

**WASTEWATER TRUNK MAIN LINE EXTENSION CONSTRUCTION
AND REIMBURSEMENT AGREEMENT**

STATE OF TEXAS §
 §
COUNTY OF NUECES §

This Wastewater Collection Line Extension Construction and Reimbursement Agreement ("Agreement") is entered into between the City of Corpus Christi ("City"), a Texas home-rule municipality, and Braselton Custom Homes, Ltd. ("Developer"), a Texas Limited Partnership.

WHEREAS, the Developer, in lieu of submitting a plat, has submitted a Land plan which is to be platted and developed in the future, to wit: 118 Acres existing outside the City Limits, as shown in the attached **Exhibit 1**, the content of such exhibit being incorporated by reference into this Agreement.

WHEREAS, under the UDC, the Developer is responsible for construction of the wastewater collection line extension ("Wastewater Extension");

WHEREAS, under the UDC, the Developer is eligible for reimbursement of the Developer's costs for the construction of Wastewater Extension;

WHEREAS, it is to the best interest of the City that the Wastewater Extension be constructed to its ultimate capacity under the City's applicable Master Plan;

WHEREAS, Section 8.5.2.E.2 of the UDC authorizes the acceptance of applications to be eligible for reimbursement in the future when funds become fully available in the Wastewater Trunk System Trust Fund and are appropriated by the City Council; and

WHEREAS, the Developer has submitted an application for reimbursement of the costs from the Wastewater Trunk System Trust Fund for installing the Wastewater Extension, as shown in **Exhibit 2**, the content of such exhibit being incorporated by reference into this Agreement.

NOW, THEREFORE, in consideration of the mutual promises and covenants contained in this Agreement, the parties do covenant and agree as follows:

1. **REQUIRED CONSTRUCTION.** Developer shall construct the Wastewater Extension in compliance with the City's UDC and under the plans and specifications approved by the City's Development Services Engineer.
2. **PLANS AND SPECIFICATIONS.**
 - a. Developer shall contract with a professional engineer, acceptable to the City's Development Services Engineer, to prepare plans and specifications for the Wastewater Extension, as shown in the design memorandum **Exhibit 3**, the content of such exhibit being incorporated by reference into this Agreement, with the following basic design:

1. Install 8896 linear feet 16-inch PVC force main; (2-6 feet deep)

2. Install 1351 linear feet 18" PVC gravity sewer 30 feet deep;
3. Install five (5) 5- foot diameter manholes (28-30 feet depth);
4. Install one (1) 8-foot diameter wet well (30 feet depth);
5. Install lift station pump assembly
6. Install diesel stand by generator
7. Install approximately 1384' of 16" directional bore;
8. Install approximately 10,188 feet of OSHA trench protection
9. Dewatering;
10. Connect to existing waste water treatment plant and;
11. Traffic control;

b. The Wastewater Plan indicates a lift station to be located on City property near Oso Creek to take advantage of the natural ground slope and help with extending gravity collection system to the service area boundaries. **Exhibit 4**

c. The plans and specifications must comply with the City's Wastewater Standards Detail Sheets and Standard Specifications.

d. Before the Developer starts construction, the plans and specifications must be approved by the City's Development Services Engineer.

e. The wastewater extension plans and specifications must be submitted for review by the City within 45 days of approval of this Agreement by the City Council.

3. **SITE IMPROVEMENTS.** Prior to the start of construction of the Wastewater Extension, Developer shall acquire and dedicate to the City the required additional public utility easements ("Easements"), if any, necessary for the completion of the Wastewater Extension. Where portions of the proposed Wastewater Extension reside on City land, easements necessary for the Wastewater Extension will be granted by the City upon agreement of the metes and bounds.

4. **PLATTING REQUIRED.** Within 45 days of execution of this agreement, Developer shall submit a master preliminary plat application for future consideration by the Corpus Christi Planning Commission for the area in the Land plan attached in Exhibit 1.

5. **DEVELOPER TO AWARD CONTRACT FOR IMPROVEMENTS.** Developer shall award a contract and complete the Wastewater Extension, under the approved plans and specifications, within 18 months from the date of the approval of the Wastewater extension plans by the City.

6. **TIME IS OF THE ESSENCE.** Time is of the essence in the performance of this contract.

7. **PROMPT AND GOOD FAITH ACTIONS.** The parties shall act promptly and in good faith in performing their duties and obligations under this Agreement. If this Agreement calls for review

or inspections by the City, then the City's reviews or inspections must be completed thoroughly and promptly per published timelines.

8. DEFAULT. The following events shall constitute default:

- a. Developer fails to engage a professional engineer for the preparation of plans and specifications by the 10th calendar day after the date of approval of this Agreement by the City Council.
- b. Developer's professional engineer fails to submit the plans and specifications to the City's Director of Engineering Services and to the Development Services Engineer by the 45th calendar day after the date of approval of this Agreement by the City Council.
- c. Developer fails to award a contract for the construction of the Wastewater Extension, according to the approved plans and specifications, within 9 months after the date of approval of this Agreement by the City Council.
- d. Developer's contractor does not reasonably pursue construction of the Wastewater Extension under the approved plans and specifications.
- e. Developer's contractor fails to complete construction of the Wastewater Extension, under the approved plans and specifications, within the later of 18 months from the date of City Council approval of this agreement or 18 months from the approval of wastewater extension plans by the City.
- f. Either the City or the Developer otherwise fails to comply with its duties or obligations under this Agreement.

9. NOTICE AND CURE OF DEFAULT.

- a. In the event of a default by either party under this Agreement, the non-defaulting party shall deliver notice of the default, in writing, to the defaulting party stating, in sufficient detail, the nature of the default and the requirements to cure such default.
- b. After delivery of the default notice, the defaulting party has 15 business days from the delivery of the default notice ("Cure Period") to cure the default.
- c. In the event the default is not cured by the defaulting party within the Cure Period, then the non-defaulting party may pursue its remedies in this section.
- d. Should the Developer fail to perform any obligation or duty of this Agreement, the City shall give notice to the Developer, at the address stated in section 11, of the need to perform the obligation or duty and, should the Developer fail to perform the required obligation or duty within 15 business days of receipt of the notice, the City may perform the obligation or duty, charging the cost of such performance to the Developer by reducing the reimbursement amount due to the Developer.
- e. In the event of an uncured default by the Developer, after the appropriate notice and Cure Period, the City has all its common law remedies and the City may:

1. Terminate this Agreement after the required notice and opportunity to cure the default;

2. Refuse to record a related plat or issue any certificate of occupancy for any structure to be served by the project; and/or

3. Perform any obligation or duty of the Developer under this Agreement and charge the cost of such performance to the Developer. The Developer shall pay to the City the reasonable and necessary cost of the performance within 30 days from the date the Developer receives notice of the cost of performance. In the event the Developer pays the City under the preceding sentence and is not otherwise in default under this Agreement, then the Agreement shall be considered in effect and no longer in default.

f. In the event of an uncured default by the City after the appropriate notice and Cure Period, the Developer has all its remedies at law or in equity for such default.

10. FORCE MAJEURE.

a. The term "force majeure" as employed in this Agreement means and refers to acts of God; strikes, lockouts, or other industrial disturbances; acts of public enemies; insurrections; riots; epidemics; landslides; lightning; earthquakes; fires; hurricanes; storms; floods; washouts; droughts; arrests; civil disturbances; explosions; or other causes not reasonably within the control of the party claiming the inability.

b. If, by reason of force majeure, either party is rendered wholly or partially unable to carry out its obligations under this Agreement, then the party claiming force majeure shall give written notice of the full particulars of the force majeure to the other party within ten (10) business days after the occurrence or waive the right to claim it as a justifiable reason for delay. The obligations of the party giving the required notice, to the extent affected by the force majeure, are suspended during the continuance of the inability claimed but for no longer period, and the party shall endeavor to remove or overcome such inability with all reasonable dispatch.

11. NOTICES.

a. Any notice or other communication required or permitted to be given under this Agreement must be given to the other party in writing at the following address:

1. If to the Developer:

Braselton Custom Homes
5537 Yorktown
Corpus Christi, Texas 78413

2. If to the City:

City of Corpus Christi
Attn: Director, Development Services Department
2406 Leopard Street 78401
P. O. Box 9277

Corpus Christi, Texas 78469-9277

with a copy to:

City of Corpus Christi
Attn: Assistant City Manager, Business Support Services
1201 Leopard Street 78401
P. O. Box 9277
Corpus Christi, Texas 78469-9277

b. Notice must be made by United States Postal Service, First Class mail, certified, return receipt requested, postage prepaid; by a commercial delivery service that provides proof of delivery, delivery prepaid; or by personal delivery.

c. Either party may change the address for notices by giving notice of the change under the provisions of this section.

12. THIRD PARTY BENEFICIARY. Developer's contracts with the professional engineer for the preparation of the plans and specifications for the construction of the Wastewater Extension, contracts for testing services, and contracts with the contractor for the construction of the Wastewater Extension must provide that the City is a third party beneficiary of each contract.

13. PERFORMANCE AND PAYMENT BONDS. Developer shall, before beginning the work that is the subject of this Agreement, execute a performance bond if the contract is in excess of \$100,000 and a payment bond if the contract is in excess of \$25,000. The performance and payment bonds must comply with Texas Government Code, Chapter 2253.

14. WARRANTY. Developer shall fully warranty the workmanship of and function of the Wastewater Extension and the construction of the Wastewater Extension for a period of one year from and after the date of acceptance of the facilities by the City's Director of Engineering Services and Development Services Engineer.

15. PLATTING FEES. Upon platting, the actual wastewater system lot/acreage fees will be credited in accordance with Corpus Christi Texas Unified Development Code §8.5.

16. REIMBURSEMENT.

a. Subject to the conditions for reimbursement from the Wastewater Trunk System Trust Fund, availability of funds, and the appropriation of funds, the City will reimburse the developer the reasonable actual cost of the Wastewater Extension in an amount not to exceed **\$4,266,283.53** less the wastewater system lot/acreage fees for phase 1 of the master preliminary plat required by this agreement. Reasonable actual costs are attached in **Exhibit 5**; the contents of such exhibit being incorporated by reference into this Agreement.

b. The City agrees to reimburse the Developer on a monthly basis upon invoicing for work performed. The reimbursement will be made no later than 30 days from the date of the invoice. Developer shall submit all required performance bonds and proof of required insurance under the provisions of this Agreement.

- c. The final 10% of the reimbursement will be held in retention until such time the City accepts dedication of the Wastewater Extension.
- d. To be eligible for reimbursement, the work must be completed in a good and workmanlike manner and must have been inspected and accepted by the City. The City agrees to conduct periodic inspections and approve the progress of the work at key points during construction.
- e. In the event that this Agreement is terminated by the City as a result of an uncured default by the Developer and at a time when there has been a partial completion and/or partial payment for the improvements, then the City shall only reimburse the Developer for its costs that were legitimately incurred towards the completion of the improvements that have been inspected and accepted by the City up to the time that the uncured default occurred.

16. **INDEMNIFICATION.**

DEVELOPER/OWNER SHALL FULLY INDEMNIFY, SAVE, AND HOLD HARMLESS THE CITY OF CORPUS CHRISTI, ITS OFFICERS, OFFICIALS, EMPLOYEES, AND AGENTS ("INDEMNITEES") FROM AND AGAINST ALL SUITS, CLAIMS, DEMANDS, ACTIONS, LOSSES, COSTS, EXPENSES, LIABILITY, DAMAGES AND JUDGMENTS RECOVERED FROM OR ASSERTED AGAINST CITY FOR ANY AND ALL PROPERTY DAMAGE OR INJURIES SUSTAINED BY ANY PERSON, INCLUDING WITHOUT LIMITATION, WORKERS' COMPENSATION, PERSONAL INJURY OR DEATH, ARISING FROM OR INCIDENT TO, BE CAUSED BY, OR BE IN ANY WAY CONNECTED WITH THE CONSTRUCTION OF THE WASTEWATER EXTENSION.

17. **DEVELOPMENT OF LAND.** This Agreement is to encourage the development of the land within the boundaries of the London Area Master Wastewater Plan, including initially a section of that portion of Tract II as described in Correction Warranty Deed having DOC # 2015011169 containing approximately 118 acres and incorporated herein as **EXHIBIT 6**

18. **ASSIGNMENT OF AGREEMENT.** This Agreement or any rights under this Agreement may not be assigned by the Developer to another without the written approval and consent of the City's City Manager.

19. **DISCLOSURE OF INTEREST.** Developer agrees, in compliance with the City Ordinance No. 17110, to complete, as part of this Agreement, the Disclosure of Interest form attached to this Agreement as **Exhibit 7.**

20. **EFFECTIVE DATE.** This Agreement becomes effective and is binding upon and inures to the benefit of the City and the Developer and their respective heirs, successors, and assigns from and after the date of final execution by all parties.

21. **AUTHORITY.** The person signing this Agreement on behalf of each of the parties represents, warrants, and guarantees that they have authority to act on behalf of the party and make this Agreement binding and enforceable by their signature.

22. TRUSTEE LIABILITY. The City is executing this agreement as trustee of the Wastewater Trunk System Trust Fund pursuant to Corpus Christi Texas Unified Development Code §8.5. It constitutes a promise to pay only to the extent that the assets and future assets of the trust are sufficient for such purpose and it is expressly agreed that any judgment will only be satisfied out of the assets of the trust and not out of the City's assets. The City is excluded from personal liability.

23. PAYMENTS, CREDITS AND DEFERRED REIMBURSEMENT. All payments, credits, priority of reimbursement, and deferred reimbursement shall be made in accordance with Corpus Christi Texas Unified Development Code §8.5.

24. DEDICATION OF WASTEWATER EXTENSION. Upon completion of the construction, dedication of Wastewater Extension will be subject to City inspection and approval.

25. VERIFICATION REGARDING ISRAEL. In accordance with Chapter 2270, Texas Government Code, the City may not enter into a contract with a company for goods or services unless the contract contains a written verification from the company that it: (1) does not boycott Israel; and (2) will not boycott Israel during the term of the contract. The signatory executing this Agreement on behalf of the Developer verifies that the company does not boycott Israel and will not boycott Israel during the term of this Agreement.

26. CERTIFICATE OF INTERESTED PARTIES. Developer agrees to comply with Texas Government Code section 2252.908 and complete Form 1295 Certificate of Interested Parties as part of this agreement.

Form 1295 requires disclosure of "interested parties" with respect to entities that enter contracts with cities. These interested parties include:

- (1) persons with a "controlling interest" in the entity, which includes:
 - a. an ownership interest or participating interest in a business entity by virtue of units, percentage, shares, stock or otherwise that exceeds 10 percent;
 - b. membership on the board of directors or other governing body of a business entity of which the board or other governing body is composed of not more than 10 members; or
 - c. service as an officer of a business entity that has four or fewer officers, or service as one of the four officers most highly compensated by a business entity that has more than four officers.
- (2) a person who actively participates in facilitating a contract or negotiating the terms of a contract with a governmental entity or state agency, including a broker, intermediary, adviser or attorney for the business entity.

Form 1295 must be electronically filed with the Texas Ethics Commission at https://www.ethics.state.tx.us/whatsnew/elf_info_form1295.htm. The form must then be printed, signed, notarized and filed with the City. For more information, please review the Texas Ethics Commission Rules at <https://www.ethics.state.tx.us/legal/ch46.html>.

27. CONFLICT OF INTEREST. Developer agrees to comply with Chapter 176 of the Texas Local Government Code and file Form CIQ with the City Secretary's Office, if required. For more information and to determine if you need to file a Form CIQ, please review the information on the City Secretary's website at <http://www.cctexas.com/government/city-secretary/conflict-disclosure/index>

EXECUTED IN ONE ORIGINAL this _____ day of _____, 2018.

ATTEST:

CITY OF CORPUS CHRISTI

Rebecca Huerta
City Secretary

Keith Selman
Assistant City Manager, designee
of the City Manager

APPROVED AS TO FORM: _____, 2018

Buck Brice, Assistant City Attorney
For the City Attorney

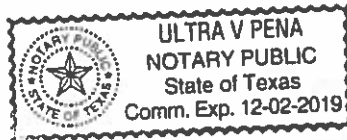
Developer:
Braselton Custom Homes, LTD

By: _____
Bart Braselton

STATE OF TEXAS

COUNTY OF Nueces

§
§
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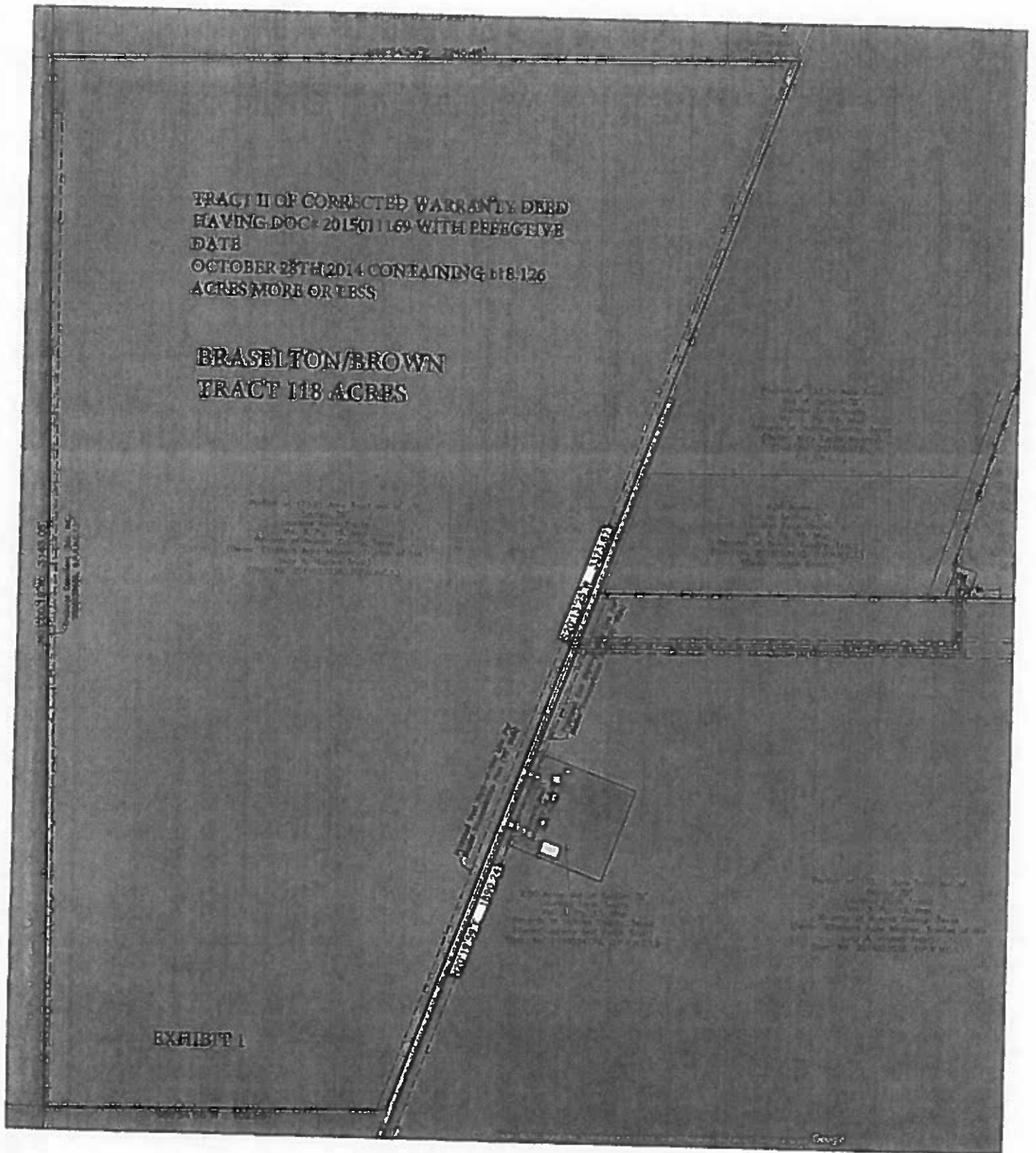
This instrument was acknowledged before me on April 12th, 2018, by Bart Braselton, President, Braselton Custom Homes, a Texas Corporation, on behalf of said corporation.

