

# CITY OF CASTLE HILLS

## Capital Improvement Plan

### Phase II - Drainage



007021  
DRAINAGE CAPITAL  
IMPROVEMENT PLAN  
VER 1  
March 26, 2019

CAPITAL IMPROVEMENT PLAN  
PHASE II - DRAINAGE

---

## Contents

<b>1</b>	<b>EXECUTIVE SUMMARY .....</b>	<b>3</b>
<b>2</b>	<b>DRAINAGE IMPROVEMENT PROJECTS.....</b>	<b>3</b>
2.1	Watershed I (Fox Hall) .....	3
2.2	Watershed II .....	3
2.3	Watershed III .....	4
2.4	Watershed IV (Lemonwood/Travertine) .....	5
2.5	Watershed V (Atwater) .....	5
<b>3</b>	<b>ASSESSMENT .....</b>	<b>6</b>
<b>4</b>	<b>COST BASIS .....</b>	<b>6</b>
<b>5</b>	<b>RECOMMENDATION .....</b>	<b>7</b>

## Appendix

Appendix A Cost Estimates .....	8
---------------------------------	---

## 1 EXECUTIVE SUMMARY

RPS was authorized by the City of Castle Hills (City) to perform a Drainage Capital Improvement Plan (CIP) at the February 2019 council meeting.

The purpose of the CIP is to provide the City with a 5-year drainage improvement plan based on the City of Castle Hills' Master Drainage Plan- Phase I dated July 2015 and Master Drainage Plan- Task Order 2 dated May 2016. The CIP will incorporate all drainage improvement projects referenced from the Master Drainage Plan and will develop a total construction cost for all drainage projects and prioritize each project to be constructed for a 5-year planning period. Recommendations for the 5-year CIP will be based on level of importance, assumed annual drainage budget for the City, and project construction cost. Project construction cost for each project is inclusive of anticipated engineering services. This CIP will not incorporate any roadway related improvements from the Capital Improvements Plan Phase 1- Streets dated December 2018. The drainage CIP is intended to be a living document that can be updated to coordinate with any street related improvements.

## 2 DRAINAGE IMPROVEMENT PROJECTS

The City of Castle Hills is partitioned into five different watershed areas. From these delineated watershed areas, proposed drainage related improvements were developed per City of Castle Hills' Master Drainage Plan – Phase I and Task Order 2 Reports. The following is summary of drainage projects categorized according to watershed area.

### 2.1 Watershed I (Fox Hall)

The Fox Hall watershed is an open channel system that follows the natural watercourse of the area and outfalls into Olmos Creek. The proposed improvements include increasing the channel cross section of the existing channel and adding culvert crossings at Fox Hall Ln. and Hibiscus Ln.

Watershed I (Fox Hall): Summary of Improvements		
Location	Existing Conditions	Proposed Improvement
Fox Hall Ln.	No existing drainage channel; no existing culvert crossing	<ul style="list-style-type: none"><li>2 - 36 in RCP</li><li>New Trapezoidal channel</li></ul>
Hibiscus Ln.	Undersized existing drainage channel; no existing culvert crossing	<ul style="list-style-type: none"><li>2 - 36 in RCP</li><li>New Trapezoidal channel and upsized existing trapezoidal channel cross section.</li></ul>

### 2.2 Watershed II

Watershed II proposed improvements consist of two separate drainage projects. This first improvement involves extending the existing storm drain system along Dogwood Ln. from NW Military to Lockhill-Selma. The second improvement consists of reconstructing the existing channel from E. Castle Ln. to the outfall at West Ave. The channel improvements include concrete lined channels and upsizing culvert crossings at E. Castle Ln., Mimosa Dr., and Krameria Dr. Additional projects not included in the Master Drainage Plan involve improvements at N. Manton Ln. This project is considered an interim condition

## CAPITAL IMPROVEMENT PLAN PHASE II - DRAINAGE

improvement that will not solve the drainage issue. This project involves improving the roadway geometrics at the channel crossing to partially alleviate the localized drainage issues in that area.

Watershed II: Summary of Improvements		
Location	Existing Conditions	Proposed Improvement
Dogwood Ln.	Normal crown road with no storm drain system; no sags, varying road capacity	<ul style="list-style-type: none"> <li>2 - 30 ft. and 2 -10 ft. curb inlets at Dogwood Ln. and Selma Dr.,</li> <li>2 - 30 ft. and 2 -10 ft. curb inlets midway of Dogwood Ln.,</li> <li>48 in. RCP to convey flow into exist storm drain</li> </ul>
E. Castle Ln.	A low water crossing with no culvert; existing channel crossing	<ul style="list-style-type: none"> <li>3 - 8 x 5 ft. SBCs</li> <li>a rectangular concrete channel, 30 ft. wide by 2.6 ft. minimum depth up to mimosa, constant slope</li> </ul>
Wisteria Dr.	Existing channel crossing with trapezoidal channel downstream	<ul style="list-style-type: none"> <li>a rectangular concrete channel, 30 ft. wide by 2.84 ft. minimum depth up to Mimosa Dr., constant slope</li> </ul>
Mimosa Dr.	Existing channel crossing with 3 - 36 in. RCPs	<ul style="list-style-type: none"> <li>3 - 8 x 5 ft. SBCs</li> <li>a rectangular concrete channel, 28 ft. wide by 2.7 ft. minimum depth up to Krameria Dr., constant slope</li> </ul>
Krameria Dr.	Existing channel crossing with 3 - 36 in. RCPs	<ul style="list-style-type: none"> <li>3 - 8 x 6 ft. SBCs</li> <li>a rectangular concrete channel, 35 ft. wide by 2.5 ft. minimum depth up to West Ave., constant slope</li> </ul>
*N. Manton	Existing channel crossing with no culvert structures	<ul style="list-style-type: none"> <li>Concrete pavement at channel crossing</li> <li>Lowering roadway profile to improve existing drainage pattern</li> <li>Not designed for any particular storm event. Temporary short-term solution.</li> </ul>

\* Not included in the Master Drainage Plan – Phase I Report

## 2.3 Watershed III

Drainage improvements for Watershed II includes constructing a new storm drain system along 1) Carolwood Dr. from Lockhill-Selma to Banyan Dr., along 2) Banyan Dr. from Carolwood Dr. to Glentower Dr., and along 3) Glentower Dr. from Banyan Dr. to NW Military Frontage Road. Additionally, a proposed concrete lined channel is proposed parallel to NW Military Frontage Road connecting to the existing drainage channel and outfall.

