

May 8, 2019

To: Louis Pomes, SBP
Darren Austin, PE, SLFPA-East

From: Jack Morgan, PE, PS, Evans-Graves Engineers, Inc.

Re: **Cost Estimate Backup Data**

Evans-Graves Engineers (E-G) was tasked by St. Bernard Parish and the Southeast Louisiana Flood Protection Authority – East (SLFPA-E) to provide a visual assessment of the eight (8) existing St. Bernard Parish drainage pump stations. This memo is to provide backup information regarding the preliminary cost estimate our firm included in the Lake Borgne Pump Stations Assessment Report. The intent of the cost estimate was not to provide detailed bid numbers for each recommended item; however, if authorized, E-G could go into more detail on the numbers.

The Parish provided Evans-Graves with a cost tabulation that we broke down into categories as follows:

- Items already included in the E-G report
- Items for E-G to further investigate
- Items covered in our report under Additional General Suggestions
- Maintenance Items
- Betterments

As we have done with the report itself, we will break the costs down by pump station below.

PUMP STATION No. 1

Items already included in the E-G report

The cost of the items involved in the ongoing contractor litigation was provided to us by the Parish. The items include:

- Installation of a second new drive engine at Pump 1 for \$650,000.
- Removal and reinstallation, with factory rebuilding and calibrating, of one right angle gear drive at Pump 1 for \$575,000.
- Removal and reinstallation, with factory calibrating, of one right angle gear drive at Pump 2 for \$325,000.

Of the additional items already included in the E-G report, our estimates were based on the following:

- Electric Pump – The electric motor that drives the service pump at PS-1 is experiencing intermittent electrical failures. E-G was not tasked to do any analysis on the motor to determine the cause or extent of any damage. To cover the cost of an electrical evaluation and overhaul,

but not the replacement of the entire electrical system and motor, E-G estimated a cost of \$100,000

- Trash rakes – E-G considered that the trash rakes and bar screens could be brought back into service for a contract amount roughly one-quarter of the cost of a new system or \$375,000 per rake, based on other similar projects, times 5 rakes = \$1,875,000 times 25 percent = \$468,750. Because PS-1 and PS-4 are identical, and because PS-4 appears in a similar but slightly worse condition, we pushed PS-1 down to \$400,000.
- Compressor – Other work may eliminate the need for the air compressor, but E-G estimated a replacement cost of \$50,000. This cost is based on current pricing trends for like-model compressors with similar capacities and associated labor costs from the estimated number of man-hours required to remove the existing compressor and install a new compressor.

Items for E-G to further investigate

The Parish provided:

- Tainter gates rehab – The existing Tainter gates were inaccessible to E-G personnel and the operators on site did not express any concerns with the gates. The Parish provided E-G with a suggested refurbishment cost of \$100,000, but this was not included in our report.

Items covered in our report under Additional General Suggestions

Several items were recommended as considerations, but that do not affect the adequacy for service of the pump stations or their components. Because these are miscellaneous small projects, all of the costs were derived from a broad estimate of man-hours and equipment needs. These items are advisable, but not considered necessary for pump station operation:

- Cleanup – Removal and disposal of clutter and obsolete materials from operator facilities and common areas was estimated at \$20,000.
- Abandoned Equipment – Dismantling, removing, and disposing of unused remnant electrical, pneumatic, and cooling components was estimated at \$40,000.
- Booms – Installation of boom systems at intake sumps is estimated at \$80,000 based on the expected length of the booms to be installed at PS-1.
- Sump Depth – Digging out silt from the area immediately adjacent to the intake was estimated at \$25,000 based on the depth of the canal.
- Pneumatic Leak – Sealing leaks in the compressed air system was estimated at \$5,000.

Betterments

Several items were suggested by the Parish for consideration in the report, but were considered by Evans-Graves to fall under the category of Betterments, which falls outside our Scope:

- New bar screens and trash rakes – The Parish cost for the trash rakes represents complete removal and replacement of the existing rakes and screens for \$1,950,000.

- Telemetry – No telemetry exists at PS-1. Parish included an estimate of \$12,000.
- Refurbish pumps – Parish is concerned that the pumps have not been pulled in decades, although there is no current obvious indications of pump deterioration. Parish estimated \$500,000.
- Modify Layout – Parish seeks to evaluate making “limited structural and mechanical changes to operating floor” at an estimated cost of \$30,000.
- Safe House Communications – Parish would like a radio and antenna installed at the Safe House at an estimated cost of \$7,500.
- Electrical Rehabilitation – Parish foresees an “extensive rework of low-voltage equipment,” in addition to the above cost of the electric drive motor repairs, at an estimated cost of \$250,000.