Notary Public's Signature

TRACT II OF CORRECTED WARRANTY DEED
HAVING DOC# 2015011169 WITH EFFECTIVE
DATE
OCTOBER 28TH 2014 CONTAINING 618.126
ACRES MORE OR LESS

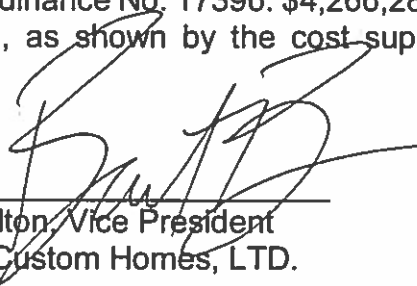
BRASELTON/BROWN
TRACT 118 ACRES

EXHIBIT 1



APPLICATION FOR WASTE WATER REIMBURSEMENT

We, Braselton Custom Homes LTD., a Texas Partnership, 5337 Yorktown, Corpus Christi, Texas, 78413, owners and developers of proposed London Towne Unit 1 (see attached land plan), hereby request reimbursement of \$4,266,283.53 for the installation of the waste water line in conjunction with said lot, as provided for by City Ordinance No. 17396. \$4,266,283.53 is the construction cost, including Engineering and Surveying, as shown by the cost supporting documents attached herewith.



Bart Braselton, Vice President
Braselton Custom Homes, LTD.

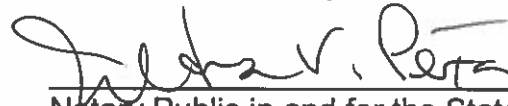
4/12/18

Date

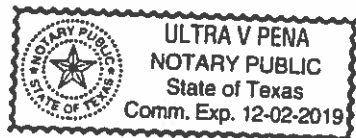
THE STATE OF TEXAS §

COUNTY OF Wheeler §

This instrument was acknowledged before me on April 12th, 2018, by Homes LTD., a Texas Corporation, Barton Holder Braselton, of Braselton Custom Homes LTD., a Texas Corporation, on behalf of the said corporation.



Notary Public in and for the State of Texas



CERTIFICATION

The information submitted with this application for reimbursement has been reviewed and determined to be correct. Reimbursement is subject to:

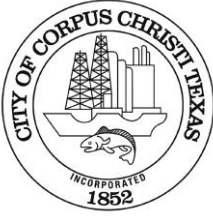
- (a) Sufficiency of funds in the Sanitary Sewer Trunk System Trust Fund, and
- (b) Appropriation and approval by the City Council.



Development Services Engineer

April 12, 2018

(Date)



MEMORANDUM

DATE: April 12, 2018
FROM: David Thornburg Development Services Project Manager
(361) 826-8451

DESIGN MEMORANDUM UPDATE

PURPOSE:

The purpose of this is to acknowledge that the design memorandum was prepared prior to the updated Wastewater master plan amendment.

DISCUSSION

The design memorandum was submitted to Development Services prior to the Wastewater Master Plan Amendment being updated and as such the body of the document has not been altered.

The cost estimate and the relative graphic exhibits have been updated to reflect the changes required by the new Wastewater Master plan. All other areas of the design memorandum were not materially affected by the change.

DESIGN MEMORANDUM

For:

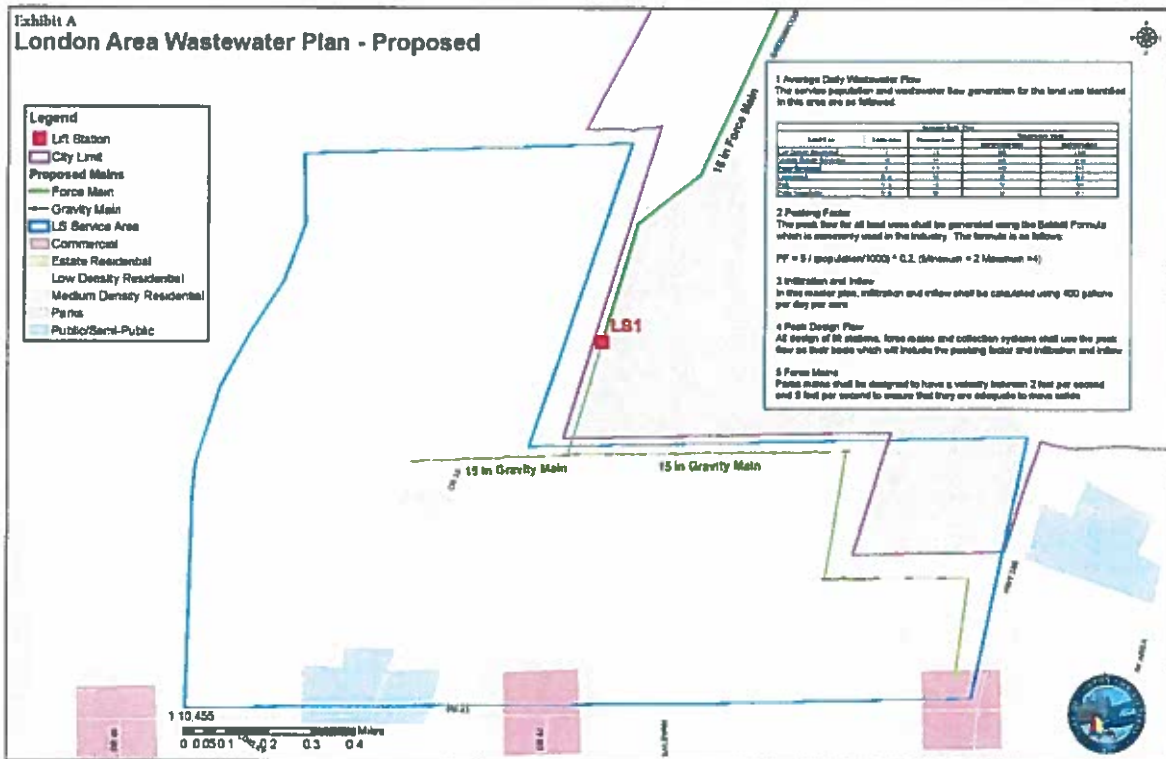
London Area Wastewater Plan Lift Station No. 1

November 3, 2017

Revised: November 27, 2017

Revised: December 18, 2017

RECEIVED
 19 DEC 2017
 City of Corpus Christi
 Development Services



Prepared By
 Urban Engineering
 2725 Swantner Drive
 Corpus Christi Texas 78404
 361-854-3101
 TBPE Firm #145



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EXECUTIVE SUMMARY

The following is the Executive Summary for the plan submission for the London Area Wastewater Plan Improvements. This project involves the installation of a wastewater duplex lift station, approximately 1,470 linear feet of 18" gravity sanitary sewer and approximately 10,185 linear feet of 16" diameter sanitary sewer force main (See Exhibit 'C' - Project Overview).

The London Area Wastewater Plan was adopted by City Council in April 2017 and provides a wastewater service area for an area south of Oso Creek (see Exhibit 'A'). This system will initially serve a proposed development to the west along County Road 33. Ultimately it will serve all of the area within the London Area Wastewater Master Plan.

The London Area Wastewater Master Plan, as adopted, calls for two 15-inch gravity sewer lines to deliver the flow from the entire service area to a common manhole, and then to the proposed lift station via a single gravity sewer line. As the lift station is proposed to be located approximately in the center of the service area, it is assumed that each of the 15-inch gravity lines would carry approximately half of the total flow. Based on the criteria adopted by the city with the master plan, a 15-inch gravity line does not have sufficient capacity to carry half of the total flow from the service area. Based on that same criteria, an 18-inch gravity line does have sufficient capacity to carry half of the total flow from the service area. An 18-inch gravity sewer line will provide a 40% greater capacity than the 15-inch line, and will do so at no additional cost to the city. See the Capacity Calculations Exhibit included with Appendix 'D'.

The proposed project includes 18" diameter gravity sanitary sewer lines to be built at master plan depths to serve the entire London Area Service Area. The proposed gravity sanitary sewer will start at the new lift station and branch out to serve the proposed development to the west of the lift station. A stub-out will be provided from the lift station to the east for future extension to serve developments on the east side of the London Wastewater Service Area. The proposed gravity sanitary is planned to be constructed along city and private property. Utility easements will be dedicated for all wastewater infrastructure as needed. The material for the gravity sanitary sewer will be PVC (Green, SDR-21).

The proposed wastewater lift station is a duplex submersible pump station with an 8' diameter x 30' deep fiberglass wet well. Lift station is designed such that both the Phase 1 and future Phase 2 pumps will function with no changes, other than replacing pumps and control panel. The proposed Phase 1 pumps are 12 horsepower submersible pumps. Future development in this area will dictate when the future Phase 2, 20 horsepower submersible pumps will need to be installed in the lift station. Design of the proposed lift station will follow criteria established by TCEQ in TAC 30 Chapter 217 and will conform to the City of Corpus Christi standards.

EXECUTIVE SUMMARY

The proposed lift station will pump into a proposed 16" diameter force main that will be constructed across City property, within the Greenwood Drive right-of-way, and within the Saratoga Boulevard right-of-way, and will discharge into the plant lift station at the Greenwood Wastewater Treatment Plant. Utility easements will be dedicated where needed. Design of the force main will follow criteria established by TCEQ in TAC 30 Chapter 217. A portion of the force main will be installed by directional drill across Oso Creek. The material for the drilled portion of the force main will be Fusible PVC (Green, C-900, DR 18, pressure class 235 psi). The Material for the remainder of the force main line will be PVC (Green, C-900, DR 18, pressure class 235 psi). Pipe embedment and trench backfill will conform to applicable City of Corpus Christi standards.

SECTION I - INTRODUCTION

A. PURPOSE

The objective of this report is to identify, analyze and review design issues relating to this project, develop a work plan and provide recommendations for the new wastewater lift station per the London Area Wastewater Plan. The proposed new sanitary sewer infrastructure includes a gravity sewer system, a lift station, and a force main. To date there has not been any public wastewater systems to serve this area. This system will initially serve a proposed development to the west along County Road 33. Ultimately it will serve all of the area within the London Area Wastewater Master Plan.

B. LONDON AREA WASTEWATER PLAN ADOPTED APRIL 2017

The London Area Wastewater Plan was adopted by City Council in April 2017 and provides a wastewater service area for an area south of Oso Creek. The service area is bounded by Oso Creek on the north, SH 286 on the east, Weber Road on the south, and farmland to the west. See Exhibit A at the back of this report for a map of the Wastewater Plan. Grades for the service area generally drain from south to north (Weber Road to Oso Creek). The Wastewater Plan indicates a lift station to be located on City property near Oso Creek to take advantage of the natural ground slope and help with extending gravity collection system to the service area boundaries. However, the master plan shows gravity sewer coming from the east and west, combining approximately 1,100 feet south of the lift station, and then flowing by gravity sewer north to the lift station. This effectively eliminates any advantage gained by moving the lift station to the lower elevation. Therefore, it is proposed that the lift station be located approximately 1,100 feet south of the location depicted on the master plan. This will eliminate 1,100 feet of gravity sewer and replace with force main which is considerably more economical.

The force main will be constructed from the new lift station northward through city property, and then adjacent to Greenwood Drive terminating at the lift station at the Greenwood Wastewater Treatment Plant. The Wastewater Plan indicates the force main to be 16" diameter.

Branching out from the new lift station to the east and to the west will be gravity sewer lines, as indicated on Exhibit A. The line to the east will be a short stub-out which will be capped for future extension. The line to the west will be installed approximately to west edge of the County Road 33 right-of-way.

SECTION I - INTRODUCTION

C. SITE DEDICATION

The lift station site will be located on city property. The gravity collection system will be located on city and private property. The force main will be located on city property, and within dedicated right-of-way. Utility easements will be dedicated for all wastewater infrastructure as needed. Metes and Bounds descriptions with exhibits will be provided for these locations where necessary.

SECTION II – LIFT STATION DESIGN CRITERIA

A. SITE SELECTION

The new London Area Lift Station No. 1 will be located on the City's property south of the Oso Creek and will be designed such that it can serve the entire service area by gravity (See Exhibit A for approved wastewater plan). Metes and Bounds with exhibit will be developed for the site that the lift station will encompass. The site will be large enough to construct the Phase 1 lift station wet well and allow construction of future wet well to expand the pumping capacity.

B. DESIGN FLOW

The design flow for the proposed lift station was calculated by determining the land use for the various parcels of land within the lift station service area per the City's London Area Wastewater Plan (see Exhibit A), applying the master plan flow rate per land use type and then totaling the flows. A peaking factor of three was used, based on the Babbitt formula, and 400 gallons/day/acre was added for infiltration. Potential flowrate from the London Independent School District (ISD) property was also added, based on information provided by the school district. Exhibit B shows more detailed information of the service area and land use acreage used to develop the design flows. Flow calculations are shown in the table on the following page and recommended design flows for this lift station are as follows:

Phase 1 Design Flow:	625 GPM (0.90 MGD)
Future Phase 2 Design Flow:	1,220 GPM (1.76 MGD)
Future (Ultimate) Design Flow:	3,044 GPM (4.38 MGD)

The components of the lift station, except for the pumps and control panel, will be sized to handle the Phase 2 design flow of 1.76 MGD (1,220 GPM).

The lift station will be designed using Flygt (Xylem) submersible centrifugal pumps. The pump motors will be 3-phase, 460V, 60 Hz.

Phase 1: NP 3153 LT-3 416 Impellor 12 Hp	669 GPM @ 32.6' TDH
Phase 2: NP 3153 LT-3 413 Impellor 20 Hp	1230 GPM @ 41.6' TDH

SECTION II – LIFT STATION DESIGN CRITERIA

Phase 1 Lift Station Flow Calculations

Acreage	Land Use	Persons Per Acre	GPD Per Person	Peak Factor	Flow Without I/I (GPM)	Add I/I (GPM)	Total Flow (GPM)
109.06	Low Density Residential (Brown Tract)	14	100	3	319	30	349
60.72	Regional Sports Complex (per HDR)	28 GPM	-	3	84	17	101
50.00	Dev Around Sports Complex	30	30	3	94	14	108
81.97	London School - Existing Phase I: Avg. = 14 GPM	-	-	3	42	23	65
301.75					539	84	623

PH 1 SAY 625 GPM

Phase 2 Lift Station Flow Calculations

Acreage	Land Use	Persons Per Acre	GPD Per Person	Peak Factor	Flow Without I/I (GPM)	Add I/I (GPM)	Total Flow (GPM)
109.06	Low Density Residential (Brown Tract)	14	100	3	319	30	349
4.99	Parks (Brown Tract)	10	20	3	3	2	5
60.72	Regional Sports Complex (per HDR)	28 GPM	-	3	84	17	101
50.00	Dev Around Sports Complex	30	30	3	94	14	108
81.97	London School - Existing Phase I: Avg. = 14 GPM	-	-	3	42	23	65
	London School - Future Phase II: Avg = 8 GPM	-	-	3	24		24
135.00	Low Density Residential	14	100	3	394	38	431
15.00	Medium Density Residential	35	100	3	110	5	115
10.00	Commercial	30	30	3	19	3	22
466.74					1089	132	1220

PH 2 SAY 1220 GPM

Ultimate Lift Station Flow Calculations

Acreage	Land Use	Persons Per Acre	GPD Per Person	Peak Factor	Flow Without I/I (GPM)	Add I/I (GPM)	Total Flow (GPM)
109.06	Low Density Residential (Brown Tract)	14	100	3	319	30	349
4.99	Parks (Brown Tract)	10	20	3	3	2	5
60.72	Regional Sports Complex (per HDR)	28 GPM	-	3	84	17	101
50.00	Dev Around Sports Complex	30	30	3	94	14	108
81.97	London School - Existing Phase I: Avg. = 14 GPM	-	-	3	42	23	65
	London School - Future Phase II: Avg = 8 GPM	-	-	3	24		24
632.24	Low Density Residential	14	100	3	1,844	176	2,020
43.23	Medium Density Residential	35	100	3	316	13	329
19.68	Commercial	30	30	3	37	6	43
1,001.89					2763	281	3044

ULTIMATE FLOW = 3,050 GPM



SECTION II – LIFT STATION DESIGN CRITERIA

C. WET WELL DESIGN

1. WET WELL VOLUME

The lift station will be designed using the criteria set forth in TCEQ's Chapter 217 of TAC 30. The primary design consideration for lift stations is given to wet well volume. The wet well volume required is calculated using the formula found in TCEQ Ch 217.60.

$$V = (T * Q) / (4 * 7.48)$$

V = Active volume (cubic feet)

Q = Pump capacity (gallons per minute)

T = Cycle time (minutes)

This formula is used to calculate wet well volumes when the pump capacity is equal to the peak flow. For less than 50 Hp motors a pump cycle time of 6 minutes is required, for 50 to 100 Hp motors a pump cycle time of 10 minutes is required and for greater than 100 Hp motors a pump cycle time of 15 minutes is required. For future peak flow of 3,044 GPM (4.38 MGD) additional wet well capacity will have to be constructed. A stub-out for an interconnecting pipe between the existing and future wet wells is being provided.

The preliminary recommended dimensions for a fiberglass round wet well are:

Diameter: 8'-0"
Water Depth: 5'-0" (El. 3.00 to El. (-)2.00)
Area: 50.3 SF
Total Volume: 251 CF (1,877 Gallons)

2. PUMP LEVELS

Recommended pump levels based on design flow are provided in the following.

High Level Alarm On	El. 3.00
Lag Pump On	El. 1.60
Lead Pump On	El. 0.60
Pumps Off	El. (-) 2.00

Actual levels will likely vary during initial flows and flow changes will occur over time. Flow should be monitored and changes made in the field as necessary.

SECTION II – LIFT STATION DESIGN CRITERIA

3. WET WELL DETENTION

Wet well detention calculations are based on the following previously developed values and the pump curve in the Appendix 'A':

PHASE 1

Peak Wet Weather Design Flow = 0.90 MGD = 625 GPM

One Pump On = 669 GPM

Wet Well Surface Area: 50.3 SF

Lead Pump On to Pump Off at 2.6' = 978 Gallons

T_d = Detention Time in the wet well

$$T_d = (978/625) + (978/(669-625)) = 23.8 \text{ min.}$$

PHASE 2

Peak Wet Weather Design Flow = 1.76 MGD = 1,220 GPM

One Pump On = 1230 GPM

Wet Well Surface Area: 50.3 SF

Lead Pump On to Pump Off at 5' = 1,881 Gallons

T_d = Detention Time in the wet well

$$T_d = (1,881/1,220) + (1,881/(1,230-1,220)) = 203 \text{ min.}$$

D. PUMP HEAD CALCULATIONS

Pump design is based on the system analysis as presented in Appendix 'A' for one pump running (second pump is backup pump) and with the new 16" dia. force main. The system curve was developed utilizing hydraulic calculations.

E. LIFT STATION EMERGENCY PROVISIONS

1. STORAGE CAPACITY

According to TAC 30 Chapter 217, storage capacity must be provided for 20 minutes of peak flow in the event of a power outage (or equal to the longest power outage in the last 60 months), to prevent the release of untreated wastewater. Nueces Electric Cooperative (NEC) provides power for the lift station site. Since this is a new lift station and a new overhead power supply will have to be constructed, there is no historical information for outages to this lift station. However, NEC has provided power outage information for the London ISD area

SECTION II – LIFT STATION DESIGN CRITERIA

(see Appendix 'C'). The information provided indicates the longest duration of power outage to the area was over 26-hours during Hurricane Harvey. This duration would result in a storage amount which cannot be contained within the wet well, gravity lines, and manholes.

Therefore, a diesel powered back-up generator will be permanently located on site and provided with an automatic transfer switch. The generator will be sized to run one of the two phase 2 lift station pumps for at least 27 hours (one pump is designed to pump the phase 2 peak flow). Generator will be self-starting with the loss of the primary power source.

