Volume 3: Norco

3.1 Executive Summary

St. Charles Parish tasked Principal Engineering, Inc. to complete the study of the Norco Drainage Area for the East Bank Master Drainage Plan. Principal Engineering performed analyses for the 25-Year and 100-Year Design Storms (NOAA Atlas 14) and developed drainage improvements that:

1. 25-Year: Reduce the water surface elevations in the canals to one foot below top of the bank such that future internal drainage improvements may function to eliminate street flooding.
2. 100-Year: Lower water surface elevations in the canals such that direct structure flooding from the canals is eliminated and future internal drainage improvements may function to eliminate internal area structure flooding.

The recommended program consists of the 25-Year improvements, and select 100-Year improvements at major street crossings and railroad crossings.

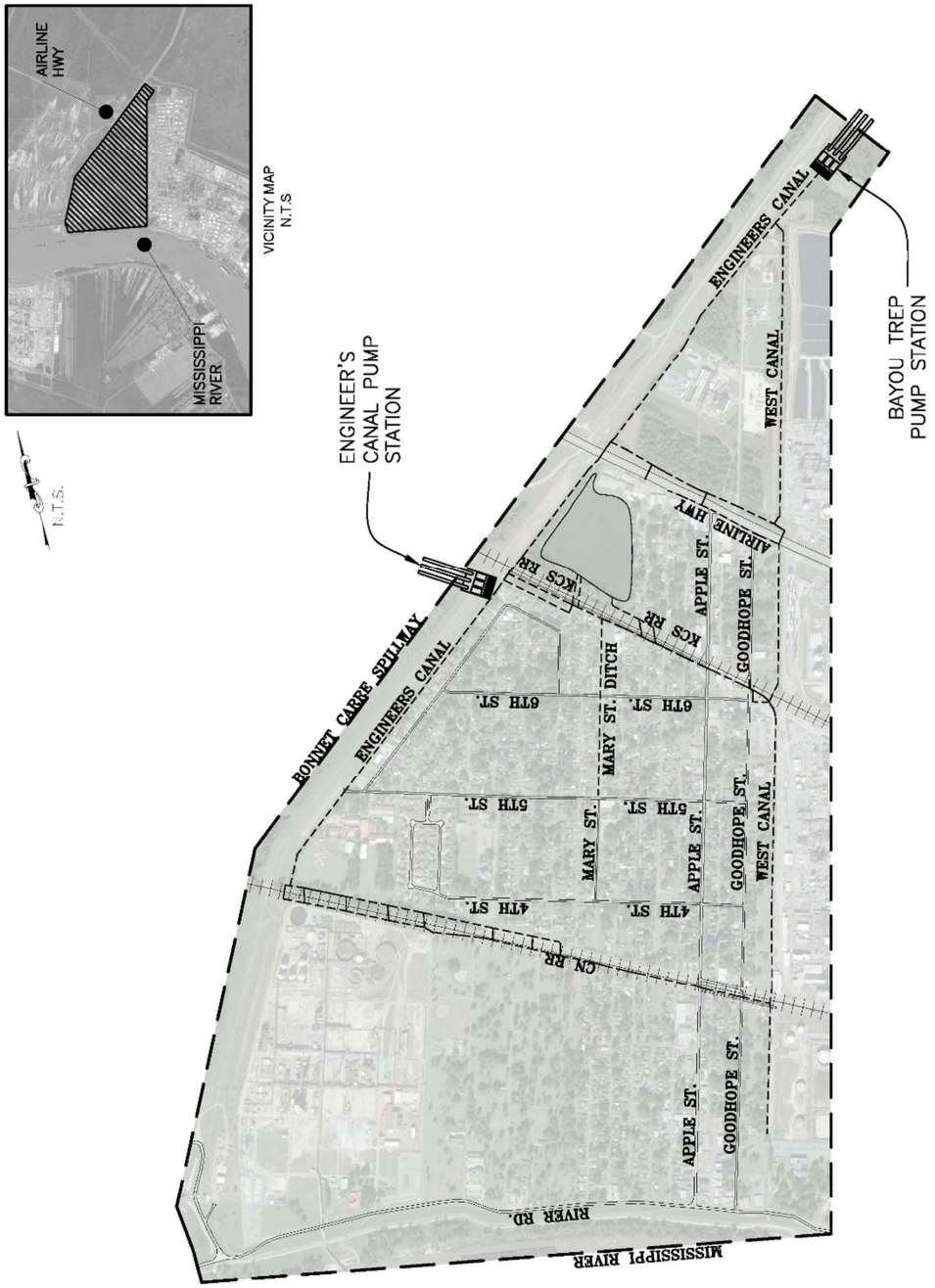
Analysis used models built in EPA SWMM and AutoDesk's Storm and Sanitary Analysis. Existing flood-prone areas identified were the Engineer's Canal south of KCS RR, Engineer Canal North of Airline Highway, the West Canal, and the Mary St. Canal.

