

ENGINEERING REPORT
OF PROJECT SCOPE

For the
EAST OUACHITA GRAVITY DRAINAGE DISTRICT NO. 2

Issued 5-15-2017



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PART I

INTRODUCTION

This Engineering Report has been prepared for the benefit of the East Ouachita Gravity Drainage District No. 2, which was established by the Ouachita Parish Police Jury in Early 2017. This report is prepared to define the requirements for drainage improvements that will provide adequate control of storm water runoff to prevent flooding of streets and homes.

Severe flooding occurred during the March 2016 storm event that highlighted the issues presently in place within the District. Although that storm event represented a reported 1000-year recurrence situation, the disastrous result of over 40 homes being inundated and many more being isolated due to street flooding, prompted a long term concern to have the drainage in the area evaluated and a plan developed to prevent the same thing from happening again. The limits of the area which define the District include all area bounded by LA 134 and Bayou DeSiard on the north, Bayou DeSiard on the west and south, and the railroad (A&LM) on the east; essentially all of the Frenchman's Bend subdivision, including the golf course and "no-build" reserve in the middle. The area is within a natural bend of Bayou DeSiard, where the "high" ground follows the east bank of the bayou and the remainder slopes toward the middle. Storm water is collected along the street that parallels the bayou and discharges into the bayou at multiple piped locations and naturally along the slope of the bank. The remainder of the area drains thru various ditches, across the golf course, and in piped systems within the subdivision toward the interior reserve land where there are ditches that collect and eventually join together in a single channel referred to as Indian Creek which flows out to Bayou DeSiard near the middle of the east side of the District.

Information gathered from construction plans of the subdivision development, topographic data from public sources, and input from residents have been compiled to more precisely define the drainage patterns and the areas where drainage problems exist. The subdivision development started in about 1992 with Units 1 & 2 (126 residential lots) being completed consisting of a street from the entrance on LA 134 running southwest following the bayou and the 18-hole golf course. The developer was Trey Jay, Inc. (now Trey Jay, LLC). Subsequently, Units 2 thru 15 and 17 have been constructed adding approximately 500 more residential lots. The initial units mostly drained directly to the bayou; rear yards drained to the golf course which drained toward the interior undeveloped area and eventually out Indian Creek. As the subsequent units were constructed, many abutted the golf course on the downhill side which complicated the natural flow paths. In addition to this, ponds were constructed on the golf course that impacted the natural flow paths. Numerous conditions were created where the runoff from the golf course was no longer allowed to sheet toward the interior and piped outlets were installed. Areas of standing water and shallow flooding of yards resulted. As the rate of runoff increased due to the

development, improvements were required in the major collector ditches in the interior; these ditches silted in over time and grew up in natural vegetation. All of the conditions have contributed to the problems that now exist.

This study has evaluated all of the present conditions and identified solutions in the form of individual projects to correct the situation. Some of the projects address the channelizing of runoff to remove the shallow flooding, while others are major ditch/channel cleaning and grading. One project addresses the backwater flooding from Bayou DeSiard. There are eleven (11) projects identified in all. The following section of the report provides a description of each project along with its cost and a map depicting the conceptual plan for construction.

PART II

PROJECT 1 – Indian Creek Backwater Control Structure

This project provides a flood control structure to be installed on Indian Creek for the purpose of preventing backwater flooding of the lower portions of the EOGDD from Bayou DeSiard, as occurred in March 2016.

From a hydraulic standpoint, the structure must pass as much water as the present 10' diameter culvert under East Frenchman's Bend Road (Indian Creek Bridge) when the Bayou DeSiard water level reaches near the 100-year flood stage of 78.0'. This is provided by two 6'x6' openings which have slightly more flow area as the 10' culvert when the flow depth is seven feet (or a water surface elevation of 76.0'). Each opening will be provided with a steel plate slide gate that is normally held in the full open position. These gates would be lowered (closed) if the Bayou DeSiard level ever gets above the water level on the west side of the structure, i.e. if the flow ever reverses where it flows back toward the subdivision. Once the gates are closed, it would be necessary to install temporary pumps to remove the accumulated storm water from within the subdivision. This project does not address the size requirements for these pumps, nor does it address the cost of their operation. It is assumed that the responsibility for operation of the proposed structure would be placed in the hands of the EOGDD and paid for as necessary thru accumulated operating funds.

Attached are conceptual drawings of the proposed structure, including a site plan and details. Access to the structure is assumed from the north side. It is noted that the north side of Indian Creek is not in any dedicated drainage easement, whereas the south side is in a dedicated easement. Both sides lie within private ownership of lots and acquisition of property for the construction and access will be required. The placement of the structure has been chosen to allow for construction without interference with the present culvert but close enough to East Frenchman's Bend Road to allow a crane to reach the structure for operation of the gates or for any maintenance. Access from the existing abandoned concrete turn-around is provided for small vehicular maintenance and observation from the operating platform. Removal of some existing trees may be required for both construction and future access.

The estimated cost of this conceptual plan is also attached. It shows a construction cost of \$240,000 and a project cost of \$306,480 including engineering design, legal, permitting, and contingency. Land purchase cost has been included. It has been assumed that the structure will have to be permitted (or at least a request for permitting) thru the Corps of Engineers and the State Office of Public Works (now thru LDOTD), although the construction will be limited to land above the jurisdictional water level of the Bayou DeSiard for waterways of the state. Environmental concern will dictate proper erosion control measures for the construction. A determination of existing wetlands and any mitigation requirements will be part of the review process by the Corps of Engineers.

PART III

PROJECT 2 – Railroad Ditch Rehabilitation

This project provides for cleaning and regarding of the existing main outfall ditch that runs along the west side of the railroad (extreme east side of the District).

This outfall ditch existed along the railroad at the time the original development took place. It was regarded and deepened as a part of the construction of Unit 3, where street drainage along East Frenchman's Bend Road and the east side of Hole #13 of the golf course was directed thru a piped system. The present ditch is heavily overgrown and silted in at spots; the original flow capacity has been reduced by at least 25% and the flowline raised by at least 0.5'. These have resulted in inadequate capacity to handle the flow without shallow flooding in the rear of the lots along the railroad as well as the rear of the lots along Hole #13.

The limit of the clearing and grading of this ditch is approximately 2100 feet. It will be cleared of all brush and trees within the normal channel as well as a 15' access berm on the district side of the ditch. The design size of the ditch will be a 2' wide bottom with 3:1 side slopes; the depth will vary as required to convey from the present piped connections from the road to the final outfall into Bayou DeSiard. Note that the piped connections will be addressed as a separate project (Project 3). The ditch lies within an existing easement which is of adequate width for the ditch itself; additional access easement for construction of the project and for future access for maintenance will have to be acquired.

The estimated cost of this conceptual plan is attached in the Appendix. It shows a construction cost of \$126,450 and a project cost of \$175,451 including engineering design, legal, permitting, and contingency. Land purchase cost (access easement) has been included. It has been assumed that a request for permitting thru the Corps of Engineers will be required. Environmental concern will dictate proper erosion control measures for the construction. A determination of existing wetlands and any mitigation requirements will be part of the review process by the Corps of Engineers.

PART IV

PROJECT 3 – Unit 3 and Hole #13 Drainage Improvements

This project provides for regarding of the existing area that runs along the east side of Hole #13 to direct runoff to existing pipes that connect to the piping system in Unit 3, as well as installing new pipe from the golf course side to the street system side of the railroad (extreme east side of the District).

There is currently a roughly graded area along the east side of Hole #13 that flows to a point between lots 9 & 10 of Unit 3 where it enters a catch basin and is piped east to the underground system on the west side of East Frenchman's bend Road; it flows from there to the Railroad ditch. There have been two pipes installed to carry the water from the golf course to the street; these are inadequate in size to handle the total flow. The poor grading and inadequate pipe capacity to handle the flow cause shallow flooding in the rear of the lots along Hole #13.

The entire length along the east side of Hole #13 will be re-graded to eliminate high points and carry the flow to the outlet pipes; the length is about 1400'. Access will have to come from the golf course side. An additional pipe will be installed from the golf course to the pipe system in East Frenchman's Bend Road; this will have to be installed between existing houses and will supplement the existing pipes to provide adequate capacity. The pipe size will be 15" for a length of about 220 feet. A new easement will be required where the pipe crosses thru private property.

The estimated cost of this conceptual plan is attached in the Appendix. It shows a construction cost of \$69,850 and a project cost of \$89,254 including engineering design, legal, permitting, and contingency. Land purchase cost (access and permanent easements) has been included. No environmental permits will be required for this project.

PART V

PROJECT 4 –Hole #12 Drainage Improvements

This project provides for regarding and the establishment of a shallow ditch along the area that runs on the north side of Hole #12, installing new drainage across Hole #12, and along the south side of Hole #12 to direct runoff to existing pipes that pass thru the portion of Unit 4 at the entrance to Maison. Additional pipes will be installed at this point of crossing.

There is currently a roughly graded area along the north side of Hole #12 that naturally flows westerly; it finds its way across the golf course to join with the roughly grade area on the south of Hole #12 that also naturally drains to the west. They converge on the southeast side of the green for Hole#11 and enter a pipe that passes from the north side of Unit 4 to the south side of Unit 4 at the entrance to Maison. The pipe is inadequate to carry the flow and it overflows along the north side of the lots on Maison Drive (south side of Hole #11). The poor grading, lack of defined ditches and the golf cart path all contribute to shallow flooding and standing water on both sides of Hole #12; the inadequate pipe capacity to handle the flow contributes to the shallow flooding in the rear of the lots along Hole #13. The overflow from this area impacts the area of Hole #11, which is addressed as a separate project.