2. DISCHARGE PREVENTION SYSTEM

An audiovisual alarm system consisting of a Supervisory Control and Data Acquisition (SCADA) panel located at the lift station will be provided to communicate station conditions and alarms to the Wastewater Service Center. The alarm system will monitor and provide notification of power outages, pump failures and/or a wet well high water level.

F. UTILITIES IN PROJECT AREA

There are no known utilities located in or around the proposed lift station site. There is an existing Enterprise gas pipeline which traverses the city landfill property and runs along Greenwood Drive. The proposed force main will cross the existing gas pipeline just south of the Greenwood Drive terminus at the city landfill property. The proposed force main will be located on the east side of the Greenwood Drive pavement and will run parallel to the above mentioned existing gas pipeline, an existing city gas line, and a small diameter sewer force main.

G. GEOTECHNICAL INVESTIGATION

Geotechnical investigation of the subsurface materials and conditions was performed at the lift station site, along the route of the force main and along the route of the gravity lines and a study prepared by Rock Engineering & Testing Laboratory, Inc. A copy of the boring log and the results of the soil sample analysis are provided as Appendix 'B'. The soils at the lift station are described as firm to stiff, highly plastic, dark grey to brown clay. Ground water was encountered at four of the six bore holes during the drilling operation and read again 24 hours later and water levels are presented in the soils report pages in Appendix 'B'. Well pointing of some sort will likely be required for some of the construction elements.

SECTION II – LIFT STATION DESIGN CRITERIA

The entire geotechnical study will be included with the bidding documents for use by the contractors bidding the project.

SECTION III – PROPOSED IMPROVEMENTS

A. LIFT STATION

1. Pumps and Accessories

The proposed lift station is a duplex lift station, two pumps will be installed, with one pump handling the design flow and the other pump acting as a backup pump. The lift station will initially have 12 Hp Phase 1 pumps. When flows increase and the Phase 1 pumps near capacity future Phase 2 20 Hp pumps can be installed and control panel replaced.

2. Wet Well

The proposed wet well will be 8' in diameter, approximately 30' deep, and made of fiberglass. Active volume with 5'-0" operating level is 251.5 CF (1,881 Gallons). The fiberglass wet well would be constructed with concrete bottom and top slab (note that there is also a fiberglass top to the vessel to protect the top from hydrogen sulfide gasses). One access hatch, wide enough to serve both phase 1 and phase 2 submersible pumps, will be provided in the top of the concrete roof to allow access to the pumps. Access hatches will be provided with safety grating for fall protection when the access door is opened.

3. Lift Station Discharge Piping and Valves (above ground)

For ease of maintenance, the proposed lift station isolation and check valves will be installed on top of the station above the top slab. All above ground discharge piping will be constructed with ductile iron pipe and fittings. An emergency bypass connection will be provided on the downstream discharge header with a tee, plug valve and blind flange to allow connection of a temporary pump should the need ever arise to bypass the lift station wet well or due to pump failures.

4. Wet Well Ventilation

The proposed lift station will have passive ventilation per TCEQ Chapter 217 Regulations. The passive ventilation will consist of one 8" pipe vent with a stainless steel bird screen over the end.

$1.76 \text{ MGD} = 2.72 \text{ CFS} \times 60 \text{ Min/Sec} = 163 \text{ CFM Each}$

Area Required: $163 \text{ CFM}/500 \text{ FPM} = 0.33 \text{ SF Min.}$

USE ONE 8" DIA. VENT (0.349 SF)

5. Flow Meter

The proposed lift station will include a flow meter to measure flow through the discharge piping. The flow meter will be installed in a fiberglass manhole adjacent to the lift station wet well downstream of the above ground discharge piping.

SECTION III – PROPOSED IMPROVEMENTS

6. Odor Control

Since the proposed lift station is brand new and peak flows are minimal, there will be no odor control systems installed at the lift station site. Space is being provided on the site, though, for a future bio-filter type odor control unit, should the need arise.

7. Miscellaneous Site Improvements

- The lift station will be accessible from County Road 33 with construction of a new 12' wide access road from the existing country road to the lift station site. Proposed access road is outside of the boundary of the existing and proposed FEMA 100 year storm event.
- For security, the proposed lift station site will have a 6' tall chain link fence with three strands of barbed wire. Access to the new lift station will be through a lockable 3' wide personnel gate and a lockable 12' wide main gate to allow for vehicular entry.
- Control panels and wet well access hatches will also be lockable to limit access.
- A security light will be provided with dusk till dawn photo cell.

B. FORCE MAIN

1. Force Main Piping

The proposed 16" diameter sanitary sewer force main will be constructed of PVC (green, C-900, DR 25, pressure class 165 psi). The proposed force main will be installed with a minimum of 2'-6" of ground cover.

2. Line Valves

Line valves for isolation of the force main will be installed at maximum 2,000' intervals.

C. GRAVITY SANITARY SEWER

1. 18" Diameter PVC

All proposed PVC gravity lines will be installed at master plan depths.

2. Manholes

Manholes for this project will be spaced at a maximum of 500' apart per TCEQ Chapter 217 requirements. Manhole wall thickness and construction will conform to City of Corpus Standard Details and Specifications.

EXHIBITS

Exhibit 'A' – Adopted London Area Wastewater Master Plan

Exhibit 'B' – Basis of Design

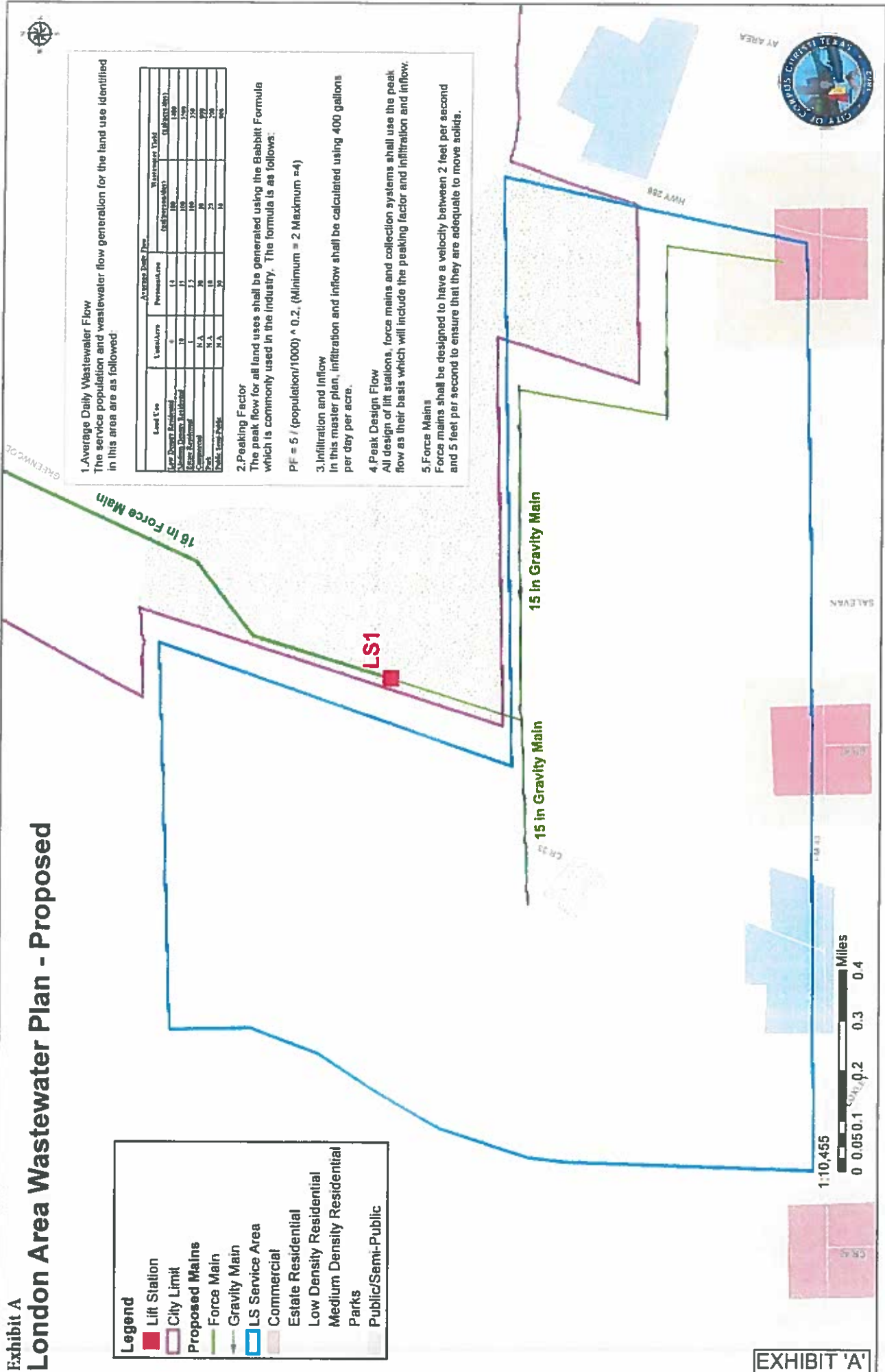
Exhibit 'C' – Project Overview

Exhibit 'D' – Opinion of Probable Cost

Exhibit 'E' – Lift Station Exhibits

Exhibit A

London Area Wastewater Plan - Proposed



Legend

- Lift Station
- City Limit
- Proposed Mains
- Force Main
- Gravity Main
- LS Service Area
- Commercial
- Estate Residential
- Low Density Residential
- Medium Density Residential
- Parks
- Public/Semi-Public

1. Average Daily Wastewater Flow
The service population and wastewater flow generation for the land use identified in this area are as followed:

Land Use	Units/Acre	Per Capita/Day (gallons/1000/Day)	Wastewater Yield (gallons/Day)
Land Design Residential	1.4	100	1400
Medium Density Residential	1.0	100	1000
Low Density Residential	1.0	100	1000
Public/Semi-Public	N.A.	100	1000
Commercial	N.A.	100	1000
Parks	N.A.	100	1000
Public/Semi-Public	N.A.	100	1000

- 2. Peaking Factor**
The peak flow for all land uses shall be generated using the Babbitt Formula which is commonly used in the industry. The formula is as follows:
 $PF = 5 / (\text{population}/1000) \wedge 0.2$, (Minimum = 2 Maximum = 4)
- 3. Infiltration and Inflow**
In this master plan, infiltration and inflow shall be calculated using 400 gallons per day per acre.
- 4. Peak Design Flow**
All design of lift stations, force mains and collection systems shall use the peak flow as their basis which will include the peaking factor and infiltration and inflow.
- 5. Force Mains**
Force mains shall be designed to have a velocity between 2 feet per second and 5 feet per second to ensure that they are adequate to move solids.

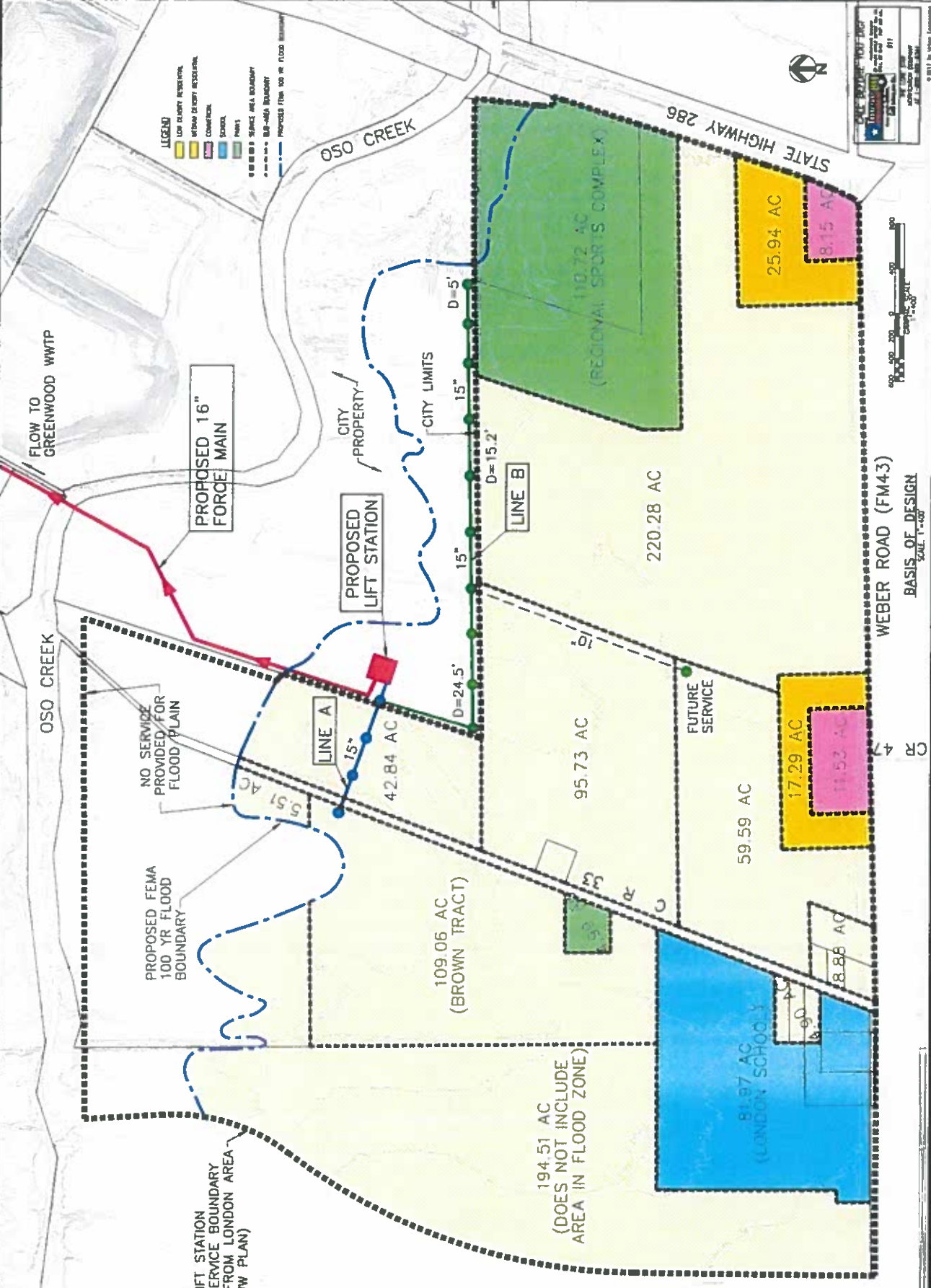




LONDON AREA WASTEWATER PLAN
LIFT STATION NO. 1
CORPUS CHRISTI, TEXAS

SCALE AS NOTED
DRAWN: SR
CHECKED: NV
DATE: MAY 20 2011

SHEET
OF XX
JOB NO.
41000 07.00



SCALE: 1"=400'
GRAPHIC SCALE

PROPOSED 16" FORCE MAIN
PROPOSED LIFT STATION
LINE A
LINE B
CITY LIMITS
CITY PROPERTY
OSO CREEK
WEBER ROAD (FM43)
REGIONAL SPORTS COMPLEX
LONDON SCHOOL
BROWN TRACT
FUTURE SERVICE
NO SERVICE PROVIDED FOR FLOOD PLAIN
PROPOSED FEMA 100 YR FLOOD BOUNDARY
LIFT STATION SERVICE BOUNDARY (FROM LONDON AREA WW PLAN)

220.28 AC
25.94 AC
8.15 AC
110.72 AC
42.84 AC
5.51 AC
95.73 AC
59.59 AC
17.29 AC
11.53 AC
194.51 AC
109.06 AC

PROPOSED 16" FORCE MAIN
PROPOSED LIFT STATION
LINE A
LINE B
CITY LIMITS
CITY PROPERTY
OSO CREEK
WEBER ROAD (FM43)
REGIONAL SPORTS COMPLEX
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194.51 AC
109.06 AC

EXHIBIT 'B'



LEGEND

- PROPOSED SANITARY SEWER
- FUTURE SANITARY SEWER
- PROPOSED FORCE MAIN
- PROPERTY LINE

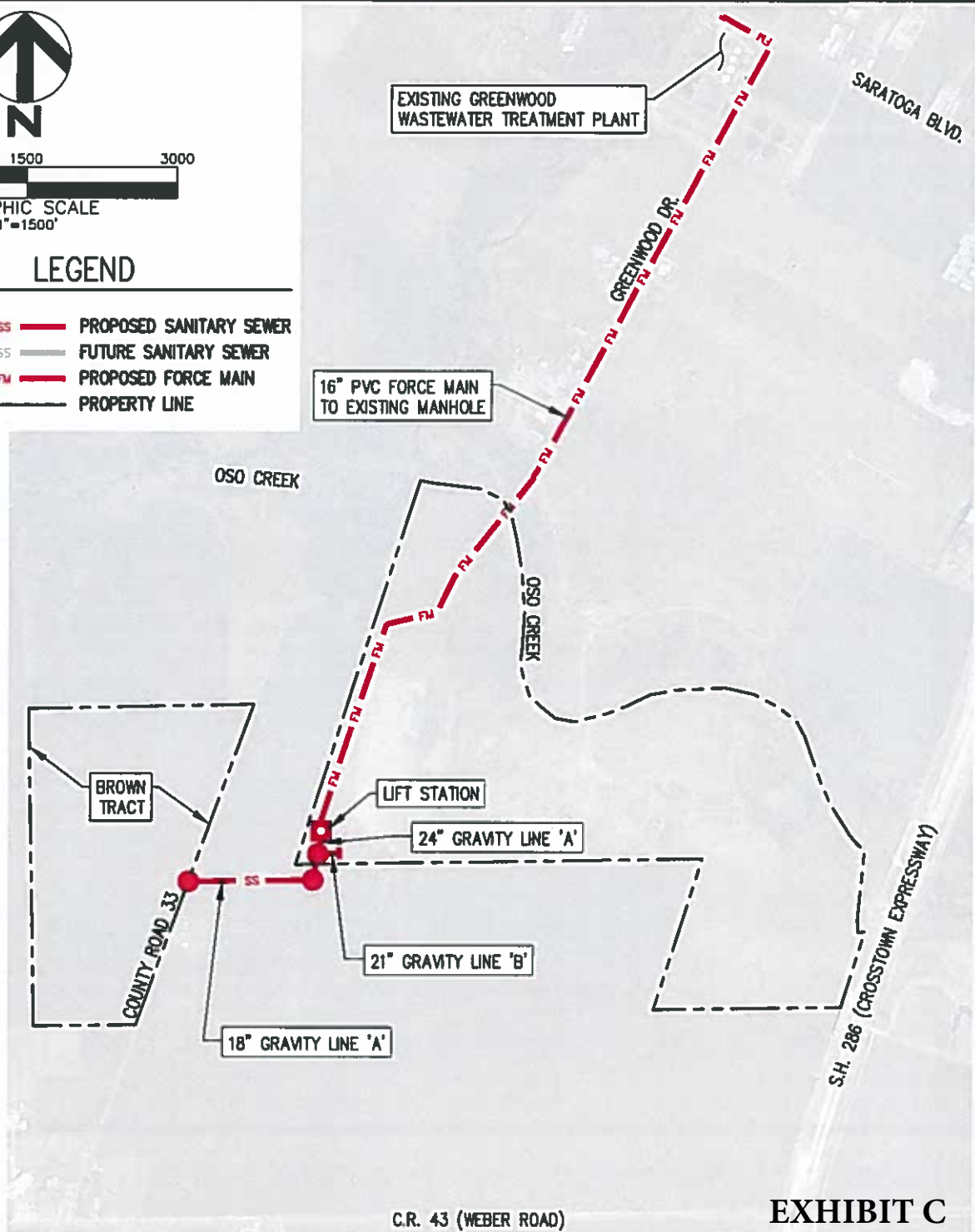


EXHIBIT C



TBPE FIRM NO. 145, TBPLS FIRM NO. 10032400
 2725 SWANTNER DR, CORPUS CHRISTI, TX 78404
 PHONE: 361.854.3101 WWW.URBANENG.COM

JOB NO. 42900.87.00

EXHIBIT OF PROPOSED LONDON AREA MASTER PLAN WASTEWATER INFRASTRUCTURE

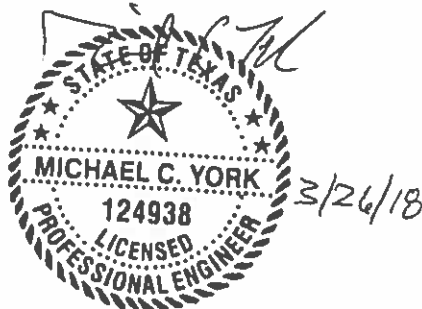
Note: This exhibit was revised per city request on March 27, 2018 to reflect a change in size of gravity sanitary sewer lines. The sizes shown on this revised exhibit are congruent with the sizes shown on the city's revised London master sanitary sewer plan which was presented to planning commission on 3/21/2018.

