



Corpus Christi Aquifer Storage
& Recovery Conservation District

1201 Leopard St.
Corpus Christi, TX 78401

QUARTERLY PROJECT PERFORMANCE REPORT

Date: April 1, 2019

Reporting Period: Q4 CY18, October 1 – December 31, 2018
Q1 CY19, January 1 – March 31, 2019

Recipient:  Corpus Christi Aquifer Storage and Recovery Conservation District
Larijai Francis, CCASRCD Project Manager
1201 Leopard Street
Corpus Christi, Texas 78401-2825

Executive Administrator

Designee: Erika Mancha, Innovative Water Technologies Manager

Subject: Research Contract between the Corpus Christi Aquifer Storage and Recovery Conservation District and the Texas Development Board, Contract No. 1600011956

Project: Corpus Christi ASR Feasibility Study

Work Completed:

Pursuant to Section II, Article II, subsection 3 of the Contract this progress report represents a summary of work completed during the 4th Quarter 2018 and the 1st Quarter 2019 for the Corpus Christi ASR Feasibility Study. Exhibit B of the TWDB contract includes the Scope of Work. Exhibit B contain six (6) distinct tasks with subtasks. An update to these tasks is provided overleaf and thus serves as the update mechanism for this contract. The drilling program was completed, and all submittals received in November 2018 and resulted in completion of 3 permanent monitoring wells. Details of the exploratory drilling program is contained in the Draft Technical memorandum on Task #2. The Geochemical Analysis, task #3 was completed in February 2019. The present evaluation provides an indicator that potential recharge water is geochemically compatible with the native groundwater aquifer solids. At this field-scale level, no critical issues are identified. The full report is contained in the Draft Technical memorandum on Task #3. The next major coordination in this project is the Field Scale Groundwater Modeling effort and ASR Policy considerations. A high-level project assessment was done after the K:\ESI\Water Resources\CCASRCD\E16265 - ASR Feasibility Study\Progress reports and payment Req\1QCY19\CCASRCD_ProgRep9_1QCY19

Task#3 milestone was reached and to date the project expenditures have been within budget, with some savings. The project team is looking to see if monies can be programed elsewhere within the project scope that will expand the current efforts and lead to producing greater functionality to the CCASRCD. Since the last update we have since identified that a new task #7, TCEQ Permit Application that may be possible to add to the scope of work.

Project Financial Update

The Corpus Christi Aquifer Storage and Recovery Conservation District have incurred cumulative expenditures for the Project in the amount of \$1,278,617.63. The responsibility for this expenditure has been distributed between the District and TWDB and is reflected on the payment request form for this quarter.



HDR Engineering, Inc.
Austin, TX 78741
Phone: (512) 912-5100

Invoice

HDR Invoice No.	DRAFT
Invoice Date	12/10/2018
Month Ending	10/27/2018

Corpus Christi ASR Feasibility Study - Invoice #23

Task 1 - Formulate Program

No Work this period.
Problems Encountered this period: None

Task 2 - Exploratory Test Drilling Program

Received City comments, developed responses, and followed-up and confirmed responses satisfactorily met City's needs.
Issued final Draft TM.
Problems Encountered this period: None

Task 3 - Geochemical Analysis

Completed source water chemistry evaluation of source and groundwater to identify blending/mixing considerations that might occur during recharge/storage.
Prepared final round of HDR comments to team partner for review and addressing in TM- Geochemical analysis.
Received final draft geochemical analysis from team partner and prepared summary for TM- main body report.
Developed and formatted draft TM- Geochemical analysis.
Problems Encountered this period: None

Task 4 - Field Scale Groundwater Model

Completed construction of local, field scale model. Sensitivity testing of pumping parameters, finalization of aquifer layering, grid size and extent.
Peer review of model, independent review of layering and feedback to team partner.
Reviewed example ASR operating scenario, rates and spacing, provided feedback, and received follow-up scenario.
Continued modeled heads and performed wellbore-correction to revise single-well rates for constructability. Iteration to well recharge and recovery rates to maintain minimum distance above Layer 3 (active ASR storage zone).
Began model development to simulate water quality with ASR operations.
Problems Encountered this period: None

Task 5 - ASR Operating Policies

Considered water quality data (native groundwater & potential recharge source) to identify TCEQ considerations.
Problems Encountered this period: None

Task 6 - TWDB Coordination, Draft/Final Deliverables and Meetings

No Work this Period.
Problems Encountered this period: None

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HDR Engineering, Inc.
Austin, TX 78741
Phone: (512) 912-5100