The entire length along the north side of Hole #12 will be re-graded to create a shallow ditch to carry the flow to the west, a length is about 900'. This will include small piped crossing for maintenance and to pass thru the cart path. The ditch will be piped across the golf course to the south side, a length of about 180'. The entire length along the south side of Hole #12 will be re-graded to create a shallow ditch to carry the flow to the west, a length is about 1100'. Access for the work will have to come from the golf course side. An additional pipe will be installed along the golf course (around the Hole#11 green); this will supplement the existing pipe to provide adequate capacity. This extra capacity will be routed to the proposed system along Hole#11 that is included in Project No. 5. The pipe size will be 18" diameter and have a length of about 360 feet. New easements will be required where the ditches are constructed and where pipe crosses thru private property.

The estimated cost of this conceptual plan is attached in the Appendix. It shows a construction cost of \$149,200 and a project cost of \$188,806 including engineering design, legal, permitting, and contingency. Land purchase cost (access and permanent easements) has been included. No environmental permits will be required for this project.

PART VI

PROJECT 5 –Hole #11 Drainage Improvements

This project provides for regarding and the establishment of a ditch along the area that runs on the south side of Hole #11, installing controlled inlets and outlets to the existing pond that lies between Hole #11 and Hole #18, and construction of a ditch from the pond outlet south to the outfall at the Reserve area, including adjustments to the cart path crossing.

There is currently a graded area along the south side of Hole #11 that flows westerly; it is shaped into a ditch and finds its way around the cul-de-sac at the end of Maison Drive. It converges with other golf course flow entering from the northwest and continues south towards the Reserve area. The ditch is inadequate to carry the flow and it overflows along the west side into the existing pond. The poor grading, lack of defined ditches and the restrictions at the golf cart path all contribute to shallow flooding and standing water along the lots that abut this portion of Hole #11. The ineffective flow into and out of the pond do not let it act in any form of detention system. This system also has to accommodate the overflow due to the inadequate capacity coming from Hole #12 (see Project No. 4).

The entire length along the south side of Hole #11 that abuts development will be re-graded to create a ditch to carry the flow to the west, a length is about 950'. This ditch will be reshaped around the west side of the developed area and carried south to the Reserve area; this will include a new piped section to pass thru the cart path. A permanent inlet for some of the water will be constructed at the head end of the existing pond and a structure for outlet and pond level control such that benefits of detention are recognized. Access for the work will have to come from the golf course side. New easements will be required where the ditches or pipes are constructed.

The estimated cost of this conceptual plan is attached in the Appendix. It shows a construction cost of \$93,600 and a project cost of \$118,751 including engineering design, legal, permitting, and contingency. Land purchase cost (access and permanent easements) has been included. No environmental permits will be required for this project.

PART VII

PROJECT 6 –Hole #8 Drainage Improvements

This project provides for regarding, enlarging, and establishing of an outlet control structure for the existing pond on the west side of Hole #8 so that it will function properly as a detention system for runoff from the golf course, and construction of a ditch from the pond outlet east to the outfall at the Reserve area. This detention is critical to the capacity requirements downstream due to the large amount of the golf course that drains to this location.

There is currently a rough dug pond along the east side of Hole #8. Outlet control is in the form of a temporary pipe that passes thru future development area (Unit 16). Flow currently is restricted by this temporary pipe and the pond level rises to cause shallow flooding on the golf course (and rear yards of the future homes), as well as the yards at the northwest end of Unit 9. The discharge from this area continues to the Reserve.

The entire length along the south side of Hole #8 and continuing north along Hole #9 to the driving range that abuts future development will be re-graded to enlarge the pond area and increase the volume available for detention storage. A permanent structure for outlet and pond level control will be installed to create a regulated flow thru the future development and on to the Reserve. Access for the work will have to come from the golf course side. New easements will be required for the extent of the detention pond and where the ditches or structures are constructed.

The estimated cost of this conceptual plan is attached in the Appendix. It shows a construction cost of \$191,000 and a project cost of \$238,722 including engineering design, legal, permitting, and contingency. Land purchase cost (access and permanent easements) has been included. No environmental permits will be required for this project.

PART VIII

PROJECT 7 –Hole #4 Drainage Improvements

This project provides for regarding and establishing an overflow and drainage path for the pond that exists on Hole #4.

This pond is the reservoir for the golf course irrigation system and is fed from water pumped out of Bayou DeSiard. There is currently a rough dug ditch along the east side of pond that is inadequate to handle overflow that occurs at random locations along the bank of the pond. Overflow from the ditch drains down into rear yards of the houses on the west side of Bunker Lane in Unit 9.

Adequate drainage facilities located near the entrance to Unit 9 exist to carry the flow from this area. A new or reshaped ditch will be constructed to convey the pond overflow to this area. A permanent overflow location will be established on the southeast corner of the pond.

The estimated cost of this conceptual plan is attached in the Appendix. It shows a construction cost of \$38,100 and a project cost of \$48,820 including engineering design, legal, permitting, and contingency. Land purchase cost (access and permanent easements) has been included. No environmental permits will be required for this project.

PART IX

PROJECT 8 –Major Ditch Cleaning in Area A

This project provides for cleaning, regarding and shaping of the existing major collector ditches in Area A of the Reserve.

The major drainage ditches that were installed by the developer in Area A (east side of Unit 9) have silted in and grown up with light vegetation. In order for the flow capacity to be maintained, the ditches require proper maintenance. Due to variations in the flow line grade, ponding occurs along the rear property of lots on the east side of Bunker lane in Unit 9.

This project includes the cleaning, shaping, and re-grading of approximately 2240 feet of 6' bottom width ditches and 2100 feet of 3' bottom ditches. The smaller ditches that parallel the development are presently in public easements; the larger ditches that run thru the Reserve need to be placed into public easements, including sufficient width to access and maintain.

The estimated cost of this conceptual plan is attached in the Appendix. It shows a construction cost of \$60,240 and a project cost of \$77,398 including engineering design, legal, permitting, and contingency. Land purchase cost (access and permanent easements) has been included. It has been assumed that the ditch work will have to be permitted (or at least a request for permitting) thru the Corps of Engineers. Environmental concern will dictate proper erosion control measures for the construction. A determination of existing wetlands and any mitigation requirements will be part of the review process by the Corps of Engineers.

PART X

PROJECT 9 –Major Ditch Cleaning in Area B

This project provides for cleaning, regarding and shaping of the existing major collector ditches in Area B of the Reserve.

The major drainage ditches that were installed by the developer in Area B (north part of the Reserve) have silted in and grown up with light vegetation. In order for the flow capacity to be maintained, the ditches require proper maintenance. Due to variations in the flow line grade, ponding occurs along the rear route and flow is impeded that affects the capacity to carry the discharges from the outfalls from Projects No 5 and 6.

This project includes the cleaning, shaping, and re-grading of approximately 1820 feet of 6' bottom width ditches and 2720 feet of 3' bottom ditches. Approximately 850 feet of the larger ditches are almost non-existent. All of the ditches that run thru the Reserve need to be placed into public easements, including sufficient width to access and maintain.

The estimated cost of this conceptual plan is attached in the Appendix. It shows a construction cost of \$82,630 and a project cost of \$105,206 including engineering design, legal, permitting, and contingency. Land purchase cost (access and permanent easements) has been included. It has been assumed that the ditch work will have to be permitted (or at least a request for permitting) thru the Corps of Engineers. Environmental concern will dictate proper erosion control measures for the construction. A determination of existing wetlands and any mitigation requirements will be part of the review process by the Corps of Engineers.

PART XI

PROJECT 10—Major Ditch Cleaning in Area C

This project provides for cleaning, regarding and shaping of the existing major collector ditches in Area C of the Reserve.

The major drainage ditches that were installed by the developer in Area C (west side of Units 5 and 6 and the north side of Unit 7) have silted in and grown up with light vegetation. In order for the flow capacity to be maintained, the ditches require proper maintenance. Due to variations in the flow line grade, ponding occurs along the rear property of lots that abut these ditches.

This project includes the cleaning, shaping, and re-grading of approximately 1810 feet of 6' bottom width ditches and 1320 feet of 3' bottom ditches. All of the ditches that run thru the Reserve in Area C need to be placed into public easements, including sufficient width to access and maintain.

The estimated cost of this conceptual plan is attached in the Appendix. It shows a construction cost of \$58,235 and a project cost of \$74,828 including engineering design, legal, permitting, and contingency. Land purchase cost (access and permanent easements) has been included. It has been assumed that the ditch work will have to be permitted (or at least a request for permitting) thru the Corps of Engineers. Environmental concern will dictate proper erosion control measures for the construction. A determination of existing wetlands and any mitigation requirements will be part of the review process by the Corps of Engineers.

PART XII

PROJECT 11–Drainage Improvements in Unit 4

This project provides for installation of pipes in Unit 4 to provide adequate capacity for the design run-off. Some existing pipe cleaning will also be included. Improved outfalls for the piped systems will be installed.

Unit 4 of the Frenchman's Bend Subdivision was constructed in phases. Inconsistencies in design of one phase to account for adjacent phases was found to have produced a pipe network that had less than adequate capacity for the larger rainfalls which has resulted in localized yard and street flooding in some areas; longer times for the area to drain down after rains has been an issue.

This project includes the installation of several new pipes to parallel existing pipes in order to increase capacity. Approximately 400 feet of 24" and 30" pipe will be required, together with about 320 feet of smaller pipe. Catch basins will be reworked to connect the new pipes. All of work will be adjacent to streets or thru developed yards. Although present piping systems lie in public easements, additional easement for the added pipe will be required in some cases. Alternative routing will be investigated during the design phase of this project in order to minimize disruption and added cost.

The estimated cost of this conceptual plan is attached in the Appendix. It shows a construction cost of \$146,500 and a project cost of \$187,453 including engineering design, legal, permitting, and contingency. Land purchase cost (access and permanent easements) has been included. No environmental permits will be required for this project.