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URBAN ENGINEERING
TBPE Firm No. 145

**LONDON AREA MASTER PLAN
REIMBURSABLE
SANITARY SEWER IMPROVEMENTS**

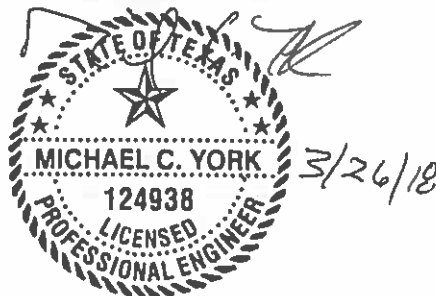
ITEM	DESCRIPTION	QUAN.	QUAN. +5%	UNIT	UNIT PRICE	TOTAL COST
NEW LIFT STATION						
1	Mobilization, Bonds, Insurance	1	1	LS	\$18,000.00	\$18,000.00
2	Lift Station No. 1	1	1	LS	\$425,000.00	\$425,000.00
3	Lift Station No. 1 Access Road NEC Cost Estimate To Provide 480 v/3 Ph	2,924	3,070	SY	\$50.00	\$153,500.00
4	Overhead Power LS Site	1	1	LS	\$100,000.00	\$100,000.00
5	Emergency Generator w/ Foundation	1	1	LS	\$110,000.00	\$110,000.00
LIFT STATION CONSTRUCTION SUB-TOTAL:						\$806,500.00
Contingencies @ 15%						\$120,975.00
LIFT STATION CONSTRUCTION TOTAL:						\$927,475.00
EASEMENT COSTS:						TBD
ENGINEERING, SURVEYING, STAKING, & TESTING @ 12%:						\$112,000.00
SWPPP ITEMS:						\$7,500.00
LIFT STATION GRAND TOTAL:						\$1,046,975.00
NEW 16" FORCE MAIN TO GREENWOOD WWTP						
1	Mobilization, Bonds, Insurance	1	1	LS	\$38,000.00	\$38,000.00
2	16" C900 PVC Force Main (Green Pipe)	8,896	9,341	LF	\$75.00	\$700,575.00
3	16" D.I. 90 Degree Bends (MJ)	3	3	EA	\$2,150.00	\$6,450.00
4	16" D.I. 45 Degree Bends (MJ)	5	5	EA	\$2,150.00	\$10,750.00
5	16" D.I. 22 1/2 Degree Bends (MJ)	3	3	EA	\$2,150.00	\$6,450.00
6	16" D.I. 11 1/4 Degree Bends (MJ)	3	3	EA	\$2,150.00	\$6,450.00
7	16" Plug Valve and Valve Box (MJ)	5	5	EA	\$7,800.00	\$39,000.00
8	Air/ Vacuum Valve Installations	3	3	EA	\$12,250.00	\$36,750.00
9	Well Pointing - Force Main	2,000	2,100	LF	\$50.00	\$105,000.00
10	Asphalt Pavement Repair (Existing)	120	126	SY	\$50.00	\$6,300.00
11	Concrete Pavement Repair (Exist. Driveways)	300	315	SF	\$10.00	\$3,150.00
12	Directional Bore Oso Creek-16" Fusible PVC	1,384	1,453	LF	\$400.00	\$581,200.00
13	Construct Horizontal Directional Drill Pads	2	2	EA	\$30,000.00	\$60,000.00
14	Tie to Wastewater Treatment Plant	1	1	LS	\$25,000.00	\$25,000.00
15	Traffic Control	1	1	LS	\$7,500.00	\$7,500.00
16	Marker Signs	20	20	EA	\$150.00	\$3,000.00
17	OSHA Trench Protection - Force Main	8,896	9,341	LF	\$1.50	\$14,011.50
FORCE MAIN CONSTRUCTION SUB-TOTAL:						\$1,649,586.50
Contingencies @ 15%						\$247,437.98
FORCE MAIN CONSTRUCTION TOTAL:						\$1,897,024.48
EASEMENT COSTS:						TBD
ENGINEERING, SURVEYING, STAKING, & TESTING @ 12%:						\$230,000.00
SWPPP ITEMS:						\$20,000.00
FORCE MAIN GRAND TOTAL:						\$2,147,024.48



URBAN ENGINEERING
TBPE Firm No. 145

**LONDON AREA MASTER PLAN
REIMBURSABLE
SANITARY SEWER IMPROVEMENTS**

ITEM	DESCRIPTION	QUAN.	QUAN. +5%	UNIT	UNIT PRICE	TOTAL COST
LINE 'A' Gravity Sewer (West of Lift Station to CR 33):						
1	Mobilization, Bonds, Insurance	1	1	LS	\$16,000.00	\$16,000.00
2	24" PVC SDR 21 (28'-30' Cut)	36	38	LF	\$460.00	\$17,480.00
3	18" PVC SDR 21 (28'-30' Cut)	1,351	1,419	LF	\$385.00	\$546,315.00
4	Embedment	1,387	1,456	LF	\$7.50	\$10,920.00
5	OSHA Trench Protection	1,387	1,456	LF	\$8.50	\$12,376.00
6	Well Pointing	1,387	1,456	LF	\$50.00	\$72,800.00
7	5' Diameter Manhole (28-30' Deep)	5	5	EA	\$14,750.00	\$73,750.00
LINE 'A' CONSTRUCTION SUB-TOTAL:						\$749,641.00
Contingencies @ 15%						\$112,446.15
LINE 'A' CONSTRUCTION TOTAL:						\$862,087.15
EASEMENT COSTS:						TBD
ENGINEERING, SURVEYING, STAKING, & TESTING @ 12%:						\$105,000.00
SWPPP ITEMS:						\$10,500.00
LINE 'A' GRAND TOTAL:						\$977,587.15
LINE 'B' Gravity Sewer (stub out to East of Lift Station)						
1	Mobilization, Bonds, Insurance	1	1	LS	\$10,000.00	\$10,000.00
2	21" PVC SDR 21 (28'-30' Cut)	120	126	LF	\$415.00	\$52,290.00
3	Embedment	120	126	LF	\$7.50	\$945.00
4	OSHA Trench Protection	120	126	LF	\$8.50	\$1,071.00
5	Well Pointing	120	126	LF	\$50.00	\$6,300.00
LINE 'B' CONSTRUCTION SUB-TOTAL:						\$70,606.00
Contingencies @ 15%						\$10,590.90
LINE 'B' CONSTRUCTION TOTAL:						\$81,196.90
EASEMENT COSTS:						TBD
ENGINEERING, SURVEYING, STAKING, & TESTING @ 12%:						\$10,000.00
SWPPP ITEMS:						\$3,500.00
LINE 'B' GRAND TOTAL:						\$94,696.90
PROJECT COST SUMMARY						
1	New Lift Station					\$1,046,975.00
2	New Force Main to Greenwood WWTP					\$2,147,024.48
3	LINE 'A' Gravity Sewer (West of Lift Station to CR 33)					\$977,587.15
4	LINE 'B' Gravity Sewer (stub out to East of Lift Station)					\$94,696.90
ESTIMATE OF TOTAL PROBABLE PROJECT COST						\$4,266,283.53
Note						
1	This cost estimate was revised per city request on March 26, 2018 to reflect a change in size of gravity sanitary sewer lines. The sizes shown on this revised estimate are congruent with the sizes shown on the city's revised London master sanitary sewer plan which was presented to planning commission on 3/21/2018.					



LIFT STATION SITE PLAN

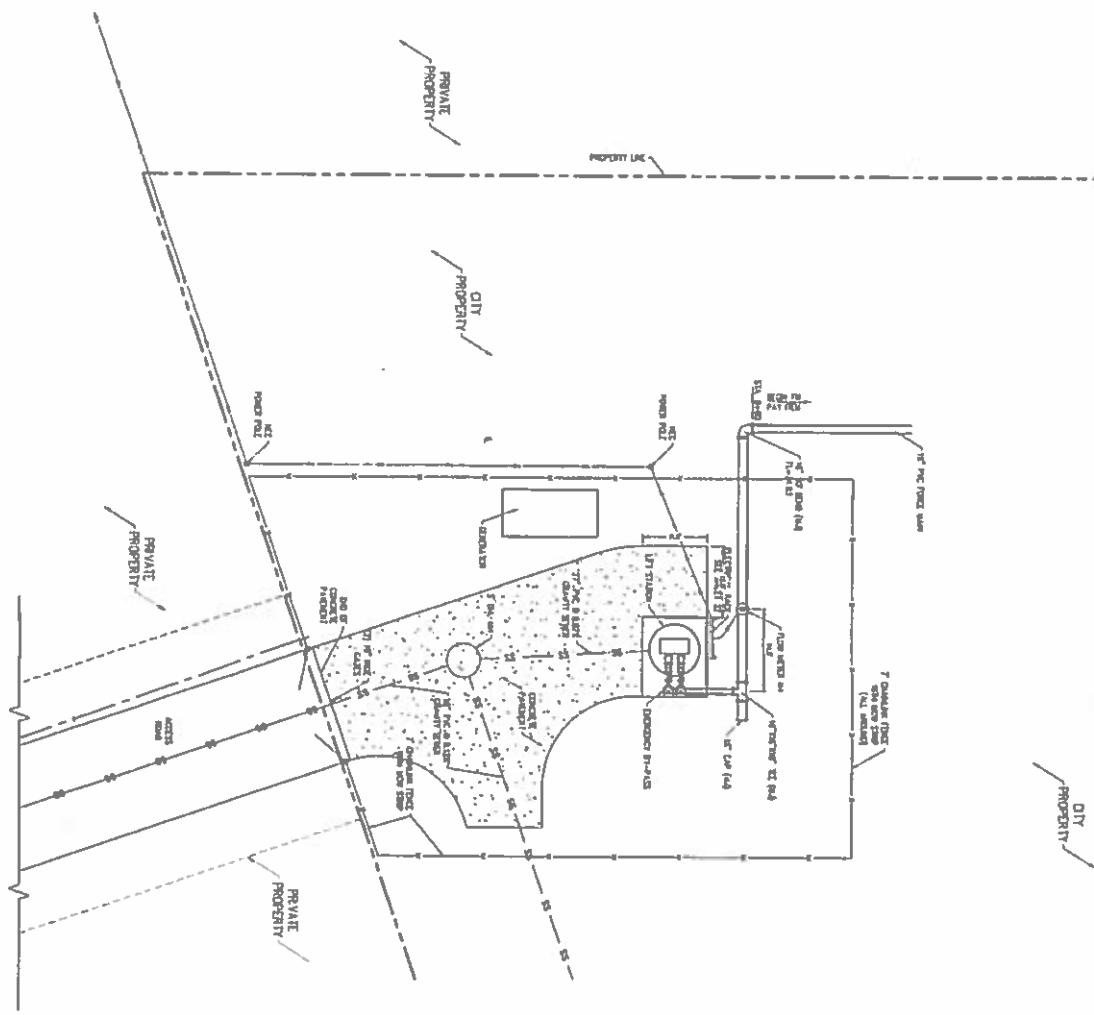


EXHIBIT 'E'

SHEET 18 OF 41

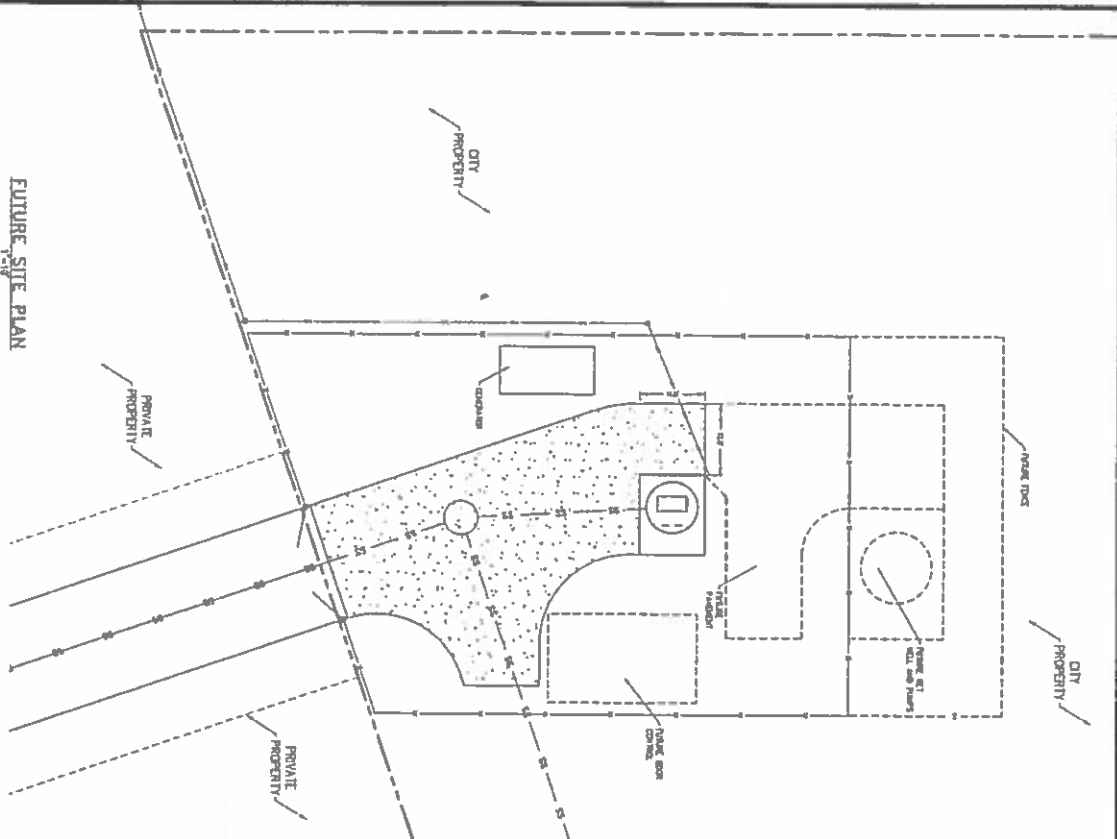


LIFT STATION SITE PLAN

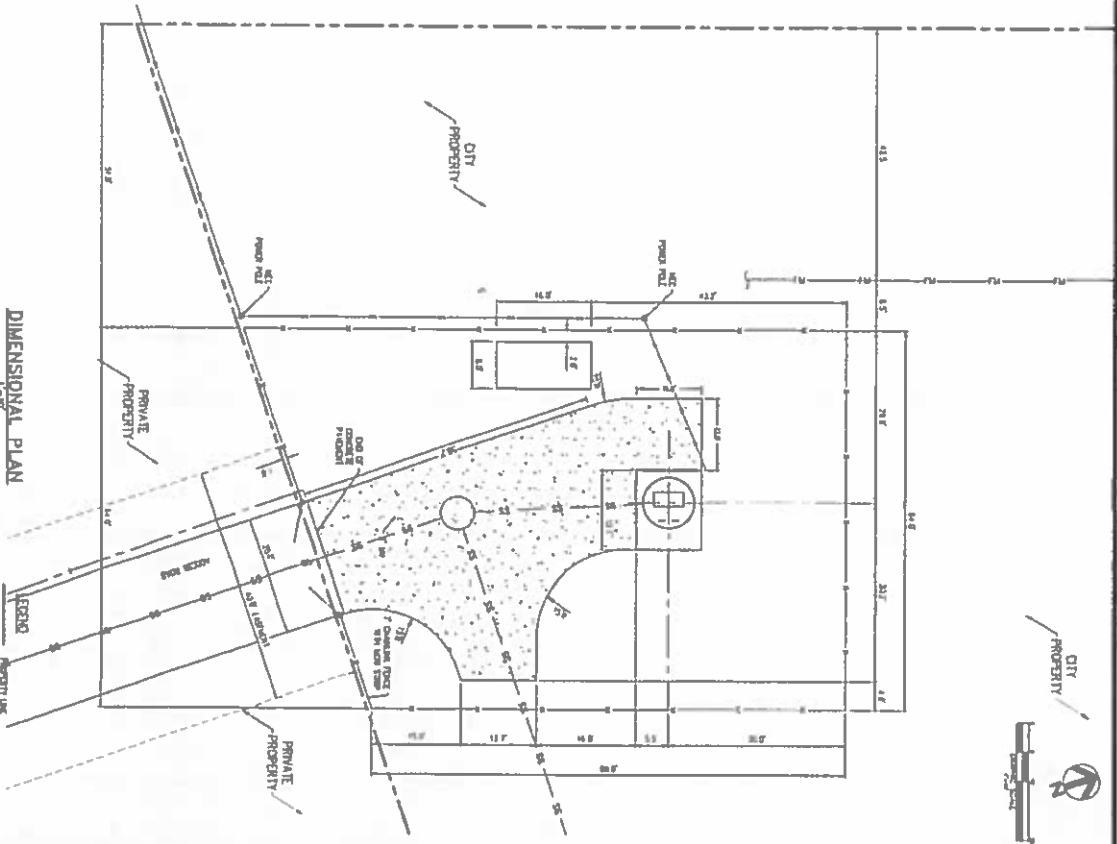
LONDON AREA MASTER PLAN
WASTEWATER INFRASTRUCTURE
CORPUS CHRISTI, TEXAS

DESIGNED:	MCY	REV.	DATE	DESCRIPTION
CHECKED:	MCY			
DATE:	DEC. 2017			

FUTURE SITE PLAN



DIMENSIONAL PLAN



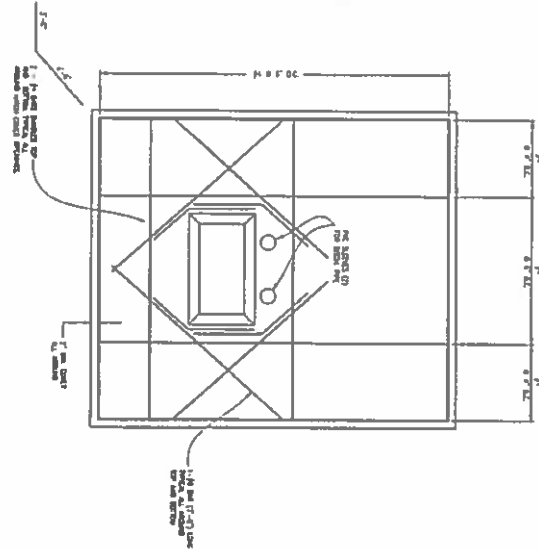
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 --- PROPERTY LINE
 --- CONCRETE PAVEMENT
 --- 6" DIA. DIA. LINE
 --- 6" DIA. DIA. LINE
 --- 6" DIA. DIA. LINE

EXHIBIT 'E'

URBAN ENGINEERING
 SHEET 19 OF 41
 JOB NO. 458387100

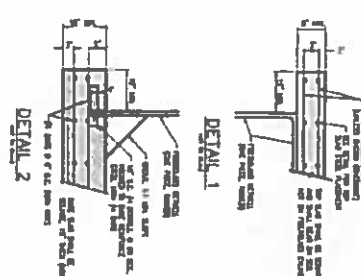
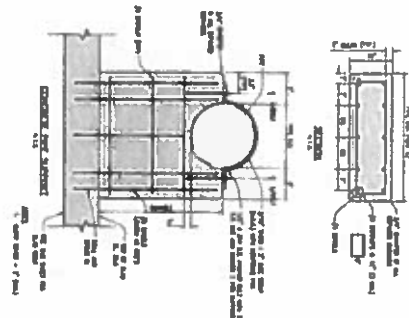
LIFT STATION SITE DIMENSION PLAN
 LONDON AREA MASTER PLAN
 WASTEWATER INFRASTRUCTURE
 CORPUS CHRISTI, TEXAS

DATE	DEC. 2017
CHECKED	MCY
DESIGNED	MCY
DRAWN	MCY

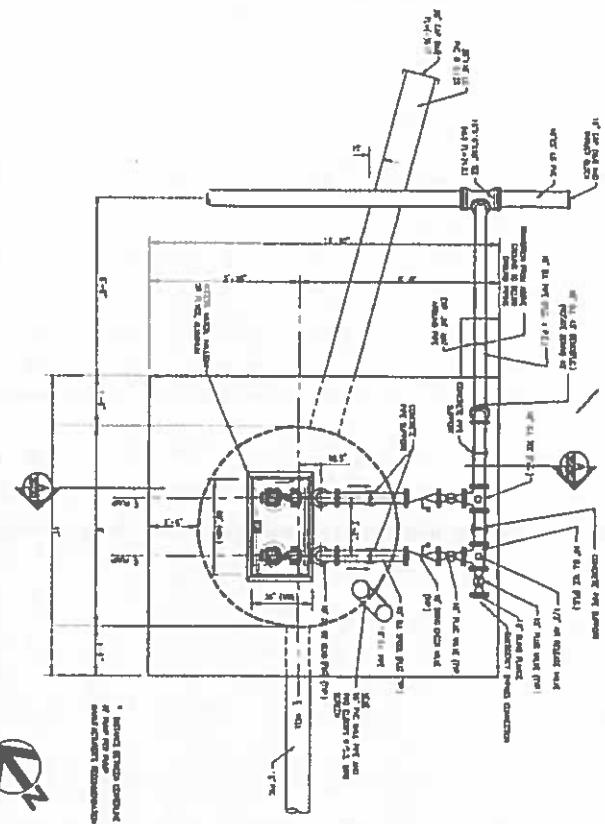


NOTE:
 PROVIDE LIFT STATION FLOOR AND ACCESSORY PIPE SLABS, CURT WALLS, LIFT CHAMBER, DUCTS, CABLE TRAYS, ACCESS COVERS, ETC. TO BE PROVIDED BY OTHER CONTRACTORS. THIS DRAWING IS FOR INFORMATION ONLY. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND CONDITIONS OF THE WELL OPENING AND PROVIDE ALL NECESSARY REINFORCING BARS TO BE PLACED IN THE WELL OPENING.

