### San Felipe Creek Master Plan VOLUME II









Prepared for:

The San Felipe Creek Commissioners & The City of Del Rio



and the



Prepared by:







TBPE Registered Firm No.: F-355

September 2012

NEI Project No. 8267/TWDB Contract No. 1004831077

**Final Report** 

2012 SEP 24 PM 3: 08

### **Engineering Oversight of the San Felipe Creek Master Plan**

On August 11, 2005, the Texas Board of Professional Engineers (TBPE) issued a "Policy Advisory Opinion" on the aspects of water quality planning that are subject to the Texas Engineering Practice Act (TEPA). Under Texas State Law, the TBPE is authorized to issue advisory opinions and interpretations of the TEPA.

Based on this Policy Advisory Opinion, "Water Quality Planning Activities" that require professional engineers include the following:

- Feasibility studies regarding engineered water quality control measures, treatment technologies and treatment plants;
- Siting of engineered water quality management measures:
- Monitoring and evaluation of engineered water quality measures for assessment or adjustment of functional processes; and,
- Specification of engineered water treatment technologies.

In addition to these specific tasks, Texas licensed engineers are required to prepare the specifications, designs and perform construction monitoring of public works projects not exempted by the Act. Licensed professional engineers are required to perform the design of the listed activities for private works not exempted by the Act.

Based on this opinion, certain elements of this Plan include the "specification of engineered water treatment technologies", to the degree that certain minimum design requirements for water quality best management practices have been included in the Plan. This Plan does not involve feasibility studies for specific water quality control measures. The siting of specific water quality control measures included in this plan should be considered preliminary only, and final siting and design of any water quality control system will require the services of a professional engineer. I certify that the elements of this Plan determined by the TBPE under this Policy Advisory Opinion to constitute the practice of engineering have been performed under my direct supervision.

David B. Fusilier, P.E. Texas License No. 88710

September 18, 2012

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### CANE ERADICATION COSTS SAN FELIPE CREEK MASTER PLAN

A-1 to A-6; B-1 to B-3; C-1 to C-5; D-1 to D-3; E-1 to E-2; F-1 to F-4 Project No.: Cane Eradication - Manual Labor (cutting by Gas Trimmer w/ Brush Attachment) Project: Project Area: ALL Short-Term Priority: Cane Removal / Day / Person = sq.ft. (average production rate) **Unit Price Total Cost** Item **Improvement Description** Quantity Unit 40 \$ 200 8,000 Chemicals \$ acres Cane Eradication - Personnel (see details below) 40 acres 23,397 \$ 935,872 Cane Eradication - Equipment (see details below) 40 11,400 \$ 456,000 acres \$ 1,399,872 Construction \$ Engineering Design & Mgmt (13%) \$ Total Estimated Construction Cost \$ 1,399,872 Contingency (25%) \$ 349,968 Total Project Estimated Cost \$ 1,749,840 PLANNING PROJECT COST 1,750,000 43,750 AVERAGE COST / ACRE (Project Cost / 40 acres) = \$

PERSONNEL	COSTS:
LLIVOOINIALE	00010.

Number of Person Per Crew

Cane Removal / Day / Crew
Cane Removal / Day / Person
Cane Removal / Week / Person
of Persons Needed to Remove 1.0 Acres of Cane in One Week
of Cane Loaders (general laborers)
of Front Loader/Bobcat Operators
of Truck Drivers
of Shredder Operators
of Shredder Operators
TOTAL NUMBER OF WORKERS
Worker Saleries & Overhead Cost to City
Hours Worked per Week
Cost / Worker / Week
TOTAL COST OF CANE REMOVAL - PERSONNEL ONLY
Total Area of Cane

TOTAL COST OF CANE REMOVAL - PERSONNEL ONLY

2,000	sq. ft. / day
1,000	sq. ft. / day
5,000	sq. ft. / week
9	persons [min. necessary to remove 1 acre / week]
2	persons
17	persons / 1 acre of cane removed / week

# \$ 35 \$ / hour 40 hours / week \$ 1,400 \$ / Worker / Week \$ 23,397 \$ / acre 40 acres \$ 935,872

2 trucks

colored cells require data input

2 persons

#### **EQUIPMENT COST:**

# of Trucks Needed

# of Front Loaders
# of Shredders

Cost of 1 Truck / Hour
Cost of 1 Front Loader / Hour
Cost of 1 Shredder / Hour

Hours Worked (Operated) / Week

Cost of 1 Truck / Week
Cost of 1 Front Loader / Week
Cost of 1 Shredder / Week
Total Cost of Trucks / Week
Total Cost of Front Loaders / Week
Total Cost of Shredders / Week
TOTAL COST OF EQUIPMENT / WEEK
TOTAL COST OF EQUIPMENT / 1 acre of cane removed

2	front loadres
2	shredders
60	\$ / hour
60	\$ / hour
30	\$ / hour
40	1
40	hours
\$ 2,400	\$ / week
\$ 2,400	\$ / week
\$ 900	\$ / week
\$ 4,800	\$ / week
\$ 4,800	\$ / week
\$	\$ / week
\$ 11,400	\$ / week
\$ 11,400	\$ / acre
40	acres

#### PERSONNEL + EQUIPMENT COST:

COST OF CANE REMOVAL - CHEMICALS ONLY COST OF CANE REMOVAL - PERSONNEL ONLY COST OF CANE REMOVAL - EQUIPMENT ONLY TOTAL COST OF CANE REMOVAL -

\$	8,	000	)
\$ CONTRACTOR OF THE PARTY OF	35,	COP BOOK	400
\$ 4	56,	000	)
\$ 1,3	99,	872	!

456,000

#### TOTAL PERSONNEL + EQUIPMENT COST [PER 1 ACRE REMOVED]:

COST OF CANE REMOVAL - CHEMICALS ONLY COST OF CANE REMOVAL - PERSONNEL ONLY COST OF CANE REMOVAL - EQUIPMENT ONLY TOTAL COST OF CANE REMOVAL -

\$	200	/ ACRE	
\$	23,397		
\$	11,400	/ ACRE	
\$	34,997	/ ACRE	[NO CONTINGENCY]

### CANE ERADICATION COSTS SAN FELIPE CREEK MASTER PLAN

Project No.: A-1 to A-6; B-1 to B-3; C-1 to C-5; D-1 to D-3; E-1 to E-2; F-1 to F-4 Cane Eradication - Hydro Ax Project: Project Area: Priority: Short-Term Cane Removal / Day / Person = 3,000 sq.ft. (average production rate) Item Improvement Description Quantity **Unit Price** Unit **Total Cost** Chemicals 40 AC 200 8,000 Cane Eradication - Personnel (see details below) 40 \$ 11.906 476.224 AC \$ Cane Eradication - Equipment (see details below) 40 AC 10,960 \$ \$ 438,400 922,624 Construction \$ Engineering Design & Mgmt (13%) \$ Total Estimated Construction Cost \$ 922,624 Contingency (25%) 230,656 Total Project Estimated Cost \$ 1,153,280 PLANNING PROJECT COST \$ 1,155,000 AVERAGE COST / ACRE (Project Cost / 40 acres) = \$ 28,875 colored cells require data input

PER	SO	NNFI	COS	STS

Number of Person Per Crew
Cane Removal / Day / Crew
Cane Removal / Day / Person
# of Persons Needed to Remove 1.0 Acres of Cane in One Day
# of Cane Loaders
# of Cane Off-Loaders
# of Truck Drivers
# of Shredder Operators (@ 2 persons / shredder)
TOTAL NUMBER OF WORKERS
Worker Saleries & Overhead Cost to City
Hours Worked per Day
Hours Worked per Week
Cost / Worker / Day
COST OF CANE REMOVAL / DAY - PERSONNEL ONLY
Total Area of Cane
TOTAL COST OF CANE REMOVAL - PERSONNEL ONLY

#### 2 persons 6,000 sq. ft. / day 3,000 sq. ft. / day 15 persons [min. necessary to remove 1 acre / day] persons persons persons persons 43 persons / 1 acre of cane removed / DAY 35 \$ / hour 8 hours / day 40 hours / week 280 \$ / Worker / Day 11,906 \$ / acre removed in 1 day 40 acres 476,224

#### EQUIPMENT COST: # of Hydro-Axes

# of Trucks Needed # of Front Loaders # of Shredders Cost of 1 Hydro-Ax / Hour Cost of 1 Truck / Hour Cost of 1 Front Loader / Hour Cost of 1 Shredder / Hour Hours Worked (Operated) / Day Cost of 1 Hydro-Ax / Week Cost of 1 Truck / Week Cost of 1 Front Loader / Week Cost of 1 Shredder / Week Total Cost of Hydro-Ax / Week Total Cost of Trucks / Week Total Cost of Front Loaders / Week Total Cost of Shredders / Week TOTAL COST OF EQUIPMENT / DAY COST OF EQUIPMENT / 1 acre of cane removed Total Area of Cane TOTAL COST OF CANE REMOVAL - EQUIPMENT ONLY

1	Hydro-Ax
6	trucks
6	front loadres
	shredders

200 \$ / hour

60 \$ / hour 60 \$ / hour 30 \$ / hour 8 hours 1600 \$ / day 480 \$ / day 480 \$ / day 900 \$ / day 1,600 \$ / day 2,880 \$ / day 2,880 \$ / day 3,600 \$ / day 10,960 \$ / day 10,960 \$ / day 40 acres 438,400

### TOTAL PERSONNEL + EQUIPMENT COST [40 ACRES]:

COST OF CANE REMOVAL - CHEMICALS ONLY
COST OF CANE REMOVAL - PERSONNEL ONLY
COST OF CANE REMOVAL - EQUIPMENT ONLY
TOTAL COST OF CANE REMOVAL -

\$ 8,000
\$ 476,224
\$ 438,400
\$ 922,624

#### TOTAL PERSONNEL + EQUIPMENT COST [PER 1 ACRE REMOVED]:

COST OF CANE REMOVAL - CHEMICALS ONLY
COST OF CANE REMOVAL - PERSONNEL ONLY
COST OF CANE REMOVAL - EQUIPMENT ONLY
TOTAL COST OF CANE REMOVAL 
\$ 1,200 / ACRE
\$ 11,906 / ACRE
\$ 10,960 / ACRE
\$ 24,066 / ACRE

Project No.: A-1 to A-6, B-1, B-2, C-1, C-2, D-1, D-2

Project: CANE ERADICATION - LABOR COSTS FOR 5 YEAR PERIOD

Project Area: San Felipe Creek (Item No. 3 includes only the cane between US Hwy 90 and Tardy Dam - Approx. 2 acres)

Item	Improvement Description	\$/acre	Year 1	Year 2	Year 3	Year 4	Year 5	T	otal Cost
1	Cane Eradication - Manual (all 40 acres)	\$ 43,750	\$ 1,750,000	\$ 700,000	\$ 280,000	\$ 112,000	\$ 44,800	\$	2,930,550
2	Cane Eradication - Hydro-Ax (all 40 acres)	\$ 28,875	\$ 1,155,000	\$ 462,000	\$ 184,800	\$ 73,920	\$ 29,568	\$	1,934,163
3	Cane Eradication - Manual Between Hwy 90 & Tardy Dam (2 acres)	\$ 43,750	\$ 87,500	\$ 35,000	\$ 14,000	\$ 5,600	\$ 2,240	\$	188,090
4	Cane Eradication - Manual (Remaining 38 acres)	\$ 43,750	\$ 1,662,500	\$ 665,000	\$ 266,000	\$ 106,400	\$ 42,560	\$	2,786,210

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### **APPENDIX F**

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inked Projects		Tie Breakers: (1) Project Cost; (2) Project Type (e.g., Bank Improvement before Veg. Enhance.); (3) Project Area/Length; and, (3) Judgement [judgement includes the nature of the proposed project, the project location, and proximity of project to SFC].	Linked Projects: The use of a Projects" column indicates prelated and should be constru	rojects tha	t are closely				Public Safety & Public Access	Impact on Endange Species (Long-Tern	Impact on Water Qu	Degredation - Exist Environmental Degredation Within Project Area	Project Cost	Maintenance - Expected Impact	Total Score	Average Score	Rank
Rank	Project #	Project	Туре	Priority	Cost	Project Area/Length	Units	Project #	1	2	3	4	5	6		1000	
NVASIVE S	PECIES ERADI	CATION			THE STREET PROPERTY AND COMP	The second secon											
											-						
1a	/ B-1	Cane Eradication – West Fork of SFC	INVASIVE SPECIES CONTROL	<u> </u>	\$ 9,000	0.25	ac	B-1	5	5	5		5	2			
1b	B-2	Cane Eradication – East Fork of SFC	INVASIVE SPECIES CONTROL	1	\$ 9,000	0.25	ac	B-2	5	5	5		5	2	Terrane .	3.86	
1c	N B-3	Veg. Removal - Blue Hole	INVASIVE SPECIES CONTROL		\$ 35,000	1	LS	B-3	5	5	5	5	4	2		3.71	1c
2a	/ C-1	Cane Eradication – left bank of SFC between Dr. F. Calderon Blvd. & Romanelli Park Footbridge	INVASIVE SPECIES CONTROL	1	\$ 9,000	0.25	ac	C-1	5	5	5	5	5	2		3.86	
2b	C-2	Cane Eradication - right bank of SFC between Dr. F. Calderon Blvd. & Romanelli Park Footbridge	INVASIVE SPECIES CONTROL	1	\$ 9,000	0.25	ac	C-2	5	5	5	5	5	2		3.86	- Francisco
2c	C-3	Cane Eradication – left bank of SFC between Romanelli Park Footbridge & Gillis St.	INVASIVE SPECIES CONTROL	1	\$ 9,000	0.25	ac	C-3	5	5		5	5	2	27.00	3.86	
2d	C-4	Cane Eradication – right bank of SFC between Romanelli Park Footbridge & Gillis St.	INVASIVE SPECIES CONTROL	1_	\$ 9,000	0.25	ac	C-4	5	5	5	5	5	2	27.00	3.86	
2e	1 C-5	Cane Eradication – drainage channel at end of Calderon Ln upstream to Roosevelt Park	INVASIVE SPECIES CONTROL	1	\$ 9,000	0.25	ac	C-5	5	5	5	5	5	2	27.00	3.86	
3a	/ D-1	Cane Eradication – left bank of SFC between Gillis St. & Tardy Dam	INVASIVE SPECIES CONTROL	1_	\$ 9,000	0.25	ac	D-1	5	5	5	5	5	2		3.86	
3b	D-2	Cane Eradication – right bank of SFC between Gillis St. & Tardy Dam	INVASIVE SPECIES CONTROL	l I	\$ 9,000	0.25	ac	D-2	5	5	5	5	5	2		3.86	
3c	\ D-3	Cane Eradication – at Tardy Dam (between Tardy Dam and Johnson St.)	INVASIVE SPECIES CONTROL	1	\$ 9,000	0.25	ac	D-3	5	5	5	5	5	2		3.86	A CONTRACTOR
4a	/ A-1	Cane Eradication – right bank of West Fork	INVASIVE SPECIES CONTROL	S	\$ 44,000	1.00	ac	A-1	5	5	5	5	4	2		3.71	4a
4b	A-2	Cane Eradication – left bank of West Fork	INVASIVE SPECIES CONTROL	S	\$ 88,000	2.00	ac	A-2	5	5	5	5	3	2	25.00	3.57	4b
4c	A-3	Cane Eradication – right bank of Mid Fork	INVASIVE SPECIES CONTROL	S	\$ 88,000	2.00	ac	A-3	5	5	5	5	3	2	25.00	3.57	4c
4d	A-4	Cane Eradication – left bank of Mid Fork	INVASIVE SPECIES CONTROL	S	\$ 44,000	1.00	ac	A-4	5	5	5	5	4	2	26.00	3.71	4d
4e	A-5	Cane Eradication – right bank of East Fork	INVASIVE SPECIES CONTROL	S	\$ 44,000	1.00	ac	A-5	5	5	5	5	4	2	26.00	3.71	4e
4f \	A-6	Cane Eradication – left bank of East Fork	INVASIVE SPECIES CONTROL	S	\$ 44,000	1.00	ac	A-6	5	5	5	5	4	2	26.00	3.71	4f
5	A-13	Nutria/Rodent Control	INVASIVE SPECIES CONTROL	S	\$ 3,000	1	LS	A-13	4	5	5	4	5	3	26.00	3.71	5
6	\ A-14	Armored Catfish Eradication	INVASIVE SPECIES CONTROL	S	\$ UNKNOWN	1	LS	A-14	4	5		5	1	3	23.00	3.29	
7a	/ E-1	Cane Eradication – left bank of SFC between Taini St./Johnson St. Bridge and Canal St. Bridge	INVASIVE SPECIES CONTROL	S	\$ 132,000	3.00	ac	E-1	5	5	5	5	2	2	24.00	3.43	7a
7b	\ E-2	Cane Eradication – right bank of SFC between Taini St./Johnson St. Bridge and Canal St. Bridge	INVASIVE SPECIES CONTROL	S	\$ 220,000	5.00	ac	E-2	5	5	5	5	2	2	24.00	3.43	7b
8a	/ F-1	Cane Eradication – left bank of SFC between Canal St. and E. Academy St.	INVASIVE SPECIES CONTROL	S	\$ 132,000	3.00	ac	F-1	5	5	5	5	2	2	24.00	3.43	
8b	F-2	Cane Eradication - right bank of SFC between Canal St. and E. Academy St.	INVASIVE SPECIES CONTROL	S	\$ 220,000	5.00	ac	F-2	5	5	5	5	2	2	24.00	3.43	
8c	F-3	Cane Eradication – left bank of SFC between E. Academy St. & Weir Dam	INVASIVE SPECIES CONTROL	S	\$ 352,000	8.00	ac	F-3	5	5	5	5	1	2	23.00	3.29	
8d	\ F-4	Cane Eradication – right bank of SFC between E. Academy St. & Weir Dam	INVASIVE SPECIES CONTROL	S	\$ 264,000	6.00	ac	F-4	5	5	5	5	1	2	23.00	3.29	8d
					\$ 1,800,000		California de la companya della companya della companya de la companya della comp										
NIBUC CAE	TTV 9 ACCES																
OBLIC SAF	ETY & ACCES																1 × 1 × 2
1	C-21	Bank Stab./Focused Access – under Gillis St. Bridge	BANK IMPROVEMENTS	S	\$ 110,000	1	ea	C-21	5	5	5	5	3	4	27.00	4.50	1
2	C-15	Bank Stab./New Pervious Parking Area – under Dr. F. Calderon Blvd. Bridge	STORMWATER BMP	s	\$ 350,000	190	ft	C-15	5	5	5	5	1	4	25.00	4.17	2
3a	/ D-11	Remove Existing Walls – right bank of SFC immediately downstream of Tardy Dam	BANK IMPROVEMENTS	s	\$ 12,000	300	ft	D-11	5	4	4	4	4	3	24.00	4.00	3a
3b	\ D-12	Reconstruct Existing Walls – right bank area of SFC immediately downstream of Tardy Dam	BANK IMPROVEMENTS	S	\$ 140,000	300	ft	D-12									3b
4	D-18	Convert Existing Wading Area to Kayak Put In/Take Out Area	BANK IMPROVEMENTS	S	\$ 45,000	120	ft	D-18	5	3	3	3	4	4	22.00	3.67	4
5a	/ B-9	Remove Exist. Wall – left bank of East Fork, between Blue Wall & Dr. F. Calderon Blvd.	BANK IMPROVEMENTS	L	\$ 51,000	290	ft	B-9	5	4	4	4	1	4	22.00	3.67	5a
5b	B-23	Bank Stab. – along left bank of East Fork between Blue Wall and Dr. F. Calderon Blvd.	BANK IMPROVEMENTS	L	\$ 106,000	290	ft	B-23									5b
5c	N B-25	Install Focused Access Features @ Select Locations on left bank of E. Fork between Blue Wall and Calderon Blvd	BANK IMPROVEMENTS	L	\$ 110,000	1	ea	B-25							-		5c
6a	/ C-8	Remove Existing Walls - left bank of SFC from Amphitheater downstream to stone ramp	BANK IMPROVEMENTS	L	\$ 56,000	410	ft	C-8	4	5	4	3	1	5	22.00	3.67	6a
6b	C-9	Remove Existing Walls - left bank of SFC from existing stone ramp downstream to Gillis St.	BANK IMPROVEMENTS	L	\$ 68,000	500	ft	C-9							-		6b
6c	C-19	Bank Stab left bank from Amphitheater to Gillis St. Bridge	BANK IMPROVEMENTS	L	\$ 335,000	910	ft	C-19							-		6c
6d	\ C-20	Install Focused Access Features @ Select Locations on left bank between Amphitheater and Gillis Street Bridge	BANK IMPROVEMENTS	L	\$ 325,000	3	ea	C-20							<u>-</u>		6d
7	E-6	Kayak Put In/Take Out Area – left bank of SFC at end of existing Hike & Bike Trail	BANK IMPROVEMENTS	L	\$ 82,000	1	ea	E-6	4	3	3	3	3	5	21.00	3.50	7
8a	/ B-8	Remove Exist. Wall – right bank of East Fork, between Footbridge and Blue Wall	BANK IMPROVEMENTS	L	Committee of the Commit	270		B-8	5	3	4	The state of the s	1		21.00	100000000000000000000000000000000000000	The same of the sa

	inked Projects		Tie Breakers: (1) Project Cost; (2) Project Type (e.g., Bank Improvement before Veg. Enhance.); (3) Project Area/Length; and, (3) Judgement [judgement includes the nature of the proposed project, the project location, and proximity of project to SFC].	Linked Projects: The use of Projects" column indicates prelated and should be const	projects tha	are closely	1			Public Safety & Public Access	Impact on Endangered Species (Long-Term)	at	Degredation - Existing Environmental Degredation Within Project Area	Project Cost	Maintenance - Expected Impact	Total Score	Average Score	Rank
Rank		Project #	Project	Туре	Priority	Cost	Project Area/Length	Units	Project #	1	2	3	4	5	6			
8b	1	B-74	Reconstruct Existing Walls between Footbridge & Blue Wall, right bank of E. Fork	BANK IMPROVEMENTS	L	\$ 240,0	00 270	ft	B-74				. 1			- 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		8b
9a	1	B-7	Remove Exist. Wall – left bank of East Fork, between Footbridge & Blue Wall	BANK IMPROVEMENTS	L	\$ 55,0	00 310	ft	B-7	5	3	4	3	1	5	21.00	3.50	9a
9b	1	B-33	Reconstruct Exist. Wall – left bank of East Fork, between Footbridge & Blue Wall	BANK IMPROVEMENTS	L	\$ 275,0	00 310	ft	B-33					1		- N		9b
10a	1	B-10	Remove Exist. Wall – right bank of East Fork, between Blue Wall and Bedell Ave.	BANK IMPROVEMENTS	L	\$ 80,0	00 450	ft	B-10	5	4	4	4	1	3	21.00	3.50	10a
10b		B-24	Bank Stab. – along right bank of East Fork between Blue Wall and Dr. F. Calderon Blvd.	BANK IMPROVEMENTS	L	\$ 165,0	00 450	ft	B-24					10		198-3		10b
10c	١	B-26	Install Focused Access Features@Select Locations on rt. bank of E. Fork, between Blue Wall and Calderon Blvd	BANK IMPROVEMENTS	L	\$ 110,0	00 1	ea	B-26							- 1		10c
11a	1	D-5	Remove Existing Walls – left bank of SFC from 400' downstream of Gillis St. Bridge to 120' upstream of Tardy Dam	BANK IMPROVEMENTS	L	\$ 50,0	00 370	ft	D-5	5	3	4	3	1	5	21.00	3.50	11a
11b	1	D-6	Reconstruct Existing Walls – left bank of SFC from 400' downstream of Gillis St. Bridge to 120' upstream of Tardy Dam	BANK IMPROVEMENTS	L	\$ 310,0	00 370	ft	D-6					AT I		-		11b
12a	1	B-6	Remove Exist. Wall – left bank of East Fork, between RR Trestle & Footbridge	BANK IMPROVEMENTS	L	\$ 71,0	00 430	ft	B-6	5	3	4	3	1	5	21.00	3.50	12a
12b		B-32	Reconstruct Exist. Wall – left bank of East Fork, between RR Trestle & Footbridge	BANK IMPROVEMENTS	L	\$ 380,0	00 430	ft	B-32				2 F 12 F 13		-	-		12b
12c	1	B-48	Install Kayak Launch Station – left bank of East Fork in Moore Park	BANK IMPROVEMENTS	L	\$ 82,0	00 1	LS	B-48				See Mary	A Trans		-		12c
13		F-15	Kayak Take Out Area – near Magnolia St. & Andrade St.	BANK IMPROVEMENTS	L	\$ 82,0	00 1	LS	F-15	4	3	3	3	3	4	20.00	3.33	13
14a	1	B-5	Remove Exist. Wall – right bank of East Fork, between Hwy 90 & RR Trestle	BANK IMPROVEMENTS	L	\$ 28,0	00 200	ft	B-5	4	3	3	3	1	5	19.00	3.17	14a
14b	1	B-73	Reconstruct Existing wall between Hwy 90 & RR Trestle (approx.), right bank of E. Fork	BANK IMPROVEMENTS	L	\$ 180,0	00 200	ft	B-73			i de la F	10 KM 18			-		14b
15a	1	B-4	Remove Exist. Wall – left bank of East Fork, between Hwy 90 & RR Trestle	BANK IMPROVEMENTS	L	\$ 37,0	00 270	ft	B-4	4	3	3	3	1	5	19.00	3.17	15a
15b	١	B-63	Reconstruct Existing Walls between Hwy 90 & RR Trestle, left bank of E. Fork	BANK IMPROVEMENTS	L	\$ 240,0	00 270	ft	B-63	1.3						12 13- 50		15b
16a	1	D-4	Remove Existing Walls – left bank of SFC from Gillis St. Bridge to 400' downstream	BANK IMPROVEMENTS	L	\$ 54,0	00 400	ft	D-4	4	4	4	3	1	3	19.00	3.17	16a
16b		D-8	Bank Stab. – left bank of SFC between Gillis St. Bridge to 400' downstream	BANK IMPROVEMENTS	L	\$ 130,0	00 400	ft	D-8		1.1.			A Songar				16b
16c	١	D-9	Install Focused Access Feature (1 total) – on left bank of SFC between Gillis St. Bridge to 400' downstream	BANK IMPROVEMENTS	L	\$ 110,0	00 1	LS	D-9			1 1 1 1 1 1		THE PARTY				16c
17		B-11	Remove/Replace Blue Wall	BANK IMPROVEMENTS	L	\$ 620,0	00 180	ft	B-11	4	3	3	3	1	5	19.00	3.17	17
18a	1	C-7	Remove Existing Walls – left bank of SFC from Romanelli Park Footbridge downstream to Amphitheater	BANK IMPROVEMENTS	L	\$ 105,0	00 570	ft	C-7	4	3	3	3	1	5	19.00	3.17	18a
18b	١	C-10	Reconstruct Existing Walls w/ Focused Access Features – left bank from Romanelli Park Footbridge to Amphitheater	BANK IMPROVEMENTS	L	\$ 885,0	00 570	ft	C-10	1			Mark San	-14074	- 12 11	-	Day of	18b
19		F-7	Focused Access Features (4 total) – left bank of SFC in Rotary Park	BANK IMPROVEMENTS	L	\$ 435,0	00 4	ea	F-7	4	3	3	3	1	4	18.00	3.00	19
20		F-8	Focused Access Features (4 total) – left bank of SFC from E. Academy St. to Weir Dam	BANK IMPROVEMENTS	L	\$ 435,0	00 4	ea	F-8	4	3	3	3	1	4	18.00	3.00	20
21	- 66	B-65	Relocate Existing Pipelines crossing E. Fork of SFC	MISCELLANEOUS	L	\$ 51,0	00 1	LS	B-65	5	1	1	1	3	3	14.00	2.33	21
						\$ 7,049,0	00											
- T.	1 20							R. 74 17							1			

inked Projects

Tie Breakers: (1) Project Cost; (2) Project Type (e.g., Bank Improvement before Veg. Enhance.); (3) Project Area/Length; and, (3) Judgement [judgement includes the nature of the proposed project, the project location, and proximity of project to SFC].

Linked Projects: The use of a / and a \ under the "Linked Projects" column indicates projects that are closely related and should be constructed at the same time.

- C		project location, and proximity of project to SFCJ.	related and should be constru	icted at the	same time.				Public Saf Public Acc	Impact on Species (L	Impact on	Degredativ Environme Degredativ Project An	Project Co	Maintenan Expected I	Total Scor	Average S	Rank
Rank	Project #	Project	Туре	Priority	Cost	Project Area/Length	Units	Project #	1	2	3	4	5	6			
WATER Q	JALITY				Comment of the Comment										1		
1	C-27	Rehabilitation of Existing Restrooms near Joe Ramos Center	STORMWATER BMP	S	\$ 43,000	0 1	LS	C-27	5	4	5	3	4	3	24.00	4.00	1
2	D-21	Rehabilitation of Existing Restrooms at Lions Park	STORMWATER BMP	S	\$ 43,000	0 1	LS	D-21	5	4	5	3	4	3	24.00	4.00	2
3 ·	F-17	New Pervious Pavement Parking Area – on street parking along Magnolia St., between Barron St. and Canal St.	STORMWATER BMP	S	\$ 165,000		ac	F-17	5	5	5	5	2	2	24.00	4.00	3
4	F-18	Demolition of Existing Streets/Convert to Pervious Pavement – along Perez St. & Magnolia St.	STORMWATER BMP	S	\$ 210,000		ac	F-18	5	5	5	5	2	2	24.00	4.00	4
5	D-34	Install Pet Waste Stations	STORMWATER BMP	S	\$ 2,000		ea	D-34	5	4	4	3	5	2	23.00	3.83	5
6	B-69	Reveg. Around RR Trestle, both sides of the Acequia Madre Ditch	VEGETATION ENHANCEMENT	S	\$ 3,000		ac	B-69	3	4	4	5	5	2	23.00	3.83	6
7	E-16	Install Pet Waste Stations	STORMWATER BMP	S	\$ 3,000		ea	E-16	5	4	4	3	5	2	23.00	3.83	7
8	D-35	Install Trash Cans w/ Foundations	STORMWATER BMP	S	\$ 4,000		ea	D-35	5	4	4	3	5	2	23.00	3.83	8
9	E-17	Install Trash Cans w/ Foundations	STORMWATER BMP	S	\$ 4,000		ea	E-17	5	4	4	3	5	2	23.00	3.83	9
10	B-76	Install Pet Waste Stations	STORMWATER BMP	S	\$ 4,000		ea	B-76	5	4	4	3	5	2	23.00	3.83	10
11	C-41	Install Pet Waste Stations	STORMWATER BMP	S	\$ 4,000		ea	C-41 F-24	5	4	4	3	5	2	23.00	3.83	11
12	F-24 B-77	Install Pet Waste Stations Install Trash Cans w/ Foundations	STORMWATER BMP STORMWATER BMP	S	\$ 5,000 \$ 6,000		ea	B-77	5	4	4	3	5	2	23.00	3.83	12
13	C-42	Install Trash Cans w/ Foundations	STORMWATER BMP		\$ 6,000		ea	C-42	5	4	4	3	5	2	23.00	3.83	13 14
15	F-25	Install Trash Cans w/ Foundations	STORMWATER BMP	S	\$ 10,000		ea ea	F-25	5	4	4	3	5	2	23.00	3.83	15
16	F-16	New Pervious Pavement Parking Area – north of Barron St./Magnolia St. intersection	STORMWATER BMP	L	\$ 270,000		ac	F-16	5	5	5	5	1	2	23.00	3.83	16
17	B-49	Install Pervious Parking Lot at end of Avenue 2 in Moore Park	STORMWATER BMP		\$ 315,000		ac	B-49	5	5	5	5	1	2	23.00	3.83	17
18	F-12	New Pervious Pavement Parking Area – east side of Andrade St., between Cisneros St. & Guillen St.	STORMWATER BMP	L	\$ 385,000		ac	F-12	5	5	5	5	1	2	23.00	3.83	18
19	F-13	New Pervious Pavement Parking Area – west side of Andrade St., between Cisneros St. & Guillen St.	STORMWATER BMP	ī	\$ 470,000		ac	F-13	5	5	5	5	1	2	23.00	3.83	19
20	D-16	Install New Pervious Pavement Parking Area, southside of Bridge St. between Broadbent Ave. and Barrera Ave.	STORMWATER BMP	L	\$ 605,000			D-16	5	5	5	5	1	2	23.00	3.83	20
21	F-11	Convert Existing Unimproved Parking Areas to Pervious Pavement, in Rotary Park along Canal St. and Cisneros St.	STORMWATER BMP	L	\$ 770,000			F-11	5	5	5	5	1	2	23.00	3.83	21
22	B-13	Veg. Enhancement – around Horseshoe Park area	VEGETATION ENHANCEMENT		\$ 5,000		ac	B-13	3	4	4	4	5	2	22.00	3.67	22
23	B-12	Veg. Enhancement/Veg. Filter Strip – End of Parking Area Next to Horseshoe Park	VEGETATION ENHANCEMENT		\$ 5,000		ac	B-12	3	4	4	4	5	2	22.00	3.67	23
24	B-59	Install Public Education Kiosk next to baseball fields (Hogan Park) in Moore Park	STORMWATER BMP	L	\$ 7,000		LS	B-59	3	4	4	3	5	3	22.00	3.67	24
25	B-16	Veg. Enhancement – along right bank of East Fork in Moore Park (s. of RR Trestle, n. of footbridge)	VEGETATION ENHANCEMENT	L	\$ 10,000	0.15	ac	B-16	3	4	4	4	5	2	22.00	3.67	25
26	D-33	Install Public Education Kiosks	STORMWATER BMP	L	\$ 10,000	1	ea	D-33	3	4	4	3	5	3	22.00	3.67	26
27	E-15	Install Public Education Kiosks	STORMWATER BMP	L	\$ 10,000	1	ea	E-15	3	4	4	3	5	3	22.00	3.67	27
28	D-13	Veg. Enhancement – right bank area of SFC immediately downstream of Tardy Dam	VEGETATION ENHANCEMENT	L	\$ 24,000	0.30	ac	D-13	3	4	4	5	4.	2	22.00	3.67	28
29	B-61	Repair Erosion @ RR Trestle, E. Fork of SFC	BANK IMPROVEMENTS	L	\$ 31,000	1	LS	B-61	3	4	4	4	4	3	22.00	3.67	29
30	B-41	Rehab. Footbridge across East Fork in Moore Park (adjacent to Hwy 90)	BANK IMPROVEMENTS	L	\$ 35,000	1	LS	B-41	5	4	3	3	4	3	22.00	3.67	30
31	B-20	Bank Stab. – Blue Hole Banks	BANK IMPROVEMENTS	L	\$ 39,000	500	ft	B-20	3	4	4	4	4	3	22.00	3.67	31
32	C-14	Veg. Enhancement – left bank of SFC from Dr. F. Calderon Dr. to Romanelli Footbridge	VEGETATION ENHANCEMENT	L	\$ 44,000	0.55	ac	C-14	3	4	4	5	4	2	22.00	3.67	32
33	B-58	Construct Public Restrooms next to baseball fields (Hogan Park) in Moore Park	STORMWATER BMP	L	\$ 85,000	1	LS	B-58	5	4	5	3	3	2	22.00	3.67	33
34	F-26	New Public Restrooms – Rotary Park	STORMWATER BMP	L	\$ 85,000	1	LS	F-26	5	4	5	3	3	2	22.00	3.67	34
35	F-14	New Public Restrooms – near Magnolia St. & Canal St.	STORMWATER BMP	L	\$ 85,000	1	LS	F-14	5	4	5	3	3	2	22.00	3.67	35
36	D-14	Replace Existing Footbridge across SFC @ Tardy Dam	BANK IMPROVEMENTS	L	\$ 165,000	1	LS	D-14	5	4	4	4	2	3	22.00	3.67	36
37	D-15	Install New Pervious Pavement Parking Area – on FEMA Buyout Property across Gillis St. from Memo's	STORMWATER BMP	L	\$ 220,000	0.36	ac	D-15	4	5	5	4	2	2	22.00	3.67	37
38	B-34	Install New Pervious Pavement Parking Area – between Horseshoe Park Fountain & RR Tracks	STORMWATER BMP	L	\$ 275,000	0.39	ac	B-34	4	5	5	5	1	2	22.00	3.67	38
39	B-29	Install New Perv. Pvmt Parking Lot - exist. dirt area next to the Acequia Madre Ditch, rt. bank of W. Fork in Moore Park	STORMWATER BMP	L	\$ 690,000	0.96	ac	B-29	4	5	5	5	1	2	22.00	3.67	39
40	C-25	Install Pervious Pavement Parking Lot adjacent to Joe Ramos Center	STORMWATER BMP	L	\$ 1,290,000	2.27	ac	C-25	4	5	5	5	1	2	22.00	3.67	40
41	B-67	Veg. Enhancement/Veg. Filter Strip, adjacent to parking lot on W. side of the Acequia Madre Ditch	VEGETATION ENHANCEMENT	L	\$ 14,000	0.15	ac	B-67	3	4	4	4	4	2	21.00	3.50	41
42	C-40	Install Public Education Kiosks	STORMWATER BMP	L	\$ 17,000	2	ea	C-40	3	4	4	3	4	3	21.00	3.50	42
43	B-53	Veg. Enhancement of area next to existing parking lot in Moore Park, across from swimming pool	VEGETATION ENHANCEMENT	L	\$ 20,000	0.34	ac	B-53	3	4	4	4	4	2	21.00	3.50	43

Linked Projects		Tie Breakers: (1) Project Cost; (2) Project Type (e.g., Bank Improvement before Veg. Enhance.); (3) Project Area/Length; and, (3) Judgement [judgement includes the nature of the proposed project, the project location, and proximity of project to SFC].	Linked Projects: The use of a Projects" column indicates projects properties of a related and should be construed.	ojects the	at are clo	osely				Public Safety & Public Access	Impact on Endanger Species (Long-Term)	Impact on Water Qua	Degredation - Existi Environmental Degredation Within Project Area	Project Cost	Maintenance - Expected Impact	Total Score	Average Score	Rank
Rank	Project #	Project	Туре	Priority	У	Cost	Project Area/Length	Units	Project #	1	2	3	4	5	6			The same
44	B-14	Veg. Enhancement/Veg. Filter Strip – along right bank of West Fork in Moore Park	VEGETATION ENHANCEMENT	L	\$	24,000	0.35	ac	B-14	3	4	4	4	4	2	21.00	3.50	44
45	B-15	Veg. Enhancement – along left bank of West Fork in Moore Park (downstream of Blue Hole)	VEGETATION ENHANCEMENT	L	\$	24,000	0.35	ac	B-15	3	4	4	4	4	2	21.00	3.50	45
46	B-18	Veg. Enhancement – along right bank of East Fork, between Footbridge & Dr. F. Calderon Blvd.	VEGETATION ENHANCEMENT	L	\$	29,000	0.45	ac	B-18	3	4	4	4	4	2	21.00	3.50	46
47	C-13	Veg. Enhancement – around Amphitheater	VEGETATION ENHANCEMENT	L	\$	31,000	1.06	ac	C-13	3	4	4	4	4	2	21.00	3.50	47
48	B-52	Veg. Enhancement along left bank of E. Fork next to San Felipe Lions Club	VEGETATION ENHANCEMENT	L	\$	32,000	0.54	ac	B-52	3	4	4	4	4	2	21.00	3.50	48
49	B-17	Veg. Enhancement – picnic area between West Fork and the Acequia Madre Ditch in Moore Park	VEGETATION ENHANCEMENT	L	\$	34,000	0.75	ac	B-17	3	4	4	4	4	2	21.00	3.50	49
50	D-17	Veg. Enhancement – park area on south side of Bridge St. between Barrera Ave. and Taini St.	VEGETATION ENHANCEMENT	L	\$	39,000	1.34	ac	D-17	3	4	4	4	4	2	21.00	3.50	50
51	C-35	Veg. Enhancement – from Severiano Perez Pkwy to Gillis St. Bridge	VEGETATION ENHANCEMENT	L	\$	40,000	0.95	ac	C-35	3	4	4	4	4	2	21.00	3.50	51
52	B-19	Veg. Enhancement – left bank of East Fork @ footbridge	VEGETATION ENHANCEMENT	L	\$	40,000	0.70	ac	B-19	3	4	4	4	4	2	21.00	3.50	52
53	D-28	Installation of Hydrodynamic Separator Unit @ Johnson St. / Taini St. Bridge (@ Tardy Dam)	STORMWATER BMP	L	\$	43,000	1	LS	D-28	1	4	4	3	4	5	21.00	3.50	53
54	B-51	Veg. Enhancement along left bank of E. Fork between Hwy 90 & RR trestle	VEGETATION ENHANCEMENT	L	\$	44,000	0.75	ac	B-51	3	4	4	4	4	2	21.00	3.50	54
55a	/ A-11	Bank Stab right bank of East Fork	BANK IMPROVEMENTS	L	\$	23,000	1,100	ft	A-11	3	4	4	3	4	3	21.00	3.50	55a
55b	\ A-12	Bank Stab left bank of East Fork	BANK IMPROVEMENTS	L	\$	26,000	1,230	ft	A-12							-		55b
56	D-7	Bank Stab. – right bank of SFC between Gillis St. Bridge & Tardy Dam	BANK IMPROVEMENTS	L	\$	55,000	950	ft	D-7	3	4	4	4	3	3	21.00	3.50	
57	C-12	Veg. Enhancement – around Joe Ramos Center	VEGETATION ENHANCEMENT		\$	60,000	2.10	ac	C-12	3	4	4	5	3	2	21.00	3.50	57
58a	1 A-7	Bank Stab right bank of West Fork	BANK IMPROVEMENTS	L		33,000	1,560	ft	A-7	3	4	4	3	4	3	21.00	3.50	
58b	\ A-8	Bank Stab left bank of West Fork	BANK IMPROVEMENTS	L		33,000	1,580	ft	A-8	To the last								58b
59a	/ A-9	Bank Stab right bank of Mid Fork	BANK IMPROVEMENTS	L		43,000	2,010	ft	A-9	3	4	4	3	4	3	21.00	3.50	59a
59b	\ A-10	Bank Stab left bank of Mid Fork	BANK IMPROVEMENTS	L		36,000	1,680	ft	A-10		The Street of th		BINE OF A		100			59b
60	E-5	Repair Existing Tree Wells – left bank of SFC just downstream of Taini St./Johnson St. Bridge	BANK IMPROVEMENTS	L		5,000	1	LS	E-5	3	3	3		5	3	20.00	3.33	60
61	F-23	Install Public Education Kiosks	STORMWATER BMP	L		17,000	2	ea	F-23	2	4	4		4	3	20.00	3.33	61
62	B-75	Install Public Education Kiosks	STORMWATER BMP	<u> </u>		17,000	2	ea	B-75	2	4	4		4	3	20.00	3.33	62
63	F-19	Bird/Wildlife Observation Area – south of Barron St./Magnolia St. intersection	STORMWATER BMP	L		18,000	1	LS	F-19	3	4	4	3	3	3	20.00	3.33	63
64	B-47	Replace Existing Sidewalk w/ Pervious Concrete along right bank of West Fork, between Hwy 90 and footbridge	STORMWATER BMP	L		37,000	570	ft	B-47	3	4	4	3	4	2	20.00	3.33	64
65	C-11	Veg. Enhancement – Romanelli Park	VEGETATION ENHANCEMENT	L		43,000	2.00	ac	C-11	3	4	4	3	4	2	20.00	3.33	65
66	B-57	Installation of Hydrodynamic Separator Unit on Bedell Ave. @Calderon Blvd.	STORMWATER BMP	L		57,000	1	LS	B-57	1	4	4	3	3	5	20.00	3.33	66
67	E-4	Veg. Enhancement – left bank & park area of SFC immediately downstream of Taini St./Johnson St. Bridge	VEGETATION ENHANCEMENT	L		68,000	1.20	ac	E-4	3	4	4	4	3	2	20.00	3.33	67
68	E-8	Veg. Enhancement – area on left bank of SFC from Flores St. to Mendez St.	VEGETATION ENHANCEMENT	L		76,000	1.33	ac	E-8	3	4	4	4	3	2	20.00	3.33	68
69	F-10	Veg. Enhancement – Rotary Park	VEGETATION ENHANCEMENT	L	\$	77,000 84,000	3.33 1.92	ac	F-10 D-10	3	4	4	4	3	2	20.00	3.33	69
70	D-10	Veg. Enhancement – area from left bank of SFC to Bridge St. between Gillis St. Bridge & Tardy Dam	VEGETATION ENHANCEMENT VEGETATION ENHANCEMENT		\$	87,000		ac	B-50	3	4	4	4	3			3.33	70
71	B-50 E-9	Veg. Enhancement along left bank of E. Fork next to baseball field (Hogan Park)  Veg. Enhancement – area on left bank of SFC from Diaz St. to Canal St. Bridge	VEGETATION ENHANCEMENT	L		90,000	1.54	ac	E-9	3	4	4		3	2	20.00	3.33	71
72 73	B-55	Bank Stabilization under Hwy. 90 bridge, E. Fork of SFC	BANK IMPROVEMENTS	i		125,000	200	ft	B-55	3	4	4		2	3	20.00	3.33	72 73
74	B-33	Bank Stab. – right bank of East Fork, between RR Trestle and Footbridge	BANK IMPROVEMENTS	L		180,000	320	ft	B-27	3	4	4	4	2	3	20.00	3.33	74
75a	/ B-28	Bridge Replacement/Bank Stab. – footbridge across East Fork in Moore Park	BANK IMPROVEMENTS	L		470,000	1	LS	B-28	4	4	4	4	1	3	20.00	3.33	75a
75a	/ B-20	Replace Exist. ADA Ramps & Install New Ramps at footbridge across East Fork in Moore Park (both ends of bridge)	BANK IMPROVEMENTS	L		48,000	1		B-42						3	20.00	3.33	75b
76	C-23	Bank Stab /Replace Existing Footbridge to Romanelli Park & Install ADA Access Ramps	BANK IMPROVEMENTS	L		645,000	1		C-23	5	4	4	3	1	3	20.00	3.33	76
77	D-24	Inspect Existing Walls (replace if necessary) – left bank from old diving board area to Taini St./Johnson St. Bridge	BANK IMPROVEMENTS	L	11.0/0	6,000	400	ft	D-24	2	3	3	3	5	3	19.00	3.17	77
78	E-12	Inspect Existing Walls (replace if necessary) – left bank from Taini St./Johnson St. Bridge to End of Wall	BANK IMPROVEMENTS	L		6,000	400	ft	E-12	2	3	3	3	5	3	19.00	3.17	78
79	C-30	Biofiltration/Bioretention for existing parking area	STORMWATER BMP	Ĺ		12,000	1		C-30	1	4	4	3	4	3	19.00	3.17	79
80	C-38	Biofiltration/Bioretention for existing parking area at the Joe Ramos Center	STORMWATER BMP	L		17,000	1	LS	C-38	1	4	4	3	4	3	19.00	3.17	80
81	C-39	Community Garden Improvements - on FEMA Buyout Properties	STORMWATER BMP		\$	22,000	0.80	ac	C-39	1	4	4	4	4	2	19.00	3.17	81
82	E-14	Community Garden Improvements - on FEMA Buyout Properties	STORMWATER BMP		\$	41,000	1.50	ac	E-14	1	4	4	4	4	2	19.00	3.17	82
83	B-22	Bank Stab. – along the Acequia Madre Ditch in Moore Park	BANK IMPROVEMENTS		\$	53,000	1,380	ft	B-22	3	4	3	3	3	3	19.00	3.17	83
00	B-62	Replace exist. flagstone Hike & Bike Trail w/ Perv. Concrete, between Footbridge & Bedell Ave., left bank of E. Fork	STORMWATER BMP		\$	66,000	700		B-62	2	4	4	3	3	2	19.00	3.17	84

Tie Breakers: (1) Project Cost; (2) Project Type (e.g., Bank Improvement before Veg. Enhance.); (3) Project Area/Length; and, (3) Judgement [judgement includes the nature of the proposed project, the project location, and proximity of project to SFC].

Linked Projects: The use of a / and a \ under the "Linked Projects" column indicates projects that are closely related and should be constructed at the same time.

Linked Proj		project location, and proximity of project to SFC].	related and should be constru						Public Safet Public Acce	Impact on E Species (Lo	Impact on M	Degredation Environmen Degredation Project Area	Project Cost	Maintenance Expected Im	Total Score	Average Sco	Rank
Rank	Project #	Project	Туре	Priority	Cost	Project Area/Length	Units	Project #	1	2	3	4	5	6			
85	B-43	Rehab. Existing Detention Basins on left bank of East Fork, adjacent to Hwy 90	STORMWATER BMP	L \$	68,000	1.15	ac	B-43	1	4	4	4 4	3	3	19.00	3.17	85
86	D-22	Rehabilitation of Tardy Dam	MISCELLANEOUS	L \$	71,000	1	LS	D-22	3	4	3	3 3	3	3	19.00	3.17	86
87	E-13	Replace Asphalt H & B Trail w/ Pervious Pavement, from Taini St./Johnson St. Bridge to End of Existing H&B Trail	STORMWATER BMP	L \$	75,000	700	ft	E-13	3	4	4	1 3	3	2	19.00	3.17	87
88	C-32	Convert Existing Concrete Sidewalk to Pervious Pavement	STORMWATER BMP	L \$	77,000	1,085	ft	C-32	3	4	4	3	3	2	19.00	3.17	88
89	B-35	Rehab Footbridge over Blue Hole	BANK IMPROVEMENTS	L \$	80,000	1	LS	B-35	4	3	3	3	3	3	19.00	3.17	89
90	F-5	Bank Stab. – left bank of SFC in Rotary Park, between Canal St. & E. Academy St.	BANK IMPROVEMENTS	L \$	85,000	1,100	ft	F-5	3	4	3	3	3	3	19.00	3.17	90
91	D-36	Replace Exist. Hike&Bike Trail w/ Pervious Pavement, left bank of SFC, between Gillis St. Bridge & Bridge St.	STORMWATER BMP	L \$	86,000	800	ft	D-36	3	4	4	3	3	2	19.00	3.17	91
92	D-31	Kayak Put In/Take Out Area - Pervious Pavement Parking Area (on Bridge St.)	STORMWATER BMP	L \$	105,000	0.13	ac	D-31	3	4	4	3	2	3	19.00	3.17	92
93	F-20	Veg. Enhancement – area between Magnolia St. & SFC, from Barron St. to Canal St.	VEGETATION ENHANCEMENT	L \$	115,000	1.95	ac	F-20	3	4	4	4	2	2	19.00	3.17	93
94	B-54	Veg. Enhancement [of median areas at intersection of Calderon Blvd. & Ogden St.	VEGETATION ENHANCEMENT	L \$	115,000	1.91	ac	B-54	3	4	4	4	2	2	19.00	3.17	94
95	B-21	Bank Stab. – West Fork in Moore Park (s. of Blue Hole)	BANK IMPROVEMENTS	L \$	120,000	1,540	ft	B-21	2	4	4	4	2	3	19.00	3.17	95
96	B-56	Veg. Enhancement of median area between Bedell Ave. & Calderon Blvd.	VEGETATION ENHANCEMENT	L \$	120,000	2.13	ac	B-56	3	4	4	4	2	2	19.00	3.17	96
97	C-34	Veg. Enhancement – area from Amphitheater to Severiano Perez Pkwy	VEGETATION ENHANCEMENT	L \$	125,000	2.95	ac	C-34	3	4	4	4	2	2	19.00	3.17	97
98	C-33	Veg. Enhancement – around existing soccer field and adjoining areas near Medical Center	VEGETATION ENHANCEMENT	L \$	135,000	3.20	ac	C-33	3	4	4	4	2	2	19.00	3.17	98
99	E-11	Bank Stab./Focused Access Feature – under Canal St. Bridge	BANK IMPROVEMENTS	L \$	145,000	1	ea	E-11	4	4	3	3	2	3	19.00	3.17	99
100	B-30	Bridge Replacement/Bank Stab. – footbridge across West Fork in Moore Park	BANK IMPROVEMENTS	L \$	165,000	1	LS	B-30	5	3	3	3	2	3	19.00	3.17	100
101	B-31	Bridge Replacment/Bank Stab Replace Footbridges across the Acequia Madre Ditch in Moore Park	BANK IMPROVEMENTS	L \$	205,000	1	LS	B-31	5	3	3	3	2	3	19.00	3.17	101
102	E-3	Bank Stab. – left bank of SFC from Taini St./Johnson St. Bridge to Canal St. Bridge	BANK IMPROVEMENTS	L \$	290,000	2,450	ft	E-3	3	4	4	4	1	3	19.00	3.17	102
103a	/ C-6	Remove Existing Walls – left bank of SFC just upstream of Romanelli Park Footbridge	BANK IMPROVEMENTS	L \$	17,000	120	ft	C-6	3	4	4	4	1	3	19.00	3.17	103a
103b	C-17	Bank Stab. – left bank approx. 225 feet downstream of Dr. F. Calderon Blvd.	BANK IMPROVEMENTS	L \$	98,000	100	ft	C-17							-		103b
103c	\ C-16	Bank Stab. – left bank from Dr. F. Calderon Blvd. to Romanelli Park Footbridge	BANK IMPROVEMENTS	L \$	220,000	600	ft	C-16							-		103c
104	C-18	Bank Stab. – right bank from Dr. F. Calderon Blvd. to Romanelli Park Footbridge	BANK IMPROVEMENTS	L \$	460,000	1,000	ft	C-18	3	4	4	4	1	3	19.00	3.17	104
105	B-45	Install Bioretention/Biofiltration Area downstream of Existing San Felipe Lions Club Asphalt Parking Lot	STORMWATER BMP	L \$	50,000	1	LS	B-45	1	4	4	3	3	3	18.00	3.00	105
106	B-46	Replace existing flagstone Hike & Bike Trail w/ Pervious Concrete, between Hwy 90 & Footbridge, left bank of E. Fork	STORMWATER BMP	L \$	57,000	590	ft	B-46	1	4	4	3	3	3	18.00	3.00	106
107	D-32	Community Garden Improvements - on FEMA Buyout Properties	STORMWATER BMP	L \$	95,000	3.50	ac	D-32	1	4	4	4	3	2	18.00	3.00	107
108	C-22	Bank Stab./Channel Improvements – drainage channel at end of Calderon Ln upstream to Roosevelt Park	BANK IMPROVEMENTS	L \$	99,000	1,800	ft	C-22	3	4	3	3	2	3	18.00	3.00	108
109	D-20	Convert Existing Asphalt Parking Area to Pervious Pavement – Bridge St. @ Broadbent Ave.	STORMWATER BMP	L \$	140,000	0.18	ac	D-20	3	4	4	3	2	2	18.00	3.00	109
110	D-19	Convert Existing Asphalt Parking Area to Pervious Pavement – Bridge St. @ Gillis St.	STORMWATER BMP	L \$	210,000	0.28	ac	D-19	3	4	4	3	2	2	18.00	3.00	110
111	C-36	Replace Existing Asphalt H&B Trail w/ Pervious Pavement	STORMWATER BMP	L \$	240,000	2,250	ft	C-36	3	4	4	3	2	2	18.00	3.00	111
112	F-22	Community Garden Improvements - on FEMA Buyout Properties	STORMWATER BMP	L \$	135,000	5.00	ac	F-22	1	4	4	4	2	2	17.00	2.83	112
113	E-7	Construct Pervious Pavement Hike & Bike Trail – from end of existing Hike & Bike Trail to Canal St. Bridge	STORMWATER BMP	L \$	145,000	1,700	ft	E-7	5	3	3	3	1	2	17.00	2.83	113
114	F-6	Bank Stab left bank of SFC between E. Academy St. & Weir Dam	BANK IMPROVEMENTS	L \$	305,000	3,950	ft	F-6	3	4	3	3	1	3	17.00	2.83	114
115	C-31	Convert Existing Asphalt Parking to Pervious Pavement	STORMWATER BMP	L \$	305,000	0.40	ac	C-31	3	4	4	3	1	2	17.00	2.83	115
116	F-9	New Pervious Pvmt. Hike & Bike Trail – along left bank of SFC, from Canal St. Bridge to Magnolia St. (4,050 LF)	STORMWATER BMP	L \$	340,000	4,050	ft	F-9	5	3	3	3	1	2	17.00	2.83	116
117	B-72	Replace Existing Asphalt Parking Area w/ Pervious Pavement	STORMWATER BMP	L \$	385,000	0.51	ac	B-72	3	4	4	3	1	2	17.00	2.83	117
118	C-29	Convert Existing Asphalt Parking to Pervious Pavement	STORMWATER BMP	L \$	440,000	0.57	ac	C-29	3	4	4	3	1	2	17.00	2.83	118
119	E-10	Convert Existing Asphalt Parking Area to Pervious Pavement – north side of Canal St./Cisneros St. intersection	STORMWATER BMP	L \$	625,000	0.82	ac	E-10	3	4	4	3	1	2	17.00	2.83	119
120	B-40	Replace Existing Asphalt Parking w/ Pervious Pavement – parking area on West Fork in Moore Park	STORMWATER BMP	L \$	625,000	0.82	ac	B-40	3	4	4	3	1	2	17.00	2.83	120
121	B-44	Convert Existing San Felipe Lions Club Asphalt Parking Lot to Pervious Pavement	STORMWATER BMP	L \$	1,220,000	1.61	ac	B-44	3	4	4	3	1	2	17.00	2.83	121
			Total - Wa	ter Quality = \$	17,942,000												
										AL IN				= 7/2 T			

Type

PARK IMPROVEMENTS

Project #

Tie Breakers: (1) Project Cost; (2) Project Type (e.g., Bank Improvement before Veg. Enhance.); (3) Project Area/Length; and, (3) Judgement [judgement includes the nature of the proposed project, the project location, and proximity of project to SFC].

Project

Linked Projects: The use of a / and a \ under the "Linked Projects" column indicates projects that are closely related and should be constructed at the same time.

Priority

Cost

Project Area/Length Units

	Public Safety & Public Access	Impact on Endanger Species (Long-Term)	Impact on Water Qua	Degredation - Existii Environmental Degredation Within Project Area	Project Cost	Maintenance - Expected Impact	Total Score	Average Score	Rank
Project #	1	2	3	4	5	6			
B-64	3	3	3	3	4	3	19.00	3.17	1
B-37	3	3	3	3	4	3	19.00	3.17	2
D-25	3	3	3	3	4	3	19.00	3.17	3
B-36	3	3	3	3	4	3	19.00	3.17	4
C-37	3	3	3	3	4	3	19.00	3.17	5
D-27	3	3	3	3	4	3	19.00	3.17	6
B-68	3	3	3	3	4	3	19.00	3.17	7
C-28	3	3	3	4	3	3	19.00	3.17	8
C-24	5	3	3	3	2	3	19.00	3.17	9

	B-64 Rehab. Picnic Area on left bank of E. Fork, South of Footbridge	PARK IMPROVEMENT	L	\$ 20,000	1	LS	B-64	3	3	3	3	4	3	19.00	3.17	
	B-37 Rehab. Picnic Area on right bank of East Fork @ Hwy 90	PARK IMPROVEMENT	L	\$ 21,000	1	LS	B-37	3	3	3	3	4	3	19.00	3.17	
	D-25 Rehab. Existing Picnic Area – left bank of SFC upstream of Tardy Dam	PARK IMPROVEMENT	L	\$ 32,000	1	LS	D-25	3	3	3	3	4	3	19.00	3.17	I
	B-36 Rehab. Picnic Area off Hwy 90, between East & West Fork	PARK IMPROVEMENT	L	\$ 32,000	1	LS	B-36	3	3	3	3	4	3	19.00	3.17	
9	C-37 Rehab. Existing Playground	PARK IMPROVEMENT	L	\$ 37,000	1	LS	C-37	3	3	3	3	4	3	19.00	3.17	
	D-27 Rehab. Existing Playground	PARK IMPROVEMENT	L	\$ 39,000	1	LS	D-27	3	3	3	3	4	3	19.00	3.17	
	B-68 Rehab. Picnic Area between W. Fork of SFC & Acequia Madre Ditch	PARK IMPROVEMENT	L	\$ 42,000	1	LS	B-68	3	3	3	3	4	3	19.00	3.17	
	C-28 Rehab./Renovate Amphitheater	PARK IMPROVEMENT	L	\$ 99,000	1	LS	C-28	3	3	3	4	3	3	19.00	3.17	ĺ
	C-24 Rehab Concrete Slab & Install Pavilion/Shade Structure	PARK IMPROVEMENT	L	\$ 190,000	1	LS	C-24	5	3	3	3	2	3	19.00	3.17	
	B-60 Rehab. Horseshoe Park Fountain	PARK IMPROVEMENT	L	\$ 29,000	1	LS	B-60	3	3	3	2	4	3	18.00	3.00	
	C-26 Rehab. Fountain @ Joe Ramos Center	PARK IMPROVEMENT	L	\$ 43,000	1	LS	C-26	3	3	3	2	4	3	18.00	3.00	
	B-38 Rehab. Picnic Area on left bank of East Fork @ Hwy 90, N. of Footbridge	PARK IMPROVEMENT	L	\$ 50,000	1	LS	B-38	3	3	3	3	3	3	18.00	3.00	
	B-70 Rehab. Picnic Area of Horseshoe Park	PARK IMPROVEMENT	L	\$ 51,000	1	LS	B-70	3	3	3	3	3	3	18.00	3.00	
	B-39 Rehab. Picnic Area on left bank of East Fork @ footbridge	PARK IMPROVEMENT	L	\$ 59,000	1	LS	B-39	3	3	3	3	3	3	18.00	3.00	
	F-21 Rehab. Existing Playground	PARK IMPROVEMENT	L	\$ 63,000	1	LS	F-21	3	3	3	3	3	3	18.00	3.00	
	B-66 Rehab. Existing BBQ Pit Area, SFC at Bedell Ave. in Moore Park	PARK IMPROVEMENT	L	\$ 71,000	1	LS	B-66	3	3	3	3	3	3	18.00	3.00	
	D-26 Rehab. Existing Playground @ Tardy Dam	PARK IMPROVEMENT	L	\$ 57,000	1	LS	D-26	3	3	3	2	3	3	17.00	2.83	
	B-71 Rehab. Horseshoe Park Sign	PARK IMPROVEMENT	L	\$ 7,000	1	LS	B-71	1	3	3	1	5	3	16.00	2.67	
	D-29 Rehab. Existing Park Sign (San Felipe Lions Club/Abe Barrera Memorial)	PARK IMPROVEMENT	L	\$ 7,000	1	LS	D-29	1	3	3	1	5	3	16.00	2.67	
	D-30 Rehab. Existing Park Sign (San Felipe Lions Park)	PARK IMPROVEMENT	L	\$ 14,000	1	LS	D-30	1	3	3	1	4	3	15.00	2.50	
	D-23 Upgrade of Tardy Dam	MISCELLANEOUS	L	\$ 530,000	1	LS	D-23	3	2	3	3	1	3	15.00	2.50	
			7	\$ 1,493,000	1 2			1	9							

OVERALL COST SUMM	VIARY	
Invasive Species Eradication	\$	1,800,000
Public Access & Safety	\$	7,049,000
Water Quality	\$	17,942,000
Park Improvements	\$	1,493,000
TOTAL	\$	28,284,000

Project #	Project	Туре	Priorit	у	Cost	Project #
4 A			antinens seem	4	and the second s	er end or train
A-1	Cane Eradication – right bank of West Fork	INVASIVE SPECIES CONTROL	S	\$	44,000	A-1
A-2	Cane Eradication – left bank of West Fork	INVASIVE SPECIES CONTROL	S	\$	88,000	A-2
A-3	Cane Eradication – right bank of Mid Fork	INVASIVE SPECIES CONTROL	S	\$	88,000	A-3
A-4	Cane Eradication – left bank of Mid Fork	INVASIVE SPECIES CONTROL	S	\$	44,000	A-4
A-5	Cane Eradication – right bank of East Fork	INVASIVE SPECIES CONTROL	S	\$	44,000	A-5
A-6	Cane Eradication – left bank of East Fork	INVASIVE SPECIES CONTROL	S	\$	44,000	A-6
A-7	Bank Stab right bank of West Fork	BANK IMPROVEMENTS	S	\$	33,000	A-7
A-8	Bank Stab left bank of West Fork	BANK IMPROVEMENTS	S	\$	33,000	A-8
A-9	Bank Stab right bank of Mid Fork	BANK IMPROVEMENTS	S	\$	43,000	A-9
A-10	Bank Stab left bank of Mid Fork	BANK IMPROVEMENTS	S	\$	36,000	A-10
A-11	Bank Stab right bank of East Fork	BANK IMPROVEMENTS	S	\$	23,000	A-11
A-12	Bank Stab left bank of East Fork	BANK IMPROVEMENTS	S	\$	26,000	A-12
A-13	Nutria/Rodent Control	INVASIVE SPECIES CONTROL	S	\$	3,000	A-13
A-14	Armored Catfish Eradication	INVASIVE SPECIES CONTROL	S	\$	UNKNOWN	A-14
				\$	549,000	
B-1	Cane Eradication – West Fork of SFC	INVASIVE SPECIES CONTROL	S	\$	9,000	B-1
B-2	Cane Eradication – East Fork of SFC	INVASIVE SPECIES CONTROL	S	\$	9,000	B-2
B-3	Veg. Removal - Blue Hole	INVASIVE SPECIES CONTROL	S	\$	35,000	B-3
B-4	Remove Exist. Wall – left bank of East Fork, between Hwy 90 & RR Trestle	BANK IMPROVEMENTS	S	\$	37,000	B-4
B-5	Remove Exist. Wall – right bank of East Fork, between Hwy 90 & RR Trestle	BANK IMPROVEMENTS	S	\$	28,000	B-5
B-6	Remove Exist. Wall – left bank of East Fork, between RR Trestle & Footbridge	BANK IMPROVEMENTS	S	\$	71,000	B-6
B-7	Remove Exist. Wall – left bank of East Fork, between Footbridge & Blue Wall	BANK IMPROVEMENTS	S	\$	55,000	B-7
		BANK IMPROVEMENTS	S	\$	49,000	B-8
B-8	Remove Exist. Wall – right bank of East Fork, between Footbridge and Blue Wall	BART IIII NO TEINERTO		100000000000000000000000000000000000000		B-9
B-8 B-9	Remove Exist. Wall – right bank of East Fork, between Footbridge and Blue Wall  Remove Exist. Wall – left bank of East Fork, between Blue Wall & Dr. F. Calderon Blvd.	BANK IMPROVEMENTS	s	\$	51,000	
				\$	51,000 80,000	B-10
B-9	Remove Exist. Wall – left bank of East Fork, between Blue Wall & Dr. F. Calderon Blvd.	BANK IMPROVEMENTS	S		West of the second	
B-9 B-10	Remove Exist. Wall – left bank of East Fork, between Blue Wall & Dr. F. Calderon Blvd.  Remove Exist. Wall – right bank of East Fork, between Blue Wall and Bedell Ave.	BANK IMPROVEMENTS BANK IMPROVEMENTS	S S	\$	80,000	B-10
B-9 B-10 B-11	Remove Exist. Wall – left bank of East Fork, between Blue Wall & Dr. F. Calderon Blvd.  Remove Exist. Wall – right bank of East Fork, between Blue Wall and Bedell Ave.  Remove/Replace Blue Wall	BANK IMPROVEMENTS BANK IMPROVEMENTS BANK IMPROVEMENTS	S S S	\$	80,000 620,000	B-10 B-11
B-9 B-10 B-11 B-12	Remove Exist. Wall – left bank of East Fork, between Blue Wall & Dr. F. Calderon Blvd.  Remove Exist. Wall – right bank of East Fork, between Blue Wall and Bedell Ave.  Remove/Replace Blue Wall  Veg. Enhancement/Veg. Filter Strip – End of Parking Area Next to Horseshoe Park	BANK IMPROVEMENTS  BANK IMPROVEMENTS  BANK IMPROVEMENTS  VEGETATION ENHANCEMENT	\$ \$ \$ \$	\$ \$	80,000 620,000 5,000	B-10 B-11 B-12
B-9 B-10 B-11 B-12 B-13	Remove Exist. Wall – left bank of East Fork, between Blue Wall & Dr. F. Calderon Blvd.  Remove Exist. Wall – right bank of East Fork, between Blue Wall and Bedell Ave.  Remove/Replace Blue Wall  Veg. Enhancement/Veg. Filter Strip – End of Parking Area Next to Horseshoe Park  Veg. Enhancement – around Horseshoe Park area	BANK IMPROVEMENTS BANK IMPROVEMENTS BANK IMPROVEMENTS VEGETATION ENHANCEMENT VEGETATION ENHANCEMENT	\$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$	\$ \$ \$ \$	80,000 620,000 5,000 5,000	B-10 B-11 B-12 B-13

B-17	Veg. Enhancement – picnic area between West Fork and the Acequia Madre Ditch in Moore Park	VEGETATION ENHANCEMENT	S	\$ 34,000	B-17
B-18	Veg. Enhancement – along right bank of East Fork, between Footbridge & Dr. F. Calderon Blvd.	VEGETATION ENHANCEMENT	S	\$ 29,000	B-18
B-19	Veg. Enhancement – left bank of East Fork @ footbridge	VEGETATION ENHANCEMENT	S	\$ 40,000	B-19
B-20	Bank Stab. – Blue Hole Banks	BANK IMPROVEMENTS	S	\$ 39,000	B-20
B-21	Bank Stab. – West Fork in Moore Park (s. of Blue Hole)	BANK IMPROVEMENTS	S	\$ 120,000	B-21
B-22	Bank Stab. – along the Acequia Madre Ditch in Moore Park	BANK IMPROVEMENTS	S	\$ 53,000	B-22
B-23	Bank Stab. – along left bank of East Fork between Blue Wall and Dr. F. Calderon Blvd.	BANK IMPROVEMENTS	S	\$ 106,000	B-23
B-24	Bank Stab. – along right bank of East Fork between Blue Wall and Dr. F. Calderon Blvd.	BANK IMPROVEMENTS	S	\$ 165,000	B-24
B-25	Install Focused Access Features @ Select Locations on left bank of E. Fork between Blue Wall and Dr. F. Calderon Blvd	BANK IMPROVEMENTS	S	\$ 110,000	B-25
B-26	Install Focused Access Features @ Select Locations on right bank of E. Fork between Blue Wall and Dr. F. Calderon Blvd	BANK IMPROVEMENTS	S	\$ 110,000	B-26
B-27	Bank Stab. – right bank of East Fork, between RR Trestle and Footbridge	BANK IMPROVEMENTS	S	\$ 180,000	B-27
B-28	Bridge Replacement/Bank Stab. – footbridge across East Fork in Moore Park	BANK IMPROVEMENTS	S	\$ 470,000	B-28
B-29	Install New Pervious Pvmt Parking Lot - exist. dirt area next to the Acequia Madre Ditch, right bank of W. Fork in Moore Park	STORMWATER BMP	S	\$ 690,000	B-29
B-30	Bridge Replacement/Bank Stab. – footbridge across West Fork in Moore Park	BANK IMPROVEMENTS	L	\$ 165,000	B-30
B-31	Bridge Replacment/Bank Stab Replace Footbridges across the Acequia Madre Ditch in Moore Park	BANK IMPROVEMENTS	L	\$ 205,000	B-31
B-32	Reconstruct Exist. Wall – left bank of East Fork, between RR Trestle & Footbridge	BANK IMPROVEMENTS	S	\$ 380,000	B-32
B-33	Reconstruct Exist. Wall – left bank of East Fork, between Footbridge & Blue Wall	BANK IMPROVEMENTS	S	\$ 275,000	B-33
B-34	Install New Pervious Pavement Parking Area – between Horseshoe Park Fountain & RR Tracks	STORMWATER BMP	S	\$ 275,000	B-34
B-35	Rehab Footbridge over Blue Hole	BANK IMPROVEMENTS	L	\$ 80,000	B-35
B-36	Rehab. Picnic Area off Hwy 90, between East & West Fork	PARK IMPROVEMENT	L	\$ 32,000	B-36
B-37	Rehab. Picnic Area on right bank of East Fork @ Hwy 90	PARK IMPROVEMENT	L	\$ 21,000	B-37
B-38	Rehab. Picnic Area on left bank of East Fork @ Hwy 90, N. of Footbridge	PARK IMPROVEMENT	L	\$ 50,000	B-38
B-39	Rehab. Picnic Area on left bank of East Fork @ footbridge	PARK IMPROVEMENT	L	\$ 59,000	B-39
B-40	Replace Existing Asphalt Parking w/ Pervious Pavement – parking area on West Fork in Moore Park	STORMWATER BMP	L	\$ 625,000	B-40
B-41	Rehab. Footbridge across East Fork in Moore Park (adjacent to Hwy 90)	BANK IMPROVEMENTS	S	\$ 35,000	B-41
B-42	Replace Existing ADA Ramps & Install New Ramps at footbridge across East Fork in Moore Park (both ends of bridge)	BANK IMPROVEMENTS	S	\$ 48,000	B-42
B-43	Rehab. Existing Detention Basins on left bank of East Fork, adjacent to Hwy 90	STORMWATER BMP	S	\$ 68,000	B-43
B-44	Convert Existing San Felipe Lions Club Asphalt Parking Lot to Pervious Pavement	STORMWATER BMP	L	\$ 1,220,000	B-44
B-45	Install Bioretention/Biofiltration Area downstream of Existing San Felipe Lions Club Asphalt Parking Lot	STORMWATER BMP	S	\$ 50,000	B-45
B-46	Replace existing flagstone Hike & Bike Trail w/ Pervious Concrete, between Hwy 90 & Footbridge, left bank of E. Fork	STORMWATER BMP	L	\$ 57,000	B-46
B-47	Replace Existing Sidewalk w/ Pervious Concrete along right bank of West Fork, between Hwy 90 and footbridge	STORMWATER BMP	L	\$ 37,000	B-47
B-48	Install Kayak Launch Station – left bank of East Fork in Moore Park	BANK IMPROVEMENTS	S	\$ 82,000	B-48
B-49	Install Pervious Parking Lot at end of Avenue 2 in Moore Park	STORMWATER BMP	S	\$ 315,000	B-49
B-50	Veg. Enhancement along left bank of E. Fork next to baseball field (Hogan Park)	VEGETATION ENHANCEMENT	S	\$ 87,000	B-50
B-51	Veg. Enhancement along left bank of E. Fork between Hwy 90 & RR trestle	VEGETATION ENHANCEMENT	S	\$ 44,000	B-51

				\$ 7,138,000	
D-1	Cane Eradication – left bank of SFC between Gillis St. & Tardy Dam	INVASIVE SPECIES CONTROL	S	\$ 9,000	D-1
D-2	Cane Eradication – right bank of SFC between Gillis St. & Tardy Dam	INVASIVE SPECIES CONTROL	S	\$ 9,000	D-2
D-3	Cane Eradication – at Tardy Dam (between Tardy Dam and Johnson St.)	INVASIVE SPECIES CONTROL	S	\$ 9,000	D-3
D-4	Remove Existing Walls – left bank of SFC from Gillis St. Bridge to 400' downstream	BANK IMPROVEMENTS	S	\$ 54,000	D-4
D-5	Remove Existing Walls – left bank of SFC from 400' downstream of Gillis St. Bridge to 120' upstream of Tardy Dam	BANK IMPROVEMENTS	S	\$ 50,000	D-5
D-6	Reconstruct Existing Walls – left bank of SFC from 400' downstream of Gillis St. Bridge to 120' upstream of Tardy Dam	BANK IMPROVEMENTS	S	\$ 310,000	D-6
D-7	Bank Stab. – right bank of SFC between Gillis St. Bridge & Tardy Dam	BANK IMPROVEMENTS	S	\$ 55,000	D-7
D-8	Bank Stab. – left bank of SFC between Gillis St. Bridge to 400' downstream	BANK IMPROVEMENTS	S	\$ 130,000	D-8
D-9	Install Focused Access Feature (1 total) - on left bank of SFC between Gillis St. Bridge to 400' downstream	BANK IMPROVEMENTS	S	\$ 110,000	D-9
D-10	Veg. Enhancement – area from left bank of SFC to Bridge St. between Gillis St. Bridge & Tardy Dam	VEGETATION ENHANCEMENT	S	\$ 84,000	D-10
D-11	Remove Existing Walls – right bank of SFC immediately downstream of Tardy Dam	BANK IMPROVEMENTS	S	\$ 12,000	D-11
D-12	Reconstruct Existing Walls – right bank area of SFC immediately downstream of Tardy Dam	BANK IMPROVEMENTS	S	\$ 140,000	D-12
D-13	Veg. Enhancement – right bank area of SFC immediately downstream of Tardy Dam	VEGETATION ENHANCEMENT	S	\$ 24,000	D-13
D-14	Replace Existing Footbridge across SFC @ Tardy Dam	BANK IMPROVEMENTS	S	\$ 165,000	D-14
D-15	Install New Pervious Pavement Parking Area – on FEMA Buyout Property across Gillis St. from Memo's	STORMWATER BMP	S	\$ 220,000	D-15
D-16	Install New Pervious Pavement Parking Area – on southside of Bridge St. between Broadbent Ave. and Barrera Ave.	STORMWATER BMP	S	\$ 605,000	D-16
D-17	Veg. Enhancement – park area on south side of Bridge St. between Barrera Ave. and Taini St.	VEGETATION ENHANCEMENT	S	\$ 39,000	D-17
D-18	Convert Existing Wading Area to Kayak Put In/Take Out Area	BANK IMPROVEMENTS	S	\$ 45,000	D-18
D-19	Convert Existing Asphalt Parking Area to Pervious Pavement – Bridge St. @ Gillis St.	STORMWATER BMP	S	\$ 210,000	D-19
D-20	Convert Existing Asphalt Parking Area to Pervious Pavement – Bridge St. @ Broadbent Ave.	STORMWATER BMP	S	\$ 140,000	D-20
D-21	Rehabilitation of Existing Restrooms at Lions Park	PARK IMPROVEMENT	S	\$ 43,000	D-21
D-22	Rehabilitation of Tardy Dam	MISCELLANEOUS	S	\$ 71,000	D-22
D-23	Upgrade of Tardy Dam	MISCELLANEOUS	S	\$ 530,000	D-23
D-24	Inspect Existing Walls (replace if necessary) – left bank from old diving board area to Taini St./Johnson St. Bridge	BANK IMPROVEMENTS	S	\$ 6,000	D-24
D-25	Rehab. Existing Picnic Area – left bank of SFC upstream of Tardy Dam	PARK IMPROVEMENT	S	\$ 32,000	D-25
D-26	Rehab. Existing Playground @ Tardy Dam	PARK IMPROVEMENT	S	\$ 57,000	D-26
D-27	Rehab. Existing Playground	PARK IMPROVEMENT	S	\$ 39,000	D-27
D-28	Installation of Hydrodynamic Separator Unit @ Johnson St. / Taini St. Bridge (@ Tardy Dam)	STORMWATER BMP	S	\$ 43,000	D-28
D-29	Rehab. Existing Park Sign (San Felipe Lions Club/Abe Barrera Memorial)	PARK IMPROVEMENT	S	\$ 7,000	D-29
D-30	Rehab. Existing Park Sign (San Felipe Lions Park)	PARK IMPROVEMENT	S	\$ 14,000	D-30
D-31	Kayak Put In/Take Out Area Pervious Pavement Parking Area (on Bridge St.)	STORMWATER BMP	S	\$ 105,000	D-31
D-32	Community Garden Improvements - on FEMA Buyout Properties	STORMWATER BMP	S	\$ 95,000	D-32
D-33	Install Public Education Kiosks	STORMWATER BMP	S	\$ 10,000	D-33

D-34	Install Pet Waste Stations	STORMWATER BMP	S	\$ 2,000	D-34
D-35	Install Trash Cans w/ Foundations	STORMWATER BMP	S	\$ 4,000	D-35
D-36	Replace Exist. Hike&Bike Trail w/ Pervious Pavement, left bank of SFC, between Gillis St. Bridge & Bridge St.	STORMWATER BMP	S	\$ 86,000	D-36
				\$ 3,564,000	
ΛE					
E-1	Cane Eradication – left bank of SFC between Taini St./Johnson St. Bridge and Canal St. Bridge	INVASIVE SPECIES CONTROL	S	\$ 132,000	E-1
E-2	Cane Eradication – right bank of SFC between Taini St./Johnson St. Bridge and Canal St. Bridge	INVASIVE SPECIES CONTROL	S	\$ 220,000	E-2
E-3	Bank Stab. – left bank of SFC from Taini St./Johnson St. Bridge to Canal St. Bridge	BANK IMPROVEMENTS	S	\$ 290,000	E-3
E-4	Veg. Enhancement – left bank & park area of SFC immediately downstream of Taini St./Johnson St. Bridge	VEGETATION ENHANCEMENT	S	\$ 68,000	E-4
E-5	Repair Existing Tree Wells – left bank of SFC just downstream of Taini St./Johnson St. Bridge	BANK IMPROVEMENTS	S	\$ 5,000	E-5
E-6	Kayak Put In/Take Out Area – left bank of SFC at end of existing Hike & Bike Trail	BANK IMPROVEMENTS	S	\$ 82,000	E-6
E-7	Construct Pervious Pavement Hike & Bike Trail – from end of existing Hike & Bike Trail to Canal St. Bridge	STORMWATER BMP	S	\$ 145,000	E-7
E-8	Veg. Enhancement – area on left bank of SFC from Flores St. to Mendez St.	VEGETATION ENHANCEMENT	S	\$ 76,000	E-8
E-9	Veg. Enhancement – area on left bank of SFC from Diaz St. to Canal St. Bridge	VEGETATION ENHANCEMENT	S	\$ 90,000	E-9
E-10	Convert Existing Asphalt Parking Area to Pervious Pavement – north side of Canal St./Cisneros St. intersection	STORMWATER BMP	S	\$ 625,000	E-10
E-11	Bank Stab./Focused Access Feature – under Canal St. Bridge	BANK IMPROVEMENTS	S	\$ 145,000	E-11
E-12	Inspect Existing Walls (replace if necessary) – left bank from old diving board area to Taini St./Johnson St. Bridge	BANK IMPROVEMENTS	S	\$ 6,000	E-12
E-13	Replace Asphalt Hike & Bike Trail w/ Pervious Pavement, from Taini St./Johnson St. Bridge to End of Existing H&B Trail	STORMWATER BMP	S	\$ 75,000	E-13
E-14	Community Garden Improvements - on FEMA Buyout Properties	STORMWATER BMP	S	\$ 41,000	E-14
E-15	Install Public Education Kiosks	STORMWATER BMP	S	\$ 10,000	E-15
E-16	Install Pet Waste Stations	STORMWATER BMP	S	\$ 3,000	E-16
E-17	Install Trash Cans w/ Foundations	STORMWATER BMP	S	\$ 4,000	E-17
				\$ 2,017,000	
F					380 3
F-1	Cane Eradication – left bank of SFC between Canal St. and E. Academy St.	INVASIVE SPECIES CONTROL	S	\$ 132,000	F-1
F-2	Cane Eradication – right bank of SFC between Canal St. and E. Academy St.	INVASIVE SPECIES CONTROL	S	\$ 220,000	F-2
F-3	Cane Eradication – left bank of SFC between E. Academy St. & Weir Dam	INVASIVE SPECIES CONTROL	S	\$ 352,000	F-3
F-4	Cane Eradication – right bank of SFC between E. Academy St. & Weir Dam	INVASIVE SPECIES CONTROL	S	\$ 264,000	F-4
F-5	Bank Stab. – left bank of SFC in Rotary Park, between Canal St. & E. Academy St.	BANK IMPROVEMENTS	S	\$ 85,000	F-5
F-6	Bank Stab left bank of SFC between E. Academy St. & Weir Dam	BANK IMPROVEMENTS	S	\$ 305,000	F-6
F-7	Focused Access Features (4 total) – left bank of SFC in Rotary Park	BANK IMPROVEMENTS	S	\$ 435,000	F-7
F-8	Focused Access Features (4 total) – left bank of SFC from E. Academy St. to Weir Dam	BANK IMPROVEMENTS	S	\$ 435,000	F-8
F-9	New Pervious Pvmt. Hike & Bike Trail – along left bank of SFC, from Canal St. Bridge to Magnolia St. (4,050 LF)	STORMWATER BMP	S	\$ 340,000	F-9
F-10	Veg. Enhancement – Rotary Park	VEGETATION ENHANCEMENT	S	\$ 77,000	F-10
F-11	Convert Existing Unimproved Parking Areas to Pervious Pavement – located in Rotary Park along Canal St. and Cisneros St.	STORMWATER BMP	S	\$ 770,000	F-11

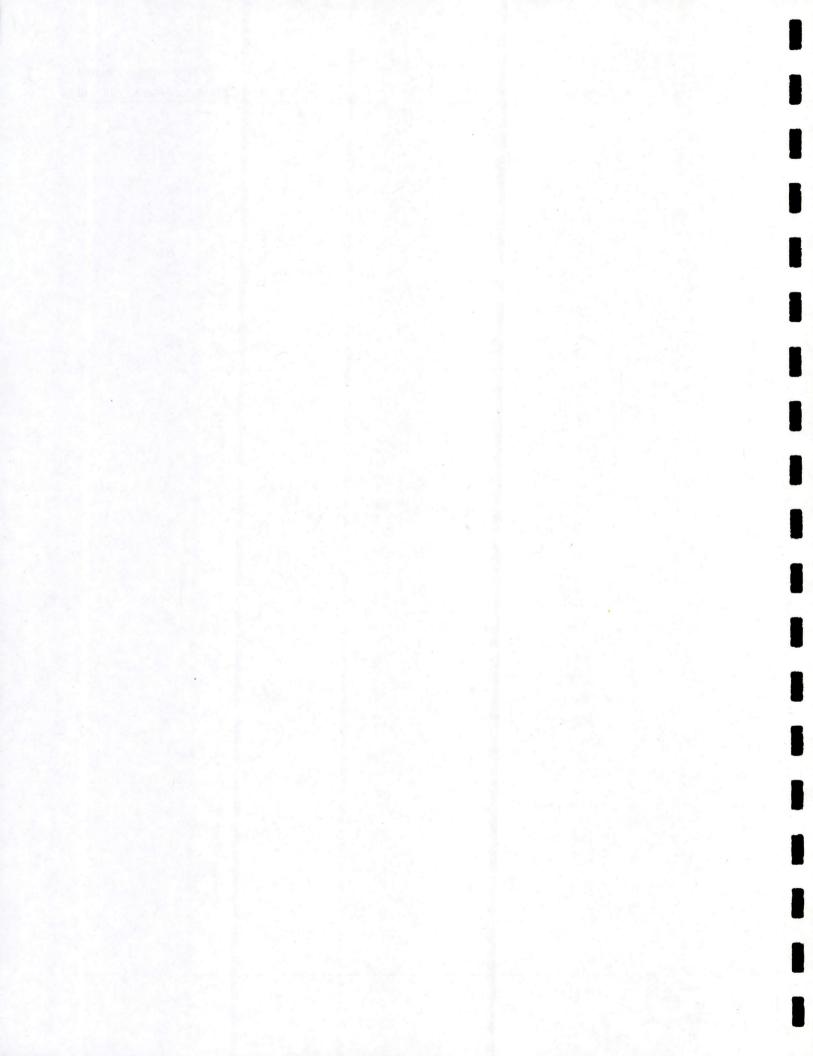
B-52	Veg. Enhancement along left bank of E. Fork next to San Felipe Lions Club	VEGETATION ENHANCEMENT	S	\$	32,000	B-52
B-53	Veg. Enhancement of area next to existing parking lot in Moore Park, across from swimming pool	VEGETATION ENHANCEMENT	S	\$	20,000	B-53
B-54	Veg. Enhancement [of median areas at intersection of Calderon Blvd. & Ogden St.	VEGETATION ENHANCEMENT	S	\$	115,000	B-54
B-55	Bank Stabilization under Hwy. 90 bridge, E. Fork of SFC	BANK IMPROVEMENTS	S	\$	125,000	B-55
B-56	Veg. Enhancement of median area between Bedell Ave. & Calderon Blvd.	VEGETATION ENHANCEMENT	S	\$	120,000	B-56
B-57	Installation of Hydrodynamic Separator Unit on Bedell Ave. @Calderon Blvd.	STORMWATER BMP	L	\$	57,000	B-57
B-58	Construct Public Restrooms next to baseball fields (Hogan Park) in Moore Park	STORMWATER BMP	S	\$	85,000	B-58
B-59	Install Public Education Kiosk next to baseball fields (Hogan Park) in Moore Park	STORMWATER BMP	S	\$	7,000	B-59
B-60	Rehab. Horseshoe Park Fountain	PARK IMPROVEMENT	S	\$	29,000	B-60
B-61	Repair Erosion @ RR Trestle, E. Fork of SFC	BANK IMPROVEMENTS	S	\$	31,000	B-61
B-62	Replace existing flagstone Hike & Bike Trail w/ Pervious Concrete, between Footbridge & Bedell Ave., left bank of E. Fork	STORMWATER BMP	S	\$	66,000	B-62
B-63	Reconstruct Existing Walls between Hwy 90 & RR Trestle, left bank of E. Fork	BANK IMPROVEMENTS	S	\$	240,000	B-63
B-64	Rehab. Picnic Area on left bank of E. Fork, South of Footbridge	PARK IMPROVEMENT	L	\$	20,000	B-64
B-65	Relocate Existing Pipelines crossing E. Fork of SFC	MISCELLANEOUS	L	\$	51,000	B-65
B-66	Rehab. Existing BBQ Pit Area, SFC at Bedell Ave. in Moore Park	PARK IMPROVEMENT	L	\$	71,000	B-66
B-67	Veg. Enhancement/Veg. Filter Strip, adjacent to parking lot on W. side of the Acequia Madre Ditch	VEGETATION ENHANCEMENT	S	\$	14,000	B-67
B-68	Rehab. Picnic Area between W. Fork of SFC & Acequia Madre Ditch	PARK IMPROVEMENT	L	\$	42,000	B-68
B-69	Reveg. Around RR Trestle, both sides of the Acequia Madre Ditch	VEGETATION ENHANCEMENT	S	\$	3,000	B-69
B-70	Rehab. Picnic Area of Horseshoe Park	PARK IMPROVEMENT	L	\$	51,000	B-70
B-71	Rehab. Horseshoe Park Sign	PARK IMPROVEMENT	S	\$	7,000	B-71
B-72	Replace Existing Asphalt Parking Area w/ Pervious Pavement	STORMWATER BMP	L	\$	385,000	B-72
B-73	Reconstruct Existing wall between Hwy 90 & RR Trestle (approx.), right bank of E. Fork	BANK IMPROVEMENTS	S	\$	180,000	B-73
B-74	Reconstruct Existing Walls between Footbridge & Blue Wall, right bank of E. Fork	BANK IMPROVEMENTS	S	\$	240,000	B-74
B-75	Install Public Education Kiosks	STORMWATER BMP	S	\$	17,000	B-75
B-76	Install Pet Waste Stations	STORMWATER BMP	S	\$	4,000	B-76
B-77	Install Trash Cans w/ Foundations	STORMWATER BMP	S	\$	6,000	B-77
				\$	9,486,000	
EA C						
C-1	Cane Eradication – left bank of SFC between Dr. F. Calderon Blvd. & Romanelli Park Footbridge	INVASIVE SPECIES CONTROL	S	\$	9,000	C-1
C-2	Cane Eradication – right bank of SFC between Dr. F. Calderon Blvd. & Romanelli Park Footbridge	INVASIVE SPECIES CONTROL	S	\$	9,000	C-2
C-3	Cane Eradication – left bank of SFC between Romanelli Park Footbridge & Gillis St.	INVASIVE SPECIES CONTROL	S	\$	9,000	C-3
C-4	Cane Eradication – right bank of SFC between Romanelli Park Footbridge & Gillis St.	INVASIVE SPECIES CONTROL	S	\$	9,000	C-4
C-5	Cane Eradication – drainage channel at end of Calderon Ln upstream to Roosevelt Park	INVASIVE SPECIES CONTROL	S	\$	9,000	C-5
C-6	Remove Existing Walls – left bank of SFC just upstream of Romanelli Park Footbridge	BANK IMPROVEMENTS	S	s	17,000	C-6
C-7	Remove Existing Walls – left bank of SFC from Romanelli Park Footbridge downstream to Amphitheater	BANK IMPROVEMENTS	S	\$	105,000	C-7

C-8	Remove Existing Walls - left bank of SFC from Amphitheater downstream to stone ramp	BANK IMPROVEMENTS	S	\$ 56,000	C-8
C-9	Remove Existing Walls - left bank of SFC from existing stone ramp downstream to Gillis St.	BANK IMPROVEMENTS	S	\$ 68,000	C-9
C-10	Reconstruct Existing Walls w/ Focused Access Features – left bank from Romanelli Park Footbridge to Amphitheater	BANK IMPROVEMENTS	S	\$ 885,000	C-10
C-11	Veg. Enhancement – Romanelli Park	VEGETATION ENHANCEMENT	S	\$ 43,000	C-11
C-12	Veg. Enhancement – around Joe Ramos Center	VEGETATION ENHANCEMENT	S	\$ 60,000	C-12
C-13	Veg. Enhancement – around Amphitheater	VEGETATION ENHANCEMENT	S	\$ 31,000	C-13
C-14	Veg. Enhancement – left bank of SFC from Dr. F. Calderon Dr. to Romanelli Footbridge	VEGETATION ENHANCEMENT	S	\$ 44,000	C-14
C-15	Bank Stab./New Pervious Parking Area – under Dr. F. Calderon Blvd. Bridge	STORMWATER BMP	S	\$ 350,000	C-15
C-16	Bank Stab. – left bank from Dr. F. Calderon Blvd. to Romanelli Park Footbridge	BANK IMPROVEMENTS	S	\$ 220,000	C-16
C-17	Bank Stab. – left bank approx. 225 feet downstream of Dr. F. Calderon Blvd.	BANK IMPROVEMENTS	S	\$ 98,000	C-17
C-18	Bank Stab. – right bank from Dr. F. Calderon Blvd. to Romanelli Park Footbridge	BANK IMPROVEMENTS	S	\$ 460,000	C-18
C-19	Bank Stab. – left bank from Amphitheater to Gillis St. Bridge	BANK IMPROVEMENTS	S	\$ 335,000	C-19
C-20	Install Focused Access Features @ Select Locations on left bank between Amphitheater and Gillis Street Bridge	BANK IMPROVEMENTS	S	\$ 325,000	C-20
C-21	Bank Stab./Focused Access – under Gillis St. Bridge	BANK IMPROVEMENTS	S	\$ 110,000	C-21
C-22	Bank Stab./Channel Improvements – drainage channel at end of Calderon Ln upstream to Roosevelt Park	BANK IMPROVEMENTS	S	\$ 99,000	C-22
C-23	Bank Stab./Replace Existing Footbridge to Romanelli Park & Install ADA Access Ramps	BANK IMPROVEMENTS	S	\$ 645,000	C-23
C-24	Rehab Concrete Slab & Install Pavilion/Shade Structure	PARK IMPROVEMENT	S	\$ 190,000	C-24
C-25	Install Pervious Pavement Parking Lot adjacent to Joe Ramos Center	STORMWATER BMP	S	\$ 1,290,000	C-25
C-26	Rehab. Fountain @ Joe Ramos Center	PARK IMPROVEMENT	S	\$ 43,000	C-26
C-27	Rehab. Existing Restrooms near Joe Ramos Center	PARK IMPROVEMENT	S	\$ 43,000	C-27
C-28	Rehab./Renovate Amphitheater	PARK IMPROVEMENT	S	\$ 99,000	C-28
C-29	Convert Existing Asphalt Parking to Pervious Pavement	STORMWATER BMP	S	\$ 440,000	C-29
C-30	Biofiltration/Bioretention for existing parking area	STORMWATER BMP	S	\$ 12,000	C-30
C-31	Convert Existing Asphalt Parking to Pervious Pavement	STORMWATER BMP	S	\$ 305,000	C-31
C-32	Convert Existing Concrete Sidewalk to Pervious Pavement	STORMWATER BMP	S	\$ 77,000	C-32
C-33	Veg. Enhancement – around existing soccer field and adjoining areas near Medical Center	VEGETATION ENHANCEMENT	S	\$ 135,000	C-33
C-34	Veg. Enhancement – area from Amphitheater to Severiano Perez Pkwy	VEGETATION ENHANCEMENT	S	\$ 125,000	C-34
C-35	Veg. Enhancement – from Severiano Perez Pkwy to Gillis St. Bridge	VEGETATION ENHANCEMENT	S	\$ 40,000	C-35
C-36	Replace Existing Asphalt H&B Trail w/ Pervious Pavement	STORMWATER BMP	S	\$ 240,000	C-36
C-37	Rehab. Existing Playground	PARK IMPROVEMENT	S	\$ 37,000	C-37
C-38	Biofiltration/Bioretention for existing parking area at the Joe Ramos Center	STORMWATER BMP	S	\$ 17,000	C-38
C-39	Community Garden Improvements - on FEMA Buyout Properties	STORMWATER BMP	S	\$ 22,000	C-39
C-40	Install Public Education Kiosks	STORMWATER BMP	S	\$ 17,000	C-40
C-41	Install Pet Waste Stations	STORMWATER BMP	S	\$ 4,000	C-41
C-42	Install Trash Cans w/ Foundations	STORMWATER BMP	S	\$ 6,000	C-42

F-12	New Pervious Pavement Parking Area – east side of Andrade St., between Cisneros St. & Guillen St.	STORMWATER BMP	S	\$ 385,000	F-12
F-13	New Pervious Pavement Parking Area – west side of Andrade St., between Cisneros St. & Guillen St.	STORMWATER BMP	S	\$ 470,000	F-13
F-14	New Public Restrooms – near Magnolia St. & Canal St.	STORMWATER BMP	S	\$ 85,000	F-14
F-15	Kayak Take Out Area – near Magnolia St. & Andrade St.	BANK IMPROVEMENTS	S	\$ 82,000	F-15
F-16	New Pervious Pavement Parking Area – north of Barron St./Magnolia St. intersection	STORMWATER BMP	S	\$ 270,000	F-16
F-17	New Pervious Pavement Parking Area – on street parking along Magnolia St., between Barron St. and Canal St.	STORMWATER BMP	S	\$ 165,000	F-17
F-18	Demolition of Existing Streets/Convert to Pervious Pavement – along Perez St. & Magnolia St.	STORMWATER BMP	S	\$ 210,000	F-18
F-19	Bird/Wildlife Observation Area – south of Barron St./Magnolia St. intersection	STORMWATER BMP	S	\$ 18,000	F-19
F-20	Veg. Enhancement – area between Magnolia St. & SFC, from Barron St. to Canal St.	VEGETATION ENHANCEMENT	S	\$ 115,000	F-20
F-21	Rehab. Existing Playground	PARK IMPROVEMENT	S	\$ 63,000	F-21
F-22	Community Garden Improvements - on FEMA Buyout Properties	STORMWATER BMP	S	\$ 135,000	F-22
F-23	Install Public Education Kiosks	STORMWATER BMP	S	\$ 17,000	F-23
F-24	Install Pet Waste Stations	STORMWATER BMP	S	\$ 5,000	F-24
F-25	Install Trash Cans w/ Foundations	STORMWATER BMP	S	\$ 10,000	F-25
F-26	New Public Restrooms – Rotary Park	STORMWATER BMP	S	\$ 85,000	F-26
				\$ 5,530,000	

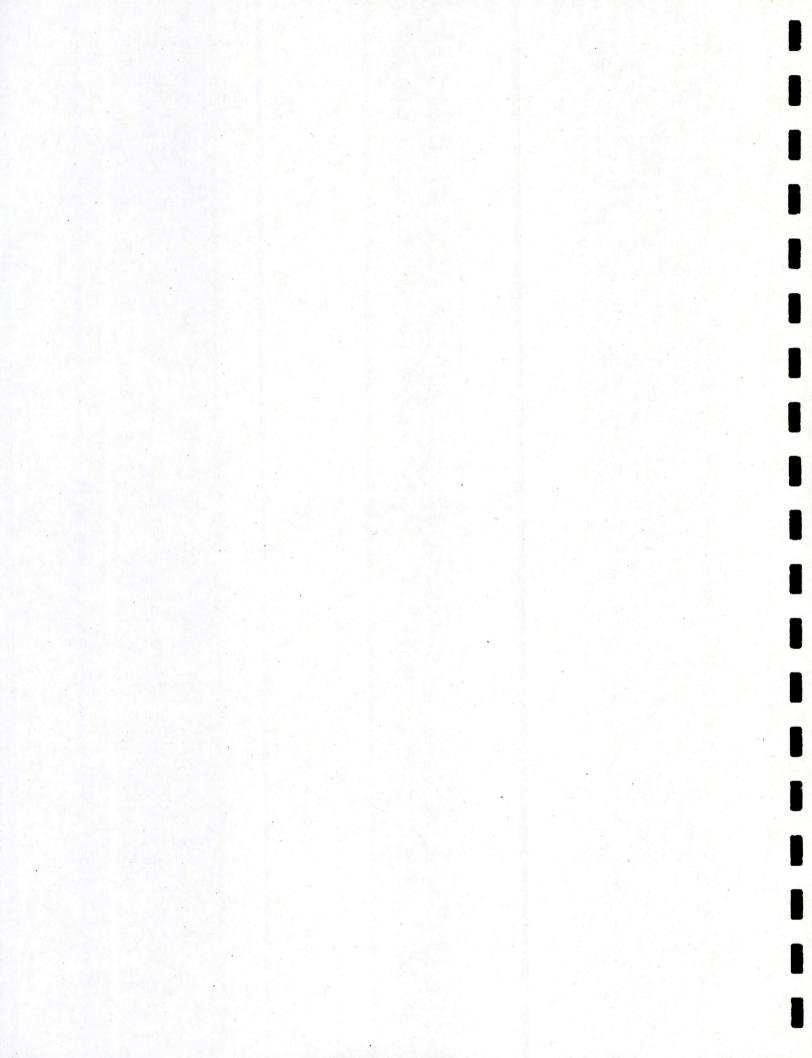
OVERALL COST SUI	MMARY	
AREA A	\$	549,000
AREA B	\$	9,486,000
AREA C	\$	7,138,000
AREA D	\$	3,564,000
AREA E	\$	2,017,000
AREA F	\$	5,530,000
TOTAL	\$	28,284,000

### **APPENDIX G**



City of Del Rio San Felipe Creek Master Plan

# Area A



Project Type: INVASIVE SPECIES CONTROL

A-1 to A-6. CANE ERADICATION – San Felipe Golf Course

Project Priority: SHORT-TERM Related Projects:

Project Location: San Felipe Golf Course

### **Project Description:**

Project includes the eradication of Arundo Donax (a.k.a., "Giant Reed", "River Cane") within the San Felipe Creek Golf Course property. Project areas A-1 through A-6 include the known individual tributaries located on the golf course property. Eradication should follow the steps outlined in the San Felipe Creek Master Plan and include: Cut Cane (after annual flowering around mid-July); Removal of Cuttings; Herbicide Spray; Removal of Dead Cane (in winter); Repeat. Work should proceed from upstream to downstream.

### **Design/Construction Issues:**

#### **Known Constraints:**

- Herbicide use in and around the creek area should proceed with caution.
- No spraying in the creek; herbicide must be hand applied to cane located in the creek.
- Eradication efforts will involve several cycles.

#### **Project Options:**

 Small patches can be cut by hand; large patches should be cut with mechanical equipment, if possible; avoid disturbing soil by the use of rubber tired equipment.

#### **Construction BMPs:**

Construction BMPs (silt fence, etc...) should be used if mechanical equipment results in soil disturbance.

Project Length/Area:

**8.0** acres [area is approximate, based on latest aerial photos]

#### Photographs/Graphics:

Area 1 = \$44,000

Area 2 = \$88,000

Area 3 = \$88,000

Area 4 = \$44,000

Area 5 = \$44,000

Area 6 = \$44,000

Total = \$352,000 (1<sup>st</sup> Year Efforts Only)

Anticipated Labor Source: <u>City Crews</u> / <u>Contractor</u> / Volunteers

Cost Estimate: \$ 352,000 (1<sup>ST</sup> YEAR EFFORTS ONLY) Operations & Maintenance Impact: INCREASE

Project No.: A-1 - right bank of West Fork

Project: Arundo Donax Removal (Giant Reed, a.k.a. "river cane")

Project Area: San Felipe Country Club

Priority: Short-Term

Item	Improvement Description	Quantity	Quantity Unit Unit Price				
1	Arundo Donax Removal*	1	1 Acre \$ 44,00	\$ 44,000	\$	44,000	
		Y			No.		
* - estimated	at \$44,000 / acre for one-time manual removal; price			Construction	\$	44,000	
does not in	nclude follow up visits (which should be once per year); see Appendix	Engineeri	ng Design &	Mgmt (13%)**	S	-	
E for deta	ails on cane removal cost estimate.	Total I	Estimated Co	onstruction Cost	\$	44,000	
** - Enginee	ring Design/Mgmt. + Contigency included in Unit Cost; see Appendix	in literature	Conti	ngency (25%)**	s		
E for ad	ditional details.	1	Total Project	Estimated Cost	\$	44,000	
		PL	ANNING P	ROJECT COST	S	44,000	

Project No.: A-2 - left bank of West Fork

Project: Arundo Donax Removal (Giant Reed, a.k.a. "river cane")

Project Area: San Felipe Country Club

Item	Improvement Description	Quantity	Unit	Uı	it Price	To	tal Cost
1	Arundo Donax Removal*	2	Acre	\$	44,000	\$	88,000
				+	1		
* - estimated	at \$44,000 / acre for one-time manual removal; price			Co	nstruction	\$	88,000
does not in	clude follow up visits (which should be once per year); see Appendix	Engineeri	ng Design &	Mgm	t (13%)**	\$	
E for deta	ils on cane removal cost estimate.	Total E	Stimated C	onstru	ction Cost	\$	88,000
** - Engineer	ring Design/Mgmt. + Contigency included in Unit Cost; see Appendix	Contingency (25%)**			\$		
E for ad	ditional details.	T	otal Projec	t Estin	ated Cost	\$	88,000
		PL	ANNING P	ROJE	CT COST	S	88,000

Project No.: A-3 - right bank of Mid Fork

Project: Arundo Donax Removal (Giant Reed, a.k.a. "river cane")

Project Area: San Felipe Country Club

Priority: Short-Term

Item	Improvement Description	Quantity	Unit	Unit I	Price	Total	l Cost
1	Arundo Donax Removal*	2	Acre	\$ 4	14,000	\$	88,000
	at \$44,000 / acre for one-time manual removal; price clude follow up visits (which should be once per year); see Appendix	Engineeri	ng Design &		uction 3%)**		88,000
E for deta	ils on cane removal cost estimate.	Total I	Estimated Co	onstructio	n Cost	\$	88,000
** - Engineer	ring Design/Mgmt. + Contigency included in Unit Cost; see Appendix		Conti	ngency (2	5%)**	\$	
E for add	ditional details.		Total Project	t Estimate	d Cost	\$	88,000
		PL	ANNING P	ROJECT	COST	S	88,000

Project No.: A-4 - left bank of Mid Fork

Project: Arundo Donax Removal (Giant Reed, a.k.a. "river cane")

Project Area: San Felipe Country Club

Item	Improvement Description	Quantity	Unit	To	tal Cost		
1	Arundo Donax Removal*	1	1 Acre		44,000	\$	44,000
* - estimated	at \$44,000 / acre for one-time manual removal; price			Con	nstruction	\$	44,000
does not in	clude follow up visits (which should be once per year); see Appendix	Engineeri	ng Design &	Mgm	t (13%)**	\$	-
E for deta	ils on cane removal cost estimate.	Total F	Estimated C	onstru	ction Cost	\$	44,000
** - Engineer	ring Design/Mgmt. + Contigency included in Unit Cost; see Appendix		Conti	ngency	(25%)**	\$	-
E for add	litional details.	7	Total Projec	t Estim	ated Cost	\$	44,000
		PL	ANNING P	ROJE	CT COST	\$	44,000

Project No.: A-5 - right bank of East Fork

Project: Arundo Donax Removal (Giant Reed, a.k.a. "river cane")

Project Area: San Felipe Country Club

Priority: Short-Term

Item	Improvement Description	Quantity	Quantity Unit Unit Price				Total Cost		
1	Arundo Donax Removal*	1	1 Acre \$ 44,		44,000	\$	44,000		
			7-		4 4 1				
					, F - 3				
* - estimated	at \$44,000 / acre for one-time manual removal; price			Co	nstruction	\$	44,000		
does not in	clude follow up visits (which should be once per year); see Appendix	Engineeri	ng Design &	Mgm	t (13%)**	S			
E for deta	ils on cane removal cost estimate.	Total I	Estimated Co	onstru	ction Cost	\$	44,000		
** - Enginee	ring Design/Mgmt. + Contigency included in Unit Cost; see Appendix	(	Conti	ngenc	y (25%)**	S			
E for ad	ditional details.	7	Total Project	t Estin	nated Cost	\$	44,000		
Name of the least		PL	ANNING P	ROJE	CT COST	\$	44,000		

Project No.: A-6 - left bank of East Fork

Project: Arundo Donax Removal (Giant Reed, a.k.a. "river cane")

Project Area: San Felipe Country Club

Item	Improvement Description Arundo Donax Removal*	Quantity	Unit Acre	Unit Price		Total Cost	
1		1		\$	44,000	\$	44,000
* - estimated at \$44,000 / acre for one-time manual removal; price		Construction				\$	44,000
does not include follow up visits (which should be once per year); see Appendix		Engineering Design & Mgmt (13%)**				\$	-
E for details on cane removal cost estimate.		Total I	<b>Total Estimated Construction Cost</b>				44,000
** - Engineering Design/Mgmt. + Contigency included in Unit Cost; see Appendix			Contingency (25%)**				-
E for additional details.		1	Total Project Estimated Cost				44,000
		PL	ANNING P	ROJE	CT COST	S	44,000

#### **Project Type: BANK IMPROVEMENTS BANK STABILIZATION – San Felipe Golf Course**

A-7 to A-12.

**Project Priority: LONG-TERM Related Projects:** A-7&A-8; A-9&A-10; A-11&A-12

**Project Location:** San Felipe Golf Course

# **Project Description:**

Project includes the stabilization of the stream banks. Stabilization may include a variety of methods including grading, establishment of vegetation, improvement of soil organics, structural stability including fiber mats, plastic geogrid systems, and other options. Bank stabilization is these areas should follow cane eradication. Project areas A-7 through A-12 include the known individual tributaries located on the golf course property.

# **Design/Construction Issues:**

#### **Known Constraints:**

- Construction site is located on the banks of a creek that provides habitat to Threatened and/or Endangered Species that have been identified by the USFWS.
- Activities should proceed, as necessary, following the eradication of river cane along the banks (see Projects A-1 to A-6).

#### **Project Options:**

- Small patches can be cut by hand; large patches should be cut with mechanical equipment, if possible; avoid disturbing soil by the use of rubber tired equipment.
- Labor can be provided by City Crews or a Contractor can be hired (contractors should be experienced).

#### **Construction BMPs:**

- Coffer Dams or inflatable barriers will be needed to prevent or limit the amount of sediment or suspended soils created by construction activities.
- Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area:	A-7 = 1,560	feet [lengths are approximate, based on latest aerial photos]
	A-8 = 1,580	feet
	A-9 = 2,010	feet
	A-10 = 1,680	feet
	A-11 = 1,100	feet
	A-12 = 1,230	feet
	Total = 9,160	

# Photographs/Graphics:

Anticipated Labor Source:	City Crews	Contractor	/ Volunteers

**Cost Estimate:** \$ 195,000 (total) **Operations & Maintenance Impact: NO CHANGE** 

Project No.: A-7 - A-12

Project: Bank Stabilization - San Felipe Country Club

Project Area: San Felipe Country Club

Item .	Improvement Description	Quantity	Unit	Unit Price		Total Cost	
1	Vegetation Enhancement - Soil(2")+Compost(2") Only*	20,356	SY	\$	3	\$	61,067
2	Soil Retention Blanket	20,356	SY	\$	2	\$	40,711
3	Silt Fence	9,160	LF	\$	4	\$	36,640
			Construction				138,418
	* - includes soil & compost along 20 feet of bank area;	Enginee	ring Design	& Mgm	t (13%)	S	17,994
	total length of bank is approx. 9,160 LF	Total E	Stimated C	onstructi	on Cost	S	156,412
			Co	ntingency	(25%)	S	39,103
		Total Project Estimated Cost \$					195,515
		PL	ANNING P	ROJECT	COST	s	195,000

Project No.: A-7 - 1,560 FEET

Project: Bank Stabilization - San Felipe Country Club

Project Area: San Felipe Country Club

Priority: Long-Term

Item	Improvement Description	Quantity	Unit	Unit	Price	To	tal Cost
1	Vegetation Enhancement - Soil(2")+Compost(2") Only	3,467	SY	\$	. 3	\$	10,400
- 2	Soil Retention Blanket	3,467	SY	\$	2	\$	6,933
3	Silt Fence	1,560	LF	\$	4	\$	6,240
	AND THE RESERVE OF THE PROPERTY OF THE PROPERT	Construct		truction	\$	23,573	
	* - includes soil & compost along 20 feet of bank area	Engineering Design & Mgmt (13%				\$	3,065
		Total E	Total Estimated Construction Cost			\$	26,638
		and the second	Co	ntingenc	y (25%)	\$	6,659
1		Т	otal Projec	t Estima	ted Cost	S	33,297
		PL	ANNING P	ROJEC	r cost	\$	33,000

Project No.: A-8 - 1,580 FEET

Project: Bank Stabilization - San Felipe Country Club

Project Area: San Felipe Country Club

Item	Improvement Description	Quantity	Unit	Unit	Unit Price		tal Cost
1	Vegetation Enhancement - Soil(2")+Compost(2") Only	3,511	SY	\$	. 3	\$	10,533
2	Soil Retention Blanket	3,511	SY	\$	2	\$	7,022
3	Silt Fence	1,580	LF	\$	4	\$	6,320
			Construction				23,876
	* - includes soil & compost along 20 feet of bank area	Enginee	Engineering Design & Mgmt (13%)				
		Total F	<b>Total Estimated Construction Cos</b>				
			Co	ntingenc	y (25%)	\$	6,745
		Total Project Estimated Cos				\$	33,72
		PL	ANNING P	ROJECT	COST	S	33,000

Project No.: A-9 - 2,010 FEET

Project: Bank Stabilization - San Felipe Country Club

Project Area: San Felipe Country Club

Priority: Long-Term

Item	Improvement Description	Quantity	Unit	Unit Price		To	tal Cost
1	Vegetation Enhancement - Soil(2")+Compost(2") Only	4,467	SY	\$	3	\$	13,400
2	Soil Retention Blanket	4,467	SY	\$	2	\$	8,933
3	Silt Fence	2,010	LF	\$	4	\$	8,040
	* - includes soil & compost along 20 feet of bank area	Construction Engineering Design & Mgmt (13%)					30,373 3,949
		Total E	stimated C	onstructi	ion Cost	\$	34,322
		Contingency (25%)				\$	8,580
		Total Project Estimated Cost					42,902
		PL	ANNING P	ROJEC	r cost	S	43,000

Project No.: A-10 - 1,680 FEET

Project: Bank Stabilization - San Felipe Country Club

Project Area: San Felipe Country Club

Item	Improvement Description	Quantity 3,733	Unit	Unit Price		To	tal Cost
1	Vegetation Enhancement - Soil(2")+Compost(2") Only		SY	\$	3	\$	11,200
2	Soil Retention Blanket	3,733	SY	\$	2	\$	7,467
3	Silt Fence	1,680	ĹF	\$	4	\$	6,720
	* - includes soil & compost along 20 feet of bank area	Construction  apost along 20 feet of bank area  Engineering Design & Mgmt (13%)					25,387 3,300
		Total E	Total Estimated Construction Cost			\$	28,687
			Co	ntingenc	y (25%)	s	7,172
4/2		Т	otal Projec	t Estimat	ed Cost	\$	35,859
		PL.	ANNING P	ROJECT	COST	\$	36,000

Project No.: A-11 - 1,100 FEET

Project: Bank Stabilization - San Felipe Country Club

Project Area: San Felipe Country Club

Priority: Long-Term

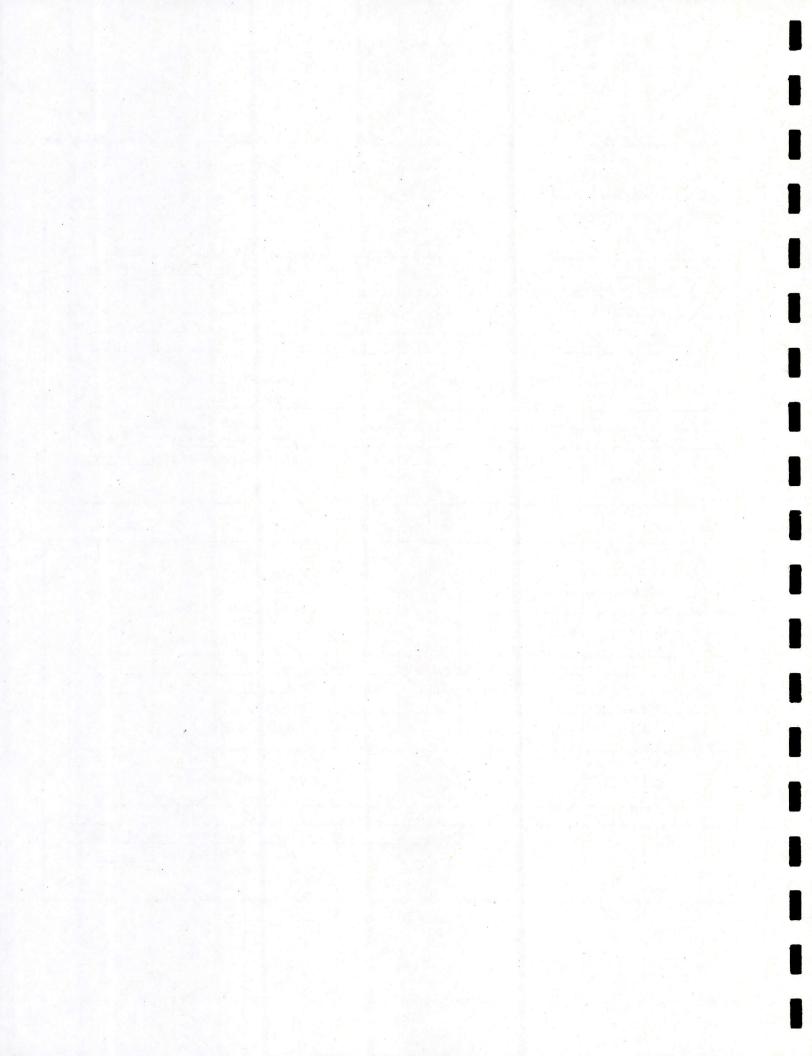
[tem	Improvement Description	Quantity	Unit	Unit Price		Tot	tal Cost
1	Vegetation Enhancement - Soil(2")+Compost(2") Only	2,444	SY	\$	3	\$	7,333
2	Soil Retention Blanket	2,444	SY	\$	2	\$	4,889
3	Silt Fence	1,100	LF	\$	4	\$ .	4,400
			Constructio				16,622
	* - includes soil & compost along 20 feet of bank area	Enginee	neering Design & Mgmt (13%)			S	2,16
		Total F	Estimated C	onstruction	on Cost	\$	18,78
		Contingency (25%)					4,696
		Total Project Estimated Cost				\$	23,479
19 / 1		PL	ANNING P	ROJECT	COST	\$	23,000

Project No.: A-12 - 1,230 FEET

Project: Bank Stabilization - San Felipe Country Club

Project Area: San Felipe Country Club

n	Improvement Description	Quantity	Unit	Unit Price		Tot	tal Cost
	Vegetation Enhancement - Soil(2")+Compost(2") Only	2,733	SY	S	3	\$	8,200
	Soil Retention Blanket	2,733	ŞY	\$	2	\$	5,467
	Silt Fence	1,230	LF	\$	4	\$	4,920
	* - includes soil & compost along 20 feet of bank area		Construction Engineering Design & Mgmt (13%)				18,587 2,416
		Total Estimated Construction Cost					21,003
			Co	ntingenc	y (25%)	\$	5,251
		Total Project Estimated Cost				\$	26,254
		PL	ANNING P	ROJECT	COST	S	26,000



Project Type: INVASIVE SPECIES CONTROL

A-13. NUTRIA CONTROL - San Felipe Golf Course

Project Priority: SHORT-TERM Related Projects:

Project Location: San Felipe Golf Course

# **Project Description:**

Project includes the eradication of nutria (*Myocastor coypus*) currently living in and around the creek bank areas within the San Felipe Creek Golf Course property. The nutria are currently damaging the creek bank areas, contributing to bank failures and increased sediment runoff into the creek. Eradication of nutria may proceed independently of the eradication of the river cane located in and around the golf course property.

#### **Design/Construction Issues:**

#### **Known Constraints:**

- Nutria eradication would preferably proceed before the bank stabilization project(s) outlined in projects A-7 through A-12
- Eradication should be accomplished by trapping (no poisons).
- Project will involve several cycles.

# **Project Options:**

- Eradication should be accomplished by trapping (no poisons).
- .

#### **Construction BMPs:**

• Construction BMPs (silt fence, etc...) should be used if mechanical equipment results in soil disturbance.

Project Length/Area:

8.0 acres [area is approximate, based on latest aerial photos]

# Photographs/Graphics:





Above photos courtesy of Mr. Dan Riley, San Felipe Creek Commissioner.

