U.S. ARMY CORPS
OF ENGINEERS

Office of the Chief of Engineers
Value Engineering Study Team

VALUE ENGINEERING STUDY FOR

UPGRADE PUMP STATIONS 2 AND 3 JEFFERSON PARISH, LA

Sponsored By:

U.S. Army Engineer District, New Orleans

October 1997

DOD SERVICE: USACE
CONTROL NO: CELMN-VE-98-01
VALUE ENGINEERING OFFICER: Frank Vicidomina

Value Engineering Study for the

UPGRADE PUMP STATIONS 2 AND 3

JEFFERSON PARISH, LA

October 1997

U.S. Army Engineer District, New Orleans

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VALUE ENGINEERING TEAM STUDY
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PROJECT TITLE: Upgrade Pump Stations 2 and 3
PROJECT LOCATION: New Orleans, LA

Pump Station No. 2 (Suburban Canal Pumping Station)

This project expands the existing pump station. The existing Jefferson Parish Pumping Station No. 2 is located at the northern end of Suburban Canal and discharges directly into Lake Pontchartrain. The purpose for expanding this pump station is to reduce flood damages in Jefferson Parish, Louisiana. This expansion consists of a 134' x 54' addition to the main building to house two 1,200 cfs horizontal pumps and required equipment. An exterior maintenance bridge crane will be added on the north side of the building. The current working estimate (CWE) for this project is $4,827,152.

Pump Station No. 3 (Elmwood Canal Pumping Station)

The objective of this project is to reduce future flood damage by increasing the pumping capacity of the Elmwood Pumping Station by a nominal 2,300 cfs by the addition of two nominally 1,150 cfs horizontal pumps.

This project includes modifications to the existing suction basin, construction of a pile supported building structurally separate from, on the east side of, and close to, the existing Elmwood Pumping Station and installation of two horizontal nominally 1,150 cfs pumps, complete with all required ancillary equipment and modifications to the discharge basin in Lake Pontchartrain.

An exterior maintenance bridge crane will also be added and will serve the new addition as well as the existing pump station. No cost estimate was included in this design submittal.

Both Pump Stations

In general, the station additions will include horizontal pumps driven by 3,000 HP diesel engines. Priming of the pumps are by independent, electric motor or diesel engine driven vacuum pumps. Engine starting will be by compressed air stored in compressed air tanks, compressed by electric motor or diesel engine driven compressors. Diesel fuel oil will be stored in fuel oil storage tanks, which will supply day tanks.

It should be noted that the horizontal pumps, diesel engines, and gear reducers are not a part of these design packages. The decision to use horizontal pumps and diesel drivers was made by Jefferson Parish, hence, the design teams simply responded to their wish. The pumps, drivers, and gear reducers will be purchased under a separate contract and will be supplied as Government-furnished equipment for these expansion projects.

VALUE ENGINEERING TEAM STUDY
EXECUTIVE SUMMARY

The Value Engineering Study was conducted in the New Orleans' District Office during the week of 6-10 October 1997.The study was based on the Concept (50%) Design Submission Reports, dated October 1997.

The project was studied using the standard VE methodology, consisting of five phases: Information, Speculation, Analysis, Development, and Presentation.

During the Information Phase, the Team studied the drawings, figures, descriptions of project work, and cost estimates to fully understand the work to be performed and the functions to be achieved. Cost Models were prepared to determine areas of relative high cost to ensure that the Team focused on those parts of the project which offered the most potential for cost savings. (See Appendix C.)

The Team performed the Speculation Phase by conducting a brainstorming session to generate ideas for alternative designs (see Appendix B). All Team Members were encouraged to contribute ideas.

Following the Speculation Phase, the Team analyzed these ideas and ranked them by priority for development. Ideas which did not survive critical analysis were deleted.

The surviving ideas were developed by the VE Study Team. In addition to proposals, VE Team Comments are included. Also, proposal estimates shown on the Cost Estimate Worksheet use a markup of 15% for all proposals. The 15% markup was taken from the Oleander and Dublin Pump Station/Canal Estimate.

VALUE ENGINEERING TEAM STUDY
SUMMARY OF RECOMMENDATIONS

Forty-eight ideas for ways to improve the project or reduce costs were generated during the Speculation Phase of this study. The Analysis Phase of the study reduced the ideas to 16 proposals and 14 comments.

PROPOSAL NO.	DESCRIPTION	POTENTIAL SAVINGS
C-1	Provide Bituminous Vice Concrete Paving for Area Adjacent to New Building (Station No. 3)	$10,763
C-2	Provide Bituminous Paving for Access Roads (Station No. 2)	($18,012) Quality Improvement
C-3	Modify the Cofferdam and Grading Plan on Pump Station No. 2	$375,981
A-1	Revise Copper Standing Seam Metal Roofing (Station No. 3)	$238,573
A-2	Delete Structural Bay Between Column Lines B and C Containing Office (Station No. 3)	$152,352
A-3	Reduce Thickness of Precast Concrete Wall Panels (Station Nos. 2 and 3)	$29,193
M-1	Reduce Capacity of Exterior Crane on Pump Station No. 2	$11,500
M-2	Reduce Capacity of Interior Bridge Crane on Pump Station No. 3	$11,500
M-3	Reduce Quantity of Combustion Air Intake Piping on Plant No. 3	$13,800
M-4	Reduce Mechanical Equipment and Size of Building at Pump Station No. 2	$237,967

PROPOSAL NO.	DESCRIPTION	POTENTIAL SAVINGS
M-5	Reduce Number of Vacuum Pumps for Pump Station No. 2	$142,255
M-6	Consider Vertical Pumps at Pump Station Nos. 2 and 3	$11,270,000
M-7	Reduce Mechanical Equipment and Building Size of Pump Station No. 3	$261,473
M-8	Provide a Wet Pipe Sprinkler in Pump Stations Nos. 2 and 3	($87,890)
E-1	Use Existing Emergency Generators at Pump Station No. 2	$307,510
E-2	Provide New Emergency Generator to Drive Existing Electrical pump (Pump Station No. 2)	($138,000)

TOTAL POTENTIAL CUMULATIVE SAVINGS **$13,026,532**

(Summation of all Proposals except C-2, M-8 and E-2. Also Proposals A-1, A-2 and A-3 are adjusted for overlapping.)

VALUE ENGINEERING PROPOSAL

PROPOSAL NO: C-1 PAGE NO: 1 OF 5

DESCRIPTION: Provide Bituminous Vice Concrete Paving for Area Adjacent to New Building (Station No. 3)

ORIGINAL DESIGN:

Drawing No. 1 shows concrete paving for the area immediately adjacent to the new building addition. The east end of the addition encloses a drive-thru/loading dock at grade level (see Drawing No. 2).

PROPOSED DESIGN:

Except for the enclosed drive-thru/loading dock, substitute a bituminous paving system for the concrete paving.

ADVANTAGES/JUSTIFICATION:

1. Concrete paving does not appear to be necessary or justified in this location, particularly since the corresponding adjacent area for Pump Station No. 2 has been requested by the User to be constructed of bituminous surface material (see Drawing No. 3).
2. Reduces construction costs.

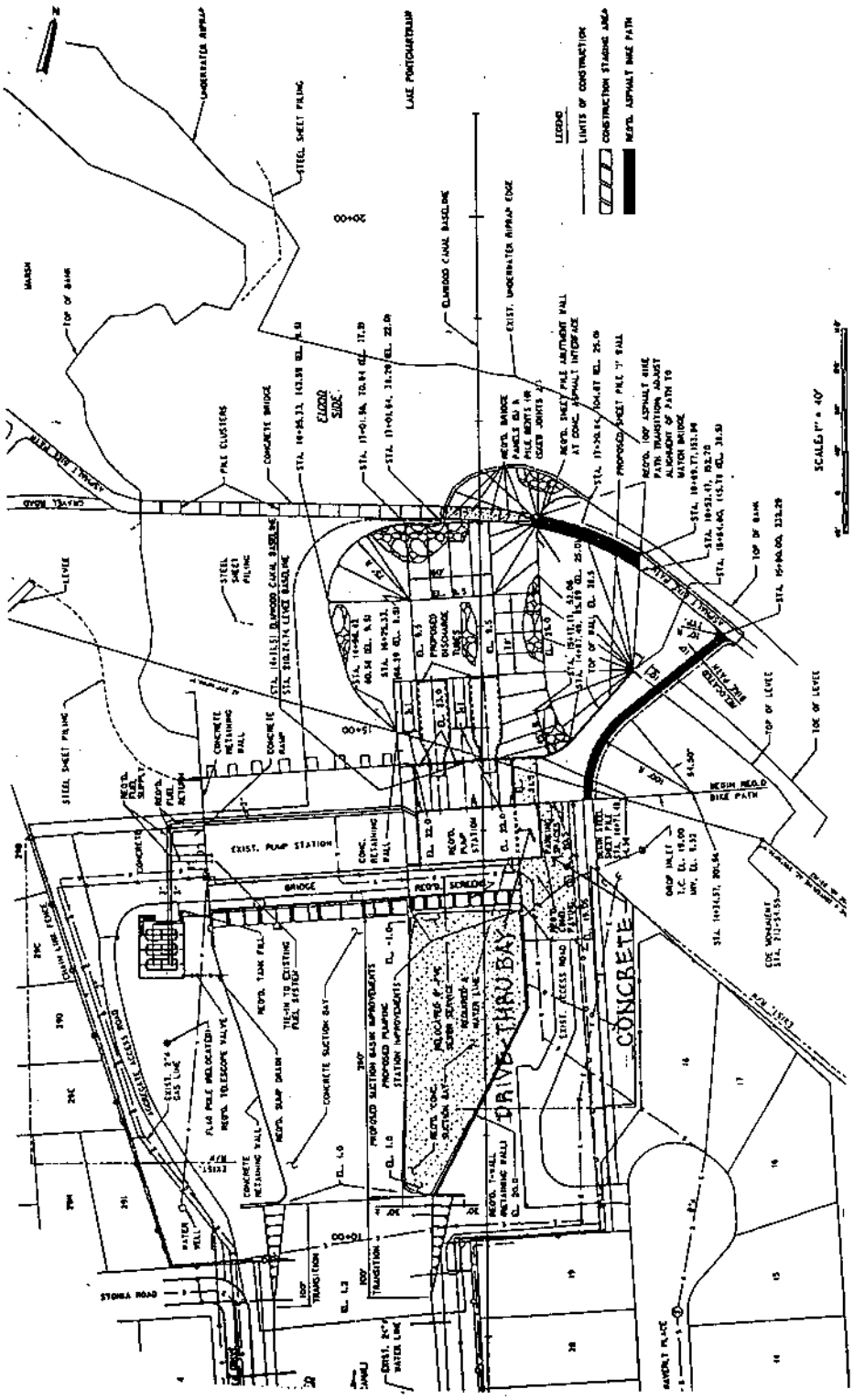
DISADVANTAGES:

Not as durable as concrete paving.

JUSTIFICATION:

See "Advantages".

DRAWING NO. 1

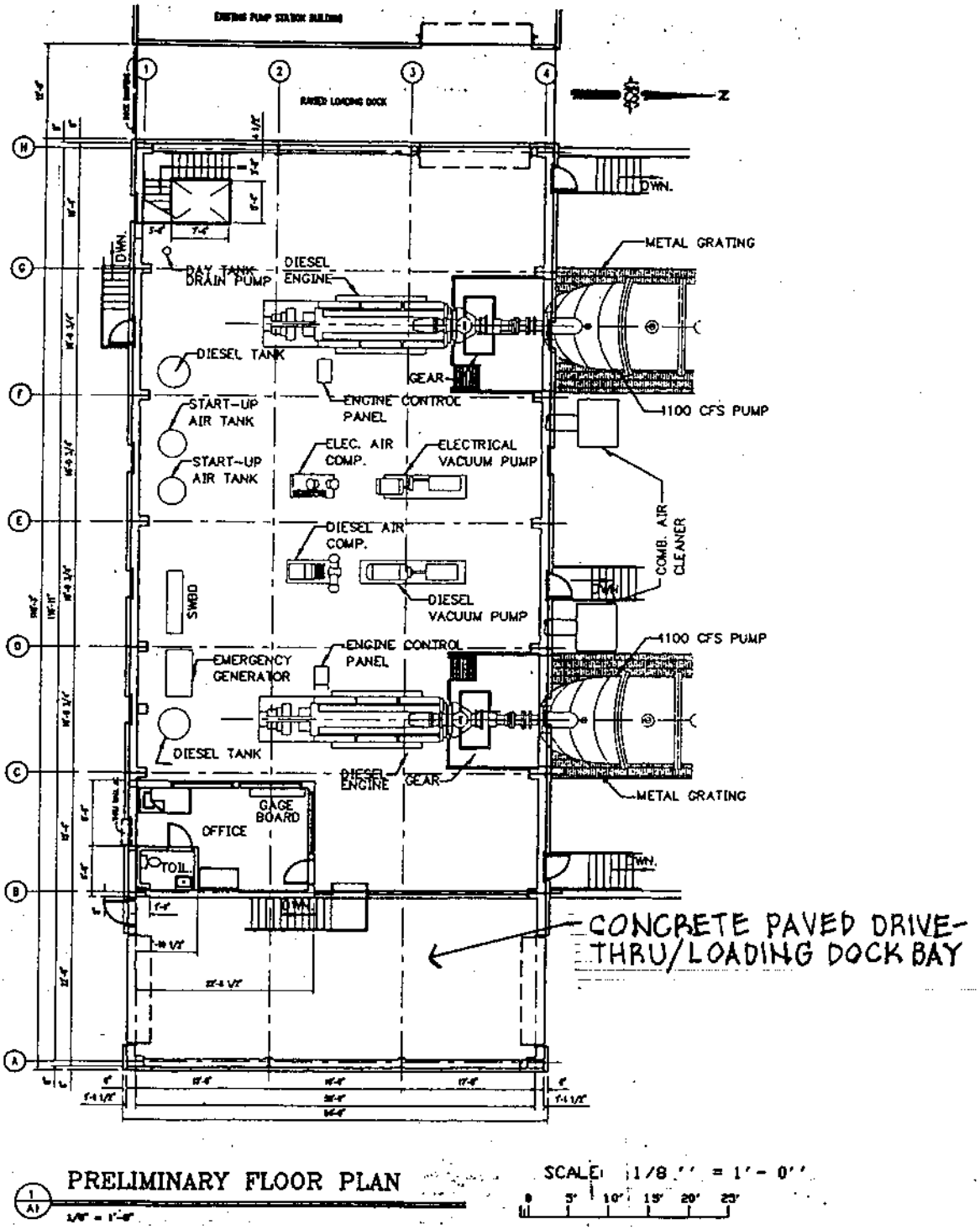


SITE PLAN
(STATION No. 3)

VALUE ENGINEERING PROPOSAL

PROPOSAL NO: C-1 PAGE NO: 3 OF 5

DRAWING NO. 2



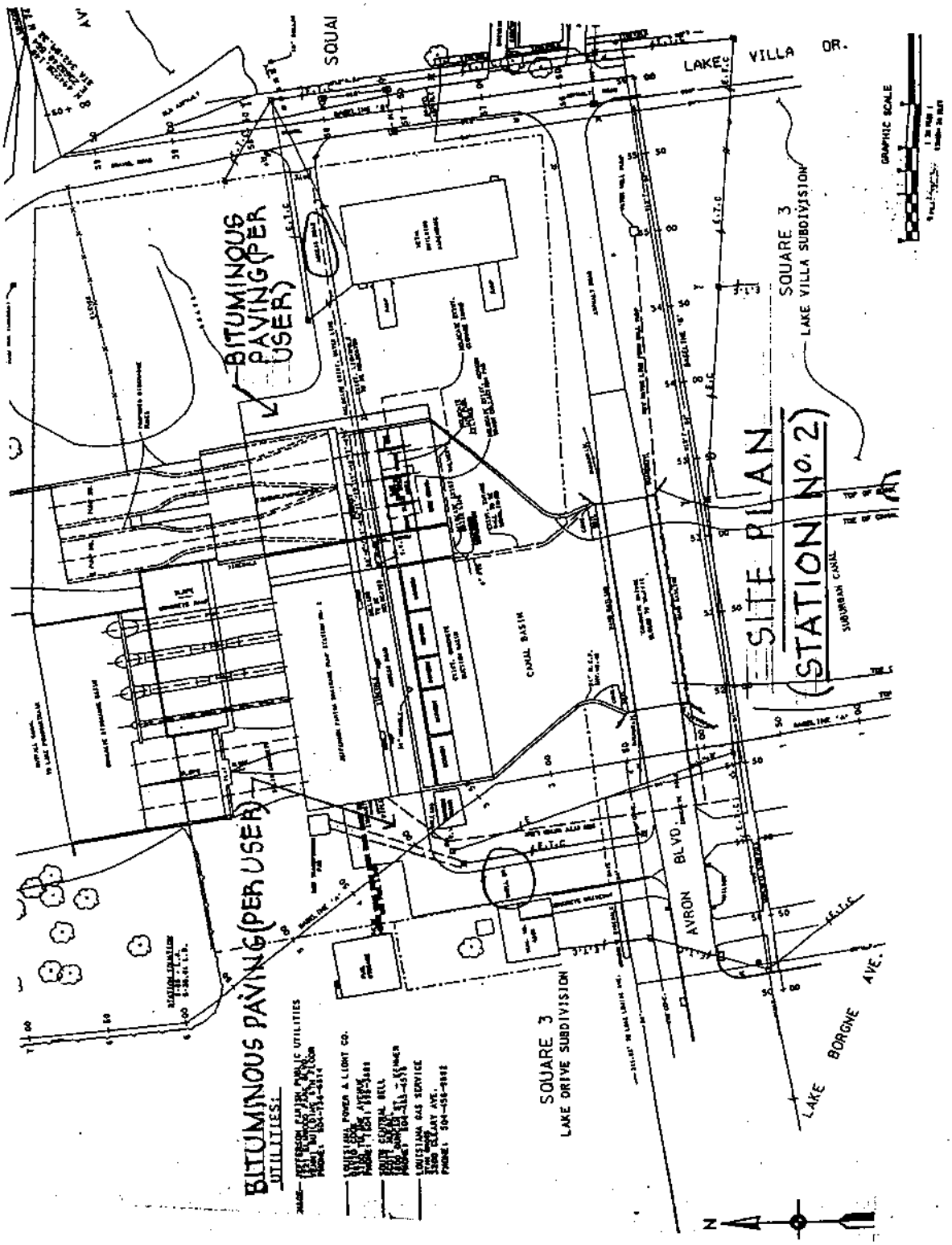
PRELIMINARY FLOOR PLAN

SCALE: 1/8'' = 1'- 0''

VALUE ENGINEERING PROPOSAL

PROPOSAL NO: C-1 PAGE NO: 4 OF 5

DRAWING NO. 3



COST ESTIMATE WORKSHEET

PROPOSAL NO: C-1 PAGE NO: 5 OF 5

DELETIONS

ITEM	U/M	QTY	UNIT COST	TOTAL
7" Concrete	SY	764	$21.00	$16,044
9" Subgrade	CY	191	32.50	6,208
TOTAL DELETIONS				$22,252

ADDITIONS

ITEM	U/M	QTY	UNIT COST	TOTAL
2" Asphalt	SY	764	$8.75	$6,685
9" Subgrade	CY	191	32.50	6,208
TOTAL ADDITIONS				$12,893

Net Savings (Deletes - Adds)	$9,359
Markups 15%	1,404
TOTAL SAVINGS	$10,763

VALUE ENGINEERING PROPOSAL

PROPOSAL NO: C-2 PAGE NO: 1 OF 3

DESCRIPTION: Provide Bituminous Paving for Access Roads (Station No. 2)

ORIGINAL DESIGN:

Drawing No. 1 shows a new access road from Lake Villa Drive to the new building addition, and existing Shell Drive leading from Avron Boulevard to the existing Pump Station. The latter road is gravel, and the new access road is specified to be crushed limestone.