Watershed III: Summary of Improvements		
Location	Existing Conditions	Proposed Improvement
Carolwood Dr	Normal crown road with no sags that transitions into inverted crown road with no sags; no storm drain	<ul style="list-style-type: none"> <li>8 - 30 ft. and 2 - 20 ft. curb inlets at Carolwood Dr. and Selma Dr.,</li> <li>8 x 4 ft. SBC from Carolwood Dr. to Banyan</li> </ul>

## CAPITAL IMPROVEMENT PLAN PHASE II - DRAINAGE

Banyan Dr.	Inverted crown road with no sags; existing asphalt pavement; no storm drain	<ul style="list-style-type: none"> <li>2 - 3 x 10 ft. and 1 - 3 x 5 ft. grate inlets along road centerline,</li> <li>11 x 5 ft. from Banyan Dr. to Glentower Dr.</li> </ul>
Glentower Dr.	Inverted crown road with no sags; existing asphalt pavement; no storm drain	<ul style="list-style-type: none"> <li>3 - 3 x 10 ft. grate inlets along road centerline,</li> <li>12 x 5 ft. SBC from Glentower Dr. to NW Military Hwy.</li> </ul>
Outfall channel	Runoff drains into concrete roadside channel on Banyan Dr. between Gardenvue Dr. and Glentower Dr.	<ul style="list-style-type: none"> <li>Existing culvert at Glentower Dr. and NW Military Hwy. adjustments</li> <li>Construct 17.5 x 3 ft. concrete rectangular channel and match existing outfall</li> </ul>

## 2.4 Watershed IV (Lemonwood/Travertine)

The proposed improvements for Watershed IV consist of two separate drainage projects. The proposed improvements for Lemonwood include a proposed storm drain system with inlets throughout the storm drain alignment. The storm drain alignment follows a narrow corridor, runs parallel to Lemonwood Dr and outfalls at Interstate 410. Due to insufficient horizontal space, the portions of storm drain alignment will be located under the existing drainage channel. The proposed improvements for Travertine include a proposed storm drain system with inlets throughout the storm drain alignment. The storm sewer system is proposed for Town Vue Dr., Twin Leaf Ln., Trillium Ln., Bluet Ln., Shalimar Dr., and will outfall at Jackson Keller Rd.

Watershed IV (Lemonwood/Travertine): Summary of Improvements		
Location	Existing Conditions	Proposed Improvement
Lemonwood Dr.	Existing drainage channel with insufficient horizontal space	<ul style="list-style-type: none"> <li>36 in RCP and 48 in RCP along storm drain alignment from NW Military Hwy. to outfall at Interstate 410</li> </ul>
Travertine	Existing roadway with no storm drain system	<ul style="list-style-type: none"> <li>36 in RCP along Town Vue, Twinleaf, Trillium, and Bluet.</li> <li>48 in RCP along Travertine Ln.</li> <li>54 in RCP along Bluet and Shalimar Dr.</li> </ul>

## 2.5 Watershed V (Atwater)

The proposed improvements for Watershed V include a storm drain system that starts upstream at Antler Dr. and outfalls at Jackson Keller Rd. Portions of the proposed storm drain alignment will be located under an existing rectangular concrete channel.

Watershed V (Atwater): Summary of Improvements		
Location	Existing Conditions	Proposed Improvement
Atwater Dr.	Existing drainage channel with insufficient horizontal space	<ul style="list-style-type: none"> <li>48 in RCP along storm drain alignment from Antler Dr. to Atwater Dr.</li> <li>60 in RCP under existing drainage channel from Atwater Dr. to outfall at Lockhill Selma Rd.</li> </ul>



### 3 ASSESSMENT

Based on Master Drainage Plan – Phase I, the City will require a Capital Improvement Plan to mitigate drainage concerns for all watersheds located within City limits. The proposed drainage improvements will be separated into individual projects to coordinate and work within the limitations of the City's annual drainage budget. Furthermore, watershed projects constructed in segments must start proposed construction at the furthest downstream limits of design.

RPS was authorized in March 2019 to conduct design on two drainage projects for the City of Castle Hills. These two projects are the downstream sections of design for Watershed II and III. These two projects will be considered a priority and will be assessed as individual projects when determining the 5-year CIP plan. Both projects will serve an interim phase of construction until the full limits of proposed improvements are complete for both watersheds. They are as follows:

Watershed III Drainage Improvement Phase 1 (Banyan Dr. & Glentower Dr.)

Concrete lined channel from Mimosa Dr. to West Ave, Upsize culvert crossings at Mimosa Dr. and Krameria Dr.

Watershed II Drainage Improvement Phase 1 (Mimosa/Krameria to West Ave.)

Traffic inlets at Banyan/Glentower Dr. intersection, 3-4'x5' box culverts along Glentower from Banyan to NW Military Frontage Rd, Proposed concrete lined channel parallel to NW Military Frontage Rd.

The remaining drainage improvements will be coordinated and phased within the proposed 5-year CIP.