The results of the existing conditions simulation illustrate the inadequacy of the drainage system for the design events.

The recommended improvements are grouped into phases and projects, building from the previous, in sensible order of construction, downstream to upstream. Some of the major improvements include upgrades to Engineer's Canal Pump Station or a new pump station to move water to the Bayou Trepagnier Pump Station, which is obstructed by, and connection from Engineer's Canal to Clayton's Pond.

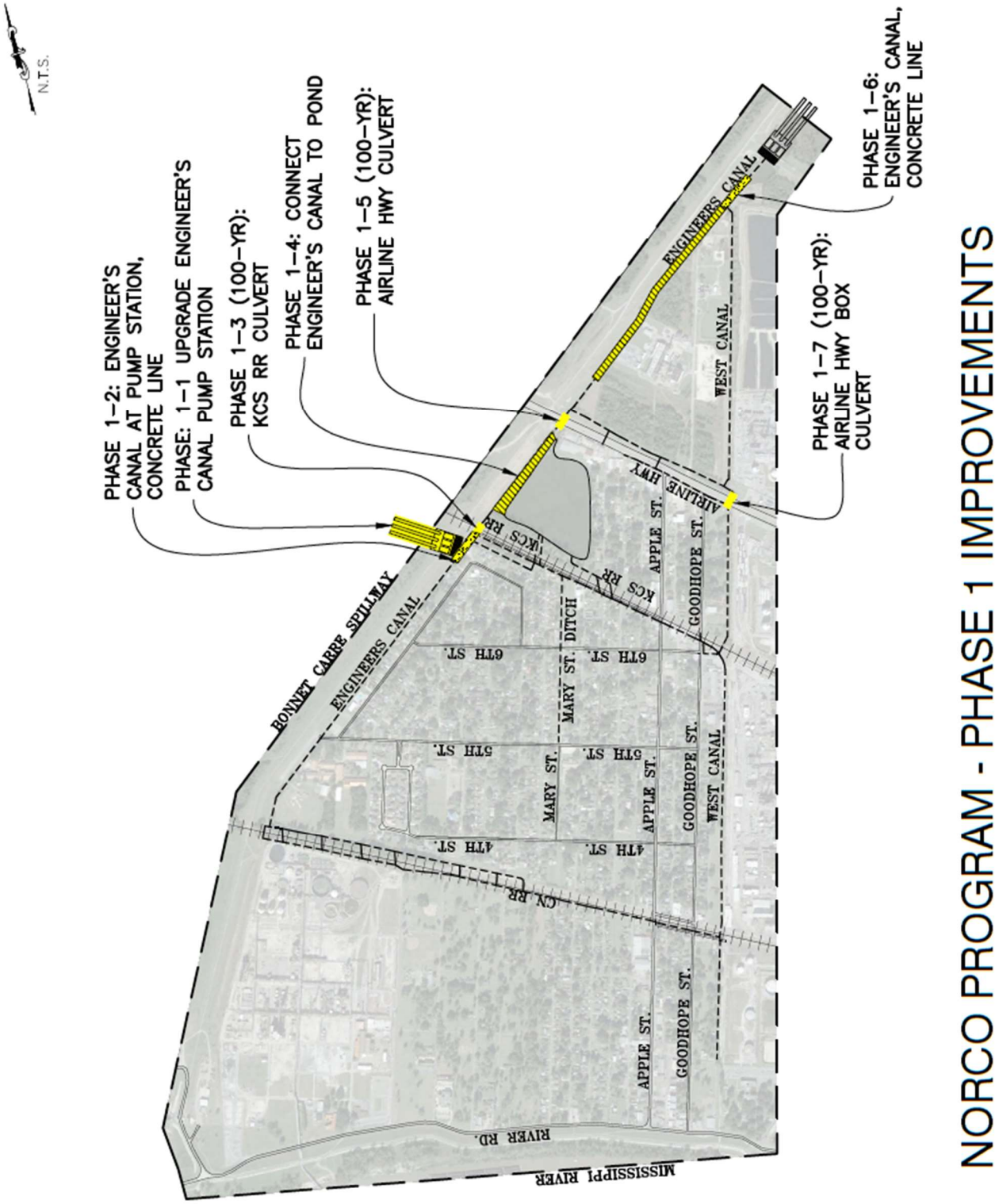
Modeled improvements have been partitioned into executable projects with cost estimates provided. It is expected that the Parish will create an integrated priority list consisting of projects from all basins, constructed individually as funding becomes available. A summary of projects and costs is tabulated on the following pages by phase.