PROPOSED DESIGN:

Recommend bituminous paving system be substituted for the gravel and crushed limestone roads.

ADVANTAGES/JUSTIFICATION:

1. Bituminous paving will not create the numerous maintenance problems experienced by the Users with the existing gravel road and the specified crushed limestone.
2. The User requested bituminous paving as a quality improvement.

DISADVANTAGES:

Additional cost.

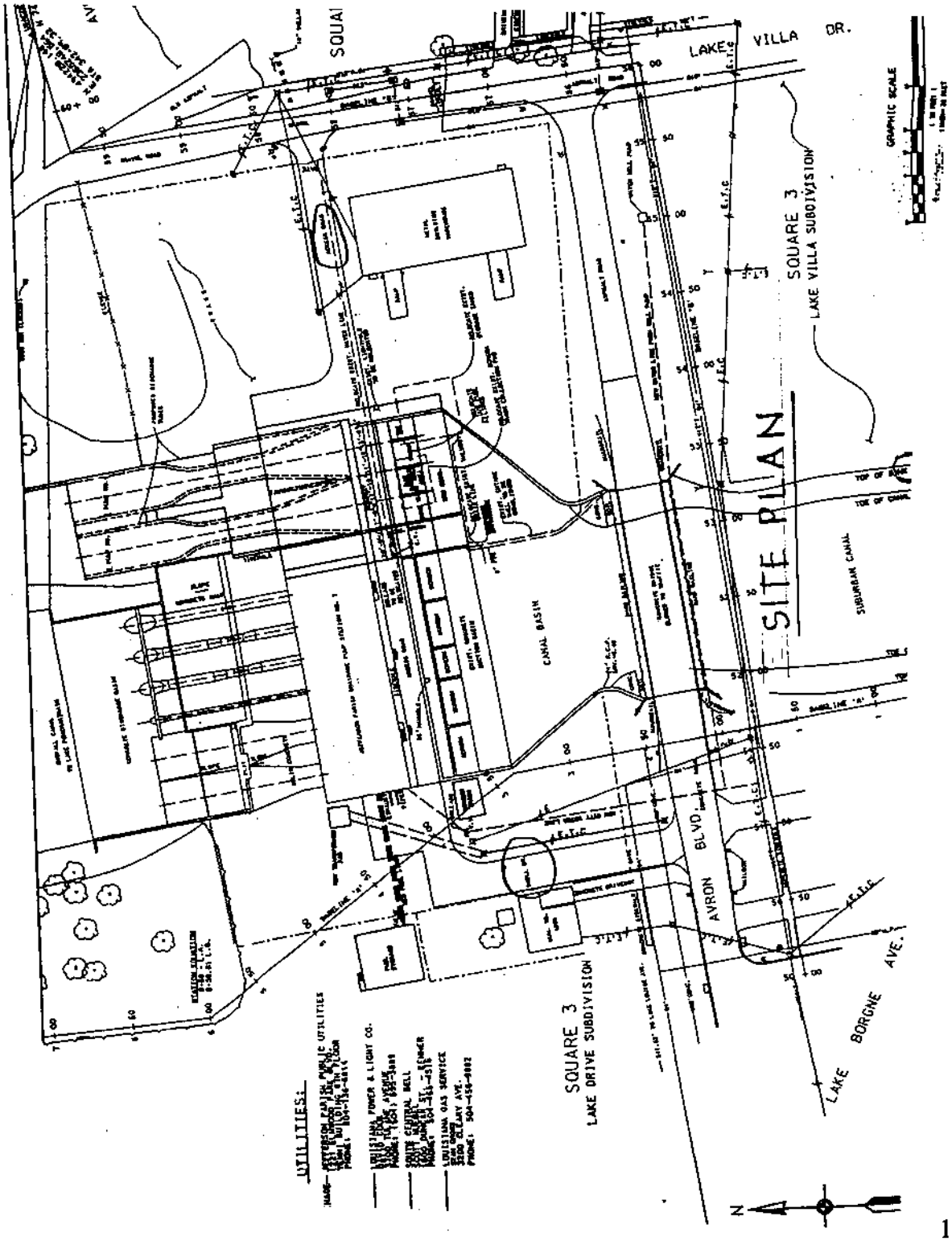
JUSTIFICATION:

See "Advantages".

VALUE ENGINEERING PROPOSAL

PROPOSAL NO: C-2 PAGE NO: 2 OF 3

DRAWING NO. 1



COST ESTIMATE WORKSHEET

PROPOSAL NO: C-2 PAGE NO: 3 OF 3

DELETIONS

ITEM	U/M	QTY	UNIT COST	TOTAL
10" Crushed Limestone (New Access Road)	CY	192	$9.00	1,728
Gravel & Shell (Shell Drive)	CY	94	6.00	565
TOTAL DELETIONS				$2,292

ADDITIONS

ITEM	U/M	QTY	UNIT COST	TOTAL
2" Asphalt (Both Roads)	SY	1,064	$8.75	$9,310
9" Subgrade (Both Roads)	CY	266	32.50	8,645
TOTAL ADDITIONS				$17,955

Net Savings (Deletes - Adds)	($15,663)
Markups 15%	(2,350)
TOTAL INCREASE	($18,012)

Note: Cost increase may be less if gravel and shell at Shell Drive can be used in the new bituminous paving system for that road.

VALUE ENGINEERING PROPOSAL

PROPOSAL NO: C-3 PAGE NO: 1 OF 4

DESCRIPTION: Modify the Cofferdam and Grading Plan on Pump Station No. 2

ORIGINAL DESIGN:

The current design creates four cofferdam cells on the east side of the existing pump station. Cells 1 and 2 are for the excavation of material to construct the discharge tubes. Cell 3 is for excavation of the pump station building and Cell 4 is for the intake suction basin (see Drawing No. 1).

PROPOSED DESIGN:

Construct two cells. The first cell (Cell 1) will be north of the existing sheet pile floodwall. This cell is the same as the current Cell 1. The second cell (Cell 2) is a combination of Cells, 2, 3, and 4 from the existing design. However, these two new cells are reduced in size from the area in the current design. It is 15' closer to the existing facility and parallels the intake suction basin on a diagonal to the Avron bridge abutment (see Drawing No. 2).

ADVANTAGES:

1. Reduces quantity of sheet pile required.
2. Reduces amount of excavation.

DISADVANTAGES:

None known.

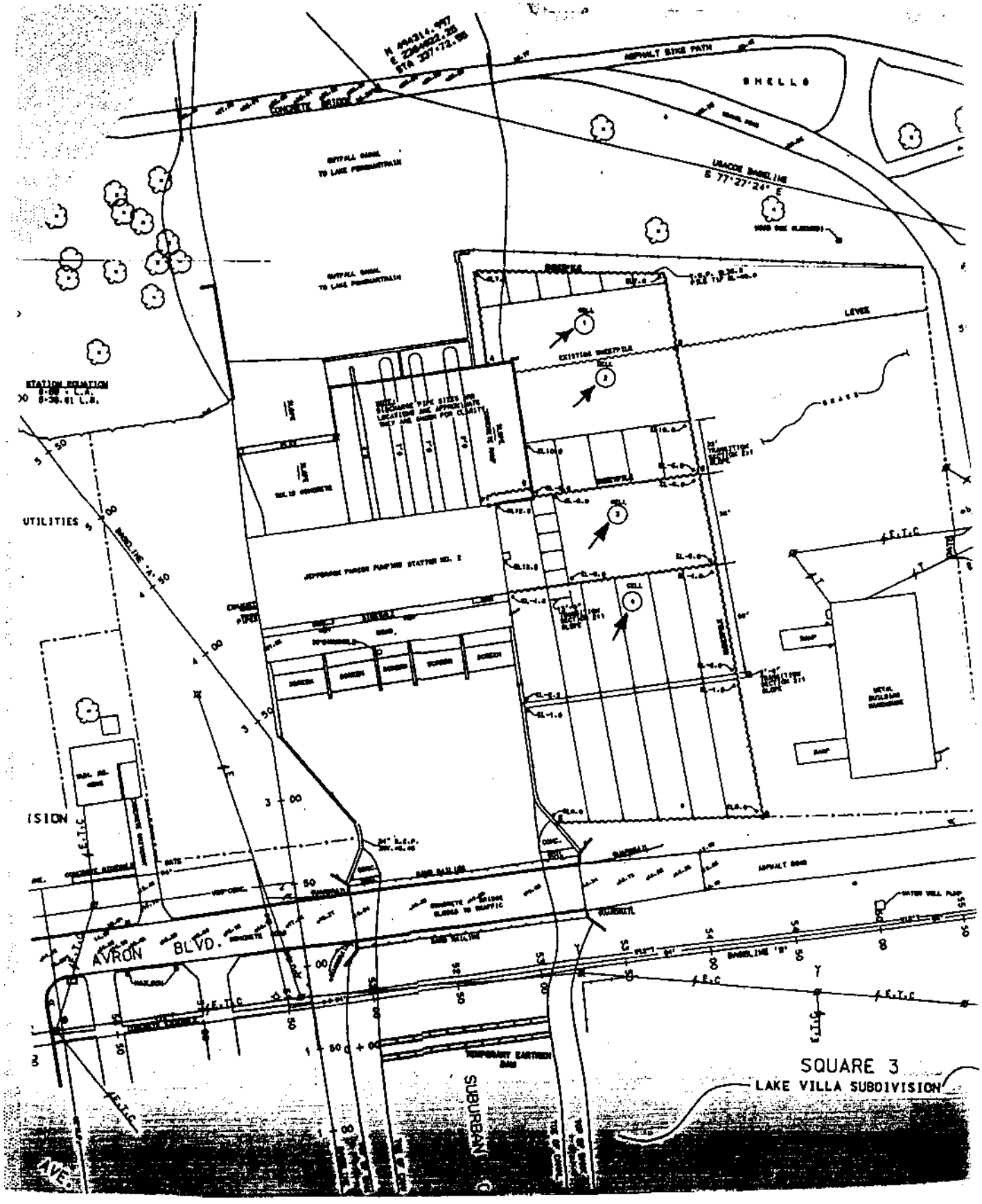
JUSTIFICATION:

This proposal eliminates the sheetpile wall between Cells 2 and 3 and between Cells 3 and 4 because there is only 2' of difference in the depth of their excavations. This shallow of a depth difference can be handled by cutting back the slope at much less expense than placing sheetpiling. The southern end of the construction is changed to a diagonal paralleling the design channel wall which reduces amount of sheetpiling and excavation. Each of the changes is feasible and will result in cost savings during construction. They will also make it easier for the contractor to move around in one large cell rather than across three smaller ones.

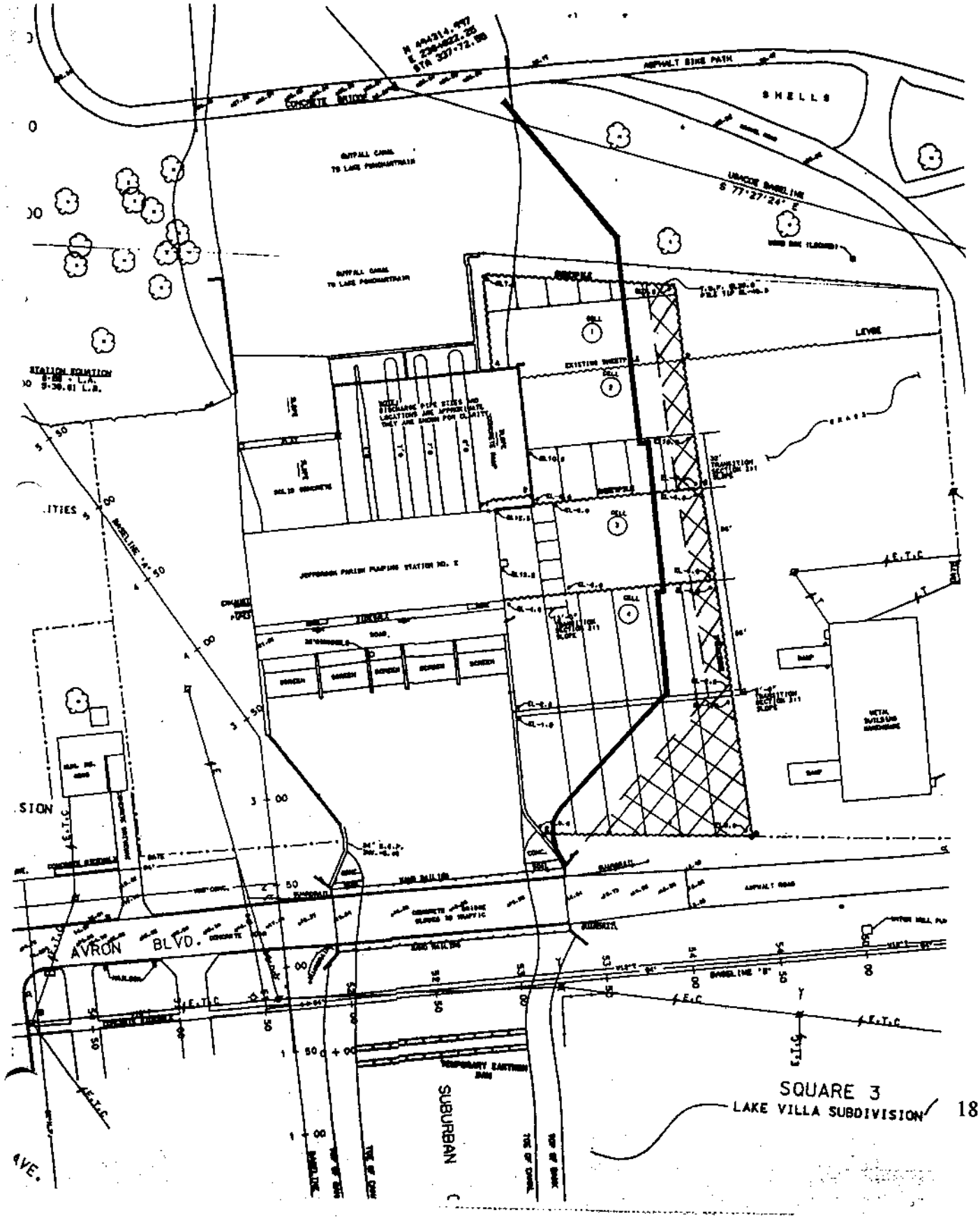
VALUE ENGINEERING PROPOSAL

PROPOSAL NO: C-3 PAGE NO: 2 OF 4

DRAWING NO. 1



DRAWING NO. 2


ASPHALT BIKE PATH
SHELL
OUTFALL CANAL TO LAKE PONTCHARTRAIN
LEVEE
AVRON BLVD.
SUBURBAN
SQUARE 3
LAKE VILLA SUBDIVISION
18

COST ESTIMATE WORKSHEET

PROPOSAL NO: C-3

DELETIONS

ITEM	U/M	QTY	UNIT COST	TOTAL
Cofferdam (AZ36 Sections)	SF	24,019	$13.00	$312,247
Excavation	CY	4,521	3.25	14,693
TOTAL DELETIONS				$326,940

ADDITIONS

ITEM	U/M	QTY	UNIT COST	TOTAL
TOTAL ADDITIONS				$0

Net Savings (Deletes - Adds)	$326,940
Markups 15%	49,041
TOTAL SAVINGS	$375,981

Markups: Contractor's markup for OH & Profit, Contingencies, and S&A where applicable.

VALUE ENGINEERING PROPOSAL

PROPOSAL NO: A-1 PAGE NO: 1 OF 2

DESCRIPTION: Revise Copper Standing Seam Metal Roofing (Station No. 3)

ORIGINAL DESIGN:

Copper standing seam roofing and flashing are specified for Pump Station No. 3.

PROPOSED DESIGN:

Recommend aluminum with a Kynar finish, Galvalume, or other more customary standing seam metal roofing, be substituted for the copper roofing.

ADVANTAGES/JUSTIFICATION:

1. The recommended metal roofing will be more than adequate for the projected life span of this building.
2. Reduces construction costs.

DISADVANTAGES:

None known.

JUSTIFICATION:

See "Advantages".

COST ESTIMATE WORKSHEET

PROPOSAL NO: A-1 PAGE NO: 2 OF 2

DELETIONS

ITEM	U/M	QTY	UNIT COST	TOTAL
Copper Roofing (20 oz)	SQ	644	$730.80	$470,635
Copper Flashing (20 oz)	SF	330	5.94	1,961
TOTAL DELETIONS				$472,596

ADDITIONS

ITEM	U/M	QTY	UNIT COST	TOTAL
Aluminum Roofing (0.032") W/Kynar Finish	SQ	644	$411.71	$265,141
Aluminum Flashing (0.032") W/Kynar Finish	SF	330	2.91	960
TOTAL ADDITIONS				$266,101

Net Savings (Deletes - Adds)	$207,455
Markups 15%	31,118
TOTAL SAVINGS	$238,573

Notes: Unit costs arrived at by consultation with a major standing seam roof panel manufacturer, and (escalated) 1996 Means Building Construction Cost Data.

VALUE ENGINEERING PROPOSAL

PROPOSAL NO: A-2 PAGE NO: 1 OF 5

DESCRIPTION: Delete Structural Bay Between Column Lines B and C Containing Office (Station No. 3)

ORIGINAL DESIGN:

The current architectural floor plan shows an office located between Column Lines B and C. Adjacent to it is an enclosed drive-thru/loading dock bay for maintenance vehicles between Column Lines A and B. The mechanical floor plan reveals engine exhaust (from the diesel engine nearest to the office) penetrating the building's north wall. The mechanical floor plan also shows two combustion air cleaners penetrating the building's north wall. (See Drawing Nos. 1 and 2.)

PROPOSED DESIGN:

Recommend the following:

1. Delete the structural bay containing the office. Relocate the adjacent enclosed drive-thru/ loading dock bay to the deleted office bay location.

2. Relocate both engine combustion air cleaners to the building's interior, making both air cleaners engine-mounted (per those in the existing building).

3. Relocate the engine exhaust silence and its piping to the west (vice the east) side of the easternmost pump.

ADVANTAGES/JUSTIFICATION (keyed to "Proposed Change" Items):

1 and 3 Another office with its own gage board is not necessary. That in the existing building appears sufficient. Also, the engine exhaust silence can be relocated to another bay.

2. Those within the current building which are engine-mounted are apparently operating adequately.

1 and 2 Reduces construction costs.

