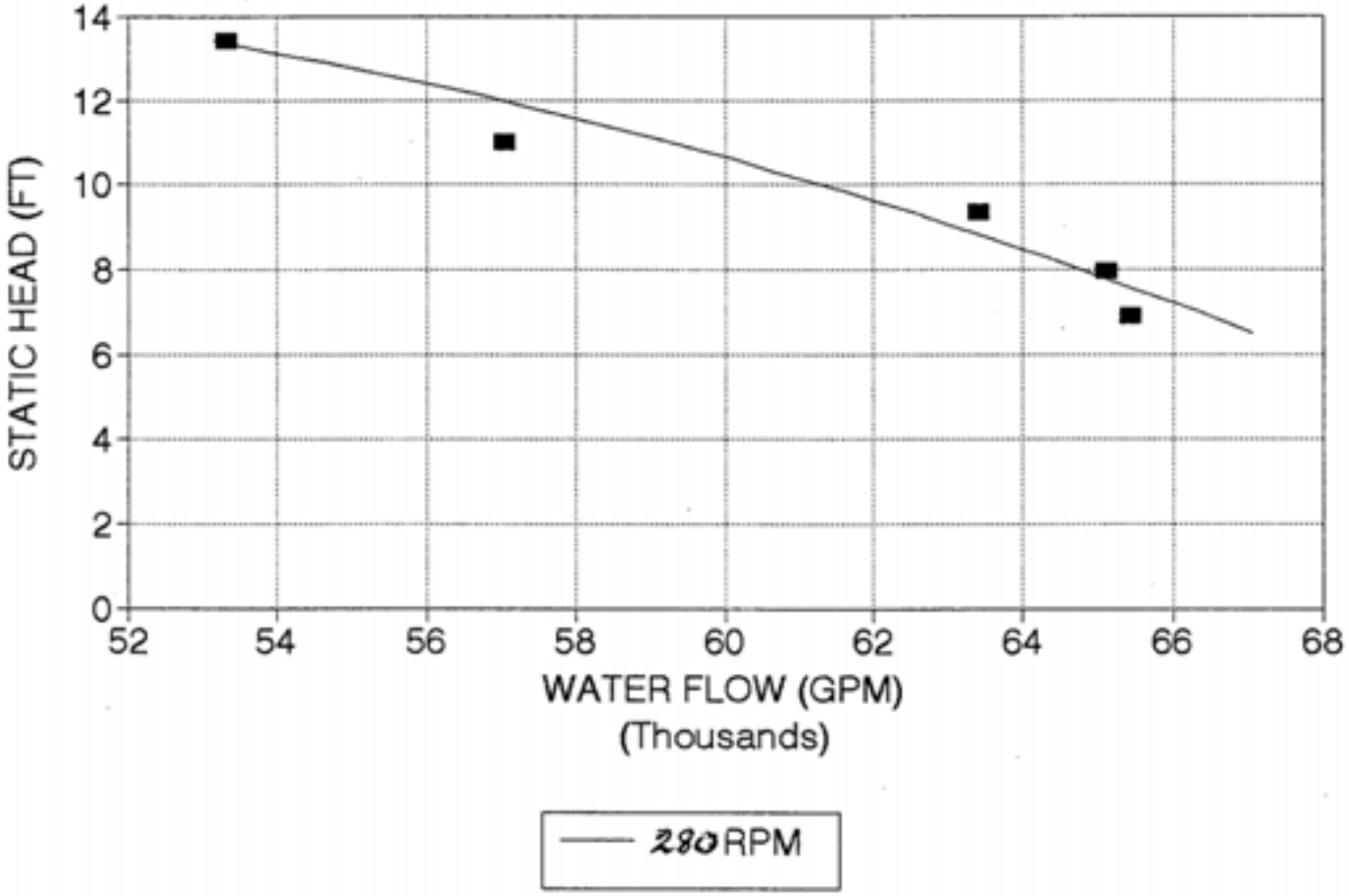
Exhibit 18

M & W PUMP CORPORATION
33 N. W. 2nd STREET
DEERFIELD BEACH
FLORIDA 33441
U. S. A.
ESTABLISHED 1926

SITE SPECIFIC FIELD TEST PERMORMANCE CURVE

STATION No.3 PUMP No.1

S/N 2754 24-APR-96



ASSUMING THAT NO ALTERATIONS ARE MADE TO THE SYSTEM, IN MY PROFESSIONAL JUDGMENT AND CALIBRATION METHODOLOGY, INSTRUMENTATION, PROCEDURE, DATA COLLECTION AND INTERPRETATION, AND FINAL FLOW EQUATION WILL BE SUFFICIENT TO CALCULATE THE DISCHARGE QUANTITY AS DESCRIBED IN CHAPTER 40E-63 FLORIDA ADMINISTRATIVE CODE (F. A. C.).

