30% Value Analysis Workshop
FINAL REPORT

Lafayette Interceptor Drain and Outlet
Arcadia Drive to 44th Street, Phoenix, Arizona

March 18, 2011

Prepared for:

Flood Control District of Maricopa County
2801 West Durango St.
Phoenix, AZ 85009

Prepared by:

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Fountain Hills, AZ 85268

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SAVE International # 970301

SiteTek
Financial Arts

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FINAL REPORT

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Arcadia Drive to 44th Street
Phoenix, Arizona

March 7 & 8, 2011

TABLE OF CONTENTS

Value Analysis Executive Summary
Lafayette Interceptor Drain and Outlet

Workshop Objectives

- Maximize Arcadia flood control
- Maximize flood control at a minimum cost
- Minimize impact on residents
- Maintain character of the area
- Stay within budget
- Optimize phasing
- Minimize impact on school
- Minimize utility impact
- Explore alternative alignments within road

Design Team

- Olsson Associates
- Aztec

Project Description

- VA baseline Estimated Cost
  - Base design $ 5.9 million
  - Optional Arcadia $ 1.6 million
  - East LID (Lafayette) $ 2.2 million or East LID (50th St.)$ 1.8 million

  Total $ 9.7 million

Project Issues / Concerns

- Maintain character of Arcadia neighborhood
- Maintain access during construction
- Public perception of project success
- Phasing within available budget

High Cost Items Identified by VA Team

- 84" RGRCP $ 1.48 million
- 72" RGRCP $ 909,500
- 102" RGRCP $ 733,500
- Pavement Replacement $ 470,000

Value Workshop Overview

Ideas generated: 20
Recommendations developed: 8

1. Avoid 44th Street and Camelback intersection: $ 95,000 savings

3. Evaluate alternative pipe materials (CIPP): $ 635,000 savings

7. Build Lafayette to 46th Street and Arcadia to Camelback: $ 120,000 savings

11. Use existing drainage facilities to reduce volume: $ 187,500 enhancement

12. Explore options for capture and conveyance of additional 300 CFS: $ 600,000 enhancement

14. Conduct brainstorming session with SRP to explore 100 year solution

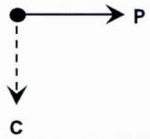
16. Use existing right-of-way for temporary traffic flow: $ 160,000 enhancement

17. Provide temporary access at existing tail water ditch on south side: $ 90,000 enhancement

VALUE ANALYSIS RECOMMENDATIONS SUMMARY

Figure 1

Project: **Lafayette Interceptor Drain & Outlet** Location: **Phoenix, Arizona**

No.	Idea Description ilo = in lieu of	Value Indicator P = Performance C = Cost	Performance Benefits					VA Potential Savings ( ) indicates cost increase		Implementation		
			Minimize Construction Impacts	Maintain Project Functions	Increase Public Acceptance	Enhance Project Value		Initial Cost	Life Cycle Cost	Accept	Reject	Implemented Costs
1	Avoid 44th Street and Camelback intersection		+	-	+	+		95,000	95,000			
3	Evaluate alternative pipe materials		+	+	+			635,000	635,000			
7	Build Lafayette to 46th Street and Arcadia to Camelback			-		-		151,800	151,800			
11	Use existing drainage facilities to reduce volume				-	-		(187,500)	(187,500)			
12	Explore options for capture and conveyance of additional 300 CFS			+	+	+		(600,000)	(600,000)			
14	Conduct brainstorming session with SRP to explore 100 year solution				+	+		(7,500,000)	(7,500,000)			

VALUE ANALYSIS RECOMMENDATIONS SUMMARY

Figure 1

Project: **Lafayette Interceptor Drain & Outlet** Location: **Phoenix, Arizona**

No.	Idea Description ilo = in lieu of	Value Indicator P = Performance C = Cost	Performance Benefits Minimize Construction Impacts	Maintain Project Functions	Increase Public Acceptance	Enhance Project Value		VA Potential Savings ( ) indicates cost increase Initial Cost	Life Cycle Cost	Implementation Accept	Reject	Implemented Costs
16	Use existing right-of-way for temporary traffic flow	P C	+		+	+		(162,500)	(162,500)			
17	Provide temporary access at existing tailwater ditch on south side	P C	+	+	-	+		(82,500)	(82,500)			
Performance Improvements			4	3	5	5						
Summary of VA Savings Recommendations								1,516,800	1,516,800			
Summary of VA Value Enhancements (Adds)								(8,532,500)	(8,532,500)			