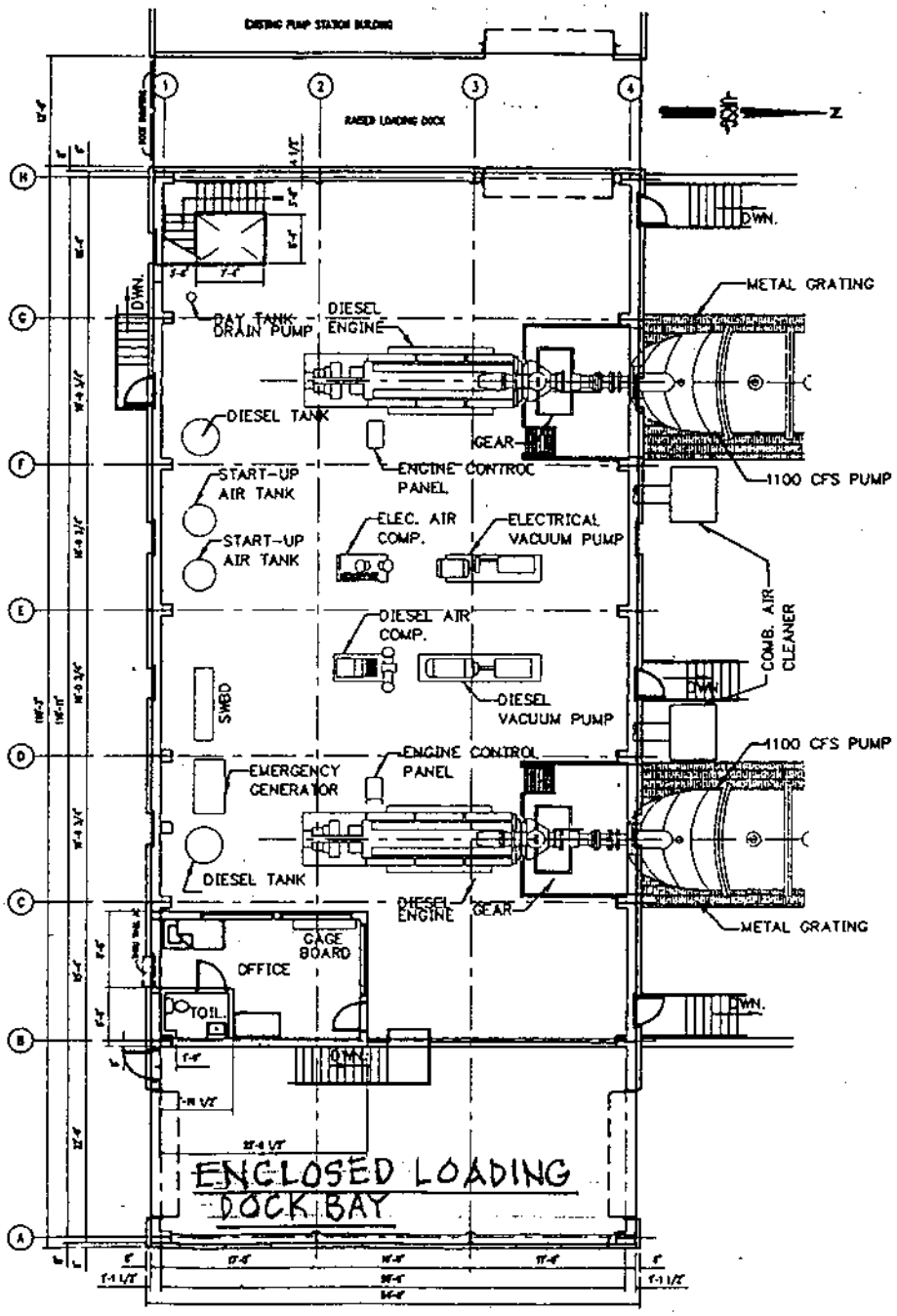
DISADVANTAGES (keyed to "Proposed Change" Items):

1, 2, and 3 None known.

JUSTIFICATION:

See "Advantages".

DRAWING NO. 1 -- Original Design



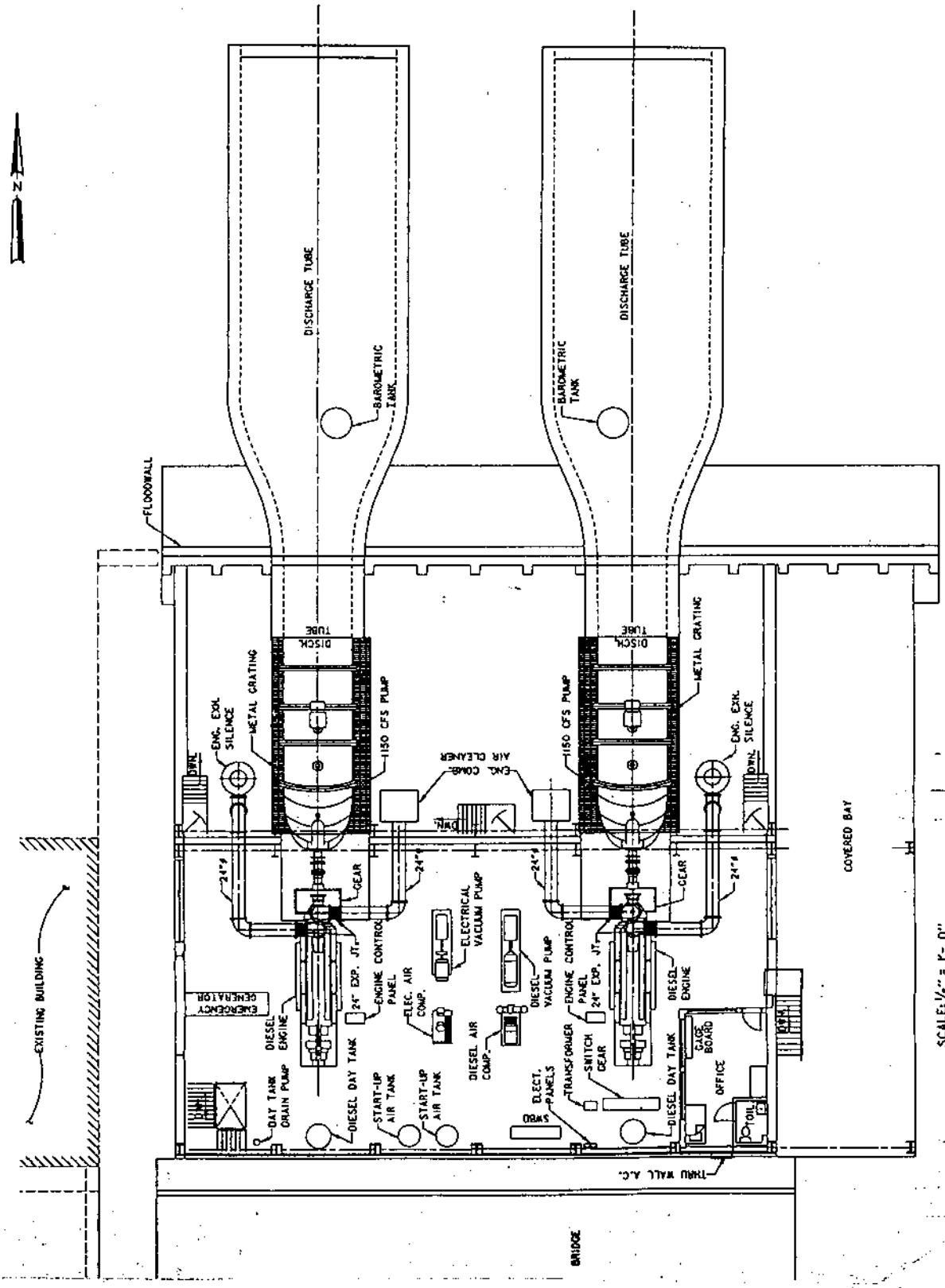
PRELIMINARY FLOOR PLAN

SCALE: 1/8" = 1'-0"

VALUE ENGINEERING PROPOSAL

PROPOSAL NO: A-2

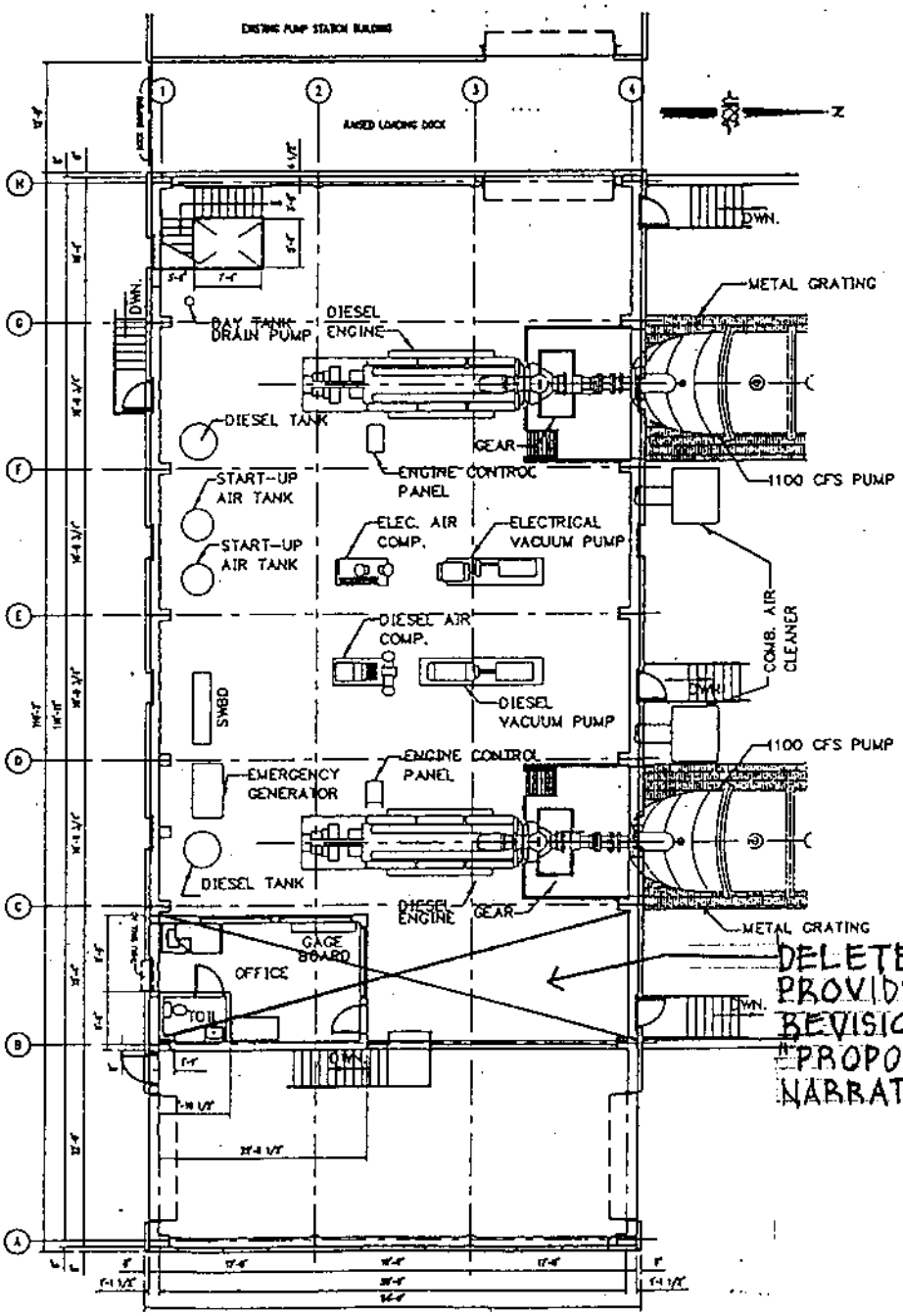
DRAWING NO. 2 -- Original Design



VALUE ENGINEERING PROPOSAL

PROPOSAL NO: A-2 PAGE NO: 4 OF 5

DRAWING NO. 3 -- Proposed Design



PRELIMINARY FLOOR PLAN

SCALE: 1/8" = 1'-0"

COST ESTIMATE WORKSHEET

PROPOSAL NO: A-2

DELETIONS

ITEM	U/M	QTY	UNIT COST	TOTAL
Structural Bay Between Column Lines B & C	SF	828	$160.00	$132,480
TOTAL DELETIONS				$132,480

ADDITIONS

ITEM	U/M	QTY	UNIT COST	TOTAL
TOTAL ADDITIONS				$0

Net Savings (Deletes - Adds)	$132,480
Markups 15%	19,872
TOTAL SAVINGS	$152,352

Markups: Contractor's markup for OH & Profit, Contingencies, and S&A where applicable.

VALUE ENGINEERING PROPOSAL

PROPOSAL NO: A-3 PAGE NO: 1 OF 4

DESCRIPTION: Reduce Thickness of Precast Concrete Wall Panels (Station Nos. 2 and 3)

ORIGINAL DESIGN:

The current design shows 6" thick non load-bearing precast concrete wall panels. The panels are attached to the building's structural framing system (see Drawing Nos. 1 and 2).

PROPOSED DESIGN:

Recommend 4" thick panels be substituted for the 6" thick panels.

ADVANTAGES/JUSTIFICATION:

1. For non-loading bearing panels of the face dimensions shown, 6" appears slightly thicker than needed. The precast panels on this building are architectural panels with no structural load carrying requirements other than wind load and selfweight. It is structurally feasible and common in industry practice to use 4" thickness for this type of precast panel. Also, acceptance of this proposal reduces the dead loads the building frame will need to support due to the reduced panel weight, and may result in a reduction in the size of structural support.
2. Reduces construction costs.

DISADVANTAGES:

None known.

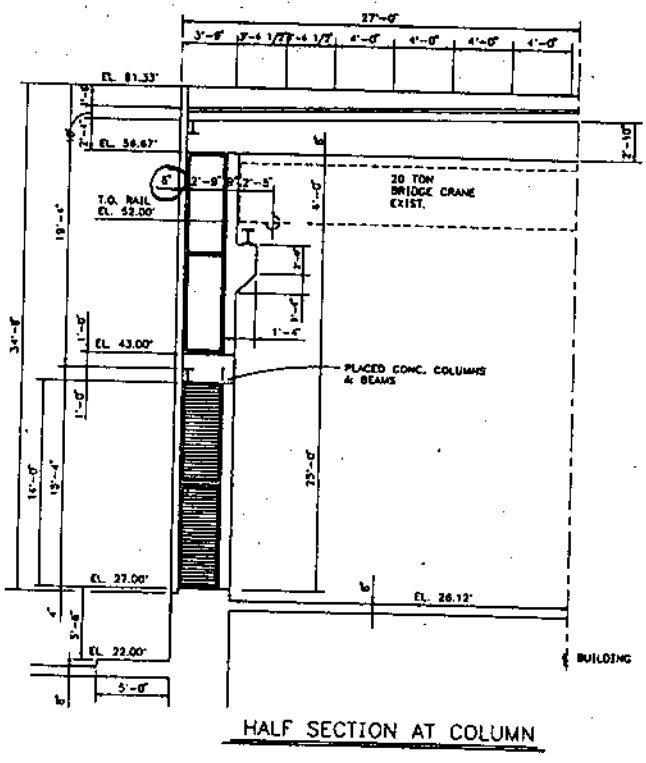
JUSTIFICATION:

See "Advantages".

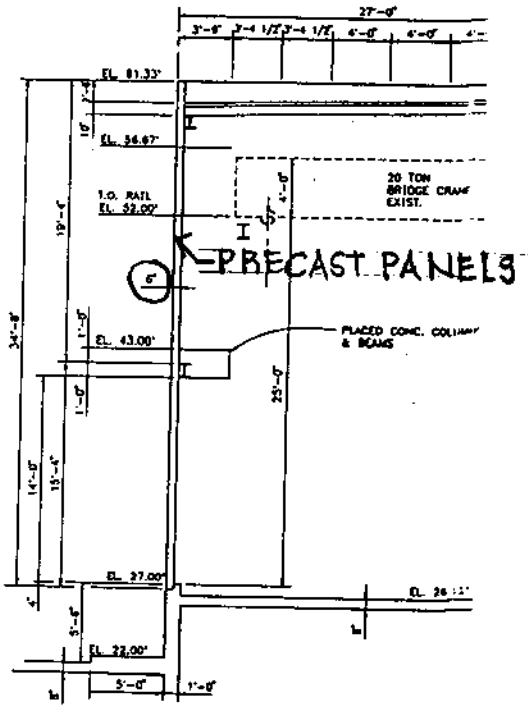
VALUE ENGINEERING PROPOSAL

PROPOSAL NO: A-3 PAGE NO: 2 OF 4

DRAWING NO. 1



HALF SECTION AT COLUMN

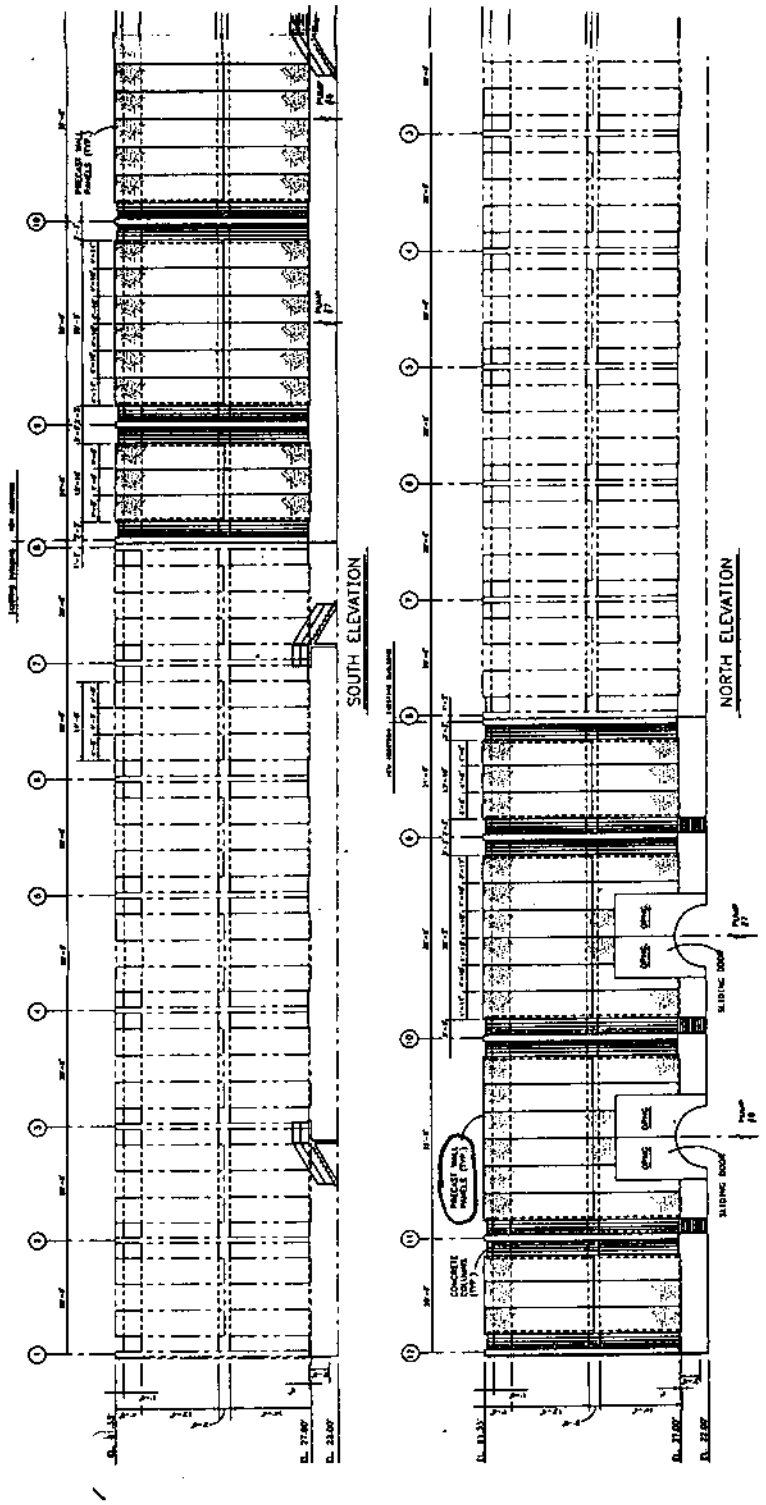


HALF SECTION AT WALL

VALUE ENGINEERING PROPOSAL

PROPOSAL NO: A-3 PAGE NO: 3 OF 4

DRAWING NO. 2



COST ESTIMATE WORKSHEET

PROPOSAL NO: A-3 PAGE NO: 4 OF 4

DELETIONS

ITEM	U/M	QTY	UNIT COST	TOTAL
Precast Wall Panels (6" Thick)	LS	1	$76,923.00	$76,923
TOTAL DELETIONS				$76,923

ADDITIONS

ITEM	U/M	QTY	UNIT COST	TOTAL
Precast Wall Panels (4" Thick)	LS	1	$51,538.00*	$51,538
TOTAL ADDITIONS				$51,538

Net Savings (Deletes - Adds)	$25,385
Markups 15%	3,808
TOTAL SAVINGS	$29,193

*Note: Per recent guidance from a cost estimator in another district for a similar proposal, used 33-1/3% savings for reducing panel thickness to 4 ".