PUMP STATION No. 2

Items for E-G to further investigate

The Parish provided:

- Repair Butterfly Valves – The Parish considers the existing butterfly valves a potential issue. The Parish provided E-G with a suggested refurbishment cost of \$10,000, but this was not included in our report.
- Retrofit Building Exterior – The Parish has concerns about water infiltration into the building. The Parish provided E-G with a suggested cost of \$15,000, but this was not included in our report.

Items covered in our report under Additional General Suggestions

Several items were recommended as considerations, but that do not affect the adequacy for service of the pump stations or their components. Because these are miscellaneous small projects, all of the costs were derived from a broad estimate of man-hours and equipment needs. These items are advisable, but not considered necessary for pump station operation:

- Booms – Installation of boom systems at intake sumps is estimated at \$80,000 based on the expected length of the booms to be installed at PS-2.
- Sump Depth – Digging out silt from the area immediately adjacent to the intake was estimated at \$25,000 based on the depth of the canal.
- Slab Connections – Releasing various pipe clamps affected by slab movement was estimated at \$10,000.

Betterments

Several items were suggested by the Parish for consideration in the report, but were considered by Evans-Graves to fall under the category of Betterments, which falls outside our Scope:

- Trash rakes – No rakes exist at PS-2. Parish included an estimate of \$1,560,000.
- Telemetry – No telemetry exists at PS-1. Parish included an estimate of \$12,000.
- Reset Discharges – Parish is concerned with inadequate heat exchangers. Parish estimated \$45,000.
- Reconstruct Sump – Parish wants new sheet piles and concrete piles with new access deck at an estimated cost of \$500,000.

PUMP STATION No. 3

Items already included in the E-G report

- Generator – The emergency backup generator was not operational during the E-G assessment. We estimated a new generator cost of \$10,000. This cost was based on current pricing trends for like-model 15kW industrial generators.

Items for E-G to further investigate

The Parish provided:

- Repair Butterfly Valves – The Parish considers the existing butterfly valves a potential issue. The Parish provided E-G with a suggested refurbishment cost of \$10,000, but this was not included in our report.
- Repair Fence Segment – The existing fence is in need of repair. The Parish provided E-G with a suggested cost of \$4,500, but this was not included in our report.
- Retrofit Building Exterior – The Parish has concerns about water infiltration into the building. The Parish provided E-G with a suggested cost of \$15,000, but this was not included in our report.

Items covered in our report under Additional General Suggestions

Several items were recommended as considerations, but that do not affect the adequacy for service of the pump stations or their components. Because these are miscellaneous small projects, all of the costs were derived from a broad estimate of man-hours and equipment needs. These items are advisable, but not considered necessary for pump station operation:

- Booms – Installation of boom systems at intake sumps is estimated at \$80,000 based on the expected length of the booms to be installed at PS-3.
- Sump Depth – Digging out silt from the area immediately adjacent to the intake was estimated at \$25,000 based on the depth of the canal.
- Slab Connections – Releasing various pipe clamps affected by slab movement was estimated at \$10,000.

Betterments

Several items were suggested by the Parish for consideration in the report, but were considered by Evans-Graves to fall under the category of Betterments, which falls outside our Scope:

- Trash rakes – No rakes exist at PS-2. Parish included an estimate of \$1,560,000.
- Telemetry – No telemetry exists at PS-1. Parish included an estimate of \$12,000.
- Reset Discharges – Parish is concerned with inadequate heat exchangers. Parish estimated \$45,000.
- Reconstruct Sump – Parish wants new sheet piles and concrete piles with new access deck at an estimated cost of \$500,000.
- Parish wants new water service to PS-3 at an estimated cost of \$10,000.

PUMP STATION No. 4

Items already included in the E-G report

The cost of the items involved in the ongoing contractor litigation was provided to us by the Parish. The items include:

- Installation of a second new drive engine at Pump 2 for \$650,000.
- Removal and reinstallation, with factory rebuilding and calibrating, of one right angle gear drive at Pump 2 for \$575,000.
- Removal and reinstallation, with factory calibrating, of one right angle gear drive at Pump 1 for \$325,000.

Of the additional items already included in the E-G report, our estimates were based on the following:

- Trash rakes – E-G considered that the trash rakes and bar screens could be brought back into service for a contract amount roughly one-quarter of the cost of a new system or \$375,000 per rake, based on other similar projects, times 5 rakes = \$1,875,000 times 25 percent = \$468,750. Because PS-1 and PS-4 are identical, and because PS-4 appears in a similar but slightly worse condition, we pushed PS-4 up to \$500,000.