### 4 COST BASIS

The cost estimates for the drainage improvements were based on recent City of Castle Hills project estimates, City of San Antonio (CoSA) standard unit pricing, TxDOT twelve month moving average unit bid prices, and contractor bids received from surrounding municipalities. Additionally, anticipated engineering services are included in the cost estimates. See Appendix A.

The total construction cost for all proposed drainage improvements referenced in the Master Drainage Plan – Phase I and Task Order 2 for all watersheds is approximately **\$18,826,185**.

COST SUMMARY OF DRAINAGE IMPROVEMENTS	
WATERSHED	CONSTRUCTION COST
I	\$683,647.84
II	\$3,750,761.49
III	\$3,626,477.19
IV	\$8,806,117.87
V	\$1,334,804.41
<b>TOTAL CONSTRUCTION COST</b>	<b>\$18,201,808.80</b>

## 5 RECOMMENDATION

The approach to the 5-year Drainage CIP will focus on first constructing the downstream sections of improvements for Watersheds II and III as indicated for year 1. Once the downstream sections are constructed, the focus will be separating the upstream sections of improvements into different projects. These individual projects will be identified based on logical construction limits and evaluated to fit within the City's annual drainage budget. Recommendations for years 1 through 5 will assume an annual drainage budget of approx. \$1.5 million.

The recommendation for Years 1-5 is as follows:

CAPITAL IMPROVEMENT PLAN PHASE II - DRAINAGE (YEARS 1 - 5)			
YEAR	PROJECT	WATERSHED	CONSTRUCTION COST
1	GLENTOWER	III	\$1,026,065.63
	MIMOSA & KRAMERIA	II	\$1,230,363.14
	N. MANTON	II	\$191,036.12
YEAR 1 TOTAL			<b>\$2,447,464.88</b>
2	FOX HALL	I	\$683,647.84
	DOGWOOD	II	\$1,020,973.16
YEAR 2 TOTAL			<b>\$1,704,621.00</b>
3	CASTLE & WISTERIA	II	\$1,499,425.20
YEAR 3 TOTAL			<b>\$1,499,425.20</b>
4	ATWATER	V	\$1,334,804.41
YEAR 4 TOTAL			<b>\$1,334,804.41</b>
5	CAROLWOOD	III	\$1,266,241.86
YEAR 5 TOTAL			<b>\$1,266,241.86</b>
6+	REMAINING PROJECTS	III, IV	\$10,140,287.57

## Appendix A

### Cost Estimates





**FOR REVIEW ONLY**  
DO NOT USE FOR PERMITTING, BIDDING, OR  
CONSTRUCTION.

**CLIENT: CITY OF CASTLE HILLS**  
**PROJECT: WATERSHED I - FOX HALL**  
**SUBJECT: OPINION OF PROBABLE CONSTRUCTION COST**

**ESTIMATED QUANTITIES**

ITEM NO.	DESCRIPTION	UNIT	QUANT.	UNIT PRICE	TOTAL PRICE
105.1	CHANNEL EXCAVATION ( 150< X < 5,000 C.Y.)	C.Y.	6000	\$ 25.00	\$150,000.00
401.1	REINFORCED CONCRETE PIPE (CLASS III)(36" DIA)	L.F.	200	\$ 157.19	\$31,437.33
-	INLET	EA	14	\$ 5,000.00	\$70,000.00
-	STREET REPAIR	LF	400	\$ 250.00	\$100,000.00
-	MISC. DEMOLITION	LS	1	\$ 25,000.00	\$25,000.00
<b>DRAINAGE CONSTRUCTION TOTAL</b>					<b>\$376,437.33</b>
100.1	MOBILIZATION (10%)	LS	1	\$ 37,643.73	\$37,643.73
100.2	INSURANCE AND BOND (3%)	LS	1	\$ 11,293.12	\$11,293.12
101.1	PREPARING RIGHT-OF-WAY (5%)	LS	1	\$ 18,821.87	\$18,821.87
-	CONTINGENCIES (25%)	LS	1	\$ 94,109.33	\$94,109.33
<b>DRAINAGE PROJECT TOTAL</b>					<b>\$538,305.39</b>
-	GEOTECHNICAL SERVICES (7%)	LS	1	\$ 37,681.38	\$37,681.38
-	ENGINEERING SERVICES (15%)	LS	1	\$ 80,745.81	\$80,745.81
-	SURVEY AND FIELD RECONNAISSANCE (5%)	LS	1	\$ 26,915.27	\$26,915.27
<b>PROJECT TOTAL</b>					<b>\$683,647.84</b>



**FOR REVIEW ONLY**  
DO NOT USE FOR PERMITTING, BIDDING, OR  
CONSTRUCTION.

**CLIENT:** CITY OF CASTLE HILLS  
**PROJECT:** WATERSHED II - MIMOSA / KRAMERIA  
**SUBJECT:** OPINION OF PROBABLE CONSTRUCTION COST