CREATIVE IDEAS

Brainstorming

Project: **Lafayette Interceptor Drain and Outlet**
Flood Control District of Maricopa County
Location: **Phoenix, Arizona**
Date: **March 7 & 8, 2011**

Key:
Bold = Ideas developed into proposals
Key: DS = Design Suggestion; ilo = in lieu of

No.	Description:	
1	**Avoid 44th Street and Camelback intersection**	
2	Use NOAA 14 in lieu of NOAA 2	
3	**Evaluate alternative pipe materials**	
4	Evaluate speed bumps to direct flows	DS
5	Install pipe north of existing high pressure gas line	
6	Divert flows away from Arcadia	
7	**Build Lafayette to 46th Street and Arcadia to Camelback**	
8	Investigate empty properties for basins	
9	Clean surface flows and put in canal	
10	Stack smaller pipes to save room	
11	**Use existing drainage facilities to reduce volume**	
12	**Explore options for capture and conveyance of additional 300 CFS**	
13	Put language in specifications for protection of historic trees and canal	DS
14	**Conduct brainstorming session with SRP to explore 100 year solution**	
15	Evaluate 100 year vs. 10 year solution	
16	**Use existing right-of-way for temporary traffic flow**	
17	**Provide temporary access at existing tailwater ditch on south side**	
18	Don't do the project (10 year solution, no floodplain revision)	
19	Coordinate City of Phoenix ADA program with this project	
20	Further analyze locations of inlets with regard to 10 ft. ADA requirement	
21	Increase public information budget to accommodate projected increased effort	

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Arcadia Drive to 44th Street
Phoenix, Arizona

March 7 & 8, 2011

SECTION 2: VALUE ENGINEERING RECOMMENDATIONS

Value Engineering Recommendation

Project: **Lafayette Interceptor Drain and Outlet** **VA No.**

Item: **Avoid 44th Street and Camelback Road Intersection** **1**

Function (verb noun): ***Convey Flow***

Original Design

The original alignment extends west to 44th Street, where it turns north to Colter Street through the Camelback / 44th Street intersection.

Proposed Design

Turn the storm drain north approximately 400 ft. east of 44th Street north across Camelback Road, up North Village Drive to 44th Street.

Advantages and Disadvantages

Advantages:

- Reduces traffic control, better public acceptance
- Reduces risk of constructing through the intersection
- Eliminates island reconstruction
- Eliminates traffic loop reconstruction
- Eliminates gas utility relocations

Value Indicator:

Disadvantages:

- May require new easements or additional right-of-way
- Will not pick up flows from northeast corner
- Tie-in existing storm drain difficult

Discussion

Substantially reduces risks associated with the intersection construction, as well as reduces the utility relocations (gas, traffic loops, water). City of Phoenix to investigate viability of drainage easement in North Village Drive. Constructability VA Team member indicated constructing through this intersection would not be a significant issue as long as the proposed storm drain is not deep.

Life Cycle Cost Summary

	Initial Cost
Original Design	**$132,500**
Proposed Design	**$37,500**
Potential Savings	**$95,000**