Items for E-G to further investigate

The Parish provided:

- Tainter gates rehab – The existing Tainter gates were inaccessible to E-G personnel and the operators on site did not express any concerns with the gates. The Parish provided E-G with a suggested refurbishment cost of \$100,000, but this was not included in our report.

Items covered in our report under Additional General Suggestions

Several items were recommended as considerations, but that do not affect the adequacy for service of the pump stations or their components. Because these are miscellaneous small projects, all of the costs

were derived from a broad estimate of man-hours and equipment needs. These items are advisable, but not considered necessary for pump station operation:

- Cleanup – Removal and disposal of clutter and obsolete materials from operator facilities and common areas was estimated at \$20,000.
- Abandoned Equipment – Dismantling, removing, and disposing of unused remnant electrical, pneumatic, and cooling components was estimated at \$40,000.
- Booms – Installation of boom systems at intake sumps is estimated at \$80,000 based on the expected length of the booms to be installed at PS-4.
- Sump Depth – Digging out silt from the area immediately adjacent to the intake was estimated at \$25,000 based on the depth of the canal.
- Pneumatic Leak – Sealing leaks in the compressed air system was estimated at \$5,000.

Betterments

Several items were suggested by the Parish for consideration in the report, but were considered by Evans-Graves to fall under the category of Betterments, which falls outside our Scope:

- New bar screens and trash rakes – The Parish costs for the trash rakes represents complete removal and replacement of the existing rakes and screens for \$1,950,000.
- Telemetry – No telemetry exists at PS-1. Parish included an estimate of \$12,000.
- Refurbish pumps – Parish is concerned that the pumps have not been pulled in decades, although there is no current obvious indications of pump deterioration. Parish estimated \$500,000.
- Compressor – Other work may eliminate the need for the air compressor, but Parish estimated a replacement cost of \$50,000.
- Modify Layout – Parish seeks to evaluate making “limited structural and mechanical changes to operating floor” at an estimated cost of \$30,000.
- Safe House Communications – Parish would like a radio and antenna installed at the Safe House at an estimated cost of \$7,500.
- Electrical Rehabilitation – Parish foresees an “extensive rework of low-voltage equipment,” in addition to the above cost of the electric drive motor repairs, at an estimated cost of \$250,000.

PUMP STATION No. 5

Items already included in the E-G report

- Piling – Piling supporting the discharge pipes and platform is failing. For geotechnical work and new piles, we estimated a cost of \$100,000, which is based on E-G’s previous experience on projects involving similar work.

- Rehab Discharge Flap Gates – The discharge pipe flap gates are failing to adequately seal. For refurbishing the gates, E-G estimated a cost of \$50,000, which is based on E-G's previous experience on projects involving similar work.

Items for E-G to further investigate

The Parish provided:

- Repair Intake Boom – The Parish has concerns about the existing boom and provided E-G with a suggested cost of \$10,000, but this was not included in our report.

Items covered in our report under Additional General Suggestions

Several items were recommended as considerations, but that do not affect the adequacy for service of the pump stations or their components. Because these are miscellaneous small projects, all of the costs were derived from a broad estimate of man-hours and equipment needs. These items are advisable, but not considered necessary for pump station operation:

- Air Hoods – Installation of air hoods to shield engine air intake is estimated at \$50,000.
- Sump Depth – Digging out silt from the area immediately adjacent to the intake was estimated at \$25,000 based on the depth of the canal.

Betterments

Several items were suggested by the Parish for consideration in the report, but were considered by Evans-Graves to fall under the category of Betterments, which falls outside our Scope:

- Trash rakes – No rakes exist at PS-2. Parish included an estimate of \$1,560,000.
- Telemetry – No telemetry exists at PS-1. Parish included an estimate of \$12,000.
- Replace Bridge – Parish is concerned over existing bridge. Parish estimated \$600,000.
- Raise/floodproof Building – Parish wants to raise and otherwise floodproof the pump station building at an estimated cost of \$50,000.

PUMP STATION No. 6

Items for E-G to further investigate

The Parish provided:

- Repair Gantry Crane – The Parish has concerns about the existing gantry crane and provided E-G with a suggested cost of \$10,000, but this was not included in our report.