Anticipated Labor Source: City Crews / Contractor / Volunteers

Cost Estimate: \$ 3,000 (estimated) Operations & Maintenance Impact: NO CHANGE

Project No.:

Project: Nutria/Rodent Control

Project Area: San Felipe Country Club Area

Priority: Short-Term

Item	Improvement Description	Quantity	Unit	Unit Price	Tota	al Cost
1	Rodent Control (as needed)*	1	LS	\$ 2,000	\$	2,000
						All Indiana
	* rodent control shall be on an as-needed basis; no Engineering			Construction	\$	2,000
	Design & Mgmt costs have been included.	Engin	eering Design	& Mgmt (13%)	S	
	Total Estimated Construction Cost					
	Contingency (25%)					
			Total Project	<b>Estimated Cost</b>	\$	2,500
		P	LANNING PI	ROJECT COST	S	3,000

Project Type: INVASIVE SPECIES CONTROL

# A-14. Armored Catfish Eradication – San Felipe Golf Course downstream to Rio Grande

**Project Priority:** 

**LONG-TERM** 

**Related Projects:** 

**Project Location:** 

San Felipe Golf Course - downstream to Rio Grande

# **Project Description:**

Project includes the eradication of the Armored catfish () currently living in San Felipe Creek. These fish are non-native species that are currently damaging the creek bank areas, contributing to bank failures and increased sediment runoff into the creek. The catfish outcompete native species for food and their destructive behavior.

# **Design/Construction Issues:**

#### **Known Constraints:**

- There are no known, effective eradication methods.
- Research for effective eradication is on-going.
- The large number of Armored catfish in the creek, coupled with the presence of endangered species, make catching/trapping/netting efforts next to impossible.

#### **Project Options:**

At the present time there are no known, effective eradication methods.

#### **Construction BMPs:**

None necessary at this time.

Project Length/Area:

9 miles [length of San Felipe Creek from golf course to Rio Grande)

#### Photographs/Graphics:







2. East Fork of SFC in Moore Park

Anticipated Labor Source: City Crews / Contractor / Volunteers

Cost Estimate: \$ UNKNOWN

Operations & Maintenance Impact:

**NO CHANGE** 

Project No.: A-14

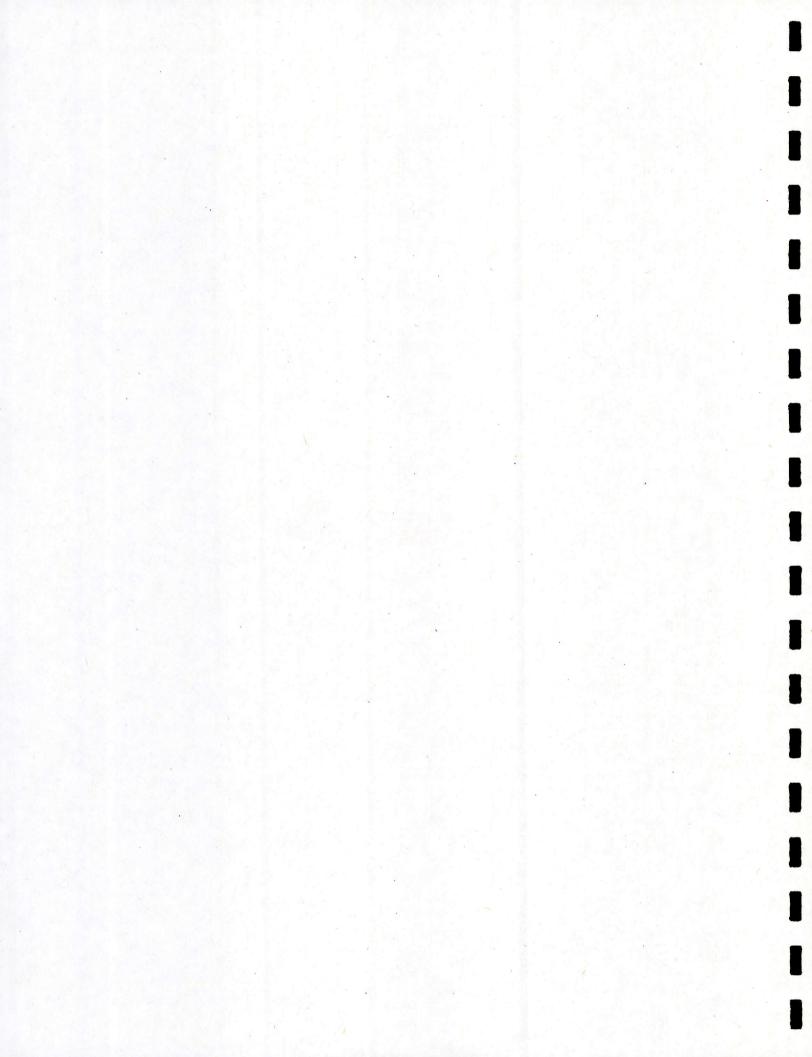
Project: Eradication of the Armored Catfish

Project Area: San Felipe Country Club Area downstream to the Rio Grande

Total Cos	ce	Unit Price	Unit	Quantity	Improvement Description	Item
Unkow	/n \$	\$ Unkown	LS	1	Armored Catfish Eradication*	1
	tion \$	Construction			* - there is no known eradication method for the Armored	
	\$%) \$	Engineering Design & Mgmt (13%)			catfish; research efforts should be supported and encouraged	
	Cost \$	Total Estimated Construction Cost			by the City of Del Rio	
	\$%) \$	ntingency (25%)	Cor			
UNKOV	Cost S	Estimated Cost	Total Project			
UNKOW	ST S	ROJECT COST	ANNING PI	PI		The same

City of Del Rio San Felipe Creek Master Plan

# Area B



Project Type: INVASIVE SPECIES CONTROL

**B-1.** CANE ERADICATION – West Fork of San Felipe Creek (Moore Park)

Project Priority: IMMEDIATE Related Projects: B-2, B-3

Project Location: Moore Park (also Blue Hole & Horseshoe Park)

# **Project Description:**

Project includes the eradication of Arundo Donax (a.k.a., "Giant Reed", "River Cane") along the banks of the West Fork of San Felipe Creek from immediately downstream of the Hwy. 90 bridge through Moore Park. Project area includes Blue Hole downstream to Dr. F. Calderon Blvd. Eradication should follow the steps outlined in the San Felipe Creek Master Plan and include: Cut Cane (after annual flowering around mid-July); Removal of Cuttings; Herbicide Spray; Removal of Dead Cane (in winter); Repeat. Work should proceed from upstream to downstream.

# **Design/Construction Issues:**

#### **Known Constraints:**

- Project should be started after, or at the same time, as Projects A-1 to A-6.
- Herbicide use in and around the creek area should proceed with caution.
- No spraying in the creek; herbicide must be hand applied to cane located in the creek.
- Eradication efforts will involve several cycles.

#### **Project Options:**

 Small patches can be cut by hand; large patches should be cut with mechanical equipment, if possible; avoid disturbing soil by the use of rubber tired equipment.

#### **Construction BMPs:**

• Construction BMPs (silt fence, etc...) should be used if mechanical equipment results in soil disturbance.

Project Length/Area:

< 1 acre [area is approximate, based on latest aerial photos]

# Photographs/Graphics:



1. West Fork of SFC in Moore Park



2. West Fork of SFC in Moore Park



3. West Fork of SFC in Moore Park

Anticipated Labor Source: <u>City Crews / Contractor / Volunteers</u>

Cost Estimate: \$ 9,000 (1<sup>ST</sup> Year Efforts Only) Operations & Maintenance Impact: INCREASE

Project No.: B-1 - West Fork of San Felipe Creek

Project: Arundo Donax Removal (Giant Reed, a.k.a. "river cane")

Project Area: Moore Park
Priority: Immediate

Item	Improvement Description	Quantity	Unit	Unit Price	Tot	al Cost
1	Arundo Donax Removal*	0.20	Acre	\$ 44,000	\$	8,800
335.5						9, 9, 1
* - estimated	at \$44,000 / acre for one-time manual removal; price			Construction	\$	8,800
does not in	clude follow up visits (which should be once per year); see Appendix	Engineeri	ng Design &	Mgmt (13%)**	\$	
E for deta	nils on cane removal cost estimate.	Total I	Estimated Co	onstruction Cost	S	8,800
** - Enginee	ring Design/Mgmt. + Contigency included in Unit Cost; see Appendix		Conti	ngency (25%)**	\$	1.
E for ad	ditional details.		Total Project	Estimated Cost	S	8,800
		DI	ANNING P	ROJECT COST	•	9,000

Project Type: INVASIVE SPECIES CONTROL

B-2. CANE ERADICATION - East Fork of San Felipe Creek (Moore Park)

Project Priority: IMMEDIATE Related Projects: B-1, B-3

Project Location: Moore Park (also State Park)

# **Project Description:**

Project includes the eradication of Arundo Donax (a.k.a., "Giant Reed", "River Cane") along the banks of the East Fork of San Felipe Creek through Moore Park. Project area includes the stream reach from Hwy. 90 downstream to Dr. F. Calderon Blvd. Eradication should follow the steps outlined in the San Felipe Creek Master Plan and include: Cut Cane (after annual flowering around mid-July); Removal of Cuttings; Herbicide Spray; Removal of Dead Cane (in winter); Repeat. Work should proceed from upstream to downstream.

# **Design/Construction Issues:**

#### **Known Constraints:**

- Herbicide use in and around the creek area should proceed with caution.
- No spraying in the creek; herbicide must be hand applied to cane located in the creek.
- Eradication efforts will involve several cycles.
- Project should be started after, or at the same time, as Projects A-1 to A-6.

#### **Project Options:**

 Small patches can be cut by hand; large patches should be cut with mechanical equipment, if possible; avoid disturbing soil by the use of rubber tired equipment.

#### **Construction BMPs:**

• Construction BMPs (silt fence, etc...) should be used if mechanical equipment results in soil disturbance.

Project Length/Area

< 1 acre [area is approximate, based on latest aerial photos]</p>

# Photographs/Graphics:







1. 2695

2.2706

3.2754

Anticipated Labor Source: <u>City Crews</u> / <u>Contractor</u> / Volunteers

Cost Estimate: \$ 9,000 (1<sup>ST</sup> Year Efforts Only) Operations & Maintenance Impact: INCREASE

Project No.: B-2 - East Fork of San Felipe Creek

Project: Arundo Donax Removal (Giant Reed, a.k.a. "river cane")

Project Area: Moore Park
Priority: Immediate

Item	Improvement Description	Quantity	Unit	Ur	it Price	Tot	al Cost
1	Arundo Donax Removal*	0.20	Acre	\$	44,000	\$	8,800
		1.00	1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1	i jez	4	1 A	of the same
	* - estimated at \$44,000 / acre for one-time manual removal; price does not include follow up visits (which should be once per year); see Appendix		Construction Engineering Design & Mgmt (13%)**				
	ils on cane removal cost estimate.	Total I	ction Cost	S	8,800		
** - Enginee	ring Design/Mgmt. + Contigency included in Unit Cost; see Appendix		Contingency (25%)**				
E for ad	ditional details.	0	Total Project Estimated Cos				8,800
		PI	ANNING P	ROIF	CT COST	\$	9,000

**INVASIVE SPECIES CONTROL Project Type:** 

**VEGETATION REMOVAL – BLUE HOLE (on West Fork of SFC @ HWY 90)** B-3.

B-1. B-2 **Project Priority: IMMEDIATE Related Projects:** 

**Project Location:** Blue Hole (also Horseshoe Park)

# **Project Description:**

Project includes the removal of vegetation from Blue Hole. Most of the vegetation is located under the water surface. Eradication should follow the steps outlined in the San Felipe Creek Master Plan and include: Cut Cane (after annual flowering around mid-July); Removal of Cuttings; Herbicide Spray; Removal of Dead Cane (in winter); Repeat. Work should proceed from upstream to downstream.

#### **Design/Construction Issues:**

#### **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species.
- Herbicides should not be used within the Blue Hole area.
- Vegetation should be removed by mechanical means.
- The plants should be cut, instead of pulled, to avoid disturbing the soil.

#### **Project Options:**

- Some cutting by hand may be possible, however, the bulk of the cutting and removal will likely need to be by mechanical means.
- Project should be completed before project B-20 (Blue Hole Bank Stabilization).

#### **Construction BMPs:**

A floating silt fence or other appropriate BMP should be used at the downstream end of Blue Hole while vegetation removal operations are in progress.

Project Length/Area:

acre [area is approximate, based on latest aerial photos] < 1

#### Photographs/Graphics:







903

904

2846

**Anticipated Labor Source:** City Crews / Contractor / Volunteers

**Cost Estimate:** \$ 35,000 **Operations & Maintenance Impact:** 

**INCREASE** 

Project No.: B-3

rojectitoii 2

Project: Removal of Vegetation - Blue Hole

Project Area: Blue Hole
Priority: Immediate

Item	Improvement Description	Quantity	Unit	Un	it Price	To	tal Cost
1	Vegetation Removal	1	LS	\$	18,000	\$	18,00
2	Silt Fence	250	LF	\$	4	\$	1,00
3	Stabilized Construction Entrance	1	EA	\$	1,000	\$	1,00
4 )	In-Stream Barrier/Curtain	100	LF	\$	50	\$	5,00
		Enginee	ring Desigi		nstruction (mt (13%)		25,00 3,25
	Total Estimated Construction Con					\$	28,25
			Co	ntinger	ncy (25%)	S	7,06
		Т	Co otal Projec				7,00 35,31

# B-4. REMOVAL OF EXISTING BANK WALL – Left Bank of East Fork of SFC, between Hwy 90 & RR Trestle (in Moore Park)

**Project Priority:** 

**LONG-TERM** 

**Related Projects:** 

B-63

**Project Location:** 

Moore Park (also State Park)

# **Project Description:**

Project includes the removal of existing stone/concrete walls along the left bank of the East Fork of San Felipe Creek (SFC), from the Hwy 90 bridge to the railroad trestle in Moore Park (a.k.a., State Park).

# **Design/Construction Issues:**

#### **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as possible and should be conducted in a manner that minimized soil disturbance.
- Existing stone should be salvaged for possible use on future creek-side projects.

# **Project Options:**

A combination of manual and mechanical labor will likely be necessary to accomplish the removal operation in accordance with USFWS requirements.

#### Construction BMPs:

 A coffer dam or in-stream barrier will be needed to avoid the potential for suspended solids being introduced in the creek; water-filled portable coffer dams or other temporary measures should be considered.

Project Length/Area:

270 feet

# Photographs/Graphics:







1034

1037

1047

Anticipated Labor Source: City Crews / Contractor / Volunteers

Cost Estimate: \$ 37,000

**Operations & Maintenance Impact:** 

**DECREASE** 

Project No.:

B-4

Project:

Removal of Existing Bank Wall, left bank of E. Fork of SFC, between Hwy. 90 & Railroad Trestle

Project Area: State Park
Priority: Long-Term

tal Cost	Total Cos		Unit Price		Quantity	Improvement Description	Item
10,80	\$	40	\$	LF	270	Demolition - Existing Creek Walls I [ 2' - 4']	1
1,08	\$	4	\$	LF	270	Silt Fence	2
1,00	\$	1,000	\$	EA	1	Stabilized Construction Entrance	3
13,50	\$	50	\$	LF	270	In-Stream Barrier/Curtain	4
26,3	S	struction	Con				
3,4				ring Design	Enginee		
29,8	\$	tion Cost	onstruc	stimated C	Total I		
	S	cy (25%)	ntingen	Co			
7,4			100				
7,4: 37,2	\$	ated Cost	t Estima	otal Projec			

B-5. REMOVAL OF EXISTING BANK WALL –
Right Bank of East Fork of SFC, between Hwy 90 & RR Trestle (in Moore Park)

Project Priority: LONG-TERM Related Projects: B-73

Project Location: Moore Park (also State Park)

# **Project Description:**

Project includes the removal of existing stone/concrete walls along the right bank of the East Fork of San Felipe Creek (SFC), from the Hwy 90 bridge to the railroad trestle in Moore Park (a.k.a., State Park).

# **Design/Construction Issues:**

#### **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as
  possible and should be conducted in a manner that minimized soil disturbance.
- Existing stone should be salvaged for possible use on future creek-side projects.

# **Project Options:**

 A combination of manual and mechanical labor will likely be necessary to accomplish the removal operation in accordance with USFWS requirements .

#### **Construction BMPs:**

 A coffer dam or in-stream barrier will be needed to avoid the potential for suspended solids being introduced in the creek; water-filled portable coffer dams or other temporary measures should be considered.

Project Length/Area: 200 feet

#### Photographs/Graphics:







1042 1043 1044

Anticipated Labor Source: <u>City Crews</u> / <u>Contractor</u> / Volunteers

Cost Estimate: \$ 28,000 Operations & Maintenance Impact: DECREASE

Project No.:

Project:

Removal of Existing Bank Wall - right bank of E. Fork of SFC, between Hwy. 90 & Railroad Trestle

Project Area: State Park Priority: Long-Term

Item	Improvement Description	Quantity	Unit	Un	it Price	To	tal Cost
1	Demolition - Existing Creek Walls I [ 2' - 4']	200	LF	\$	40	\$	8,000
2	Silt Fence	200	LF	\$	4	\$	800
3	Stabilized Construction Entrance		EA	\$	1,000	\$	1,00
4	In-Stream Barrier/Curtain	200	LF	\$	50	\$	10,00
	Construction Engineering Design & Mgmt (13%)						19,800 2,57
		Total E	stimated C	onstruc	tion Cost	\$	22,37
		AND	Co	ntinger	icy (25%)	\$	5,59
		Ţ	otal Projec	t Estim	ated Cost	S	27,96
		PL	ANNING P	ROJE	T COST	S	28,00

B-6. REMOVAL OF EXISTING BANK WALL –
Left Bank of East Fork of SFC, between RR Trestle & Footbridge (in Moore Park)

Project Priority: LONG-TERM Related Projects: B-32, B-48

Project Location: Moore Park

# **Project Description:**

Project includes the removal of existing stone/concrete walls along the left bank of the East Fork of San Felipe Creek (SFC), from the railroad trestle to the existing footbridge across SFC in Moore Park.

# **Design/Construction Issues:**

#### **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required; to minimize the potential for soil disturbance demolition/removal
  operations should be completed as quickly as possible.
- Existing stone should be salvaged for possible use on future creek-side projects.

#### **Project Options:**

A combination of manual and mechanical labor will likely be necessary to accomplish the removal operation in accordance with USFWS requirements.

#### **Construction BMPs:**

A coffer dam or in-stream barrier will be needed to avoid the potential for suspended solids being introduced in the creek; water-filled portable coffer dams or other temporary measures should be considered.

Project Length/Area: 430 feet

# Photographs/Graphics:







Anticipated Labor Source: <u>City Crews</u> / <u>Contractor</u> / Volunteers

Cost Estimate: \$ 71,000 Operations & Maintenance Impact: DECREASE

Project No.: B-6

Project: Removal of Existing Bank Wall - left bank of E. Fork of SFC, between Railroad Trestle & Footbridge

Project Area: Moore Park
Priority: Long-Term

Item	. Improvement Description	Quantity	Unit	Unit Price	To	tal Cost
1	Demolition - Existing Creek Walls II [ 4' - 6' ]	430	LF	\$ 60	\$	25,80
2	Silt Fence	430	LF	\$ 4	\$	1,72
3	Stabilized Construction Entrance	1	EA	\$ 1,000	\$	1,00
4	In-Stream Barrier/Curtain	430	LF	\$ 50	\$	21,50
		Enginee	ring Design	Construction		50,02 6,50
					LOCAL STATE	
		Total E	stimated C	onstruction Co	st S	56,52
		Total E		ntingency (25%		
			Co		5) \$	56,52 14,13 70,65

B-7. REMOVAL OF EXISTING BANK WALL –
Left Bank of East Fork of SFC, between Footbridge & Blue Wall (in Moore Park)

Project Priority: LONG-TERM Related Projects: B-33

Project Location: Moore Park

# **Project Description:**

Project includes the removal of existing stone/concrete walls along the left bank of the East Fork of San Felipe Creek (SFC), from the existing footbridge across SFC to the existing Blue Wall in Moore Park.

# **Design/Construction Issues:**

#### **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as
  possible and should be conducted in a manner that minimized soil disturbance.
- Existing stone should be salvaged for possible use on future creek-side projects.

#### **Project Options:**

 A combination of manual and mechanical labor will likely be necessary to accomplish the removal operation in accordance with USFWS requirements .

#### **Construction BMPs:**

 A coffer dam or in-stream barrier will be needed to avoid the potential for suspended solids being introduced in the creek; water-filled portable coffer dams or other temporary measures should be considered.

Project Length/Area: 310 feet

# Photographs/Graphics:







Anticipated Labor Source: <u>City Crews</u> / <u>Contractor</u> / Volunteers

Cost Estimate: \$ 55,000 Operations & Maintenance Impact: DECREASE

Project No.: B-7

Project: Removal of Existing Bank Wall - left bank of E. Fork of SFC, between Footbridge & Blue Wall

Project Area: Moore Park
Priority: Long-Term

Item	Improvement Description	Quantity	Unit	Un	it Price	To	tal Cost
1	Demolition - Existing Creek Walls II [ 4' - 6' ]	310	LF	\$	60	\$	18,600
2	Demolition - Existing Concrete Walkways [ 4' wide ]	1,240	· SF	\$	2	\$	2,480
3	Silt Fence	310	LF	\$	4	\$	1,240
4	Stabilized Construction Entrance	1	EA	\$	1,000	\$	1,000
5	In-Stream Barrier/Curtain	310	LF	\$	50	\$	15,500
				Con	struction	\$	38,82

\*- sidewalk area is approx. 4' x 310'

Engineering Design & Mgmt (13%)

Total Estimated Construction Cost

Contingency (25%)

Total Project Estimated Cost

PLANNING PROJECT COST

\$ 38,820

\$ 5,047

Total Estimated Construction Cost

\$ 10,967

Total Project Estimated Cost

\$ 54,833

PLANNING PROJECT COST

\$ 55,000

**B-8. REMOVAL OF EXISTING BANK WALL-**

Right Bank of East Fork of SFC, between Footbridge & Blue Wall (in Moore Park)

**Project Priority:** 

**LONG-TERM** 

**Related Projects:** 

B-74

**Project Location:** 

**Moore Park** 

# **Project Description:**

Project includes the removal of existing stone/concrete walls along the right bank of the East Fork of San Felipe Creek (SFC), from the existing footbridge across SFC to the existing Blue Wall in Moore Park.

# **Design/Construction Issues:**

#### **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as possible and should be conducted in a manner that minimized soil disturbance.
- Existing stone should be salvaged for possible use on future creek-side projects.

#### **Project Options:**

A combination of manual and mechanical labor will likely be necessary to accomplish the removal operation in accordance with USFWS requirements.

# **Construction BMPs:**

A coffer dam or in-stream barrier will be needed to avoid the potential for suspended solids being introduced in the creek; water-filled portable coffer dams or other temporary measures should be considered.

Project Length/Area:

270 feet

#### Photographs/Graphics:







**Anticipated Labor Source:** 

City Crews / Contractor / Volunteers

**Cost Estimate:** 

\$ 49,000

**Operations & Maintenance Impact:** 

**DECREASE** 

Project No.: B-8

Project:

Removal of Existing Bank Wall - right bank of E. Fork of SFC, between Footbridge & Blue Wall

Project Area: Moore Park

Priority:

Long-Term

Item	Improvement Description	Quantity	Unit	Un	it Price	To	tal Cost
1	Demolition - Existing Creek Walls II [ 4' - 6' ]	270	LF	\$	60	\$	16,200
2	Demolition - Existing Concrete Walkways [ 5' wide ]	1,350	SF	\$	2	\$	2,700
3	Silt Fence	270	LF	\$	4	\$	1,080
4	Stabilized Construction Entrance	1	EA	\$	1,000	\$	1,000
5	In-Stream Barrier/Curtain	270	LF	\$	50	\$	13,500
	* - sidewalk area is approx. 5' x 270'	Construction Engineering Design & Mgmt (13%)					34,480
	- sidewaik area is approx. 3 x 270	The state of the s	stimated C				38,962
			Co	ntingen	cy (25%)	\$	9,74
	Total Project Estimated Cost						48,70
PLANNING PROJECT COST						•	49,00

B-9. REMOVAL OF EXISTING BANK WALL –
Left Bank of East Fork of SFC, Blue Wall to Bedell Ave. (in Moore Park)

Project Priority: LONG-TERM Related Projects: B-23, B-25

Project Location: Moore Park

# **Project Description:**

Project includes the removal of existing stone/concrete walls along the left bank of the East Fork of San Felipe Creek (SFC), from the existing Blue Wall to the Bedell Ave. Bridge in Moore Park.

# **Design/Construction Issues:**

#### **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as
  possible and should be conducted in a manner that minimized soil disturbance.
- Existing stone should be salvaged for possible use on future creek-side projects.

#### **Project Options:**

 A combination of manual and mechanical labor will likely be necessary to accomplish the removal operation in accordance with USFWS requirements.

#### **Construction BMPs:**

 A coffer dam or in-stream barrier will be needed to avoid the potential for suspended solids being introduced in the creek; water-filled portable coffer dams or other temporary measures should be considered.

Project Length/Area: 290 feet

# Photographs/Graphics:







Anticipated Labor Source: City Crews / Contractor / Volunteers

Cost Estimate: \$ 51,000 Operations & Maintenance Impact: DECREASE

Project No.:

B-9

Project:

Removal of Existing Bank Wall - left bank of E. Fork of SFC, between Blue Wall & Bedell Ave.

Project Area.

Project Area: Moore Park

Priority:

Long-Term

Item	Improvement Description	Quantity	Unit	Un	it Price	To	tal Cost
1	Demolition - Existing Creek Walls II [ 4' - 6' ]	290	LF	\$	60	\$	17,400
2	Demolition - Existing Concrete Walkways [ 4' wide ]	1,160	SF	\$	2	\$	2,320
3 -	Silt Fence	290	LF	\$	4	\$	1,16
4	Stabilized Construction Entrance	1	EA	\$	1,000	\$	1,00
5	In-Stream Barrier/Curtain	290	LF	\$	50	\$	14,50
	* - sidewalk area is approx. 4' x 290'  Engineering Design & Mgmt (13%)						36,38 4,72
		Total E	Stimated C	Construc	tion Cost	\$	41,10
			Co	ntingen	cy (25%)	\$	10,27
	Total Project Estimated Cost					\$	51,38
		PL.	ANNING I	ROJEC	CT COST	S	51,00

B-10. REMOVAL OF EXISTING BANK WALL –
Right Bank of East Fork of SFC, Blue Wall to Bedell Ave. (in Moore Park)

Project Priority: LONG-TERM Related Projects: B-24, B-26

Project Location: Moore Park

# **Project Description:**

Project includes the removal of existing stone/concrete walls along the right bank of the East Fork of San Felipe Creek (SFC), from the existing Blue Wall to the Bedell Ave. Bridge in Moore Park.

# **Design/Construction Issues:**

#### **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as possible and should be conducted in a manner that minimized soil disturbance.
- Existing stone should be salvaged for possible use on future creek-side projects.

feet

# **Project Options:**

 A combination of manual and mechanical labor will likely be necessary to accomplish the removal operation in accordance with USFWS requirements .

#### **Construction BMPs:**

 A coffer dam or in-stream barrier will be needed to avoid the potential for suspended solids being introduced in the creek; water-filled portable coffer dams or other temporary measures should be considered.

Project Length/Area: 450

# Photographs/Graphics:







Anticipated Labor Source: City Crews / Contractor / Volunteers

Cost Estimate: \$ 80,000 Operations & Maintenance Impact: NO CHANGE

Project No.:

B-10

Project:

Removal of Existing Bank Wall - right bank of E. Fork of SFC, between Blue Wall & Bedell Ave.

Project Area: Moore Park
Priority: Long-Term

Item	Improvement Description	Quantity	Unit	Un	it Price	To	tal Cost
1	Demolition - Existing Creek Walls II [ 4' - 6' ]	450	LF	\$	60	\$	27,000
2	Demolition - Existing Concrete Walkways [ 5' wide ]	2,250	SF	\$	2	\$	4,50
3	Silt Fence	450	LF	\$	4	\$	1,80
4	Stabilized Construction Entrance	1	EA	\$	1,000	\$	1,00
5	In-Stream Barrier/Curtain	450	LF	\$	50	\$	22,50
				Con	struction	\$	56,80
	* - sidewalk area is approx. 5' x 270'	lewalk area is approx. 5' x 270'  Engineering Design & Mgmt (13%)				S	7,38
		Total E	stimated C	onstruc	tion Cost	\$	64,18
			Co	ntingen	cy (25%)	\$	16,04
		T	otal Projec	t Estim	ated Cost	S	80,23
		PI.	ANNING P	ROJEC	T COST	\$	80,00

# B-11. REMOVAL & REPLACEMENT OF EXISTING BLUE WALL – Left Bank of East Fork of SFC, adjacent to Bedell Ave. (in Moore Park)

Project Priority: LONG-TERM Related Projects:

Project Location: Moore Park

# **Project Description:**

Project includes the removal of the existing Blue Wall (concrete rip rap) along the left bank of the East Fork of San Felipe Creek (SFC), adjacent to Bedell Ave. Bridge in Moore Park. The project will require the use of engineered bank stabilization methods including rock gabions, engineered bank systems, or structural walls. The proposed wall system should be both esthetically pleasing and environmentally friendly.

# **Design/Construction Issues:**

#### **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as possible and should be conducted in a manner that minimized soil disturbance.
- Armored catfish pose a threat to the damage/destruction of the proposed improvements. If necessary, proposed improvements should be designed to minimize potential damage by the catfish.

#### **Project Options:**

A combination of manual and mechanical labor will likely be necessary to accomplish the removal operation in accordance with USFWS requirements.

#### **Construction BMPs:**

- A coffer dam or in-stream barrier will be needed to avoid the potential for suspended solids being introduced in the creek; water-filled portable coffer dams or other temporary measures should be considered.
- Construction stormwater BMPs will include silt fence and other appropriate BMPs, as necessary.

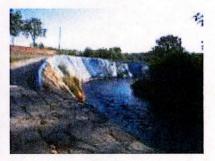
Project Length/Area:

180 feet [wall height estimated at 20 feet (including below water surface)]

#### Photographs/Graphics:







Anticipated Labor Source: City Crews / Contractor / Volunteers

Cost Estimate: \$ 620,000 | Operations & Maintenance Impact: | DECREASE

Project No.:

B-11

Project:

Remove/Reconstruct Existing Blue Wall - left bank of E. Fork of SFC, adjacent to Bedell Ave.

Project Area: Moore Park Priority:

Long-Term

Item	Improvement Description	Quantity	Unit	Un	it Price	To	tal Cost
1	Demolition - Existing Blue Wall (180 ft. long x 20 ft. high)	3,600	SF	\$	10	\$	36,000
2	Bank Improvements - Blue Wall Replacement	3,600	SF	\$	100	\$	360,000
3	Silt Fence	180	LF	\$	4	\$	720
4	Stabilized Construction Entrance	1	EA	\$	1,000	\$	1,000
5	In-Stream Coffer Dam (w/ dewatering)	200	LF	\$	200	\$	40,000
		Enginee	ring Desigi		struction mt (13%)	7	437,72 56,90
		Total E	stimated C	onstruc	tion Cost	\$	494,62
			Co	ntingen	cy (25%)	\$	123,65
4		T	otal Projec	t Estim	ated Cost	\$	618,28
		PI	ANNING P	ROIF	T COST	\$	620,00

**VEGETATION ENHANCEMENT Project Type:** 

## **VEGETATION ENHANCEMENT/VEGETATIVE FILTER STRIP –** B-12. **End of Existing Parking Area adjacent to Horseshoe Park**

**Related Projects: Project Priority:** LONG-TERM

**Project Location: Moore Park** 

# **Project Description:**

Project includes the establishment of a vegetative filter strip area at the end of the existing gravel/dirt parking area between the railroad tracks and Horseshoe Park Fountain. Project will include vegetation enhancement including importing top soil, organic material (compost), and the use of fiber rolls/blanket and/or plastic "geogrid" reinforcement for structural support of the soil.

# **Design/Construction Issues:**

#### **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as possible and should be conducted in a manner that minimized soil disturbance.

#### **Project Options:**

- Options include the importation of soil and soil materials suitable for the establishment of a high-quality soil matrix.
- Vegetation should include appropriate native grasses and plants.
- Flow onto vegetated area should be in the form a sheet flow; design/construction should include appropriate elements to achieve a sheet-type flow.

#### **Construction BMPs:**

Construction stormwater BMPs will include silt fence and other appropriate BMPs, as necessary.

Project Length/Area:

380 SY (or approx. 0.08 acres)

# Photographs/Graphics:







**Anticipated Labor Source:** City Crews / Contractor / Volunteers

**INCREASE Cost Estimate:** \$ 5,000

**Operations & Maintenance Impact:** 

Project No.: B-12

Project: Vegetation Enhancement - End of Existing Parking Area, adjacent to Horseshoe Park

Project Area: Horseshoe Park

Item	Improvement Description	Quantity	Unit	Unit Price		Tot	al Cost
1	Vegetation Enhancement - Soil+Compost+SRB*	380	ŞY	\$	8	\$	3,040
2	Silt Fence	120	LF	\$	4	\$	480
	* - SRB = soil retention blanket	Constructio ion blanket Engineering Design & Mgmt (13%					3,520 458
		Total Estimated Construction Cost					3,978
			Co	ntingency	y (25%)	\$	994
		Total Project Estimated Cost				S	4,972
		PL	PLANNING PROJECT COST				

**Project Type: VEGETATION ENHANCEMENT** 

#### **VEGETATION ENHANCEMENT – around the Horseshoe Park Area** B-13.

**LONG-TERM Related Projects:** B-12,B-20,B-70,B-71 **Project Priority:** 

**Project Location:** Horseshoe Park

# **Project Description:**

Project includes the improvement and/or establishment of a vegetative cover around the Horseshoe Park area. Project will include vegetation enhancement including importing top soil, organic material (compost), and the use of fiber rolls/blanket and/or plastic "geogrid" reinforcement for structural support of the soil.

# **Design/Construction Issues:**

#### **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
  - To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as possible and should be conducted in a manner that minimized soil disturbance.

#### **Project Options:**

- Options include the importation of soil and soil materials suitable for the establishment of a high-quality soil matrix.
- Vegetation should include appropriate native grasses and plants.

#### **Construction BMPs:**

Construction stormwater BMPs will include silt fence and other appropriate BMPs, as necessary.

Project Length/Area:

SY (or approx. 0.18 acres) 850

# Photographs/Graphics:







**Anticipated Labor Source:** <u>City Crews</u> / <u>Contractor</u> / Volunteers

**Cost Estimate:** \$ 5,000 **Operations & Maintenance Impact:** 

**INCREASE** 

Project No.: B-13

Project: Vegetation Enhancement - Around the Horseshoe Park Area

Item	Improvement Description	Quantity	Unit	Unit	Price	Tot	tal Cost
1	Vegetation Enhancement - Soil(2")+Compost(2")	850	· SY	\$	3	\$	2,550
2	Silt Fence	200	. LF	\$	4	\$	800
				Const	truction	S	3,350
		Engine	ering Design	& Mgm	t (13%)	\$	436
		Total I	Estimated C	onstructi	on Cost	S	3,786
			Co	ntingency	y (25%)	\$	946
		j	Total Projec	t Estimat	ed Cost	S	4,732
		PL	ANNING P	ROJECT	COST	S	5,000

Project Type: VEGETATION ENHANCEMENT

# B-14. VEGETATION ENHANCEMENT – along right bank of West Fork of SFC (in Moore Park)

**Project Priority:** 

LONG-TERM

**Related Projects:** 

**Project Location:** 

**Moore Park** 

# **Project Description:**

Project includes the improvement and/or establishment of a vegetative cover along the right bank of the West Fork of San Felipe Creek (SFC) through Moore Park. Project will include vegetation enhancement including importing top soil, organic material (compost), and the use of fiber rolls/blanket and/or plastic "geogrid" reinforcement for structural support of the soil.

# **Design/Construction Issues:**

#### **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as
  possible and should be conducted in a manner that minimized soil disturbance.
- Armored catfish pose a threat to the damage/destruction of the proposed improvements. Proposed improvements should be designed to minimize potential damage by the catfish.

#### **Project Options:**

- Options include the importation of soil and soil materials suitable for the establishment of a high-quality soil matrix.
- Vegetation should include appropriate native grasses and plants.

## **Construction BMPs:**

Construction stormwater BMPs will include silt fence and other appropriate BMPs, as necessary.

Project Length/Area:

1,700 SY (or approx. 0.35 acres)

# Photographs/Graphics:







Anticipated Labor Source:

City Crews / Contractor / Volunteers

**Cost Estimate:** 

\$ 24,000

**Operations & Maintenance Impact:** 

**INCREASE** 

Project No.: B-

B-14

Project:

Vegetation Enhancement - along right bank of West Fork of SFC

Item	Improvement Description	Quantity	Unit	Unit Price		To	Total Cost	
1	Vegetation Enhancement - Soil+Compost+SRB*	1,700	SY	\$	8	\$	13,600	
2	Silt Fence	770	LF	\$	4	\$	3,080	
				Const	ruction	\$	16,680	
	* - area is approx. 770 ft. x 20 ft.	Enginee	ring Design	& Mgm	t (13%)	\$	2,168	
	* - SRB = soil retention blanket	Total E	Stimated C	onstructi	on Cost	\$	18,848	
			Co	ntingenc	y (25%)	\$	4,712	
		T	otal Projec	t Estimat	ed Cost	\$	23,561	
		PL	ANNING P	ROJECT	COST	s	24,000	

**Project Type: VEGETATION ENHANCEMENT** 

# B-15. VEGETATION ENHANCEMENT – along left bank of West Fork of SFC (south of Blue Hole)

**Project Priority:** 

**LONG-TERM** 

**Related Projects:** 

**Project Location:** 

**Blue Hole Area** 

# **Project Description:**

Project includes the improvement and/or establishment of a vegetative cover along the left bank of the West Fork of San Felipe Creek (SFC) just south of Blue Hole. Project will include vegetation enhancement including importing top soil, organic material (compost), and the use of fiber rolls/blanket and/or plastic "geogrid" reinforcement for structural support of the soil.

## **Design/Construction Issues:**

#### **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as possible and should be conducted in a manner that minimized soil disturbance.
- Armored catfish pose a threat to the damage/destruction of the proposed improvements. Proposed improvements should be designed to minimize potential damage by the catfish.

#### **Project Options:**

- Options include the importation of soil and soil materials suitable for the establishment of a high-quality soil matrix.
- Vegetation should include appropriate native grasses and plants.

#### **Construction BMPs:**

Construction stormwater BMPs will include silt fence and other appropriate BMPs, as necessary.

Project Length/Area:

1,700 SY (or approx. 0.35 acres)

# Photographs/Graphics:







Anticipated Labor Source:

City Crews / Contractor / Volunteers

**Cost Estimate:** 

\$ 24,000

**Operations & Maintenance Impact:** 

**INCREASE** 

Project No.:

Project:

Vegetation Enhancement - along left bank of West Fork of SFC, downstream of Blue Hole

Project Area: Blue Hole / Moore Park

Priority:

Long-Term

tal Cost	Tot	Price	Unit	Unit	Quantity	Improvement Description	Item
13,600	\$	8	\$	SY	1,700	Vegetation Enhancement - Soil+Compost+SRB*	1
3,080	\$	4	\$	LF	770	Silt Fence	2
16,68	\$	truction	Const	V III			
2,16	\$	ıt (13%)	& Mgm	ring Design	Enginee	* - area is approx. 770 ft. x 20 ft.	
18,84	\$	ion Cost	onstructi	stimated Co	Total E	* - SRB = soil retention blanket	
4,71	\$	y (25%)	ntingency	Cor			
23,56	\$	ted Cost	t Estimat	otal Project	T		
24,00	S	T COST	ROJECT	ANNING PI	PLA		

Project Type: VEGETATION ENHANCEMENT

B-16. VEGETATION ENHANCEMENT – along right bank of the East Fork of SFC, between the railroad trestle and the footbridge (in Moore Park)

Project Priority: LONG-TERM Related Projects:

Project Location: Moore Park

# **Project Description:**

Project includes the improvement and/or establishment of a vegetative cover along the right bank of the East Fork of San Felipe Creek (SFC) between the railroad trestle and the footbridge in Moore Park. Project will include vegetation enhancement including importing top soil, organic material (compost), and the use of fiber rolls/blanket and/or plastic "geogrid" reinforcement for structural support of the soil.

# **Design/Construction Issues:**

## **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as
  possible and should be conducted in a manner that minimized soil disturbance.
- Armored catfish pose a threat to the damage/destruction of the proposed improvements. If necessary, proposed improvements should be designed to minimize potential damage by the catfish.

#### **Project Options:**

- Options include the importation of soil and soil materials suitable for the establishment of a high-quality soil matrix.
- Vegetation should include appropriate native grasses and plants.

#### **Construction BMPs:**

Construction stormwater BMPs will include silt fence and other appropriate BMPs, as necessary.

Project Length/Area:

700 sq. yards [approx. 320 feet x 20 feet]

# Photographs/Graphics:







**Anticipated Labor Source:** 

City Crews / Contractor / Volunteers

**Cost Estimate:** 

\$ 10,000

Operations & Maintenance Impact:

**INCREASE** 

Project No.: B-16

Project: Vegetation Enhancement - along right bank of the E. Fork of SFC, between Railroad Trestle & the Footbridge

Item	Improvement Description	Quantity	Unit	Unit Price		Tot	Total Cost	
1	Vegetation Enhancement - Soil+Compost+SRB*	700	SY	\$	8	\$	5,600	
2	Silt Fence	320	LF	\$	4	\$	1,280	
			4.0					
				Cons	truction	\$	6,88	
	* - area is approx. 320 ft. x 20 ft.	Enginee	ring Design	& Mgm	t (13%)	\$	89	
	* - SRB = soil retention blanket	Total E	stimated C	onstructi	on Cost	S	7,77	
			Co	ntingenc	y (25%)	s	1,94	
		Ţ	otal Projec	ect Estimated Cos		S	9,718	
		PL	ANNING P	ROJECT	COST	s	10,00	

**VEGETATION ENHANCEMENT Project Type:** 

# **VEGETATION ENHANCEMENT – picnic area between the West Fork of SFC and** B-17. the Acequia Madre Ditch in Moore Park

**Related Projects: LONG-TERM Project Priority:** 

**Project Location: Moore Park** 

# **Project Description:**

Project includes the improvement and/or establishment of a vegetative cover in and around the picnic area located between the West Fork of San Felipe Creek (SFC) and the Acequia Madre Ditch in Moore Park. Project will include vegetation enhancement including importing top soil, organic material (compost), and the use of fiber rolls/blanket and/or plastic "geogrid" reinforcement for structural support of the soil.

# **Design/Construction Issues:**

#### **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as possible and should be conducted in a manner that minimized soil disturbance.
- Armored catfish pose a threat to the damage/destruction of the proposed improvements. If necessary, proposed improvements should be designed to minimize potential damage by the catfish.

## **Project Options:**

- Options include the importation of soil and soil materials suitable for the establishment of a high-quality soil matrix.
- Vegetation should include appropriate native grasses and plants.

#### Construction BMPs:

Construction stormwater BMPs will include silt fence and other appropriate BMPs, as necessary.

**Project Length/Area:** 3,600 SY (or approx. 0.75 acres)

# Photographs/Graphics:







City Crews / Contractor / Volunteers **Anticipated Labor Source:** 

**INCREASE Cost Estimate:** \$ 34,000 **Operations & Maintenance Impact:** 

Project No.: B-17

Project:

Vegetation Enhancement - Picnic Area between W. Fork of SFC & Acequia Madre Ditch

Item	Improvement Description	Quantity	Unit	Unit Price		To	tal Cost
1	Vegetation Enhancement - Soil+Compost	3,600	SY	\$	6	\$	21,600
2	Silt Fence	600	LF	\$	4	\$	2,400
	* - picnic area is approx. 300 feet long x 110 feet wide	Construction Engineering Design & Mgmt (13%)					24,000 3,120
			stimated C		` ′		27,120
			Co	ntingency	(25%)	\$	6,780
		T	otal Projec	t Estimat	ed Cost	\$	33,900
		PL	ANNING P	ROJECT	COST	S	34,000

**Project Type: VEGETATION ENHANCEMENT** 

B-18. VEGETATION ENHANCEMENT – the right bank area of the East Fork of SFC, between the footbridge & Calderon Blvd. (in Moore Park)

Project Priority: LONG-TERM Related Projects:

**Project Location:** Moore Park

# **Project Description:**

Project includes the improvement and/or establishment of a vegetative cover along the right bank area of the East Fork of San Felipe Creek (SFC), between the existing footbridge and Dr. F. Calderon Blvd. in Moore Park. Project will include vegetation enhancement including importing top soil, organic material (compost), and the use of fiber rolls/blanket and/or plastic "geogrid" reinforcement for structural support of the soil.

# **Design/Construction Issues:**

#### **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as possible and should be conducted in a manner that minimized soil disturbance.
- Armored catfish pose a threat to the damage/destruction of the proposed improvements. If necessary, proposed improvements should be designed to minimize potential damage by the catfish.

#### **Project Options:**

- Options include the importation of soil and soil materials suitable for the establishment of a high-quality soil matrix.
- Vegetation should include appropriate native grasses and plants.

#### **Construction BMPs:**

Construction stormwater BMPs will include silt fence and other appropriate BMPs, as necessary.

Project Length/Area: 2,200 SY (approx. 650' x 30')

# Photographs/Graphics:







Anticipated Labor Source: City Crews / Contractor / Volunteers

Cost Estimate: \$ 29,000 Operations & Maintenance Impact: INCREASE

Project No.: B-18

Project:

Vegetation Enhancement - along right bank area of the E. Fork of SFC, between footbridge & Calderon Blvd.

Item	Improvement Description	Quantity	Unit	Unit	Price	To	tal Cost
1	Vegetation Enhancement - Soil+Compost+SRB*	2,200	SY	\$	8	\$	17,600
2	Silt Fence	650	LF	\$	4	\$	2,600
				Cons	truction	\$	20,200
	* - area is approx. 650 ft. x 30 ft.	Engineering Design & Mgmt (13%					2,626
	* - SRB = soil retention blanket	Total E	<b>Total Estimated Construc</b>				22,826
			Co	ntingenc	y (25%)	\$	5,707
		Т	otal Projec	t Estima	ted Cost	t \$	28,533
		PL	ANNING P	ROJEC	COST	S	29,000

Project Type: VEGETATION ENHANCEMENT

# B-19. VEGETATION ENHANCEMENT – the left bank area of the East Fork of SFC (in Moore Park), near the footbridge

Project Priority: LONG-TERM Related Projects:

**Project Location:** Moore Park

# **Project Description:**

Project includes the improvement and/or establishment of a vegetative cover around the left bank area of the East Fork of San Felipe Creek (SFC) in Moore Park near the existing footbridge. Project will include vegetation enhancement including importing top soil, organic material (compost), and the use of fiber rolls/blanket and/or plastic "geogrid" reinforcement for structural support of the soil.

# **Design/Construction Issues:**

#### **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as possible and should be conducted in a manner that minimized soil disturbance.
- Armored catfish pose a threat to the damage/destruction of the proposed improvements. If necessary, proposed improvements should be designed to minimize potential damage by the catfish.

# **Project Options:**

- Options include the importation of soil and soil materials suitable for the establishment of a high-quality soil matrix.
- Vegetation should include appropriate native grasses and plants.

## **Construction BMPs:**

• Construction stormwater BMPs will include silt fence and other appropriate BMPs, as necessary.

Project Length/Area: 3,410 SY (or approx. 0.70 acres)

# Photographs/Graphics:







Anticipated Labor Source: City Crews / Contractor / Volunteers

Cost Estimate: \$ 40,000 Operations & Maintenance Impact: INCREASE

Project No.: B-19

Project: Veg

Vegetation Enhancement - along left bank area of the E. Fork of SFC, near the footbridge

Item	Improvement Description	Quantity	Unit	Unit Price		To	tal Cost
1	Vegetation Enhancement - Soil+Compost+SRB*	3,410	SY	\$	8	\$	27,280
2	Silt Fence	300	LF	\$	4	\$	1,200
				Const	ruction	\$	28,480
	* - SRB = soil retention blanket	Enginee	ring Design	& Mgm	(13%)	\$	3,70
		Total E	stimated C	onstructi	on Cost	S	32,182
			Co	ntingency	(25%)	\$	8,04
		Т	otal Projec	t Estimat	ed Cost	S	40,22
		PL	ANNING P	ROJECT	COST	S	40,00

**BANK IMPROVEMENTS Project Type:** 

**BANK STABILIZATION - Banks of Blue Hole** B-20.

**Related Projects:** A-1 to A-6, A-13 LONG-TERM **Project Priority:** 

**Project Location:** Blue Hole

# **Project Description:**

Project includes the stabilization of the banks of Blue Hole. Stabilization may include a variety of methods including grading, establishment of vegetation, improvement of soil organics, structural stability including fiber mats, plastic geogrid systems, and other options. Bank stabilization is these areas should follow cane eradication efforts upstream of the project area. Project areas A-1 through A-6 include the known individual tributaries located on the golf course property.

# Design/Construction Issues:

# **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as possible and should be conducted in a manner that minimized soil disturbance.
- Armored catfish pose a threat to the damage/destruction of the proposed improvements. If necessary, proposed improvements should be designed to minimize potential damage by the catfish.

# **Project Options:**

- Options include the importation of soil and soil materials suitable for the establishment of a high-quality soil matrix.
- Vegetation should include appropriate native grasses and plants.

# **Construction BMPs:**

- Coffer Dams or inflatable barriers will be needed to prevent or limit the amount of sediment or suspended soils created by construction activities.
- Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area:

feet [Total = 500 feet w/ each bank approx. 250 feet in length] 500

# Photographs/Graphics:







City Crews / Contractor / Volunteers **Anticipated Labor Source:** 

**Operations & Maintenance Impact:** \$ 39,000 Cost Estimate:

**NO CHANGE** 

Project No.: B-20

Project: Bank Stabilization - along the Banks of Blue Hole

Project Area: Blue Hole
Priority: Long-Term

Item	Improvement Description	Quantity	Unit	Unit	Price	To	tal Cost
1	Bank Improvements - Vegetation I20 + Geogrid*	500	LF	\$	51	\$	25,500
2	Silt Fence	500	LF	\$	4	\$	2,000
					truction		27,500
	* - banks of Blue Hole are approx. 250 ft. each side		ring Design stimated C				3,57: 31,07:
		1	Co	ntingenc	y (25%)	\$	7,769
		T	otal Projec	t Estimat	ted Cost	\$	38,844
		PL	ANNING P	ROJEC	r cost	\$	39,000

**Project Type: BANK IMPROVEMENTS** 

B-21. BANK STABILIZATION – West Fork of SFC, south of Blue Hole (in Moore Park)

Project Priority: LONG-TERM Related Projects:

Project Location: Moore Park

# **Project Description:**

Project includes the stabilization of the stream banks (both left and right banks) along the West Fork of San Felipe Creek (SFC) through Moore Park. Stabilization may include a variety of methods including grading, establishment of vegetation, improvement of soil organics, structural stability including fiber mats, plastic geogrid systems, and other options. Bank stabilization is these areas should follow cane eradication efforts upstream of the project area. Project areas A-1 through A-6 include the known individual tributaries located on the golf course property.

# **Design/Construction Issues:**

## **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as possible and should be conducted in a manner that minimized soil disturbance.
- Armored catfish pose a threat to the damage/destruction of the proposed improvements. If necessary, proposed improvements should be designed to minimize potential damage by the catfish.

#### **Project Options:**

- Options include the importation of soil and soil materials suitable for the establishment of a high-quality soil matrix.
- Vegetation should include appropriate native grasses and plants.

#### **Construction BMPs:**

- Coffer Dams or inflatable barriers will be needed to prevent or limit the amount of sediment or suspended soils created by construction activities.
- Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

**Project Length/Area:** 

**1,540 feet** [Total = 1,540 feet w/ Right & Left Bank = 770 feet each]

# Photographs/Graphics:







**Anticipated Labor Source:** 

City Crews / Contractor / Volunteers

**Cost Estimate:** 

\$ 120,000

**Operations & Maintenance Impact:** 

**NO CHANGE** 

Project No.: B-21

Project: Bank Stabilization - along West Fork of SFC, downstream of Blue Hole

Item	Improvement Description	Quantity	Unit	Uni	t Price	To	tal Cost
1	Bank Improvements - Vegetation I20 + Geogrid*	1,540	LF	\$	51	\$	78,540
2	Silt Fence	1,540	LF	\$	4	\$	6,160
				Con	struction	\$	84,700
	* - banks of SFC are approx. 770 ft. each side	Enginee	ring Design	& Mgr	nt (13%)	\$	11,011
		Total E	stimated C	onstruc	tion Cost	\$	95,711
			Co	ntingen	cy (25%)	\$	23,928
		Т	otal Projec	t Estima	ited Cost	\$	119,639
		PL	ANNING P	ROJEC	T COST	s	120,000

City of Del Rio San Felipe Creek Master Plan

**Project Type:** BANK IMPROVEMENTS

B-22. BANK STABILIZATION - along the Acequia Madre Ditch in Moore Park

Project Priority: LONG-TERM Related Projects:

Project Location: Moore Park

# **Project Description:**

Project includes the stabilization of the bank areas (both left and right banks) along the Acequia Madre Ditch through Moore Park. Stabilization may include a variety of methods including grading, establishment of vegetation, improvement of soil organics, structural stability including fiber mats, plastic geogrid systems, and other options. Bank stabilization is these areas should follow cane eradication efforts upstream of the project area.

# **Design/Construction Issues:**

# **Known Constraints:**

- Project involves work on drainage canals owned and operated by the San Felipe Agricultural, Manufacturing, and Irrigation District (SFAMID). Permission/approval from the SFAMID must be received prior to beginning construction operations
- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as possible and should be conducted in a manner that minimized soil disturbance.
- Armored catfish may pose a threat to the damage/destruction of the proposed improvements. If necessary, proposed improvements should be designed to minimize potential damage by the catfish.

## **Project Options:**

- Options include the importation of soil and soil materials suitable for the establishment of a high-quality soil matrix.
- Vegetation should include appropriate native grasses and plants.

## **Construction BMPs:**

- Coffer Dams or inflatable barriers will be needed to prevent or limit the amount of sediment or suspended soils
  created by construction activities.
- Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area:

**1,380 feet** [Total = 1,380 w/ Right & Left Bank = 690 feet each]

# Photographs/Graphics:







Anticipated Labor Source: City Crews / Contractor / Volunteers

Cost Estimate: \$ 53,000 Operations & Maintenance Impact:

**NO CHANGE** 

Project No.: B-22

Project: Bank Stabilization - along the Acequia Madre Ditch

Item	Improvement Description	Quantity	Unit	Unit	t Price	To	tal Cost
1	Bank Improvements - Vegetation I10	1,380	LF	\$	23	\$	31,740
2	Silt Fence	1,380	LF	\$	4	\$	5,520
			-	Cons	truction	\$	37,260
	* - banks of Acequia Madre Ditch are approx. 690 ft. each side	Enginee	ring Design	& Mgn	ıt (13%)	\$	4,84
		Total E	stimated C	onstruct	ion Cost	\$	42,104
			Co	ntingenc	y (25%)	\$	10,526
		T	otal Projec	t Estima	ted Cost	\$	52,630
		PL	ANNING P	ROJEC	T COST	S	53,000

**Project Type: BANK IMPROVEMENTS** 

B-23. BANK STABILIZATION – along the left bank of the East Fork of SFC, between the Blue Wall and Calderon Blvd. (in Moore Park)

Project Priority: LONG-TERM Related Projects: B-9, B-25

Project Location: Moore Park

# **Project Description:**

Project includes the stabilization of the stream bank along the left bank of the East Fork of San Felipe Creek (SFC) through Moore Park, between the Blue Wall and Calderon Blvd. Stabilization may include a variety of methods including grading, establishment of vegetation, the improvement of soil organics, structural stability including fiber mats, plastic geogrid systems, and other options. Bank stabilization is these areas should follow cane eradication efforts upstream of the project area. Project areas A-1 through A-6 include the known individual tributaries located on the golf course property. Project areas B-1 and B-2 include the East and West Forks of SFC through Moore Park.

# **Design/Construction Issues:**

#### **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as possible and should be conducted in a manner that minimized soil disturbance.
- Armored catfish pose a threat to the damage/destruction of the proposed improvements. If necessary, proposed improvements should be designed to minimize potential damage by the catfish.

# **Project Options:**

- Options include the importation of soil and soil materials suitable for the establishment of a high-quality soil matrix.
- Vegetation should include appropriate native grasses and plants.

#### **Construction BMPs:**

- Coffer Dams or inflatable barriers will be needed to prevent or limit the amount of sediment or suspended soils
  created by construction activities.
- Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area:

290 feet

# Photographs/Graphics:







**Anticipated Labor Source:** 

City Crews / Contractor / Volunteers

**Cost Estimate:** 

\$ 106,000

**Operations & Maintenance Impact:** 

**DECREASE** 

Project No.: B-23

Project: Bank Stabilization - along the left bank of the E. Fork of SFC, between the Blue Wall & Calderon Blvd.

Item	Improvement Description	Quantity	Unit	Uni	t Price	To	tal Cost
1	Bank Improvements - Vegetation II + Geogrid	290	LF	\$	90	\$	26,100
2.	Bank Improvements - 2' Rock Gabion	290	LF	\$	115	\$	33,350
3	Silt Fence	290	LF	\$	4	\$	1,160
4	In-Stream Barrier/Curtain	290	LF	\$	50	\$	14,500
	* - bank of E. Fork of SFC in this area is approx. 290 ft. in length	Engine	ering Design		struction nt (13%)		75,110 9,764
		Total I	Estimated C	onstruct	tion Cost	S	84,874
			Co	ntingeno	ey (25%)	\$	21,219
		7	otal Projec	t Estima	ted Cost	\$	106,093
		PL	ANNING P	ROJEC	T COST	S	106,000

**BANK IMPROVEMENTS Project Type:** 

BANK STABILIZATION – along the right bank of the East Fork of SFC, between B-24. the Blue Wall and Calderon Blvd. (in Moore Park)

**Project Priority:** LONG-TERM

B-10, B-26 **Related Projects:** 

**Moore Park Project Location:** 

# **Project Description:**

Project includes the stabilization of the stream bank along the right bank of the East Fork of San Felipe Creek (SFC) through Moore Park, between the Blue Wall and Calderon Blvd. Stabilization may include a variety of methods including grading, establishment of vegetation, the improvement of soil organics, structural stability including fiber mats, plastic geogrid systems, and other options. Bank stabilization is these areas should follow cane eradication efforts upstream of the project area. Project areas A-1 through A-6 include the known individual tributaries located on the golf course property. Project areas B-1 and B-2 include the East and West Forks of SFC through Moore Park.

# **Design/Construction Issues:**

## **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as possible and should be conducted in a manner that minimized soil disturbance.
- Armored catfish pose a threat to the damage/destruction of the proposed improvements. If necessary, proposed improvements should be designed to minimize potential damage by the catfish.

## **Project Options:**

- Options include the importation of soil and soil materials suitable for the establishment of a high-quality soil matrix.
- Vegetation should include appropriate native grasses and plants.

#### Construction BMPs:

- Coffer Dams or inflatable barriers will be needed to prevent or limit the amount of sediment or suspended soils created by construction activities.
- Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area:

450 feet

# Photographs/Graphics:







**Anticipated Labor Source:** 

City Crews / Contractor / Volunteers

**Cost Estimate:** 

\$ 165,000

**Operations & Maintenance Impact:** 

**NO CHANGE** 

Project No.: B-24

Project:

Bank Stabilization - along the right bank of the E. Fork of SFC, between the Blue Wall & Calderon Blvd.

Item	Improvement Description	Quantity	Unit	Uni	t Price	To	tal Cost
1 .	Bank Improvements - Vegetation II + Geogrid	450	LF	\$	90	\$	40,500
2	Bank Improvements - 2' Rock Gabion	450	LF	\$	115	\$	51,750
3	Silt Fence	450	LF	\$	4	\$	1,800
4	In-Stream Barrier/Curtain	450	LF	\$	50	\$	22,500
	* - bank of E. Fork of SFC in this area is approx. 450 ft. in length	Enginee	ring Desigi		struction nt (13%)		116,550 15,152
		Total E	stimated C	onstruct	tion Cost	S	131,702
			Co	ntingen	ey (25%)	S	32,925
		T	otal Projec	t Estima	ted Cost	S	164,62
		PI.	ANNING P	ROJEC	T COST	S	165,000

Project Type: **BANK IMPROVEMENTS** 

#### **INSTALL FOCUSED ACCESS FEATURE –** B-25.

Left Bank of East Fork of SFC, between Blue Wall & Bedell Ave. (in Moore Park)

**Related Projects:** B-9, B-23 **Project Priority: LONG-TERM** 

**Project Location:** Moore Park

# **Project Description:**

Project includes the construction of a Focused Access Feature along the left bank of the East Fork of San Felipe Creek (SFC), between the existing Blue Wall and the Bedell Ave. Bridge in Moore Park. The Focused Access Feature will provide a defined location for public access to SFC, and will help reduce environmental impacts of pedestrian foot traffic.

# **Design/Construction Issues:**

#### **Known Constraints:**

- Project should be constructed in conjunction with projects B-9 (Existing Wall Removal) and B-23 (Bank Stabilization).
- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as possible and should be conducted in a manner that minimized soil disturbance.

# **Project Options:**

Project may include an access ramp (ADA accessible) and/or stairs. Variance may be required from TDLR if ADA access not provided.

#### Construction BMPs:

 A coffer dam or in-stream barrier will be needed to avoid the potential for suspended solids being introduced in the creek; water-filled portable coffer dams or other temporary measures should be considered.

Project Length/Area: 1 Each

# Photographs/Graphics:







**Anticipated Labor Source:** City Crews / Contractor / Volunteers

\$ 110,000 **DECREASE Cost Estimate:** 

**Operations & Maintenance Impact:** 

Project No.: B-25

Project: Install Focused Access Feature - left bank of E. Fork of SFC, between the Blue Wall & Calderon Blvd.

Item	Improvement Description	Quantity	Unit	Uı	nit Price	To	tal Cost
1	Focused Access Feature	1	EA	\$	60,000	\$	60,000
2	Stabilized Construction Entrance	1	EA	\$	1,000	\$	1,000
3	Silt Fence	200	LF	\$	4	\$	800
4	In-Stream Coffer Dam (w/ dewatering)	80	LF	\$	200	\$	16,000
				Co	nstruction	\$	77,800
		Enginee	ring Desig	n & Mg	gmt (13%)	\$	10,114
1000		Total E	stimated C	Constru	ction Cost	\$	87,914
2 11			Co	ntinge	ncy (25%)	\$	21,979
		Т	otal Projec	t Estin	nated Cost	\$	109,893
7		PL.	ANNING I	ROJE	CT COST	S	110,000

Project Type: BANK IMPROVEMENTS

B-26. INSTALL FOCUSED ACCESS FEATURE -

Right Bank of East Fork of SFC, between Blue Wall & Bedell Ave. (in Moore Park)

Project Priority: LONG-TERM Related Projects: B-10, B-24

Project Location: Moore Park

# **Project Description:**

Project includes the construction of a Focused Access Feature along the right bank of the East Fork of San Felipe Creek (SFC), between the existing Blue Wall and the Bedell Ave. Bridge in Moore Park. The Focused Access Feature will provide a defined location for public access to SFC, and will help reduce environmental impacts of pedestrian foot traffic.

# **Design/Construction Issues:**

#### **Known Constraints:**

- Project should be constructed in conjunction with projects B-10 (Existing Wall Removal) and B-18 (Vegetation Enhancement, and B-24 (Bank Stabilization).
- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as possible and should be conducted in a manner that minimized soil disturbance.

## **Project Options:**

Project may include an access ramp (ADA accessible) and/or stairs. Variance may be required from TDLR if ADA access not provided.

#### **Construction BMPs:**

 A coffer dam or in-stream barrier will be needed to avoid the potential for suspended solids being introduced in the creek; water-filled portable coffer dams or other temporary measures should be considered.

Project Length/Area: 1 Each

# Photographs/Graphics:







Anticipated Labor Source: City Crews / Contractor / Volunteers

Cost Estimate: \$ 110,000 Operations & Maintenance Impact: NO CHANGE

Project No.: B-26

Project: Install Focused Access Feature - right bank of E. Fork of SFC, between the Blue Wall & Calderon Blvd.

Item	Improvement Description	Quantity	Unit	Unit Price		Total Cost	
1	Focused Access Feature	1	EA	\$	60,000	\$	60,000
2	Stabilized Construction Entrance	1	EA	\$	1,000	\$	1,000
3	Silt Fence	200	LF	\$	4	\$	800
4	In-Stream Coffer Dam (w/ dewatering)	80	LF	\$	200	\$	16,000
				Co	nstruction	\$	77,800
		Enginee	ring Design	n & Mg	gmt (13%)	\$	10,114
		Total E	stimated C	onstru	ction Cost	\$	87,914
			Co	ntinge	ncy (25%)	\$	21,979
		T	otal Projec	t Estin	nated Cost	\$	109,893
		PI	ANNING P	ROIE	CT COST	9	110,000

Project Type: BANK IMPROVEMENTS

# B-27. BANK STABILIZATION – along the right bank of East Fork of SFC, between Railroad Trestle and Existing Footbridge (in Moore Park)

Project Priority: LONG-TERM Related Projects:

Project Location: Moore Park

# **Project Description:**

Project includes the stabilization of the stream bank along the right bank of the East Fork of San Felipe Creek (SFC) through Moore Park, between the railroad trestle and the existing footbridge. Stabilization may include a variety of methods including grading, establishment of vegetation, the improvement of soil organics, structural stability including fiber mats, plastic geogrid systems, and other options. This area may require the use of engineered bank stabilization methods including rock gabions, engineered bank systems, or structural walls. Bank stabilization is these areas should follow cane eradication efforts upstream of the project area. Project areas A-1 through A-6 include the known individual tributaries located on the golf course property. Project areas B-1 and B-2 include the East and West Forks of SFC through Moore Park.

# **Design/Construction Issues:**

#### **Known Constraints:**

- Construction site is located on the banks of a creek that provides habitat to Threatened and/or Endangered Species
  that have been identified by the USFWS.
- Activities should proceed, as necessary, following the eradication of river cane along the banks of the project area
  and in the area of San Felipe Country Club Golf Course (see Projects A-1 to A-6, and B-2).

#### **Project Options:**

- Project area to be evaluated by a professional engineer for appropriate stabilization methods.
- Bank stabilization options may include structural walls, rock gabions, or other methods appropriate to the site conditions.

## **Construction BMPs:**

- Coffer Dams or inflatable barriers will be needed to prevent or limit the amount of sediment or suspended soils
  created by construction activities.
- Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used
  around the construction site in accordance with TCEQ requirements.

Project Length/Area:

320 feet

# Photographs/Graphics:







**Anticipated Labor Source:** 

City Crews / Contractor / Volunteers

**Cost Estimate:** 

\$ 180,000

Operations & Maintenance Impact:

**NO CHANGE** 

Project No.: B-27

Project: Bank Stabilization - along the right bank of the E. Fork of SFC, between the Railroad Trestle & the Footbridge

Item	Improvement Description	Quantity	Unit	Uni	t Price	To	tal Cost
1	Bank Improvements - Vegetation II + Geogrid	320	LF	\$	90	\$	28,800
2	Bank Improvements - 6' Rock Gabion	320	LF	\$	250	\$	80,000
3	Silt Fence	320	LF	\$	4	\$	1,280
4	In-Stream Barrier/Curtain	320	LF	\$	50	\$	16,000
	* - bank of E. Fork of SFC in this area is approx. 320 ft. in length	Enginee	ering Desig	41	struction	65.12	126,080
	- bank of E. Fork of SPC in this area is approx. 320 ft. in length		Estimated C			Total State of	142,470
		7000	Co	ntingen	cy (25%)	\$	35,618
		Total Project Estimated C					178,088
		PL	ANNING F	ROJEC	T COST	\$	180,000

Project Type: BANK IMPROVEMENTS

# B-28. BRIDGE REPLACEMENT / BANK STABILIZATION – Existing Footbridge across East Fork of SFC (in Moore Park)

Project Priority: LONG-TERM Related Projects: B-42

Project Location: Moore Park

# **Project Description:**

Project includes the replacement of the existing footbridge across the East Fork of San Felipe Creek (SFC) in Moore Park. Project will include the complete replacement of the existing bridge (5' wide), reconstruction of the bridge abutments, and stabilization of the stream banks. Bank stabilization should include installation of structural improvements that will prevent the erosion of the creek bank in the areas immediately upstream and downstream of the bridge. The exact distance of stabilization has not been determined, but should be evaluated by a professional engineering. At this time it is estimated that stabilization efforts could extend 100 feet upstream and downstream of the footbridge. Bank Stabilization methods should include the most environmentally friendly and esthetically pleasing methods appropriate for the Del Rio, Texas area.

# **Design/Construction Issues:**

# **Known Constraints:**

Construction site is located on the banks of a creek that provides habitat to Threatened and/or Endangered Species
that have been identified by the USFWS.

## **Project Options:**

 Bank stabilization options may include structural walls, rock gabions, or other methods appropriate to the site conditions.

#### **Construction BMPs:**

- Coffer Dams or inflatable barriers will be needed to prevent or limit the amount of sediment or suspended soils
  created by construction activities.
- Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

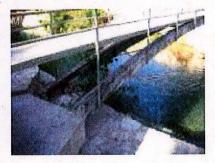
Project Length/Area:

56 feet [length of bridge + Bank Stabilization for 100' upstream/downstream]

# Photographs/Graphics:







Anticipated Labor Source: City Crews / Contractor / Volunteers

Cost Estimate: \$ 470,000 Operations & Maintenance Impact: NO CHANGE

Project No.: B-28

Project: Bridge Replacement / Bank Stabilization\* - Existing Footbridge across E. Fork of SFC

Item	Improvement Description	Quantity	Unit	Ur	it Price	To	tal Cost
1	Demolition - Existing Concrete Footbridge (walkway)	300	SF	\$	20	\$	6,000
2	Demolition - Existing Concrete Footbridge (abutments)	5,000	EA	\$	2	\$	10,000
3	Bank Improvements - Footbridge I (5' wide)	60	LF	\$	600	\$	36,000
4	Bank Improvements - Bridge Abutments (> 40' for 5' bridge)	1	LS	\$	50,000	\$	50,000
5	Bank Improvements - Vegetation I20 + Geogrid [200' left bank]	200	LF	\$	90	\$	18,000
6	Bank Improvements - 6' Rock Gabion [200' left bank]	200	LF	\$	250	\$	50,000
7	Bank Improvements - Vegetation I20 + Geogrid [100' left bank]	100	LF	\$	90	\$	9,000
8	Bank Improvements - 6' Rock Gabion [100' left bank]	100	LF	\$	250	\$	25,000
9	Bank Improvements - Structural Walls IV [ 6' - 8' ] [100' right bank]	100	LF	\$	480	\$	48,000
10	Stabilized Construction Entrance	1	EA	\$	1,000	\$	1,000
11	Silt Fence	200	LF	\$	4	\$	800
12	In-Stream Coffer Dam (w/ dewatering) [200' along both banks]	400	LF	\$	200	\$	80,000
				Co	nstruction	\$	333,800
	* - bank stabilization for 100' upstream/downstream of bridge	Enginee	ring Design	n & Mg	gmt (13%)	\$	43,394
		Total E	stimated C	Constru	ction Cost	S	377,194
			Co	ntinge	ncy (25%)	\$	94,299
		Т	otal Projec	t Estin	nated Cost	S	471,493
		PL	ANNING P	ROJE	CT COST	S	470,000

Project Type: STORMWATER BMP

B-29. INSTALL PERVIOUS PAVEMENT PARKING AREA – next to the railroad tracks, the Acequia Madre Ditch, and the existing asphalt parking area (in Moore Park)

Project Priority: LONG-TERM Related Projects:

Project Location: Moore Park

# **Project Description:**

Project includes the installation of a pervious pavement parking area on the west side of Moore Park, south of the railroad tracks, and adjacent to the Acequia Madre Ditch and an existing asphalt parking area. An engineered pervious pavement system should be designed and installed according to manufacturer's recommendations and recognized engineering design standards.

# **Design/Construction Issues:**

#### **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as
  possible and should be conducted in a manner that minimized soil disturbance.

## **Project Options:**

- Identified pervious pavement options include pervious concrete, a gravel/geogrid system (GravelPave®, etc...).
- System should be designed to detain stormwater up to the 25-yr storm event.
- On areas within the defined project boundaries not suitable for pervious pavement should be provided with vegetation enhancement, including an improved soil matrix, along with appropriate native grasses and plants.

## **Construction BMPs:**

 Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area: 52,505 sq. ft. [assume parking on 80% = 42,000 sq.ft. = 0.96 acres]

## Photographs/Graphics:







Anticipated Labor Source: City Crews / Contractor / Volunteers

Cost Estimate: \$ 690,000 Operations & Maintenance Impact: INCREASE

# **NEW PERVIOUS CONCRETE PARKING AREA**

Project No.: B-29

Project: Install New Pervious Parking Area, next to railroads tracks & the Acquia Madre Ditch, adjacent to asphalt parking area

Project Area: Moore Park
Priority: Long-Term

Item	Improvement Description	Quantity	Unit	Un	it Price	To	otal Cost
1	Clearing, Grubbing & Subgrade Preparation	52,500	SF	\$	0.10	\$	5,250
2	Excavation & Haul-Off of Existing Surface Material (12" depth)	1,944	CY	\$	20	\$	38,889
3	Pervious Concrete	42,000	SF	\$	10	\$	420,000
4	Wheel Stops (based on 1 / 440 sf of property)	95	EA	\$	200	\$	19,091
5	Striping (based on 1 / 440 sf of property)	95	EA	\$	5	\$	477
6	Silt Fence	800	LF	\$	5	\$	4,000
7	Stabilized Construction Entrance	1	EA	\$.	1,000	\$	1,000
				Cor	struction	\$	488,707
	* - total area is 52,500 sq. ft.; assume parking on 80%	Enginee	ring Design	n & Mg	mt (13%)	\$	63,532
		Total E	Estimated C	Construc	ction Cost	\$	552,239
ing a state			Co	ntinger	icy (25%)	\$	138,060
		1	otal Projec	t Estim	ated Cost	\$	690,299
The state of the s		PL	ANNING I	PROJE	CT COST	\$	690,000

# **NEW GRAVEL PAVEMENT SYSTEM PARKING AREA**

Project No.: B-29

Project: Install New Pervious Parking Area, next to railroads tracks & the Acquia Madre Ditch, adjacent to asphalt parking area

Item	Improvement Description	Quantity	Unit	Un	it Price	To	otal Cost
1	Clearing, Grubbing & Subgrade Preparation	52,500	SF	\$	0.10	\$	5,250
2	Excavation & Haul-Off of Existing Surface Material (12" depth)	1,944	CY	\$	20	\$	38,889
3	GRAVEL PAVEMENT SYSTEM**	42,000	SF	\$	6	\$	252,000
4	Wheel Stops (based on 1 / 440 sf of property)	95	EA	\$	200	\$	19,091
5	Striping (based on 1 / 440 sf of property)		EA	\$	5	\$	-
6	Silt Fence	800	LF	\$	5	\$	4,000
7	Stabilized Construction Entrance	1	EA	\$	1,000	\$	1,000
	* - total area is 52,500 sq. ft.; assume parking on 80%	Enginee	ring Desigi		struction mt (13%)		320,230 41,630
	** - includes a plastic cell structural component to contain gravel	Total E	stimated C	onstruc	ction Cost	\$	361,860
			Co	ntinger	icy (25%)	\$	90,465
		Т	otal Projec	t Estim	ated Cost	\$	452,325
		PL.	ANNING P	PROJE	CT COST	\$	450,000

Project Type: BANK IMPROVEMENTS

# B-30. BRIDGE REPLACEMENT / BANK STABILIZATION – Existing Footbridge across West Fork of SFC (in Moore Park)

Project Priority: LONG-TERM Related Projects:

Project Location: Moore Park

# **Project Description:**

Project includes the replacement of the existing footbridge, adjacent to the Moore Park Pool, that crosses the West Fork of San Felipe Creek (SFC) in Moore Park. The project will include the complete replacement of the existing bridge, reconstruction of the bridge abutments, and stabilization of the stream banks. Bank stabilization should include installation of structural improvements that will prevent the erosion of the creek bank in the areas immediately upstream and downstream of the bridge. The exact distance of stabilization has not been determined, but should be evaluated by a professional engineering. At this time it is estimated that stabilization efforts could extend 50 feet upstream and downstream of the footbridge. Bank Stabilization methods should include the most environmentally friendly and esthetically pleasing methods appropriate for the Del Rio, Texas area.

# **Design/Construction Issues:**

#### **Known Constraints:**

Construction site is located on the banks of a creek that provides habitat to Threatened and/or Endangered Species
that have been identified by the USFWS.

## **Project Options:**

 Bank stabilization options may include structural walls, rock gabions, or other methods appropriate to the site conditions.

## **Construction BMPs:**

- Coffer Dams or inflatable barriers will be needed to prevent or limit the amount of sediment or suspended soils
  created by construction activities.
- Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area:

35 feet [length of bridge + Bank Stabilization for 50' upstream/downstream]

# Photographs/Graphics:







Anticipated Labor Source:

City Crews / Contractor / Volunteers

**Cost Estimate:** 

\$ 165,000

Operations & Maintenance Impact:

**NO CHANGE** 

Project No.:

B-30

Project:

Bridge Replacement/Bank Stabilization - Existing Footbridge across W. Fork of SFC

ltem	Improvement Description	Quantity	Unit	Ur	nit Price	To	tal Cost
1	Demolition - Existing Concrete Footbridge (walkway)	175	SF	\$	20	\$	3,500
2	Demolition - Existing Concrete Footbridge (abutments)	5,000	EA	\$.	2	\$	10,00
3	Bank Improvements - Footbridge I (5' wide)	35	LF	\$	600	\$	21,00
4	Bank Improvements - Bridge Abutments (< 40' for 5' bridge)	1	LS	\$	25,000	\$	25,000
5	Bank Improvements - Vegetation I20 + Geogrid [50' left bank]	50	LF	\$	90	\$	4,500
6	Bank Improvements - 2' Rock Gabion [50' left bank]	50	LF	\$	250	\$	12,50
7	Bank Improvements - Vegetation I20 + Geogrid [50' right bank]	50	LF	\$	90	\$	4,50
8	Bank Improvements - 2' Rock Gabion [50' left bank]	50	LF	\$	250	\$	12,50
9	Stabilized Construction Entrance	. 1	EA	\$	1,000	\$	1,00
10	Silt Fence	200	LF	\$	4	\$	80
11	In-Stream Coffer Dam (w/ dewatering) [200' along both banks]	100	LF	\$	200	\$	20,00
	* - bank stabilization for 25' upstream/downstream of bridge	Enginee	ring Desig		nstruction gmt (13%)		115,30 14,98
		Total E	stimated C	onstru	ction Cost	\$	130,28
		K	Co	ntinge	ncy (25%)	\$	32,57
		1	otal Projec	t Estin	nated Cost	\$	162,86
		PI.	ANNING F	ROJE	CT COST	S	165,000

**Project Type: BANK IMPROVEMENTS** 

B-31. BRIDGE REPLACEMENT / BANK STABILIZATION – Existing Footbridges across the Acequia Madre Ditch, just west of the swimming pool (in Moore Park)

Project Priority: LONG-TERM Related Projects:

**Project Location:** Moore Park

# **Project Description:**

Project includes the replacement of the existing footbridges (two bridges) that cross the Acequia Madre Ditch in Moore Park, located just west of the swimming pool. The project will include the complete replacement of the existing bridges, reconstruction of the bridge abutments, and stabilization of the ditch banks (if necessary). Any bank stabilization should include installation of structural improvements that will prevent the erosion of the creek bank in the areas immediately upstream and downstream of the bridge. Bank Stabilization methods should include the most environmentally friendly and esthetically pleasing methods appropriate for the Del Rio, Texas area.

# **Design/Construction Issues:**

## **Known Constraints:**

- Project involves work on drainage canals owned and operated by the San Felipe Agricultural, Manufacturing, and Irrigation District (SFAMID). Permission/approval from the SFAMID must be received prior to beginning construction operations
- Construction site is located on the banks of a creek that provides habitat to Threatened and/or Endangered Species
  that have been identified by the USFWS.

## **Project Options:**

 Bank stabilization options may include structural walls, rock gabions, or other methods appropriate to the site conditions.

## **Construction BMPs:**

- Coffer Dams or inflatable barriers will be needed to prevent or limit the amount of sediment or suspended soils
  created by construction activities.
- Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used
  around the construction site in accordance with TCEQ requirements.

Project Length/Area:

40 feet [Total = 40 feet w/ each bridge @ 20 LF each]

# Photographs/Graphics:







Anticipated Labor Source: City Crews / Contractor / Volunteers

Cost Estimate: \$ 205,000 Operations & Maintenance Impact: NO CHANGE

Project No.:

B-31

Project:

Bridge Replacement/Bank Stabilization - for Two (2) Existing 20' Footbridges across W. Fork of SFC

ltem	Improvement Description	Quantity	Unit	Ur	nit Price	To	tal Cost
1	Demolition - Existing Concrete Footbridge (walkway)	200	SF	\$	20	\$	4,000
2	Demolition - Existing Concrete Footbridge (abutments)	4	EA	\$	2,500	\$	10,000
3	Bank Improvements - Footbridge I (5' wide)	20	LF	\$	600	\$	12,00
4	Bank Improvements - Footbridge I (5' wide)	20	LF	\$	600	\$	12,00
5	Bank Improvements - Bridge Abutments (< 40' for 5' bridge)	1	LS	\$	25,000	\$	25,000
6	Bank Improvements - Bridge Abutments (< 40' for 5' bridge)	1	LS	\$	25,000	\$	25,000
7	Bank Improvements - Vegetation I20 + Geogrid [50' left bank]	50	LF	\$	90	\$	4,500
8	Bank Improvements - 2' Rock Gabion [50' left bank]	50	ĻF	\$	250	\$	12,500
9	Bank Improvements - Vegetation I20 + Geogrid [50' right bank]	50	LF	\$	90	\$	4,500
10	Bank Improvements - 2' Rock Gabion [50' left bank]	50	LF	\$	250	\$	12,500
11	Stabilized Construction Entrance	1	EA	\$	1,000	\$	1,000
12	Silt Fence	200	LF	\$	4	\$	800
13	In-Stream Coffer Dam (w/ dewatering) [200' along both banks]	100	LF	\$	200	\$	20,000
				Co	nstruction	\$	143,800
	* - bank stabilization for 25' upstream/downstream of bridges	Enginee	ring Design	1 & Mg	gmt (13%)	S	18,69
		Total E	stimated C	onstru	ction Cost	S	162,49
			Co	ntinge	ncy (25%)	S	40,62
		T	otal Projec	t Estin	nated Cost	S	203,11
		DI.	ANNING P	ROIE	CT COST	9	205,000

Project Type: BANK IMPROVEMENTS

**B-32. RECONSTRUCT EXISTING WALL-**

Left Bank of East Fork of SFC, between railroad trestle & footbridge (in Moore Park)

Project Priority: LONG-TERM Related Projects: B-6, B-48

Project Location: Moore Park

# **Project Description:**

Project includes the reconstruction of the existing creek retaining wall/walk along the left bank of the East Fork of San Felipe Creek (SFC), between the railroad trestle & footbridge in Moore Park.

# **Design/Construction Issues:**

### **Known Constraints:**

- Project should be constructed in conjunction with projects B-6 (Existing Wall Removal) and B-48 (Kayak Put In Station).
- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as
  possible and should be conducted in a manner that minimized soil disturbance.
- ADA access should be provided if not continuous access, provide access at select locations along the creek (TDLR review will likely be required).

## **Project Options:**

New wall should provide continuous access to the creek for park visitors.

## **Construction BMPs:**

A coffer dam or in-stream barrier will be needed to avoid the potential for suspended solids being introduced in the creek; water-filled portable coffer dams or other temporary measures should be considered.

Project Length/Area: 430 feet

## Photographs/Graphics:







Anticipated Labor Source: City Crews / Contractor / Volunteers

Cost Estimate: \$ 380,000 Operations & Maintenance Impact: DECREASE

Project No.: B-32

Project: Reconstruct Existing Wall, left bank of W. Fork of SFC, between the Railroad Trestle & the Existing Footbridge

Item	Improvement Description	Quantity	Unit	Un	it Price	To	tal Cost
1	Bank Improvements - Structural Walls III [ 4' - 6' ]	430	LF	\$	360	\$	154,80
2	Pervious Concrete [ 430' x 6' wide ]	2,580	SF	\$	10	\$	25,80
3	Stabilized Construction Entrance	1	EA	\$	1,000	\$	1,00
4	Silt Fence	430	LF	\$	4	\$	1,72
5	In-Stream Coffer Dam (w/ dewatering)	430	LF	\$	200	\$	86,00
				Con	struction	\$	269,32
	* - bank reconstruction + 6' pervious concrete sidewalk	Enginee	ring Desigi	& Mg	mt (13%)	\$	35,01
		Total E	stimated C	onstruc	tion Cost	S	304,33
1.			Co	ntingen	cy (25%)	\$	76,08
		Total Project Estimated Cost \$ PLANNING PROJECT COST \$					
Total Inc							

Project Type: BANK IMPROVEMENTS

**B-33. RECONSTRUCT EXISTING WALL-**

Left Bank of East Fork of SFC, between footbridge & Blue Wall (in Moore Park)

**Project Priority:** 

LONG-TERM

**Related Projects:** 

B-7

**Project Location:** 

**Moore Park** 

# **Project Description:**

Project includes the reconstruction of the existing creek retaining wall/walk along the left bank of the East Fork of San Felipe Creek (SFC), between the existing footbridge and the existing Blue Wall in Moore Park.

# **Design/Construction Issues:**

### **Known Constraints:**

- Project should be constructed in conjunction with projects B-7 (Existing Wall Removal).
- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as possible and should be conducted in a manner that minimized soil disturbance.
- ADA access should be provided if not continuous access, provide access at select locations along the creek (TDLR review will likely be required).

## **Project Options:**

New wall should provide continuous access to the creek for park visitors.

## **Construction BMPs:**

 A coffer dam or in-stream barrier will be needed to avoid the potential for suspended solids being introduced in the creek; water-filled portable coffer dams or other temporary measures should be considered.

**Project Length/Area:** 

310 feet

# Photographs/Graphics:







**Anticipated Labor Source:** 

City Crews / Contractor / Volunteers

**Cost Estimate:** 

\$ 275,000

**Operations & Maintenance Impact:** 

**DECREASE** 

Project No.:

B-33

Project:

Reconstruct Existing Wall\*, left bank of W. Fork of SFC, between the Railroad Trestle & the Eexisting Footbridge

Item	Improvement Description	Quantity	Unit	Un	it Price	To	otal Cost
1	Bank Improvements - Structural Walls III [ 4' - 6' ]	310	LF	\$	360	\$	111,600
2	Pervious Concrete [ 430' x 6' wide ]	1,860	SF	\$	10	\$	18,600
3	Stabilized Construction Entrance	1	EA	\$	1,000	\$	1,000
4	Silt Fence	310	LF	\$	4	\$	1,240
5	In-Stream Coffer Dam (w/ dewatering)	310	LF	\$	200	\$	62,000
	* - bank reconstruction + 6' pervious concrete sidewalk	기계에 가는 그는 그리고 있는데 그리고 있는데 가는데 맛있다.		struction mt (13%)		194,440 25,27	
		Total E	stimated C	onstruc	ction Cost	\$	219,71
1,000			Co	ntinger	icy (25%)	\$	54,929
		· T	otal Projec	t Estim	ated Cost	S	274,64
		PI.	ANNING F	ROJE	CT COST	s	275,000

Project Type: STORMWATER BMP

# B-34. INSTALL PERVIOUS PAVEMENT PARKING AREA – between the Horseshoe Park Fountain and the railroad tracks (in Horseshoe Park)

Project Priority: LONG-TERM Related Projects:

Project Location: Moore Park

# **Project Description:**

Project includes the installation of a new pervious pavement parking area on the west side of the West Fork of San Felipe Creek, on the north side of the railroad tracks, and adjacent to the Horseshoe Park Fountain. This new pervious pavement parking area would replace an existing unimproved parking area at this same location. An engineered pervious pavement system should be designed and installed according to manufacturer's recommendations and recognized engineering design standards.

# **Design/Construction Issues:**

## **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as possible and should be conducted in a manner that minimized soil disturbance.

# **Project Options:**

- Identified pervious pavement options include pervious concrete, a gravel/geogrid system (GravelPave®, etc...).
- System should be designed to detain stormwater for up to the 25-yr storm event.
- On areas within the defined project boundaries not suitable for pervious pavement should be provided with vegetation enhancement, including an improved soil matrix, along with appropriate native grasses and plants.

## **Construction BMPs:**

• Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area:

16,971 sq. ft. (0.39 acres)

# Photographs/Graphics:







Anticipated Labor Source:

City Crews / Contractor / Volunteers

**Cost Estimate:** 

\$ 275,000

**Operations & Maintenance Impact:** 

**INCREASE** 

Project No.:

B-34

Project:

Install New Pervious Parking Area, between the Horseshoe Park Fountain & the Railroad Tracks

Project Area: Horseshoe Park

Priority:

Long-Term

Item	Improvement Description	Quantity	Unit	Un	it Price	To	tal Cost
1	Clearing, Grubbing & Subgrade Preparation	16,971	SF	\$	0.10	\$	1,697
2	Excavation & Haul-Off of Existing Surface Material (12" depth)	629	CY .	\$	20	\$	12,571
3	Pervious Concrete	16,971	SF	\$	10	\$	169,710
4	Wheel Stops (based on 1 / 440 sf of property)	39	EA	\$	200	\$	7,714
5	Striping (based on 1 / 440 sf of property)	39	EA	\$	5	\$	193
6	Silt Fence	500	LF	\$	4	\$ .	2,000
7	Stabilized Construction Entrance	1	EA	\$	1,000	\$	1,000
-				Cor	struction	\$	194,88
	* - total area is approx. 16,971 sq. ft.	Enginee	ring Desigi	ı & Mg	mt (13%)	\$	25,335
		Total E	stimated C	onstruc	ction Cost	\$	220,220
			Co	ntinger	icy (25%)	\$	55,055
		T	otal Projec	t Estim	ated Cost	\$	275,275
		PL	ANNING P	ROJE	CT COST	\$	275,000

Project Type: BANK IMPROVEMENTS

B-35. REFURBISH FOOTBRIDGE ACROSS BLUE HOLE (@ Horseshoe Park)

Project Priority: LONG-TERM Related Projects:

Project Location: Blue Hole

# **Project Description:**

Project includes the refurbishment of the existing footbridge that crosses Blue Hole. The project will include the complete refurbishment of the existing footbridge, including any necessary repairs/improvements to the bridge abutments. Any necessary bank stabilization should include installation of structural improvements that will prevent the erosion of the creek bank in the areas immediately upstream and downstream of the bridge. Bank Stabilization methods should include the most environmentally friendly and esthetically pleasing methods appropriate for the Del Rio, Texas area.

# **Design/Construction Issues:**

## **Known Constraints:**

- Construction site is located on the banks of a creek that provides habitat to Threatened and/or Endangered Species
  that have been identified by the USFWS.
- Existing bridge paint should be tested for the presence of lead. If lead is found, refurbishment of bridge should proceed in accordance with all State and federal requirements pertaining to the abatement of lead-paint structures.
- Construction operations should minimize or eliminate the possibility of undesirable materials falling into the waters
  of Blue Hole.

# **Project Options:**

 Bank stabilization options may include structural walls, rock gabions, or other methods appropriate to the site conditions.

## **Construction BMPs:**

- Coffer Dams or inflatable barriers will be needed to prevent or limit the amount of sediment or suspended soils created by construction activities.
- Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used
  around the construction site in accordance with TCEQ requirements.

Project Length/Area:

1 each

# Photographs/Graphics:







Anticipated Labor Source:

City Crews / Contractor / Volunteers

**Cost Estimate:** 

\$ 80,000

**Operations & Maintenance Impact:** 

**NO CHANGE** 

Project No.: B-35

Project: Refurbish Existing Footbridge Across Blue Hole

Project Area: Blue Hole
Priority: Long-Term

Item	Improvement Description	Quantity 1	Unit	Unit Price		To	tal Cost
1	Refurbish Existing Footbridge*		LS	\$	50,000	\$	50,000
2	Stabilized Construction Entrance	1	EA	\$	1,000	\$	1,000
3	Silt Fence	200	LF	\$	4	\$	800
4	In-Stream BMPs	1	LS	\$	5,000	\$ -	5,000
	* - refurbish is cosmetic only; does not include structural	Construction Engineering Design & Mgmt (13%)				56,800 7,384	
		Total E	stimated C	onstru	ction Cost	S	64,184
			Co	ntinge	ncy (25%)	s	16,046
		Т	otal Projec	t Estin	nated Cost	S	80,230
The T		PL	ANNING P	ROJE	CT COST	\$	80,000

Project Type: PARK IMPROVEMENT

# B-36. REHABILITATION OF EXISTING PICNIC AREA, located adjacent to Hwy. 90, between the East and West Forks of SFC

Project Priority: LONG-TERM Related Projects:

Project Location: State Park / Blue Hole

# **Project Description:**

Project includes the complete rehabilitation of the existing park elements including picnic tables, BBQ pits, trash cans, and other improvements. Vegetation enhancement should also be provided including importing top soil, organic material (compost), and the use of fiber rolls/blanket and/or plastic "geogrid" reinforcement for structural support of the soil.

# **Design/Construction Issues:**

## **Known Constraints:**

- Construction site is located on the banks of a creek that provides habitat to Threatened and/or Endangered Species
  that have been identified by the USFWS.
- Park improvements should provide ADA access. Improvements must meet the requirements found in the Texas
   Accessibility Standards (TAS) administered by the Texas Department of Licensing and Registrations (TDLR). Review
   and approval by a Registered Accessibility Specialist (RAS) will likely be required.

## **Project Options:**

- Options include the importation of soil and soil materials suitable for the establishment of a high-quality soil matrix.
- Vegetation should include appropriate native grasses and plants.

## **Construction BMPs:**

• Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area:

1 LS

## Photographs/Graphics:







**Anticipated Labor Source:** 

City Crews / Contractor / Volunteers

**Cost Estimate:** 

\$ 32,000

**Operations & Maintenance Impact:** 

NO CHANGE

Project No.: B-36

Project: Rehab of Existing Picnic Area, located adjacent to Hwy. 90, between the E. & W. Forks of SFC

Project Area: Blue Hole / State Park

Priority: Long-Term

Item	Improvement Description	Quantity	Unit	Un	it Price	To	tal Cost
1	Demolition/Haul Off	1	LS	\$	2,500	\$	2,500
2	Picnic Tables - Concrete w/ concrete slab	3	EA	\$	6,000	\$	18,000
3	BBQ Pits - Metal w/ concrete foundation	2	EA	\$	500	\$	1,000
4	Trash Can w/ foundation	2	EA	\$	700	\$	1,400
5	Vegetation Enhancement* - Soil(2")+Compost(2") Only	556	SY	\$	3	\$	1,667
	* - vegetation enhancement area is approx. 50' x 100'	Enginee	Construction gineering Design & Mgmt (13%				22,900 2,977
		Total E	stimated C	onstru	ction Cost	\$	25,877
			Co	ntinger	icy (25%)	\$	6,469
		Т	otal Projec	t Estim	ated Cost	\$	32,346
		PLANNING PROJECT COS				S	32,000

Project Type: PARK IMPROVEMENT

# B-37. REHABILITATION OF EXISTING PICNIC AREA, on right bank of the East Fork of SFC @ Hwy. 90

Project Priority: LONG-TERM Related Projects:

Project Location: State Park

# **Project Description:**

Project includes the complete rehabilitation of the existing park elements including picnic tables, BBQ pits, trash cans, and other improvements. Vegetation enhancement should also be provided including importing top soil, organic material (compost), and the use of fiber rolls/blanket and/or plastic "geogrid" reinforcement for structural support of the soil.

# **Design/Construction Issues:**

## **Known Constraints:**

- Construction site is located on the banks of a creek that provides habitat to Threatened and/or Endangered Species
  that have been identified by the USFWS.
- Park improvements should provide ADA access. Improvements must meet the requirements found in the Texas
   Accessibility Standards (TAS) administered by the Texas Department of Licensing and Registrations (TDLR). Review
   and approval by a Registered Accessibility Specialist (RAS) will likely be required.

## **Project Options:**

- Options include the importation of soil and soil materials suitable for the establishment of a high-quality soil matrix.
- Vegetation should include appropriate native grasses and plants.

## **Construction BMPs:**

• Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area:

1 LS

# Photographs/Graphics:







Anticipated Labor Source: City Crews / Contractor / Volunteers

Cost Estimate: \$ 21,000 Operations & Maintenance Impact: NO CHANGE

Project No.: B-37

Project: Rehab of Existing Picnic Area, along the right bank of the E. Fork of SFC @ Hwy. 90

Item	Improvement Description	Quantity	Unit	Un	it Price	To	tal Cost
1	Demolition/Haul Off	1	LS	\$	2,000	\$	2,000
2	Picnic Tables - Concrete w/ concrete slab	2	EA	\$	6,000	\$	12,000
3	BBQ Pits - Metal w/ concrete foundation	1	EA	\$	500	\$	500
4	Trash Can w/ foundation	1	EA	\$	700	\$	700
5	Vegetation Enhancement* - Soil(2")+Compost(2") Only	333	SY	\$	3	\$	1,000
	* - vegetation enhancement is approx. 30' x 100'	Enginee	ring Desigi		nstruction mt (13%)		15,200 1,976
		Total E	stimated C	Constru	ction Cost	\$	17,176
			Co	ntinger	icy (25%)	S	4,294
		T	otal Projec	t Estim	ated Cost	\$	21,470
		$\mathbf{PL}_{\ell}$	ANNING P	ROJE	CT COST	S	21,000

Project Type: PARK IMPROVEMENT

B-38. REHABILITATION OF EXISTING PICNIC AREA, on left bank of the East Fork of SFC @ Hwy. 90

Project Priority: LONG-TERM Related Projects:

Project Location: State Park (near Blue Hole)

# **Project Description:**

Project includes the complete rehabilitation of the existing park elements including picnic tables, BBQ pits, trash cans, and other improvements. Vegetation enhancement should also be provided including importing top soil, organic material (compost), and the use of fiber rolls/blanket and/or plastic "geogrid" reinforcement for structural support of the soil.

# **Design/Construction Issues:**

## **Known Constraints:**

- Construction site is located on the banks of a creek that provides habitat to Threatened and/or Endangered Species
  that have been identified by the USFWS.
- Park improvements should provide ADA access. Improvements must meet the requirements found in the Texas Accessibility Standards (TAS) administered by the Texas Department of Licensing and Registrations (TDLR). Review and approval by a Registered Accessibility Specialist (RAS) will likely be required.

## **Project Options:**

- Options include the importation of soil and soil materials suitable for the establishment of a high-quality soil matrix.
- Vegetation should include appropriate native grasses and plants.

## **Construction BMPs:**

• Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area: 1 LS

## Photographs/Graphics:







Anticipated Labor Source: City Crews / Contractor / Volunteers

Cost Estimate: \$ 50,000 Operations & Maintenance Impact: NO CHANGE

Project No.:

Project:

Rehab of Existing Picnic Area, along the left bank of the E. Fork of SFC @ Hwy. 90

Project Area: State Park (near Blue Hole)

Priority:

Long-Term

Item	Improvement Description	Quantity	Unit	Un	it Price	To	tal Cost
1	Demolition/Haul Off	1	LS	\$	3,000	\$	3,000
2	Picnic Tables - Concrete w/ concrete slab	4	EA	\$	6,000	\$	24,000
3	BBQ Pits - Stone	2	EA	\$	3,000	\$	6,000
4	Trash Can w/ foundation	3	EA	\$	700	\$	2,100
5	Vegetation Enhancement* - Soil(2")+Compost(2") Only	667	SY	\$	3	\$	2,000
				Cor	struction	S	35,10
	* - vegetation enhancement is approx. 60' x 100'	Enginee	ring Design	n & Mg	mt (13%)	\$	4,563
		Total E	stimated C	Constru	ction Cost	\$	39,663
			Co	ntinger	icy (25%)	\$	9,916
		T	otal Projec	t Estim	ated Cost	\$	49,579
		PL	ANNING P	PROJE	CT COST	S	50,000

Project Type: PARK IMPROVEMENT

REHABILITATION OF EXISTING PICNIC AREA – on the left bank of the East Fork B-39. of SFC at the Existing Footbridge (west of the baseball field, Hogan Park)

**Related Projects:** 

**Project Priority:** LONG-TERM

**Project Location: Moore Park** 

# **Project Description:**

Project includes the complete rehabilitation of the existing park elements including picnic tables, shade structures, BBQ pits, trash cans, and other improvements. Vegetation enhancement should also be provided including importing top soil, organic material (compost), and the use of fiber rolls/blanket and/or plastic "geogrid" reinforcement for structural support of the soil.

# Design/Construction Issues:

## **Known Constraints:**

- Construction site is located on the banks of a creek that provides habitat to Threatened and/or Endangered Species that have been identified by the USFWS.
- Park improvements should provide ADA access. Improvements must meet the requirements found in the Texas Accessibility Standards (TAS) administered by the Texas Department of Licensing and Registrations (TDLR). Review and approval by a Registered Accessibility Specialist (RAS) will likely be required.

## **Project Options:**

- Options include the importation of soil and soil materials suitable for the establishment of a high-quality soil matrix.
- Vegetation should include appropriate native grasses and plants.

## **Construction BMPs:**

■ Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area:

1 LS

## Photographs/Graphics:







City Crews / Contractor / Volunteers Anticipated Labor Source:

**NO CHANGE** \$ 59,000 **Operations & Maintenance Impact: Cost Estimate:** 

Project No.:

B-39

Project:

Rehab of Existing Picnic Area, along the left bank of the E. Fork of SFC @ the Existing Footbridge (west of baseball field)

ltem	Improvement Description	Quantity	Unit	Un	it Price	To	tal Cost
1	Demolition/Haul Off	1	LS .	\$	5,000	\$	5,000
2	Picnic Tables - Concrete w/ concrete slab	4	EA	\$	6,000	\$	24,000
3	Picnic Tables - Shade Structures	4	EA	\$	2,000	\$	8,000
4	BBQ Pits - Metal w/ concrete foundation	4	EA	\$	500	\$	2,000
5	Trash Can w/ foundation	4	EA	\$	700	\$	2,800
6	Vegetation Enhancement* - Soil(2")+Compost(2") Only	667	SY	\$	3	\$	2,000
	* - vegetation enhancement is approx. 60' x 100'	Enginee	ring Desig		nstruction mt (13%)		41,800 5,434
		Total E	stimated C	onstru	ction Cost	S	47,234
			Co	ntinger	icy (25%)	S	11,809
		Т	otal Projec	t Estim	ated Cost	S	59,043
		PL	ANNING I	ROJE	CT COST	\$	59,000

Project Type: STORMWATER BMP

# B-40. CONVERT EXISTING ASPHALT PARKING AREA TO PERVIOUS PAVEMENT PARKING AREA – WEST FORK OF SFC (across from pool)

Project Priority: LONG-TERM Related Projects:

Project Location: Moore Park

# **Project Description:**

Project includes the demolition of an existing asphalt parking area and the installation of a new pervious pavement parking area on the west side of the West Fork of San Felipe Creek. An engineered pervious pavement system should be designed and installed according to manufacturer's recommendations and recognized engineering design standards.

# **Design/Construction Issues:**

## **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as possible and should be conducted in a manner that minimized soil disturbance.

## **Project Options:**

- Identified pervious pavement options include pervious concrete, a gravel/geogrid system (GravelPave®, etc...).
- System should be designed to detain stormwater for up to the 25-yr storm event.
- Areas within the defined project boundaries not suitable for pervious pavement should be provided with vegetation enhancement, including an improved soil matrix, along with appropriate native grasses and plants.

## **Construction BMPs:**

 Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area: 35,694 sq. ft. (0.82 acres)

## Photographs/Graphics:







Anticipated Labor Source: City Crews / Contractor / Volunteers

Cost Estimate: \$ 625,000 Operations & Maintenance Impact: INCREASE

Project No.: B-40

Project: Convert Exisiting Asphalt Parking Area to Pervious Pavement, W. Fork of SFC across from pool

Item	Improvement Description	Quantity	Unit	Un	it Price	To	tal Cost
1	Demo Existing Asphalt Parking Area	35,694	SF	\$	1.00	\$	35,694
2	Excavation & Haul-Off of Existing Surface Material (12" depth)	1,322	CY	\$	20	\$	26,440
3	Clearing, Grubbing & Subgrade Preparation	35,694	SF	\$	0.10	\$	3,569
4	Pervious Concrete	35,694	SF	\$	10	\$	356,940
5	Wheel Stops (based on 1 / 440 sf of property)	81	EA	\$	200	\$	16,225
6	Striping (based on 1 / 440 sf of property)	81	EA	\$	5	\$	406
7	Silt Fence	500	LF	\$	4	\$	2,000
8	Stabilized Construction Entrance	1	EA	\$	1,000	\$	1,000
				Cor	struction	\$	442,274
	* - total area is approx. 35,694 sq. ft.	Enginee	ring Design	& Mg	mt (13%)	\$	57,496
		Total E	Stimated C	onstruc	ction Cost	\$	499,769
			Co	ntingen	icy (25%)	\$	124,942
		1	otal Projec	t Estim	ated Cost	S	624,711
		PL	ANNING F	ROJEC	CT COST	s	625,000

**BANK IMPROVEMENTS Project Type:** 

#### B-41. REFURBISH FOOTBRIDGE ACROSS the EAST FORK OF SFC (@ HWY 90)

**Project Priority: LONG-TERM Related Projects:** 

**Project Location:** State Park

# **Project Description:**

Project includes the refurbishment of the existing footbridge that crosses the East Fork of San Felipe Creek (SFC), just south of the Hwy. 90 bridge. The project will include the complete refurbishment of the existing footbridge, including any necessary repairs/improvements to the bridge abutments. Any necessary bank stabilization should include installation of structural improvements that will prevent the erosion of the creek bank in the areas immediately upstream and downstream of the bridge. Bank Stabilization methods should include the most environmentally friendly and esthetically pleasing methods appropriate for the Del Rio, Texas area.

## **Design/Construction Issues:**

## **Known Constraints:**

- Construction site is located on the banks of a creek that provides habitat to Threatened and/or Endangered Species that have been identified by the USFWS.
- If present, the existing bridge paint should be tested for the presence of lead. If lead is found, refurbishment of bridge should proceed in accordance with all State and federal requirements pertaining to the abatement of leadpaint structures.
- Construction operations should minimize or eliminate the possibility of undesirable materials falling into the waters of San Felipe Creek.

## **Project Options:**

 Bank stabilization options may include structural walls, rock gabions, or other methods appropriate to the site conditions.

## **Construction BMPs:**

- Coffer Dams or inflatable barriers will be needed to prevent or limit the amount of sediment or suspended soils created by construction activities.
- Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area:

50 feet

## Photographs/Graphics:







Anticipated Labor Source:

City Crews / Contractor / Volunteers

\$ 35,000 **Operations & Maintenance Impact:** Cost Estimate:

**NO CHANGE** 

Project No.: B-41

Project: Refurbish Existing Footbridge Across the East Fork of SFC (@ Hwy 90)

Item	Improvement Description	Quantity	Unit	Uı	nit Price	To	tal Cost
1	Refurbish Existing Footbridge*	1	LS	\$	25,000	\$	20,000
2	Stabilized Construction Entrance	1	EA	\$	1,000	\$	1,000
3	Silt Fence	200	LF	\$	4	\$	800
4	In-Stream BMPs	1	LS	\$	3,000	\$	3,000
	* - refurbish is cosmetic only; does not include structural	Construction Engineering Design & Mgmt (13%)				1000	24,800 3,224
		Total E	Stimated C	onstru	ction Cost	S	28,024
			Co	ntinge	ncy (25%)	\$	7,006
		Т	otal Projec	t Estin	nated Cost	\$	35,030
		PL	ANNING P	ROJE	CT COST	S	35,000

**Project Type: BANK IMPROVEMENTS** 

# B-42. REPLACEMENT OF EXISTING ADA ACCESS RAMPS & HANDRAILS AT FOOTBRIDGE ACROSS the EAST FORK OF SFC (in Moore Park)

Project Priority: LONG-TERM Related Projects: B-28

Project Location: Moore Park

# **Project Description:**

Project includes the installation of necessary ramps, handrails, and other amenities necessary to comply with the requirements of the Texas Accessibility Standards (TAS) administered by the Texas Department of Licensing and Registrations (TDLR). The project will include the complete replacement of the existing access ramps and handrails currently installed at the existing footbridge. Access ramps and handrails must be provided for access from both ends of the bridge (i.e., east and west).

## **Design/Construction Issues:**

## **Known Constraints:**

- Construction site is located on the banks of a creek that provides habitat to Threatened and/or Endangered Species
  that have been identified by the USFWS.
- All improvements should provide ADA access. Improvements must meet the requirements found in the Texas Accessibility Standards (TAS) administered by the Texas Department of Licensing and Registrations (TDLR). Review and approval by a Registered Accessibility Specialist (RAS) will likely be required.
- The existing handrails paint should be tested for the presence of lead. If lead is found, the project should proceed in accordance with all State and federal requirements pertaining to the abatement of lead-paint structures.
- Construction operations should minimize or eliminate the possibility of undesirable materials falling into the waters
  of San Felipe Creek.

## **Project Options:**

 Bank stabilization options may include structural walls, rock gabions, or other methods appropriate to the site conditions.

## **Construction BMPs:**

 Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area:

135 feet (RAMPS)

270 feet (HANDRAILS)

## Photographs/Graphics:







Anticipated Labor Source: City Crews / Contractor / Volunteers

Cost Estimate: \$ 48,000 Operations & Maintenance Impact: NO CHANGE

Project No.: B-42

Project: Replace Existing ADA Access Ramps & Handrails @ Footbridge across E. Fork of SFC

Item	Improvement Description	Quantity	Unit	Un	it Price	To	tal Cost
1	Demolition - Existing Concrete Walkways/Ramps [ 135' x 5' ]	675	SF	\$	2	\$	1,350
2	Demolition - Existing Handrails	270	LF	\$	4	\$	1,080
3	Pervious Concrete [ 135' x 6' wide ]	810	SF	\$	10	\$	8,100
4	Handrails [ 2 x 135' = 270' ]	270	LF	\$	80	\$ .	21,600
5	Stabilized Construction Entrance	1	EA	\$	1,000	\$	1,000
6	Silt Fence	200	LF	\$	4	\$	800
	* - bank stabilization for 25' upstream/downstream of bridges	8	ring Desigi stimated C	ı & Mg		\$	33,930 4,411 38,341
			Co	ntingen	icy (25%)	\$	9,585
No. of the second		T	otal Projec	t Estim	ated Cost	s	47,926
		PI.	ANNING P	ROIF	T COST	9	48,000

Project Type: STORMWATER BMP

# B-43. REFURBISH EXISTING STORMWATER DETENTION BASINS – on left bank of East Fork of SFC, adjacent to Hwy 90 (Blue Star Park)

Project Priority: LONG-TERM Related Projects:

Project Location: Blue Star Park (adjacent to State Park)

# **Project Description:**

Project includes the rehabilitation of the existing stormwater detention basins located on the left bank of the East Fork of San Felipe Creek (SFC). The area is also known as Blue Star Park and is adjacent to State Park. The project will include the refurbishment of the existing stone walls that form the detention area, repair/replacement of any drainage pipes, removal of undesirable materials, removal of excess brush, and vegetation enhancement of the area within the detention basins. Project will include vegetation enhancement including importing top soil, organic material (compost), and the use of fiber rolls/blanket and/or plastic "geogrid" reinforcement for structural support of the soil.

# **Design/Construction Issues:**

## **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as possible and should be conducted in a manner that minimized soil disturbance.

## **Project Options:**

- Options include the importation of soil and soil materials suitable for the establishment of a high-quality soil matrix.
- Vegetation should include appropriate native grasses and plants.

## **Construction BMPs:**

• Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area: 5,600 SY (approx. 1.15 acres)

## Photographs/Graphics:







Anticipated Labor Source: City Crews / Contractor / Volunteers

Cost Estimate: \$ 68,000 Operations & Maintenance Impact: NO CHANGE

Project No.:

Project:

Refurbish Existing Stormwater Detention Basins - on left bank of E. Fork of SFC, adjacent to Hwy 90

Project Area: Blue Star Park (adjacent to State Park)

Priority:

Long-Term

Item	Improvement Description	Quantity	Unit	Un	it Price	To	tal Cost
1	Trash/Rubish Removal & Site Clean Up	1	LS	\$	2,000	\$	2,000
2	Existing Wall Repair*	300	SF	\$	10	\$	3,000
3	Vegetation Enhancement - Soil+Compost+Fiber Mat	5,600	SY	\$	8	\$	44,800
4	Silt Fence	80	LF	\$	4	\$	320
	* - existing wall area is approx. 5 ft. x 60 ft.	Enginee	s s	48,120 6,250			
	existing wan area to approve a trace of	Total Estimated Construction Cost S					54,37
1		Contingency (25%)					13,59
		Total Project Estimated Cost					67,97
		PLANNING PROJECT COST				S	68,00

Project Type: STORMWATER BMP

# B-44. CONVERT EXISTING ASPHALT PARKING AREA TO PERVIOUS PAVEMENT PARKING AREA – SAN FELIPE LIONS CLUB (adjacent to baseball fields, Hogan Park)

**Project Priority:** 

LONG-TERM

**Related Projects:** 

**Project Location:** 

**Moore Park** 

# **Project Description:**

Project includes the demolition of an existing asphalt parking area and the installation of a new pervious pavement parking area currently serving the San Felipe Lion Club and Hogan Park (baseball field) located in Moore Park. An engineered pervious pavement system should be designed and installed according to manufacturer's recommendations and recognized engineering design standards.

# **Design/Construction Issues:**

## **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as
  possible and should be conducted in a manner that minimized soil disturbance.

## **Project Options:**

- Identified pervious pavement options include pervious concrete, a gravel/geogrid system (GravelPave®, etc...).
- System should be designed to detain stormwater for up to the 25-yr storm event.
- Areas within the defined project boundaries not suitable for pervious pavement should be provided with vegetation enhancement, including an improved soil matrix, along with appropriate native grasses and plants.
- Stormwater flow from the pervious pavement system parking area should <u>not</u> be designed/constructed to contribute flow into the biofiltration/bioretention BMP (proposed as Project No. 45).

## **Construction BMPs:**

 Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area:

70,039 sq. ft. (1.61 acres)

# Photographs/Graphics:







**Anticipated Labor Source:** 

City Crews / Contractor / Volunteers

**Cost Estimate:** 

\$ 1,220,000

**Operations & Maintenance Impact:** 

**INCREASE** 

Project No.: B-44

Project:

Convert Exisitng Asphalt Parking Area to Pervious Pavement, San Felipe Lions Club (adjacent to baseball field)

Item	Improvement Description  Demo Existing Asphalt Parking Area	Quantity 70,039	Unit	Unit Price		Total Cost	
1			SF	\$	1.00	\$	70,039
2	Excavation & Haul-Off of Existing Surface Material (12" depth)	2,594	CY	\$	20	\$	51,881
3	Clearing, Grubbing & Subgrade Preparation	70,039	SF	\$	0.10	\$	7,004
4	Pervious Concrete	70,039	SF	\$	10	\$	700,390
5	Wheel Stops (based on 1 / 440 sf of property)	159	EA	\$	200	\$	31,836
6	Stiping (based on 1 / 440 sf of property)	159	EA	\$	5	\$	796
7	Silt Fence	550	LF	\$	. 4	\$	2,200
8	Stabilized Construction Entrance	1	EA	\$	1,000	\$	1,000
				Cor	struction	\$	865,145
	* - total area is approx. 70,039 sq. ft.	Engineering Design & Mgmt (13%)				\$	112,469
		Total E	stimated C	onstruc	ction Cost	\$	977,614
	Contingency (25%)						244,404
		Total Project Estimated Cost				\$	1,222,018
		PL	ANNING P	ROJE	CT COST	S	1,220,000

Project Type: STORMWATER BMP

# B-45. INSTALL BIOFILTRATION/BIORETENTION AREA – downstream of San Felipe Lions Club Parking Area (adjacent to baseball fields, Hogan Park)

Project Priority: LONG-TERM Related Projects:

Project Location: Moore Park

# **Project Description:**

Project includes the installation of a biofiltration/bioretention system to be located at the downstream end of the existing San Felipe Lions Club Park Area. The biofiltration/bioretention system should be designed in accordance with existing regulatory requirements and engineering design standards. The proposed project would include the installation of a system utilizing native plants and vegetation that are capable of withstanding extended periods of little or no rainfall.

# **Design/Construction Issues:**

## **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as
  possible and should be conducted in a manner that minimized soil disturbance.

## **Project Options:**

- The defined drainage boundary for the system must be established during design.
- Underdrain systems may be designed to outfall onto vegetative areas provided that the flow is not concentrated; the
  use of a properly designed and constructed level spreader is required.
- Stormwater flow from the pervious pavement system (Proposed as Project No. 44) parking area should <u>not</u> be designed/constructed to contribute flow into the biofiltration/bioretention BMP.

## **Construction BMPs:**

 Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area:

1 LS

# Photographs/Graphics:







Anticipated Labor Source: City Crews / Contractor / Volunteers

Cost Estimate: \$ 50,000 Operations & Maintenance Impact: NO CHANGE

Project No.: B-45

Project: Install Biofiltration/Bioretention Area - downstream of San Felipe Lions Club Existing Asphalt Parking Area

Item	Improvement Description  Biofiltration/Bioretention Area*	Quantity 1.6	Unit	Unit Price		Total Cost	
1			AC	\$	20,000	\$	32,157
2	Silt Fence	770	LF	\$	4	\$	3,080
	* - based on size of drainage area (@ \$20,000 / acre of area served)	Enginee	ering Desigi		nstruction		35,237 4,581
	[parking lot area = 70,039 sq.ft. = 1.6 acres]	Total Estimated Construction Cost					39,818
		Contingency (25%)				\$	9,955
		Total Project Estimated Cost				\$	49,773
		PLANNING PROJECT COST				S	50,000

Project Type: STORMWATER BMP

B-46. CONVERT FLAGSTONE HIKE & BIKE TRAIL to PERVIOUS CONCRETE – Left Bank of East Fork of SFC, between Hwy 90 & Footbridge (in Moore Park)

Project Priority: LONG-TERM Related Projects:

Project Location: Moore Park

# **Project Description:**

Project includes the demolition of an existing asphalt hike & bike trail and the installation of a new pervious pavement hike & bike trail along the same route (approximately). An engineered pervious pavement system should be designed and installed according to manufacturer's recommendations and recognized engineering design standards.

# **Design/Construction Issues:**

## **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as possible and should be conducted in a manner that minimized soil disturbance.

## **Project Options:**

- Identified pervious pavement options include pervious concrete, a gravel/geogrid system (GravelPave®, etc...).
- System should be designed to detain stormwater for up to the 25-vr storm event.
- Areas within the defined project boundaries not suitable for pervious pavement should be provided with vegetation enhancement, including an improved soil matrix, along with appropriate native grasses and plants.

## **Construction BMPs:**

Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used
around the construction site in accordance with TCEQ requirements.

Project Length/Area:

**3,540 sq. ft.** [area is approximate, based on 590 linear feet x 6 ft. width)

## Photographs/Graphics:







Anticipated Labor Source: City Crews / Contractor / Volunteers

Cost Estimate: \$ 57,000 Operations & Maintenance Impact: NO CHANGE

Project No.: B-46

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Project: Convert Exist. Hike&Bike Trail to Pervious Pavement, left bank of E. Fork of SFC, between Hwy. 90 & Footbridge

Item	Improvement Description	Quantity	Unit	Unit Price		Total Cost	
1	Demo Existing Flagstone Hike & Bike Trail*	3,540	SF	\$	2.00	\$	7,080
2	Clearing, Grubbing & Subgrade Preparation**	5,900	SF	\$	0.10	\$	590
3	Pervious Concrete**	5,900	SF	\$	5	\$	29,500
4,	Silt Fence	600	LF	\$	4	\$	2,400
5	Stabilized Construction Entrance	1	EA	\$	1,000	\$	1,000
	* - area is based on an approx. 590 ft. long x 6 ft. wide trail	Construction Engineering Design & Mgmt (13%)					40,570 5,27
	** - area is based on an approx. 590 ft. long x 10 ft. wide trail	Total E	\$	45,84			
		Contingency (25%)					11,46
~		Total Project Estimated Cost					57,30

Project Type: STORMWATER BMP

# B-47. CONVERT EXISTING CONCRETE SIDEWALK to PERVIOUS PAVEMENT SIDEWALK - along right bank of East Fork of SFC, between Hwy 90 & Footbridge

Project Priority: LONG-TERM Related Projects:

Project Location: Moore Park

# **Project Description:**

Project includes the demolition of an existing concrete sidewalk and the installation of a new pervious pavement sidewalk along the same route (approximately). An engineered pervious pavement system should be designed and installed according to manufacturer's recommendations and recognized engineering design standards.

# **Design/Construction Issues:**

## **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as
  possible and should be conducted in a manner that minimized soil disturbance.

## **Project Options:**

- Identified pervious pavement options include pervious concrete, a gravel/geogrid system (GravelPave®, etc...).
- System should be designed to detain stormwater for up to the 25-yr storm event.