M & W PUMP CORPORATION
CERTIFICATION
20-MAY-96

Exhibit 18

ACME IMPROVEMENT DISTRICT
STATION # 4
UNIT # 1

SERIAL # FARMERS 1886
EXHIBIT 13 24 APR 96

PIPE INSIDE DIA 54 INCHES
ENGINE SPEED FOR CURVE 1199 RPM

DESIGN POINT
255 RPM
60000 GPM
8.5 FT

STATIC HEAD (INCHES)	TEST PUMP SPEED (RPM)	TEST ENG SPEED (RPM)
65	308	1448
64	288	1354
62	261	1227
60	238	1119
59	221	1039

MANOMETER READINGS (INCHES)	20.0	17.5	11.0	10.0	9.2
	19.5	17.8	11.0	9.0	9.1
	18.1	15.1	12.8	9.0	8.0
	17.5	15.0	12.0	8.9	8.0
	16.8	14.0	12.0	8.1	7.1
	16.5	13.1	9.9	8.0	7.0
	16.1	12.0	9.8	7.0	6.0
	14.8	13.6	9.0	7.1	5.9
	15.1	14.5	9.0	7.5	4.1
	12.8	11.7	9.8	6.1	3.6
AVG VEL (FT/SEC)	9.45	8.78	7.54	6.56	5.98
AIR GAP IN TOP OF PIPE (INCHES)	0.0	0.0	0.0	0.0	0.0
FRACTION OF TOTAL PIPE AREA	1.00	1.00	1.00	1.00	1.00
TEST FLOW RATE (GPM)	67486	62678	53821	46863	42694
TEST HEAD (FT)	6.8	6.5	6.0	5.7	5.5

SPEED TO BE USED FOR CURVE 255 RPM

POINTS TO PLOT ON CURVE
DEVELOPED FROM AFFINITY LAWS

SPEED (RPM)	HEAD (FT)	FLOW (GPM)	ST HEAD (FT)	FLOW (GPM)
308	6.8	67486	3.7	55873
288	6.5	62678	4.2	55496
261	6.0	53821	4.9	52584
238	5.7	46863	5.7	50210
221	5.5	42694	6.5	49262