VALUE ENGINEERING PROPOSAL

PROPOSAL NO: M-1 PAGE NO: 1 OF 2

DESCRIPTION: Reduce Capacity of Exterior Crane on Pump Station No. 2

ORIGINAL DESIGN:

The current design intent for Pump Station No. 2 is to extend the rails for the existing 20-ton interior bridge crane into the pump station expansion. In addition, a 30-ton bridge crane will be provided on the exterior of the building. This new exterior bridge crane will run the entire length of the existing pump station plus the expansion. It should be noted that the expansion for Pump Station No. 3 includes the identical equipment as that planned for Pump Station No. 2. However, the exterior bridge crane planned for Pump Station No. 3 is 25 tons.

PROPOSED DESIGN:

This proposal recommends using a 25-ton exterior bridge crane for Pump Station No. 2 instead of the planned 30-ton crane.

ADVANTAGES:

First cost savings.

DISADVANTAGES:

None known.

JUSTIFICATION:

This proposal meets the functional requirements of the project at a reduced cost.

COST ESTIMATE WORKSHEET

PROPOSAL NO: M-1 PAGE NO: 2 OF 2

DELETIONS

ITEM	U/M	QTY	UNIT COST	TOTAL
30-Ton Bridge Crane	LS	1	$80,000.00	$80,000
TOTAL DELETIONS				$80,000

ADDITIONS

ITEM	U/M	QTY	UNIT COST	TOTAL
25-Ton Bridge Crane	LS	1	$70,000.00	$70,000
TOTAL ADDITIONS				$70,000

Net Savings (Deletes - Adds)	$10,000
Markups 15%	1,500
TOTAL SAVINGS	$11,500

Markups: Contractor's markup for OH & Profit, Contingencies, and S&A where applicable.

Note: Crane prices were provided by Thimons Corp. (412-826-4950)

VALUE ENGINEERING PROPOSAL

PROPOSAL NO: M-2 PAGE NO: 1 OF 2

DESCRIPTION: Reduce Capacity of Interior Bridge Crane on Pump Station No. 3

ORIGINAL DESIGN:

The current design includes a 25-ton interior bridge crane. In addition, a 25-ton exterior bridge crane will be provided along the entire length of the new expansion.

PROPOSED DESIGN:

Per survey of the existing equipment with the operators and in an attempt to match the crane capacity for Pump Station No. 2 (which will include the identical equipment in its expansion project), this proposal recommends the use of a 20-ton interior bridge crane.

ADVANTAGES:

First cost savings.

DISADVANTAGES:

None known.

JUSTIFICATION:

This proposal meets the functional requirements of the project at a reduced first cost.

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VALUE ENGINEERING PROPOSAL

PROPOSAL NO: M-3 PAGE NO: 1 OF 4

DESCRIPTION: Reduce Quantity of Combustion Air Intake Piping on Plant No. 3

ORIGINAL DESIGN:

The current design locates the combustion air intake filters on the exterior of the building and transports the air to each engine via 24" diameter pipes (see Drawing No. 1).

PROPOSED DESIGN:

This proposal recommends mounting the intake filters on the engines and eliminating the 24" piping (see Drawing No. 2). The combustion air will be drawn from within the plant.

ADVANTAGES:

1. First cost savings.
2. Locates filters indoors.
3. Improves aesthetics.
4. Reduces wall penetrations.

DISADVANTAGES:

None known.

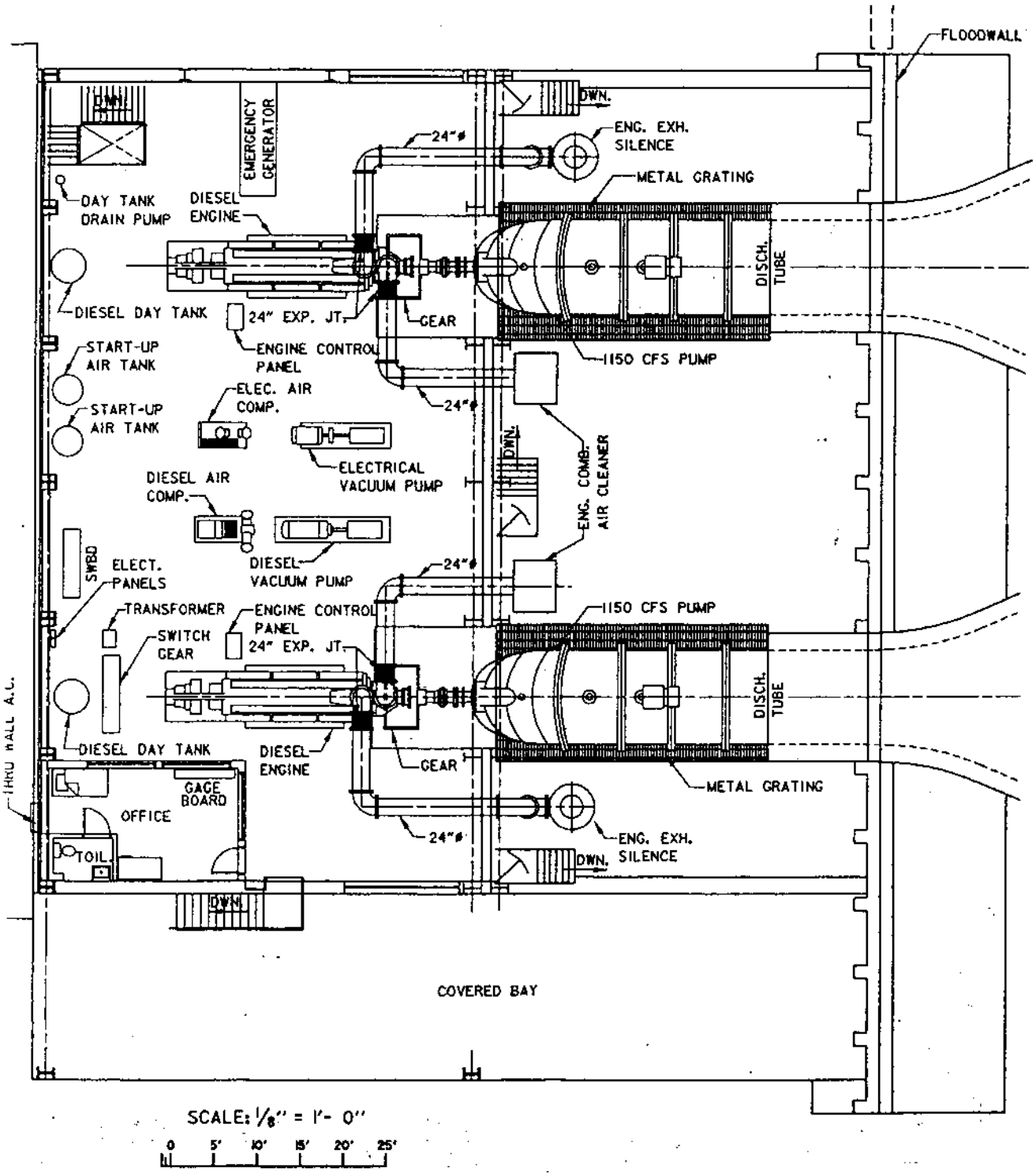
JUSTIFICATION:

This proposal meets the functional requirements of the project at a reduced cost.

VALUE ENGINEERING PROPOSAL

PROPOSAL NO: M-3 PAGE NO: 2 OF 4

DRAWING NO. 1

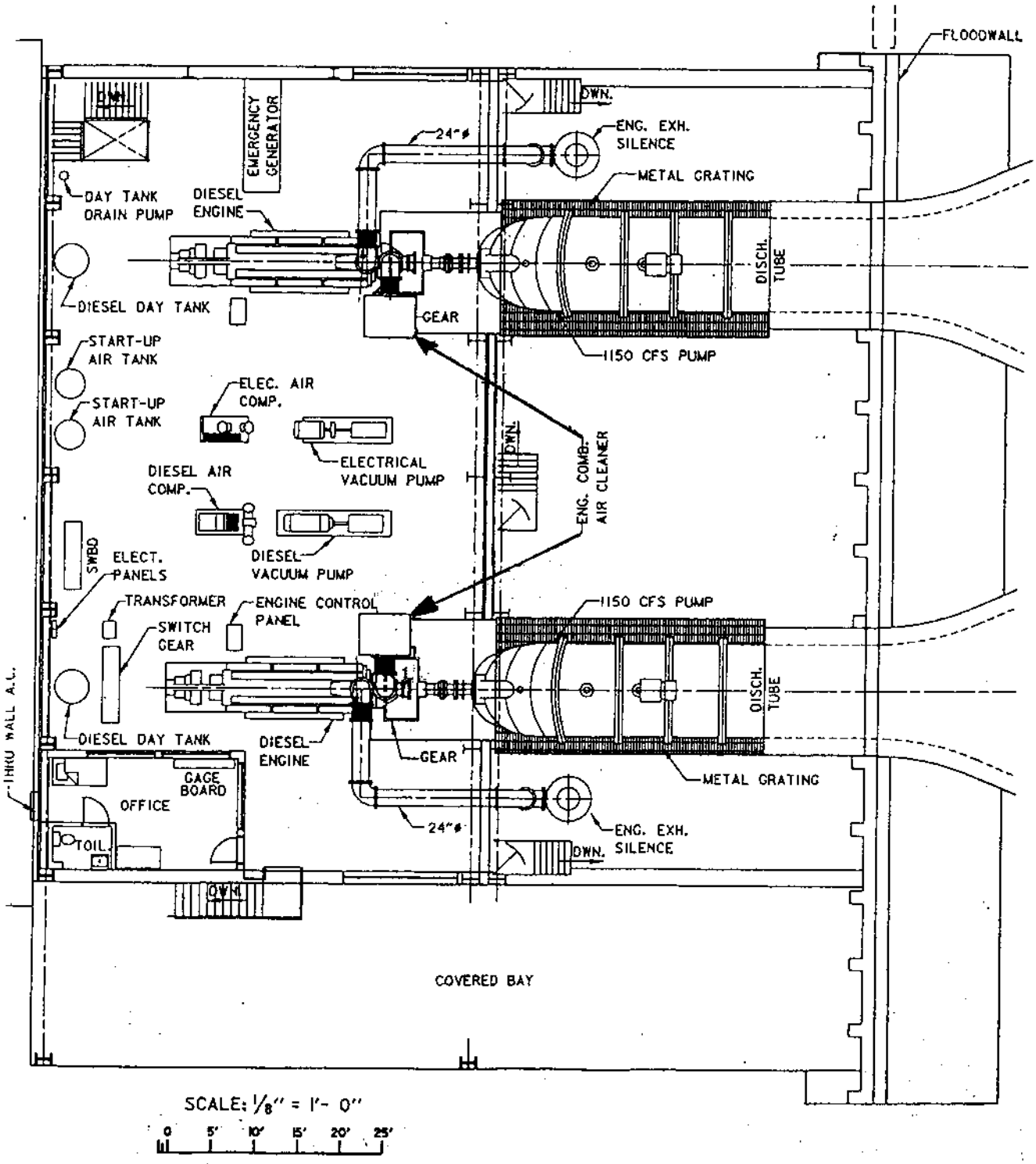


EXISTING DESIGN

VALUE ENGINEERING PROPOSAL

PROPOSAL NO: M-3 PAGE NO: 3 OF 4

DRAWING NO. 2



PROPOSED DESIGN

COST ESTIMATE WORKSHEET

PROPOSAL NO: M-3 PAGE NO: 4 OF 4

DELETIONS

ITEM	U/M	QTY	UNIT COST	TOTAL
24" Dia Piping	LF	50	$240.00	$12,000
TOTAL DELETIONS				$12,000

ADDITIONS

ITEM	U/M	QTY	UNIT COST	TOTAL
TOTAL ADDITIONS				$0

Net Savings (Deletes - Adds)	$12,000
Markups 15%	1,800
TOTAL SAVINGS	$13,800

Markups: Contractor's markup for OH & Profit, Contingencies, and S&A where applicable.

VALUE ENGINEERING PROPOSAL

PROPOSAL NO:	M-4	PAGE NO: 1 OF 4
DESCRIPTION:	Reduce Mechanical Equipment and Size of Building at Pump Station No. 2	

ORIGINAL DESIGN:

The current design includes the two new vacuum pumps, two new air compressors and a new emergency generator. The generator is in a dedicated bay (see Drawing No. 1).

PROPOSED DESIGN:

This proposal recommends deleting the electric motor-driven vacuum pump and the electric motor-driven air compressor. This proposal also recommends relocating the emergency generator and eliminating the bay which currently includes the generator (see Drawing No. 2).

ADVANTAGES:

1. First cost savings.
2. Less equipment to maintain.

DISADVANTAGES:

None known.

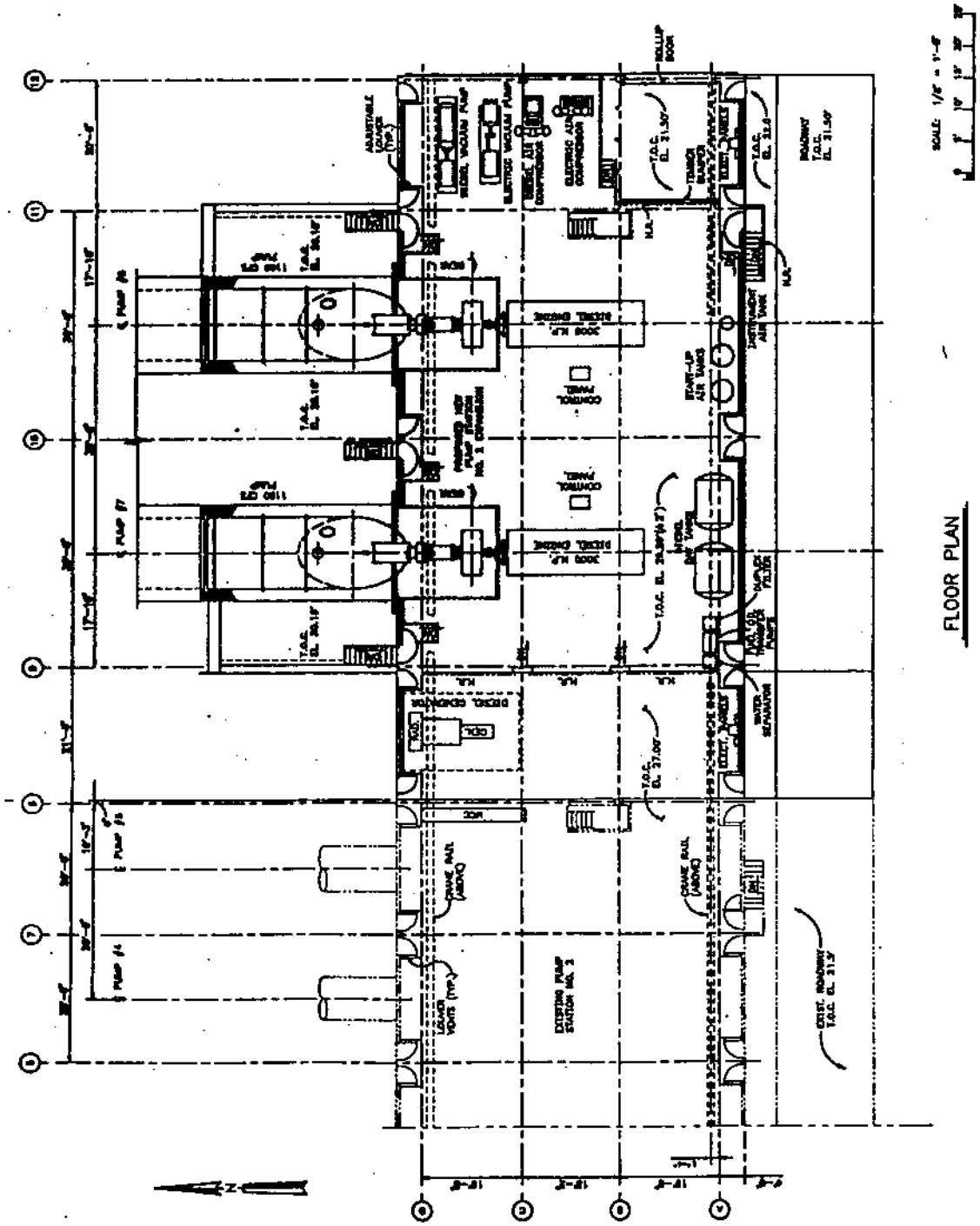
JUSTIFICATION:

With one new vacuum pump and one new air compressor, plus the existing two vacuum pumps and the existing two air compressors this plant should never be without startup air or primer pumps.

VALUE ENGINEERING PROPOSAL

PROPOSAL NO: M-4 PAGE NO: 2 OF 4

DRAWING NO. 1



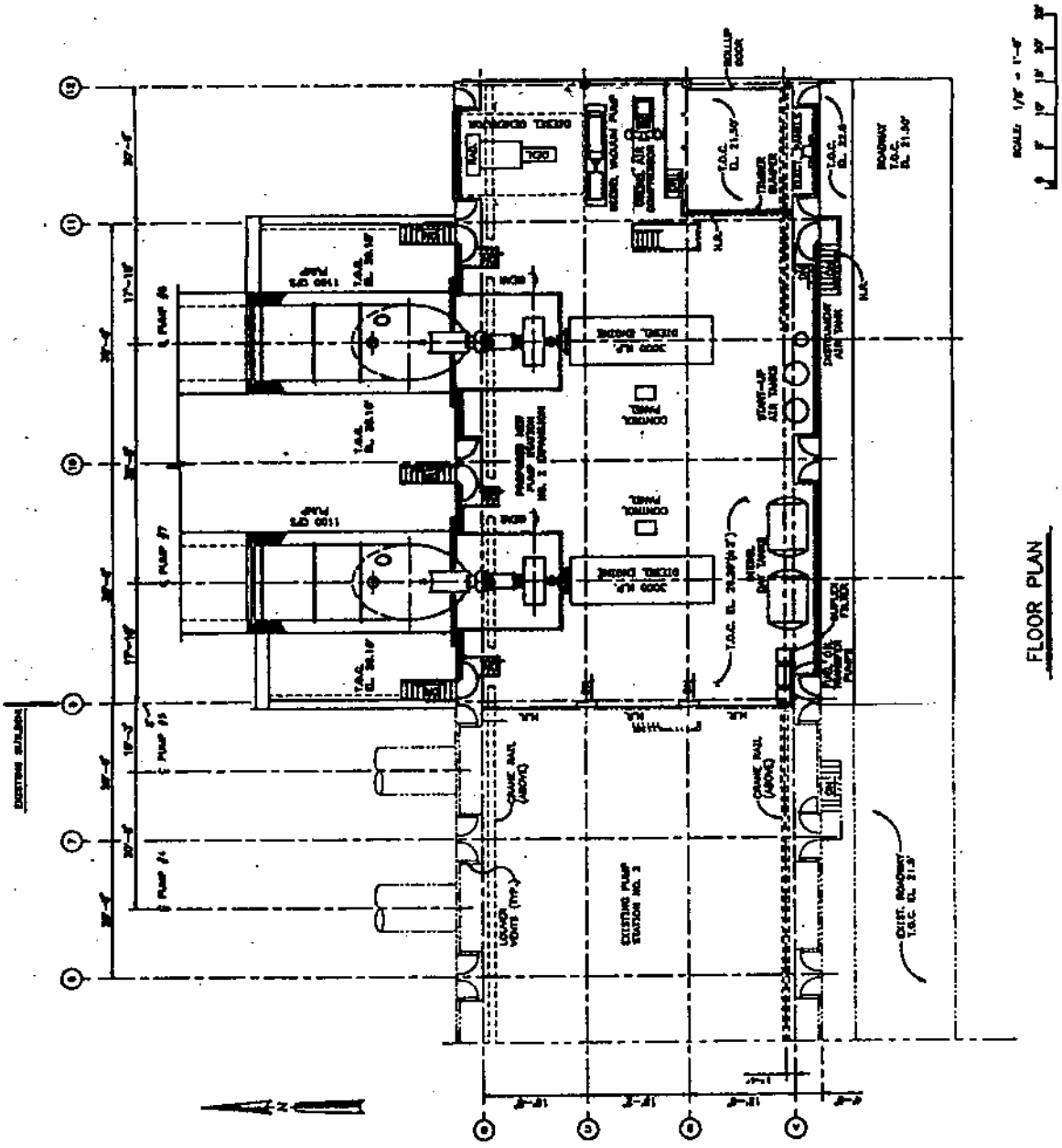
FLOOR PLAN

EXISTING DESIGN

VALUE ENGINEERING PROPOSAL

PROPOSAL NO: M-4 PAGE NO: 3 OF 4

DRAWING NO. 2



FLOOR PLAN

PROPOSED DESIGN

COST ESTIMATE WORKSHEET

PROPOSAL NO: M-4 PAGE NO: 4 OF 4

DELETIONS

ITEM	U/M	QTY	UNIT COST	TOTAL
Generator Bay	SF	989	$160.00	$158,240
Elec-Driven Compressor	EA	1	8,338.00	8,338
Elec-Driven Vac Pump	EA	1	37,950.00	37,950
Piping	LS	1	2,000.00	2,000
Controls	LS	1	400.00	400
TOTAL DELETIONS				$206,928

ADDITIONS

ITEM	U/M	QTY	UNIT COST	TOTAL
TOTAL ADDITIONS				$0

Net Savings (Deletes - Adds)	$206,928
Markups 15%	31,039
TOTAL SAVINGS	$237,967

Markups: Contractor's markup for OH & Profit, Contingencies, and S&A where applicable.