### **Construction BMPs:**

 Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area:

**2,850 sq. ft.** [area is approximate, based on 570 linear feet x 5 ft. width)

## Photographs/Graphics:







**Anticipated Labor Source:** 

City Crews / Contractor / Volunteers

**Cost Estimate:** 

\$ 37,000

**Operations & Maintenance Impact:** 

**INCREASE** 

Project No.: B-47

Project: Convert Exist. Hike&Bike Trail to Pervious Pavement, right bank of E. Fork of SFC, between Hwy. 90 & Footbridge

Item	Improvement Description	Quantity	Unit	Unit Price		Total Cost	
1	Demo Existing Concrete Hike & Bike Trail*	2,850	SF	\$	2.00	\$	5,700
2	Clearing, Grubbing & Subgrade Preparation**	3,420	SF	\$	0.10	\$	342
3	Pervious Concrete**	3,420	SF	\$	5	\$	17,100
4	Silt Fence	600	LF	\$	4	\$	2,400
5	Stabilized Construction Entrance	1	EA	\$	1,000	\$	1,000
	* - area is based on an approx. 570 ft. long x 5 ft. wide trail	Construction Engineering Design & Mgmt (13%)					26,542 3,450
	** - area based on an approx. 570 ft. long x 6 ft. wide trail	Total E	\$	29,992			
		Contingency (25%)					7,498
		Total Project Estimated Cost					37,491
		PLANNING PROJECT COST					37,000

**Project Type: BANK IMPROVEMENTS** 

**Kavak Launch Station -**B-48.

Left Bank of East Fork of SFC, between railroad trestle & footbridge (in Moore Park)

**Related Projects:** B-6, B-32 **Project Priority:** LONG-TERM

**Project Location: Moore Park** 

# **Project Description:**

Project includes the construction of a kayak launch station (a.k.a., "kayak put in") along the left bank of the East Fork of San Felipe Creek (SFC), between the railroad trestle & footbridge in Moore Park.

# **Design/Construction Issues:**

## **Known Constraints:**

- Project should be constructed in conjunction with projects B-6 (Existing Wall Removal) and B-32 (Existing Wall Reconstruction).
- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as possible and should be conducted in a manner that minimized soil disturbance.
- Park improvements should provide ADA access. Improvements should meet the requirements found in the Texas Accessibility Standards (TAS) administered by the Texas Department of Licensing and Registrations (TDLR). Review and approval by a Registered Accessibility Specialist (RAS) will likely be required.

## **Project Options:**

Project should result in a easy to use, easily accessible kayak launch area.

## Construction BMPs:

- A coffer dam or in-stream barrier will be needed to avoid the potential for suspended solids being introduced in the creek; water-filled portable coffer dams or other temporary measures should be considered.
- Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area:

LS 1

# Photographs/Graphics:







**Anticipated Labor Source:** City Crews / Contractor / Volunteers

**DECREASE** Cost Estimate: \$ 82,000 **Operations & Maintenance Impact:** 

Project No.: B-48

Project: Install Kayak Launch Station, left bank of E. Fork of SFC, between Railroad Trestle & Footbridge

Item	Improvement Description	Quantity	Unit	Uı	nit Price	To	tal Cost
1	Kayak Launch Station	1	EA	\$	40,000	\$	40,000
2	Stabilized Construction Entrance	1	EA	\$	1,000	\$	1,000
3	Silt Fence	200	·LF	\$	4	\$	800
4	In-Stream Coffer Dam (w/ dewatering)	80	LF	\$	200	\$	16,000
				Co	nstruction	\$	57,800
		Enginee	ring Desig	n & Mg	gmt (13%)	\$	7,514
		Total E	stimațed C	Constru	ction Cost	\$	65,314
111			Co	ntinge	ncy (25%)	\$	16,329
	Total Project Estimated Cost					6	01 (12
			otal Projec	et Estin	nated Cost	2	81,643

Project Type: STORMWATER BMP

# B-49. INSTALL NEW PERVIOUS PAVEMENT PARKING AREA – at the end of Avenue 2, adjacent to Hogan Park (baseball field) (in Moore Park)

**Project Priority:** 

LONG-TERM

**Related Projects:** 

**Project Location:** 

**Moore Park** 

## **Project Description:**

Project includes the installation of a pervious pavement parking area at the end of Avenue 2, adjacent to Hogan Park (on the west side of Moore Park, just south of the railroad tracks). An engineered pervious pavement system should be designed and installed according to manufacturer's recommendations and recognized engineering design standards.

## **Design/Construction Issues:**

#### **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as
  possible and should be conducted in a manner that minimized soil disturbance.

#### **Project Options:**

- Identified pervious pavement options include pervious concrete, a gravel/geogrid system (GravelPave®, etc...).
- System should be designed to detain stormwater up to the 25-yr storm event.
- On areas within the defined project boundaries not suitable for pervious pavement should be provided with vegetation enhancement, including an improved soil matrix, along with appropriate native grasses and plants.

#### **Construction BMPs:**

• Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area:

19,587 sq. ft. (0.45 acres)

## Photographs/Graphics:







**Anticipated Labor Source:** 

City Crews / Contractor / Volunteers

**Cost Estimate:** 

\$ 315,000

**Operations & Maintenance Impact:** 

**INCREASE** 

Project No.:

Project:

Install New Pervious Parking Area, @ end of Avenue 2, adjacent to Hogan Park (baseball field)

Item	Improvement Description	Quantity	Unit	Un	it Price	To	tal Cost
1	Clearing, Grubbing & Subgrade Preparation	19,587	SF	\$	0.10	\$	1,959
2	Excavation & Haul-Off of Existing Surface Material (12" depth)	725	CY	\$	20	\$	14,50
3	Pervious Concrete	19,587	SF	\$	10	\$	195,87
4	Wheel Stops (based on 1 / 440 sf of property)	45	EA	\$	200	\$	8,90
5	Striping (based on 1 / 440 sf of property)	45	EA	\$	5	\$	22
6	Silt Fence	400	LF	\$	4	\$	1,60
7	Stabilized Construction Entrance	1	EA	\$	1,000	\$	1,00
				Cor	struction	\$	224,06
	* - total area is approx. 19,587 sq. ft.	Enginee	ring Design	ı & Mg	mt (13%)	\$	29,12
		Total E	stimated C	onstruc	tion Cost	\$	253,19
			Co	ntinger	icy (25%)	\$	63,29
		Total Project Estimated Cost			S	316,48	
		PI.	ANNING P	ROJE	T COST	\$	315,00

Project Type: VEGETATION ENHANCEMENT

B-50. VEGETATION ENHANCEMENT – along left bank of East Fork of SFC, between railroad track & footbridge, adjacent to Hogan Park (baseball field)

Project Priority: LONG-TERM Related Projects:

Project Location: Moore Park

## **Project Description:**

Project includes the improvement and/or establishment of vegetative cover in and around the project area located between the railroad tracks and the existing footbridge along the left bank of the East Fork of San Felipe Creek (SFC). The project area is adjacent to Hogan Park (baseball field). Project will include vegetation enhancement including importing top soil, organic material (compost), and the use of fiber rolls/blanket and/or plastic "geogrid" reinforcement for structural support of the soil.

#### **Design/Construction Issues:**

## **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as
  possible and should be conducted in a manner that minimized soil disturbance.

## **Project Options:**

- Options include the importation of soil and soil materials suitable for the establishment of a high-quality soil matrix.
- Vegetation should include appropriate native grasses and plants.

#### Construction BMPs:

Construction stormwater BMPs will include silt fence and other appropriate BMPs, as necessary.

Project Length/Area: 7,430 SY (or approx. 1.54 acres)

## Photographs/Graphics:







Anticipated Labor Source: <u>City Crews</u> / <u>Contractor</u> / Volunteers

Cost Estimate: \$ 87,000 Operations & Maintenance Impact: INCREASE

Project No.: B-50

Project: Vegetation Enhancement - along left bank of E. Fork of SFC, between the Railroad Trestle & the Footbridge

Item	Improvement Description	Quantity	Unit	Unit Price		Total Co		
1	Vegetation Enhancement - Soil+Compost+SRB*	7,430	SY	\$	8	\$	59,440	
2	Silt Fence	500	LF	\$	4	\$	2,000	
	* - SRB = soil retention blanket		Engineering Design			S	61,440 7,987	
		Total Estimated Construction Cost Contingency (25%)				69,427 17,357		
		Т	otal Projec	t Estimat	ted Cost	\$	86,784	
		PLANNING PROJECT COST			s	87,000		

**Project Type: VEGETATION ENHANCEMENT** 

## **VEGETATION ENHANCEMENT – along left bank of East Fork of SFC, between** B-51. Hwy 90 and the Railroad Trestle

**Project Priority:** LONG-TERM **Related Projects:** 

**Project Location:** State Park

## **Project Description:**

Project includes the improvement and/or establishment of vegetative cover in and around the project area located between Hwy. 90 and the existing railroad trestle/tracks, along the left bank of the East Fork of San Felipe Creek (SFC). Project will include vegetation enhancement including importing top soil, organic material (compost), and the use of fiber rolls/blanket and/or plastic "geogrid" reinforcement for structural support of the soil.

#### **Design/Construction Issues:**

#### **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as possible and should be conducted in a manner that minimized soil disturbance.

#### **Project Options:**

- Options include the importation of soil and soil materials suitable for the establishment of a high-quality soil matrix.
- Vegetation should include appropriate native grasses and plants.

Construction stormwater BMPs will include silt fence and other appropriate BMPs, as necessary.

Project Length/Area:

3,700 SY (or approx. 0.75 acres)

## Photographs/Graphics:







**Anticipated Labor Source:** City Crews / Contractor / Volunteers

\$ 44,000 **Cost Estimate: INCREASE** 

Project No.: B

B-51

Project:

Vegetation Enhancement - along left bank of E. Fork of SFC, between Hwy. 90 & the Railroad Trestle

Item	Improvement Description	Quantity	Unit	U	nit Pr	ice	То	tal Cost
1	Vegetation Enhancement - Soil+Compost+SRB*	3,700	SY	\$		8	\$	29,600
2	Silt Fence	300	LF	\$		4	\$	1,200
	* - SRB = soil retention blanket	Enginee	ering Design		nstruc gmt (1			30,800 4,004
			Estimated C				N. Santana	34,804
			Co	ntinge	ncy (2	25%)	\$	8,701
		Т	otal Projec	t Estin	nated	Cost	S	43,505
T .		PL	ANNING P	ROJE	CT C	OST	\$	44,000

Project Type: VEGETATION ENHANCEMENT

## B-52. VEGETATION ENHANCEMENT – along left bank of East Fork of SFC, adjacent to San Felipe Lions Club

Project Priority: LONG-TERM Related Projects:

Project Location: Moore Park

## **Project Description:**

Project includes the improvement and/or establishment of vegetative cover in and around the project area located adjacent to San Felipe Lions Club along the left bank of the East Fork of San Felipe Creek (SFC), from the existing footbridge to the Bedell Ave. bridge. Project will include vegetation enhancement including importing top soil, organic material (compost), and the use of fiber rolls/blanket and/or plastic "geogrid" reinforcement for structural support of the soil.

### **Design/Construction Issues:**

#### **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as
  possible and should be conducted in a manner that minimized soil disturbance.

#### **Project Options:**

- Options include the importation of soil and soil materials suitable for the establishment of a high-quality soil matrix.
- Vegetation should include appropriate native grasses and plants.

#### **Construction BMPs:**

Construction stormwater BMPs will include silt fence and other appropriate BMPs, as necessary.

Project Length/Area: 2,610 SY (or approx. 0.54 acres)

## Photographs/Graphics:







Anticipated Labor Source: City Crews / Contractor / Volunteers

Cost Estimate: \$ 32,000 | Operations & Maintenance Impact: | INCREASE

Project No.: B-52

Project: Vegetation Enhancement - along left bank of E. Fork of SFC, adjacent to San Felipe Lions Club

Item	Improvement Description	Quantity	Unit	Unit	Price	To	tal Cost
1	Vegetation Enhancement - Soil+Compost+SRB	2,610	SY	\$	8	\$	20,880
2	Silt Fence	400	LF	\$	4	\$	1,600
	* - SRB = soil retention blanket	Engine	ering Design		truction t (13%)	The second	22,480
		Total F	Estimated C	onstructi ontingenc			25,402 6,351
		7	otal Projec	t Estimat	ted Cost	S	31,753
10 M		PL	ANNING P	ROJECT	r cost	s	32,000

Project Type: VEGETATION ENHANCEMENT

B-53. VEGETATION ENHANCEMENT – next to existing parking area adjacent to the Ogden St./Dr. F. Calderon Blvd. Intersection

Project Priority: LONG-TERM Related Projects:

Project Location: Moore Park

## **Project Description:**

Project includes the improvement and/or establishment of vegetative cover in and around the project area located between an existing asphalt parking area and the Ogden St./Dr. F. Calderon Blvd. intersection. Project will include vegetation enhancement including importing top soil, organic material (compost), and the use of fiber rolls/blanket and/or plastic "geogrid" reinforcement for structural support of the soil.

## **Design/Construction Issues:**

#### **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as
  possible and should be conducted in a manner that minimized soil disturbance.
- Armored catfish pose a threat to the damage/destruction of the proposed improvements. If necessary, proposed improvements should be designed to minimize potential damage by the catfish.

#### **Project Options:**

- Options include the importation of soil and soil materials suitable for the establishment of a high-quality soil matrix.
- Vegetation should include appropriate native grasses and plants.

#### **Construction BMPs:**

Construction stormwater BMPs will include silt fence and other appropriate BMPs, as necessary.

Project Length/Area: 1,660 SY (or approx. 0.34 acres)

## Photographs/Graphics:







Anticipated Labor Source: City Crews / Contractor / Volunteers

Cost Estimate: \$ 20,000 Operations & Maintenance Impact: INCREASE

Project No.: B-53

Project: Vegetation Enhancement - next to existing parking area adjacent to Ogden St. / Calderon Blvd. Intersection

Item	Improvement Description	Quantity	Unit	Unit Price		To	tal Cost
1	Vegetation Enhancement - Soil+Compost+SRB	1,660	SY	\$	8	\$	13,280
2	Silt Fence	300	LF	\$	4	\$	1,200
	* - SRB = soil retention blanket	Construction Engineering Design & Mgmt (13%)			14,486		
		Total E	stimated C	onstructio	on Cost	\$	16,36
			Co	ntingency	(25%)	S	4,09
		Т	otal Projec	t Estimat	ed Cost	S	20,453
		PL	ANNING P	ROJECT	COST	\$	20,000

Project Type: VEGETATION ENHANCEMENT

## B-54. VEGETATION ENHANCEMENT – in the median areas of the Dr. F. Calderon Blvd. / Ogden St. Intersection

Project Priority: LONG-TERM Related Projects:

Project Location: Moore Park

## **Project Description:**

Project includes the improvement and/or establishment of vegetative cover in and around the project area located in the medians of the Dr. F. Calderon Blvd. / Ogden St. Intersection. Project will include vegetation enhancement including importing top soil, organic material (compost), and the use of fiber rolls/blanket and/or plastic "geogrid" reinforcement for structural support of the soil.

#### **Design/Construction Issues:**

#### **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as possible and should be conducted in a manner that minimized soil disturbance.
- Armored catfish pose a threat to the damage/destruction of the proposed improvements. If necessary, proposed improvements should be designed to minimize potential damage by the catfish.

#### **Project Options:**

- Options include the importation of soil and soil materials suitable for the establishment of a high-quality soil matrix.
- Vegetation should include appropriate native grasses and plants.

#### **Construction BMPs:**

Construction stormwater BMPs will include silt fence and other appropriate BMPs, as necessary.

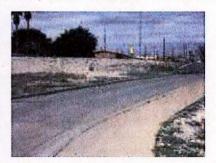
Project Length/Area:

9,240 SY (or approx. 1.91 acres)

#### Photographs/Graphics:







Anticipated Labor Source: City Crews / Contractor / Volunteers

Cost Estimate: \$ 115,000 | Operations & Maintenance Impact: | INCREASE

Project No.: B-54

Project: Vegetation Enhancement - in the median areas of the Calderon Blvd. / Ogden St. Intersection

Item	Improvement Description  Vegetation Enhancement - Soil+Compost+SRB	Quantity	Unit	Unit Price		To	tal Cost
1		9,240	SY	\$	8	\$	73,920
2	Silt Fence	1,600	LF	\$	4	\$	6,400
				Const	ruction	\$	80,320
	* - SRB = soil retention blanket	Enginee	ring Desigi	& Mgm	t (13%)	\$	10,442
		Total E	stimated C	onstructi	on Cost	\$	90,762
			Co	ntingency	y (25%)	\$	22,690
		Т	otal Projec	t Estimat	ed Cost	\$	113,452
		PL.	ANNING P	ROJECT	COST	\$	115,000

Project Type: BANK IMPROVEMENTS

B-55. BANK STABILIZATION – under the Hwy. 90 bridge along both banks of the East Fork of SFC

Project Priority: LONG-TERM Related Projects:

Project Location: Moore Park

## **Project Description:**

Project includes the stabilization of the stream banks along both banks of the East Fork of San Felipe Creek (SFC) underneath the Hwy. 90 bridge as it crosses SFC. Stabilization may include a variety of methods including grading, installation of rock rip rap, or some other appropriate engineered solution. This area may require the use of engineered bank stabilization methods including rock gabions, engineered bank systems, or structural walls. Bank stabilization is these areas should follow cane eradication efforts upstream of the project area. Project areas A-1 through A-6 include the known individual tributaries located on the golf course property. Project area B-2 includes the East Fork of SFC through Moore Park.

## **Design/Construction Issues:**

#### **Known Constraints:**

- Construction site is located on the banks of a creek that provides habitat to Threatened and/or Endangered Species
  that have been identified by the USFWS.
- Activities should proceed, as necessary, following the eradication of river cane along the banks of the project area
  and in the area of San Felipe Country Club Golf Course (see Projects A-1 to A-6, and B-2).

## **Project Options:**

- Project area to be evaluated by a professional engineer for appropriate stabilization methods.
- Bank stabilization options may include structural walls, rock gabions, or other methods appropriate to the site conditions.

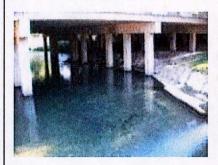
#### **Construction BMPs:**

- Coffer Dams or inflatable barriers will be needed to prevent or limit the amount of sediment or suspended soils
  created by construction activities.
- Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area:

**200 feet** [Total = 200 feet w/ each bank @ 100 ft. each]

#### Photographs/Graphics:







Anticipated Labor Source: City Crews / Contractor / Volunteers

Cost Estimate: \$ 125,000 Operations & Maintenance Impact: NO CHANGE

Project No.:

B-55

Project:

Bank Stabilization - under the Hwy. 90 Bridge, along both banks of the E. Fork of SFC

Item	Improvement Description	Quantity	Unit	Un	it Price	To	tal Cost
1	Bank Improvements - Rock Gabions (4' high)*	200	LF	\$	180	\$	36,000
2	Rock Rip Rap [ 30' x 100' + 50' x 100' ]	889	SY	\$	10	\$	8,889
3	Stabilized Construction Entrance	1	EA	\$	1,000	\$	1,000
4	Silt Fence	400	LF	\$	4	\$	1,600
5	In-Stream Coffer Dam (w/ dewatering)	200	LF	\$	200	\$	40,000
THE WAY				Con	struction	S	87,489
	* - based on each bank at 100 feet long per bank	Enginee	ring Desig	& Mg	mt (13%)	S	11,37
		Total E	stimated C	onstruc	tion Cost	\$	98,862
			Co	ntingen	cy (25%)	\$	24,710
		T	otal Projec	t Estim	ated Cost	\$	123,578
		PL	ANNING P	ROJEC	T COST	S	125,000

Project Type: VEGETATION ENHANCEMENT

B-56. VEGETATION ENHANCEMENT – in the median area between Bedell Ave. & Dr. F. Calderon Blvd., just north of E. De La Rosa St.

Project Priority: LONG-TERM Related Projects:

Project Location: South of Moore Park (north of Calderon Blvd./E. De La Rosa intersection)

## **Project Description:**

Project includes the improvement and/or establishment of vegetative cover in and around the project area located in the median between Dr. F. Calderon Blvd. and Bedell Ave., immediately north of E. De La Rosa St. Project will include vegetation enhancement including importing top soil, organic material (compost), and the use of fiber rolls/blanket and/or plastic "geogrid" reinforcement for structural support of the soil.

## **Design/Construction Issues:**

#### **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as
  possible and should be conducted in a manner that minimized soil disturbance.

#### **Project Options:**

- Options include the importation of soil and soil materials suitable for the establishment of a high-quality soil matrix.
- Vegetation should include appropriate native grasses and plants.

#### **Construction BMPs:**

Construction stormwater BMPs will include silt fence and other appropriate BMPs, as necessary.

Project Length/Area:

10,300 SY (or approx. 2.13 acres)

#### Photographs/Graphics:









City Crews / Contractor / Volunteers

Cost Estimate: \$ 120,000

**Operations & Maintenance Impact:** 

**INCREASE** 

Project No.: B-56

Project: Vegetation Enhancement - in the median areas between Bedell Ave. & Dr. F. Calderon Blvd., just north of De La Rosa St.

Project Area: South of Moore Park

Priority: Long-Term

Item	Improvement Description  Vegetation Enhancement - Soil+Compost+SRB	Quantity	Unit Unit Price		Price	To	tal Cost
1		10,300	SY	\$	8	\$	82,400
2	Silt Fence	1,000	LF	\$	4	\$	4,000
	* CDD Total District	Construction Engineering Design & Mgmt (13%)		100	86,400		
	* - SRB = soil retention blanket		stimated C				97,63
/			Co	ntingency	y (25%)	\$	24,408
		T	otal Projec	t Estimat	ed Cost	\$	122,040
		PL	ANNING F	PROJECT	COST	S	120,000



Project Type: STORMWATER BMP

## B-57. INSTALL HYDRODYNAMIC SEPARATOR UNIT – at curb cut on Bedell Ave., upstream of Dr. F. Calderon Blvd. Bridge

Project Priority: LONG-TERM Related Projects:

**Project Location:** Moore Park

## **Project Description:**

Project includes the installation of a hydrodynamic separator unit (Stormceptor©, Vortecs<sup>TM</sup>, or similar type unit) to be located at the existing curb cut on Bedell Ave. just upstream of the Dr. F. Calderon Blvd. Bridge on the East Fork of San Felipe Creek (SFC) in Moore Park. The hydrodynamic separator unit should be designed in accordance with existing regulatory requirements and current engineering design standards. The unit should be properly sized to accommodate the volume and rate of flow of stormwater expected at this site.

## **Design/Construction Issues:**

#### **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as possible and should be conducted in a manner that minimized soil disturbance.

#### **Project Options:**

- The defined drainage boundary for the system must be established during design.
- If feasible, the system should be designed to outfall onto vegetative areas; concentrated flows (i.e., pipe flows) should be avoided if possible; the use of a properly designed and constructed level spreader would be required.

#### **Construction BMPs:**

• Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area:

1 LS

## Photographs/Graphics:







Anticipated Labor Source: City Crews / Contractor / Volunteers

Cost Estimate: \$ 57,000 Operations & Maintenance Impact: DECREASE

Project No.: B-57

Project: Install Hydrodynamic Separator Unit - at curb cut on Bedell Avenue, upstream of the Calderon Ave. Bridge

Item	Improvement Description	Quantity	Unit	Uı	it Price	To	tal Cost
1	Hydrodynamic Separator Unit	2.0	AC	\$	20,000	\$	40,000
2	Silt Fence	100	LF	\$	4	\$	400
				Co	nstruction	s	40,40
	* - based on size of drainage area (@ \$20,000 / acre of area served)	Engineering Design & Mgmt (13%			gmt (13%)	\$	5,25
	[drainage area = approx. 2 acres]	Total E	Stimated C	onstru	ction Cost	\$	45,65
		Contingency (25)				\$	11,41
			otal Projec	t Estin	nated Cost	\$	57,06
		PLANNING PROJECT COS			CT COST	9	57,000

Project Type: STORMWATER BMP

## B-58. CONSTRUCTION OF NEW PUBLIC RESTROOMS – adjacent to Hogan Field (baseball field) and San Felipe Lions Club parking area (in Moore Park)

Project Priority: LONG-TERM Related Projects:

Project Location: Moore Park

## **Project Description:**

Project includes the construction of a new public restroom to be located adjacent to the existing parking area for the San Felipe Lions Club / Hogan Field, on the east side of Moore Park. The project will include the restrooms and associated walkways leading from the existing parking area.

## **Design/Construction Issues:**

#### **Known Constraints:**

- Construction site is located on the banks of a creek that provides habitat to Threatened and/or Endangered Species
  that have been identified by the USFWS.
- Proposed improvements should provide ADA access. Improvements should meet the requirements found in the Texas Accessibility Standards (TAS) administered by the Texas Department of Licensing and Registrations (TDLR).
   Review and approval by a Registered Accessibility Specialist (RAS) will likely be required.

### **Project Options:**

- Options include the installation of separate men's and women's stand-alone units, a single building with both men's and women's, or unisex-style restrooms.
- Restrooms should be designed to reduce the potential for vandalism.

#### **Construction BMPs:**

• Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area:

1 LS

## Photographs/Graphics:







Anticipated Labor Source: City Crews / Contractor / Volunteers

Cost Estimate: \$ 85,000 Operations & Maintenance Impact: INCREASE

Project No.: B-58

Project:

Construction of New Public Restrooms - adjacent to Hogan Park (baseball field) & San Felipe Lions Club Parking Lot

Item	Improvement Description Public Restroom - ADA accessible	Quantity	Unit	Uı	nit Price	To	tal Cost
1		1.0	LS	\$	60,000	\$	60,000
2	Silt Fence	100	LF	\$	4	\$	400
NA.		Engine	ering Design		nstruction gmt (13%)		60,400 7,852
		Total I	Estimated C	onstru	ction Cost	\$	68,252
			Co	ntinge	ncy (25%)	\$ .	17,063
		7	otal Projec	t Estin	nated Cost	\$	85,315
		PI.	ANNING P	ROJE	CT COST	S	85,000

Project Type: STORMWATER BMP

B-59. INSTALLATION OF A PUBLIC EDUCATION KIOSK – adjacent to Hogan Field (baseball field) and San Felipe Lions Club parking area (in Moore Park)

**Project Priority:** 

**LONG-TERM** 

**Related Projects:** 

**Project Location:** 

**Moore Park** 

## **Project Description:**

Project includes the installation of a public information kiosk to be located adjacent to the existing parking area for the San Felipe Lions Club / Hogan Field, on the east side of Moore Park. The project will include a kiosk capable of displaying educational material relating to San Felipe Creek and its associated watershed. The kiosk will provide an all-weather display area for posters, pamphlets, signs, and other informational materials.

## **Design/Construction Issues:**

#### **Known Constraints:**

- Construction site is located on the banks of a creek that provides habitat to Threatened and/or Endangered Species that have been identified by the USFWS.
- Proposed improvements should provide ADA access. Improvements should meet the requirements found in the Texas Accessibility Standards (TAS) administered by the Texas Department of Licensing and Registrations (TDLR).
   Review and approval by a Registered Accessibility Specialist (RAS) will likely be required.

## **Project Options:**

- Options include several different types of kiosks.
- The kiosk should be designed to reduce the potential for vandalism.

#### Construction BMPs:

 Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area:

1 each

## Photographs/Graphics:







Anticipated Labor Source:

City Crews / Contractor / Volunteers

**Cost Estimate:** 

\$ 7,000

**Operations & Maintenance Impact:** 

**NO CHANGE** 

Project No.: B-59

Project: Construction of Public Education Kiosk - adjacent to Hogan Park (baseball field) & San Felipe Lions Club Parking Lot

Item	Improvement Description	Quantity	Unit	Un	it Price	Tot	al Cost
1	Public Education Kiosk	1.0	LS	\$	5,000	\$	5,000
2	Silt Fence	50	LF	\$	4	\$	200
		Engine	ering Design		nstruction mt (13%)		5,200 676
			Estimated C			Engle Walter	5,876
			Co	ntinger	icy (25%)	S	1,469
		7	otal Projec	et Estim	ated Cost	s	7,345
		PL	ANNING P	PROJE	CT COST	S	7,000

Project Type: PARK IMPROVEMENT

# B-60. REHABILITATION OF THE EXISTING HORSESHOE PARK FOUNTAIN – located in Horseshoe Park at Hwy. 90 & the West Fork of SFC

**Project Priority:** 

LONG-TERM

**Related Projects:** 

**Project Location:** 

**Horseshoe Park** 

## **Project Description:**

Project includes the complete rehabilitation of the existing fountain including stone work, drains, valves, pumps, and all associated piping and related improvements.

## **Design/Construction Issues:**

#### **Known Constraints:**

- Construction site is located on the banks of a creek that provides habitat to Threatened and/or Endangered Species
  that have been identified by the USFWS.
- Build up of scum, algae, and other floatables has been a problem in the fountain; project should attempt to eliminate or minimize these issues.

## **Project Options:**

- Project options should consider both rehabilitation of the existing fountain improvements or the complete redesign and replacement.
- Project should consider possible ways to reduce evaporation and water use.

## **Construction BMPs:**

• Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area:

1 LS

## Photographs/Graphics:







**Anticipated Labor Source:** 

City Crews / Contractor / Volunteers

**Cost Estimate:** 

\$ 29,000

**Operations & Maintenance Impact:** 

**NO CHANGE** 

Project No.: B-60

Project: Rehabiliation of Existing Horseshoe Park Fountain

Project Area: Horseshoe Park (adjacent to Blue Hole)

Priority: Long-Term

Item	Improvement Description	Quantity	Unit	U	nit Price	То	tal Cost
1	Rehabiliation of Horseshoe Park Fountain	1.0	LS	\$	20,000	\$	20,000
2	Silt Fence	200	LF	\$	4	\$	800
		Engine	ering Design		nstruction gmt (13%)	Market Street	20,800 2,704
		Total I	Stimated C	onstru	ction Cost	s	23,504
			Co	ntinge	ncy (25%)	\$	5,876
			otal Projec	t Estin	nated Cost	S	29,380
		PL	ANNING P	ROJE	CT COST	S	29,000

**Project Type:** BANK IMPROVEMENTS

B-61. REPAIR EROSION AT RAILROAD TRESTLE - on left bank of East Fork of SFC

Project Priority: LONG-TERM Related Projects:

Project Location: Moore Park / State Park

## **Project Description:**

Project includes the complete repair of the eroded areas located at the railroad trestle that crosses the East Fork of San Felipe Creek (SFC), just south of the Hwy. 90 bridge. The project will include the complete repair of the eroded area, included needed repairs/improvements upstream of the damaged/eroded area. Any necessary bank stabilization should include installation of structural improvements that will prevent the erosion from reoccurring. Bank Stabilization methods should include the most environmentally friendly and esthetically pleasing methods appropriate for the Del Rio, Texas area.

## **Design/Construction Issues:**

#### **Known Constraints:**

- Construction site is located on the banks of a creek that provides habitat to Threatened and/or Endangered Species
  that have been identified by the USFWS.
- Construction operations should minimize or eliminate the possibility of undesirable materials falling into the waters of San Felipe Creek.

### **Project Options:**

 Bank stabilization options may include rock rip rap, structural erosion mats, vegetation enhancements (using soil structural supporting materials or systems), or other methods appropriate to the site conditions.

#### **Construction BMPs:**

 Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area:

1 LS

#### Photographs/Graphics:







Anticipated Labor Source: City Crews / Contractor / Volunteers

Cost Estimate: \$31,000 Operations & Maintenance Impact: NO CHANGE

Project No.: B-61

Project: Repair Erosion at Railroad Trestle - along left bank of the E. Fork of SFC

Project Area: State Park / Moore Park

Priority: Long-Term

Item	Improvement Description  Excavation & Subgrade Preparation*	Quantity 2,000	Unit	Unit Price		Total Cost	
1			CF	\$	1	\$	1,000
2	Rock Gabion Mattress**	2,000	CF	\$	10	\$	20,000
3	Stabilized Construction Entrance	1	EA	\$	1,000	\$	1,000
4	Silt Fence	60	LF	\$	4	\$	240
	* - excavated area is approx. 10 ft. wide x 100 ft. long x 2 ft. deep	Enginee	ering Desig		struction mt (13%)		22,240 2,891
	** - rock gabion mattress @ 10 ft. x 100 ft. x 2 ft.	<b>Total Estimated Construction Cost</b>				s	25,131
			Co	ntingen	cy (25%)	\$	6,283
		1	otal Projec	t Estim	ated Cost	\$	31,414
		PL	ANNING P	PROJEC	CT COST	\$	31,000

Project Type: STORMWATER BMP

## B-62. CONVERT EXISTING FLAGSTONE HIKE & BIKE TRAIL to PERVIOUS CONCRETE – Left Bank of East Fork of SFC, between Footbridge & Bedell Ave. (in Moore Park)

Project Priority: LONG-TERM Related Projects:

Project Location: Moore Park

## **Project Description:**

Project includes the removal and reconstruction of the existing hike & bike trail. Project would include the removal of the existing flagstone hike & bike trail (6' wide) and construction of a pervious concrete hike & bike trail (10 ft. wide), along the East Fork of San Felipe Creek (SFC), between the Railroad Trestle & the existing footbridge in Moore Park.

## **Design/Construction Issues:**

#### **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as
  possible and should be conducted in a manner that minimized soil disturbance.
- ADA access should be provided if not continuous access, provide access at select locations along the creek (TDLR review will likely be required).

## **Project Options:**

New wall should provide continuous access to the creek for park visitors.

#### **Construction BMPs:**

- A coffer dam or in-stream barrier will be needed to avoid the potential for suspended solids being introduced in the creek; water-filled portable coffer dams or other temporary measures should be considered.
- Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area:

7,000 sq. ft [ 700 ft. x 10 ft. = 7,000 sq.ft.] (Demo. = 600 ft. x 6 ft.)

## Photographs/Graphics:







Anticipated Labor Source: City Crews / Contractor / Volunteers

Cost Estimate: \$ 66,000 Operations & Maintenance Impact: INCREASE

Project No.: B-62

Project:

Convert Exist. Hike&Bike Trail to Pervious Pavement, left bank of E. Fork of SFC, between Footbridge & Bedell Ave.

Item	Improvement Description	Quantity	Unit	Unit Price		Total Cost	
1	Demo Existing Flagstone Hike & Bike Trail*	3,600	SF	\$	2.00	-\$	7,200
2	Clearing, Grubbing & Subgrade Preparation**	7,000	SF	\$	0.10	\$	700
3	Pervious Concrete**	7,000	SF	\$	5	\$	35,000
4	Silt Fence	700	LF	\$	4	\$	2,800
5	Stabilized Construction Entrance	1	EA	\$	1,000	\$	1,000
				Con	struction	\$	46,70
	* - area is based on 600 ft. long x 6 ft. wide trail	Engineering Design & Mgmt (13%)					6,07
	** - area based on 700 ft. long x 10 ft. wide trail	Total Estimated Construction Cost					52,771
		Contingency (25%)					13,193
		Total Project Estimated Cost				\$	65,964
		PLANNING PROJECT COST				S	66,000

Project Type: BANK IMPROVEMENTS

B-63. RECONSTRUCT EXISTING WALL -

Left Bank of East Fork of SFC, between Hwy. 90 & railroad trestle (in Moore Park)

Project Priority: LONG-TERM Related Projects: B-4

Project Location: Moore Park

## **Project Description:**

Project includes the reconstruction of the existing creek retaining wall/walk along the left bank of the East Fork of San Felipe Creek (SFC), between Hwy. 90 and the railroad trestle in Moore Park.

## **Design/Construction Issues:**

#### **Known Constraints:**

- Project should be constructed in conjunction with project B-4 (Existing Wall Removal).
- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as
  possible and should be conducted in a manner that minimized soil disturbance.
- ADA access should be provided if not continuous access, provide access at select locations along the creek (TDLR review will likely be required; TDLR consultation prior to design/construction is advised).

### **Project Options:**

New wall should provide continuous access to the creek for park visitors.

#### Construction BMPs:

- A coffer dam or in-stream barrier will be needed to avoid the potential for suspended solids being introduced in the creek; water-filled portable coffer dams or other temporary measures should be considered.
- Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used
  around the construction site in accordance with TCEQ requirements.

Project Length/Area: 270 feet

## Photographs/Graphics:







Anticipated Labor Source: <u>City Crews</u> / <u>Contractor</u> / Volunteers

Cost Estimate: \$ 240,000 Operations & Maintenance Impact: DECREASE

Project No.:

B-63

Project: Re

Reconstruct Existing Wall\*, left bank of E. Fork of SFC, between Hwy. 90 & the Railroad Trestle

Item	Improvement Description  Bank Improvements - Structural Walls III [ 4' - 6' ]	Quantity	Unit LF	Unit Price		Total Cost	
1		270		\$	360	\$ .	97,200
2	Pervious Concrete [ 270' x 6' wide ]	1,620	SF	\$	10	\$	16,200
3	Stabilized Construction Entrance	1	EA	\$	1,000	\$	1,000
4	Silt Fence	270	LF	\$	4	\$	1,080
5	In-Stream Coffer Dam (w/ dewatering)	270	LF	\$	200	\$	54,000
				Cor	struction	\$	169,480
	* - bank reconstruction + 6' pervious concrete sidewalk	Engineering Design & Mgmt (13%)				\$	22,032
		Total Estimated Construction Cost				\$	191,512
		Contingency (25%)				\$	47,878
		Т	otal Projec	t Estim	ated Cost	\$	239,391
	PLANNING PROJECT COST					S	240,000

Project Type: PARK IMPROVEMENT

B-64. REHABILITATION OF EXISTING PICNIC AREA – along left bank of the East Fork of SFC, just downstream of the existing footbridge

**Project Priority:** 

LONG-TERM

**Related Projects:** 

**Project Location:** 

Moore Park (adjacent to San Felipe Lions Hut)

## **Project Description:**

Project includes the complete rehabilitation of the existing park elements including picnic tables, BBQ pits, trash cans, and other improvements. Installation of a non-vegetated, pervious walking surface (gravel, engineered wood fiber, pervious pavement system (pervious concrete/GravelPave, etc...), or other system) should be considered for the picnic areas located directly under existing trees. ADA access requirements should be considered during final selection of the walking surface.

## **Design/Construction Issues:**

#### **Known Constraints:**

- Construction site is located on the banks of a creek that provides habitat to Threatened and/or Endangered Species
  that have been identified by the USFWS.
- Park improvements should provide ADA access. Improvements must meet the requirements found in the Texas
   Accessibility Standards (TAS) administered by the Texas Department of Licensing and Registrations (TDLR). Review
   and approval by a Registered Accessibility Specialist (RAS) will likely be required.

### **Project Options:**

- Project may include simply the replacement of existing park elements or may involve a complete reconfiguration of the park elements.
- Consideration should be given to the appropriate walking surface to be installed under existing trees (shaded areas).
   The installation of grasses/vegetation may not be advisable in areas that receive little or no sunlight.

#### **Construction BMPs:**

 Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area:

1 LS

## Photographs/Graphics:







**Anticipated Labor Source:** 

City Crews / Contractor / Volunteers

**Cost Estimate:** 

\$ 20,000

**Operations & Maintenance Impact:** 

**NO CHANGE** 

Project No.: B-

Project: Rehab of Existing Picnic Area, along left bank of the E. Fork of SFC @ just downstream of the Footbridge

Item 1	Improvement Description  Demolition/Haul Off	Quantity 1	Unit LS	Unit Price		Tot	tal Cost
				\$	2,500	\$	2,500
2	Picnic Tables - Metal w/ concrete slab	3	EA	S	3,000	\$	9,000
3	BBQ Pits - Metal w/ concrete foundation	2	EA	\$	500	\$	1,000
4	Trash Can w/ foundation	2	EA	\$	700	\$	1,400
5	Vegetation Enhancement* - Soil(2")+Compost(2") Only+Fiber Mat	444	SY	\$	5	\$	2,222
	* - vegetation enhancement is approx. 50' x 80'	Construction Engineering Design & Mgmt (13%)					13,900 1,807
1		Total Estimated Construction Cost				\$	15,70
			Co	ntinger	cy (25%)	\$	3,927
		Total Project Estimated Cost				\$	19,634
		PL	ANNING P	ROJEC	CT COST	s	20,000

Project Type: MISCELLANEOUS

## B-65. RELOCATION/LOWERING OF EXISTING PIPELINES CROSSING THE EAST FORK OF SFC - located in Moore Park, just south of the Moore Park Pool

Project Priority: LONG-TERM Related Projects:

**Project Location:** Moore Park

## **Project Description:**

Project includes the relocation or lowering of two (2) existing pipelines that currently cross the East Fork of San Felipe Creek (SFC) in Moore Park, just south of the Moore Park Pool, between the existing footbridge and the Dr. F. Calderon Bridge. Project will include the complete relocation or lowering of the existing pipelines to improve the hydraulic capacity of SFC, to eliminate known obstructions in the SFC, and to reduce the potential for spills of potentially harmful substances into SFC. Prior to design of any improvements, the individual pipelines must be identified to determine their function (i.e., water line, sewer line, force main, etc...).

Note – this project does not include the existing natural gas pipeline that crosses SFC immediately upstream of the Bedell Ave. Bridge in Moore Park.

## **Design/Construction Issues:**

#### **Known Constraints:**

 Construction site is located on the banks of a creek that provides habitat to Threatened and/or Endangered Species that have been identified by the USFWS.

#### **Project Options:**

- Project options include the relocation of the existing pipelines, or the lowering of the existing pipelines.
- Tunneling/boring of new pipelines under San Felipe Creek should be considered and reviewed to determine if it is a suitable option.

#### **Construction BMPs:**

- Coffer Dams or inflatable barriers may be needed to prevent or limit the amount of sediment or suspended soils
  created by construction activities.
- Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area:

1 LS (Total Length of Pipelines across SFC = approx. 100 feet)

## Photographs/Graphics:







Anticipated Labor Source: City Crews / Contractor / Volunteers

Cost Estimate: \$ 51,000 Operations & Maintenance Impact: NO CHANGE

Project No.: B-65

Project: Relocation/Lowering of Existing Pipelines Crossing the E. Fork of SFC, just south of the Moore Park Pool

Item	Improvement Description	Quantity	Unit	Uni	t Price	То	tal Cost
1	Relocation/Lowering of Pipeline	100	LF	\$	200	\$	20,000
2	Silt Fence	100	LF	\$	4	\$	400
3	In-Stream Coffer Dam (w/ dewatering)	80	LF	\$	200	\$	16,000
		11.0		Con	struction	\$	36,400
	* - based on size of drainage area (@ \$20,000 / acre of area served)	Enginee	ring Desigi	n & Mgr	nt (13%)	\$	4,732
	[drainage area = approx. 2 acres]	<b>Total Estimated Construction Cost</b>				S	41,132
			Co	ntingen	cy (25%)	\$	10,283
¥		Total Project Estimated Cost			S	51,415	
6179		PLANNING PROJECT COST				s	51,000

Project Type: PARK IMPROVEMENT

B-66. REHABILITATION OF BBQ AREA - located at SFC & Bedell Ave. in Moore Park

Project Priority: LONG-TERM Related Projects:

**Project Location:** Moore Park

## **Project Description:**

Project includes the complete rehabilitation of the existing BBQ area including picnic tables, BBQ pits, trash cans, and other improvements. Consideration should be given to the walking surface to be installed for the proposed project. Installation of a non-vegetated, pervious walking surface (gravel, engineered wood fiber, pervious pavement system (pervious concrete/GravelPave, etc...), or other system) should be considered for the picnic areas located directly under existing trees. ADA access requirements should be considered during final selection of the walking surface.

## **Design/Construction Issues:**

#### **Known Constraints:**

- Construction site is located on the banks of a creek that provides habitat to Threatened and/or Endangered Species that have been identified by the USFWS.
- Park improvements should provide ADA access. Improvements must meet the requirements found in the Texas
   Accessibility Standards (TAS) administered by the Texas Department of Licensing and Registrations (TDLR). Review
   and approval by a Registered Accessibility Specialist (RAS) will likely be required.

## **Project Options:**

- Project may include simply the replacement of existing park elements or may involve a complete reconfiguration of the park elements.
- Consideration should be given to the appropriate walking surface to be installed under existing trees (shaded areas).
   The installation of grasses/vegetation may not be advisable in areas that receive little or no sunlight.

#### **Construction BMPs:**

Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used
around the construction site in accordance with TCEQ requirements.

Project Length/Area:

Photographs/Graphics:





1 LS



Anticipated Labor Source: <u>City Crews</u> / <u>Contractor</u> / <u>Volunteers</u>

Cost Estimate: \$71,000 Operations & Maintenance Impact: NO CHANGE

Project No.: B-66

Project: Rehab of Existing BBQ Area, @ SFC & Bedell Avenue

Item	Improvement Description	Quantity	Unit	Uni	t Price	To	tal Cost
1	Demolition/Haul Off	1	LS	\$	10,000	\$	10,000
2	BBQ Pits Rehab	1	LS	\$	30,000	\$	30,000
3	Miscellaneous Improvements	1	LS	\$	10,000	\$	10,000
		Construction			\$	50,000	
	* - vegetation enhancement is approx. 60' x 100'	Enginee	ring Design	ı & Mgn	nt (13%)	S	6,500
		<b>Total Estimated Construction Cost</b>				\$	56,500
			Co	ntingen	cy (25%)	s	14,125
		Total Project Estimated Cost				S	70,625
		PLANNING PROJECT COST				S	71,000

**Project Type: VEGETATION ENHANCEMENT** 

#### **VEGETATION ENHANCEMENT/VEGETATIVE FILTER STRIP –** B-67. area between Existing Parking Area & Acequia Madre Ditch (in Moore Park)

**Project Priority: LONG-TERM Related Projects:** 

**Project Location:** Moore Park

## **Project Description:**

Project includes the establishment of a vegetative filter strip area between the existing asphalt parking area and the Acequia Madre Ditch located near the southwest corner of Moore Park. Project will include vegetation enhancement including importing top soil, organic material (compost), and the use of fiber rolls/blanket and/or plastic "geogrid" reinforcement for structural support of the soil.

## **Design/Construction Issues:**

#### **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as possible and should be conducted in a manner that minimized soil disturbance.

#### **Project Options:**

- Options include the importation of soil and soil materials suitable for the establishment of a high-quality soil matrix.
- Vegetation should include appropriate native grasses and plants.
- Flow onto vegetated area should be in the form a sheet flow; design/construction should include appropriate elements to achieve a sheet-type flow.

#### Construction BMPs:

Construction stormwater BMPs will include silt fence and other appropriate BMPs, as necessary.

**Project Length/Area:** 

700 SY (or approx. 0.15 acres)

## Photographs/Graphics:







<u>City Crews</u> / <u>Contractor</u> / Volunteers **Anticipated Labor Source:** 

\$ 14,000 **Operations & Maintenance Impact: INCREASE Cost Estimate:** 

Project No.: B-67

Project: Vegetation Enhancement - bank area between Existing Parking Area & the Acquia Madre Ditch

Project Area: Moore Park
Priority: Long-Term

Item	Improvement Description	Quantity	Unit	Unit	Price	Tot	al Cost
1	Vegetation Enhancement* - Soil+Compost+GeoGrid	778	SY	\$	11	\$	8,558
2 /	Silt Fence	350	LF	\$	4	\$	1,400
	* - area is approx. 20' x 350'	Enginee	ring Design		truction		9,958 1,295
	men is approximate in the second		Stimated C			R Commission	11,253
			Co	ntingenc	y (25%)	S	2,813
		Т	otal Projec	t Estimat	ted Cost	S	14,066
- 7		PL	ANNING P	ROJECT	COST	\$	14,000

Project Type: PARK IMPROVEMENT

## REHABILITATION OF EXISTING PICNIC AREA – between West Fork of SFC and B-68. the Acequia Madre Ditch (in Moore Park)

**Project Priority:** LONG-TERM **Related Projects:** 

**Project Location: Moore Park** 

## **Project Description:**

Project includes the complete rehabilitation of the existing park elements including picnic tables, BBQ pits, trash cans, sidewalks, walking surfaces, and other improvements. Installation of a non-vegetated, pervious walking surface (gravel, engineered wood fiber, pervious pavement system (pervious concrete/GravelPave, etc...), or other system) should be considered for the picnic areas located directly under existing trees. ADA access requirements should be considered during final selection of the walking surface.

## **Design/Construction Issues:**

#### **Known Constraints:**

- Construction site is located on the banks of a creek that provides habitat to Threatened and/or Endangered Species that have been identified by the USFWS.
- Park improvements should provide ADA access. Improvements must meet the requirements found in the Texas Accessibility Standards (TAS) administered by the Texas Department of Licensing and Registrations (TDLR). Review and approval by a Registered Accessibility Specialist (RAS) will likely be required.

## **Project Options:**

- Project may include simply the replacement of existing park elements or may involve a complete reconfiguration of the park elements.
- Consideration should be given to the appropriate walking surface to be installed under existing trees (shaded areas). The installation of grasses/vegetation may not be advisable in areas that receive little or no sunlight.

#### **Construction BMPs:**

 Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area:

#### Photographs/Graphics:





1 LS



City Crews / Contractor / Volunteers **Anticipated Labor Source:** 

Project No.: B-68

Project: Rehab of Existing Picnic Area, between the W. Fork of SFC & the Acquia Madre Ditch

Project Area: Moore Park
Priority: Long-Term

Item	Improvement Description	Quantity	Unit	Un	it Price	To	tal Cost
1	Demolition/Haul Off	1	LS	\$	3,000	\$	3,000
2	Picnic Tables - Concrete w/ concrete slab	4	EA	\$	6,000	\$	24,000
3	BBQ Pits	2	EA	\$	500	\$	1,000
4	Trash Can w/ foundation	2	EA	\$	700	\$	1,400
			, ran	Eng.	struction	anna.	29,400
		Enginee	ring Design	n & Mg	mt (13%)	\$	3,82
		Total E	Stimated C	Constru	ction Cost	\$	33,222
			Co	ntinger	icy (25%)	\$	8,300
		1	otal Projec	t Estim	ated Cost	S	41,52
		PI.	ANNING P	PROJE	CT COST	9	42,000

Project Type: VEGETATION ENHANCEMENT

# B-69. VEGETATION ENHANCEMENT – around the Railroad Trestle along the Right Bank of the West Fork of SFC

Project Priority: SHORT-TERM Related Projects:

Project Location: Horseshoe Park/Blue Hole

## **Project Description:**

Project includes the improvement and/or establishment of a vegetative cover in and around the right bank area of the West Fork of SFC at the existing railroad trestle (area is also adjacent to the Acequia Madre Ditch). Project will include vegetation enhancement including importing top soil, organic material (compost), and the use of fiber rolls/blanket and/or plastic "geogrid" reinforcement for structural support of the soil.

## **Design/Construction Issues:**

#### **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as possible and should be conducted in a manner that minimized soil disturbance.

#### **Project Options:**

- Options include the importation of soil and soil materials suitable for the establishment of a high-quality soil matrix.
- Vegetation should include appropriate native grasses and plants.

#### **Construction BMPs:**

Construction stormwater BMPs will include silt fence and other appropriate BMPs, as necessary.

Project Length/Area: 250 SY (or approx. 0.05 acres)

#### Photographs/Graphics:







Anticipated Labor Source: <u>City Crews</u> / <u>Contractor</u> / Volunteers

Cost Estimate: \$ 3,000 Operations & Maintenance Impact: INCREASE

Project No.: B-69

Project: Vegetation Enhancement - around the Railroad Trestle, along the right bank of the W. Fork of SFC

Project Area: Horseshoe Park/Blue Hole/Moore Park

Priority: Short-Term

Item	Improvement Description	Quantity	Unit	Unit	Price	Tot	al Cost
1	Vegetation Enhancement - Soil+Compost+Fiber Mat*	250	SY	\$	8	\$	2,000
2	Silt Fence	100	LF	\$	4	\$	400
				Const	ruction	\$	2,400
	* - area is approx. 30 ft. x 75 ft.	Engine	ering Design	& Mgm	t (13%)	\$	312
		Total H	Estimated C	onstructi	on Cost	S	2,712
			Co	ntingency	(25%)	S	678
		)	otal Projec	t Estimat	ed Cost	S	3,390
		PL	ANNING P	ROJECT	COST	S	3,000

Project Type: PARK IMPROVEMENT

## B-70. REHABILITATION OF EXISTING PICNIC AREA – Horseshoe Park

Project Priority: LONG-TERM Related Projects:

**Project Location:** Horseshoe Park

## **Project Description:**

Project includes the complete rehabilitation of the existing park elements including picnic tables, BBQ pits, trash cans, walking surfaces, and other improvements. Installation of a non-vegetated, pervious walking surface (gravel, engineered wood fiber, pervious pavement system (pervious concrete/GravelPave, etc...), or other system) should be considered for the picnic areas located directly under existing trees. ADA access requirements should be considered during final selection of the walking surface.

## **Design/Construction Issues:**

#### **Known Constraints:**

- Construction site is located on the banks of a creek that provides habitat to Threatened and/or Endangered Species
  that have been identified by the USFWS.
- Park improvements should provide ADA access. Improvements must meet the requirements found in the Texas
   Accessibility Standards (TAS) administered by the Texas Department of Licensing and Registrations (TDLR). Review
   and approval by a Registered Accessibility Specialist (RAS) will likely be required.

#### **Project Options:**

- Project may include simply the replacement of existing park elements or may involve a complete reconfiguration of the park elements.
- Consideration should be given to the appropriate walking surface to be installed under existing trees (shaded areas).
   The installation of grasses/vegetation may not be advisable in areas that receive little or no sunlight.

## **Construction BMPs:**

 Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area:

1 LS

## Photographs/Graphics:







Anticipated Labor Source: <u>City Crews</u> / Contractor / Volunteers

Cost Estimate: \$ 51,000 Operations & Maintenance Impact: NO CHANGE

Project No.: B-70

Project: Rehab of Existing Picnic Area - Horseshoe Park

Project Area: Horseshoe Park
Priority: Long-Term

Item	Improvement Description	Quantity	Unit	Un	it Price	To	tal Cost
1	Demolition/Haul Off	1	LS	\$	3,500	\$	3,500
2	Picnic Tables - Concrete w/ concrete slab	5	EA	\$	6,000	.\$	30,000
3	BBQ Pits	3	EA	\$	500	\$	1,500
4	Trash Can w/ foundation	2	EA	\$	700	\$	1,400
		Fnginee	ring Desigi		nstruction mt (13%)		36,400 4,732
		3	stimated C			PARCHUSE.	41,132
			Co	ntinger	icy (25%)	\$	10,283
		T	otal Projec	t Estim	ated Cost	S	51,415
			other a rojec	e Aboutin	-		

PARK IMPROVEMENT **Project Type:** 

#### REHABILITATION OF EXISTING HORSESHOE PARK SIGN – Horseshoe Park B-71.

LONG-TERM **Related Projects: Project Priority:** 

**Project Location: Horseshoe Park** 

#### **Project Description:**

Project includes the complete rehabilitation of the existing Horseshoe Park sign.

## **Design/Construction Issues:**

#### **Known Constraints:**

- Construction site is located on the banks of a creek that provides habitat to Threatened and/or Endangered Species that have been identified by the USFWS.
- Existing sign paint should be tested for the presence of lead. If lead is found, refurbishment of sign should proceed in accordance with all State and federal requirements pertaining to the abatement of lead-paint structures.

## **Project Options:**

 Project may include the refurbishment of the existing Horseshoe Park sign, or may involve the complete removal of the existing sign and installation of a new park sign.

#### **Construction BMPs:**

As appropriate, silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area:

1 LS

#### Photographs/Graphics:







**Anticipated Labor Source:** City Crews / Contractor / Volunteers

\$ 7,000 **Operations & Maintenance Impact: NO CHANGE Cost Estimate:** 

Project No.: B-71

Project: Rehab of Existing Horseshoe Park Sign

Project Area: Horseshoe Park

Priority: Long-Term

Item	Improvement Description	Quantity	Unit	Unit Price	Tota	al Cost
1	Rehabilitation of Existing Horseshoe Park Sign	1	LS	\$ 5,000	\$	5,000
Ellin				Construction	\$	5,000
		Enginee	ring Design	& Mgmt (13%)	\$	650
		Total F	Stimated C	onstruction Cost	\$	5,650
			Co	ntingency (25%)	\$	1,413
T .		Т	otal Projec	t Estimated Cost	S	7,063
		PL	ANNING P	ROJECT COST	S	7,000

STORMWATER BMP **Project Type:** 

## **CONVERT EXISTING ASPHALT PARKING AREA TO PERVIOUS PAVEMENT** B-72. PARKING AREA – existing picnic area located adjacent to Hwy. 90, between the East and West Forks of SFC

**Project Priority:** LONG-TERM **Related Projects:** 

Blue Hole / State Park **Project Location:** 

## **Project Description:**

Project includes the demolition of an existing asphalt parking area and the installation of a new pervious pavement parking area that serves the existing picnic area located adjacent to Hwy. 90, between the East and West Forks of San Felipe Creek (SFC). An engineered pervious pavement system should be designed and installed according to manufacturer's recommendations and recognized engineering design standards.

#### **Design/Construction Issues:**

#### **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as possible and should be conducted in a manner that minimized soil disturbance.

## **Project Options:**

- Identified pervious pavement options include pervious concrete, a gravel/geogrid system (GravelPave®, etc...).
- System should be designed to detain stormwater for up to the 25-yr storm event.
- Areas within the defined project boundaries not suitable for pervious pavement should be provided with vegetation enhancement, including an improved soil matrix, along with appropriate native grasses and plants.

#### **Construction BMPs:**

• Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area: 22,031 sq. ft. (0.51 acres)

#### Photographs/Graphics:







City Crews / Contractor / Volunteers **Anticipated Labor Source:** 

**Cost Estimate:** \$ 385,000 **Operations & Maintenance Impact: INCREASE** 

Project No.: B-72

Project: Convert Exist. Asphalt Parking Area to Pervious Pavement, Existing Picnic Area between E. & W. Forks of SFC @ Hwy. 90

Project Area: Blue Hole / State Park

Priority: Long-Term

Item	Improvement Description	Quantity	Unit	Un	it Price	To	tal Cost
1	Demo Existing Asphalt Parking Area	22,031	SF	\$	1.00	\$	22,03
2	Excavation & Haul-Off of Existing Surface Material (12" depth)	816	CY	\$	20	\$	16,31
3	Clearing, Grubbing & Subgrade Preparation	22,031	SF	\$	0.10	\$	2,20
4	Pervious Concrete	22,031	SF	\$	10	\$	220,310
5	Wheel Stops (based on 1 / 440 sf of property)	50	EA	\$	200	\$	10,01
6	Striping (based on 1 / 440 sf of property)	50	EA	\$	5	\$	250
7	Silt Fence	400	LF	\$	4	\$	1,60
8	Stabilized Construction Entrance	1	EA	\$	1,000	\$	1,000
				Cor	struction	\$	273,72
	* - total area is approx. 22,031 sq. ft.	Enginee	ring Design	a & Mg	mt (13%)	\$	35,58
		Total E	stimated C	onstruc	tion Cost	\$	309,312
			Co	ntingen	cy (25%)	\$	77,32
		Т	otal Projec	t Estim	ated Cost	\$	386,64
		PI	ANNING P	ROIF	T COST	•	385,000

**BANK IMPROVEMENTS Project Type:** 

#### B-73. **RECONSTRUCT EXISTING WALL -**

Right Bank of East Fork of SFC, between Hwy. 90 & railroad trestle (in Moore Park)

**Project Priority:** LONG-TERM **Related Projects:** 

**Project Location:** Moore Park

## **Project Description:**

Project includes the reconstruction of the existing creek retaining wall/walk along the right bank of the East Fork of San Felipe Creek (SFC), between Hwy. 90 and the railroad trestle in Moore Park.

#### **Design/Construction Issues:**

#### **Known Constraints:**

- Project should be constructed in conjunction with projects B-5 (Existing Wall Removal).
- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as possible and should be conducted in a manner that minimized soil disturbance.
- ADA access should be provided if not continuous access, provide access at select locations along the creek (TDLR review will likely be required).

#### **Project Options:**

New wall should provide continuous access to the creek for park visitors.

#### **Construction BMPs:**

- A coffer dam or in-stream barrier will be needed to avoid the potential for suspended solids being introduced in the creek; water-filled portable coffer dams or other temporary measures should be considered.
- Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area: 200 feet

## Photographs/Graphics:







**Anticipated Labor Source:** City Crews / Contractor / Volunteers

**Cost Estimate:** \$ 180,000 **Operations & Maintenance Impact: DECREASE** 

Project No.: B-73

Project: Reconstruct Existing Wall, along the right bank of the E. Fork of SFC, between Hwy. 90 & the Railroad Trestle

Project Area: State Park
Priority: Long-Term

Item	Improvement Description	Quantity	Unit	Un	it Price	To	tal Cost
1	Bank Improvements - Structural Walls III [ 4' - 6' ]	200	LF	\$	360	\$	72,000
2	Pervious Concrete [ 200' x 6' wide ]	1,200	SF	\$	10	\$	12,000
3	Stabilized Construction Entrance	1	EA	\$	1,000	\$	1,000
4	Silt Fence	200	LF	\$	4	\$	800
5	In-Stream Coffer Dam (w/ dewatering)	200	LF	\$	200	\$	40,000
			7.7%	Con	struction	\$	125,80
	* - bank reconstruction + 6' pervious concrete sidewalk	Enginee	ring Design	a & Mg	mt (13%)	\$	16,35
		Total E	stimated C	onstruc	tion Cost	\$	142,154
			Co	ntingen	cy (25%)	\$	35,539
		Т	otal Projec	t Estim	ated Cost	\$	177,693
		PL	ANNING P	ROJEC	T COST	S	180,000

**Project Type: BANK IMPROVEMENTS** 

B-74. RECONSTRUCT EXISTING WALL -

Right Bank of East Fork of SFC, between Footbridge & Blue Wall (in Moore Park)

**Project Priority:** 

**LONG-TERM** 

**Related Projects:** 

B-8

**Project Location:** 

**Moore Park** 

## **Project Description:**

Project includes the reconstruction of the existing creek retaining wall/walk along the right bank of the East Fork of San Felipe Creek (SFC), between the existing footbridge & the Blue Wall in Moore Park.

## **Design/Construction Issues:**

#### **Known Constraints:**

- Project should be constructed in conjunction with projects B-8 (Existing Wall Removal).
- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as possible and should be conducted in a manner that minimized soil disturbance.
- ADA access should be provided if not continuous access, provide access at select locations along the creek (TDLR review will likely be required).

#### **Project Options:**

New wall should provide continuous access to the creek for park visitors.

#### **Construction BMPs:**

- A coffer dam or in-stream barrier will be needed to avoid the potential for suspended solids being introduced in the creek; water-filled portable coffer dams or other temporary measures should be considered.
- Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used
  around the construction site in accordance with TCEQ requirements.

Project Length/Area:

270 feet

## Photographs/Graphics:







**Anticipated Labor Source:** 

City Crews / Contractor / Volunteers

**Cost Estimate:** 

\$ 240,000

Operations & Maintenance Impact:

**DECREASE** 

Project No.:

B-74

Project:

Reconstruct Existing Wall, along the right bank of E. Fork of SFC, between the Footbridge & the Blue Wall

Project Area: Moore Park
Priority: Long-Term

Item	Improvement Description	Quantity	Unit	Un	it Price	To	tal Cost
1	Bank Improvements - Structural Walls III [ 4' - 6' ]	270	LF	\$	360	\$	97,20
2	Pervious Concrete [ 270' x 6' wide ]	1,620	SF	\$	10	\$	16,20
3	Stabilized Construction Entrance	1	EA	\$	1,000	\$ -	1,00
4	Silt Fence	270	LF	\$	4	\$	1,08
5	In-Stream Coffer Dam (w/ dewatering)	270	LF	\$	200	\$	54,00
				Con	struction	S	169,48
	* - bank reconstruction + 6' pervious concrete sidewalk	Enginee	ring Design	& Mg	mt (13%)	S	22,03
		Total E	stimated C	onstruc	tion Cost	S	191,51
			Co	ntingen	cy (25%)	\$	47,87
		Т	otal Projec	t Estim	ated Cost	S	239,39
		PL	ANNING F	ROIF	T COST	\$	240,00

Project Type: STORMWATER BMP

## B-75. INSTALLATION OF PUBLIC EDUCATION KIOSKS — in Moore Park

Project Priority: LONG-TERM Related Projects:

Project Location: Moore Park

## **Project Description:**

Project includes the installation of two (2) public information kiosks to be located in Moore Park. The project will include a kiosk capable of displaying educational material relating to San Felipe Creek and its associated watershed. The kiosk will provide an all-weather display area for posters, pamphlets, signs, and other informational materials. The signs will be located adjacent to heavily used/trafficked areas for the most impact.

## **Design/Construction Issues:**

#### **Known Constraints:**

- Construction site is located on the banks of a creek that provides habitat to Threatened and/or Endangered Species
  that have been identified by the USFWS.
- Proposed improvements should provide ADA access. Improvements should meet the requirements found in the Texas Accessibility Standards (TAS) administered by the Texas Department of Licensing and Registrations (TDLR). Review and approval by a Registered Accessibility Specialist (RAS) will likely be required.

## **Project Options:**

- Options include several different types of kiosks.
- The kiosk should be designed to reduce the potential for vandalism.
- Project budget includes the design/printing of informational signs.

#### **Construction BMPs:**

 Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area:

2 each

## Photographs/Graphics:







Anticipated Labor Source: <u>City Crews / Contractor / Volunteers</u>

Cost Estimate: \$ 17,000 Operations & Maintenance Impact: NO CHANGE

Project No.: B-75

Project: Install Public Education Kiosks along the San Felipe Creek

Project Area: Moore Park
Priority: Long-Term

Item	Improvement Description	Quantity	Unit	Un	it Price	To	tal Cost
1	Public Education Kiosk	2	LS	\$	5,000	\$	10,000
2	Signs/Exhibits	2	LS	\$	1,000	\$	2,000
				Con	struction	\$	12,000
		Enginee	ring Design	& Mg	mt (13%)	\$	1,560
			ring Desigr stimated C			Police School	1,560 13,560
			stimated C	onstruc		S	THE RESERVE
		Total E	stimated C	onstruc	tion Cost cy (25%)	<b>\$</b>	13,560

**Project Type:** STORMWATER BMP

## INSTALLATION OF PET WASTE STATIONS — in Moore Park

**Project Priority: SHORT-TERM Related Projects:** 

**Project Location: Moore Park** 

## **Project Description:**

Project includes the installation of four (4) pet waste stations to be located in Moore Park. The stations will be located adjacent to heavily used/trafficked areas for the most impact.

## **Design/Construction Issues:**

#### **Known Constraints:**

- Construction site is located on the banks of a creek that provides habitat to Threatened and/or Endangered Species that have been identified by the USFWS.
- Proposed improvements should provide ADA access. Improvements should meet the requirements found in the Texas Accessibility Standards (TAS) administered by the Texas Department of Licensing and Registrations (TDLR). Review and approval by a Registered Accessibility Specialist (RAS) will likely be required.

#### **Project Options:**

- Options include several different types of pet waste stations.
- Recommend that pet waste station include bag dispenser and trash can.
- Recommend purchasing extra pet waste bags at the time of purchase of the pet waste station.

#### **Construction BMPs:**

 Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

**Project Length/Area:** 

4 each

## Photographs/Graphics:







**Anticipated Labor Source:** <u>City Crews / Contractor / Volunteers</u>

\$ 4,000 **INCREASE** 

**Cost Estimate:** 

**Operations & Maintenance Impact:** 

Project No.: B-76

Project: Pet Waste Stations

Project Area: Moore Park
Priority: Short-Term

Item	Improvement Description	Quantity	Unit	Uni	it Price	Tot	al Cost
1	Pet Waste Stations w/ Trash Cans & Bag Dispenser*	4	EA	\$	750	\$	3,000
	* - Pet Waste Stations located at maximum 1,000 ft. spacing	Engine	ering Desigi		struction nt (13%)		3,000 390
	along San Felipe Creek	Total l	tion Cost	S	3,390		
			Co	ntingen	cy (25%)	\$	848
		1	Total Projec	t Estima	ited Cost	S	4,238
		PL	ANNING P	ROJEC	T COST	S	4,000

Project Type: STORMWATER BMP

#### INSTALLATION OF TRASH CANS - in Moore Park B-77.

**Related Projects: Project Priority:** SHORT-TERM

**Project Location: Moore Park** 

#### **Project Description:**

Project includes the installation of six (6) trash cans, including concrete support foundations, to be located in Moore Park. The trash cans will be located adjacent to heavily used/trafficked areas for the most impact.

## **Design/Construction Issues:**

#### **Known Constraints:**

- Construction site is located on the banks of a creek that provides habitat to Threatened and/or Endangered Species that have been identified by the USFWS.
- Proposed improvements should provide ADA access. Improvements should meet the requirements found in the Texas Accessibility Standards (TAS) administered by the Texas Department of Licensing and Registrations (TDLR). Review and approval by a Registered Accessibility Specialist (RAS) will likely be required.

#### **Project Options:**

- Options include several different types of trash cans.
- Installation will include trash can, trash can support, and concrete foundation.
- The unit shall be designed to prevent the trash can from being easily stolen.

#### **Construction BMPs:**

■ Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area:

each

#### Photographs/Graphics:







**Anticipated Labor Source:** <u>City Crews / Contractor / Volunteers</u>

**INCREASE** 

**Cost Estimate:** 

\$ 6,000

**Operations & Maintenance Impact:** 

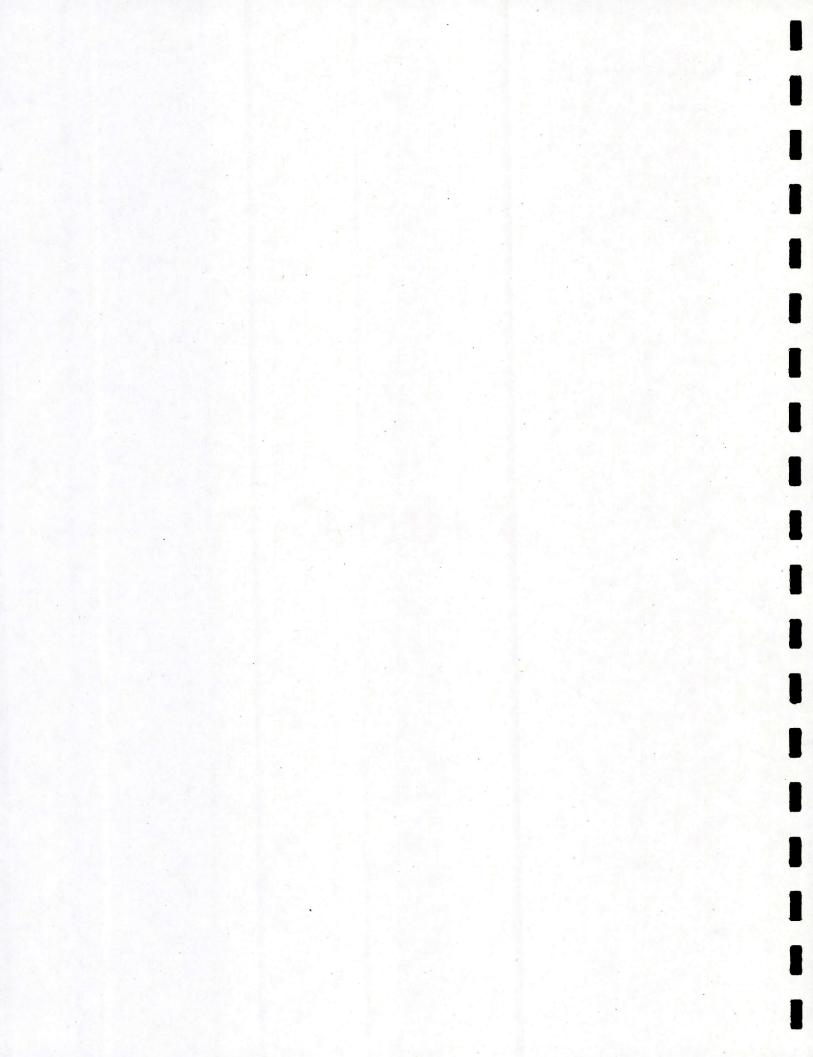
Project No.: B-77

Project: Trash Cans w/ Foundations

Project Area: Moore Park
Priority: Short-Term

Item	Improvement Description	Quantity	Unit	Unit Price	Tot	al Cost
1	Trash Cans w/ Foundations	6	EA	\$ 700	\$	4,200
				Construction	\$	4,200
	Engin		ering Design	& Mgmt (13%)	\$	546
		Total I	S	4,746		
			Co	ntingency (25%)	s	1,187
		'n	Total Projec	t Estimated Cost	\$	5,933
		PL	ANNING P	ROJECT COST	s	6,000

# Area C



**INVASIVE SPECIES CONTROL Project Type:** 

**CANE ERADICATION – Left Bank of San Felipe Creek (near Joe Ramos Center)** C-1.

**Related Projects:** C-2, C-3, C-4, C-5 **Project Priority: IMMEDIATE** 

**Project Location:** Between Dr. F. Calderon Blvd. and Romanelli Park Footbridge

## **Project Description:**

Project includes the eradication of Arundo Donax (a.k.a., "Giant Reed", "River Cane") along the left bank of San Felipe Creek (SFC) from the Dr. F. Calderon Blvd. bridge downstream to the Romanelli Park Footbridge over SFC. Eradication should follow the steps outlined in the San Felipe Creek Master Plan and include: Cut Cane (after annual flowering around mid-July); Removal of Cuttings; Herbicide Spray; Removal of Dead Cane (in winter); Repeat. Work should proceed from upstream to downstream.

## **Design/Construction Issues:**

#### **Known Constraints:**

- Project should be started after, or at the same time, as Projects A-1 to A-6, B-1, and B-2, and C-2.
- Herbicide use in and around the creek area should proceed with caution.
- No spraying in the creek; herbicide must be hand applied to cane located in the creek.
- Eradication efforts will involve several cycles.

## **Project Options:**

Small patches can be cut by hand; large patches should be cut with mechanical equipment, if possible; avoid disturbing soil by the use of rubber tired equipment.

#### **Construction BMPs:**

• Construction BMPs (silt fence, etc...) should be used if mechanical equipment results in soil disturbance.

Project Length/Area:

< 1 acre [area is approximate, based on latest aerial photos]

#### Photographs/Graphics:







City Crews / Contractor / Volunteers **Anticipated Labor Source:** 

\$ 9,000 (1st Year Efforts Only) **Cost Estimate: INCREASE** 

**Operations & Maintenance Impact:** 

Project No.: C-1 - Left Bank of SFC, between Dr. F. Calderon Blvd. & Romanelli Park Footbridge

Project: Arundo Donax Removal (Giant Reed, a.k.a. "river cane")

Project Area: Romanelli Park/Amphitheater/Joe Ramos Center

Priority: Immediate

Item	Improvement Description	Quantity	Unit	Unit Price	Tota	al Cost
1	Arundo Donax Removal*	0.20	Acre	\$ 44,000	\$	8,800
Hay 1						
			5			
	at \$44,000 / acre for one-time manual removal; price	Engineeri	ing Design &	Construction Mgmt (13%)**		8,800
	clude follow up visits (which should be once per year); see Appendix ils on cane removal cost estimate.	J	0 0	onstruction Cost		8,80
** - Enginee	ring Design/Mgmt. + Contigency included in Unit Cost; see Appendix		Conti	ngency (25%)**	\$	
E for ad	ditional details.		Total Projec	t Estimated Cost	\$	8,80
		DI	ANNING D	ROJECT COST	•	9,00

Project Type: INVASIVE SPECIES CONTROL

C-2. CANE ERADICATION - Right Bank of San Felipe Creek (near Joe Ramos Center)

Project Priority: IMMEDIATE Related Projects: C-1, C-3, C-4, C-5

Project Location: Between Dr. F. Calderon Blvd. and Romanelli Park Footbridge

## **Project Description:**

Project includes the eradication of Arundo Donax (a.k.a., "Giant Reed", "River Cane") along the right bank of San Felipe Creek (SFC) from the Dr. F. Calderon Blvd. bridge downstream to the Romanelli Park Footbridge over SFC. Eradication should follow the steps outlined in the San Felipe Creek Master Plan and include: Cut Cane (after annual flowering around mid-July); Removal of Cuttings; Herbicide Spray; Removal of Dead Cane (in winter); Repeat. Work should proceed from upstream to downstream.

## **Design/Construction Issues:**

#### **Known Constraints:**

- Project should be started after, or at the same time, as Projects A-1 to A-6, B-1, and B-2, and C-1.
- Herbicide use in and around the creek area should proceed with caution.
- No spraying in the creek; herbicide must be hand applied to cane located in the creek.
- Eradication efforts will involve several cycles.

#### **Project Options:**

 Small patches can be cut by hand; large patches should be cut with mechanical equipment, if possible; avoid disturbing soil by the use of rubber tired equipment.

#### **Construction BMPs:**

Construction BMPs (silt fence, etc...) should be used if mechanical equipment results in soil disturbance.

Project Length/Area:

< 1 acre [area is approximate, based on latest aerial photos]

#### Photographs/Graphics:







Anticipated Labor Source: City Crews / Contractor / Volunteers

Cost Estimate: \$ 9,000 (1<sup>st</sup> Year Efforts Only) Operations & Maintenance Impact:

**INCREASE** 

Project No.: C-2 - Right Bank of SFC, between Dr. F. Calderon Blvd. & Romanelli Park Footbridge

Project: Arundo Donax Removal (Giant Reed, a.k.a. "river cane")

Project Area: Romanelli Park/Amphitheater/Joe Ramos Center

Priority: Immediate

Item	Improvement Description	Quantity	Unit	Unit	Price	Tot	al Cost
1	Arundo Donax Removal*	0.20	Acre	\$	44,000	\$	8,800
* - estimated	at \$44,000 / acre for one-time manual removal; price			Cons	truction	\$	8,800
does not include follow up visits (which should be once per year); see Appendix		Engineering Design & Mgmt (13%)** \$					0,000
E for details on cane removal cost estimate.		Total E	<b>Total Estimated Construction Cost</b>				8,800
* - Engineering Design/Mgmt. + Contigency included in Unit Cost; see Appendix		(	Contingency (25%)**				
E for additional details.		1	Total Project Estimated Cost			\$	8,800
		PL	ANNING P	ROJECT	r cost	s	9,000

Project Type: INVASIVE SPECIES CONTROL

C-3. CANE ERADICATION - Left Bank of San Felipe Creek (near Amphitheater)

Project Priority: IMMEDIATE Related Projects: C-1, C-2, C-4, C-5

Project Location: Between Romanelli Park Footbridge and Gillis St. Bridge

## **Project Description:**

Project includes the eradication of Arundo Donax (a.k.a., "Giant Reed", "River Cane") along the left bank of San Felipe Creek (SFC) from the Romanelli Park Footbridge over SFC downstream to the Gillis St. Bridge (near Memo's). Eradication should follow the steps outlined in the San Felipe Creek Master Plan and include: Cut Cane (after annual flowering around mid-July); Removal of Cuttings; Herbicide Spray; Removal of Dead Cane (in winter); Repeat. Work should proceed from upstream to downstream. NOTE: very little cane is located along this stretch of San Felipe Creek at the present time (Jan. 2012).

## **Design/Construction Issues:**

#### **Known Constraints:**

- Project should be started after, or at the same time, as Projects A-1 to A-6, B-1, B-2, C-1, and C-2.
- Herbicide use in and around the creek area should proceed with caution.
- No spraying in the creek; herbicide must be hand applied to cane located in the creek.
- Eradication efforts will involve several cycles.

### **Project Options:**

Small patches can be cut by hand; large patches should be cut with mechanical equipment, if possible; avoid disturbing soil by the use of rubber tired equipment.

#### **Construction BMPs:**

• Construction BMPs (silt fence, etc...) should be used if mechanical equipment results in soil disturbance.

Project Length/Area:

< 1 acre [area is approximate, based on latest aerial photos]

#### Photographs/Graphics:







Anticipated Labor Source: City Crews / Contractor / Volunteers

Cost Estimate: \$ 9,000 (1st Year Efforts Only)

**Operations & Maintenance Impact:** 

**INCREASE** 

Project No.: C-3 - Left Bank of SFC, between Romanelli Park Footbridge & Gillis St.

Project: Arundo Donax Removal (Giant Reed, a.k.a. "river cane")

Project Area: Amphitheater/Joe Ramos Center

Priority: Immediate

Item	Improvement Description	Quantity	Unit	Unit Price	Tot	al Cost
1	Arundo Donax Removal*	0.20	Acre	\$ 44,000	\$	8,800
		- 1				R. L.
		in the fifth				
* - estimated at \$44,000 / acre for one-time manual removal; price				Constructio	1 \$	8,800
does not include follow up visits (which should be once per year); see Appendix		Engineering Design & Mgmt (13%)** \$				
E for details on cane removal cost estimate.		Total I	Total Estimated Construction Cost			
** - Engineering Design/Mgmt. + Contigency included in Unit Cost; see Appendix		ζ	Contingency (25%)**			
E for ad	ditional details.		Total Projec	t Estimated Cos	t \$	8,800
				ROJECT COS		9,000

**Project Type: . INVASIVE SPECIES CONTROL** 

C-4. CANE ERADICATION - Right Bank of San Felipe Creek (near Amphitheater)

Project Priority: IMMEDIATE Related Projects: C-1, C-2, C-3, C-5

Project Location: Between Romanelli Park Footbridge and Gillis St. Bridge

## **Project Description:**

Project includes the eradication of Arundo Donax (a.k.a., "Giant Reed", "River Cane") along the right bank of San Felipe Creek (SFC) from the Romanelli Park Footbridge over SFC downstream to the Gillis St. Bridge. Eradication should follow the steps outlined in the San Felipe Creek Master Plan and include: Cut Cane (after annual flowering around mid-July); Removal of Cuttings; Herbicide Spray; Removal of Dead Cane (in winter); Repeat. Work should proceed from upstream to downstream.

## **Design/Construction Issues:**

#### **Known Constraints:**

- Project should be started after, or at the same time, as Projects A-1 to A-6, B-1, B-2, C-1, C-2, and C-3.
- Some of the existing cane is known to be located on private property.
- Herbicide use in and around the creek area should proceed with caution.
- No spraying in the creek; herbicide must be hand applied to cane located in the creek.
- Eradication efforts will involve several cycles.

#### **Project Options:**

Small patches can be cut by hand; large patches should be cut with mechanical equipment, if possible; avoid disturbing soil by the use of rubber tired equipment.

#### **Construction BMPs:**

• Construction BMPs (silt fence, etc...) should be used if mechanical equipment results in soil disturbance.

Project Length/Area:

< 1 acres [area is approximate, based on latest aerial photos]

## Photographs/Graphics:







**Anticipated Labor Source:** 

City Crews / Contractor / Volunteers

**Cost Estimate:** 

\$ 9,000 (1st Year Efforts Only)

**Operations & Maintenance Impact:** 

**INCREASE** 

Project No.: C-4 - Right Bank of SFC, between Romanelli Park Footbridge & Gillis St.

Project: Arundo Donax Removal (Giant Reed, a.k.a. "river cane")

Project Area: Amphitheater/Joe Ramos Center

Priority: Immediate

Item	Improvement Description	Quantity	Unit	Unit Pri	ce	Total	Cost
1	Arundo Donax Removal*	0.20	Acre	\$ 44,0	000	\$	8,800
			4 1 1				
* - estimated at \$44,000 / acre for one-time manual removal; price does not include follow up visits (which should be once per year); see Appendix		Construction Engineering Design & Mgmt (13%)**					8,800
E for details on cane removal cost estimate.		<b>Total Estimated Construction Cost</b>			Cost	S	8,800
** - Engineering Design/Mgmt. + Contigency included in Unit Cost; see Appendix			Contingency (25%)**			\$	
E for additional details.		ī	Total Project Estimated Cost			S	8,800
		PI	ANNING P	ROJECT CO	OST	S	9,000

Project Type: INVASIVE SPECIES CONTROL

## C-5. CANE ERADICATION – Drainage Channel at end of Calderon Lane (on the right bank of SFC near Memo's), upstream to Roosevelt Park

Project Priority: IMMEDIATE Related Projects: C-1, C-2, C-3, C-4

Project Location: Between Romanelli Park Footbridge and Gillis St. Bridge

## **Project Description:**

Project includes the eradication of Arundo Donax (a.k.a., "Giant Reed", "River Cane") along a drainage channel that enters San Felipe Creek (SFC) on the right bank at the end of Calderon Lane (near Memo's). The open drainage channel begins on the north side of the railroad tracks that run along Ogden Street, and continues down the east side of Roosevelt Park. Eradication should follow the steps outlined in the San Felipe Creek Master Plan and include: Cut Cane (after annual flowering around mid-July); Removal of Cuttings; Herbicide Spray; Removal of Dead Cane (in winter); Repeat. Work should proceed from upstream to downstream.

## **Design/Construction Issues:**

#### **Known Constraints:**

- Project should be started after, or at the same time, as Projects A-1 to A-6, B-1, B-2, C-1, C-2, C-3, and C-4.
- Some of the existing cane is known to be located on private property.
- Herbicide use in and around the creek area should proceed with caution.
- No spraying in the creek; herbicide must be hand applied to cane located in the creek.
- Eradication efforts will involve several cycles.

#### **Project Options:**

Small patches can be cut by hand; large patches should be cut with mechanical equipment, if possible; avoid disturbing soil by the use of rubber tired equipment.

#### **Construction BMPs:**

Construction BMPs (silt fence, etc...) should be used if mechanical equipment results in soil disturbance.

Project Length/Area:

< 1 acres [area is approximate, based on latest aerial photos]

#### Photographs/Graphics:







Anticipated Labor Source: City Crews / Contractor / Volunteers

Cost Estimate: \$ 9,000 (1<sup>st</sup> Year Efforts Only) Operations & Maintenance Impact: INCREASE

Project No.: C-5 - drainage channel at end of Calderon Lane, upstream to Roosevelt Park

Project: Arundo Donax Removal (Giant Reed, a.k.a. "river cane")

Project Area: Memo's & Roosevelt Park

Priority: Immediate

Item	Improvement Description	Quantity	Unit	Un	it Price	Tota	al Cost
1	Arundo Donax Removal*	0.20	Acre	\$	44,000	\$	8,800
area de la companya del companya de la companya del companya de la							
	* - estimated at \$44,000 / acre for one-time manual removal; price		Construction				8,80
	does not include follow up visits (which should be once per year); see Appendix  E for details on cane removal cost estimate.		Engineering Design & Mgmt (13%)**  Total Estimated Construction Cost				8,80
** - Enginee	* - Engineering Design/Mgmt. + Contigency included in Unit Cost; see Appendix		Contingency (25%)**			\$	
E for additional details.			Total Project Estimated Cost			\$	8,80
		PLANNING PROJECT COST		9	9,00		

**Project Type: BANK IMPROVEMENTS** 

C-6. REMOVAL OF EXISTING BANK WALL –
Left Bank of SFC, immediately upstream of the Romanelli Park Footbridge

**Project Priority:** 

LONG-TERM

**Related Projects:** 

C-16, C-17

**Project Location:** 

**Moore Park** 

## **Project Description:**

Project includes the removal of existing stone/concrete walls along the left bank of San Felipe Creek (SFC), immediately upstream of the existing footbridge that crosses San Felipe Creek (SFC) to Romanelli Park.

## **Design/Construction Issues:**

#### **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as
  possible and should be conducted in a manner that minimized soil disturbance.
- Existing stone should be salvaged for possible use on future creek-side projects.

#### **Project Options:**

 A combination of manual and mechanical labor will likely be necessary to accomplish the removal operation in accordance with USFWS requirements .

#### **Construction BMPs:**

- A coffer dam or in-stream barrier may be needed to avoid the potential for suspended solids being introduced in the creek; water-filled portable coffer dams or other temporary measures should be considered.
- Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

**Project Length/Area:** 

120 feet

## Photographs/Graphics:







**Anticipated Labor Source:** 

City Crews / Contractor / Volunteers

**Cost Estimate:** 

\$ 17,000

**Operations & Maintenance Impact:** 

**NO CHANGE** 

Project No.: C-6

Project:

Removal of Existing Bank Wall - along the left bank of SFC, immediately upstream of Romanelli Park Footbridge

Project Area: Romanelli Park

Priority:

Long-Term

Item	Improvement Description	Quantity	Unit	Unit Price		Total Cost	
1	Demolition - Existing Creek Walls I [ 2' - 4']	120	LF	\$	40	\$	4,800
2	Silt Fence	120	LF	\$	4	\$	480
3	Stabilized Construction Entrance	1	EA	\$	1,000	\$	1,000
4	In-Stream Barrier/Curtain	120	LF	\$	50	\$	6,000
		Enginee	ring Desigi		struction mt (13%)	4 1 1	12,280
		Total E	Stimated C	onstru	ction Cost	S	13,87
			Co	ntinger	icy (25%)	\$	3,469
		Total Project Estimated Cost					17,34
V - 12:10	PLANNING PROJECT COST					S	17,000

C-7. REMOVAL OF EXISTING BANK WALL –

Left Bank of SFC, from Romanelli Park footbridge to the Amphitheater

Project Priority: LONG-TERM Related Projects: C-10

Project Location: Amphitheater/Joe Ramos Center Area

## **Project Description:**

Project includes the removal of existing stone/concrete walls along the left bank of San Felipe Creek (SFC), from the Romanelli Park footbridge downstream to the Amphitheater.

## **Design/Construction Issues:**

#### **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as possible and should be conducted in a manner that minimized soil disturbance.
- Existing stone should be salvaged for possible use on future creek-side projects.

### **Project Options:**

 A combination of manual and mechanical labor will likely be necessary to accomplish the removal operation in accordance with USFWS requirements.

### **Construction BMPs:**

- A coffer dam or in-stream barrier may be needed to avoid the potential for suspended solids being introduced in the creek; water-filled portable coffer dams or other temporary measures should be considered.
- Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area:

570 feet

## Photographs/Graphics:







Anticipated Labor Source: City Crews / Contractor / Volunteers

Cost Estimate: \$ 105,000 Operations & Maintenance Impact: DECREASE

Project No.: C-7

Project: Re

Removal of Existing Bank Wall - left bank of SFC, from the Romanelli Park Footbridge & to the Amphitheater

Project Area: Amphitheater / Joe Ramos Center

Item	Improvement Description	Quantity	Unit	Un	it Price	To	tal Cost
1	Demolition - Existing Creek Walls II [ 4' - 6' ]	570	LF	\$	60	\$	34,200
2	Demolition - Existing Concrete Walkways [8' wide ]	4,560	SF	\$	2	\$	9,12
3	Silt Fence	570	LF	\$	4	\$	2,28
4	Stabilized Construction Entrance	1	EA	\$	1,000	\$	1,000
5	In-Stream Barrier/Curtain	570	LF	\$	50	\$	28,500
	* - sidewalk area is approx. 8' x 570'	Enginee	ring Desigi		struction mt (13%)		75,10 9,76
		Total E	Stimated C	onstruc	tion Cost	S	84,86
			Co	ntingen	cy (25%)	\$	21,21
		T	otal Projec	t Estim	ated Cost	\$	106,07
The State		PL	ANNING P	ROJEC	CT COST	s	105,000

## C-8. REMOVAL OF EXISTING BANK WALL –

Left Bank of SFC, from Amphitheater downstream to Existing Stone Ramp

Project Priority: LONG-TERM Related Projects: C-9, C-19, C-20

Project Location: Amphitheater/Joe Ramos Center Area

## **Project Description:**

Project includes the removal of existing stone/concrete walls along the left bank of San Felipe Creek (SFC), from the Amphitheater downstream to the existing stone ramp.

## **Design/Construction Issues:**

### **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as possible and should be conducted in a manner that minimized soil disturbance.
- Existing stone should be salvaged for possible use on future creek-side projects.

feet

### **Project Options:**

 A combination of manual and mechanical labor will likely be necessary to accomplish the removal operation in accordance with USFWS requirements .

### **Construction BMPs:**

- A coffer dam or in-stream barrier may be needed to avoid the potential for suspended solids being introduced in the creek; water-filled portable coffer dams or other temporary measures should be considered.
- Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area: 410

## Photographs/Graphics:







Anticipated Labor Source: City Crews / Contractor / Volunteers

Cost Estimate: \$ 56,000 Operations & Maintenance Impact: DECREASE

Project No.: C-8

Project: Removal of Existing Bank Wall, left bank of , between the Amphitheater & the Existing Stone Ramp

Project Area: Amphitheater / Joe Ramos Center

[tem	Improvement Description	Quantity	Unit	Un	it Price	To	tal Cost
1	Demolition - Existing Creek Walls I [ 2' - 4']	410	LF	\$	40	\$	16,400
2	Silt Fence	410	LF	\$	4	\$	1,640
3	Stabilized Construction Entrance	1	EA	\$	1,000	\$	1,000
4	In-Stream Barrier/Curtain	410	LF	\$	50	\$	20,500
		Enginee	ering Design	1 7 7	struction mt (13%)		39,54 5,14
		Total F	Estimated C	onstruc	ction Cost	\$	44,68
			Co	ntingen	icy (25%)	\$	11,170
		7	otal Projec	t Estim	ated Cost	S	55,850
W. July		PL	ANNING P	ROJE	CT COST	s	56,000

## C-9. REMOVAL OF EXISTING BANK WALL – Left Bank of SFC, from Existing Stone Ramp downstream to the Gillis St. Bridge

Project Priority: LONG-TERM Related Projects: C-

C-8, C-19, C-20

Project Location: Amphitheater/Joe Ramos Center Area

## **Project Description:**

Project includes the removal of existing stone/concrete walls along the left bank of San Felipe Creek (SFC), from the existing stone ramp downstream to the Gillis St. Bridge (across from Memo's).

## **Design/Construction Issues:**

### **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as possible and should be conducted in a manner that minimized soil disturbance.
- Existing stone should be salvaged for possible use on future creek-side projects.

## **Project Options:**

 A combination of manual and mechanical labor will likely be necessary to accomplish the removal operation in accordance with USFWS requirements .

### **Construction BMPs:**

- A coffer dam or in-stream barrier may be needed to avoid the potential for suspended solids being introduced in the creek; water-filled portable coffer dams or other temporary measures should be considered.
- Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area:

500 feet

## Photographs/Graphics:







Anticipated Labor Source: City Crews / Contractor / Volunteers

Cost Estimate: \$ 68,000 Operations & Maintenance Impact: DECREASE

Project No.: C-9

Project: Removal of Existing Bank Wall, left bank of, between the Existing Stone Ramp & the Gillis St. Bridge

Project Area: Amphitheater / Joe Ramos Center

Item	Improvement Description	Quantity	Unit	Un	it Price	To	tal Cost
1	Demolition - Existing Creek Walls I [ 2' - 4']	500	LF	\$	40	\$	20,000
2	Silt Fence	500	LF	\$	4	\$	2,000
3	Stabilized Construction Entrance	1	EA	\$	1,000	\$	1,000
4	In-Stream Barrier/Curtain	500	LF	\$	50	\$	25,000
		Enginee	ering Design		istruction mt (13%)		48,000 6,240
		Total E	Stimated C	onstruc	ction Cost	\$	54,240
			Co	ntinger	icy (25%)	\$	13,560
		T	otal Projec	t Estim	ated Cost	\$	67,800
		PI.	ANNING P	ROJE	T COST	8	68,000

C-10. RECONSTRUCT EXISTING CREEK-SIDE WALLS/WALKS with FOCUSED ACCESS FEATURES - Left Bank of SFC, between Romanelli Park footbridge to Amphitheater

Project Priority: LONG-TERM Related Projects: C-7

Project Location: Amphitheater/Joe Ramos Center Area

## **Project Description:**

Project includes the reconstruction of the existing creek retaining walls/walks along the left bank of San Felipe Creek (SFC), between the existing Romanelli Park footbridge and the Amphitheater. Project also includes the construction of a Focused Access Features. The Focused Access Feature will provide defined locations for public access to this portion of SFC, and will help reduce environmental impacts of pedestrian foot traffic.

## **Design/Construction Issues:**

### **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as
  possible and should be conducted in a manner that minimized soil disturbance.
- ADA access should be provided if not continuous access, provide access at select locations along the creek (TDLR review will likely be required, and consultation with TDLR is recommended prior to design/construction).

## **Project Options:**

- New walls/walks should provide focused access to the creek for park visitors (provide three (3) separate Focused Access Features).
- Pervious pavement should be considered for construction of walkways.

### **Construction BMPs:**

 A coffer dam or in-stream barrier will be needed to avoid the potential for suspended solids being introduced in the creek; water-filled portable coffer dams or other temporary measures should be considered.

Project Length/Area:

570 feet [includes construction of three (3) separate Focused Access Features]

## Photographs/Graphics:







Anticipated Labor Source: City Crews / Contractor / Volunteers

Cost Estimate: \$ 885,000 Operations & Maintenance Impact: DECREASE

Project No.: C-10

Project: Reconstruct Existing Creek-Side Walls/Walk\*, left bank of SFC, between Romanelli Park Footbridge & Amphitheater

Project Area: Romanelli Park/Amphitheater

Priority: Long-Term

Item	Improvement Description	Quantity	Unit	Uı	nit Price	To	otal Cost
1	Bank Improvements - Structural Walls IV [ 6' - 8' ]	570	LF	\$	480	\$	273,600
2	Pervious Concrete [ 570' x 10' wide ]	5,700	SF	\$	10	\$	57,000
3	Focused Access Feature	3	EA	\$	60,000	\$	180,000
4	Stabilized Construction Entrance	1	EA	\$	1,000	\$	1,000
5	Silt Fence	570	LF	\$	4	\$	2,280
6	In-Stream Coffer Dam (w/ dewatering)	570	LF	\$	200	\$	114,000
1	* - bank reconstruction + 6' pervious concrete sidewalk	Enginee	ring Desig		nstruction gmt (13%)		627,880 81,624
		Total E	stimated C	Constru	ction Cost	\$	709,504
			Co	ntinge	ncy (25%)	S	177,376
		T	otal Projec	t Estin	nated Cost	S	886,88
		PL	ANNING I	PROJE	CT COST	s	885,000

Project No.: C-10a

Project: FOCUSED ACCESS FEATURES ONLY - along portion of Reconstructed Creek Walls, left bank of SFC,

between Romanelli Park Footbridge & Amphitheater

Project Area: Romanelli Park/Amphitheater

Item	Improvement Description	Quantity	Unit	Unit Price		To	otal Cost
3	Focused Access Feature	3	EA	\$	60,000	\$	180,000
4	Stabilized Construction Entrance	1	EA	\$	1,000	\$	1,000
5	Silt Fence	300	LF	\$	4	\$	1,200
6	In-Stream Coffer Dam (w/ dewatering)	200	LF	\$	200	\$	40,000
				Co	nstruction	\$	222,200
		Enginee	ring Design	& Mg	mt (13%)	\$	28,88
			stimated C			CALLO TITION OF	251,08
			Co	ntinge	ncy (25%)	S	62,772
		T	otal Projec	t Estin	nated Cost	S	313,858
		DI	ANNING P	DOTE	CT COST	•	315,000

**Project Type: VEGETATION ENHANCEMENT** 

## C-11. VEGETATION ENHANCEMENT – Romanelli Park

**Project Priority:** 

**LONG-TERM** 

**Related Projects:** 

**Project Location:** 

Romanelli Park

## **Project Description:**

Project includes the improvement and/or establishment of a vegetative cover in and around Romanelli Park. Project includes only those areas in need of vegetation enhancement. Project will include vegetation enhancement including importing top soil, organic material (compost), and the use of fiber rolls/blanket and/or plastic "geogrid" reinforcement for structural support of the soil.

## **Design/Construction Issues:**

### **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as
  possible and should be conducted in a manner that minimized soil disturbance.

### **Project Options:**

- Options include the importation of soil and soil materials suitable for the establishment of a high-quality soil matrix.
- Vegetation should include appropriate native grasses and plants.

### **Construction BMPs:**

Construction stormwater BMPs will include silt fence and other appropriate BMPs, as necessary.

Project Length/Area:

2 acres (approximate) (or 9,700 SY)

## Photographs/Graphics:







**Anticipated Labor Source:** 

City Crews / Contractor / Volunteers

**Cost Estimate:** 

\$ 43,000

**Operations & Maintenance Impact:** 

**INCREASE** 

Project No.: C-11

Project: Vegetation Enhancement - select areas of Romanelli Park

Project Area: Romanelli Park
Priority: Long-Term

Item	Improvement Description	Quantity	Unit	Unit	Price	To	tal Cost	
1	Vegetation Enhancement - Soil(2")+Compost(2")	9,700	SY	\$	3	\$	29,100	
2	Silt Fence	400	LF	\$	4	\$	1,600	
	* - area is estimated at approx. 2.0 acres	Enginee	ring Design		ruction		30,700 3,991	
	- area is estimated at approx. 2.0 acres		0 0	Constructio	` ´r	Marie No. 10	34,691	
4.			Co	ntingency	(25%)	\$	8,673	
		· T	otal Projec	t Estimat	ed Cost	\$	43,364	
		PL.	PLANNING PROJECT COST					

Project Type: VEGETATION ENHANCEMENT

## C-12. VEGETATION ENHANCEMENT – around the Joe Ramos Center area

Project Priority: LONG-TERM Related Projects:

Project Location: Joe Ramos Center

## **Project Description:**

Project includes the improvement and/or establishment of vegetative cover in and around the project area located adjacent to the Joe Ramos Center, along the left bank of San Felipe Creek (SFC). Project will include vegetation enhancement including importing top soil, organic material (compost), and the use of fiber rolls/blanket and/or plastic "geogrid" reinforcement for structural support of the soil.

## **Design/Construction Issues:**

### **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as
  possible and should be conducted in a manner that minimized soil disturbance.

### **Project Options:**

- Options include the importation of soil and soil materials suitable for the establishment of a high-quality soil matrix.
- Vegetation should include appropriate native grasses and plants.

## **Construction BMPs:**

Construction stormwater BMPs will include silt fence and other appropriate BMPs, as necessary.

Project Length/Area: 10,150 SY (or approx. 2.10 acres)

## Photographs/Graphics:







Anticipated Labor Source: City Crews / Contractor / Volunteers

Cost Estimate: \$ 60,000 Operations & Maintenance Impact: INCREASE

Project No.: C-12

Project: Vegetation Enhancement - area around the Joe Ramos Center

Project Area: Joe Ramos Center

Item	Improvement Description	Quantity	Unit	Unit Price		To	tal Cost
1	Vegetation Enhancement - Soil(2")+Compost(2")+SRB	10,150	SY	\$	4	\$	40,600
2	Silt Fence	400	LF	\$	4	\$	1,600
		Construction					42,200
	* - SRB = soil retention blanket	Enginee	it (13%)	S	5,486		
		Total E	stimated C	onstructi	ion Cost	\$	47,686
			Co	ntingency (25%)		\$	11,922
		Т	otal Projec	t Estimat	ted Cost	S	59,608
		PL	ANNING P	ROJECT	r cost	\$	60,000

Project Type: VEGETATION ENHANCEMENT

## C-13. VEGETATION ENHANCEMENT – around the Amphitheater area

Project Priority: LONG-TERM Related Projects:

**Project Location:** Amphitheater

## **Project Description:**

Project includes the improvement and/or establishment of vegetative cover in and around the project area located adjacent to the Amphitheater, along the left bank of San Felipe Creek (SFC). Project will include vegetation enhancement including importing top soil, organic material (compost), and the use of fiber rolls/blanket and/or plastic "geogrid" reinforcement for structural support of the soil.

## **Design/Construction Issues:**

### **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as possible and should be conducted in a manner that minimized soil disturbance.

## **Project Options:**

- Options include the importation of soil and soil materials suitable for the establishment of a high-quality soil matrix.
- Vegetation should include appropriate native grasses and plants.

### **Construction BMPs:**

Construction stormwater BMPs will include silt fence and other appropriate BMPs, as necessary.

**Project Length/Area:** 

5,140 SY (or approx. 1.06 acres)

## Photographs/Graphics:







Anticipated Labor Source: City Crews / Contractor / Volunteers

Cost Estimate: \$ 31,000 Operations & Maintenance Impact: INCREASE

Project No.: C-13

Project: Vegetation Enhancement - area around the Amphitheater

Project Area: Amphitheater
Priority: Long-Term

Item	Improvement Description	Quantity	Unit	Unit Price		To	Total Cost	
1	Vegetation Enhancement - Soil(2")+Compost(2")+SRB	5,140	SY	\$	4	\$	20,560	
2	Silt Fence	400	LF	\$	4	\$	1,600	
				\$	22,160			
	* - SRB = soil retention blanket	Enginee	ring Design	n & Mgm	t (13%)	\$	2,881	
		Total E	Stimated C	Constructi	on Cost	S	25,041	
			Co	ntingenc	y (25%)	\$	6,260	
		Т	otal Projec	t Estimat	ted Cost	\$	31,301	
		PL	ANNING P	ROJECT	COST	\$	31,000	

Project Type: VEGETATION ENHANCEMENT

C-14. VEGETATION ENHANCEMENT – along left bank area of SFC, between the Dr. F. Calderon Blvd. Bridge and the Romanelli Park Footbridge

Project Priority: LONG-TERM Related Projects:

Project Location: just north of the Joe Ramos Center

## **Project Description:**

Project includes the improvement and/or establishment of a vegetative cover along the left bank area of San Felipe Creek (SFC) between the Dr. F. Calderon Blvd. Bridge and the Romanelli Park Footbridge. Project will include vegetation enhancement including importing top soil, organic material (compost), and the use of fiber rolls/blanket and/or plastic "geogrid" reinforcement for structural support of the soil.

## **Design/Construction Issues:**

### **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as possible and should be conducted in a manner that minimized soil disturbance.

### **Project Options:**

- Options include the importation of soil and soil materials suitable for the establishment of a high-quality soil matrix.
- Vegetation should include appropriate native grasses and plants.

### **Construction BMPs:**

Construction stormwater BMPs will include silt fence and other appropriate BMPs, as necessary.

Project Length/Area:

2,670 SY (or approx. 0.55 acres)

## Photographs/Graphics:







Anticipated Labor Source: City Crews / Contractor / Volunteers

Cost Estimate: \$ 44,000 Operations & Maintenance Impact: INCREASE

Project No.: C-14

Project: Vegetation Enhancement - left bank area of SFC, between the Calderon Blvd. Bridge & the Romanelli Park Footbridge

Project Area: Joe Ramos Center

Item	Improvement Description	Quantity	Unit	Unit Price		To	tal Cost
1	Vegetation Enhancement - Soil (4") + Compost (4") + SRB	2,670	SY	\$	11	\$	29,370
2	Silt Fence	500	LF	\$	4	\$	2,000
	* - SRB = soil retention blanket	Enginee	Construction Engineering Design & Mgmt (13%)				31,370 4,078
		Total E	Estimated C	onstruct	ion Cost	\$	35,448
			Co	ntingenc	y (25%)	\$	8,862
		1	otal Projec	t Estima	ted Cost	\$	44,310
		PL	ANNING P	ROJEC	T COST	S	44,000

Project Type: STORMWATER BMP / BANK IMPROVEMENTS

C-15. BANK STABILIZATION / PERVIOUS PARKING AREA – under the Dr. F. Calderon Blvd. Bridge crossing SFC

Project Priority: SHORT-TERM Related Projects:

Project Location: Romanelli Park

## **Project Description:**

Project includes the stabilization of the stream banks along both banks of San Felipe Creek (SFC) where it crosses underneath the Dr. F. Calderon Blvd. Bridge. This area will likely require the use of engineered bank stabilization methods including rock gabions, engineered bank systems, or structural walls. The installation of a parking area under the existing bridge should include an engineered pervious pavement system designed and installed according to manufacturer's recommendations and recognized engineering design standards. Bank stabilization is these areas should follow cane eradication efforts upstream of the project area. Pervious Prkng Area of approx. 0.35 ac.

## **Design/Construction Issues:**

### **Known Constraints:**

- Construction site is located on the banks of a creek that provides habitat to Threatened and/or Endangered Species that have been identified by the USFWS.
- Activities should proceed, as necessary, following the eradication of river cane along the banks of the project area
  and in the area of San Felipe Country Club Golf Course (see Projects A-1 to A-6, and B-2).

## **Project Options:**

- Project area to be evaluated by a professional engineer for appropriate stabilization methods.
- Bank stabilization options may include structural walls, rock gabions, or other methods appropriate to the site conditions.
- Identified pervious pavement options include pervious concrete, a gravel/geogrid system (GravelPave®, etc...).
- System should be designed to detain stormwater for up to the 25-yr storm event.
- Areas within the defined project boundaries not suitable for pervious pavement should be provided with vegetation enhancement, including an improved soil matrix, along with appropriate native grasses and plants.

### **Construction BMPs:**

Coffer Dams or inflatable barriers will be needed to prevent or limit the amount of sediment or suspended soils
created by construction activities; Silt fence, temporary stabilized construction entrance(s), and other appropriate
Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area: 190 ft. [total bnk lngth = 190' (95' ea. side) + Perv Prkng Area of approx. 15,000 sq.ft.]

## Photographs/Graphics:







Anticipated Labor Source: City Crews / Contractor / Volunteers

Cost Estimate: \$ 350,000 Operations & Maintenance Impact: DECREASE

Project No.: C-15

Project: Bank Stabilization / Pervious Park Area - under the Calderon Blvd. Bridge across SFC

Project Area: Between Moore Park & Joe Ramos Center

Priority: Short-Term

Item	Improvement Description	Quantity	Unit	Un	it Price	To	tal Cost
1	Bank Improvements - Rock Gabions (4' high)*	190	LF	\$	180	\$	34,200
2	Fill/Embankment	500	CY	\$	30	\$	15,000
3	Pervious Concrete	15,000	SF	\$	10	\$	150,000
4	Wheel Stops (based on 1 / 440 sf of property)	34	EA	\$	200	\$	6,818
5	Striping (based on 1 / 440 sf of property)	34	EA	\$	5	\$	170
6	Stabilized Construction Entrance	1	EA	\$	1,000	\$	1,000
7	Silt Fence	200	LF	\$	4	\$	800
8	In-Stream Coffer Dam (w/ dewatering)	200	LF	\$	200	\$	40,000
				Con	struction	\$	247,989
	* - based on each bank at approx. 95 feet long	Enginee	ring Desigi	a & Mg	mt (13%)	\$	32,239
		Total E	stimated C	onstruc	tion Cost	\$	280,227
			Co	ntingen	cy (25%)	\$	70,057
		Т	otal Projec	t Estim	ated Cost	\$	350,284
		PL	ANNING P	ROJEC	CT COST	S	350,000

C-16. BANK STABILIZATION – along the left bank of SFC, between the Dr. F. Calderon Bridge and the Romanelli Park Footbridge

**Project Priority:** 

**LONG-TERM** 

**Related Projects:** 

C-6,C-17

**Project Location:** 

just north of the Joe Ramos Center

## **Project Description:**

Project includes the stabilization of the stream bank along the left bank of San Felipe Creek (SFC) from the Dr. F. Calderon Bridge to the Romanelli Park Footbridge. Stabilization may include a variety of methods including grading, establishment of vegetation, the improvement of soil organics, structural stability including fiber mats, plastic geogrid systems, and other options, up to and including the installation of structural walls. For this area, the establishment of a natural, riparian area is desired, however, an engineering evaluation should be performed to ensure that a proper and reasonable solution is proposed. Bank stabilization is these areas should follow cane eradication efforts upstream of the project area.

## **Design/Construction Issues:**

### **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Bank area should be evaluated; if necessary, structural bank improvements should be installed to prevent erosion/bank failure issues.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as possible and should be conducted in a manner that minimized soil disturbance.
- Armored catfish pose a threat to the damage/destruction of the proposed improvements. If necessary, proposed improvements should be designed to minimize potential damage by the catfish.

### **Project Options:**

- Options include the importation of soil and soil materials suitable for the establishment of a high-quality soil matrix.
- Vegetation should include appropriate native grasses and plants.

### **Construction BMPs:**

- Coffer Dams or inflatable barriers will be needed to prevent or limit the amount of sediment or suspended soils
  created by construction activities.
- Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area:

600 feet

## Photographs/Graphics:







**Anticipated Labor Source:** 

City Crews / Contractor / Volunteers

Cost Estimate: \$ 220,000

**Operations & Maintenance Impact:** 

**NO CHANGE** 

Project No.: C-16

Project: Bank Stabilization - along the left bank of SFC, between the Calderon Blvd. Bridge & the Romanelli Park Footbridge

Project Area: Joe Ramos Center

Item	Improvement Description	Quantity	Unit	Uni	t Price	To	tal Cost
1	Bank Improvements - Vegetation II + Geogrid*	. 600	LF	\$	90	\$	54,000
2	Bank Improvements - 2' Rock Gabion*	600	LF	\$	115	\$	69,000
3	Silt Fence	600	LF	\$	4	\$	2,400
4	In-Stream Barrier/Curtain	600	LF	\$	50	\$	30,000
	* - bank of SFC in this area is approx. 600 ft. in length	Enginee	ering Desigi	34.5	struction at (13%)		155,40 20,20
		Total E	Stimated C	onstruct	ion Cost	S	175,602
			Co	ntingeno	y (25%)	S	43,901
		T	otal Projec	t Estima	ted Cost	S	219,503
		PI.	ANNING P	ROJEC	TCOST	\$	220,000

# C-17. BANK STABILIZATION – Left Bank of SFC, approximately 225 feet downstream of the Dr. F. Calderon Blvd. Bridge

Project Priority: LONG-TERM Related Projects: C-6, C-16

Project Location: just north of the Joe Ramos Center

### **Project Description:**

Project includes the stabilization of the left bank of San Felipe Creek (SFC), approximately 225 feet downstream of the Dr. F. Calderon Blvd. Bridge. There is currently severe bank failure in this area that threatens the stability of the existing hike & bike trail. The project will likely require the use of engineered bank stabilization methods including rock gabions, engineered bank systems, or structural walls. An engineering evaluation should be performed to ensure that a proper and reasonable solution is proposed. The proposed wall system should be both esthetically pleasing and environmentally friendly.

### **Design/Construction Issues:**

### **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as
  possible and should be conducted in a manner that minimized soil disturbance.
- Armored catfish pose a threat to the damage/destruction of the proposed improvements. If necessary, proposed improvements should be designed to minimize potential damage by the catfish.

### **Project Options:**

 A combination of manual and mechanical labor will likely be necessary to accomplish the removal operation in accordance with USFWS requirements.

### **Construction BMPs:**

- A coffer dam or in-stream barrier will be needed to avoid the potential for suspended solids being introduced in the creek; water-filled portable coffer dams or other temporary measures should be considered.
- Construction stormwater BMPs will include silt fence and other appropriate BMPs, as necessary.

Project Length/Area: 100 feet

## Photographs/Graphics:







Anticipated Labor Source: City Crews / Contractor / Volunteers

Cost Estimate: \$ 98,000 Operations & Maintenance Impact: NO CHANGE

Project No.: C-17

Project: Bank Stabilization - left bank of SFC, approx. 225 feet downstream of Calderon Blvd. Bridge

Project Area: Joe Ramos Center

Item	Improvement Description	Quantity	Unit	Un	it Price	To	tal Cost
1	Bank Improvements - Structural Walls IV [ 6' - 8' ]*	100	LF	\$	480	\$	48,000
2	Stabilized Construction Entrance	1	EA	\$	1,000	\$	1,000
3 .	Silt Fence	100	LF	\$	4	\$	400
4	In-Stream Coffer Dam (w/ dewatering)	100	LF	\$	200	\$	20,000
				Cor	struction	\$	69,400
	* - spot repair of existing failing bank area (approx. 100 ft.)	Enginee	ring Desig	n & Mg	mt (13%)	\$	9,022
W.		Total E	stimated C	onstru	ction Cost	\$	78,422
			Co	ntinger	icy (25%)	\$	19,606
		Т	otal Projec	t Estim	ated Cost	S	98,028
		PL	ANNING I	ROJE	CT COST	S	98,000

C-18. BANK STABILIZATION – along the right bank of SFC, between the Dr. F. Calderon Bridge and the Romanelli Park Footbridge

Project Priority: LONG-TERM Related Projects:

Project Location: adjacent to Romanelli Park

## **Project Description:**

Project includes the stabilization of the stream bank along the right bank of San Felipe Creek (SFC) from the Dr. F. Calderon Bridge to the Romanelli Park Footbridge. Stabilization may include a variety of methods including grading, establishment of vegetation, the improvement of soil organics, structural stability including fiber mats, plastic geogrid systems, and other options, up to and including the installation of structural walls. For this area, the establishment of a natural, riparian area is desired, however, an engineering evaluation should be performed to ensure that a proper and reasonable solution is proposed. Bank stabilization is these areas should follow cane eradication efforts upstream of the project area.

### **Design/Construction Issues:**

### **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Bank area should be evaluated; if necessary, structural bank improvements should be installed to prevent erosion/bank failure issues.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as possible and should be conducted in a manner that minimized soil disturbance.
- Armored catfish pose a threat to the damage/destruction of the proposed improvements. If necessary, proposed improvements should be designed to minimize potential damage by the catfish.

### **Project Options:**

- Options include the importation of soil and soil materials suitable for the establishment of a high-quality soil matrix.
- Vegetation should include appropriate native grasses and plants.

### **Construction BMPs:**

- Coffer Dams or inflatable barriers will be needed to prevent or limit the amount of sediment or suspended soils
  created by construction activities.
- Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area:

1.000 feet

## Photographs/Graphics:







Anticipated Labor Source: City Crews / Contractor / Volunteers

Cost Estimate: \$ 460,000 Operations & Maintenance Impact:

NO CHANGE

Project No.:

Project:

Bank Stabilization - along the right bank of SFC, between the Calderon Blvd. Bridge & the Romanelli Park Footbridge

Project Area: Joe Ramos Center

Priority:

Long-Term

Item	Improvement Description	Quantity	Unit	Uni	t Price	To	otal Cost
1	Bank Improvements - Vegetation II + Geogrid*	1,000	LF	\$	90	\$	90,000
2	Bank Improvements - 4' Rock Gabion*	1,000	LF	\$	180	\$	180,000
3 .	Silt Fence	1,000	LF	\$	4	\$	4,000
4	In-Stream Barrier/Curtain	1,000	LF	\$	50	\$	50,000
	* - bank of SFC in this area is approx. 1,000 ft. in length		ı & Mgn		\$	324,000 42,120 366,120	
			Co	ntingeno	y (25%)	\$	91,530
		Total Project Estimated Cost					457,650
		PLANNING PROJECT COST				S	460,000

# C-19. BANK STABILIZATION – along the left bank of SFC, between the Amphitheater and the Gillis St. Bridge (across from Memo's)

Project Priority: LONG-TERM Related Projects: C-8, C-9, C-20

Project Location: immediately downstream of the Amphitheater

### **Project Description:**

Project includes the stabilization of the stream bank along the left bank of San Felipe Creek (SFC) from the Amphitheater to the Gillis St. Bridge. Stabilization may include a variety of methods including grading, establishment of vegetation, the improvement of soil organics, structural stability including fiber mats, plastic geogrid systems, and other options. For this area, the establishment of a natural, riparian area is desired, so the utilization of structural walls should be avoided. Bank stabilization is these areas should follow cane eradication efforts upstream of the project area.

## **Design/Construction Issues:**

### **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as
  possible and should be conducted in a manner that minimized soil disturbance.
- Armored catfish pose a threat to the damage/destruction of the proposed improvements. If necessary, proposed improvements should be designed to minimize potential damage by the catfish.

### **Project Options:**

- Options include the importation of soil and soil materials suitable for the establishment of a high-quality soil matrix.
- Vegetation should include appropriate native grasses and plants.
- Structural enhancement of the soil is desired in this location including the use of plastic "geogrid" systems and/or fiber mats/rolls.

#### **Construction BMPs:**

- Coffer Dams or inflatable barriers will be needed to prevent or limit the amount of sediment or suspended soils
  created by construction activities.
- Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area: 910

## Photographs/Graphics:





feet



Anticipated Labor Source: City Crews / Contractor / Volunteers

Cost Estimate: \$ 335,000 Operations & Maintenance Impact: DECREASE

Project No.: C-19

Project: Bank Stabilization - along the left bank of SFC, between the Amphitheater & the Gillis St. Bridge

Project Area: Joe Ramos Center
Priority: Long-Term

Item	Improvement Description	Quantity	Unit	Uni	t Price	To	otal Cost
1	Bank Improvements - Vegetation II + Geogrid*	910	LF	\$	90	\$	81,900
2	Bank Improvements - 2' Rock Gabion*	910	LF	\$	115	\$	104,650
3	Silt Fence	910	LF	\$	4	\$	3,640
4	In-Stream Barrier/Curtain	910	LF	\$	50	\$	45,500
	* - bank of SFC in this area is approx. 910 ft. in length	Enginee	ring Desig	11.71	struction nt (13%)		235,690 30,640
		Total E	stimated C	onstruct	ion Cost	S	266,330
			Co	ntingen	ey (25%)	s	66,582
		T	otal Projec	t Estima	ted Cost	S	332,912
		PL	ANNING P	ROJEC	T COST	\$	335,000

# C-20. INSTALL FOCUSED ACCESS FEATURES – Left Bank of SFC, between the Amphitheater and the Gillis St. Bridge

**Project Priority:** 

LONG-TERM

**Related Projects:** 

C-8, C-9, C-19

**Project Location:** 

immediately downstream of the Amphitheater

## **Project Description:**

Project includes the construction of three (3) Focused Access Features along the left bank of San Felipe Creek (SFC), between the Amphitheater and the Gillis St. Bridge. The Focused Access Feature will provide a defined location for public access to SFC, and will help reduce environmental impacts of pedestrian foot traffic.

## **Design/Construction Issues:**

### **Known Constraints:**

- Project should be constructed in conjunction with projects C-8/C-9 (Existing Wall Removal) and C-19 (Bank Stabilization).
- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as
  possible and should be conducted in a manner that minimized soil disturbance.
- Armored catfish pose a threat to the damage/destruction of the proposed improvements. If necessary, proposed improvements should be designed to minimize potential damage by the catfish.

## **Project Options:**

Project may include an access ramp (ADA accessible) and/or stairs. Variance may be required from TDLR if ADA access not provided.

### **Construction BMPs:**

 A coffer dam or in-stream barrier will be needed to avoid the potential for suspended solids being introduced in the creek; water-filled portable coffer dams or other temporary measures should be considered.