PART XIII

SUMMARY OF PROJECTS AND COST ESTIMATE

The total of all of the eleven projects includes new ditch construction, existing ditch cleaning and grading, new pipe installation, and the construction of new structures. The type of work will dictate the number of projects that might be included in a bid package; similar work will be grouped together so that economies of scale will help control the bid prices. At least three bid packages are anticipated. The projects with major work being required along the golf course and thru developed areas will be grouped in one, the projects that involve ditch cleaning will be grouped, and the projects with structures may be grouped, although the Project 1, Indian Creek Backwater Control Structure may be bid a stand-alone contract.

With the total project being bid in multiple packages, consideration will need to be given on the priority of the awards. For drainage work, it is normal to have the downstream work completed before starting on upstream work. This would result in staggering the start dates for several of the projects. None of the projects should have a construction time of more than 90 days and all work needs to be performed during the "dry" construction period of May thru October. Those areas where re-establishment of grass is required for erosion control, September and October represent the best months, with re-seeding done in April or May where summer grasses are required.

A cost estimate has been prepared for each project; these are presented separately on the following pages. The cost estimates have included a contingency of 15% of the construction cost; this is considered normal for a conceptual design, although the scope of the work has been pretty well defined. These cost estimates are being used for the establishment of a fixed amount of money as a funding source for construction. It is not advisable to assume that the contingency will be available for other purposes. After all projects are bid, there should be a contingency remaining to cover costs of unforeseen issues discovered during the construction period. The cost estimate also includes the engineering (design) cost, permitting cost, land cost for the obtaining of easements, and the platting cost of having the easements surveyed and recorded. It is not anticipated that the District will own any fee simple property; all improvements will be on easements granted by the property owner. Easement size and description will have to account for necessary access for maintenance of the drainage improvements.

CONCEPTUAL PROJECT COST ESTIMATE

PROJECT 1 - INDIAN CREEK BACKWATER FLOOD CONTROL STRUCTURE

ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	COST
1.	Mobilization	1	Lump Sum	\$ 10,000.00	\$ 10,000
2.	Clearing and Grubbing	1	Lump Sum	\$ 10,000.00	\$ 10,000
3.	Earthwork	40	C.Y.	\$ 150.00	\$ 6,000
4.	Ditch Muckout	80	C.Y.	\$ 200.00	\$ 16,000
5.	Temporary Cofferdam	1	Lump Sum	\$ 20,000.00	\$ 20,000
6.	Dewatering	1	Lump Sum	\$ 10,000.00	\$ 10,000
7.	False Bottom	200	S.Y.	\$ 75.00	\$ 15,000
8.	Concrete Structure	80	C.Y.	\$ 700.00	\$ 56,000
9.	Gates w/frames	1	Lump Sum	\$ 24,000.00	\$ 24,000
10.	Catwalk and Frame	1	Lump Sum	\$ 36,000.00	\$ 36,000
11.	Access Drive	1	Lump Sum	\$ 15,000.00	\$ 15,000
12.	Rip-rap	100	C.Y.	\$ 120.00	\$ 12,000
13.	Dress-up of Channel	1	Lump Sum	\$ 10,000.00	\$ 10,000
Subtotal Construction					\$ 240,000
	Contingency			@15%	\$ 36,000.00
	Permitting				\$ 5,000.00
	Engineering			@8%	\$ 22,480.00
	Land				\$ 5,000.00
	Platting				\$ 3,000.00
Total Cost of Project					\$ 311,480.00

CONCEPTUAL PROJECT COST ESTIMATE

PROJECT 2 - RAILROAD DITCH REHABILITATION

ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	COST
1.	Mobilization	1	Lump Sum	\$ 5,000.00	\$ 5,000
2.	Clearing and Grubbing	1.32	Acre	\$ 10,000.00	\$ 13,200
3.	Earthwork	2500	C.Y.	\$ 20.00	\$ 50,000
4.	Ditch Muckout	250	C.Y.	\$ 50.00	\$ 12,500
5.	Access Drive	1	Lump Sum	\$ 10,000.00	\$ 10,000
6.	Rip-rap	200	C.Y.	\$ 120.00	\$ 24,000
7.	Dress-up of Channel	1	Lump Sum	\$ 11,750.00	\$ 11,750
Subtotal Construction					\$ 126,450
	Contingency			@15%	\$ 18,967.50
	Permitting				\$ 5,000.00
	Engineering			@8%	\$ 12,033.40
	Land				\$ 10,000.00
	Platting				\$ 3,000.00
Total Cost of Project					\$ 175,450.90

CONCEPTUAL PROJECT COST ESTIMATE

PROJECT 3 -

UNIT 3 and HOLE #13 DRAINAGE IMPROVEMENTS

ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	COST
1.	Mobilization	1	Lump Sum	\$ 5,000.00	\$ 5,000
2.	Clearing and Grubbing	0.22	Acre	\$ 10,000.00	\$ 2,200
3.	Earthwork	1400	C.Y.	\$ 20.00	\$ 28,000
4.	Ditch Muckout	15	C.Y.	\$ 50.00	\$ 750
5.	Access Drive	1	Lump Sum	\$ 10,000.00	\$ 10,000
6.	18" PVC Pipe	220	L.F.	\$ 45.00	\$ 9,900
7.	Catch Basins	2	Each	\$ 3,500.00	\$ 7,000
8.	Dress-up of Channel	1	Lump Sum	\$ 7,000.00	\$ 7,000
Subtotal Construction					\$ 69,850
	Contengency			@15%	\$ 10,477.50
	Permitting				\$ -
	Engineering			@8%	\$ 6,426.20
	Land				\$ 1,000.00
	Platting				\$ 1,500.00
Total Cost of Project					\$ 89,253.70

CONCEPTUAL PROJECT COST ESTIMATE

PROJECT 4 - HOLE #12 DRAINAGE IMPROVEMENTS

ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	COST
1.	Mobilization	1	Lump Sum	\$ 5,000.00	\$ 5,000
2.	Clearing and Grubbing	0.12	Acre	\$ 10,000.00	\$ 1,200
3.	Earthwork	2450	C.Y.	\$ 20.00	\$ 49,000
4.	Ditch Muckout	25	C.Y.	\$ 50.00	\$ 1,250
5.	Access Drive	1	Lump Sum	\$ 10,000.00	\$ 10,000
6.	18" PVC Pipe	640	L.F.	\$ 75.00	\$ 48,000
7.	Catch Basins	3	Each	\$ 3,500.00	\$ 10,500
8.	Repairs to Cart Path	1	Lump Sum	\$ 4,000.00	\$ 4,000
9.	Repairs to Street	1	Lump Sum	\$ 8,000.00	\$ 8,000
10.	Dress-up of Channel	1	Lump Sum	\$ 12,250.00	\$ 12,250
Subtotal Construction					\$ 149,200
	Contingency		@15%		\$ 22,380.00
	Permitting				\$ -
	Engineering		@8%		\$ 13,726.40
	Land				\$ 2,000.00
	Platting				\$ 1,500.00
Total Cost of Project					\$ 188,806.40

CONCEPTUAL PROJECT COST ESTIMATE

PROJECT 5 - HOLE #11 DRAINAGE IMPROVEMENTS

ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	COST
1.	Mobilization	1	Lump Sum	\$ 5,000.00	\$ 5,000
2.	Clearing and Grubbing	0.12	Acre	\$ 10,000.00	\$ 1,200
3.	Earthwork	1600	C.Y.	\$ 20.00	\$ 32,000
4.	Ditch Muckout	50	C.Y.	\$ 50.00	\$ 2,500
5.	Access Drive	1	Lump Sum	\$ 5,000.00	\$ 5,000
6.	18" PVC Pipe	200	L.F.	\$ 45.00	\$ 9,000
7.	24" PVC Pipe	140	L.F.	\$ 60.00	\$ 8,400
8.	Catch Basins	3	Each	\$ 3,500.00	\$ 10,500
9.	Pond Structure	1	Each	\$ 4,000.00	\$ 4,000
10.	Repairs to Cart Path	1	Lump Sum	\$ 4,000.00	\$ 4,000
11.	Dress-up of Channel	1	Lump Sum	\$ 12,000.00	\$ 12,000
Subtotal Construction					\$ 93,600
	Contengency		@15%		\$ 14,040.00
	Permitting				\$ -
	Engineering		@8%		\$ 8,611.20
	Land				\$ 1,000.00
	Platting				\$ 1,500.00
Total Cost of Project					\$ 118,751.20

CONCEPTUAL PROJECT COST ESTIMATE

PROJECT 6 - HOLE #8 DRAINAGE IMPROVEMENTS

ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	COST
1.	Mobilization	1	Lump Sum	\$ 5,000.00	\$ 5,000
2.	Clearing and Grubbing	0.75	Acre	\$ 10,000.00	\$ 7,500
3.	Earthwork	12000	C.Y.	\$ 12.00	\$ 144,000
4.	Ditch Muckout	300	C.Y.	\$ 50.00	\$ 15,000
5.	Access Drive	1	Lump Sum	\$ 5,000.00	\$ 5,000
6.	Pond Structure	1	Each	\$ 8,000.00	\$ 8,000
7.	Dress-up of Bank	1	Lump Sum	\$ 6,500.00	\$ 6,500
Subtotal Construction					\$ 191,000
	Contingency			@15%	\$ 28,650.00
	Permitting				\$ -
	Engineering			@8%	\$ 17,572.00
	Land				\$ -
	Platting				\$ 1,500.00
Total Cost of Project					\$ 238,722.00