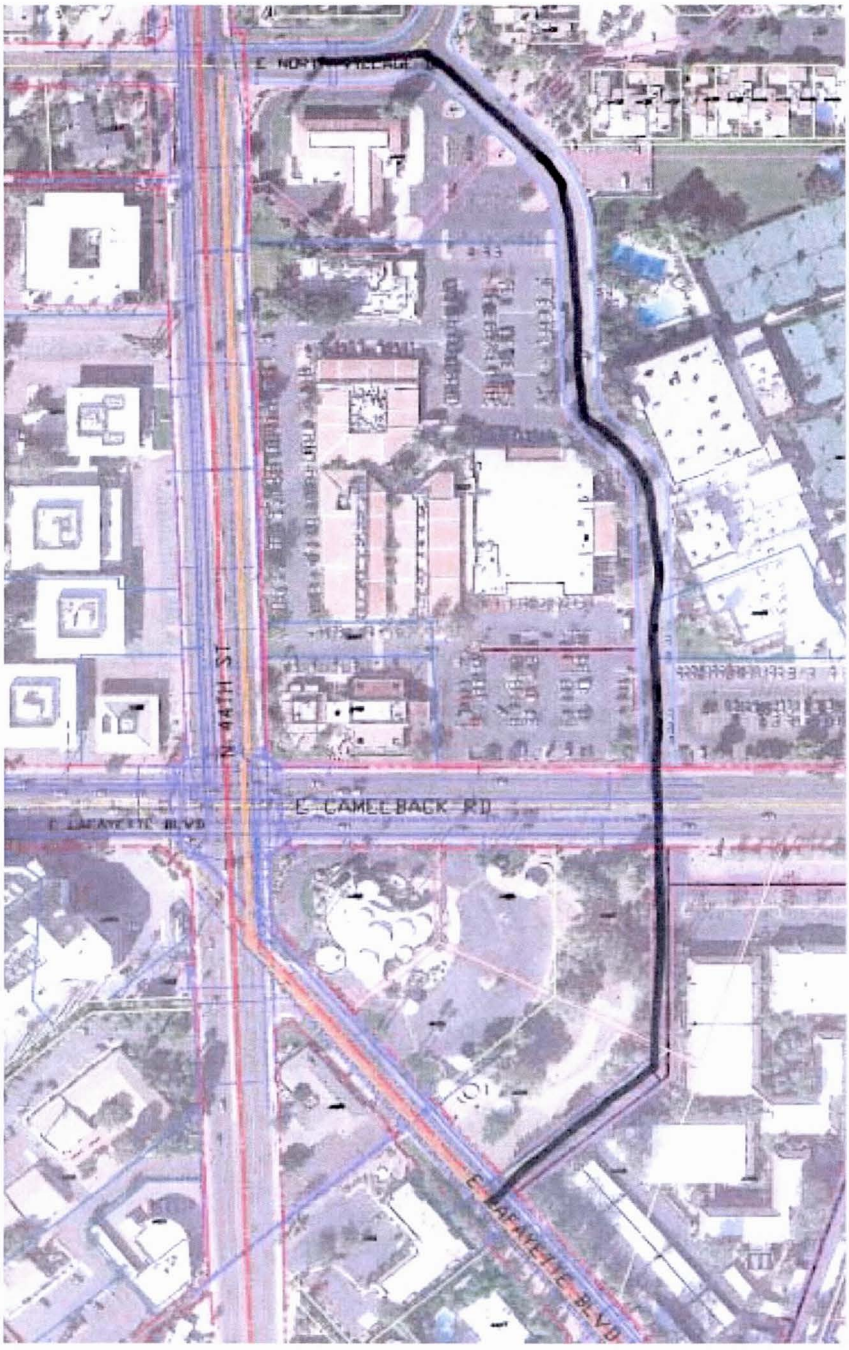
Sketch Worksheet

Project: Lafayette Interceptor Drain and Outlet
Item: Avoid 44th Street and Camelback Road Intersection

VA No.
1

Function (verb noun): *Convey Flow*

☐ Original Design ■ Proposed Design



Cost Worksheet

Project: **Lafayette Interceptor Drain and Outlet** **VA No.**
Item: **Avoid 44th Street and Camelback Road Intersection** **1**

Function (verb noun): ***Convey Flow***

Original Design

	Quantity	Unit	Unit Cost	Total
Relocate islands	3	ls	10,000.00	30,000
Relocate traffic loops	2	ls	8,000.00	16,000
Traffic control	1	ls	35,000.00	35,000
Duration	1	ls	25,000.00	25,000
Subtotal				106,000
Markup	25.0%			26,500
			Total Cost	**132,500**

Proposed Design

	Quantity	Unit	Unit Cost	Total
Acquire easements	30,000	sf	1.00	30,000
Subtotal				30,000
Markup	25.0%			7,500
			Total Cost	**37,500**

Potential Savings

Potential Savings	**$95,000**

Value Engineering Recommendation

Project: **Lafayette Interceptor Drain and Outlet** **VA No.**
Item: **Evaluate alternative pipe materials** **3**

Function (verb noun): ***Convey Water***

Original Design

Base design is for RGRCP

Proposed Design

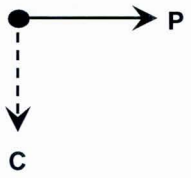
Consider alternative pipe materials including CIPP and possibly HDPE. This recommendation compares the cost difference between RGRCP and CIPP.