Project Length/Area:

3 each

### Photographs/Graphics:







**Anticipated Labor Source:** 

City Crews / Contractor / Volunteers

Cost Estimate:

\$ 325,000

**Operations & Maintenance Impact:** 

**DECREASE** 

Project No.:

Project:

Install Focused Access Features - left bank of SFC, between the Amphitheater & the Gillis St. Bridge

Project Area: Amphitheater Priority: Long-Term

Item	Improvement Description	Quantity	Unit	Uı	nit Price	To	tal Cost
1	Focused Access Feature*	3	EA	\$	60,000	\$	180,000
2	Stabilized Construction Entrance	1	EA	\$	1,000	\$	1,000
3	Silt Fence	600	LF	\$	. 4	\$	2,400
4	In-Stream Coffer Dam (w/ dewatering)	240	LF	\$	200	\$	48,000
					nstruction		231,400
	* - assumes three (3) individual focused access features	Engineering Design & Mgmt (13%)					30,08
	** - dewatering for 80 LF at each construction site	Total E	\$	261,48			
	Contingency (25%)						
		Т	otal Projec	t Estin	nated Cost	\$	326,85
		PL.	S	325,000			

# C-21. BANK STABILIZATION / FOCUSED ACCESS FEATURE INSTALLATION – under the Gillis St. Bridge crossing SFC

**Project Priority:** 

SHORT-TERM

**Related Projects:** 

**Project Location:** 

Gillis St. @ San Felipe Creek (across from Memo's)

## **Project Description:**

Project includes the stabilization of the left bank of San Felipe Creek (SFC) where it crosses underneath the Gillis St. Bridge. Stabilization may include a variety of methods including grading, installation of rock rip rap, or some other appropriate engineered solution. This area may require the use of engineered bank stabilization methods including rock gabions, stone walls, engineered bank systems, or structural walls. The installation of a focused access feature suitable for providing pedestrian access to SFC is also part of this project. Bank stabilization is this area should follow cane eradication efforts upstream of the project area.

## **Design/Construction Issues:**

#### **Known Constraints:**

- Construction site is located on the banks of a creek that provides habitat to Threatened and/or Endangered Species
  that have been identified by the USFWS.
- Improvements should be designed to provide easy access to the creek for park visitors by use of steps or ramps.
- Providing ADA access <u>may</u> be required consultation with the Texas Department of Licensing and Regulation (TDLR) is recommended prior to design/construction.

### **Project Options:**

- Project area to be evaluated by a professional engineer for appropriate stabilization methods.
- Bank stabilization options may include structural walls, rock gabions, rock walls, or other methods appropriate to the site conditions.

### **Construction BMPs:**

Coffer Dams or inflatable barriers will be needed to prevent or limit the amount of sediment or suspended soils
created by construction activities; Silt fence, temporary stabilized construction entrance(s), and other appropriate
Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area:

1 each (includes approx. 50 linear feet of bank area)

## Photographs/Graphics:







Anticipated Labor Source: City Crews / Contractor / Volunteers

Cost Estimate: \$ 110,000

**Operations & Maintenance Impact:** 

**DECREASE** 

Project No.:

C-21

Project: Bank Stabilization / Focused Access Feature Installation - left bank of SFC, under Gillis St. Bridge

Project Area: Gillis St. @ San Felipe Creek (across from Memo's)

Priority: Short-Term

Item	Improvement Description	Quantity	Quantity Unit Unit Price		To	tal Cost	
1	Focused Access Feature	1	EA	\$	60,000	\$	60,000
2	Stabilized Construction Entrance	1	EA	\$	1,000	\$	1,000
3	Silt Fence	200	LF	\$	4	\$	800
4	In-Stream Coffer Dam (w/ dewatering)	80	LF	\$	200	\$	16,000
				Co	nstruction	\$	77,800
		Enginee	ring Design	1 & Mg	gmt (13%)	\$	10,114
		Total E	stimated C	onstru	ction Cost	\$	87,914
			Co	ntinge	ncy (25%)	\$	21,979
			-4-1 D	· E ·	atad Cost	•	100.003
			otal Projec	t Estin	iated Cost	2	109,893

# C-22. BANK STABILIZATION / CHANNEL IMPROVEMENTS – along the drainage channel at the end of Calderon Lane (from SFC to upstream to Ogden St.)

Project Priority: LONG-TERM Related Projects:

Project Location: adjacent to Memo's & Roosevelt Park

## **Project Description:**

Project includes the stabilization of the bank areas and improvement of the existing drainage channel that begins at the end of Calderon Lane. The channel runs from San Felipe Creek (SFC) upstream to Ogden St. (next to Roosevelt Park). Stabilization may include a variety of methods including grading, establishment of vegetation, the improvement of soil organics, structural stability including fiber mats, plastic geogrid systems, and other options, up to and including the installation of structural walls. For this area, the establishment of a natural, riparian area is desired, however, an engineering evaluation should be performed to ensure that a proper and reasonable solution is proposed. Bank stabilization is these areas should follow cane eradication efforts upstream of the project area.

### **Design/Construction Issues:**

### **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Armored catfish pose a threat to the damage/destruction of the proposed improvements. If necessary, proposed improvements should be designed to minimize potential damage by the catfish.
- Bank area should be evaluated if necessary, structural bank improvements should be installed to prevent erosion/bank failure issues; To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as possible and should be conducted in a manner that minimized soil disturbance.

### **Project Options:**

- Options include the importation of soil and soil materials suitable for the establishment of a high-quality soil matrix.
- Vegetation should include appropriate native grasses and plants.
- Structural walls may be necessary, however, a natural riparian area is desired.

### **Construction BMPs:**

- Coffer Dams or inflatable barriers will be needed to prevent or limit the amount of sediment or suspended soils created by construction activities.
- Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used
  around the construction site in accordance with TCEQ requirements.

Project Length/Area:

1,800 feet

## Photographs/Graphics:







Anticipated Labor Source: <u>City Crews</u> / <u>Contractor</u> / Volunteers

Cost Estimate: \$ 99,000 Operations & Maintenance Impact:

**NO CHANGE** 

Project No.: C-2

Project: Bank Stabilization / Channel Improvements - along drainage channel at end of Calderon Ln. (from SFC to Ogden St.)

Project Area: Memo's & Roosevelt Park

Item	Improvement Description	Quantity Unit Unit Price	Price	To	tal Cost		
1	Vegetation Enhancement - Soil (4") + Compost (4") + Geogrid*	6,000	SY	\$	11	\$	66,000
2	Silt Fence	1,000	LF	\$	4	\$	4,000
				Cons	truction	S	70,000
	* - area is approx. 2 (both banks) x 15' x 1800' = 6,000 SY	Enginee	ring Desigr	& Mgm	t (13%)	\$	9,10
		Total Estimated Construct	onstructi	on Cost	t S	79,10	
			Co	ntingenc	y (25%)	\$	19,77
7		T	otal Projec	t Estimat	ted Cost	\$	98,87
		PLANNING PROJECT C		COST	S	99,000	

# C-23. BRIDGE REPLACEMENT / BANK STABILIZATION – Existing Romanelli Park Footbridge across SFC

Project Priority: LONG-TERM Related Projects:

Project Location: Romanelli Park / Joe Ramos Center area

## **Project Description:**

Project includes the replacement of the existing Romanelli Park Footbridge across San Felipe Creek (SFC). The project will include the complete replacement of the existing bridge, reconstruction of the bridge abutments, and stabilization of the stream banks. Bank stabilization should include installation of structural improvements that will prevent the erosion of the creek bank in the areas immediately upstream and downstream of the bridge. The exact distance of stabilization has not been determined, but should be evaluated by a professional engineering. At this time it is estimated that stabilization efforts could extend 100 feet upstream and downstream of the footbridge. Bank Stabilization methods should include the most environmentally friendly and esthetically pleasing methods appropriate for the Del Rio, Texas area. The project also includes the installation of ADA ramps and railings necessary to comply with the requirements of the Texas Accessibility Standards (TAS).

## **Design/Construction Issues:**

### **Known Constraints:**

- Construction site is located on the banks of a creek that provides habitat to Threatened and/or Endangered Species
  that have been identified by the USFWS.
- Construction operations should minimize or eliminate the possibility of undesirable materials falling into the waters
  of San Felipe Creek.
- All improvements should provide ADA access. Improvements should meet the requirements found in the Texas Accessibility Standards (TAS) administered by the Texas Department of Licensing and Registrations (TDLR). Review and approval by a Registered Accessibility Specialist (RAS) will likely be required.

### **Project Options:**

Bank stabilization options may include structural walls, rock gabions, or other methods appropriate to the site conditions.

### **Construction BMPs:**

Coffer Dams or inflatable barriers will be needed to prevent or limit the amount of sediment or suspended soils
created by construction activities; silt fence, temporary stabilized construction entrance(s), and other appropriate
Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area:

60 feet [Bridge is approx. 60 feet long & 14 feet wide]

### Photographs/Graphics:







Anticipated Labor Source: City Crews / Contractor / Volunteers

Cost Estimate: \$ 645,000 Operations & Maintenance Impact:

**NO CHANGE** 

Project No.: C-23

Project: Bridge Replacement/Bank Stabilization - Existing Romanellis Park Footbridge across SFC

Project Area: Romanelli Park
Priority: Long-Term

ltem	Improvement Description	Quantity	Unit	U	nit Price	To	otal Cost
1	Demolition - Existing Concrete Footbridge (walkway)	840	SF	\$	25	\$	21,000
2	Demolition - Existing Concrete Footbridge (abutments)	2	EA	\$	10,000	\$	20,000
3	Bank Improvements - Footbridge III (14' wide)	60	LF	\$	2,800	\$	168,000
4	Bank Improvements - Bridge Abutments (> 40' for 14' bridge)	1	LS	\$	150,000	\$	150,000
5	Bank Improvements - Vegetation II + Geogrid [50' right bank]	80	LF	\$	90	\$	7,200
6	Bank Improvements - 6' Rock Gabion [50' right bank]	80	LF	\$	250	\$	20,000
7	Bank Improvements - Vegetation 120 + Geogrid [50' left bank]	80	LF	\$	90	\$	7,200
8	Bank Improvements - 6' Rock Gabion [50' right bank]	80	LF	\$	250	\$	20,000
9	Stabilized Construction Entrance	1	EA	\$	1,000	\$	1,000
10	Silt Fence	200	LF	\$	4	\$	800
11	In-Stream Coffer Dam (w/ dewatering) [100' along both banks]	200	LF	\$	200	\$	40,000
			Construction				455,200
	* - bank stabilization for 25' upstream/downstream of bridge	Enginee	ring Desig	1 & M	gmt (13%)	\$	59,176
w. 9- L		Total E	stimated C	onstru	iction Cost	\$	514,376
1, 115			Co	ntinge	ency (25%)	\$	128,594
		T	otal Projec	t Estir	nated Cost	\$	642,970
		PL	ANNING P	ROJE	CT COST	S	645,000

# C-24. REHABILITATION OF CONCRETE SLAB / INSTALLATION OF SHADE STRUCTURE/PAVILION – ROMANELLI PARK

Project Priority: LONG-TERM Related Projects:

Project Location: Romanelli Park

### **Project Description:**

Project includes the rehabilitation of an existing concrete slab for use as a pavilion/group gathering area. The project would also include installation of a shade structure/pavilion over the concrete slab.

## **Design/Construction Issues:**

### **Known Constraints:**

- Construction site is located on the banks of a creek that provides habitat to Threatened and/or Endangered Species
  that have been identified by the USFWS.
- Park improvements should provide ADA access. Improvements must meet the requirements found in the Texas Accessibility Standards (TAS) administered by the Texas Department of Licensing and Registrations (TDLR). Review and approval by a Registered Accessibility Specialist (RAS) will likely be required.

### **Project Options:**

- Existing slab should be evaluated for use by an engineer; existing slab may be modified for use or demolished and replaced.
- The shade structure/pavilion should be designed by an engineer.

### **Construction BMPs:**

 Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area: 3,100 sq. ft.

### Photographs/Graphics:







Anticipated Labor Source: <u>City Crews / Contractor / Volunteers</u>

Cost Estimate: \$ 190,000 Operations & Maintenance Impact: NO CHANGE

Project No.:

C-24

Project:

Rehabilitation of Existing Concrete Slab & Installation of Shade Structure, in Romanelli Park

Project Area: Romanelli Park

Priority:

Long-Term

Item	Improvement Description	Quantity	Unit	Un	it Price	To	tal Cost
1	Rehabilitation of Existing Concrete Slab*	2,975	SF	\$	5	\$	14,875
2	Shade Structure*	2,975	EA	\$	40	\$	119,000
3	Stabilized Construction Entrance	1	EA	\$	1,000	\$	1,000
4	Silt Fence	200	LF	\$	4	\$	800
					struction		135,675
	* - area of concrete slab & shade structure is approx. 35' x 85'	Enginee	ring Design	n & Mg	mt (13%)	\$	17,638
*		Total E	stimated C	Construc	tion Cost	\$	153,313
3			Co	ntingen	cy (25%)	\$	38,328
		T	otal Projec	t Estim	ated Cost	\$	191,641
1		PL	ANNING P	ROJEC	CT COST	\$	190,000

STORMWATER BMP **Project Type:** 

#### INSTALL NEW PERVIOUS PAVEMENT PARKING AREA – adjacent to the Joe C-25. Ramos Center

**Project Priority: LONG-TERM Related Projects:** 

**Project Location:** adjacent to the Joe Ramos Center

## **Project Description:**

Project includes the installation of a pervious pavement parking area just north of the Joe Ramos Center, off of E. De La Rosa St. An engineered pervious pavement system should be designed and installed according to manufacturer's recommendations and recognized engineering design standards.

## **Design/Construction Issues:**

#### **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as possible and should be conducted in a manner that minimized soil disturbance.

#### **Project Options:**

- Identified pervious pavement options include pervious concrete, a gravel/geogrid system (GravelPave®, etc...).
- System should be designed to detain stormwater up to the 25-yr storm event.
- Underdrain system should outfall via sheet flow to a vegetative filter strip area.
- On areas within the defined project boundaries not suitable for pervious pavement should be provided with vegetation enhancement, including an improved soil matrix, along with appropriate native grasses and plants.

## **Construction BMPs:**

 Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area:

98,713 sq. ft. ( or approx. 2.27 acres)

## Photographs/Graphics:







City Crews / Contractor / Volunteers **Anticipated Labor Source:** 

\$ 1,290,000 **Operations & Maintenance Impact: Cost Estimate:** 

Project No.: C-25

Project: Install New Pervious Parking Area, adjacent to Joe Ramos Center

Project Area: Joe Ramos Center

Priority: Long-Term

Item	Improvement Description	Quantity	Unit	Un	it Price	T	otal Cost
1	Clearing, Grubbing & Subgrade Preparation	98,713	SF	\$	0.10	\$	9,871
2	Excavation & Haul-Off of Existing Surface Material (12" depth)	3,656	CY	\$	20	\$	73,121
3	Pervious Concrete	78,970	SF	\$	10	\$	789,704
4	Wheel Stops (based on 1 / 440 sf of property)	179	EA	\$	200	\$	35,896
5	Striping (based on 1 / 440 sf of property)	179	EA	\$	5	\$	897
6	Silt Fence	500	LF	\$	4	\$	2,000
7	Stabilized Construction Entrance	1	EA	\$	1,000	\$	1,000
	* - assume pervious parking on 80% of total area		ering Design	n & Mg		\$	912,489 118,624 1,031,113
					icy (25%)	20222400	257,778
		1	otal Projec	t Estim	ated Cost	S	1,288,891
. 7		PL	ANNING P	ROJE	CT COST	s	1,290,000

Project No.: C-25 - Alternative [GravelPave System instead of Pervious Concrete]

Project: Install New Pervious Parking Area, adjacent to Joe Ramos Center

Project Area: Joe Ramos Center
Priority: Long-Term

Item	Improvement Description	Quantity	Unit	Un	it Price	To	tal Cost
1	Clearing, Grubbing & Subgrade Preparation	98,713	SF	\$	0.10	\$	9,871
2	Excavation & Haul-Off of Existing Surface Material (12" depth)	3,656	CY	\$	20	\$	73,121
3	GravelPave System instead of Pervious Concrete	78,970	SF	\$	5	\$	394,852
4	Wheel Stops (based on 1 / 440 sf of property)	179	EA	\$	200	\$	35,89
- 5	Striping (based on 1 / 440 sf of property)	179	EA	\$	5	\$	89
6	Silt Fence	500	LF	\$	- 4	\$	2,00
7	Stabilized Construction Entrance	1	EA	\$	1,000	\$ .	1,00
	* - assume pervious parking on 80% of total area	Enginee	ring Desigi		struction mt (13%)	-	517,63° 67,29
		Total E	stimated C	onstruc	tion Cost	S	584,93
Annual passes			Co	ntingen	cy (25%)	S	146,23
		T	otal Projec	t Estim	ated Cost	S	731,16
-			ANNING P	The state of the s	Charles and the Control of the Contr	CONTRACTOR DESCRIPTION OF THE PERSON NAMED IN COLUMN TWO	730,00

Project Type: PARK IMPROVEMENT

#### REHABILITATION OF THE EXISTING PARK FOUNTAIN – located adjacent to the C-26. Joe Ramos Center

**Project Priority:** LONG-TERM **Related Projects:** 

**Project Location:** adjacent to the Joe Ramos Center

## **Project Description:**

Project includes the complete rehabilitation of the existing fountain including stone work, drains, valves, pumps, and all associated piping and related improvements.

## **Design/Construction Issues:**

#### **Known Constraints:**

 Construction site is located on the banks of a creek that provides habitat to Threatened and/or Endangered Species that have been identified by the USFWS.

### **Project Options:**

- Project options should consider both rehabilitation of the existing fountain improvements or the complete redesign and replacement.
- Project should consider possible ways to reduce evaporation and water use.

#### **Construction BMPs:**

■ Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

**Project Length/Area:** 

1 LS

# Photographs/Graphics:







**Anticipated Labor Source:** City Crews / Contractor / Volunteers

\$ 43,000 **NO CHANGE Cost Estimate: Operations & Maintenance Impact:** 

Project No.: C-26

Project: Rehabiliation of Existing Park Fountain - located adjacent to the Joe Ramos Center

Project Area: Joe Ramos Center

Item	Improvement Description	Quantity	Unit	Ur	it Price	Tot	tal Cost	
1	Rehabiliation of Park Fountain	1.0	LS	\$	30,000	\$	30,000	
2	Silt Fence	100	LF	\$	4	\$	400	
		Enginee	ering Design		nstruction		30,400 3,952	
				ering Design Estimated C			Car Carrie	34,352
			Co	ntinge	ncy (25%)	\$	8,588	
		1	otal Projec	t Estin	ated Cost	\$	42,940	
		PL	ANNING P	ROJE	CT COST	S	43,000	

# C-27. REHABILITATION OF THE EXISTING PUBLIC RESTROOMS – located adjacent to the Amphitheater/Joe Ramos Center

**Project Priority:** 

**SHORT-TERM** 

**Related Projects:** 

**Project Location:** 

adjacent to the Amphitheater / Joe Ramos Center

## **Project Description:**

Project includes the complete rehabilitation of the existing public restrooms located adjacent to the Amphitheater / Joe Ramos Center. The Rehabilitation would include complete interior and exterior renovations.

## **Design/Construction Issues:**

#### **Known Constraints:**

Construction site is located on the banks of a creek that provides habitat to Threatened and/or Endangered Species
that have been identified by the USFWS.

#### **Project Options:**

- Project options should consider both rehabilitation of the existing restrooms or the complete redesign and replacement of the restrooms.
- Project should consider possible ways to reduce vandalism and improve safety for park visitors.

#### **Construction BMPs:**

Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area:

1 LS

# Photographs/Graphics:







**Anticipated Labor Source:** 

City Crews / Contractor / Volunteers

**Cost Estimate:** 

\$ 43,000

**Operations & Maintenance Impact:** 

**NO CHANGE** 

Project No.: C-27

Project: Rehabiliation of Existing Public Restrooms - located adjacent to the Joe Ramos Center

Project Area: Joe Ramos Center

Priority: Short-Term

tem	Improvement Description	Quantity	Unit	Uı	it Price	To	tal Cost
1	Rehabiliation of Public Restroom	1.0	LS	\$	30,000	\$	30,000
2	Silt Fence	100	LF	\$	4	\$	400
		Enginee	ring Desigr		nstruction gmt (13%)		30,400 3,952
		Total E	stimated C	onstru	ction Cost	\$	34,352
			Co	ntinge	ncy (25%)	\$	8,588
		T	otal Projec	t Estin	nated Cost	S	42,940
. (		PL	ANNING P	ROJE	CT COST	\$	43,000

# Project Type: PARK IMPROVEMENT

## C-28. REHABILITATION OF THE AMPHITHEATER

**Project Priority:** 

**LONG-TERM** 

**Related Projects:** 

**Project Location:** 

adjacent to the Amphitheater / Joe Ramos Center

# **Project Description:**

Project includes the complete rehabilitation of the Amphitheater located adjacent to the Joe Ramos Center. The rehabilitation would include complete interior and exterior renovations, including renovation of the seating area.

## **Design/Construction Issues:**

#### **Known Constraints:**

Construction site is located on the banks of a creek that provides habitat to Threatened and/or Endangered Species
that have been identified by the USFWS.

## **Project Options:**

- Project options should consider innovative seating options.
- The project seeks to limit the use of conventional impervious cover materials and encourage the use of pervious pavement and other similar materials.

#### **Construction BMPs:**

 Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area:

1 LS

# Photographs/Graphics:







**Anticipated Labor Source:** 

City Crews / Contractor / Volunteers

**Cost Estimate:** 

\$ 99,000

**Operations & Maintenance Impact:** 

**NO CHANGE** 

Project No.: C-28

Project: Rehabiliation of the Amphitheater

Project Area: Joe Ramos Center

Item	Improvement Description	Quantity	Unit	Uı	nit Price	To	tal Cost
1	Rehabiliation of Amphitheater Seating Area*	10,000	SF	\$	2	\$	20,000
2	Rehabiliation of Amphitheater	1.0	LS	\$	50,000	\$	50,000
	* - area is approx., includes soil/compost/sodding + stone rehab	Enginee	ring Desigr		nstruction gmt (13%)		70,000 9,100
		Total E	stimated C	onstru	ction Cost	S	79,100
			Co	ntinge	ncy (25%)	S	19,775
		Т	otal Projec	t Estin	nated Cost	S	98,875
		PL	ANNING P	ROJE	CT COST	\$	99,000

## CONVERT EXISTING ASPHALT PARKING AREA TO PERVIOUS PAVEMENT C-29. PARKING AREA - Joe Ramos Center Parking Area

**Project Priority:** LONG-TERM **Related Projects:** 

**Project Location:** Joe Ramos Center

## **Project Description:**

Project includes the demolition of an existing asphalt parking area and the installation of a new pervious pavement parking area located immediately adjacent to the Joe Ramos Center. An engineered pervious pavement system should be designed and installed according to manufacturer's recommendations and recognized engineering design standards.

## **Design/Construction Issues:**

#### **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as possible and should be conducted in a manner that minimized soil disturbance.

## **Project Options:**

- Identified pervious pavement options include pervious concrete, a gravel/geogrid system (GravelPave®, etc...).
- System should be designed to detain stormwater for up to the 25-yr storm event.
- Areas within the defined project boundaries not suitable for pervious pavement should be provided with vegetation enhancement, including an improved soil matrix, along with appropriate native grasses and plants.

#### **Construction BMPs:**

 Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area:

25,026 sq. ft. (or approx. 0.57 acres)

## Photographs/Graphics:







City Crews / Contractor / Volunteers Anticipated Labor Source:

\$ 440,000 **INCREASE** 

**Cost Estimate:** 

**Operations & Maintenance Impact:** 

Project No.: C-29

Project: Convert Exisitng Asphalt Parking Area to Pervious Pavement, Joe Ramos Center Parking Area

Project Area: Joe Ramos Center

[tem	Improvement Description	Quantity	Unit	Un	it Price	To	otal Cost
1	Demo Existing Asphalt Parking Area	25,026	SF	\$	1.00	\$	25,020
2	Excavation & Haul-Off of Existing Surface Material (12" depth)	927	CY	\$	20	\$	18,538
3	Clearing, Grubbing & Subgrade Preparation	25,026	SF	\$	0.10	\$	2,503
4	Pervious Concrete	25,026	SF	\$	10	\$	250,26
5	Wheel Stops (based on 1 / 440 sf of property)	57	EA	\$	200	\$	11,37
6	Striping (based on 1 / 440 sf of property)	57	EA	\$	5	\$	28
7	Silt Fence	200	LF	\$	4	\$	80
8	Stabilized Construction Entrance	1	EA	\$	1,000	\$	1,00
				Con	struction	\$	309,78
	* - total area is approx. 70,039 sq. ft.	Enginee	ring Design	& Mg	mt (13%)	\$	40,27
		Total E	stimated C	onstruc	tion Cost	\$	350,05
			Co	ntingen	icy (25%)	\$	87,51
		T	otal Projec	t Estim	ated Cost	\$	437,57
		PL	ANNING P	ROJEC	T COST	S	440,00

# C-30. INSTALL BIOFILTRATION/BIORETENTION AREA – downstream of existing asphalt parking area @ Severiano Perez Parkway

**Project Priority:** 

LONG-TERM

**Related Projects:** 

**Project Location:** 

Severiano Perez Parkway (McLymont St. @ E. De La Rosa St.)

## **Project Description:**

Project includes the installation of a biofiltration/bioretention system to be located at the downstream end of the existing asphalt parking area at the Severiano Perez Parkway (at the corner of McLymont St. and E. De La Rosa St.). The biofiltration/bioretention system should be designed in accordance with existing regulatory requirements and engineering design standards. The proposed project would include the installation of a system utilizing native plants and vegetation that are capable of withstanding extended periods of little or no rainfall.

## **Design/Construction Issues:**

#### **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as possible and should be conducted in a manner that minimized soil disturbance.

## **Project Options:**

- The defined drainage boundary for the system must be established during design.
- Underdrain systems may be designed to outfall onto vegetative areas provided that the flow is not concentrated; the
  use of a properly designed and constructed level spreader is required.
- Stormwater flow from the pervious pavement system (Proposed as Project No. 44) parking area should <u>not</u> be designed/constructed to contribute flow into the biofiltration/bioretention BMP.

#### **Construction BMPs:**

 Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area:

1 LS (serves 17,431 sq.ft. (0.40 acres) parking area – see Project C-31)

# Photographs/Graphics:







**Anticipated Labor Source:** 

City Crews / Contractor / Volunteers

**Cost Estimate:** 

\$ 12,000

**Operations & Maintenance Impact:** 

**NO CHANGE** 

Project No.: C-30

Project: Install Biofiltration/Bioretention Area - downstream of Existing Asphalt Parking Area @ Severiano Perez Parkway

Project Area: Severiano Perez Parkway

Item	Improvement Description	Quantity	Unit	Ur	it Price	Tot	tal Cost
1	Biofiltration/Bioretention Area*	0.40	AC	\$	20,000	\$	8,000
2	Silt Fence	100	LF	\$	4	\$	400
					nstruction		8,400
		ring Design	a & Mg	mt (13%)	\$	1,092	
		Total E	Total Estimated Co		onstruction Cost	\$	9,492
			Co	ntinge	icy (25%)	\$	2,373
		Т	otal Projec	t Estin	ated Cost	\$	11,865
		PL	ANNING P	ROJE	CT COST	s	12,000

# C-31. CONVERT EXISTING ASPHALT PARKING AREA TO PERVIOUS PAVEMENT PARKING AREA – Severiano Perez Parkway Parking Area

**Project Priority:** 

**LONG-TERM** 

**Related Projects:** 

**Project Location:** 

Severiano Perez Parkway

### **Project Description:**

Project includes the demolition of an existing asphalt parking area and the installation of a new pervious pavement parking area located at the Severiano Perez Parkway (at the corner of McLymont St. and E. De La Rosa St.). An engineered pervious pavement system should be designed and installed according to manufacturer's recommendations and recognized engineering design standards.

## **Design/Construction Issues:**

#### **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as possible and should be conducted in a manner that minimized soil disturbance.

#### **Project Options:**

- Identified pervious pavement options include pervious concrete, a gravel/geogrid system (GravelPave®, etc...).
- System should be designed to detain stormwater for up to the 25-yr storm event.
- Areas within the defined project boundaries not suitable for pervious pavement should be provided with vegetation enhancement, including an improved soil matrix, along with appropriate native grasses and plants.

### **Construction BMPs:**

• Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area:

17,431 sq. ft. (or approx. 0.40 acres)

#### Photographs/Graphics:







**Anticipated Labor Source:** 

City Crews / Contractor / Volunteers

**Cost Estimate:** 

\$ 305,000

**Operations & Maintenance Impact:** 

Project No.: C-31

Project: Convert Exisitng Asphalt Parking Area to Pervious Pavement, Severiano Perez Parkway Parking Area

Project Area: Severiano Perez Parkway

Item	Improvement Description	Quantity	Unit	Un	it Price	To	otal Cost
1	Demo Existing Asphalt Parking Area	17,431	SF	\$	1.00	\$	17,43
2	Excavation & Haul-Off of Existing Surface Material (12" depth)	646	CY	\$	20	\$	12,91
3	Clearing, Grubbing & Subgrade Preparation	17,431	SF	\$	0.10	\$	1,74
4	Pervious Concrete	17,431	SF	\$	10	\$	174,31
5	Wheel Stops (based on 1 / 440 sf of property)	40	EA	\$	200	\$	7,92
6	Striping (based on 1 / 440 sf of property)	40	EA	\$	5	\$	19
7	Silt Fence	200	LF	\$	4	\$	80
8	Stabilized Construction Entrance	1	EA	\$	1,000	\$	1,00
				Con	struction	\$	216,3
	* - total area is approx. 70,039 sq. ft.	Enginee	ring Desig	n & Mg	mt (13%)	\$	28,12
		Total E	stimated C	Construc	tion Cost	\$	244,43
			Co	ntingen	cy (25%)	\$	61,1
		Т	otal Projec	t Estim	ated Cost	\$	305,5
		PL	ANNING I	PROJEC	CT COST	S	305,0

# C-32. CONVERT EXISTING CONCRETE SIDEWALK to PERVIOUS PAVEMENT SIDEWALK – Amphitheater / Severiano Perez Parkway area

Project Priority: LONG-TERM Related Projects:

Project Location: Severiano Perez Parkway / Amphitheater area

## **Project Description:**

Project includes the demolition of an existing concrete sidewalk and the installation of a new pervious pavement sidewalk along the same route (approximately). An engineered pervious pavement system should be designed and installed according to manufacturer's recommendations and recognized engineering design standards.

## **Design/Construction Issues:**

#### **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as possible and should be conducted in a manner that minimized soil disturbance.

#### **Project Options:**

- Identified pervious pavement options include pervious concrete, a gravel/geogrid system (GravelPave®, etc...).
- System should be designed to detain stormwater for up to the 25-yr storm event.

#### **Construction BMPs:**

 Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area: 6,510 sq. ft. [area is approximate, based on 1,085 linear feet x 6 ft. width)

# Photographs/Graphics:













**Anticipated Labor Source:** 

City Crews / Contractor / Volunteers

**Cost Estimate:** 

\$ 77,000

**Operations & Maintenance Impact:** 

Project No.:

Project:

Convert Existing Concrete Sidewalk to Pervious Concrete, Amphitheater / Severiano Perez Parkway Area

Project Area: Amphitheater / Severiano Perez Parkway

Priority:

Long-Term

Item	Improvement Description	Quantity	Unit	Un	it Price	To	tal Cost
1	Demo Existing Concrete Sidewalk*	6,510	SF	\$	2.00	\$	13,020
2	Clearing, Grubbing & Subgrade Preparation	6,510	SF	\$	0.10	\$	651
3	Pervious Concrete	6,510	SF	\$	5	\$	32,550
4	Wheel Stops (based on 1 / 440 sf of property)	15	EA	\$	200	\$	2,959
5	Striping (based on 1 / 440 sf of property)	15	EA	\$	5	\$	74
6	Silt Fence	1,085	LF	\$	4	\$	4,340
7	Stabilized Construction Entrance	1	EA	\$	1,000	\$	1,000
				Cor	nstruction	S	54,594
	* - existing sidewalk is approx. 1,085 ft. long x 6 ft. wide	Enginee	ring Design	& Mg	mt (13%)	\$	7,097
		Total E	stimated C	onstru	ction Cost	\$	61,691
			Co	ntinger	icy (25%)	\$	15,423
		Т	otal Projec	t Estim	ated Cost	\$	77,114
		PL	ANNING P	ROJE	CT COST	S	77,000

**Project Type: VEGETATION ENHANCEMENT** 

**VEGETATION ENHANCEMENT – the existing soccer field and adjacent areas** C-33. (next to the Medical Center)

**Project Priority:** 

**LONG-TERM** 

**Related Projects:** 

**Project Location:** 

**Amphitheater** 

# **Project Description:**

Project includes the improvement and/or establishment of vegetative cover on the existing soccer field and adjacent areas, including the area along the right-of-way of Dr. F. Calderon Blvd. from San Felipe Creek to E. De La Rosa St. Project will include vegetation enhancement including importing top soil, organic material (compost), and the use of fiber rolls/blanket and/or plastic "geogrid" reinforcement for structural support of the soil.

## **Design/Construction Issues:**

#### **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as possible and should be conducted in a manner that minimized soil disturbance.

#### **Project Options:**

- Options include the importation of soil and soil materials suitable for the establishment of a high-quality soil matrix.
- Vegetation should include appropriate native grasses and plants.

#### **Construction BMPs:**

Construction stormwater BMPs will include silt fence and other appropriate BMPs, as necessary.

Project Length/Area:

15,480

SY (or approx. 3.20 acres)

# Photographs/Graphics:







**Anticipated Labor Source:** 

<u>City Crews</u> / <u>Contractor</u> / Volunteers

**Cost Estimate:** 

\$ 135,000

**Operations & Maintenance Impact:** 

Project No.: C-33

Project: Vegetation Enhancement - the existing soccer field and adjacent areas (next to Medical Center)

Project Area: Medical Center / Joe Ramos Center

Item	Improvement Description	Quantity	Unit	Unit	Price	To	tal Cost
1	Vegetation Enhancement - Soil(4")+Compost(4")	15,480	SY	\$	6	\$	92,880
2	Silt Fence	1,000	LF	\$	4	\$	4,000
	*				ruction		96,880
	* - area is estimated at approx. 2.0 acres	The state of the s	ring Desigi stimated C			AND RESERVE	12,59
			Co	ntingency	(25%)	\$	27,36
		T	otal Projec	t Estimate	ed Cost	\$	136,84
		PL	ANNING P	ROJECT	COST	S	135,00

Project Type: VEGETATION ENHANCEMENT

C-34. VEGETATION ENHANCEMENT – left bank area of SFC from the Amphitheater to Severiano Perez Parkway (McLymont St.)

**Project Priority:** 

**LONG-TERM** 

**Related Projects:** 

**Project Location:** 

Amphitheater / Severiano Perez Parkway area

## **Project Description:**

Project includes the improvement and/or establishment of vegetative cover on the left bank area of San Felipe Creek (SFC) including all areas from the Amphitheater to the Severiano Perez Parkway (at McLymont St.). Project will include vegetation enhancement including importing top soil, organic material (compost), and the use of fiber rolls/blanket and/or plastic "geogrid" reinforcement for structural support of the soil.

# **Design/Construction Issues:**

#### **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as possible and should be conducted in a manner that minimized soil disturbance.

### **Project Options:**

- Options include the importation of soil and soil materials suitable for the establishment of a high-quality soil matrix.
- Vegetation should include appropriate native grasses and plants.

#### **Construction BMPs:**

Construction stormwater BMPs will include silt fence and other appropriate BMPs, as necessary.

Project Length/Area:

14,270 SY (or approx. 2.95 acres)

### Photographs/Graphics:







**Anticipated Labor Source:** 

City Crews / Contractor / Volunteers

**Cost Estimate:** 

\$ 125,000

**Operations & Maintenance Impact:** 

Project No.: C-34

Project: Vegetation Enhancement - the left bank area of SFC, between the Amphitheater & Severiano Perez Parkway

Project Area: Amphitheater / Joe Ramos Center

Item	Improvement Description	Quantity	Unit	Un	it Price	To	tal Cost
1	Vegetation Enhancement - Soil(4")+Compost(4")	14,270	SY	\$	6	\$	85,620
2	Silt Fence	300	. LF	\$	4	\$	1,200
					struction		86,820
	* - area is estimated at approx. 2.0 acres	Enginee	ring Design	ı & Mgı	mt (13%)	\$	11,287
		Total E	stimated C	onstruc	tion Cost	S	98,107
			Со	ntingen	cy (25%)	\$	24,527
		I	otal Projec	t Estima	ated Cost	\$	122,633
		PL	ANNING P	ROJEC	T COST	\$	125,000

Project Type: VEGETATION ENHANCEMENT

# C-35. VEGETATION ENHANCEMENT – left bank area of SFC from the Severiano Perez Parkway (McLymont St.) to the Gillis St. Bridge

**Project Priority:** 

**LONG-TERM** 

**Related Projects:** 

**Project Location:** 

Severiano Perez Parkway area

## **Project Description:**

Project includes the improvement and/or establishment of vegetative cover on the left bank area of San Felipe Creek (SFC) including all areas from the Severiano Perez Parkway (at McLymont St.) to the Gillis St. Bridge. Project will include vegetation enhancement including importing top soil, organic material (compost), and the use of fiber rolls/blanket and/or plastic "geogrid" reinforcement for structural support of the soil.

# **Design/Construction Issues:**

#### **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as
  possible and should be conducted in a manner that minimized soil disturbance.

#### **Project Options:**

- Options include the importation of soil and soil materials suitable for the establishment of a high-quality soil matrix.
- Vegetation should include appropriate native grasses and plants.

#### **Construction BMPs:**

• Construction stormwater BMPs will include silt fence and other appropriate BMPs, as necessary.

Project Length/Area:

4,500

SY (or approx. 0.95 acres)

## Photographs/Graphics:







**Anticipated Labor Source:** 

<u>City Crews</u> / <u>Contractor</u> / Volunteers

**Cost Estimate:** 

\$ 40,000

**Operations & Maintenance Impact:** 

Project No.: C-35

Project: Vegetation Enhancement - the left bank area of SFC, between Severiano Perez Parkway & the Gillis St. Bridge

Project Area: Joe Ramos Center / Severiano Perez Parkway

Item	Improvement Description	Quantity	Unit	Unit I	rice	Tot	tal Cost
1	Vegetation Enhancement - Soil(4")+Compost(4")	4,500	SY	\$	6	\$	27,000
2	Silt Fence	350	LF	\$	4	\$	1,400
			- Nac	Constr	uction	\$	28,400
	* - area is estimated at approx. 2.0 acres	Enginee	ring Design	& Mgmt	(13%)	\$	3,69
7-1		Total E	stimated C	onstructio	n Cost	\$	32,092
			Co	ntingency	(25%)	\$	8,023
		Т	otal Projec	t Estimate	d Cost	\$	40,115
		PL	ANNING P	ROJECT	COST	S	40,000

C-36. CONVERT EXISTING ASPHALT PAVEMENT HIKE & BIKE TRAIL to PERVIOUS PAVEMENT HIKE & BIKE TRAIL, along left bank of SFC, between Dr. F. Calderon Blvd. & Gillis St.

**Project Priority:** 

**LONG-TERM** 

**Related Projects:** 

**Project Location:** 

Joe Ramos / Severiano Perez Parkway area

# **Project Description:**

Project includes the demolition of an existing asphalt hike & bike trail and the installation of a new pervious pavement hike & bike trail along the same route (approximately). Project area includes the existing hike & bike trail from Dr. F. Calderon Blvd. to the Gillis St. An engineered pervious pavement system should be designed and installed according to manufacturer's recommendations and recognized engineering design standards.

## **Design/Construction Issues:**

#### **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as possible and should be conducted in a manner that minimized soil disturbance.

#### **Project Options:**

- Identified pervious pavement options include pervious concrete, a gravel/geogrid system (GravelPave®, etc...).
- System should be designed to detain stormwater for up to the 25-yr storm event.
- Areas within the defined project boundaries not suitable for pervious pavement should be provided with vegetation enhancement, including an improved soil matrix, along with appropriate native grasses and plants.

## Construction BMPs:

 Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area:

22,500 sq. ft. [area is approximate, based on 2,250 linear feet x 10 ft. width)

## Photographs/Graphics:







Anticipated Labor Source:

City Crews / Contractor / Volunteers

**Cost Estimate:** 

\$ 240,000

**Operations & Maintenance Impact:** 

Project No.: C-36

Project: Convert Exist. Hike&Bike Trail to Pervious Pavement, left bank of SFC, between Calderon Blvd. & Gillis St.

Project Area: Amphitheater / Joe Ramos Center

Item	Improvement Description	Quantity	Unit	Unit Price		ce Total (	
1	Demo Existing Asphalt Hike & Bike Trail*	22,500	SF	\$	2.00	\$	45,000
2	Clearing, Grubbing & Subgrade Preparation*	22,500	SF	\$	0.10	\$	2,250
3	Pervious Concrete*	22,500	SF	\$	5	\$	112,500
4	Silt Fence	2,250	LF	\$	4	\$	9,000
5	Stabilized Construction Entrance	1	EA	\$ .	1,000	\$	1,000
	* - area is based on an approx. 2,250 ft. long x 10 ft. wide trail	Enginee	ring Desigi		Construction & Mgmt (13%)		169,750
		Total Estimated Construction Cost  Contingency (25%)  Total Project Estimated Cost				\$	191,818
						\$	47,954
						\$	239,772
		PL.	ANNING P	ROJE	CT COST	S	240,000

PARK IMPROVEMENT **Project Type:** 

### C-37. REHABILITATION OF EXISTING PLAYGROUND AREA, on left bank of SFC @ Severiano Perez Parkway

**Related Projects: Project Priority: LONG-TERM** 

**Project Location:** Severiano Perez Parkway

## **Project Description:**

Project includes the complete rehabilitation of the existing park elements including play stations, picnic tables, BBQ pits, trash cans, and other improvements. Where appropriate, vegetation enhancement should also be provided around the park area, including importing top soil, organic material (compost), and the use of fiber rolls/blanket and/or plastic "geogrid" reinforcement for structural support of the soil.

# **Design/Construction Issues:**

#### **Known Constraints:**

- Construction site is located on the banks of a creek that provides habitat to Threatened and/or Endangered Species that have been identified by the USFWS.
- Park improvements should provide ADA access. Improvements must meet the requirements found in the Texas Accessibility Standards (TAS) administered by the Texas Department of Licensing and Registrations (TDLR). Review and approval by a Registered Accessibility Specialist (RAS) will likely be required.

## **Project Options:**

- Play area fall surface should be upgraded to meet current safety requirements.
- Options include the importation of soil and soil materials suitable for the establishment of a high-quality soil matrix.
- Vegetation should include appropriate native grasses and plants.

#### **Construction BMPs:**

 Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area:

LS 1

### Photographs/Graphics:







**Anticipated Labor Source:** City Crews / Contractor / Volunteers

**NO CHANGE** 

**Cost Estimate:** 

\$ 37,000

**Operations & Maintenance Impact:** 

Project No.: C-37

Project: Rehab of Existing Playground Area, along the left bank of SFC @ Severiano Perez Parkway

Project Area: Moore Park
Priority: Long-Term

Item	Improvement Description	Quantity	Unit	Ur	nit Price	To	tal Cost
1	Demolition/Haul Off	1	LS	\$	2,000	\$	2,000
2	Replace Existing Slide	1	EA	\$	10,000	\$	10,000
3	Replace Existing Swing	1	EA	\$	5,000	\$	5,000
4	Fall Surface Improvement	2,000	SF	\$	2	\$	4,000
5	Bench	4	EA	\$	1,000	\$	4,000
6	Trash Can w/ foundation	2	EA	\$	700	\$	1,400
7	Vegetation Enhancement* - Soil(2")+Compost(2") Only	444	SY	\$	3	\$	1,333
	* - vegetation enhancement is approx. 40' x 100'	Construction Engineering Design & Mgmt (13%)					26,400 3,432
		Total E	stimated C	onstru	ction Cost	S	29,832
			Co	ntinge	ncy (25%)	\$	7,458
		T	otal Projec	t Estin	nated Cost	S	37,290
		PL	ANNING P	ROJE	CT COST	s	37,000

# C-38. INSTALL BIOFILTRATION/BIORETENTION AREA – downstream of existing asphalt parking area @ the Joe Ramos Center

Project Priority: LONG-TERM Related Projects:

Project Location: Joe Ramos Center

## **Project Description:**

Project includes the installation of a biofiltration/bioretention system to be located at the downstream end of the existing asphalt parking area at the Joe Ramos Center (southwest side of building). The biofiltration/bioretention system should be designed in accordance with existing regulatory requirements and engineering design standards. The proposed project would include the installation of a system utilizing native plants and vegetation that are capable of withstanding extended periods of little or no rainfall.

## **Design/Construction Issues:**

#### **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as
  possible and should be conducted in a manner that minimized soil disturbance.

#### **Project Options:**

- The defined drainage boundary for the system must be established during design.
- Underdrain systems may be designed to outfall onto vegetative areas provided that the flow is not concentrated; the
  use of a properly designed and constructed level spreader is required.

#### **Construction BMPs:**

Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used
around the construction site in accordance with TCEQ requirements.

Project Length/Area:

1 LS (serves existing 25,026 sq. ft. (0.57 acres) parking area (C-29))

## Photographs/Graphics:







Anticipated Labor Source: City Crews / Contractor / Volunteers

Cost Estimate: \$ 17,000 Operations & Maintenance Impact: NO CHANGE

Project No.: C-38

Project: Install Biofiltration/Bioretention Area - downstream of Existing Asphalt Parking Area @ Joe Ramos Center

Project Area: Joe Ramos Center

Item	Improvement Description	Quantity	Unit	Ur	it Price	To	tal Cost
1	Biofiltration/Bioretention Area*	0.57	AC	\$	20,000	\$	11,400
2	Silt Fence	200	LF	\$	4	\$	800
				Co	nstruction	\$	12,200
	* - based on size of drainage area (@ \$20,000 / acre of area served)	Enginee	gineering Design & Mgmt (13%)				1,586
	[parking lot area = 25,026 sq.ft. = 0.57 acres]	<b>Total Estimated Construction Cost</b>				\$	13,786
			Co	ntinge	ıcy (25%)	.\$	3,447
		Total Project Estimated Cost			\$	17,233	
		PLANNING PROJECT COST				\$	17,000

# C-39. COMMUNITY GARDEN IMPROVEMENTS – on FEMA Buyout Properties

Project Priority: LONG-TERM Related Projects:

Project Location: Joe Ramos Center Area

## **Project Description:**

Project includes the improvement of multiple, existing FEMA Buyout Properties located within the defined Project Area. The proposed project would include the installation of a community garden area on each existing property utilizing native plants and vegetation that are capable of withstanding extended periods of little or no rainfall.

## **Design/Construction Issues:**

#### **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Landscaped areas will be cared for by volunteers, neighbors, or City crews any proposed improvements should focus on low maintenance plants and improvements.
- The community garden sites are located within residential neighborhoods all improvements should be neighbor-friendly and should not create, or lead to the creation of, an unsafe environment or an unsightly property.

## **Project Options:**

- The proposed community garden improvements can include a variety of landscaping options. The goal for each individual property (or lot) is to create an attractive area that utilizes native plants and vegetation that require minimal care and maintenance.
- Each property (or lot) should be provided with water service; if not served by an automatic sprinkler system, the
  property should have multiple hose bibs for use by volunteers and/or City crews.

## **Construction BMPs:**

• If necessary, silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the site in accordance with any TCEQ requirements.

Project Length/Area: 0.8 acres

### Photographs/Graphics:





Anticipated Labor Source: <u>City Crews</u> / Contractor / <u>Volunteers</u>

Cost Estimate: \$ 22,000 Operations & Maintenance Impact: INCREASE

Project No.:

C-39

Project: Community Garden Improvements - on FEMA Buyout Properties Project Area: Neighborhood near Severiano Perez Parkway, north of Gillis St.

Item	Improvement Description	Quantity	Unit	Unit Price		Tot	tal Cost		
1	Trash/Rubbish Haul Off	0.80	AC	\$	1,000	\$	800		
2	Clearing & Grubbing	0.80	AC	\$	1,000	\$	800		
3	Vegetation Enhancement - Soil(2")+Compost(2") (@ \$20/CY)	0.80	AC	\$	10,800	\$	8,640		
4	Plantings*	0.80	AC	\$	6,050	\$	4,840		
5 .	Basic Irrigation System	0.80	AC	\$	2,000	\$	1,600		
6	Silt Fence	0.80	AC	\$	800	\$	640		
	* - assumes 1 - 1 gallon plant spaced every 6.0 feet; such spacing in an average of 9 plants/36 SY (or 0.25 plants/SY); @ \$5 / plant		nstruction emt (13%)	S	17,32				
	the cost would be \$1.25/SY or \$6,050/Acre.	Total Estimated Construction Cost				\$	17,320		
			Co	ntinge	ncy (25%)	\$	4,330		
	Total Project Estimated Cost						21,650		
		PL	ANNING P	ROJE	PLANNING PROJECT COST				

C-40. INSTALLATION OF PUBLIC EDUCATION KIOSKS — in the Joe Ramos Center/Severiano Perez Parkway area

**Project Priority:** 

**LONG-TERM** 

**Related Projects:** 

**Project Location:** 

Joe Ramos Center/Severiano Perez Parkway

# **Project Description:**

Project includes the installation of two (2) public information kiosks to be located in the Joe Ramos Center/ Severiano Perez Parkway area. The project will include a kiosk capable of displaying educational material relating to San Felipe Creek and its associated watershed. The kiosk will provide an all-weather display area for posters, pamphlets, signs, and other informational materials. The signs will be located adjacent to heavily used/trafficked areas for the most impact.

## **Design/Construction Issues:**

## **Known Constraints:**

- Construction site is located on the banks of a creek that provides habitat to Threatened and/or Endangered Species
  that have been identified by the USFWS.
- Proposed improvements should provide ADA access. Improvements should meet the requirements found in the Texas Accessibility Standards (TAS) administered by the Texas Department of Licensing and Registrations (TDLR). Review and approval by a Registered Accessibility Specialist (RAS) will likely be required.

### **Project Options:**

- Options include several different types of kiosks.
- The kiosk should be designed to reduce the potential for vandalism.
- Project budget includes the design/printing of informational signs.

#### **Construction BMPs:**

Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used
around the construction site in accordance with TCEQ requirements.

Project Length/Area:

2 each

# Photographs/Graphics:







**Anticipated Labor Source:** 

City Crews / Contractor / Volunteers

**Cost Estimate:** 

\$ 17,000

**Operations & Maintenance Impact:** 

**NO CHANGE** 

Project No.: C-40

Project: Install Public Education Kiosks along the San Felipe Creek

Project Area: Joe Ramos Center / Severiano Perez Parkway

Item	Improvement Description	Quantity	Unit Unit Price		it Price	Total Cost	
. 1	Public Education Kiosk	2	LS	\$	5,000	\$	10,000
2	Signs/Exhibits	2	LS	\$	1,000	\$	2,000
				Con	struction	\$	12,000
		Engineering Design & Mgmt (13%)				\$	1,56
		Total E	stimated C	onstruc	tion Cost	\$	13,56
			Co	ntingen	cy (25%)	\$	3,39
		Т	otal Projec	t Estima	ited Cost	\$	16,95

# C-41. INSTALLATION OF PET WASTE STATIONS — in the Joe Ramos Center/Severiano Perez Parkway area

Project Priority: SHORT-TERM

**Related Projects:** 

Project Location: Joe Ramos Center/Severiano Perez Parkway

# **Project Description:**

Project includes the installation of four (4) pet waste stations to be located in the Joe Ramos Center/Severiano Perez Parkway area. The stations will be located adjacent to heavily used/trafficked areas for the most impact.

## **Design/Construction Issues:**

#### **Known Constraints:**

- Construction site is located on the banks of a creek that provides habitat to Threatened and/or Endangered Species
  that have been identified by the USFWS.
- Proposed improvements should provide ADA access. Improvements should meet the requirements found in the Texas Accessibility Standards (TAS) administered by the Texas Department of Licensing and Registrations (TDLR).
   Review and approval by a Registered Accessibility Specialist (RAS) will likely be required.

## **Project Options:**

- Options include several different types of pet waste stations.
- Recommend that pet waste station include bag dispenser and trash can.
- Recommend purchasing extra pet waste bags at the time of purchase of the pet waste station.

#### **Construction BMPs:**

• Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area:

4 each

# Photographs/Graphics:







Anticipated Labor Source: City Crews / Contractor / Volunteers

Cost Estimate: \$ 4,000 Operations & Maintenance Impact: INCREASE

Project No.: C-41

Project: Pet Waste Stations

Project Area: Joe Ramos Center / Severiano Perez Parkway

Priority: Short-Term

Item	Improvement Description	Quantity	Unit	Uni	Unit Price		al Cost
1	Pet Waste Stations w/ Trash Cans & Bag Dispenser*	4	EA	\$	750	\$	3,000
	* - Pet Waste Stations located at maximum 1,000 ft. spacing	Engin	eering Desigi		struction nt (13%)		3,000 390
17	along San Felipe Creek	Total Estimated Construction Cost			\$	3,390	
	along San Felipe Creek		Co	ntingen	cy (25%)	\$	848
			Total Projec	et Estima	ted Cost	\$	4,238
		P	LANNING P	PROJEC	T COST	\$	4,000

# C-42. INSTALLATION OF TRASH CANS — in the Joe Ramos Center/Severiano Perez Parkway area

**Project Priority:** 

SHORT-TERM

**Related Projects:** 

**Project Location:** 

Joe Ramos Center/Severiano Perez Parkway

## **Project Description:**

Project includes the installation of six (6) trash cans, including concrete support foundations, to be located in the Joe Ramos/Severiano Perez Parkway area. The trash cans will be located adjacent to heavily used/trafficked areas for the most impact.

## **Design/Construction Issues:**

#### **Known Constraints:**

- Construction site is located on the banks of a creek that provides habitat to Threatened and/or Endangered Species
  that have been identified by the USFWS.
- Proposed improvements should provide ADA access. Improvements should meet the requirements found in the Texas Accessibility Standards (TAS) administered by the Texas Department of Licensing and Registrations (TDLR). Review and approval by a Registered Accessibility Specialist (RAS) will likely be required.

### **Project Options:**

- Options include several different types of trash cans.
- Installation will include trash can, trash can support, and concrete foundation.
- The unit shall be designed to prevent the trash can from being easily stolen.

#### **Construction BMPs:**

 Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area:

6 each

## Photographs/Graphics:







Anticipated Labor Source: City (

City Crews / Contractor / Volunteers

Cost Estimate:

\$ 6,000

**Operations & Maintenance Impact:** 

Project No.: C-42

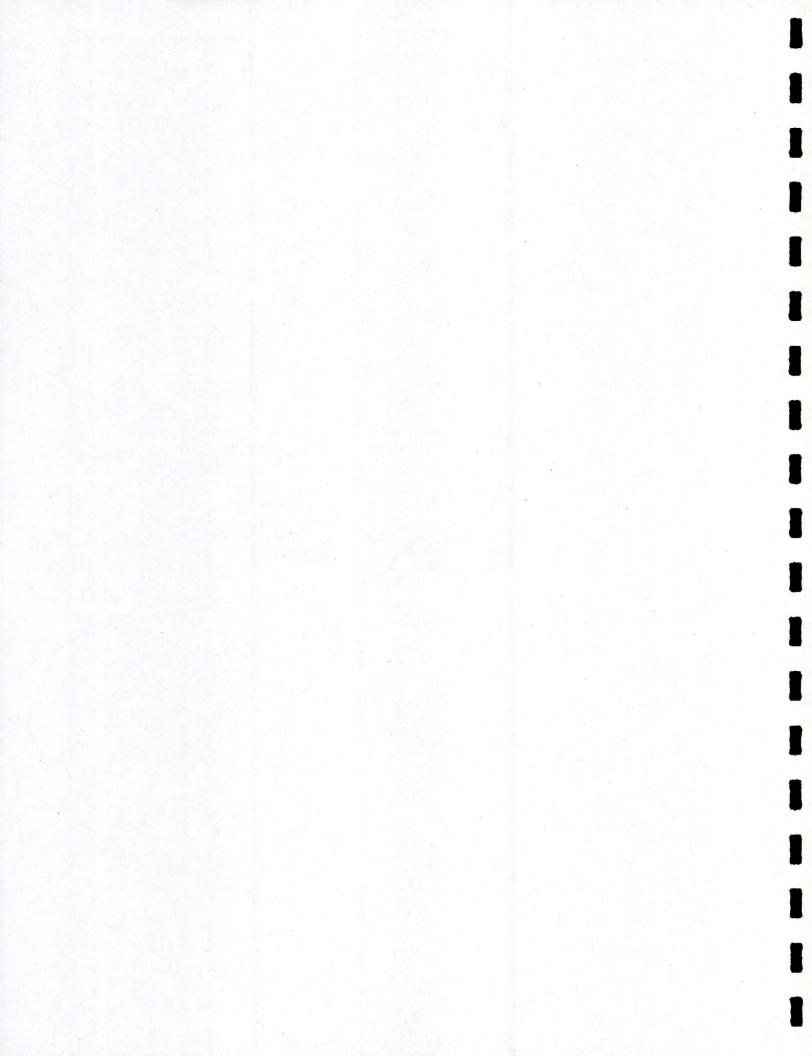
Project: Trash Cans w/ Foundations

Project Area: Joe Ramos Center / Severiano Perez Parkway

Priority: Short-Term

Item	Improvement Description	Quantity	Unit	Unit Price		Tota	al Cost	
1	Trash Cans w/ Foundations	6	EA	\$	700	\$	4,200	
				Cons	truction	\$	4,200	
		Enginee	ering Design	& Mgn	nt (13%)	\$	546	
		Total I	ion Cost	\$	4,746			
			\$	1,187				
		7	Total Projec	t Estima	ted Cost	\$	5,933	
		PL	ANNING P	ROJEC	T COST	\$	6,000	

# Area D



Project Type: INVASIVE SPECIES CONTROL

D-1. CANE ERADICATION – Left Bank of San Felipe Creek, between Gillis St. Bridge (Memo's) & Johnson St. (Tardy Dam)

**Project Priority:** 

**IMMEDIATE** 

**Related Projects:** 

D-2, D-3

**Project Location:** 

Between Gillis St. Bridge (Memo's) and Johnson St. Bridge (Tardy Dam)

## **Project Description:**

Project includes the eradication of Arundo Donax (a.k.a., "Giant Reed", "River Cane") along the left bank of San Felipe Creek (SFC) from the Gillis St. Bridge (at Memo's Restaurant) downstream to the Johnson St. Bridge (at Tardy Dam). Eradication should follow the steps outlined in the San Felipe Creek Master Plan and include: Cut Cane (after annual flowering around mid-July); Removal of Cuttings; Herbicide Spray; Removal of Dead Cane (in winter); Repeat. Work should proceed from upstream to downstream. NOTE: very little cane is located along this stretch of San Felipe Creek at the present time (Jan. 2012)

## **Design/Construction Issues:**

#### **Known Constraints:**

- Project should be started after, or at the same time, as Projects A-1 to A-6, B-1, B-2, C-1 to C-5, D-2.
- Herbicide use in and around the creek area should proceed with caution.
- No spraying in the creek; herbicide must be hand applied to cane located in the creek.
- Eradication efforts will involve several cycles.

#### **Project Options:**

 Small patches can be cut by hand; large patches should be cut with mechanical equipment, if possible; avoid disturbing soil by the use of rubber tired equipment.

#### **Construction BMPs:**

• Construction BMPs (silt fence, etc...) should be used if mechanical equipment results in soil disturbance.

Project Length/Area:

< 1 acre [area is approximate, based on latest aerial photos]

#### Photographs/Graphics:







**Anticipated Labor Source:** 

City Crews / Contractor / Volunteers

**Cost Estimate:** 

\$ 9,000 (1st Year Efforts Only)

**Operations & Maintenance Impact:** 

**INCREASE** 

Project No.: D-1 - left bank of San Felipe Creek between Gillis St. and Tardy Dam

Project: Arundo Donax Removal (Giant Reed, a.k.a. "river cane")

Project Area: San Felipe Lions Park / Tardy Dam

Priority: Immediate

Item	Improvement Description	Quantity	Unit	Unit Price		Tota	al Cost
1	Arundo Donax Removal*	0.20	Acre	\$	44,000	\$	8,80
	at \$44,000 / acre for one-time manual removal; price clude follow up visits (which should be once per year); see Appendix	Engineeri	ng Design &		truction		8,800
E for deta	ils on cane removal cost estimate.	Total I	Estimated Co	onstruct	ion Cost	\$	8,80
** - Enginee	ring Design/Mgmt. + Contigency included in Unit Cost; see Appendix		Conti	ingency (	(25%)**	\$	
E for ad	ditional details.	1	Fotal Project	t Estima	ted Cost	\$	8,80
		PL	ANNING P	ROJEC'	T COST	S	9,000

Project Type: INVASIVE SPECIES CONTROL

## D-2. CANE ERADICATION – Right Bank of San Felipe Creek, between Gillis St. Bridge (Memo's) & Tardy Dam

**Project Priority:** 

**IMMEDIATE** 

**Related Projects:** 

D-1, D-3

**Project Location:** 

Between Gillis St. Bridge (Memo's) and Tardy Dam

## **Project Description:**

Project includes the eradication of Arundo Donax (a.k.a., "Giant Reed", "River Cane") along the right bank of San Felipe Creek (SFC) from the Gillis St. Bridge (at Memo's Restaurant) downstream to the Johnson St. Bridge (at Tardy Dam). Eradication should follow the steps outlined in the San Felipe Creek Master Plan and include: Cut Cane (after annual flowering around mid-July); Removal of Cuttings; Herbicide Spray; Removal of Dead Cane (in winter); Repeat. Work should proceed from upstream to downstream.

## **Design/Construction Issues:**

#### **Known Constraints:**

- Project should be started after, or at the same time, as Projects A-1 to A-6, B-1, B-2, C-1 to C-5, and D-1.
- Some of the existing cane is known to be located on <u>private property</u>.
- Herbicide use in and around the creek area should proceed with caution.
- No spraying in the creek; herbicide must be hand applied to cane located in the creek.
- Eradication efforts will involve several cycles.

#### **Project Options:**

 Small patches can be cut by hand; large patches should be cut with mechanical equipment, if possible; avoid disturbing soil by the use of rubber tired equipment.

#### **Construction BMPs:**

• Construction BMPs (silt fence, etc...) should be used if mechanical equipment results in soil disturbance.

Project Length/Area:

< 1 acre [area is approximate, based on latest aerial photos]

#### Photographs/Graphics:







**Anticipated Labor Source:** 

City Crews / Contractor / Volunteers

**Cost Estimate:** 

\$ 9,000 (1st Year Efforts Only)

**Operations & Maintenance Impact:** 

**INCREASE** 

Project No.: D-2 - right bank of San Felipe Creek between Gillis St. and Tardy Dam

Project: Arundo Donax Removal (Giant Reed, a.k.a. "river cane")

Project Area: San Felipe Lions Park / Tardy Dam

Priority: Immediate

Item	Improvement Description	Quantity	Unit	Unit Price	Tot	al Cost
1	Arundo Donax Removal*	0.20	Acre	\$ 44,000	\$	8,800
		N .				
* - estimated	at \$44,000 / acre for one-time manual removal; price			Construction	S	8,800
does not in	clude follow up visits (which should be once per year); see Appendix	Engineeri	ng Design &	Mgmt (13%)**	\$	
E for deta	ils on cane removal cost estimate.	Total F	Estimated C	onstruction Cost	S	8,800
** - Enginee	ring Design/Mgmt. + Contigency included in Unit Cost; see Appendix		Conti	ngency (25%)**	\$	
E for ad	ditional details.		Total Project	t Estimated Cost	\$	8,800
		DI	ANDING	ROJECT COST	6	9,000

Project Type: INVASIVE SPECIES CONTROL

## D-3. CANE ERADICATION – Right Bank of San Felipe Creek @ Tardy Dam

Project Priority: IMMEDIATE Related Projects: D-1,D-2

Project Location: Between Gillis St. Bridge (Memo's) and Tardy Dam

## **Project Description:**

Project includes the eradication of Arundo Donax (a.k.a., "Giant Reed", "River Cane") along the right bank of San Felipe Creek (SFC) from the Gillis St. Bridge (at Memo's Restaurant) downstream to Tardy Dam. Eradication should follow the steps outlined in the San Felipe Creek Master Plan and include: Cut Cane (after annual flowering around mid-July); Removal of Cuttings; Herbicide Spray; Removal of Dead Cane (in winter); Repeat. Work should proceed from upstream to downstream.

## **Design/Construction Issues:**

#### **Known Constraints:**

- Project should be started after, or at the same time, as Projects A-1 to A-6, B-1, B-2, C-1 to C-5, D-1 and D-2.
- Some of the existing cane is known to be located on <u>private property</u>.
- Herbicide use in and around the creek area should proceed with caution.
- No spraying in the creek; herbicide must be hand applied to cane located in the creek.
- Eradication efforts will involve several cycles.

#### **Project Options:**

 Small patches can be cut by hand; large patches should be cut with mechanical equipment, if possible; avoid disturbing soil by the use of rubber tired equipment.

#### **Construction BMPs:**

• Construction BMPs (silt fence, etc...) should be used if mechanical equipment results in soil disturbance.

Project Length/Area:

< 1 acre [area is approximate, based on latest aerial photos]

## Photographs/Graphics:







Anticipated Labor Source: City Crews / Contractor / Volunteers

Cost Estimate: \$ 9,000 (1<sup>st</sup> Year Efforts Only) Operations & Maintenance Impact: INCREASE

Project No.: D-3 - at Tardy Dam, between Tardy Dam and Johnson St.

Project: Arundo Donax Removal (Giant Reed, a.k.a. "river cane")

Project Area: San Felipe Lions Park / Tardy Dam

Priority: Immediate

Item	Improvement Description	Quantity	Unit	Unit Price		Tota	l Cost
1	Arundo Donax Removal*	0.20	Acre	\$ 44,0	00	\$	8,800
				7	W		
* - estimated	at \$44,000 / acre for one-time manual removal; price			Construct	ion	\$	8,800
does not in	clude follow up visits (which should be once per year); see Appendix	Engineeri	ng Design &	Mgmt (13%	)**	S	
E for deta	ils on cane removal cost estimate.	Total I	Estimated Co	onstruction C	ost	\$	8,800
** - Enginee:	ring Design/Mgmt. + Contigency included in Unit Cost; see Appendix		Conti	ngency (25%	)**	s	
E for ad	ditional details.	1	Total Project	t Estimated C	ost	\$	8,800
		PI	ANNING P	ROJECT CO	ST	c	9,000

D-4. REMOVAL OF EXISTING BANK WALL -

Left Bank of SFC, from Gillis St. Bridge to 400 ft. downstream

**Project Priority:** 

**LONG-TERM** 

**Related Projects:** 

D-8, D-9

**Project Location:** 

San Felipe Lion Park area

## **Project Description:**

Project includes the removal of existing stone/concrete walls along the left bank of San Felipe Creek (SFC), from the Gillis St. Bridge for approximately 400 feet downstream.

## **Design/Construction Issues:**

#### **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as
  possible and should be conducted in a manner that minimized soil disturbance.
- Existing stone should be salvaged for possible use on future creek-side projects.

#### **Project Options:**

A combination of manual and mechanical labor will likely be necessary to accomplish the removal operation in accordance with USFWS requirements.

#### **Construction BMPs:**

- A coffer dam or in-stream barrier may be needed to avoid the potential for suspended solids being introduced in the creek; water-filled portable coffer dams or other temporary measures should be considered.
- Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area:

400 feet

## Photographs/Graphics:







**Anticipated Labor Source:** 

<u>City Crews</u> / <u>Contractor</u> / Volunteers

**Cost Estimate:** 

\$ 54,000

**Operations & Maintenance Impact:** 

Project No.: D-4

Project:

Removal of Existing Bank Wall, left bank of SFC, from the Gillis St. Bridge to 400' Downstream

Project Area: Tardy Dam
Priority: Long-Term

tem	Improvement Description	Quantity	Unit_	Un	it Price	To	tal Cost
1	Demolition - Existing Creek Walls I [ 2' - 4']	400	LF	\$	40	\$	16,000
2	Silt Fence	200	LF	\$	4	\$	80
3	Stabilized Construction Entrance	1	EA	- \$	1,000	\$	1,00
4	In-Stream Barrier/Curtain	400	LF	\$	50	\$	20,00
		Enginee	ring Desigr		struction mt (13%)		37,80 4,91
		Total E	stimated C	onstruc	tion Cost	\$	42,71
			Co	ntingen	cy (25%)	\$	10,67
		Т	otal Projec	t Estim	ated Cost	\$	53,39
In Hill I		PLANNING PROJECT COST					54,00

D-5. REMOVAL OF EXISTING BANK WALL – Left Bank of SFC, from 400 ft. Downstream of Gillis St. Bridge to 120 ft. Upstream of Tardy Dam

Project Priority: LONG-TERM Related Projects:

Project Location: San Felipe Lion Park area

## **Project Description:**

Project includes the removal of existing stone/concrete walls along the left bank of San Felipe Creek (SFC), from approximately 400 feet downstream of the Gillis St. Bridge (end of Project D-4) to a point approximately 120 feet upstream of Tardy Dam (at the old diving board location). Total length of wall is approximately 370 feet.

## **Design/Construction Issues:**

#### **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as possible and should be conducted in a manner that minimized soil disturbance.
- Existing stone should be salvaged for possible use on future creek-side projects.

## **Project Options:**

A combination of manual and mechanical labor will likely be necessary to accomplish the removal operation in accordance with USFWS requirements.

#### **Construction BMPs:**

- A coffer dam or in-stream barrier may be needed to avoid the potential for suspended solids being introduced in the creek; water-filled portable coffer dams or other temporary measures should be considered.
- Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area:

370 feet

## Photographs/Graphics:







Anticipated Labor Source: <u>City Crews</u> / <u>Contractor</u> / Volunteers

Cost Estimate: \$ 50,000 Operations & Maintenance Impact: DECREASE

Project No.: D-5

Project: Removal of Existing Bank Wall, left bank of SFC, from 400' Downstream of Gillis St. Bridge to 120' Upstream of Tardy Dam

Project Area: San Felipe Lions Park / Tardy Dam

Priority: Long-Term

Item	Improvement Description	Quantity	Unit	Un	it Price	To	tal Cost
1	Demolition - Existing Creek Walls I [ 2' - 4']	370	LF	\$	40	\$	14,800
2	Silt Fence	200	LF	\$	.4	\$	800
3	Stabilized Construction Entrance	1	EA	\$	1,000	\$	1,000
4	In-Stream Barrier/Curtain	370	LF	\$	50	\$	18,500
		Enginee	ring Design		struction mt (13%)		35,100 4,563
		Total E	Stimated C	onstruc	tion Cost	S	39,663
			Co	ntingen	cy (25%)	\$	9,916
		' Т	otal Projec	t Estim	ated Cost	\$	49,579
		PL	ANNING P	ROJEC	T COST	S	50,000

D-6. RECONSTRUCT EXISTING CREEK-SIDE WALLS/WALKS - Left Bank of SFC, from 400 feet downstream of Gillis St. Bridge to 120 feet upstream of Tardy Dam

**Project Priority:** 

LONG-TERM

**Related Projects:** 

C-5

**Project Location:** 

San Felipe Lions Park area

## **Project Description:**

Project includes the reconstruction of the existing creek retaining walls and associated walkways along the left bank of San Felipe Creek (SFC), from a point approximately 400 feet downstream of the Gillis St. Bridge to approximately 120 feet upstream of Tardy Dam (at the old diving board location).

## **Design/Construction Issues:**

#### **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as
  possible and should be conducted in a manner that minimized soil disturbance.

#### **Project Options:**

- New walls/walks should be installed at the same height and in the same location as the existing walls.
- Pervious pavement should be considered for construction of any adjoining walkways.

#### **Construction BMPs:**

 A coffer dam or in-stream barrier will be needed to avoid the potential for suspended solids being introduced in the creek; water-filled portable coffer dams or other temporary measures should be considered.

Project Length/Area:

370 feet

## Photographs/Graphics:







**Anticipated Labor Source:** 

City Crews / Contractor / Volunteers

**Cost Estimate:** 

\$ 310,000

**Operations & Maintenance Impact:** 

**DECREASE** 

Project No.:

D-6

Project:

Reconstruct Existing Wall\*, left bank of SFC, from 400' Downstream of Gillis St. Bridge to 120' Upstream of Tardy Dam

Project Area: Moore Park
Priority: Long-Term

Item	Improvement Description	Quantity	Unit	Un	it Price	To	otal Cost
1	Bank Improvements - Structural Walls III [ 4' - 6' ]	370	LF	\$	360	. \$	133,200
2	Pervious Concrete Sidewalk (6' wide @ \$5/sq.ft.)	370	LF	\$	30	\$	11,100
3	Stabilized Construction Entrance	1	EA	\$	1,000	\$	1,000
4	Silt Fence	200	LF	\$	4	\$	800
5	In-Stream Coffer Dam (w/ dewatering)	370	LF	\$	200	\$	74,000
				Construction S	S	220,100	
	* - bank reconstruction + 6' pervious concrete sidewalk	Enginee	neering Design & Mgmt (13%)			S	28,613
		<b>Total Estimated Construction Cost</b>		ction Cost	S	248,713	
			Co	ntingen	icy (25%)	\$	62,178
		Total Project Estimated Cost				\$	310,891
		PL	PLANNING PROJECT COST			S	310,000

## D-7. BANK STABILIZATION – along the right bank of SFC, between the Gillis St. Bridge and Tardy Dam

**Project Priority:** 

**LONG-TERM** 

**Related Projects:** 

**Project Location:** 

across from the San Felipe Lions Park area

## **Project Description:**

Project includes the stabilization of the stream bank along the right bank of San Felipe Creek (SFC) from the Gillis St. Bridge to Tardy Dam. Stabilization may include a variety of methods including grading, establishment of vegetation, the improvement of soil organics, structural stability including fiber mats, plastic geogrid systems, and other options, up to and including the installation of structural walls. For this area, the establishment of a natural, riparian area is desired, however, an engineering evaluation should be performed to ensure that a proper and reasonable solution is proposed. Bank stabilization is these areas should follow cane eradication efforts upstream of the project area.

## **Design/Construction Issues:**

#### **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization
  will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- Bank area should be evaluated; if necessary, structural bank improvements should be installed to prevent erosion/bank failure issues.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as possible and should be conducted in a manner that minimized soil disturbance.
- Armored catfish pose a threat to the damage/destruction of the proposed improvements. If necessary, proposed improvements should be designed to minimize potential damage by the catfish.

#### **Project Options:**

- Options include the importation of soil and soil materials suitable for the establishment of a high-quality soil matrix.
- Vegetation should include appropriate native grasses and plants.

#### **Construction BMPs:**

Coffer Dams or inflatable barriers will be needed to prevent or limit the amount of sediment or suspended soils
created by construction activities; silt fence, temporary stabilized construction entrance(s), and other appropriate
Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area:

**150 feet** [along City-owned property]

**800 feet** [along private property]

## Photographs/Graphics:







**Anticipated Labor Source:** 

City Crews / Contractor / Volunteers

**Cost Estimate:** 

\$ 55,000

**Operations & Maintenance Impact:** 

Project No.: D-7

Project: Bank Stabilization - along the right bank of SFC, immediately downstream of the Gillis St. Bridge

Project Area: Gillis St. Bridge / Memo's

Priority: Long-Term

Item	Improvement Description	Quantity	Unit	Uni	t Price	To	tal Cost
1	Bank Improvements - Vegetation II + Geogrid*	150	LF	\$	90	\$	13,500
2	Bank Improvements - 2' Rock Gabion*	150	LF	\$	115	\$	17,250
3	Silt Fence	150	LF	\$	4	\$	600
4	In-Stream Barrier/Curtain	150	LF	\$	50	\$	7,500
	* - length of bank stabilization is dictated by length of property owned	Enginee	ring Desig		struction nt (13%)		38,850 5,051
	by the City; currently the property has approx. 150' of creek frontage	e property has approx. 150' of creek frontage Total Estimated Construction Cost		ion Cost	\$	43,901	
			Co	ntingen	ey (25%)	\$	10,975
		Total Project Estimated Cost				\$	54,876
		PL.	S	55,000			

D-8. BANK STABILIZATION – along the left bank of SFC, from the Gillis St. Bridge for approximately 400 feet downstream

**Project Priority:** 

**LONG-TERM** 

**Related Projects:** 

D-4, D-9

**Project Location:** 

San Felipe Lions Park area

## **Project Description:**

Project includes the stabilization of the stream bank along the left bank of San Felipe Creek (SFC) from the Gillis St. Bridge to a point approximately 400 feet downstream. This project is intended to replace the existing creek-side walls removed in Project D-4 with a more riparian-like area. Stabilization may include a variety of methods including grading, establishment of vegetation, the improvement of soil organics, structural stability including fiber mats, plastic geogrid systems, and other options, up to and including the installation of structural walls. For this area, the establishment of a natural, riparian area is desired, however, an engineering evaluation should be performed to ensure that a proper and reasonable solution is proposed. Bank stabilization is these areas should follow cane eradication efforts upstream of the project area.

## **Design/Construction Issues:**

#### **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- Bank area should be evaluated; if necessary, structural bank improvements should be installed to prevent erosion/bank failure issues.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as possible and should be conducted in a manner that minimized soil disturbance.
- Armored catfish pose a threat to the damage/destruction of the proposed improvements. If necessary, proposed improvements should be designed to minimize potential damage by the catfish.

#### **Project Options:**

- Options include the importation of soil and soil materials suitable for the establishment of a high-quality soil matrix.
- Vegetation should include appropriate native grasses and plants.

## **Construction BMPs:**

Coffer Dams or inflatable barriers will be needed to prevent or limit the amount of sediment or suspended soils
created by construction activities; silt fence, temporary stabilized construction entrance(s), and other appropriate
Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

**Project Length/Area:** 

400 feet

#### Photographs/Graphics:







**Anticipated Labor Source:** 

<u>City Crews</u> / Contractor / Volunteers

Cost Estimate: \$ 130,000

**Operations & Maintenance Impact:** 

Project No.: D-8

Project: I

et: Bank Stabilization - along the left bank of SFC, from Gillis St. Bridge to 400' Downstream

Project Area: Gillis St. Bridge / Memo's

Priority: Long-Term

Item	Improvement Description	Quantity	Unit	Uni	Price	To	tal Cost
1	Bank Improvements - Vegetation I30	400	LF	\$	65	\$	26,000
2	Bank Improvements - 2' Rock Gabion	400	LF	\$	115	\$	46,000
3	Silt Fence	400	LF	\$	4	\$	1,600
4	In-Stream Barrier/Curtain	400	LF	\$	50	\$	20,000
	Construction Engineering Design & Mgmt (13%)						93,600
		Total Estimated Construction Cost					105,76
			Co	ntingenc	y (25%)	\$	26,442
		Total Project Estimated Cost					132,21
		PLANNING PROJECT COST				9	130,00

D-9. INSTALL FOCUSED ACCESS FEATURE – Left Bank of SFC, from the Gillis St. Bridge to 400 feet downstream

**Project Priority:** 

**LONG-TERM** 

**Related Projects:** 

D-4, D-8

**Project Location:** 

San Felipe Lions Park area

## **Project Description:**

Project includes the construction of one (1) Focused Access Feature along the left bank of San Felipe Creek (SFC), from the Gillis St. Bridge to 400 feet downstream. The Focused Access Feature should be installed within the improved riparian bank area constructed in Project D-8. The Focused Access Feature will provide a defined location for public access to SFC, and will help reduce environmental impacts of pedestrian foot traffic.

#### **Design/Construction Issues:**

#### **Known Constraints:**

- Project should be constructed in conjunction with projects D-4 (Existing Wall Removal) and D-8 (Bank Stabilization).
- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as possible and should be conducted in a manner that minimized soil disturbance.
- Armored catfish pose a threat to the damage/destruction of the proposed improvements. If necessary, proposed improvements should be designed to minimize potential damage by the catfish.

#### **Project Options:**

Project may include an access ramp (ADA accessible) and/or stairs. Variance may be required from TDLR if ADA access not provided.

#### **Construction BMPs:**

A coffer dam or in-stream barrier will be needed to avoid the potential for suspended solids being introduced in the creek; water-filled portable coffer dams or other temporary measures should be considered.

Project Length/Area:

1 each

## Photographs/Graphics:







Anticipated Labor Source:

City Crews / Contractor / Volunteers

Cost Estimate:

\$ 110,000

**Operations & Maintenance Impact:** 

Project No.: D-9

Project: Install Focused Access Features - left bank of SFC, between the Gillis St. Bridge to 400' Downstream

Project Area: San Felipe Lions Park

Priority: Long-Term

Item	Improvement Description	Quantity	Unit	Uı	nit Price	To	tal Cost
1	Focused Access Feature*	1	EA	\$	60,000	\$	60,000
2	Stabilized Construction Entrance	1	EA	\$	1,000	\$	1,000
3	Silt Fence	200	LF	\$	4	\$	800
4	In-Stream Coffer Dam (w/ dewatering)**	80	LF	\$	200	\$	16,000
				Construction	\$	77,800	
	* - includes one (1) individual focused access feature	Engineering Design & Mgmt (13%)					10,114
	** - dewatering for 80 LF at each construction site	<b>Total Estimated Construction Cost</b>					87,914
		Contingency (25%)					21,979
		Т	otal Projec	t Estin	nated Cost	\$	109,893
		PLANNING PROJECT COST					110,000

**Project Type: VEGETATION ENHANCEMENT** 

## D-10. VEGETATION ENHANCEMENT – left bank area of SFC, between SFC and Bridge St. from the Gillis St. to Tardy Dam

**Project Priority:** 

**LONG-TERM** 

**Related Projects:** 

**Project Location:** 

San Felipe Lions Park area

## **Project Description:**

Project includes the improvement and/or establishment of vegetative cover on the left bank area of San Felipe Creek (SFC), between SFC and Bridge St., from the Gillis St. Bridge to Tardy Dam. Project will include vegetation enhancement including importing top soil, organic material (compost), and the use of fiber rolls/blanket and/or plastic "geogrid" reinforcement for structural support of the soil.

## **Design/Construction Issues:**

#### **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as possible and should be conducted in a manner that minimized soil disturbance.

#### **Project Options:**

- Options include the importation of soil and soil materials suitable for the establishment of a high-quality soil matrix.
- Vegetation should include appropriate native grasses and plants.

#### **Construction BMPs:**

Construction stormwater BMPs will include silt fence and other appropriate BMPs, as necessary.

Project Length/Area:

9,300

SY (or approx. 1.92 acres)

#### Photographs/Graphics:







**Anticipated Labor Source:** 

<u>City Crews / Contractor / Volunteers</u>

**Cost Estimate:** 

\$ 84,000

**Operations & Maintenance Impact:** 

**INCREASE** 

Project No.: D-10

Project: Vegetation Enhancement - left bank area between SFC & Bridge St., from Gillis St. Bridge downstream to Tardy Dam

Project Area: Tardy Dam / San Felipe Lion Park

Priority: Long-Term

Item	Improvement Description	Quantity	Unit SY LF	Unit Price		To	tal Cost
1	Vegetation Enhancement - Soil(4")+Compost(4")	9,300		\$	6	\$	55,800
2	Silt Fence	1,000		\$	4	\$	4,000
				Cons	truction	\$	59,800
	* - area is estimated at approx. 2.0 acres	Engineering Design & Mgmt (13%) Total Estimated Construction Cos					7,774
							67,574
			Co	ntingenc	y (25%)	S	16,894
		Т	otal Projec	t Estima	ted Cost	S	84,468
		PL	ANNING P	ROJEC	COST	\$	84,000

D-11. REMOVAL OF EXISTING BANK WALL – right bank of SFC, immediately downstream from Tardy Dam (upstream of the Taini St./Johnson St. Bridge)

**Project Priority:** 

SHORT-TERM

**Related Projects:** 

D-12

**Project Location:** 

**Tardy Dam** 

## **Project Description:**

Project includes the removal of existing stone/concrete walls along the right bank of San Felipe Creek (SFC), from the area immediately downstream of Tardy Dam (upstream of the Taini St. /Johnson St. Bridge). Total length of wall is approximately 300 feet.

## **Design/Construction Issues:**

#### **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as
  possible and should be conducted in a manner that minimized soil disturbance.
- Existing stone should be salvaged for possible use on future creek-side projects.

## **Project Options:**

 A combination of manual and mechanical labor will likely be necessary to accomplish the removal operation in accordance with USFWS requirements .

#### **Construction BMPs:**

- A coffer dam or in-stream barrier may be needed to avoid the potential for suspended solids being introduced in the creek; water-filled portable coffer dams or other temporary measures should be considered.
- Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area:

300 feet

#### Photographs/Graphics:







Anticipated Labor Source:

<u>City Crews</u> / <u>Contractor</u> / Volunteers

**Cost Estimate:** 

\$ 12,000

**Operations & Maintenance Impact:** 

Project No.: D-11

Project: Removal of Existing Bank Wall - right bank of SFC, immediately downstream of Tardy Dam, upstream of Taini St. Bridge

Project Area: Tardy Dam
Priority: Short-Term

Item	Improvement Description	Quantity	Unit	Un	it Price	Tot	al Cost
1	Demolition - Existing Creek Walls	300	LF	\$	20	\$	6,000
2	Silt Fence	300	LF	\$	. 4	\$	1,200
3	Stabilized Construction Entrance	1	EA	\$	1,000	\$	1,000
		Enginee	ring Design		struction mt (13%)		8,200 1,066
	Engineering Design & Mgmt (13% Total Estimated Construction Cons			EAST AND ADDRESS OF	9,266		
			Co	ntingen	icy (25%)	S	. 2,317
		T	otal Projec	t Estim	ated Cost	\$	11,583
		PL	ANNING P	ROJE	CT COST	s	12,000

D-12. RECONSTRUCT EXISTING CREEK-SIDE WALLS - Right Bank of SFC, immediately downstream of Tardy Dam

**Project Priority:** 

**SHORT-TERM** 

**Related Projects:** 

D-11

**Project Location:** 

**Tardy Dam** 

## **Project Description:**

Project includes the reconstruction of the existing creek retaining walls along the right bank of San Felipe Creek (SFC), immediately downstream of Tardy Dam (upstream of the Taini St. /Johnson St. Bridge).

## **Design/Construction Issues:**

#### **Known Constraints:**

- Project should be constructed in conjunction with project D-11(Existing Wall Removal).
- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as possible and should be conducted in a manner that minimized soil disturbance.
- ADA access should be provided if not continuous access, provide access at select locations along the creek (TDLR review will likely be required).

#### **Project Options:**

- New wall should provide continuous access to the creek for park visitors.
- The project should include creek bank/wall improvements that are both environmentally sensitive and esthetically pleasing; vertical walls are not desired in this area; steps or sloped walls are preferable.

#### **Construction BMPs:**

 A coffer dam or in-stream barrier will be needed to avoid the potential for suspended solids being introduced in the creek; water-filled portable coffer dams or other temporary measures should be considered.

Project Length/Area:

300 feet

## Photographs/Graphics:







**Anticipated Labor Source:** 

City Crews / Contractor / Volunteers

**Cost Estimate:** 

\$ 140,000

**Operations & Maintenance Impact:** 

Project No.: D-1

Project: Reconstruct Existing Creek-Side Wall - right bank of SFC, immediately downstream of Tardy Dam

Project Area: Tardy Dam
Priority: Short-Term

Item	Improvement Description	Quantity	Unit	Unit Price		To	tal Cost
1	Bank Improvements - Structural Walls I [ 0-2' ]	300	LF	\$	120	\$	36,000
2	Stabilized Construction Entrance	1	EA	\$	1,000	\$	1,000
3	Silt Fence	300	LF	\$	4	\$	1,200
4	In-Stream Coffer Dam (w/ dewatering)	300	LF	\$	200	\$	60,000
				Cor	struction	\$	98,200
		Engineering Design & Mgmt (13%)					12,766
		Total E	stimated C	onstruc	ction Cost	\$	110,966
			Co	ntingen	icy (25%)	\$	27,742
	Total l		otal Projec	t Estim	ated Cost	\$	138,708

Project Type: VEGETATION ENHANCEMENT

## D-13. VEGETATION ENHANCEMENT – right bank area of SFC, immediately downstream of Tardy Dam

**Project Priority:** 

**LONG-TERM** 

**Related Projects:** 

**Project Location:** 

**Tardy Dam** 

## **Project Description:**

Project includes the improvement and/or establishment of vegetative cover in and around the project area located on the right bank of San Felipe Creek (SFC), immediately downstream of Tardy Dam. Project will include vegetation enhancement including importing top soil, organic material (compost), and the use of fiber rolls/blanket and/or plastic "geogrid" reinforcement for structural support of the soil.

## **Design/Construction Issues:**

#### **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as possible and should be conducted in a manner that minimized soil disturbance.

#### **Project Options:**

- Options include the importation of soil and soil materials suitable for the establishment of a high-quality soil matrix.
- Vegetation should include appropriate native grasses and plants.

#### **Construction BMPs:**

Construction stormwater BMPs will include silt fence and other appropriate BMPs, as necessary.

Project Length/Area:

1,440 SY (or approx. 0.30 acres)

## Photographs/Graphics:







**Anticipated Labor Source:** 

City Crews / Contractor / Volunteers

**Cost Estimate:** 

\$ 24,000

**Operations & Maintenance Impact:** 

**INCREASE** 

Project No.: D-13

Project: Vegetation Enhancement - right bank area of SFC, immediately downstream of Tardy Dam

Project Area: Tardy Dam
Priority: Long-Term

Item	Improvement Description	Quantity	Unit	Unit Price		To	tal Cost
1	Vegetation Enhancement - Soil(4")+Compost(4")+Geogrid	1,440	SY	\$	11	\$	15,840
2	Silt Fence	300	LF	\$	4	\$	1,200
	* 20	F	uluu Duuluu		truction		17,040
	* - area is estimated at approx. 2.0 acres	Engineering Design & Mgmt (13%)  Total Estimated Construction Cost				2,21: 19,25:	
		Contingency (25%)				\$	4,814
		Total Project Estimated Cost				S	24,069
		PLANNING PROJECT COST			s	24,000	

## D-14. BRIDGE REPLACEMENT / BANK STABILIZATION – Existing Footbridge @ Tardy Dam

Project Priority: LONG

LONG-TERM Related Projects:

Project Location: Tardy Dam

## **Project Description:**

Project includes the replacement of the existing footbridge across San Felipe Creek (SFC), immediately downstream from Tardy Dam. The project will include the complete replacement of the existing bridge, reconstruction of the bridge abutments, and stabilization of the stream banks, and construction of ADA access ramps. Bank stabilization should include installation of structural improvements that will prevent the erosion of the creek bank in the areas immediately upstream and downstream of the bridge. The exact distance of stabilization has not been determined, but should be evaluated by a professional engineering. Bank Stabilization methods should include the most environmentally friendly and esthetically pleasing methods appropriate for the Del Rio, Texas area. The project also includes the installation of ADA ramps and railings necessary to comply with the requirements of the Texas Accessibility Standards (TAS).

## **Design/Construction Issues:**

#### **Known Constraints:**

- Construction site is located on the banks of a creek that provides habitat to Threatened and/or Endangered Species
  that have been identified by the USFWS.
- Construction operations should minimize or eliminate the possibility of undesirable materials falling into the waters of San Felipe Creek.
- All improvements should provide ADA access. Improvements should meet the requirements found in the Texas Accessibility Standards (TAS) administered by the Texas Department of Licensing and Registrations (TDLR). Review and approval by a Registered Accessibility Specialist (RAS) will likely be required.

#### **Project Options:**

 Bank stabilization options may include structural walls, rock gabions, or other methods appropriate to the site conditions.

#### Construction BMPs:

- Coffer Dams or inflatable barriers will be needed to prevent or limit the amount of sediment or suspended soils created by construction activities.
- Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

**Project Length/Area:** 

1 LS [based on a 5' wide - 50 LF bridge]

#### Photographs/Graphics:







Anticipated Labor Source: City Crews / Contractor / Volunteers

Cost Estimate: \$ 165,000 Operations & Maintenance Impact:

Project No.:

Project:

Bridge Replacement/Bank Stabilization - Existing Footbridge across SFC @ Tardy Dam

Project Area: Tardy Dam Priority: Long-Term

Item 1	Improvement Description  Demolition - Existing Concrete Footbridge (walkway) [5' x 50']	Quantity 250	Unit SF	Unit Price		Total Cost	
				\$	20	\$	5,000
2	Demolition - Existing Concrete Footbridge (abutments)	5,000	EA	\$	2	\$	10,000
3	Bank Improvements - Footbridge I (5' wide)	50	LF	\$	600	\$	30,000
4	Bank Improvements - Bridge Abutments (> 40' for 5' bridge)	. 2	EA	\$	25,000	\$	50,000
5	Stabilized Construction Entrance	1	EA	\$	1,000	\$	1,000
6	Silt Fence	200	LF	\$	4	\$	800
7	In-Stream Coffer Dam (w/ dewatering) [50' along both banks]	100	LF	\$	200	\$	20,000
,	* - bank stabilization for 25' upstream/downstream of bridge  * - bank stabilization for 25' upstream/downstream of bridge  * - bank stabilization for 25' upstream/downstream of bridge  * Total Estimated Construction Cos					\$	116,800 15,184 131,984
		Contingency (25%)			BEET SURVEY	32,996	
	Total Project Estimated Cos PLANNING PROJECT COST						164,980
							165,000

Project Type: STORMWATER BMP

## D-15. INSTALL NEW PERVIOUS PAVEMENT PARKING AREA – right bank area of SFC, on FEMA Buyout Property, across Gillis St. from Memo's

Project Priority: LONG-TERM Related Projects:

Project Location: Gillis St. Bridge / Memo's area

#### **Project Description:**

Project includes the installation of a pervious pavement parking area on existing, vacant FEMA Buyout Property located on the right bank of San Felipe Creek (SFC) on Gillis St. across the street from Memo's. An engineered pervious pavement system should be designed and installed according to manufacturer's recommendations and recognized engineering design standards. Includes a 150 LF 6' wide sidewalk from the parking area to the Gillis St. Bridge.

## **Design/Construction Issues:**

## **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as
  possible and should be conducted in a manner that minimized soil disturbance.

#### **Project Options:**

- Identified pervious pavement options include pervious concrete, a gravel/geogrid system (GravelPave®, etc...).
- System should be designed to detain stormwater up to the 25-yr storm event.
- Underdrain system should outfall via sheet flow to a vegetative filter strip area.
- On areas within the defined project boundaries not suitable for pervious pavement should be provided with vegetation enhancement, including an improved soil matrix, along with appropriate native grasses and plants.

#### **Construction BMPs:**

 Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area:

15,855 sq. ft. (Parking Area) [0.36 acres] 900 sq. ft. (Sidewalk – 6' x 150')

## Photographs/Graphics:







Anticipated Labor Source: City Crews / Contractor / Volunteers

Cost Estimate: \$ 220,000 Operations & Maintenance Impact: INCREASE

Project No.: D-15

Project: Install New Pervious Parking Area - FEMA Buyout Property across from Memo's

Project Area: Gillis St. Bridge / Memo's

Priority: Long-Term

Item	Improvement Description	Quantity	Unit	Unit Price		Total Cost	
1	Clearing, Grubbing & Subgrade Preparation	15,855	SF	\$	0.10	\$	1,586
2	Excavation & Haul-Off of Existing Surface Material (12" depth)	587	CY	\$	20	\$	11,744
3	Pervious Concrete - Parking Area*	12,684	SF	\$	10	\$	126,840
4	Wheel Stops (based on 1 / 440 sf of property)	29	EA	\$	200	\$	5,76:
5	Striping (based on 1 / 440 sf of property)	29	EA	\$	5	\$	14
6	Pervious Concrete - Sidewalk**	900	SF	\$	10	\$	9,00
7	Silt Fence	200	LF	\$	4	\$	80
8	Stabilized Construction Entrance	1	EA	\$	1,000	\$	1,00
		Construction				156,88	
	* - assume pervious parking on 80% of total area  Engineering Design & Mgmt (139)  ** - sidewalk is 6' wide x 150' long  Total Estimated Construction Co					State of the last	20,39 177,27
	Contingency (25%)						44,31
	Total Project Estimated Cost						221,59
4 - 4 - 7		PLANNING PROJECT COST				S	220,00

Project Type: STORMWATER BMP

D-16. INSTALL NEW PERVIOUS PAVEMENT PARKING AREA – area south of Bridge St., between Broadbent Ave. & Barrera Ave.

**Project Priority:** 

LONG-TERM

**Related Projects:** 

**Project Location:** 

San Felipe Lions Park/Tardy Dam area

## **Project Description:**

Project includes the installation of a pervious pavement parking area on existing undeveloped property located on the south side of Bridge St., between Broadbent Ave. and Barrera Ave. An engineered pervious pavement system should be designed and installed according to manufacturer's recommendations and recognized engineering design standards.

#### **Design/Construction Issues:**

#### **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as
  possible and should be conducted in a manner that minimized soil disturbance.

#### **Project Options:**

- Identified pervious pavement options include pervious concrete, a gravel/geogrid system (GravelPave®, etc...).
- System should be designed to detain stormwater up to the 25-yr storm event.
- Underdrain system should outfall via sheet flow to a vegetative filter strip area.
- On areas within the defined project boundaries not suitable for pervious pavement should be provided with vegetation enhancement, including an improved soil matrix, along with appropriate native grasses and plants.

#### **Construction BMPs:**

 Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area:

42,831

sq. ft. (approx. 0.98 acres)

#### Photographs/Graphics:







**Anticipated Labor Source:** 

City Crews / Contractor / Volunteers

Cost Estimate:

\$ 605,000

**Operations & Maintenance Impact:** 

**INCREASE** 

Project No.:

D-16

Project: Install New Pervious Parking Area - vacant area south of Bridge St., between Broadbent Ave. & Barrera Ave.

Project Area: Gillis St. Bridge / Memo's

Priority: Long-Term

Item	Improvement Description	Quantity	Unit	Unit Price		To	tal Cost
1	Clearing, Grubbing & Subgrade Preparation	42,831	SF	\$	0.10	\$	4,283
2	Excavation & Haul-Off of Existing Surface Material (12" depth)	1,586	CY	\$	20	\$	31,72
3	Pervious Concrete - Parking Area*	29,982	SF	\$	10	\$	299,81
4	Wheel Stops (based on 1 / 440 sf of property)	68	EA	\$	200	\$	13,628
5	Striping (based on 1 / 440 sf of property)	68	EA	\$	5	\$	34
6	Vegetation Enhancement - Soil(4")+Compost(4")	12,849	SY	\$	6	\$	77,096
7	Silt Fence	200	LF	\$	4	\$	800
8	Stabilized Construction Entrance	1	EA	\$	1,000	\$	1,000
	Construction						428,69
	* - assume pervious parking on 80% of total area Engineering Design & Mgmt (13%)						55,73
	** - vegetation enhancement on remainder of property Total Estimated Construction Cost						484,42
7.14.	Contingency (25%)						121,10
		Total Project Estimated Cost					605,52
		PLANNING PROJECT COST			S	605,00	

Project Type: VEGETATION ENHANCEMENT

D-17. VEGETATION ENHANCEMENT – existing park area on the south side of Bridge St., between Barrera Ave. and Taini St.

**Project Priority:** 

**LONG-TERM** 

**Related Projects:** 

**Project Location:** 

San Felipe Lions Park/Tardy Dam area

## **Project Description:**

Project includes the improvement and/or establishment of vegetative cover in and around the project area located on the south side of Bridge St., between Barrera Ave. and Taini St. The existing area includes park/playscape improvements that will remain in place. Project will include vegetation enhancement including importing top soil, organic material (compost), and the use of fiber rolls/blanket and/or plastic "geogrid" reinforcement for structural support of the soil.

## **Design/Construction Issues:**

#### **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as possible and should be conducted in a manner that minimized soil disturbance.

#### **Project Options:**

- Options include the importation of soil and soil materials suitable for the establishment of a high-quality soil matrix.
- Vegetation should include appropriate native grasses and plants.

#### **Construction BMPs:**

Construction stormwater BMPs will include silt fence and other appropriate BMPs, as necessary.

Project Length/Area:

6,470 SY (or approx. 1.34 acres)

## Photographs/Graphics:







**Anticipated Labor Source:** 

City Crews / Contractor / Volunteers

**Cost Estimate:** 

\$ 39,000

**Operations & Maintenance Impact:** 

**INCREASE** 

Project No.: D-17

Project: Ve

Vegetation Enhancement - existing park site on the south side of Bridge St., between Barrera Ave. & Taini St.

Project Area: Tardy Dam
Priority: Long-Term

1 2	Improvement Description  Vegetation Enhancement* - Soil(4")+Compost(4")+SRB**  Silt Fence	<b>Quantity</b> 3,235 500	Unit SY LF	Unit Price		Tot	al Cost
				\$	8	\$ .	25,880
				\$	4	\$	2,000
	* - total area is approx. 6,470 sq. yds.; assume that vegetation						27,880
	enhancement will occur on 50% of the existing park area	Engineering Design & Mgmt (13%)				\$	3,624
	** - SRB = soil retention blanket	<b>Total Estimated Construction Cost</b>				\$	31,504
		Contingency (25%)				\$	7,876
		Total Project Estimated Cost			\$	39,381	
		PLANNING PROJECT COST				s	39,000

**Project Type: BANK IMPROVEMENTS** 

# D-18. CONVERSION OF EXISTING WADING AREA TO A KAYAK PUT-IN/TAKE-OUT AREA – located on the left bank of SFC immediately upstream of Tardy Dam

**Project Priority:** 

**SHORT-TERM** 

**Related Projects:** 

**Project Location:** 

Tardy Dam/San Felipe Lions Park area

# **Project Description:**

Project includes the conversion of an existing wading area into a kayak put-in/take-out area, along the left bank of San Felipe Creek (SFC), just upstream of Tardy Dam. The project would include any necessary removal of the existing wading area improvements and construction of the kayak put-in/take-out area.

# **Design/Construction Issues:**

### **Known Constraints:**

- Project should be constructed in conjunction with projects D-5 (Existing Wall Removal) and D-6 (Existing Wall Reconstruction).
- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as
  possible and should be conducted in a manner that minimized soil disturbance.
- ADA access should be provided if not continuous access, provide access at select locations along the creek (TDLR review will likely be required).

# **Project Options:**

Project should result in an easy to use, easily accessible kayak launch area.

### **Construction BMPs:**

 A coffer dam or in-stream barrier will be needed to avoid the potential for suspended solids being introduced in the creek; water-filled portable coffer dams or other temporary measures should be considered.

Project Length/Area:

120 feet [approx. length of perimeter wall; wading area = approx. 2,200 sq.ft.]

## Photographs/Graphics:







Anticipated Labor Source: City Crew

City Crews / Contractor / Volunteers

Cost Estimate: \$ 45,000

**Operations & Maintenance Impact:** 

**DECREASE** 

Project No.:

D-18

Project:

Convert of Exist. Wading Area to a Kayak Put-In / Take-Out Area - located on the left Bank of SFC, upstream of Tardy Dam

Project Area: Tardy Dam
Priority: Short-Term

Item	Improvement Description	Quantity	Unit	Uı	nit Price	To	tal Cost
1	Existing Wall Rehab	120	LF	\$	40	\$	4,800
2	Existing Floor Rehab	2,200	SF	\$	5	\$	11,000
3	ADA Access Upgrade*	1	LS	\$	15,000	\$	15,000
4	Silt Fence	200	LF	\$	4	\$	800
			Constructio				31,600
	* - estimated; actual amount will depend on actual improvements	Enginee	ring Design	1 & Mg	gmt (13%)	\$	4,108
		Total E	stimated C	onstru	ction Cost	\$	35,708
			Co	ntinge	ncy (25%)	\$	8,927
		Total Project Estimated Cost					44,635
		PL	ANNING P	ROJE	CT COST	S	45,000

# D-19. CONVERT EXISTING ASPHALT PARKING AREA TO PERVIOUS PAVEMENT PARKING AREA – just west of Bridge St. / Gillis St. intersection

**Project Priority:** 

**LONG-TERM** 

**Related Projects:** 

**Project Location:** 

San Felipe Lion Park area

# **Project Description:**

Project includes the demolition of an existing asphalt parking area and the installation of a new pervious pavement parking area located at the corner of Bridge St. and Gillis St. An engineered pervious pavement system should be designed and installed according to manufacturer's recommendations and recognized engineering design standards.

### **Design/Construction Issues:**

### **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as possible and should be conducted in a manner that minimized soil disturbance.

### **Project Options:**

- Identified pervious pavement options include pervious concrete, a gravel/geogrid system (GravelPave®, etc...).
- System should be designed to detain stormwater for up to the 25-yr storm event.
- Areas within the defined project boundaries not suitable for pervious pavement should be provided with vegetation enhancement, including an improved soil matrix, along with appropriate native grasses and plants.

### **Construction BMPs:**

 Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area:

11,984 sq. ft. (approx. 0.28 acres)

### Photographs/Graphics:







Anticipated Labor Source: City Crews / Cor

City Crews / Contractor / Volunteers

Cost Estimate: \$ 210,000

**Operations & Maintenance Impact:** 

**INCREASE** 

Project No.: D-19

Project: Convert Exisitng Asphalt Parking Area to Pervious Pavement - just W. of Bridge St./Gillis St. Intersection

Project Area: San Felipe Lions Park

ltem	Improvement Description	Quantity	Unit	Un	it Price	To	otal Cost
1	Demo Existing Asphalt Parking Area	11,984	SF	\$	1.00	\$	11,984
2	Excavation & Haul-Off of Existing Surface Material (12" depth)	444	CY	\$	20	\$	8,877
3	Clearing, Grubbing & Subgrade Preparation	11,984	SF	\$	0.10	\$	1,198
4	Pervious Concrete	11,984	SF	\$	10	\$	119,840
5	Wheel Stops (based on 1 / 440 sf of property)	27	EA	\$	200	\$	5,44
6	Striping (based on 1 / 440 sf of property)	27	EA	\$	5	\$	136
7	Silt Fence	300	LF	\$	4	\$	1,20
8	Stabilized Construction Entrance	1	EA	\$	1,000	\$	1,00
				Con	struction	S	149,68
	* - total area is approx. 11,984 sq. ft.	Enginee	ring Desigi	& Mg	mt (13%)	\$	19,45
		Total E	Stimated C	onstruc	tion Cost	\$	169,14
			Co	ntingen	cy (25%)	\$	42,28
		Total Project Estimated Cost					211,42
		PL.	ANNING P	ROJEC	CT COST	s	210,00

# D-20. CONVERT EXISTING ASPHALT PARKING AREA TO PERVIOUS PAVEMENT PARKING AREA — on the north side of Bridge St. at Broadbent Ave.

**Project Priority:** 

**LONG-TERM** 

**Related Projects:** 

**Project Location:** 

San Felipe Lion Park area

# **Project Description:**

Project includes the demolition of an existing asphalt parking area and the installation of a new pervious pavement parking area located on the north side of Bridge St. at its corner with Broadbent Ave. An engineered pervious pavement system should be designed and installed according to manufacturer's recommendations and recognized engineering design standards.

### **Design/Construction Issues:**

### **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as possible and should be conducted in a manner that minimized soil disturbance.

### **Project Options:**

- Identified pervious pavement options include pervious concrete, a gravel/geogrid system (GravelPave®, etc...).
- System should be designed to detain stormwater for up to the 25-yr storm event.
- Areas within the defined project boundaries not suitable for pervious pavement should be provided with vegetation enhancement, including an improved soil matrix, along with appropriate native grasses and plants.

### **Construction BMPs:**

 Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area:

7,776 sq. ft. (approx. 0.18 acres)

### Photographs/Graphics:







**Anticipated Labor Source:** 

City Crews / Contractor / Volunteers

**Cost Estimate:** 

\$ 140,000

**Operations & Maintenance Impact:** 

**INCREASE** 

Project No.: D-20

Project: Convert Exisiting Asphalt Parking Area to Pervious Pavement - on N. side of Bridge St. at Broadbent Ave.

Project Area: Tardy Dam / San Felipe Lions Park

ltem	Improvement Description	Quantity	Unit	Un	it Price	To	tal Cost
1	Demo Existing Asphalt Parking Area	7,776	SF	\$	1.00	\$	7,776
2	Excavation & Haul-Off of Existing Surface Material (12" depth)	288	CY	\$	20	\$	5,76
3	Clearing, Grubbing & Subgrade Preparation	7,776	SF	\$	0.10	\$	77
4	Pervious Concrete	7,776	SF	\$	10	\$	77,76
5	Wheel Stops (based on 1 / 440 sf of property)	18	EA	\$	200	\$	3,53
6	Striping (based on 1 / 440 sf of property)	18	EA	\$	5	\$	8
7	Silt Fence	300	LF	\$	4	\$	1,20
8	Stabilized Construction Entrance	1	EA	\$	1,000	\$	1,00
				Cor	struction	\$	97,89
	* - total area is approx. 11,984 sq. ft.	Enginee	ring Design	n & Mg	mt (13%)	S	12,72
		Total E	stimated C	Construc	tion Cost	S	110,62
			Co	ntingen	cy (25%)	S	27,65
		T	otal Projec	t Estim	ated Cost	S	138,27
		PL	ANNING P	PROJEC	CT COST	s	140,00

### REHABILITATION OF THE EXISTING PUBLIC RESTROOMS – located at San D-21. **Felipe Lions Park**

**Project Priority: SHORT-TERM Related Projects:** 

**Project Location:** San Felipe Lions Park

# **Project Description:**

Project includes the complete rehabilitation of the existing public restrooms located at San Felipe Lions Park. The rehabilitation would include complete interior and exterior renovations.

# **Design/Construction Issues:**

### **Known Constraints:**

 Construction site is located on the banks of a creek that provides habitat to Threatened and/or Endangered Species that have been identified by the USFWS.

### **Project Options:**

- Project options should consider both rehabilitation of the existing restrooms or the complete redesign and replacement of the restrooms.
- Project should consider possible ways to reduce vandalism and improve safety for park visitors.

### **Construction BMPs:**

 Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area:

1 LS

# Photographs/Graphics:







**Anticipated Labor Source:** City Crews / Contractor / Volunteers

**Cost Estimate:** \$ 43,000 **Operations & Maintenance Impact: NO CHANGE** 

Project No.: D-21

Project: Rehabiliation of Existing Public Restrooms - located at San Felipe Lions Park

Project Area: San Felipe Lions Park

Priority: Short-Term

Item	Improvement Description	Quantity	Unit	Un	it Price	To	tal Cost
1	Rehabiliation of Public Restroom	1.0	LS	\$	30,000	\$	30,000
2	Silt Fence	100	LF	\$	4	\$	400
							n de la
				Cor	struction	\$	30,400
		Enginee	ring Design	ı & Mg	mt (13%)	S	3,952
		Total E	Stimated C	onstruc	ction Cost	S	34,352
Ŋ.			Co	ntingen	icy (25%)	S	8,588
		T	otal Projec	t Estim	ated Cost	\$	42,940
		PL	ANNING P	ROJE	CT COST	S	43,000

**Project Type: MISCELLANEOUS** 

# D-22. REFURBISH/REPAIR TARDY DAM

Project Priority: LONG-TERM Related Projects:

Project Location: Tardy Dam

# **Project Description:**

Project includes the refurbishment/repair of Tardy Dam. The project will include the in place refurbishment and repair of the existing dam. The project would include the possible use of hydraulic concrete pumping into the dam to improve its structural stability. The proposed project would not include in major structural changes to the existing dam, nor the substantial removal of existing improvements. Dam is owned and operated by the San Felipe Agricultural, Manufacturing, and Irrigation District (SFAMID).

# **Design/Construction Issues:**

### **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as
  possible and should be conducted in a manner that minimized soil disturbance.

### **Project Options:**

- Working from the downstream side of the dam is the preferred option.
- Substantial changes to the dam's structural will likely require both USFWS approval and a U.S. Army Corps of Engineers permit.

### **Construction BMPs:**

- A coffer dam or in-stream barrier will be needed to avoid the potential for suspended solids being introduced in the creek; water-filled portable coffer dams or other temporary measures should be considered.
- Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area:

**250 feet** [length of dam is approximate, based on latest aerial photos]

# Photographs/Graphics:







Anticipated Labor Source: City Crews / Contractor / Volunteers

Cost Estimate: \$ 71,000 Operations & Maintenance Impact: NO CHANGE

Project No.: D-22

Project: Refurbish / Repair Tardy Dam

Project Area: Tardy Dam
Priority: Long-Term

Item	Improvement Description	Quantity	Unit	Unit Price	To	otal Cost
1	Refurbish Tardy Dam*	1,250.	SF	\$ 40	\$	50,000
				Constructio	n S	50,000
	* - estimated dam face area = $250$ ft. x 5 ft. = $1,250$ sq.ft.	Enginee	Engineering Design & Mgmt (13%)			6,500
		Total F	Estimated C	onstruction Cos	t S	56,50
			Co	ntingency (25%	) \$	14,12
		Total Project Estimated Cos				70,62
		PL	ANNING P	ROJECT COS	Г \$	71,00

**Project Type: MISCELLANEOUS** 

# D-23. UPGRADE OF TARDY DAM

Project Priority: LONG-TERM Related Projects:

Project Location: Tardy Dam

# **Project Description:**

Project includes upgrades to Tardy Dam. The project will include major improvements to the existing dam. Possible improvements include the installation of kayak shoots, fish ladders, and overall structural renovations. Prior to the construction of such improvements, USFWS approval will be required and a U.S. Army Corps of Engineers permit must be obtained. Dam is owned and operated by the San Felipe Agricultural, Manufacturing, and Irrigation District (SFAMID) whose approval and cooperation must be obtained prior to the design and construction of any planned improvements.

# **Design/Construction Issues:**

#### **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as
  possible and should be conducted in a manner that minimized soil disturbance.

### **Project Options:**

- Proposed structural improvements (i.e., walls, etc...) should be located downstream of the existing dam to avoid working within possible habitat area.
- Substantial changes to the dam's structural will likely require both USFWS approval and a U.S. Army Corps of Engineers permit.

### **Construction BMPs:**

- A coffer dam or in-stream barrier will be needed to avoid the potential for suspended solids being introduced in the creek; water-filled portable coffer dams or other temporary measures should be considered.
- Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area:

250 feet [length of dam is approximate, based on latest aerial photos]

# Photographs/Graphics:







Anticipated Labor Source: City Crews / Contractor / Volunteers

Cost Estimate: \$ 530,000 Operations & Maintenance Impact: NO CHANGE

Project No.: D-23

Project: Upgrade / Improvements to Tardy Dam

Project Area: Tardy Dam
Priority: Long-Term

Item	Improvement Description	Quantity	Unit	U	nit Price	To	otal Cost
1	Upgrade Tardy Dam*	1	LS	\$	250,000	\$	250,000
	In-Stream Coffer Dam (w/ dewatering)	250	LF	\$	500	\$	125,000
		Construction					375,000
	* - upgrades include chutes and fish ladders;	Engineering Design & Mgmt (13%)			\$	48,750	
	estimated dam face area = $250$ ft. x 5 ft. = $1,250$ sq.ft.	Total Estimated Construction Cost					423,750
			Co	ntinge	ency (25%)	s	105,938
Harry		Total Project Estimated Cost				\$	529,688
		PL	ANNING P	ROJE	ECT COST	s	530,000

**Project Type: BANK IMPROVEMENTS** 

D-24. INSPECTION AND REPAIR (if necessary) EXISTING CREEK-SIDE WALLS - Left Bank of SFC, from Old Diving Board Area to Taini St./Johnson St. Bridge

**Project Priority:** 

**LONG-TERM** 

**Related Projects:** 

**Project Location:** 

**Tardy Dam** 

# **Project Description:**

Project includes the inspection and repair (if necessary) of the existing creek retaining walls along the left bank of San Felipe Creek (SFC), immediately downstream of Tardy Dam to the upstream side of the Taini St. /Johnson St. Bridge.

# **Design/Construction Issues:**

### **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as possible and should be conducted in a manner that minimized soil disturbance.

### **Project Options:**

- The project includes the inspection of the existing creek bank wall improvements, along with necessary repairs or improvements. Repairs should attempt to match the existing wall features and esthetics.
- Unless required for public safety reasons, complete replacement of the existing walls is not a desired option.

### **Construction BMPs:**

 A coffer dam or in-stream barrier will be needed to avoid the potential for suspended solids being introduced in the creek; water-filled portable coffer dams or other temporary measures should be considered.

Project Length/Area:

400 feet

### Photographs/Graphics:







Anticipated Labor Source:

City Crews / Contractor / Volunteers

**Cost Estimate:** 

\$ 6,000

**Operations & Maintenance Impact:** 

**NO CHANGE** 

Project No.: D-24

Project: Inspection & Repair of Existing Creek-Side Wall - left bank of SFC, from Old Diving Board Area to Taini St. Bridge

Project Area: Tardy Dam
Priority: Long-Term

Item	Improvement Description	Quantity	Unit	Unit Price	Tot	al Cost
1	Inspection & Repair (as needed) of Existing Walls*	400	LF	\$ 10	\$	4,000
				Construction	\$	4,000
	* - wall repairs are assumed to be cosmetic in nature; significant structural repairs would be at additional expense	Enginee	\$	520		
		Total E	onstruction Cost	\$	4,520	
			ntingency (25%)	\$	1,130	
		Total Project Estimated Cos PLANNING PROJECT COST				5,650
						6,000

Project Type: PARK IMPROVEMENT

### REHABILITATION OF EXISTING PICNIC AREA - on left bank of SFC, just D-25. upstream from Tardy Dam

**Project Priority: LONG-TERM Related Projects:** 

**Project Location: Tardy Dam** 

# **Project Description:**

Project includes the complete rehabilitation of the existing park elements including picnic tables, BBQ pits, trash cans, and other improvements. Vegetation enhancement should also be provided including importing top soil, organic material (compost), and the use of fiber rolls/blanket and/or plastic "geogrid" reinforcement for structural support of the soil.

### **Design/Construction Issues:**

### **Known Constraints:**

- Construction site is located on the banks of a creek that provides habitat to Threatened and/or Endangered Species that have been identified by the USFWS.
- Park improvements should provide ADA access. Improvements must meet the requirements found in the Texas Accessibility Standards (TAS) administered by the Texas Department of Licensing and Registrations (TDLR). Review and approval by a Registered Accessibility Specialist (RAS) will likely be required.

### **Project Options:**

- Project may include simply the replacement of existing park elements or may involve a complete reconfiguration of the park elements.
- Consideration should be given to the use of pervious pavement for any proposed pavement/walking surfaces installed.
- Consideration should be given to the appropriate walking surface to be installed under existing trees (shaded areas). The installation of grasses/vegetation may not be advisable in areas that receive little or no sunlight.

#### **Construction BMPs:**

 Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area:

1 LS

# Photographs/Graphics:







**Anticipated Labor Source:** City Crews / Contractor / Volunteers

**Cost Estimate:** \$ 32,000 **NO CHANGE Operations & Maintenance Impact:** 

Project No.:

D-25

Project: Reh

Rehab of Existing Picnic Area - on the left bank of SFC, just upstream of Tardy Dam

Project Area: Tardy Dam / San Felipe Lions Park

[tem	Improvement Description	Quantity	Unit	Un	it Price	Tot	tal Cost
1	Demolition/Haul Off	1	LS	\$	3,000	\$	3,000
2	Picnic Tables - Metal w/ concrete slab	5	EA	\$	3,000	\$	15,000
3	BBQ Pits - Metal w/ concrete foundation	4	EA	\$	500	\$	2,000
4	Trash Can w/ foundation	4	EA	\$	700	\$	2,800
						S	22,800
	* - vegetation enhancement is approx. 30' x 100'	7	ring Design				2,964
		Total E	stimated C	onstru	ction Cost	\$	25,764
			Co	ntinger	icy (25%)	\$	6,441
		T	otal Projec	t Estim	ated Cost	S	32,205
		PI.	ANNING P	ROJE	CT COST	S	32,000

Project Type: PARK IMPROVEMENT

# D-26. REHABILITATION OF EXISTING PLAYGROUND AREA - on left bank of SFC @ San Felipe Lions Park

Project Priority: LONG-TERM Related Projects:

Project Location: San Felipe Lions Park/Tardy Dam area

# **Project Description:**

Project includes the complete rehabilitation of the existing park elements including play stations, picnic tables, BBQ pits, trash cans, and other improvements. Where appropriate, vegetation enhancement should also be provided around the park area, including importing top soil, organic material (compost), and the use of fiber rolls/blanket and/or plastic "geogrid" reinforcement for structural support of the soil.

# **Design/Construction Issues:**

#### **Known Constraints:**

- Construction site is located on the banks of a creek that provides habitat to Threatened and/or Endangered Species
  that have been identified by the USFWS.
- Park improvements should provide ADA access. Improvements must meet the requirements found in the Texas Accessibility Standards (TAS) administered by the Texas Department of Licensing and Registrations (TDLR). Review and approval by a Registered Accessibility Specialist (RAS) will likely be required.

# **Project Options:**

- Play area fall surface should be upgraded to meet current safety requirements.
- Options for vegetation enhancement should include the importation of soil and soil materials suitable for the
  establishment of a high-quality soil matrix; vegetation should include appropriate native grasses and plants.

### **Construction BMPs:**

• Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area:

1 LS

# Photographs/Graphics:







**Anticipated Labor Source:** 

City Crews / Contractor / Volunteers

**Cost Estimate:** 

\$ 57,000

**Operations & Maintenance Impact:** 

**NO CHANGE** 

Project No.: D-2

Project: Rehab of Existing Playground Area - on the left bank of SFC @ San Felipe Lions Park

Project Area: Tardy Dam / San Felipe Lions Park

Item	Improvement Description	Quantity	Unit	U	nit Price	To	tal Cost
1	Demolition/Haul Off	1	LS	\$	5,000	\$	5,000
2	Picnic Tables - Metal w/ concrete slab	1	EA	\$	3,000	\$	3,000
3	Picnic Tables - Concrete w/ concrete slab	1	EA	\$	6,000	\$	6,000
4	BBQ Pits - Metal w/ concrete foundation	1	EA	\$	500	\$	500
5	Trash Can w/ foundation	1	EA	\$	700	\$	700
6	Swings	1	EA	\$	2,000	\$	2,000
7	Slide	1	EA	\$	3,000	\$	3,000
8	Playscape	1	EA	\$	20,000	\$	20,000
				Co	nstruction	\$	40,20
	* - vegetation enhancement is approx. 30' x 100'	Enginee	ring Desigi	1 & M	gmt (13%)	\$	5,22
		Total E	stimated C	onstru	ction Cost	\$	45,420
			Co	ntinge	ncy (25%)	\$	11,35
		Total Project Estimated Cost			\$	56,783	
PLANNING					CT COST	S	57,00

Project Type: PARK IMPROVEMENT

D-27. REHABILITATION OF EXISTING PLAYGROUND AREA - San Felipe Lions Club/Abe Barrera Memorial Park (south of Bridge St., between Taini St. & E. De La Rosa St.)

