

**CITY OF CORPUS CHRISTI  
CONTRACT FOR PROFESSIONAL SERVICES**

The City of Corpus Christi, a Texas home rule municipal corporation, P.O. Box 9277, Corpus Christi, Nueces County, Texas 78469-9277 (City) acting through its duly authorized City Manager or Designee (Director of Engineering Services) and **Espey Consultants, Inc. dba RPS Espey**, a Texas corporation, 4801 Southwest Parkway, Parkway 2, Suite 150, Austin, Texas 78735, (Architect/Engineer – A/E), hereby agree as follows:

**1. SCOPE OF PROJECT**

**Oso Water Reclamation Plant Dissolved Oxygen Modeling for Oso Bay (Project No. E10196) –**  
The objectives are to identify a model that is acceptable to both the City and the TCEQ, obtain the data necessary to effectively run the model, and develop results that are scientifically defensible and supportive of the Oso Water Reclamation Plant Nutrient Removal Project (Ammonia) (Project No. E09007). These objectives must also meet the schedule constraints of the Oso Water Reclamation Plant Nutrient Removal Project (Ammonia) (Project No. E09007). A summary of the activities follows:

1. Finalize the current permit action for the Oso Plant
2. Identify the Appropriate Model
3. Compile relevant existing data necessary for the model
4. Prepare a Study Work Plan
5. Conduct field studies, as necessary to obtain additional data
6. Construct the model
7. Define critical conditions
8. Calibrate the model
9. Evaluate potential discharge limitations
10. Prepare report of the results

**2. SCOPE OF SERVICES**

The A/E hereby agrees, at its own expense, to perform design services necessary to review and prepare plans, specifications, and bid and contract documents. In addition, A/E will provide monthly status updates (project progress or delays, gantt charts presented with monthly invoices) and provide contract administration services, as described in **Exhibit "A" and "A-1"**, to complete the Project. Work will not begin on Additional Services until requested by the A/E (provide breakdown of costs, schedules), **and** written authorization is provided by the Director of Engineering Services.

A/E services will be "Services for Construction Projects"- (Basic Services for Construction Projects") which are shown and are in accordance with "Professional Engineering Services- A Guide to the Selection and Negotiation Process, 1993" a joint publication of the Consulting Engineer's Council of Texas and Texas Society of Professional Engineers. For purposes of this contract, certain services listed in this publication as Additional Services will be considered as Basic Services.

**3. ORDER OF SERVICES**

The A/E agrees to begin work on those authorized Basic Services for this contract upon receipt of the Notice to Proceed from the Director of Engineering Services. Work will not begin on any phase or any

Contract for Engineering (A/E) Services

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Additional Services until requested in writing by the A/E and written authorization is provided by the Director of Engineering Services. The anticipated schedule of the preliminary phase, design phase, bid phase, and construction phase is shown on **Exhibit "A"**. This schedule is not to be inclusive of all additional time that may be required for review by the City staff and may be amended by or with the concurrence of the Director of Engineering Services.

The Director of Engineering Services may direct the A/E to undertake additional services or tasks provided that no increase in fee is required. Services or tasks requiring an increase of fee will be mutually agreed and evidenced in writing as an amendment to this contract. A/E shall notify the City of Corpus Christi within three (3) days of notice if tasks requested requires an additional fee.

#### 4. INDEMNITY AND INSURANCE

A/E agrees to the mandatory contract indemnification and insurance requirements as set forth in **Exhibit "B"**.

#### 5. FEE

The City will pay the A/E a fee, as described in **Exhibit "A"**, for providing services authorized, a total fee not to exceed \$538,680.00, (Five Hundred Thirty Eight Thousand Six Hundred Eighty Dollars and Zero Cents). Monthly invoices will be submitted in accordance with **Exhibit "D"**.

#### 6. TERMINATION OF CONTRACT

The City may, at any time, with or without cause, terminate this contract upon seven days written notice to the A/E at the address of record. In this event, the A/E will be compensated for its services on all stages authorized based upon A/E and City's estimate of the proportion of the total services actually completed at the time of termination.

#### 7. ASSIGNABILITY

The A/E will not assign, transfer or delegate any of its obligations or duties in this contract to any other person without the prior written consent of the City, except for routine duties delegated to personnel of the A/E staff. If the A/E is a partnership, then in the event of the termination of the partnership, this contract will inure to the individual benefit of such partner or partners as the City may designate. No part of the A/E fee may be assigned in advance of receipt by the A/E without written consent of the City.

The City will not pay the fees of expert or technical assistance and consultants unless such employment, including the rate of compensation, has been approved in writing by the City.

#### 8. OWNERSHIP OF DOCUMENTS

All documents including contract documents (plans and specifications), record drawings, contractor's field data, and submittal data will be the sole property of the City, may not be used again by the A/E without the express written consent of the Director of Engineering Services. However, the A/E may use standard details that are not specific to this project. The City agrees that any modification of the plans will be evidenced on the plans, and be signed and sealed by a professional engineer prior to re-use of modified plans.


9. DISCLOSURE OF INTEREST

A/E further agrees, in compliance with City of Corpus Christi Ordinance No. 17112, to complete, as part of this contract, the *Disclosure of Interests* form attached hereto as **Exhibit "C"**.