Recommended Program Construction Cost Estimation		
Phase	**No. of Projects**	**Cost**
Phase 1	7	$32,358,700
Phase 2	7	$3,318,831
Phase 3	9	$1,581,875
Total	22	$37,259,406



NORCO WATERSHED

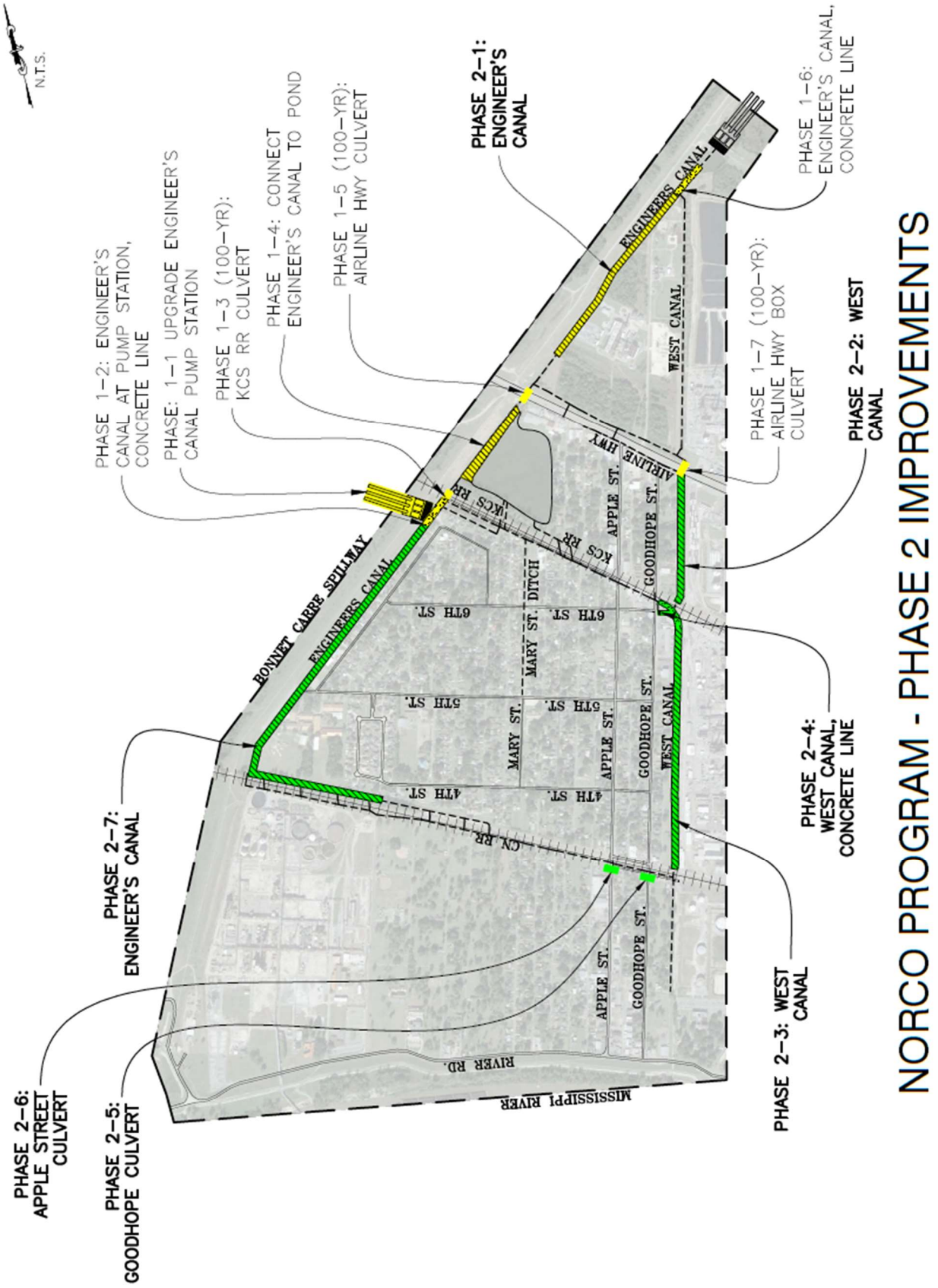
Phase 1 Projects and Construction Cost Estimates	
1-1: Engineer's Canal Pump Station Upgrade (Alternative 1) Upgrade Engineers Canal Pump Station from 185 cfs to 250 cfs.	$ 3,650,000.00
1-1: Additional Pump Station along Engineers Canal downstream of Airline Highway (Alternative 2) Additional 400 cfs Pump Station to pump water downstream toward Bayou Trepagnier Pump Station.	$ 14,980,000.00
1-2: Concrete Lined U-Channel leading into Engineer's Canal Pump Station Concrete-Lined U-Channel leading into the pump station from either side of Engineers Canal 8′ Depth x 30′ Width Approximately 360 linear feet	$ 1,476,000.00
1-3: 2-72" Pipes crossing KCS RR at Engineer's Canal Add 2-72″ Steel pipe crossing KCS RR Existing 66″ CMP and 2-72″ steel pipe to remain Approximately 180 linear feet (360′ material length)	$ 1,761,200.00