Invoice

HDR Invoice No.	DRAFT
Invoice Date	1/11/2019
Month Ending	11/24/2018

Corpus Christi ASR Feasibility Study - Invoice #24

- Task 1 - Formulate Program
No Work this period.
Problems Encountered this period: None
- Task 2 - Exploratory Test Drilling Program
Responded to additional follow-up questions regarding TM.
Provided final Draft TM to the TWDB.
Problems Encountered this period: None
- Task 3 - Geochemical Analysis
Provided draft TM- Geochemical analysis to City Staff for review and comment on November 5, 2018. Brief conference call to discuss results.
Problems Encountered this period: None
- Task 4 - Field Scale Groundwater Model
Continued model development to simulate water quality with ASR operations.
Completed review of steady state model. Intera's (teaming partner) technical efforts associated with model development.
Prepared summary of example operating scenario to the City which showed 10-16 MGD seasonal recovery potential after sustained injection of 7.5 MGD of source water for preceding four years.
Problems Encountered this period: None
- Task 5 - ASR Operating Policies
Performed cursory analysis of Greenwood WWTP effluent to identify pre-treatment needs for ASR operations.
Problems Encountered this period: None
- Task 6 - TWDB Coordination, Draft/Final Deliverables and Meetings
Coordination with TWDB staff regarding scheduling and future tasks. Project management. Scheduling of November 28, 2018 meeting with City Staff to discuss progress and results.
Problems Encountered this period: None

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HDR Engineering, Inc.
Austin, TX 78741
Phone: (512) 912-5100

Invoice

HDR Invoice No.	1200175176
Invoice Date	2/25/2019
Month Ending	12/29/2018

Corpus Christi ASR Feasibility Study - Invoice #25

Task 1 - Formulate Program

No Work this period.

Problems Encountered this period: None

Task 2 - Exploratory Test Drilling Program

No Work this period.

Problems Encountered this period: None

Task 3 - Geochemical Analysis

Received comments from City Staff and revised draft TM in response to City Staff comments/questions.

Problems Encountered this period: None

Task 4 - Field Scale Groundwater Model

Continued model development to simulate water quality with ASR operations, including water quality component.

Problems Encountered this period: None

Task 5 - ASR Operating Policies

Performed cursory analysis of Greenwood WWTP effluent to identify pre-treatment needs for ASR operations.

Problems Encountered this period: None

Task 6 - TWDB Coordination, Draft/Final Deliverables and Meetings

Preparation of presentation and meeting with City Staff on Nov 28th to discuss progress and results.

Preparation and meeting with TWDB staff on Dec 4th to provide status update, schedule and future tasks.

Presentation and meeting with Corpus Christi ASRCD on Dec 6th.

Project management.

Problems Encountered this period: None

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HDR Engineering, Inc.
Austin, TX 78741
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Invoice

HDR Invoice No. 1200175682
Invoice Date 3/4/2019
Month Ending 2/2/2019

Corpus Christi ASR Feasibility Study - Invoice #26

Task 1 - Formulate Program

No Work this period.

Problems Encountered this period: None

Task 2 - Exploratory Test Drilling Program

No Work this period.

Problems Encountered this period: None

Task 3 - Geochemical Analysis

Coordination with geochemist to revise draft TM in response to City Staff comments/questions.

Problems Encountered this period: None

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Task 4 - Field Scale Groundwater Model

Internal QA/QC of field scale groundwater model and minor updates to layering.

Continued development of water quality component, including testing.

Evaluated aquifer response to preliminary recharge cycles.

Researched industrial water demand, water quality, and future needs to prepare operational scenario. Coorespondence with EDC, Industrial representatives, City Staff- WWTP. Development of ASR operating scenarios based on research findings for City Staff feedback.

Problems Encountered this period: None

Task 5 - ASR Operating Policies

Began preparation of CCASRCD Groundwater Management Plan.

Problems Encountered this period: None

Task 6 - TWDB Coordination, Draft/Final Deliverables and Meetings

Prepared status report. Coordination with TWDB and City Staff regarding schedule and new tasks. Project management.

Problems Encountered this period: None



Invoice

HDR Engineering, Inc.
Austin, TX 78741
Phone: (512) 912-5100

HDR Invoice No. 1200182322
Invoice Date 3/28/2019
Month Ending 2/2/2019

Corpus Christi ASR Feasibility Study - Invoice #27

Task 1 - Formulate Program

No Work this period.

Problems Encountered this period: None

Task 2 - Exploratory Test Drilling Program

No Work this period.

Problems Encountered this period: None

Task 3 - Geochemical Analysis

Submittal of final draft TM to City and District staff.

Problems Encountered this period: None

Task 4 - Field Scale Groundwater Model

Completed development of four ASR operating scenarios for modeling based on industrial feedback and WWTP staff input.

Responded to City Staff comment and confirmed operating scenarios for model simulation.

Prepared brief summary of ASR operating scenarios and submitted to City Staff.

Began preparation of pumping and recharge files to simulate four operating scenarios.

Problems Encountered this period: None

Task 5 - ASR Operating Policies

Continued development of draft CCASRCD Groundwater Management Plan including identifying goals and developing an updated 5 year plan based on study results.

Submitted draft CCASRCD Groundwater Management Plan to City Staff.

Problems Encountered this period: None

Task 6 - TWDB Coordination, Draft/Final Deliverables and Meetings

Coordination with TWDB and City Staff regarding schedule and new tasks. Project management.

Problems Encountered this period: None

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3/29/19