**CITY OF CORPUS CHRISTI**


**ESPEY CONSULTANTS, INC. dba RPS ESPEY**

\_\_\_\_\_  
Oscar R. Martinez, Date  
Assistant City Manager

  
\_\_\_\_\_  
David K. Harkins, PH. D., P. E., D. WRE. Date  
Vice President  
4801 Southwest Parkway, Parkway 2, Suite 150  
Austin, TX 78735  
(512) 326-5659 Office  
(512) 326-5723 Fax

**RECOMMENDED**

\_\_\_\_\_  
Daniel Biles, P. E., Date  
Director of Engineering Services

  
\_\_\_\_\_  
Foster Crowell, Date  
Director of Wastewater Services

**APPROVED AS TO FORM**

\_\_\_\_\_  
Office of Management and Budget Date

\_\_\_\_\_  
Legal Department Date

**ATTEST**

\_\_\_\_\_  
Armando Chapa, City Secretary

Project Number: E10196  
Fund Source Number: 550950-4247-00000-E10196  
Encumbrance Number: \_\_\_\_\_

RECEIVED  
JUN 27 2012

VP



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DATE: April 30, 2012.

TO: Dan Biles, P.E.

Foster D. Crowell, P.E.

William J. Green, P.E.

Joe Trejo, P.E.

*City of Corpus Christi*

*Department of Engineering Services*

FROM: David Harkins, Ph.D., P.E., D.WRE

Ernest To, Ph.D., P.E.

Subject: Revised scopes, schedules and budgets for Phase I and 2 of Oso Bay Dissolved Oxygen Modeling Project (Project number: E10196)

## Introduction

On 4/23/2012, RPS-Espey met with City of Corpus Christi Engineering Services (City) to discuss the scope, schedule and budget of the Oso Bay Dissolved Oxygen Modeling Project (submitted on 3/22/2012). Several comments and changes were received by RPS-Espey from the City during the meeting. This memo presents the revised scope, schedule and budget that incorporate the agreed-upon changes from the meeting.

The project is organized into two phases: Phase 1 and Phase 2.

Phase 1 focuses on the collection and compilation of data and a preliminary study of Oso Bay. The goal of Phase 1 is 1) to generate a detailed work plan for subsequent investigation and modeling in Phase 2; and 2) to execute field sampling to support the development of the dissolved oxygen model. Phase I is anticipated to start in August 2012.

Phase 2 focuses on model selection, development and execution of the Oso Bay dissolved oxygen model. Once calibrated, the model will be used to evaluate various permit scenarios on water quality in the Bay. Results from the scenario runs will help determine the impact of plant effluent on bay health and provide valuable site-specific information for finalizing the permit action for the Oso treatment plant. Phase 2 is anticipated to start in December 2012.

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[Australia](#) | [Asia Pacific](#) | [Russia](#) | [Middle East](#) | [Africa](#)

This memo provides separate scopes and budgets for the two phases for the City's review. Together, the two phases cover the 9 stated key activities laid out in the Oso Reclamation Plant Nutrient Removal Project (Ammonia) RFQ, namely:

1. Finalize the current permit action for the Oso Plant,
2. Identify the appropriate model,
3. Compile relevant existing data necessary for the model,
4. Prepare a study work plan,
5. Conduct field studies, as necessary to obtain additional data,
6. Construct the model,
7. Define critical conditions,
8. Calibrate the model; and,
9. Evaluate potential discharge limitations.

Details of tasks in Phase 1 and 2 are provided in the following sections. For a summary table of tasks and costs please refer to the attached pdf ([Oso\\_Projected\\_Costs\\_20120501.pdf](#)).

## Phase 1 scope and budget

Phase 1 has an anticipated start date of August 2012 and is expected to last 13 months till September 2013. The projected cost for Phase 1 is \$159,380. It consists of two main tasks: Task 1 and Task 2, which will be executed concurrently.

### Task 1 summary

*Projected period: Aug 2012 to Dec 2012.*

Task 1 consists of site characterization, review of existing information on Oso Bay and Oso Plant and conceptual modeling. The site characterization includes a reconnaissance and bathymetric survey of Oso Bay. In his research, Prof. Ben Hodges from the University of Texas at Austin observed the presence of sandbars in the Bay, which due to the Bay's shallowness, can dramatically impact circulation patterns. Locating the sandbars and other underwater features such as shallow areas will be crucial to subsequent sampling and modeling activities. Once site characterization has been performed, the team will designate sites for deployment of CTD (conductivity, temperature and depth) sensors, velocity meters, and dissolved oxygen probes in Task 2. Monitoring activities may also include measurements of site-specific data such as sediment oxygen demand and benthic nutrient fluxes so that the impact of seagrasses and benthic organisms on the nutrient cycle can be quantified.

The review of existing information will include permit requirements, water quality standards, related reports and previous modeling efforts. At the end of Task 1, a conceptual modeling exercise will be performed to list the physical, chemical and biological processes in the Bay and identify data gaps for further investigation.

The deliverable from Task 1 will be a detailed Study Work Plan. A presentation to the City and TCEQ on the Study Work Plan will be conducted at the end of this phase.

*The projected cost for Task 1 is \$98,320 and the projected duration is 4 months.*

### Task 2 summary

*Projected period: Sept 2012 to Sept 2013.*

Task 2 involves the water quality monitoring of Oso Bay to provide site-specific and up-to-date water quality and hydrodynamic data for subsequent development of the Oso Bay model. This task includes 1) a 12-month continuous water quality monitoring program and 2) an intensive summer sampling program to study the impact of the plant effluent during critical conditions.

The purpose of the continuous monitoring program is to evaluate the seasonal and diurnal behavior of the Bay with respect to water quality, tidal effects, oxygen production and respiration, and circulation. One key goal of this study is to investigate how the changes in water quality and quantity of the Barney Davis Power Plant discharge affects circulation and nutrient processes in the Bay. Data from the sampling will be published via a web portal which will also allow online mapping and visualization of the data.



The purpose of summer sampling is to track the effluent from the Oso Bay treatment plant through an intensive 48-hr survey to observe effluent behavior under critical conditions. This study will provide ground confirmation of the plume fate and transport and validation data for the DO-nutrient model.