1-4: Connect Engineers Canal and Pond between KCS RR and Airline Highway Connect Engineers Canal and the existing pond by removing a portion of the levee between the channel and pond. This will equalize the pressure between the channel and the pond, and the pond will become a retention pond and sump for both pump stations. Approximate distance is subjective. Removing the entire levee between the canal and the pond and a portion of it will both result in equalization. The Cost Estimation portion of this study considers the entire levee being removed Approximately 1,200 ft	$ 478,200.00
1-5: 5-72" Pipes crossing Airline Highway along Engineer's Canal Add 5-72″ Steel Pipes Existing 3-54″ CMP and 2-60″ CMP Pipes to be removed. Approximately 220 linear feet (1100′ material length)	$ 5,568,500.00
1-6: Concrete Lined U-Channel West Canal and Engineer's Canal Converging Point Widen and concrete line channel to 50 feet, and 4 foot depth (or other depth allowed by pipeline crossings) into the Bayou Trepagnier Sump Approximately 280 linear feet	$ 1,444,800.00
1-7: 3-6′x6′ CBC under Airline Highway at West Canal Add 3-6′x6′ box culverts under Airline highway at West Canal Remove existing pipes. Approximately 125 linear feet (375′ material length)	$ 3,000,000.00
Phase 1 Subtotal	**$ 32,358,700**