Advantages and Disadvantages

Advantages:

- Lower costs
- Approximate 20 ft. wide work zone instead of 34 ft. work zone
- Less construction traffic
- Faster construction

Value Indicator:



Disadvantages:

- Restrictions to pressure head. Pipe has to be shallower, may require additional load bearing analysis
- Requires compliance with FCDMC CIPP restrictions (see attached e-mail)

Discussion

We will determine if practical when design is further along (may not be sufficient non-surcharged length to warrant use) City of Phoenix accepts HDPE pipe up to 48" diameter and may be open to considering greater diameters.

Life Cycle Cost Summary

	Initial Cost
Original Design	**$2,545,700**
Proposed Design	**$1,910,700**
Potential Savings	**$635,000**

Sketch Worksheet

Project: Lafayette Interceptor Drain and Outlet **VA No.** 3

Item: Evaluate alternative pipe materials

Function (verb noun): *Convey Water*

☐ Original Design ■ Proposed Design

Bobbie Ohler - FCDX

From: Jeff Riddle - FCDX
Sent: Tuesday, March 08, 2011 10:14 AM
To: Bobbie Ohler - FCDX
Subject: RE: Lafayette VA - CIPP requirements/restrictions

Bobbie,

Cast in Place Pipe restrictions:

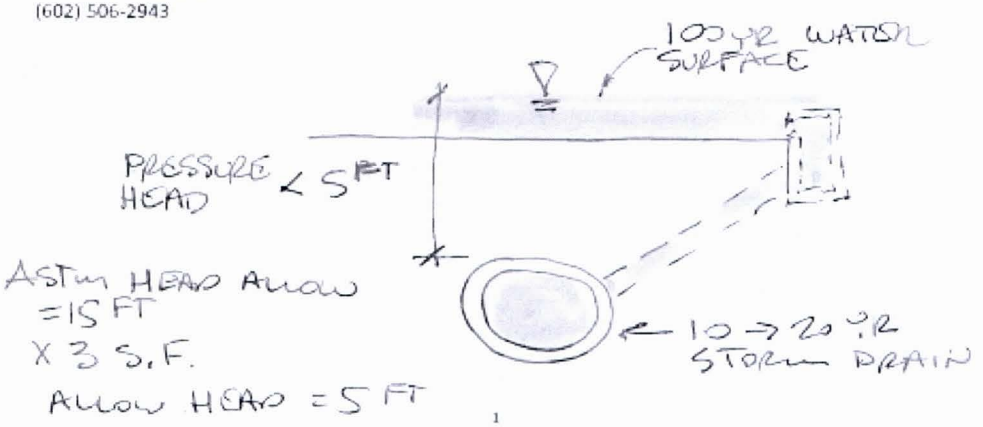
1. We require that the HGL be within the pipe.
2. Cracks in the pipe must be repaired.
3. We don't like CIPP under pavement.
4. We must meet ADOT Guidelines for CIPP Pipe.
5. The soil conditions must be favorable for CIPP.
6. There may be some velocity restrictions.

Jeff

From: Bobbie Ohler - FCDX
Sent: Tuesday, March 08, 2011 9:25 AM
To: Jeff Riddle - FCDX
Subject: Lafayette VA - CIPP requirements/restrictions

Jeff – can you please send us your requirements/restrictions for CIPP? The City of Phoenix will be maintaining the pipe when it is constructed, so if that makes a difference please let me know. I need this by noon, if at all possible. Thanks!

Bobbie Ohler, P.E.
Project Manager
Flood Control District of Maricopa County
2801 W. Durango St.
Phoenix, AZ 85009
(602) 506-2943



Cost Worksheet

Project: **Lafayette Interceptor Drain and Outlet** **VA No.** 3

Item: **Evaluate alternative pipe materials**

Function (verb noun): ***Convey Water***

Original Design

	Quantity	Unit	Unit Cost	Total
42" RGRCP	1,176	lf	225.00	264,600
72" RGRCP	2,140	lf	425.00	909,500
84" RGRCP	1,413	lf	525.00	741,825
36" RGRCP	603	lf	200.00	120,600
Subtotal				2,036,525
Markup	25.0%			509,131
			Total Cost	**2,545,700**

Proposed Design

	Quantity	Unit	Unit Cost	Total
42" CIPP	603	lf	150.00	90,450
48" CIPP	1,176	lf	169.00	198,744
78" CIPP	2,140	lf	319.00	682,660
90" CIPP	1,413	lf	394.00	556,722
Subtotal				1,528,576
Markup	25.0%			382,144
			Total Cost	**1,910,700**

Potential Savings

Potential Savings	**$635,000**

Value Engineering Recommendation

Project: **Lafayette Interceptor Drain and Outlet** **VA No.**

Item: **Build Lafayette to 46th Street and Arcadia to Camelback** **7**

Function (verb noun): ***Convey Flow***

Original Design

The original option extends the storm drain west to 44th Street where it turns north to Colter Street through the 44th Street and Camelback intersection.