VALUE ENGINEERING PROPOSAL

PROPOSAL NO: M-5 PAGE NO: 1 OF 2

DESCRIPTION: Reduce Number of Vacuum Pumps for Pump Station No. 2

ORIGINAL DESIGN:

The existing pump station includes an electric motor- driven vacuum pump and a diesel-driven vacuum pump. This project adds one electric motor-driven vacuum pump and one diesel-driven vacuum pump. In addition, the existing pump station includes two emergency generators, and this project adds another emergency generator.

PROPOSED DESIGN:

This proposal recommends adding only one new vacuum pump. This pump will be diesel driven.

ADVANTAGES:

1. First cost savings.
2. Fewer pumps to maintain.
3. Will reduce the new emergency load to the point that a new emergency generator is not required.

DISADVANTAGES:

None known.

JUSTIFICATION:

All vacuum pumps will be manifolded together so the existing vacuum pumps could be used to prime the "new" pumps or the new vacuum pumps could be used to prime the "existing pumps". In addition, with an existing electric vacuum pump, an existing diesel vacuum pump, emergency generators, and this new diesel-driven vacuum pump, there should never be a condition in which the flood control pumps can not be primed.

COST ESTIMATE WORKSHEET

PROPOSAL NO: M-5 PAGE NO: 4 OF 4

DELETIONS

ITEM	U/M	QTY	UNIT COST	TOTAL
Electric Motor-Driven Vac Pump	EA	1	$37,950.00	$37,950
Piping	LS	1	10,000.00	10,000
Controls	LS	1	750.00	750
Emergency Generator	EA	1	75,000.00	75,000
TOTAL DELETIONS				$12,700

ADDITIONS

ITEM	U/M	QTY	UNIT COST	TOTAL
TOTAL ADDITIONS				$0

Net Savings (Deletes - Adds)	$12,700
Markups 15%	18,555
TOTAL SAVINGS	$142,255

Markups: Contractor's markup for OH & Profit, Contingencies, and S&A where applicable.

VALUE ENGINEERING PROPOSAL

PROPOSAL NO: M-6 PAGE NO: 1 OF 5

DESCRIPTION: Consider Vertical Pumps at Pump Stations Nos. 2 and 3

ORIGINAL DESIGN:

The current design intent is to add two 1200 CFS pumps to the Suburban Canal Pumping Station (Station No. 2) and two 1200 CFS pumps to the Elmwood Canal Pumping Station (Station No. 3). The pumps and diesel engine drivers are not included in the design package for these two pumping stations. These pumps and drivers are planned to be government furnished equipment and purchased under a separate contract. The pump contract will purchase seven horizontal pumps which have been specified around the ITT-Allis Chambers model WCXH-132. Two of these pumps will be installed at Pump Station No. 2, two at Pump Station No. 3 and the remaining five at other pump stations. The expansion for these two pump stations has been designed around Jefferson Parish's decision to use horizontal pumps with diesel engine drivers (see drawing no.1). The existing Pump Station No. 2 includes a combination of horizontal and vertical pumps. The existing Pump Station No. 3 consists of all vertical pumps.

PROPOSED DESIGN:

This proposal recommends that vertical pumps be considered in the design process for these two projects. With the proposed configuration, a diesel engine would drive the pump via a right-angle gear reducer (see drawing no. 2). The vertical pumps could be specified around an Ingersoll Dresser model -111 APS or equal.

ADVANTAGES:

1. The vertical pump installation offers significant first cost savings.
2. Vertical pumps require zero or minimal priming (if impeller is located above low water pool).
3. The use of vertical pumps would be consistent with the existing units at Pump Station No. 3.
4. Smaller support and discharge structures are required with the proposed configuration.
5. The vertical pump is physically smaller (108" diameter vs. 132" diameter) than the horizontal pump. Considering the net positive suction head (NPSH) requirements in placing the horizontal pump far above the suction pool, the maximum pump speed is limited relative to a vertical pump which can be placed in or only slightly above the suction pool. Hence, the lower speed of the horizontal unit requires a larger pump diameter to convey an equivalent volume of a higher speed vertical pump.
6. The vertical unit is easier and faster to install than the horizontal unit.

DISADVANTAGES:

1. Maintenance is more difficult to perform on vertical units than on horizontal units.
2. Vertical pumps are less energy efficient than horizontal pumps. However, due to the limited usage per year, energy efficiency should not be an issue.
3. Vertical pumps require careful design of both the suction and discharge.
4. Due to the lower operating speeds, the horizontal pumps require slightly less frequent maintenance than the vertical pumps.

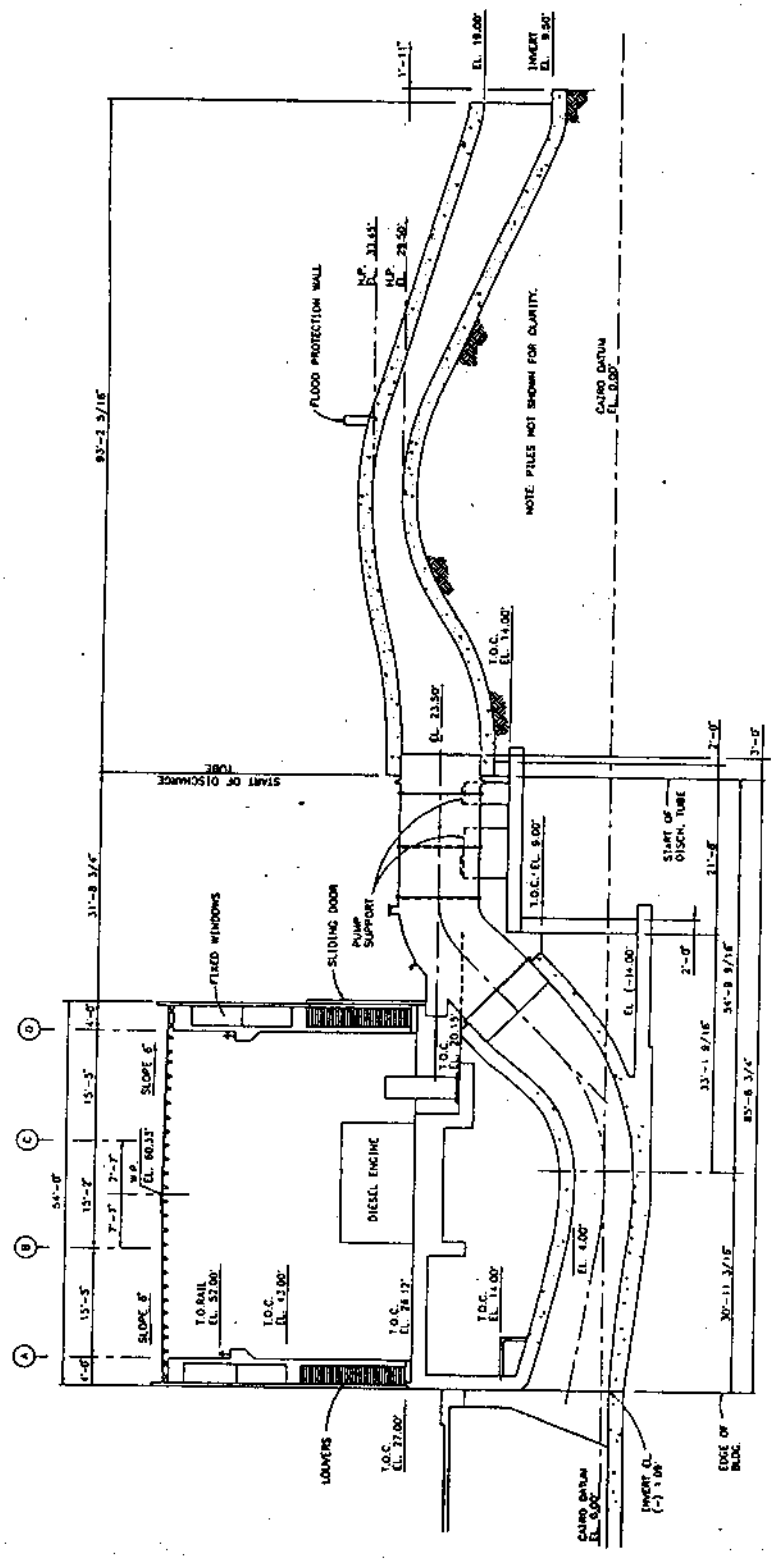
JUSTIFICATION:

Given the relative advantages and disadvantages of vertical verses horizontal pump installations it would appear that the significant first cost difference associated with horizontal pumps would only be justified in a high use/high maintenance application. This is far from the project situation. These pumps are not expected to run much more than fifty hours per year. Such limited use indicates minimal fuel consumption and infrequent major maintenance. In fact, past history in the project area has shown that the existing vertical pumps in service have seldomly required major maintenance. While there is no doubt that maintenance, when required, would be easier for the horizontal pumps, the substantial first cost savings associated with vertical pumps far outweighs the expected infrequent maintenance savings of the current plan.

VALUE ENGINEERING PROPOSAL

PROPOSAL NO.: M-6

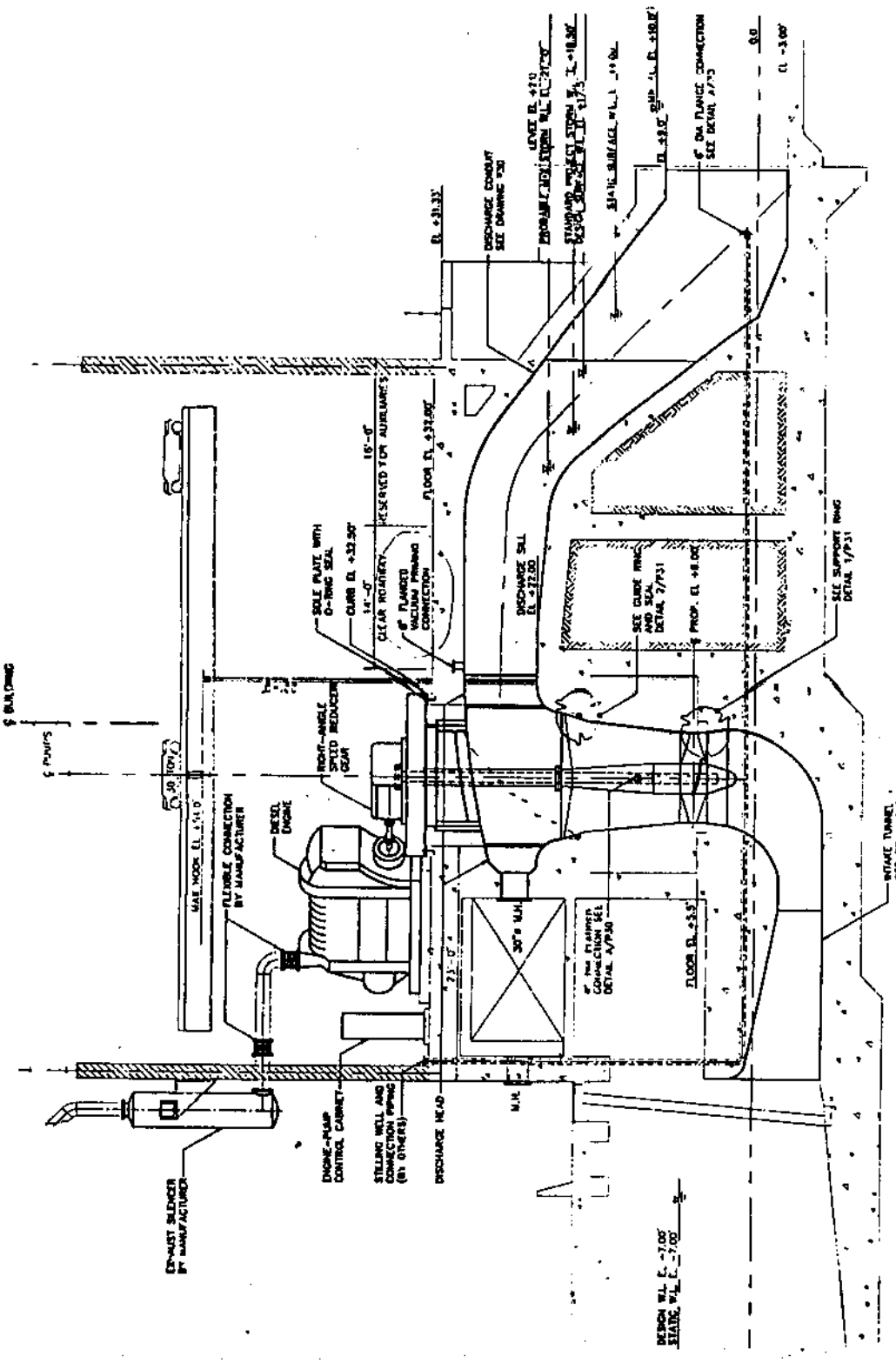
DRAWING NO: 1



TYPICAL SECTION THRU SUCTION TUBE & HORIZONTAL PUMP

EXISTING DESIGN

DRAWING NO. 2



TYPICAL SECTION THRU VERTICAL PUMP

PROPOSED DESIGN

COST ESTIMATE WORKSHEET

PROPOSAL NO: M-6 PAGE NO: 5 OF 5

DELETIONS

ITEM	U/M	QTY	UNIT COST	TOTAL
Horizontal Pumps	EA	7	$1,460,000.00	$10,220,000
Differential in Installation & Formed Suction/Discharge Cost	EA	7	700,000.00	4,900,000
TOTAL DELETIONS				$15,120,000

ADDITIONS

ITEM	U/M	QTY	UNIT COST	TOTAL
Vertical Pumps	EA	7	$760,000.00	$5,320,000
TOTAL ADDITIONS				$5,320,000

Net Savings (Deletes - Adds)	$9,800,000
Markups 15%	1,470,000
TOTAL SAVINGS	*$11,270,000

*This figure represents the potential savings if all seven units in the pump supply contract become vertical units. **Using vertical pumps at Pump Stations Nos. 2 and 3 saves $6,440,000.**

Markups: Contractor's markup for OH & Profit, Contingencies, and S&A where applicable.

VALUE ENGINEERING PROPOSAL

PROPOSAL NO: M-7 PAGE NO: 1 OF 3

DESCRIPTION: Reduce Mechanical Equipment and Building Size of Pump Station No. 3

ORIGINAL DESIGN:

The current design adds two vacuum pumps and two air compressors (one diesel, and one electric of each) to the new plant addition. This equipment will be located between the diesel engines that drive the new flood control pumps (see Drawing No. 1). The spacing between the centerline of these two engines is 50'-3". It should be noted that the spacing between the engines on Pump Station No. 2 is 35'-8", however, no equipment is located between the engines on Pump Station No. 3.

PROPOSED DESIGN:

This proposal recommends deleting one electric motor-driven air compressor and one electric motor-driven vacuum pump. In addition, this proposal recommends deleting 12' from the space between the flood control pumps. The elimination of the electric motor-driven vacuum pump and air compressor also eliminates the need for an emergency generator within the new addition. The small remaining emergency loads can be handled by the existing emergency generator.

ADVANTAGES:

1. First cost savings.
2. Less equipment to maintain.
3. Eliminates the need for a new emergency generator.

DISADVANTAGES:

None known.

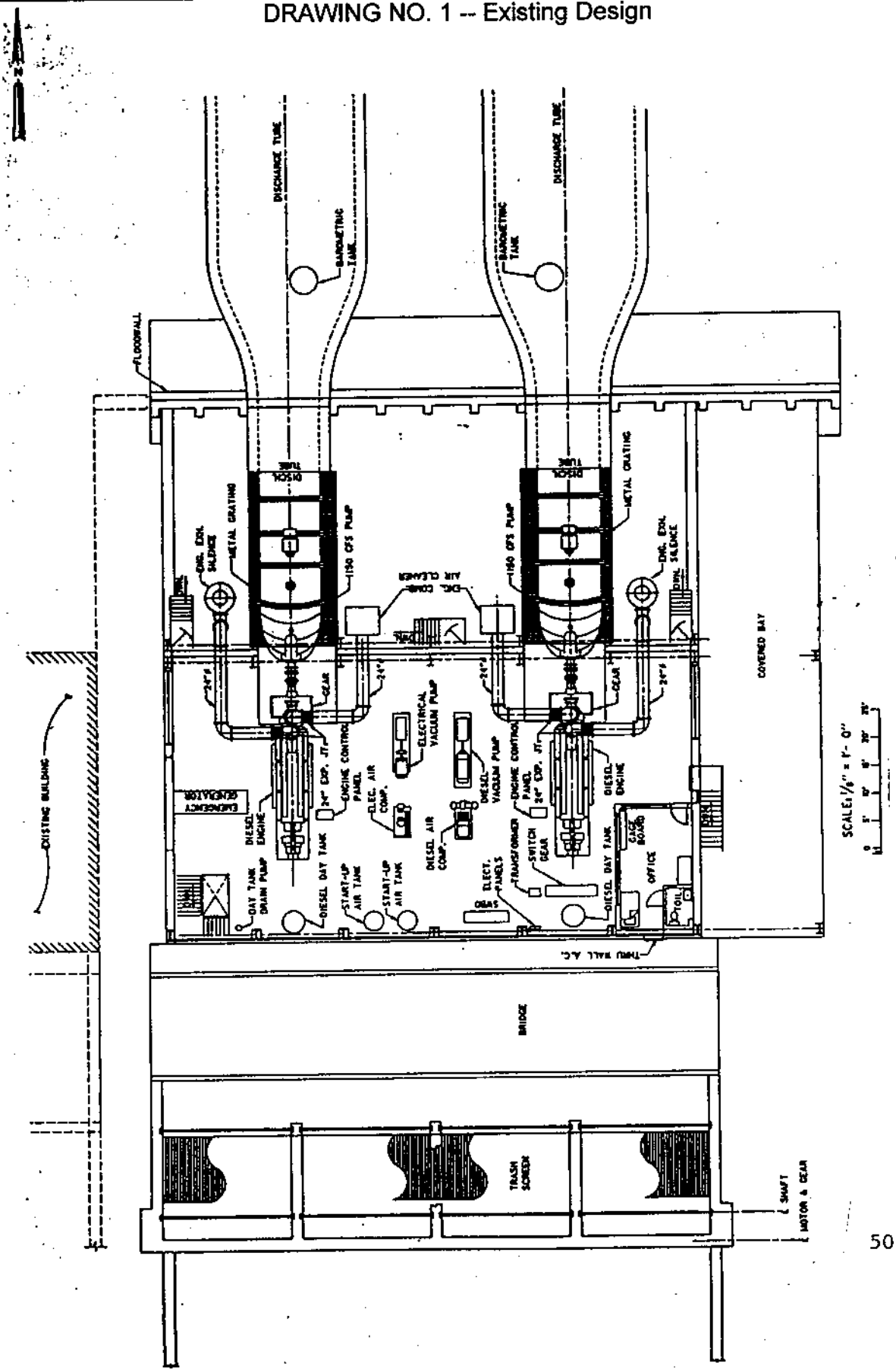
JUSTIFICATION:

This proposal meets the functional requirements of the project at a reduced cost.