CONCEPTUAL PROJECT COST ESTIMATE

PROJECT 7 -

HOLE #4 DRAINAGE IMPROVEMENTS

ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	COST
1.	Mobilization	1	Lump Sum	\$ 3,500.00	\$ 3,500
2.	Clearing and Grubbing	0.12	Acre	\$ 10,000.00	\$ 1,200
3.	Earthwork	1200	C.Y.	\$ 12.00	\$ 14,400
4.	Ditch Muckout	50	C.Y.	\$ 50.00	\$ 2,500
5.	Access Drive	1	Lump Sum	\$ 5,000.00	\$ 5,000
6.	Pond Structure	1	Each	\$ 3,500.00	\$ 3,500
7.	Dress-up of Bank	1	Lump Sum	\$ 8,000.00	\$ 8,000
Subtotal Construction					\$ 38,100
	Contingency			@15%	\$ 5,715.00
	Permitting				\$ -
	Engineering			@8%	\$ 3,505.20
	Land				\$ -
	Platting				\$ 1,500.00
Total Cost of Project					\$ 48,820.20

CONCEPTUAL PROJECT COST ESTIMATE

PROJECT 8 - MAJOR DITCH CLEANING in AREA "A"

ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	COST
1.	Mobilization	1	Lump Sum	\$ 3,500.00	\$ 3,500
2.	Clearing and Grubbing	3.52	Acre	\$ 2,500.00	\$ 8,800
3.	Earthwork	6510	C.Y.	\$ 4.00	\$ 26,040
4.	Ditch Muckout	650	C.Y.	\$ 20.00	\$ 13,000
5.	Access Drive	1	Lump Sum	\$ 3,000.00	\$ 3,000
7.	Dress-up of Ditch	1	Lump Sum	\$ 5,900.00	\$ 5,900
Subtotal Construction					\$ 60,240
	Contengency			@15%	\$ 9,036.00
	Permitting				\$ 1,000.00
	Engineering			@8%	\$ 5,622.08
	Land				\$ -
	Platting				\$ 1,500.00
Total Cost of Project					\$ 77,398.08

CONCEPTUAL PROJECT COST ESTIMATE

PROJECT 9 -

MAJOR DITCH CLEANING in AREA "B"

ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	COST
1.	Mobilization	1	Lump Sum	\$ 3,500.00	\$ 3,500
2.	Clearing and Grubbing	4.78	Acre	\$ 2,500.00	\$ 11,950
3.	Earthwork	5900	C.Y.	\$ 4.00	\$ 23,600
4.	Ditch Muckout	1475	C.Y.	\$ 20.00	\$ 29,500
5.	Access Drive	1	Lump Sum	\$ 5,000.00	\$ 5,000
7.	Dress-up of Ditch	1	Lump Sum	\$ 9,080.00	\$ 9,080
Subtotal Construction					\$ 82,630
	Contingency			@15%	\$ 12,394.50
	Permitting				\$ 1,000.00
	Engineering			@8%	\$ 7,681.96
	Land				\$ -
	Platting				\$ 1,500.00
Total Cost of Project					\$ 105,206.46

CONCEPTUAL PROJECT COST ESTIMATE

PROJECT 10 -

MAJOR DITCH CLEANING in AREA "C"

ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	COST
1.	Mobilization	1	Lump Sum	\$ 3,500.00	\$ 3,500
2.	Clearing and Grubbing	2.87	Acre	\$ 2,500.00	\$ 7,175
3.	Earthwork	4035	C.Y.	\$ 4.00	\$ 16,140
4.	Ditch Muckout	1008	C.Y.	\$ 20.00	\$ 20,160
5.	Access Drive	1	Lump Sum	\$ 5,000.00	\$ 5,000
7.	Dress-up of Ditch	1	Lump Sum	\$ 6,260.00	\$ 6,260
Subtotal Construction					\$ 58,235
	Contingency			@15%	\$ 8,735.25
	Permitting				\$ -
	Engineering			@8%	\$ 5,357.62
	Land				\$ 1,000.00
	Platting				\$ 1,500.00
Total Cost of Project					\$ 74,827.87

CONCEPTUAL PROJECT COST ESTIMATE

PROJECT 11 - UNIT 4 DRAINAGE IMPROVEMENTS

ITEM DESCRIPTION

QUANTITY UNITS

UNIT PRICE

COST

1.	Mobilization	1	Lump Sum	\$	5,000.00	\$	5,000
2.	Clearing and Grubbing	0.5	Acre	\$	10,000.00	\$	5,000
3.	Earthwork	400	C.Y.	\$	30.00	\$	12,000
4.	Ditch Muckout	50	C.Y.	\$	50.00	\$	2,500
5.	Access Drive	1	Lump Sum	\$	5,000.00	\$	5,000
6.	18" PVC Pipe	200	L.F.	\$	75.00	\$	15,000
7.	24" PVC Pipe	200	L.F.	\$	90.00	\$	18,000
8.	30" PVC Pipe	200	L.F.	\$	100.00	\$	20,000
9.	Catch Basins	4	Each	\$	4,000.00	\$	16,000
10.	Interconnect to Existing Piping	1	Lump Sum	\$	12,000.00	\$	12,000
11.	Repairs to Cart Path	1	Lump Sum	\$	4,000.00	\$	4,000
12.	Repairs to Street	1	Lump Sum	\$	8,000.00	\$	8,000
13.	Dress-up of Channel & Yards	1	Lump Sum	\$	24,000.00	\$	24,000
Subtotal Construction						\$	146,500
Contingency				@15%		\$	21,975.00
Permitting				@8%		\$	-
Engineering						\$	13,478.00
Land						\$	4,000.00
Platting						\$	1,500.00
Total Cost of Project						\$	187,453.00

CONCEPTUAL PROJECT COST ESTIMATE

SUMMARY OF PROJECT COST

PROJECT	CONSTRUCTION COST	CONTINGENCY	PERMITTING	ENGINEERING	LAND	PLATTING	TOTAL PROJECT COST
No. 1 - Indian Creek Backwater Control Structure	\$ 240,000	\$ 36,000	\$ 5,000	\$ 22,480	\$ 5,000	\$ 3,000	\$ 311,480
No. 2 - Railroad Ditch Rehabilitation	\$ 126,450	\$ 18,968	\$ 5,000	\$ 12,033	\$ 10,000	\$ 3,000	\$ 175,451
No. 3 - Unit 3 and Hole #13 Drainage Improvements	\$ 69,850	\$ 10,478	\$ -	\$ 6,426	\$ 1,000	\$ 1,500	\$ 89,254
No. 4 - Hole #12 Drainage Improvements	\$ 149,200	\$ 22,380	\$ -	\$ 13,726	\$ 2,000	\$ 1,500	\$ 188,806
No. 5 - Hole #11 Drainage Improvements	\$ 93,600	\$ 14,040	\$ -	\$ 8,611	\$ 1,000	\$ 1,500	\$ 118,751
No. 6 - Hole #8 Draiaage Improvements	\$ 191,000	\$ 28,650	\$ -	\$ 17,572	\$ -	\$ 1,500	\$ 238,722
No. 7 - Hole #4 Drainage Improvements	\$ 38,100	\$ 5,715	\$ -	\$ 3,505	\$ -	\$ 1,500	\$ 48,820
No. 8 - Major Ditch Cleaning in Area "A"	\$ 60,240	\$ 9,036	\$ 1,000	\$ 5,542	\$ -	\$ 1,500	\$ 77,318
No. 9 - Major Ditch Cleaning in Area "B"	\$ 82,630	\$ 12,395	\$ 1,000	\$ 7,602	\$ -	\$ 1,500	\$ 105,126
No. 10 - Major Ditch Cleaning in Area "C"	\$ 58,235	\$ 8,735	\$ 1,000	\$ 5,358	\$ -	\$ 1,500	\$ 74,828
No. 11 - Unit 4 Drainage Improvements	\$ 146,500	\$ 21,975	\$ -	\$ 13,478	\$ 4,000	\$ 1,500	\$ 187,453
TOTAL PROJECT COST	\$ 1,255,805	\$ 188,371	\$ 13,000	\$ 116,334	\$ 23,000	\$ 19,500	\$ 1,616,010

PART XIV

ANNUAL MAINTENANCE REQUIREMENTS AND COST

Once the improvements have been constructed, it will be the responsibility of the District to maintain them. It is assumed that piped drainage systems that where (or will be) installed as part of normal subdivision development will be dedicated to the Ouachita Parish Police Jury for maintenance. The only piped system that the District will maintain will be those that are incidental to the main ditch systems identified in this report. The majority of the maintenance required by the district will involve periodic mowing, vegetation control, and erosion control. The control structure on Indian Creek will require minor maintenance to assure that it stays ready to function when needed. It is also assumed that limited maintenance will be performed on the golf course or on improvements made by this project that lie within the boundary of the golf course.

Based on the assumption the District will not be purchasing maintenance equipment, the estimate for annual maintenance cost is based on contract methods.

Annual Cost

Mowing of ditches; four times per year (20 acres @ \$200/acre).....	\$ 16,000
Vegetation control of ditches; twice per year (10 acres @ \$500/acre).....	\$ 10,000
Miscellaneous repairs	<u>\$ 5,000</u>
Total Annual Cost of Maintenance	\$ 31,000

Funds generated from the revenue source shall provide at least this amount over and above the debt service.