Proposed Design

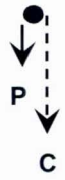
Stop the storm drain for Phase I at 46th Street and extend the storm drain along Arcadia. See attached sketch.

Advantages and Disadvantages

Advantages:

- Reduces surface flows along Arcadia
- Pushes out storm drain construction through Camelback / 44th Street

Value Indicator:



Disadvantages:

- Picks up less flow
- Constructs expensive intersection in future when costs will be higher
- Will not pick up over 225 cfs currently in Phase I

Discussion

Reduces the cfs per dollar invested.

Life Cycle Cost Summary

	Initial Cost
Original Design	**$1,467,600**
Proposed Design	**$1,315,800**
Potential Savings	**$151,800**

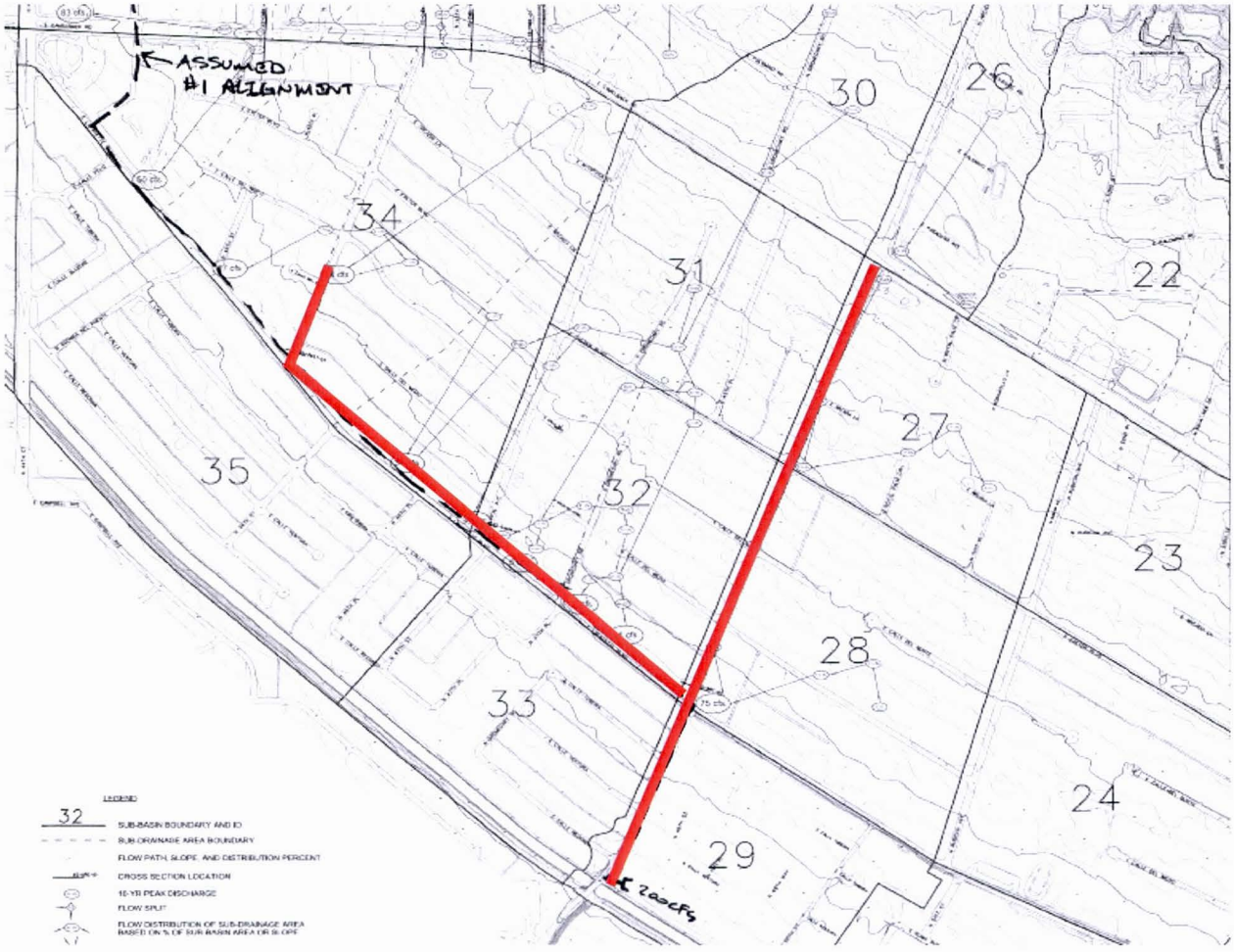
Sketch Worksheet

Project: Lafayette Interceptor Drain and Outlet
Item: Build Lafayette to 46th Street and Arcadia to Camelback

VA No. 7

Function (verb noun): *Convey Flow*

☐ Original Design ■ Proposed Design



Cost Worksheet

Project: **Lafayette Interceptor Drain and Outlet** **VA No.**
Item: **Build Lafayette to 46th Street and Arcadia to Camelback** 7

Function (verb noun): ***Convey Flow***

Original Design

	Quantity	Unit	Unit Cost	Total
72" Lafayette	2,140	lf	425.00	909,500
42" 44th Street	1,176	lf	225.00	264,600
Subtotal				1,174,100
Markup	25.0%			293,525
			Total Cost	**1,467,600**

Proposed Design

	Quantity	Unit	Unit Cost	Total
78" Arcadia	2,216	lf	475.00	1,052,600
Subtotal				1,052,600
Markup	25.0%			263,150
			Total Cost	**1,315,800**

Potential Savings

Potential Savings	**$151,800**

Value Engineering Recommendation

Project: **Lafayette Interceptor Drain and Outlet** **VA No.**

Item: **Use existing drainage facilities to reduce volume of flow** **11**

Function (verb noun): ***Convey Flow***

Original Design

Use of existing basin at northeast corner of Arcadia Drive and Arizona Canal near Arcadia Estates.

Proposed Design

Deepen basin between paths to increase basin storage capacity to attenuate flows.

Advantages and Disadvantages

Advantages:

- Increases storage capacity
- Attenuates flows