VALUE ENGINEERING PROPOSAL

PROPOSAL NO: M-7 PAGE NO: 2 OF 3

DRAWING NO. 1 -- Existing Design



EXISTING DESIGN

COST ESTIMATE WORKSHEET

PROPOSAL NO: M-7

DELETIONS

ITEM	U/M	QTY	UNIT COST	TOTAL
Bay Reduction	SF	648	$160.00	103,680
Elec-Driven Vac Pump	EA	1	37,950.00	37,950
Elec-Driven Air Comp	EA	1	8,338.00	8,338
Piping	LS	1	2,000.00	2,000
Controls	LS	1	400.00	400
Emergency Generator	EA	1	75,000.00	75,000
TOTAL DELETIONS				$227,368

ADDITIONS

ITEM	U/M	QTY	UNIT COST	TOTAL
TOTAL ADDITIONS				$0

Net Savings (Deletes - Adds)	$227,368
Markups 15%	34,105
TOTAL SAVINGS	$261,473

Markups: Contractor's markup for OH & Profit, Contingencies, and S&A where applicable.

VALUE ENGINEERING PROPOSAL

PROPOSAL NO: M-8 PAGE NO: 1 OF 2
DESCRIPTION: Provide a Wet Pipe Sprinkler in Pump Station Nos. 2 and 3

ORIGINAL DESIGN:

The existing pump stations are not protected by sprinkler systems. The planned expansions do not include sprinkler systems.

PROPOSED DESIGN:

This proposal recommends that both pump stations be protected by a wet pipe sprinkler system. This recommendation is consistent with the guidance provided by Mil-HDBK-1008C. This is an industrial facility which is critical to the mission of protecting property from flooding. In addition, this facility includes contents with a replacement value exceeding 2.5 million dollars (the threshold for content value requiring sprinkler protection).

ADVANTAGES:

The sprinkler systems increase the reliability of these pump stations.

DISADVANTAGES:

1. First cost increase.
2. The sprinkler systems become one more item to test and maintain.

JUSTIFICATION:

The addition of the sprinkler systems is simply good engineering practice. Fuel is stored in each day tank and to ignore this hazard, creates a week link in the flood protection system. For pump priming and pump starting systems, we have back-ups (diesel and electric for each). However, for fire protection, there are no systems included in this design. The recommendation to add wet pipe sprinkler systems is also supported by the Fire Protection Engineer at HQUSACE (Bob Diangelo, 202-761-4803).

COST ESTIMATE WORKSHEET

PROPOSAL NO: M-8 PAGE NO: 2 OF 2

DELETIONS

ITEM	U/M	QTY	UNIT COST	TOTAL
TOTAL DELETIONS				$0

ADDITIONS

ITEM	U/M	QTY	UNIT COST	TOTAL
Wet Pipe Sprinkler System:				
Existing PS No. 2	SF	5,778	$2.85	$16,467
Existing PS No. 2	SF	6,048	2.85	17,237
Existing PS No. 3	SF	8,550	2.85	24,368
Existing PS No. 3	SF	6,440	2.85	18,354
TOTAL ADDITIONS				$76,426

Net Savings (Deletes - Adds)	($76,426)
Markups 15%	(11,464)
TOTAL SAVINGS	($87,890)

Markups: Contractor's markup for OH & Profit, Contingencies, and S&A where applicable.

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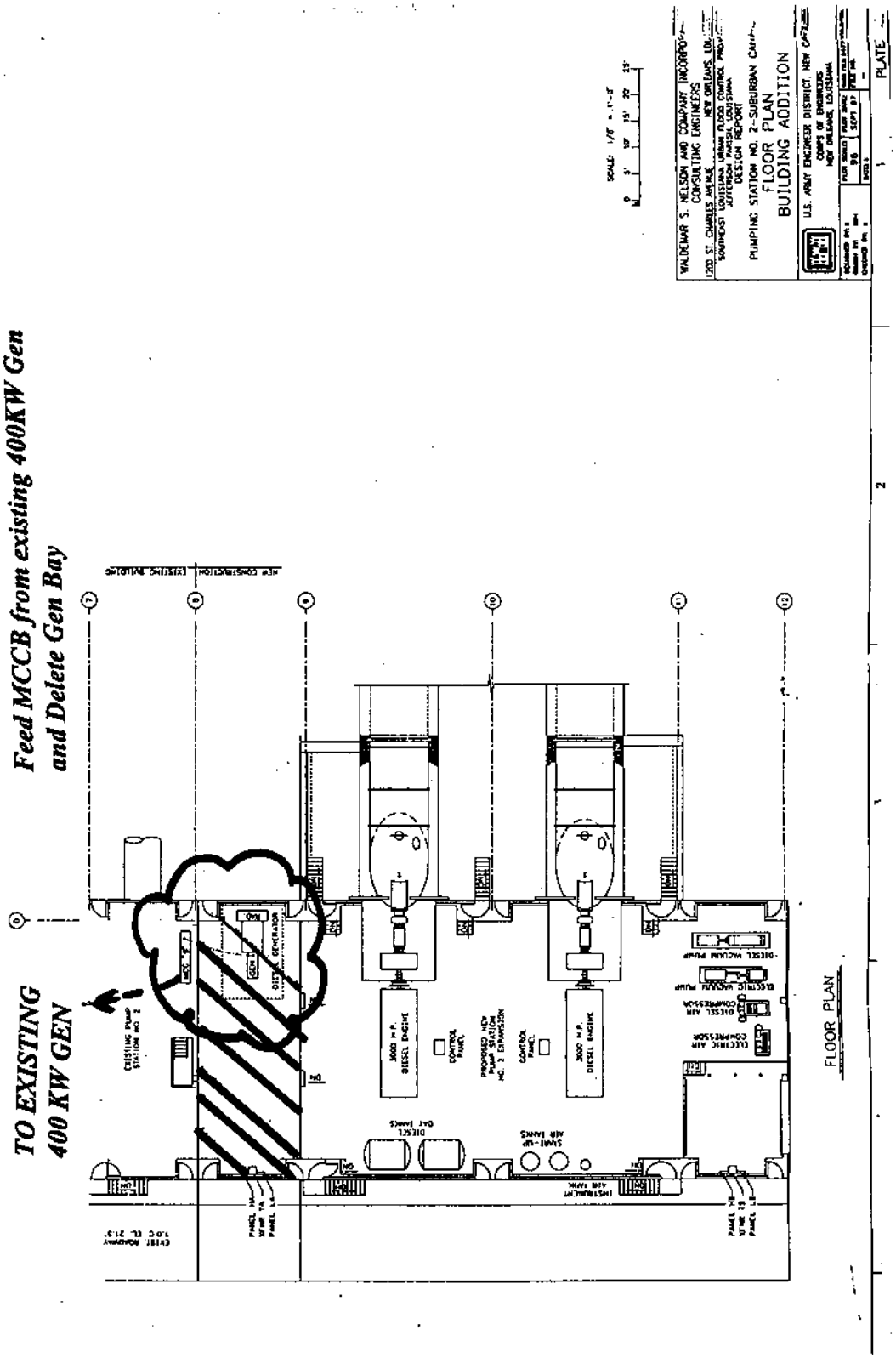
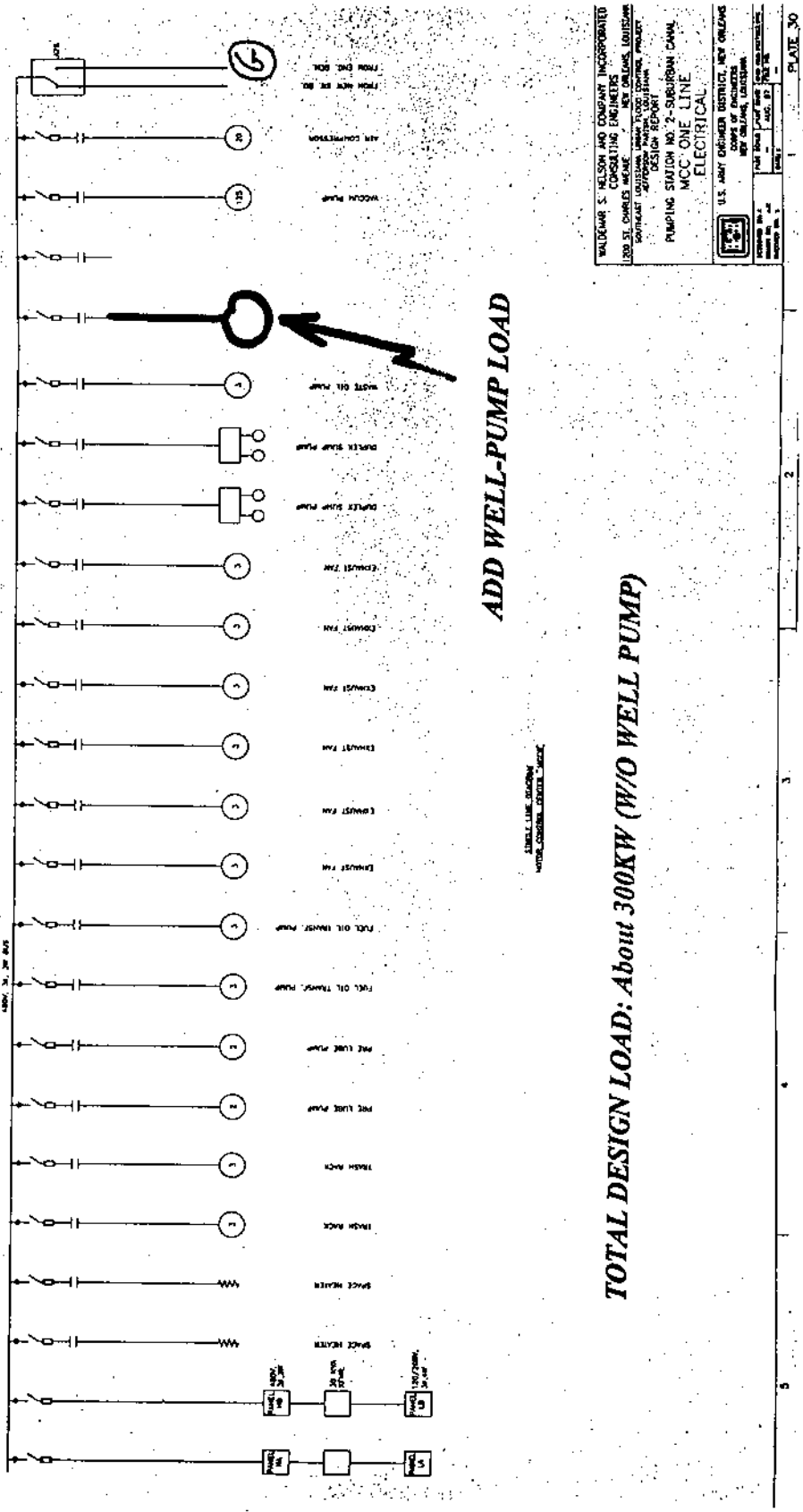
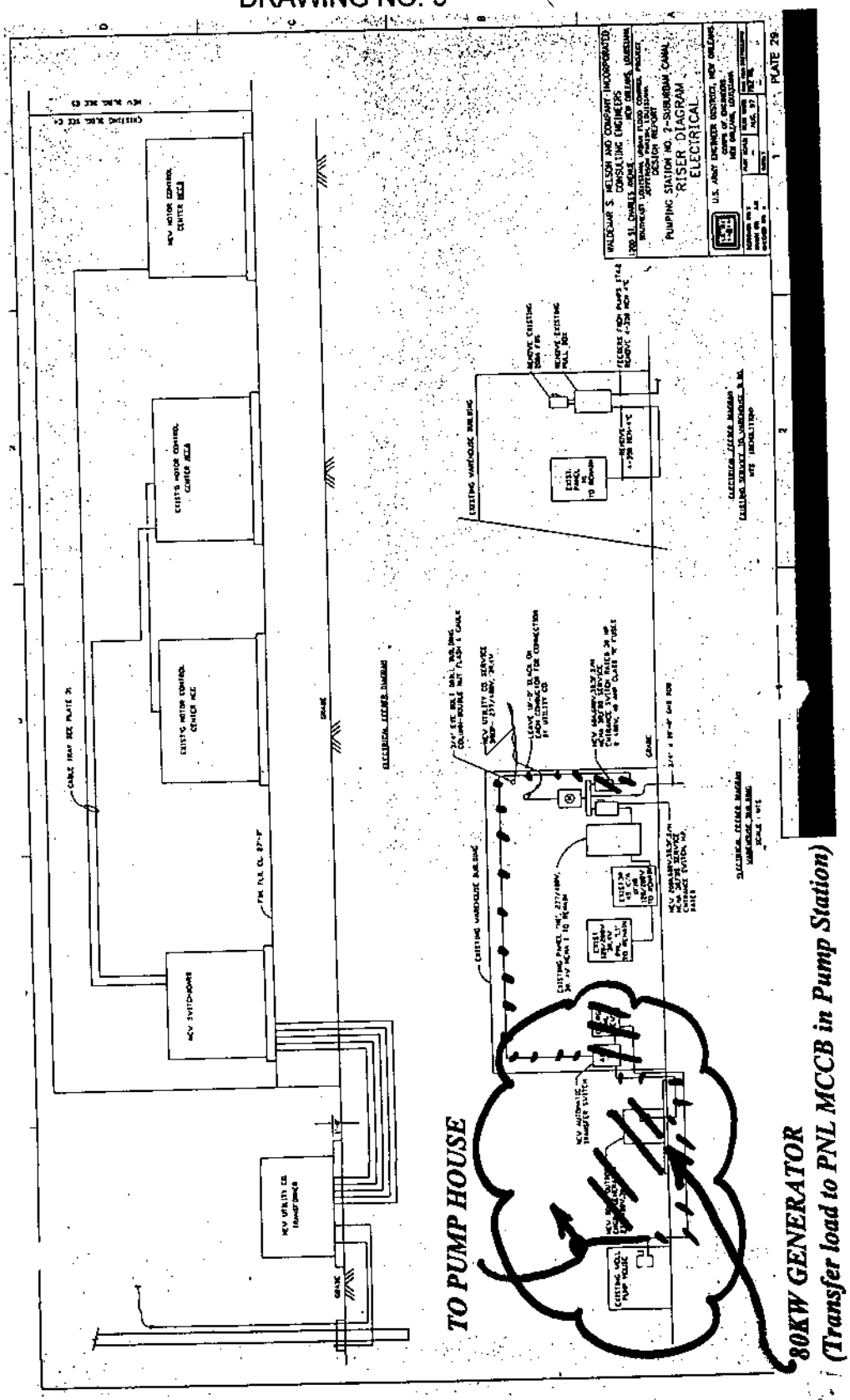
DRAWING NO. 1


Feed MCCB from existing 400KW Gen and Delete Gen Bay
TO EXISTING 400 KW GEN
FLOOR PLAN
PLATE
PUMPING STATION NO. 2-SUBURBAN CANAL
FLOOR PLAN
BUILDING ADDITION
U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA
WALDEMAR S. NELSON AND COMPANY, INCORPORATED
CONSULTING ENGINEERS
NEW ORLEANS, LOUISIANA
SOUTHEAST LOUISIANA URBAN FLOOD CONTROL PROJECT
JEFFERSON PARISH, LOUISIANA
DESIGN REPORT

DRAWING NO. 2


ADD WELL-PUMP LOAD
TOTAL DESIGN LOAD: About 300KW (W/O WELL PUMP)
MCC ONE LINE
ELECTRICAL
PUMPING STATION NO. 2-SUBURBAN CANAL
PLATE 30

DRAWING NO. 3


PUMPING STATION NO. 2-SUBURBAN CANAL
RISER DIAGRAM
ELECTRICAL
PLATE 29
TO PUMP HOUSE
80KW GENERATOR
(Transfer load to PNL MCCB in Pump Station)

COST ESTIMATE WORKSHEET

PROPOSAL NO: E-1 PAGE NO: 5 OF 5

DELETIONS

ITEM	U/M	QTY	UNIT COST	TOTAL
400KW Gen	EA	1	$75,000.00	$75,000
80 KW Gen	EA	1	30,000.00	30,000
Gen Bay	SF	1,040	160.00	166,400
TOTAL DELETIONS				$271,400

ADDITIONS

ITEM	U/M	QTY	UNIT COST	TOTAL
New Feeder to Warehouse	LS	1	$4,000.00	$4,000
TOTAL ADDITIONS				$4,000

Net Savings (Deletes - Adds)	$267,400
Markups 15%	40,110
TOTAL SAVINGS	$307,510

Markups: Contractor's markup for OH & Profit, Contingencies, and S&A where applicable.

VALUE ENGINEERING PROPOSAL

PROPOSAL NO: E-2 PAGE NO: 1 OF 6

DESCRIPTION: Provide New Emergency Generator to Drive Existing Electrical Pump (Pump Station No. 2)

ORIGINAL DESIGN:

(See Drawing Nos. 1 and 2). The existing pump station contains two 400KW emergency generators. The new addition will add a new 400KW generator to feed a new motor control center, MCCB, to be located in the existing plant. MCCB is to feed the start-up equipment in the new addition. The new design load for the addition appears to be about 300KW+/- (See Drawing. No 2). There also currently exists an electric motor-driven pump at the plant, capable of about 300 CFS.

The current design also plans to add a new 80KW generator adjacent to the warehouse to run the well pump.

PROPOSED DESIGN:

(See Drawing Nos. 1 and 2). This proposal suggests providing a new 1200KW emergency generator at Pump Station No 2. In addition to serving as the emergency generator, this new generator will have the capability to run the 700 HP electric pump. This would eliminate the need to purchase a new 400KW emergency generator. It would also free-up one of the existing 400 KW generators to be used at Pump Station No. 3. The remaining 400KW generator could remain as a back-up.

Furthermore, like Proposal E-1, it is suggested that a circuit be extended to the warehouse from MCCB to operate the 80KW load of the well pump.

The result of this proposal is the elimination of the need to purchase three generators: the new 80KW well pump generator, the new 400KW emergency generator for the new addition at Pump Station No.2, and the new 200KW generator for Pump Station No 3.

(Note: The 200 KW generator proposed for Pump Stations No. 3 does not appear adequately sized to handle MDP.

This proposal should be coordinated with another Proposal, M-7, which will reduce the emergency load further by eliminating the 125 HP Vacuum pump.

ADVANTAGES:

1. Reduces first cost by eliminating the purchase of three new generators.
2. Reduces O&M costs in not having to maintain two additional generators.
3. Increases plant capacity by 300 CFS (about 5.5% increase) at a time when commercial power would most likely be out.