**ESTIMATED QUANTITIES**

ITEM NO.	DESCRIPTION	UNIT	QUANT.	UNIT PRICE	TOTAL PRICE
462 2020	CONC BOX CULV (8FT X 5FT)	LF	174	\$ 434.00	\$75,516.00
402 2001	TRENCH EXCAVATION PROTECTION	LF	116	\$ 3.00	\$348.00
432 2001	RIPRAP (CONC)(4IN)	CY	414	\$ 1,000.00	\$414,000.00
105.1	CHANNEL EXCAVATION ( 150< X < 5,000 C.Y.)	C.Y.	2793	\$ 25.00	\$69,825.00
466 2050	WINGWALL (PW)(HW=6FT)	EA	2	\$ 12,350.00	\$24,700.00
462 2021	CONC BOX CULV (8FT X 6FT)	LF	174	\$ 397.00	\$69,078.00
466 2051	WINGWALL (PW)(HW=7FT)	EA	2	\$ 16,347.00	\$32,694.00
-	ROADWAY REPLACEMENT	SY	444	\$ 90.00	\$39,960.00
-	MOBILIZATION, PREP ROW, TRAFFIC CONTROL, & BONDS (18%)	LS	1	\$ 130,701.78	\$130,701.78
<b>DRAINAGE CONSTRUCTION TOTAL</b>					<b>\$856,822.78</b>
-	CONTINGENCIES (25%)	LS	1	\$ 214,205.70	\$214,205.70
<b>DRAINAGE PROJECT TOTAL</b>					<b>\$1,071,028.48</b>
-	ENGINEERING SERVICES	LS	1	\$ 147,267.66	\$147,267.66
-	SURVEY AND FIELD RECONNAISSANCE	LS	1	\$ 12,067.00	\$12,067.00
<b>PROJECT TOTAL</b>					<b>\$1,230,363.14</b>



**FOR REVIEW ONLY**  
DO NOT USE FOR PERMITTING, BIDDING, OR  
CONSTRUCTION.

**CLIENT:** CITY OF CASTLE HILLS  
**PROJECT:** WATERSHED II - CASTLE / WISTERIA  
**SUBJECT:** OPINION OF PROBABLE CONSTRUCTION COST

**ESTIMATED QUANTITIES**

ITEM NO.	DESCRIPTION	UNIT	QUANT.	UNIT PRICE	TOTAL PRICE
E. CASTLE LN.					
462 2020	CONC BOX CULV (8 FT X 5 FT)	LF	201	\$ 434.00	\$87,234.00
402 2001	TRENCH EXCAVATION PROTECTION	LF	67	\$ 3.00	\$201.00
432 2001	RIPRAP (CONC)(4 IN)	CY	342	\$ 1,000.00	\$341,851.85
105.1	CHANNEL EXCAVATION ( 150< X < 5,000 C.Y.)	C.Y.	2383	\$ 25.00	\$59,583.33
466 2050	WINGWALL (PW)(HW=6 FT)	EA	2	\$ 12,350.00	\$24,700.00
<b>SUBTOTAL</b>					<b>\$513,570.19</b>
WISTERIA DR.					
462 2020	RIPRAP (CONC)(4 IN)	CY	175	\$ 1,000.00	\$175,308.64
105.1	CHANNEL EXCAVATION ( 150< X < 5,000 C.Y.)	C.Y.	556	\$ 25.00	\$13,888.89
<b>SUBTOTAL</b>					<b>\$189,197.53</b>
100.1	MOBILIZATION (10%)	LS	1	\$ 70,276.77	\$70,276.77
100.2	INSURANCE AND BOND (3%)	LS	1	\$ 21,083.03	\$21,083.03
101.1	PREPARING RIGHT-OF-WAY (5%)	LS	1	\$ 35,138.39	\$35,138.39
-	UTILITY ADJUSTMENTS (25%)	LS	1	\$ 175,691.93	\$175,691.93
-	CONTINGENCIES (25%)	LS	1	\$ 175,691.93	\$175,691.93
<b>DRAINAGE PROJECT TOTAL</b>					<b>\$1,180,649.76</b>
-	GEOTECHNICAL SERVICES (7%)	LS	1	\$ 82,645.48	\$82,645.48
-	ENGINEERING SERVICES (15%)	LS	1	\$ 177,097.46	\$177,097.46
-	SURVEY AND FIELD RECONNAISSANCE (5%)	LS	1	\$ 59,032.49	\$59,032.49
<b>PROJECT TOTAL</b>					<b>\$1,499,425.20</b>



**FOR REVIEW ONLY**  
DO NOT USE FOR PERMITTING, BIDDING, OR  
CONSTRUCTION.

**CLIENT:** CITY OF CASTLE HILLS  
**PROJECT:** WATERSHED II - DOGWOOD  
**SUBJECT:** OPINION OF PROBABLE CONSTRUCTION COST

**ESTIMATED QUANTITIES**

ITEM NO.	DESCRIPTION	UNIT	QUANT.	UNIT PRICE	TOTAL PRICE
465 2054	INLET (COMPL)(CURB)(TY 2)(10')	EA	4	\$ 5,862.00	\$23,448.00
-	INLET (COMPL)(CURB)(TY 2)(30')	EA	4	\$ 12,000.00	\$48,000.00
464 2005	RC PIPE (CL III)(24 IN)	LF	56	\$ 92.35	\$5,171.60
464 2011	RC PIPE (CL III)(48 IN)	LF	1700	\$ 271.45	\$461,459.33
402 2001	TRENCH EXCAVATION PROTECTION	LF	1700	\$ 3.00	\$5,100.00
-	JUNCTION BOX 5'X5'X5'	EA	2	\$ 4,500.00	\$9,000.00
-	SPECIAL JUNCTION BOXES (COMPLETE)	EA	1	\$ 10,000.00	\$10,000.00
<b>DRAINAGE CONSTRUCTION TOTAL</b>					<b>\$562,178.93</b>
100.1	MOBILIZATION (10%)	LS	1	\$ 56,217.89	\$56,217.89
100.2	INSURANCE AND BOND (3%)	LS	1	\$ 16,865.37	\$16,865.37
101.1	PREPARING RIGHT-OF-WAY (5%)	LS	1	\$ 28,108.95	\$28,108.95
-	UTILITY ADJUSTMENTS (25%)	LS	1	\$ 140,544.73	\$140,544.73
-	CONTINGENCIES (25%)	LS	1	\$ 140,544.73	\$140,544.73
<b>DRAINAGE PROJECT TOTAL</b>					<b>\$803,915.87</b>
-	GEOTECHNICAL SERVICES (7%)	LS	1	\$ 56,274.11	\$56,274.11
-	ENGINEERING SERVICES (15%)	LS	1	\$ 120,587.38	\$120,587.38
-	SURVEY AND FIELD RECONNAISSANCE (5%)	LS	1	\$ 40,195.79	\$40,195.79
<b>PROJECT TOTAL</b>					<b>\$1,020,973.16</b>



FOR REVIEW ONLY  
DO NOT USE FOR PERMITTING, BIDDING,  
OR CONSTRUCTION.