EQUATION COEFFICIENTS

A = 2 C = 8
B = 15500 N = 255

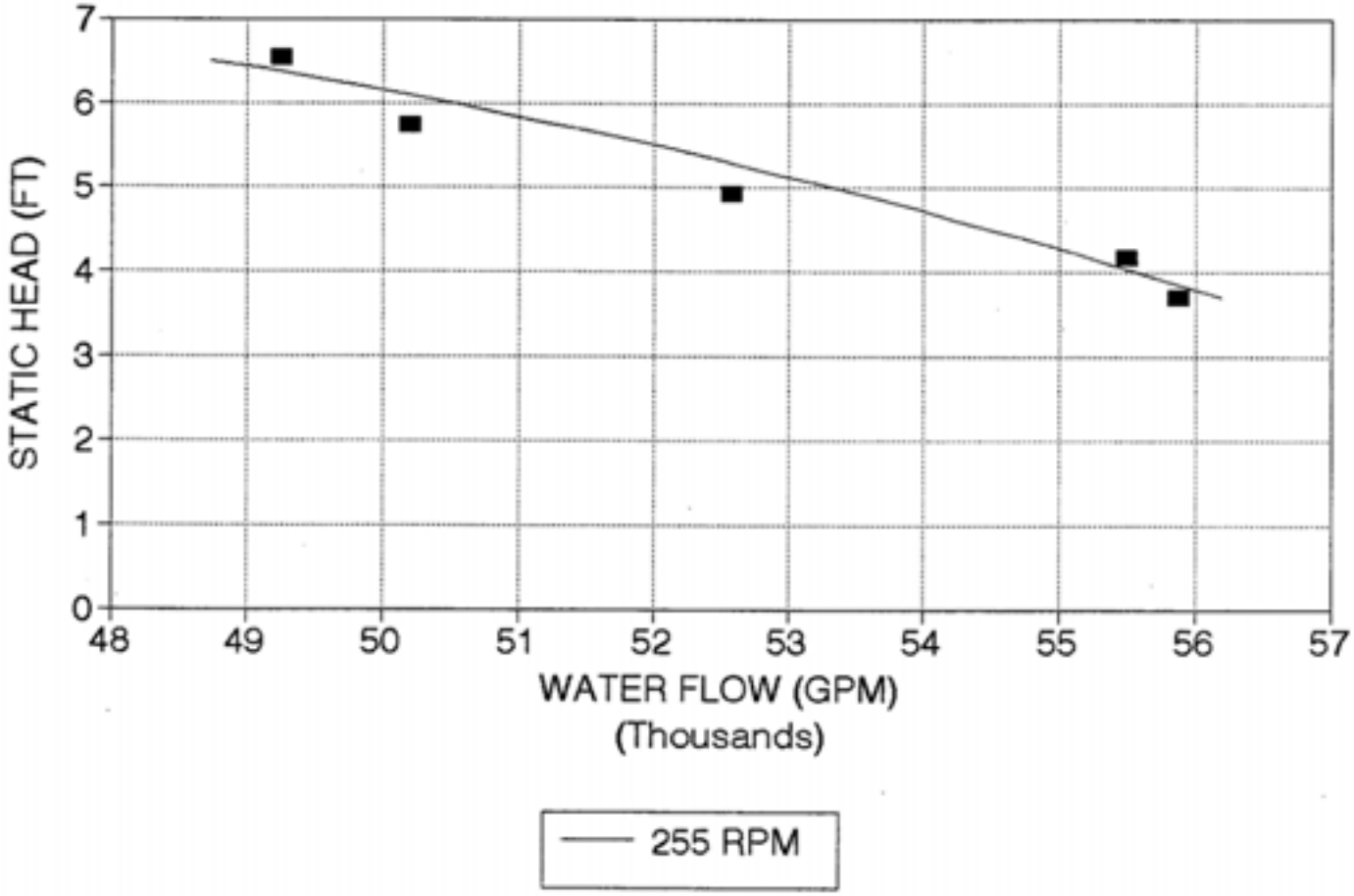
Exhibit 18

M & W PUMP CORPORATION
33 N. W. 2nd STREET
DEERFIELD BEACH
FLORIDA 33441
U. S. A.
ESTABLISHED 1926

SITE SPECIFIC FIELD TEST PERMORMANCE CURVE

STATION No.4 PUMP No.1

S/N 1886 24-APR-96



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M & W PUMP CORPORATION
CERTIFICATION
James D. Cobb
20-MAY-96

Exhibit 18

ACME IMPROVEMENT DISTRICT
STATION # 4
UNIT # 2

SERIAL # 4816
EXHIBIT 13
DATE 24 APR 96

PIPE INSIDE DIA 54 INCHES
ENGINE SPEED FOR CURVE 1600 RPM

DESIGN POINT
320 RPM
60000 GPM
6.5 FT

STATIC HEAD (INCHES)	TEST PUMP SPEED (RPM)	TEST ENG SPEED (RPM)
58	355	1775
60	327	1635
65	299	1495
68	280	1400
71.5	265	1325

MANOMETER READINGS (INCHES)	12.0	9.9	8.1	6.1	3.3
	12.6	10.3	7.1	6.1	3.0
	12.8	10.2	9.0	7.0	2.1
	13.8	9.3	6.1	6.1	1.8
	11.0	9.8	6.9	5.9	1.8
	11.6	8.5	7.8	5.8	2.0
	9.8	8.0	7.1	4.8	3.0
	10.0	7.3	6.3	5.3	5.1
	11.8	9.0	7.8	6.3	5.0
	12.0	9.0	8.0	5.3	4.5
AVG VEL (FT/SEC)	7.93	6.99	6.30	5.61	4.04
AIR GAP IN TOP OF PIPE (INCHES)	0.0	0.0	0.0	0.0	0.0
FRACTION OF TOTAL PIPE AREA	1.00	1.00	1.00	1.00	1.00
TEST FLOW RATE (GPM)	56590	49900	44973	40015	28845
TEST HEAD (FT)	5.8	5.8	6.0	6.2	6.2