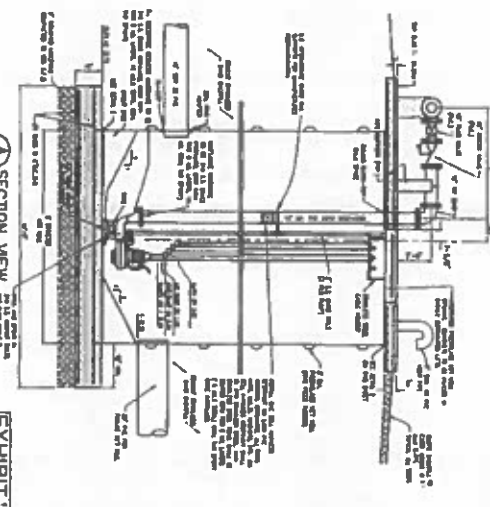
WELL TOP SLAB STEEL CONFIGURATION
 NOT TO SCALE



- GENERAL NOTES FOR LIFT STATION:**
1. ALL CONCRETE SHALL BE 3,000 PSI AND SHALL BE PLACED AND FINISHED TO THE FINISH SURFACE OF THE CURT WALL.
 2. ALL CONCRETE SHALL BE 3,000 PSI AND SHALL BE PLACED AND FINISHED TO THE FINISH SURFACE OF THE CURT WALL.
 3. ALL CONCRETE SHALL BE 3,000 PSI AND SHALL BE PLACED AND FINISHED TO THE FINISH SURFACE OF THE CURT WALL.
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 9. ALL CONCRETE SHALL BE 3,000 PSI AND SHALL BE PLACED AND FINISHED TO THE FINISH SURFACE OF THE CURT WALL.
 10. ALL CONCRETE SHALL BE 3,000 PSI AND SHALL BE PLACED AND FINISHED TO THE FINISH SURFACE OF THE CURT WALL.
 11. ALL CONCRETE SHALL BE 3,000 PSI AND SHALL BE PLACED AND FINISHED TO THE FINISH SURFACE OF THE CURT WALL.
 12. ALL CONCRETE SHALL BE 3,000 PSI AND SHALL BE PLACED AND FINISHED TO THE FINISH SURFACE OF THE CURT WALL.
 13. ALL CONCRETE SHALL BE 3,000 PSI AND SHALL BE PLACED AND FINISHED TO THE FINISH SURFACE OF THE CURT WALL.
 14. ALL CONCRETE SHALL BE 3,000 PSI AND SHALL BE PLACED AND FINISHED TO THE FINISH SURFACE OF THE CURT WALL.
 15. ALL CONCRETE SHALL BE 3,000 PSI AND SHALL BE PLACED AND FINISHED TO THE FINISH SURFACE OF THE CURT WALL.



PLAN VIEW AT GRADE ELEVATION-DUPLEX
 NOT TO SCALE



SECTION VIEW
 NOT TO SCALE

<p>URBAN ENGINEERING</p> <p>20 OF 41</p> <p>DATE: 12/19/2017</p>	<p>LIFT STATION SECTION & DETAILS</p> <p>LONDON AREA MASTER PLAN WASTEWATER INFRASTRUCTURE CORPUS CHRISTI, TEXAS</p>		<p>DESIGNED: MCV</p> <p>CHECKED: MCV</p> <p>DATE: DEC. 2017</p>	<p>REVISIONS</p> <table border="1"> <tr> <th>NO.</th> <th>DATE</th> <th>DESCRIPTION</th> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> </table>	NO.	DATE	DESCRIPTION			
	NO.	DATE	DESCRIPTION							
	<p>PREPARED BY: MCV</p> <p>DATE: 12/19/2017</p>			<p>DATE: DEC. 2017</p>						
<p>EXHIBIT 'E'</p>			<p>DATE: DEC. 2017</p>							
<p>DATE: DEC. 2017</p>										

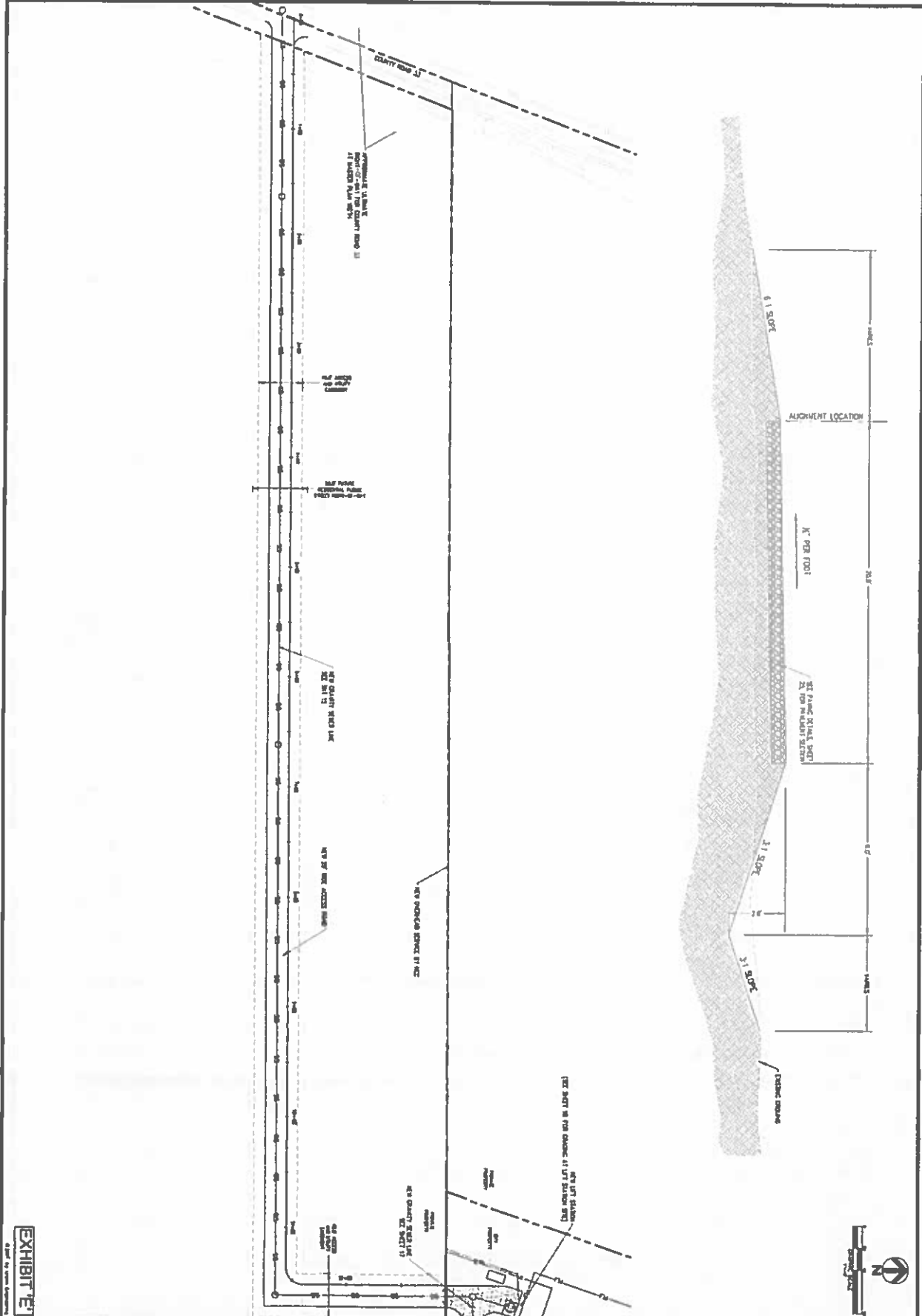


EXHIBIT 71



LIFT STATION ACCESS ROAD

**LONDON AREA MASTER PLAN
WASTEWATER INFRASTRUCTURE
CORPUS CHRISTI, TEXAS**

NO.	REV.	DATE	DESCRIPTION	BY

DRAWN: MCV
 DESIGNED: MCV
 CHECKED: MCV
 DATE: DEC 2017

PRELIMINARY
 NOT FOR CONSTRUCTION
 FOR REVIEW PURPOSES ONLY
 CADD & GRAPHIC PLOT
 CIVIL REV. NO. 1302
 DEC. 21 2017

SHEET 23 OF 24

APPENDIX

Appendix 'A' – London Area Lift Station 16" Force Main Duty Analysis - Flygt

Appendix 'B' – Geotechnical Report – Rock Engineering and Testing Laboratory, Inc.

Appendix 'C' – Record of Power Outages for London ISD Area

Appendix 'D' – Responses to City Comments (sent via email response)

London Area Lift Station 16" Force Main

PRINTED

28' Static Head

DATE: TIME:

Revision Notes:

Design Conditions

Beginning Location = New lift station approximately 5040' to the north of the CR 33 and FM 43 intersection on the east side of CR 33

Ending Location = Discharge into existing manhole on southwest corner of Saratoga and Greenwood

Pipe Dimensional Data

Pipe Diam. (inches)	Pipe Diam. (feet)	Area (ft ²)	Wetted Perim.
8	0.67	0.3491	2.0944
16	1.33	1.3963	4.1688

Elevation Data

Location	Elevation
Top of discharge pipe at lift station	34.00
Min. water surface in LS wet well	6.00
Difference =	28.00 ft
Static Head =	28.00 ft

Equivalent Lengths

8" Pipe Description	Quantity	Equivalent Length (LF)	Equivalent Length (LF)
8" 90 Degree Bend	2 @	21 =	42
8" 45 Degree Bend	2 @	10 =	20
8" Tee (Branch Flow)	1 @	45 =	45
8" Tee (Line Flow)	1 @	15 =	15
8" Plug Valve	1 @	23 =	23
8" Check Valve	1 @	54 =	54
8"x16" increaser	1 @	14 =	14
Equivalent length for fittings, valves, etc. =		213 LF	
Length of 8" Pipe =		48 LF	
Total Equivalent Length of 8" Pipe =		259 LF	

16" Pipe Description	Quantity	Equiv Length (LF)	Equiv Length (LF)
16" 45 Degree Bend	20 @	20 =	400
16" Plug Valve	2 @	46 =	92
16" Discharge	1 @	80 =	80
Equivalent length for fittings, valves, etc. =		572 LF	
Length of 16" Pipe =		890 LF	
Total Equivalent Length of 16" Pipe =		9472 LF	

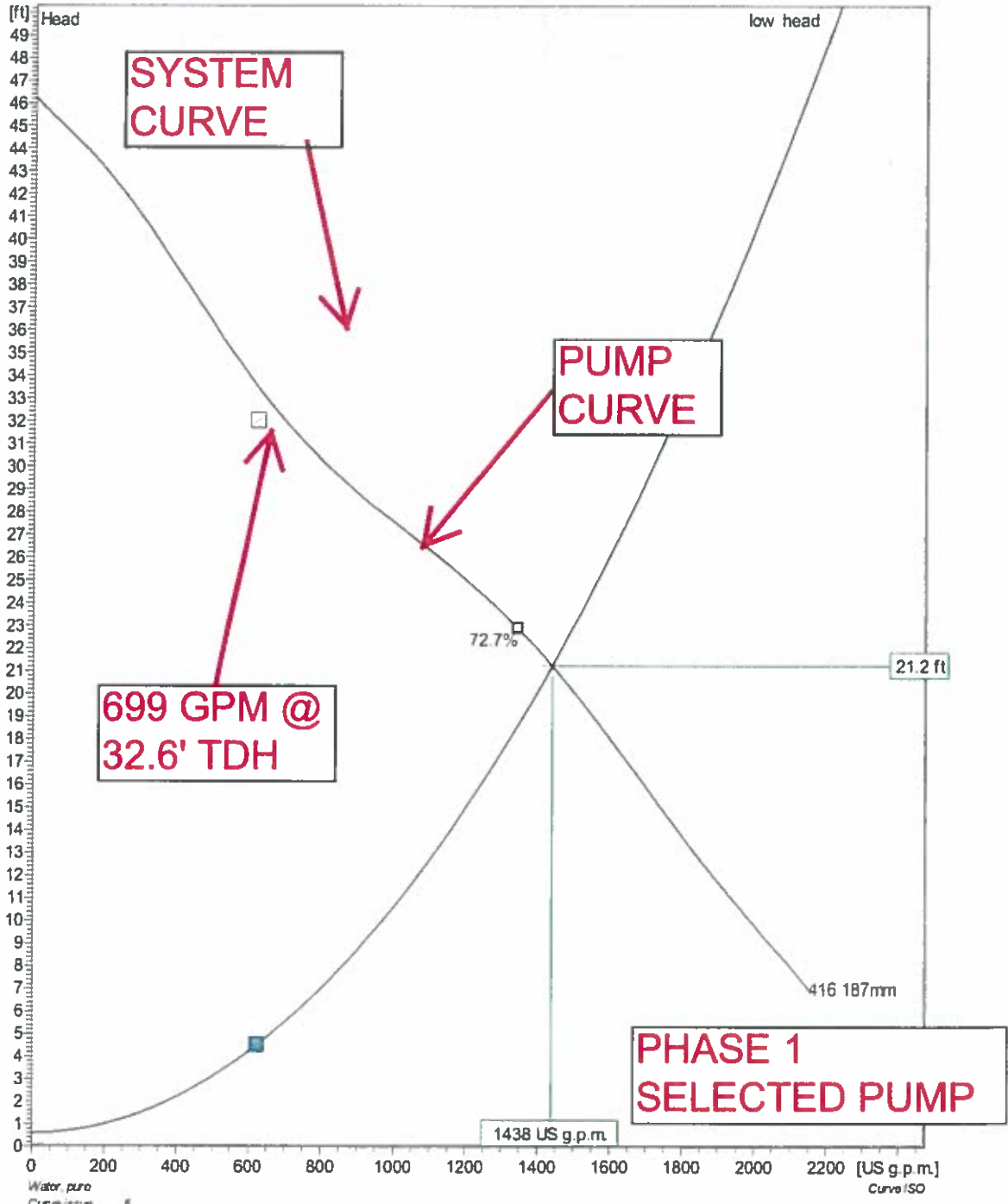
Calculated System Curve

$$HL = \left[\frac{Q}{1.318 \cdot A \cdot C \cdot ((A/P)^{0.83})} \right]^{1.85} \times [L]$$

HL = Head Loss (ft) Q = Flow (cfs) A = Area (sf) C = Coefficient of Friction
P = Wetted Perimeter (ft) L = Equivalent Length of Pipe (ft)