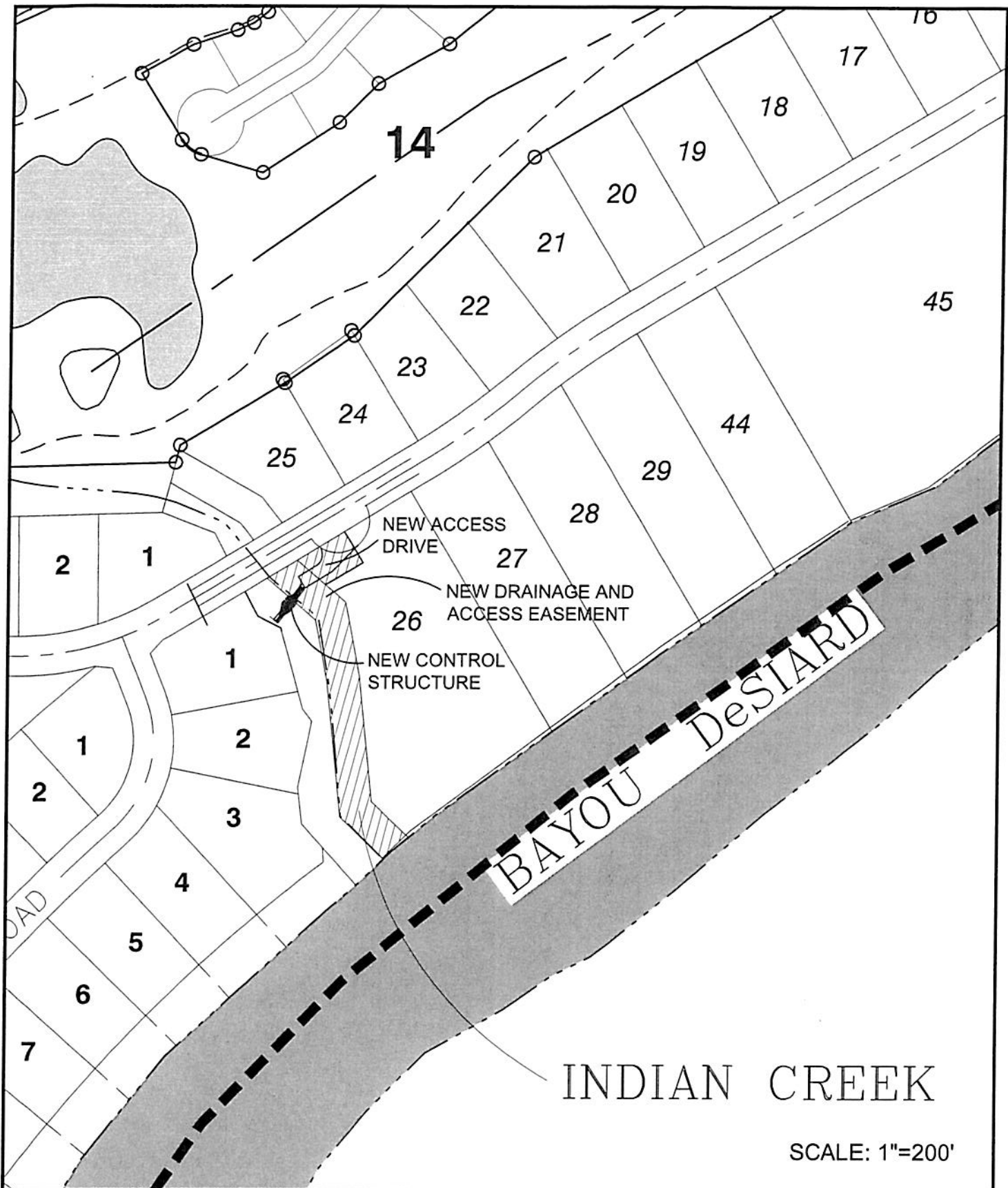
PART XV

CONCLUSION AND FINANCING COMMENTARY

This report is presented for the use of the Board of Commissioners of the East Ouachita Gravity Drainage District No. 2 and represents a conceptual solution to the drainage issues that exist within the District. The work has been done without detailed design data which can only be furnished from actual survey. The cost estimates are consistent with the conceptual nature of the proposed solutions and can only be made firm after detailed design. There do not appear to be any legal, environmental, or constructible issues that would prohibit the proposed work from being carried out. The scope of the District's responsibility for addressing the drainage problems does not extend to those that involve "backyard" neighbors where the problem is not related to the major drainage patterns.

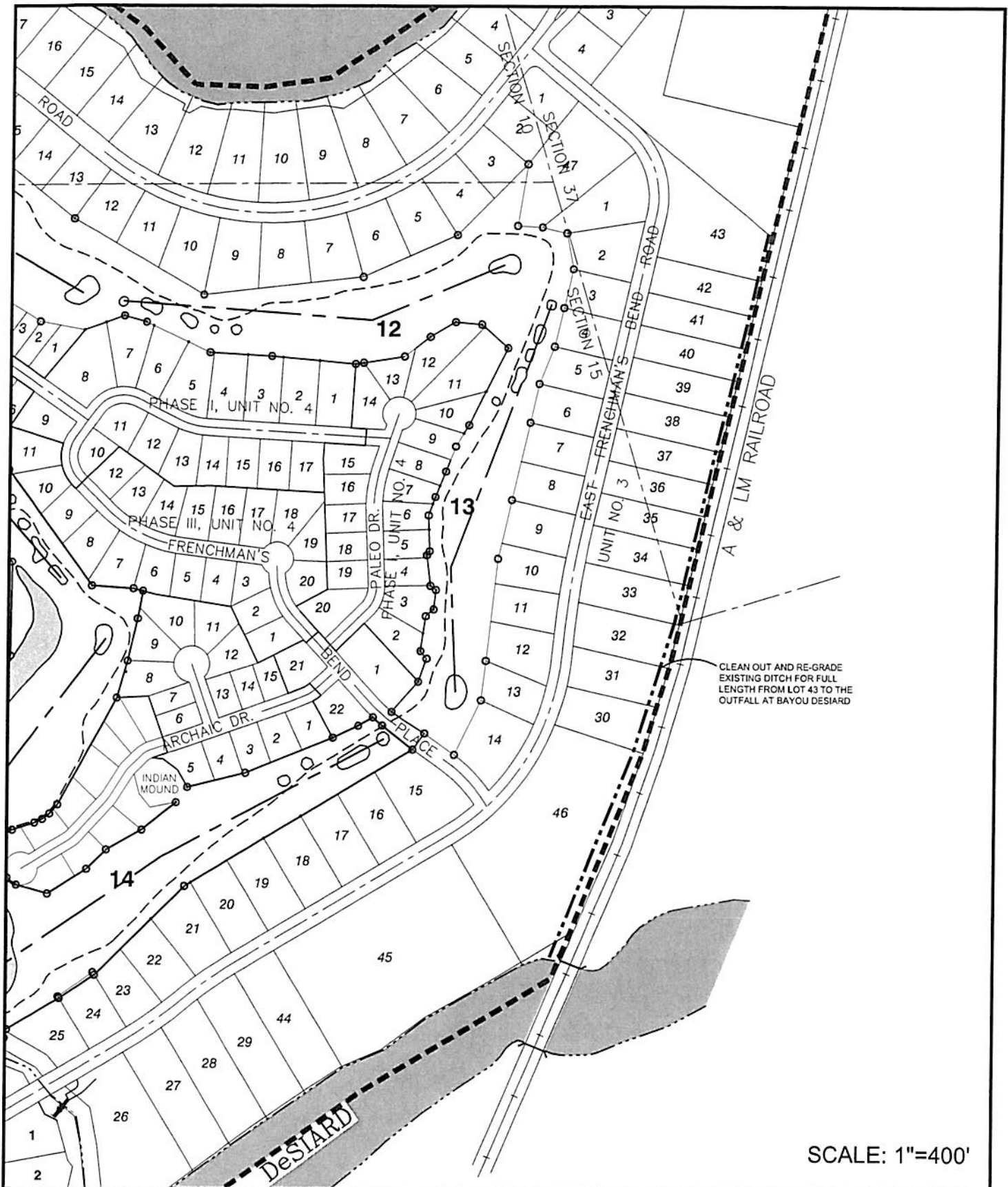
The method of financing the work identified in this report is assumed to be thru the issuance of bonds based on the passage of a property tax to be levied on the property owners' within the boundary of the District. This tax will have to be passed by a majority of those voting; it is anticipated that that the referendum will be placed on the ballot in the fall of 2017.

APPENDIX



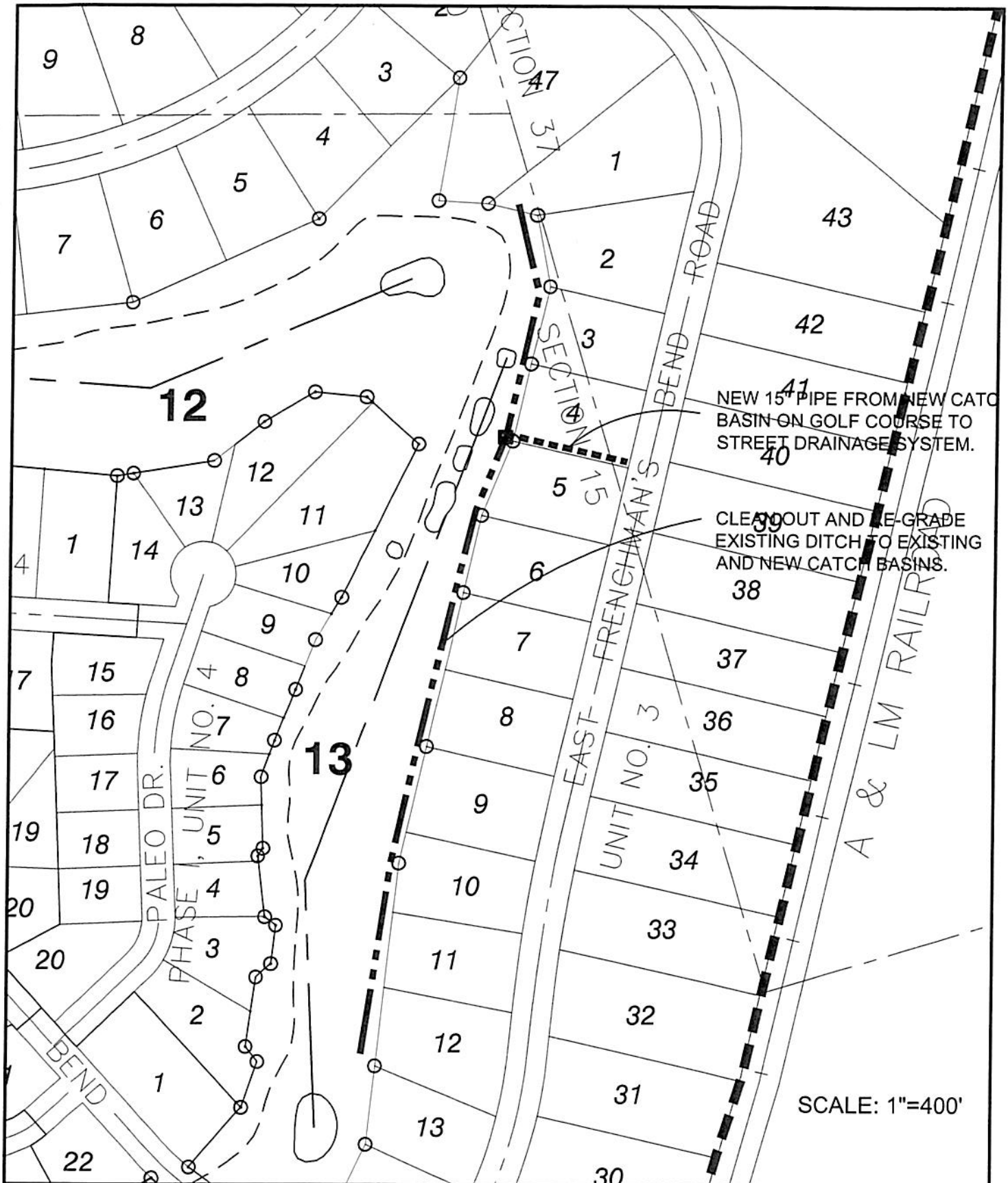
East Ouachita Gravity
Drainage District No. 2