DISADVANTAGES:

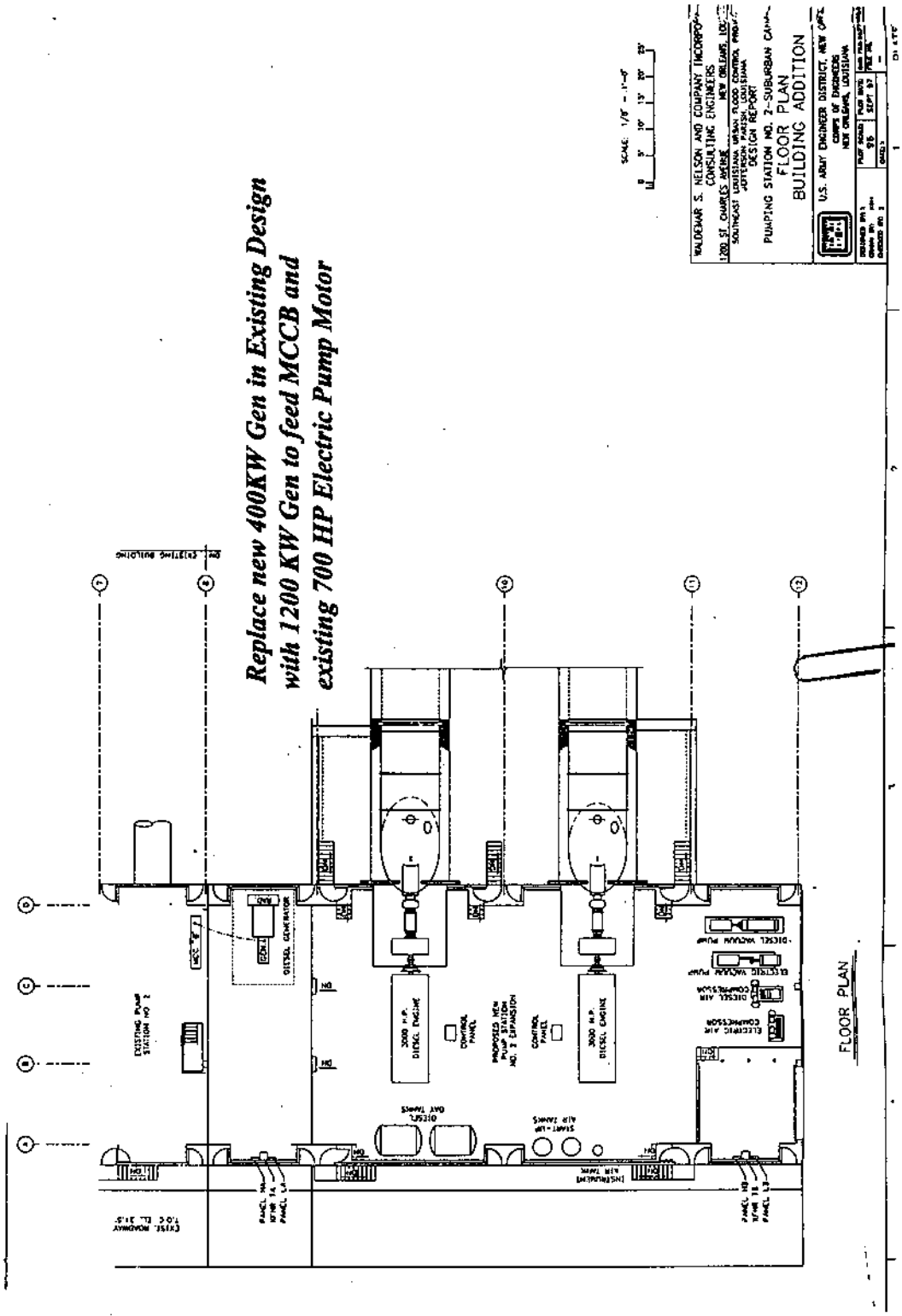
Increased first cost.

JUSTIFICATION: The advantage of using a larger generator to increase plant capacity at a relatively small increase in cost, justifies the purchase. A 5.5% increase in plant capacity (including emergency power) for a cost of $138,000 provides a very high benefit to cost.

VALUE ENGINEERING PROPOSAL

PROPOSAL NO: E-2 PAGE NO: 3 OF 6

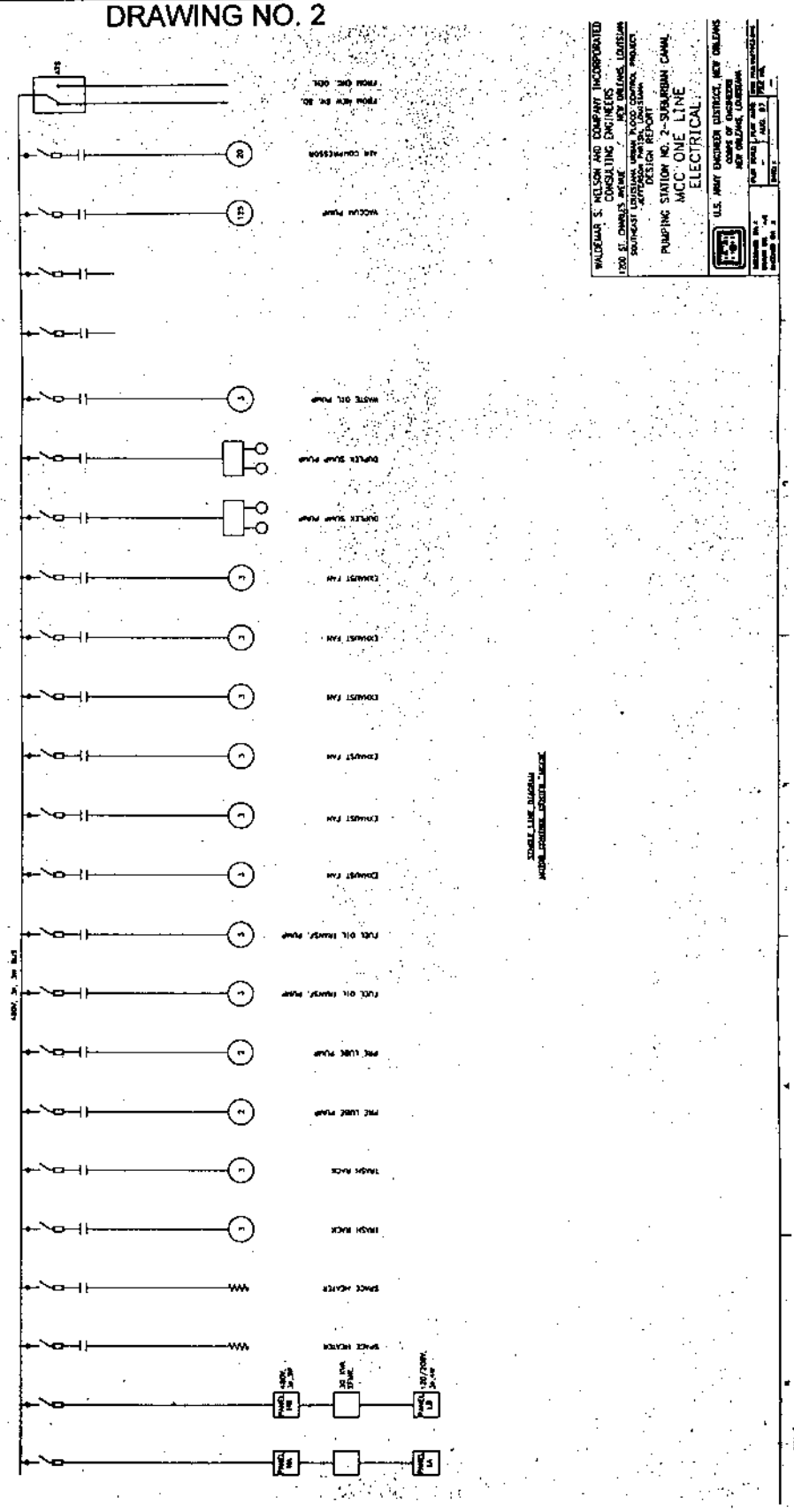
DRAWING NO. 1



VALUE ENGINEERING PROPOSAL

PROPOSAL NO: E-2

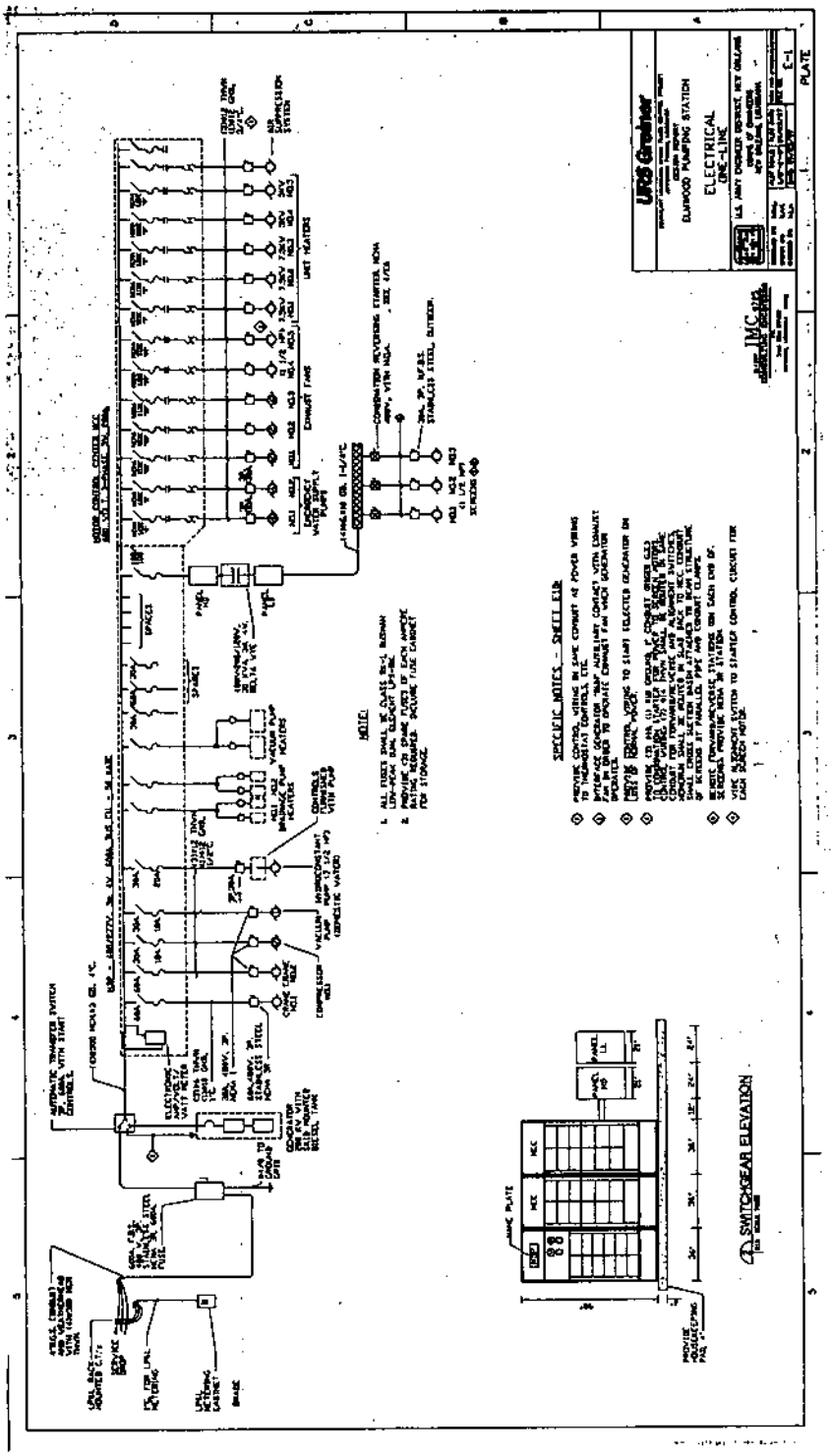
DRAWING NO. 2



VALUE ENGINEERING PROPOSAL

PROPOSAL NO: E-2 PAGE NO: 5 OF 6

DRAWING NO. 3



COST ESTIMATE WORKSHEET

PROPOSAL NO: E-2 PAGE NO: 6 OF 6

DELETIONS

ITEM	U/M	QTY	UNIT COST	TOTAL
400KW Gen at PS 2	EA	1	$75,000	$75,000
400KW Gen at PS #3	EA	1	75,000	75,000
80 KW Gen at PS 2	EA	1	30,000	30,000
TOTAL DELETIONS				$180,000

ADDITIONS

ITEM	U/M	QTY	UNIT COST	TOTAL
1.2MW Gen	EA	1	$300,000	$300,000
TOTAL ADDITIONS				$300,000

Net Savings (Deletes - Adds)	($120,000)
Markups 15%	(18,000)
TOTAL INCREASE	($138,000)

Markups: Contractor's markup for OH & Profit, Contingencies, and S&A where applicable.

1. **Pump Station No. 2 -- Revise Crushed Limestone Unit Cost** -- Page 1 of 8 in the 50% Design Review Cost Estimate shows $9/CY for the limestone unit cost. According to a New Orleans District estimator, this figure appears to be too low. Verify unit cost.

2. **Pump Station Nos. 2 and 3 -- Revisit Architectural Design for New Pump Station Additions** -- Recommend that the design A-E's be tasked to investigate providing compatible and harmonious optional building elevations to the current design. The VE Team felt that a conscious attempt to "match" exactly the new additions with the existing buildings would clearly be recognized as additions. Why not, then, deliberately vary the design of the additions such that it is evident that they are additions, but yet, are designed to be compatible with the existing buildings? One such design technique used to accomplish this end was employed at Pump Station No. 7. There, the same palette of exterior building materials was used for the addition as was found on the original building, however, the roof line and profile was varied, creating a unified and harmonious, yet not monotonous, whole.

3. **Pump Station No. 3 -- Relocate Barometric Tanks** -- The current design shows the barometric tanks on the "flood side" of the flood wall. The Study Team recommends that these tanks be relocated to the "protected side" of the flood wall.

4. **Postpone Pump Purchase and Further Design Work Until Intake Basin Modeling is Complete** -- There is currently uncertainty regarding whether or not locating two large pump units together on the east end of each station will work properly. There is an ongoing hydraulic study to address this. The results of this study may indicate that the new pumps must be separated and located on each side of the existing station. The modeling may also indicate that the size or suction requirements, specific to pump type, may also require significant change. It would appear prudent to postpone $10 million in equipment purchase and further design work until the study is complete.

5. **Extend Avron Bridge** -- The current plan for Suburban Canal will widen the canal south of Avron Bridge. The Pump Station No. 2 enlargement will widen the forebay north of Avron Bridge. The Avron Bridge will become somewhat of a bottleneck in this configuration. Instead of contracting the channel by means of structures under, around, or in vicinity of the bridge, it should prove more cost effective to extend the bridge by adding a section to the east, (and west as necessary) to accommodate an enlarged channel section, while providing hydraulically a more uniform approach into the pump forebay. In this case, removal or rebuilding the existing bridge will not be necessary.

6. **Synchronize Paired Motors to Reduce Noise** – During the study, a comment was made concerning existing noise complaints made by neighbors when stations are all running near full capacity. However, operators at Pump Station No. 2 stated they had never received a noise complaint. In any case, some level of noise reduction can be achieved by synchronizing paired motors so that rotational cycles are out of phase. The resultant for noise and vibration at a distance from the pair (dipole) source is a cancellation of energy and overall reduction. This may require computer control of motor speed and synchronization. A competent sound consultant can perform the necessary analyses and recommend additional methods of sound control and abatement, should addition of these two additional pumps and motors, and closer proximity to neighboring homes, result in noise complaints.

7. **Modify Pedestrian Bridge to Allow Channel Access by a Barge Crane** -- Outflow channels at Pump Stations Nos. 2 and 3 will be widened to accommodate additional outfall from two 1,200 CFS pumps. This will require extending the lengths of the pedestrian bridges which cross the outflow channels. Since the widening will be required, install removable clear span 45' wide to allow barge crane entry to the outflow channel and access to rear of the pump station. Doing this in advance of the new station enlargement will allow the contractor flexibility in a construction access and should result in better bid prices. After construction is complete, the channel and rear of station will still be accessible by barged crane for maintenance or repairs by removing the span, bring the barge in and replacing the span. Additional piles and piers can be installed adjacent to the existing bridge to allow temporary relocation and replacement of the clear span.

8. **Drain Waste Oil to the Existing 7,000-Gallon Tank** -- Pump Station No. 2 has a 7,000-gallon waste oil storage tank located in the lower level of the existing facility. The station operators want waste oil from the new station extension piped to the existing waste oil tank. This will eliminate storage of drums containing waste oil on the floor of the new station or addition of a waste oil storage tank in the new facility. (Drum storage wastes floor space and presents a fire hazard.) The existing tank has ample capacity for waste oil from the two additional pumps. Existing plumbing may require relocation so that the tank can be pumped out to an external tank truck for periodic emptying.

9. **Add a Waste Oil Storage Tank at Pump Station No. 3** -- Currently, Pump Station No. 3 stores waste oil in 55-gallon drums on the floor of the facility. In conjunction with the station expansion, provide two 500-gallon or one 1,000-gallon waste oil storage tank located in the sub-floor level of either old or new facility. Plumb the tank(s) to the exterior for periodic emptying to a tank trunk for disposal. This frees up floor space, reduces spill hazard and fire hazard from many drums on the main floor. Pump Station No. 2 currently has a sub-floor tank that is used for waste oil storage. The square-foot value of floor space is considerably more than the additional cost of a storage tank.

10. **Pump Station No. 2 -- Keep Fuel Tanks on East Side** -- During site visit to Pump Station No. 2, we noted that more room exists on the east side for relocation of fuel tanks than on the west side. Relocating tanks to the west side puts them closer to homes than if they are relocated on the east side. This becomes an increased safety risk. New electrical service will be re-routed to the west side, and it seems desirable to keep electrical service and fuel service separated. (The original station had fuel located on east, and electrical, on west. Although a west side location may provide a more direct route for trucks making fuel delivery, this occurs approximately once every 4 months and is not a critical design consideration. Operators at Pump Station No. 2 also indicated they favored the east side location for fuel tanks.

11. **Pump Stations Nos. 2 and 3 --Increase Pedestrian Bridge Design Loading to H-15** -- During a site visit to Pump Station No. 2, we observed a sign on the pedestrian bridge road that read "No Motorized Vehicles". However, we observed a dump truck drive across this bridge from the west, where some lakefront construction is taking place. Obviously, this bridge has an existing capacity greater than pedestrian loading. H-15 design loading for vehicular capacity on pedestrian bridges at Pump Stations Nos. 2 and 3 should be maintained for occasional construction access and necessary emergency vehicular access to lakefront recreational areas existing and now being constructed on the lake side of levee, along the recreational trail. The current design document by URS Greiner, dated October 1997, page 18, Paragraph 32 sates bridge is designed for pedestrian loading, which AASHTO Code is 85# per square foot live load.

12 **Heads Up -- Revise Plate 3, H-2-44957** -- T.O.C. elevations are incorrectly labeled, as well as stair locations (see Drawing No. 1).