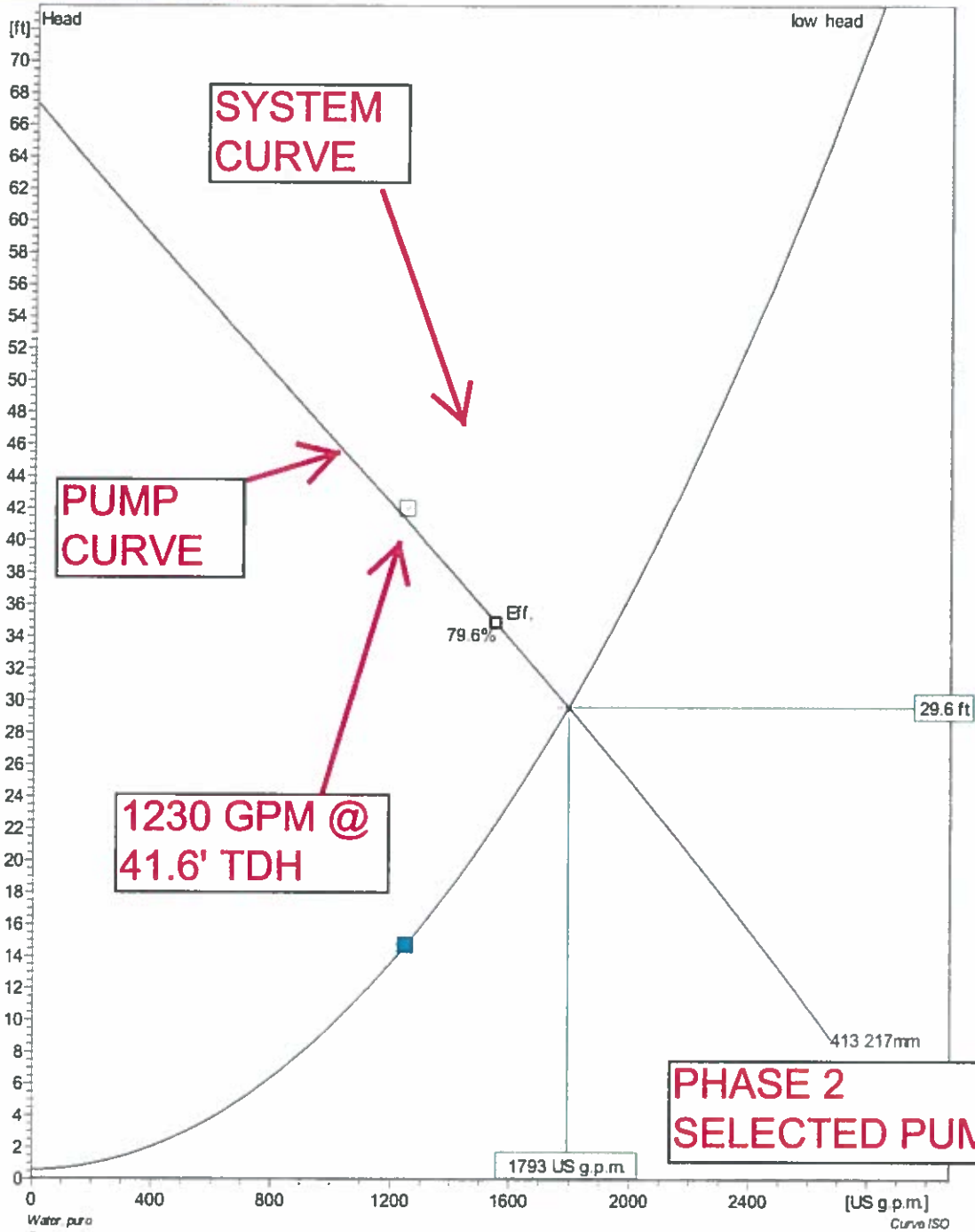
Flow (gal/day)	Flow GPM	Flow (cfs)	Eq. Length 259 8" PVC Pipe C = 140 Headloss (ft)	Eq. Length 9472 16" PVC Pipe C = 140 Headloss (ft)	Static Head (ft)	TDH (ft)	Pressure (psi)
72000	50	0.11	0.02	0.02	28.00	28.04	12.2
144000	100	0.22	0.06	0.07	28.00	28.13	12.2
288000	200	0.45	0.21	0.26	28.00	28.48	12.3
432000	300	0.67	0.45	0.56	28.00	29.01	12.6
576000	400	0.89	0.76	0.95	28.00	29.71	12.9
720000	500	1.11	1.15	1.44	28.00	30.59	13.3
864000	600	1.34	1.61	2.02	28.00	31.63	13.7
900000	625	1.39	1.74	2.18	28.00	31.92	13.8
1008000	700	1.56	2.14	2.69	28.00	32.83	14.2
1152000	800	1.78	2.74	3.44	28.00	34.18	14.8
1296000	900	2.01	3.41	4.28	28.00	35.69	15.5
1440000	1000	2.23	4.14	5.20	28.00	37.34	16.2
1584000	1100	2.45	4.94	6.20	28.00	39.14	17.0
1728000	1200	2.67	5.81	7.28	28.00	41.09	17.6
1800000	1250	2.79	6.26	7.85	28.00	42.11	18.3
1872000	1300	2.90	6.73	8.44	28.00	43.18	18.7
2016000	1400	3.12	7.72	9.69	28.00	45.41	19.7
2160000	1500	3.34	8.77	11.00	28.00	47.78	20.7
2304000	1600	3.56	9.88	12.40	28.00	50.28	21.8
2448000	1700	3.79	11.06	13.87	28.00	52.93	22.9
2592000	1800	4.01	12.29	15.42	28.00	55.71	24.1
2736000	1900	4.23	13.58	17.04	28.00	58.62	25.4
2880000	2000	4.46	14.94	18.74	28.00	61.67	26.7
3240000	2250	5.01	18.57	23.30	28.00	69.87	30.3
3600000	2500	5.57	22.57	28.31	28.00	78.88	34.2
3960000	2750	6.13	26.92	33.77	28.00	88.69	38.4
4320000	3000	6.68	31.62	39.67	28.00	99.29	43.0
4680000	3250	7.24	36.67	46.00	28.00	110.67	48.0
5040000	3500	7.80	42.06	52.76	28.00	122.82	53.2

NP 3153 LT 3~ 416
Duty Analysis



Pumps running /System	Individual pump			Total			Pump eff.	Specific energy	NPSH _r
	Flow	Head	Shaft power	Flow	Head	Shaft power			
low head 1	1440 US g.p.m.	21.2 ft	10.7 hp	1440 US g.p.m.	21.2 ft	10.7 hp	72.1%	105 kWh/US MG	28.7 ft
	699 US g.p.m.	32.6 ft	10.4 hp	699 US g.p.m.	32.6 ft	10.4 hp	53.2%	217 kWh/US MG	31.8 ft

Project	Project ID	Created by	Created on	Last update
	London LB	Patrick Palacios	5/24/2017	5/24/2017



Pumps running /System	Individual pump			Total					
	Flow	Head	Shaft power	Flow	Head	Shaft power	Pump eff.	Specific energy	NPSH _r
low head	1790 US g.p.m.	25.6 ft	17.2 hp	1790 US g.p.m.	29.6 ft	17.2 hp	78 %	135 kWh/US MG	28.8 ft
	1230 US g.p.m.	41.6 ft	16.9 hp	1230 US g.p.m.	41.6 ft	16.9 hp	76.8 %	193 kWh/US MG	29.2 ft

Project	Project ID London LS	Created by Patrick Palacios	Created on 5/24/2017	Last update 5/24/2017
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**SUBSURFACE INVESTIGATION, LABORATORY TESTING PROGRAM, AND
GEOTECHNICAL RECOMMENDATIONS
FOR THE PROPOSED
LONDON AREA WASTEWATER IMPROVEMENTS – UE JOB NO. 42900.B700
OSO CREEK – FROM GREENWOOD DRIVE TO CHAPMAN RANCH ROAD
CORPUS CHRISTI, TEXAS**

RETL JOB NUMBER: G117309

PREPARED FOR:

**URBAN ENGINEERING
2725 SWANTNER DRIVE
CORPUS CHRISTI, TEXAS 78404**

AUGUST 10, 2017

PREPARED BY:

**ROCK ENGINEERING AND TESTING LABORATORY, INC.
6817 LEOPARD STREET
CORPUS CHRISTI, TEXAS 78409
PHONE: (361) 883-4555; FAX: (361) 883-4711**

TEXAS PROFESSIONAL ENGINEERING FIRM NO. 2101



Brian Geiger
**Brian J. Geiger, P.E.
Geotechnical Engineer
Cell: 906 370 5196**



Mark C. Rock
**Mark C. Rock, P.E.
Vice President of Operations
Cell: 361 438 8755**



Soil Profile Table; Boring B-1

D	Description	LL	PI	C	ϕ	γ_c	-#200	K_a	K_p
0-22	Fat CLAY	60-69	39-45	1,900	0	120	86-98	0.49	2.04
22-31	Fat/Lean CLAY	---	---	1,100	0	120	77	0.49	2.04
31-50	Fat/Lean CLAY	---	---	1,900	0	60	55-85	0.49	2.04
50-58	Silty SAND	---	---	0	31	55	13	0.32	3.12
58-60	Fat CLAY	---	---	1,500	0	60	---	0.49	2.04

Soil Profile Table; Boring B-2

D	Description	LL	PI	C	ϕ	γ_c	-#200	K_a	K_p
0-24	Fat CLAY	71-74	50-53	700	0	115	67-83	0.53	1.89
24-37	Fat/Lean CLAY	---	---	1,400	0	60	---	0.49	2.04
37-47	Fat/Lean CLAY	---	---	800	0	55	62	0.53	1.89
47-60	Fat CLAY	---	---	2,300	0	60	100	0.46	2.16

Soil Profile Table; Boring B-3

D	Description	LL	PI	C	ϕ	γ_c	-#200	K_a	K_p
0-28	Fat CLAY	60-61	39	1,600	0	120	83-88	0.49	2.04
28-34	Silty SAND	---	---	0	34	55	55	0.28	3.54
34-35	Lean CLAY	---	---	2,500	0	60	---	0.46	2.16

Soil Profile Table; Boring B-4

D	Description	LL	PI	C	ϕ	γ_c	-#200	K_a	K_p
0-16	Fat CLAY	51-70	34-51	1,500	0	120	83	0.49	2.04
16-25	Fat CLAY	---	---	2,200	0	60	---	0.46	2.16

Soil Profile Table; Boring B-5

D	Description	LL	PI	C	ϕ	γ_c	-#200	K_a	K_p
0-12	Fat CLAY	55-67	37-48	2,300	0	120	86	0.46	2.16
12-25	Fat/Lean CLAY	---	---	3,000	0	60	84	0.46	2.16

Soil Profile Table; Boring B-6

D	Description	LL	PI	C	ϕ	γ_e	-#200	K_a	K_p
0-20	Fat CLAY	57-59	39-40	3,100	0	120	88-92	0.46	2.16

Where:

- D = Depth in feet below existing grade
- LL = Liquid limit (%)
- PI = Plasticity index
- C = Soil Cohesion, psf (undrained)
- ϕ = Angle of Internal Friction, deg. (undrained)
- γ_e = Effective soil unit weight, pcf
- #200 = Percent passing the Minus #200 Sieve (%)
- K_a = Active Earth Pressure Coefficient
- K_p = Passive Earth Pressure Coefficient

The trench protection should be designed to provide the most conservative design given the design parameters provided in the tables above.

It should be noted that the values for the design of braced excavations provided in the tables above are based on the soil strengths and soil densities encountered in the field and generally accepted empirical formulas correlating undrained shear strengths to drained shear strengths and the corresponding angle of internal friction for clay soils.

The active and passive earth pressure coefficients were calculated using the drained angle of internal friction as recommended in "**FOUNDATION ANALYSIS AND DESIGN**", written by Mr. Joseph Bowles where he states, "Drained soil parameters for stiff clays and ϕ -C soils in general may be appropriate for lateral pressures behind braced walls where the excavation is open for a considerable length of time."

Groundwater Observations

Groundwater (GW) observations and the depths the borings caved are provided in the following table:

GROUNDWATER OBSERVATIONS			
BORING NO.	DURING DRILLING	UPON COMPLETION	24-HOUR DELAYED READING
B-1	31'	Dry and Caved at 27'	Dry and Caved at 27'
B-2	24'	GW at 8' and Caved at 12'	GW at 3' and Caved at 15'
B-3	30'	GW at 16' and Caved at 24'	GW at 8' and Caved at 10'
B-4	Dry	Dry and Open	GW at 10' and Caved at 16'
B-5	Dry	Dry and Open	GW at 12' and Caved at 13'
B-6	Dry	Dry and Caved at 16'	Dry and Caved at 16'



- GEOTECHNICAL ENGINEERING
- CONSTRUCTION MATERIALS ENGINEERING & TESTING
- SOILS • ASPHALT • CONCRETE

BORING LOCATION PLAN



August 10, 2017
Urban Engineering
Attn: Mr. Mark Maroney, P.E.

PROPOSED LONDON AREA WASTEWATER IMPROVEMENTS
Oso Creek – From Greenwood Dr. to Chapman Ranch Rd.; Corpus Christi, Texas
RETL Job No.: G117309

ROCK ENGINEERING & TESTING LABORATORY, INC.
www.rocktesting.com

6817 LEOPARD STREET • CORPUS CHRISTI, TEXAS 78409-1703
OFFICE: (361) 883-4555 • FAX: (361) 883-4711

10856 VANDALE ST • SAN ANTONIO, TEXAS 78216-3625
OFFICE: (210) 495-8000 • FAX: (210) 495-8015

NO.1 ROUNDVILLE LANE • ROUND ROCK, TEXAS 78664
OFFICE: (512) 284-8022 • FAX: (512) 284-7764

APPENDIX 'B'

LOG OF BORING B-1

SHEET 1 of 1



Rock Engineering and Testing Laboratory, Inc.
6817 Leopard St.
Corpus Christi, Texas 78409
Telephone: 361-883-4555
Fax: 361-883-4711

CLIENT: Urban Engineering
PROJECT: London Area Wastewater Improvements
LOCATION: Greenwood Dr., Corpus Christi, TX
NUMBER: G117309

DATE(S) DRILLED: 6/2/17 - 6/2/17

FIELD DATA				LABORATORY DATA								DRILLING METHOD(S): Hollow Stem Auger
SOIL SYMBOL	DEPTH (FT)	SAMPLE NUMBER	SAMPLES	N: BLOWS/FT P: TONS/SQ.FT Tc: TONS/SQ.FT Qc: TONS/SQ.FT	MOISTURE CONTENT (%)	ATTERBERG LIMITS			DRY DENSITY POUNDS/CU.FT	COMPRESSIVE STRENGTH (TONS/SQ.FT)	MINUS NO. 200 SIEVE (%)	GROUNDWATER INFORMATION: Groundwater was encountered at a depth of 31-feet during drilling. Dry and Caved at 27-feet upon completion. 24-Hour Delayed Readings: Dry and Caved by 27-feet.
						LIQUID LIMIT LL	PLASTIC LIMIT PL	PLASTICITY INDEX PI				
												DESCRIPTION OF STRATUM
SS S-1	5	X	N= 6	18								FAT CLAY , moist, dark gray, firm.
SH S-2			P= 4.5+	21	66	23	43				86	Same as above, gray and brown, with calcareous nodules, very stiff. (CH)
SH S-3			P= 4.25	18				105	2.3			Same as above, brown.
SH S-4	10		P= 2.75	23	60	21	39				89	FAT CLAY , moist, brown, very stiff. (CH)
SH S-5			P= 2.5	28								Same as above, brown and greenish gray.
SH S-6	15		P= 3.25	26	69	24	45	96	0.8		98	Same as above, greenish gray, firm, slickensided. (CH)
SH S-7	20		P= 3.25	26				99	1.6			FAT CLAY , moist, greenish gray, stiff, slickensided.
SH S-8	25		P= 1.25	19								Same as above, brown, firm.
SH S-9	30		P= 1.75	18							77	SANDY LEAN CLAY , moist, brown, stiff.
SH S-10	35		P= 4.0	24								FAT CLAY , moist, brown and greenish gray, very stiff.
SS S-11	40		X N= 10	21								Same as above, stiff.
SH S-12	45		P= 2.25	22				104	1.2		85	LEAN CLAY , moist, brown, stiff.
SS S-13	50		X N= 19	23							55	Same as above, sandy, very stiff.
SS S-14	55		X N= 16	23							13	SILTY SAND , moist, brown, medium.
SS S-15	60		X N= 12	30								FAT CLAY , moist, brown and greenish gray, stiff. Boring was terminated at a depth of 60-feet.

G117309.GPJ ROCK ETL.GDT 8/10/17

LOG OF BORING

N - STANDARD PENETRATION TEST RESISTANCE
P - POCKET PENETROMETER RESISTANCE
Qc - STATIC CONE PENETROMETER RESISTANCE

REMARKS:

Boring depth and location were determined by Urban Engineering. Drilling operations were performed by RETL at GPS Coordinates N 27° 42' 27.33" W 97° 27' 47.60".
Boring Location: Pipeline Directional Drill

APPENDIX 'B'

LOG OF BORING B-2

SHEET 1 of 1



Rock Engineering and Testing Laboratory, Inc.
6817 Leopard St.
Corpus Christi, Texas 78409
Telephone: 361-883-4555
Fax: 361-883-4711

CLIENT: Urban Engineering
PROJECT: London Area Wastewater Improvements
LOCATION: Greenwood Dr.; Corpus Christi, TX
NUMBER: G117309

DATE(S) DRILLED: 6/19/17 - 6/19/17

FIELD DATA				LABORATORY DATA							DRILLING METHOD(S): Hollow Stem Auger
SOIL SYMBOL	DEPTH (FT)	SAMPLE NUMBER	SAMPLES N: BLOWS/FT P: TONS/SQ FT Tc: TONS/SQ FT Qc: TONS/SQ FT	MOISTURE CONTENT (%)	ATTERBERG LIMITS			DRY DENSITY POUNDS/CU FT	COMPRESSIVE STRENGTH (TONS/SQ FT)	MINUS NO. 200 SIEVE (%)	GROUNDWATER INFORMATION: Groundwater (GW) was encountered at a depth of 24-feet during drilling. GW at 8-feet and Caved at 12-feet upon completion. 24-Hour Delayed Readings: GW at 3-feet and Caved at 15-feet.
					LIQUID LIMIT LL	PLASTIC LIMIT PL	PLASTICITY INDEX PI				
DESCRIPTION OF STRATUM											
LOG OF BORING G117309.GPJ ROCK ETL.GDT 8/10/17	5	SS S-1	N= 5	22							<u>FAT CLAY</u> , moist, dark gray, firm.
		SH S-2	P= 1.25	28	71	21	50	96	1.4	83	Same as above, stiff. (CH)
		SH S-3	P= 0.5	25							Same as above, gray, soft.
	10	SH S-4	P= 1.25	29				91	1.4		<u>FAT CLAY</u> , moist, gray, stiff.
		SH S-5	P= 0.25	29							Same as above, very soft.
	15	SS S-6	N= WOH	32	74	21	53			67	Same as above, sandy, very soft. (CH)
	20	SS S-7	N= 7	24							<u>FAT CLAY</u> , moist, dark brown, firm.
	25	SH S-8	P= 2.75	26							Same as above, very stiff.
	30	SH S-9	P= 2.0	22							<u>SILTY LEAN CLAY</u> , moist, brown, stiff.
	35	SH S-10	P= 3.25	25				96	0.7		<u>FAT CLAY</u> , moist, brown, firm, slickensided.
	40	SH S-11	P= 0.75	22							<u>SILTY LEAN CLAY</u> , moist, brown, firm.
	45	SS S-12	N= 9	29						62	Same as above, stiff, with sand layer from approximately 42-feet to 44½-feet.
	50	SH S-13	P= 4.25	31						100	<u>FAT CLAY</u> , moist, brown, very stiff.
	55	SH S-14	P= 4.5+	27				98	2.2		Same as above, greenish gray.
	60	SS S-15	N= 12	23							Same as above, stiff.
Boring was terminated at a depth of 60-feet.											

N - STANDARD PENETRATION TEST RESISTANCE
P - POCKET PENETROMETER RESISTANCE
Qc - STATIC CONE PENETROMETER RESISTANCE

REMARKS:

Boring depth and location were determined by Urban Engineering. Drilling operations were performed by RETL at GPS Coordinates N 27° 42' 23.10" W 97° 27' 54.30".
Boring Location: Pipeline Directional Drill

APPENDIX 'B'

LOG OF BORING B-3



Rock Engineering and Testing Laboratory, Inc.
 6817 Leopard St.
 Corpus Christi, Texas 78409
 Telephone: 361-883-4555
 Fax: 361-883-4711

CLIENT: Urban Engineering
 PROJECT: London Area Wastewater Improvements
 LOCATION: Greenwood Dr., Corpus Christi, TX
 NUMBER: G117309

DATE(S) DRILLED: 6/19/17 - 6/19/17

FIELD DATA				LABORATORY DATA							DRILLING METHOD(S):
SOIL SYMBOL	DEPTH (FT)	SAMPLE NUMBER	SAMPLES	MOISTURE CONTENT (%)	ATTERBERG LIMITS			DRY DENSITY POUNDS/CU.FT	COMPRESSIVE STRENGTH (TONS/SQ.FT)	MINUS NO. 200 SIEVE (%)	GROUNDWATER INFORMATION:
					LIQUID LIMIT LL	PLASTIC LIMIT PL	PLASTICITY INDEX PI				
			N: BLOWS/FT P: TONS/SQ.FT Tc: TONS/SQ.FT Qc: TONS/SQ.FT								SURFACE ELEVATION: N/A
DESCRIPTION OF STRATUM											
5 10 15 20 25	SS S-1	×	N= 9	24							FAT CLAY , moist, dark gray, stiff.
	SH S-2	■	P= 1.25	26							Same as above.
	SH S-3	■	P= 2.25	23	60	21	39	95	1.1	83	Same as above, brown, with sand, stiff. (CH)
	SH S-4	■	P= 2.75	24							FAT CLAY , moist, brown, very stiff.
	SH S-5	■	P= 2.75	26	61	22	39	97	1.1	88	Same as above, stiff, slickensided. (CH)
	SH S-6	■	P= 3.75	26							Same as above, very stiff.
	SH S-7	■	P= 1.75	30							FAT CLAY , moist, brown, stiff.
	SH S-8	■	P= 3.5	27				94	1.4		Same as above, very stiff, slickensided.
	SS S-9	×	N= 24	24						55	SILTY SAND , moist, brown, with clay layer, medium.
	SS S-10	×	N= 20	27							SANDY LEAN CLAY , moist, brown, very stiff. Boring was terminated at a depth of 35-feet.