The deliverables from Task 2 will be initially 1) a continuous monitoring plan and 2) a summer sampling plan which will be submitted before commencement of the field work. After the field work has been performed, 3) a continuous monitoring report and 4) a summer sampling report will be submitted.

*The projected cost for Task 2 is \$46,600 and the projected duration is 12 months.*

**Phase 1 Project Meetings (4)**

The team anticipates four (4) meetings with the City and/or TCEQ over the duration of this project.

The projected cost for meeting and preparation is \$14,460.

**Total Projected costs for Phase 1:**

<i>Task 1. Site Characterization and Detailed Study Work Plan</i>	<i>\$ 98,320</i>
<i>Task 2. Long Term Monitoring</i>	<i>\$ 46,600</i>
<i>(+) Meetings</i>	<i>\$ 14,460</i>
<hr/>	
<i>Phase 1 Total:</i>	<i>\$ 159,380</i>

**Detailed project schedule for Phase 1**

A detailed project schedule table for Phase 1 is provided on the next page.



### Detailed Schedule for Oso Bay Dissolved Oxygen Modeling Project (Phase 1)

Task	Subtask	Task Description	2012					2013					2014												
			Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	
1	1.1	Review effluent permit requirements for Oso water reclamation plant		Review current - historical discharge permits and plant effluent concentrations																					
	1.2	Review DO/nutrient impairments in Oso bay		Review surface water quality standards																					
	1.3	Identify data sources, data gaps			Identify data gaps and sources																				
	1.4	Data Completion			Data Completion																				
	1.5	Site reconnaissance, bathymetric survey of Oso Bay			Site reconnaissance, bathymetric survey																				
	1.6	Conceptual modeling, identify important processes in Oso Bay				Conceptual Modeling																			
	1.7	Prepare detailed study work plan				Detailed study work plan																			
	1.8	Presentation to TCEQ and City on study work plan																							

#### Task 2. Long-term monitoring and summer sampling programs

Task	Subtask	Task Description	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May			
2	2.1	Prepare continuous monitoring plan and summer sampling plan		Continuous monitoring plan and summer sampling plan																							
	2.2	Field Studies: Long Term Monitoring		Continuous Monitoring																							
	2.3	Publish and host sampling data on Oso Bay HS																									
	2.4	Field Studies: Summer Sampling																									

#### Meetings

M	Task Description	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	
	Regular project meetings with City and/or TCEQ (4 mtgs)																							

#### DELIVERABLES



### Detailed scope of services for Phase 1

A detailed breakdown of the subtasks under each task under Phase 1 of the project is listed below.

#### Task 1. Site Characterization and Detailed Study Work Plan

Subtasks:

##### 1.1 REVIEW EFFLUENT PERMIT REQUIREMENTS FOR OSO WATER RECLAMATION PLANT

- a. Review current TPDES permit requirements for Oso Plant.
- b. Review treatment performance and goals of Oso Plant for nutrients and DO.
- c. Review nutrient removal processes at Oso Plant from:
  - i. current methods of ammonia removal (e.g. breakpoint chlorination) and their limitations; and,
  - ii. alternative methods of ammonia removal and effectiveness.
- d. Investigate Oso Plant's permitting needs and future/potential effluent targets.

##### 1.2 REVIEW DO/NUTRIENT IMPAIRMENTS IN OSO BAY

- a. Review historical and current TCEQ screening criteria in Oso Bay.
- b. Review historical and current TCEQ listings of impaired WQ segments in Oso Bay.
- c. Review previous nutrient modeling efforts by TCEQ and other parties.

##### 1.3 IDENTIFY DATA SOURCES, DATA GAPS, ETC.



- a. Identify sources of data for data compilation, e.g.
  - i. CCBNEP;
  - ii. City of Corpus Christi;
  - iii. Texas Coastal Ocean Observation Network;
  - iv. Texas Parks and Wildlife Department;
  - v. TCEQ Surface Water Monitoring Program;
  - vi. United States Geological Survey; and,
  - vii. other research reports and academic journal articles. Identify relevant study reports from state, local and academic sources, e.g. TCEQ TMDL studies, Corpus Christi Bay National Estuary Program (CCBNEP) reports, academic journal articles.

#### 1.4 DATA COMPILATION

- a. Perform preliminary data compilation to assist in development of study work plan.

#### 1.5 SITE RECONNAISSANCE AND BATHYMETRIC SURVEY OF OSO BAY

- a. Perform bathymetry survey to locate underwater features such as sandbars that can impact water circulation.

#### 1.6 CONCEPTUAL MODELING

- a. Select study area by taking into account impacted TCEQ WQ segments, location of sources and site characterization data.
- b. Identify sources of inflow, nutrients, BOD and DO for Oso Bay
  - i. point sources – WWTPs, Barney Davis Power Plant discharge;
  - ii. non-point sources – watershed runoff; and,
  - iii. in-bay sources (e.g. benthic demand and benthic nutrient sinks/sources).
- c. Identify natural processes within Oso Bay that affect DO and nutrients, e.g.
  - i. aquatic vegetation (e.g. algae, seagrass);
  - ii. benthic processes;
  - iii. water circulation patterns;
  - iv. tidal exchanges with Corpus Christi Bay; and,
  - v. salinity gradients or stratification in the Bay.

#### 1.7 PREPARE A STUDY WORK PLAN

#### 1.8 PRESENTATION TO TCEQ AND CITY ON STUDY WORK PLAN

- a. Presentation to TCEQ and City on study work plan + conceptual model.
- b. Prepare response to comments from TCEQ.