- Additional head to increase pipe conveyance capacity
- Protection improved to approximately 10-year plus event
- Removes connection to Arizona Canal

Value Indicator:

Disadvantages:

- Reconstruction of existing park
- Construction impact on adjacent residents
- Increased construction costs
- Increased maintenance costs
- Negative public perception and acceptance
- Takes away from character of Arcadia area

Discussion

This VE feature provides flood protection to the area east of Arcadia Drive. While this proposal will decrease the flow volume approximately 10 to 15 cfs, it does not add any benefits. The limiting factor is the capacity of the downstream 102" pipe, which is 990 cfs. With 686 cfs in the the storm drain, there is a maximum of 304 cfs of additional flow to collect in the system. Increasing the depth of the basin does not increase the capacity of the overall system. The proposed inlet structure can be sized to accept up to 304 cfs at the basin without any reconstruction.

Life Cycle Cost Summary

	Initial Cost
Original Design	**$0**
Proposed Design	**$187,500**
Value Enhancement	**($187,500)**

Cost Worksheet

Project: Lafayette Interceptor Drain and Outlet **VA No.** 11

Item: Use existing drainage facilities to reduce volume of flow

Function (verb noun): *Convey Flow*

Original Design

	Quantity	Unit	Unit Cost	Total
Subtotal				0
Markup	25.0%			0
			Total Cost	**0**

Proposed Design

	Quantity	Unit	Unit Cost	Total
Basin excavation and reconstruction	1	ls	100,000.00	100,000
Re-Landscape area	1	ls	50,000.00	50,000
Subtotal				150,000
Markup	25.0%			37,500
			Total Cost	**187,500**

Potential Savings

Value Enhancement **($187,500)**

Value Engineering Recommendation

Project: **Lafayette Interceptor Drain and Outlet** **VA No.**

Item: **Explore options for capture and conveyance of additional 300 CFS** **12**

Function (verb noun): ***Convey Flow***

Original Design

Original pipe sizing per ~~1999~~ 1997 report allowed for 681 discharge across the Arizona Canal. All storm drains sized for 10 year.