N - STANDARD PENETRATION TEST RESISTANCE
 P - POCKET PENETROMETER RESISTANCE
 Qc - STATIC CONE PENETROMETER RESISTANCE

REMARKS:
 Boring depth and location were determined by Urban Engineering. Drilling operations were performed by RETL at GPS Coordinates N 27° 42' 03.90" W 97° 28' 08.30".
 Boring Location: Proposed Lift Station

LOG-OF-BORING G117309.GPJ ROCK ETL.GDT 8/10/17

LOG OF BORING B-4



Rock Engineering and Testing Laboratory, Inc.
 6817 Leopard St.
 Corpus Christi, Texas 78409
 Telephone: 361-883-4555
 Fax: 361-883-4711

CLIENT: Urban Engineering
 PROJECT: London Area Wastewater Improvements
 LOCATION: Greenwood Dr., Corpus Christi, TX
 NUMBER: G117309

DATE(S) DRILLED: 6/20/17 - 6/20/17

FIELD DATA				LABORATORY DATA							DRILLING METHOD(S):
SOIL SYMBOL	DEPTH (FT)	SAMPLE NUMBER	SAMPLES	N: BLOWS/FT P: TONS/SQ FT Tv: TONS/SQ FT Qc: TONS/SQ FT	MOISTURE CONTENT (%)	ATTERBERG LIMITS			DRY DENSITY POUNDS/CU FT	COMPRESSIVE STRENGTH (TONS/SQ FT)	MINUS NO. 200 SIEVE (%)
						LIQUID LIMIT LL	PLASTIC LIMIT PL	PLASTICITY INDEX PI			
	5	SS S-1	N= 4	23	70	19	51			83	DRILLING METHOD(S): Hollow Stem Auger GROUNDWATER INFORMATION: Groundwater (GW) was not encountered during drilling. Dry and Open upon completion. 24-Hour Delayed Readings: GW at 10-feet and Caved at 16-feet. SURFACE ELEVATION: N/A DESCRIPTION OF STRATUM FAT CLAY with SAND , moist, dark gray, soft. (CH)
		SH S-2	P= 1.75	29							Same as above, gray, stiff.
		SH S-3	P= 2.0	22							Same as above, brown.
	10	SH S-4	P= 1.75	22	51	17	34	98	1.0	83	FAT CLAY with SAND , moist, brown, stiff. (CH)
		SH S-5	P= 2.75	26				96	1.5		Same as above, stiff.
	15	SH S-6	P= 3.75	25							Same as above, very stiff.
	20	SH S-7	P= 2.75	30							FAT CLAY , moist, brown, very stiff.
	25	SH S-8	P= 3.0	29							Same as above.
Boring was terminated at a depth of 25-feet.											

N - STANDARD PENETRATION TEST RESISTANCE
 P - POCKET PENETROMETER RESISTANCE
 Qc - STATIC CONE PENETROMETER RESISTANCE

REMARKS:

Boring depth and location were determined by Urban Engineering. Drilling operations were performed by RETL at GPS Coordinates N 27° 42' 04.50" W 97° 28' 19.50". Boring Location: County Road 33 Right-of-Way

APPENDIX 'B'

LOG OF BORING B-5



Rock Engineering and Testing Laboratory, Inc.
 6817 Leopard St.
 Corpus Christi, Texas 78409
 Telephone: 361-883-4555
 Fax: 361-883-4711

CLIENT: Urban Engineering
 PROJECT: London Area Wastewater Improvements
 LOCATION: Greenwood Dr.; Corpus Christi, TX
 NUMBER: G117309

DATE(S) DRILLED: 6/19/17 - 6/19/17

FIELD DATA				LABORATORY DATA							DRILLING METHOD(S):
SOIL SYMBOL	DEPTH (FT)	SAMPLE NUMBER	SAMPLES	N: BLOWS/FT P: TONS/SQ FT Tv: TONS/SQ FT Qc: TONS/SQ FT	MOISTURE CONTENT (%)	ATTERBERG LIMITS			DRY DENSITY POUNDS/CU.FT	COMPRESSIVE STRENGTH (TONS/SQ FT)	MINUS NO. 200 SIEVE (%)
						LIQUID LIMIT LL	PLASTIC LIMIT PL	PLASTICITY INDEX PI			
	5	SS S-1	N=6		21						
		SH S-2	P= 4.5+		19	67	19	48	104	8.4	86
		SH S-3	P= 4.0		20				102	4.7	
	10	SH S-4	P= 2.5		21						
		SH S-5	P= 3.25		23	55	18	37			84
	15	SH S-6	P= 3.75		21						
	20	SH S-7	P= 4.5+		23						
	25	SH S-8	P= 3.5		16						

Hollow Stem Auger

GROUNDWATER INFORMATION:
 Groundwater (GW) was not encountered during drilling.
 Dry and Open upon completion.
 24-Hour Delayed Readings: GW at 12-feet and Caved at 13-feet.

SURFACE ELEVATION: N/A

DESCRIPTION OF STRATUM

FAT CLAY, moist, dark gray, firm.

Same as above, hard. (CH)

Same as above, brown.

FAT CLAY, moist, brown, very stiff.

Same as above, with sand. (CH)

Same as above.

FAT CLAY, moist, brown, very stiff.

LEAN CLAY, moist, brown, very stiff.

Boring was terminated at a depth of 25-feet.

N - STANDARD PENETRATION TEST RESISTANCE
 P - POCKET PENETROMETER RESISTANCE
 Qc - STATIC CONE PENETROMETER RESISTANCE

REMARKS:

Boring depth and location were determined by Urban Engineering. Drilling operations were performed by RETL at GPS Coordinates N 27° 41' 52.80" W 97° 28' 12.80".
 Boring Location: Proposed Gravity Sewer Pipeline

LOG OF BORING B-6



Rock Engineering and Testing Laboratory, Inc.
6817 Leopard St.
Corpus Christi, Texas 78409
Telephone: 361-883-4555
Fax: 361-883-4711

CLIENT: Urban Engineering
PROJECT: London Area Wastewater Improvements
LOCATION: Greenwood Dr.; Corpus Christi, TX
NUMBER: G117309

DATE(S) DRILLED: 6/20/17 - 6/20/17

FIELD DATA				LABORATORY DATA							DRILLING METHOD(S):	
SOIL SYMBOL	DEPTH (FT)	SAMPLE NUMBER	SAMPLES	N: BLOWS/FT P: TONS/SQ FT T _v : TONS/SQ FT Q _c : TONS/SQ FT	MOISTURE CONTENT (%)	ATTERBERG LIMITS			DRY DENSITY POUNDS/CU.FT	COMPRESSIVE STRENGTH (TONS/SQ FT)	MINUS NO. 200 SIEVE (%)	Hollow Stem Auger
						LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX				GROUNDWATER INFORMATION:
						LL	PL	PI				Groundwater was not encountered during drilling. Dry and Caved at 16-feet upon completion. 24-Hour Delayed Readings: Dry and Caved at 16-feet.
DESCRIPTION OF STRATUM												
SH	5	S-1	X	N= 12	20							FAT CLAY , moist, dark gray, stiff.
SH		S-2	■	P= 4.5+	15							Same as above, gray and brown, very stiff.
SH		S-3	■	P= 4.5+	19	57	18	39	105	6.6	88	Same as above, hard. (CH)
SH	10	S-4	■	P= 4.25	21				101	3.3		FAT CLAY , moist, gray and brown, very stiff.
SH		S-5	■	P= 4.25	19							Same as above.
SH	15	S-6	■	P= 4.25	22	59	19	40			92	Same as above. (CH)
SH	20	S-7	■	P= 4.25	26							FAT CLAY , moist, gray and brown, very stiff. Boring was terminated at a depth of 20-feet.

N - STANDARD PENETRATION TEST RESISTANCE
P - POCKET PENETROMETER RESISTANCE
Qc - STATIC CONE PENETROMETER RESISTANCE

REMARKS:
Boring depth and location were determined by Urban Engineering. Drilling operations were performed by RETL at GPS Coordinates N 27° 41' 52.90" W 97° 27' 28.10".
Boring Location: Proposed Gravity Sewer Pipeline

APPENDIX 'B'

LOG OF BORING G117309.GPJ ROCK ETL.GDT 8/10/17



Nueces Electric Cooperative

Your Touchstone Energy® Cooperative 

November 21, 2017

Trace McCuan
Chief Executive Officer

Board of Directors
Brian Menking
President

Pat Hutchason
Vice President

David Rizzo
Secretary, Treasurer

Talena Ems
Assistant Secretary,
Treasurer

Jeffrey Edwards

Quayle Robinson

David Robinson

Wanda Stewart

Wendy Tronzo

John H. Ward

2017-11-21
1411 Nueces Blvd
P.O. Box 10000
Port Aransas, TX 78373
Tel: 361-749-1111
Fax: 361-749-1112
www.nueceselectric.org

To Whom it may concern,

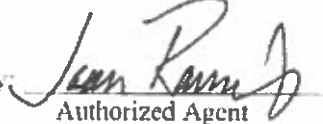
The data displayed below is a list of outages we have on record for London ISD, which is in the vicinity of the proposed lift station.

Duration	OutageRecID	TimeOfInterruption	TimeRestored	OutagedPhase	CustomersAffected
267	2013-05-27-0367	5/27/2013 3:11 PM	5/27/2013 7:38 PM	ABC	32
172	2013-11-22-0163	11/22/2013 9:54 AM	11/22/2013 12:46 PM	ABC	68
216	2013-11-22-0163	11/22/2013 12:56 PM	11/22/2013 4:32 PM	ABC	68
145	2014-07-22-0532	7/22/2014 4:00 AM	7/22/2014 6:25 AM	ABC	71
104	2014-10-21-0188	10/21/2014 10:14 AM	10/21/2014 11:58 AM	ABC	1
470	2015-04-22-1013	4/22/2015 1:29 PM	4/22/2015 9:19 PM	ABC	121
124	2015-11-07-0047	11/7/2015 12:26 PM	11/7/2015 2:30 PM	ABC	352
1493	2016-03-19-0415	3/19/2016 12:23 AM	3/20/2016 1:16 AM	ABC	153
99	2016-05-09-0119	5/9/2016 12:46 PM	5/9/2016 2:25 PM	A	3
141	2017-01-28-0865	1/28/2017 8:23 AM	1/28/2017 10:45 AM	ABC	143
25	2017-01-31-0947	1/31/2017 10:18 AM	1/31/2017 10:43 AM	ABC	142
6	2017-02-20-0432	2/20/2017 4:51 AM	2/20/2017 4:57 AM	ABC	153
1578	2017-08-25-0523	8/25/2017 4:16 PM	8/26/2017 6:34 PM	ABC	183

Please note that the duration is measured in minutes. The two lengthy outages were due to major storms.

Thank you,

Nueces Electric

By: 
Authorized Agent

Jason Ramirez



Michael York

From: Michael York
Sent: Monday, November 27, 2017 3:58 PM
To: 'David Thornburg'
Cc: Gabriel Hinojosa; Annika Gunning; William J Green (BillG@cctexas.com); Larry J. Urban
Subject: RE: London area design Memorandum comments.
Attachments: Design Memorandum - London Wastewater Infrastructure_20171127.pdf; Capacity Calculation Exhibit_20171127.pdf

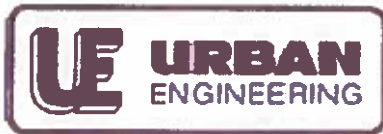
David,

Please find attached a revised design memorandum for your review and approval. Our responses to the city's comments are below in red. There is an additional attachment that accompanies one of the comment responses.

Please let me know if you have any questions, or require additional information. FYI, Larry Urban will be hand delivering a hard copy of the revised design memorandum to Keith Selman this afternoon.

Best Regards,

Michael C. York, P.E.



From: David Thornburg [mailto:DavidTh@cctexas.com]
Sent: Tuesday, November 14, 2017 8:36 AM
To: Michael York <MichaelY@urbaneng.com>
Cc: Gabriel Hinojosa <GabrielH@cctexas.com>; Annika Gunning <AnnikaG@cctexas.com>; Bill Green <BillG@cctexas.com>
Subject: London area design Memorandum comments.

Michael the following are the comments on the information in the design memorandum that was submitted November 3rd.

- Section II Flow calculations are based on approximately 4 homes per acre per the city's master plan the preliminary subdivision plan shows a density quite a bit higher than that closer to 6 units per acre. This subdivision will set the tone for the area development, is the design for 4 units per acre realistic?
The preliminary layouts for the proposed subdivision result in a density that is close to that assumed on the master plan. The proposed subdivision will be located on a tract of approximately 120 acres. The master plan projected that the service area would include approximately 750 acres of residential development. It is assumed that the average density for the overall 750 acres of residential development will be in line with the assumptions on the master plan. Therefore, the design is based on the criteria set forth in the master plan.
- Section II emergency storage is based on the outages in the area for the last 60 months not necessarily at the lift station. Please provide the outage history for

that area for the last 60 months you may use the London school complex. Identify how much of this was from the hurricane.

Outage history has been provided by Nueces Electric Cooperative (NEC) for the London ISD area. Based on the information provided, it was determined that adequate storage could not be provided. Therefore, the design has been revised to show a back-up generator for phase 1.

- Storage capacity, The majority of the storage volume shown on page 7/10 48,762 gal. is in the line to the east serving the sports complex. As this is not scheduled to be constructed it is not realistic to use it for the majority of the storage unless there are plans to construct this line in the near future. Update the storage capacity calculations based on what is currently proposed for construction.

See response to above comment. Storage capacity is no longer relevant as design now includes a back-up generator to be installed with phase 1.

- The master plan calls for a 15" gravity line please provide capacity calculations to justify the increase to 18". Increasing this to 18" will require a master plan amendment. In order to facilitate the masterplan amendment the utility department needs to agree and approve the capacity calculations for the upsizing of the line.

Based on criteria set forth in the master plan, the peak design flow for the service area to the lift station will be 3,044 GPM. The lift station is located approximately in the center of the service area. Assuming the two proposed gravity collection lines will split the flow evenly, each line will carry 1,522 GPM. The capacity for a 15-inch gravity collection line laid at minimum allowable slopes is 1,160 GPM. This is less than the anticipated peak flow. The capacity for an 18-inch gravity collection line laid at minimum allowable slopes is 1,633 GPM.

Therefore, it is necessary to use an 18-inch line in lieu of a 15-inch. (see attached capacity calculation exhibit)

- How will AEP be serving the lift station? Will there be easement requirements and will there be costs associated with the extension of service to the site?

The lift station will be served by Nueces Electric Cooperative (NEC), not AEP. Our team coordinated with NEC regarding electric service to the proposed lift station. Electric service will be routed from Weber, North along County Road 33, and then East within the proposed Access and Utility Easement from County Road 33 to the lift station site.

Michael these are the comments that we have received from the Utility department and an internal review. Please address these comments so I can respond to Utilities.

DT

David Thornburg
Project Manager
Development Services
2406 Leopard Street
Corpus Christi, Texas 78408
Email, davidth@cctexas.com
Phone: (361) 826-8451

London Area Lift Station No. 1 Capacity Calculations Exhibit

Total Peak Design Flow Per Master Plan Criteria: 3,044 GPM

MANNING'S EQUATION FOR GRAVITY LINE CAPACITY:

$$Q = \frac{K}{n} R^{2/3} S_f^{1/2} A$$

Where:

K=1.486 (constant)

R=A/WP (Area / Wetted Perimeter)

WP=2πr

CAPACITY OF 15-INCH PVC (SDR-21)	
DIA (in.):	15.00
AREA (S.F.):	1.23
SLOPE (%):	0.16
MANNING 'n':	0.013
DESIGN CAPACITY (cfs):	2.58
DESIGN CAPACITY (gpm):	1160
REQUIRED CAPACITY (gpm):	1522
15-INCH LINE NOT SUFFICIENT	

CAPACITY OF 18-INCH PVC (SDR-21)	
DIA (in.):	18.00
AREA (S.F.):	1.77
SLOPE (%):	0.12
MANNING 'n':	0.013
DESIGN CAPACITY (cfs):	3.64
DESIGN CAPACITY (gpm):	1633
REQUIRED CAPACITY (gpm):	1522
18-INCH LINE SUFFICIENT	

Notes:

1. Criteria for values used in the above calculations was obtained from the Adopted London Area Wastewater Master Plan (see Exhibit 'A' of this Memorandum), and from the Adopted Allison Service Area Wastewater Master plan (see remainder of Appendix 'D').
2. In accordance with common practice for this area, it is assumed the proposed gravity wastewater lines will be installed at the minimum allowable slopes.
3. Lift station is proposed approximately in center of service area. Therefore, it is assumed each of the two proposed gravity collection lines will carry approximately half of the total peak flow.

20 feet. Selection of locations for lift stations and force mains were dictated by topography while avoiding parallel gravity lines and force mains wherever possible.

3.3 Summary of Sanitary Sewer Collection System Design

The sanitary sewers included in this master plan were designed on the basis of information contained in the proceeding paragraphs of this section. A brief description of this information and assumptions, which were used as a basis for the design, are outlined below:

1. Ground elevations were obtained from Lidar-produced topographic maps furnished by the City of Corpus Christi.
2. Area served by a sewer assumed to be fully developed.
3. Peak domestic flow = $M \times \text{Average Domestic Flow}$ where $M = 5 / P^{1/5}$; where P = population in thousands of contributing sub-basin.
4. Infiltration = 400 gal/acre/ day.
5. Design Flow = Peak Domestic Flow + Infiltration.
6. Upper end of small lateral to have a minimum depth of 5 feet.
7. Minimum size of pipe for trunk mains = 10 inches.
8. Minimum design velocity = 2 ft/s.
9. Capacity of pipes based on Manning's formula: $V = 1.486/n \times R^{2/3} \times S^{1/2}$.
10. Roughness Factor: $n = 0.013$.

3.3.1 Pipe Size

Based on the minimum velocity of 2 ft/s, Tables 3-3 below was generated using Manning's formula. It illustrates the minimum and maximum slopes and pipe capacities for several sizes of pipe.