### Task 2. Long-term monitoring and summer sampling program

#### Subtasks:

#### 2.1 PREPARE CONTINUOUS MONITORING PLAN AND SUMMER SAMPLING PLAN

- a. Review information gathered from site characterization and bathymetric survey
- b. Designate sites for deployment of CTD (conductivity, temperature and depth) sensors, velocity meters, and dissolved oxygen probes to evaluate the seasonal and diurnal behavior

in water quality, tidal effects, oxygen production and respiration and circulation that are characteristic of the Bay and the Barney Davis Power Plant discharge.

- c. Conduct measurements of site-specific data such as sediment oxygen demand and benthic nutrient fluxes so that the impact of seagrasses on the nutrient cycle can be quantified.
- d. Anticipated length of monitoring is 12 months.
- e. Develop field study plan to track the effluent from the Oso Bay treatment plant through an intensive 48-hr survey to observe effluent behavior under critical conditions and to provide validation data for the DO-nutrient model.

#### **2.2 FIELD STUDIES: LONG TERM MONITORING**

- a. Acquire sampling equipment and construct monitoring platforms for deployment in Oso Bay.
- b. Provide regular servicing and maintenance to monitoring stations.

#### **2.3 PUBLISH AND HOST SAMPLING DATA ON CCBAY HIS**

- a. Create a web portal for downloading and visualizing data collected from this project for public access.

#### **2.4 FIELD STUDIES: SUMMER SAMPLING**

- a. Projected to be conducted in Summer 2013.

#### **Phase 1 Project Meetings (4)**

The team anticipates four meetings with the City and/or TCEQ over the duration of this project.

## **Phase 2 scope and budget**

Phase 2 has an anticipated start in Dec 2012 (upon approval of study work plan) and is expected to last 18 months till June 2014. The projected cost for Phase1 is \$379,300. It consists of three main tasks: Task 3, Task 4 and Task 5.

The three tasks and the projected costs are summarized below. For the detailed schedule, please refer to section 3. For detailed description of the tasks under each phase, please refer to section 4. The team will provide detailed descriptions of QAQC procedures and targets in its sampling and modeling plans to ensure the quality of the final products.

### **Task 3 summary**

*Projected period: Dec 2012 to May 2013.*

This task consists of data compilation, trend analysis, model review and selection. Trend analysis of the data will help identify which processes in the Bay are dominant and what conditions are most critical to dissolved oxygen levels. A list of applicable existing models will be drafted. This list will be reviewed based on criteria such as ability to simulate dominant processes, acceptability by regulatory agencies, and ease-of transfer to other entities to use.

The deliverable will be a model selection report which will describe the selection process and the final recommended model(s). Two meetings with the TCEQ and the City will be conducted: one in the middle of Phase II to give a progress update and to obtain comments; and, one after the submission of the report to explain the model selection process and the results.

*The projected cost for Task 3 is \$98,960 and the projected duration is 6 months.*

### **Task 4 summary**

*Projected period: Jun2013 to April 2014.*

This task consists of the literature review for model parameters, construction of the hydrodynamic and DO-nutrient models, model calibration and validation, and finally scenario runs. For the model construction, first the hydrodynamic model will be built and calibrated, followed by the DO-nutrient model. Data from the continuous and summer sampling (see sampling phase below) will be used to calibrate and validate the data. Critical DO conditions identified in Task 3 and potential discharge limits will be used to develop model scenarios for simulation. Results will be used to evaluate the impact of new and old effluent standards.

The deliverable will be a modeling report which will describe model inputs, parameters and results in detail. Documentation will also be provided to aid in the transfer of the model to other entities to use it.

*The projected cost for Task 4 is \$218,640 and the projected duration is 10 months.*

### **Task 5 summary**

*Projected period: April 2014 to June 2014.*



This task consists of drafting the permit application and finalizing the permit action. The technology-based effluent limits developed by the Oso Plant nutrient removal team will be utilized together with water quality-based effluent limits derived from the DO-nutrient model to draft the permit.

*The projected cost for Task 5 is \$33,080 and the projected duration is 2 months.*

**Phase 2 Project Meetings (6)**

The team anticipates six (6) meetings with the City and/or TCEQ over the duration of Phase 2 of this project.

*The projected cost for meeting and preparation is \$28,620.*

**Total Projected costs for Phase 2:**

<i>Task 3. Data analysis and model selection</i>	<i>\$ 98,960</i>
<i>Task 4. Model development and permit scenario evaluation</i>	<i>\$ 218,640</i>
<i>Task 5. Finalize Permit action for Oso Plant</i>	<i>\$ 33,080</i>
<b>(+) Meetings</b>	<b>\$ 28,620</b>
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<i>Phase 2 Total:</i>	<i>\$ 379,300</i>

**Detailed project schedule for Phase 2**

A detailed project schedule table for Phase 2 is provided on the next page.



Detailed Schedule for Oso Bay Dissolved Oxygen Modeling Project (Phase 2)

Phase 2

Task 3. Data analysis and model selection

Phase	Task	Task Description	2012					2013					2014											
			Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
1	3.1	Data Compilation																						
	3.2	Data and trend analysis																						
	3.3	Define critical conditions																						
	3.4	Create list of appropriate models																						
	3.5	Prepare and submit model selection report																						
	3.6	Presentations to TCEQ and City to explain modeling approach (2)																						

Task 4. Model development and permit scenario evaluation.