Proposed Design

1. 300 cfs capture structure at northeast corner of Arizona Canal and Arcadia Drive. 2. Upsize collection system by approximately 15% (100/681). 3. Add Lafayette - East as a future phase to improve drainage systems. Further analysis is required to determine where the best benefit (above 10-year) can be achieved. See attached sketch.

Advantages and Disadvantages

Advantages:

- Utilizes additional capacity provided by Old Crosscut Canal crossing
- Increases protection to 10-year +

Value Indicator:

Disadvantages:

- Increases costs

Discussion

Inlet at northeast corner provides interim drainage until build-out of entire system. In the future, this inlet will still function to drain area at canal more quickly. 100 year protection is not feasible, upsizing from 10 year is feasible and recommended to improve drainage in the Arcadia area. At the VA Presentation, Olsson was instructed to prepare an Options / Benefits memo on this item for further consideration and action by the District.

Life Cycle Cost Summary

	Initial Cost
Original Design	
Proposed Design	
Value Enhancement	**$600,000** **(upsizing)**

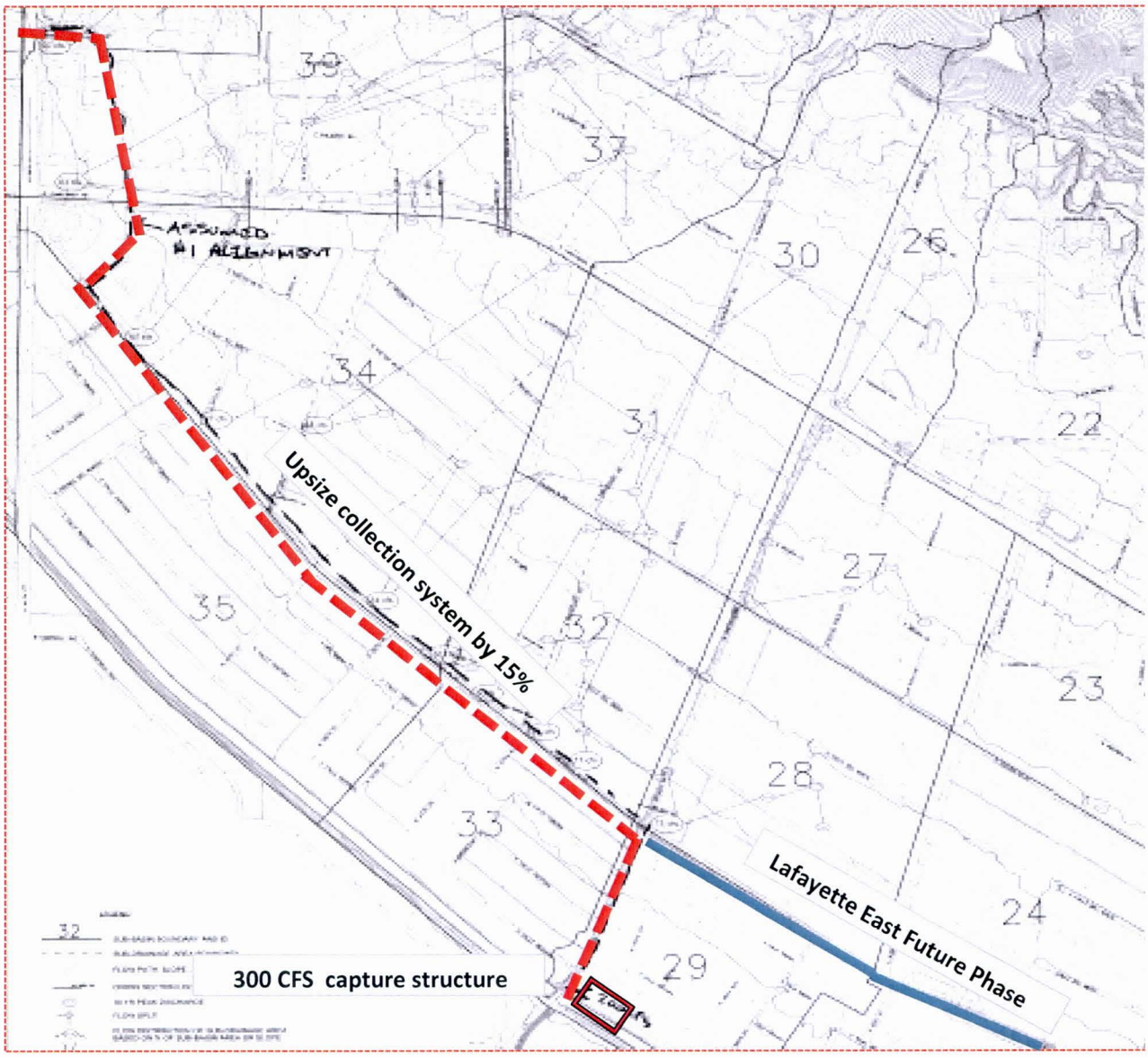
Sketch Worksheet

Project: Lafayette Interceptor Drain and Outlet **VA No.** 12

Item: Explore options for capture and conveyance of additional 300 CFS

Function (verb noun): *Convey Flow*

☐ Original Design ■ Proposed Design



Value Engineering Recommendation

Project: **Lafayette Interceptor Drain and Outlet** **VA No.**

Item: **Conduct brainstorming session with SRP to explore 100 year solution** **14**

Function (verb noun): ***Convey Flow***

Original Design

Provide 10 year plus solution

Proposed Design

Provide 100 year solution by constructing 2 - 96" diameter pipes to convey 1400 cfs to the ACDC along the Arizona Canal.

Advantages and Disadvantages

Advantages:

- Improves canal protection to 100 year level
- Improves resident protection to 100 year level
- Utilizes available capacity of ACDC — ?
- Removes floodplain and insurance premium — NO
- Eliminates potential for canal breach — NO

Value Indicator:

Disadvantages:

- Requires management level agreement between SRP and FCDMC
- Utility impacts during construction
- Requires SRP to waive their crane loading criteria

Discussion