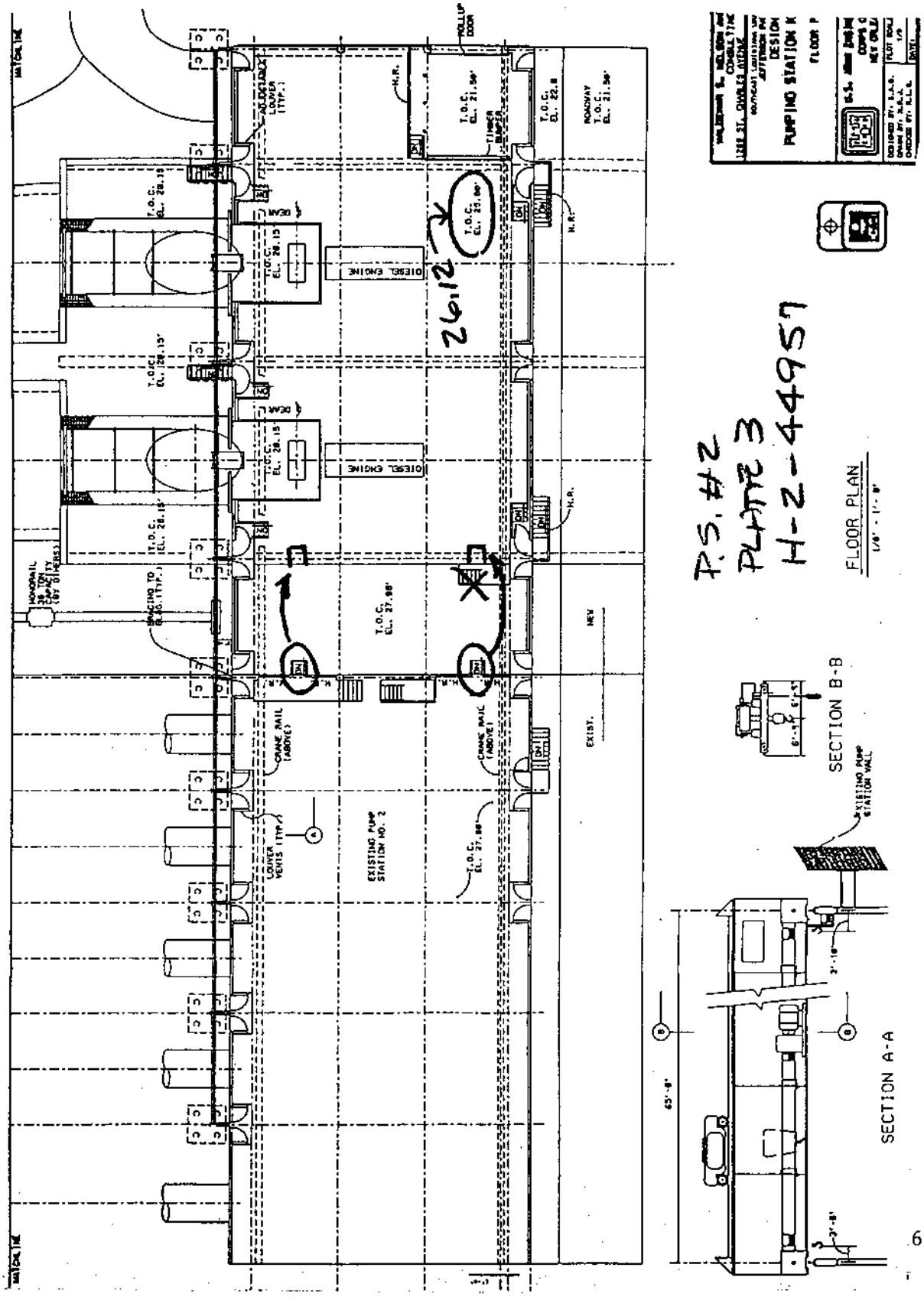
13. **Pump Station No. 3 --Use Pre-Cast Panels on East Wall** -- Currently, Pump Station No. 2 has a brickend wall on the east side, where station extension will be located. The current design does not show an elevation view of the east wall, so the design intent is uncertain. Pump Station No. 3 uses pre-cast panels for end walls, east and west which match the north and south walls, and is more aesthetically pleasing than the brick wall. The brickend wall of Pump Station No. 2 makes the station appear to be unfinished, awaiting expansion. The new east wall of Pump Station No. 2 should also be pre-cast panels to match the north and south treatment of both the new addition and existing station, eliminating "patched structure" or "temporary wall" appearance that the existing brick wall conveys.

14. **Current Plans Appear to be a Copy of the Cousins Pump Station Plan** – During the course of the study, several District participants stated that the URS Greiner Plan for Pump Station No. 3 looked like a Xerox of the Cousins Pump Station Plan. Cousins is a new Pump Station,, and a new station would require office space and equipment back-up which would not be required in an add-on to an existing station. Many of the comments and/or proposals involved excessive floor space, office space, or back-up equipment. This may be generated by using a stand-alone pump station plan for an add-on configuration.

VALUE ENGINEERING COMMENTS

COMMENT NO: 12

DRAWING NO. 1



VALUE ENGINEERING TEAM STUDY

APPENDIX A: [redacted] CONTACT LIST

NAME	ORGANIZATION	TEL/FAX NUMBERS
Frank Vicidomina	CENOD-VE	504-862-1251/1785
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SPECULATION LIST

VALUE ENGINEERING TEAM STUDY

APPENDIX B: SPECULATION LIST

✓=Develop Idea ?=Investigation X=Deleted CMT=Comment

✓	1.	Nos. 1 and 2 -- Use emergency power from existing plant.
X	2.	Nos. 2 and 3 -- One common fuel tank (concrete, fiberglass, etc.)
X	3.	Bury fuel tanks.
✓	4.	Do not use a copper roof on Plant No. 3.
✓	5.	No. 3 -- Extend rail of existing indoor crane.
✓	6.	Coordinate crane capacities between Plants No. 2 and 3. (25-ton outdoor and indoor will meet load)
X	7.	No. 3 -- Use 5-ton bridge cranes in lieu of 20-ton bridge cranes (gear box dictator).
X	8.	Re-use sheet pile from one project to the other.
✓	9.	Nos. 2 and 3 -- Revisit extent of cofferdam construction.
✓	10.	Nos. 2 and 3 -- Revisit direction of deck slope on screen side and change deck on existing No. 2 (make fit).
✓	11.	Nos. 2 and 3 -- Revisit need for fire supp sprinkler system.
✓	12.	Nos. 2 and 3 -- Check spacing between pump units (face vel of intake screen dictates 1.5'/sec.
✓	13.	Nos. 2 and 3 -- Reduce mechanical equipment and eliminate a structural bay (vac pumps, comp).
✓	14.	No. 3 -- Eliminate truck/office bay approximately 15'.
✓	15.	No. 2 -- Reduce thickness of precast wall panels.
✓	16.	No. 2 -- Support well pump with existing generator (probably arranged this way now).
✓	17.	No. 3 -- Design electrical service same as No. 2.
X	18.	Nos. 2 and 3 -- Change arch. And do not attempt to match existing construction.
X	19.	Nos. 2 and 3 -- Increase diesel engine speeds to 1,800 RPM.
✓	20.	No. 2 -- Replace or extend Averon Bridge.
?	21.	Nos. 2 and 3 -- Construct as much as possible "in the wet".
✓	22.	Nos. 2 and 3 -- Use vertical pumps.
CMT	23.	Nos. 2 and 3 -- Syn paired motors to reduce noise.
?	24.	Nos. 2 and 3 -- Revisit sheet pile type.
✓	25.	Nos. 2 and 3 -- Modify pedestrian bridges to allow a float-in crane to be used.
CMT	26.	Nos. 2 and 3 -- Stop design work and award of pump contract until modeling studies are complete.
✓	27.	No. 2 -- configure vac. Pump equip No. 2; this same as is being done on No. 3.
?	28.	Nos. 2 and 3 -- Revisit concrete thickness.

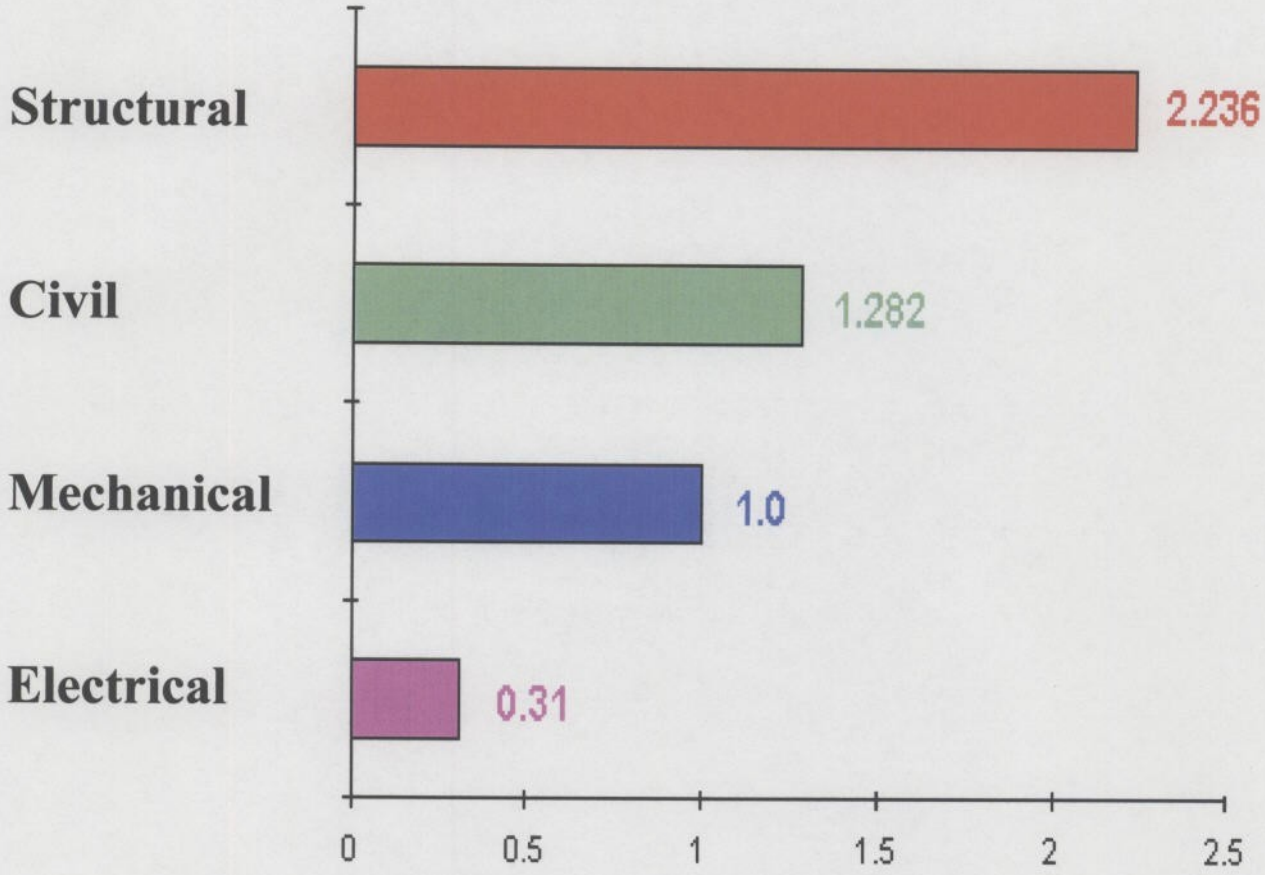
✓=Develop Idea ?=Investigation X=Deleted CMT=Comment

✓/CMT	29.	No. 3 -- Coordinate number of generators -- drawings show two, however, there is only one new emergency generator.
✓	30.	No. 2 -- Revisit channel intake grading plan.
✓	31.	No. 2 -- Eliminate central bay which includes the emergency generator.
X	32.	No. 2 -- Convert "east-end" bay to a loading dock.
?	33.	No. 2 -- Use a rigid steel frame building.
X	34.	Nos. 2 and 3 -- Drop pumps to canal level.
✓	35.	No. 3 -- Relocate baro tank to protected side of flood wall.
✓	36.	No. 2 -- Modify existing trash screens and/or deck such that a bobcat can be used without so much manual handling of trash.
✓	37.	No. 2 -- Pave access roads.
✓	38.	Visit the possibility of driving the existing vertical pump with the emergency generator (consider paralleling).
✓	39.	No. 2 -- Drain waste oil to the existing 7,000 gal tank.
X	40.	No. 2 -- Locate loading dock to west side of plant and retain east wall.
X	41.	No. 2 -- Extend crane all the way through to a "west end" loading dock.
✓	42.	Nos. 2 and 3 -- Add a new SCADA System.
✓	43.	No. 2 -- Add one 2,000 cfs diesel driven vac pump. Bottom line -- three vac pump in lieu of four.
✓	44.	Create waste oil tank at No. 3.
✓	45.	Increase pedestrian bridge design loading to H-15.
✓	46.	Coordinate architectural and mechanical floor plans re: bay between Column Lines A and B.
	47.	No. 2 -- Keep fuel tanks on east side.
CMT	48.	No. 2 -- Very limestone cost.

COST MODELS

COST MODEL

Pump Stations 2 & 3
Jefferson Parish
New Orleans, La.

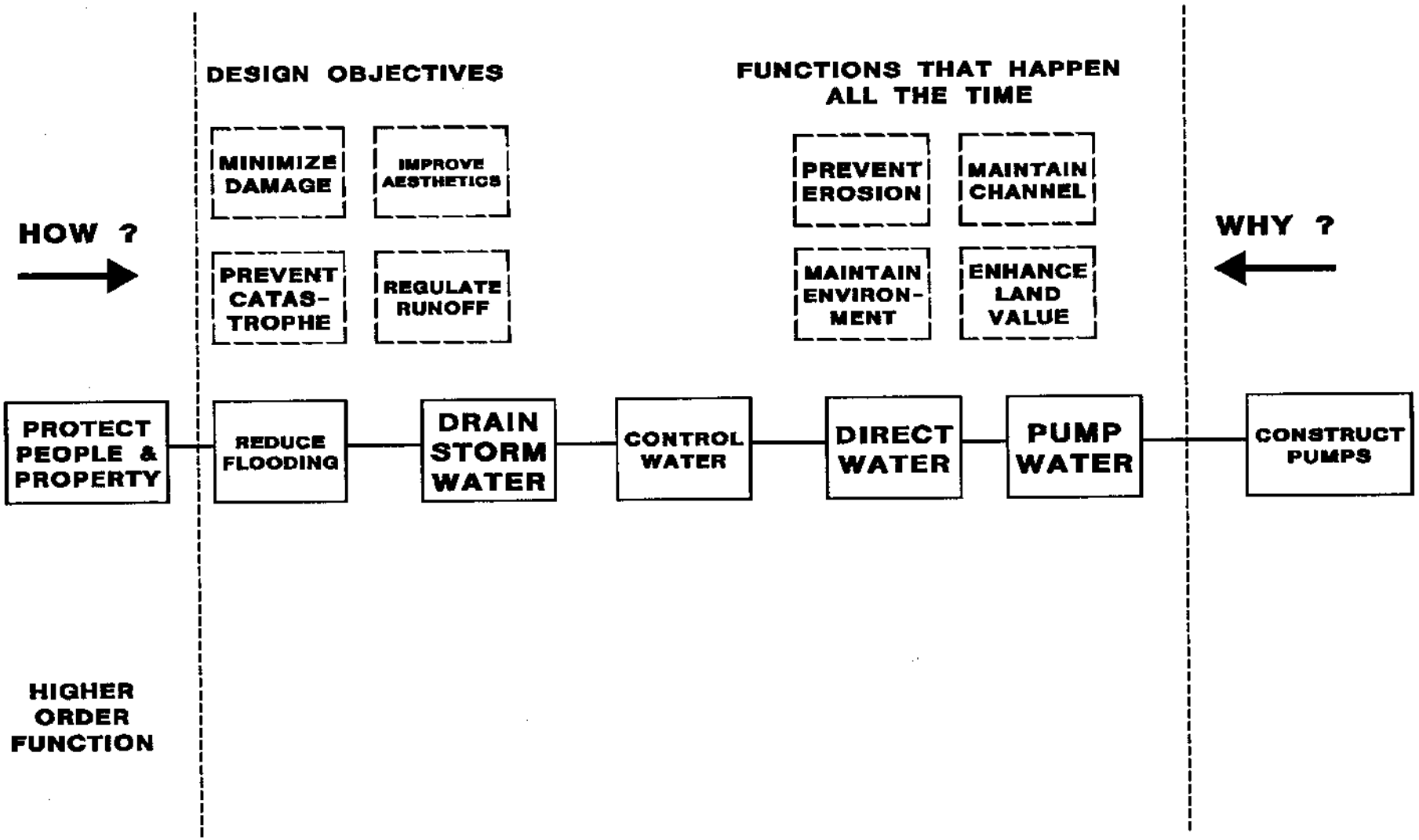


Dollars (Millions)

Total CWE = $4,827,152

FAST DIAGRAM

UPGRADE PUMP STATIONS 2 AND 3
NEW ORLEANS, LA



FUNCTION ANALYSIS SYSTEM TECHNIQUE
(FAST) DIAGRAM

V. E. PROPOSAL M-6
Consider Vertical Pumps at Pump Stations Nos. 2 and 3

RESPONSE

ORIGINAL DESIGN: The initial decision to use horizontal pumps (made jointly by Jefferson Parish and the New Orleans District) was based the Parish's requirement that pumps over 300 cfs must be horizontal, and the New Orleans District's belief that there was no significant advantage to one type over the other. The Parish's position on horizontal pumps is based on their experiences with vertical pumps with respect to their heavier weight, lower energy efficiency, and greater difficulties associated with maintenance work. While Pump Stations 2 and 3 (as well as other lakefront pump stations) do have vertical pumps, most are 300 cfs; and all pumps in the range of 1,200 cfs are horizontal.

ADVANTAGES:

1. Reference the COST ESTIMATE WORK SHEET for Proposal M-6.

a. Based on a recent procurement action for 1,200 cfs horizontal pumps, the average cost of the pump was $816,000. This is $56,000 more than the cost used for vertical pumps, or $392,000 for seven pumps, versus the $4,900,000 claimed. Further, the vertical pump would require a right angle speed reducer versus a straight HOL speed reducer used on the horizontal pump. The right angle gear would have to carry the pump rotating weight, plus the hydraulic downthrust. The size of the thrust loads would be high (as much as 160,000 lbs.) This would add as much as 15% to 20% to the speed reducer costs ($50,000 to $60,000 per pump), offsetting the first cost savings on the pump purchase.

b. With regard to differential in installation and formed suction/discharge costs, the $700,000 per pump differential cost is disputed. No basis is presented for this estimate. While the horizontal pumps may have more requirements for alignment, etc., the following issues must be considered:

1) The weight of the vertical pumps is significantly higher than (perhaps as much as twice) that of the horizontal pumps. It is questionable that any significant reduction in structure costs could be realized given the greater foundation requirements.

2) Both horizontal and vertical pumps would require formed suction inlets (FSI) and discharges. The FSI on vertical pumps would be slightly shorter, but would require a deeper setting. The requirement for a deeper setting would offset any cost savings presented by the shorter FSI.

3) The discharge is not relevant to the pump hydraulics and is strictly a function of discharging the pumped fluid in the most efficient manner possible. If a more cost-effective and efficient discharge is proposed, it would be used with the horizontal pumps, as well.

Based on the limited cost differential of the pumps, the offset cost with the thrust loads, and the questionable and unsupported differential in installation and formed suction/discharge costs, there would appear to be no first cost advantage to using vertical pumps.

2. The priming advantage is not disputed.

3. The use of horizontal pumps at Pump Station No. 3 is perfectly consistent with what has been done at Jefferson Parish pump stations when pumps are the size of those in consideration.

4. The smaller support and discharge structures are disputed, given the heavier weight of the vertical pumps, and the fact there should be no significant difference in the discharge structure for horizontal versus vertical pumps.

5. The lower speed horizontal pump is more advantageous from an NPSHR, a maintenance, and a wear/longevity perspective.

6. The vertical unit may be easier and faster to install from an alignment, etc. perspective, but the greater weight, and more hazardous situation involved with installing vertical pumps over water make that advantage questionable.

DISADVANTAGES:

1. Again, the greater difficulty and cost associated with maintenance of the vertical pumps supports the decision to use horizontal pumps.

2. The increased operation cost due to the reduced energy efficiency of the vertical pumps is another life-cycle cost that supports the decision to use horizontal pumps.

3. Agree that suction and discharge for vertical pumps involves more complex designs.

4. Life-cycle increased maintenance of vertical pumps, again, supports the decision to use horizontal pumps.

JUSTIFICATION:

In view of the fact that: (a) the first cost savings on the units are not realized; (b) the differential in installation and formed suction/discharge costs are not supported and, in fact, are disputed; and (c) the higher life cycle costs of operation and maintenance are acknowledged, there appears to be no justification for the change to vertical pumps. Further, while there would be significant cost increases associated with changing to vertical pumps from horizontal at this point in time (re-design costs, delayed benefits costs, claims for proposal preparation costs associated with the canceling of the current solicitation, etc.), the information presented herein supports the conclusion that, even without those cost increases, there is no significant advantage, cost or otherwise, to the use of vertical pumps over horizontal in the applications associated with this project.