4	4.1	Literature review and data analysis for model parameters																					
	4.2	Construct hydrodynamic model																					
	4.3	Calibrate hydrodynamic model																					
	4.4	Construct DO-nutrient model																					
	4.5	Calibrate DO-nutrient model																					
	4.6	Validate model with Summer Sampling data																					
	4.7	Evaluate potential discharge limitations																					
	4.8	Prepare report of the results																					

Task 5. Finalize Permit action for Oso Plant

	5.1	Finalize the current permit action for the Oso plant																					
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Meetings

M		Regular project meetings with City and/or TCEQ (6 mgs)																					
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DELIVERABLES

Model selection report

Modeling Simulation Results Report

Draft Permit Application

3.6 Detailed scope of services for Phase 2

Phase 2: Task 3. Data analysis and model selection

Subtasks:

3.1 COMPILE RELEVANT EXISTING DATA NECESSARY FOR THE MODEL

- a. Compile relevant study reports from sources identified in Phase I.
- b. Compile data from sources identified in Phase I into extensive WQ database.
- c. Employ data-models to organize, manage and disseminate data.

3.2 DATA AND TREND ANALYSIS

- a. Develop time-series, spatial and statistical plots of the data.
- b. Identify dominant processes in the Bay/watershed through trend analysis.

3.3 DEFINE CRITICAL CONDITIONS

- a. Define critical conditions for DO and nutrients based on

- i. Temperature conditions;
- i. Wind conditions;
- ii. Tidal conditions;
- iii. High-flow and low-flow events;
- iv. Influent loads to treatment plant; and,
- v. Barney Davis Power Plant discharge.

### 3.4 CREATE LIST OF APPROPRIATE MODELS

- a. Identify potential models for hydrodynamic and water quality modeling, examples are listed below (from the most simplistic to most sophisticated):
  - i. CSTR models
  - ii. CORMIX mixing zone model,
  - iii. EFDC hydrodynamic model,
  - iv. SWAT watershed model,
  - v. WASP nutrient model, and
  - vi. ELCOM hydrodynamic model, etc.  
(Bay model may be a combination of models coupled through a linkage system)

### 3.5 PREPARE AND SUBMIT MODEL SELECTION REPORT

- a. Review model choices identified based on criteria such as
  - i. ability to simulate dominant processes in the Bay,
  - ii. data and parameter requirements,
  - iii. computational requirements,
  - iv. ease of training and transferability of model to client or other entities, and
  - v. public domain vs. copyrighted software.
- b. DO model may be a combination of two or more models, e.g. EFDC-WASP combination to simulate hydrodynamics-nutrient cycle.
- c. Prepare and submit model selection report

### 3.6 PRESENTATIONS TO TCEQ AND CITY TO EXPLAIN MODELING APPROACH (2)

- a. Two meetings with the TCEQ and the City will be conducted: one in the middle of Phase II to give a progress update and to obtain comments; and, one after the submission of the report to explain the model selection process and the results.

## **Task 4. Model development and permit scenario evaluation**

Subtasks:

### 4.1 LITERATURE REVIEW AND DATA ANALYSIS FOR MODEL PARAMETERS

- b. conduct literature review and data analysis to derive the parameters necessary to characterize the physical and biological processes in the Bay.

### 4.2 CONSTRUCT HYDRODYNAMIC MODEL

- a. Construct the model grid for the selected study area.

- b. Incorporate model parameters into model.
- c. Implement boundary and initial conditions.
- d. Perform test runs of the model.

#### 4.3 CALIBRATE HYDRODYNAMIC MODEL

- a. Define model calibration period.
- b. Calibrate the model with data collected
- c. Provide plots to compare model results with data.
- d. Perform sensitivity analysis and plots to show sensitivity to selected parameters.

#### 4.4 CONSTRUCT DISSOLVED OXYGEN-NUTRIENT MODEL

- a. Construct the model grid for the selected study area.
- b. Incorporate model parameters into model.
- c. Implement boundary and initial conditions.
- d. Couple flow information from hydrodynamic model outputs.
- e. Perform test runs of the model.

#### 4.5 CALIBRATE DISSOLVED OXYGEN-NUTRIENT MODEL

- a. Define model calibration period.
- b. Calibrate the model with data collected
- c. Provide plots to compare model results with data.
- d. Perform sensitivity analysis and plots to show sensitivity to selected parameters.

#### 4.6 EVALUATE POTENTIAL DISCHARGE LIMITATIONS

- a. Define simulation scenarios based on critical conditions identified in Task 8.
- b. Include scenarios based on various effluent concentrations.
- c. Evaluate DO and nutrients in the Bay under various scenarios.
- d. Evaluate potential discharge limitations under various scenarios.

#### 4.7 VALIDATE MODEL WITH SUMMER SAMPLING DATA

#### 4.8 PREPARE REPORT OF THE RESULTS

- a. Prepare report documenting modeling process and results from scenario runs.

### **Task 5. Finalize permit action for Oso Plant**

#### Subtasks:

#### 5.1 FINALIZE THE CURRENT PERMIT ACTION FOR THE OSO PLANT

- a. Provide recommendations for permit action based on model results.
- b. Review permitting procedures and finalize permit action for Oso Plant.
- c. Provide recommendations for future studies/modeling efforts



**Detailed cost breakdown for both Phase 1 and Phase 2**

For detailed cost breakdown please refer to the attached pdf (Oso\_Projected\_Costs\_20120501.pdf).