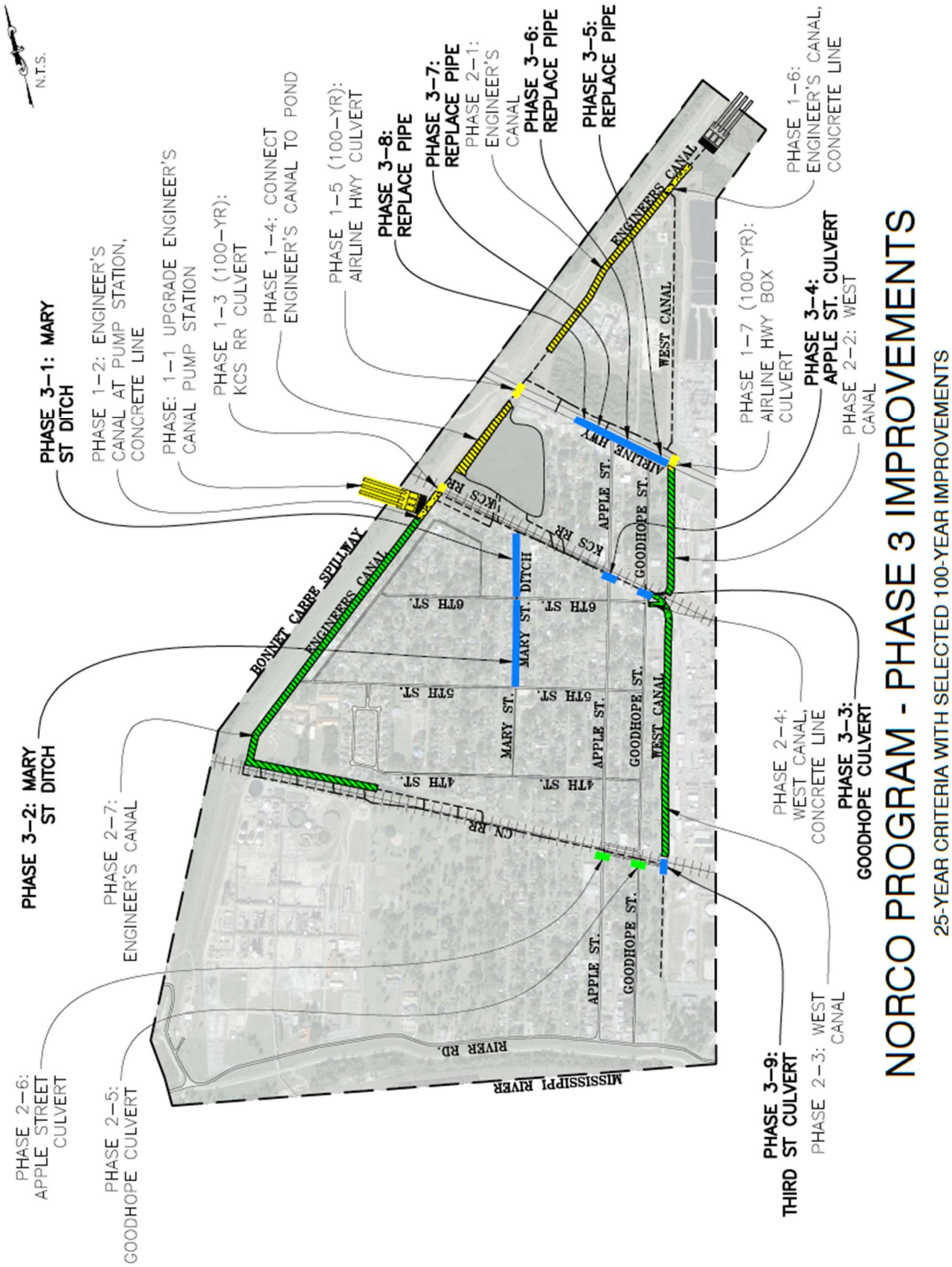
NORCO PROGRAM - PHASE 1 IMPROVEMENTS

25-YEAR CRITERIA WITH SELECTED 100-YEAR IMPROVEMENTS

Phase 2 Projects and Construction Cost Estimates		
2-1: Reshape and Clean Engineer's Canal Required reshaping and cleaning of Engineer's canal between Airline Hwy and Bayou Trepagnier Pump Station Approximately 2,800 linear feet	$	384,611.00
2-2: Reshape and Clean West Canal Required reshaping and cleaning of West canal between Airline Hwy and KCS RR 7 foot dept, 7 foot bottom width, 1:2 side slopes Approximately 1,500 linear feet	$	142,000.00
2-3: Reshape and Clean West Canal Required reshaping and cleaning of West canal between KCS RR and CN RR 6.5 foot dept, 10 foot bottom width, 1:1.8 side slopes Approximately 2,750 linear feet	$	244,500.00
2-4: Concrete Lined U-Channel leading into KCS RR Concrete lined U-channel the three channels leading into the trestle under KCS RR. The ditch along KCS RR from the west shall be 7 foot depth, 12 foot width Approximately 400 linear feet The ditch branching north shall be 7 foot depth, 10 foot width Approximately 180 linear feet	$	1,339,800.00
2-5: 1-5'x7' CBC at CN RR Southside Ditch crossing Goodhope St. Add 1-5'x7' concrete box culvert Remove existing 42" RCP Approximately 70 linear feet	$	229,320.00