D _{in.}	Min			Max	
	S% Min	Q (cfs)	Q _{mgd}	S% Max	Q _{mgd}
8	0.4	0.764	0.494	8.4	2.263
10	0.29	1.179	0.762	6.23	3.533
12	0.22	1.671	1.080	4.88	5.085
15	0.16	2.583	1.669	3.62	7.941
18	0.12	3.638	2.351	2.83	11.417
21	0.1	5.009	3.237	2.3	15.526
24	0.08	6.396	4.134	1.93	20.305
27	0.06	7.583	4.901	1.62	25.468
30	0.055	9.616	6.215	1.43	31.690
33	0.05	11.822	7.641	1.26	38.355
36	0.045	14.144	9.141	1.12	45.605
39	0.04	16.508	10.669	1.01	53.613

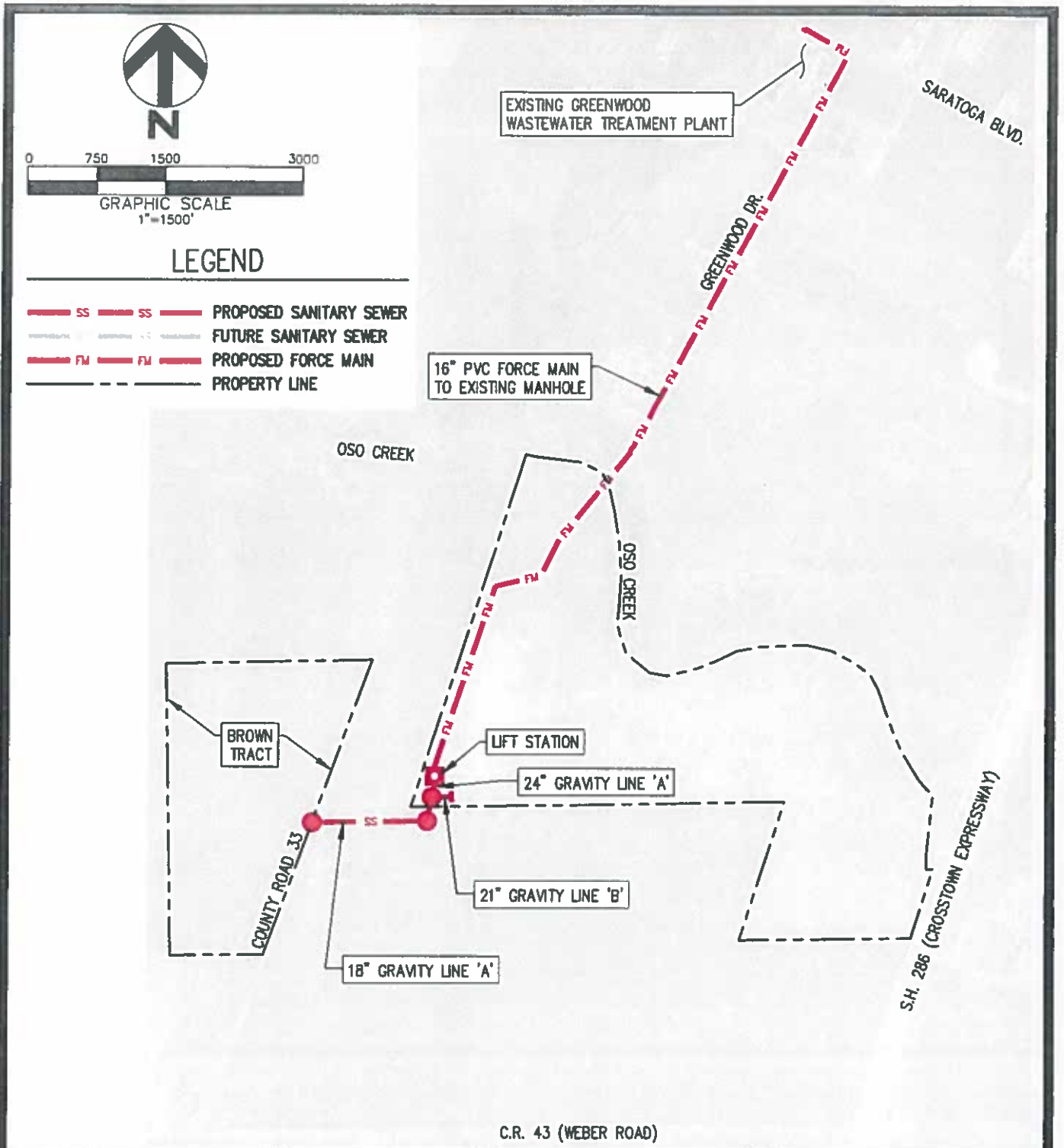
Table 3-3. Minimum and Maximum Pipe Slopes and Capacities

3.3.2 Anticipated Wastewater Flows

Based on the parameters and assumptions outlined in this section, anticipated wastewater flows were calculated for all sub-basins in the service area. Appendix A illustrates the Quantity of Wastewater Flow for each land use based on area and population. Using the charts in Appendix A, Appendix B was developed to illustrate the anticipated wastewater flows in each wastewater basin, and furthermore, in each sub-basin.

3.4 Lift Station Analysis

Lift Station analysis was performed by anticipating all upstream wastewater contributions and comparing this result with the existing capacity for each station. Proposed lift stations in the system should be designed to handle the anticipated wastewater flows. There are thirteen existing lift stations and seven proposed lift stations in the Allison Service Area. Each lift station is tabulated in Appendix C.



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TBPE FIRM NO. 145, TBPLS FIRM NO. 10032400
 2725 SWANTNER DR, CORPUS CHRISTI, TX 78404
 PHONE: 361.854.3101 WWW.URBANENG.COM

JOB NO. 42900.B7.00

EXHIBIT OF PROPOSED LONDON AREA MASTER PLAN WASTEWATER INFRASTRUCTURE

Note: This exhibit was revised per city request on March 27, 2018 to reflect a change in size of gravity sanitary sewer lines. The sizes shown on this revised exhibit are congruent with the sizes shown on the city's revised London master sanitary sewer plan which was presented to planning commission on 3/21/2018.

Eng Michael C York P E

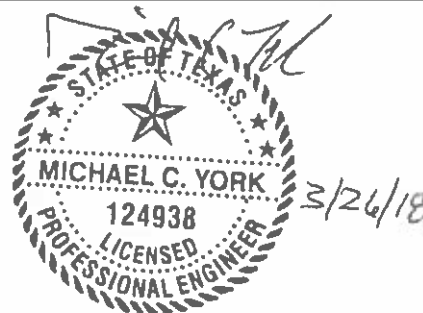
OPINION OF PROBABLE COST
for

March 26 ,2018
Job No 42900 B7.00

URBAN ENGINEERING
TBPE Firm No. 145

**LONDON AREA MASTER PLAN
REIMBURSABLE
SANITARY SEWER IMPROVEMENTS**

ITEM	DESCRIPTION	QUAN.	QUAN. +5%	UNIT	UNIT PRICE	TOTAL COST
NEW LIFT STATION						
1	Mobilization, Bonds, Insurance	1	1	LS	\$18,000.00	\$18,000.00
2	Lift Station No. 1	1	1	LS	\$425,000.00	\$425,000.00
3	Lift Station No. 1 Access Road NEC Cost Estimate To Provide 480 v/3 Ph	2,924	3,070	SY	\$50.00	\$153,500.00
4	Overhead Power LS Site	1	1	LS	\$100,000.00	\$100,000.00
5	Emergency Generator w/ Foundation	1	1	LS	\$110,000.00	\$110,000.00
LIFT STATION CONSTRUCTION SUB-TOTAL:						\$806,500.00
Contingencies @ 15%						\$120,975.00
LIFT STATION CONSTRUCTION TOTAL:						\$927,475.00
EASEMENT COSTS:						TBD
ENGINEERING, SURVEYING, STAKING, & TESTING @ 12%:						\$112,000.00
SWPPP ITEMS:						\$7,500.00
LIFT STATION GRAND TOTAL:						\$1,046,975.00
NEW 16" FORCE MAIN TO GREENWOOD WWTP						
1	Mobilization, Bonds, Insurance	1	1	LS	\$38,000.00	\$38,000.00
2	16" C900 PVC Force Main (Green Pipe)	8,896	9,341	LF	\$75.00	\$700,575.00
3	16" D.I. 90 Degree Bends (MJ)	3	3	EA	\$2,150.00	\$6,450.00
4	16" D.I. 45 Degree Bends (MJ)	5	5	EA	\$2,150.00	\$10,750.00
5	16" D.I. 22 1/2 Degree Bends (MJ)	3	3	EA	\$2,150.00	\$6,450.00
6	16" D.I. 11 1/4 Degree Bends (MJ)	3	3	EA	\$2,150.00	\$6,450.00
7	16" Plug Valve and Valve Box (MJ)	5	5	EA	\$7,800.00	\$39,000.00
8	Air/ Vacuum Valve Installations	3	3	EA	\$12,250.00	\$36,750.00
9	Well Pointing - Force Main	2,000	2,100	LF	\$50.00	\$105,000.00
10	Asphalt Pavement Repair (Existing)	120	126	SY	\$50.00	\$6,300.00
11	Concrete Pavement Repair (Exist. Driveways)	300	315	SF	\$10.00	\$3,150.00
12	Directional Bore Oso Creek-16" Fusible PVC	1,384	1,453	LF	\$400.00	\$581,200.00
13	Construct Horizontal Directional Drill Pads	2	2	EA	\$30,000.00	\$60,000.00
14	Tie to Wastewater Treatment Plant	1	1	LS	\$25,000.00	\$25,000.00
15	Traffic Control	1	1	LS	\$7,500.00	\$7,500.00
16	Marker Signs	20	20	EA	\$150.00	\$3,000.00
17	OSHA Trench Protection - Force Main	8,896	9,341	LF	\$1.50	\$14,011.50
FORCE MAIN CONSTRUCTION SUB-TOTAL:						\$1,649,586.50
Contingencies @ 15%						\$247,437.98
FORCE MAIN CONSTRUCTION TOTAL:						\$1,897,024.48
EASEMENT COSTS:						TBD
ENGINEERING, SURVEYING, STAKING, & TESTING @ 12%:						\$230,000.00
SWPPP ITEMS:						\$20,000.00
FORCE MAIN GRAND TOTAL:						\$2,147,024.48



Eng Michael C York P.E.

OPINION OF PROBABLE COST
for

March 26, 2018
Job No. 42900 B7 00

URBAN ENGINEERING
TBPE Firm No. 145

**LONDON AREA MASTER PLAN
REIMBURSABLE
SANITARY SEWER IMPROVEMENTS**

ITEM	DESCRIPTION	QUAN.	QUAN. +5%	UNIT	UNIT PRICE	TOTAL COST
LINE 'A' Gravity Sewer (West of Lift Station to CR 33):						
1	Mobilization Bonds Insurance	1	1	LS	\$16,000.00	\$16,000.00
2	24" PVC SDR 21 (28'-30' Cut)	35	38	LF	\$460.00	\$17,480.00
3	18" PVC SDR 21 (28'-30' Cut)	1,351	1,419	LF	\$385.00	\$546,315.00
4	Embedment	1,387	1,456	LF	\$7.50	\$10,920.00
5	OSHA Trench Protection	1,387	1,456	LF	\$9.50	\$12,376.00
6	Well Pointing	1,337	1,456	LF	\$50.00	\$72,800.00
7	5' Diameter Manhole (28'-30' Deep)	5	5	EA	\$14,750.00	\$73,750.00
LINE 'A' CONSTRUCTION SUB-TOTAL:						\$749,641.00
Contingencies @ 15%						\$112,446.15
LINE 'A' CONSTRUCTION TOTAL:						\$862,087.15
EASEMENT COSTS:						TBD
ENGINEERING, SURVEYING, STAKING, & TESTING @ 12%:						\$105,000.00
SWPPP ITEMS:						\$10,500.00
LINE 'A' GRAND TOTAL:						\$977,587.15
LINE 'B' Gravity Sewer (stub out to East of Lift Station)						
1	Mobilization Bonds Insurance	1	1	LS	\$10,000.00	\$10,000.00
2	21" PVC SDR 21 (28'-30' Cut)	120	126	LF	\$415.00	\$52,290.00
3	Embedment	120	126	LF	\$7.50	\$945.00
4	OSHA Trench Protection	120	126	LF	\$8.50	\$1,071.00
5	Well Pointing	120	126	LF	\$50.00	\$6,300.00
LINE 'B' CONSTRUCTION SUB-TOTAL:						\$70,606.00
Contingencies @ 15%						\$10,590.90
LINE 'B' CONSTRUCTION TOTAL:						\$81,196.90
EASEMENT COSTS:						TBD
ENGINEERING, SURVEYING, STAKING, & TESTING @ 12%:						\$10,000.00
SWPPP ITEMS:						\$3,500.00
LINE 'B' GRAND TOTAL:						\$94,696.90
PROJECT COST SUMMARY						
1	New Lift Station					\$1,046,975.00
2	New Force Main to Greenwood WWTP					\$2,147,024.48
3	LINE 'A' Gravity Sewer (West of Lift Station to CR 33)					\$977,587.15
4	LINE 'B' Gravity Sewer (stub out to East of Lift Station)					\$94,696.90
ESTIMATE OF TOTAL PROBABLE PROJECT COST						\$4,266,283.53
Note						
1 This cost estimate was revised per city request on March 26, 2018 to reflect a change in size of gravity sanitary sewer lines. The sizes shown on this revised estimate are congruent with the sizes shown on the city's revised London master sanitary sewer plan which was presented to planning commission on 3/21/2018.						



GF # 01021-5190 6P
Stewart Title

CORRECTION WARRANTY DEED

EFFECTIVE DATE: October 28, 2014

GRANTOR: SHERILAH LONDON, a single person

GRANTEES: (1) BILL J. BROWN, as his separate property (1/3rd)

(2) REAGAN TRAVIS BROWN, as his separate property (1/3rd)

(3) ALYSSA ANN BROWN McCOY, as her separate property (1/3rd)

GRANTEE'S MAILING ADDRESS:

P.O. Box 8229
Corpus Christi, Texas 78468

CONSIDERATION: Ten Dollars and other valuable consideration.

PROPERTY: The following described Land:

Tract I:

That 89.868 acre tract in Nueces County, Texas as described on EXHIBIT "A" hereto attached and made a part hereof.

Tract II:

That 118.126 acre tract in Nueces County, Texas as described on EXHIBIT "A" hereto attached and made a part hereof.

Together with and including all of the Grantor's right, title and interest in and to the rights and appurtenances in any way belonging or appurtenant to said Land, including, without limitation: (i) any improvements on said Land; (ii) strips and gores, if any, adjacent or contiguous to the Land; (iii) any land lying in or under the bed of any street, alley, road, creek or stream running through, abutting or adjacent to the Land; (iv) any riparian rights appurtenant to the Land relating to surface or subsurface waters; and (v) easements, rights of ingress and egress and reversionary interests benefiting or serving the Land (the Land and other appurtenant rights being referred to herein as the "Property").

RESERVATIONS FROM AND EXCEPTIONS TO CONVEYANCE AND WARRANTY:

This conveyance is subject to the following matters to the extent that such are presently in force and effect and affect the Property:

- (1) Those Permitted Exceptions set forth in EXHIBIT "B";

EXHIBIT 6

meteorological tower fees, substation and/or operations and maintenance building fees, crop or grassland damage payments, penalties assessed by any governmental agency for removal of any of the Land from any governmental program, and indemnity payments of any physical damages to the Land; (iv) this reservation shall not apply to any electricity generated by wind power upon the Land and Property for domestic or other non-commercial uses on the Land and Property; (v) the royalty herein reserved is a non-participating and non-executive royalty and it shall not be necessary for the Grantor or Grantor's assigns to join in the execution of any wind power lease which may be granted or created by Grantees, their heirs, representatives and assigns covering the Land, or any part thereof, and all executive rights for any wind power lease are conveyed to the Grantees, their heirs, representatives and assigns, including the right to grant to the lessee the right to pool or unitize the Land and Property with other lands; and (vi) the Grantor and Grantor's assigns shall not have any right of ingress or egress on the Land with regard to this reservation for any purpose.

This royalty reserved as to wind rights shall be only for the life of Grantor, and shall terminate on the death of Grantor.

GRANT OF PROPERTY:

Grantor, for the Consideration and subject to the Reservations From and Exceptions to Conveyance and Warranty, GRANTS, SELLS, and CONVEYS to Grantees the Property, together with all and singular the rights and appurtenances thereto in any way belonging, to have and to hold unto Grantees and Grantees' heirs, representatives and assigns forever. Grantor binds Grantor and Grantor's heirs, executors, administrators, and successors to warrant and forever defend all and singular the Property to Grantees and Grantees' heirs, representatives and assigns against every person whomsoever lawfully claiming or to claim the same or any part thereof, and except as to the Reservations From and Exceptions to Conveyance and Warranty.

When the context requires, singular nouns and pronouns include the plural.

CORRECTION:

This Correction Warranty Deed is made in correction of and in substitution of that Warranty Deed dated October 28, 2014 from Grantor to Grantees recorded at Document No. 2014041948 of the Official Records of Nueces County, Texas (the "Original Deed"). The purpose of this Correction Warranty Deed is to correctly set forth by metes and bounds the legal description of Tracts I and II as set forth in EXHIBIT "A" of this Correction Warranty Deed. Other than the stated correction of the legal description, this Correction Warranty Deed is intended to restate in all respects the Original Deed, and the effective date of this Correction Warranty Deed relates back to the effective date of the Original Deed.

(Signature Pages Follow)

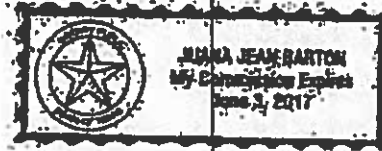
Signature Page for Correction Warranty Deed
Grantor: Sheila London
Grantees: Bill J. Brown
Reagan Travis Brown
Alyssa Ann Brown McCoy

GRANTEE:


Bill J. Brown

STATE OF TEXAS

COUNTY OF Nueces

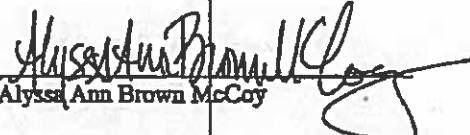


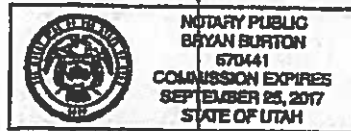
This instrument was acknowledged before me on the 20th day of March,
2015, by BILL J. BROWN.


Notary Public, State of Texas

Signature Page for Correction Warranty Deed
Grantor: Sheilah London
Grantees: Bill J. Brown
Reagan Travis Brown
Alyssa Ann Brown McCoy

GRANTEE:


Alyssa Ann Brown McCoy



STATE OF UTAH

COUNTY OF SALT LAKE

§
§
§

This instrument was acknowledged before me on the 23rd day of March,
2015, by ALYSSA ANN BROWN McCOY.


Notary Public, State of UTAH

STATE OF TEXAS
COUNTY OF NUECES

TRACT II

Field Notes of a 118.126 acre tract of land being out of a 145.5 acre tract of land as described in a deed recorded in Volume 1357, Page 187, Deed Records Nueces County, Texas. Said 118.126 acre tract also being out of the I. & G. N. R. Survey No. 135 and 139, and Tract "D", Laureles Farm Tracts, as shown on a map recorded in Volume 3, Page 15, Map Records Nueces County, Texas. Said 118.126 acres being more particularly described as follows;

BEGINNING at a 5/8" iron rod set in the west right of way of County Road 33, for the northeast corner of the 20.0 acre tract, as described in a deed recorded in Document No. 2005027456, Deed Records of Nueces County, Texas, and for the southeast corner of this survey, from **WHENCE** the intersection of the west right of way of County Road 33 and the north right of way of FM Highway 43 bears South 20°10'55" West, a distance of 2055.79 feet.

THENCE with the north boundary of said 20.0 acre tract, South 88°52'26" West, a distance of 1023.87 feet to a 5/8" iron rod set for the northwest corner of the said 20.0 acre tract, in the east line of the South Texas Children's Home Land Management 194.45 acre tract as described in a deed recorded in Document No. 2009010903, Deed Records Nueces County, Texas, and for the southwest corner of this survey.

THENCE with the east boundary line of said 194.45 acre tract, North 01°01'58" West, a distance of 3146.16 feet to a 5/8" iron rod set for the southwest corner of the Walter B. Camp 130.49 acre tract as described in a deed recorded in Document No. 1997034377, Deed Records Nueces County, Texas, in the east line of the said 194.45 acre tract, and for the northwest corner of this survey.

THENCE with the south boundary line of the said 130.49 acre tract, North 88°49'45" East, a distance of 2246.58 feet to a 5/8" iron rod set in the west right of way of County Road 33, for the southeast corner of the said 130.49 acre tract, and for the northeast corner of this survey.

THENCE with the west right of way of County Road 33, South 20°10'55" West, a distance of 3378.89 feet to the **POINT OF BEGINNING** of this survey, and containing 118.126 acres of land, more or less.

Notes:

- 1.) Bearings are based on Global Positioning System NAD 83 (93) 4205 Datum.
- 2.) A Map of equal date accompanies this Metes and Bounds description.

I, Ronald E. Brister do hereby certify that this survey of the property legally described herein is correct to the best of my knowledge and belief.

Ronald E. Brister

Ronald E. Brister, RPLS No. 5407
Date: March 11, 2015



EXHIBIT A
PAGE 2 OF 2



City of Corpus Christi, Texas
 Department of Development Services
 P.O. Box 9277
 Corpus Christi, Texas 78469-9277
 (361) 826-3240
 Located at 3406 Leopard Street
 (Corner of Leopard St. and Port Ave.)

DISCLOSURE OF INTERESTS

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"

NAME: BRASELTON HOMES
 STREET: 5337 YORKTOWN CITY: CORPUS CHRISTI ZIP: 78413
 FIRM IS: Corporation Partnership Sole Owner Association 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)
_____	_____
_____	_____

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
_____	_____
_____	_____

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>BART BRASELTON</u>	<u>TYPE A, TYPE B</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
_____	_____
_____	_____

CERTIFICATE

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: Bart Braselton (Print) Title: EXEC VP

Signature of Certifying Person: [Signature] Date: 3/16/10