Oso Bay DO Modeling Project Costs (4/20/2012)

Phase 1

Task 1. Site Characterization and Detailed Study Work Plan

Task	Subtask	Task Description	2012												Total		
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec			
I	1.1	Identify affected parties and develop a list of stakeholders for the study															
	1.2	Identify water quality standards															
	1.3	Identify data sources, data gaps, and data needs															
	1.4	Develop data collection plan															
	1.5	Develop data collection protocol															
	1.6	Develop data collection protocol															
	1.7	Develop data collection protocol															
	1.8	Develop data collection protocol															
	1.9	Develop data collection protocol															
	1.10	Develop data collection protocol															
	1.11	Develop data collection protocol															
	1.12	Develop data collection protocol															
	1.13	Develop data collection protocol															
	1.14	Develop data collection protocol															
	1.15	Develop data collection protocol															
	1.16	Develop data collection protocol															
	1.17	Develop data collection protocol															
	1.18	Develop data collection protocol															
Total																	

Task 2. Data Analysis and Model Selection

Task	Subtask	Task Description	2012												Total		
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec			
II	2.1	Develop data collection protocol															
	2.2	Develop data collection protocol															
	2.3	Develop data collection protocol															
	2.4	Develop data collection protocol															
	2.5	Develop data collection protocol															
	2.6	Develop data collection protocol															
	2.7	Develop data collection protocol															
	2.8	Develop data collection protocol															
	2.9	Develop data collection protocol															
	2.10	Develop data collection protocol															
	2.11	Develop data collection protocol															
	2.12	Develop data collection protocol															
	2.13	Develop data collection protocol															
	2.14	Develop data collection protocol															
	2.15	Develop data collection protocol															
	2.16	Develop data collection protocol															
	2.17	Develop data collection protocol															
	2.18	Develop data collection protocol															
Total																	

Task 3. Model Development and Model Selection

Phase	Task	Subtask	Task Description	2012												Total	
				Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Phase 1	3.1	1.1	Identify affected parties and develop a list of stakeholders for the study														
	3.1	1.2	Identify water quality standards														
	3.1	1.3	Identify data sources, data gaps, and data needs														
	3.1	1.4	Develop data collection plan														
	3.1	1.5	Develop data collection protocol														
	3.1	1.6	Develop data collection protocol														
	3.1	1.7	Develop data collection protocol														
	3.1	1.8	Develop data collection protocol														
	3.1	1.9	Develop data collection protocol														
	3.1	1.10	Develop data collection protocol														
	3.1	1.11	Develop data collection protocol														
	3.1	1.12	Develop data collection protocol														
	3.1	1.13	Develop data collection protocol														
	3.1	1.14	Develop data collection protocol														
	3.1	1.15	Develop data collection protocol														
	3.1	1.16	Develop data collection protocol														
	3.1	1.17	Develop data collection protocol														
	3.1	1.18	Develop data collection protocol														
Total																	

Task 4. Model Development and Model Selection

Phase	Task	Subtask	Task Description	2012												Total	
				Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Phase 2	4.1	1.1	Identify affected parties and develop a list of stakeholders for the study														
	4.1	1.2	Identify water quality standards														
	4.1	1.3	Identify data sources, data gaps, and data needs														
	4.1	1.4	Develop data collection plan														
	4.1	1.5	Develop data collection protocol														
	4.1	1.6	Develop data collection protocol														
	4.1	1.7	Develop data collection protocol														
	4.1	1.8	Develop data collection protocol														
	4.1	1.9	Develop data collection protocol														
	4.1	1.10	Develop data collection protocol														
	4.1	1.11	Develop data collection protocol														
	4.1	1.12	Develop data collection protocol														
	4.1	1.13	Develop data collection protocol														
	4.1	1.14	Develop data collection protocol														
	4.1	1.15	Develop data collection protocol														
	4.1	1.16	Develop data collection protocol														
	4.1	1.17	Develop data collection protocol														
	4.1	1.18	Develop data collection protocol														
Total																	

Task 5. Model Development and Model Selection

Phase	Task	Subtask	Task Description	2012												Total	
				Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Phase 3	5.1	1.1	Identify affected parties and develop a list of stakeholders for the study														
	5.1	1.2	Identify water quality standards														
	5.1	1.3	Identify data sources, data gaps, and data needs														
	5.1	1.4	Develop data collection plan														
	5.1	1.5	Develop data collection protocol														
	5.1	1.6	Develop data collection protocol														
	5.1	1.7	Develop data collection protocol														
	5.1	1.8	Develop data collection protocol														
	5.1	1.9	Develop data collection protocol														
	5.1	1.10	Develop data collection protocol														
	5.1	1.11	Develop data collection protocol														
	5.1	1.12	Develop data collection protocol														
	5.1	1.13	Develop data collection protocol														
	5.1	1.14	Develop data collection protocol														
	5.1	1.15	Develop data collection protocol														
	5.1	1.16	Develop data collection protocol														
	5.1	1.17	Develop data collection protocol														
	5.1	1.18	Develop data collection protocol														
Total																	

**EXHIBIT "B"**  
**INSURANCE REQUIREMENTS**

**Insurance Requirements**

- A. Consultant must not commence work under this agreement until all insurance required herein has been obtained and such insurance has been approved by the City. The Consultant must not allow any subcontractor to commence work until all similar insurance required of the subcontractor has been obtained.
- B. Consultant must furnish to the City's Risk Manager, two (2) copies of Certificates of Insurance with applicable policy endorsements, showing the following minimum coverages by insurance company(s) acceptable to the City's Risk Manager. The City must be named as an additional insured for all liability policies (except Workers Compensation/EL and Professional Liability), and a blanket waiver of subrogation is required on all applicable policies (except Professional Liability).