CLIENT: CITY OF CASTLE HILLS  
PROJECT: WATERSHED II - NORTH MANTON  
SUBJECT: OPINION OF PROBABLE CONSTRUCTION COST

ESTIMATED QUANTITIES

ITEM NO.	DESCRIPTION	UNIT	QUANT.	UNIT PRICE	TOTAL PRICE
BASE BID					
103.3	REMOVE CONCRETE SIDEWALKS & DRIVEWAYS (1,000 S.F. < X < 3,000 S.F.)	SF	1049	\$ 4.11	\$4,311.39
103.4	REMOVE MISCELLANEOUS CONCRETE	SF	740	\$ 7.47	\$5,527.80
104.1	STREET EXCAVATION (< 1,000 C.Y.)	CY	478	\$ 34.63	\$16,553.14
105.1	CHANNEL EXCAVATION (< 150 C.Y.)	CY	26	\$ 42.34	\$1,100.84
107.1	EMBANKMENT (FINAL)(ORD COMP)(TY A)	CY	2	\$ 19.14	\$38.28
108.1	LIME TREATED SUBGRADE (6" COMPACTED DEPTH)	SY	512	\$ 6.23	\$3,189.76
108.2	LIME (< 100 TON.)	TON	8	\$ 193.93	\$1,551.44
200.1	FLEXIBLE BASE (6" COMPACTED DEPTH)	SY	502	\$ 9.50	\$4,769.00
202.1	PRIME COAT	GAL	103	\$ 6.51	\$670.53
203.1	TACK COAT	GAL	50	\$ 5.58	\$279.00
307.1	CONCRETE STRUCTURE(RETAINING WALLS) (10 C.Y. < X < 100 C.Y.)	CY	2	\$ 730.24	\$1,460.48
503.1	PORTLAND CEMENT CONCRETE DRIVEWAYS (100 S.Y. < X < 10,000 S.Y.)	SY	60	\$ 70.11	\$4,206.60
503.3	EXPOSED AGGREGATE DRIVEWAY	SY	20	\$ 124.66	\$2,493.20
503.4	ASPHALT CONCRETE DRIVEWAY (< 100 S.Y.)	SY	32	\$ 76.13	\$2,436.16
505.1	CONCRETE RIPRAP (5" THICK) (< 100 S.Y.)	SY	81	\$ 275.14	\$22,286.34
512.3	VALVE BOX ADJUSTMENTS	EA	1	\$ 452.43	\$452.43
513.1	REMOVING AND RELOCATING MAIL BOXES (< 50 UNITS)	EA	3	\$ 231.61	\$694.83
515.1	TOPSOIL (< 500 C.Y.)	CY	31	\$ 33.95	\$1,052.45
516.1	BERMUDA SODDING (< 2,000 S.Y.)	SY	266	\$ 5.92	\$1,574.72
530.1	BARRICADES, SIGNS & TRAFFIC HANDLING	LS	1	\$ 5,000.00	\$5,000.00
540.1	ROCK FILTER DAMS (INSTALL/REMOVE) (TYPE 2)	LF	14	\$ 33.55	\$469.70
540.1	ROCK FILTER DAMS (INSTALL/REMOVE) (TYPE 4)	LF	8	\$ 56.84	\$454.72
540.6	CONSTRUCTION EXISTS (INSTALL/REMOVE)	SY	78	\$ 24.53	\$1,913.34
540.9	TEMPORARY SEDIMENT CONTROL FENCE	LF	120	\$ 3.09	\$370.80
341 6040	D-GR HMA TY-D PG64-22	TON	109	\$ 58.78	\$6,407.02
360 6002	CONC PVMF (CONT REINF-CRCP) (8")	SY	203	\$ 46.07	\$9,352.21
460 6010	CMP AR (GAL STL DES 3)	LF	48	\$ 67.92	\$3,260.16
1004 6001	TREE PROTECTION / CERTIFIED ARBORIST	EA	11	\$ 287.52	\$3,162.72
5033 XXXX	PIPE BOLLARD	EA	10	\$ 795.00	\$7,950.00
BASE BID SUBTOTAL					\$112,989.06
100.1	MOBILIZATION (10%)	LS	1	\$ 11,298.91	\$11,298.91
100.2	INSURANCE AND BOND (3%)	LS	1	\$ 3,389.67	\$3,389.67
101.1	PREPARING RIGHT-OF-WAY (4%)	LS	1	\$ 4,519.56	\$4,519.56
-	CONTINGENCIES (10%)	LS	1	\$ 11,298.91	\$11,298.91
BASE BID PROJECT TOTAL					\$143,496.11
ADDITIVE ALTERNATIVE 1					
103.3	REMOVE CONCRETE SIDEWALKS & DRIVEWAYS (1,000 S.F. < X < 3,000 S.F.)	SF	1212	\$ 4.11	\$4,981.32
104.1	STREET EXCAVATION (< 1,000 C.Y.)	CY	43	\$ 34.63	\$1,489.09
107.1	EMBANKMENT (FINAL)(ORD COMP)(TY A)	CY	1	\$ 19.14	\$19.14
503.1	PORTLAND CEMENT CONCRETE DRIVEWAYS (100 S.Y. < X < 10,000 S.Y.)	SY	134	\$ 70.11	\$9,394.74
513.1	REMOVING AND RELOCATING MAIL BOXES (< 50 UNITS)	EA	1	\$ 231.61	\$231.61
515.1	TOPSOIL (< 500 C.Y.)	CY	26	\$ 33.95	\$882.70
516.1	BERMUDA SODDING (< 2,000 S.Y.)	SY	234	\$ 5.92	\$1,385.28
540.1	ROCK FILTER DAMS (INSTALL/REMOVE) (TYPE 2)	LF	28	\$ 33.55	\$939.40
460 6010	CMP AR (GAL STL DES 3)	LF	86	\$ 67.92	\$5,841.12
ADDITIVE ALTERNATIVE 1 SUB-TOTAL					\$25,164.40
100.1	MOBILIZATION (10%)	LS	1	\$ 2,516.44	\$2,516.44
100.2	INSURANCE AND BOND (3%)	LS	1	\$ 754.93	\$754.93
101.1	PREPARING RIGHT-OF-WAY (4%)	LS	1	\$ 1,006.58	\$1,006.58
-	CONTINGENCIES (10%)	LS	1	\$ 2,516.44	\$2,516.44
ADDITIVE ALTERNATIVE 1 PROJECT TOTAL					\$31,958.79
ADDITIVE ALTERNATIVE 2					
307.1	CONCRETE STRUCTURE(RETAINING WALLS) (10 C.Y. < X < 100 C.Y.)	CY	11	\$ 730.24	\$8,032.64
540.1	ROCK FILTER DAMS (INSTALL/REMOVE) (TYPE 4)	LF	29	\$ 56.84	\$1,648.36
1004 6001	TREE PROTECTION / CERTIFIED ARBORIST	EA	9	\$ 287.52	\$2,587.68
ADDITIVE ALTERNATIVE 2 SUB-TOTAL					\$12,268.68
100.1	MOBILIZATION (10%)	LS	1	\$ 1,226.87	\$1,226.87
100.2	INSURANCE AND BOND (3%)	LS	1	\$ 368.06	\$368.06
101.1	PREPARING RIGHT-OF-WAY (4%)	LS	1	\$ 490.75	\$490.75
-	CONTINGENCIES (10%)	LS	1	\$ 1,226.87	\$1,226.87
ADDITIVE ALTERNATIVE 2 PROJECT TOTAL					\$15,581.22
GRAND TOTAL WITH ADDITIVE ALTERNATIVE 1 AND 2					\$191,036.12