**Project Priority:** 

**LONG-TERM** 

**Related Projects:** 

**Project Location:** 

San Felipe Lions Park/Tardy Dam area

# **Project Description:**

Project includes the complete rehabilitation of the existing park elements including play stations, picnic tables, BBQ pits, trash cans, and other improvements. Where appropriate, vegetation enhancement should also be provided around the park area, including importing top soil, organic material (compost), and the use of fiber rolls/blanket and/or plastic "geogrid" reinforcement for structural support of the soil.

# **Design/Construction Issues:**

### **Known Constraints:**

- Construction site is located on the banks of a creek that provides habitat to Threatened and/or Endangered Species that have been identified by the USFWS.
- Park improvements should provide ADA access. Improvements must meet the requirements found in the Texas Accessibility Standards (TAS) administered by the Texas Department of Licensing and Registrations (TDLR). Review and approval by a Registered Accessibility Specialist (RAS) will likely be required.

### **Project Options:**

- Play area fall surface should be upgraded to meet current safety requirements.
- Options for vegetation enhancement should include the importation of soil and soil materials suitable for the
  establishment of a high-quality soil matrix; vegetation should include appropriate native grasses and plants.

### **Construction BMPs:**

• Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area:

1 LS

### Photographs/Graphics:







**Anticipated Labor Source:** 

City Crews / Contractor / Volunteers

**Cost Estimate:** 

\$ 39,000

**Operations & Maintenance Impact:** 

**NO CHANGE** 

Project No.: D-27

Project: Rehab of Existing Playground Area - San Felipe Lions Park/Abe Barrera Memorial Park\*

Project Area: Tardy Dam / San Felipe Lions Park

Item	Improvement Description	Quantity	Unit	Un	it Price	To	tal Cost
1	Demolition/Haul Off	1	LS	\$	3,000	\$	3,000
2	Picnic Tables - Metal w/ concrete slab	5	EA	\$	3,000	\$	15,000
3	BBQ Pits - Metal w/ concrete foundation	2	EA	\$	500	\$	1,000
4	Trash Can w/ foundation	4	EA	\$	700	\$	2,800
5	Swings	1	EA	\$	2,000	\$	2,000
6	Rehab Existing Sand Volleyball Area**	1	LS	\$	4,000	\$	4,000
	* - existing playscape would remain in place	Construction Engineering Design & Mgmt (13%)					27,800 3,614
	** - includes new net, net posts, and sand	Total E	stimated C	onstru	ction Cost	\$	31,414
			Co	ntinger	icy (25%)	\$	7,854
		T	otal Projec	t Estim	ated Cost	\$	39,268
		PL	ANNING P	ROJE	CT COST	s	39,000

# D-28. INSTALL HYDRODYNAMIC SEPARATOR UNIT – at curb cut on Taini St./Johnson St. Bridge, immediately downstream of Tardy Dam

Project Priority: LONG-TERM Related Projects:

Project Location: Moore Park

# **Project Description:**

Project includes the installation of a hydrodynamic separator unit (Stormceptor©, Vortecs<sup>TM</sup>, or similar type unit) to be located at the existing curb cut on Taini St./Johnson St. just downstream of Tardy Dam on San Felipe Creek (SFC). The hydrodynamic separator unit should be designed in accordance with existing regulatory requirements and current engineering design standards. The unit should be properly sized to accommodate the volume and rate of flow of stormwater expected at this site.

# **Design/Construction Issues:**

### **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as possible and should be conducted in a manner that minimized soil disturbance.

### **Project Options:**

- The defined drainage boundary for the system must be established during design.
- If feasible, the system should be designed to outfall onto vegetative areas; concentrated flows (i.e., pipe flows) should be avoided if possible; the use of a properly designed and constructed level spreader would be required.

### **Construction BMPs:**

• Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area:

1 LS

# Photographs/Graphics:







Anticipated Labor Source: City Crews / Contractor / Volunteers

Cost Estimate: \$ 43,000 Operations & Maintenance Impact: DECREASE

Project No.: D-28

Project: Install Hydrodynamic Separator Unit - at curb cut on Taini St., immediately downstream of Tardy Dam

Project Area: Tardy Dam
Priority: Long-Term

Item	Improvement Description	Quantity	Unit	Unit Price		To	tal Cost
1	Hydrodynamic Separator Unit	1.5	AC	\$	20,000	\$	30,000
2	Silt Fence	100	LF	\$	4	\$	400
					nstruction		30,400
	* - based on size of drainage area (@ \$20,000 / acre of area served) [drainage area = approx. 1.5 acres]	Engineering Design & Mgmt (13%) Total Estimated Construction Cos					3,952 34,352
			Co	ntinge	ncy (25%)	\$	8,588
		T	otal Projec	t Estin	ated Cost	S	42,940
		PL	ANNING P	ROJE	CT COST	\$	43,000

# Project Type: PARK IMPROVEMENT

# D-29. REHABILITATION OF THE EXISTING SIGN FOR THE SAN FELIPE LIONS CLUB/ABE BARRERA MEMORIAL PARK

**Project Priority:** 

**LONG-TERM** 

**Related Projects:** 

**Project Location:** 

San Felipe Lions Club/Abe Barrera Memorial Park (Bridge St. @ Taini St.)

# **Project Description:**

Project includes the complete rehabilitation of the existing San Felipe Lions Club/Abe Barrera Memorial Park sign.

# **Design/Construction Issues:**

#### **Known Constraints:**

- Construction site is located on the banks of a creek that provides habitat to Threatened and/or Endangered Species
  that have been identified by the USFWS.
- Existing sign paint (if any) should be tested for the presence of lead. If lead is found, refurbishment of sign should proceed in accordance with all State and federal requirements pertaining to the abatement of lead-paint structures.

### **Project Options:**

Project may include the refurbishment of the existing park sign, or may involve the complete removal of the existing sign and installation of a new park sign.

### **Construction BMPs:**

 As appropriate, silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area:

1 LS

# Photographs/Graphics:







Anticipated Labor Source:

City Crews / Contractor / Volunteers

**Cost Estimate:** 

\$ 7,000

**Operations & Maintenance Impact:** 

**NO CHANGE** 

Project No.: D-29

Project: Rehab of Existing San Felipe Lions Club / Abe Barrera Memorial Park Sign

Project Area: San Felipe Lions Club / Abe Barrera Memorial Park

Item	Improvement Description	Quantity	Unit	Unit Price	Tot	tal Cost
1	Rehabilitation of Existing Park Sign	1	LS	\$ 5,000	\$	5,000
				Construction	\$	5,000
		Engine	ering Desigr	& Mgmt (13%)	\$	650
		Total	Estimated C	onstruction Cost	S	5,650
			Co	ntingency (25%)	\$	1,413
			Total Projec	t Estimated Cost	\$	7,063
		PI	ANNING P	ROJECT COST	\$	7,000

Project Type: PARK IMPROVEMENT

# D-30. REHABILITATION OF THE EXISTING SIGN FOR THE SAN FELIPE LIONS PARK

**Project Priority:** 

**LONG-TERM** 

**Related Projects:** 

**Project Location:** 

San Felipe Lions Park (north side of Bridge St., between Barrera Ave. & Broadbent Ave.)

# **Project Description:**

Project includes the complete rehabilitation of the existing San Felipe Lions Park sign.

# **Design/Construction Issues:**

### **Known Constraints:**

- Construction site is located on the banks of a creek that provides habitat to Threatened and/or Endangered Species
  that have been identified by the USFWS.
- Existing sign paint (if any) should be tested for the presence of lead. If lead is found, refurbishment of sign should
  proceed in accordance with all State and federal requirements pertaining to the abatement of lead-paint structures.

### **Project Options:**

Project may include the refurbishment of the existing park sign, or may involve the complete removal of the existing sign and installation of a new park sign.

### **Construction BMPs:**

 As appropriate, silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area:

1 LS

# Photographs/Graphics:







**Anticipated Labor Source:** 

City Crews / Contractor / Volunteers

**Cost Estimate:** 

\$ 14,000

**Operations & Maintenance Impact:** 

**NO CHANGE** 

Project No.: D-30

Project:

Rehab of Existing San Felipe Lions Park Sign

Project Area: San Felipe Lions Park

Item	Improvement Description	Quantity	Unit	Unit Price	To	otal Cost
1	Rehabilitation of Existing Park Sign	1	LS	\$ 10,000	\$	10,000
				Construction	\$	10,000
		Enginee	\$	1,300		
		Total E	stimated C	onstruction Cost	\$	11,300
			Co	ntingency (25%)	\$	2,825
		Total Project Estimated Cos		t Estimated Cost	\$	14,125
		PL	ANNING P	ROJECT COST	S	14,000

# D-31. CONVERT EXISTING ASPHALT PAVEMENT LOADING/UNLOADING AREA TO PERVIOUS PAVEMENT — on the north side of Bridge St. at Barrera Ave. intersection

Project Priority: LONG-TERM Related Projects:

Project Location: San Felipe Lion Park/Tardy Dam area

# **Project Description:**

Project includes the demolition of an existing asphalt loading/unloading area and the installation of a new pervious pavement. The area is located on the north side of Bridge St. at Barrera Ave. (at Tardy Dam). An engineered pervious pavement system should be designed and installed according to manufacturer's recommendations and recognized engineering design standards.

# **Design/Construction Issues:**

### **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as
  possible and should be conducted in a manner that minimized soil disturbance.

### **Project Options:**

- Identified pervious pavement options include pervious concrete, a gravel/geogrid system (GravelPave®, etc...).
- System should be designed to detain stormwater for up to the 25-yr storm event.
- Areas within the defined project boundaries not suitable for pervious pavement should be provided with vegetation enhancement, including an improved soil matrix, along with appropriate native grasses and plants.

### **Construction BMPs:**

Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area: 5,859 sq. ft. (approx. 0.13 acres)

## Photographs/Graphics:







Anticipated Labor Source: City Crews / Contractor / Volunteers

Cost Estimate: \$ 105,000 Operations & Maintenance Impact: NO CHANGE

Project No.: D-31

Project: Convert Exist. Asphalt Pavement Loading/Unloading Area to Pervious Pavement - on N. side of Bridge St. at Barrerra Ave.

Project Area: Tardy Dam / San Felipe Lions Park

Item	Improvement Description	Quantity	Unit	Unit Price		Total Cost	
1	Demo Existing Asphalt Pavement Area	5,859	SF	\$	1.00	\$	5,859
2	Excavation & Haul-Off of Existing Surface Material (12" depth)	217	. CY	\$	20	\$	4,340
3	Clearing, Grubbing & Subgrade Preparation	5,859	SF	\$	0.10	\$	580
4	Pervious Concrete	5,859	SF	\$	10	\$	58,590
5	Wheel Stops	16	EA	\$	. 200	\$	3,200
6	Striping	1	LS	\$	200	\$ .	200
7	Silt Fence	300	LF	\$	4	\$	1,20
8	Stabilized Construction Entrance	1	EA	\$	1,000	\$	1,000
					struction		74,975
* - total area is approx. 5,859 sq. ft.  Engineering Design & Mgmt (13%)  Total Estimated Construction Cost					NEW YORK	9,747	
			Co	ntingen	icy (25%)	\$	21,180
		T	otal Projec	t Estim	ated Cost	\$	105,902
	PLANNING PROJECT COS'					S	105,000

# D-32. COMMUNITY GARDEN IMPROVEMENTS – on FEMA Buyout Properties

Project Priority:

**LONG-TERM** 

**Related Projects:** 

**Project Location:** 

Joe Ramos Center Area

# **Project Description:**

Project includes the improvement of multiple, existing FEMA Buyout Properties located within the defined Project Area. The proposed project would include the installation of a community garden area on each existing property utilizing native plants and vegetation that are capable of withstanding extended periods of little or no rainfall.

# **Design/Construction Issues:**

### **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Landscaped areas will be cared for by volunteers, neighbors, or City crews any proposed improvements should focus on low maintenance plants and improvements.
- The community garden sites are located within residential neighborhoods all improvements should be neighbor-friendly and should not create, or lead to the creation of, an unsafe environment or an unsightly property.

### **Project Options:**

- The proposed community garden improvements can include a variety of landscaping options. The goal for each individual property (or lot) is to create an attractive area that utilizes native plants and vegetation that require minimal care and maintenance.
- Each property (or lot) should be provided with water service; if not served by an automatic sprinkler system, the
  property should have multiple hose bibs for use by volunteers and/or City crews.

### **Construction BMPs:**

• If necessary, silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the site in accordance with any TCEQ requirements.

Project Length/Area:

3.5 acres

### Photographs/Graphics:





**Anticipated Labor Source:** 

City Crews / Contractor / Volunteers

**Cost Estimate:** 

\$ 95,000

Operations & Maintenance Impact:

**INCREASE** 

Project No.: D-32

Project: Community Garden Improvements - on FEMA Buyout Properties

Project Area: Neighborhood near San Felipe Lions Park, between Gillis St. & Taini St.

Item	Improvement Description	Quantity	Unit	Unit Price		Total Cost	
1	Trash/Rubbish Haul Off	3.50	AC	\$	1,000	\$	3,500
2	Clearing & Grubbing	3.50	AC	\$	1,000	\$	3,500
3	Vegetation Enhancement - Soil(2")+Compost(2") (@ \$20/CY)	3.50	AC	\$	10,800	.\$	37,800
4	Plantings*	3.50	AC	\$	6,050	\$	21,175
5	Basic Irrigation System	3.50	AC	\$	2,000	\$	7,000
6	Silt Fence	3.50	AC	\$	800	\$	2,800
	* - assumes 1 - 1 gallon plant spaced every 6.0 feet; such spacing in an average of 9 plants/36 SY (or 0.25 plants/SY); (@\$5 / plant	Enginee	ring Design		nstruction	\$	75,775
	the cost would be \$1.25/SY or \$6,050/Acre.  Total Estimated Construction Cost					\$	75,775
			Co	ntinge	ncy (25%)	\$	18,944
		T	otal Projec	t Estin	nated Cost	\$	94,719
		PL	ANNING P	ROJE	CT COST	S	95,000

# D-33. INSTALLATION OF A PUBLIC EDUCATION KIOSK — in the Tardy Dam/San Felipe Lions Park area

**Project Priority:** 

LONG-TERM

**Related Projects:** 

**Project Location:** 

Tardy Dam/San Felipe Lions Park

# **Project Description:**

Project includes the installation of one (1) public information kiosk to be located in the Tardy Dam/San Felipe Lions Park area. The project will include a kiosk capable of displaying educational material relating to San Felipe Creek and its associated watershed. The kiosk will provide an all-weather display area for posters, pamphlets, signs, and other informational materials. The kiosk will be located adjacent to heavily used/trafficked areas for the most impact.

# **Design/Construction Issues:**

### **Known Constraints:**

- Construction site is located on the banks of a creek that provides habitat to Threatened and/or Endangered Species
  that have been identified by the USFWS.
- Proposed improvements should provide ADA access. Improvements should meet the requirements found in the Texas Accessibility Standards (TAS) administered by the Texas Department of Licensing and Registrations (TDLR).
   Review and approval by a Registered Accessibility Specialist (RAS) will likely be required.

### **Project Options:**

- Options include several different types of kiosks.
- The kiosk should be designed to reduce the potential for vandalism.
- Project budget includes the design/printing of informational signs.

### **Construction BMPs:**

• Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area:

1 each

# Photographs/Graphics:







**Anticipated Labor Source:** 

City Crews / Contractor / Volunteers

**Cost Estimate:** 

\$ 10,000

**Operations & Maintenance Impact:** 

**NO CHANGE** 

Project No.: D-33

Project: Install Public Education Kiosks along the San Felipe Creek

Project Area: Tardy Dam / San Felipe Lions Park

Item	Improvement Description	Quantity	Unit	Uni	it Price	Tot	tal Cost
1	Public Education Kiosk	1	LS	\$	5,000	\$	5,000
2	Signs/Exhibits	2	LS	\$	1,000	\$	2,000
				Con	struction	\$	7,000
		Enginee	Engineering Design & Mgmt (13%)				040
		Enginee	ring Design	& Mgr	nt (13%)	S	910
			stimated C		, ,	No. of Contract of	7,910
			stimated C	onstruc	, ,	\$	
		Total E	stimated C	onstruc ntingen	tion Cost cy (25%)	<b>\$</b>	7,910

# D-34. INSTALLATION OF PET WASTE STATIONS — in the Tardy Dam/San Felipe Lions Park area

**Project Priority:** 

SHORT-TERM

**Related Projects:** 

**Project Location:** 

Tardy Dam/San Felipe Lions Park

# **Project Description:**

Project includes the installation of two (2) pet waste stations to be located in the Tardy Dam/San Felipe Lions Park area. The stations will be located adjacent to heavily used/trafficked areas for the most impact,

# **Design/Construction Issues:**

### **Known Constraints:**

- Construction site is located on the banks of a creek that provides habitat to Threatened and/or Endangered Species
  that have been identified by the USFWS.
- Proposed improvements should provide ADA access. Improvements should meet the requirements found in the Texas Accessibility Standards (TAS) administered by the Texas Department of Licensing and Registrations (TDLR). Review and approval by a Registered Accessibility Specialist (RAS) will likely be required.

### **Project Options:**

- Options include several different types of pet waste stations.
- Recommend that pet waste station include bag dispenser and trash can.
- Recommend purchasing extra pet waste bags at the time of purchase of the pet waste station.

### **Construction BMPs:**

Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used
around the construction site in accordance with TCEQ requirements.

Project Length/Area:

2 each

### Photographs/Graphics:







Anticipated Labor Source:

<u>City Crews</u> / <u>Contractor</u> / Volunteers

**Cost Estimate:** 

\$ 2,000

**Operations & Maintenance Impact:** 

**INCREASE** 

Project No.: D-34

Project: I

**Pet Waste Stations** 

Project Area: Tardy Dam / San Felipe Lions Park

Priority: Short-Term

Item	Improvement Description	Quantity	Unit	Uni	t Price	Tot	tal Cost
1	Pet Waste Stations w/ Trash Cans & Bag Dispenser*	2	EA	\$	750	\$	1,500
	Construction			struction	\$	1,500	
* - Pet Waste Stations located at maximum 1,000 ft. spacing along San Felipe Creek		Engine	\$	195			
		<b>Total Estimated Construction Cost</b>					1,695
			Co	ntingen	ey (25%)	\$	424
			Total Projec	t Estima	ited Cost	\$	2,119
		PI	LANNING P	ROJEC	T COST	S	2,000

# D-35. INSTALLATION OF TRASH CANS - in the Tardy Dam/San Felipe Lions Park

area

Project Priority: SHORT-TERM Related Projects:

Project Location: Tardy Dam/San Felipe Lions Park

# **Project Description:**

Project includes the installation of four (4) trash cans, including concrete support foundations, to be located in the Tardy Dam/San Felipe Lions Park area. The trash cans will be located adjacent to heavily used/trafficked areas for the most impact.

# **Design/Construction Issues:**

### **Known Constraints:**

- Construction site is located on the banks of a creek that provides habitat to Threatened and/or Endangered Species
  that have been identified by the USFWS.
- Proposed improvements should provide ADA access. Improvements should meet the requirements found in the Texas Accessibility Standards (TAS) administered by the Texas Department of Licensing and Registrations (TDLR). Review and approval by a Registered Accessibility Specialist (RAS) will likely be required.

### **Project Options:**

- Options include several different types of trash cans.
- Installation will include trash can, trash can support, and concrete foundation.
- The unit shall be designed to prevent the trash can from being easily stolen.

#### Construction BMPs:

 Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area:

4 each

# Photographs/Graphics:







Anticipated Labor Source: City Crews / Contractor / Volunteers

Cost Estimate: \$ 4,000 Operations & Maintenance Impact: INCREASE

Project No.: D-35

Project: Trash Cans w/ Foundations

Project Area: Tardy Dam / San Felipe Lions Park

Priority: Short-Term

Item	Improvement Description	Quantity	Unit	Unit Price		Tota	l Cost
1	Trash Cans w/ Foundations	4	EA	\$	700	\$	2,800
				Cons	truction	\$	2,800
		Enginee	ring Design	& Mgm	it (13%)	\$	364
		Total E	stimated C	onstruct	ion Cost	\$	3,164
			Co	ntingenc	y (25%)	\$	791
		Т	otal Projec	t Estima	ted Cost	\$	3,955
		PL	ANNING P	ROJEC	r cost	S	4,000

Project Type: STORMWATER BMP

**CONVERT EXISTING ASPHALT PAVEMENT HIKE & BIKE TRAIL to PERVIOUS** D-36. PAVEMENT HIKE & BIKE TRAIL, along left bank of SFC, between Gillis St. Bridge & Bridge St.

**Project Priority: LONG-TERM Related Projects:** 

**Project Location:** San Felipe Lions Park

# **Project Description:**

Project includes the demolition of an existing asphalt hike & bike trail and the installation of a new pervious pavement hike & bike trail along the same route (approximately). Project area includes the existing hike & bike trail from the Gillis St. Bridge to Bridge St. An engineered pervious pavement system should be designed and installed according to manufacturer's recommendations and recognized engineering design standards.

# **Design/Construction Issues:**

#### **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as possible and should be conducted in a manner that minimized soil disturbance.

#### **Project Options:**

- Identified pervious pavement options include pervious concrete, a gravel/geogrid system (GravelPave®, etc...).
- System should be designed to detain stormwater for up to the 25-yr storm event.
- Areas within the defined project boundaries not suitable for pervious pavement should be provided with vegetation enhancement, including an improved soil matrix, along with appropriate native grasses and plants.

# **Construction BMPs:**

 Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area: 8,000 sq. ft. [area is approximate, based on 800 linear feet x 10 ft. width)

#### Photographs/Graphics:







**Anticipated Labor Source:** City Crews / Contractor / Volunteers

**Cost Estimate:** \$ 86,000 **Operations & Maintenance Impact: INCREASE** 

Project No.:

D-36

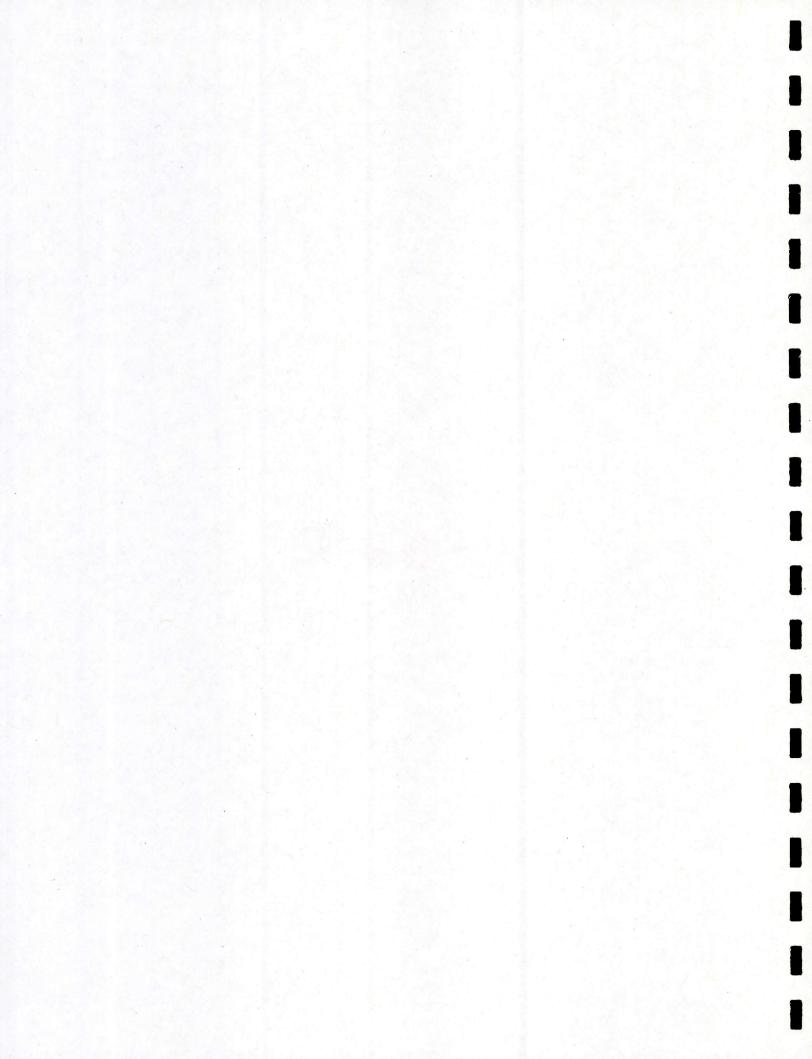
Project:

Convert Exist. Hike&Bike Trail to Pervious Pavement, left bank of SFC, between Gillis St. Bridge & Bridge St.

Project Area: San Felipe Lions Park

Item	Improvement Description	Quantity	Unit	Un	it Price	To	tal Cost
1	Demo Existing Asphalt Hike & Bike Trail*	8,000	SF	\$	2.00	\$	16,00
2	Clearing, Grubbing & Subgrade Preparation*	8,000	SF	\$	0.10	\$	80
3	Pervious Concrete*	8,000	SF	\$	5	\$	40,00
4	Silt Fence	800	LF	\$	4	\$	3,20
5	Stabilized Construction Entrance	1	EA	\$	1,000	\$	1,00
	* - area is based on an approx. 800 ft. long x 10 ft. wide trail	Enginee	ring Desigi		struction mt (13%)	7	61,00 7,93
		, Total E	stimated C	onstruc	ction Cost	S	68,93
			Co	ntingen	icy (25%)	\$	17,23
	Action to the second of the se	Т	otal Projec	t Estim	ated Cost	\$	86,16
		PL	ANNING P	ROJE	CT COST	S	86,00

# Area E



Project Type: INVASIVE SPECIES CONTROL

E-1. CANE ERADICATION – Left Bank of San Felipe Creek, between Johnson St. Bridge (Tardy Dam) & Canal St. Bridge (Rotary Park)

Project Priority: SHORT-TERM Related Projects:

Project Location: Between Johnson St. Bridge (Tardy Dam) & Canal St. Bridge (Rotary Park)

# **Project Description:**

Project includes the eradication of Arundo Donax (a.k.a., "Giant Reed", "River Cane") along the left bank of San Felipe Creek (SFC) from the Johnson St. Bridge (at Tardy Dam) downstream to the Canal St. Bridge (at Rotary Park). Eradication should follow the steps outlined in the San Felipe Creek Master Plan and include: Cut Cane (after annual flowering around mid-July); Removal of Cuttings; Herbicide Spray; Removal of Dead Cane (in winter); Repeat. Work should proceed from upstream to downstream.

# **Design/Construction Issues:**

#### **Known Constraints:**

- Project should be started after, or at the same time, as Projects A-1 to A-6, B-1, B-2, C-1 to C-5, D-1 to D-3, and E-1.
- Some of the existing cane may be located on private property.
- Herbicide use in and around the creek area should proceed with caution.
- No spraying in the creek; herbicide must be hand applied to cane located in the creek.
- Eradication efforts will involve several cycles.

#### **Project Options:**

 Small patches can be cut by hand; large patches should be cut with mechanical equipment, if possible; avoid disturbing soil by the use of rubber tired equipment.

#### Construction BMPs:

• Construction BMPs (silt fence, etc...) should be used if mechanical equipment results in soil disturbance.

Project Length/Area:

< 1 acre [area is approximate, based on latest aerial photos]</p>

#### Photographs/Graphics:







Anticipated Labor Source: City Crews / Contractor / Volunteers

Cost Estimate: \$ 132,000 (1st Year Efforts Only) Operations & Maintenance Impact: INCREASE

Project No.: E-1 - left bank of San Felipe Creek between Taini St./Johnson St. Bridge and Canal St. Bridge

Project: Arundo Donax Removal (Giant Reed, a.k.a. "river cane")

Project Area: Between Tardy Dam & Rotary Park

Priority: Short-Term

Item	Improvement Description	Quantity	Unit	Uı	nit Price	To	tal Cost
1	Arundo Donax Removal*	3	Acre	\$	44,000	\$	132,000
* - estimated	l at \$44,000 / acre for one-time manual removal; price			Co	nstruction	\$	132,000
does not in	nclude follow up visits (which should be once per year); see Appendix	Engineeri	ng Design &	Mgm	t (13%)**	S	100
E for deta	ails on cane removal cost estimate.	Total F	Estimated Co	onstru	ction Cost	\$ -	132,000
** - Enginee	ring Design/Mgmt. + Contigency included in Unit Cost; see Appendix		Conti	ngenc	y (25%)**	\$	,
E for ad	ditional details.	1	Total Project	t Estin	nated Cost	\$	132,000
730 37			ANNING P	DOTE	or coor		132,000

**INVASIVE SPECIES CONTROL Project Type:** 

CANE ERADICATION - Right Bank of San Felipe Creek, between Johnson St. Bridge (Tardy Dam) & Canal St. Bridge (Rotary Park)

**Project Priority:** 

SHORT-TERM

**Related Projects:** 

**Project Location:** 

Between Johnson St. Bridge (Tardy Dam) & Canal St. Bridge (Rotary Park)

E-1

# **Project Description:**

Project includes the eradication of Arundo Donax (a.k.a., "Giant Reed", "River Cane") along the right bank of San Felipe Creek (SFC) from the Johnson St. Bridge (at Tardy Dam) downstream to the Canal St. Bridge (at Rotary Park). Eradication should follow the steps outlined in the San Felipe Creek Master Plan and include: Cut Cane (after annual flowering around mid-July); Removal of Cuttings; Herbicide Spray; Removal of Dead Cane (in winter); Repeat. Work should proceed from upstream to downstream.

# **Design/Construction Issues:**

#### **Known Constraints:**

- Project should be started after, or at the same time, as Projects A-1 to A-6,B-1,B-2,C-1 to C-5,D-1 to D-3, and E-1.
- Some of the existing cane is known to be located on private property.
- Herbicide use in and around the creek area should proceed with caution.
- No spraying in the creek; herbicide must be hand applied to cane located in the creek.
- Eradication efforts will involve several cycles.

#### **Project Options:**

 Small patches can be cut by hand; large patches should be cut with mechanical equipment, if possible; avoid disturbing soil by the use of rubber tired equipment.

#### **Construction BMPs:**

Photographs/Graphics:

• Construction BMPs (silt fence, etc...) should be used if mechanical equipment results in soil disturbance.

Project Length/Area: <1	acre [area is approximate, based on latest aerial photos]
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	/																				

Anticipated Labor Source: City Crews / Contractor / Volunteers

\$ 220,000 (1st Year Efforts Only) **Cost Estimate: Operations & Maintenance Impact: INCREASE** 

Project No.: E-2 - right bank of San Felipe Creek between Taini St./Johnson St. Bridge and Canal St. Bridge

Project: Arundo Donax Removal (Giant Reed, a.k.a. "river cane")

Project Area: Between Tardy Dam & Rotary Park

Priority: Short-Term

Item	Improvement Description	Quantity	Unit	Unit Price		To	tal Cost
.1	Arundo Donax Removal*	5	Acre	\$	44,000	\$	220,000
						The state of	
						<u>Ja</u>	
						T Y	
* - estimated	at \$44,000 / acre for one-time manual removal; price			Co	nstruction	\$	220,000
does not in	clude follow up visits (which should be once per year); see Appendix	Engineeri	ng Design &	Mgm	t (13%)**	\$	
E for deta	ils on cane removal cost estimate.	Total I	Estimated Co	onstru	ction Cost	\$	220,000
** - Enginee	ring Design/Mgmt. + Contigency included in Unit Cost; see Appendix		Conti	ngenc	y (25%)**	\$	
E for ad	ditional details.	7	Total Project	t Estin	nated Cost	S	220,000
		PL	ANNING P	ROJE	CT COST	\$	220,000

Project Type: BANK IMPROVEMENTS

# E-3. BANK STABILIZATION – along the left bank of SFC, between the Taini St./ Johnson St. Bridge & the Canal St. Bridge

**Project Priority:** 

LONG-TERM

**Related Projects:** 

**Project Location:** 

between Tardy Dam & Rotary Park

# **Project Description:**

Project includes the stabilization of the stream bank along the left bank of San Felipe Creek (SFC) from the Taini St./ Johnson St. Bridge & the Canal St. Bridge (along SFC between Tardy Dam and Rotary Park). Stabilization may include a variety of methods including grading, establishment of vegetation, the improvement of soil organics, structural stability including fiber mats, plastic geogrid systems, and other options. For this area, the establishment of a natural, riparian area is desired, so the utilization of structural walls should be avoided. Bank stabilization is these areas should follow cane eradication efforts upstream of the project area.

# **Design/Construction Issues:**

#### **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as
  possible and should be conducted in a manner that minimized soil disturbance.
- Armored catfish pose a threat to the damage/destruction of the proposed improvements. If necessary, proposed improvements should be designed to minimize potential damage by the catfish.

#### **Project Options:**

- Options include the importation of soil and soil materials suitable for the establishment of a high-quality soil matrix.
- Vegetation should include appropriate native grasses and plants.

#### **Construction BMPs:**

- Coffer Dams or inflatable barriers will be needed to prevent or limit the amount of sediment or suspended soils
  created by construction activities.
- Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area:

**2,450 feet** [length includes approx. 700 feet on private property]

# Photographs/Graphics:







**Anticipated Labor Source:** 

<u>City Crews / Contractor / Volunteers</u>

**Cost Estimate:** 

\$ 290,000

**Operations & Maintenance Impact:** 

**NO CHANGE** 

Project No.: E-3

Project: Bank Stabilization - along the left bank of SFC, between the Taini St./Johnson St. Bridge & the Canal St. Bridge

Project Area: Between Tardy Dam & Rotary Park

Item	Improvement Description	Quantity	Unit	Unit	Price	To	otal Cost
1	Bank Improvements - Vegetation II	2,450	LF	\$	80	\$	196,000
2	Silt Fence	2,450	LF	\$	4	. \$	9,800
		1 1 1 2 3		Const	truction	\$	205,800
	* - length of bank stabilization includes approx. 700 feet of bank area	Enginee	ring Design	& Mgm	t (13%)	\$	26,75
	that is currently on private property	Total E	stimated C	onstructi	on Cost	\$	232,55
			Co	ntingency	y (25%)	\$	58,13
		Т	otal Projec	t Estimat	ed Cost	S	290,693
		PL	ANNING P	ROJECT	COST	S	290,000

Project Type: VEGETATION ENHANCEMENT

E-4. VEGETATION ENHANCEMENT – left bank area of SFC, immediately downstream of the Taini St./Johnson St. Bridge (around the San Felipe Lions Hut)

Project Priority: LONG-TERM Related Projects: D-

Project Location: Tardy Dam /San Felipe Lions Hut area

# **Project Description:**

Project includes the improvement and/or establishment of vegetative cover on the left bank area of San Felipe Creek (SFC), immediately downstream of the Taini St./Johnson St. Bridge. Project area includes the San Felipe Lions Hut and surrounding areas. Project will include vegetation enhancement including importing top soil, organic material (compost), and the use of fiber rolls/blanket and/or plastic "geogrid" reinforcement for structural support of the soil.

# **Design/Construction Issues:**

#### **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as possible and should be conducted in a manner that minimized soil disturbance.

#### **Project Options:**

- Options include the importation of soil and soil materials suitable for the establishment of a high-quality soil matrix.
- Vegetation should include appropriate native grasses and plants.

#### **Construction BMPs:**

Construction stormwater BMPs will include silt fence and other appropriate BMPs, as necessary.

Project Length/Area: 5,800 SY ( or approx. 1.20 acres)

# Photographs/Graphics:







Anticipated Labor Source: City Crews / Contractor / Volunteers

Cost Estimate: \$ 68,000 Operations & Maintenance Impact: INCREASE

Project No.: E-4

Project: Vegetation Enhancement - left bank area of SFC, immediately downstream of the Taini St./Johnson St. Bridge\*

Project Area: Tardy Dam
Priority: Long-Term

ltem	Improvement Description	Quantity	Unit	Unit	Price	To	tal Cost
1	Vegetation Enhancement - Soil(4")+Compost(4")+SRB**	5,800	SY	\$	8	\$	46,400
2	Silt Fence	500	LF	\$	4	\$	2,000
					truction	1	48,400
	* - area is around the San Felipe Lions Hut	Enginee	ring Design	ı & Mgm	t (13%)	\$	6,292
	** - SRB = soil retention blanket	Total E	stimated C	onstructi	on Cost	\$	54,692
W.			Co	ntingency	y (25%)	S	13,673
		T	otal Projec	t Estimat	ed Cost	S	68,365
		PL	ANNING P	ROJECT	COST	S	68,000

**Project Type: BANK IMPROVEMENTS** 

# E-5. REPLACEMENT / REPAIR OF EXISTING TREE WELLS - on left bank of SFC, just downstream from the Taini St./Johnson St. Bridge (Tardy Dam)

Project Priority: LONG-TERM Related Projects:

Project Location: Tardy Dam area

# **Project Description:**

Project includes the complete rehabilitation/repair of the existing tree wells located on the left bank of San Felipe Creek (SFC) immediately downstream of the Taini St./Johnson St. Bridge.

# **Design/Construction Issues:**

#### **Known Constraints:**

- Construction site is located on the banks of a creek that provides habitat to Threatened and/or Endangered Species
  that have been identified by the USFWS.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as possible and should be conducted in a manner that minimized soil disturbance.

#### **Project Options:**

Project may include simply the replacement of existing park elements or may involve a complete reconfiguration of the park elements.

#### **Construction BMPs:**

Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area:

2 each (each tree well assumed @ 6 ft. diameter, 2 feet high)

# Photographs/Graphics:







**Anticipated Labor Source:** 

City Crews / Contractor / Volunteers

**Cost Estimate:** 

\$ 5,000

Operations & Maintenance Impact:

**NO CHANGE** 

Project No.: E-

Project:

Repair and/or Replacement of Existing Tree Wells - on left bank of SFC, just downstream of the Taini St./Johnson St. Bridge

Project Area: Tardy Dam

Priority: Long-Term

Item	Improvement Description	Quantity	Unit	Un	it Price	Tot	tal Cost
1	Repair and/or Replacement of Existing Tree Wells*	2	EA	\$	1,800	\$	3,600
	* - each tree well is approx. 6 ft. diameter and 2 feet high;			Con	struction	S	3,600
	total area of each tree well wall is approx. 60 SF (each);	Engineering Design & Mgmt (13%)				\$	468
	@ \$ 30/SF each tree well is \$1,800 (total replacement).	Total I	Estimated C	onstruc	tion Cost	S	4,068
			Co	ntingen	cy (25%)	S	1,017
		j	Total Projec	t Estim	ated Cost	\$	5,085
		PL	ANNING P	ROJEC	CT COST	S	5,000

**Project Type: BANK IMPROVEMENTS** 

# E-6. Kayak Launch Station - left bank SFC, at southern end of existing Hike & Bike Trail (downstream of Tardy Dam)

**Project Priority:** 

LONG-TERM

**Related Projects:** 

**Project Location:** 

Tardy Dam area

# **Project Description:**

Project includes the construction of a kayak launch station (a.k.a., "kayak put-in/take-out") along the left bank of San Felipe Creek (SFC), at the southern end of the existing Hike & Bike Trail (downstream of Tardy Dam).

# **Design/Construction Issues:**

#### **Known Constraints:**

- Project should be constructed in conjunction with project E-3 (Bank Stabilization).
- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as
  possible and should be conducted in a manner that minimized soil disturbance.
- Park improvements should provide ADA access. Improvements should meet the requirements found in the Texas
   Accessibility Standards (TAS) administered by the Texas Department of Licensing and Registrations (TDLR). Review
   and approval by a Registered Accessibility Specialist (RAS) will likely be required.

#### **Project Options:**

Project should result in an easy to use, easily accessible kayak launch area.

#### Construction BMPs:

- A coffer dam or in-stream barrier will be needed to avoid the potential for suspended solids being introduced in the creek; water-filled portable coffer dams or other temporary measures should be considered.
- Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area:

1 each

# Photographs/Graphics:







**Anticipated Labor Source:** 

City Crews / Contractor / Volunteers

**Cost Estimate:** 

\$ 82,000

**Operations & Maintenance Impact:** 

**DECREASE** 

Project No.: E-6

Project: Install Kayak Launch Station, left bank of SFC, at southern end of existing Hike & Bike Trail

Project Area: Tardy Dam / San Felipe Lions Hut

Item	Improvement Description	Quantity	Unit	Uı	it Price	To	tal Cost
1	Kayak Launch Station	1	EA	\$	40,000	\$	40,000
2	Stabilized Construction Entrance	1	EA	\$	1,000	\$	1,000
3	Silt Fence	200	LF	\$	4	\$	800
4	In-Stream Coffer Dam (w/ dewatering)	80	LF	\$	200	\$	16,000
				Co	nstruction	S	57,800
		Enginee	ring Design	1 & Mg	mt (13%)	\$	7,514
		Total E	Stimated C	onstru	ction Cost	\$	65,314
			Co	ntinge	ncy (25%)	\$	16,329
		1	otal Projec	t Estin	nated Cost	\$	81,643
K .		PL	ANNING P	ROJE	CT COST	S	82,000

Project Type: STORMWATER BMP

# E-7. CONSTRUCT NEW PERVIOUS PAVEMENT HIKE & BIKE TRAIL - along left bank of SFC, from end of existing H&B Trail to Canal St. Bridge

Project Priority: LONG-TERM Related Projects:

Project Location: between Tardy Dam & Rotary Park

#### **Project Description:**

Project includes the construction of a new, pervious pavement hike & bike trail along the left bank of San Felipe Creek (SFC) from the southern end of the existing hike & bike trail, downstream to the Canal St. Bridge. An engineered pervious pavement system should be designed and installed according to manufacturer's recommendations and recognized engineering design standards.

# **Design/Construction Issues:**

#### **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as possible and should be conducted in a manner that minimized soil disturbance.

#### **Project Options:**

- Identified pervious pavement options include pervious concrete.
- Pavement system should be designed to detain stormwater for up to the 25-yr storm event.

# **Construction BMPs:**

 Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area:	17,000	sq. ft. [area is approximate, based on 1,700 linear feet x 10 ft. width]	Y

# Photographs/Graphics:

Insert a photograph or drawing as appropriate. Include a helpful caption if possible.

Anticipated Labor Source: <u>City Crews / Contractor / Volunteers</u>

Cost Estimate: \$ 145,000 Operations & Maintenance Impact: INCREASE

Project No.: E-7

Project: Construct New Pervious Pavement Hike&Bike Trail - left bank of SFC, from end of Exist. H&B Trail to the Canal St. Bridge

Project Area: Between Tardy Dam & Rotary Park

Item	Improvement Description	Quantity	Unit	Un	it Price	To	tal Cost
1	Clearing, Grubbing & Subgrade Preparation*	17,000	SF	\$	0.50	\$	8,500
2	Pervious Concrete*	17,000	SF	\$	5	\$	85,000
3	Silt Fence	1,700	LF	\$	4	\$	6,800
4	Stabilized Construction Entrance	1	EA	\$	1,000	\$	1,00
	* - area is based on an approx. 1,700 ft. long x 10 ft. wide trail	Enginee	ring Desigi	17.4	struction mt (13%)		101,300 13,169
		Total E	stimated C	onstruc	tion Cost	S	114,46
			Co	ntingen	cy (25%)	\$	28,61
		Т	otal Projec	t Estim	ated Cost	\$	143,08
		***			CT COST		145,00

Project Type: VEGETATION ENHANCEMENT

E-8. VEGETATION ENHANCEMENT – along left bank area of SFC, between Flores St. and Mendez St.

**Project Priority:** 

**LONG-TERM** 

**Related Projects:** 

**Project Location:** 

near the Mendez St. / Jones St. intersection (between Tardy Dam & Rotary Park)

# **Project Description:**

Project includes the improvement and/or establishment of a vegetative cover along the left bank area of San Felipe Creek (SFC) between Flores St. and Mendez St. Project will include vegetation enhancement including importing top soil, organic material (compost), and the use of fiber rolls/blanket and/or plastic "geogrid" reinforcement for structural support of the soil.

# **Design/Construction Issues:**

#### **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as
  possible and should be conducted in a manner that minimized soil disturbance.

#### **Project Options:**

- Options include the importation of soil and soil materials suitable for the establishment of a high-quality soil matrix.
- Vegetation should include appropriate native grasses and plants.

#### **Construction BMPs:**

• Construction stormwater BMPs will include silt fence and other appropriate BMPs, as necessary.

Pro	ect	Length	/F	Area:
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6,460 SY (or approx. 1.33 acres)

# Photographs/Graphics:

Insert a photograph or drawing as appropriate. Include a helpful caption if possible.

**Anticipated Labor Source:** 

<u>City Crews</u> / <u>Contractor</u> / Volunteers

Cost Estimate:

\$ 76,000

**Operations & Maintenance Impact:** 

**INCREASE** 

Project No.: E-8

Project: Vegetation Enhancement - left bank area of SFC, area between Flores St. and Mendez St.

Project Area: Near Mendez St./Jones St. Intersection (between Tardy Dam and Rotary Park)

Item	Improvement Description	Quantity	Unit	Unit Price		To	tal Cost
1	Vegetation Enhancement - Soil(4")+Compost(4")+SRB*	6,460	SY	\$	8	\$	51,680
2	Silt Fence	500	LF	\$	4	\$	2,000
	* - SRB = soil retention blanket	Fuginee	ring Design		truction		53,680
	- SKB – son retention branket	9	stimated C			PART 100	60,658
			Co	ntingenc	y (25%)	\$	15,165
		Т	otal Projec	t Estima	ted Cost	S	75,823
4.7		PL	ANNING P	ROJEC	r cost	\$	76,000

**Project Type: VEGETATION ENHANCEMENT** 

**VEGETATION ENHANCEMENT – along left bank area of SFC, between Diaz St.** and the Canal St. Bridge

**Project Priority: LONG-TERM Related Projects:** 

**Project Location:** Rotary Park/Brown Plaza area

### **Project Description:**

Project includes the improvement and/or establishment of a vegetative cover along the left bank area of San Felipe Creek (SFC) between Diaz St. and the Canal St. Bridge. Project will include vegetation enhancement including importing top soil, organic material (compost), and the use of fiber rolls/blanket and/or plastic "geogrid" reinforcement for structural support of the soil.

#### **Design/Construction Issues:**

#### **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as possible and should be conducted in a manner that minimized soil disturbance.

#### **Project Options:**

- Options include the importation of soil and soil materials suitable for the establishment of a high-quality soil matrix.
- Vegetation should include appropriate native grasses and plants.

#### Construction BMPs:

Construction stormwater BMPs will include silt fence and other appropriate BMPs, as necessary.

Project Length/Area:	7,410	SY ( or approx. 1.53 acres)		
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Photographs/Graphic
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Insert a photograph or drawing as appropriate. Include a helpful caption if possible.

City Crews / Contractor / Volunteers **Anticipated Labor Source:** 

**Cost Estimate:** \$ 90,000 **Operations & Maintenance Impact: INCREASE** 

Project No.: E-9

Project:

Vegetation Enhancement - left bank area of SFC, area between Diaz St. and the Canal St. Bridge

Project Area: Rotary Park / Brown Plaza Area

Item	Improvement Description	Quantity	Quantity Unit Unit Price				
1	Vegetation Enhancement - Soil(4")+Compost(4")+SRB	7,410	SY	\$	8	\$	59,280
2	Silt Fence	1,200	LF	\$	4	\$	4,80
				Const	ruction	S	64,08
	* - SRB = soil retention blanket	Enginee	ring Design	& Mgm	t (13%)	\$	8,33
		Total E	stimated C	onstructi	on Cost	\$	72,41
			Co	ntingency	(25%)	\$ .	18,10
		Т	otal Projec	t Estimat	ed Cost	\$	90,51
		PL	ANNING P	ROJECT	COST	S	90,00

Project Type: STORMWATER BMP

# E-10. CONVERT EXISTING ASPHALT PARKING AREA TO PERVIOUS PAVEMENT PARKING AREA – Canal St. / Cisneros St. Intersection

**Project Priority:** 

**LONG-TERM** 

**Related Projects:** 

**Project Location:** 

Rotary Park/Brown Plaza area

# **Project Description:**

Project includes the demolition of an existing asphalt parking area and the installation of a new pervious pavement parking area on the left bank area of San Felipe Creek (SFC), on the north side of the Canal St. / Cisneros St. intersection. An engineered pervious pavement system should be designed and installed according to manufacturer's recommendations and recognized engineering design standards.

# **Design/Construction Issues:**

#### **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as
  possible and should be conducted in a manner that minimized soil disturbance.

#### **Project Options:**

- Identified pervious pavement options include pervious concrete, a gravel/geogrid system (GravelPave®, etc...).
- System should be designed to detain stormwater for up to the 25-yr storm event.
- Areas within the defined project boundaries not suitable for pervious pavement should be provided with vegetation enhancement, including an improved soil matrix, along with appropriate native grasses and plants.

#### **Construction BMPs:**

• Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area:

35,584 sq. ft. (approx. 0.82 acres)

# Photographs/Graphics:





**Anticipated Labor Source:** 

City Crews / Contractor / Volunteers

Cost Estimate:

\$ 625,000

**Operations & Maintenance Impact:** 

**INCREASE** 

Project No.: E-

Project:

E-10

Convert Existing Asphalt Parking Area to Pervious Pavement - Canal St. / Cisneros St. Intersection

Project Area: Rotary Park / Brown Plaza

Item	Improvement Description	Quantity	Unit	Un	it Price	To	otal Cost
1	Demo Existing Asphalt Parking Area	35,584	SF	\$	1.00	\$	35,584
2	Excavation & Haul-Off of Existing Surface Material (12" depth)	1,318	CY	\$	20	\$	26,359
3	Clearing, Grubbing & Subgrade Preparation	35,584	SF	\$	0.10	\$	3,55
4	Pervious Concrete	35,584	SF	\$	10	\$	355,840
5	Wheel Stops (based on 1 / 440 sf of property)	81	EA	\$	200	\$	16,17
6	Striping (based on 1 / 440 sf of property)	81	EA	\$	5	\$	40-
7	Silt Fence	500	LF	\$	4	\$	2,00
8	Stabilized Construction Entrance	1	EA	\$	1,000	\$	1,00
				Con	struction	\$	440,92
	* - total area is approx. 3558411,984 sq. ft.	Enginee	ring Design	& Mg	mt (13%)	\$	57,32
		Total E	stimated C	onstruc	tion Cost	\$	498,23
			Co	ntingen	cy (25%)	\$	124,56
		T	otal Projec	t Estim	ated Cost	\$	622,79
		· PL	ANNING P	ROJEC	T COST	S	625,00

**Project Type: BANK IMPROVEMENTS** 

# E-11. BANK STABILIZATION / FOCUSED ACCESS FEATURE INSTALLATION – under the Canal St. Bridge

**Project Priority:** 

**LONG-TERM** 

**Related Projects:** 

**Project Location:** 

Rotary Park/Brown Plaza area

# **Project Description:**

Project includes the stabilization of the left bank of San Felipe Creek (SFC) where it crosses underneath the Canal St. Bridge. Stabilization may include a variety of methods including grading, installation of rock rip rap, or some other appropriate engineered solution. This area may require the use of engineered bank stabilization methods including rock gabions, stone walls, engineered bank systems, or structural walls. The installation of a focused access feature suitable for providing pedestrian access to SFC is also part of this project. Bank stabilization is this area should follow cane eradication efforts upstream of the project area.

# **Design/Construction Issues:**

#### **Known Constraints:**

- Construction site is located on the banks of a creek that provides habitat to Threatened and/or Endangered Species
  that have been identified by the USFWS.
- Improvements should be designed to provide easy access to the creek for park visitors by use of steps or ramps.
- Providing ADA access <u>may</u> be required consultation with the Texas Department of Licensing and Regulation (TDLR) is recommended prior to design/construction.

#### **Project Options:**

- Project area to be evaluated by a professional engineer for appropriate stabilization methods.
- Bank stabilization options may include structural walls, rock gabions, rock walls, or other methods appropriate to the site conditions.

#### **Construction BMPs:**

Coffer Dams or inflatable barriers will be needed to prevent or limit the amount of sediment or suspended soils
created by construction activities; Silt fence, temporary stabilized construction entrance(s), and other appropriate
Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

**Project Length/Area:** 

1 LS [includes approx. 60 feet of bank stabilization]

### Photographs/Graphics:



Anticipated Labor Source: City Crews / Contractor / Volunteers

Cost Estimate: \$

\$ 145,000

**Operations & Maintenance Impact:** 

**NO CHANGE** 

Project No.: E-11

Project: Bank Stabilization / Focused Access Feature Installation - left bank of SFC, under Canal St. Bridge

Project Area: Canal St. @ San Felipe Creek (Rotary Park)

Item	Improvement Description	Quantity	Unit	Un	it Price	To	otal Cost
1	Focused Access Feature	1	EA	\$	60,000	\$	60,000
2	Fill/Embankment*	180	CY	\$	30	\$	5,400
3	Rock Rip Rap - along right bank of SFC under bridge (12" deep)	44	CY		\$80	\$	3,556
4	Bank Improvements - Rock Gabions (2' high)**	60	LF	\$	115	\$	6,900
5	Stabilized Construction Entrance	2	EA	\$	1,000	\$	2,000
6	Silt Fence	200	LF	\$	4	\$	800
7	In-Stream Coffer Dam (w/ dewatering)	120	LF	\$	200	\$	24,000
	* - 2 x [60 ft. x 20 ft. x 2 ft.] = 180 CY			Con	struction	`\$	102,656
	** - 2' high rock gabions on left bank of SFC under bridge	Enginee	ring Desigr	& Mg	mt (13%)	\$	13,345
		Total E	stimated C	onstru	ction Cost	\$	116,001
			Co	ntinger	icy (25%)	S	29,000
		T	otal Projec	t Estim	ated Cost	\$	145,001
-		PL,	ANNING P	ROJE	CT COST	S	145,000

Project Type: BANK IMPROVEMENTS

E-12. INSPECTION AND REPAIR (if necessary) EXISTING CREEK-SIDE WALLS - left bank of SFC, immediately downstream of the Taini St./Johnson St. Bridge to the end of the existing wall

**Project Priority:** 

LONG-TERM

**Related Projects:** 

**Project Location:** 

**Tardy Dam area** 

# **Project Description:**

Project includes the inspection and repair (if necessary) of the existing creek retaining walls along the left bank of San Felipe Creek (SFC), immediately downstream of the Taini St./Johnson St. Bridge to the end of the existing wall (approximately 400 feet).

# **Design/Construction Issues:**

#### **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as possible and should be conducted in a manner that minimized soil disturbance.

#### **Project Options:**

- The project includes the inspection of the existing creek bank wall improvements, along with necessary repairs or improvements. Repairs should attempt to match the existing wall features and esthetics.
- Unless required for public safety reasons, complete replacement of the existing walls is not a desired option.

#### **Construction BMPs:**

 A coffer dam or in-stream barrier will be needed to avoid the potential for suspended solids being introduced in the creek; water-filled portable coffer dams or other temporary measures should be considered.

Project Length/Area:

400 feet

# Photographs/Graphics:







Anticipated Labor Source:

City Crews / Contractor / Volunteers

**Cost Estimate:** 

\$ 6,000

**Operations & Maintenance Impact:** 

**NO CHANGE** 

Project No.: E-12

Project:

Inspection & Repair of Existing Creek-Side Wall - left bank of SFC, from Taini St. Bridge downstream to end of wall

Project Area: Tardy Dam
Priority: Long-Term

Item	Improvement Description	Quantity	Unit	Unit Price	To	tal Cost
1	Inspection & Repair (as needed) of Existing Walls*	400	LF	\$ 10	\$	4,000
				Construction	1 \$	4,000
	* - wall repairs are assumed to be cosmetic in nature; significant	Engineering Design & Mgmt (13%)			) \$	520
	structural repairs would be at additional expense	Total E	Estimated C	onstruction Cos	t S	4,520
			Co	ntingency (25%	) \$	1,130
		T	otal Projec	t Estimated Cos	t S	5,650
		PL	ANNING P	ROJECT COST	S	6,000

Project Type: STORMWATER BMP

# E-13. CONVERT EXISTING ASPHALT PAVEMENT HIKE & BIKE TRAIL to PERVIOUS PAVEMENT HIKE & BIKE TRAIL, along left bank of SFC, between Taini St./Johnson St. Bridge and end of existing Hike & Bike Trail

Project Priority: LONG-TERM Related Projects: B-

Project Location: Tardy Dam area

# **Project Description:**

Project includes the demolition of an existing asphalt hike & bike trail and the installation of a new pervious pavement hike & bike trail along the same route (approximately). Project area includes the existing hike & bike trail from the Taini St./Johnson St. Bridge downstream to the end of the existing hike & bike trail (approximately 700 feet). An engineered pervious pavement system should be designed and installed according to manufacturer's recommendations and recognized engineering design standards.

# **Design/Construction Issues:**

#### **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as
  possible and should be conducted in a manner that minimized soil disturbance.

#### **Project Options:**

- Identified pervious pavement options include pervious concrete.
- System should be designed to detain stormwater for up to the 25-yr storm event.

#### **Construction BMPs:**

 Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area: 5,600 sq. ft. [area is approximate, based on 700 linear feet x 8 ft. width)

#### Photographs/Graphics:







Anticipated Labor Source: City Crews / Contractor / Volunteers

Cost Estimate: \$ 75,000 Operations & Maintenance Impact: INCREASE

Project No.: E-13

Project: Convert Exist. Hike&Bike Trail to Pervious Pavement - left bank of SFC, between Taini St. Bridge & End of H&B Trail

Project Area: Tardy Dam
Priority: Long-Term

Item	Improvement Description	Quantity	Unit	Un	it Price	To	tal Cost
1	Demo Existing Asphalt Hike & Bike Trail*	7,000	SF	\$	2.00	\$	14,000
2 .	Clearing, Grubbing & Subgrade Preparation*	7,000	SF	\$	0.10	\$	70
3	Pervious Concrete*	7,000	SF	\$	5	\$	35,00
4.	Silt Fence	700	LF	\$	4	\$	2,80
5	Stabilized Construction Entrance	1	EA	\$	1,000	\$	1,00
	* - area is based on an approx. 700 ft. long x 10 ft. wide trail	Enginee	ring Desigi		struction mt (13%)		53,50 6,95
		Total E	stimated C	onstruc	tion Cost	\$	60,45
			Co	ntingen	cy (25%)	S	15,11
		T	otal Projec	t Estim	ated Cost	\$	75,56
		DI	ANNING P	DOIL	T COST	•	75,00

Project Type: STORMWATER BMP

# E-14. COMMUNITY GARDEN IMPROVEMENTS - on FEMA Buyout Properties

Project Priority:

**LONG-TERM** 

**Related Projects:** 

**Project Location:** 

Joe Ramos Center Area

# **Project Description:**

Project includes the improvement of multiple, existing FEMA Buyout Properties located within the defined Project Area. The proposed project would include the installation of a community garden area on each existing property utilizing native plants and vegetation that are capable of withstanding extended periods of little or no rainfall.

# **Design/Construction Issues:**

#### **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Landscaped areas will be cared for by volunteers, neighbors, or City crews any proposed improvements should
  focus on low maintenance plants and improvements.
- The community garden sites are located within residential neighborhoods all improvements should be neighbor-friendly and should not create, or lead to the creation of, an unsafe environment or an unsightly property.

# **Project Options:**

- The proposed community garden improvements can include a variety of landscaping options. The goal for each individual property (or lot) is to create an attractive area that utilizes native plants and vegetation that require minimal care and maintenance.
- Each property (or lot) should be provided with water service; if not served by an automatic sprinkler system, the
  property should have multiple hose bibs for use by volunteers and/or City crews.

#### **Construction BMPs:**

• If necessary, silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the site in accordance with any TCEQ requirements.

Project Length/Area:

1.5 acres

# Photographs/Graphics:



Anticipated Labor Source: <u>City Crews</u> / Contractor / <u>Volunteers</u>

Cost Estimate: \$ 41,000 Operations & Maintenance Impact: INCREASE

Project No.: E-14

Project:

Community Garden Improvements - on FEMA Buyout Properties

Project Area: Neighborhood between Tardy Dam & Rotary Park

Long-Term Priority:

Item	Improvement Description	Quantity	Unit	Ur	it Price	To	tal Cost
1	Trash/Rubbish Haul Off	1.50	AC	\$	1,000	\$	1,500
2	Clearing & Grubbing	1.50	AC	\$	1,000	\$	1,50
3	Vegetation Enhancement - Soil(2")+Compost(2") (@ \$20/CY)	1.50	AC	\$	10,800	\$	16,20
4	Plantings*	1.50	AC	\$	6,050	\$	9,07
5	Basic Irrigation System	1.50	AC	\$	2,000	\$	3,000
6	Silt Fence	1.50	AC	\$	800	\$	1,20
	* - assumes 1 - 1 gallon plant spaced every 6.0 feet; such spacing in an average of 9 plants/36 SY (or 0.25 plants/SY); @ \$5 / plant	Enginee	ring Desigi		nstruction gmt (13%)	S	32,47
	the cost would be \$1.25/SY or \$6,050/Acre.	Total E	stimated C	onstru	ction Cost	S	32,47
			Co	ntinge	ncy (25%)	\$	8,11
		T	otal Projec	t Estin	nated Cost	\$	40,59
Val		PL	ANNING P	ROJE	CT COST	s	41,000

Project Type: STORMWATER BMP

# E-15. INSTALLATION OF A PUBLIC EDUCATION KIOSK — along the area of San Felipe Creek between Tardy Dam and Rotary Park

**Project Priority:** 

LONG-TERM

**Related Projects:** 

**Project Location:** 

**Between Tardy Dam and Rotary Park** 

# **Project Description:**

Project includes the installation of one (1) public information kiosk to be located along San Felipe Creek between Tardy Dam and Rotary Park. The project will include a kiosk capable of displaying educational material relating to San Felipe Creek and its associated watershed. The kiosk will provide an all-weather display area for posters, pamphlets, signs, and other informational materials. The kiosk will be located adjacent to heavily used/trafficked areas for the most impact.

#### **Design/Construction Issues:**

#### **Known Constraints:**

- Construction site is located on the banks of a creek that provides habitat to Threatened and/or Endangered Species
  that have been identified by the USFWS.
- Proposed improvements should provide ADA access. Improvements should meet the requirements found in the Texas Accessibility Standards (TAS) administered by the Texas Department of Licensing and Registrations (TDLR). Review and approval by a Registered Accessibility Specialist (RAS) will likely be required.

#### **Project Options:**

- Options include several different types of kiosks.
- The kiosk should be designed to reduce the potential for vandalism.
- Project budget includes the design/printing of informational signs.

#### **Construction BMPs:**

 Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area:

1 each

# Photographs/Graphics:



Anticipated Labor Source:

<u>City Crews</u> / <u>Contractor</u> / Volunteers

**Cost Estimate:** 

\$ 10,000

**Operations & Maintenance Impact:** 

**NO CHANGE** 

Project No.: E-15

Project:

Install Public Education Kiosks along the San Felipe Creek

Project Area: Between Tardy Dam & Rotary Park

Priority:

Long-Term

Item	Improvement Description	scription Quantity Unit Unit Price			Tot	tal Cost	
1	Public Education Kiosk	1	LS	\$	5,000	\$	5,000
2	Signs/Exhibits	2	LS	\$	1,000	\$	2,000
				Con	struction	S	7,000
		Enginee	ring Design	& Mo	mt (13%)	•	910
					111 (15 70)	3	910
			stimated C			Description of the last	7,910
			stimated C	onstruc		S	
		Total E	stimated C	onstruc	etion Cost	s s	7,910

**Project Type:** STORMWATER BMP

**INSTALLATION OF PET WASTE STATIONS – along the area of San Felipe Creek** E-16. between Tardy Dam and Rotary Park

**Project Priority:** SHORT-TERM **Related Projects:** 

**Project Location: Between Tardy Dam and Rotary Park** 

# **Project Description:**

Project includes the installation of three (3) pet waste stations to be located along San Felipe Creek between Tardy Dam and Rotary Park. The stations will be located adjacent to heavily used/trafficked areas for the most impact.

#### Design/Construction Issues:

#### **Known Constraints:**

- Construction site is located on the banks of a creek that provides habitat to Threatened and/or Endangered Species that have been identified by the USFWS.
- Proposed improvements should provide ADA access. Improvements should meet the requirements found in the Texas Accessibility Standards (TAS) administered by the Texas Department of Licensing and Registrations (TDLR). Review and approval by a Registered Accessibility Specialist (RAS) will likely be required.

# **Project Options:**

- Options include several different types of pet waste stations.
- Recommend that pet waste station include bag dispenser and trash can.
- Recommend purchasing extra pet waste bags at the time of purchase of the pet waste station.

#### **Construction BMPs:**

 Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area: 3 each

# Photographs/Graphics:



**Anticipated Labor Source:** <u>City Crews / Contractor / Volunteers</u>

**Cost Estimate:** \$ 3,000 **INCREASE** 

**Operations & Maintenance Impact:** 

Project No.: E-16

Project: Pet Waste Stations

Project Area: Between Tardy Dam & Rotary Park

Priority: Short-Term

Item	Improvement Description	Quantity	Unit	Uni	it Price	Tot	tal Cost
1	Pet Waste Stations w/ Trash Cans & Bag Dispenser*	3	EA	\$	750	\$	2,250
				Con	struction	\$	2,250
	* - Pet Waste Stations located at maximum 1,000 ft. spacing	at maximum 1,000 ft. spacing  Engineering Design & Mgmt (13%)  Total Estimated Construction Cost			\$	293	
	along San Felipe Creek				\$	2,543	
			Co	ntingen	cy (25%)	\$	636
			Fotal Projec	t Estima	ated Cost	S	3,178
		PL	ANNING P	ROJEC	T COST	S	3,000

Project Type: STORMWATER BMP

E-17. INSTALLATION OF TRASH CANS — along the area of San Felipe Creek between Tardy Dam and Rotary Park

**Project Priority:** 

SHORT-TERM

**Related Projects:** 

**Project Location:** 

**Between Tardy Dam and Rotary Park** 

## **Project Description:**

Project includes the installation of four (4) trash cans, including concrete support foundations, to be located along San Felipe Creek between Tardy Dam and Rotary Park. The trash cans will be located adjacent to heavily used/trafficked areas for the most impact.

## **Design/Construction Issues:**

#### **Known Constraints:**

- Construction site is located on the banks of a creek that provides habitat to Threatened and/or Endangered Species
  that have been identified by the USFWS.
- Proposed improvements should provide ADA access. Improvements should meet the requirements found in the Texas Accessibility Standards (TAS) administered by the Texas Department of Licensing and Registrations (TDLR). Review and approval by a Registered Accessibility Specialist (RAS) will likely be required.

## **Project Options:**

- Options include several different types of trash cans.
- Installation will include trash can, trash can support, and concrete foundation.
- The unit shall be designed to prevent the trash can from being easily stolen.

#### **Construction BMPs:**

Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used
around the construction site in accordance with TCEQ requirements.

Project Length/Area:

each

## Photographs/Graphics:



**Anticipated Labor Source:** 

<u>City Crews</u> / <u>Contractor</u> / Volunteers

**Cost Estimate:** 

\$ 4,000

**Operations & Maintenance Impact:** 

Project No.: E-17

Project:

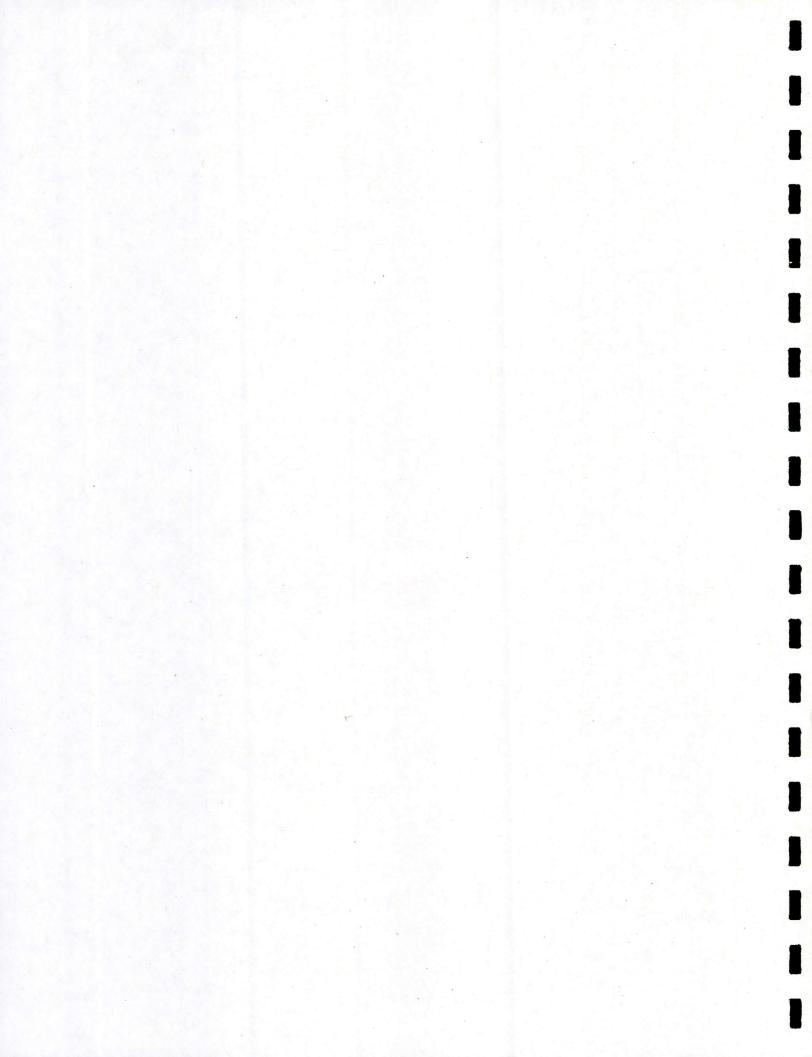
Trash Cans w/ Foundations

Project Area: Between Tardy Dam & Rotary Park

Priority: Short-Term

Item	Improvement Description	Quantity	Unit	Unit Price	Tot	tal Cost
1	Trash Cans w/ Foundations	4	EA	\$ 700	\$	2,800
				Construction	\$	2,800
		Engine	\$	364		
		Total I	Estimated C	onstruction Cost	S	3,16
		t	Co	ntingency (25%)	\$	79:
		7	otal Projec	t Estimated Cost	\$	3,95
B		PL	ANNING P	ROJECT COST	\$	4,000

# Area F



**Project Type: INVASIVE SPECIES CONTROL** 

F-1. CANE ERADICATION – Left Bank of San Felipe Creek, between the Canal St. Bridge & the E. Academy St. Bridge (in Rotary Park)

**Project Priority:** 

SHORT-TERM

Related Projects: F-2, F-3, F-4

**Project Location:** 

Between Canal St. Bridge and E. Academy St. Bridge (in Rotary Park)

## **Project Description:**

Project includes the eradication of Arundo Donax (a.k.a., "Giant Reed", "River Cane") along the left bank of San Felipe Creek (SFC) from the Canal St. Bridge downstream to the E. Academy St. Bridge (in Rotary Park). Eradication should follow the steps outlined in the San Felipe Creek Master Plan and include: Cut Cane (after annual flowering around mid-July); Removal of Cuttings; Herbicide Spray; Removal of Dead Cane (in winter); Repeat. Work should proceed from upstream to downstream.

## **Design/Construction Issues:**

### **Known Constraints:**

- Project should be started after, or at the same time, as Projects A-1 to A-6,B-1,B-2,C-1 to C-5, E-1, E-2, and F-2.
- Herbicide use in and around the creek area should proceed with caution.
- No spraying in the creek; herbicide must be hand applied to cane located in the creek.
- Eradication efforts will involve several cycles.

## **Project Options:**

 Small patches can be cut by hand; large patches should be cut with mechanical equipment, if possible; avoid disturbing soil by the use of rubber tired equipment.

## Construction BMPs:

• Construction BMPs (silt fence, etc...) should be used if mechanical equipment results in soil disturbance.

Project Length/Area:

< 1 acre [area is approximate, based on latest aerial photos]

## Photographs/Graphics:







Anticipated Labor Source: City Crews / Contractor / Volunteers

Cost Estimate: \$ 132,000 (1<sup>st</sup> Year Efforts Only)

**Operations & Maintenance Impact:** 

Project No.: F-1 - left bank of San Felipe Creek between the Canal St. Bridge and E. Academy St.

Project: Arundo Donax Removal (Giant Reed, a.k.a. "river cane")

Project Area: Between Tardy Dam & Rotary Park

Priority: Short-Term

Item	Improvement Description	Quantity	Unit	Unit Price	To	tal Cost
1	Arundo Donax Removal*	3	Acre	\$ 44,000	\$	132,000
			1 4 7			
	at \$44,000 / acre for one-time manual removal; price clude follow up visits (which should be once per year); see Appendix	Engineer	ing Design &	Construction  2 Mgmt (13%)**		132,000
E for deta	ils on cane removal cost estimate.	Total	Estimated C	onstruction Cost	\$	132,000
* - Engineer	ring Design/Mgmt. + Contigency included in Unit Cost; see Appendix		Conti	ingency (25%)**	\$	
E for add	ditional details.		Total Projec	t Estimated Cost	\$	132,000
		PI	ANNING P	ROJECT COST	\$	132,000

Project Type: INVASIVE SPECIES CONTROL

F-2. CANE ERADICATION – Right Bank of San Felipe Creek, between the Canal St. Bridge & the E. Academy St. Bridge (in Rotary Park)

Project Priority: SHORT-TERM Related Projects: F-1, F-3, F-4

Project Location: Between Canal St. Bridge and E. Academy St. Bridge (in Rotary Park)

## **Project Description:**

Project includes the eradication of Arundo Donax (a.k.a., "Giant Reed", "River Cane") along the right bank of San Felipe Creek (SFC) from the Canal St. Bridge downstream to the E. Academy St. Bridge (in Rotary Park). Eradication should follow the steps outlined in the San Felipe Creek Master Plan and include: Cut Cane (after annual flowering around mid-July); Removal of Cuttings; Herbicide Spray; Removal of Dead Cane (in winter); Repeat. Work should proceed from upstream to downstream.

## **Design/Construction Issues:**

#### **Known Constraints:**

- Project should be started after, or at the same time, as Projects A-1 to A-6,B-1,B-2,C-1 to C-5, E-1, E-2, and F-1.
- Some of the existing cane is known to be located on private property.
- Herbicide use in and around the creek area should proceed with caution.
- No spraying in the creek; herbicide must be hand applied to cane located in the creek.
- Eradication efforts will involve several cycles.

## **Project Options:**

 Small patches can be cut by hand; large patches should be cut with mechanical equipment, if possible; avoid disturbing soil by the use of rubber tired equipment.

## Construction BMPs:

Construction BMPs (silt fence, etc...) should be used if mechanical equipment results in soil disturbance.

Project Length/Area:

< 1 acre [area is approximate, based on latest aerial photos]

## Photographs/Graphics:







**Anticipated Labor Source:** 

City Crews / Contractor / Volunteers

**Cost Estimate:** 

\$ 220,000 (1st Year Efforts Only)

**Operations & Maintenance Impact:** 

Project No.: F-2 - right bank of San Felipe Creek between the Canal St. Bridge and E. Academy St.

Project: Arundo Donax Removal (Giant Reed, a.k.a. "river cane")

Project Area: Between Tardy Dam & Rotary Park

Priority: Short-Term

Item	Improvement Description	Quantity	Unit	Uı	it Price	To	tal Cost
1	Arundo Donax Removal*	5	Acre	\$	44,000	\$	220,000
							UATED TO
* - estimated	at \$44,000 / acre for one-time manual removal; price			Co	nstruction	S	220,000
does not in	clude follow up visits (which should be once per year); see Appendix	Engineeri	ng Design &	Mgm	t (13%)**	\$	
E for deta	ails on cane removal cost estimate.	Total 1	Estimated C	onstru	ction Cost	S	220,000
** - Enginee	ring Design/Mgmt. + Contigency included in Unit Cost; see Appendix	(	Conti	ngenc	y (25%)**	\$	
E for ad	imated at \$44,000 / acre for one-time manual removal; price not include follow up visits (which should be once per year); see Appendix or details on cane removal cost estimate.  gineering Design/Mgmt. + Contigency included in Unit Cost; see Appendix for additional details.		Total Projec	t Estin	nated Cost	\$	220,000
		PI	ANNING P	ROJE	CT COST	s	220,000

#### **Project Type: INVASIVE SPECIES CONTROL**

## F-3. CANE ERADICATION – Left Bank of San Felipe Creek, between the E. Academy St. Bridge (at Rotary Park) & Weir Dam (near Canal St. & Magnolia St. intersection)

**Project Priority:** 

SHORT-TERM

Related Projects: F-1, F-2, F-4

**Project Location:** 

Between E. Academy St. Bridge (Rotary Park) & Weir Dam (near Canal St. @ Magnolia St.)

## **Project Description:**

Project includes the eradication of Arundo Donax (a.k.a., "Giant Reed", "River Cane") along the left bank of San Felipe Creek (SFC) from the E. Academy St. Bridge (at Rotary Park) downstream to the Weir Dam (near Canal St. & Magnolia St. intersection). Eradication should follow the steps outlined in the San Felipe Creek Master Plan and include: Cut Cane (after annual flowering around mid-July); Removal of Cuttings; Herbicide Spray; Removal of Dead Cane (in winter); Repeat. Work should proceed from upstream to downstream.

## **Design/Construction Issues:**

#### **Known Constraints:**

- Project should be started after or at the same time, as Projects A-1 to A-6, B-1, B-2, C-1 to C-5, E-1, E-2, F-1, F-2, and F-4.
- Herbicide use in and around the creek area should proceed with caution.
- No spraying in the creek; herbicide must be hand applied to cane located in the creek.
- Eradication efforts will involve several cycles.

#### **Project Options:**

 Small patches can be cut by hand; large patches should be cut with mechanical equipment, if possible; avoid disturbing soil by the use of rubber tired equipment.

## **Construction BMPs:**

• Construction BMPs (silt fence, etc...) should be used if mechanical equipment results in soil disturbance.

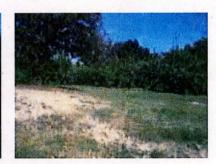
Project Length/Area:

acre [area is approximate, based on latest aerial photos] < 1

## Photographs/Graphics:







**Anticipated Labor Source:** 

City Crews / Contractor / Volunteers

**Cost Estimate:** 

\$ 352,000 (1st Year Efforts Only)

**Operations & Maintenance Impact:** 

Project No.: F-3 - left bank of San Felipe Creek, between E. Academy St. and Weir Dam

Project: Arundo Donax Removal (Giant Reed, a.k.a. "river cane")

Project Area: Between Tardy Dam & Rotary Park

Priority: Short-Term

Item	Improvement Description	Quantity	Unit	Unit Price		To	tal Cost	
1	Arundo Donax Removal*	8	Acre	\$	44,000	\$	352,000	
							Lagi	
	at \$44,000 / acre for one-time manual removal; price clude follow up visits (which should be once per year); see Appendix	Engineeri	ing Design &		struction		352,000	
	rils on cane removal cost estimate.		Estimated Co			12.550000	352,000	
** - Enginee	ring Design/Mgmt. + Contigency included in Unit Cost; see Appendix		Conti	ngency	(25%)**	S		
E for ad	ditional details.		Fotal Project	t Estim	ated Cost	\$	352,000	
		PL	ANNING P	ROJE	CT COST	S	352,000	

Project Type: INVASIVE SPECIES CONTROL

F-4. CANE ERADICATION – Right Bank of San Felipe Creek, between the E. Academy St. Bridge (at Rotary Park) & Weir Dam (near Canal St. & Magnolia St. intersection)

Project Priority: SHORT-TERM Related Projects: F-1, F-2, F-3

Project Location: Between E. Academy St. Bridge (Rotary Park) & Weir Dam (near Canal St. @ Magnolia St.)

## **Project Description:**

Project includes the eradication of Arundo Donax (a.k.a., "Giant Reed", "River Cane") along the right bank of San Felipe Creek (SFC) from the E. Academy St. Bridge (at Rotary Park) downstream to the Weir Dam (near Canal St. & Magnolia St. intersection). Eradication should follow the steps outlined in the San Felipe Creek Master Plan and include: Cut Cane (after annual flowering around mid-July); Removal of Cuttings; Herbicide Spray; Removal of Dead Cane (in winter); Repeat. Work should proceed from upstream to downstream.

## **Design/Construction Issues:**

#### **Known Constraints:**

- Project should be started after or at the same time, as Projects A-1 to A-6, B-1, B-2, C-1 to C-5, E-1, E-2, F-1, F-2, and F-3.
- Some of the existing cane is known to be located on <u>private property</u>.
- Herbicide use in and around the creek area should proceed with caution.
- No spraying in the creek; herbicide must be hand applied to cane located in the creek.
- Eradication efforts will involve several cycles.

#### **Project Options:**

 Small patches can be cut by hand; large patches should be cut with mechanical equipment, if possible; avoid disturbing soil by the use of rubber tired equipment.

#### **Construction BMPs:**

• Construction BMPs (silt fence, etc...) should be used if mechanical equipment results in soil disturbance.

Project Length/Area:

< 1 acre [area is approximate, based on latest aerial photos]

## Photographs/Graphics:



Anticipated Labor Source: City Crews / Contractor / Volunteers

Cost Estimate: \$ 264,000 (1st Year Efforts Only)

**Operations & Maintenance Impact:** 

Project No.: F-4 - right bank of San Felipe Creek, between E. Academy St. and Weir Dam

Project: Arundo Donax Removal (Giant Reed, a.k.a. "river cane")

Project Area: Between Tardy Dam & Rotary Park

Priority: Short-Term

Item	Improvement Description	Quantity	Unit	Unit Price		To	tal Cost
1	Arundo Donax Removal*	. 6	Acre	\$	44,000	\$	264,000
						1	
				1			
* - estimated	at \$44,000 / acre for one-time manual removal; price			Co	nstruction	\$	264,000
does not in	clude follow up visits (which should be once per year); see Appendix	Engineeri	ng Design &	Mgm	t (13%)**	S	
E for deta	ils on cane removal cost estimate.	Total F	Estimated Co	onstru	ction Cost	\$	264,000
* - Enginee	ring Design/Mgmt. + Contigency included in Unit Cost; see Appendix		Conti	ngenc	y (25%)**	\$	
E for ad	ditional details.	T	Total Project	t Estin	nated Cost	\$	264,000
Y		PL	ANNING P	ROJE	CT COST	S	264,000

Project Type: BANK IMPROVEMENTS

F-5. BANK STABILIZATION – along the left bank of SFC in Rotary Park, between the Canal St. Bridge and E. Academy St.

Project Priority: LONG-TERM Related Projects:

Project Location: Rotary Park

## **Project Description:**

Project includes the stabilization of the stream bank along the left bank of San Felipe Creek (SFC) from the Canal St. Bridge to E. Academy St. (along SFC in Rotary Park). Stabilization may include a variety of methods including grading, establishment of vegetation, the improvement of soil organics, structural stability including fiber mats, plastic geogrid systems, and other options. For this area, the establishment of a natural, riparian area is desired, so the utilization of structural walls should be avoided, if possible. Bank stabilization is these areas should follow cane eradication efforts upstream of the project area.

## **Design/Construction Issues:**

### **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as possible and should be conducted in a manner that minimized soil disturbance.
- Armored catfish pose a threat to the damage/destruction of the proposed improvements. If necessary, proposed improvements should be designed to minimize potential damage by the catfish.

### **Project Options:**

- Options include the importation of soil and soil materials suitable for the establishment of a high-quality soil matrix.
- Vegetation should include appropriate native grasses and plants.

#### **Construction BMPs:**

- Coffer Dams or inflatable barriers will be needed to prevent or limit the amount of sediment or suspended soils
  created by construction activities.
- Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area:

1.100 linear feet

## Photographs/Graphics:







**Anticipated Labor Source:** 

<u>City Crews</u> / <u>Contractor</u> / Volunteers

Cost Estimate:

\$ 85,000

**Operations & Maintenance Impact:** 

**NO CHANGE** 

Project No.:

Project: Bank Stabilization - along the left bank of SFC, in Rotary Park between the Canal St. Bridge & E. Academy St.

Project Area: Rotary Park Priority: Long-Term

Item	Improvement Description	Quantity	Unit LF LF	Unit Price		To	tal Cost
1	Bank Improvements - Vegetation I20	1,100		\$	45	\$	49,500
2	Bank Improvements - Geogrid	1,100		\$	6	\$	6,60
3	3 Silt Fence	1,100	LF	\$	. 4	\$	4,400
					struction		60,500
		Enginee	ring Design	& Mg	mt (13%)	\$	7,86
450		Total E	stimated C	onstruc	tion Cost	\$	68,36
			Co	ntingen	cy (25%)	\$	17,09
		T	otal Projec	t Estim:	ated Cost	\$	85,45
		DI	ANNING P	DOID	T COCT	0	85,000

**Project Type: BANK IMPROVEMENTS** 

F-6. BANK STABILIZATION – along the left bank of SFC, between E. Academy St. and Weir Dam

Project Priority: LONG-TERM Related Projects:

Project Location: downstream of Rotary Park

## **Project Description:**

Project includes the stabilization of the stream bank along the left bank of San Felipe Creek (SFC) from E. Academy St. downstream to Weir Dam (near the intersection of Canal St. & Magnolia St). Stabilization may include a variety of methods including grading, establishment of vegetation, the improvement of soil organics, structural stability including fiber mats, plastic geogrid systems, and other options. For this area, the establishment of a natural, riparian area is desired, so the utilization of structural walls should be avoided, if possible. Bank stabilization is these areas should follow cane eradication efforts upstream of the project area.

## **Design/Construction Issues:**

### **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as
  possible and should be conducted in a manner that minimized soil disturbance.
- Armored catfish pose a threat to the damage/destruction of the proposed improvements. If necessary, proposed improvements should be designed to minimize potential damage by the catfish.

## **Project Options:**

- Options include the importation of soil and soil materials suitable for the establishment of a high-quality soil matrix.
- Vegetation should include appropriate native grasses and plants.

#### Construction BMPs:

- Coffer Dams or inflatable barriers will be needed to prevent or limit the amount of sediment or suspended soils
  created by construction activities.
- Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area: 3,950 linear feet

## Photographs/Graphics:







Anticipated Labor Source: City Crews / Contractor / Volunteers

Cost Estimate: \$ 305,000 Operations & Maintenance Impact: NO CHANGE

Project No.: F-6

Project: Bank Stabilization - along the left bank of SFC, between E. Academy St. and Weir Dam

Project Area: downstream of Rotary Park

Priority: Long-Term

Item	Improvement Description	Quantity	Unit	Unit Price		To	otal Cost	
1	Bank Improvements - Vegetation I20	3,950	LF	\$	45	\$	177,750	
2	Bank Improvements - Geogrid	3,950	LF	\$	6	\$	23,70	
3	Silt Fence	3,950	LF	\$	4	\$	15,80	
				Cons	truction	\$	217,25	
		Enginee	ring Design	& Mgm	it (13%)	\$	28,24	
		Total E	stimated C	onstructi	ion Cost	\$	245,49	
			Co	ntingenc	y (25%)	\$	61,37	
		Т	otal Projec	t Estima	ted Cost	\$	306,86	
		PL.	ANNING P	ROJEC	T COST	•	305,00	

Project Type: BANK IMPROVEMENTS

F-7. INSTALL FOCUSED ACCESS FEATURES – left bank of SFC in Rotary Park, between Canal St. Bridge and E. Academy St.

Project Priority: LONG-TERM Related Projects:

Project Location: Rotary Park

## **Project Description:**

Project includes the construction of four (4) Focused Access Features along the left bank of San Felipe Creek (SFC) in Rotary Park, between the Canal St. Bridge and E. Academy St. The Focused Access Features should be installed within the improved riparian bank area constructed in Project E-5. The Focused Access Features will provide a defined location for public access to SFC, and will help reduce environmental impacts of pedestrian foot traffic.

## **Design/Construction Issues:**

#### **Known Constraints:**

- Project should be constructed in conjunction with projects E-1 (Cane Eradication) and E-5 (Bank Stabilization).
- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as
  possible and should be conducted in a manner that minimized soil disturbance.
- Armored catfish pose a threat to the damage/destruction of the proposed improvements. If necessary, proposed improvements should be designed to minimize potential damage by the catfish.

## **Project Options:**

Project may include an access ramp (ADA accessible) and/or stairs. Variance may be required from TDLR if ADA access not provided.

#### **Construction BMPs:**

 A coffer dam or in-stream barrier will be needed to avoid the potential for suspended solids being introduced in the creek; water-filled portable coffer dams or other temporary measures should be considered.

Project Length/Area: 4 each

## Photographs/Graphics:







Anticipated Labor Source: City Crews / Contractor / Volunteers

Cost Estimate: \$ 435,000 Operations & Maintenance Impact: DECREASE

Project No.: F-7

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Project: Install Focused Access Features - left bank of SFC in Rotary Park, between Canal St. Bridge & E. Academy St.

Project Area: Rotary Park
Priority: Long-Term

[tem	Improvement Description	Quantity	Unit	Uı	nit Price	To	otal Cost
1	Focused Access Feature*	4	EA	\$	60,000	\$	240,000
2	Stabilized Construction Entrance	1	EA	\$	1,000	\$	1,000
3	Silt Fence	400	LF	\$	4	\$	1,600
4	In-Stream Coffer Dam (w/ dewatering)**	320	LF ·	\$	200	\$	64,000
			7	Co	nstruction	\$	306,600
	* - includes one (1) individual focused access feature	Enginee	ring Design	1 & Mg	gmt (13%)	\$	39,858
	** - dewatering for 80 LF at each construction site	Total E	stimated C	onstru	ction Cost	S	346,458
			Co	ntinge	ncy (25%)	S	86,615
		T	otal Projec	t Estin	nated Cost	\$	433,073
		PL	ANNING P	ROJE	CT COST	S	435,000

Project Type: BANK IMPROVEMENTS

F-8. INSTALL FOCUSED ACCESS FEATURES – left bank of SFC, between E. Academy St. and Weir Dam

Project Priority: LONG-TERM Related Projects:

Project Location: downstream of Rotary Park

## **Project Description:**

Project includes the construction of four (4) Focused Access Features along the left bank of San Felipe Creek (SFC), between E. Academy St. and Weir Dam (near the intersection of Canal St. and Magnolia St.). The Focused Access Features should be installed within the improved riparian bank area constructed in Project E-6. The Focused Access Features will provide a defined location for public access to SFC, and will help reduce environmental impacts of pedestrian foot traffic.

## **Design/Construction Issues:**

#### **Known Constraints:**

- Project should be constructed in conjunction with projects E-3 (Cane Eradication) and E-6 (Bank Stabilization).
- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as
  possible and should be conducted in a manner that minimized soil disturbance.
- Armored catfish pose a threat to the damage/destruction of the proposed improvements. If necessary, proposed improvements should be designed to minimize potential damage by the catfish.

#### **Project Options:**

Project may include an access ramp (ADA accessible) and/or stairs. Variance may be required from TDLR if ADA access not provided.

#### Construction BMPs:

 A coffer dam or in-stream barrier will be needed to avoid the potential for suspended solids being introduced in the creek; water-filled portable coffer dams or other temporary measures should be considered.

Project Length/Area: 4 each

## Photographs/Graphics:







Anticipated Labor Source: City Crews / Contractor / Volunteers

Cost Estimate: \$ 435,000 Operations & Maintenance Impact: DECREASE

Project No.:

Project:

Install Focused Access Features - left bank of SFC in Rotary Park, between E. Academy St. & Weir Dam

Project Area: downstream of Rotary Park

Priority:

Long-Term

Item	Improvement Description	Quantity	Unit	Uı	it Price	To	otal Cost
1	Focused Access Feature*	4	EA	\$	60,000	\$	240,000
2	Stabilized Construction Entrance	1	EA	\$	1,000	\$	1,000
3	Silt Fence	400	LF	\$	4	\$	1,600
4	In-Stream Coffer Dam (w/ dewatering)**	320	LF	\$	200	\$	64,000
				Co	nstruction	\$	306,600
	* - includes one (1) individual focused access feature	Enginee	ring Desig	n & Mg	mt (13%)	\$	39,858
	** - dewatering for 80 LF at each construction site	Total E	Stimated C	Constru	ction Cost	\$	346,458
			Co	ntinge	ncy (25%)	\$	86,615
ESF		T	otal Projec	t Estin	ated Cost	\$	433,073
		PL	ANNING P	ROJE	CT COST	S	435,000

Project Type: STORMWATER BMP

## F-9. CONSTRUCT NEW PERVIOUS PAVEMENT HIKE & BIKE TRAIL - along left bank of SFC, from the Canal St. Bridge to the Barron St. / Magnolia St. Intersection

Project Priority: LONG-TERM Related Projects:

Project Location: Rotary Park

## **Project Description:**

Project includes the construction of a new, pervious pavement hike & bike trail along the left bank of San Felipe Creek (SFC) from the Canal St. Bridge to the Barron St./Magnolia St. intersection. An engineered pervious pavement system should be designed and installed according to manufacturer's recommendations and recognized engineering design standards.

## **Design/Construction Issues:**

## **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as possible and should be conducted in a manner that minimized soil disturbance.

## **Project Options:**

- Identified pervious pavement options include pervious concrete.
- Pavement system should be designed to detain stormwater for up to the 25-yr storm event.

## **Construction BMPs:**

Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used
around the construction site in accordance with TCEQ requirements.

Project Length/Area:

40,050

sq. ft. [area is approximate, based on 4,050 linear feet x 10 ft. width)

## Photographs/Graphics:







Anticipated Labor Source:

City Crews / Contractor / Volunteers

**Cost Estimate:** 

\$ 340,000

**Operations & Maintenance Impact:** 

Project No.: F-9

Project: New Pervious Pavement Hike&Bike Trail - left bank of SFC, from the Canal St. Bridge to Barron St./Magnolia St.

Project Area: Rotary Park and downstream

Priority: Long-Term

Item	Improvement Description	Quantity.	Unit	Un	it Price	To	otal Cost
1	Clearing, Grubbing & Subgrade Preparation*	40,500	SF	\$	0.50	\$	20,25
2	Pervious Concrete*	40,500	SF	\$	5	\$	202,50
3	Silt Fence	4,050	LF	\$	4	\$	16,20
4	Stabilized Construction Entrance	1	EA	\$	1,000	\$	1,00
	* - area is based on an approx. 4,050 ft. long x 10 ft. wide trail	Enginee	ring Desigi		struction mt (13%)		239,95 31,19
		Total E	stimated C	onstruc	tion Cost	S	271,14
			Co	ntingen	cy (25%)	\$	67,78
		Т	otal Projec	t Estim	ated Cost	S	338,92
		PL	ANNING P	ROJEC	CT COST	\$	340,00

Project No.: F-9a (shorten version of Project No. F-9)

Project: New Pervious Pavement Hike&Bike Trail - left bank of SFC, from the Canal St. Bridge to Barron St./Magnolia St.

Project Area: Rotary Park and downstream

Priority: Long-Term

Item	Improvement Description	Quantity	Unit	Un	it Price	To	otal Cost
1	Clearing, Grubbing & Subgrade Preparation*	30,000	SF	\$	0.50	\$	15,000
2	Pervious Concrete*	30,000	SF	\$	5	\$	150,000
3	Silt Fence	3,000	LF	\$	4	\$	12,000
4	Stabilized Construction Entrance	1	EA	\$	1,000	\$	1,000
				Con	struction	\$	178,000
	* - area is based on an approx. 3,000 ft. long x 10 ft. wide trail	Enginee	ring Design	& Mg	mt (13%)	\$	23,140
		Total E	Stimated C	onstruc	tion Cost	\$	201,140
			Co	ntingen	cy (25%)	\$	50,285
		I	otal Projec	t Estim	ated Cost	\$	251,425
		PL	ANNING P	ROJE	CT COST	\$	250,000

Project Type: VEGETATION ENHANCEMENT

## F-10. VEGETATION ENHANCEMENT – in Rotary Park

Project Priority: LONG-TERM Related Projects:

Project Location: Rotary Park

## **Project Description:**

Project includes the improvement and/or establishment of vegetative cover throughout Rotary Park (located on the left bank of San Felipe Creek (SFC) immediately downstream of the Canal St. Bridge). Project will include vegetation enhancement including importing top soil, organic material (compost), and the use of fiber rolls/blanket and/or plastic "geogrid" reinforcement for structural support of the soil.

## **Design/Construction Issues:**

#### **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as possible and should be conducted in a manner that minimized soil disturbance.

## **Project Options:**

- Options include the importation of soil and soil materials suitable for the establishment of a high-quality soil matrix.
- Vegetation should include appropriate native grasses and plants.

### **Construction BMPs:**

• Construction stormwater BMPs will include silt fence and other appropriate BMPs, as necessary.

Project Length/Area: 16,130 SY (or approx. 3.33 acres)

## Photographs/Graphics:







Anticipated Labor Source: <u>City Crews</u> / <u>Contractor</u> / Volunteers

Cost Estimate: \$ 77,000 Operations & Maintenance Impact: INCREASE

Project No.: F-10

Project: Vegetation Enhancement - in Rotary Park

Project Area: Tardy Dam
Priority: Long-Term

Item	Improvement Description	Quantity	Unit	Unit Price		To	tal Cost
1	Vegetation Enhancement - Soil(2")+Compost(2")	16,130	SY	\$	3	\$	48,390
2	Silt Fence	1,500	LF	\$	4	\$	6,000
				Const	ruction	\$	54,390
		Enginee	ring Design	& Mgmt	t (13%)	\$	7,07
		Total E	stimated C	onstructio	on Cost	\$	61,461
			Co	ntingency	(25%)	\$	15,365
		Т	otal Projec	t Estimat	ed Cost	S	76,826
		PL	ANNING P	ROJECT	COST	S	77,000

Project Type: STORMWATER BMP

## F-11. CONVERT EXISTING PARKING AREA TO PERVIOUS PAVEMENT – in Rotary Park, along Canal St. and Cisneros St.

Project Priority: LONG-TERM Related Projects:

Project Location: Rotary Park

## **Project Description:**

Project includes the conversion of existing parking areas to a new pervious pavement parking areas in Rotary Park, along Canal St. and Cisneros St. The new pervious pavement parking areas would replace existing unimproved parking areas at the same locations. An engineered pervious pavement system should be designed and installed according to manufacturer's recommendations and recognized engineering design standards.

## **Design/Construction Issues:**

## **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as
  possible and should be conducted in a manner that minimized soil disturbance.

## **Project Options:**

- Identified pervious pavement options include pervious concrete, a gravel/geogrid system (GravelPave®, etc...).
- System should be designed to detain stormwater for up to the 25-yr storm event.
- On areas within the defined project boundaries not suitable for pervious pavement should be provided with vegetation enhancement, including an improved soil matrix, along with appropriate native grasses and plants.

#### **Construction BMPs:**

• Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area:

47,784 sq. ft. (approx. 1.10 acres)

## Photographs/Graphics:







Anticipated Labor Source: <u>City Crews / Contractor / Volunteers</u>

Cost Estimate: \$ 770,000 Operations & Maintenance Impact: INCREASE

Project No.: I

Project: Convert Existing Parking Area to Pervious Pavement - in Rotary Park, along Canal St. & Cisneros St.

Project Area: Rotary Park
Priority: Long-Term

Item	Improvement Description	Quantity	Unit	Un	it Price	To	otal Cost
1	Clearing, Grubbing & Subgrade Preparation	47,784	SF	\$	0.10	\$	4,778
2	Excavation & Haul-Off of Existing Surface Material (12" depth)	1,770	CY	\$	20	\$	35,39
3	Pervious Concrete - Parking Area*	47,784	SF	\$	10	\$	477,84
4	Wheel Stops (based on 1 / 440 sf of property)	109	EA	\$	200	\$	21,720
5	Striping (based on 1 / 440 sf of property)	109	EA	\$	5	\$	54
6	Silt Fence	800	LF	\$	4	\$	3,20
7	Stabilized Construction Entrance	1	EA	\$	1,000	\$	1,00
				Con	struction	s	544,47
		Enginee	ering Design	ı & Mg	mt (13%)	\$	70,78
		Total E	Estimated C	onstruc	ction Cost	S	615,25
			Co	ntingen	icy (25%)	\$	153,81
		Т	otal Projec	t Estim	ated Cost	\$	769,07
		PL	ANNING P	ROJEC	CT COST	\$	770,00

Project Type: STORMWATER BMP

F-12. INSTALL NEW PERVIOUS PAVEMENT PARKING AREA – on property adjacent to Rotary Park, between Cisneros St. & Guillen St., on the east side of Andrade St.

Project Priority: LONG-TERM Related Projects:

Project Location: Rotary Park area

## **Project Description:**

Project includes the installation of a new pervious pavement parking area on existing property bound by Cisneros St., Brown Plaza, Guillen St., and Andrade St. An improved parking service will serve visitors of Brown Plaza, Rotary Park, and San Felipe Creek. An engineered pervious pavement system should be designed and installed according to manufacturer's recommendations and recognized engineering design standards.

## **Design/Construction Issues:**

#### **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as possible and should be conducted in a manner that minimized soil disturbance.

## **Project Options:**

- Identified pervious pavement options include pervious concrete, a gravel/geogrid system (GravelPave®, etc...).
- System should be designed to detain stormwater up to the 25-yr storm event.
- Underdrain system should outfall via sheet flow to a vegetative filter strip area.
- On areas within the defined project boundaries not suitable for pervious pavement should be provided with vegetation enhancement, including an improved soil matrix, along with appropriate native grasses and plants.

## **Construction BMPs:**

 Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area: 30	,851 sq. ft.	prox. 0.71 acres)
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Photographs/0	Graphics:
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Anticipated Labor Source: City Crews / Contractor / Volunteers

Cost Estimate: \$ 385,000 Operations & Maintenance Impact: INCREASE

Project No.: F-12

Project: In:

Install New Pervious Parking Area - adjacent to Rotary Park, between Cisneros St. & Guillen St., on east side of Andrade St.

Project Area: Rotary Park
Priority: Long-Term

Item	Improvement Description	Quantity	Unit	Un	it Price	To	tal Cost
1	Clearing, Grubbing & Subgrade Preparation	30,851	SF	\$	0.10	\$	3,085
2	Excavation & Haul-Off of Existing Surface Material (12" depth)	1,143	CY	\$	20	\$	22,853
3	Pervious Concrete - Parking Area*	23,138	SF	\$	10	\$	231,383
4	Wheel Stops (based on 1 / 440 sf of property)	53	EA	\$	200	\$	10,517
5	Striping (based on 1 / 440 sf of property)	53	EA	\$	5	\$	263
6	Silt Fence	850	LF	\$	4	\$	3,400
7	Stabilized Construction Entrance	1	EA	\$	1,000	\$	1,000
				Cor	astruction	s	272,501
	* - assume pervious parking on 75% of total area	Enginee	ring Design	a & Mg	mt (13%)	S	35,425
		Total E	stimated C	onstruc	ction Cost	\$	307,926
			Co	ntinger	icy (25%)	\$	76,981
		T	otal Projec	t Estim	ated Cost	S	384,907
		PL	ANNING P	ROJE	CT COST	\$	385,000

Project Type: STORMWATER BMP

F-13. INSTALL NEW PERVIOUS PAVEMENT PARKING AREA – on property adjacent to Rotary Park, between Cisneros St. & Guillen St., on the west side of Andrade St.

Project Priority: LONG-TERM Related Projects:

Project Location: Rotary Park area

## **Project Description:**

Project includes the installation of a new pervious pavement parking area on existing property bound by Cisneros St., Andrade St., Guillen St., and Barron St. An improved parking service will serve visitors of Brown Plaza, Rotary Park, and San Felipe Creek. An engineered pervious pavement system should be designed and installed according to manufacturer's recommendations and recognized engineering design standards.

## **Design/Construction Issues:**

#### **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as
  possible and should be conducted in a manner that minimized soil disturbance.

## **Project Options:**

- Identified pervious pavement options include pervious concrete, a gravel/geogrid system (GravelPave®, etc...).
- System should be designed to detain stormwater up to the 25-yr storm event.
- Underdrain system should outfall via sheet flow to a vegetative filter strip area.
- On areas within the defined project boundaries not suitable for pervious pavement should be provided with vegetation enhancement, including an improved soil matrix, along with appropriate native grasses and plants.

#### **Construction BMPs:**

 Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area: 37,661 sq. ft. (approx. 0.86 acres)

Photographs/Gi	raphics:
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Anticinated	Labor Source:	City Crews /	Contractor	/ Volunteers

Cost Estimate: \$ 470,000 Operations & Maintenance Impact: INCREASE

Project No.: F-13

Project:

Install New Pervious Parking Area - adjacent to Rotary Park, between Cisneros St. & Guillen St., on west side of Andrade St.

Project Area: Rotary Park Priority: Long-Term

Item	Improvement Description	Quantity	Unit	Un	it Price	To	otal Cost
1	Clearing, Grubbing & Subgrade Preparation	37,661	SF	\$	0.10	\$	3,766
2	Excavation & Haul-Off of Existing Surface Material (12" depth)	1,395	CY	\$	20	\$	27,897
3	Pervious Concrete - Parking Area*	28,246	SF	\$	10	\$	282,458
4	Wheel Stops (based on 1 / 440 sf of property)	64	EA	\$	200	\$	12,839
5	Striping (based on 1 / 440 sf of property)	64	EA	\$	5	\$	321
6	Silt Fence	900	LF	\$	4	\$	3,600
7	Stabilized Construction Entrance	1	EA	\$	1,000	\$	1,000
				Cor	struction	S	331,881
	* - assume pervious parking on 75% of total area	Enginee	ring Design	ı & Mg	mt (13%)	\$	43,144
		Total E	stimated C	onstruc	tion Cost	\$	375,025
No.			Co	ntingen	cy (25%)	\$	93,756
		T	otal Projec	t Estim	ated Cost	\$	468,781
		PL	ANNING P	ROJE	CT COST	\$	470,000

Project Type: STORMWATER BMP

## F-14. CONSTRUCTION OF NEW PUBLIC RESTROOMS – adjacent to SFC, on the south side of the Magnolia St./Canal St. intersection

Project Priority: LONG-TERM Related Projects:

Project Location: Magnolia St. @ Canal St.

## **Project Description:**

Project includes the construction of a new public restroom to be located adjacent to San Felipe Creek, on the south side of the Magnolia St. / Canal St. intersection. The project will include the restrooms and associated walkways leading from the existing parking area. The restrooms will serve visitors of the kayak take out station, as well as the hike & bike trail.

## **Design/Construction Issues:**

### **Known Constraints:**

- Construction site is located on the banks of a creek that provides habitat to Threatened and/or Endangered Species
  that have been identified by the USFWS.
- Proposed improvements should provide ADA access. Improvements should meet the requirements found in the Texas Accessibility Standards (TAS) administered by the Texas Department of Licensing and Registrations (TDLR). Review and approval by a Registered Accessibility Specialist (RAS) will likely be required.

## **Project Options:**

- Options include the installation of separate men's and women's stand-alone units, a single building with both men's and women's, or unisex-style restrooms.
- Restrooms should be designed to reduce the potential for vandalism.

## Construction BMPs:

Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used
around the construction site in accordance with TCEQ requirements.

Project Length/Area:

1 LS

## Photographs/Graphics:







Anticipated Labor Source: Cit

City Crews / Contractor / Volunteers

**Cost Estimate:** 

\$ 85,000

Operations & Maintenance Impact:

Project No.: F-14

Project: Construction of New Public Restrooms - adjacent to SFC, on south side of Magnolia St. / Canal St. Intersection

Project Area: Magnolia St. @ Canal St.

Priority: Long-Term

Item	Improvement Description	Quantity	Unit	Unit Price		To	tal Cost
1	Public Restroom - ADA accessible	1,0	LS	\$	60,000	\$	60,000
2	Silt Fence	100	LF	\$	4	\$	400
1				1			
				Con	nstruction	\$	60,400
		Enginee	ering Design	a & Mg	mt (13%)	\$	7,852
		Total E	Estimated C	onstru	ction Cost	\$	68,252
			Co	ntinge	ncy (25%)	\$	17,063
T. P		7	otal Projec	t Estin	ated Cost	S	85,315
4		PL	ANNING P	ROJE	CT COST	S	85,000

Project Type: **BANK IMPROVEMENTS** 

Kayak Take-Out Station - left bank of SFC, on the south side of Magnolia St. & F-15. Andrade St.

**Project Priority:** LONG-TERM **Related Projects:** 

**Project Location:** Magnolia St. @ Canal St.

## **Project Description:**

Project includes the construction of a kayak take-out station along the left bank of San Felipe Creek (SFC), on the south side of Magnolia St. & Andrade St.

## **Design/Construction Issues:**

#### **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as possible and should be conducted in a manner that minimized soil disturbance.
- Park improvements should provide ADA access. Improvements should meet the requirements found in the Texas Accessibility Standards (TAS) administered by the Texas Department of Licensing and Registrations (TDLR). Review and approval by a Registered Accessibility Specialist (RAS) will likely be required.

## **Project Options:**

Project should result in an easy to use, easily accessible kayak take-out area.

#### **Construction BMPs:**

- A coffer dam or in-stream barrier will be needed to avoid the potential for suspended solids being introduced in the creek; water-filled portable coffer dams or other temporary measures should be considered.
- Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area:

1 LS

## Photographs/Graphics:



City Crews / Contractor / Volunteers **Anticipated Labor Source:** 

\$ 82,000 **Cost Estimate: Operations & Maintenance Impact: DECREASE** 

Project No.: F-15

Project: Install Kayak Launch Station - left bank of SFC, on south side of Magnolia St. @ Andrade St.

Project Area: Magnolia St. @ Canal St.

Priority: Long-Term

Item	Improvement Description	Quantity	Unit	Uı	nit Price	To	tal Cost
1	Kayak Launch Station	1	EA	\$	40,000	\$	40,000
2	Stabilized Construction Entrance	1	EA	\$	1,000	\$	1,000
3	Silt Fence	200	LF	\$	4	\$	800
4	In-Stream Coffer Dam (w/ dewatering)	80	LF	\$	200	\$	16,000
				Co	nstruction	\$	57,800
		Enginee	ring Design	& Mg	gmt (13%)	\$	7,514
		Total E	stimated C	onstru	ction Cost	\$	65,314
			Co	ntinge	ncy (25%)	\$	16,329
		Т	otal Projec	t Estin	nated Cost	\$	81,643
		PL	ANNING P	ROJE	CT COST	s	82,000

**Project Type:** STORMWATER BMP

INSTALL NEW PERVIOUS PAVEMENT PARKING AREA - on property located on F-16. the east side of Barron St., between Rubio St. & Magnolia St.

**Project Priority: LONG-TERM Related Projects:** 

**Project Location:** Magnolia St. @ Barron St.

## **Project Description:**

Project includes the installation of a new pervious pavement parking area on existing property located on the east side of Barron St., between Rubio St. and Magnolia St. An improved parking service will serve visitors of San Felipe Creek (SFC). An engineered pervious pavement system should be designed and installed according to manufacturer's recommendations and recognized engineering design standards.

## Design/Construction Issues:

### **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as guickly as possible and should be conducted in a manner that minimized soil disturbance.

## **Project Options:**

- Identified pervious pavement options include pervious concrete, a gravel/geogrid system (GravelPave®, etc...).
- System should be designed to detain stormwater up to the 25-yr storm event.
- Underdrain system should outfall via sheet flow to a vegetative filter strip area.
- On areas within the defined project boundaries not suitable for pervious pavement should be provided with vegetation enhancement, including an improved soil matrix, along with appropriate native grasses and plants.

## **Construction BMPs:**

 Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area: 21,591	sq. ft. (approx. 0.50 acres)	
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**Anticipated Labor Source:** City Crews / Contractor / Volunteers

**Cost Estimate:** \$ 270,000 Operations & Maintenance Impact: **INCREASE** 

Project No.:

F-16

Project:

Install New Pervious Parking Area - on property on east side of Barron St., between Rubio St. & Magnolia St.

Project Area: Magnolia St. @ Barron St.

Priority:

Long-Term

Item	Improvement Description	Quantity	Unit	Un	it Price	To	tal Cost
1	Clearing, Grubbing & Subgrade Preparation	21,591	SF	\$	0.10	\$	2,159
2	Excavation & Haul-Off of Existing Surface Material (12" depth)	800	CY	\$	20	\$	15,993
3	Pervious Concrete - Parking Area*	16,193	SF	\$	10	\$	161,93
4	Wheel Stops (based on 1 / 440 sf of property)	37	EA	\$	200	\$	7,36
5	Striping (based on 1 / 440 sf of property)	37	EA	\$	5	\$	184
6	Silt Fence	600	LF	\$	4	\$	2,40
7	Stabilized Construction Entrance	1	EA	\$	1,000	\$	1,00
				Con	struction	\$	191,03
	* - assume pervious parking on 75% of total area	Enginee	ring Desigi	ı & Mg	mt (13%)	\$	24,83
		Total E	stimated C	onstruc	tion Cost	S	215,86
		essential de la companya de la comp	Co	ntingen	icy (25%)	\$	53,96
		T	otal Projec	t Estim	ated Cost	\$	269,82
		PI.	ANNING P	ROJE	T COST	\$	270,00

INSTALL NEW PERVIOUS PAVEMENT PARKING AREA - along the south side of F-17. Magnolia St., between Barron St. and Canal St.

**Project Priority: SHORT-TERM Related Projects:** 

**Project Location:** Magnolia St.

# **Project Description:**

Project includes the installation of a new pervious pavement parking area in existing street right of way. Parking area will be located on the south side of Magnolia St., between Barron St. and Canal St. An improved parking service will serve visitors of San Felipe Creek (SFC). An engineered pervious pavement system should be designed and installed according to manufacturer's recommendations and recognized engineering design standards.

# **Design/Construction Issues:**

#### **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as possible and should be conducted in a manner that minimized soil disturbance.

# **Project Options:**

- Identified pervious pavement options include pervious concrete, a gravel/geogrid system (GravelPave®, etc...).
- System should be designed to detain stormwater up to the 25-yr storm event.
- Underdrain system should outfall via sheet flow to a vegetative filter strip area.
- On areas within the defined project boundaries not suitable for pervious pavement should be provided with vegetation enhancement, including an improved soil matrix, along with appropriate native grasses and plants.

#### Construction BMPs:

 Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area: 12,97	4 sq. ft. (approx. 0.30 acres)
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			-	250	Charge	10000			•			

**Anticipated Labor Source:** City Crews / Contractor / Volunteers

**Cost Estimate:** \$ 165,000 Operations & Maintenance Impact: **INCREASE** 

Project No.:

Project:

Install New Pervious Parking Area - along south side of Magnolia St., between Barron St. and Canal St.

Project Area: Magnolia St. @ Barron St.

Priority:

Short-Term

ltem	Improvement Description	Quantity	Unit	Un	it Price	To	tal Cost
1	Clearing, Grubbing & Subgrade Preparation	12,974	SF	\$	0.10	\$	1,297
2	Excavation & Haul-Off of Existing Surface Material (12" depth)	481	CY	\$	20	\$	9,610
3	Pervious Concrete - Parking Area*	9,731	SF	\$	10	\$	97,305
4	Wheel Stops (based on 1 / 440 sf of property)	22	EA	\$	200	\$	4,423
5	Striping (based on 1 / 440 sf of property)	22	EA	\$	5	\$	111
6	Silt Fence	1,000	LF	\$	4	\$	4,000
7	Stabilized Construction Entrance	1	EA	\$	1,000	\$	1,000
			* 5	Cor	struction	\$	117,746
	* - assume pervious parking on 75% of total area	Enginee	ring Desigi	n & Mg	mt (13%)	\$	15,307
		Total E	stimated C	onstru	ction Cost	S	133,053
			Co	ntinger	icy (25%)	\$	33,263
		Т	otal Projec	t Estim	ated Cost	\$	166,317
		PL	ANNING P	ROJE	CT COST	S	165,000

# F-18. CONVERT EXISTING ASPHALT STREETS TO PERVIOUS PAVEMENT DRIVING SURFACE – Magnolia St./Perez St., just west of Barron St.

Project Priority: SHORT-TERM Related Projects:

Project Location: Magnolia St. / Barron St intersection

# **Project Description:**

Project includes the demolition of existing asphalt streets and the installation of a new pervious pavement driving surface. New driving surface will serve the hike & bike trail and kayak take-out station located near the Barron St. / Magnolia St. intersection. An engineered pervious pavement system should be designed and installed according to manufacturer's recommendations and recognized engineering design standards.

# **Design/Construction Issues:**

#### **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as
  possible and should be conducted in a manner that minimized soil disturbance.

# **Project Options:**

- Identified pervious pavement options include pervious concrete, a gravel/geogrid system (GravelPave®, etc...).
- System should be designed to detain stormwater for up to the 25-yr storm event.
- Areas within the defined project boundaries not suitable for pervious pavement should be provided with vegetation enhancement, including an improved soil matrix, along with appropriate native grasses and plants.

#### **Construction BMPs:**

 Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area: 12,300 sq. ft. (0.28 ac.) [area is approximate, based on 820 linear feet x 15 ft. width]

# Photographs/Graphics:



Anticipated Labor Source: City Crews / Contractor / Volunteers

Cost Estimate: \$ 210,000 Operations & Maintenance Impact: INCREASE

Project No.: ]

F-18

Project:

Convert Existing Asphalt Streets to Pervious Pavement - Magnolia St./Perez St., just west of Barron St.

Project Area: Magnolia St. / Barron St. Intersection

Priority: Short-Term

Item	Improvement Description	Quantity	Unit	Un	it Price	To	tal Cost
1	Demo Existing Asphalt Pavement Area*	12,300	SF	\$	1.00	\$	12,300
2	Excavation & Haul-Off of Existing Surface Material (12" depth)	456	CY	\$	20	\$	9,111
3	Clearing, Grubbing & Subgrade Preparation*	12,300	SF	\$	0.10	\$	1,230
4	Pervious Concrete*	12,300	SF	\$	10	\$	123,000
5	Silt Fence	300	LF	\$	4	\$	1,200
6	Stabilized Construction Entrance	1	EA	\$	1,000	\$	1,000
	* - total area is approx. 820 feet long x 15 ft. wide = $12,300$ sq.ft.	Enginee	ring Desigi		nstruction mt (13%)		147,841 19,219
		Total E	stimated C	onstruc	ction Cost	\$	167,060
			Co	ntingen	icy (25%)	\$	41,765
		Т	otal Projec	t Estim	ated Cost	\$	208,826
		PL	ANNING P	ROJEC	CT COST	S	210,000

# F-19. CONSTRUCTION OF BIRD/WILDLIFE OBSERVATION AREA – south of the Barron St. / Magnolia St. intersection

Project Priority: LONG-TERM Related Projects:

Project Location: Magnolia St. / Barron St. Intersection

# **Project Description:**

Project includes the construction of a bird/wildlife observation area south of the Barron St./Magnolia St. intersection, located in the left bank area of San Felipe Creek (SFC).

### **Design/Construction Issues:**

#### **Known Constraints:**

- Construction site is located on the banks of a creek that provides habitat to Threatened and/or Endangered Species
  that have been identified by the USFWS.
- Proposed improvements should provide ADA access. Improvements should meet the requirements found in the Texas Accessibility Standards (TAS) administered by the Texas Department of Licensing and Registrations (TDLR). Review and approval by a Registered Accessibility Specialist (RAS) will likely be required.

#### **Project Options:**

- Options include the construction of an at-grade observation area constructed of pervious pavement, gravel-type area, or other pervious material. Observation area may also be constructed as a raised, deck area.
- Project should be constructed and configured to be esthetically pleasing and environmentally friendly.

#### **Construction BMPs:**

 Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area:

1 LS

# Photographs/Graphics:





Anticipated Labor Source: <u>City Crews / Contractor / Volunteers</u>

Cost Estimate: \$ 18,000 Operations & Maintenance Impact: NO CHANGE

Project No.: F-19

Project: Construct Bird/Wildlife Observation Area
Project Area: Magnolia St. / Barron St. Intersection

Priority: Long-Term

Item	Improvement Description	Quantity	Unit	Un	it Price	To	tal Cost
1	Clearing, Grubbing & Subgrade Preparation*	1,000	SF	\$	0.50	\$	500
2	Bird/Wildlife Observation Deck	1,000	SF	\$	10	\$	10,000
3	Silt Fence	300	LF	\$	4	\$	1,200
4	Stabilized Construction Entrance	1	EA	\$	1,000	\$	1,000
	* - total area is approx. 820 feet long x 15 ft. wide = 12,300 sq.ft.	Enginee	ring Desigr	1-1	struction mt (13%)		12,700 1,651
. 1		Total E	stimated C	onstruc	tion Cost	\$	14,351
			Co	ntingen	cy (25%)	\$	3,588
		T	otal Projec	t Estim	ated Cost	\$	17,939
		DI	ANNING P	DOTE	T COST	0	18,000

Project Type: VEGETATION ENHANCEMENT

F-20. VEGETATION ENHANCEMENT – along left bank area of SFC, adjacent to Magnolia St., between Barron St. and Canal St.

Project Priority: LONG-TERM Related Projects:

Project Location: Magnolia St. / Barron St. Intersection

# **Project Description:**

Project includes the improvement and/or establishment of a vegetative cover along the left bank area of San Felipe Creek (SFC) adjacent to Magnolia St., between Barron St. and Canal St. Project will include vegetation enhancement including importing top soil, organic material (compost), and the use of fiber rolls/blanket and/or plastic "geogrid" reinforcement for structural support of the soil.