<b>TYPE OF INSURANCE</b>	<b>MINIMUM INSURANCE COVERAGE</b>
<b>30-Day Written Notice of Cancellation, or reduction in coverage or limits required on all certificates or by policy endorsements</b>	<b>Bodily Injury &amp; Property Damage Per occurrence - aggregate</b>
<b>COMMERCIAL GENERAL LIABILITY</b> including: 1. Broad Form 2. Premises - Operations 3. Products/ Completed Operations 4. Contractual Liability 5. Independent Contractors 6. Personal Injury / Advertising Injury	<b>\$1,000,000 COMBINED SINGLE LIMIT Per Occurrence and in the aggregate</b>
<b>AUTOMOBILE LIABILITY</b> to include: 1. Owned vehicles 2. Hired – Non-owned vehicles	<b>\$1,000,000 COMBINED SINGLE LIMIT</b>
<b>UMBRELLA – EXCESS LIABILITY</b> Must follow form	<b>\$1,000,000 COMBINED SINGLE LIMIT</b>
<b>PROFESSIONAL LIABILITY</b> including: Coverage provided shall cover all employees, officers, directors and agents 1. Errors and Omissions	<b>\$2,000,000 per claim / \$2,000,000 aggregate</b> (Defense costs not included in face value of the policy) If claims made policy, retro date must be prior to inception of agreement; have extended reporting period provisions and identify any limitations regarding who is an Insured
<b>WORKERS' COMPENSATION</b>	<b>Applicable to paid employees while on City property</b> Which Complies with the Texas Workers Compensation Act
<b>EMPLOYERS' LIABILITY</b>	<b>\$500,000/\$500,000/\$500,000</b>

- C. In the event of accidents of any kind related to this agreement, Consultant must furnish the Risk Manager with copies of all reports within (10) ten days of accident.
- D. Consultant must obtain workers' compensation coverage through a licensed insurance company in accordance with Texas law. The contract for coverage must be written on a policy and endorsements approved by the Texas Department of Insurance. The coverage provided must be in amounts sufficient to assure that all workers' compensation obligations incurred will be promptly met.
- E. Consultant's financial integrity is of interest to the City; therefore, subject to Successful Consultant's right to maintain reasonable deductibles in such amounts as are approved by the City, Consultant shall obtain and maintain in full force and effect for the duration of this Contract, and any extension hereof, at Consultant's sole expense, insurance coverage written on an occurrence basis (except for Professional Liability), by companies authorized and admitted to do business in the State of Texas and with an A.M. Best's rating of no less than A-VII.
- F. City shall be entitled, upon request and without expense, to receive Certificates of Insurance and all endorsements thereto as they apply to the limits required by the City. All notices under this Article shall be given to City at the following address:

City of Corpus Christi  
Attn: Risk Management  
P.O. Box 9277  
Corpus Christi, TX 78469-9277  
Fax: (361) 826-4555

- G. **Consultant agrees that with respect to the above required insurance, all insurance policies are to contain or be endorsed to contain the following required provisions:**
- i. Name the City and its officers, officials, employees, volunteers, and elected representatives as additional insured by endorsement, as respects operations and activities of, or on behalf of, the named insured performed under contract with the City, with the exception of the workers' compensation and professional liability policies;
  - ii. Provide for an endorsement that the "other insurance" clause shall not apply to the City of Corpus Christi where the City is an additional insured shown on the policy;
  - iii. Workers' compensation and employers' liability policies will provide a waiver of subrogation in favor of the City; and
  - iv. Provide thirty (30) calendar days advance written notice directly to City on CGL and Auto policies of any suspension, cancellation, non-renewal or reduction in coverage or limits in coverage, and not less than ten (10) calendar days advance written notice for nonpayment of premium. Consultant shall provide this notice to City on Workers Compensation and Professional Liability policies.
- H. Within five (5) calendar days of a suspension, cancellation, or non-renewal of coverage, Successful Consultant shall provide a replacement Certificate of Insurance and applicable endorsements to City. City shall have the option to suspend Consultant's performance should there be a lapse in coverage at any time during this contract. Failure to provide and to maintain the required insurance shall constitute a material breach of this agreement.

- I. In addition to any other remedies the City may have upon Consultant's failure to provide and maintain any insurance or policy endorsements to the extent and within the time herein required, the City shall have the right to order Consultant to stop work hereunder, and/or withhold any payment(s) which become due to Consultant hereunder until Consultant demonstrates compliance with the requirements hereof.
- J. Nothing herein contained shall be construed as limiting in any way the extent to which Successful Consultant may be held responsible for payments of damages to persons or property resulting from Consultant's or its subcontractors' performance of the work covered under this agreement.
- K. It is agreed that Consultant's insurance shall be deemed primary and non-contributory with respect to any insurance or self insurance carried by the City of Corpus Christi for liability arising out of operations under this agreement.
- L. It is understood and agreed that the insurance required is in addition to and separate from any other obligation contained in this agreement.

#### **INDEMNIFICATION AND HOLD HARMLESS**

**Consultant shall indemnify, save harmless and defend the City of Corpus Christi, and its agents, servants, and employees, and each of them against and hold it and them harmless from any and all lawsuits, claims, demands, liabilities, losses and expenses, including court costs and attorneys' fees, for or on account of any injury to any person, or any death at any time resulting from such injury, or any damage to any property, which may arise or which may be alleged to have arisen out of or in connection with the negligent performance of Consultant's services covered by this contract. The foregoing indemnity shall apply except if such injury, death or damage is caused by the sole or concurrent negligence of the City of Corpus Christi, its agents, servants, or employees or any other person indemnified hereunder.**



City of  
Corpus  
Christi

SUPPLIER NUMBER  
TO BE ASSIGNED BY CITY  
PURCHASING DIVISION

## CITY OF CORPUS CHRISTI DISCLOSURE OF INTEREST

City of Corpus Christi Ordinance 17112, as amended, requires all persons or firms seeking to do business with the City to provide the following information. **Every question must be answered.** If the question is not applicable, answer with "NA". See reverse side for Filing Requirements, Certifications and definitions.

COMPANY NAME: Espey Consultants, Inc. dba RPS Espey

P. O. BOX: \_\_\_\_\_

STREET ADDRESS: 4801 Southwest Pkwy, Pkwy 2, Suite 150 CITY: Austin, TX ZIP: 78735

FIRM IS: 1. Corporation  2. Partnership  3. Sole Owner   
4. Association  5. Other

### DISCLOSURE QUESTIONS

If additional space is necessary, please use the reverse side of this page or attach separate sheet.