2-6: 1-5'x7' CBC at CN RR Southside Ditch crossing Apple St. Add 1-5'x7' concrete box culvert Remove existing 54" RCP Approximately 100 linear feet	$	327,600.00
2-7: Reshape and Clean Engineer's Canal Required reshaping and cleaning of Engineer's canal between CN RR and Engineer's Canal Pump Station Approximately 4,800 linear feet	$	651,000.00
Phase 2 Subtotal	**$**	**3,318,831**


N.T.S.
PHASE 1–2: ENGINEER'S CANAL AT PUMP STATION, CONCRETE LINE
PHASE: 1–1 UPGRADE ENGINEER'S CANAL PUMP STATION
PHASE 1–3 (100–YR): KCS RR CULVERT
PHASE 1–4: CONNECT ENGINEER'S CANAL TO POND
PHASE 1–5 (100–YR): AIRLINE HWY CULVERT
PHASE 2–1: ENGINEER'S CANAL
PHASE 1–6: ENGINEER'S CANAL, CONCRETE LINE
PHASE 1–7 (100–YR): AIRLINE HWY BOX CULVERT
PHASE 2–2: WEST CANAL
PHASE 2–4: WEST CANAL, CONCRETE LINE
PHASE 2–3: WEST CANAL
PHASE 2–5: GOODHOPE CULVERT
PHASE 2–6: APPLE STREET CULVERT
PHASE 2–7: ENGINEER'S CANAL
BONNET CARRE SPILLWAY
ENGINEERS CANAL
WEST CANAL
AIRLINE HWY
KCS RR
CN RR
6TH ST.
5TH ST.
4TH ST.
MARY ST.
APPLE ST.
GOODHOPE ST.
DITCH
RIVER RD.
MISSISSIPPI RIVER
NORCO PROGRAM - PHASE 2 IMPROVEMENTS
25-YEAR CRITERIA WITH SELECTED 100-YEAR IMPROVEMENTS