# **Design/Construction Issues:**

#### **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Construction stormwater BMPs will be required.
- To minimize the potential for soil disturbance demolition/removal operations should be completed as quickly as possible and should be conducted in a manner that minimized soil disturbance.

#### **Project Options:**

- Options include the importation of soil and soil materials suitable for the establishment of a high-quality soil matrix.
- Vegetation should include appropriate native grasses and plants.

#### **Construction BMPs:**

• Construction stormwater BMPs will include silt fence and other appropriate BMPs, as necessary.

Project Length/Area: 9,460 SY (or approx. 1.95 acres)

# Photographs/Graphics:







Anticipated Labor Source: <u>City Crews</u> / <u>Contractor</u> / Volunteers

Cost Estimate: \$ 115,000 Operations & Maintenance Impact: INCREASE

Project No.: F-20

Project: Vegetation Enhancement - along left bank area of SFC, adjacent to Magnolia St., between Barron St. & Canal St.

Project Area: Magnolia St. / Barron St. Intersection

Priority: Long-Term

Item	Improvement Description	Quantity	Unit	Unit	Price	To	tal Cost
1	Vegetation Enhancement - Soil+Compost+SRB*	9,460	SY	\$	8	\$	75,680
2	Silt Fence	1,300	LF	\$	4	\$	5,200
				Const	ruction	s	80,880
	* - SRB = soil retention blanket	Enginee	ring Design	& Mgmt	t (13%)	S	10,514
		Total E	stimated C	onstructio	on Cost	\$	91,394
			Co	ntingency	(25%)	\$	22,849
		Т	otal Projec	t Estimate	ed Cost	S	114,243
		PL	ANNING P	ROJECT	COST	\$	115,000

PARK IMPROVEMENT Project Type:

# F-21. REHABILITATION OF EXISTING PLAYGROUND AREA – located on the left bank of SFC in Rotary Park

**Project Priority: LONG-TERM Related Projects:** 

**Project Location: Rotary Park** 

# **Project Description:**

Project includes the complete rehabilitation of the existing park elements including play stations, picnic tables, BBQ pits, trash cans, and other improvements. Where appropriate, vegetation enhancement should also be provided around the park area, including importing top soil, organic material (compost), and the use of fiber rolls/blanket and/or plastic "geogrid" reinforcement for structural support of the soil.

# **Design/Construction Issues:**

#### **Known Constraints:**

- Construction site is located on the banks of a creek that provides habitat to Threatened and/or Endangered Species that have been identified by the USFWS.
- Park improvements should provide ADA access. Improvements must meet the requirements found in the Texas Accessibility Standards (TAS) administered by the Texas Department of Licensing and Registrations (TDLR). Review and approval by a Registered Accessibility Specialist (RAS) will likely be required.

# **Project Options:**

- Play area fall surface should be upgraded to meet current safety requirements.
- Options for vegetation enhancement should include the importation of soil and soil materials suitable for the establishment of a high-quality soil matrix; vegetation should include appropriate native grasses and plants.

#### **Construction BMPs:**

■ Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area:

1 LS

# Photographs/Graphics:





Anticipated Labor Source: <u>City Crews</u> / <u>Contractor</u> / Volunteers

**Cost Estimate:** \$ 63,000 **Operations & Maintenance Impact: NO CHANGE** 

Project No.: F-21

Project: Rehab of Existing Playground Area - in Rotary Park

Project Area: Rotary Park
Priority: Long-Term

Item	Improvement Description	Quantity	Unit	Uı	nit Price	To	tal Cost
1	Demolition/Haul Off	1	LS	\$	2,000	\$	2,000
2	Picnic Tables - Metal w/ concrete slab	5	EA	\$	3,000	\$	15,000
3	BBQ Pits - Metal w/ concrete foundation	2	EA	\$	500	\$	1,000
4	Trash Can w/ foundation	4	EA	\$	700	\$	2,800
5	New Playscape	1	EA	\$	20,000	\$	20,000
6	Rehab Existing Sand Volleyball Area**	1	LS	\$	4,000	\$	4,000
	* - existing playscape would remain in place	Enginee	ring Desig		nstruction gmt (13%)		44,800 5,824
	** - includes new net, net posts, and sand	Total E	stimated C	Constru	ction Cost	\$	50,624
			Co	ontinge	ncy (25%)	\$	12,656
		Т	otal Projec	et Estin	nated Cost	\$	63,280
		PL	ANNING P	PROJE	CT COST	S	63,000

#### **COMMUNITY GARDEN IMPROVEMENTS – on FEMA Buyout Properties** F-22.

**Project Priority: LONG-TERM Related Projects:** 

**Project Location:** Joe Ramos Center Area

# **Project Description:**

Project includes the improvement of multiple, existing FEMA Buyout Properties located within the defined Project Area. The proposed project would include the installation of a community garden area on each existing property utilizing native plants and vegetation that are capable of withstanding extended periods of little or no rainfall.

# **Design/Construction Issues:**

#### **Known Constraints:**

- San Felipe Creek has been identified as habitat for known Threatened and/or Endangered Species USFWS service authorization will be needed prior to starting demolition activities.
- Landscaped areas will be cared for by volunteers, neighbors, or City crews any proposed improvements should focus on low maintenance plants and improvements.
- The community garden sites are located within residential neighborhoods all improvements should be neighborfriendly and should not create, or lead to the creation of, an unsafe environment or an unsightly property.

#### **Project Options:**

- The proposed community garden improvements can include a variety of landscaping options. The goal for each individual property (or lot) is to create an attractive area that utilizes native plants and vegetation that require minimal care and maintenance.
- Each property (or lot) should be provided with water service; if not served by an automatic sprinkler system, the property should have multiple hose bibs for use by volunteers and/or City crews.

#### **Construction BMPs:**

 If necessary, silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the site in accordance with any TCEQ requirements.

Project Length/Area: 5.0 acres

# Photographs/Graphics:



Anticipated Labor Source: City Crews / Contractor / Volunteers

Cost Estimate: \$ 135,000 **Operations & Maintenance Impact: INCREASE** 

Project No.: F-22

Project: Community Garden Improvements - on FEMA Buyout Properties

Project Area: Neighborhood south of Rotary Park, between Guillen St. & Magnolia St.

Priority: Long-Term

[tem	Improvement Description	Quantity	Unit	Ur	nit Price	To	tal Cost
1	Trash/Rubbish Haul Off	5.00	AC	\$	1,000	\$	5,000
2	Clearing & Grubbing	5.00	AC	\$	1,000	\$	5,000
3	Vegetation Enhancement - Soil(2")+Compost(2") (@ \$20/CY)	5.00	AC	\$	10,800	\$	54,000
4	Plantings*	5.00	AC	\$	6,050	\$	30,250
5	Basic Irrigation System	5.00	AC	\$	2,000	\$	10,000
6	Silt Fence	5.00	AC	\$	800	\$	4,000
	* - assumes 1 - 1 gallon plant spaced every 6.0 feet; such spacing in an average of 9 plants/36 SY (or 0.25 plants/SY); @ \$5 / plant	Enginee	ring Desigi		nstruction gmt (13%)	S	108,250
	the cost would be \$1.25/SY or \$6,050/Acre.	Total E	stimated C	onstru	ction Cost	\$	108,250
			Co	ntinge	ncy (25%)	\$	27,063
		Т	otal Projec	t Estin	nated Cost	\$	135,313
		PL	ANNING P	ROJE	CT COST	S	135,000

# F-23. INSTALLATION OF PUBLIC EDUCATION KIOSKS — along the area of San Felipe Creek between Rotary Park & the Magnolia St. @ Barron St. Area

Project Priority: LONG-TERM Related Projects:

Project Location: Between Rotary Park & the Magnolia St. @ Barron St. Area

# **Project Description:**

Project includes the installation of two (2) public information kiosks to be located along San Felipe Creek between Rotary Park & the Magnolia St. @ Barron St. area. The project will include kiosks capable of displaying educational material relating to San Felipe Creek and its associated watershed. The kiosks will provide an all-weather display area for posters, pamphlets, signs, and other informational materials. The kiosks will be located adjacent to heavily used/trafficked areas for the most impact.

# **Design/Construction Issues:**

#### **Known Constraints:**

- Construction site is located on the banks of a creek that provides habitat to Threatened and/or Endangered Species
  that have been identified by the USFWS.
- Proposed improvements should provide ADA access. Improvements should meet the requirements found in the Texas Accessibility Standards (TAS) administered by the Texas Department of Licensing and Registrations (TDLR). Review and approval by a Registered Accessibility Specialist (RAS) will likely be required.

# **Project Options:**

- Options include several different types of kiosks.
- The kiosk should be designed to reduce the potential for vandalism.
- Project budget includes the design/printing of informational signs.

### **Construction BMPs:**

 Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area: 2 each

### Photographs/Graphics:



Anticipated Labor Source: <u>City Crews / Contractor / Volunteers</u>

Cost Estimate: \$ 17,000 Operations & Maintenance Impact: NO CHANGE

Project No.: F-23

Project: Install Public Education Kiosks along the San Felipe Creek

Project Area: Between Rotary Park & Magnolia St. @ Barron St. Area

Priority: Long-Term

Item	Improvement Description	Quantity	Unit	Un	it Price	To	tal Cost
1	Public Education Kiosk	2	LS	\$	5,000	\$	10,000
2	Signs/Exhibits	2	LS	\$	1,000	\$	2,000
				Con	struction	\$	12,000
		Engine	wing Deciar		-4 (120/)		1.500
		Engine	ering Design	a Mig	mt (13%)	3	1,560
			Estimated C			SALVE AND S	T. S. C. S.
			Estimated C	onstruc		S	1,560 13,560 3,390
1		Total ]	Estimated C	onstruc ntingen	etion Cost	s s	13,560

F-24. INSTALLATION OF PET WASTE STATIONS — along the area of San Felipe Creek between Rotary Park & the Magnolia St. @ Barron St. Area

Project Priority: SHORT-TERM Related Projects:

Project Location: Between Rotary Park & the Magnolia St. @ Barron St. Area

# **Project Description:**

Project includes the installation of five (5) pet waste stations to be located along San Felipe Creek between Rotary Park & the Magnolia St. @ Barron St. area. The stations will be located adjacent to heavily used/trafficked areas for the most impact.

# **Design/Construction Issues:**

# **Known Constraints:**

- Construction site is located on the banks of a creek that provides habitat to Threatened and/or Endangered Species
  that have been identified by the USFWS.
- Proposed improvements should provide ADA access. Improvements should meet the requirements found in the Texas Accessibility Standards (TAS) administered by the Texas Department of Licensing and Registrations (TDLR). Review and approval by a Registered Accessibility Specialist (RAS) will likely be required.

#### **Project Options:**

- Options include several different types of pet waste stations.
- Recommend that pet waste station include bag dispenser and trash can.
- Recommend purchasing extra pet waste bags at the time of purchase of the pet waste station.

# **Construction BMPs:**

 Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area: 5 each

#### Photographs/Graphics:



Anticipated Labor Source: <u>City Crews / Contractor / Volunteers</u>

Cost Estimate: \$ 5,000 Operations & Maintenance Impact: INCREASE

Project No.: F-24

Project:

Pet Waste Stations

Project Area: Between Rotary Park & Magnolia St. @ Barron St. Area

Priority: Short-Term

Item	Improvement Description	Quantity		Unit	Uni	it Price	To	tal Cost
1.	Pet Waste Stations w/ Trash Cans & Bag Dispenser*		5	EA	\$	750	\$	3,750
					Con	struction	S	3,750
	* - Pet Waste Stations located at maximum 1,000 ft. spacing	En	ginee	ring Design	& Mgr	nt (13%)	\$	488
	along San Felipe Creek	To	tal E	stimated C	onstruc	tion Cost	S	4,238
			1	Co	ntingen	cy (25%)	S	1,059
			T	otal Projec	t Estima	ited Cost	S	5,297
			PLA	ANNING P	ROJEC	T COST	S	5,000

INSTALLATION OF TRASH CANS - along the area of San Felipe Creek F-25. between Rotary Park & the Magnolia St. @ Barron St. Area

**Project Priority:** SHORT-TERM **Related Projects:** 

**Project Location:** Between Rotary Park & the Magnolia St. @ Barron St. Area

# **Project Description:**

Project includes the installation of ten (10) trash cans, including concrete support foundations, to be located along San Felipe Creek between Rotary Park & the Magnolia St. @ Barron St. area. The trash cans will be located adjacent to heavily used/trafficked areas for the most impact.

# **Design/Construction Issues:**

#### **Known Constraints:**

- Construction site is located on the banks of a creek that provides habitat to Threatened and/or Endangered Species that have been identified by the USFWS.
- Proposed improvements should provide ADA access. Improvements should meet the requirements found in the Texas Accessibility Standards (TAS) administered by the Texas Department of Licensing and Registrations (TDLR). Review and approval by a Registered Accessibility Specialist (RAS) will likely be required.

# **Project Options:**

- Options include several different types of trash cans.
- Installation will include trash can, trash can support, and concrete foundation.
- The unit shall be designed to prevent the trash can from being easily stolen.

#### **Construction BMPs:**

 Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area: 10 each

# Photographs/Graphics:



**Anticipated Labor Source:** <u>City Crews</u> / <u>Contractor</u> / Volunteers

**Cost Estimate:** \$ 10,000

**Operations & Maintenance Impact:** 

**INCREASE** 

Project No.: F-25

Project: Trash Cans w/ Foundations

Project Area: Between Rotary Park & Magnolia St. @ Barron St. Area

Priority: Short-Term

Item	Improvement Description	Quantity	Unit	Unit Price	To	tal Cost
1	Trash Cans w/ Foundations	10	EA	\$ 700	\$	7,00
			1	Construction	\$	7,00
		Enginee	ring Design	a & Mgmt (13%)	\$	91
		Total E	stimated C	onstruction Cost	\$	7,91
			Co	entingency (25%)	\$	1,97
		T	otal Projec	t Estimated Cost	\$	9,88
		PL	ANNING P	ROJECT COST	\$	10,00

# F-26. CONSTRUCTION OF NEW PUBLIC RESTROOMS – in Rotary Park

Project Priority: LONG-TERM Related Projects:

**Project Location:** Rotary Park

# **Project Description:**

Project includes the construction of a new public restroom to be located in Rotary Park. The project will include the restrooms and associated walkways leading from the existing parking area. The restrooms will serve visitors of the park, as well as the hike & bike trail.

# **Design/Construction Issues:**

#### **Known Constraints:**

- Construction site is located on the banks of a creek that provides habitat to Threatened and/or Endangered Species
  that have been identified by the USFWS.
- Proposed improvements should provide ADA access. Improvements should meet the requirements found in the Texas Accessibility Standards (TAS) administered by the Texas Department of Licensing and Registrations (TDLR).
   Review and approval by a Registered Accessibility Specialist (RAS) will likely be required.

#### **Project Options:**

- Options include the installation of separate men's and women's stand-alone units, a single building with both men's and women's, or unisex-style restrooms.
- Restrooms should be designed to reduce the potential for vandalism.

#### **Construction BMPs:**

 Silt fence, temporary stabilized construction entrance(s), and other appropriate Construction BMPs should be used around the construction site in accordance with TCEQ requirements.

Project Length/Area: 1 LS

# Photographs/Graphics:





Anticipated Labor Source: City Crews / Contractor / Volunteers

Cost Estimate: \$ 85,000 Operations & Maintenance Impact: INCREASE

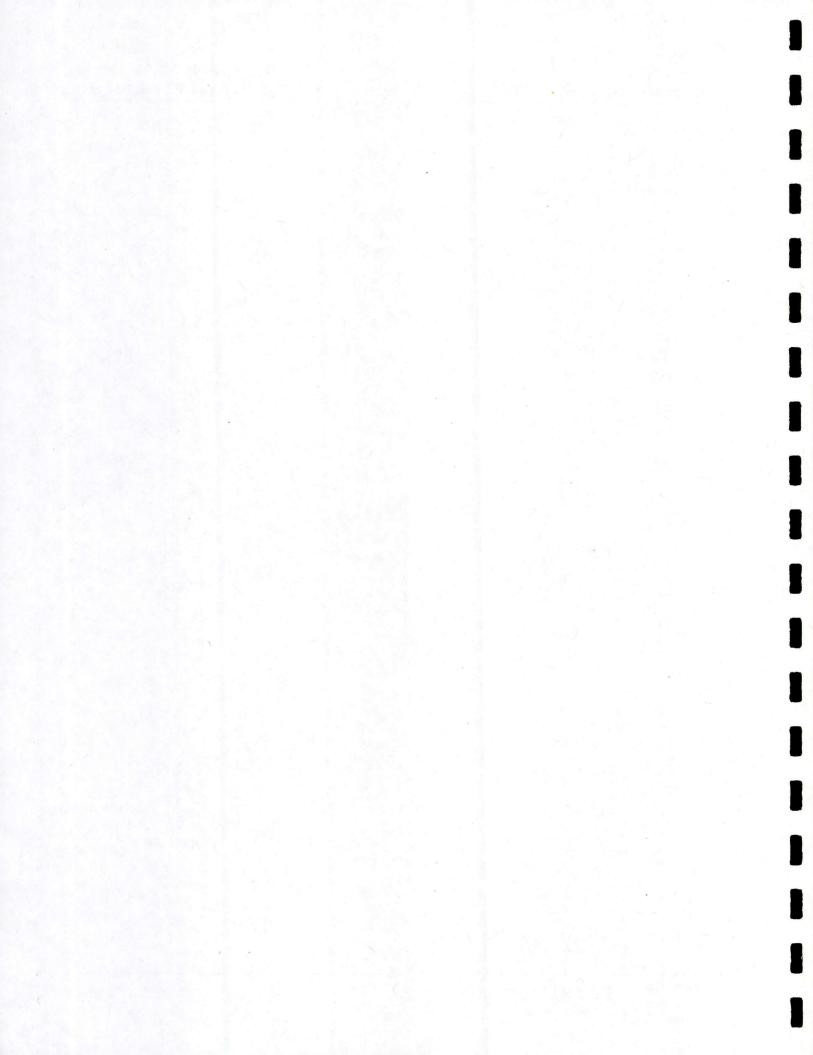
Project No.: F-26

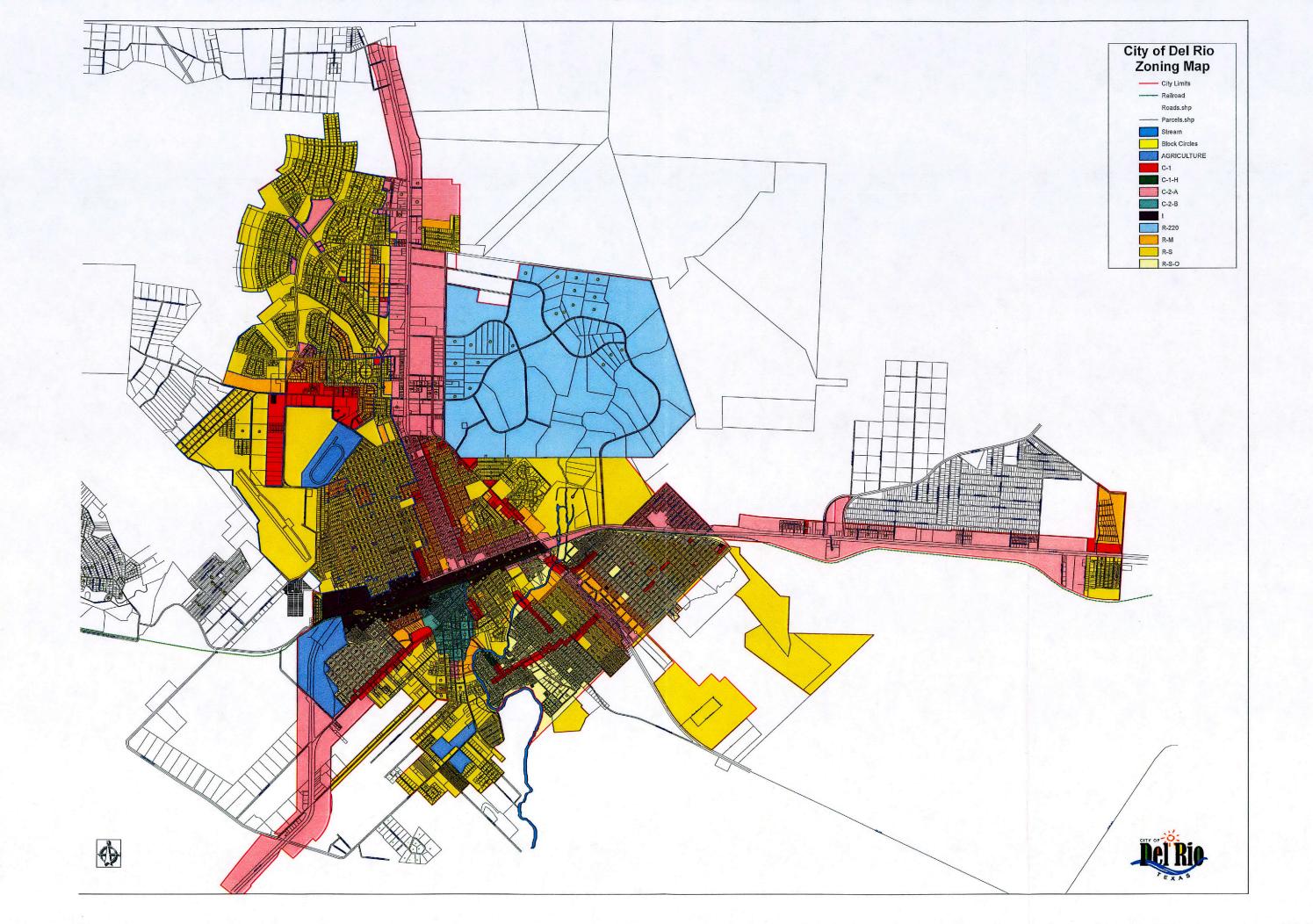
Project: Construction of New Public Restrooms - Rotary Park

Project Area: Rotary Park
Priority: Long-Term

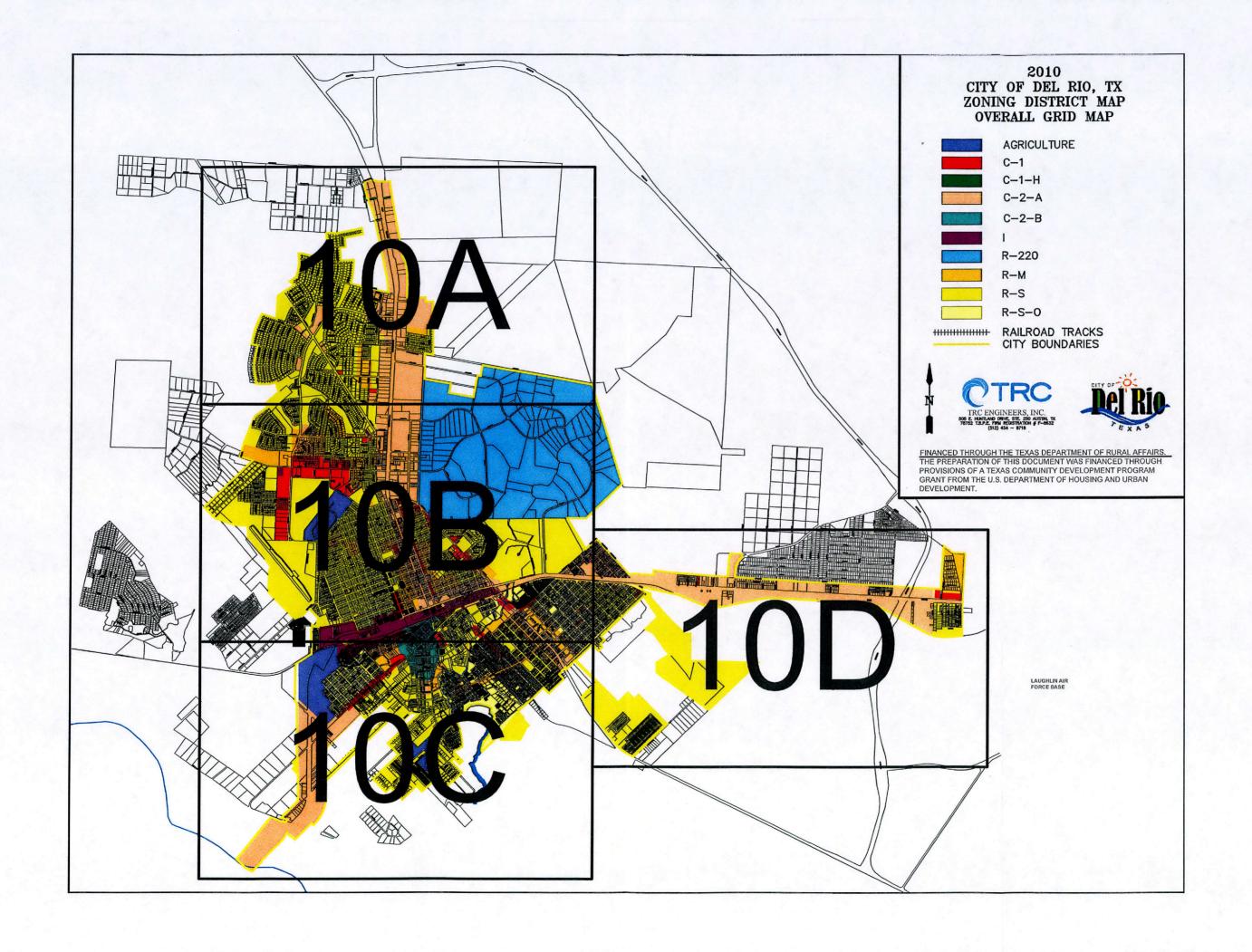
Item	Improvement Description	Quantity	Unit	Unit Price	To	tal Cost
1	Public Restroom - ADA accessible	1.0	LS	\$ 60,000	\$	60,000
2	Silt Fence	100	LF	\$ 4	\$	400
				Construction	\$	60,400
		Enginee	ring Design	& Mgmt (13%)	\$ ·	7,852
		Total E	stimated C	onstruction Cost	\$	68,252
			Co	ntingency (25%)	\$	17,063
		Т	otal Projec	t Estimated Cost	\$	85,315
		PL	ANNING P	ROJECT COST	\$	85,000

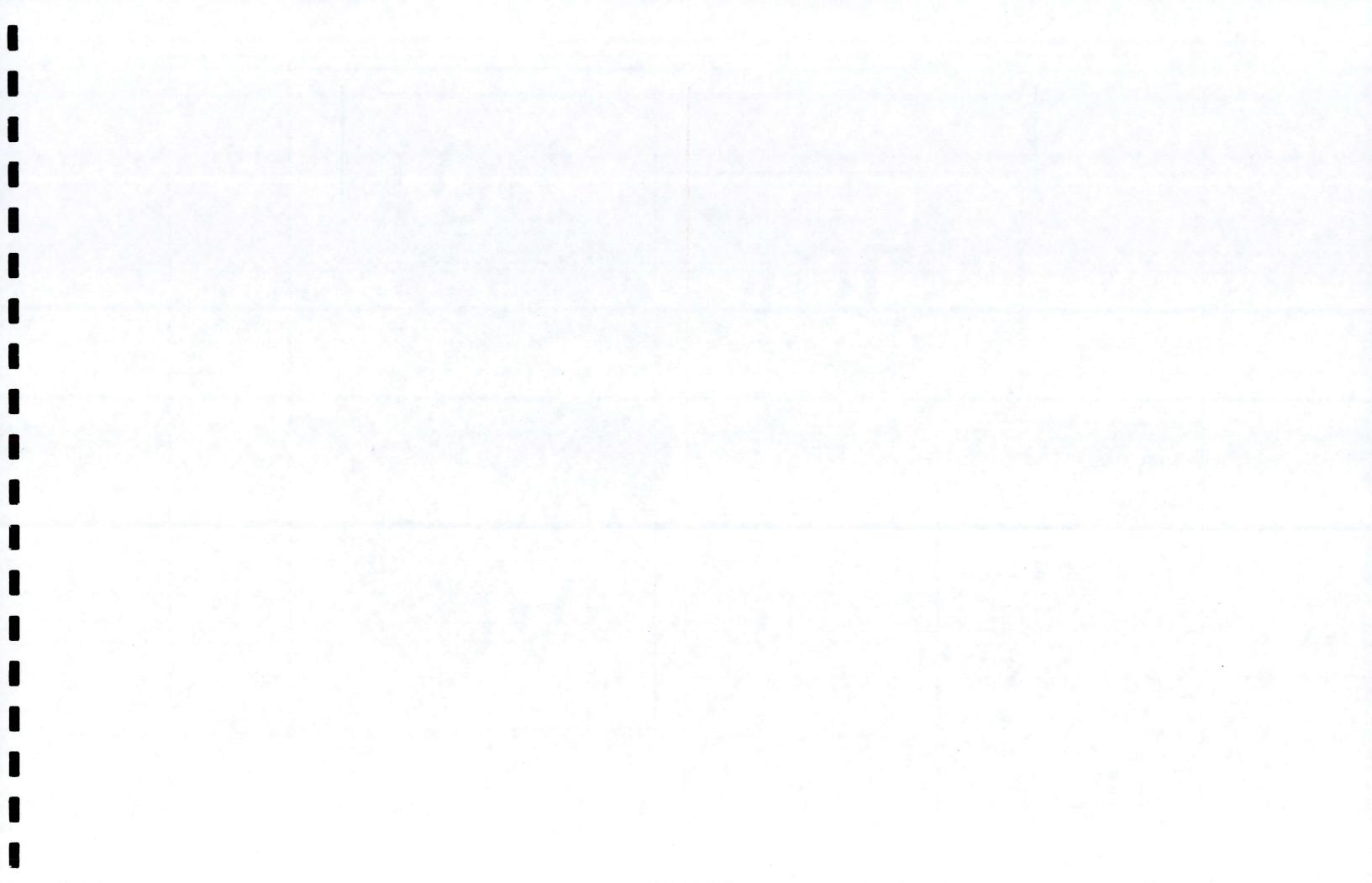
# **APPENDIX H**

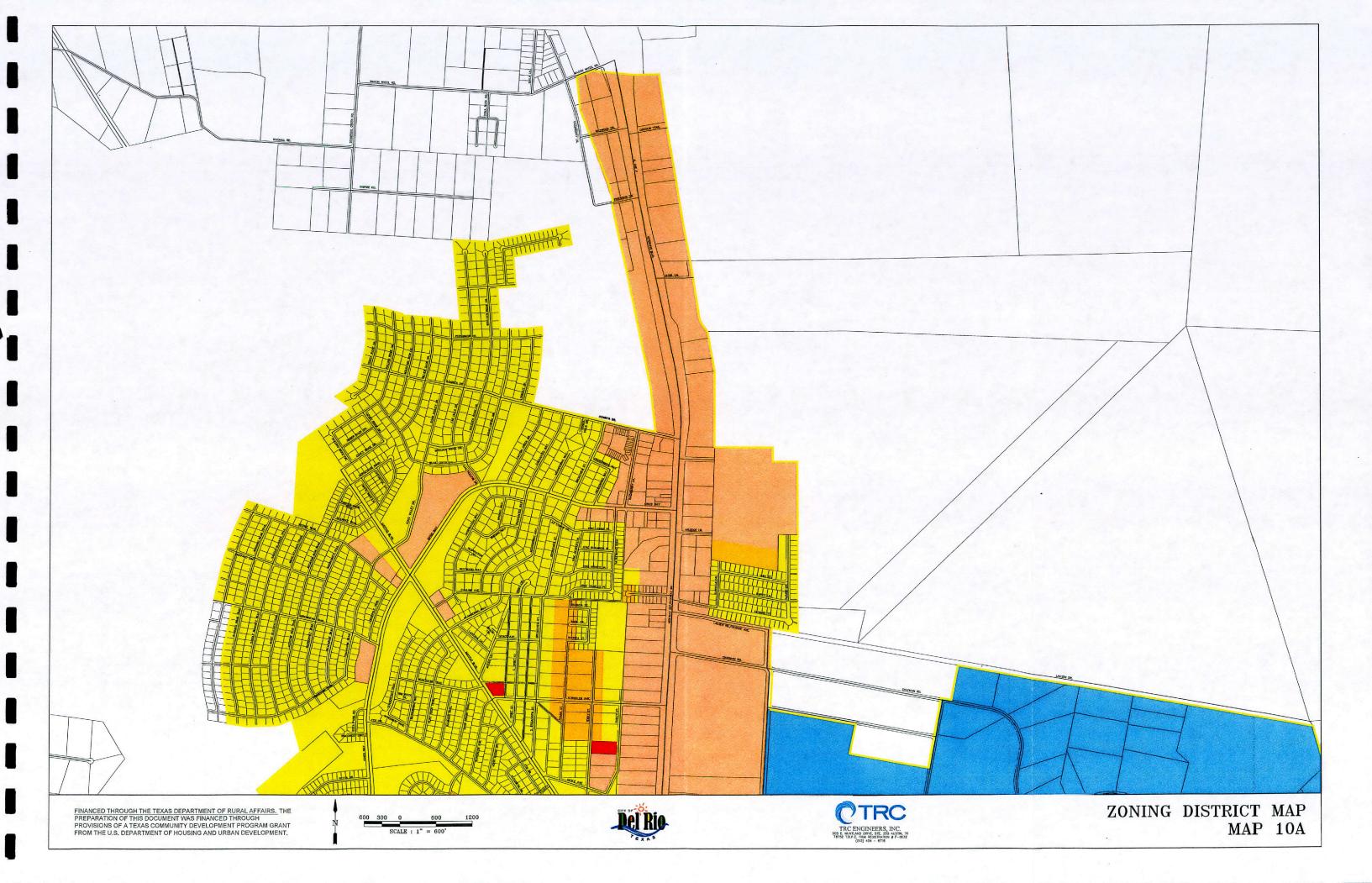




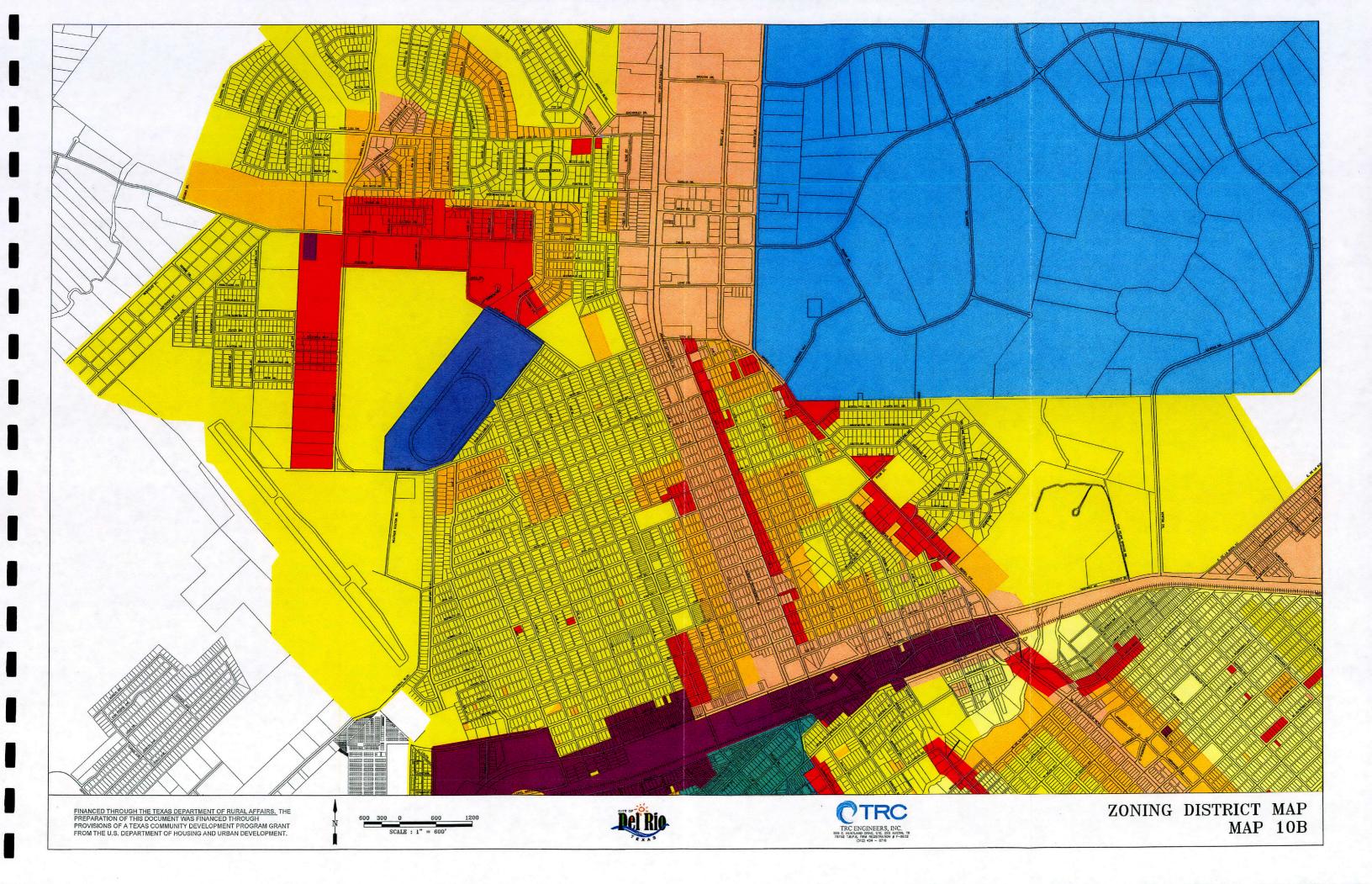


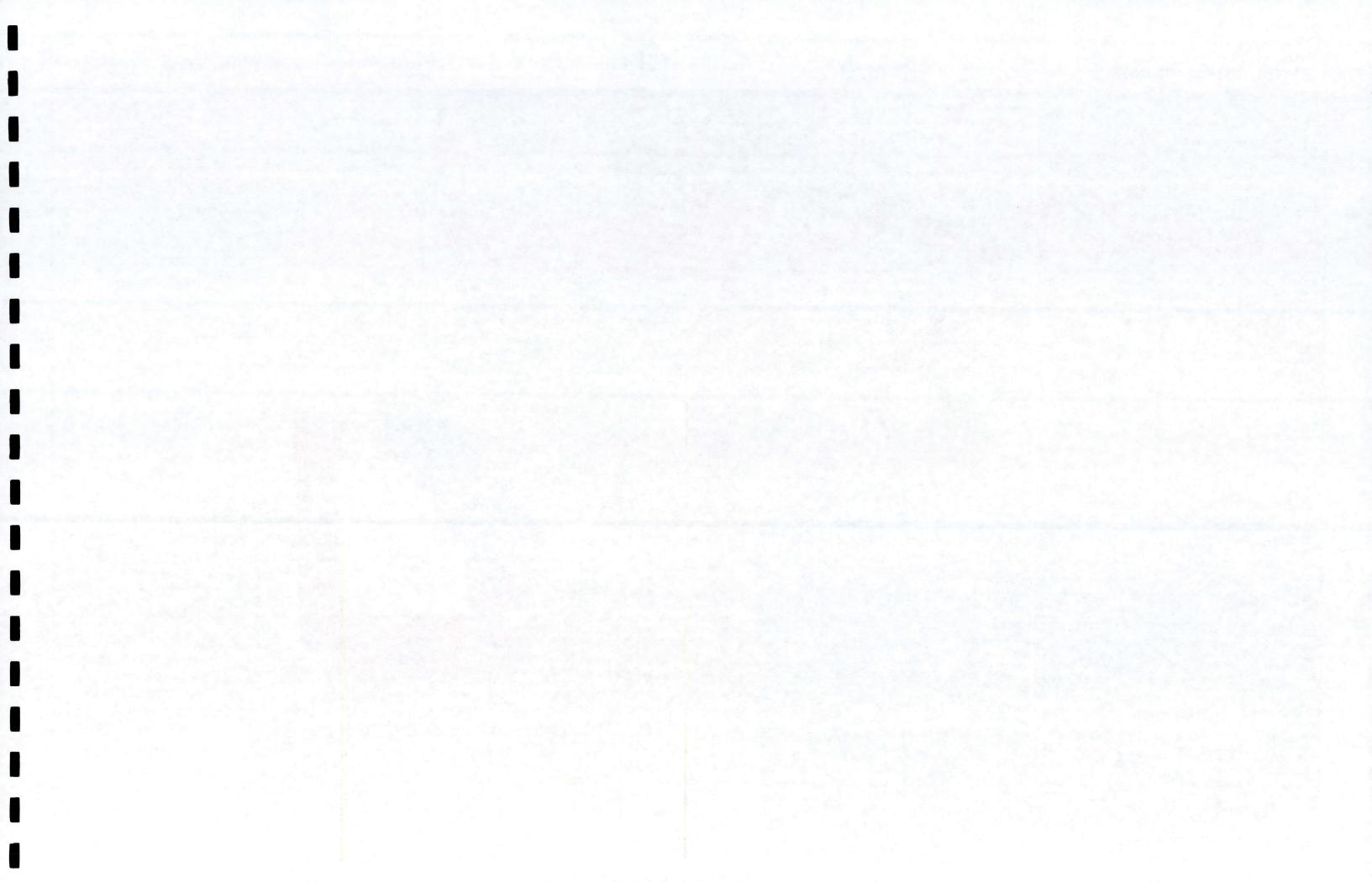


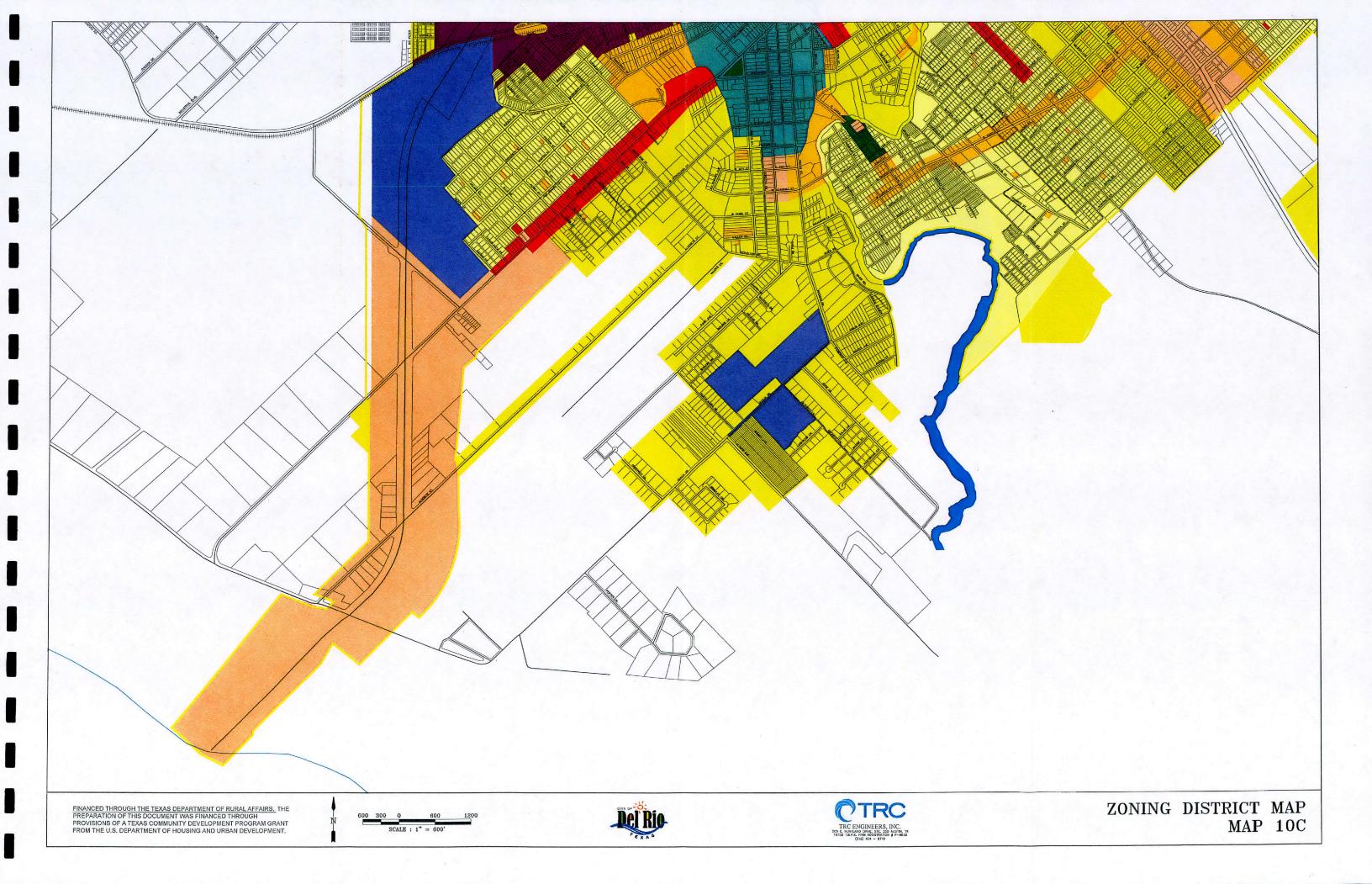


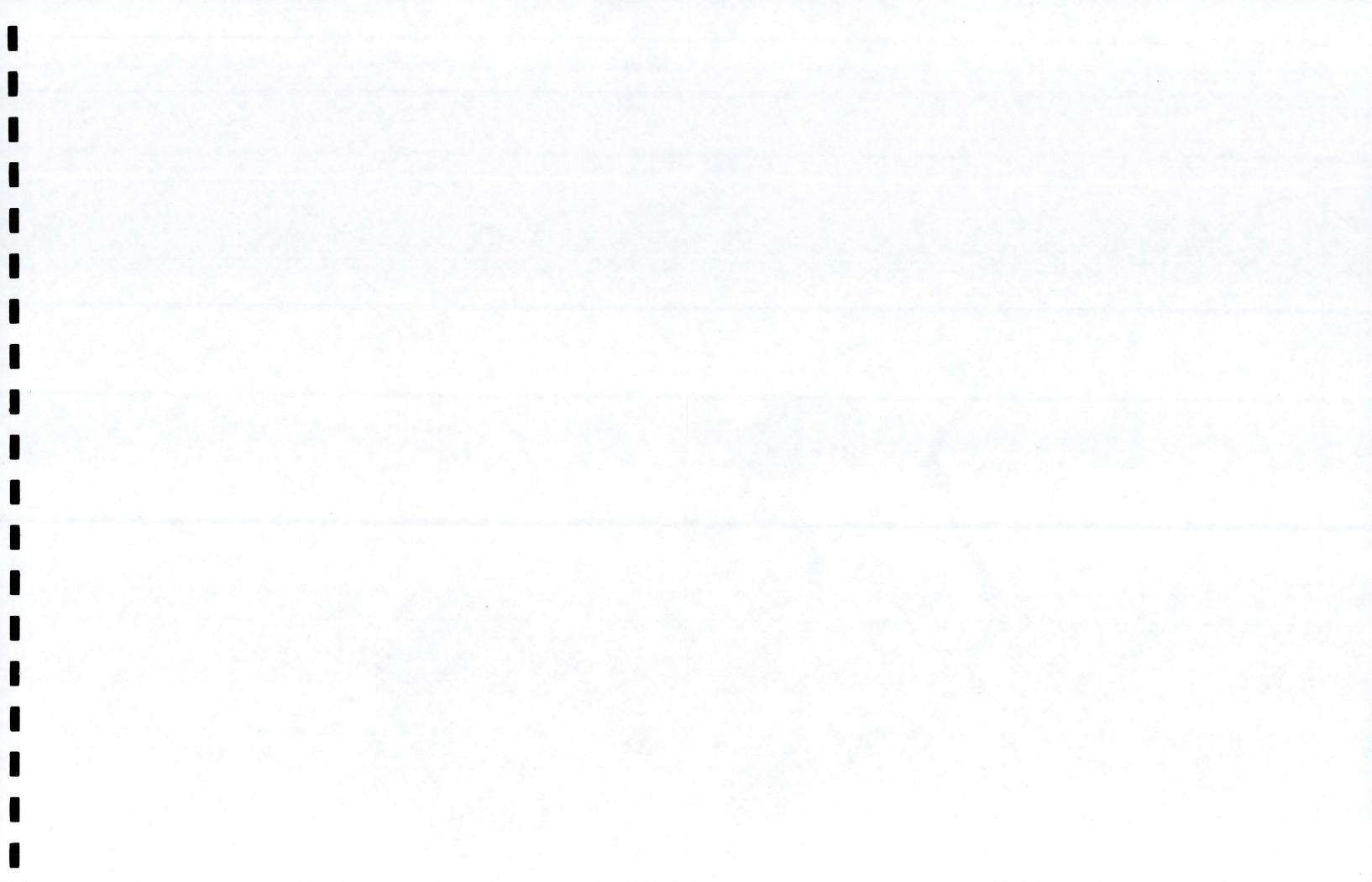


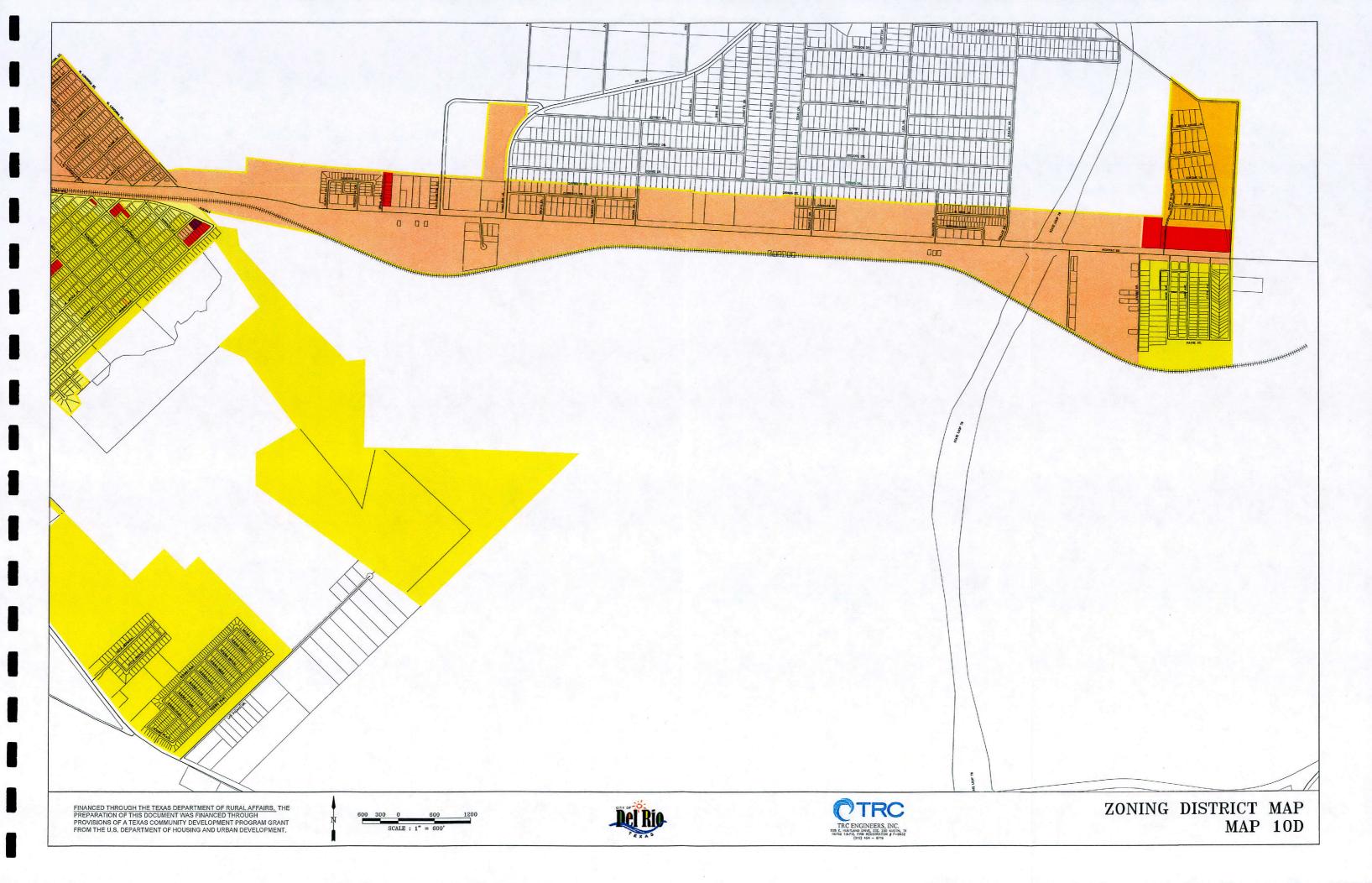














# **APPENDIX I**

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# PARKS, RECREATION AND OPEN SPACE MASTER PLAN

2011-2020 for the CITY OF DEL RIO









Prepared by:

TRC Engineers, Inc., and the City of Del Rio Parks and Recreation Department



T.B.P.E. Firm Registration #F-8632

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#### INTRODUCTION

Del Rio is located in Val Verde County on the United States-Mexico border, midway between Padre Island and Big Bend National Park. The City is eight miles south of Amistad national Recreational Area, which surrounds the United States portion of Lake Amistad formed by the Rio Grande, Pecos, and Devil's Rivers, with 850 miles of shoreline.

Del Rio is immediately across the International Bridge from Ciudad Acuña, Mexico and is seven miles west of the Air Education Training Command's Laughlin Air Force base. It is on U.S. Highway 90, running east-west and U.S. 277, running north-south. It sits 150 miles southwest from San Antonio and 154 miles south of San Angelo. It is served by Amtrak. Del Rio is the largest and fastest growing city in Val Verde County.

**Table 1 - Demographics** 

Tubic I Delliog	, rupines	
Population, 2000	33,867	
Population, 2009	36,676	
Population Change, 1990 - 2000	3,162	10.3%
Population Change, 2000 - 2009	2,809	8.3%
Hispanic population	31,153	82.0%
Black population	509	1.3%
Median Household income	\$34,655	
High School graduates	13,812	36.3%
Bachelor's Degree	3,033	8.0%
Population below poverty line	9,313	24.5%
2008 unemployment	957	6.2%

Source: U.S. Census 2000 and Census Estimate 2008

The Texas Water Development Board (TPWD) published in 2000 indicated that by 2020 Del Rio would have a population of 40,050. Current population estimates for 2009 show that Del Rio is increasing towards this projection at the predicted rate.

The park system in Del Rio is developed and run by the parks and recreation department (PARD). Activities of the department are guided by the appointed Del Rio City Council Board. Del Rio PARD not only manages the park properties, but provides a variety of recreation programs for the community residents. The San Felipe Creek Commission works with city staff and the PARD to further enhance parks and recreation along San Felipe Creek.

#### PLAN DEVELOPMENT PROCESS

In July 2010, TRC Engineers, Inc. completed a parks and recreation survey. Using the results of the survey, the PARD Director and the planning staff from TRC Engineers, Inc.

worked as a planning team to craft the master plan components following the outline of this report.

Previously crafted city planning and design documents, shown below, were referenced prior to beginning concept development. Sections of these plans will be referenced for use in this planning document. These documents include:

- Del Rio Comprehensive Plan, 2008
- Del Rio Joint Land Use Study, 2008
- San Felipe Creek Vision Plan, 2007
- City of Del Rio Existing Land Use Maps

# PARK LANDS AND RECREATION FACILITIES

#### **FACILITY CLASSIFICATIONS**

The City of Del Rio currently has 25 parks and 6 special use facilities consisting of approximately 140 acres. For future planning purposes the parks in Del Rio will be distinguished by the following categories and definitions:

- Mini-park is used to address limited isolated or unique recreational needs. They are
  often used where larger land tracts are unavailable. Size ranges from 2500 square feet to
  one acre.
- Neighborhood park is the basic unit of the park system, which serves as the recreational and social focus of the neighborhood. Focus is on informal recreation, whether active or passive. Neighborhood parks generally range from one to ten acres. Anything smaller is considered a mini park. Any neighborhood block within the City should not be more than half a mile from a neighborhood park (or parks with residential-use recreational facilities), and the route from each block to a park should be uninterrupted by non-residential roads or other barriers.
- Community park serves multiple community-based needs as well as preserving unique landscapes and open spaces. Size ranges from ten to fifty acres. These parks are not defined as much as size as they are by functions for the majority of the community.
- School park depending upon circumstances, combining parks with school sites can fulfill the space requirements for other classes of parks.
- Special Use park has a single purpose or specialized recreation activity. Single-activity sport complexes are included in this category.

#### **INVENTORY**

Table 2 on the next page provides the inventory of the public recreation facilities for Del Rio.

Table 2 - Del Rio Parks Inventory

Site	Property Owner	Facility	Number	Condition
14th Street Park	City of Del Rio	Park Benches	3	Excellent
		Playscape	1	Excellent
		Basketball Court	1	Good & Fair
		Trash Cans	2	Good
Abe Barrera	City of Del Rio	Volleyball Courts	1	Poor
Memorial Park		Picnic Tables	4	Fair
		BBQ Pits	3	Poor
		Trash Cans	4	Fair
		Swing Set	1	Poor
Agarita Walking	City of Del Rio	Open Space		
Trail		Walking trail	1	Good
		Bench	1	Excellent
		Playscape	1	Excellent
		Light Posts	6	Good
		Trash Cans	4	Fair
		Water Fountain	1	Good
American G.I.	City of Del Rio	Open Space		
Forum		Picnic Pavilions	4	Good
		Stone Gazebo	1	Fair
		Park Benches	8	Fair
		Trash Cans	2	Good & Fair
		Picnic Tables	5	3 Good, 2 Fair
		Water Fountain	1	Poor
		BBQ Pits	5	4 Fair, 1 Poor
		Basketball Court	1	Fair & Poor
		Swing Sets	2	Fair & Poor
		Slide	1	Fair
		Light Posts	5	Good
Blue Hole	City of Del Rio	(Facilities included in	Moore Park cou	nt)
Blue Star Park	City of Del Rio	Trash Cans	1	Good
Brown Plaza	City of Del Rio	Park Benches	26	Good
		Trash Cans	4	Good
		Brick Fountains	2	Good
		Light Posts	7	Good

Site	Property Owner	Facility	Number	Condition
Buena Vista Park	City of Del Rio	Open Space		
		Park Benches	17	16 Good, 1 Poor
		Picnic Tables	5	2 Excellent, 3 Good
		Playscape	1	Excellent
		Swing Sets	2	Fair
		Slides	3	2 Excellent, 1 Fair
		Trash Cans	9	2 Good, 7 Fair
		BBQ Pit	1	Good
		Covered Pavilion	2	Excellent & Good
		Frisbee Golf Course	1	Good
		Rest Rooms	2	Good
		Monkey Bars	1	Fair
		Pool w/ Bathhouse/Restroom	1	Excellent
		Baseball Field	1	Fair & Poor
		Tennis Courts	2	Poor
		Water Fountain	1 .	Fair
Camp Del Rio	City of Del Rio	Walking trail		Poor
		Soccer Field	1	Fair w/ Poor Goal Posts
		Bleachers	4	Good
		Trash Cans	3	Good
Carranza Park	City of Del Rio	Open Space		
		Hike & Bike Trail		Fair
		Rest Rooms	1	Good
		Pavilion	1	Excellent
		Playscape	1	Excellent
		Basketball Court	, 1	Excellent
Crestline Park	City of Del Rio	Open Space		
		Park Benches	2	Poor
		Playscape	1	Excellent
		Slide	1	Fair
		Swing Set	1	Fair
		Trash Cans	2	Good
		BBQ Pit	1	Good
		Picnic Table	1	Good

Site	Property Owner	Facility	Number	Condition
Del Rio Lions Park	City of Del Rio	Hike & Bike Trail		Good
		Ring Set	1	Excellent
		Park Benches	6	5 Excellent, 1 Poor
		Playscape	1	Fair
		Light Posts	12	Good
		Trash Can	1	Fair
		Picnic Tables	2	Fair
		Water Fountain	1	Fair
Greenbelt Park	City of Del Rio	Flagpole	1	Good
		Park Benches	6	Fair
		Trash Cans	2	Fair
		Picnic Tables	3	Fair
		Basketball Court	1	Good & Fair
		Swing Set	1	Fair
		Slide	1	Fair
Greenwood Park	City of Del Rio	Open Space	B - 3 - 3	
		Park Benches	12	Good
		Trash Cans	5	Fair
		Stone Gazebo	1	Good
Moore Park	City of Del Rio	Open Space		
		Walking trail		Good
		Park Benches	13	11 Good, 2 Fair
		Trash Cans	14	8 Good, 6 Fair
		BBQ Pits	14	9 Good, 4 Fair, 1 Poor
		Picnic Tables	25	24 Good, 1 Fair
		Basketball Court	0.5	Poor
		Pool w/	1	Excellent
		Bathhouse/Restroom		
		Volleyball Courts	2	Poor
		Water Fountain	1	Poor
		Dumpster	1	Good
Riverside Park	City of Del Rio	Along Creek		

Site	Property Owner	Facility	Number	Condition
Romanelli Park	City of Del Rio	Open Space		
		Stone Monuments	6	Good
		Flagpoles	3	Good
		Park Benches	5	Excellent
		Trash Cans	4	Fair
		BBQ Pits	4	Fair
		Picnic Tables	5	Excellent
Rotary Park	City of Del Rio	Open Space		7. 13. g 7. e L
		Covered Pavilion	1	Good
		Park Benches	7	3 Fair, 4 Poor
		Trash Cans	4	3 Good, 1 Fair
		Large BBQ Pit	1	Good
		BBQ Pits	4	Good, Fair, 2 Poor
		Picnic Tables	17	Fair
		Playscapes	2	Excellent & Poor
		Basketball Court	1	Good
		Volleyball Courts	1	Good
		Soccer Field	1	Poor
San Felipe Lions	City of Del Rio	Open Space		
Park		Picnic Tables	6	4 Good, 2 Fair
		Trash Cans	6	Good
		Playscape	1	Good
		Swing Set	1	Fair
Severiano Perez Park	City of Del Rio	Open Space		
Way		Park Benches	4	1 Good, 3 Fair
		Trash Cans	3	Good
		BBQ Pits	2	Good & Fair
		Picnic Table	2	Good
		Water Fountain	1	Poor
		Playscapes	2	Excellent
		Swing Set	1	Fair
		Slides	1	Fair
		Light Posts	3	Good

Site	Property Owner	Facility	Number	Condition
Skate Park	City of Del Rio	Skate Course		Good
		Walking trail		Poor
		Basketball Court	1	Fair
		Park Bench	1	Poor
		Trash Cans	2	Fair
Star Park	City of Del Rio	Walking trail		Good
		Park Benches	13	7 Good, 6 Fair
		Trash Cans	2	Good
		Light Posts	4	Good
		Pavilion	1	Good
		Flagpole and Monument	1	Good
State Park	City of Del Rio	(Facilities included in Moo	ore Park cour	nt)
UCO Park	City of Del Rio	Open Space		
		Park Benches	7	5 Fair, 2 Poor
		Trash Cans	8	1 Good, 7 Fair
		BBQ Pits	2	Fair
		Picnic Tables	3	Fair
		Playscape	1	Good
		Basketball Courts	2	Good & Fair
		Baseball Field	1	Good
		Light Posts	4	Good
		Pavilions	2	Fair
		Monkey Bars	1	Poor
		Swing Set	1	Poor
		Rest Rooms	1	Fair
		Bleachers	6	1 Good, 5 Fair
West Martin Park	City of Del Rio	Park Benches	10	3 Good, 7 Fair
		Trash Can	1	Fair
		Picnic Table	1	Fair
		BBQ Pit	1	Fair
		Swing Sets	2	Good
		Basketball Court	1	Good & Fair
		Monkey Bars	1	Good
		See-Saw	1	Good
		Pavilion	1	Good
		Water Fountain	1	Poor

**Special Use Facilities:** 

Site	Property Owner	Facility	Number	Condition
Amphitheater	City of Del Rio	Park Benches	4	1 Excellent, 3 Good
		Trash Cans	2	Good & Fair
		Rest Rooms	1	Good
		Picnic Tables	3	Excellent
Chihuahua Soccer Field	City of Del Rio	Soccer Field	1	Good
Hogan Baseball Park	City of Del Rio	Baseball Field	1	Good
		Trash Cans	2	Fair
		Dumpster	1	Good
		Bleachers	4	Good w/ Fair Siding
Joe Ramos Gym	City of Del Rio	Basketball Court	1	Excellent
		Cafeteria	1	Excellent
		Recreation Room	1	Excellent
Pop Word Field	City of Del Rio	Baseball Field	1	Good
		Trash Cans	2	Fair
		Water Fountain	1	Poor
		Bleachers	6	2 Good, 4 Poor
		Rest Rooms	1	Fair
Roosevelt Baseball	City of Del Rio	Baseball Field	1	Good
Field		Concession Stand	1	Fair
		Rest Rooms	1	Fair
		Bleachers		Poor

Source: 2010 Park Condition Survey conducted by TRC Engineers, Inc.

# **FACILITY ASSESSMENT**

The City of Del Rio currently has 25 parks and 6 special use facilities:

14th Street Park – a mini-park serving the northern area of downtown Del Rio. The location of this park is within walking distance of many residents of the City. The park hosts a recently added playscape and an asphalt basketball court making the park suitable for citizens of all ages.

Abe Barrera Memorial Park and San Felipe Lions Park - San Felipe Lions Park is host to many of the City's large events including Memorial Day and Fourth of July celebrations. This park is located along the widest portion of San Felipe Creek at the dam, creating a large natural swimming area. A new playscape area has recently been installed at the entrance to the park. Abe Barrera Park is an older mini-park that sits adjacent to San Felipe Lions Park. Abe Barrera Park is one of the older parks in the City, and Figure 1 - San Felipe Creek at San Felipe Lions Park



maintenance of the park has become overlooked, possibly because the larger and more frequently used San Felipe Lions Park requires more attention and upkeep. This park has an area for sand volleyball, as well as a playscape area, but the equipment has been removed. All equipment in this park is in fair or poor condition.

Agarita Walking Trail – a recently added walking trail serving the northern-most residents of Del Rio. This park consists of a one-half mile asphalt walking/running trail circling an open brush covered area. A new playscape has been recently added at the entrance of the walking trail, giving the area more amenities other than the trail.

American G.I. Forum and Pop Word Field – a neighborhood park that provides a gathering area for the southeastern part of the City. This park provides many amenities for citizens of all ages, including a gazebo, barbeque and picnic areas, playscapes, and a basketball court. Some of these amenities have are showing signs of use and are in need of maintenance or replacement. Pop Word Field is a little league baseball park that resides on the same lot as the American G.I. Forum Park. Pop Word Field is one of the few parks in Del Rio that has an old, outdated lighting system.

Blue Hole Park, Moore Park, State Park and Hogan Baseball Park – Many of the parks serving the community are focused along and around San Felipe Creek. Moore Park, Blue Hole Park and State Park cover an area of 15 acres with San Felipe Creek as their focal point. Throughout the year, these parks are the most frequently used by the residents of Del Rio coming to swim in the creek. Moore Park has many more amenities, including a city owned swimming pool with locker rooms and a bathhouse in very good condition. Hogan Baseball Park is a pony league sized baseball field that is located beside Moore Park. The field is in good condition with new lighting, and hosts many of Del Rio's little league games.



Figure 2 - Brown Plaza

Brown Plaza – This plaza located in the southern area of the city is one of the original parks of Del Rio. Brown Plaza was built specifically to create a gathering place for the community of San Felipe and it continues to serve as a cultural reminder of Del Rio's rich Mexican heritage. Residents view this plaza as the heart of San Felipe, and it continues to host the Cinco de Mayo and Dies y Seis de Septiembre celebrations each year.

Buena Vista Park and Del Rio Lions Park – Buena Vista Park is a community park covering 14 acres and provides the most amenities of any park in the Del Rio park system. Including a large open space, this park includes a Frisbee golf course, tennis courts, picnic area, playscape areas, a baseball field and a large swimming pool with bathhouse. This park is frequently used by residents for its many amenities, but the location is more suited for the northern residents of the City. Del Rio Lions Park is a large open park that sits adjacent to Buena Vista Park. Del Rio Lions Park consists of a 0.79 mile hike and bike trail that circles an open area. The Del Rio Lions Club building sits at the entrance to the park and has old, worn playscape equipment in need of upgrades.

Camp Del Rio, Joe Ramos Gym and Romanelli Park — Romanelli Park was constructed along San Felipe Creek for the fallen members of the fire department, law enforcement and military of Del Rio. This park consists of a large open area that focuses on a monument area in the center of the park. Unfortunately, the monuments in this park are frequent victims to vandalism, and the City believes that this park has the ability to



Figure 3 – San Felipe Creek at Romanelli Park

become nice if the vandalism can be controlled. Next to Romanelli Park sits Camp Del Rio, a soccer field and gravel walking path open to the community. The field and walking trail are in poor condition and in need of repair and maintenance. Joe Ramos Gym is operated by the City Parks Department and is a center for a large range of ages. The gym is host to many sports camps for younger age groups, and the cafeteria and recreation area is a common gathering place for older age groups.

Carranza Park – This city park is currently under construction on the east side of the City. This park is intended to focus on and serve residents from the ages five through twelve. New restrooms have been constructed, along with a concrete pavilion in the center of the park and a basketball court. There is a large amount of open area remaining in the park leaving room for more amenities if needed.

Crestline Park – Crestline Park is a neighborhood park at a cul-de-sac serving the Highland Park subdivision. A new playscape has recently been installed, along with a picnic and barbeque area. A gravel hiking trail begins at the edge of the park and continues into the brushy, undeveloped area to the northeast of the park.

Greenbelt Park – This mini-park was constructed along Canon Street on the southwest side of the City. This park has an asphalt sidewalk walkway and worn swing and slide equipment. A basketball court is tucked in between trees in good condition. There is limited room to add amenities to this park.

Greenwood Park – This neighborhood park is a very well kept park located near the original downtown area of the City. A stone gazebo and park benches allow for quiet areas for downtown visitors to relax.

Riverside Park and Rotary Park – At the southern part of the city along San Felipe Creek, many areas of land have been given to the City of Del Rio Parks Department to maintain. These areas lie within the floodplain of the creek and do not allow home construction. Riverside Park consists of areas along the creek that were given to the city to maintain. At this area is a large amount of Carrizo Cane which blocks the view of the creek. Rotary Park is a neighborhood park that sits just north of Riverside Park along the creek. Amenities of Rotary Park include large barbeque pits and picnic areas, playscapes, a basketball court, a sand volleyball court and a soccer field. This park is frequently used, and the amenities are beginning to show the signs of wear. Carrizo Cane continues along the creek through the park, blocking the creek from view and from resident's use.

Severiano Perez Park Way and Skate Park – Severiano Perez Park Way and Skate Park sit along San Felipe Creek and are attached to each other. These parks host many amenities

including a basketball court, playscape areas, barbeque and picnic areas and a skate park area.

**Star Park** – This neighborhood park is one of the only parks that serves the downtown area north of U.S. Highway 90. A one-fifth mile track surrounds a large open area and concrete pavilion. A stone monument and flagpole is dedicated to Laughlin Air Force Base in the center of the park.

**U.C.O.** Park – This park is a community park covering 6 acres serving the western area of the City. In the center of the park is a pony league size baseball field that is host to many of Del Rio's little league games, along with two basketball courts. Other amenities at the park include a playscape area, barbeque and picnic areas and a large open area. This open area gives the park an ability to add more amenities if needed.

West Martin Park – This mini-park is within walking distance for many residents in the southwestern area of the City. With a playscape area, a basketball court and a barbeque and picnic area, this park is suitable for citizens of all ages in the neighborhood.

Amphitheater and Creekwalk – San Felipe Creek is a designated natural area that the City of Del Rio has continuously preserved and focused parks upon. The Creekwalk was constructed as a stone walk path from San Felipe Lions Park to State Park. At many areas along the creek, the Creekwalk was intended to create stone retaining walls to control erosion along the creek as well as provide areas for walking and swimming in the creek. These retaining walls were not properly designed and recent flooding



Figure 4 - Amphitheater

along the creek has caused erosion problems to continue and the retaining wall to fail in places. The Amphitheater was constructed along with the Creekwalk and serves as an area for the City to hold special events, such as concerts and holiday celebrations.

Chihuahua Soccer Field and Roosevelt Baseball Field – The Chihuahua Soccer Field is run by the City of Del Rio Parks Department and is open to the public. The Roosevelt Baseball Field is also run by the Parks Department, and serves as the baseball field for Del Rio High School, as well as the Del Rio little league.

#### OTHER PROVIDERS

Val Verde County and the San Felipe Del Rio Consolidated Independent School District are the only other providers of public recreation facilities in Del Rio. Del Rio PARD and San Felipe Del Rio CISD have a unique and positive relationship to allow joint use of recreation facilities owned by each organization. The school athletic teams use city park facilities for practice and competition. San Felipe Del Rio CISD schools are:

- 1. Irene C. Cardwell Elementary
- 2. Buena Vista Elementary
- 3. Dr. Lonnie Green Elementary
- 4. Dr. Fermin Calderon Elementary
- 5. East Side Elementary
- 6. Garfield Elementary
- 7. Lamar Elementary
- 8. North heights Elementary
- 9. Ruben Chavira Elementary
- 10. San Felipe Memorial Middle School
- 11. Del Rio Freshman School
- 12. Del Rio High School

#### **FESTIVALS AND OTHER EVENTS**

Del Rio hosts a range of festivals and event celebrations throughout the year. The events take place at various venues. The list below details events:

- Fourth of July Celebration is a large citywide event that includes a parade, vendor and food area, ceremonies at the Amphitheater and fireworks
- George Paul Memorial Bullriding Superbull takes place every May. This is the largest bull riding event in the United Stated, drawing participants from around the nation
- Oktoberfest Celebration takes place each September at the Whitehead Memorial Museum
- Veterans Day is celebrated each year with a parade and memorial service
- Cinco de Mayo is held at Brown Plaza every year with food, crafts, gifts and other events to celebrate the Mexican culture
- Diez y Seis de Septiembre is the anniversary of Mexican Independence from Spain and is celebrated at Brown Plaza with a carnival and a variety of vendors and activities
- Fiesta de Amistad promotes the friendship between sister cities Del Rio, Texas and Ciudad Acuña, Mexico. The celebration started as Neighborhood Day in 1956 and grew into a weeklong display featuring the only parade in the world that starts in one country and ends in another
- Winter Visitor Season is a collection of events to welcome visitors during the winter months. Many people call Del Rio home each winter to escape the harsh northern

winters and the Winter Visitor Committee sponsors a range of events to make them welcome

• First Friday Art Walk was established to promote art at each of Del Rio's art galleries

#### **GOALS AND OBJECTIVES**

Based on the analysis of Del Rio's existing facilities and the projected growth in the community, the general goals for the Del Rio Parks Recreations and Open Space development are:

- Create a convenient and coherent park and recreation system to serve citizens of all ages
- Plan for future park development and for preservation of open space resources
- Preserve and maintain San Felipe Creek for the benefit of citizens and the local creek ecosystem

The Committee felt that the development of Del Rio's park system should focus on these specific goals:

- Update recreation facilities, including active, passive and informal play areas, as well as sports and athletic facilities
- Conserve natural resources through the preservation of areas along San Felipe Creek
- Promote joint planning development and maintenance with San Felipe Del Rio CISD, San Felipe Creek Commissioners and recreation groups
- Focus on providing recreation activities for seniors and youth
- Craft a long range plan based on public need, tourism and potential to attract quality business growth
- Use a phased parks plan development to improve the quality of life for Del Rio residents
- Make park facilities easily accessible from any part of the community including projected future growth areas
- Continue to improve the image of Del Rio as a quality growth community
- Promote sports and special events (tournaments, art and crafts festivals, concerts, etc.)
- Identify general growth areas of Del Rio, which require park facilities, and establish zones based on neighborhood unity and physical barriers to park facilities
- Update this plan every two years and develop a new plan every five years to be adaptable to change
- Identify funding mechanisms for implementation of the plan
- Improve areas for passive recreation
- Improve safety and security in all existing parks
- Renovate and add rest rooms in all parks as needed

# **NEEDS ASSESSMENT**

#### **DEMAND BASED ASSESSMENT - PARKS SURVEY**

An assessment of the detailed survey conducted in 2011 was the most significant tool to measure parks and recreation needs for Del Rio. The tables below summarize the results of the 108 completed surveys. The questionnaire listed 19 activities. Respondents were asked to indicate what they are most involved in or would be most involved in participating. Table 6.6 shows the number of responses to each activity.

Table 3 – Recreation Preferences

Rank	Activity	Responses
1	Walking/Jogging	79
2	Barbeque/Picnic	73
3	Swimming	72
4	Fishing	49
5	Camping	47
6	Bicycling	37
7	Playground Equipment	31
8	Volleyball	27
9	Youth Baseball	24
10	Basketball	22
11	Youth Football	22
12	Soccer	21
13	Hiking	21
14	Frisbee Golf	9
15	Tennis	6
16	Softball	3
17	Golf Range	1
18	Handball	1
19	Horseback Riding	1

In the survey, the respondents were asked to rank the need for additional outdoor and indoor recreation facilities on a scale from one to five, with one being 'Least Important' and five being 'Most Important'. From these responses, a score was generated for each recreation facility and ranked in order. Table 6.7 summarizes the response to facilities needed in Del Rio.

Table 4 - Recreation Facilities Needed in Del Rio

Rank	Amenity	Score
1	Public Rest Rooms	450
2	Trails (Walking/Jogging)	393
3	Covered Picnic Areas	388
4	Swimming Pool	384
5	Bicycle Trails	366
6	Baseball Fields	357
7	Playground Areas/Playscapes	354
8	Softball Fields	342
9	Practice Fields	330
10	Soccer Fields - Full Size	325
11	Football Fields	323
12	Event Pavilion - Large	320
13	Park Concessions (food, etc.)	319
14	Basketball Courts - Indoor	314
15	Basketball Courts - Outdoor	297
16	Soccer Fields - Indoor	296
17	Volleyball Courts - Indoor	293
18	Volleyball Courts - Outdoor	289
19	Tennis Courts	243
20	Frisbee Golf	192

#### RESOURCE-BASED NEEDS ASSESSMENT

The resource-based approach to needs assessment uses existing opportunities already within the community. Other open space in the city includes:

- The FEMA buyout properties that were given to the City PARD in the southern portion of town along San Felipe Creek.
- One lot at the junction of Noriega Street and Rosita Street owned by the City of Del Rio.
- Vacant lots in the western areas of town that are becoming developed near the intersection of Arrowhead Trail and Running Bear Trail and the intersection of Lenora and Dove Avenues.
- Street, railroad and highway rights-of-way and utility easements.
- Areas lying in the floodplains where construction is not possible.

# STANDARDS-BASED NEEDS SURVEY

A classification scheme of the National Recreation and Park Association (NPRA) was used as the basis for determining park standards. Acreage and service area coverage were chosen as standards for the minimum level of service for each of the park classifications. These are shown in Table 4. In addition there are other factors – accessibility, quality of facilities, attractiveness of the setting – which determine the adequacy of individual parks. Park classifications are Mini-Park, Neighborhood Park, Community Park and Special Use Park.

A preliminary standards list is developed early in the planning phase to guide concept development, and augmented as the overall concepts are refined. They are based on expressed needs, past experience, population projections and knowledge of other community trends.

A park system with these classifications is currently in use by the City of Del Rio. Mini-parks are intended to serve a close community area where space is limited, and are within walking distance of 1/8 mile. Currently, Del Rio has four parks in the mini-park category. With a need of parks in the central downtown area of the City, mini-parks have the ability to be effective in small vacant lots that are available.

Many of the City of Del Rio's parks fall within the neighborhood park classification, the basic unit of the park system. Neighborhood parks are intended to serve the immediate residential area and are within walking or cycling distance of 1/4 mile. Neighborhood parks have the ability to serve a large number of residents when they are placed strategically. As the City continues to expand to the north and west, neighborhood parks should be planned along with these new subdivisions, rather than added as an afterthought.

Table 5 - Recreation Facilities Needed in Del Rio

Standards	Mini	Neighborhood	Community	Special Use
Acreage	<1	1-10	10-50	Variable
Service Area (miles)	1/4	1/2	1	City
Appropriate Facilities:				
Baseball Fields		X	X	X
Basketball Goals	X	X	X	X
Football Fields				X
Golf Course				X
Group Pavilion		X	X	
Indoor Facility				X
Picnic Tables	X	X	X	,
Playground Area	X	X	X	
Practice/Open Field	X	X	X	
Rodeo/Equestrian Facility				X
Soccer Fields		X	X	
Softball Fields		X	X	
Swimming Pool			X	
Tennis Courts		X	X	
Trail (Walk/Jog/Bike)		1/4 mile	1 1/2 mile	1-2 miles
Volleyball		X	X	X
Restroom		X	X	X
Security Lighting	X	X	X	X
Natural Open Space Area	1	X	X	
Parking	None	0-40 spaces	50-100 spaces	Variable

Source: TRPA Standards

Community parks serve a larger area of town or in some cases the entire community, with larger and more diverse facilities. For Del Rio's size, a service area of one mile was used. Many of the City parks have the adequate size and diversity of facilities to be considered as community parks. Each of these community parks receives a large amount of use from the public, and some of the facilities are beginning to show the signs of wear, and are in need of updating.

A visual analysis of the distribution of Del Rio's parks indicate a lack of mini and neighborhood facilities in the central downtown area and the need to provide new parks to serve both neighborhood and community park purposes for the expansion and new development in all directions of the City.

# MASTER PLAN CONCEPTS

The primary concepts for Del Rio's park system are presented according to the park classification system earlier, along with related features. The Key Concepts section below summarizes the plan strategy.

#### **KEY CONCEPTS**

The existing park system will be updated to meet the residential recreation needs. This concept will include updating active, passive and informal play areas as well as all sports and athletic facilities and special use parks. A phased updating plan will be created in order to update the amenities in the quickest and most efficient way possible.

Special use parks will also be updated to meet the residential recreation needs. This will include updating all outdated, inefficient lighting systems at the sporting facilities and updating the fields and facilities themselves.

San Felipe Creek will be improved and maintained to meet the vision plan of the San Felipe Creek Commission, the City of Del Rio and the residents. The existing retaining wall and Creekwalk system has become damaged and is posing a safety threat to the community. This area must be temporarily repaired while a new system is engineered and constructed. Currently the San Felipe Creek Commission is in development of the San Felipe Creek Master Plan. This Master Plan is examining multiple options, including riparian restoration and some constructed improvements, to redesign the San Felipe Creekwalk area. Also, a system will need to be created and put into effect to eradicate the non-native invasive vegetation, and preserve the Devil's River Minnow endangered species. Once completed, the San Felipe Creek Master Plan will serve the purpose of guiding the reconstruction and development of the San Felipe Creek area.

Laughlin Air Force Base has been an important figure in the continued growth of the Del Rio area. Currently there is one ballfield and one swimming pool on base and Laughlin personnel have expressed interest in coordination with the City of Del Rio about the possibility of expanding recreational facilities to benefit both the residents of the base and Del Rio. The City should continue to coordinate with Laughlin Air Force Base regarding recreational facilities.

Joint Planning, development and maintenance with San Felipe Del Rio CISD, San Felipe Creek Commissioners and recreation groups will be promoted. The City will coordinate park planning and development with the school district, through City Council and School Board workshops and meetings. The City will continue the close relationship with San Felipe Del Rio CISD to allow use of Roosevelt Park and other facilities and allow public use of school recreation facilities. The School District and the City can augment agreements for existing facility use and new facility development, to benefit school programs and the general public. The City should also create a relationship with local churches to provide public access to recreation facilities on church properties. Beginning this relationship will benefit neighborhood zones with limited land available to the parks department. The City will work communicate with all interested parties to identify facilities suitable for joint funding and maintenance.

Pathway connections will be developed to connect neighborhoods to the primary 'nodes' within the city: school, parks, high volume business areas and tourism sites. This will improve health, safety and welfare for residents while increasing the use of parks and local businesses. Additionally, these connections will serve as part of the city infrastructure to attract additional quality growth and tourism to Del Rio. This system will be an ongoing effort to update and connect these systems together throughout the city, with the beginning starting at existing schools and connecting existing sidewalks together.

Gateway features will be developed at the primary entries to the City. Underused city property can be developed for functional park use and city-image enhancement to create a positive impression of Del Rio for the high volume of travelers passing though the city.

#### **EXISTING PARK SYSTEM**

Del Rio currently has 25 parks and 6 special use parks situated throughout the City. Many of these parks are in need of repair.

#### ABE BARRERA PARK

Abe Barrera Park is one of the oldest parks in the City of Del Rio. Since it is located next to the much more heavily used San Felipe Lions Park, it has become overlooked and is in need of repair. The following improvements are recommended for the park:

- Repair existing sand volleyball court and install new posts and net
- Repair or replace existing picnic tables
- Install new barbecue pits
- Repair existing trash cans
- Install and replace existing swing set

#### AMERICAN G.I. FORUM

This park is a good neighborhood park for the southern portion of the City and has many amenities. These amenities should be repaired:

- Repair existing stone gazebo
- Repair existing park benches
- Repair the picnic tables in "fair" condition
- Replace existing water fountain
- Repair or replace barbecue pits
- Repair basketball court surface and install new goal posts and backboards
- Replace existing swing sets new swing sets

Replace existing slide

# **BUENA VISTA PARK**

Buena Vista is a community park that hosts the most amenities of any park in the city. Due to the use of the facility, these improvements are recommended:

- Replace one "poor" park bench
- Replace one "fair" slide
- Repair seven "fair" trash cans
- Replace existing monkey bars
- Repair existing water fountain

# **CRESTLINE PARK**

Crestline Park is situated at the end of a cul-de-sac and boasts a hiking trail. The following are recommendations to update this park:

- Replace existing park benches
- Replace existing slide
- Replace existing swing set

# **DEL RIO LIONS PARK**

This park is located adjacent to Buena Vista Park and is also heavily used.

- Replace existing playscape
- Repair or replace existing picnic tables
- Repair or replace existing water fountain

# **GREENBELT PARK**

This mini-park serves residents in the western area of the City. The following improvements are recommended:

- Repair or replace existing park benches
- Repair existing trash cans
- Repair or replace existing picnic tables
- Replace existing basketball goals
- Replace existing swing set
- Replace existing slide

# MOORE PARK, BLUE HOLE PARK AND STATE PARK

Moore Park shares many qualities with Buena Vista Park in that it is a community park that has many amenities for the residents. These three parks are located together and the park survey included all amenities of the parks as one. Moore Park, Blue Hole Park and State Park are situated along San Felipe Creek and many residents use these areas as swimming holes throughout the year.

- Repair or replace two "fair" park benches
- Repair six "fair" trash cans
- Repair or replace five "fair" and "poor" barbecue pits
- Repair or replace four "fair" and one "poor" barbecue pit
- Repair or replace one "fair" picnic table
- Repair existing basketball court surface and replace existing posts and goals
- Repair existing sand volleyball courts and install new posts and nets
- Replace existing water fountain

# **ROMANELLI PARK**

Romanelli Park is dedicated to members of the armed forces, police department and fire department of Del Rio. This park is a common victim of vandalism and graffiti of the monuments.

- Remove graffiti from monuments
- Install security lights around monuments
- Repair existing trash cans
- Repair or replace existing barbecue pits

# **ROTARY PARK**

This park is located along San Felipe Creek, upstream of where the Creekwalk and retaining wall system begin. There is a large amount of gravel throughout the park which reduces the growth of grass.

- Remove existing gravel throughout park to improve the growth of grass
- Repair or replace three "fair" and four "poor" park benches
- Repair one "fair" trash can
- Repair or replace one "fair" and two "poor" barbecue pits
- Repair or replace existing picnic tables
- Replace one existing playscape
- Repair soccer field surface and replace goal posts

#### SAN FELIPE LIONS PARK

This park also sits along the San Felipe Creek. Only a few items are in need of repair:

- Repair or replace two "fair" picnic tables
- Replace existing swing set

# SEVERIANO PEREZ PARK WAY

This park needs the following improvements:

- Repair or replace three "fair" picnic tables
- Repair or replace one "fair" barbecue pit
- Replace existing water fountain
- Replace existing swing set
- Replace existing slide

# **SKATE PARK**

Skate Park is located beside Severiano Perez Park Way and has the only skate park ramps in the City. Other amenities at the park are in need of repair:

- Re-install walking trail through park
- Repair basketball court surface and replace goals
- Repair existing trash cans

# **STAR PARK**

Star Park is one of the few parks that serves the northern downtown area of the City.

• Repair or replace six "fair" park benches

# **UCO PARK**

This is another community park with a large amount of amenities. Due to the use, these amenities are recommended to be repaired:

- Repair or replace existing park benches
- Repair seven "fair" trash cans
- Repair or replace existing barbecue pits
- Repair or replace existing picnic tables
- Replace basketball goals on one basketball court
- Repair existing covered pavilions

- Replace existing monkey bars
- Replace existing swing set
- Repair existing rest rooms

# **WEST MARTIN PARK**

The following improvements at West Martin Park are recommended:

- Repair or replace seven "fair" park benches
- Repair existing trash can
- Repair or replace existing picnic table
- Replace existing basketball goals
- Replace existing water fountain

#### FUTURE COMMUNITY PARK OPTIONS

As Del Rio's population grows and changes, the recreation needs will change at an equal pace. Beyond a Phase I park plan development, several factors suggest that Del Rio may soon need to consider an additional community park:

- The existing and planned community parks are relatively small for a rapidly expanding city.
- A new community park will reduce the strain on the resources of existing parks.
- Large sport events can bring tourism dollars to the city.
- Business relocations are attracted by parks and recreation systems.

The city's various departments should consider and discuss options for future park land needs on the west side of Del Rio, including

- The development of neighborhood parks in each of the new subdivisions.
- Taking fees in lieu of land as needed to acquire and develop a community-size park on the west side for the future needs of Del Rio including:
  - Sports fields
  - o Sports complex
  - o Sport courts
  - o Multi-use trails
  - Special events
  - o Natural area
- Building neighborhood parks in the north area of Del Rio where future development and expansion is leading.

Special events important to downtown business should not move from downtown, but other events could be held at a newer larger facility to accommodate larger scale events, such as sports tournaments. Such events could significantly benefit the local economy.

Considerations for choosing between the community park development options (and also the type of development) include:

- What land is available for park land dedication from the new subdivisions?
- What land is available in other areas west of Del Rio for a community park?
- What other prospective residential development is likely to occur and in which areas of Del Rio in the next 5-10 years?
- What are the maintenance requirements in each option?
- How will the increased maintenance and operation costs be handled?
- Can recreation and open space partnerships be established with Val Verde County or private developers?
- What type of development fits the Del Rio community demands?
- What type of park and particular amenities will enhance state grant award opportunities?

#### SPECIAL PARKS

Del Rio has six special use parks and sports facilities at many other parks. These facilities are in need of repair and maintenance.

The past few years the City of Del Rio has been in plans to replace the existing outdated lighting system at each of the sporting facilities. Some of these systems have been replaced, while many more are still in need of the newer lights. The following facilities should have a newer, more efficient lighting system installed:

- Baseball field at Buena Vista Park
- Tennis Courts at Buena Vista Park
- Baseball field at UCO Park
- Pop Word Field

Roosevelt Baseball Field is owned and run by the City PARD, but is the home to the Del Rio High School baseball team. This is the largest baseball park in the City and is large enough to host sporting tournaments and events. Recently Roosevelt Baseball Field has hosted two minor league exhibition baseball games, and there are hopes for Del Rio to have its own Pecos League professional baseball team in 2012. The baseball field is kept in good condition however the facilities, including the concession stand, rest rooms and bleachers are in need of repair due to the heavy use throughout the year. In order to host a professional baseball team, Roosevelt Baseball Field must be repaired and expanded.

**Pop Word Field** sees a lot of little league action every year. The park surface is kept in good condition, but other amenities are in need of updating. The one water fountain is in need of replacement, as are four of the wooden bleachers. The bleachers are beginning to sag heavily and should be replaced. The restrooms are also in need of repair.

A common complaint among the citizens of Del Rio is the lack of practice space for sporting events including pee wee football and little league baseball. Fields designed for football and soccer use will increase the amount of open space for games and practices of various sports, and allow the Del Rio National Little League and Youth Football League room to expand as the City population continues to increase. A proposed softball field will allow more practice area for sporting leagues, as well as an opportunity to create recreational sporting leagues for citizens of all ages. A common request heard by the City of Del Rio Parks and Recreation Department is for an indoor soccer facility. Indoor soccer is played on a much smaller court than a regular soccer match and is a much faster game. This facility is not required to be built and played indoors, but a fenced area must be designed for the specific rules of the game. There are many areas at existing City parks that have the ability to be updated into an indoor soccer field. Areas at Rotary Park, American G.I. Forum and Moore Park were noticed to have the ability to house one of these indoor soccer facilities. Finally, the planning committee felt that it was important to emphasize the need for designating and acquiring open space throughout Del Rio to preserve natural areas and allow for future development given the rapid growth predicted over the next ten years.

#### SAN FELIPE CREEK

San Felipe Creek runs through the heart of Del Rio and attracts both tourists and citizens to its banks. This creek attracted the first settlers to develop this unique region. San Felipe Creek continues to be a popular place where people gather together to swim, relax and hold special events.

During the recent flooding of the past few years, the retaining wall and Creekwalk have become damaged and are causing erosion problems. Temporary actions have been taken to repair these damaged areas and to control the erosion, however this portion of the creek will continue to erode during each large event. This constant erosion calls for the City to design a new Creekwalk system. The San Felipe Creek Commission is currently examining multiple options, including riparian restoration and some other construction improvements, to repair and redesign the San Felipe Creekwalk area. In order to design a long lasting system to benefit the community and attract tourists to Del Rio, proper coordination should continue be taken with the San Felipe Creek Commission, an engineering company and with any necessary governmental agency regarding conservation and preservation of San Felipe Creek.

Due to the size of this proposed project, all available grants and funds through state and federal agencies should be sought.

Another widespread problem of San Felipe Creek is the invasive, non-native Carrizo Cane that lines the banks. This vegetation is taking over the habitat and ecosystem of San Felipe Creek by forcing out the natural vegetation. This lack of natural vegetation poses a threat to the Devil's River Minnow, an endangered species that resides in the creek. The San Felipe Creek Commission has developed a San Felipe Creek Vision Plan with recommendations to alleviate this problem. The City should work with the San Felipe Creek Commission as well as Sul Ross State University to implement these actions to eradicate this vegetative species from the region. By doing this, San Felipe Creek can continue to be the focal area of the recreation of Del Rio. The goals and actions for improving San Felipe Creek are:

- Temporarily repair San Felipe Creekwalk and retaining wall to make safe for public
- Restrict public from damaged sections of Creekwalk if necessary
- Begin communication and plans with engineer to redesign San Felipe Creekwalk
- Apply to various agencies, including Texas Parks and Wildlife, for funding for this project
- Construct new Creekwalk
- Begin actions to eradicate Carrizo Cane from San Felipe Creek

#### **PATHWAY CONNECTIONS**

In July 2010, a survey of the existing street system was performed by TRC Engineering, Inc. This street survey included identifying the location of all existing sidewalks throughout the City. These sidewalks were very sparse and the locations varied throughout the city, with the majority surrounding the schools. A trail system development would be an essential part of maintaining and improving the quality of life for current residents, encourage quality business growth and promote tourism.

As part of the Del Rio Parks Master Plan the City will develop trail connections between parks, neighborhoods, schools and high volume business areas. Del Rio's current primary pathway sections are not grouped in a particular layout, rather installed at various parts of the city. The best way to begin the installation of a sidewalk/trail system is to connect the existing sidewalks throughout the city. From this connection, a system of sidewalks can be planned to connect the remaining parts of the city together. In order to create a sustainable, detailed site plan for this system, a more detailed Del Rio Pathways Master Plan should be crafted to determine actual routes, branch pathways, materials, costs and scheduling. Route sections may involve restriping existing roads, expanding road width, widening and extending sidewalks and adding new sections of sidewalks.

# **GATEWAY FEATURES**

Although citywide beautification was not listed as a major priority, members of the planning committee were concerned about Del Rio's appearance to outside visitors as well as the effect of the town's attractiveness on their own quality of life. Enhanced gateway features will be developed at the primary entries of Del Rio. High quality welcoming signs with additional description of Del Rio's uniqueness, such as "Best of the Border", will be displayed. An interesting small park development at these entrances can be functional while serving as a positive image projection for people entering Del Rio.

Informational signage and directional signage throughout the park system should also be improved.

# **PARKS FUNDING**

#### **CURRENT FUNDING SOURCES**

Funding of Del Rio parks comes primarily from the City general fund budget.

Though Del Rio may have a limited capital investment for grant matching, matching value for many communities comes in the form of donated labor, material, equipment use, professional design and donated land. The value of non-parkland (prior to funding) can often be used as part of a community's matching share provided that it is not dedicated as park land until after the grant is awarded. The City should develop a careful strategy to accept parkland as required by ordinance, but delay its dedication as parkland until a plan is in place to fund its development.

The planning committee proposes the following changes to allow a greater cost recovery for the Del Rio PARD:

- Establish a Park Land Dedication Ordinance to increase the park land dedication. This
  will help sustain the additional responsibilities of the department for the new land and
  development.
- Revise City policy to allow PARD to collect use fees for all special events. The new fees
  will, at a minimum, cover the cost to PARD for the costs of preparation and clean-up for
  the events.
- Update contracts with park user groups to more clearly define responsibilities.
- Set appropriate fees.

#### POTENTIAL FUNDING SOURCES

Other potential funding sources for future park development, maintenance and operations include:

#### A. Park Facilities and Development

- Local contributors (major employers, utilities, individual donations)
- Contributions from other user groups, such as youth leagues and service organizations
- Related programs (crime, education, youth programs), usually funded at the regional or state levels
- Texas Parks and Wildlife Department Texas Recreation & Parks Account (Outdoor and indoor programs)
- Private foundations and trusts, primarily those within the region
- RC & D, Natural Resources Conservation Service
- City General Fund or Capital Improvements Program
- General Obligation Bonds or Certificates of Obligation
- School district contributions

• Sul Ross State University research grants

# B. Landscaping and Other Beautification

- Texas Department of Transportation (along state maintained roadways)
- Texas Forest Service
- Local Garden Clubs

# C. Donated Labor and Materials

See Table 5.10 for suggested resources that might provide support for materials and/or labor for park development.

#### D. Other Resources

Other contacts for information and technical assistance on park and recreation planning, development and programming include various state and federal agencies as well as local universities and those universities with park/recreation programs. Technical assistance and referral may also be available at the Middle Rio Grande Development Council.

- Federal Agencies
   Natural Resources Conservation Service Department of Agriculture (formerly Soil Conservation Service)
- State Agencies
   Texas Parks & Wildlife Department
   Local Planning Assistance Program
   4200 Smith School Road
   Austin, Texas 78744

Texas Department of Water Resources P.O. Box 13087, Capitol Station Austin, Texas 78711 Universities
 Sul Ross State University
 Natural Resource Management
 RAS Center Box C-16
 Alpine, Texas 79832

Texas Tech University
Department of Park Administration
Lubbock, Texas 79406

University of North Texas Division on Recreation & Leisure Studies Denton, Texas 76203

Texas A&M University
Department of Recreation, Park
and Tourism Sciences
College Station, Texas 77843

Southwest Texas State University Physical Education Department Jowers Center San Marcos, Texas 78666

Park and Recreation Organizations

Additional guidance and resources are provided in the <u>Park, Recreation, Open Space</u> and <u>Greenway Guidelines</u>, published by the National Recreation and Park Association (NRPA). The head office is located at:

National Recreation and Park Association 22377 Belmont Ridge Road Ashburn, Virginia 20148 Phone: (800) 626-6772

# PRIORITIES AND IMPLEMENTATION

The proposed implementation of this plan considers the following important factors to determine facility priorities and project phasing:

- Recreation elements of high need which will also benefit the community desires for increased tourism, city image enhancement and quality business growth
- The master plan concepts for integrated development
- The ranking of recreation elements in the Public Parks Survey
- Other recreation needs identified during the planning process

#### **PRIORITIZATION**

Table 6 shows the final park facilities prioritization:

Table 6 – Recreation Facilities Neededo

Master Plan Priority	Amenity		
1	Swimming Pool		
2	Trails (Walking/Jogging/Bicycle)		
3	Rest Rooms/Rest Room Improvements		
4	Softball Fields		
5	Sport Complex and Practice Fields		
6	Football Fields		
7	Soccer Fields		
8	Tennis Courts		
9	Open Space		
10	Covered Picnic Areas		

#### **IMPLEMENTATION**

Refer to precious Concepts section for a detailed description of each of the development items below.

# PHASE I (0-5 YEARS)

Short-term objectives for addressing the goals are outlined in the following five-year strategy of Phase I. These objectives focus primarily on establishing the framework for updating and renovating the existing park system in Del Rio, and conserving the San Felipe Creek area. The City of Del Rio has done a very good job of expanding the existing park system as the population

has increased throughout the years, however many of these existing parks have become poor condition due to constant use. This five year plan will include defining the responsibilities of the Park board and any other park entities, funding, maintenance and renovation plans and coordination among the City, School, San Felipe Creek Commissioners and other recreation entities.

### Year 1 - 2011-2012

- Prepare local citizenry, City officials, Chamber of Commerce and other interested parties for the maintenance of current and future recreational facilities.
- Install new lighting where necessary at existing sports and recreational facilities.
- Adopt and begin phase system to renovate and update all existing park facilities to a higher condition utilizing volunteers whenever possible.
- Repair Creekwalk and retaining wall along San Felipe Creek that has eroded and become damaged to a safer standard for citizens. The City should work with the San Felipe Creek Commission and the United States Department of Agriculture to explore multiple options to redesign the entire Creekwalk area to protect against future erosion. Develop a San Felipe Creek renovation project to submit to Texas Parks and Wildlife Department (TPWD) for possible grant funding. Submit a grant application to TPWD.
- Finish construction of Carranza Park.
- Seek and establish funding sources for park development and maintenance.

### **Year 2 – 2012-2013**

- Continue to renovate and update all existing park facilities to a higher condition.
- Continue to work with the Fish and Wildlife Service and Sul Ross University in actions to eradicate the non-native vegetation and wildlife species along San Felipe Creek, most notably the Carrizo Cane (Arundo donax).
- Establish a conservation and preservation plan for the endangered species Devil's River Minnow.
- Design and construct park at Noriega and Rosita intersection that has been cleared by the City Council for development.
- Redevelop areas in existing park system for use as indoor soccer field facilities.

### Year 3 - 2013-2014

- Continue to coordinate with FEMA to determine the allowable use of the FEMA buyout properties along San Felipe Creek. Develop vision plan to utilize the FEMA buyout properties and Riverside Park along San Felipe Creek.
- Identify and develop existing City areas for a softball field and sporting and recreation practice facilities. Consider the FEMA buyout properties as a potential site for these facilities.
- Establish a continuous maintenance program for all existing park facilities in order to protect the investment made in renovating and updating facilities.

### Year 4 - 2014-2015

- Develop a plan to install features to deter vandalism of parks and facilities, such as installing security lights.
- Initiate a citywide beautification program, especially in the downtown area and at the major highway entrances. Enlist the involvement of local historic groups, Main Street Advisory Board, Val Verde County and other interested entities in adding landscaping and small passive park areas (benches, arbors, fountains, etc.), clean-up campaigns and maintenance of existing landscape areas.
- Begin to look for sites for small neighborhood parks, such as City owned lots or tax delinquent lots in areas of development expansion. Continue to develop and install parks along with subdivision development and expansion.
- Develop plan and promote sports and special events such as tournaments, concerts, recreational sports leagues, etc.

## Year 5 - 2015-2016

- Continue planning/acquisition of park and open space areas in Del Rio.
- Begin development of plan to connect existing parks by use of sidewalks and passive park areas.
- Continue preventative maintenance program of existing park facilities and citywide beautification program.
- Conduct a community assessment to determine how the improvements are addressing resident's needs and to update the plan.

### PHASE II (6-10 YEARS)

# PLANNING ACTIONS

- Update the Del Rio Parks Recreation and Open Space Master Plan.
- Coordinate park development and event planning with other community organizations.
- Continue the citizen participation program for development of new parks.
- Approve budget for park development/grant match and added PARD staffing.

### **DEVELOPMENT**

- Continue expansion of the sidewalk connections.
- Continue repair and maintenance program.
- Develop community or neighborhood parks in areas where the city has expanded and development has occurred.

### PHASE III (11+ YEARS)

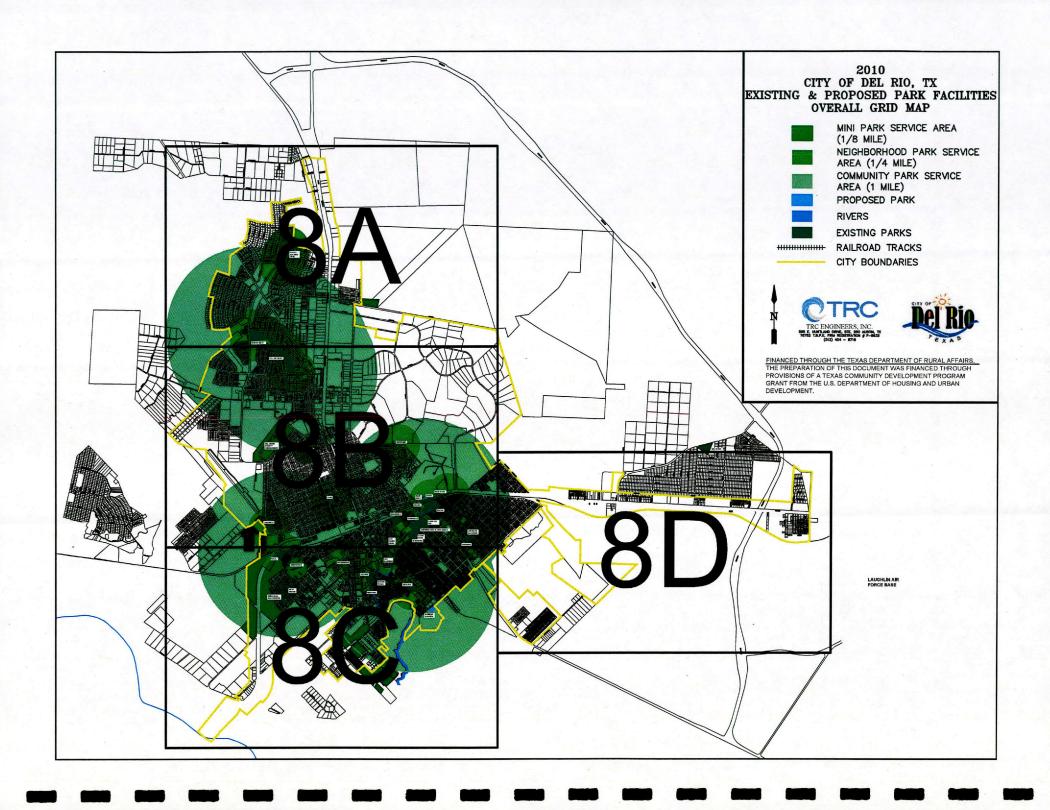
# PLANNING ACTIONS

• Update the Del Rio Parks Recreation and Open Space Master Plan.

 Continue the citizen participation program, focusing on development efforts of expanding City.

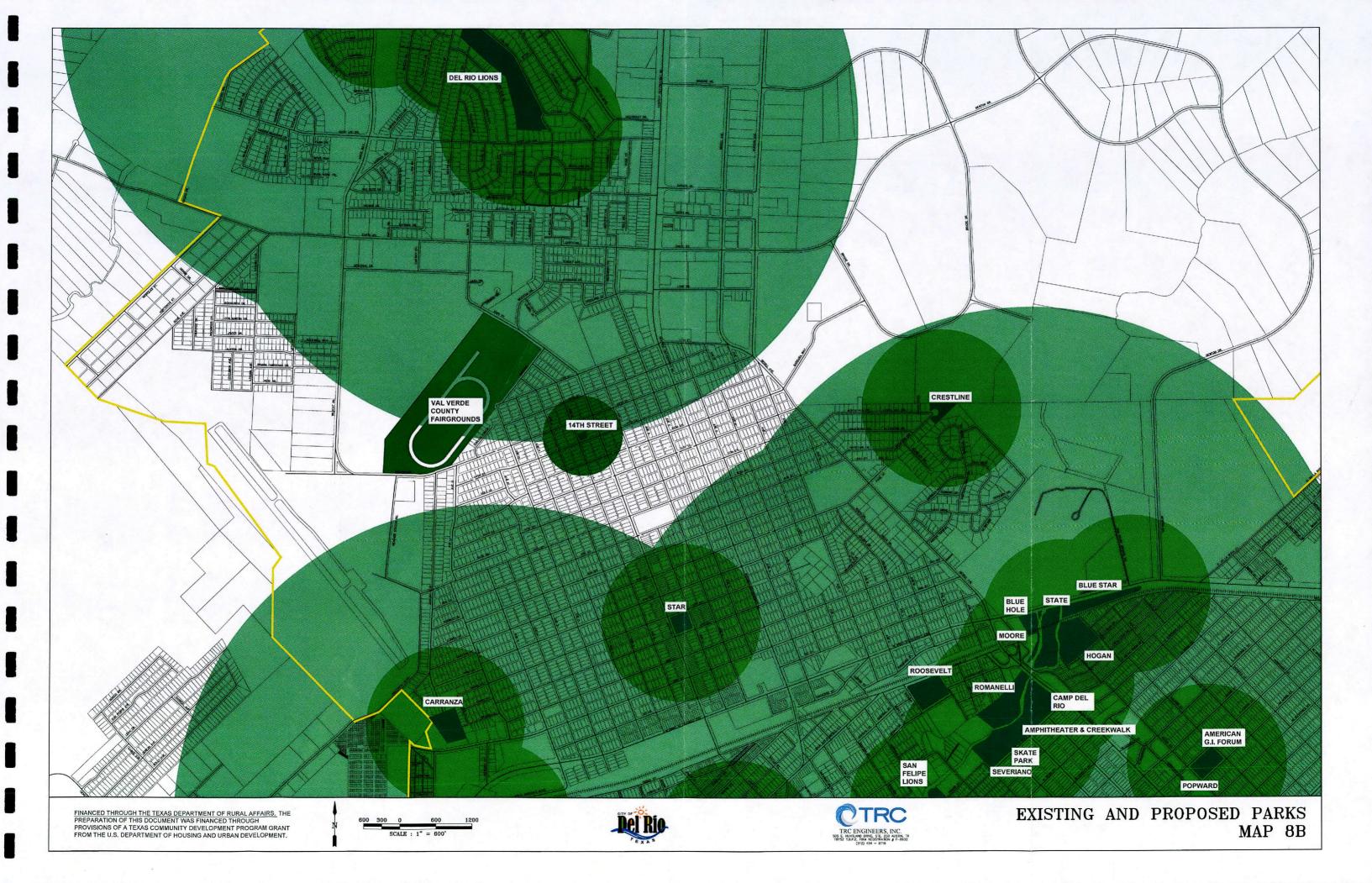
# **DEVELOPMENT**

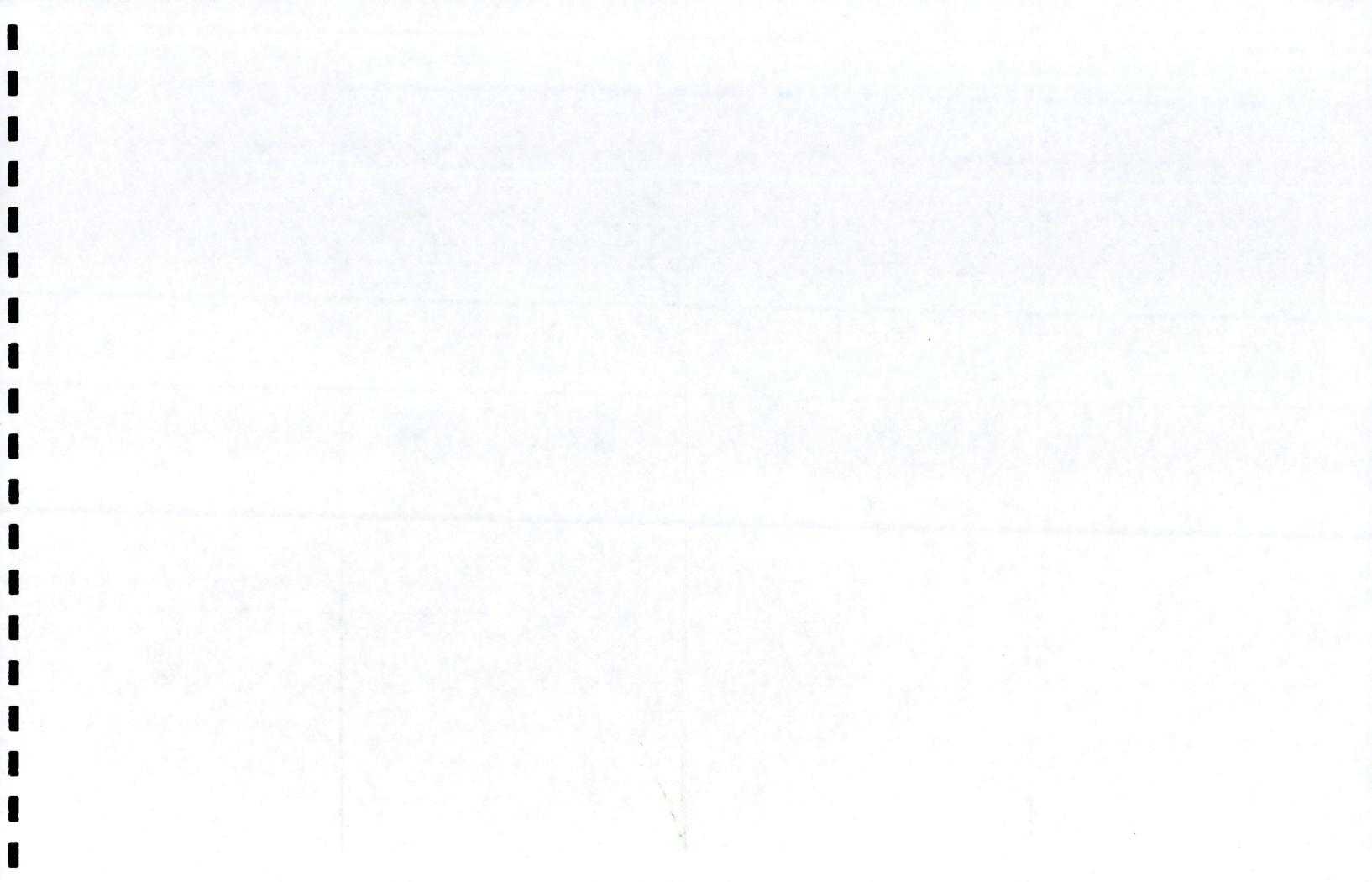
- Neighborhood and mini-park development as opportunities arise throughout the City.
- Upgrade existing parks.
- Continue expansion of the sidewalk connections.

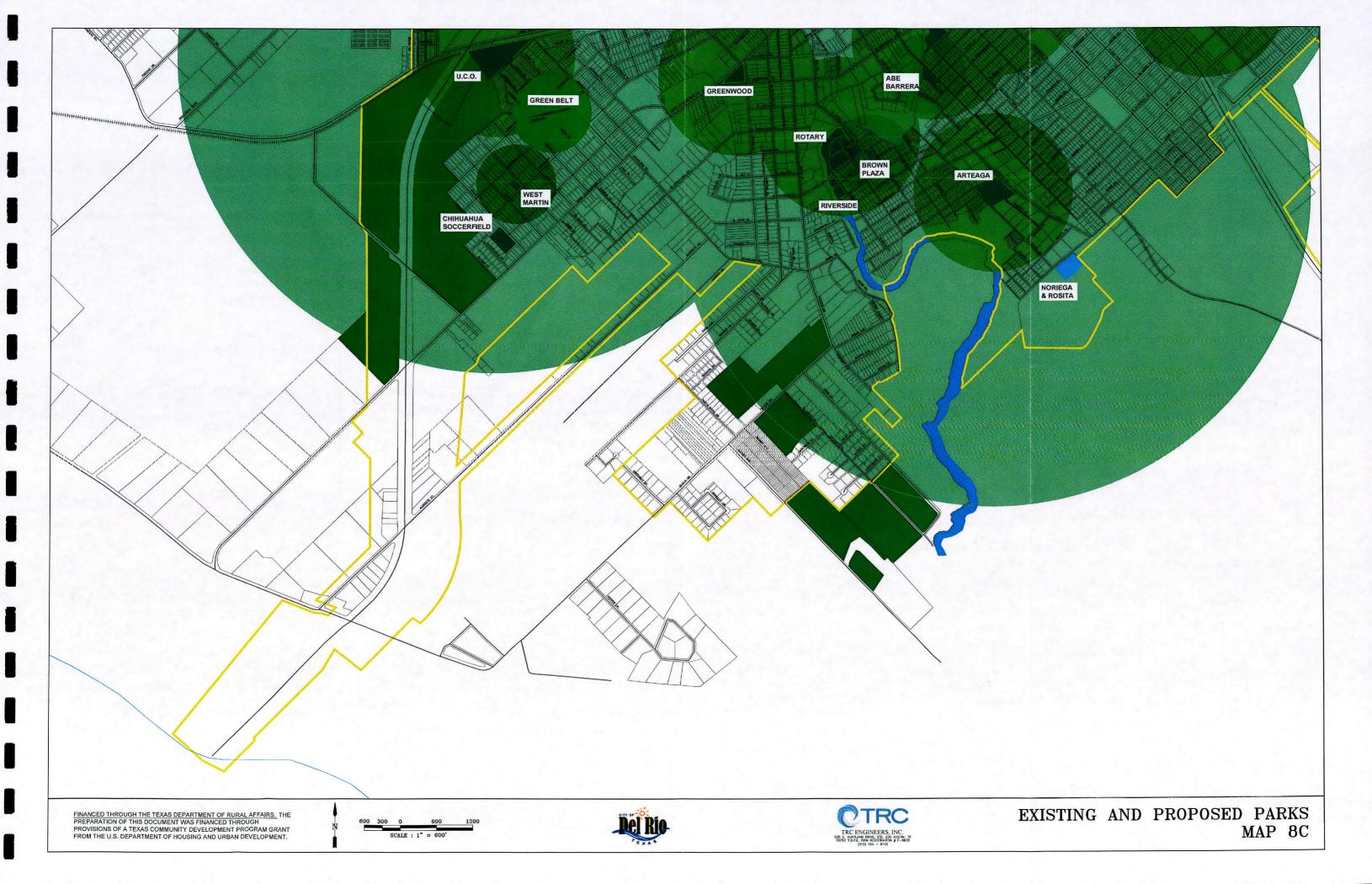


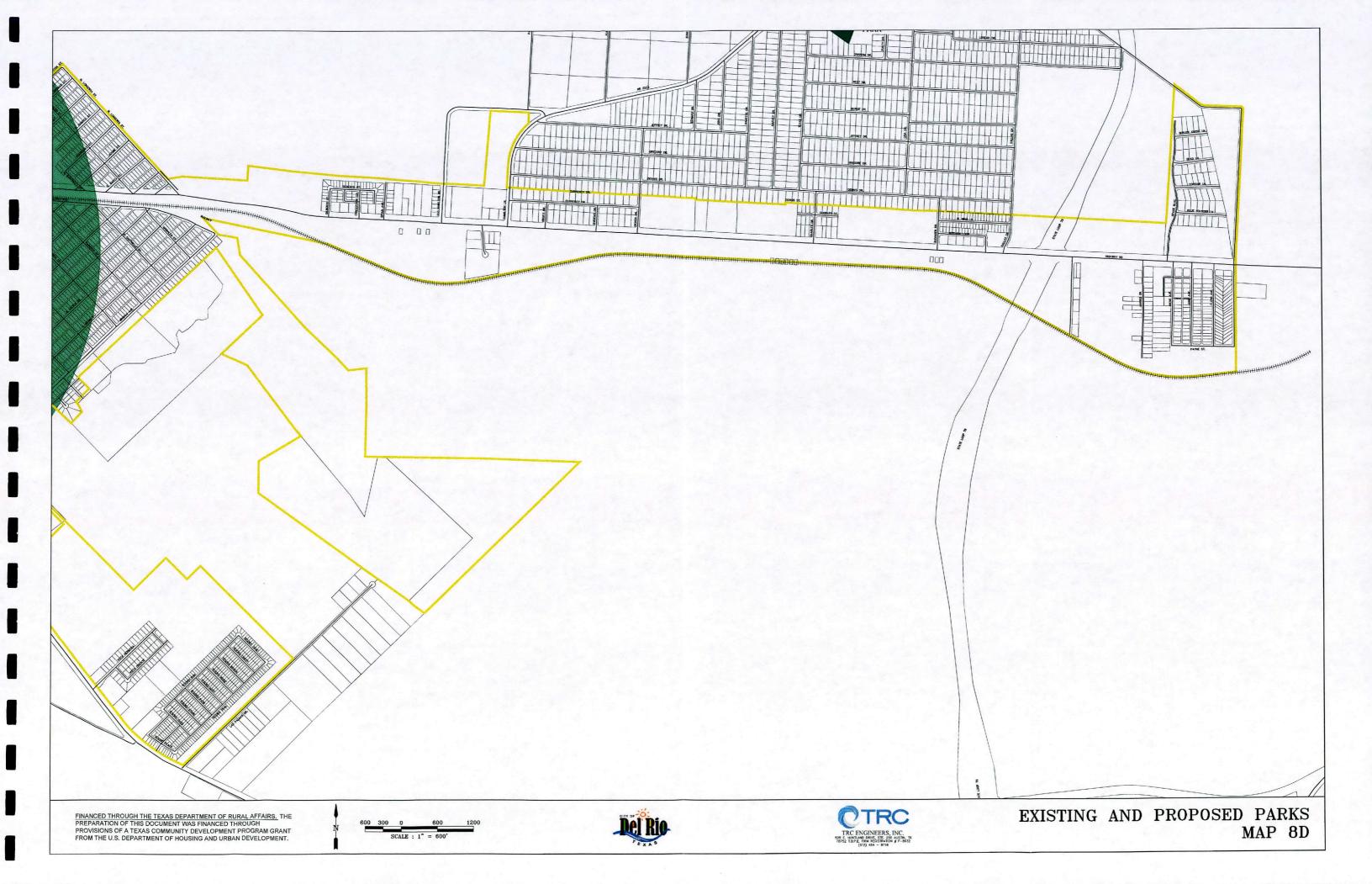






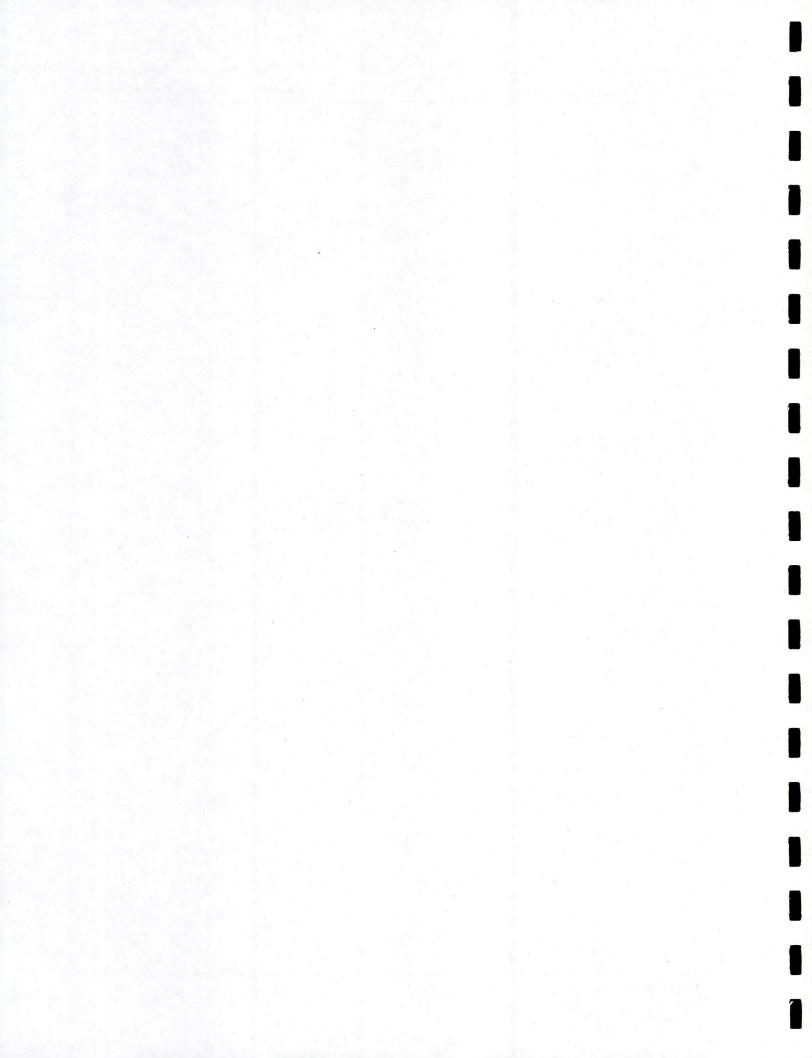








# **APPENDIX J**



# **DEL·RIOPLAN**

# Chapter Four Parks and Recreation

Parks and recreation areas and facilities are an integral part of the public infrastructure system and are essential to Del Rio's strategic goal of promoting and sustaining "active living" for all residents. Foresight and preparedness is, therefore, of utmost importance to adequately plan to satisfy the needs and desires of citizens both now and in the future. The framework of this chapter is intended to guide the City's decisions as to the enhancement of the existing parks and the ongoing development of new facilities and trails to pace future changes in population, demographics, and development.

he purpose of this Parks and Recreation chapter is to determine the community's current and future needs for improving its existing parks and providing adequate areas and facilities to meet its immediate and long-term needs. This plan element will form the policy direction pertaining to the timing of park development, their placement within the City and its Extraterritorial Jurisdiction (ETJ), the type of facilities, and the method by which enhancements and improvements may be funded. It guides the City's planning efforts for developing a "first class" public parks and recreation system, while directing private contributions through provision of active recreation areas and open space to meet the requisite needs of new development. This chapter addresses the availability, quality, type, size, and location of leisure and recreation opportunities to meet the needs of Del Rio's residents and visitors.