PROJECT 1
INDIAN CREEK BACKWATER
CONTROL STRUCTURE



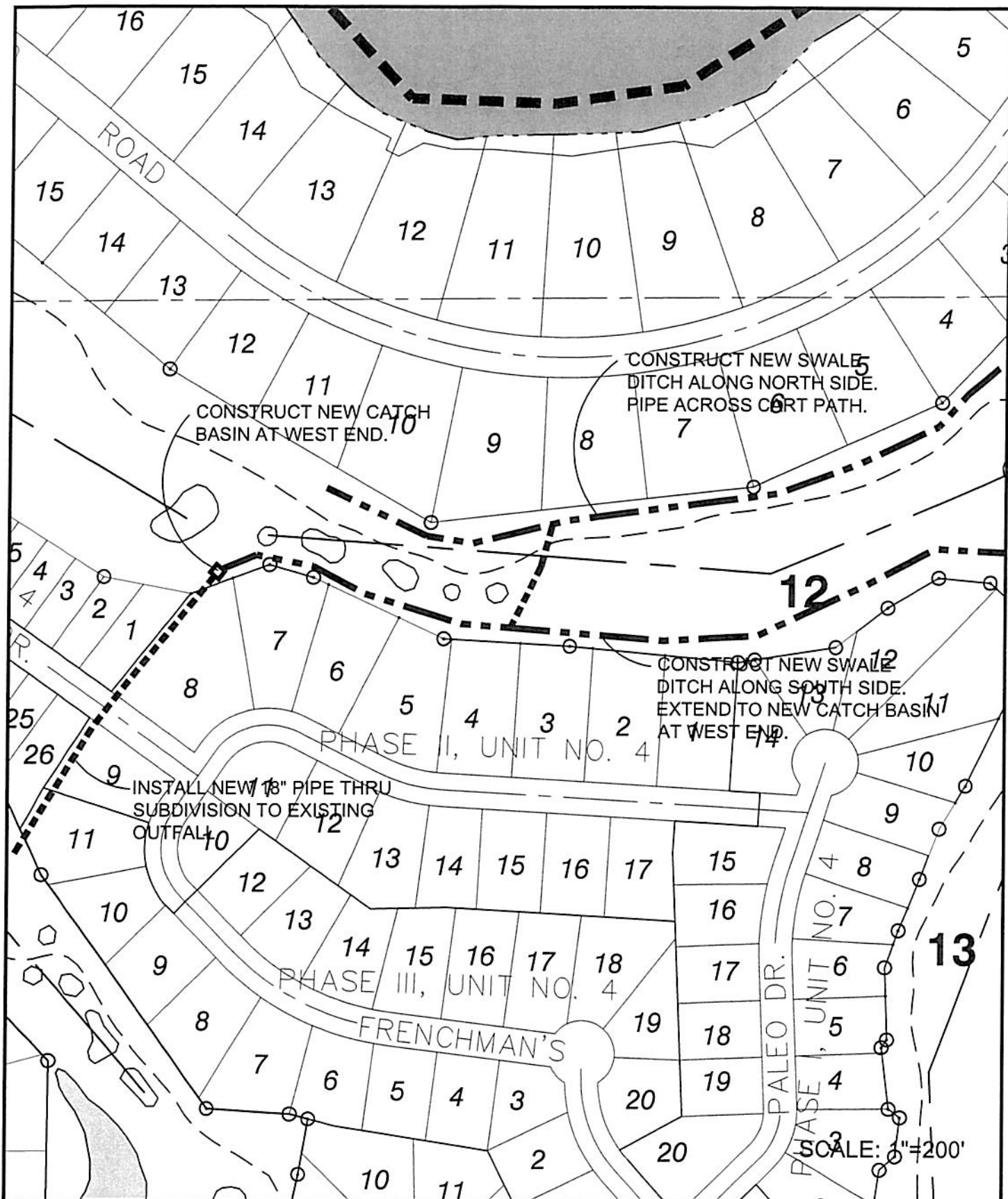
East Ouachita Gravity
Drainage District No. 2

PROJECT 2
RAILROAD DITCH
REHABILITATION



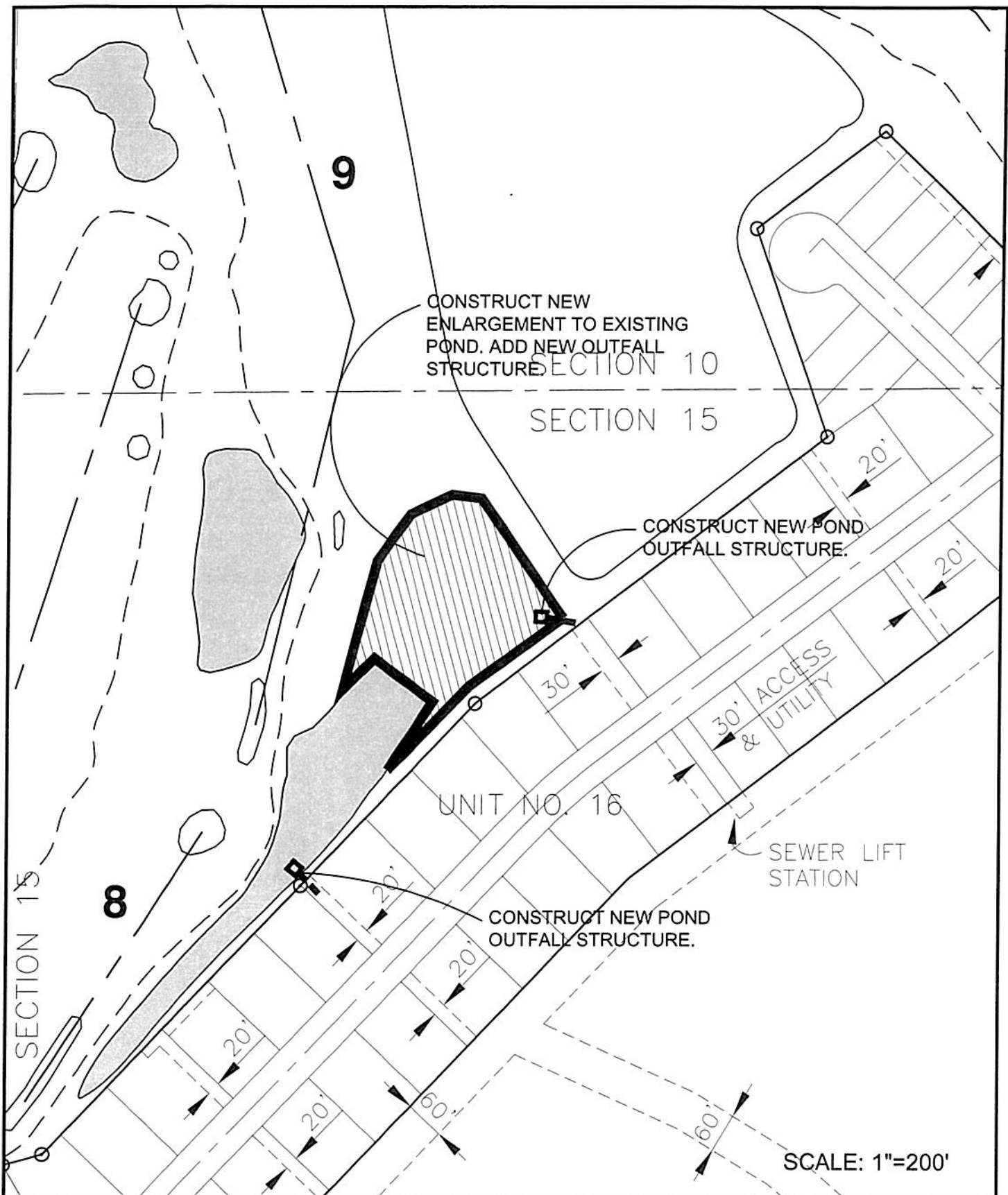
East Ouachita Gravity
Drainage District No. 2

