# Fort Bend County

# Levee Improvement District No. 19

## Aptim Environmental & Infrastructure, Inc.

## Job Order No. 5

## November 6, 2018

## Steep Bank Creek Regional Watershed Hydrologic and Hydraulic Modeling Study Coordinate and Respond to Peer Review

**BACKGROUND**

On August 25, 2017, Hurricane Harvey impacted the Gulf Coast of Texas causing record setting rainfall in the Houston metro area on August 26 and 27. Over a four-day period, it was reported that Fort Bend County received over 34 inches of rain. This unprecedented rain event resulted in flooding of the homes within the Fort Bend County Levee Districts including Levee Improvement District No. 19 (LID 19). This large flood event has produced a need for LID 19 to develop a regional watershed model to evaluate flood risk within the Steep Bank Creek Regional Watershed.

As requested, APTIM is providing engineering services to perform a Regional Watershed Hydraulic and Hydrology Study of the Steep Bank Creek Watershed including detailed LIDAR acquisition, topographic and bathymetric survey, existing information gathering, and hydrologic and hydraulic modeling.

The study area includes LID 19, LID 15, First Colony LID, MUD 46, and MUD 115. The study will provide a hydrologic and hydraulic model of the current watershed, identification of current flood risk for large (low-frequency) events, and the models will act as a platform for future development evaluation, changing conditions, and proposed projects evaluation tool.

**SCOPE OF SERVICES OVERVIEW**

The intent of these services is for APTIM to work with the District Engineer, Costello, Inc., on a peer review of the regional watershed study effort to evaluate and model the hydrologic and hydraulic conditions of the Steep Bank Creek Regional Watershed. The peer review will be of the data collection efforts as well as the hydrologic and hydraulic model of the current watershed.

Costello, Inc. will review the following stages of the study effort:

- Task 1: Data Collection Stage
    - LIDAR
    - Topographic and Bathymetric Survey
- Task 2: Hydrologic Model Stage
    - HEC-HMS Model
- Task 3: Hydraulic Model Stage
    - HEC-RAS Model
- Task 4: Reporting Stage

APTIM will coordinate the effort and work with Costello, Inc. to address, respond and resolve all of the

comments for this review effort.

The scope of work for this effort will involve the following tasks.

**TASK 1: RESPONSE AND COMMENT RESOLUTION FOR PEER REVIEW – DATA COLLECTION EFFORT**

Costello, Inc. will evaluate and conduct a peer review for the data collection effort. This effort will include a review of the following:

- LIDAR data
- Topographic and Bathymetric Survey

APTIM will work with Costello, Inc. to address, respond and resolve comments for this review effort.

**TASK 2: RESPONSE AND COMMENT RESOLUTION FOR PEER REVIEW – HYDROLOGIC MODELING EFFORT**

Costello, Inc. will evaluate and review the HEC-HMS hydrologic model. The peer review will evaluate the hydrologic parameters, input data, the HEC-HMS model, and the output files.

Hydrologic modeling will include seven (7) design storm events for the sub-basin areas that reside with the watershed areas. The design storms used in the effort will include the storms from the US Department of Commerce Technical Paper No. 40 and NOAA's Atlas-14 Study. The model will also include the storm from the 2017 Hurricane Harvey event.

APTIM will work with Costello to address, respond and resolve the comments for this review effort.

**TASK 3: RESPONSE AND COMMENT RESOLUTION FOR PEER REVIEW – HYDRAULIC MODELING EFFORT**

Costello, Inc. will evaluate and review the HEC-RAS hydraulic model. The peer review will evaluate the hydrologic parameters, input data, the HEC-RAS model, and the output files.

A 2D HEC-RAS hydraulic model will be developed for the Steep Bank Creek Regional Watershed. The hydraulic model will be calibrated using data collected during the Hurricane Harvey storm event including stage and discharge gage data. The effort will evaluate the performance of the existing geometry and drainage structures under the seven (7) design storms listed in the Hydrologic Modeling task and alternative drainage improvements under the seven (7) design storms listed in the Hydrologic Modeling task.

APTIM will work with Costello, Inc. to address, respond and resolve the comments for this review effort.

**TASK 4: RESPONSE AND COMMENT RESOLUTION FOR PEER REVIEW – REPORTING EFFORT**

Costello, Inc. will evaluate and review the draft and final report for the model. The peer review will evaluate the entire report, calculations and associated appendices.

APTIM will work with Costello to address, respond and resolve the comments for this review effort.

**PROJECT MANAGEMENT AND MEETINGS**

APTIM and the project team will perform the following services for Project Management, reporting, and meetings:

- Project Management

  APTIM will provide project management services to plan, organize, and coordinate the peer review effort.

- Meetings

  APTIM will update the LID 19 Board members regularly at monthly board meetings.

APTIM will also perform the following meetings:

1. One (1) Project Team meeting will be held at each stage of the review process.
2. Additional conference calls will be held as necessary.

Members of the Project Team may include but not be limited to:

- LID 19 Representative
- Peer Review Team – Costello, Inc.
- Engineering Modeling Team – APTIM and Kleinschmidt

**DELIVERABLES**

APTIM will provide a memorandum of the comments and responses for each task of work for the peer review.

**SCHEDULE**

The peer review effort will follow the schedule of the regional modeling study. Additional time will need to be allowed to cover the peer review process.

The revised schedule will be as follows:

- Task 1: Survey Data Collection and Existing Information Gathering
  - Draft Survey Deliverable – 3 months from NTP
  - Peer Review Process – 1 month
  - Final Deliverable will be provided within 4 months of NTP
- Task 2: Hydrologic Modeling
  - Draft HEC-HMS Model – 5 months from NTP
  - Peer Review Process – 1 month duration
  - Final Deliverable will be provided within 6 months of NTP
- Task 3: Hydraulic Modeling
  - Draft HEC-RAS Model – 7 months from NTP
  - Peer Review Process – 2 months duration
  - Final Deliverable will be provided within 9 months of NTP
- Task 4: Reporting
  - Draft Report – 10 months from NTP
  - Peer Review Process – 1 month duration
  - Final Deliverable will be provided within 11 months of NTP

**PRICE**

Work will be performed on a time and material basis for an estimated total price **$40,000.00** under the mutually agreed upon terms and conditions of the 2017 Master Services Agreement. The detailed breakdown on cost is as follows:

| Task | Cost Estimate |
|---|---|
| Task 1: Data Collection Peer Review | $3,880 |
| Task 2: Hydrologic Modeling Peer Review | $6,920 |
| Task 3: Hydraulic Modeling Peer Review | $23,765 |
| Task 4: Reporting Peer Review | $5,435 |
| **TOTAL** | **$40,000** |

APTIM appreciates the opportunity to submit this proposal to Fort Bend County LID No. 19. If you have any questions, or need additional information, please do not hesitate to contact me at (985) 858-3974.

**APTIM ENVIRONMENTAL & INFRASTRUCTURE, INC.**

By: _____ Date: 01/25/2019

Name: Hilary Thibodeaux

Title: Director Eng.

**Fort Bend County Levee Improvement District No. 19**

By: _____ Date: 01/25/2019

President, Board of Directors