Phase 3 Projects and Construction Cost Estimates		
3-1: 1-54" RCP or equivalent open channel along the Mary Street Ditch Fill in ditch; Insert 1-54″ pipe with appropriately spaced inlets or 5'x5' concrete lined U-Channel Approximately 780 linear feet	$	362,700.00
3-2: 1-48" RCP or equivalent open channel along the Mary Street Ditch Fill in ditch; Insert 1-48″ pipe with appropriately spaced inlets or 5'x5' concrete lined U-Channel Approximately 1,030 linear feet	$	458,350.00
3-3: 1-72" RCP along KCS RR at Goodhope St. Add 1-72″ RCP under Goodhope Remove existing 42″ Approximately 100 linear feet	$	60,000.00
3-4: 1-60" RCP along KCS RR at Apple St. Add 1-60″ RCP on south side Remove existing 42″ Approximately 80 linear feet	$	43,200.00
3-5: 1-72" RCP along Airline Hwy Replace 21" outfall pipe at West Canal and Airline Hwy with 1-72" RCP Approximately 260 linear feet	$	156,000.00
3-6: 1-60" RCP along Airline Hwy Replace 30" pipe between Goodhope St. and Airline Hwy box culvert near Apple St with 1-60" RCP Approximately 600 linear feet	$	324,000.00
3-7: 1-36" RCP along Airline Highway Replace 30″ pipe between Apple Street and Barreca Street with 1-36″ pipe Approximately 175 linear feet	$	72,625.00
3-8: 1-30" RCP along Airline Hwy Replace 15″ and 18″ pipe between Barreca Street and Clayton Drive with 1-30″ pipe Approximately 190 linear feet	$	76,000.00
3-9: 1-36" RCP along West Canal and Third Street Replace existing 21″ culvert with 1-36″ culvert under Third Street Approximately 35 linear feet	$	29,000.00
Phase 3 Subtotal	**$**	**1,581,875**


N.T.S.
NORCO PROGRAM - PHASE 3 IMPROVEMENTS
25-YEAR CRITERIA WITH SELECTED 100-YEAR IMPROVEMENTS
PHASE 3–1: MARY ST DITCH
PHASE 1–2: ENGINEER'S CANAL AT PUMP STATION, CONCRETE LINE
PHASE: 1–1 UPGRADE ENGINEER'S CANAL PUMP STATION
PHASE 1–3 (100–YR): KCS RR CULVERT
PHASE 1–4: CONNECT ENGINEER'S CANAL TO POND
PHASE 1–5 (100–YR): AIRLINE HWY CULVERT
PHASE 3–8: REPLACE PIPE
PHASE 3–7: REPLACE PIPE
PHASE 2–1: ENGINEER'S CANAL
PHASE 3–6: REPLACE PIPE
PHASE 3–5: REPLACE PIPE
PHASE 1–6: ENGINEER'S CANAL, CONCRETE LINE
PHASE 1–7 (100–YR): AIRLINE HWY BOX CULVERT
PHASE 3–4: APPLE ST. CULVERT
PHASE 2–2: WEST CANAL
PHASE 3–2: MARY ST DITCH
PHASE 2–7: ENGINEER'S CANAL
PHASE 2–4: WEST CANAL, CONCRETE LINE
PHASE 3–3: GOODHOPE CULVERT
PHASE 2–6: APPLE STREET CULVERT
PHASE 2–5: GOODHOPE CULVERT
PHASE 3–9: THIRD ST CULVERT
PHASE 2–3: WEST CANAL
BONNET CARRE SPILLWAY
ENGINEERS CANAL
WEST CANAL
AIRLINE HWY
KCS RR
CN RR
APPLE ST.
GOODHOPE ST.
MARY ST. DITCH
MARY ST.
6TH ST.
5TH ST.
4TH ST.
RIVER RD.
MISSISSIPPI RIVER