PROJECT 3
UNIT 3 and HOLE #13
DRAINAGE IMPROVEMENTS



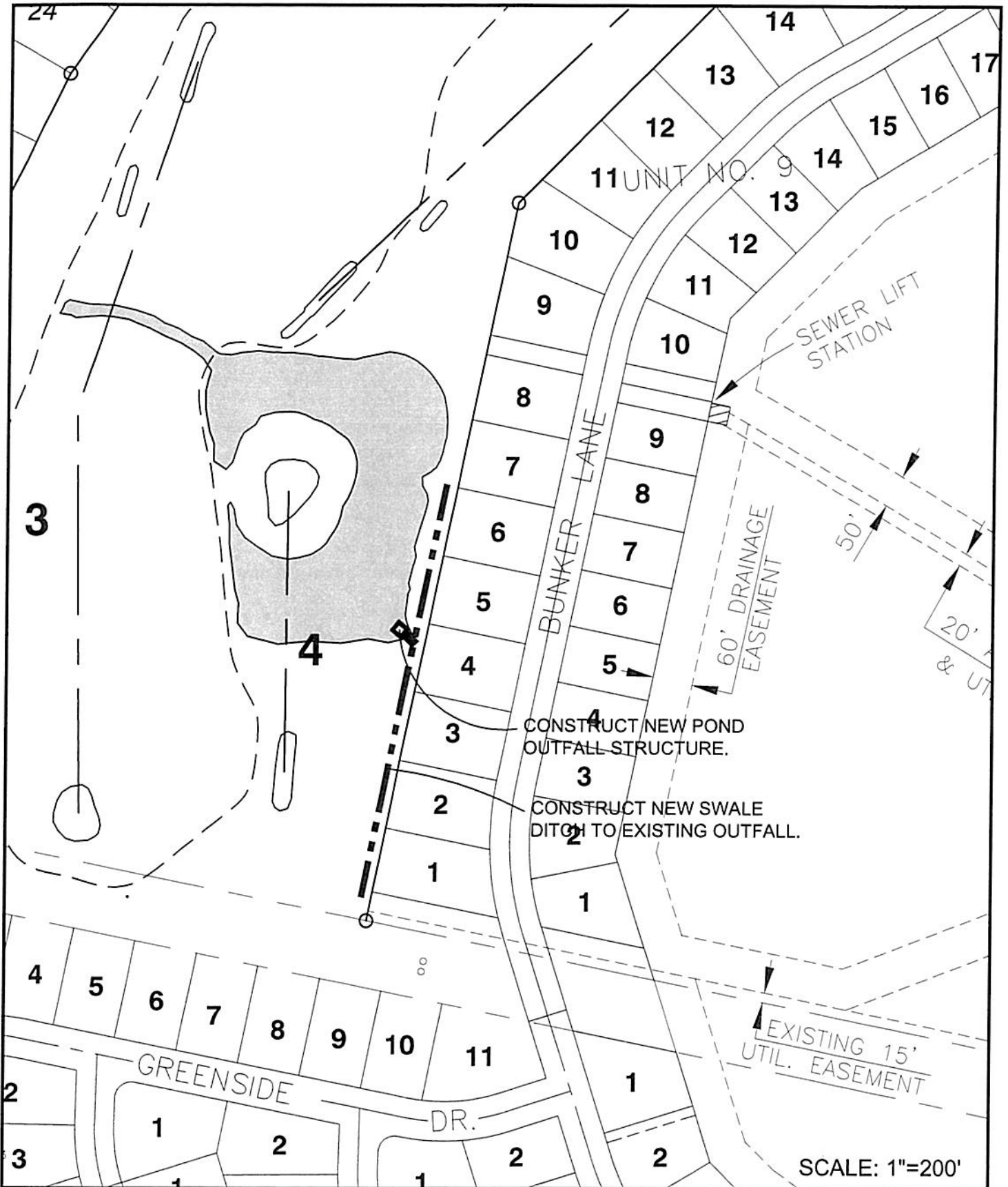
East Ouachita Gravity
Drainage District No. 2

PROJECT 4
HOLE #12
DRAINAGE IMPROVEMENTS



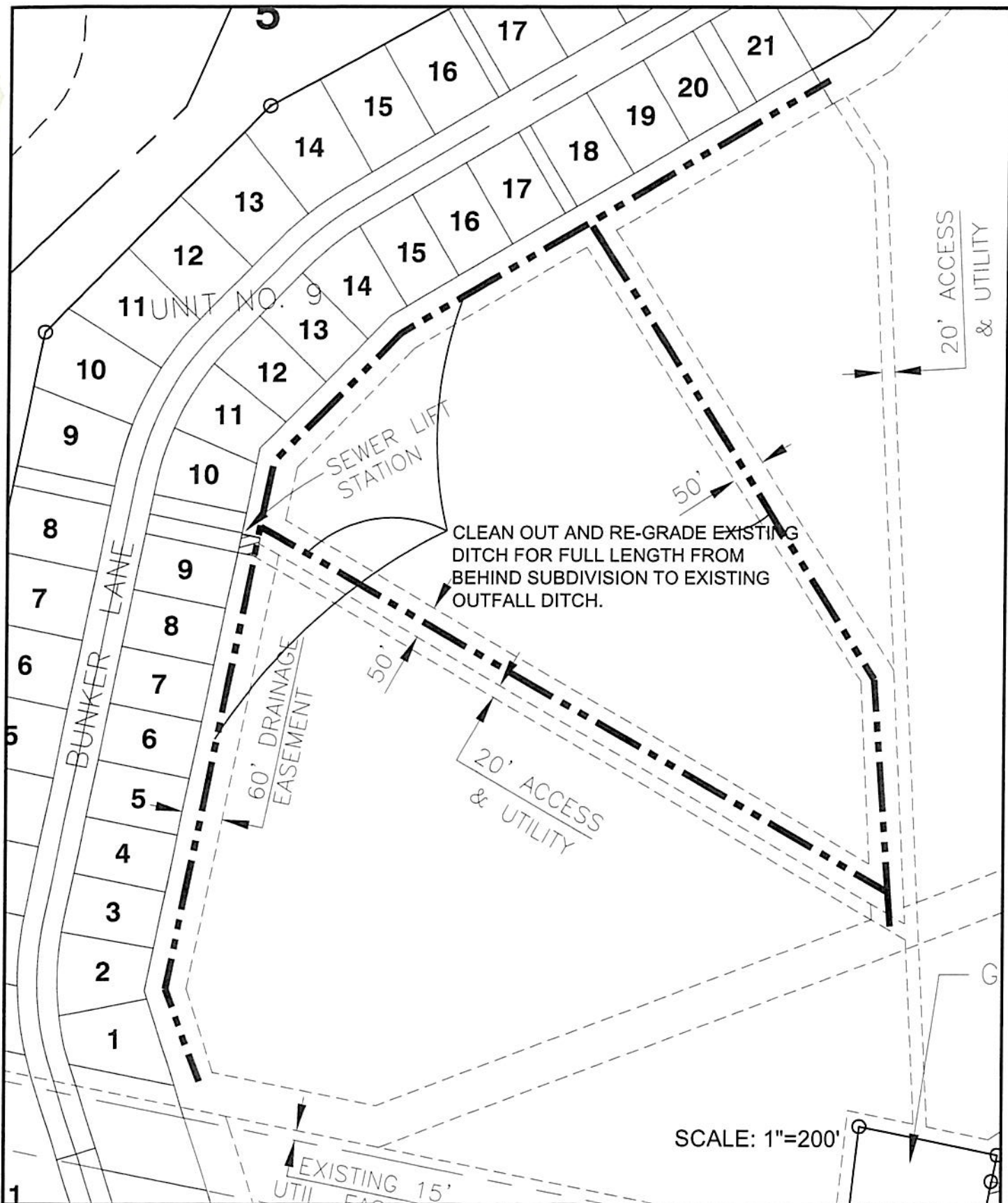
East Ouachita Gravity
Drainage District No. 2

PROJECT 6
HOLE #8
DRAINAGE IMPROVEMENTS



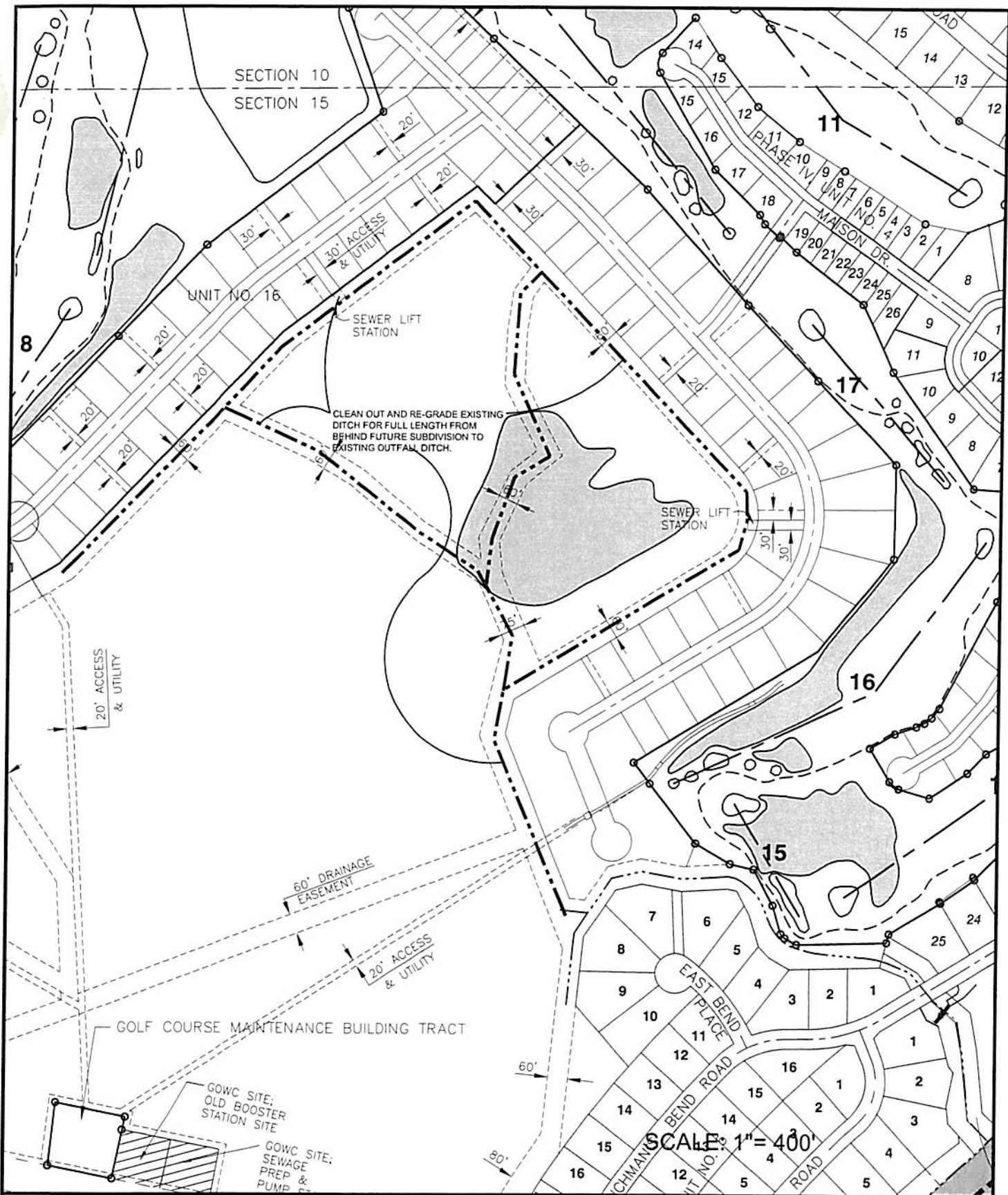
East Ouachita Gravity
Drainage District No. 2