Items covered in our report under Additional General Suggestions

Several items were recommended as considerations, but that do not affect the adequacy for service of the pump stations or their components. Because these are miscellaneous small projects, all of the costs were derived from a broad estimate of man-hours and equipment needs. These items are advisable, but not considered necessary for pump station operation:

- Booms – Installation of boom systems at intake sumps is estimated at \$80,000 based on the expected length of the booms to be installed at PS-6.
- Sump Depth – Digging out silt from the area immediately adjacent to the intake was estimated at \$25,000 based on the depth of the canal.

Maintenance Items

Several items were recommended as considerations that E-G categorized as maintenance items:

- Maintain Gear Drives – Parish is concerned with amount of wear on drives. Cost of evaluation is estimated at \$10,000.

Betterments

Several items were suggested by the Parish for consideration in the report, but were considered by Evans-Graves to fall under the category of Betterments, which falls outside our Scope:

- Trash rakes – No rakes exist at PS-2. Parish included an estimate of \$1,590,000.
- Telemetry – No telemetry exists at PS-1. Parish included an estimate of \$12,000.
- Diesel Tank Catwalk – Parish is concerned over diesel tank catwalk. Parish estimated \$25,000.

PUMP STATION No. 7

Items for E-G to further investigate

The Parish provided:

- Repair Discharge Backflow Preventers – The Parish wants the backflow preventers on the discharge pipes repaired at an estimated \$10,000, but this was not included in our report.
- Repair Gantry Crane – The Parish has concerns about the existing gantry crane and provided E-G with a suggested cost of \$10,000, but this was not included in our report due to the fact that the intent of E-G's report was to sustain, not replace, the current system.

Items covered in our report under Additional General Suggestions

Several items were recommended as considerations, but that do not affect the adequacy for service of the pump stations or their components. Because these are miscellaneous small projects, all of the costs were derived from a broad estimate of man-hours and equipment needs. These items are advisable, but not considered necessary for pump station operation:

- Booms – Installation of boom systems at intake sums is estimated at \$80,000 based on the expected length of the booms to be installed at PS-7.
- Sump Depth – Digging out silt from the area immediately adjacent to the intake was estimated at \$25,000 based on the depth of the canal.

Maintenance Items

Several items were recommended as considerations that E-G categorized as maintenance items:

- Maintain Gear Drives – Parish is concerned with amount of wear on drives. Cost of evaluation is estimated at \$10,000.

Betterments

Several items were suggested by the Parish for consideration in the report, but were considered by Evans-Graves to fall under the category of Betterments, which falls outside our Scope:

- Trash rakes – No rakes exist at PS-2. Parish included an estimate of \$1,590,000.
- Telemetry – No telemetry exists at PS-1. Parish included an estimate of \$12,000.
- Diesel Tank Catwalk – Parish is concerned over diesel tank catwalk. Parish estimated \$25,000.
- Safe House Communications – Parish would like a radio and antenna installed at the Safe House at an estimated cost of \$7,500.

PUMP STATION No. 8

Items for E-G to further investigate

The Parish provided:

- Sewer Treatment Plant Repair – The Parish proved E-G with a \$5,000 estimate to repair the existing treatment plant at the pump station; however, no deficiency in the current system was observed during our visual assessment period and this item was therefore not included in our report. This item warrants further investigation beyond E-G's scope.

Items covered in our report under Additional General Suggestions

Several items were recommended as considerations, but that do not affect the adequacy for service of the pump stations or their components. Because these are miscellaneous small projects, all of the costs were derived from a broad estimate of man-hours and equipment needs. These items are advisable, but not considered necessary for pump station operation:

- Repair/replace Dresser Coupling – Repair of leaking couplings is estimated at \$50,000.
- Booms – Installation of boom systems at intake sums is estimated at \$80,000 based on the expected length of the booms to be installed at PS-8.

- Sump Depth – Digging out silt from the area immediately adjacent to the intake was estimated at \$25,000 based on the depth of the canal.

Maintenance Items

Several items were recommended by the Parish that E-G categorized as maintenance items:

- Patch/Recoat Discharge Pipes – Parish wants discharge pipes cleaned, patched, and painted and estimated the cost of these services to be \$200,000.
- Maintain Gear Drives – Parish is concerned with amount of wear on drives. The Parish estimated the cost to perform an evaluation of the gear drives at \$10,000.

Betterments

Several items were suggested by the Parish for consideration in the report, but were considered by Evans-Graves to fall under the category of Betterments, which falls outside our Scope:

- Trash rakes – No rakes exist at PS-2. Parish included an estimate of \$1,590,000.
- Telemetry – No telemetry exists at PS-1. Parish included an estimate of \$12,000.