SPEED TO BE USED FOR CURVE 320 RPM

POINTS TO PLOT ON CURVE
DEVELOPED FROM AFFINITY LAWS

SPEED (RPM)	HEAD (FT)	FLOW (GPM)	ST HEAD (FT)	FLOW (GPM)
355	5.8	56590	3.9	51010
327	5.8	49900	4.8	48832
299	6.0	44973	6.2	48132
280	6.2	40015	7.4	45731
265	6.2	28845	8.7	34832

EQUATION COEFFICIENTS

A =	1.7	C =	9
B =	15000	N =	320

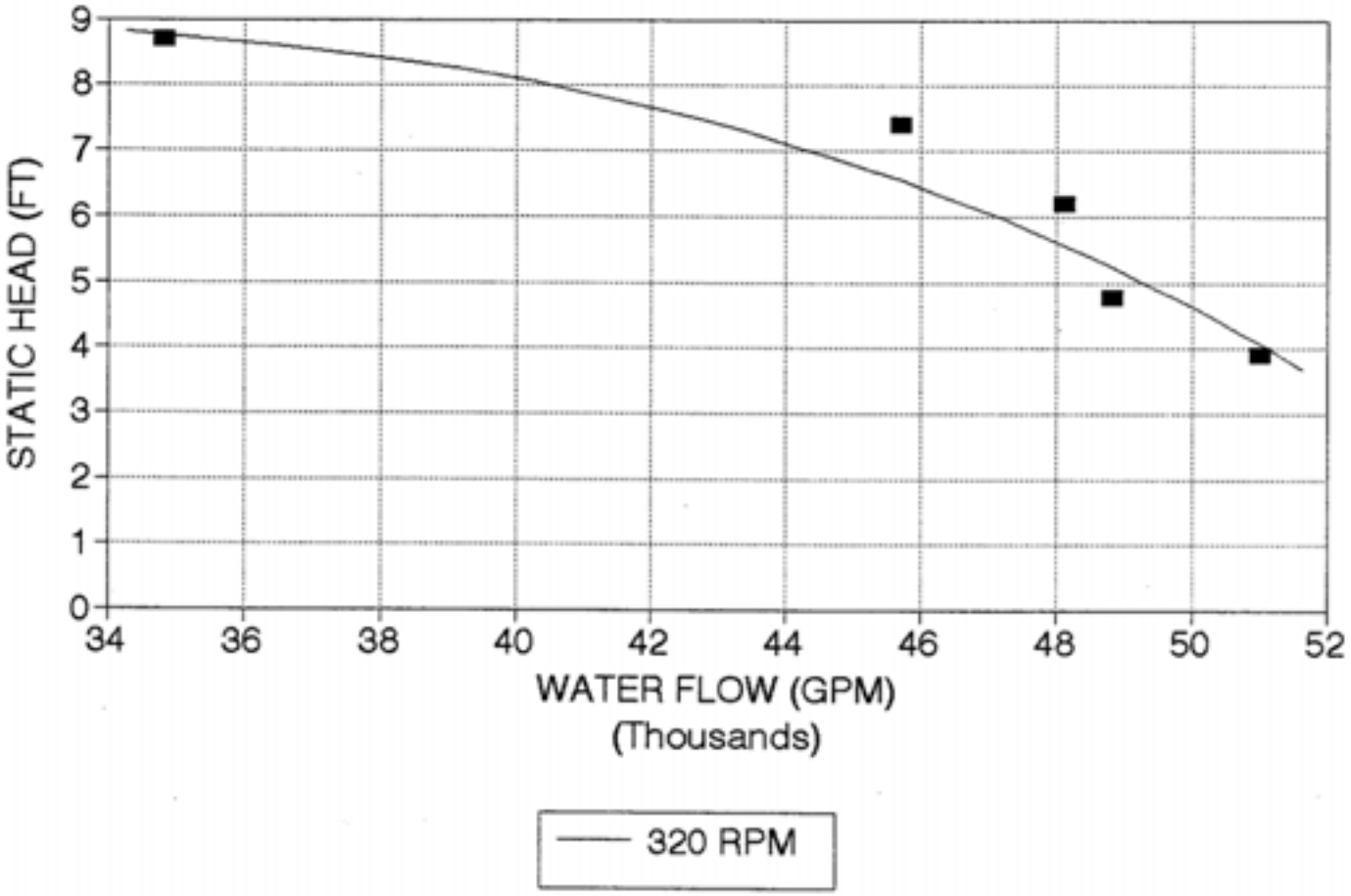
Exhibit 18

M & W PUMP CORPORATION
33 N. W. 2nd STREET
DEERFIELD BEACH
FLORIDA 33441
U. S. A.
ESTABLISHED 1926

SITE SPECIFIC FIELD TEST PERMORMANCE CURVE

STATION No.4 PUMP No.2

4816 24-APR-96



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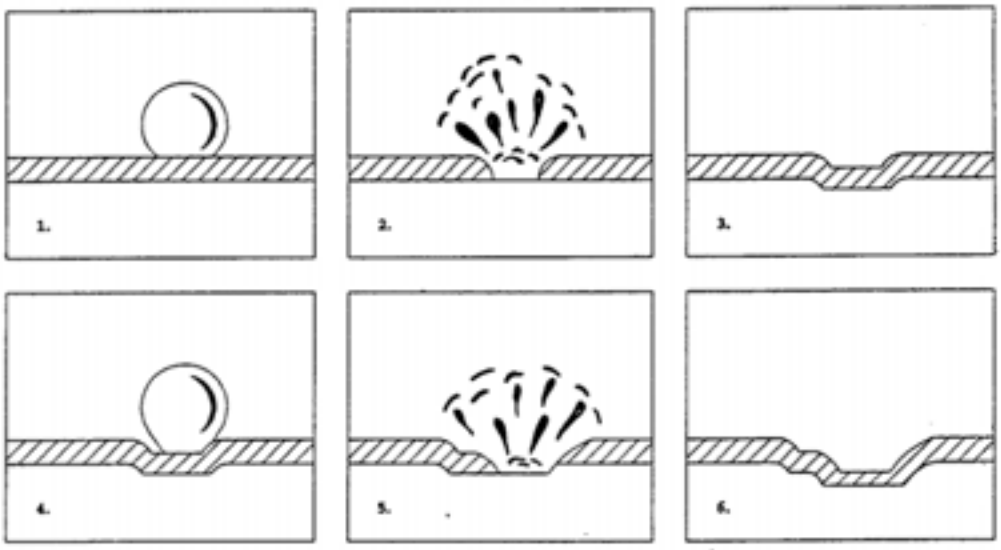
M & W PUMP CORPORATION
CERTIFICATION
James D. Crooks
20-MAY-96

Cavitation Damage

Cavitation damage is a special form of erosion corrosion which is cause by the formation and collapse of vapor bubbles in a liquid near a metal surface. Cavitation damage occurs in hydraulic turbines, ship propellers, and other surfaces where high-velocity liquid flow and pressure changes are encountered. Before considering cavitation damage, let us examine the phenomenon of cavitation. If the pressure on a liquid such as water is reduced sufficiently, it boils at room temperature. Consider a cylinder full of water which is fitted with a tight piston in contact with the water. If the piston is raised away from the water, pressure is reduced and the water vaporizes, forming bubbles. If the piston is now pushed toward the water, pressure is increased and the bubbles condense or collapse. Repeating this process at high speed such as in the case of an operating water pump, bubbles of water vapor form and collapse rapidly. Calculations have shown that rapidly collapsing vapor bubbles produce shock waves with pressure as high as 60,000 lb/in^2. Forces this high can produce plastic deformation in many metals. Evidence of this is indicated by the presence of slip lines in pump parts and other equipment subjected to cavitation.

The appearance of cavitation damage is somewhat similar to pitting, except that the pitted areas are closely spaced and the surface is usually considerably roughened. Cavitation damage has been attributed to both corrosion and mechanical effects. In the former case, it is assumed that the collapsing vapor bubbles destroy protective surface films which results in increased corrosion.

This mechanism is shown schematically. The steps are as follows: (1) a cavitation bubble forms on the protective film. (2) The bubble collapses and destroys the film. (3) The newly exposed metal surface corrodes and the film is reformed. (4) A new cavitation bubble forms at the same spot. (5) The bubble collapses and destroys the film. (6) The exposed area corrodes and the film reforms. The repetition of this process results in deep holes.



Schematic representation of steps in cavitation.