PROJECT 7
HOLE #4
DRAINAGE IMPROVEMENTS



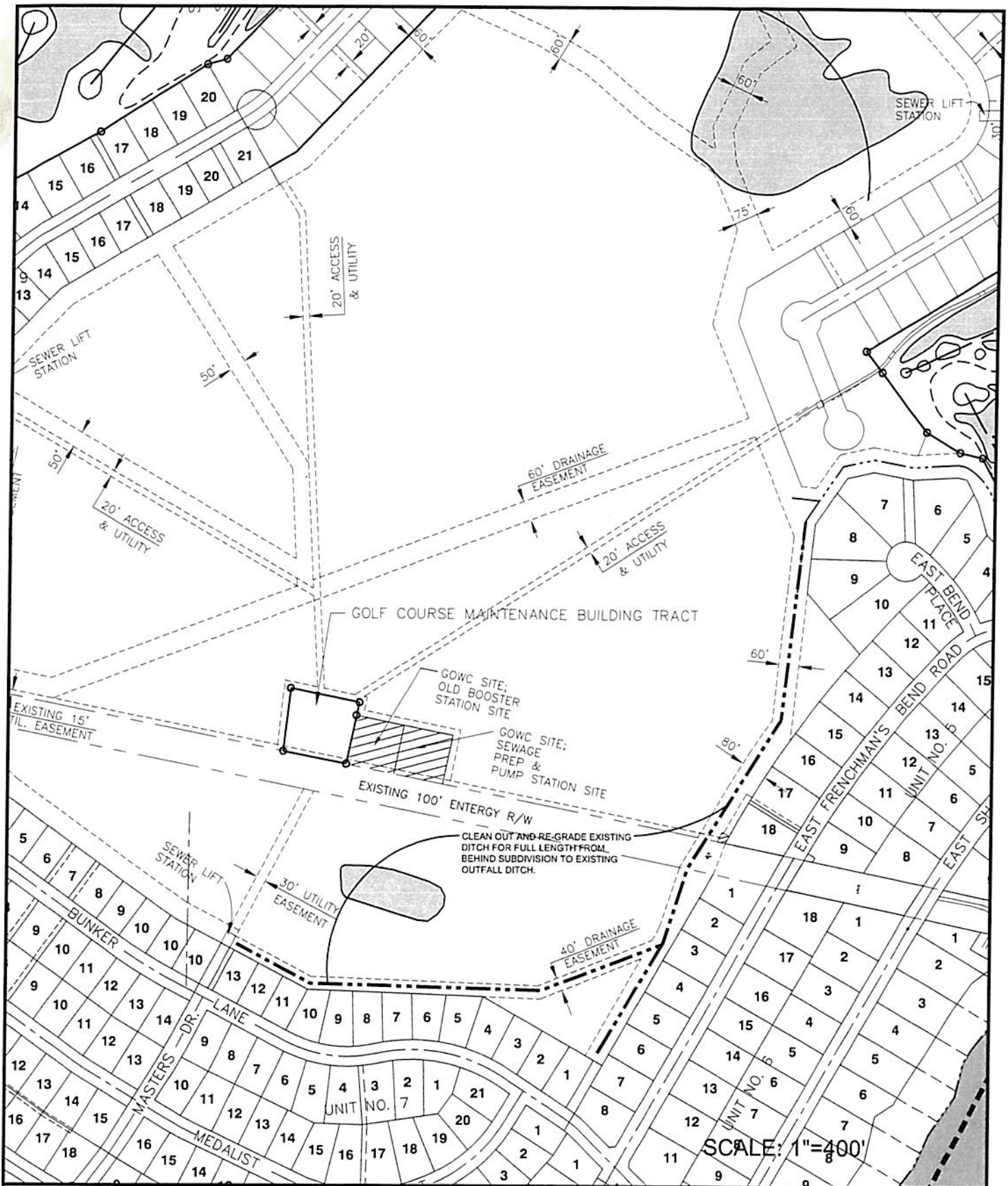
East Ouachita Gravity
Drainage District No. 2

PROJECT 8
MAJOR DITCH CLEANING
IN AREA "A"



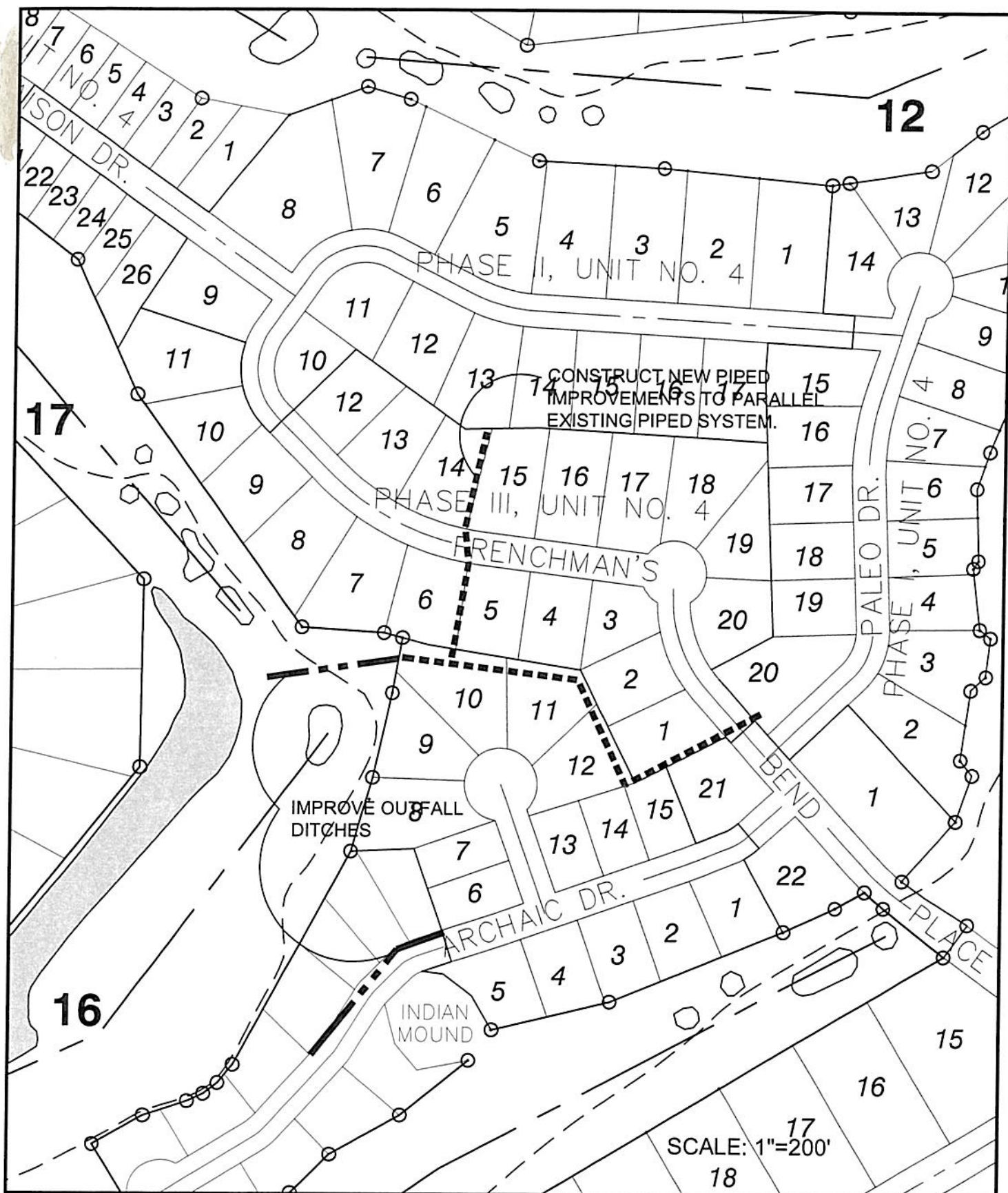
East Ouachita Gravity
Drainage District No. 2

PROJECT 9
MAJOR DITCH CLEANING
IN AREA "B"



East Ouachita Gravity
Drainage District No. 2

PROJECT 10
MAJOR DITCH CLEANING
IN AREA "C"



East Ouachita Gravity
Drainage District No. 2

PROJECT 11
UNIT 4
DRAINAGE IMPROVEMENTS