**FOR REVIEW ONLY**  
DO NOT USE FOR PERMITTING, BIDDING, OR CONSTRUCTION.

**CLIENT: CITY OF CASTLE HILLS**  
**PROJECT: WATERSHED III - GLENTOWER**  
**SUBJECT: OPINION OF PROBABLE CONSTRUCTION COST**

**ESTIMATED QUANTITIES**

ITEM NO.	DESCRIPTION	UNIT	QUANT.	UNIT PRICE	TOTAL PRICE
COSA BID ITEMS					
103.4	REMOVE MISCELLANEOUS CONCRETE	S.F.	568	\$ 10.00	\$5,680.00
105.1	CHANNEL EXCAVATION ( 150< X < 5,000 C.Y.)	C.Y.	578	\$ 25.00	\$14,450.00
106.1	BOX CULVERT EXCAVATION & BACKFILL (600 < X < 10,000 C.Y.)	C.Y.	1374	\$ 15.00	\$20,610.00
309.1	PRECAST REINFORCED CONCRETE CULVERT (5' x 4')	L.F.	923	\$ 408.00	\$376,584.00
401.1	REINFORCED CONCRETE PIPE (CLASS III)(18" DIA)	L.F.	150	\$ 175.00	\$26,250.00
505.1	CONCRETE RIPRAP (5" THICK) (100 < X < 4000 S.Y.)	S.Y.	639	\$ 61.00	\$38,979.00
550.1	TRENCH EXCAVATION SAFETY PROTECTION	L.F.	308	\$ 10.00	\$3,080.00
SAWS BID ITEMS					
851	ADJUSTING EXISTING MANHOLES	EA	1	\$ 2,350.00	\$2,350.00
TXDOT BID ITEMS					
465 6021	INLET (COMPL)(PCO)(5FT)(NONE)	EA	4	\$ 5,000.00	\$20,000.00
465 6342	INLET (COMPL) (TRAFFIC) (TY W - 2)	EA	2	\$ 12,000.00	\$24,000.00
466 6150	WINGWALL (FW - 0) (HW=3 FT)	EA	1	\$ 7,000.00	\$7,000.00
466 6209	WINGWALL (SW - 0) (HW=6 FT)	EA	1	\$ 11,000.00	\$11,000.00
1004 6001	TREE PROTECTION	EA	18	\$ 200.00	\$3,600.00
5084 6001	FIXED BOLLARD	EA	15	\$ 735.00	\$11,025.00
<b>DRAINAGE CONSTRUCTION TOTAL</b>					<b>\$564,608.00</b>
100.1	MOBILIZATION (10%)	LS	1	\$ 56,460.80	\$56,460.80
100.2	INSURANCE AND BOND (3%)	LS	1	\$ 16,938.24	\$16,938.24
101.1	PREPARING RIGHT-OF-WAY (5%)	LS	1	\$ 28,230.40	\$28,230.40
	CONTINGENCIES (25%)	LS	1	\$ 141,152.00	\$141,152.00
<b>DRAINAGE PROJECT TOTAL</b>					<b>\$807,389.44</b>
-	GEOTECHNICAL SERVICES	LS	1	\$ 7,900.00	\$8,690.00
-	ENGINEERING SERVICES	LS	1	\$ 114,649.30	\$202,946.19
-	SURVEY AND FIELD RECONNAISSANCE	LS	1	\$ 15,000.00	\$7,040.00
<b>PROJECT TOTAL</b>					<b>\$1,026,065.63</b>