Parks and recreation facilities are an essential part of a healthy, quality, and sustainable community environment. They provide necessary components in human existence for events outside of the home, after work, and beyond school activities. Whether for passive or active use, park areas and recreation facilities are an important part of everyday active living. Much like streets and sidewalks, water and wastewater lines, drainage facilities, police and fire equipment, and other municipal facilities and services, parks, and open space are integral components of the municipal infrastructure. Therefore, they warrant a significant level of attention and commitment of resources to be adequately acquired, constructed, operated, and maintained.

A comprehensive and interrelated system of parks and recreation opportunities that respond to the needs and values of the local residents contribute to a community's quality of life and livability. Parks and recreation opportunities contribute to the health of residents, provide a variety of recreational and educational activities for all ages, and preserve and enhance the

quality and integrity of the natural environment. They are also important in attracting visitors to the community and, thus, contribute to local tourism and economic development.

Understanding the economic impacts of parks can help decision makers better evaluate the creation and maintenance of parks and public open spaces. Parks provide intrinsic

community.1

### **Planning Principles**

- All residents and visitors will have unrestricted access to public park areas and recreational facilities;
- Public recreation will be highly coordinated with other organizations and programs, including Val Verde County, the school district, civic clubs, athletic organizations, private entities, and others to avoid duplication and encourage cooperation;
- Public recreation will incorporate other public services such as education, health and fitness, transportation, and leisure;
- Facilities will be well planned and coordinated to ensure adequate adaptability to future needs and requirements;
- There will be an established process and procedure for acquiring land for future parks and recreational areas and facilities prior to development; and
- The design of spaces and facilities will encourage the most efficient utilization of land and will consider the needs, desires, and opinions of the intended

There are several reasons why this chapter is important, among them are the following:

environmental, aesthetic, and recreation benefits. They enhance property

values, increase municipal revenue, bring in homebuyers and workers,

and attract retirees. Parks are a good financial investment for a

- First and foremost, invest in the community's **livability and quality of life**, which contributes to its economic development and attractiveness as a place to live and conduct business;
- Improve the quality and appearance of the community's public spaces, which help form a positive and desirable image of Del Rio to visitors and investors;
- Provide areas and facilities for community citizens of all ages to meet their active and leisure recreation needs;
- Contribute to a healthful community life by enabling citizens to use parks and trails for sport and exercise;
- Satisfy the interests of local recreation leagues and activity groups that use these facilities for athletic events and social interaction;
- Provide adequate areas and facilities within close proximity to all persons, including a diverse range and type of parks to meet the individual needs of citizens;
- Preserve valued open space, aquifers, and other sensitive lands for the benefit and enjoyment of future generations;
- Help preserve essential ecological functions and protect biodiversity;
- Availability of a hands-on learning environment for children where
  they can express their creativity, develop problem solving skills, and
  develop social skills; parks offer children a sense of place and
  belonging as an antidote to violence, social alienation, and vandalism
   parks offer children motivation to explore and discover and engages
  them in healthy physical activity;
- Parks provide sites for special events and festivals that attract tourists;
- Evidence suggests that green spaces may help people relieve mental fatigue, thereby reducing aggression – which, in turn, relieves stress;

<sup>&</sup>lt;sup>1</sup> "How Cities Use Parks for...Economic Development"; City Parks Forum Briefing Papers; American Planning Association; 2002.

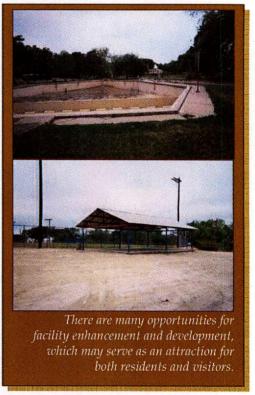
green residential spaces give neighbors gathering spaces to foster social ties resulting in **stronger sense of community and safer neighborhoods**; barren spaces are more frightening to people and are more crime prone than landscaped parks; but, in order to make the best use of open space – it must be incorporated into a community's design.<sup>2</sup>

#### **GENERAL PARKS AND RECREATION ISSUES**

The purpose of this element is to ensure that the City "catches up" on any deficiencies in the

provision of parks and recreation areas and facilities and then keeps pace with the facility requirements to support new development. There were six issues that came out of the initial focus group meetings and community forum discussions in January 2006, which were introduced in Chapter 1, Introduction, and are examined further in this chapter. In addition to these six issues, as work has progressed, equally important issues have become apparent: implementing a park-to-standards program and the organization of the department for maximum efficiency of park maintenance, enhancement, and improvement.

The parks that exist in the City require needed attention to enhance them and bring them to a quality level of standard. The 26.1 acres of Federal Emergency Management Agency (FEMA) buy-outs from the 1998 flood present a unique opportunity for the City to develop mini-parks, neighborhood gardens and gathering areas, and possible trail connections to the springs. An important demographic is that one third of the population is under the age of 18, thereby necessitating both spaces and programs for their attention and recreation needs. Offering a variety of programs and physical activities to this age group would provide benefits to them and the community, as a whole.



As the number of retirees increases in the area, it will be increasingly beneficial to have programs and passive recreation facilities available for them, as well. The essential parks and recreation issues follow.

### Balanced, Convenient and Accessible Parks

A key to a well-utilized system of parks is an even distribution of recreation areas and public open spaces throughout the community, including the newer development areas north of Mary Lou Drive and west of Kings Way, as well as the well-established neighborhoods in the central parts of the City. In this way, all residents have convenient access to public open spaces and facilities, thereby meeting their active and passive recreation needs. It is important, though, that each individual park is located and designed to be compatible with the surrounding neighborhoods, provide safe and convenient access, and incorporate the equipment and facilities desired by its users. Depending on demographics and the availability of other facilities, some

<sup>&</sup>lt;sup>2</sup> APA Parks Publications -

# Chapter Four

### **Parks and Recreation**

neighborhoods may be more interested in active play areas, such as basketball and tennis courts and open play fields, while others desire passive activities, such as trails, nature, and picnic areas. For this reason, it is essential to include users in the planning and design phases of park development.

A true "system" of parks offers a wide range of public spaces, including large-scale facilities intended for persons within a region, like Lake Amistad or even Fort Clark Springs; facilities that are used by the whole community (typically within a one-mile radius) like the amphitheatre and San Felipe Creek; facilities that are intended for use by the surrounding neighborhood residents, such as U.C.O. Park; and facilities used by an individual development, such as a play area within an apartment complex. The value of an adequate park system is its ability to meet the individual needs of all persons.

The term "balanced" refers to a combination of both indoor and outdoor facilities, as well as an adequate assortment of different types of activities (both passive and active) to meet the year-round recreational needs of residents.

**GOAL:** A balanced and wide variety of public parks, recreational areas, and open space in near proximity to all residents.

#### RECOMMENDATIONS TO CONSIDER:

- 1. Develop an even distribution of parks and recreation facilities throughout the community and developing portions of the ETJ, as displayed by the defined need areas in Figure 4.1, Parks and Recreation System Plan. Development of a "system" of parks will provide equitable opportunities and convenient access for citizens throughout the community. Spcifically, focus attention on the far northern area of the community, in the area between Stricklen Avenue and the northern City limits and west of U.S. 277. Also, the area lying immediately west of Downtown is an area of need, as well, generally west of Main Street and south of 6th Street.
- 2. By the Year 2025, aim to comply with the standards of the National Recreation and Parks Association (NRPA) for each type of park classification, which, based upon the projected future population, would require an additional 4.4 acres of mini parks, 39 acres of neighborhood parks, and 137 acres of community parks. Since the greatest deficiency is community parks, the City should focus their attention on the acquisition and development of community parks and open spaces, particularly in the
  - and development of community parks and open spaces, particularly in the identified need areas.
- 3. Amend the subdivision regulations to incorporate park land dedication provisions requiring dedication of land concurrent with new development. Tie the amount of dedicated acreage to a specified number of dwelling units (such as one acre per 100 dwelling units), which establishes a rational nexus between the demand being placed on the park system and the required acreage to be dedicated for public purposes. Also establish criteria for the location

The Mission of the National Recreation and Parks Association (NRPA) is "to advance parks, recreation and environmental conservation efforts that enhance the quality of life for all people."

# NRPA's Values - Parks and recreation:

- Enhances the human potential by providing facilities, services and programs that meet the emotional, social and physical needs of communities.
- Articulates environmental values through ecologically responsible management and environmental education programs.
- Promotes individual and community wellness that enhances the quality of life for all citizens.
- Utilizes holistic approaches to promote cultural understanding, economic development, family public health and safety, by working in coalitions and partnerships with allied organizations.
- Facilitates and promotes the development of grassroots, self-help initiatives in communities across the country.

- and usefulness of land dedicated for park purposes, including credit for private parks and other usable site amenities.
- 4. Review current provisions to allow payment of fees in lieu of dedicating land for public parks and open space purposes. The structure of fees in lieu of land must be based upon an appraised value of the existing parks and their improvements so as to require facilities of an equivalent standard. Collected fees must be invested to expand and enhance existing parks within the same vicinity (park zone) from which the fee was exacted.
- Expand upon the range of facilities and improvements within the community to include those that may provide an added attraction, such as a spray park; local art park;



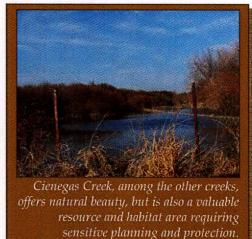
coordinated graffiti park; historical monument walk; farmers' market; bird, butterfly, and wildlife observation areas; interpretive gardens; skateboard park; spring-fed wading pool; BMX cycling course; frisbee golf; an indoor recreation center with a competitive swimming pool, water slides, weight and exercise room, basketball and racquetball courts, climbing wall, and meeting/training rooms; and other types of activity areas per the preferences of community residents.

#### Resource Conservation and Preservation

management.

Del Rio is home to a variety of ecological treasures. There are unique plant life and bird migration patterns that attract visitors to this region of the State. Increasing public awareness and educating the community about the ecology, environmental conservation, and the importance and value of preserving the San Felipe Springs and the aquifer watershed will be important to sustaining the environment. Without such informational programs, these valuable resources may be harmed or even depleted as the community expands and develops. Sensitivity to these critical areas must remain a priority for the community to ensure their long-term conservation and protection.

There are areas interspersed throughout the community and around the larger planning area that possess valuable natural resources warranting protection. Lands along and adjacent to the Rio Grande River, San Felipe Creek, Cienegas Creek, and their floodplains and flood prone areas, particularly between Pecan Street and McLymont Street, offer opportunities for resource conservation and land preservation. While these areas are sensitive to urban development, they may be utilized to fulfill other community objectives, such as environmental protection, open space preservation, and sound resource



There were numerous comments received through the focus group interviews and community forum regarding the desire for more green space integrated into development with linear greenways and trails connecting them. This objective may be achieved by adopting sound environmental conservation and responsible land development practices. Sensitive areas along the river and creeks and within the floodplain may be incorporated into development as a natural amenity, while sustaining their resource function. Doing so requires a regulatory system that balances development efficiency and resource protection. This objective may be achieved by adopting sound environmental conservation and responsible land development practices.

Parks and public open spaces create essential opportunities for protecting and preserving natural resources and sensitive lands. As the community continues to develop, it is advisable for the City to seek preservation of its valuable resource areas, such as those along each of its creeks and areas within or immediately adjacent to the floodplain, as well as critical habitats and known areas for roosting or migratory birds. These areas provide great value to the community landscape and act as an attraction for visitors and tourists of the area. In fact, nature tourism is one of the largest growth economies. Capitalizing on this economy may boost the local economy by attracting ecotourists to visit and stay in the area, particularly for those visiting Lake Amistad and the National Recreation Area.

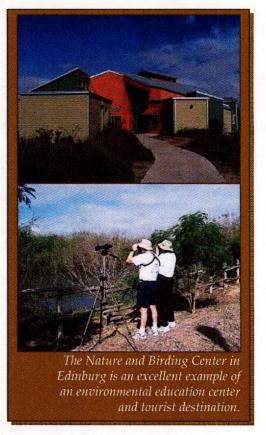
**GOAL:** Conserve natural resources through park land acquisition, open space preservation, and environmentally sensitive parks and open space planning.

#### RECOMMENDATIONS TO CONSIDER:

- 1. Identify priority conservation areas and protect them through conservation easements or fee-simple acquisition. This may be accompished through the subdivision development process or by independently securing the development rights. The area over the aquifer, for instance, may be suited for a transfer of development rights. In other words, the density currently entitled to this area may be transferred to other, less sensitive areas for development where increased density may be accommodated. This area may then be used as a large-scale open space area, which may contribute recreation and open space value to the community and its residents and visitors.
- 2. Incorporate into the City's development standards provisions for protection of resources. For properties that have sensitive resources, a density bonus may be given to transfer development density to a less vulnerable area of the property. The resource area may then be dedicated to the community as permanent passive open space or as active recreation space, such as for trails and greenways. The density bonus offsets may act as an incentive to the developer by allowing an increase in the overall development yield.
- 3. The development regulations must have provisions for stormwater management to not only move stormwater safely, but also to clean it to maintain the health of streams by reducing or eliminating pollutants before they reach the permanent streams. Strategies include avoidance, minimization, and mitigation. Avoidance techniques include cluster development; floodplain, drainageway, and wetland resource protection standards; and positive surface drainage in natural channels. Minimization techniques may include water gardens, rain barrels or cisterns,

# **Parks and Recreation**

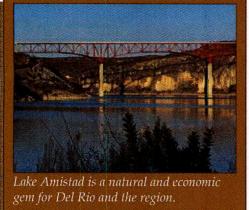
- pervious pavement, vegetated swales, riparian buffers, swale blocks, and curbs without storm sewers.
- 4. Establish standards and procedures for park maintenance to eliminate potential adverse risk to the quality of adjacent streams and waterbodies, through no-mow zones, staged mowing heights in accordance to distances from the channel edge, and other minimization techniques.
- 5. Develop a nature and birding center to serve as a roosting area for migratroy birds. The center could serve an interpretive role, offering environmental education about the local habitat and plant species. This would add value to the local recreational program while also serving as a tourist destination. There may be an opportunity for partnering with Lake Amistad National Recreation Area to exhibit information about the lake and its natural setting and habitat.
- 6. Install demonstration gardens and interpretive signage along the San Felipe Creek Walk to educate passers-by of the environmental value of this resource and means for protecting the ecosystem.
- 7. Organize management strategies to minimize the adverse effects of development projects on critical habitat areas.
- 8. Incorporate into the zoning ordinance density bonuses for the provision of open space, particularly for those areas of environmental value. This may be accomplished by converting
  - the zoning system to one based on character versus use. In other words, there may be different development types and forms within the same zoning district as long as the overall gross density and, hence, character remains roughly the same. With increasing requirements for open space, the ordinance may allow corresponding adjustments of lot sizes to result in an equivalent development yield. Such approach will allow development to occur around sensitive areas without compromising the economic feasibility of the project. In this way, lands that will otherwise remain undeveloped may be developed in harmony with the environment.
- 9. Develop a "land-bank" program in which owners of properties in the floodplain are encouraged to deed their land to the "bank" to ensure long-term conservation, which would be offset by incentives for increased development density or other favorable dimensional allowances.
- 10. Prepare a design and utilization study for the FEMA lots to determine the best use to the benefit of the parks and recreation system. These areas may serve as neighborhood gathering areas, mini-parks, passive picnic areas, or master gardener demonstration gardens, all of which add value to the surrounding neighborhood and the community. These areas may also be maintained and policed by neighborhood residents or a local club or organization.
- 11. Seek to develop a city-wide greenways program along each of the creeks, floodways and flood prone areas, and drainageways. These areas may then be used to protect the resource through



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## **Parks and Recreation**

sound management practices while also serving as a recreational trail to tie the community together.



### Lake Amistad and the Amistad National Recreational Area

Lake Amistad was recently rated as the number one lake in the world for bass fishing. Immediately, the demand for bass fishing on the lake began to increase, with 125 tournaments scheduled during the first two weeks of 2006. This designation created an opportunity for Del Rio as the closest community. With the increase in visitors to the lake, there is an opportunity for the community's parks and recreation system to complement the lake and its many offerings. In this way, the local park system needs to be viewed for its potential contribution to the region and state, and not only for its immediate residents. While it is vitally important to the livability and recreational needs of Del Rio

citizens, it also may play a key role in the economic development program.

Presently, the National Park Service is completing work on a General Management Plan and Environmental Assessment for the Amistad National Recreational Area, which will provide guidance for the management of visitor access and use of the recreation area, development of the facilities needed to support those uses, cultural and natural resource protection, park interpretive programs, and National Park Service (NPS) operations. An alternative transportation planning study is also underway. The two-phase study is being conducted in support of the General Management Plan for the National Recreational Area. The first phase consisted of an assessment of past and present conditions at Amistad, including a summary of historic and seasonal visitation patterns; analysis of traffic distribution patterns on a park-wide basis and by major recreation activity over the last decade; comparison of visitor traffic volumes at the nine major recreational use areas; analysis of traffic volumes at low, medium, and high water levels in the reservoir; and an inventory of Amistad recreation areas detailing traffic, existing recreational uses, key management issues, parking, and access. The second phase of the study will analyze in more detail the traffic and use patterns at the most heavily-used recreation areas in the park and devise detailed management strategies for adapting to changing use patterns at low, medium, and high water levels.

The above studies and the resulting management plan provide great opportunity for the community of Del Rio. It is advisable for the community to begin coordinating with the National Park Service at an early juncture to identify the role that the City may play in the long-range management plan. For instance, there may be opportunities for more facilities in or near the community, with coordinated transportation to the recreational area as a means to reduce trips to the lake. The community's recreational and environmental education program may also complement that of the NPS through coordinated programming and improvements.

**GOAL:** Aid in the long-term management and conservation of Lake Amistad and the National Recreational Area through joint planning.

#### RECOMMENDATIONS TO CONSIDER:

- Develop a partnership and joint long-range planning committee to evaluate ways for which
  the City can complement the National Recreation Area and, conversely, how the lake and
  recreational area can further enhance the community's recreation program and economic
  development efforts.
- 2. Evaluate the feasibility and sources of potential State or Federal funding for extending an off-road bicyling trail to the National Recreation Area. This may serve as an opportunity for renting bicycles to tourists who are interested in exploring the nature-scape along the way. It may also serve as a public education medium through the use of interpretive signage, historical monuments, illustrative displays, and nature exhibits to enhance the experience and value of the trail segment.
- 3. Seek ways to complement the value of the local parks and recreation system for residents by expanding upon the notion of parks as tourist destinations and educational forums, which may help convey the message of environmental conservation and sound resource management. This may be particularly useful as it relates to the management plan of the lake and National Recreation Area.
- 4. Expand on the nature and eco-tourism opportunities provided, in part, by the national park incorporating environmental and ecological education into the local park system. In other words, locate parks to leverage their value for preserving the environment and educating the public about the importance of land and resource management. This is applicable as it relates to Lake Amistad as a valuable natural resource and the means by which local residents may be sensitive to and contribute to the conservation and protection and this and other valuable resources in and around Del Rio.
- 5. Coordinate with the National Park Service to prepare a feasibility study to extend some form of public transit service high occupant vehicle by way of a tourist circulator route from Del Rio to the reservoir and its activity areas. Such route would offer the value of attracting visitors to the community to access the service, while also benefitting the NPS in their efforts

to manage their resource and protect its long-term environmental value.

6. Evaluate opportunities for possible development of recreational vehicle communities and other types of overnight stay facilities within or near the edge of Del Rio that offer an option for short-term visitors and tourists. Requisite standards would need to be enacted to ensure a quality environment that is an asset to the community.

7. Coordinate with the NPS to exchange and distribute brochures at the reservoir and throughout the community, which are designed to promote the attractions and destinations of both the National Recreation Area and the City of Del Rio.





### Quality Park Appearance and Maintenance

The appearance of parks is an indicator of their value to the community, whether intended or not. The perception of a park system that is of a "tired" condition and in need of both improvement and enhancement is that parks are not recognized for their influence on livability and community identity. In fact, recent studies have shown that quality parks increase adjacent property values and are a consideration in the decision of purchasing a home. Collectively, parks and public open space areas also contribute to the appearance and natural beauty of the community. The view of the Spring Creek channel and its green environs along U.S. 90 is exemplary of this notion. This park and the creek walk exhibit environmental value and a

pleasing aethetic addition to the community.

The idea of a parks-to-standards program is to develop a standard by which all parks, recreation areas, and public spaces are measured, with improvements conducted to bring each to an equivalent standard. In this way, the park system in its' entirety, is elevated in quality and level of importance. This may be accomplished through both public and private efforts. The City may earmark a dedicated funding source for equipment replacement, building revitalization, and increased maintenance. The private sector may provide in-kind services, volunteer labor, and contribution of funding through improvement fees.

Some of the parks in the community suffer from a lack of investment – or reinvestment - while others simply need increased maintenance. The improvements needed include replacement of equipment; installation of irrigation systems and a rigorous grounds maintenance program; reconstruction of major facilities, such as swimming pools and bath houses; court resurfacing or replacement; new benches, tables, and grills, and trash containers; additional landscaping and shade trees; picnic facilities and shaded gathering areas; improved and/or expanded parking areas; replaced fencing and lighting; and an aggressive and quick-response graffiti removal program.

The priority of the park system should, first, be to improve the existing parks and bring them to the quality and maintenance expected by residents. This will require a significant commitment on behalf of the elected leaders to provide the necessary funds to catch up on the deficiencies that have occurred over several years. All improvements certainly do not need to be achieved at once. Instead, with the establishment of immediate, mid-term, and long-range priorities the eventual achievement of the standards the community will be achieved.

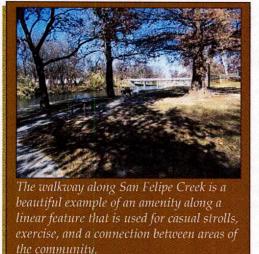
**GOAL:** Invest and reinvest of the community parks and recreation system to bring it to a quality standard that is "first-class" and inheritable..

#### RECOMMENDATIONS TO CONSIDER:

- 1. Prepare a parks and recreation master plan, which should include a detailed inventory of all equipment and improvements within each park, a quantitative condition assessment, a midweek and weekend survey of park utilization, development of facility and equipment standards, preparation of a needs assessment, and a capital improvement program identifying all requisite park additions and improvements. Sources of funds and a strategic implementation program should also be included on an annualized basis for the first five years.
- 2. Through the park master plan process, conduct interviews with local residents from each geographic area of the community to identify the types of facilities and improvements desired in the public parks. From this exercise, develop a prototypical diagram for miniparks, neighborhood parks, and community parks, which may then be used in the redevelopment of existing parks and construction of new parks.
- Consider establishment of a dedicated funding source for implementation of the parks-tostandards program. Such funding may be from a single source, such as the hotel/motel tax, or from a combination of sources including CDBG funds, bond funds, fee in-lieu of land dedication, and other sources.
- 4. Develop and carry out an aggressive maintenance program, which must be acted upon rigorously and continuously. The maintenance program must, first, identify and log all necessary maintenance items, including repair of broken equipment, identification of unsafe conditions and remedies for correction, and items needing more significant capital expenditures. An estimate of costs should be assembled and integrated into the annual work program and five-year capital improvement program.
- 5. Re-organize the Parks Department such that the requisite number of maintenance personnel are assigned solely to the park system, without responsibilities other than the revitalization and ongoing maintenance of each park.
- 6. Provide adequate funding and resources to perform ongoing maintenance and repairs and to construct needed improvements at existing and future parks and recreation facilities. Such funding should be on par with similar sized communities, given the unique consideration of the level of existing conditions of the park grounds, buildings, and improvements.
- Establish a "Friends-of-the-Park" program to solicit neighborhood involvement in maintaining and policing public parks and open space areas, such as public gardens and esplanades.
- 8. Improve accessibility for disabled and handicapped users by adding sidewalk curb cuts and ramps, wheelchair accessible sidewalks and trails, and providing accessible facilities, such as drinking fountains, trail surfaces, and play equipment.

### Connecting Parks, Schools and Neighborhoods

The recreational and social values of parks are increased exponentially when they are linked through a series of greenbelts along natural water courses and drainageways, trail and walkway corridors, and other ties and connections. Just as it is necessary to plan for road networks and other built infrastructure in advance of growth, it is also important to plan and protect green



infrastructure in coordination with development.<sup>3</sup> An interconnected system of bicycle and pedestrian facilities may serve as a form of recreation and exercise, while providing an added benefit as an alternative mode of transportation.

A system of parks and recreation areas is not complete without linear linkages between facilities and connections to neighborhoods, schools, and other public use facilities. They may serve the role of improving convenience and accessibility to parks and other public spaces, thereby expanding the service area coverage of the existing parks. This, in turn, reduces the amount of investment necessary to construct parks densely throughout the community. It is acknowledged, though, that trails are expensive and difficult to construct in developed environments. Therefore, a plan is warranted to identify the best

and most efficient means for achieving the intent of a trail network that is to enhance pedestrian and other non-motorized mobility within and throughout the community.

Existing walkways along San Felipe Creek are an ideal foundation for developing pedestrian walkways and bike trails connecting each of the City's other parks, neighborhoods, and schools. The Creek serves as a north-south spine for a portion of the established community, similar to the role of the sidewalk and linear open space along Kings Way in the northwest quadrant of the community. The challenge is finding ways to make connections, whether it is by on- or off-street means, to tie these facilities into a community-wide network of trails and walking paths. Lateral connections to the trail system could be developed along easements, excess rights-of-way along the railroad, utility and drainage easements, and, in the rural areas, wide shoulder lanes of farm-to-market and state highways.

As the community continues to develop and expand outward from the central core, linkages throughout the community and direct connections between distinct areas will become increasingly important. They are important to maintain social interaction among and a sense of identity within the community. Development on an incremental basis adds to the complexity of achieving a continuous system of linkages. Without advanced planning, these linkages will not happen naturally, as seen by the current pattern of development. Those areas that are along a linear feature are the result of good planning and foresight. To realize a comprehensive trail network, there must be a connectivity review at the stage of subdivision development, backed by the necessary requirements and standards for road continuity, sidewalks and trails within rights-of-way and easements, and other essential planning and design considerations, such as safe intersection crossings, curb cuts, signage, and many other factors.

**GOAL:** Deliberate incremental development of a complete trail network, implemented in accordance with a plan and designed to capitalize on existing infrastructure.

<sup>&</sup>lt;sup>3</sup> APA Green Infrastructure PAS Report, 2001).

#### RECOMMENDATIONS TO CONSIDER:

- 1. Inventory and map all existing trail segments and sidewalks throughout the developed area. Subsequently, identify missing and incomplete segments needed to improve continuity, particularly those adjacent to schools, parks, public buildings, and other pedestrian generators and attractors, such as Downtown and Sul Ross University. Prepare a near-term capital improvement plan and program for those segments that will have an immediate impact, meaning those for which connection may be made to and between significant destinations with relatively little planning and investment.
- 2. Prepare a trail, greenway, and bikeway master plan to include an overall network of off-street trails, nature trails and paths within linear greenways, and both on- and off-street bike lanes and routes. The intent of the network is to tie together each park with every neighborhood and school. The master plan should examine possible and feasible ways to create linkages, including trails along existing easements or rights-of-way, re-striping of road sections to include a striped and designated bike lane, completion of missing links and repair of existing sidewalks, and construction of off-street trail segments.
- 3. Amend the street cross-sections in the subdivision regulations to include provisions for trails and bikeways. These facilities should be included in all new road projects, as well as reconstruction projects. At a minimum, sidewalks should be constructed along both sides of collector and arterial streets and one (preferably both) sides of local streets. Provisions must also be made for pedestrian walkways on bridges and across culverts. Refer to Chapter 5, Transportation, for more information.
- 4. Amend the subdivision regulations to require pedestrian easements between lots so as to allow access to existing or planned parks and trails. This must be integrated as part of the preliminary plat review and approval process, which will require designation of park and school sites and locations of sidewalks.
- 5. Establish requirements for the dedication of easements or rights-of-way for development adjoining the trail network upon development of a master plan. Rights-of-way must be dedicated for the main trail segment and easements dedicated throughout the development to provide direct access points to the system. Design standards must also be established for segments of the trail and other connections to ensure long-lasting and minimal maintenance construction.
- 6. Utilize the utility corridors as trails and connections within and between neighborhoods. These areas must have an improved surface, although a paved surface is not necessary or preferred. Again, review of the alignment of the utility corridors must occur concurrent with the preliminary plat review.



throughout the community.

Unearth the irrigation canals through the downtown area and seek ways to provide connections within and through the area, as well as tying into a City-wide network of pedestrian ways.

# **Parks and Recreation**

- Construct trails and sidewalks to connect the existing pathways around the creek, South Main Walk, and tie together the parks with each neighborhood, school, and community activity area.
- Adopt a policy for the conversion and use of floodways and drainage channels, abandoned railroad corridors, under utilized or vacant alleys, and other rights-of-way and easements as trails and walking connections.
- 10. Regularly submit applications for federal grants through the Transportation Equity Act for the 21st Century (TEA-21), the Land and Water Conservation Fund, and other available programs to leverage funds for bikeway planning and development.
- 11. Prepare a sidewalk improvement program to repair, replace, or install new sidewalks where they may be used as a connection to the community-wide trail network. Explore the alternative sources of funds, e.g. Community Development Block Grant (CDBG), and means of financing, such as an assessment district.
- 12. Coordinate with Val Verde County and the Texas Department of Transportation to install shared right-of-way signage and maintain adequate shoulders along U.S. 90, U.S. 277, and F.M. 2523 to accommodate avid distance cyclists.

# Coordination, Collaboration and Adequate Funding

Aging infrastructure, changing demographics, and increased demand for recreational programs and facilities have strained the resources of Del Rio, Val Verde County, the school district, and other public entities. Intergovernmental agreements and public-private partnerships create opportunities to use tax-dollars wisely, utilize land efficiently, and conserve precious

# Available Funding Techniques

- Current revenue
- · Reserve funds
- Enterprise and revenue funds
- General obligation bonds
- Lease-purchase
- Eminent domain
- Authorities and special districts
- Sales tax
- User fees
- In-kind services and volunteer participation
- State and federal assistance
- Land donation
- Trust fund
- · Private financing
- Land dedication
- Fee-in-lieu of development
- · Tax deferral
- Tax reductions

environmental resources. Joint acquisition, development, and ongoing maintenance of public spaces leverage additional resources. Coordination and collaboration among agencies (such as Val Verde County, the school district, Sul Ross University, and other public agencies) is of mutual benefit for all interests. It eases the burden on public tax dollars, enhances the quality of areas and facilities, and leverages their effectiveness.

A collaborative approach to parks and recreation planning requires communication and coordination among all vested entities and interested parties. Through agreements created between public agencies, as well as partnerships with the private sector, the parks and recreation system benefits in its quality and affordability. Joint acquisition, construction, ongoing operation, and maintenance allow efficient use of public dollars, while ensuring that facilities are coordinated and connected.

Funding major improvements, particularly to overcome the severity of current deficiencies is admittedly a significant challenge. There are a number of Texas communities who have faced similar challenges for which Del Rio can draw from for ideas as to capitalizing on existing

areas and natural features. Some ideas include:

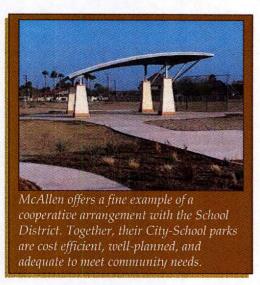
- Getting citizens personally involved in the preservation of Del Rio's precious resource by adopting a section of San Felipe Creek for clean-up and environmental protection. These and other groups could also be encouraged to participate in annual clean-ups and other "green" community events.
- A nonprofit organization could be formed such as that organized in San Marcos in 1985 during their Sesquicentennial celebration. A small group of citizens formed a group with a mission of preserving and protecting the flow, natural beauty, and purity of the San Marcos River. The group organized themselves as a nonprofit corporation to protect the river. A small group of San Marcos citizens and riverside land owners, plus civic groups like the Heritage Association and Lions Club and others, established a small endowment fund to generate interest income that could be dedicated and used for river protection. That endowment fund has been added to for over 20 years, and many people have given memorial donations in the name of family members or friends. Another example includes The Bayou Preservation Association (BPA), which is dedicated to improving surface water quality in Houston's creeks, rivers, and bayous. Much of what BPA does to improve water quality is through bayou clean-up programs, public education, habitat restoration, funding research, and advocating sustainable urban development that minimizes non-point source pollution. Working with governmental agencies and other environmental advocacy groups, the BPA strongly supports actions that would lead to water quality improvements in their waterways. The BPA is currently addressing litter in their bayous with a grant from the Galveston Bay Estuary Program.

The funding for parks and recreation is often a lesser priority in comparison to water, wastewater and drainage facilities, and safety sensitive services such as fire and police protection. However, parks and public open areas are also of essential importance to the public infrastructure system. While funding for the primary public facilities and services demand sufficient funding to avoid failing conditions, the dollars available for parks and recreation are less certain. Identifying a dedicated funding source and effectively leveraging state and federal grant funds is important to develop and sustain an adequate parks and recreation system.

**GOAL:** Cooperative agreements and coordinated efforts with other governmental jurisdictions, educational bodies, and private sector entities.

#### **RECOMMENDATIONS TO CONSIDER:**

1. Form mutually beneficial partnerships with and among the public and private sectors to expand and improve the provision of services and facilities. This can be accomplished through the establishment of programs for lease/purchase, tax incentives, and public maintenance to entice private sector participation in park system development. Another tactic is the encouragement of the private sector participation in the provision of parks and recreation opportunities by permitting innovative land development practices (clustering, conservation, and preservation development) and creating incentives that will result in an efficient utilization of land and provide greater opportunities for the provision of open space and preservation of the natural environment. The City can look at establishing alliances with



- local churches and other institutions for use of their facilities, as available, in exchange for contributions and improvements.
- 2. Provide for a "first class" parks and recreation system by providing adequate resources, funding, and attention. This could be accomplished through the identification of all potential funding sources, including Federal, State, County, City, and School District programs and budgets; donated and volunteer resources; and revenue sources such as user fees, exactions, fee-in-lieu of land, etc. The development of a formalized capital improvement program for parks and recreation areas and facilities and identification of a five-year plan of priority improvements and sources of funds. Regularly prepare nominations and applications to qualify for grant assistance or other

funding arrangements to finance annual capital improvements. Consider establishing a recreation district, as applicable, which has the authority to levy a tax to generate revenue toward the development and improvement of areas and facilities. The City could consider conducting a regulation-length, 18-hole municipal golf course feasibility study.

- 3. Develop agreements with Val Verde County, Del Rio ISD, and Sul Ross University to include joint acquisition of land, development and maintenance, and use of areas and buildings. Also encourage their involvement in the construction, management, and operation of parks and open space conservation areas.
- 4. Utilize the comprehensive listing of potential funding sources provided in Appendix A, Park Funding Sources, to identify potential programs to leverage additional funding for local projects. Subsequently, consider contracting with or hiring an experienced grant writer to regularly pursue Federal, State and foundation grants to subsidize local funding. Regularly submit applications for Texas Recreation and Parks Account (TRPA) program funds for both indoor and outdoor grants, which may be submitted in January and July of each year.
- 5. Establish a park land improvement fund, which would be an account for which fees in lieu of land dedication would be deposited. These fees must be contributed to a specific account as opposed to the general fund, that can be effectively tracked to ensure expenditures benefit the areas (park zones) from which they were derived.

#### PARK CLASSIFICATION

The National Recreation and Park Association (NRPA) published the Recreation, Park, and Open Space Standards and Guidelines to establish nationally applicable criteria for the provision of parks and recreation facilities and open space. These standards serve as a guide for parks and recreation planning, but do not replace reasonable judgment or specific local needs. The needs and desires of the citizens of Del Rio justify continued development of parks, recreation, and open space to meet the specific needs and requirements of the community.

While national standards are useful, it is important to ensure they are reasonable for the community given considerations such as participation trends, user characteristics, demographics, socioeconomics, climate, natural environment, and other considerations. Leisure and recreation values are unique to each municipality; therefore, it is important that the standards represent the interests and desires of the community.

A variety of types and sizes of parks and recreation facilities and activities are recommended to satisfy the diverse interests of the population, to ensure adequate and equal opportunity for all persons, and, ultimately, to encourage use by all population groups. The classifications of parks needed to meet the diverse needs of the community are as follows:

### Community Parks

Community parks are intended to function on a large-scale, serving the parks and recreation needs of an entire community. They are typically larger in size and include facilities and improvements for area-wide activities and assembly events such as picnic areas, walking/jogging trails, athletic fields, and other larger scale activities. It is important that adequate offstreet parking is provided. Where feasible, community parks should be located adjacent or connected to a greenway to provide an off-street linear linkage with other areas. Displayed in Figure 4.2, Illustrative Community Park, is a typical community park.



#### Role

In cities like Del Rio, a community park often serves as the principal focal point for civic gatherings and organized recreational programs, special events, and sports league play. Further, a community park can often become a major landmark to the community, a symbol that enhances community identity and is beloved by residents.

The size of community parks varies according to the availability of land and the ability to take advantage of acquisition opportunities over time. Many community parks in smaller cities are situated along river or creek corridors; others were integrated into a city at the time of original settlement and platting.

#### Standards

National standards recommend a minimum community park size of ten acres, assuming appropriate topography and absence of other development constraints. Many community parks,

#### **Chapter Four**

# **Parks and Recreation**

especially those with athletic field complexes for organized sports, are as large as 25 to 40 acres. In overall acreage terms, the standard is five acres per 1,000 in population. Recommended facilities and improvements include:

- Picnic tables with covers with barbecue pits or grills
- Sidewalks and/or a natural walking trail
- Mountain biking trails with exercise stations (optional)
- Shade trees and native landscaping
- Drinking fountains
- Security lighting
- Multi-purpose open play areas
- Multi-purpose courts
- Playground equipment and playscape (up to 50 children)
- Bicycle racks
- Perimeter fencing or landscaping
- Street signs indicating "children at play"
- Benches
- Trash receptacles and enclosures
- Curb cuts and crosswalks
- Tennis courts
- Basketball courts
- Softball and little league fields with bleachers
- Soccer/football fields with goals and goal posts
- Sand volleyball courts
- Swimming pool
- Covered pavilions
- Performance stage (optional)
- Restrooms
- Fencing for ball fields and athletic courts
- Concrete surface for a general play area
- Off-street parking

### Locations

Community parks should be centrally located for convenience to all residents. They should have direct access to collector or arterial streets in order to handle special event traffic, while avoiding neighborhood disruption. Community parks should include adequate off-street parking. The "ideal" service radius of a community park is one mile. A community park that is located in or near a residential area usually serves a secondary role as a neighborhood park (see next section).

### Neighborhood Parks

Neighborhood parks should provide facilities and improvements that conveniently accommodate use by surrounding neighborhoods. Ease of access from surrounding neighborhoods, central location, and pedestrian/bicycle linkages are key considerations when

developing neighborhood parks. They should be designed to accommodate the needs of all ages and, therefore, should have a blend of passive and active facilities.

#### Role

Neighborhood parks are intended to provide residents with ample opportunity for both passive and semi-active recreation activity. The method of determining the need for neighborhood parks is quite different from an assessment of need for community parks. Whereas community parks are designed for large-scale, area-wide events and activities, neighborhood parks are intended to meet the daily recreation needs of nearby residents. The level of activity is limited as a result of the size and location of these parks and the equipment and facilities available. A typical

neighborhood park layout is displayed in Figure 4.3, Illustrative Neighborhood Park.

The size of neighborhood parks varies according to the availability of property, method and timing of acquisition, and intended use. One or two vacant lots, such as the FEMA lots, or several acres may both adequately serve the needs of a neighborhood if there is an even distribution of parks and sufficient facilities and equipment available. National standards recommend a minimum neighborhood park size of five acres, assuming an adequate and even distribution. Although a ten-acre park may accommodate ball fields and larger recreation and open



space areas, two parks that are five acres in size may equally, and perhaps better, serve the need, while providing a broader distribution of neighborhood parks.

### Standards

The ideal neighborhood park should be between five and ten acres, with the provision of one acre per 1,000 residents. Recommended facilities and improvements include:

- Picnic tables with sheltering covers
- Barbecue pits
- Sidewalks and/or a natural walking trail
- Shade trees and landscaping
- Drinking fountain(s)
- Security lighting
- Multi-purpose open play area with multi-purpose play courts
- Playground equipment and/or a playscape (up to 25 children)
- Perimeter fencing or landscaping w/benches
- Restrooms with on- or off-street parking
- Trash receptacles with curb cuts and crosswalks

It is important that a neighborhood park has toilet facilities. The lack of a restroom significantly limits the park's service radius and prevents it from accommodating organized recreation program activities or events, especially children's programs.

### Location

Neighborhood parks should be within a short walking distance (typically one-half mile or less) for the residents of one or more neighborhoods, thereby encouraging use and promoting convenience, ease of access, and walking safety for neighborhood children. Whenever possible, they should be located away from busy arterial streets and should not require any busy street crossings for access from their constituent neighborhoods. Accomplishing this has been difficult in Del Rio, particularly in the more mature, built-up areas having grid street patterns.

#### Mini Parks

Mini parks are intended for active recreational use of nearby property owners, such as within apartment complexes and residential subdivisions. There are no specific criteria to guide development of mini parks, although they should have facilities and improvements available to meet the identified needs of children living in the immediate area. The notable features that distinguish a mini park from a neighborhood park are its considerably smaller size and the lack of restrooms.

#### Role

Mini parks serve the immediate need of providing a minimum play area within minutes' walking distance of residents in the very immediate area. Unfortunately, mini parks in many communities are established to mitigate the need for a nearby neighborhood park. When this circumstance arises, the mini park often sustains heavy use and requires considerable maintenance. Facilities that are less than one-half acre in area are usually considered inefficient, as they require nearly as much time for mowing and other routine maintenance tasks as a neighborhood park. For this reason, many communities discourage the acquisition and development of truly small mini parks.

### Standards

As mentioned before, there are no specific size or facility standards for mini parks, but guidelines suggest that there should be one- to three-tenths acre per 1,000 residents. Recommended facilities and improvements might include:

- Picnic tables with covers
- Perimeter sidewalks
- Shade trees and native landscaping
- Drinking fountain
- Security lighting
- Multi-purpose open play area
- Playground equipment (up to 15 children)
- Perimeter fencing or landscaping
- Benches

- On-street parking
- Trash receptacles
- · Curb cuts and crosswalks

#### Location

The most important criterion for mini park location is that it be situated on a local, low-traffic street with sidewalk or path access to the residents it serves.

### **Open Space**

Open space areas include reserved public lands dedicated as permanent open space, such as that along Kings Way. These lands are generally owned by the local government or dedicated through private instrument as a development reserve. They are typically undeveloped and used for informal activities. They may also serve as flood collection areas during major storm events. Other examples of open space areas include easements for drainage basins, excess rights-of-way, greenways, and street esplanades.

#### Miscellaneous Facilities

There are many additional types of park and recreational facilities that fall outside of the classifications just described. Examples include:

- Athletic Field Complexes. Within the past 25 years, many cities have developed specialized, stand-alone facilities for baseball, softball, and soccer. These include multiple fields, restrooms, refreshment stands, and an abundance of off-street parking. Usually situated on a major street, these facilities are particularly suited for organized league activities and are intensely used during summer evenings and portions of the weekend. The Val Verde County Youth Sports Complex is an example.
- Recreation Centers. Del Rio's Boys and Girls Club of America serves as an example of a facility that provides all-season indoor activities. It has direct access to an arterial street and includes an area for off-street parking.
- The Del Rio Recreation Complex helps to meet the community needs for athletic fields and courts.
- Specialized Facilities. Del Rio's Pop Word Baseball Field is an example of a specialized
  facility that draws heavy use for a single type of activity. Another example is Chihuahua
  Soccer Fields, which is City-owned and maintained by the Parks and Recreation Division.
- Pathways and Trail Systems. These facilities provide active recreation opportunities for hikers, bicyclists, casual walkers, and joggers of all ages. Dedicated trails usually take advantage of natural stream corridors like San Felipe or Cienegas Creek, drainage courses, and open areas. Often a trail system includes dedicated lanes on existing streets as linkages between components of an off-road trail system.
- Historic Sites and Buildings. Many communities get the opportunity to acquire, restore, and operate specific historic sites and buildings. These include old mansions, railroad passenger

stations, and similar landmark buildings. Often, these sites retain only limited use, but have the opportunity to be integrated into the park and recreation center with expanded programming. Historic sites in Del Rio include the Whitehead Museum and Brown Plaza.

- Nature and Interpretive Centers. These areas usually include facilities that are oriented toward a specific natural feature such as a natural prairie, wetland, unusual geologic features, or scenic vista. Uses are specific and of low intensity. These facilities usually do not integrate with other elements of a park system, except for the trail system. The nearest example of such a center in Del Rio would be the Shumla School, an Amistad NRA partner, which is a living museum and experiential education center.
- Facilities for Persons with Special Needs. Many communities are developing specialized
  facilities that support activities for persons with disabilities and special needs. In most cases,
  these facilities and activities are located within or adjacent to an existing community park,
  neighborhood park, or trail system, rather than on its own site. An example of this is a
  sensory garden at the Quinta Mazatlan World Bird Center in McAllen, which was a recent
  project of Leadership McAllen, sponsored by the Economic Development Corporation.
- Campgrounds. Some municipalities, and more often counties, support publicly-owned campgrounds. This occurs particularly in areas that attract an abundance of tourists. This is applicable as it relates to Lake Amistad and the National Recreation Area, which is an opportunity to attract visitors to Del Rio.
- Golf Courses. Many cities of Del Rio's size or larger own and operate full-size municipal golf courses designed for public play. While activities are limited only to golf, a municipal course can become a valuable contributor to the community's open space system and can enhance the aesthetics of an entrance to the City. Many public municipal golf courses throughout the U.S. were once privately owned, either as commercial facilities or as country clubs, and were subsequently purchased by the municipality in order to enable continuation of play and as a measure to preserve valuable open space from development.

# **FACILITY DEVELOPMENT GUIDELINES**

As parks and recreation sites are evaluated for development, it is important for the City to have a standardized list of facilities and equipment desired for each type of park to assess the development feasibility of each site, as identified in the park classification system described in the above section. There are important considerations in developing parks including the size, shape, and orientation of the site; pedestrian, bicycle, and vehicular access and parking; adjoining land use; development constraints such as grades, poor drainage, and flooding; environmental impacts; and the anticipated use of the park. In assessing the feasibility of a site, each of these considerations is important.

Provided in Table 4.1, Facility Development Guidelines, are general guidelines for developing activity areas and improvements within a park facility. It identifies the requisite space and dimensional requirements, orientation, applicable service radius, and generally required *per capita* units. Of note in this table is the current NRPA standard of one soccer field per 10,000 persons. This appears to be too low for many communities as the popularity of organized children's soccer programs has increased significantly in recent years. Therefore, a more accurate standard is one field per 5,000 residents.

		Table Facility Development Guidelines (par					
Activity/ Facility	Required Space	Size and Dimensions	Orientation	Units per Population	Service Radius	Location Notes	
Basketball							
Youth	2,400-3,036 sq. ft.	46'- 50' x 84'				Outdoor courts in neighborhood	
High School	5,040-7,280 sq. ft.	50' x 84'	Long axis north- south.	1 per 10,000 persons.	1/4 - 1/2 mile.	and community parks, plus active recreation areas in other park	
Collegiate	5,600-7,980 sq. ft.	50' x 84'				settings.	
Soccer	1.7 - 2.1 Ac.	195' to 225' x 330' to 360' with a minimum clearance of 10' on all sides.	Fall season long axis northwest to southeast. For longer periods, north to south.	1 per 10,000 persons. This standard needs to be discussed further.	1 - 2 miles.	Number of units depends on popularity. Youth soccer on smaller fields adjacent to schools or neighborhood parks.	
Tennis	Minimum of 7,200 sq. ft. for a single court. (2 acres for a complex).	36' x 78'; 12' clearance on both sides; 21' clearance on both ends.	Long axis north- south.	1 court per 2,000 persons.	<sup>1</sup> / <sub>4</sub> - <sup>1</sup> / <sub>2</sub> mile.	Best in batteries of 2 to 4. Located in neighborhood/ community park or adjacent to a school site.	
Volleyball	Minimum 4,000 sq. ft.	30' x 60'. Minimum 6' clearance on all sides.	Long axis north- south.	1 court per 5,000 persons.	<sup>1</sup> ⁄ <sub>4</sub> - <sup>1</sup> ⁄ <sub>2</sub> mile.	Same as other court activities (e.g badminton, basketball, etc.).	
Football	Minimum 1.5 ac.	160' x 360' with a minimum of 6' clearance on all sides.	Fall season long axis northwest to southeast. For longer periods, north to south.	1 per 20,000 persons.	15 - 30 minutes travel time.	Usually part of baseball, football, soccer complex in community park or adjacent to high school.	
Multiple-Use Recreation Court (basketball, volleyball, tennis)	9,840 sq. ft.	120' x 80'	Long axis of courts with primary use is north-south.	1 per 10,000 persons.	1 - 2 miles.	In neighborhood or community parks.	
Open Space	Minimum of 40 percent undeveloped per park.	N/A	N/A	5 acres per 1,000 persons.	30 minute travel time.	Within neighborhood and community parks or stand-alone.	

Source: Park, Recreation, Open Space and Greenway Guidelines, National Recreation and Parks Association, 1995.

Activity / Facility	Required Space	Size and Dimensions	Orientation	Units per Population	Service Radius	Location Notes
1/4 Mile Running Track	4.3 acres.	Overall width - 276'. Length - 600.02'. Track width for 8, 4'- lanes is 32'	Long axis in sector from north to south to northwest to southeast with finish line at northerly end.	1 per 20,000 persons.	15 - 30 minute travel time.	Usually part of high school or in community park complex in combination with baseball, soccer, etc.
Baseball			3 1			
Official	3.0 - 3.85 acres minimum.	Baselines 90'. Pitching distance 60-1/2'. Foul lines 320' min. Center field 400'+.	Locate home plate so the pitcher is throwing across the sun and the batter is not facing it. Line from home plate through pitcher's mound runs east-northeast.	1 per 5,000 persons.	¼ - ½ mile.	Part of neighborhood complex. Lighted fields should be part of a community park or sports complex.
Little League	1.2 acres minimum.	Baselines 60'. Foul lines 200'. Center field 200'- 250'.	Same as baseball.	Lighted 1 per 30,000 persons.		
Softball	1.5 - 2.0 acres.	Baselines 60'. Pitching distance 46' min.; 40' women.  Fast pitch field radius from plate 225' between foul lines, slow pitch 275', men; 250', women.	Same as baseball.	1 per 5,000 persons (if also used for youth baseball).	1⁄4 - 1⁄2 mile.	Slight difference in dimensions for 16" slow pitch. May also be used for youth baseball.
Trails	N/A	Maximum 10' width, maximum average grade 5% not to exceed 15%. Capacity: Rural trails 40 hikers/day/mile. Urban trails 90 hikers/day/mile.	N/A	1 system per region.	N/A	Located in greenways, natural areas and parks, and along drainage ways, levees, and utility easements. Their purpose is to accommodate walkers, joggers, and bicyclists away from traffic.

# **FACILITY INVENTORY**

Source: Park, Recreation, Open Space and Greenway Guidelines, National Recreation and Parks Association, 1995.

The foundation for establishing an adequate, "first-class" parks and recreation system begins with the availability, location, and condition of the existing City-owned parks and recreation areas. In determining the need for additional parkland, recreational facilities, and park-related improvements, the first step is to assess the level of sufficiency of the existing parks in meeting

the needs of the community. This assessment is done first by comparing the acreage of parks to standards for cities of comparable size and, secondly, by soliciting the input of citizens.

	Acres	Agency
ommunity Parks		
ue Hole Park	2.85	City of Del Rio
Buena Vista Park	13.35	City of Del Rio
Oel Rio Lions Park	20.79	City of Del Rio
American GI	1.71	City of Del Rio
Pop Word Park	1.72	City of Del Rio
Rotary Park	2.93	City of Del Rio
J.C.O Park	8.09	City of Del Rio
Sub-Total	51.44	
Neighborhood Parks		
Blue Star	2.50	City of Del Rio
Carranza Park	18.78	City of Del Rio
Crestline Park	1.86	City of Del Rio
Greenwood Park	0.96	City of Del Rio
Hogan Park	4.79	City of Del Rio
Moore Park	9.82	City of Del Rio
Riverside Park	4.59	City of Del Rio
Roosevelt Park	5.46	City of Del Rio
State Park	4.52	City of Del Rio
Star Park	2.03	City of Del Rio
Sub-Total	55.31	
Mini Parks		
Bad Boy Park	1.50	City of Del Rio
Lions Park	2.52	City of Del Rio
Severiano Park	0.50	City of Del Rio
West Martin	0.44	City of Del Rio
Sub-Total	4.96	
Special Facilities	20.01	01 15 15
Amphitheatre and Creekwalk	20.04	City of Del Rio
Chihuahua Soccer Field	3.48	City of Del Rio
Skate Park	0.23	City of Del Rio
Romanelli Park	1.92	City of Del Rio
Sub-Total	25.67	City of Del Rio
Grand Total	137.38	

Integral to park planning is a thorough evaluation of the existing system. Each park must be evaluated in terms of its proximity to its users, its safety and accessibility, the availability and condition of its equipment and facilities, and its utilization.

The City currently offers an assortment of parks that provide opportunities for a typical variety of activities, as displayed in Figure 4.4, Existing Parks and Recreation Areas. The City presently has an inventory of 25 parks (this differs from the City's count because Brown Plaza is classified as an Historic Site) owned and maintained by the City, a total of 137.38 acres of land. The acreage is divided into six community parks (Blue Hole, Buena Vista, Del Rio Lions, Pop Word, Rotary, and U.C.O. Parks) offering 51.44 acres; eleven neighborhood parks (Blue Star, Carranza, Crestline, Greenwood, Hogan, Memorial, Moore, Riverside, Roosevelt, State, Star) totaling 55.31 acres, five mini parks (American GI, Bad Boy, West Martin, Lions, and Severiano) adding 4.96 acres; and four special use facilities (Amphitheatre and Creekwalk, Chihuahua Soccer Fields, Skate Park, and Romanelli Memorial Park) contributing 25.67 acres.

Del Rio parks and other recreation or open space assets are identified in **Table 4.2**, **Existing Park Areas**. These do not include faculties maintained by the San Felipe - Del Rio Independent School District or Val Verde County.

## Community Parks

Del Rio's seven community parks, while somewhat small for this classification, with the exception of Buena Vista and Del Rio Lions Parks, are concentrated primarily in south Del Rio (south of Gibbs Street). Because they are located within residential areas, they also serve the role of a neighborhood park.

- Blue Hole Park. This park is located south of Gibbs Street, linking the San Felipe Country Club and the Amphitheatre and Creekwalk. By community park standards, it is relatively small, but includes two pedestrian bridges, eight trash cans, three dumpsters, 14 picnic tables, four grills, water fountain, two benches, two portable restrooms, a basketball court with one net, a mural, two historical markers, and three fire pits. Blue Hole Park does not have permanent restrooms, a factor that limits its service area.
- Buena Vista Park. This park is located on Fox Drive and consists of the following lighted field/courts; basketball court, softball field, and tennis court.
- San Felipe Lions Park. This park is located near Bridge Street, and its' adjacency to Spring Creek increases its number of users. It offers a shelter with four tables and two smokers/grills, 13 picnic tables, six grills, three swings, one small merry-go-round, five small spring animals, two mid-size play structures, sand volleyball, one drinking fountain, restrooms, and parking.
- American GI/Pop Word Park. This heavily used facility is dedicated to youth baseball. It is located between Aguirre and Vitela Streets, south of E. Garza and offers three covered picnic tables and trash cans, one gazebo, three fire pits, swings, one small slide, two benches, one basketball court with two nets and a surface in need of repair, bleachers, one lighted baseball field, one tennis net in poor condition, one dumpster, and approximately 50 parking spaces.

- San Felipe Rotary Park. This park is located off of Canal Street and Cisneros Street southeast of Downtown. The park offers nine picnic tables, three benches and trash cans, one fire pit, half of a basketball court in good condition, two dumpsters, one small play structure, and three small spring animals. The park is lighted, the parking lot is gravel, there are two fenced
- U.C.O Park. This park is located on U.C.O Drive in southwest Del Rio. It has a well lit
  basketball court and baseball field.

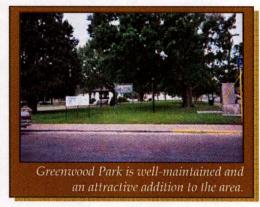
## Neighborhood Parks

Del Rio's ten neighborhood parks are concentrated in south Del Rio, south of Gibbs Street. Crestline is the one park in northeast Del Rio and Star Park is on North Main Street. None exceed five acres in size, with the exception of Moore Park that is 9.82 acres.

- Blue Star Park. This park is located on Highway 90 East across from the San Felipe Country Club.
- Carranza Park. This park is located between Second Street and Johnson Boulevard. It consists of green space and offers a half-court basketball court.

soccer goals, a shelter with a large fire pit, and restrooms.

- **Crestline Park.** This park is located on Crestline Drive in Northeast Del Rio. It consists of a swing set and a slide.
- Greenwood Park. This park is located at the southwest corner of Las Vacas Street and Losoya Streets near Downtown. It is a small triangular shaped lot and not quite one acre in size, small by neighborhood park standards. It serves the Greenwood Park subdivision and offers one gazebo, nine benches, four trash cans, and decorative lighting.



- Hogan Park. Hogan Park is adjacent the Creekwalk, which makes it a very heavily used park
  in the community. It offers a covered area, but no tables or grills. There is one portable
  restroom in addition to the permanent restrooms, a parking lot with 156 spaces, one lighted
  field, four trash cans, one dumpster, three bleachers, and a crow's nest.
- Moore Park. Moore Park offers one of two public swimming pools. As a result, this park is
  heavily used throughout the summer months. This park offers a pool house and a covered
  area with a picnic table and a large BBQ pit, two dumpsters, two portable restrooms, three
  trash cans, seven additional picnic tables, three pedestrian bridges, three grills, a water slide,
  and five benches.
- Riverside Park. This park is situated adjacent Rotary Park and the San Felipe Creek in South Del Rio.
- Roosevelt Park. This is a baseball park located on Spring and Madean Streets. This field is
  used by the Del Rio Rams and youth baseball teams. It offers a covered bleacher area with six
  cooling fans.
- Star Park. This is a small park on North Main Street, south of 5th Street.
- State Park. This park is located south of Gibbs Street, linking the San Felipe Country Club and the Amphitheatre and Creekwalk. It includes two pedestrian bridges, 14 picnic tables,

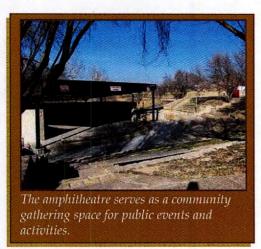
# Chapter Four

# **Parks and Recreation**

four grills, water fountains, two benches, a basketball court, two historical markers, and three fire pits.

## Mini Parks

- Rotary Annex Park. This undeveloped parkland is located in South Del Rio near Brown Plaza.
- Del Rio Lions Park. This park is located on Fox Drive. It has a walking track, pavilion, BBQ pit, swing set, monkey bar set, and several benches for this nice shady park.
- **Severiano Park.** This park is adjacent to the Amphitheatre and the San Felipe Creek. It ends beneath the Gillis Street Bridge.
- West Martin Park. This park is located in far southeast Del Rio, two blocks north of the Chihuahua Soccer Fields. It is only 0.44 acres and is surrounded by small homes. This park



offers seven benches, one basketball court with one net, one shelter with four benches, swings, climbing bars, one merry-go-round, one slide, one toddler swing, and one small spring animal.

#### Green Belts and Trails

There are 9.33 miles of walking trails provided to the community. These are scattered between 12 different locations. These are focused either in the well-established southern residential and downtown areas south of Gibbs Street, or in the newer residential areas west of Veteran's Boulevard, north of 17th Street. Most notable is the Spring Creekwalk, which is comprised of 0.7 miles of walking trails along Spring Creek between Gillis Avenue to the southwest and the Country Club

to the north. The creek is a source of considerable community pride and sponsorship. It is widely used and supported by many recreational programs.

#### **Special Facilities**

- Spring Creek Amphitheatre. The spring is the highlight of Del Rio. The amphitheatre is located along Spring Creek and provides an area for outdoor concerts and performances. The open park area surrounding the amphitheatre is heavily utilized and the creek is a source of pride for the community.
- Chihuahua Soccer Fields. This is the one dedicated soccer facility for the community and is,
  therefore, very heavily used. The park offers six soccer goals, five trash cans, three bleachers,
  has a gravel perimeter, and one dumpster. This park is located off of Frontera Road, a very
  heavily traveled truck route for 18-wheelers bringing shipments across the border. Soccer is a
  very popular sport in the community and the condition of the turf on these fields is poor.
- Skate Park. This park is a new addition to the park inventory in Del Rio. It is a former tennis court that has been converted into a skateboarding park, it is 0.23 acres in size. It is adjacent the Joe Ramos Nutrition Center.

 Romanelli Memorial Park. This is a memorial park that is presently under development to honor fallen police officers in Del Rio. The park is 1.92 acres and adjacent the amphitheatre and creekwalk

#### Joint Use of School Facilities

School playgrounds, athletic fields, and courts could provide additional park and recreation areas and, if accessible to the public, would enhance the number and availability of neighborhood parks within the City. Presently, the City and School District do not have a formalized agreement for the use and programming of both City and school facilities, particularly gymnasiums and pools. The sharing of these public resources would facilitate greater efficiency and minimize duplication.

As displayed in Figure 4.5, Park Service Areas, the school sites would contribute to the service area coverage of the neighborhood parks. While there would be some degree of overlap with the neighborhood park facilities, they serve some areas that are not well-served by existing neighborhood park facilities. If a joint use agreement can be reached between the City and School District, the coverage of park facilities can be expanded to better serve the community. Joint use of facilities and inter-jurisdictional agreements reap benefits for all parties and may result in the establishment of park and recreation facilities in unincorporated areas.

#### **RESOURCES VS. NEEDS**

combination standard-based and demand-based approach was used to assess the need for additional parks and recreation areas and facilities within Del Rio. The demand-based approach entails input from City's Parks Recreation Department staff and public meetings, which were intended to solicit citizen participation during the course of this planning process.

Classification	Standard	Low	High	Recommended	
Community Park	3 to 5 acres/1,000 persons	101.60	169.34	135.47	
Neighborhood Park	1 to 3 acres/1,000 persons	33.87	101.60	67.73	
Mini Park	.1 to .3 acre/1,000 persons	3.39	10.16	6.77	
Total	139	281	210		

Classification	Standard	Low	High	Recommended
Community Park	3 to 5 acres/1,000 persons	141.04	235.06	188.05
Neighborhood Park	1 to 3 acres/1,000 persons	47.01	141.04	94.02
Mini Park	.1 to .3 acre/1,000 persons	4.70	14.10	9.40
Total	193	390	291	

Using the published standards of the National Recreation and Park Association (NRPA), the acreages of parks and recreation areas currently needed are as displayed in **Table 4.3**, **Recommended Area Standards**. The need for additional parks and recreation acreage is determined by applying the recommended standards to the population of the City.

Displayed by Table 4.4, Recommended Area Standards - Future, is the need for park acreages based on the projected population of 47,012 persons. One can quickly comprehend that the shortages in park acreages that are experienced by the community today will be exacerbated as the population increases by the Year 2030.

## Commentary

As shown in **Table 4.3**, **Recommended Area Standards**, which is based on a 2000 Census population of 33,867 persons, the total acreage needed today ranges from approximately 139 to 281 acres. The recommended need (which is based on the average of the low and high columns indicated in the table above) shows a total of 210 acres of needed community, neighborhood, and mini parks.

Currently, the City maintains 136.91 acres of parks and recreation areas in the three specified categories, which does not include athletic fields that are owned by the School District but available for resident use. Since the athletic fields and other specialized recreational areas are not typically used by all persons on a daily basis, they have not been included in the total parks and recreational acreage for the purpose of this analysis. Therefore, based on the park acreage available to the community today, the City is roughly 57 acres deficient in the amount of public parkland. In addition to the 136.91 acres of parks, the City has 26.1 acres of FEMA buy-out properties. Also, the City has 73.14 acres of land that is leased to the San Felipe Country Club, while this may fulfill some park and recreation needs of the community, the fact that it is a private 9-hole golf course limits it from benefiting the whole community and therefore it is not included in the total park acreage for Del Rio.

Displayed in Table 4.4, Recommended Area Standards - Future, is a tabulation of the recommended supply necessary to support the existing population and a projected future population of 48,337 persons (refer to Chapter 2, Snapshot). Of the recommended acreages according to NRPA standards, Del Rio is currently deficient of park area in each of the three categories. The total acreage needed to support the projected population ranges from 193 to 390 acres. The recommended need shows a total of 291 acres of needed community parks, neighborhood parks, and mini parks. By the year 2030, the City is projected to need an additional 138 acres of developed park areas.

#### Qualitative Analysis and Commentary

From a land area standpoint, Del Rio's park system appears deficient. There are, however, significant factors that compensate for this:

- There is an abundance of regional outdoor recreational opportunities near Del Rio, most noteworthy is Lake Amistad.
- The Spring Creekwalk enhances the effectiveness of the overall park system to a degree that
  is more than commensurate with its acreage. In essence, the trail system functions as a
  community park and supports the types of contemporary, "active living" programs that are
  now so popular.

 Sul Ross University student enrollments, which are included in the Census population, skew the statistics, though it would be inappropriate to omit students from the calculations.

Nevertheless, the need for more park land is made apparent by the heavy utilization of existing parks (particularly the Chihuahua Soccer Fields and Moore Park), the frequency of needed trash collections, demand for new soccer fields, and other measurable factors. Overstressed parks require higher maintenance and more frequent replacements of facilities.

#### SERVICE AREAS

Shown by Figure 4.5, Park Service Areas, is a map showing one-half mile perimeters of existing parks and school playgrounds. The subsection will provide additional commentary on strengths and weaknesses from a location standpoint. Preliminary analysis indicates that the following areas lack convenient access to City park facilities:

- Neighborhoods north of Mary Lou Drive, which are served only by Green and Buena Vista Elementary Schools.
- Residential areas north of S.H. 90 and east of S.H. 277 are entirely lacking of parks of any kind.
- Residential areas in the far southwest sector where there are no parks for a distance of greater than one mile.
- The eastern neighborhoods that are outside the service area of Pop Word Park.

## **OPPORTUNITIES AND CONSTRAINTS**

Citizens would like to see improvements made to Del Rio's park system. It is clear that more lands are needed and that the City should take advantage of every available opportunity to supplement the system. The planning process must also give realistic consideration to its limitations.

#### **Opportunities**

Current expansion opportunities include:

- Expansion of the Creekwalk south and west, connecting Downtown and the historic residential neighborhoods.
- Neighborhood park acquisition in conjunction with new residential redevelopment, within both the City limits and extraterritorial jurisdiction.

#### Constraints

The major constraints to future park development, in addition to reasonable funding limitations, include:

- Lands surrounding heavily used U.C.O, Pop Word, Blue Hole, and Hogan Parks are already developed, precluding any reasonable expectations of expansion without acquisition and demolition of adjoining residences.
- Limitations on linear expansion to the south and west are imposed by the City's proximity to the international border. As new crossings are exceptionally costly, continuing attempts must

be made to secure separated trail/walkway rights-of-way or easements for all current and future crossings.

 Areas in west Del Rio and in developing portions of north and southeast Del Rio have already been platted, thereby hampering any opportunity for significant acquisition.

## PARKS AND RECREATION SYSTEM RECOMMENDATIONS

#### **New Parks**

To enhance the system of neighborhood and community parks that will adequately serve the existing and projected future parks and recreational needs of the community, the City will need to acquire and develop parks within the identified deficiency areas. The following improvements will help to achieve full service area coverage of community parks and an even distribution of neighborhood parks. Recommendations include:

- A new community park in the far northern area of the community, west of U.S. 277 and north
  of Mary Lou Drive.
- A new community park in the area west of Downtown, generally south of 6th Street.
- A new neighborhood park established in the Greenway Addition, in the vicinity of the Val Verde Winery.
- New neighborhood parks with all new residential developments that meet a standard of six acres per 1,000 persons. Based upon 3.09 persons per household this equates to one acre of land dedicated for each 54 dwelling units.
- A new neighborhood park or mini park in the vicinity of southeast Del Rio to serve the
  existing neighborhoods, where convenient access to a park is now deficient. Developing
  these mini parks would require use of FEMA buy-out lots.

#### Bicycle Lanes and Bikeways

Pedestrian and bicycle facilities serve not only as alternative modes of transportation, but also as important forms of recreation. Therefore, in addition to trail system improvements, the City should develop a series of marked bikeways or bicycle lanes along the existing street system. These routes would be accommodated through striped bike lanes or extra wide curb lanes on arterials and collectors.

A majority of bicyclists are less skilled and need to be separated from high speeds and high volume traffic through the use of off-street bike lanes and paths. Local and collector streets are suitable for use by most adult bicycle riders, while minor arterial streets are suitable for limited use by bicyclists due to higher traffic volumes and higher speeds. Further information on pedestrian and bicycle facilities is provided in the Transportation element. The system of off-street bike and walking trails should also be designed and constructed in compliance with the requirements of the Americans with Disabilities Act (ADA).

## Acquiring and Developing New Parks

Achieving a system of neighborhood and community parks that is uniformly distributed may be accomplished in several ways, including:

- **Pre-development acquisition.** The City should continue to identify opportunities to acquire desirable tracts that are favorably situated to accommodate expansion of the park system.
- Land donation requirements concurrent with subdivision approval. Developers should be required to set aside five percent of an intended residential development site's area for improvement as a future park that would serve the newly established neighborhood. For overall project sites smaller than 100 acres (i.e., the resulting park site would be smaller than five acres), a fee comparable to five percent of the site's market value should be provided to an established City trust fund and earmarked for future land acquisition in the vicinity of the proposed development.
- Developer impact fees. In addition to the land donation requirements stated above, developers should be required to pay an impact fee ranging from \$300 to \$500 per new residential unit to fund the actual improvements of park land. Collection of this impact fee would occur during the platting process.
- Public/private partnerships, donations, and other strategies. Just as universities, hospitals, and cultural institutions systematically pursue individual and corporate donations, the City should promote opportunities to receive donations and bequests of land.

While the maintenance and programming of community parks is generally agreed to be the responsibility of a governmental entity, there is much less certainty about the responsibility of the entity to provide and improve parks that are intended to serve a new neighborhood. Requiring the dedication of park land concurrent with a final plat or a development site plan is a sound method to assure adequate park areas consistent with the demand and impact placed on the public parks system by new development.

Development impact fees provide a needed supplement to land dedication requirements. They afford the advantage of greater flexibility in pooling of funds exacted from a cumulative number of smaller developments and, along with other funds, in applying them to purchase a larger or more desirable park site.

The limitation of land dedication and/or impact fees as a source of future park areas must be stated: Del Rio's population is projected to grow by only 14,470 in the next 25 years. Developers cannot be expected to bear the entire burden of expanding Del Rio's park system. Ultimately, the City will need to rely on other funding measures (donations, bonding, and capital budgeting) to perform this important task.

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# **APPENDIX K**

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#### 1 14" STREET PARK 14th Street

- # Gravel Playground
- \* Basketball Court

# 2 ABE BARRERA PARK

- 200 block Bridge Street ★ Picnic Tables/Benches
- ★ Volleyball Net (sand) ★ Playground Set
- ★ Grills

#### 3 AMPHITHEATRE 1105 W. De La Rosa

- \* Raskethall Court
- ★ Playground Set
- \* Swing Set

## 4 BLUE HOLE PARK

Hwv 90 E. along San Felipe Creek

- Metal Tables
- # Grills
- \* Bridge Over Creek

# BLUE STAR PARK

Hwy 90 E. ulung San Felipe Creek

# Historical Marker

# 6 BROWN PLAZA

Cantu & Cisneros

\* Gazebo

# 7 BUENA VISTA

1300 Kings' Way \* Swing Set

★ Playground Set

## 8 CAMP DEL RIO

Fermin Calderon & De La Rosa Street

\* Soccer Field

#### 9 CARRANZA PARK 608 Avenue V

\* Basketball Court

- ★ Pavilion
- \* Bathroom
- \* Playground

#### 10 CHIHUAHUA SOCCER FIELD 1401 Las Vacas

\* Soccer Field

# parks guide

# 11 CRESTLINE PARK

- 219 Crestline Drive
- ★ Playground Set
- \* Swing Set
- \* Picnic Table/Bench
- \* Grill

#### 12 DEL RIO LION'S PARK Fox Drive & Jutta

- ★ Playground Set
- \* Swing Set
- \* Monkey Bar
- \* Walking Trail

#### 13 G.I. FORUM 201 E. Garza

- \* Tennis Court
- \* Pavilion
- \* Swing set
- ★ Gazebo
- \* Basketball Court (lighted)
- \* Picnic Tables/Benches

# 14 GREEN BELT PARK

Dignowity & Ware Street

- Picnic Table/Bench
- Rocking Horses
- ★ Basketball Court
- \* Picnic Tables/Benches
- A Pavilion

# 15 GREENWOOD PARK

501 S. Griner Street

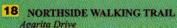
★ Gazebo

#### 16 HOGAN PARK 204 E. Garza Street

\* Picnic Tables/Benches

#### 17 MOORE PARK 100 Swift Street

- \* Picnic Tables/Benches
- \* Grills



- Playground Set
- ★ Drinking Fountain

#### 19 POPWORD FIELD 201 E. Garza

- \* Baseball Field
- \* Bathrooms

#### 20 RIVERSIDE PARK Barron Street

- ★ Grills
- \* Gravel Playground
- ★ Basketball Court
- ★ Grill

# 21 ROMANELLI

- 49 S. Bedell Avenue
- Picnic Tables
- Grills

# 22 ROOSEVELT PARK

800 Block of Spring Street

- \* Baseball Field
- \* Bathrooms
- ★ 2 Concession Stands & Press Box

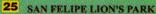
# 23 ROTARY

101 Cantu Street

- Basketball Court
- Picnic Tables/Benches
- \* Soccer Field
- \* Bathrooms
- \* Walking Trail
- \* Pavilion
- Wolleyball Sand Court
- ★ Playground Set
- ★ 2 Gravel Playground Areas

# 24 SAN FELIPE LION'S HUT

- 201 Taini Street
- Playground Set
- \* Pavilion
- \* Picnic Tables/Benches
- \* Grills



200 block Bridge Street

- \* Picnic Tables/Benches
- \* Grills
- ★ Playground Set 3 Slides & small towe
- Monkey Bars
- \* Rocking Horses
- ★ Play Set 2 Slides & tower

# 26 SEVERIANO PARK WAY

- 704 W. De La Rosa
- \* Picnic Tables/Benches

## 27 STAR PARK

North Main Street & 4th Street

- ★ Drinking Fountain
- \* Historical Marker

## 28 STATE PARK

Hwy 90 E. along San Felipe Creek

- \* Picnic Tables
- \* Grills
- \* Basketball Goal \* Historical Marker

# 29 UCO

101 U.C.O. Drive

- Playground Set
- \* Pavilions
- ★ Grills
- ★ Dathrooms

# \* Basketball Court

30 WEST MARTIN W. Martin & Perry Street

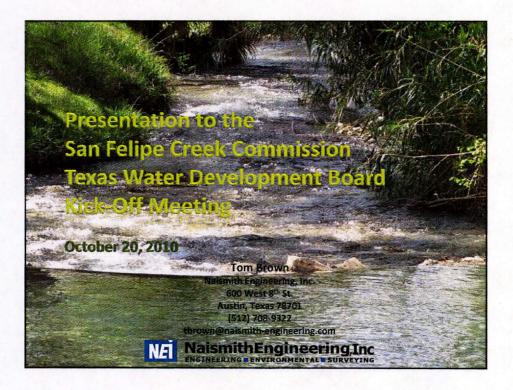
- \* Pavilion
- \* Basketball Court
- ★ Horse See/Saw
- \* Slide
- ★ Grill
- \* Picnic Table/Bench
- \* Monkey Bar
- \* Rocking Horse





# **APPENDIX L**

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# November-January, 2011

- Water Quality Strategies
  - Identify water quality issues associated with San Felipe Creek.
  - Identify impact of water quality on habitat restoration/protection.
  - Identify water quality best management practices appropriate for San Felipe Creek.
  - Review drainage plans and land use within the water shed.
  - Develop recommendations for water quality protection measures.

# **November-January 2011**

- Identify Habitat Restoration Strategies
  - Conduct a site visit and confer with applicable agencies to identify critical habitat in need of restoration.
  - Identify restoration strategies, including eradication of invasive species, protection of native vegetation, water quality protection, erosion control, and other best management practices.
  - Make recommendation on which strategies should be implemented.
  - Develop timelines and budgets for each of the strategies recommended for implementation.
- Identify Habitat Protection Strategies
  - Identify priority areas for habitat protection.
  - Identify habitat protection strategies, including protection of native species, water quality protection, erosion control, enhanced maintenance, and other best management practices.
  - Make recommendations on which strategies should be implemented.
  - Make recommendations on strategies for waste/litter prevention and collection strategies.
  - Identify compatible land uses along the creek.

# **Plan Development**

# February, 2011

- Develop interim report for San Felipe Creek Commission
- Post Interim Report on the City of Del Rio website
- Hold Public Meeting to present findings in Interim Report and solicit public input

# February-May, 2011

- Needs Assessment, Inventory, Public Involvement, and **Development of Goals, Objectives and Strategies** 

  - Identify existing land uses along San Felipe Creek including parks, open spaces and city owned properties Identify area/facility concepts for park and recreational needs in the region.

  - region:
    Conduct resident surveys/focus groups to obtain public input.
    Perform a needs assessment based on survey results, demographic analysis, and partnership opportunities.
    Identify compatible land uses along San Felipe Creek based on data collected in previous work tasks.
    Develop goals, objectives, and strategies to be incorporated into the Master Plan.

  - Identify the types of parks and recreational improvements available and future alternatives.
     Evaluate feasibility of an expanding hike and bike trail system.
     Identify education and recreational trail amenities.

  - Assimilate local historic character into the Master Plan.
     List current organized activities using San Felipe Creek.
     Identify potential activities that could be part of the public use.

# **Plan Development**

# May, 2011

- Develop Second Interim Report and post on City of Del Rio Website.
- Conduct a public meeting to obtain suggestions, comments, and input from the San Felipe Creek Commission and the community.

# June-July, 2011 Prepare Draft Master Plan

- Incorporate information obtained in Tasks 1 through 4 into a draft Master Plan addressing relevant goals, issues, and priorities and provide various alternatives to achieve the goals.
- Prepare preliminary cost estimates for each alternative presented in the draft Master Plan.
- Post the Draft Master Plan on the City of Del Rio website.
- Conduct a third public meeting to present the draft Master Plan to the public and receive suggestions and comments regarding the information and recommendations presented in the draft Master Plan.

# **Plan Development**

# August, 2011 Prepare Final Master Plan

- Incorporate suggestions and comments from the public into
  - the draft Master Plan and prepare a final Master Plan. The final Master Plan will also include:

     Prioritization of water quality, environmental, economic
  - development, park, recreational, and educational development alternatives based on owner and public input;
    Possible funding alternatives and options required in order to
  - implement aspects of the final Master Plan;

    An implementation stratogy for the final Master Plan
  - An implementation strategy for the final Master Plan, including financing and resource allocation options;
  - Cost estimates for each alternative in the final Master Plan;
- Post Final Master Plan on the City of Del Rio website
- Hold a fourth public meeting to present the final Master Plan.

# **Funding Deadlines**

# January, 2011

• Texas Water Development Board SRF Intended Use Plan Submission.

# March 1, 2011

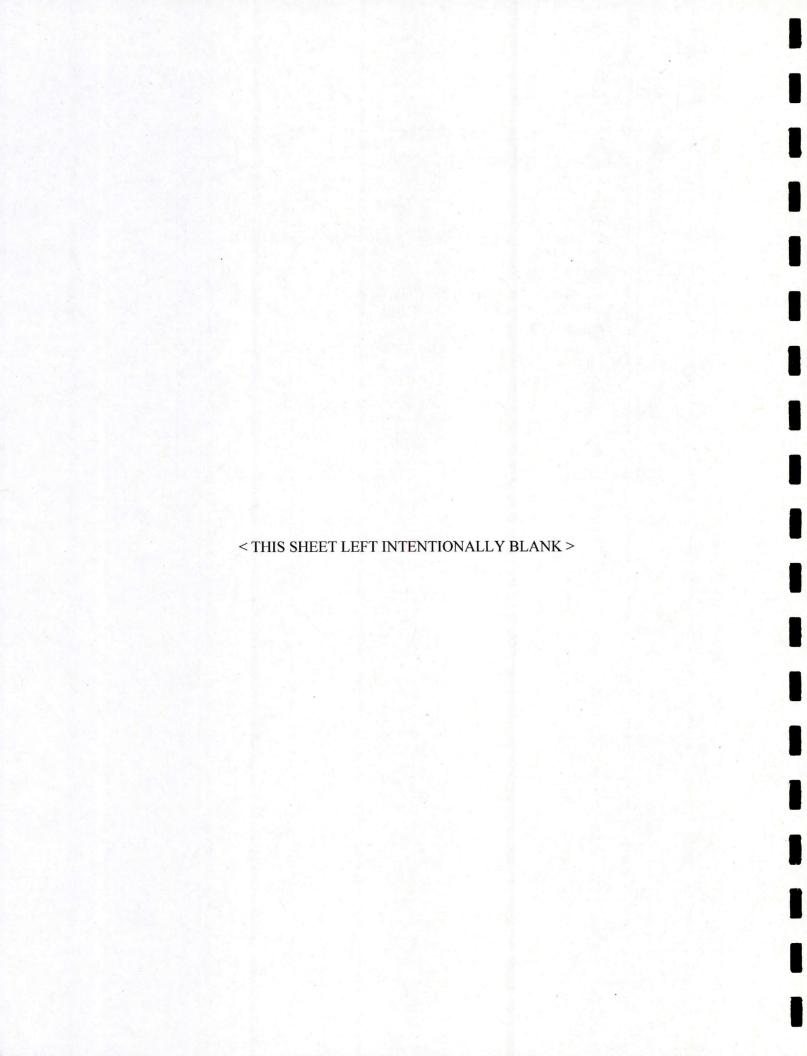
• Texas Parks and Wildlife Department Outdoor Recreation Grant Submission Date

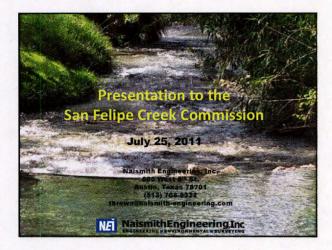
# May 1, 2011

 Texas Parks and Wildlife Department Trail Grant Submission Date

# July 31, 2011

• Texas Parks and Wildlife Department Outdoor Recreation Grant Submission Date





# San Felipe Creek Master Plan

- Subject: Development of a Master Plan for San Felipe Creek.
- · Our team consists of:
  - Naismith Engineering, Inc. (Tom Brown, David Fusilier, Adam Luke, Grant Jackson)
  - Sul Ross State University-Rio Grande Research Center (Dr. Dan Foley, PhD.)
  - CP&Y, Inc. (Bonnie Doggett, Sarah Itz)

# **Funding Sources for the Plan**

- Funding for this planning effort come from:
  - Texas Water Development Board- Research and Planning Fund.
  - Local Funds (City of Del Rio provided matching share).

# **Project Approach**

# **Integrated Management Approach**

- Incorporate existing plans into the final Master Plan.
- Natural Resource Management.
- Trail and Park Development.
- Public/Private Partnerships.
- Financial Plan.
- Public Participation.

# **Meeting Agenda**

- 1. Habitat Identification, Protection & Restoration
- 2. River Cane Delineation & Eradication Options
- 3. Water Quality Issues of San Felipe Creek
- 4. Water Quality Best Management Practices

# **Threatened and Endangered Species**

BONNIE DOGGETT, Biologist CP&Y – Austin, Texas

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	,	

# Threatened and Endangered Species of Val Verde County (USFWS)

- Black-capped Vireo (Vireo atricapilla)
- Least tern (Sterna antillarum)
- Mountain plover (Charadrius montanus)
- Texas hornshell mussell (Popenaias popei)
- Texas snowbells (Styrax texanus)
- Tobusch fishhook cactus (Ancistrocactus tobuschii)
- Devils River minnow (Dionda diaboli)

# Threatened and Endangered Species near the Project Area

- Recorded
   Occurrences from TPWD
- Critical Habitat from USFWS
- Habitat Assessment from CP&Y Field Survey



# Threatened and Endangered Species of Val Verde County

**Devils River minnow** 

- · listed as threatened
- · recorded occurrences in project area
- · critical habitat in project area



Photo @ Garold W. Sneega

# Threatened and Endangered Species of Val Verde County

San Felipe gambusia

- recently discovered (1997)
- no official federal status, but considered to be rare
- Suitable habitat for this species exists in project area



# Threatened and Endangered Species of Val Verde County

Texas hornshell mussell

- · Listed as candidate
- Lives in shallow runs over bedrock, in areas where small-grained materials collect in crevices
- San Felipe Creek in the project area contains suitable Texas hornshell habitat



# Threatened and Endangered Species of Val Verde County

**Mountain Plover** 

- Proposed threatened
- Winters in Val Verde Co in short-grass plains and fields, plowed fields, sandy areas



# U.S. Fish and Wildlife Service – Initial Coordination

- Met with Mike Montagne on June 13 and Bill Seawell on July 19.
- No mow zones discussed status. USFWS & TPWD consultation is continuing.
- Recommends cutting Arundo and then painting herbicide on by hand. Does not recommend spraying herbicide due to proximity to creek.
- Construction projects in and around the creek will require coordination with USFWS.
- Decide on and separate work to be done in creek into segments, conduct informal consultation on the portions to be completed within 5-10 years.

# U.S. Fish and Wildlife Service – Future Coordination

- No mow zones resolve status with USFWS & TPWD.
- · Coordinate and update throughout the process.
- Present San Felipe Creek Master Plan to USFWS & TPWD for their review.
- Submit construction plans for individual projects to USFWS & TPWD for approval prior to construction.
- Informal/Formal Consultation.

# Field Survey: July 6-7, 2011

Habitat assessment

Vative, non-native, and i

Wetlands & waters of the US de

# Wildlife Observed

- Squirrels
- Deer
- Crayfish Catfish
- Minnow
- Aquatic snails
- Turtles
- Lizards
- Yellow-crowned night-heron
- Cardinals
- Great-tailed grackles
- Mallard
- Geese



# **No Mow Zones**



Potential issues:

- fire hazard
- · limited visibility
- security risk
- · invasive species

City of Del Rio Management Plan for San Felipe Creek and the Devils River Minnow
"No Mow zones should be designated in open space areas adjacent to the creek... As a practical guides, no mowing should take place within and under the drip line of existing trees. No Mow zones also serve to provide habitat for birds and other wildlife."

# **No Mow Zones**

Consultation with USFWS and TPWD



Proposed Action:

Addition of riparian areas, vegetative filter strips, extended detention basins that could also serve as recreational areas (i.e. soccer fields), and native plantings to attract wildlife, including butterflies

# **Native Species**

 Common species identified within the project area:
 Pecan, Hackberry, Sycamore, Willow, Retama, Cottonwood, Mesquite, Huisache, Greenbriar, Dewberry



# Non-Native Species (species that do not occur naturally in an ecosystem)

- Elephant ears (Xanthosoma sagittifolium)
- Chinaberry (Melia azedarach)



# **Invasive Species**

(Species that aggressively establish themselves in an ecosystem at the expense of its native species and natural functions)

- Chinese tallow (*Triadica* sebifera)
- Japanese honeysuckle (Lonicera japonica)
- Fragrant Water Lily (Nymphaea odorata)
- Salt cedar (Tamarix ramosissima)
- Giant reed (Arundo donax)



# **Arundo Donax (Giant Reed)**

Dr. DAN FOLEY, Ph.D. **Associate Professor of Biology Sul Ross University** 

# BRIEF HISTORY OF (ARUNDO DONAX) IN TEXAS

➤ Introduced from Southwestern Europe (Spain) in the 1600's

• Used as feed for cattle and goats





· Provided thatching materials for roofs



## THE PROBLEM

- Can grow upwards of 4" per day
- Height of 25' 30' tall
- Huge water demand
- Outcompetes all native vegetation
- Now it is illegal to plant or sell Arundo Cane in Texas without a Texas Department of Agriculture permit



#### DOMINANCE OF ARUNDO ALONG THE RIO GRANDE

Giant River cane is now epidemic along the Rio Grande River

- ~15,000 acres of Arundo between Del Rio and San Ignacio, TX
- Spreading at a rate of 2.36% per year







#### ECONOMIC IMPACT OF ARUNDO CANE

- Along the Rio Grande Arundo cane has been measured to consume 4.37 acre-feet of water per acre per year = ~1.4 million gallons of water per acre per year.
- USDA-ARS in Weslaco has estimated that for the 170 miles from Del Rio – San Ignacio over the next 50 years Texas will lose between \$97.8 and \$159.9 million in lost revenue from the loss of saleable water for agricultural purposes alone.
- Along a 4.65 mile stretch of San Felipe Creek ~29 acres of cane currently exists resulting in a loss of 126.73 acre-feet of water per year or ~41 million gallons/year
- Arundo consumes about 3x more water than typical native vegetation

# PROLIFERATION OF GIANT RIVER CANE

Does <u>not</u> produce viable seeds



## PROLIFERATION OF GIANT RIVER CANE

> Does not predice violité seeds

➤ Spreading rhizomes



## PROLIFERATION OF GIANT RIVER CANE

Does not produce viable seeds.

factorization di manadalida escolo

➤Clonal asexual reproduction via adventitious shoots from displaced cane segments





# **ERADICATION METHODS FOR GIANT RIVER CANE**

## >Mechanical Control

- Cutting
  - Hand
    - Extremely time consuming
    - Only practical for very small patches (10-20' in diameter)
  - Tractor/brush hog
    - Much of San Felipe Creek Cane is inaccessible to equipment



- Burning
  - Arundo cane highly flammable, even when green (due to high silica content)
  - · Does not kill rhizomes (roots)
  - $\circ\,$  Not safe within residential neighborhoods

## ERADICATION METHODS FOR GIANT RIVER CANE

#### ➤ Chemical Control

- Herbicide only one brand approved by EPA for use around aquatic habitats
  - Glyphosphate Rodeo\*



- Literature indicates a 3% – 5% concentration is required for at least 60% kill ratio

- Application rate: 3 gallons per acre

- Rodeo® = ~\$40 per gallon

## ERADICATION METHODS FOR GIANT RIVER CANE

#### ➤ Chemical Control

Herbicide – only one brand approved by EPA for use around aquatic habitats

"Filvstrasphate" - Rodeo"



 Enternative indicates a 5% - 5% concentration is required for at Executive's x Tiltable

Redoch = 540 per callen

• Surfactant - DyneAmic\*



- Greatly increases effectiveness of herbicide by reducing water surface tension

- Application rate: ½ gallon per acre

- DyneAmic® = ~\$75 per gallon

## **ERADICATION METHODS FOR GIANT RIVER CANE**

#### ➤ Chemical Control

Herbicide – only one brand approved by EPA for use around aquatic habitats

Lingbooghate - Kadee)



Literature indicates a 3% - 5% opinioniration is required. For all tand 60% left water

- Applicate a take is gallows per also

Surfaciani – DyneAmic\*



without furthers affectiveness of helifolds by regits the

Applicance rate. Is gained per act

100 gallons of 3% glyphosphate + surfactant solution will treat ~1 acre Therefore, ~\$157.50 per acre treatment cost (exclusive of water fee)

# **ERADICATION METHODS FOR GIANT RIVER CANE**

#### ➤ Biological Control

- · Use of highly selective insect species which will feed upon various portions of Arundo donax
  - · Arundo Wasp (Tetramesa romana)
    - Already approved for release by USDA
    - USDA has already established populations along the Rio Grande River in Laredo, Eagle Pass & Del Rio
    - Del Rio City Council approved a resolution supporting the introduction of Arundo Wasps along San Felipe Creek
    - A minimal population is currently present along San

Felipe Creek





# ARUNDO WASP DAMAGE ALONG SAN FELIPE CREEK

## **ERADICATION METHODS FOR GIANT RIVER CANE**

# ➤Biological Control

- · Use of highly selective insect species which will feed upon various portions of Arundo donax
  - · Arundo Scale (Rhizaspidiotus donacis)
    - Feeds on the rhizomes of plant

    - Already approved for release by USDA
       In the initial stages of establishing populations along Rio



### **ERADICATION METHODS FOR GIANT RIVER CANE**

- ➤Biological Control
  - Use of highly selective insect species which will feed upon various portions of Arundo donax
    - Arundo Fly (Cryptonevra sp.)

       Larvae feed on grow tip

      - Not yet approved for release





### **ERADICATION METHODS FOR GIANT RIVER CANE**

- ➤ Biological Control
  - Use of highly selective insect species which will feed upon various portions of Arundo donax
    - · Arundo Leafminer (Lasioptera donacis)
      - Larvae feed on the leaves
      - Not yet approved for release





### SAN FELIPE COUNTRY CLUB

- ~1.06 miles in length
- ~7.74 acres of cane

To treat 8 acres will require:

800 Gallons of water 24 gallons of Rodeo\*... ...\$960 4 gallons of DyneAmic\*....\$300



## CENTRAL SAN FELIPE CREEK

- ~1.3 miles in length
- ~1.55 acres of cane

Most on private property?

To treat 2 acres will require:

200 gallons of water
6 gallon of Rodeo\*......\$240
1 gallon of DyneAmic\*....\$75
\$315



### SOUTHERN SAN FELIPE CREEK

- ~2.3 miles in length
- ~28.39 acres of cane

To treat 29 acres will require:

2,900 gallons of water 87 gallons of Rodeo\*......\$3,480 15 gallons of DyneAmic\*...\$1,088 \$4,568



### San Felipe Creek

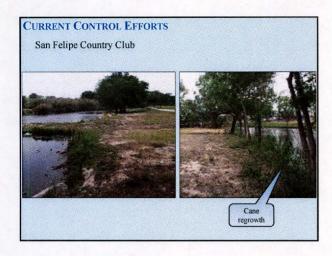
- 4.65 miles in length
- 37.68 acres of cane

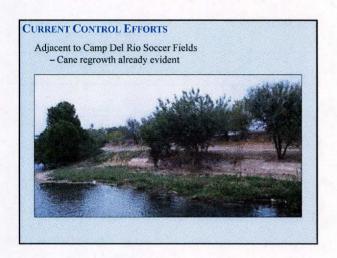
To treat 38 acres of cane will require:

3,800 gallons of water 114 gallons of Rodeo\*.........\$4,560 19 gallons of DyneAmic\*.....\$1,425

\$5,985









### RECOMMENDATIONS

- > Implement a permanent chemical control program to remove/control the infestation of Arundo cane within the Northern and Central segments of San Felipe Creek.
  - Initial spray should be in Mid summer, after the cane has flowered, and before the cane has entered its winter dormancy period.
     During the winter remove as much dead cane as possible.

  - · During the following summer repeat herbicide treatment to remove previously unaffected plants.
  - · Again, during winter remove remaining dead cane.
  - · Repeat!!!
  - Enforce no-mow zones (~30') from edge of creek to encourage native vegetation to reestablish and competitively outcompete future Arundo colonization attempts.
- ➤ Coordinate with USFWS prior to initiating control operations.
- Continue a cooperative relationship with USDA to encourage the use of San Felipe Creek as an inoculation site for the release of current and future biological control agents along creeks more southern portions.

### High-volume Foliar Spray:

- Treats the target brush with total spray solution volumes between 100 and 400 gallons per acre.
- · Densities higher than 1,500 stems per acre.
- · Heights greater than 6 to 8 feet.
- · For reclamation efforts in large areas.
- See the product labels for specific rates.





### Low-volume Foliar Spray:

- Treats the target brush with total spray solution volumes between 5 and 30 gallons
- · Used to keep shrubs and saplings from repopulating an area after an initial reclamation or to enhance a well-maintained site that contains low stem densities
- and low average stem heights.

   Densities less than 500 stems per acre.
- · Heights less than 6 to 8 feet.
- · This close-range treatment helps minimize drift.
- Coverage is quick and easy.
- · Requires minimal equipment, herbicide and personnel
- Low-profile.
  See the product labels for specific rates.



Backpack sprayers with adjustable spray tips.

# Water Quality & Stormwater Best Management Practices (BMPs)

David Fusilier, P.E. Naismith Engineering, Inc.

# Project Design/ Environmental Component

### **Water Quality Protection**

- <u>Identify water quality issues</u> associated with San Felipe Creek, including erosion, runoff, and invasive species.
- Identify <u>impact of water quality on habitat</u> and effect on restoration/protection.
- <u>Identify water quality Best Management Practices</u> appropriate for San Felipe Creek.
- Develop <u>recommendations</u> for water quality protection measures.

# Why Water Quality??

### **Critical** Habitat in San Felipe Creek:

- Fast-flowing, spring-fed waters
- · High quality, pollutant-free waters
- Gravel stream bottom
- Diverse Plant & Animal Biomass

### Improving/Maintaining Habitat in San Felipe Creek\*:

- · Protect adequate stream & spring flows
- Reduce pollutants (point & non-point)
- Manage non-native species
- · Improve riparian area
- \* from USFWS Devils River Minnow Recovery Plan (2005)

		. /

# **Existing Water Quality Issues:**

- Bank Erosion
- Erosion
- No riparian buffer
- Propagation of Non-Native Species
- Lack of Vegetation
   Pavement/Impervious Cover
- Inadequate Vegetative Management
- Trash, Litter & Illicit Dumping
- Human Waste
- Animal/Pet Waste
- Pavement/Impervious Cover
- No/Few Stormwater BMPs

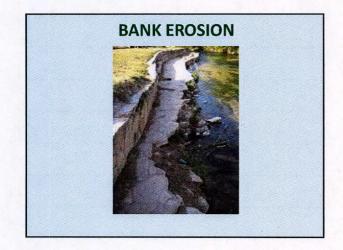
## **Potential Water Quality Issues:**

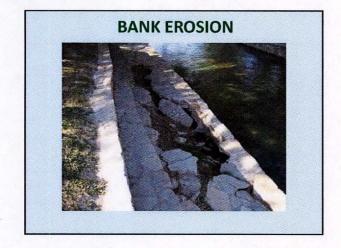
- Irrigation Co. Dam
- On-Site Sewage Facilities (OSSF)
- Construction Site Stormwater Discharges
- Hydrocarbon Spills & Improper Waste Oil Disposal
- Sewer System Overflows
- Point Source Discharges municipal & industrial
- No/Few Stormwater BMPs Pavement/Impervious Cover
- Inadequate Vegetative Management

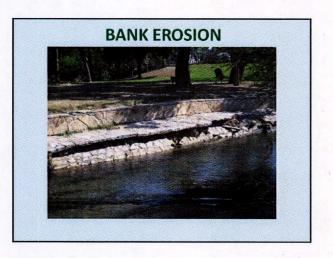
## **BANK EROSION**



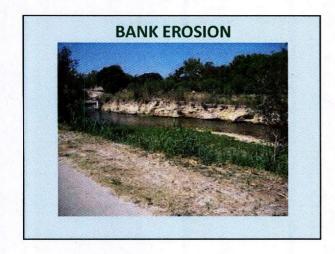
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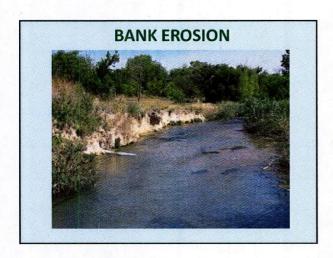


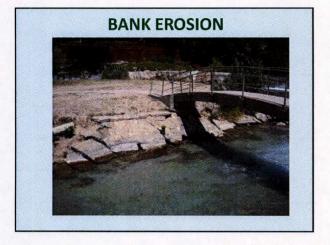


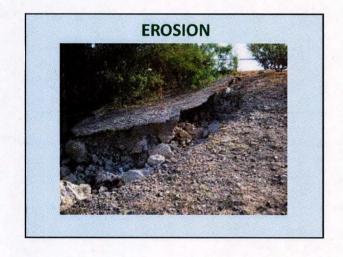


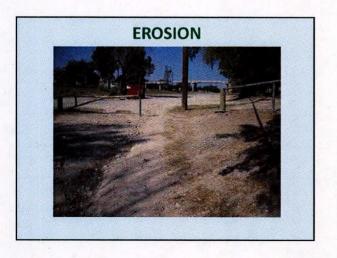
# BANK EROSION



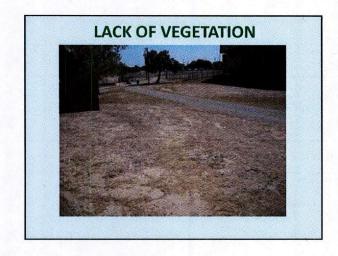


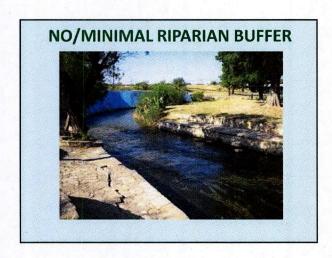




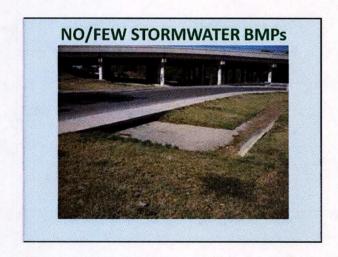


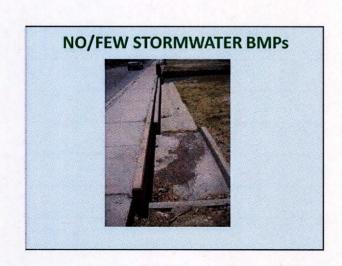
# LACK OF VEGETATION



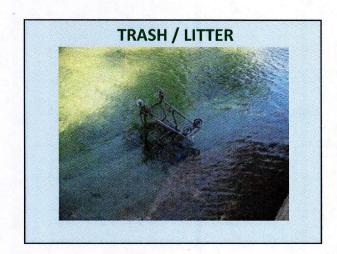






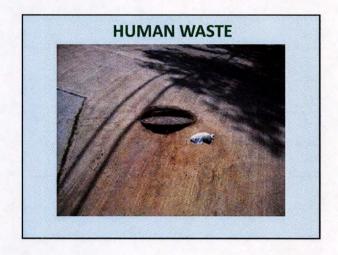


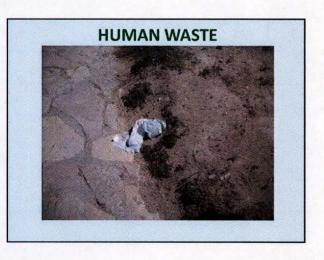




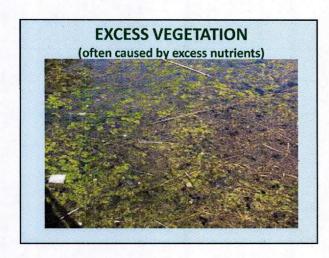


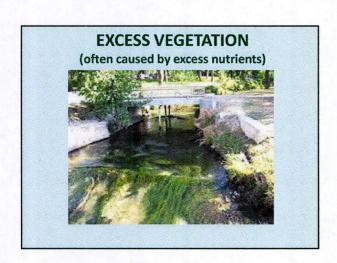






# ANIMAL / PET WASTE





## **Water Quality - Goals**

- Protection of water quality in San Felipe Creek and San Felipe Springs.
- · Prevention of runoff pollution.
- · Managing litter.
- · Managing erosion.
- · Creating buffer zones (including riparian areas)
- Integrating water quality <u>BMPs</u> into project development and maintenance.

# Water Quality Best Management Practices

- What is a Best Management Practice?
- · What are the goals for a BMP?
  - Reduce pollutant load to San Felipe Creek
  - Reduce erosion (bank, stream, etc...)
  - Reduce trash & litter
  - Park enhancement

# Water Quality Best Management Practices

- · What are the types of BMPs?
  - Structural
    - Requires construction/installation
    - Maintenance is often required
  - Non-Structural
    - No construction required
    - Requires coordination/administration

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# **Water Quality BMPs - CRITERIA**

- Effectiveness
- · Reliability
- Construction Cost
- Maintenance Cost
- Aesthetics

### STRUCTURAL BMPs

- · Vegetative Filter Strip
- · Vegetation Enhancement
- Stream Bank Stabilization / Erosion Control
- Pervious (or "Alternative) Pavement
- · Biofiltration/Bioretention
- Gravity Oil Separators
- Water Quality Ponds

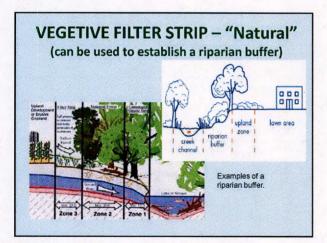
## **VEGETATIVE FILTER STRIP**

- · Types:
  - "Natural": establish/re-establish riparian area
  - "Engineered": grassed area
- Reliability High
- Construction Cost Low
- · Maintenance Cost Low
- Aesthetics Good to Excellent

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# VEGETATIVE FILTER STRIP – "Natural"

- · Re-establish the riparian area
- What makes a good riparian area?
  - Native species
  - Good variety
  - Quality root system
- Why do we need a riparian area?
  - Provides habitat
  - Improves water quality
  - Reduces bank erosion

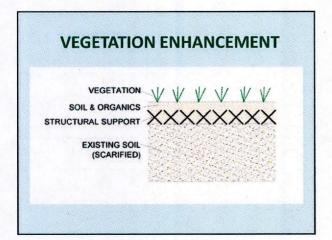




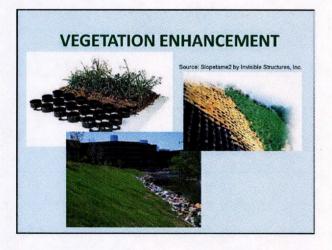
# VEGETATIVE FILTER STRIP – "Engineered"

## **VEGETATION ENHANCEMENT**

- Establish/re-establish grass/vegetation
  - Import soil
  - Improve organics
  - Provide structural support
  - Irrigate when needed
- · Reliability High
- Construction Cost Low (medium w/ irrigation)
- Maintenance Cost Low
- Aesthetics Good to Excellent



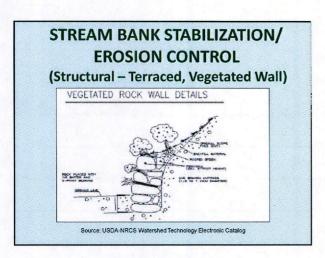




# STREAM BANK STABILIZATION/ EROSION CONTROL

- Repair/Reconstruct Stream Banks
- Replace existing bank improvements w/ more ecofriendly & "natural" features
- Where possible, restore banks to "natural" conditions
- Reliability High
- · Construction Cost Medium/High
- Maintenance Cost Low
- · Aesthetics Good to Excellent

# STREAM BANK STABILIZATION/ EROSION CONTROL (Structural – Improved Bank)





# STREAM BANK STABILIZATION/ EROSION CONTROL (Structural – Terraced, Vegetated Wall)



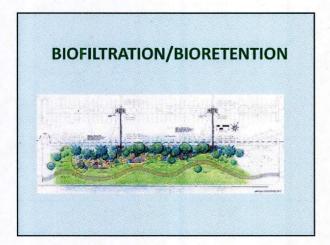
# PERVIOUS/"Alternative" PAVEMENTS

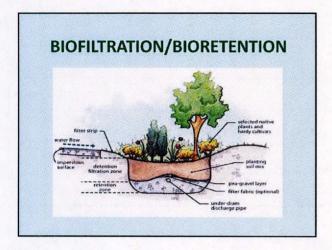
- Construct paved areas using Pervious Concrete or Other "Eco-Friendly" Alternatives (e.g., Grass Pave, Gravel Pave, etc...)
- Reliability High
- Construction Cost Low/Medium
- Maintenance Cost Low
- Aesthetics Good

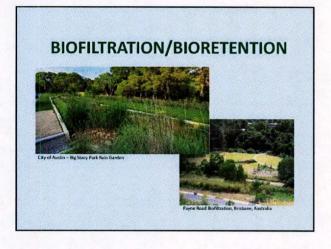


# **BIOFILTRATION/BIORETENTION**

- Biofiltration
- Bioretention
- Reliability High
- Construction Cost Medium
- Maintenance Cost Low
- Aesthetics Excellent







# HYDRODYNAMIC SEPARATORS [a.k.a., "wet vaults"]

- Stormceptor, Baysaver, CDS, Vortechs, etc...
- · Used for concentrated flows/outfalls
- Reliability Medium
- Construction Cost Medium
- Maintenance Cost Medium
- Aesthetics Good (often underground)



# WATER QUALITY PONDS – LOCAL

- Constructed Next to Impervious Area (would serve a parking lot or other impervious area)
- Types: Wetlands, Sedimentation, Filtration
- Reliability High
- · Construction Cost High
- Maintenance Cost Medium
- Aesthetics Poor to Excellent (depends on type)

# WATER QUALITY PONDS – LOCAL



Hays County Precinct 4 Office Buildin

# WATER QUALITY PONDS – "REGIONAL"

- · Constructed to serve a large drainage area
- Types: Wetlands, Sedimentation, Filtration
- Reliability High
- Construction Cost High (Extremely High if no storm sewers are in place)
- · Maintenance Cost Medium
- Aesthetics Poor to Excellent (depends on type)

# WATER QUALITY PONDS — "REGIONAL" Harris County M.U.D. No. 120

## **NON-STRUCTURAL BMPs**

- Education
- Ordinances
- · Community Involvement
- Litter/Trash Pick-Up Programs:
- Pet Waste Stations
- · Human Waste Control
- Animal Control

# **NON-STRUCTURAL BMPs**

- Education
  - Radio/TV advertisements -
    - Be good to the creek
    - · Your actions affect your water
  - School Non-Point Source Pollution
  - School San Felipe Creek
  - Pet waste
  - Used oil/antifreeze disposal
  - Yard/lawn management
  - Fertilizer / Pesticide / Herbicide management

# NON-STRUCTURAL BMPs • Education: Information is Easy Share ONLY FAIR \*\*THE BRANK \*\*THE BRANK



# NON-STRUCTURAL BMPs Searce 10.2 Analisabet Surgeout control 10.0 Pt. 10.2 Analisabet Informational Signs & Kiosks

## **NON-STRUCTURAL BMPs**

- Community Involvement:
  - "Friends" of San Felipe Creek
  - Community-wide trash pick up
  - Household Hazardous Waste Collection Day





## **NON-STRUCTURAL BMPs**

- Litter/Trash Pick-Up: Ways to Promote
  - Semi-Annual Household Hazardous Waste Collection Program
  - Used Motor Oil Collection Locations
  - More Trash Containers at Parks and Outdoor Venues
  - Targeted Advertising Programs: "Don't Mess With Texas"

# NON-STRUCTURAL BMPs THIS IS LITER TOO. Lyden was placed from the format to be a format to be a

## **NON-STRUCTURAL BMPs**

- Pet Waste: Why is it such a big deal?
  - •Dog Poop Doesn't Biodegrade Like Wild Animal Poop
  - \*Dog Poop Contains Harmful Bacteria, Parasites
  - •Dog Waste Pollutes Groundwater, Water Bodies

Source http://www.ifoothids.org/PDF/2011\_soce\_fairy\_fact\_sheet.pd

## **NON-STRUCTURAL BMPs**

- Pet Waste: FACT
  - There are approximately 4,900 dogs in Del Rio.
  - The average dog produces ½ pound of waste per day.
  - That almost 440 TONS of dog poop a year!!

# NON-STRUCTURAL BMPs There is no poop fair, Please clean up after your dog, kry: Jeannal correct of fire tal. April 19 Africa printing of anti-2005/47/mang printing or drag parts on minimals. Part of the fire the companies of anti-2005/47/mang printing or drag parts on minimals. Part of the fire the companies of anti-2005/47/mang printing or drag parts on minimals.

## **NON-STRUCTURAL BMPs**

Animal Waste/Control:

Domestic Water Fowl: Why is it such a big deal?

- Contribute Fecal Coliform to the San Felipe Creek
- Additional Nutrients Result in Excess Plant Growth

Source: San Falipe Creek Mester Plan, 2007

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## Future Schedule, Meeting Dates & **Meeting Locations**

NEXT MEETING:

October 2011

**MEETING FOCUS:** 

Public Use of San Felipe Creek as a

**Recreation Resource** 

DRAFT REPORT SUBMITTAL: NOVEMBER 2011

FINAL REPORT SUBMITTAL: JANUARY 2011

# **QUESTIONS & COMMENTS?**



- Naismith Engineering:
  Tom Brown
  Grant Jackson, P.E.
  David Fusilier, P.E.
  Adam Luke, P.E.
  NEI Austin Office: (512) 708-9322
- CP&Y, Inc.:
  - CP&Y)

  - Bonnie DoggettSarah Itz
- CP&Y Austin Office: (512) 349-0700
- Sul Ross University Rio Grande College:
- Dr. Dan Foley, Ph.D.
  Sul Ross University Rio Grande Research
  Center: (830) 703-4838



# San Felipe Creek Master Plan

- **Subject:** Development of a Master Plan for San Felipe Creek.
- This meeting is the 2<sup>nd</sup> of 4 Planned Meetings
- · Our team consists of:
  - Naismith Engineering, Inc. (Tom Brown, David Fusilier, Adam Luke, Felise Canterini, Grant Jackson)
  - Sul Ross State University-Rio Grande Research Center (Dr. Dan Foley, PhD.)
  - CP&Y, Inc. (Bonnie Doggett, Sarah Itz)

# **Funding Sources for the Plan**

- Funding for this planning effort come from:
  - Texas Water Development Board- Research and Planning Fund.
  - Local Funds (City of Del Rio provided matching share).

## **Meeting Agenda**

- 1. Recap of July 27, 2011 Public Meeting
- 2. Goals, Objectives & Strategies
- 3. Project Constraints
- 4. Preliminary Public Survey Results
- 5. Possible Improvements

Recap of July 27, 2011 Meeting

# Recap of July 27, 2011 Meeting

- Public Meeting had 26 attendees (signed)
- Topics:
  - Threatened & Endangered Species
  - Control of Arundo Donax (giant cane)
  - Water Quality Controls

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## **Threatened and Endangered Species**

BONNIE DOGGETT, Biologist CP&Y – Austin, Texas

# Threatened and Endangered Species of Val Verde County (USFWS)

- Black-capped Vireo (Vireo atricapilla)
- Least tern (Sterna antillarum)
- Mountain plover (Charadrius montanus)
- Texas hornshell mussell (Popenaias popei)
- Texas snowbells (Styrax texanus)
- Tobusch fishhook cactus (Ancistrocactus tobuschii)
- Devils River minnow (Dionda diaboli)

# Threatened and Endangered Species near the Project Area

- Recorded
   Occurrences from TPWD
- Critical Habitat from USFWS
- Habitat Assessment from CP&Y Field Survey



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# Threatened and Endangered Species of Val Verde County

**Devils River minnow** 

- · listed as threatened
- · recorded occurrences in project area
- · critical habitat in project area



Photo @ Garold W. Sneega

# Threatened and Endangered Species of Val Verde County

San Felipe gambusia

- · recently discovered (1997)
- no official federal status, but considered to be rare
- · Suitable habitat for this species exists in project area



# U.S. Fish and Wildlife Service – Initial Coordination

- Met with USFWS Field and Office Staff.
- No mow zones discussed status. USFWS & TPWD consultation is continuing.
- Recommends cutting Arundo and then painting herbicide on by hand. <u>Does not recommend spraying herbicide due</u> to proximity to creek.
- Construction projects in and around the creek will require coordination with USFWS.
- Decide on and separate work to be done in creek into segments; conduct informal consultation on the portions to be completed within 5-10 years.

## **No Mow Zones**

Consultation with USFWS and TPWD



Proposed Action:
Addition of riparian areas, vegetative filter strips, extended detention basins that could also serve as recreational areas (i.e. soccer fields), and native plantings to attract wildlife, including butterflies

### **Invasive Species**

(Species that aggressively establish themselves in an ecosystem at the expense of its native species and natural functions)

- Chinese tallow (*Triadica* sebifera)
- Japanese honeysuckle (Lonicera japonica)
- Fragrant Water Lily (Nymphaea odorata)
- Salt cedar (Tamarix ramosissima)
- Giant reed (Arundo donax)



# **Arundo Donax (Giant Reed)**

Dr. DAN FOLEY, Ph.D. Associate Professor of Biology Sul Ross University

## BRIEF HISTORY OF (ARUNDO DONAX) IN TEXAS

- >Introduced from Southwestern Europe (Spain) in the 1600's
  - · Used as feed for cattle and goats





· Provided thatching materials for roofs



### THE PROBLEM

- Can grow upwards of 4" per day
- Height of 25' 30' tall
- · Huge water demand
- · Outcompetes all native vegetation
- Now it is illegal to plant or sell *Arundo* Cane in Texas without a Texas Department of Agriculture permit



### DOMINANCE OF ARUNDO ALONG THE RIO GRANDE

Giant River cane is now epidemic along the Rio Grande River

- ~15,000 acres of Arundo between Del Rio and San Ignacio, TX
   Spreading at a rate of 2.36% per year







### ECONOMIC IMPACT OF ARUNDO CANE

- Along a 4.65 mile stretch of San Felipe Creek ~38 acres of cane currently exists resulting in a loss of 166 acre-feet of water per year or ~54 million gallons/year
- Arundo consumes about 3x more water than typical native vegetation

### **ERADICATION METHODS FOR GIANT RIVER CANE**

- ➤ Mechanical Control (mostly impractical and/or ineffective)
  - Cutting & Burning
- ➤ Biological (usually a very slow process)
  - Arundo Wasp
  - Arundo Scale
  - Arundo Fly

### > Chemical (recommended alternative)

- · Coordinate with USFWS prior to efforts
- Use herbicide (glyphosphate Rodeo®) + surfactant
- Spray in mid-summer
- · Remove dead cane in winter
- · Repeat (likely for several years)
- Chemical Costs = \$160/acre (approximate)

### San Felipe Creek

4.65 miles in length

37.68 acres of cane

To treat 38 acres of cane will require:

3,800 gallons of water

114 gallons of Rodeo\*......\$4,560

19 gallons of DyneAmic\*.....\$1,425

\$5,985

Note: From Golf Course to Tardy Dam includes ~10 acres of giant cane.