1. State the names of each "employee" of the City of Corpus Christi having an "ownership interest" constituting 3% or more of the ownership in the above named "firm."

Name	Job Title and City Department (if known)
<u>None</u>	
_____	_____
_____	_____
_____	_____

2. State the names of each "official" of the City of Corpus Christi having an "ownership interest" constituting 3% or more of the ownership in the above named "firm."

Name	Title
<u>None</u>	
_____	_____
_____	_____
_____	_____

3. State the names of each "board member" of the City of Corpus Christi having an "ownership interest" constituting 3% or more of the ownership in the above named "firm."

Name	Board, Commission or Committee
<u>None</u>	
_____	_____
_____	_____
_____	_____

4. State the names of each employee or officer of a "consultant" for the City of Corpus Christi who worked on any matter related to the subject of this contract and has an "ownership interest" constituting 3% or more of the ownership in the above named "firm."

Name	Consultant
<u>None</u>	
_____	_____
_____	_____
_____	_____

**FILING REQUIREMENTS**

If a person who requests official action on a matter knows that the requested action will confer an economic benefit on any City official or employee that is distinguishable from the effect that the action will have on members of the public in general or a substantial segment thereof, you shall disclose that fact in a signed writing to the City official, employee or body that has been requested to act in the matter, unless the interest of the City official or employee in the matter is apparent. The disclosure shall also be made in a signed writing filed with the City Secretary. [Ethics Ordinance Section 2-349 (d)]

**CERTIFICATION**

I certify that all information provided is true and correct as of the date of this statement, that I have not knowingly withheld disclosure of any information requested; and that supplemental statements will be promptly submitted to the City of Corpus Christi, Texas as changes occur.

**Certifying Person:** David K. Harkins, Ph.D., P.E., D.WRE. **Title:** Vice President  
(Type or Print)

**Signature of Certifying Person:**  **Date:** 6/21/12

**DEFINITIONS**

- a. "Board member." A member of any board, commission, or committee appointed by the City Council of the City of Corpus Christi, Texas.
- b. "Economic benefit". An action that is likely to affect an economic interest if it is likely to have an effect on that interest that is distinguishable from its effect on members of the public in general or a substantial segment thereof.
- c. "Employee." Any person employed by the City of Corpus Christi, Texas either on a full or part-time basis, but not as an independent contractor.
- d. "Firm." Any entity operated for economic gain, whether professional, industrial or commercial, and whether established to produce or deal with a product or service, including but not limited to, entities operated in the form of sole proprietorship, as self-employed person, partnership, corporation, joint stock company, joint venture, receivership or trust, and entities which for purposes of taxation are treated as non-profit organizations.
- e. "Official." The Mayor, members of the City Council, City Manager, Deputy City Manager, Assistant City Managers, Department and Division Heads, and Municipal Court Judges of the City of Corpus Christi, Texas.
- f. "Ownership Interest." Legal or equitable interest, whether actually or constructively held, in a firm, including when such interest is held through an agent, trust, estate, or holding entity. "Constructively held" refers to holdings or control established through voting trusts, proxies, or special terms of venture or partnership agreements."
- g. "Consultant." Any person or firm, such as engineers and architects, hired by the City of Corpus Christi for the purpose of professional consultation and recommendation.

**COMPLETE PROJECT NAME**  
**Project No. XXXX**  
**Invoice No. 12345**  
**Invoice Date:**

	<b>Contract</b>	<b>Amd No. 1</b>	<b>Amd No. 2</b>	<b>Total Contract</b>	<b>Amount Invoiced</b>	<b>Previous Invoice</b>	<b>Total Invoice</b>	<b>Percent Complete</b>
<b>Basic Services:</b>								
Preliminary Phase	\$1,000	\$0	\$0	\$1,000	\$0	\$1,000	\$1,000	100%
Design Phase	2,000	1,000	0	3,000	1,000	500	1,500	50%
Bid Phase	500	0	250	750	0	0	0	0%
Construction Phase	2,500	0	1,000	3,500	0	0	0	0%
<b>Subtotal Basic Services</b>	<b>\$6,000</b>	<b>\$1,000</b>	<b>\$1,250</b>	<b>\$8,250</b>	<b>\$750</b>	<b>\$1,500</b>	<b>\$2,500</b>	<b>30%</b>
<b>Additional Services:</b>								
Permitting	\$2,000	\$0	\$0	\$2,000	\$500	\$0	\$500	25%
Warranty Phase	0	1,120	0	1,120	0	0	0	0%
Inspection	0	0	1,627	1,627	0	0	0	0%
Platting Survey	TBD	TBD	TBD	TBD	TBD	TBD	TBD	0%
O & M Manuals	TBD	TBD	TBD	TBD	TBD	TBD	TBD	0%
SCADA	TBD	TBD	TBD	TBD	TBD	TBD	TBD	0%
<b>Subtotal Additional Services</b>	<b>\$2,000</b>	<b>\$1,120</b>	<b>\$1,627</b>	<b>\$4,747</b>	<b>\$500</b>	<b>\$0</b>	<b>\$500</b>	<b>11%</b>
<b>Summary of Fees</b>								
Basic Services Fees	\$6,000	\$1,000	\$1,250	\$8,250	\$750	\$1,500	\$2,500	30%
Additional Services Fees	2,000	1,120	1,627	4,747	500	0	500	11%
<b>Total of Fees</b>	<b>\$8,000</b>	<b>\$2,120</b>	<b>\$2,877</b>	<b>\$12,997</b>	<b>\$1,250</b>	<b>\$1,500</b>	<b>\$3,000</b>	<b>23%</b>