**FOR REVIEW ONLY**  
DO NOT USE FOR PERMITTING, BIDDING, OR CONSTRUCTION.

**CLIENT:** CITY OF CASTLE HILLS  
**PROJECT:** WATERSHED III - BANYAN  
**SUBJECT:** OPINION OF PROBABLE CONSTRUCTION COST

**ESTIMATED QUANTITIES**

ITEM NO.	DESCRIPTION	UNIT	QUANT.	UNIT PRICE	TOTAL PRICE
-	INLET (COMPL)(TRAFFIC)(TY X-2)	EA	2	\$ 12,000.00	\$24,000.00
465 2143	INLET (COMPL)(TRAFFIC)(TY X-1)	EA	1	\$ 5,642.00	\$5,642.00
-	PRECAST REINFORCED CONCRETE CULVERT (11' x 5')	L.F.	1067	\$ 580.00	\$618,860.00
<b>SUBTOTAL</b>					<b>\$648,502.00</b>
100.1	MOBILIZATION (10%)	LS	1	\$ 64,850.20	\$64,850.20
100.2	INSURANCE AND BOND (3%)	LS	1	\$ 19,455.06	\$19,455.06
101.1	PREPARING RIGHT-OF-WAY (5%)	LS	1	\$ 32,425.10	\$32,425.10
-	UTILITY ADJUSTMENTS (25%)	LS	1	\$ 162,125.50	\$162,125.50
-	CONTINGENCIES (25%)	LS	1	\$ 162,125.50	\$162,125.50
<b>DRAINAGE PROJECT TOTAL</b>					<b>\$1,089,483.36</b>
-	GEOTECHNICAL SERVICES (7%)	LS	1	\$ 76,263.84	\$76,263.84
-	ENGINEERING SERVICES (15%)	LS	1	\$ 163,422.50	\$163,422.50
-	SURVEY AND FIELD RECONNAISSANCE (5%)	LS	1	\$ 8,106.28	\$8,106.28
-	EASEMENT ACQUISITION	LS	1	\$ 5,000.00	\$5,000.00
<b>PROJECT TOTAL</b>					<b>\$1,334,169.70</b>





**FOR REVIEW ONLY**  
DO NOT USE FOR PERMITTING, BIDDING, OR CONSTRUCTION.

**CLIENT:** CITY OF CASTLE HILLS  
**PROJECT:** WATERSHED III - CAROLWOOD  
**SUBJECT:** OPINION OF PROBABLE CONSTRUCTION COST

**ESTIMATED QUANTITIES**

ITEM NO.	DESCRIPTION	UNIT	QUANT.	UNIT PRICE	TOTAL PRICE
465 2056	INLET (COMPL)(CURB)(TY 2)(20')	EA	2	\$ 8,874.00	\$17,748.00
-	INLET (COMPL)(CURB)(TY 2)(30')	EA	8	\$ 12,000.00	\$96,000.00
464 2005	RC PIPE (CL III)(24 IN)	LF	252	\$ 56.00	\$14,112.00
462 2019	CONC BOX CULV (8 FT X 4 FT)	LF	1300	\$ 375.00	\$487,500.00
<b>SUBTOTAL</b>					<b>\$615,360.00</b>
100.1	MOBILIZATION (10%)	LS	1	\$ 61,536.00	\$61,536.00
100.2	INSURANCE AND BOND (3%)	LS	1	\$ 18,460.80	\$18,460.80
101.1	PREPARING RIGHT-OF-WAY (5%)	LS	1	\$ 30,768.00	\$30,768.00
-	UTILITY ADJUSTMENTS (25%)	LS	1	\$ 153,840.00	\$153,840.00
-	CONTINGENCIES (25%)	LS	1	\$ 153,840.00	\$153,840.00
<b>DRAINAGE PROJECT TOTAL</b>					<b>\$1,033,804.80</b>
-	GEOTECHNICAL SERVICES (7%)	LS	1	\$ 72,366.34	\$72,366.34
-	ENGINEERING SERVICES (15%)	LS	1	\$ 155,070.72	\$155,070.72
-	SURVEY AND FIELD RECONNAISSANCE (5%)	LS	1	\$ 7,692.00	\$7,692.00
-	EASEMENT ACQUISITION	LS	1	\$ 5,000.00	\$5,000.00
<b>PROJECT TOTAL</b>					<b>\$1,266,241.86</b>



FOR REVIEW ONLY  
DO NOT USE FOR PERMITTING, BIDDING, OR  
CONSTRUCTION.