# RIPARIAN RESTORATION Given time and release of competition with Arundo cane, native plants are still present within the seed bank and will regenerate naturally. Emory Sedge (Carex emory)

# Water Quality & Stormwater Best Management Practices (BMPs)

David Fusilier, P.E. Naismith Engineering, Inc.

### **Existing Water Quality Issues:**

- Bank Erosion
- Erosion
- No riparian buffer
- Propagation of Non-Native Species
- Lack of Vegetation
- Pavement/Impervious Cover
- Trash, Litter & Illicit Dumping
- Human Waste
- Animal/Pet Waste
- Pavement/Impervious Cover
- No/Few Stormwater BMPs
- Inadequate Vegetative Management

### STRUCTURAL BMPs

- Vegetative Filter Strip
- Vegetation Enhancement
- Stream Bank Stabilization / Erosion Control
- Pervious (or "Alternative) Pavement
- Biofiltration/Bioretention
- Gravity Oil Separators
- Water Quality Ponds

### **NON-STRUCTURAL BMPs**

- Education
- Ordinances
- · Community Involvement
- Litter/Trash Pick-Up Programs:
- Pet Waste Stations
- · Human Waste Control
- Animal Control

### **End of Recap**

# Goals, Objectives & Strategies

### **PROJECT GOALS**

- An expression of what the City wishes to achieve for its water quality master plan.
- General in nature and not detail the specific actions that need to be achieved to accomplish the goal.
- Example: Develop a Master Plan for San Felipe Creek

### **PROJECT OBJECTIVES**

- Described as the milestones that need to be accomplished in order to accomplish the stated goal.
- Examples:
  - Acquire land for water quality controls.
  - Develop site plans for proposed improvements.
  - Develop a plan for control of invasive species.

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### **PROJECT STRATEGIES**

- Implementation <u>Strategies</u> are the details on how to accomplish the objectives.
- · Examples:
  - Identify land for parks/open space and develop financial plan for acquisition
  - Identify potential partners and solicit their participation.

### **PROJECT PRIORITIES**

- Objectives need to be prioritized in order to allocate resources and develop implementation strategies to accomplish the objectives.
- · Examples:
  - Priority 1 Acquire property for pervious-pavement parking lot.
  - Priority 2 Develop site plan

**Project Constraints** 

### **PROJECT CONSTRAINTS**

- · Floodplain
- FEMA Buyout Properties
- · Existing Zoning/Land Use
- Endangered /Threatened Species
- Invasive Species

### **PROJECT CONSTRAINTS**

- Floodplain
  - Existing 100-yr Floodplain straddles SFC
  - Restricts development in the creek area
  - No residential structures
  - Non-residential structures must be floodproofed
- How to address?
  - Direct commercial development outside 100-year floodplain or require floodproofing
  - Limit development to ground level improvements

### **PROJECT CONSTRAINTS**

- FEMA Buyout Properties
  - Includes approx. 275 acres along San Felipe Creek
  - Property is owned by the City of Del Rio
  - Requires removal of existing buildings
  - No permanent structures on property
  - Property must remain open space
- · How to address?
  - Development must meet FEMA open space requirements

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### **PROJECT CONSTRAINTS**

- FEMA Buyout How?
  - Community Buys Property (from voluntary seller)
  - Community Buys Conservation Easement
  - Land becomes Public Property
  - Property is cleared
  - Property remains "Open Space"

### **PROJECT CONSTRAINTS**

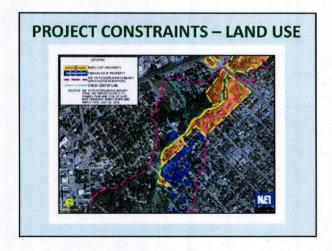
- FEMA Buyout Properties Possible Uses?
  - Open Space
  - Parks & Trails
  - Wildlife/Nature Refuge
  - Wetlands
  - Community Gardens
  - Greenway
  - Open-sided Gazebo
  - Pervious Pavement Parking

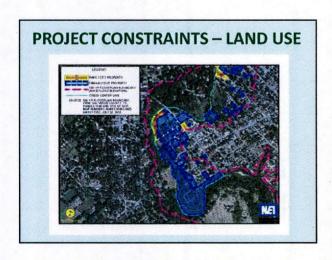
### **PROJECT CONSTRAINTS**

- Zoning
  - Zoning along SFC includes:
    - Residential Single-Family
    - Residential Multi-Family
    - Commercial
- · How to address?
  - Conform development to zoning requirements
  - Request change in zoning designation (if necessary)

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# PROJECT CONSTRAINTS — LAND USE Light Specific Constraints (Constraints) See The Specific Constraints See The Specific Const





### **PROJECT CONSTRAINTS**

- Endangered/Threatened Species
  - Development of creek area must not have negative impact
  - Any improvements require USFWS coordination
- · How to address?
  - Maintain communication links with USFWS staff
  - Use water quality controls & techniques
  - Demonstrate a <u>net-positive</u> affect on SFC

### **PROJECT CONSTRAINTS**

- Invasive Species
  - Negatively impacts habitat
  - Chokes out native species
  - Substantial water users (e.g., Arundo donax)
- · How to address?
  - Remove/eliminate invasive species
  - Replant area to improve Riparian area

Preliminary Citizen Survey Results

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### **CITIZEN SURVEY**

- Provides an opportunity for the citizens of Del Rio to voice their opinion on project priorities
- Included in published Public Notices in the Del Rio News Herald
- WE HAVE COPIES AVAILABLE HERE TONIGHT!

### **CITIZEN SURVEY**

- Provides an opportunity for the citizens of Del Rio to voice their opinion on project priorities
- Included in published Public Notices in the Del Rio News Herald

### **CITIZEN SURVEY**

Number of persons in your household by age group:

0-5 \_\_\_\_ 6-10 \_\_\_ 11-15 \_\_\_ 16-20 \_\_\_ 21-30 \_\_\_ 31-40 \_\_\_ 41-50 \_\_\_ 51-65 \_\_\_ 65+\_\_\_

	CITIZEN SURVEY
	Have you or your family used the parks or trails, or gone swimming, tubing, or boating in San Felipe Creek in the past three years?  YESNO
	Would you or your family use the parks, trails, and creek if there were additional recreational amenities available? YESNO
	CITIZEN SURVEY
	Have you or your family attended a festival or other group activity at City parks along San Felipe Creek in the past three years?  YESNO
	Would you like to see more group activities, such as festivals, concerts, recitals, etc. along San Felipe Creek? YESNO
	CITIZEN SURVEY – RANK THEM!
-	_ Additional pavilions and facilities for group gatherings
-	Additional restrooms and trash barrels along the trails and park grounds
_	Provide educational facilities to teach about the ecology of San Felipe Creek and natural areas
-	Retain open space for bird watching, habitat protection

\_ Expand hike & bike trails

Remove brush and invasive species along San Felipe Creek

### **CITIZEN SURVEY - RANK THEM!** Provide improvements that would facilitate the use of the creek for tubing and kayaking while protecting endangered species that live in San Felipe Creek Provide facilities that can be used for outdoor group activities including festivals, concerts, etc... Provide new parks and recreational facilities along San Felipe Creek Provide greater amenities at existing parks, such as playground equipment, picnic areas, restrooms, parking **CITIZEN SURVEY – PRELIM. RESULTS** · Have you or your family used the parks or trails, or gone swimming, tubing, or boating in San Felipe Creek in the past three years? YES\_\_\_NO\_\_\_ YES 7 NO 3 · Would you or your family use the parks, trails, and creek if there were additional recreational amenities available? YES\_\_\_NO\_ YES 10 NO 0 **CITIZEN SURVEY – PRELIM. RESULTS** · Have you or your family attended a festival or other group activity at City parks along San Felipe Creek in the past three years? YES\_\_\_\_NO\_\_ YES 7 NO 3 • Would you like to see more group activities, such as festivals, concerts, recitals, etc. along San Felipe

Creek? YES\_\_\_\_NO YES 9

NO 1

### **CITIZEN SURVEY – PRELIM. RESULTS**

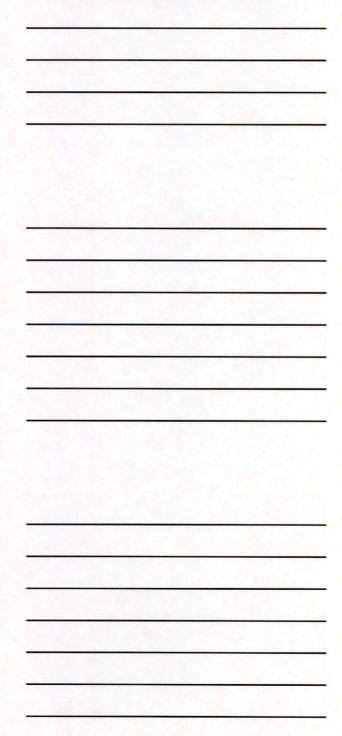
- 1 Remove brush and invasive species along San Felipe Creek
- Additional restrooms and trash barrels along the trails and park grounds
- Provide improvements that would facilitate the use of the creek for tubing and kayaking while protecting endangered species that live in San Felipe Creek
- 4 Expand hike & bike trails
- 5 Provide educational facilities to teach about the ecology of San Felipe Creek and natural areas

### **CITIZEN SURVEY - PRELIM. RESULTS**

- 6 Provide greater amenities at existing parks, such as playground equipment, picnic areas, restrooms, parking
- Provide facilities that can be used for outdoor group activities including festivals, concerts, etc...
- 8 Retain open space for bird watching, habitat protection
- 9 Additional pavilions and facilities for group gatherings
- 10 Provide new parks and recreational facilities along San Felipe Creek

### **CITIZEN SURVEY**

- IT'S NOT TOO LATE!!
- PLEASE COMPLETE A SURVEY FORM BEFORE YOU LEAVE!!



# **Suggested Improvements Suggested Improvements Suggested Improvements Include:** Water Quality Creek banks · Hike & Bike Trail • Park • Tardy Dam **Water Quality Improvements**

### **STRUCTURAL BMPs**

- Vegetative Filter Strip/Vegetation Enhancement
- Stream Bank Stabilization / Erosion Control
- Pervious (or "Alternative") Pavements
- · Biofiltration/Bioretention
- Gravity Oil Separators
- Water Quality Ponds

### **Bank Improvements**

# BANK IMPROVEMENTS – OVERALL































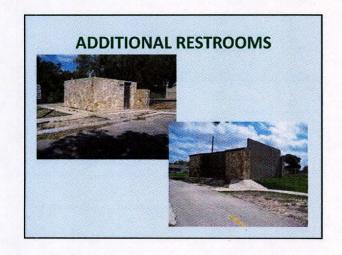
Hike & Bike Trail Improvements



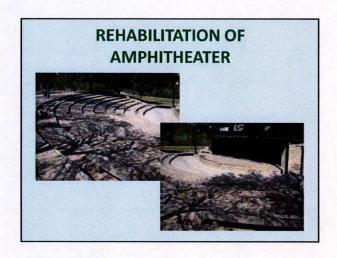




HIKE & BIKE TRAIL IMPROVEMENTS	
THE SAME	
Park Improvements	
POSSIBLE PARK IMPROVEMENTS	
<ul> <li>Additional Restrooms &amp; Trash Cans</li> <li>Educational Kiosks &amp; Exhibits</li> <li>New or Updated Playground Equipment</li> <li>Rehabilitation of Amphitheater</li> <li>New Pavilions</li> <li>Rehab/Replace All BBQ Pits &amp; Fire Pits</li> </ul>	

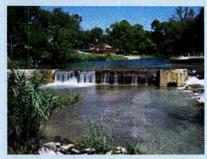






### **TARDY DAM IMPROVEMENTS**

# POSSIBLE TARDY DAM IMPROVEMENTS



# POSSIBLE TARDY DAM IMPROVEMENTS

- Strengthen/Rehab Existing Dam (in place)
- Modify Dam to Allow for Kayak Shoot
- Add Fish Passages

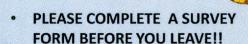
# Miscellaneous Ideas & Proposed Improvements

# MISCELLANEOUS IDEAS/THOUGHTS & ISSUES

- Hike & Bike Trail Connection to Other Areas?
- · Replace/Renovate All Bridges.
- Bank Improvements at All Bridges.
- Cane removal will be required on public & <u>private</u> properties (may need to partner).
- What to do with non-contiguous FEMA Buyout Properties? Community Gardens/Xeriscape?

### **CITIZEN SURVEY REMINDER!**

IT'S NOT TOO LATE!!



### Future Schedule, Meeting Dates & **Meeting Locations**

**NEXT MEETING:** 

November 30, 2011

**MEETING FOCUS:** 

DRAFT - San Felipe Creek Master Plan

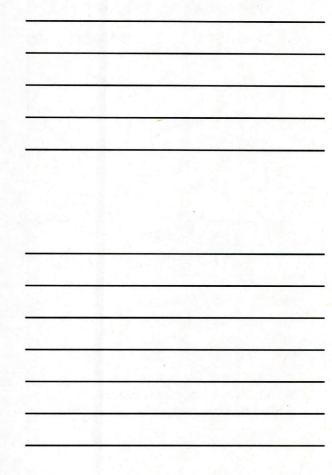
COMMENTS ON DRAFT REPORT: DECEMBER 2011

FINAL REPORT SUBMITTAL: JANUARY 2011 (per contract w/ City)

### **QUESTIONS & COMMENTS?**



- Naismith Engineering:
  Tom Brown
  Grant Jackson, P.E.
  David Fuiller, P.E.
  Adam Luke, P.E.
- NEI Austin Office: (512) 708-9322
- CP&Y, Inc.:
- CP&Y)
  - Bonnie DoggettSarah Itz
- CP&Y Austin Office: (512) 349-0700
- Sul Ross University Rio
   College:
  - Dr. Dan Foley, Ph.D.
- Sul Ross University Rio Grande Research Center: (830) 703-4838





### San Felipe Creek Master Plan

- Subject: DRAFT Master Plan for San Felipe Creek.
- This meeting is the 3<sup>rd</sup> of 4 Planned Meetings
- · Our team consists of:
  - Naismith Engineering, Inc. (Tom Brown, David Fusilier, Adam Luke, Felise Canterini, Grant Jackson)
  - Sul Ross State University-Rio Grande Research Center (Dr. Dan Foley, PhD.)
  - CP&Y, Inc. (Bonnie Doggett, Sarah Itz)

### **Meeting Agenda**

- 1. Purpose of Planning Effort
- 2. Recap of Previous Project Activities
- 3. Public Survey/Public Comment Results
- 4. Environmental Considerations
- 5. Invasive Species
- 6. Plan Recommendations

<b>Funding Sources for t</b>	:he ŀ	2lar
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- · Funding for this planning effort come from:
  - Texas Water Development Board- Research and Planning Fund.
  - Local Funds (City of Del Rio provided matching share).

### **Project Focus**

- Identify Water Quality Issues
- Identify Appropriate WQ Best Management Practices (BMPs)
- · Threatened & Endangered Species
- Invasive Species
- Agency Coordination
- Provide Recommendations / Direction

### **Project Overview**

### Meetings:

October 2010 - Kick-Off/Introductory Meeting

July 2011 - Water Quality Best Management Practices

October 2011 - Project Recommendations

February 2012 - Draft Master Plan (YOU ARE HERE!)

### Other Activities:

- · Coordination with USFWS (on-going)
- Draft Plan available at the following locations:
   City of Del Rio web site: <a href="http://www.cityofdelrio.com/">http://www.cityofdelrio.com/</a>

Naismith Engineering web site: <a href="http://www.neionline.com/">http://www.neionline.com/</a> (click "Projects")

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### The DRAFT Master Plan

### Included in the Plan:

- Body of plan with project recommendations
- Appendix A Environmental Documentation
- · Appendix B Giant River Cane Eradication
- Appendix E Cane Eradication Cost Estimates
- Appendix F Summary of Total Project Costs
- Appendix G Individual Project Descriptions & Cost Estimates

### **Project's Unique Features**

- San Felipe Creek
  - Flows up to 90 million gallons per day (MGD)
  - High Quality Water
  - City's Only Source of Drinking Water Supply
- Devils River Minnow/San Felipe Gambusia
- Giant River Cane (Arundo Donax)
- 100-year Floodplain
- FEMA Buyout Properties
- · Long-Term History of Area
- · Popularity / Use of the Project Area

### San Felipe Creek Master Plan Environmental Document

BONNIE DOGGETT, Biologist CP&Y – Austin, Texas

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### **Devils River Minnow**

### Critical Habitat in San Felipe Creek:

- Fast-flowing, spring-fed waters
- · High quality, pollutant-free waters
- · Gravel stream bottom
- · Diverse Plant & Animal Biomass

### Improving/Maintaining Habitat in San Felipe Creek\*:

- Protect adequate stream & spring flows
- Reduce pollutants (point & non-point)
- Manage non-native species
- · Improve riparian area
- \* from USFWS Devils River Minnow Recovery Plan (2005)



### San Felipe Gambusia

- Not currently listed on the USFWS threatened and endangered species list; however, the geographical range and habitat requirements for the Devils River minnow and the San Felipe gambusia are similar.
- Efforts to avoid impacts to the Devils River minnow would also avoid impacts to the San Felipe gambusia.



## U.S. Fish and Wildlife Service – Recent Coordination

Met with USFWS PM, Bill Seawell, on November 17, 2011. Discussion topics included:

- Length and locations of proposed bank improvements
- Existing water quality issues
- Armored catfish
- Recreational plans possible kayak trail on creek.
   Public access points need to be carefully chosen.
- The no-mow zones were not intended to protect invasive species such as Arundo. Work may be done in no-mow zones to eradicate Arundo. Also, the City may mow the problem areas.

## U.S. Fish and Wildlife Service – Recent Coordination

- Arundo removal: additional coordination with USFWS will occur once the City has determined:
  - area of treatment
  - steps to eradicate Arundo
  - funds allocated
  - timing
  - assumption on amount of initial spraying and subsequent years of spraying
  - and amount of herbicide would likely get into the creek
- It is likely that formal consultation with USFWS will be required and a Biological Opinion will be prepared.
- Submitted the Draft San Felipe Creek Master Plan to USFWS & TPWD in December for their review.

### **USACE Permitting**

This project would likely be permitted by the Fort Worth District of the U.S. Army Corps of Engineers (USACE) as an Individual Permit (IP)

An IP would be required due to the fact that the project is located within Critical Habitat for the Devils River minnow. As stated in the Nationwide Permit (NWP) guidance "No activity is authorized under any NWP which is likely to jeopardize the continued existence of a threatened or endangered species or a species proposed for such designation, as identified under the Federal Endangered Species Act, or which will destroy or adversely modify the critical habitat of such species."



US Army Corps of Engineers

### **Cultural Resources**

Cultural Resources associated with the San Felipe Creek include:

- Archeological artifacts and pre-historic sites
- Historical markers
  - Bridges, dams, retaining walls and irrigation canals
  - Historical Sites (i.e. Camp Mitchie)



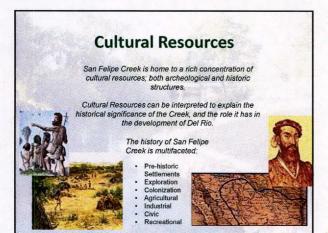


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### **Public Awareness**

- Biological Resources
  - Small plaques along trail or in garden area identifying common native vegetation and interesting facts
  - Educational signs about the natural ecoregion of Del Rio (Southern Texas Plains)
  - Wildlife identification signs





### **Public Awareness**

- Historic Resources
  - Historical photos of the creek, including flood events
  - Add the Creek paths to the Historical walking tour of Del Rio (on map or phone app)
  - Create an interactive web-based program for school age children to teach about the history and environment of the Creek
  - Display Artifacts that were discovered near the creek
  - Historic Val Verde Winery Connected via Foot/Bike path
  - Gristmills: Provide interpretive signage at sites
  - Irrigation channels: Provide route map
     Map Explorer's routes through area



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# Inventory & Needs Assessment

### **Inventory**

- · Individual park inventory listed in Table 8.1
- Figure 18 shows City Parks along San Felipe Creek
- Additional park details available in the City's "Parks, <u>Recreation & Open Space Master Plan 2011-2020"</u> prepared by TRC Engineers, Inc. and the City's Parks and Recreation Department

### **Citizen Survey**

- Provides an opportunity for the citizens of Del Rio to voice their opinion on project priorities
- Included in published Public Notices in the Del Rio News Herald
- Over 30 individual surveys were submitted
- · Citizens were asked to rank priorities
- Survey included a request for comments

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### **CITIZEN SURVEY - RESULTS**

(previous preliminary results are indicated in blue)

- 1 Remove brush and invasive species along San Felipe Creek (1) [four times more #1 votes than the next issue/Item]
- Additional restrooms and trash barrels along the trails and park grounds (2)
- Provide improvements that would facilitate the use of the creek for <u>tubing and kayaking</u> while protecting endangered species that live in San Felipe Creek (3)
- 4 Provide greater amenities at existing parks, such as playground equipment, picnic areas, restrooms, parking (6)

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(previous preliminary results are indicated in blue)

- <u>5</u> Additional pavilions and facilities for group gatherings (9)
- 6 Expand hike & bike trails (4)
- Provide <u>new parks</u> and recreational facilities along San Felipe Creek (10)
- 8 Provide facilities that can be used for outdoor group activities including festivals, concerts, etc... (7)
- 9 Provide <u>educational facilities</u> to teach about the ecology of San Felipe Creek and natural areas (5)
- 10 Retain open space for bird watching, habitat protection (8)

### **CITIZEN SURVEY – COMMENTS**

(comments from some, but not all, of the citizen survey forms submitted)

- "City should increase surveillance and enforce laws and regulations which punish citizens who litter..."
- The "No Mow Zone" are not accomplishing their intended purpose..."
- "Figure out where you can have commercial development to meet needs of visitors to the creek"
- "Create a dog park at one of the FEMA spaces in San Felipe Creek"
- "More police patrols/bike patrols"
- "Good quality health dept. inspected food and beverage (non-alcoholic) concessions at key nodes... (such as food trucks)..."
- "Extend... hike and bike trails... through the City... that takes you near most all of the historic sites"

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### Overall Priorities for Projects

- Invasive Species Control (i.e., Giant River Cane)
- Vegetation Enhancement
- · Demolition/Removal of Collapsed Creek Walls
- Bank Improvements
- Water Quality BMPs
- Demolish Existing / Install New (more enviro. friendly)

### Recommended Improvements

- · Listed in Appendix G
- Includes Project Description + Cost Estimate
- Projects Separated by Areas (A, B, C, D, E, F)
- · Intended to be flexible/functional
- Projects can be deleted/added when needed
- Plan should be reviewed annually to add/delete projects as necessary

Invasive Species – Cane Eradication

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SAN FELIPE COUNTRY CLUB	
~1.06 miles in length ~8 acres of cane	
CENTRAL SAN FELIPE CREEK  -1.3 miles in length  -2 acres of cane  Most on private property?	
SOUTHERN SAN FELIPE CREEK  -2.3 miles in length  -30 acres of cane	

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- ➤ Mechanical Control (mostly impractical and/or ineffective)
  - Cutting & Burning
- ➤ Biological (usually a very slow process)
  - Arundo Wasp
  - Arundo Scale
  - Arundo Fly

#### > Chemical (recommended alternative)

- Coordinate with USFWS prior to efforts
- Use herbicide (glyphosphate Rodeo®) + surfactant
- · Spray in mid-summer
- · Remove dead cane in winter
- · Repeat (likely for several years)
- Chemical Costs = \$200/acre (approximate)

# Invasive Species – Cane Eradication

#### Preferred eradication steps:

- 1. Cut cane after plant flowers (usually mid-July)
- 2. Haul-off or shred cut cane (biomass)
- 3. Allow cane to grow 2 to 3 feet (about 1 month)
- 4. Spray cane with 3%-5% Rodeo + a surfactant
- 5. During winter, remove/shred dead cane
- 6. Repeat annually

#### Alternate eradication method:

- 1. Spray mature cane with 3% 5% Rodeo + a surfactant
- 2. During winter, remove/shred dead cane
- 3. Repeat annually

## Invasive Species – Cane Eradication

#### Challenges presented:

- 1. A significant amount of cane is on private property
- 2. Chemical spraying near the creek is not favored by USFWS
- 3. Cutting of cane must be done in a relatively short period of time (1-2 months)
- 4. Access by mechanical equipment difficult of impossible for some reaches of San Felipe Creek
- Must be continued annually or significant regrowth likely

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### Invasive Species – Cane Eradication

#### **Cost Estimates:**

- Manual costs based on an average cane removal rate of 1,000 sq.ft./day/worker.
- 2. Mechanical costs based on an average cane removal rate of 3,000 sq.ft./day/worker.
- 3. Labor cost to City estimated at \$35/hour/worker.
- 4. Chemical Costs approximated at \$200/acre.
- 5. Subsequent annual costs based on an expected 60% kill rate.

#### **Comments:**

- Private contractor maintained an average of nearly 1,400 sq.ft./day/worker; rates were significantly lower near creek bank (as low as 200 sq.ft./day/worker).
- 2. Equipment cost vary significantly; it may be advantageous for the City to purchase its own shredders specifically for can eradication efforts

#### Invasive Species – Cane Eradication <u>Estimated Costs</u>

(for a 5 year cycle)

Type of Cutting	\$/acre*	Year 1	Year 2	Year 3	Year4	Year 5	TOTAL
40 acres - Manual	\$43,750	\$1,750,000	\$ 700,000	\$ 280,000	\$ 112,000	\$ 44,800	\$ 2,930,550
40 acres - Mechanical	\$30,125	\$1,205,000	\$ 482,000	\$ 192,800	\$ 77,120	\$ 30,848	\$ 2,017,893
2 acres - Manual **	\$43,750	\$ 87,500	\$ 35,000	\$ 14,000	\$ 5,600	\$ 2,240	\$ 188,090

\* - refer to cost estimates in APPENDIX E.

\*\* - represents the approx. area of cane between US Hwy 90 and Tardy Dam

Based on the above cost estimates a reasonable approach to cane eradication may include concentrating initial efforts on the portion of San Felipe Creek between US Highway 90 and Tardy Dam. Good record keeping can help accurately gauge the actual costs of the eradication efforts.

#### **BANK IMPROVEMENTS**

#### **BANK IMPROVEMENTS**

#### **RECOMMENDED GUIDANCE FOR PROJECTS:**

- Demolish existing damaged walls
- · Repair eroded bank areas
- · Maximize riparian areas along the creek
- · Maintain public access to the creek
- Design/construct improvements to withstand existing creek environment

#### **BANK IMPROVEMENTS**



#### **BANK IMPROVEMENTS**















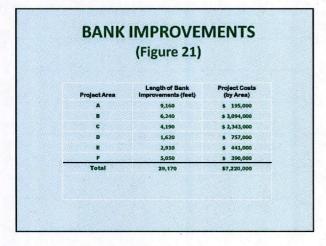












#### **FOCUSED ACCESS FEATURES**

#### **FOCUSED ACCESS FEATURES**

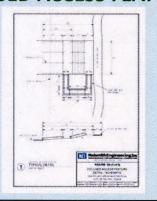
#### FUNCTION

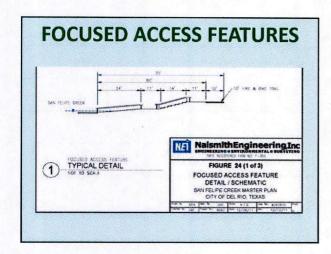
- Focuses activities and access to specific locations
- Helps keep adjacent riparian areas undisturbed

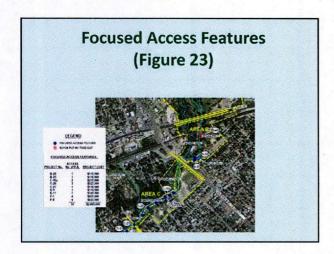
#### • FEATURES

- Provides improved access to all citizens
- Ensures ADA/handicap access to the creek

#### **FOCUSED ACCESS FEATURES**







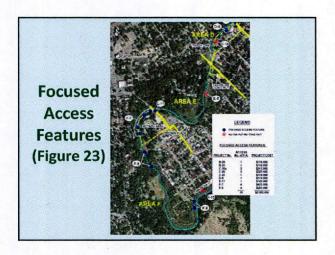
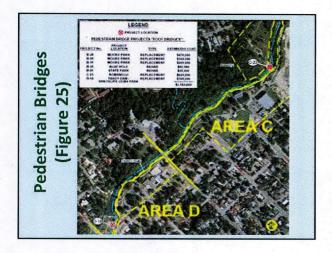


	Figure 23	)
Project Area	No. of Access Features	Project Costs (by Area)
B-26	1	\$ 110,000
B-25	1	\$ 110,000
C-10a	3	\$ 315,000
C-20	3	\$ 325,000
C-21	1	\$ 110,000
D-9	1	\$ 110,000
E-11	1	\$ 145,000
F-7	4	\$ 435,000
F-8	4	\$ 435,000
Total	19	\$2,095,000

#### **PEDESTRIAN BRIDGES**

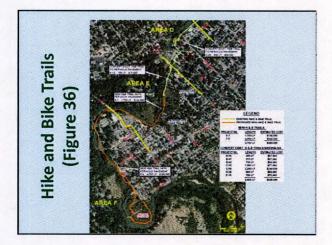


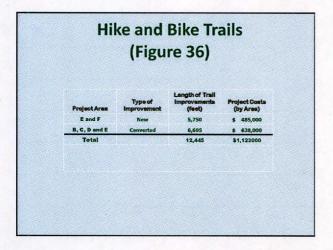


	(Figu	re 25)	
Project Area	Location/ Description	Туре	Project Costs (by Area)
B-28	Moore Park	Replacement	\$ 470,000
B-30	Moore Park	Replacement	\$ 165,000
B-31	Moore Park	Replacement	\$ 205,000
B-35	Blue Hole	Rehabilitation	\$ 80,000
B-41	State Park	Rehabilitation	\$ 35,000
C-23	Romanelli	Replacement	\$ 645,000
D-14	Tardy Dam/ San Felipe Lions Park	Replacement	\$ 165,000
Total			\$1,765,000

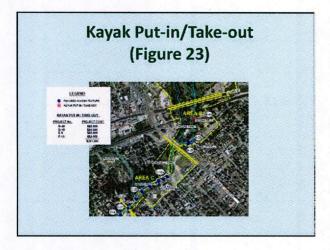
### HIKE & BIKE TRAILS







# KAYAK PUT-IN/TAKE-OUT STATIONS



Kayak Put-in/Take-out (Figure 23)



Project Area	Reference Point	Project Cost (by Area)
B-48	Hogan Field	\$ 82,000
D-18	Tardy Dam	\$ 45,000
E-6	South of Johnson St. Bridge	\$ 82,000
F-15	Magnolia St./Andrade St. Intersection	\$ 82,000
Total		\$291,000

# VEGETATION ENHANCEMENT

#### **VEGETATION ENHANCEMENT**

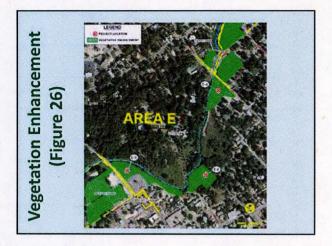
- Establish/re-establish grass/vegetation
  - Import soil
  - Improve organics
  - Provide structural support (if needed)
  - Irrigate when needed
- Reliability High
- Construction Cost Low (medium w/ irrigation)
- Maintenance Cost Low
- Aesthetics Good to Excellent

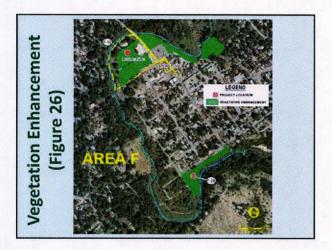
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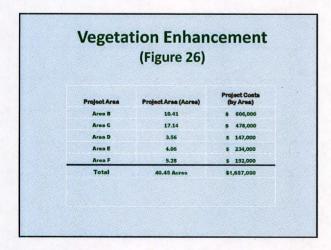












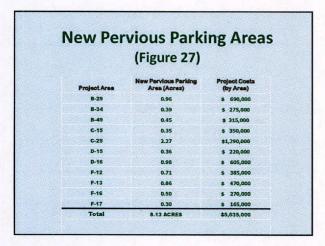
# NEW PERVIOUS PAVEMENT PARKING AREAS







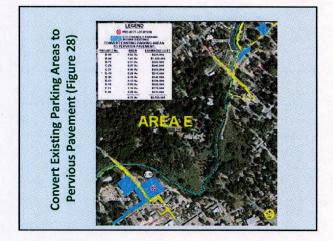




# CONVERT EXISTING ASPHALT PARKING AREAS to PERVIOUS PAVEMENT PARKING AREAS

# Convert Existing Parking Areas to Pervious Pavement (Figure 28)



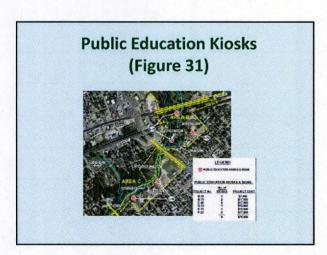


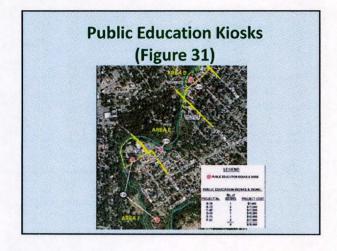


#### **Convert Existing Parking Areas to Pervious Pavement** (Figure 28) B-44 1.61 B-72 0.51 C-29 0.57 C-31 \$ 305,000 0.28 0.13 \$ 105,000 \$ 625,000 F-11 1.10 \$ 770,000 \$ 210,000

6.70 ACRES

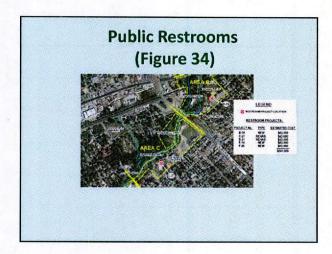
#### **PUBLIC EDUCATION KIOSKS**



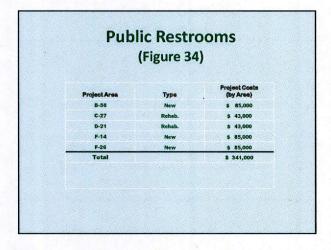


# Public Education Kiosks (Figure 31) Project Area No. of Klosks (by Area) 8-99 1 \$ 7,000 8-75 2 \$ 17,000 c-40 2 \$ 17,000 c-40 2 \$ 17,000 c-33 1 \$ 10,000 E-19 1 \$ 10,000 F-23 2 \$ 17,000 Total 9 \$ 76,000

# PUBLIC RESTROOMS







#### **COMMUNITY GARDENS**

#### **COMMUNITY GARDENS**

- · Where?
  - On FEMA property (City Owned/Controlled)
- · Who?
  - Volunteer groups
- What?
  - Soil/Compost/Plants (native, low maintenance; vegetable)
- Cost estimates assume:
  - Minimal site prep work
  - Vegetation Enhancement = Soil (2") + Compost (2")
  - Plantings 1 gal. plants @ 6 foot spacing (\$5/plant)
  - Basic irrigation system (\$2,000/acre)

### Community Gardens (Figure 35)





# Community Gardens (Figure 35) Project Area (Agres) (by Area) C 0.80 \$ 22,000 D 3.50 \$ 95,000 E 1.50 \$ 41,000 F 5.0 \$ 135,000 Total 10.80 \$ 293,000

**PET WASTE STATIONS** 





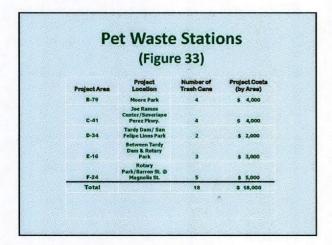




(Figure 33)

(Figure 33)

(Figure 33)



#### **BIORETENTION/BIOFILTRATION**



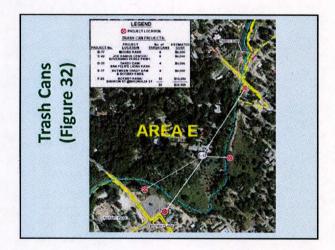
# Bioretention/Biofiltration (Figure 29) Project Area Project Location (by Area) B-45 Moore Park \$ 50,000 C-30 Jee Ramoo Center \$ 12,000 C-38 Severiano Perez Parkway \$ 17,000 Total \$ 79,000

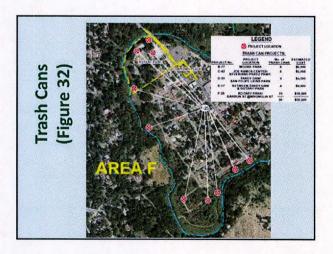
#### **TRASH CANS**





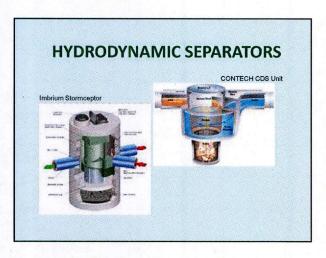






	Trash (Figur		
Project Area	Project Location	Number of Trash Cans	Project Costs (by Area)
B-77	Moore Park	6	\$ 6,000
C-42	Joe Ramos Center/Severiano Perez Pkwy.	6	\$ 6,000
D-35	Tardy Dam/ San Felipe Lions Park	4	\$ 4,000
E-17	Between Tardy Dam & Rotary Park	4	\$ 4,000
F-25	Rotary Park/Barron St. © Magnolia St.	10	\$ 10,000
Total		30	\$ 30,000

#### **HYDRODYNAMIC SEPARATORS**





	(Figure 30)	
Project Area	Project Location	Project Costs (by Area)
B-57	Moore Park	\$ 57,000
D-28	Tardy Dam	\$ 43,000
Total		\$ 100,000

COST SUMMARY

#### **COST SUMMARIES**

Project Type	Project Costs
Invasive Species*	\$ 2,930,000
Bank Improvements	\$ 10,995,000
Vegetation Enhancement	\$ 1,655,000
Stormwater BMPs**	\$ 12,132,000
Park Improvements	\$ 1,050,000
Miscellaneous***	\$ 652,000
Total	\$ 29 414 000

#### **POSSIBLE ECONOMIC DEVELOPMENT**

# **FOOD TRAILER PLAZA**

### PLAN IMPLEMENTATIONS – FINANCING OPTIONS

#### **Local Financing Options:**

- Annual Budgeting Process
- Bond Issuance
- Public/Private Partnerships
- Foundation Funding

### PLAN IMPLEMENTATIONS – FINANCING OPTIONS

#### **State & Federal Financing Options:**

- TWDB D-Fund 2, CWSRF
- TCEQ Section 319
- TxDOT Transportation Enhancement Program
- TPWD Outdoor Recreation Grant, Trail Grant Program
- Tx Dept. of Ag. Infrastructure Development Fund
- USFWS Habitat Conservation Plan
- US Dept. of Commerce Economic Dev. Admin.
- NADB/BECC Community Assistance Program
- USEPA Urban Waters Program, Border 2012 Initiative

#### PLAN IMPLEMENTATIONS -

#### RESOURCE ALLOCATIONS:

- · Cost will require more than just local resources
- Success will depend on ability to secure funds from a combination of grants, loans, and donations

#### INCORPORATION INTO PLATTING, SUBDIVISION & ZONING ORDINANCES:

 Incorporate appropriate recommendation into City's zoning, subdivision, and platting ordinances

#### **STRATEGIC PARTNERSHIPS:**

 Form and foster strategic partnerships with State/federal agencies, local volunteer groups & community organization, businesses, and private individuals

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#### WHAT'S NEXT?!

- Review & Comments by:
  - San Felipe Creek Commissioners
  - City of Del Rio Staff Members
  - Texas Water Development Board
  - General Public
- Address Comments (NEI, CP&Y, Rio Grande College)
- Submit Final Master Plan+Presentation

#### Future Schedule, Meeting Dates & **Meeting Locations**

NEXT MEETING: April 2012 (tentative)

MEETING FOCUS: FINAL – San Felipe Creek Master Plan

(ADDRESS COMMENTS ON DRAFT REPORT)

PROJECT CLOSEOUT DEADLINE: JUNE 2012

(per City's contract w/ TWDB)

#### **QUESTIONS & COMMENTS?** Naismith Engineering: NE Tom Brown David Fusilier, P.E. Grant Jackson, P.E. (Corpus Christi Office) NEI - Austin Office: (512) 708-9322 · CP&Y, Inc.: CP&Y) **Bonnie Doggett** - Sarah Itz CP&Y - Austin Office: (512) 349-0700 • Sul Ross University - Rio Grande College: - Dr. Dan Foley, Ph.D. Sul Ross University – Rio Grande Resea Center: (830) 703-4838



## San Felipe Creek Master Plan

- Subject: FINAL Master Plan for San Felipe Creek.
- This meeting is the 4th of 4 Planned Meetings
- Our team consists of:
  - Naismith Engineering, Inc. (Tom Brown, David Fusilier, Adam Luke, Felise Canterini, Grant Jackson)
  - Sul Ross State University-Rio Grande Research Center (Dr. Dan Foley, PhD.)
  - CP&Y, Inc. (Bonnie Doggett, Sarah Itz)

#### **Meeting Agenda**

- 1. Project Overview & Recap
- 2. What's Changed Since We Met Last??
- 3. Project Prioritization
- 4. What's Ahead?

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# PROJECT OVERVIEW & RECAP

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- Funding for this planning effort come from:
  - Texas Water Development Board- Research and Planning Fund (Connie Townsend, P.E.).
  - Local Funds (<u>City of Del Rio</u> provided matching share).

## **Project Overview**

#### Meetings:

October 2010 - Kick-Off/Introductory Meeting
July 2011 - Water Quality Best Management Practices
October 2011 - Project Recommendations
February 2012 - Draft Master Plan

June 2012 – Final Version of Master Plan (YOU ARE HERE!)

#### Other Activities:

• Time Extension Request w/ TWDB (until September 30, 2012)

#### **Project Focus**

- · Identify Water Quality Issues
- · Identify Appropriate WQ Best Management Practices (BMPs)
- Threatened & Endangered Species
- Invasive Species
- Agency Coordination
- · Provide Recommendations / Direction

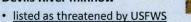
#### **Project's Unique Features**

- San Felipe Creek
  - Flows up to 90 million gallons per day (MGD)

  - High Quality Water
     City's Only Source of Drinking Water Supply
- · Devils River Minnow/San Felipe Gambusia
- · Giant River Cane (Arundo Donax)
- 100-year Floodplain
- · FEMA Buyout Properties
- · Long-Term History of Area
- · Popularity / Use of the Project Area

#### Project's Unique Features -**Threatened and Endangered Species**

#### **Devils River minnow**



- · recorded occurrences in project area
- · critical habitat in project area
- · presence necessitates coordination with USFWS

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# Project's Unique Features — Invasive Species Armored Catrish River Cane (a.k.a., Arundo)

# What's Changed Since the Last Meeting??

- Comments from the San Felipe Creek Commissioners (Appendix P)
- Comments from the TWDB (Appendix O)
- Comment Response Memos by NEI
- Updated Master Plan to Address Comments

PROJECT
PRIORITIZATION &
RANKINGS

4

# Overall Project Categories (Section 10.1)

- Invasive Species Eradication
- Public Safety & Public Access
- Water Quality
- Parks & Miscellaneous Improvements

# **Overall Project Categories**

#### **Invasive Species Eradication:**

- Cane Eradication
- · Vegetation Removal at Blue Hole
- Nutria Control
- Armored Catfish Eradication

# **Overall Project Categories**

#### **Public Safety & Public Access:**

- Bank Stabilization
- · Removal of Damaged Walls
- Reconstruction of Selected Walls
- Installation of Kayak/Tube Launch Areas
- · Access Points for Public Use

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# **Overall Project Categories**

#### **Water Quality:**

- Stormwater BMPs
- · Riparian Restoration/Vegetation Enhancement
- · Bank Stabilization/Erosion Control
- · Pervious Parking Areas + Hike & Bike Trails
- · Install Trash Cans & Pet Waste Stations
- Public Restrooms
- · Rehabilitation of Tardy Dam

## **Overall Project Categories**

#### **Park Improvements:**

- Rehabilitation of Existing Parks (picnic areas, playgrounds, parking areas)
- Installation of Kayak/Tube Launch Areas
- · Renovation of amphitheater
- · Upgrade of Tardy Dam
- · Rehabilitation of Existing Park Signs

## **Overall Project Categories**

[ Order of Preference -> ]

Invasive Species Eradication (1st)

Public Safety & Access

Water Quality (3rd) Park & Misc. Improvements

(see Section 10.1, page 80, for a similar graphic)

# Project Prioritization/ Project Rankings

- Projects Ranked by <u>Six</u> Categories:
  - Public Safety & Access
  - Long-Term Impact on Endangered Species
  - Impact on Water Quality
  - Existing Level of Degradation within Existing Project Area
  - Project Cost
  - Expected Impact on Required Maintenance

# Project Prioritization/Project Rankings

- Rankings from 1 5: 1 = worst → 5 = best
- A Project's "Ranking" = Avg. Rank of Six Categories
- Projects then Ranked within the Four Major Categories (Inv. Species Eradication, Public Safety, Water Quality, Park Improvements)
- Project Rankings discussed in <u>Section 10.2</u> (see Table 10-1 on pg. 86 for a summary)
- Projects Sorted by Rankings in <u>Appendix F</u>

## **Project Timelines**

- Immediate
- Short-Term (< 5 years)</li>
- Long-Term

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# **Project Timelines**

#### Immediate:

- ONLY PROJECT IS CANE ERADICATION
  - Between Hwy 90 bridge (Moore Park)& Tardy Dam
  - Includes about 2 acres of cane
  - Estimated cost for 5 yrs. = \$200,000

#### CENTRAL SAN FELIPE CREEK

- ~1.3 miles in length
- ~2 acres of cane

Most on private property?

ESTIMATED 5 YEAR COST (LABOR & CHEMICALS) = \$188,000 (Table 9-1, pg. 73)



# **Project Timelines**

#### Short-Term (< 5 years):

- Cane Eradication (\$2,800,000)
- Public Safety & Access Bank Improvements (\$657,000)
- Water Quality BMP Projects (\$512,000)
- Total Estimated cost for 5 yrs. = \$3,969,000

# Short-Term Project – Cane Eradication





~1.06 miles in length ~8 acres of cane

~2.3 miles in length ~30 acres of cane

# **Project Timelines**

#### Short-Term (< 5 years):

- CANE ERADICATION (approx. 38 acres)
  - Golf Course
  - Downstream of Tardy Dam to Round Mountain
  - Estimated cost for 5 yrs. = \$2,800,000

#### Invasive Species – Cane Eradication Estimated Costs

(for a 5 year cycle)

Table 9-1, pg. 73

Type of Cutting	\$/acre*	Year 1	Year 2	Year 3	Year 4	Year 5	TOTAL
40 acres - Manual	\$43,750	\$1,750,000	\$ 700,000	\$ 280,000	\$ 112,000	\$ 44,800	\$ 2,930,550
40 acres - Mechanical	\$28,875	\$1,115,000	\$ 462,000	\$ 184,800	\$ 73,920	\$ 29,568	\$ 1,934,163
2 acres - Manual**	\$43,750	\$ 87,500	\$ 35,000	\$ 14,000	\$ 5,600	\$ 2,240	\$ 188,090

• refer to cost estimates in APPENDIX E.

Based on the above cost estimates a reasonable approach to cane eradication may include concentrating initial efforts on the portion of San Felipe Creek between US Highway 90 and Tardy Dam.

# Short-Term Project – Public Safety & Access

#### Short-Term (< 5 years):

- Bank Stabilization Under Gillis St. & Calderon Blvd. Bridges
- Remove/Reconstruct Walls just downstream of Tardy Dam
- Convert Exist. Wading Area to Kayak Take Out
- Estimated cost for 5 yrs. = \$657,000

# Short-Term Project – Water Quality BMPs

#### Short-Term (< 5 years):

- Rehab Public Restrooms @ Lions Park & Amphitheater
- 30 new Trash Cans/18 Pet Waste Stations
- New Pervious Parking Areas (see next slide)
- Estimated cost for 5 yrs. = \$512,000

# Short-Term Project – Pervious Pavement WQ BMPs



# **Long-Term Projects**

# All Projects Not Considered Immediate or Short-Term:

- Invasive Species (Armored Catfish \$Unknown)
- Public Safety & Access (\$6,392,000)
- Water Quality (\$17,430,000)
- Park & Misc. Improvements (\$1,493,000)
- TOTAL ≈ \$25,300,000

#### **COST SUMMARIES**

## **Total Project Cost Summary**

(based on Project Cost Estimates\*)

Immediate\*\* = \$ 200,000

Short-Term\*\*= \$ 3,969,000

<u>Long-Term</u> = \$ 25,315,000

**TOTAL** ≈ \$ 29,500,000

- \* see Appendix G for Individual Project Cost Estimates
- \* Immediate/Short-Term Projects include 5 yrs. of cane eradication

#### **COST SUMMARIES**

#### By Project Category:

Project Type	Project Costs
Invasive Species*	\$ 2,968,000
Public Safety & Access	\$ 7,049,000
Water Quality	\$ 17,942,000
Park Improvements	\$ 1,493,000
Total	<b>\$ 29,500,000</b>

estimated 5-year cost for manual eradication of approx. 40 acres along San Felipe Creek; also includes vegetation removal at Blue Hole (8-3) and rodent control in the golf course area (A-13)

# Things to Remember about Recommended Improvements

- Listed in Appendix G (by Individual Project)
- Includes Detailed Project Description + Cost Estimate
- Projects grouped by Areas (A, B, C, D, E, F) & by functional category (for ranking purposes)
- · Intended to be flexible/functional
- · Projects can be deleted/added when needed
- Plan should be reviewed annually to add/delete projects as necessary

## Other Highlights from the Revised Master Plan

- Vegetated Management Areas (Sect. 9.10, pg. 79, & on following slide):
- Financial Considerations detailed under constraints (Sect. 3.5.8, pg. 18);
- Made clear that pervious concrete is not only option for pervious pavement (4.6.2.c, pg. 34; 9.6, pg. 77);
- Sections 7.4 (Habitat Restoration) & 7.5 (Habitat Protection) were combined;

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#### No Mow Zones



City of Del Rio Management Plan for San Felipe Creek and the Devils River Minnow

"No Mow zones should be designated in open space areas adjacent to the creek... As a practical guide, no mowing should take place within and under the drip line of existing trees. No Mow zones also serve to provide habit

# Vegetation Management Areas

- · Managed to enhance riparian area
- · Referenced on Figure 19
- See Fact Sheet for guidance (Appendix N)
- · Not intended to be a lawn or turf grass area

# Other Highlights from the Revised Master Plan (cont.)

- Cane Eradication mention USDA's role and recommend contacting USDA staff (7.4.1, pg. 55);
- Clarified roll and function of Focused Access Features

   (9.5, pg, 75)
- Conclusions and Recommendation Section Added (12.0, pg. 96)

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#### WHAT'S NEXT?!

- Review & Comments by (quickly):
  - San Felipe Creek Commissioners
- Submit Final Master Plan to TWDB
- Submit All Payment Requests to TWDB
- Project Closeout by TWDB
- Master Plan Implementation

  - Present to City Council
     Begin Addressing Funding
  - Sign contract for Texas Parks & Wildlife Dept. Trail Grant
  - Submit Master Plan to USFWS as part of coordination efforts
  - Immediate Projects Cane Eradication

#### **QUESTIONS & COMMENTS?**

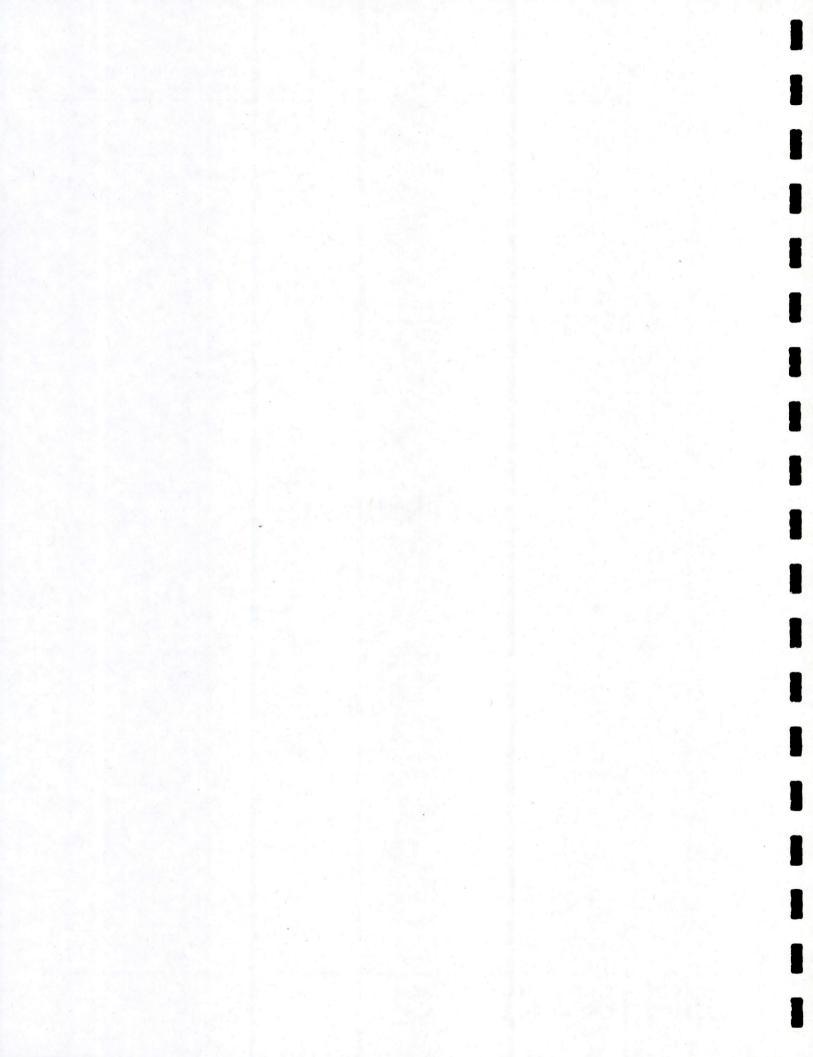


- Naismith Engineering:
   Tom Brown
   David Fusilier, P.E.
   Grant Jackson, P.E. (Corpus Christi Office)
   NEI Austin Office: (512) 708-9322
- · CP&Y, Inc.:
  - Bonnie Doggett
- CPY)
- CP&Y Austin Office: (512) 349-0700
- Sul Ross University Rio **Grande College:**
- Dr. Dan Foley, Ph.D.

Sul Ross University - Rio Gra Center: (830) 703-4838



# **APPENDIX M**





#### San Felipe Creek Water Quality and Master Plan Survey

The City of Del Rio is developing a Water Quality Master Plan for San Felipe Creek. A major component of this plan is to protect endangered species within the creek and to assure that public access is continued. As part of this planning process the City of Del Rio is requesting your input on the future of San Felipe Creek.

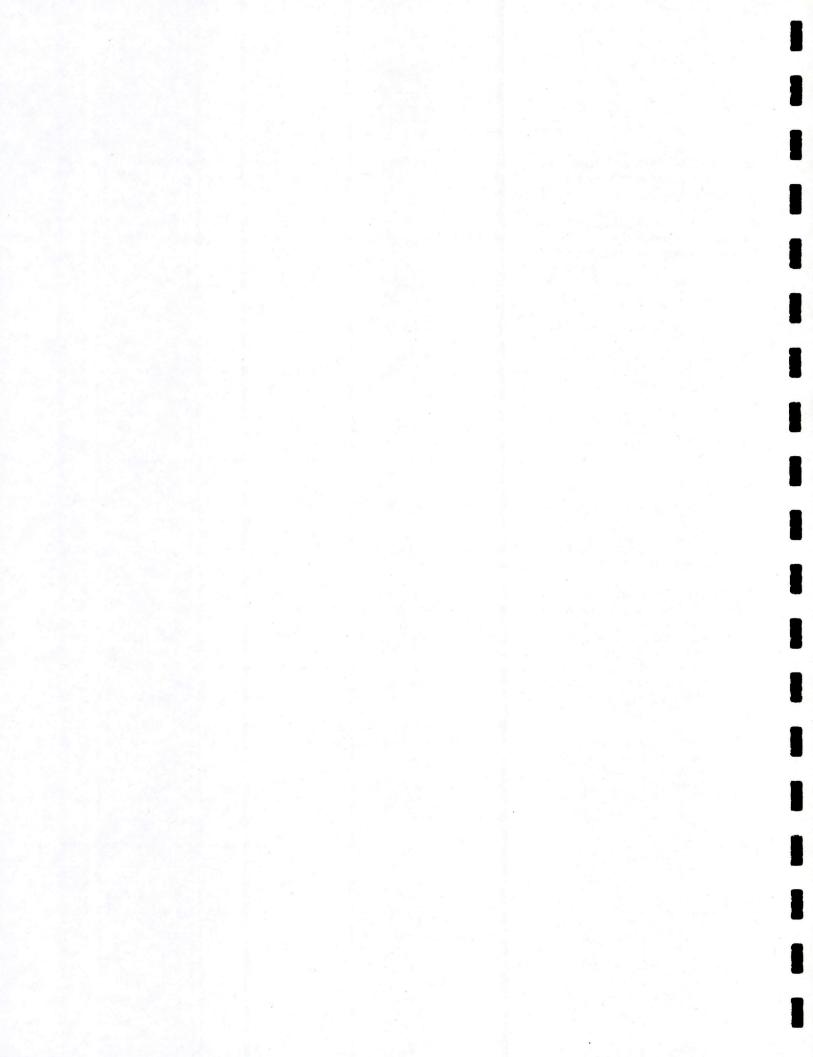
The City of Del Rio has acquired several properties along San Felipe Creek as a result of federal funding due to the 1998 flood. As part of this planning effort, the City wants input on how these properties can be used and how to improve the existing parks and recreation opportunities along San Felipe Creek.

Please take the time to complete this short questionnaire so that we can include your input into our planning process.

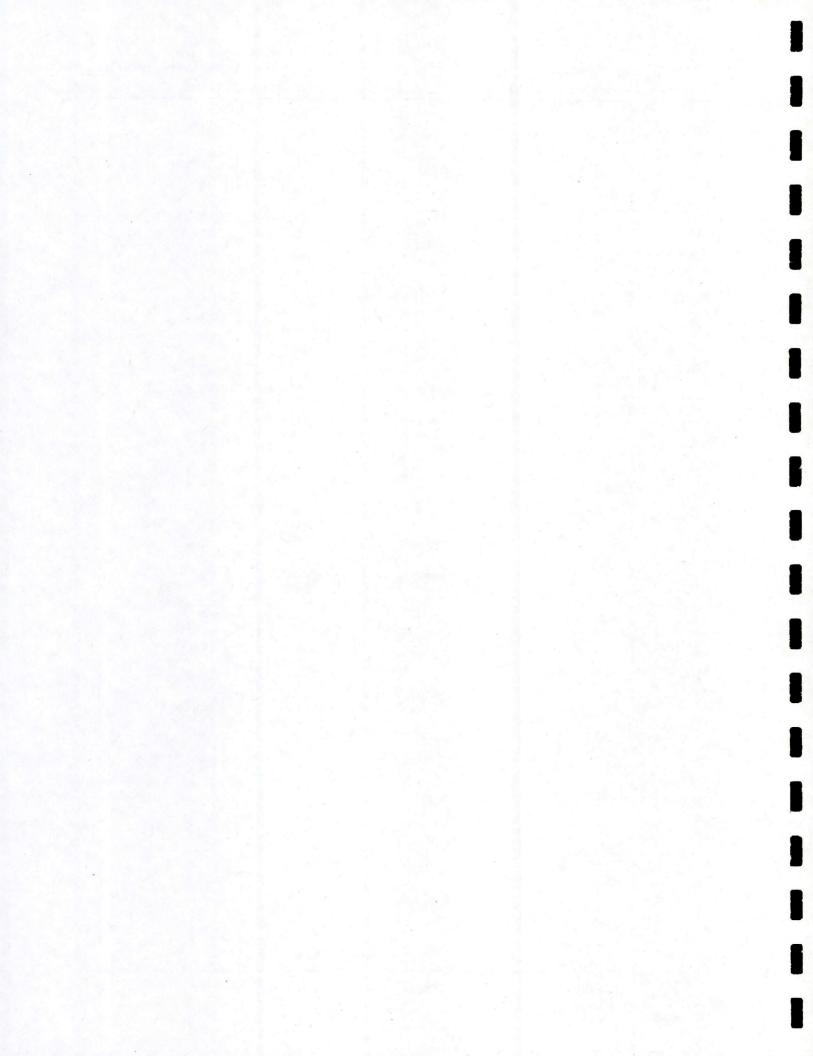
Numbe			r household by						
0-5	5 6-	10	11-15	16-20	21-30	31-40	41-50	51-65	65+
Please a	nswer the f	ollowin	g questions by	checking YE	S or NO:				
1.	Have you of years? YE			parks or trails	s, or gone swim	ming, tubing, o	or boating in Sa	n Felipe Creek	in the past three
2.	Would you NO	or you	r family use the	parks, trails,	and creek if the	re were addition	onal recreationa	l amenities ava	ilable? YES
3.	Have you of years? YE			d a festival or	other group ac	tivity at City p	oarks along Sar	Felipe Creek	in the past three
4.	Would you	like to	see more group	activities, suc	ch as festivals,	concerts, recital	ls, etc. along Sa	ın Felipe Creek'	? YESNO
			activities in or 15 being the lea			le of 1-15, wit	th 1 being the	most importar	nt, 2 the second
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122			nd invasive spec			(° 106) - 12			
	Providing of	or impro	oving erosion co	ontrol along Sa	n Felipe Creek				
	provide any ipe Creek M				hat you would			ms that are im	portant for the
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0.47									

PLEASE RETURN THIS SURVEY NO LATER THAN OCTOBER 21, 2011 TO:

Ms. Jackie Robinson, City of Del Rio Marketing and Communication 109 W. Broadway Del Rio, TX 78840



# **APPENDIX N**



# **Fact Sheet**

# Vegetation Management Areas along San Felipe Creek

#### A Guide to the Establishment and Upkeep of the Vegetation Management Areas







#### **PURPOSE**

For San Felipe Creek a Vegetative Management Area is a designated area adjacent to the creek that is managed in a way to promote a healthy, diverse riparian area and to maximize its ability to remove sediment and pollutants from stormwater runoff. Treed Vegetative Management Areas help shade the adjoining water body cooling water temperatures, stabilizing banks, and slowing high-velocity floodwaters.

#### **TYPES**

The Vegetative Management Area should have as diverse a plant life as possible for the intended use of the area. All plants should be native to the area and suitable for a riparian area.

Grass Only - vegetation should include a mixture of native grasses and sedges; the use of turf grasses should be avoided.

Grass & Trees - a diverse mixture of native grasses, sedges, woody plants, and trees should be encouraged.

#### **LAYOUT**

The Vegetative Management Area should follow the banks of San Felipe Creek. The width of this area should be maximized to the greatest extent possible. The goal for Vegetative Management Areas along San Felipe Creek is to be at least **50** feet wide.

#### **MAINTENANCE**

Maintenance activities should be organized and should promote the establishment of a healthy riparian area:

**Mowing -** Grassed areas should be mowed no lower than 8 inches in height; minimize mowing events - 1 to 3 times per year should be the goal depending on the type of vegetation; treed areas may necessitate the use of trimmers (instead of riding or walk-behind mowers).

**Herbicides & Fertilizers** - Except for eradicating invasive species, the use of herbicides should be avoided in the Vegetative Management Area; fertilizer use should be limited to compost or organic fertilizers; application rates should not exceed manufacturer's recommendations.

**Invasive Species** - Routine monitoring of the Vegetative Management Area is required; invasive species, such as *Arundo donax*, should be removed promptly to avoid propagation.

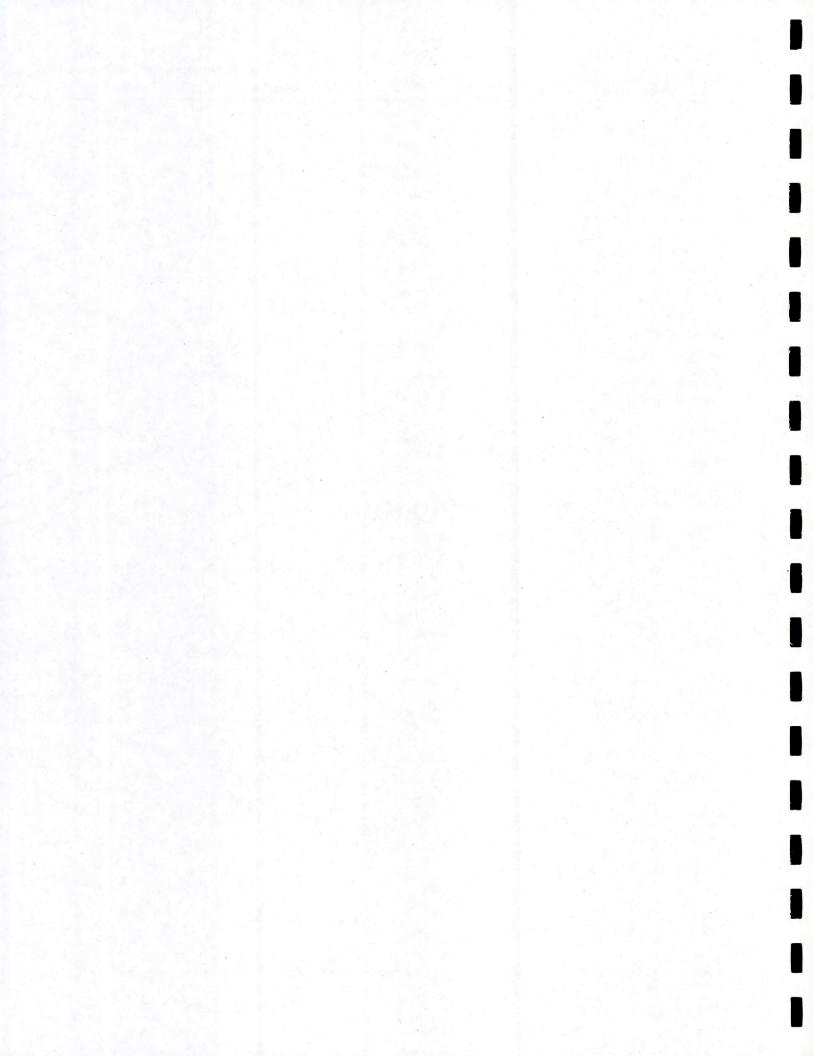
#### **RESOURCES & REFERENCES**

Your Remarkable Riparian - A field guide to riparian plants within the Nueces River Basin of Texas, Nueces River Authority, <a href="http://www.nueces-ra.org/CP/LS/literature/yrr.php">http://www.nueces-ra.org/CP/LS/literature/yrr.php</a>

Texas Plant Information Database, Texas Parks and Wildlife Department, <a href="http://tpid.tpwd.state.tx.us/index.asp">http://tpid.tpwd.state.tx.us/index.asp</a>
Texas - Central Recommended (commercially available native plant species for Central Texas), Lady Bird Johnson Wildflower Center, <a href="http://www.wildflower.org/collections/collection.php?collection=TX">http://www.wildflower.org/collections/collection.php?collection=TX</a> central

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# **APPENDIX O**



TBPE Registered Firm No. F-355

#### **MEMORANDUM**

TO:

San Felipe Creek Commissioners

**NEI Project No. 8267** 

FROM:

David Fusilier, P.E.

DATE:

June 26, 2012

City of Del Rio

SUBJECT:

Response to Comments on the Draft San Felipe Creek Master Plan from the Texas Water

Development Board's Letter of April 5, 2012

The Texas Water Development Board (TWDB) issued a letter dated April 5, 2012 to Mr. Robert Eads, City Manager, in which they transmitted their comments based on their review of the Draft San Felipe Creek Master Plan.

The following includes a summary of the actual comments received along with our response to the comments including how they are addressed in the final version of the report. The TWDB's comments are shown in italics, followed by our response.

1. Please include an Executive Summary in the final report per contract Section II, Article III(4).

An Executive Summary has been included in the final report.

2. Please include a Conclusions and Recommendations Section in the final report per contract Section II, Article III(4).

A Conclusions and Recommendations Section (Section 12) has been included in the final report.

3. Scope of Work Task 2 - Develop Habitat Restoration Strategies: The designated subtask for - "timelines...
for each of the strategies recommended for implementation" does not appear to have been completed.
There appears to be no prioritization of projects based on the sequence in which they should be implemented for best effect; nor timing considerations provided for any specific projects. Although classification of projects as "short-term" or "long-term" was mentioned in Section 10, there does not appear to be any designation of projects based on this classification in the documentation. Please provide this information in the final plan.

The projects have been prioritized in more detail. Section 10 of the report details the project rankings based on a number of different criteria, using four major project categories (Invasive Species Eradication, Public Safety & Access, Water Quality, and Park & Miscellaneous Improvements) to separate the projects. The timing of projects has been categorized as Immediate, Short-term, or Long-Term. As outlined in the Master Plan financial considerations will play a significant part in the timing of project implementation.

4. Scope of Work Task 5 - Prepare Final Water Quality Plan: The designated subtasks for - "Prioritization of water quality and environmental alternatives base on Owner and public input;" and providing "An implementation strategy... including financing and resource allocation options;" do not appear to have been carried out. Although classification of projects as "short-term" or "long-term" was mentioned in Section 10, no designation of projects using this classification appears within the document. Please consider using a more rigorous sorting of the more than 200 recommended projects such as ranking threats by the severity of their impacts on the water quality in the final plan.

# Naismith Engineering, Inc

MEMORANDUM (Continued)

To: San Felipe Creek Commissioners

From: David Fusilier Date: June 2012 Page 2 of 3

An updated project prioritization has been included in Section 10 of the Master Plan. The project categories and prioritization of projects have been based in part on Owner and public input. As indicated in the Master Plan the timing of individual will be in large part based on funding levels. Local, State and federal sources will all play a role in how much money is available for San Felipe Creek.

5. Please correct the typographical, grammatical, and formatting errors found throughout the draft report.

The typographical, grammatical, and formatting errors have been corrected.

6. Page 13, Section 3.5.1: It appears that the fourth sentence regarding FEMA 100-year floodplain requirements may not be accurate. Local ordinances may prohibit residential construction in the 100-year floodplain, but FEMA does not appear to have this prohibition. Please clarify and correct this statement where appropriate in the final report.

This sentence has been edited to more appropriately convey FEMA requirements.

7. Sections 7.4 and 7.5: Please clarify the differences between Recommended Habitat Strategies for Restoration vs. Protection if they exist; otherwise, please consider combining the identical text from these two sections into a single section in the final report.

The sections on Restoration vs. Protection strategies have been combined.

8. Page 79, Section 10: Please include in the final report the missing description from the "Immediate Projects" classification.

The missing description from the "Immediate Projects" classification has been provided.

9. Page 79, Section 10: In the final report, please provide reference to Appendix G (project details) and clarify reference to Appendix F (project summary costs)..

The references have been added/clarified as requested.

10. Appendix F - Please provide missing cost summaries for "Invasive Species Control" projects; and missing unit costs for "Invasive Species Control" in the final plan.

Cost summaries for "Invasive Species Control" have been provided.

11. Appendix F - In the final report, please correct cost summary table "Priority" designations to match individual project sheets in Appendix G [example: Project A-1 through A-6 are listed as "Immediate" in Appendix G; as "S" = "Short-Term" in Appendix F].

This has been done.

# Naismith Engineering, Inc

**MEMORANDUM** (Continued)

To: San Felipe Creek Commissioners

From: David Fusilier Date: June 2012

Page 3 of 3

12. Appendix F, "Individual Project Cost Estimates by Project Type", end of table "Overall Cost Summary": In final report, please provide the missing Overall Cost Summary for the Invasive Species Control entry. Please provide cost summary references used for the "Invasive Species Control" entry and the "Cane Erad.-Labor+Equip." entry.

This has been done.

13. Appendix F "Unit Costs" table and Appendix E "Cane Eradication Cost Estimates": "Unit Costs" table has only one listing for "Invasive Species Control Chemicals"; however, Appendix E provides two different cost estimate sheets with different chemical costs. In the final report, please clarify and revise where appropriate.

This has been done.

14. Page 44 and Appendix F Projects C-36, D-36, and E-13: Report text states that replacing existing sidewalks with pervious sidewalk are categorized as "Long-Term" projects; however, Appendix F lists projects C-36, D-36, and E-13 as "Short-Term" projects. Please clarify and revise the final report where appropriate.

These projects have been updated to indicate that they are "Long-Term" projects.

If you have any questions or comments on our proposed meeting structure please give me a call at (512) 708-9322 (office) or (512) 925-6691 (cell), or send me an e-mail (<u>dfusilier@naismith-engineering.com</u>).



P.O. Box 13231, 1700 N. Congress Ave. Austin, TX 78711-3231, www.twdb.texas.gov Phone (512) 463-7847, Fax (512) 475-2053

April 5, 2012

Robert Eads City Manager City of Del Rio 109 West Broadway Del Rio, Texas 78840

RE:

Regional Water Facility Planning Grant Contract between the Texas Water Development Board (TWDB) and the City of Del Rio (City); TWDB Contract No. 1004831077, Draft Report Comments

Dear Mr. Eads:

Staff members of the TWDB have completed a review of the draft report prepared under the above-referenced contract. ATTACHMENT I provides the comments resulting from this review. As stated in the TWDB contract, the City will consider incorporating draft report comments from the EXECUTIVE ADMINISTRATOR as well as other reviewers into the final report. In addition, City will include a copy of the EXECUTIVE ADMINISTRATOR'S draft report comments in the Final Report.

The TWDB looks forward to receiving one (1) electronic copy of the entire Final Report in Portable Document Format (PDF) and six (6) bound double-sided copies. Please further note, that in compliance with Texas Administrative Code Chapters 206 and 213 (related to Accessibility and Usability of State Web Sites), the digital copy of the final report must comply with the requirements and standards specified in statute. For more information, visit <a href="http://www.sos.state.tx.us/tac/index.shtml">http://www.sos.state.tx.us/tac/index.shtml</a>. The City shall also submit one (1) electronic copy of any computer programs or models, and, if applicable, an operations manual developed under the terms of this Contract.

If you have any questions concerning the contract, please contact Connie Townsend, the TWDB's designated Contract Manager for this project at (512) 463-8290.

Sincerely.

Carolyn L. Brittin

Deputy Executive Administrator

Water Resources Planning and Information

**Enclosures** 

c: Connie Townsend, TWDB

Our Mission

**Board Members** 

To provide leadership, planning, financial assistance, information, and education for the conservation and responsible development of water for Texas

Edward G. Vaughan, Chairman Joe M. Crutcher, Vice Chairman

Thomas Weir Labatt III, Member Lewis H. McMahan, Member

Billy R. Bradford Jr., Member Monte Cluck, Member

Melanie Callahan, Executive Administrator

#### Attachment I

#### City of Del Rio

#### San Felipe Creek Watershed Protection Study (San Felipe Creek Master Plan, Vol. 1 & 2)

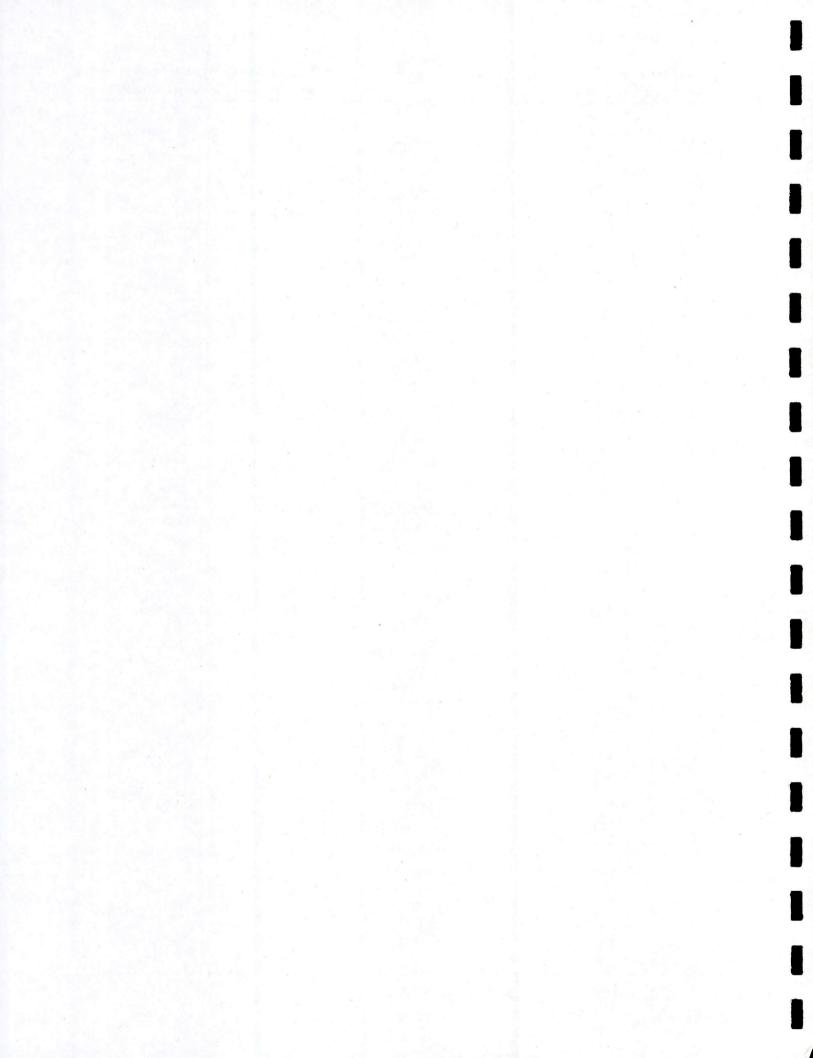
#### **TWDB Contract No. 1004831077**

#### **Draft Report Review Comments**

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- 2. Please include a Conclusions and Recommendations Section in the final report per contract Section II, Article III (4).
- 3. Scope of Work Task 2 Develop Habitat Restoration Strategies: The designated subtask for "timelines ... for each of the strategies recommended for implementation" does not appear to have been completed. There appears to be no prioritization of projects based on the sequence in which they should be implemented for best effect; nor timing considerations provided for any specific projects. Although a classification of projects as "short-term" or "long-term" was mentioned in Section 10, there does not appear to be any designation of projects based on this classification in the documentation. Please provide this information in the final plan.
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- 7. Sections 7.4 and 7.5: Please clarify the differences between Recommended Habitat Strategies for Restoration vs Protection if they exist; otherwise, please consider combining the identical text from these two sections into a single section in the final report.
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- 9. Page 79, Section 10: In the final report, please provide reference to Appendix G (project details) and clarify reference to Appendix F (project summary costs).
- 10. Appendix F Please provide missing cost summaries for "Invasive Species Control" projects; and missing unit costs for "Invasive Species Control" in the final plan.
- 11. Appendix F In the final report, please correct cost summary table "Priority" designations to match individual project sheets in Appendix G. [example: Project A-1 through A-6 are listed as "Immediate" in Appendix G; as "S" = "Short-term" in Appendix F]
- 12. Appendix F, "Individual Project Cost Estimates by Project Type", end of table "Overall Cost Summary": In final report, please provide the missing Overall Cost Summary for the "Invasive Species Control" entry. Please provide cost summary references used for the "Invasive Species Control" entry and the "Cane Erad.-Labor+Equip." entry.

- 13. Appendix F "Unit Costs" table and Appendix E "Cane Eradication Cost Estimates": "Unit Costs" table has only one listing for "Invasive Species Control Chemicals"; however, Appendix E provides two different cost estimate sheets with different chemical unit costs. In the final report, please clarify and revise where appropriate.
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# **APPENDIX P**



TBPE Registered Firm No. F-355

#### **MEMORANDUM**

TO:

San Felipe Creek Commissioners

NEI Project No. 8267

City of Del Rio

FROM:

David Fusilier, P.E. 96/26/2012

DATE:

June 26, 2012

SUBJECT:

Response to Comments on the Draft San Felipe Creek Master Plan from the

March 15, 2012 San Felipe Creek Commissioner's Meeting

At the San Felipe Creek Commissioner's meeting on Thursday, March 15, 2012 the Commissioners discussed and commented on the DRAFT San Felipe Creek Master Plan that was presented at the February 16, 2012 San Felipe Creek Commission Meeting.

The following includes a summary of the actual comments received along with our response to the comments. The SFC Commissioner's comments are shown in italics, followed by our response.

1. Overflow parking could be done with other materials.

This comment is correct. In order to be conservative in our cost estimate we have, for the present time, assumed that new and reconstructed parking areas will use a pervious concrete paying system. This cost would be at the high end of what could be expected. Other alternative parking areas, such as GravelPave or other similar systems, could be expected to cost less. The Master Plan does state that pervious concrete or other "similar" type systems can be utilized for the parking areas and we have made appropriate edits in the Master Plan to emphasize this point.

2. Existing parking lots should not be disturbed if possible.

We agree with this comment. Existing parking lots that are in good condition should be placed lower on the priority list of proposed projects than new, proposed parking areas or existing parking areas in need of renovation/reconstruction. The Master Plan recommends that, for those existing parking areas that are in poor condition and in need of resurfacing or reconstruction, the newly installed surface should be a pervious-pavement type system (pervious concrete, gravel pave system, etc...). In lieu of a pervious pavement system, a stormwater best management practice such as a vegetative filter strip or biofiltration area could be installed downstream of the new surface to treat the stormwater that flows off the area.

3. Maintenance on the permeable pavement could be a concern. Maybe there is another type of pavement that could be considered.

The Master Plan recommends that for new or reconstructed parking areas, trails, and other existing impervious surfaces the new surface should be a pervious pavement type system, or should be constructed in conjunction with a stormwater best management practice (e.g., vegetative filter strip, bioretention system etc...). The Master Plan's emphasis on pervious concrete, especially in the project descriptions and cost estimates (Appendix G), is based on the fact that these systems are typically at the higher end of construction costs. This conservative approach for the cost estimates would help ensure that the construction costs for proposed projects would not be higher than expected.

# NaismithEngineering,Inc

## **MEMORANDUM** (Continued)

To: San Felipe Creek Commissioners

From: David Fusilier Date: June 26, 2012

Page 2 of 4

4. We need a prioritized construction plan- projects should be broken down into priority sections.

The projects have been prioritized in more detail. Section 10 of the report details the project rankings based on a number of different criteria, based on four major project categories (Invasive Species Eradication, Public Safety & Access, Water Quality, and Park & Miscellaneous Improvements). The timing of projects has been categorized as Immediate, Short-term, or Long-Term.

5. Would hope that some of the projects that could be completed by the city that those projects would be looked at first.

City crews can definitely complete some of the projects outlined in the Master Plan.

6. Bank stabilization should be a priority.

Agreed.

7. Safety should be considered when looking at projects.

Agreed.

8. Some of the more costly projects should be on hold, we need to look at those projects and be reasonable about the costs and materials associated with them.

Agreed.

9. Water quality protection for drinking water does not seem to be one of the goals with this project. This project is located downstream from where we get our drinking water from.

Water quality in San Felipe Creek is a major concern because of the contact recreational uses of the Creek, as well as the presence of endangered species. The Master Plan emphasizes water quality protection for the San Felipe Creek area with an emphasis on the portion of San Felipe Creek that lies within the City Limits. The City's intake structures are located upstream of the US Highway 90 bridge and therefore outside of the main focus of this Master Plan. However, the Master Plan does provide details on possible ordinances and other watershed management techniques that may be used to improve water quality throughout the San Felipe Creek drainage basin.

10. This study should be used as a guideline and should not be placed on a shelf and not looked at again.

Agreed.

11. Page 13 Constraints are a concern. The financial constraints were not included on this list.

Agree that financial constraints will definitely be in issue in implementing many parts of the Master Plan. We have included a section on financial constraints (Section 3.5.8).

## NaismithEngineering,Inc

MEMORANDUM (Continued)

To: San Felipe Creek Commissioners

From: David Fusilier Date: June 26, 2012

Page 3 of 4

12. The creek is not right now the center piece of the city but it could become the center piece should we address the safety needs along the creek.

Agreed.

13. There were a lot of access points shown in the plan. Do we need all of these points and do they all need to be ADA accessible?

The access points shown were proposed to give the general public similar type access to the creek. Certainly fewer access points would be possible, however, it is recommended that the access points be located at points often enough along the creek to make the useful. The idea is to focus the general public's access to these particular locations in an effort to keep other portions of the riparian area less susceptible to foot traffic and potential damage. The issue of ADA accessibility would need to be addressed in detail with the Texas Department of Licensing and Regulation. Typically, issues are dealt with on a project by project basis. In general, when a focused access feature would provide the primary access point to that particular area of the creek, the focused access feature would need to be made ADA accessible.

14. List native/acceptable grass to be placed along the banks.

Acceptable native grasses to be placed along the bank area have now been listed in an updated Figure 4.

15. Do we need two foot bridges in Moore Park? Could we eliminate one and make the other ADA?

We assume this comment is about the two foot bridges located just to the west of the Moore Park swimming pool. The City has the option of replacing each bridge or replacing both bridges with one bridge. In general, the number of bridges provided would be up to the City, however the bridges themselves should be made ADA accessible.

# NaismithEngineering,Inc

#### MEMORANDUM (Continued)

To: San Felipe Creek Commissioners

From: David Fusilier Date: June 26, 2012

Page 4 of 4

#### Priority Projects/Areas

- 1. Manage the removal of the cane (continuous project)
  - start from the area upstream
  - identify the private landowners (private/city partnership)
- 2. Address safety areas
  - We should be looking at where more of the residents frequent
  - Address bank stabilization
    - o Manmade bank improvements
    - o Natural bank
- 3. Provide access points downstream to allow for other areas of the creek to be used.

The Master Plan has been drafted to address the above priorities outlined by the Commissioners.

4. Look at the projects that will attract more tourism to the creek. Appendix G Project D-23. Could we get conceptual approval for this project?

Based on our meeting with USFWS staff members, if the approval sought is from the USFWS such approval would have to be more than conceptual. The USFWS will require a detailed schematic/design plan for how exactly the Tardy Dam area will be renovated/reconstructed. This plan must include not only what the renovated dam would look like, but would need to provide details on how exactly it would be constructed. A clear picture of how the dam would be renovated while protected the endangered species in San Felipe Creek would have to be outlined to the USFWS.

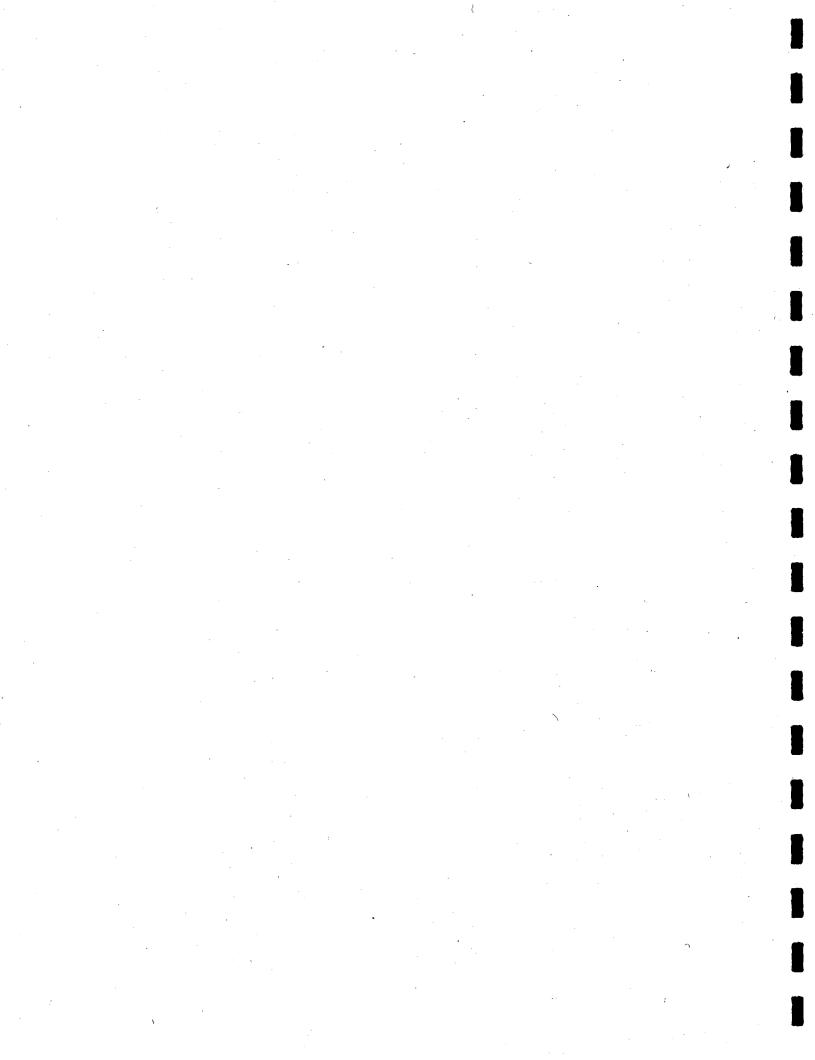
If you have any questions or comments on our proposed meeting structure please give me a call at (512) 708-9322 (office) or (512) 925-6691 (cell), or send me an e-mail (dfusilier@naismith-engineering.com).

# San Felipe Creek Master Plan Comments San Felipe Creek Master Plan Commission Meeting March 15, 2012

- Overflow parking could be done with other materials
- Existing parking lots should not be disturbed if possible
- Maintenance on the permeable pavement could be a concern. Maybe there is another type of pavement that could be considered.
- We need a prioritized construction plan- projects should be broken down into priority sections
- Would hope that some of the projects that could be completed by the city that those projects would be looked at first
- Bank stabilization should be a priority
- Safety should be considered when looking at projects
- Some of the more costly projects should be on hold, we need to look at those projects and be reasonable about the costs and materials associated with them.
- Water quality protection for drinking water does not seem to be one of the goals with this project. This project is located downstream from where we get our drinking water from
- This study should be used as a guideline and should not be placed on a shelf and not looked at again.
- Page 13 Constraints are a concern. The financial constraints were not included on this list.
- The creek is not right now the center piece of the city but it could become the center piece should we address the safety needs along the creek.
- There were a lot of access points shown in the plan. Do we need all of these points and do they all need to be ADA accessible?
- List native/acceptable grass to be placed along the banks
- Do we need two foot bridges in Moore Park? Could we eliminate one and make the other ADA?

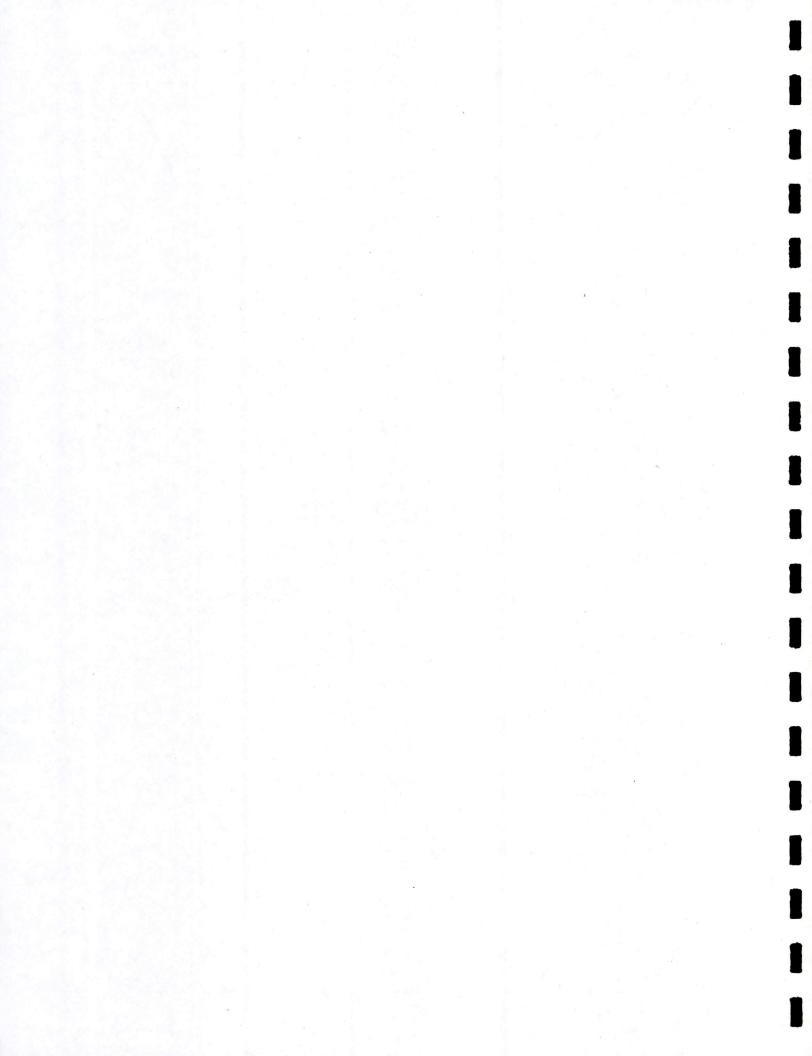
#### Priority Projects/Areas

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- 3. Provide access points downstream to allow for other areas of the creek to be used
- 4. Look at the projects that will attract more tourism to the creek. Appendix G Project D-23. Could we get conceptual approval for this project?



# **APPENDIX Q**





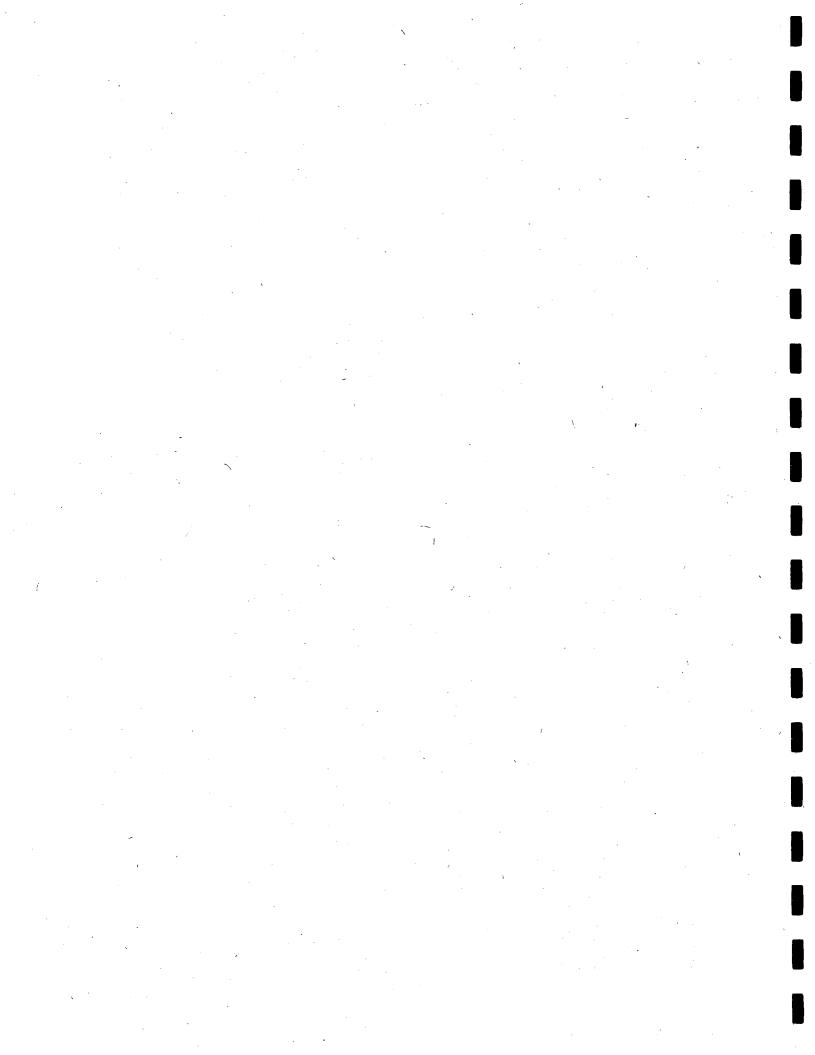
#### 1.0 Introduction

San Felipe Creek has been a focus of community use since pre-historic times. The San Felipe Springs produce up to 90 million gallons of water per day and provides the water supply for the City of Del Rio and Laughlin Air Force Base. The exceptional water quality supports threatened and endangered species as well as intensive public recreational uses. The challenges threatening the creek are invasive species, specifically river cane (arundo donax) and the armored catfish (insert scientific name). Additionally there is a significant need to address erosion and bank stabilization along the creek. San Felipe Creek has a long history of devastating floods the most recent being in 1998. Subsequent to that flood the City of Del Rio used funding through FEMA to acquire properties that were severely damaged and were located within the 100 year floodplain. The acquisition of these properties significantly increased the property holdings of the city along the creek, especially in residential neighborhoods (see Figure Q-1). One of the key objectives of this planning effort was to identify what adaptive land uses would be appropriate along San Felipe Creek understanding the need to protect endangered species, allow public access to the creek and protect the integrity of the floodplain. The following is a discussion of what some potential adaptive land uses could be supported within the project area as well as policies that would need to be implemented to accomplish this objective.

As noted earlier San Felipe Creek is habitat for threatened and endangered species as well as a recreational resource for the community. Protecting this resource is a priority of the City of Del Rio and the San Felipe Creek Commission and throughout this planning process the various strategies that have been developed have attempted to strike a balance between habitat protection and public use. Factors that affect public use and development along the creek include the following:

- 100 Year Floodplain;
- FEMA Buyout properties;
- Agreements with the U.S. Fish and Wildlife Service for protection of the endangered species;
- Public understanding of the value of the creek and the need to protect the resource;
- Impact of invasive species on creek use;
- Public safety;
- Current zoning regulations;
- Erosion and stream bank stabilization; and,
- Adjacent land uses to the creek.

These factors provide the parameters for public use of the creek and have a direct impact on any potential adaptive land uses along San Felipe Creek. Throughout this planning process it has been recognized by the participants that the beauty of the creek and its surrounding habitat are what makes San Felipe Creek the special natural resource that is a centerpiece for the community. In order to protect the creek and provide for public use the City of Del Rio must



address several policy issues that directly impact the future of the creek and land uses within the planning area.

### 2.0 Policy Issues

The following are policy issues that will have a direct impact on any adaptive land uses along San Felipe Creek. In many cases these issues are interrelated and directly affect how land use along the creek will be impacted.

- 1. 100 year floodplain- San Felipe Creek has a wide flood plain that includes primarily residential neighborhoods and restricts the type of development that can occur. Under FEMA rules the commercial building development is effectively restricted to having the building elevated above the floodplain which would make the development more expensive. While there are building restrictions there are adaptive uses that would provide amenities that are not permanent structures but must be done without increasing the runoff during storm events or be a hazard during flood events.
- 2. Current Ordinances- Current City Ordinances including the Zoning Ordinance should be reviewed and consideration be given to creating a Special Use Zoning along San Felipe Creek and within the 100 foot buffer zone identified in the floodplain ordinance. This Special Use Zoning would identify specific uses within the area that would not impact the 100 year floodplain. These uses could include parking areas, RV Parks, outdoor dining areas, tube and paddleboat rentals, movable food trailers, and other open air structures such as pavilions or gazebos.
- 3. Public-Private Partnerships- The City of Del Rio owns a significant amount of property along San Felipe Creek. With the exception of the area near Highway 90 this property borders on residential neighborhoods. Property acquired using FEMA buyout funding has significant restrictions on what can be done with the property. The city should consider developing guidelines that would allow for public-private partnerships for development. These partnerships could take the form of a long term lease of city property out of the floodplain for commercial development while having parking areas or patios using Best Management Practices (BMP) to protect water quality within the floodplain. A second potential for a partnership would be if the City owned property adjacent to private property and leased the property for parking. If the City were to embark on these public-private partnerships policies would need to be developed detailing how contracts would be written and what compensation would be due the City from the private interests.
- **4. Development Should be Compatible with Surrounding Neighborhoods-** Care should be taken to make sure that any development would be compatible with the surrounding neighborhoods.
- 5. Incorporate the FEMA Buyout Properties into the City Park System- The FEMA buyout properties should be incorporated into the City Park System. These areas

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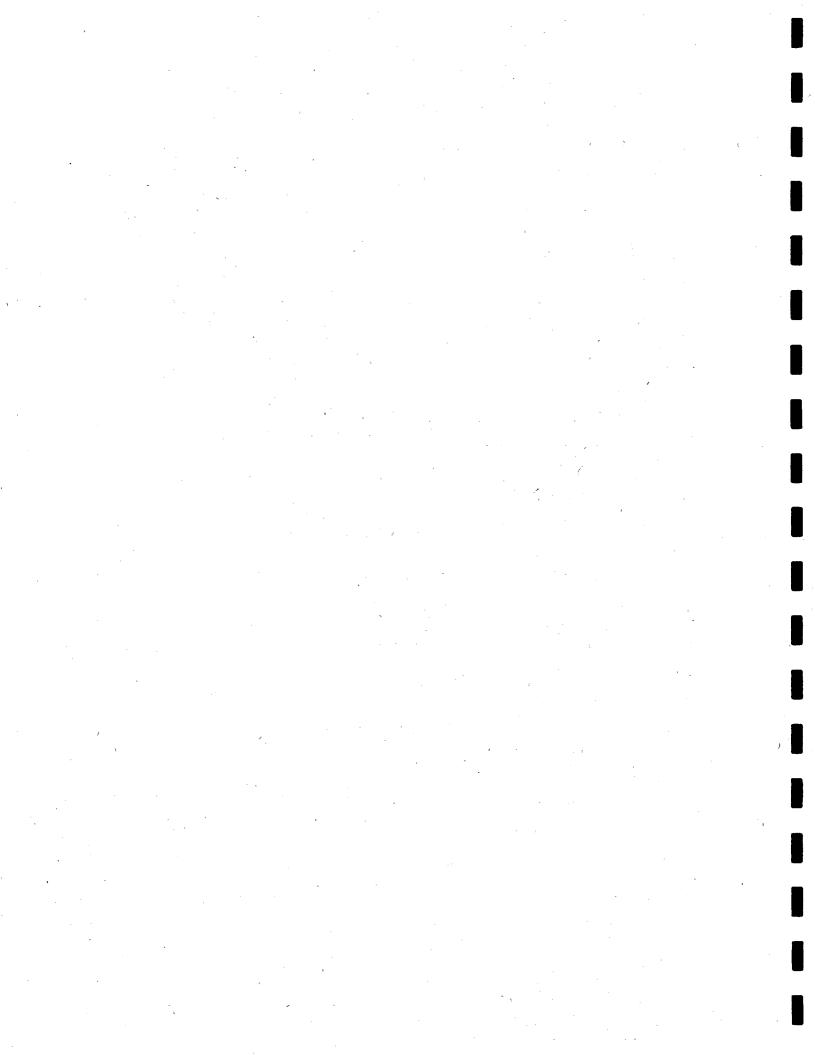
potentially could provide property for neighborhood parks, access points to the creek and potential sites for recreational development.

- 6. Financial Commitment for Public Education and Safety- Any attempt to increase public use of the creek will require a financial commitment from the City of Del Rio to provide additional services including increased maintenance and police presence to assure that public health and safety is assured. Additionally resources should be allocated to provide educational information regarding the wildlife and environmental sensitivity of the creek and surrounding properties. This could also serve as a guide for eco-tourism along the creek.
- 7. Encouraging Eco-Tourism and Biologic Diversity- All of these suggestions are based on a healthy and ecologically diverse habitat along the creek. There is a tremendous potential to restore existing city owned properties to native vegetation that will encourage greater potential for sustainable use of the creek and enhance the eco-tourism potential in Del Rio.

#### 3. General Description of Planning Areas

Adaptive land uses within the planning area should be limited to activities that are consistent with the goals and objectives of this plan and are compatible with protecting the creek. A general description of existing land use follows:

- Areas A and B are located adjacent to Highway 90 and have limited commercial development with the exception the golf course and country club. On the south side of Highway 90 all property is owned by the City of Del Rio with the area between Highway 90 and the Union Pacific Railroad vacant and south of the railroad are Moore Park and other city facilities. In both Areas most of the land is within the 100 year floodplain.
- Area C is located between Highway 277 on the north and Gillis St. to the south. Most of the property is in the 100 year floodplain with existing neighborhoods bordering the project area on the east and west.
- Area D is located between Gillis St. on the north and Taini St. in the south. The area is within the floodplain and includes Memo's restaurant and residential development on the west and residential development on the east side of the Area. Within this area is located Tardy Dam is located and the city has several park and recreation amenities. Additionally there are several FEMA properties adjoining the park and recreational sites.
- Area E is located between Taini St. on the north and Canal St. in the south. In this area is the terminus point for the hike and bike trail and bordered by residential neighborhoods on both the east and west banks of San Felipe Creek. It is the City's intention to expand



the hike and bike trail along the creek to connect the residential neighborhoods and possibly develop some of the FEMA properties into parks and nature areas.

• Area F begins at Canal St. in the north and covers the remaining property within the planning area. This area includes a significant number of FEMA properties and is bordered by residential neighborhoods to the north and south of the creek. The area is largely undeveloped with no parks or recreational amenities.

# 4. Adaptive Land Uses and Water Quality Protection

The focus of this discussion is on property owned by the city within the project area. Due to resource constraints it is critical that there be public/private partnerships to make this approach work. Care should be given to assure that there is a continued commitment to protect water quality and the threatened and endangered species. An assumption is that there will be changes to the existing City ordinances to accommodate this type of development. Any adaptive land uses should be targeted to the Public Focused Access Areas identified in this Water Quality Plan.

Ordinance changes should consider the necessity to incorporate both structural and non-structural best management techniques. There are different land management methods to address water quality protection including a strict limit on impervious cover for any site or establishing criteria that address the additional volume of runoff and pollutant loading. Establishing a strict limit for impervious cover is often very contentious because it does not recognize the ability to treat and mitigate runoff and pollutant loading from a site. It also precludes the city from developing larger scale BMP's that could potentially address water quality issues from several properties. Addressing the volume of runoff and pollutant loading from a site allows the city to adopt standards that protect both water quality and the volume of runoff from a site. The Texas Commission on Environmental Quality (TCEQ) has developed this type of standard for its Edwards Aquifer Rules. This approach has also been adopted by several local governments that regulate water quality. Based on input during this planning process it appears that establishing a strict limitation on impervious cover would not be a practical alternative for the City. It is recommended that the City consider that following criteria in developing ordinances to protect water quality within the planning area:

- Adopt buffer zones and setbacks consistent with the Regional Plan and existing agreements with U.S. Fish and Wildlife Service and Texas Parks and Wildlife Department.
- Require riparian restoration for projects that affect the banks of the creek.
- Allow for new development to implement off site riparian restoration and structural and non-structural BMP's that would accomplish the goals of the Regional Plan.

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- A pollution prevention plan should be filed with the City to assure that there is no pollutant runoff from a site during construction.
- New development must show that a minimum of 80% of the increased Total Suspended Solids (TSS) annual loading can be removed prior to runoff leaving a site after the completion of construction. The measures to control the discharge of pollution should be consistent with Best Management Practices identified in the guidance documents from the US Environmental Protection Agency (EPA), US Department of Agriculture and the Texas Commission on Environmental Quality (TCEQ). These documents can be found at the following wed sites:

http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm

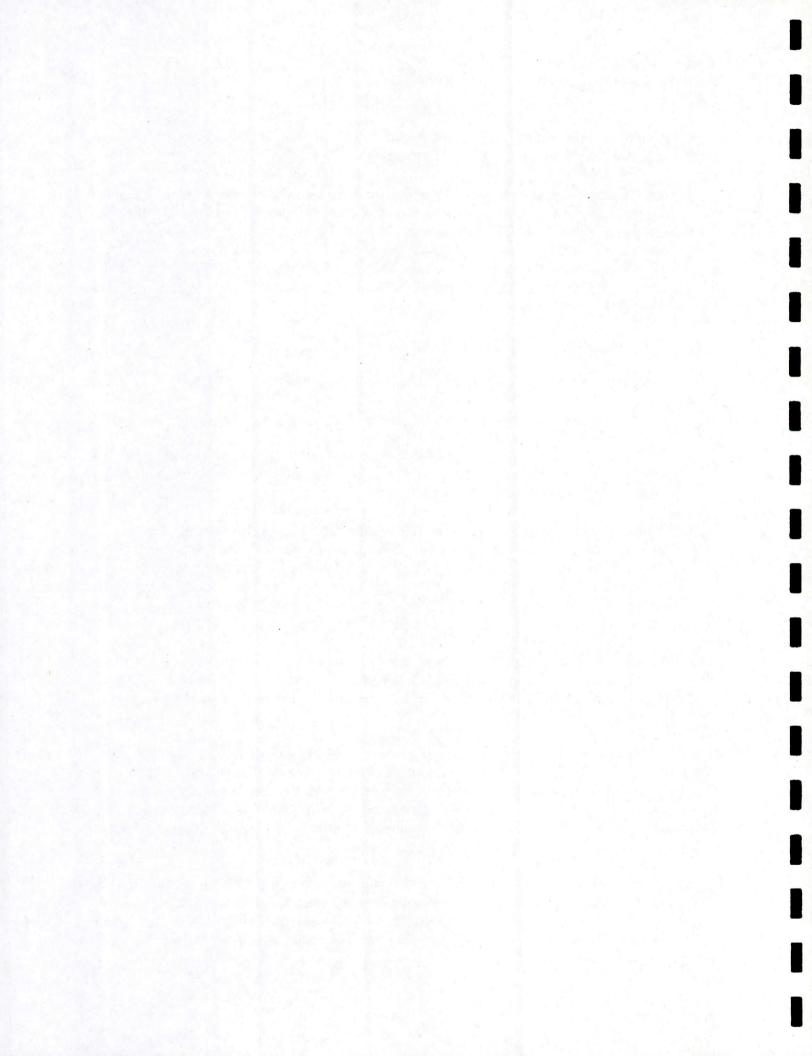
http://www.tceq.texas.gov/waterquality/nonpoint-source/mgmt-plan/index.html

http://directives.sc.egov.usda.cov/viewerFS.aspx?hid+21433

- Alternative engineering solutions to achieve compliance can be provided by the developer as part of the site development plan. This will allow for individual design solutions to be developed for an individual site.
- If a site has 20% or less of impervious cover other permanent BMP's are not required. In reviewing the proposed site plan the use of pervious materials to reduce impervious cover should be noted. This exemption should be noted in the county deed records, with a notice that if the percent impervious cover increases above 20% or land use changes, the exemption for the whole site as described in the property boundaries may no longer apply and property owner must notify the City of the change.
- Because of the nature of the area there should be some flexibility in allowing mixed use developments. Since the development alternatives discussed in this section are for both permanent and seasonal uses there should be some flexibility in zoning regulations to accommodate these uses.

Several of the recommendations include the potential use of food trailers or other "mobile" venders in the planning areas. Because of the mobility of these venues they can be located within the 100 year floodplain as long as they are not permanent structures and can be removed from the floodplain on short notice. If the City's decision is to allow this type of development it is suggested that the following guidelines be considered in order to assure that public health and safety is protected.

A stabilized pad along with water, wastewater and electric utilities and water quality
protection measures should be available to the mobile venders that would be on a site for
longer than a single festival. In many cases cities install the pad along with water
distribution and wastewater collection lines with the venders responsible for tying into



the lines and paying monthly bills. Cities often recoup the cost of these improvements through rentals of the spaces.

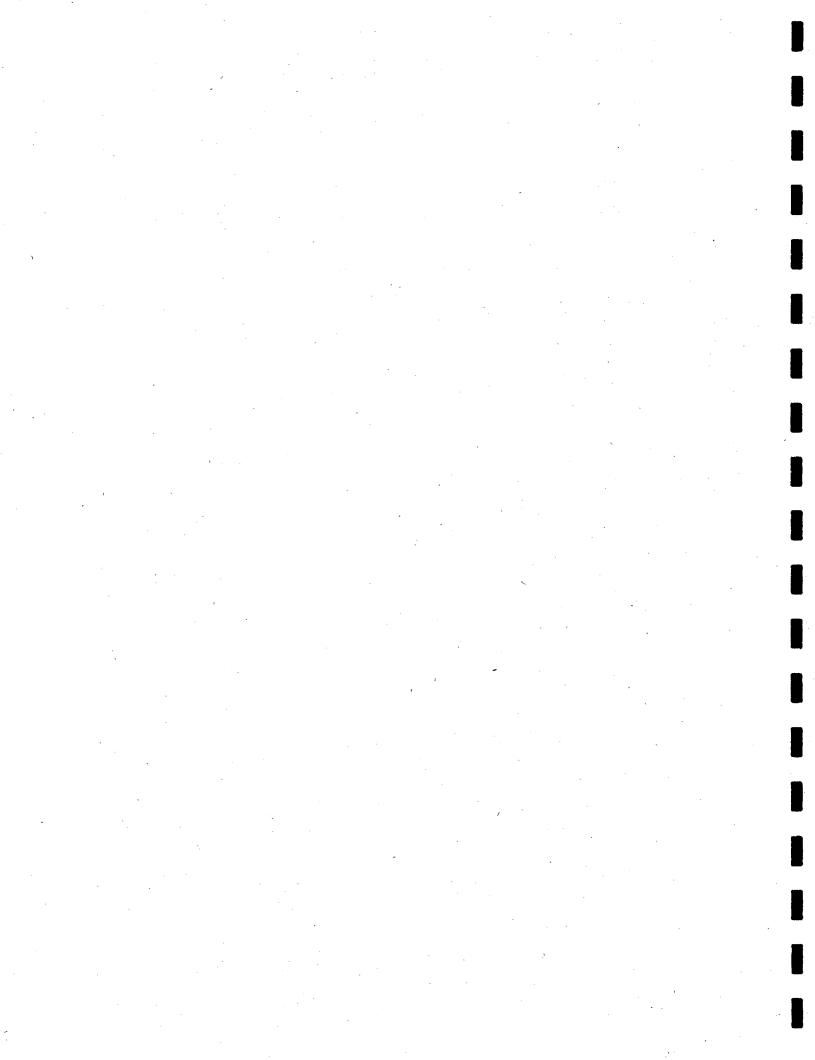
- Mobile venders should be responsible for daily trash pickup within 100 feet of their place of business and providing portable toilets during their operating hours. If the vender is selling food or drinks they should be required to provide covered seating in front of their business that can be removed on a daily basis.
- As part of a lease agreement the mobile vender should agree that they will be able to move their trailer within one hours notice from the city in case of a potential danger of flooding.
- If there are any Recreational Vehicle Parks developed on city property consideration should be given to requiring full hook-ups including electric, water and wastewater connections, limit to the length of time the vehicle can use the facility and evacuation procedures during emergency situations.
- Care should be given to assuring that water quality protections through Best Management Practices are incorporated into any site development in order to mitigate additional impervious cover within the building area. This would ensure that there is no net increase in pollutant loading runoff to the creek. As noted in other areas of the plan this can be accomplished through the use of pervious materials, water quality ponds, and other management techniques.
- Density should be limited by the characteristics of surrounding properties as well as what water quality measures can support the development,

# 5. Recommendations for Adaptive Land Uses within the Planning Area

#### Area B

The location of this area lends itself to more intensive development since it is located along Highway 90 that has existing access and commercial uses, has infrastructure in place to handle development, existing recreational amenities and has city owned property that is located outside the 100 year floodplain. Recommended adaptive land uses are shown on **Figure Q-2** and include:

- Site 1- An RV park that could be located between Highway 90 and the Union Pacific Railroad.
- Site 2- Additional parking for Hogan Field could be provided in the area north of the center field fence at the field.



- Site 3- The parking area currently adjacent to Hogan Field be partially relocated which would allow for a portion of the existing lot to be leased for a commercial use such as a restaurant or food trailers which could locate outside the floodplain and have access to views of the creek as well as for outside dining. If a permanent structure were to be built the developer should verify that the building would meet all current standards to flood proof the building or located outside the 100 year floodplain.
- **Site 4-** Mobile venders could be located between the Union Pacific southern right-of-way and the City swimming pool. This would require improvements to facilitate this use.

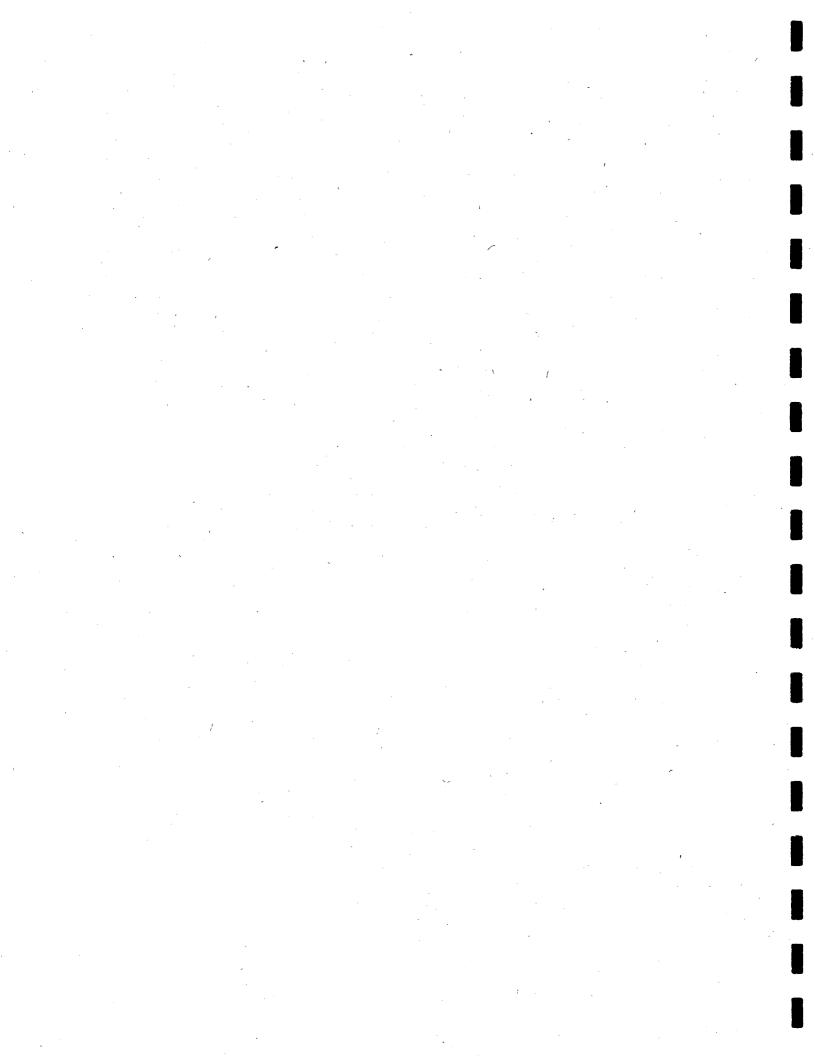
#### Area C

Area C offers several opportunities since there is property on the east side of the creek that area has property outside the 100 year floodplain, has several public access points on the creek, has buffer areas between the creek and surrounding neighborhoods, and is located on Highway 277. Recommended adaptive land uses are shown on **Figure Q-3** and include:

- Site 1- A prime commercial site along Highway 277 on the northeast side of the property could be used for a restaurant, RV site or potentially a hotel site. The property is generally located outside the 100 year floodplain, has access to the creek and Highway 277.
- Site 1-A- is located northwest of Site 1. This property is within the 100 year floodplain but could be used as an RV site or for mobile venders.
- Site 2- Located outside the 100 year floodplain this site could be used a commercial property such as a restaurant that would include outdoor dining or as an RV park.
- Site 3- This site is located east of the amphitheater adjacent to existing parking and could be a site for mobile venders for either individual events at the amphitheater or longer term since the site is on the walking trail and a popular public access point to the creek.

#### Area D

Area D is one of the intensely used parts of the creek since it includes Tardy Dam. There has been significant public use areas developed in the vicinity of the dam which is a limiting factor for additional development. Properties located across Bridge St. are part of the FEMA buyout properties and are immediately adjacent to a residential neighborhood. Due to the site layout it is recommended that the city develop these properties as part of the park and use native plants to form a buffer between the public use areas. Recommended adaptive uses are shown on **Figure Q-4** and include:



- Site 1- This site is located adjacent to the parking lot and hike and bike trail. The site lends itself to use by mobile venders for both food sales or for aquatic activities.
- Site 2- This site is one of the FEMA properties and is located on the corner of Bridge St. and Johnson St. This area is separated from the surrounding neighborhood and could be used for additional parking, mobile venders or as a park.

#### Area E

Area E is where the current hike and bike trail ends and has several FEMA buyout properties and there are no public use areas. It is anticipated that the hike and bike trail will be extended to Rotary Park in Area F. This plan has called for tube/kayak access points along the creek. It is not anticipated that this area will have any significant public use in the short term (see **Figure Q-5**).

#### Area F

This area is the furthest south and is all FEMA buyout properties. This plan has called for the development of a park on the property south of the intersection of Barron St. and Magnolia St. It has been recommended that a tube/kayak access point be constructed in this park. Recommended adaptive use areas are shown on **Figure Q-6** and include:

- Site 1- This site is Rotary Park which has been identified as a tube/kayak access point. If the park experiences significant use or greater use occurs the site lends itself to mobile venders. The property is large enough so that there is a sufficient buffer between the neighborhood and users.
- Site 2- This proposed park site is particularly adaptable for public access. If the tube/kayak access point is constructed it would be particularly adaptable for mobile venders that could pick up tubers/kayak users and transport them back to the start point, food venders as well as for festivals.