CLIENT: CITY OF CASTLE HILLS  
PROJECT: WATERSHED IV - TRAVERTINE  
SUBJECT: OPINION OF PROBABLE CONSTRUCTION COST

ESTIMATED QUANTITIES

ITEM NO.	DESCRIPTION	UNIT	QUANT.	UNIT PRICE	TOTAL PRICE
401.1	REINFORCED CONCRETE PIPE (CLASS III)(36" DIA)	L.F.	3300	\$ 157.19	\$518,716.00
401.1	REINFORCED CONCRETE PIPE (CLASS III)(48" DIA)	L.F.	880	\$ 271.45	\$238,873.07
401.1	REINFORCED CONCRETE PIPE (CLASS III)(48" DIA)		1730	\$ 309.16	\$534,846.80
465 6004	MANHOLE (COMP)(PRM)(60IN)	EA	10	\$ 4,599.85	\$45,998.45
550.1	TRENCH EXCAVATION SAFETY PROTECTION	L.F.	5910	\$ 10.00	\$59,100.00
-	INLET	EA	14	\$ 5,000.00	\$70,000.00
-	STREET REPAIR	LF	5850	\$ 250.00	\$1,462,500.00
-	MISC. DEMOLITION	LS	1	\$ 50,000.00	\$50,000.00
DRAINAGE CONSTRUCTION TOTAL					\$2,980,034.32
100.1	MOBILIZATION (10%)	LS	1	\$ 298,003.43	\$298,003.43
100.2	INSURANCE AND BOND (3%)	LS	1	\$ 89,401.03	\$89,401.03
101.1	PREPARING RIGHT-OF-WAY (5%)	LS	1	\$ 149,001.72	\$149,001.72
-	CONTINGENCIES (25%)	LS	1	\$ 745,008.58	\$745,008.58
DRAINAGE PROJECT TOTAL					\$4,261,449.07
-	GEOTECHNICAL SERVICES (7%)	LS	1	\$ 298,301.44	\$298,301.44
-	ENGINEERING SERVICES (15%)	LS	1	\$ 639,217.36	\$639,217.36
-	SURVEY AND FIELD RECONNAISSANCE (5%)	LS	1	\$ 213,072.45	\$213,072.45
-	HOUSE BUYOUT (INCLUDING CLOSING COSTS, ETC)	EA	4	\$ 300,000.00	\$1,200,000.00
PROJECT TOTAL					\$6,612,040.32



FOR REVIEW ONLY  
DO NOT USE FOR PERMITTING, BIDDING, OR  
CONSTRUCTION.

CLIENT: CITY OF CASTLE HILLS  
PROJECT: WATERSHED IV - LEMONWOOD  
SUBJECT: OPINION OF PROBABLE CONSTRUCTION COST

ESTIMATED QUANTITIES

ITEM NO.	DESCRIPTION	UNIT	QUANT.	UNIT PRICE	TOTAL PRICE
401.1	REINFORCED CONCRETE PIPE (CLASS III)(36" DIA)	L.F.	880	\$ 157.19	\$138,324.27
401.1	REINFORCED CONCRETE PIPE (CLASS III)(48" DIA)	L.F.	900	\$ 271.45	\$244,302.00
465 6004	MANHOLE (COMP)(PRM)(60IN)	EA	2	\$ 4,599.85	\$9,199.69
550.1	TRENCH EXCAVATION SAFETY PROTECTION	L.F.	2880	\$ 10.00	\$28,800.00
-	PARALLEL 48-IN RC PIPES	L.F.	1100	\$ 450.00	\$495,000.00
-	INLET	EA	6	\$ 5,000.00	\$30,000.00
-	STREET REPAIR	LF	850	\$ 250.00	\$212,500.00
-	MISC. DEMOLITION	LS	1	\$ 50,000.00	\$50,000.00
DRAINAGE CONSTRUCTION TOTAL					\$1,208,125.96
100.1	MOBILIZATION (10%)	LS	1	\$ 120,812.60	\$120,812.60
100.2	INSURANCE AND BOND (3%)	LS	1	\$ 36,243.78	\$36,243.78
101.1	PREPARING RIGHT-OF-WAY (5%)	LS	1	\$ 60,406.30	\$60,406.30
-	CONTINGENCIES (25%)	LS	1	\$ 302,031.49	\$302,031.49
DRAINAGE PROJECT TOTAL					\$1,727,620.12
-	GEOTECHNICAL SERVICES (7%)	LS	1	\$ 120,933.41	\$120,933.41
-	ENGINEERING SERVICES (15%)	LS	1	\$ 259,143.02	\$259,143.02
-	SURVEY AND FIELD RECONNAISSANCE (5%)	LS	1	\$ 86,381.01	\$86,381.01
PROJECT TOTAL					\$2,194,077.55



FOR REVIEW ONLY  
DO NOT USE FOR PERMITTING, BIDDING, OR  
CONSTRUCTION.

**CLIENT: CITY OF CASTLE HILLS**  
**PROJECT: WATERSHED V - ATWATER**  
**SUBJECT: OPINION OF PROBABLE CONSTRUCTION COST**

**ESTIMATED QUANTITIES**

ITEM NO.	DESCRIPTION	UNIT	QUANT.	UNIT PRICE	TOTAL PRICE
401.1	REINFORCED CONCRETE PIPE (CLASS III)(48" DIA)	L.F.	750	\$ 237.71	\$178,280.00
401.1	REINFORCED CONCRETE PIPE (CLASS III)(60" DIA)	L.F.	750	\$ 427.15	\$320,360.00
465 6004	MANHOLE (COMP)(PRM)(72IN)	EA	2	\$ 5,671.99	\$11,343.98
550.1	TRENCH EXCAVATION SAFETY PROTECTION	L.F.	1500	\$ 10.00	\$15,000.00
	INLET	EA	2	\$ 5,000.00	\$10,000.00
	MISC. DEMOLITION	LS	1	\$ 200,000.00	\$200,000.00
<b>DRAINAGE CONSTRUCTION TOTAL</b>					<b>\$734,983.98</b>
100.1	MOBILIZATION (10%)	LS	1	\$ 73,498.40	\$73,498.40
100.2	INSURANCE AND BOND (3%)	LS	1	\$ 22,049.52	\$22,049.52
101.1	PREPARING RIGHT-OF-WAY (5%)	LS	1	\$ 36,749.20	\$36,749.20
	CONTINGENCIES (25%)	LS	1	\$ 183,746.00	\$183,746.00
<b>DRAINAGE PROJECT TOTAL</b>					<b>\$1,051,027.09</b>
-	GEOTECHNICAL SERVICES (7%)	LS	1	\$ 73,571.90	\$73,571.90
-	ENGINEERING SERVICES (15%)	LS	1	\$ 157,654.06	\$157,654.06
-	SURVEY AND FIELD RECONNAISSANCE (5%)	LS	1	\$ 52,551.35	\$52,551.35
<b>PROJECT TOTAL</b>					<b>\$1,334,804.41</b>