Significant isolated flood condition can be solved to required level of protection utilizing existing available infrastructure as outfall.

Life Cycle Cost Summary

	Initial Cost	
Collection System	**$7,500,000**	**(enhancement)**
100-year Infrastructure	**$27,500,000**	**(enhancement)**

Cost Worksheet

Project: Lafayette Interceptor Drain and Outlet **VA No.** 14

Item: Conduct brainstorming session with SRP to explore 100 year solution

Function (verb noun): *Convey Flow*

Original Design

	Quantity	Unit	Unit Cost	Total
Collection system	1	ls	6,000,000	6,000,000
Subtotal				6,000,000
Markup	25.0%			1,500,000
			Total Cost	**7,500,000**

Proposed Design

	Quantity	Unit	Unit Cost	Total
Pipe (2 - 96")	1	ls	11,000,000	11,000,000
Structures (2)	2	ls	500,000	1,000,000
Collection system (1)	1	ls	10,000,000	10,000,000
Subtotal				22,000,000
Markup	25.0%			5,500,000
			Total Cost	**27,500,000**

Value Engineering Recommendation

Project: **Lafayette Interceptor Drain and Outlet** **VA No.**

Item: **Use existing right-of-way for temporary traffic flow / Provide temporary access at existing tailwater ditch on south side** **16 & 17**

Function (verb noun): ***Maintain Access***

Original Design

Close Lafayette to thru traffic during construction. Temporary individual homeowner access to be maintained at all times.

Proposed Design

Use temporary pavement and available right-of-way and / or replace tailwater ditch with pipe to allow two lanes of thru traffic.

Advantages and Disadvantages

Advantages:

- Maintains existing traffic condition

Value Indicator:

Disadvantages:

- Changes character of area by removing ditch
- Significant impacts to residential improvements
- Shifts / increases traffice in front of homes.

Discussion

Consider on a location by location basis. Identify locations in the specifications where ROW access may be feasible. Need to analyze cost / benefit of traffic control vs. cost to cure existing conditions.

Life Cycle Cost Summary

	Initial Cost	
VA-16	**$162,500**	**(enhancement)**
VA-17	**$82,500**	**(enhancement)**

Cost Worksheet

Project: Lafayette Interceptor Drain and Outlet

VA No. 16 & 17

Item: Use existing right-of-way for temporary traffic flow / Provide temporary access at existing tailwater ditch on south side

Function (verb noun): *Maintain Access*

VA - 16

	Quantity	Unit	Unit Cost	Total
4 home reconstruct	4	ea	20,000	80,000
Temporary pavement	1	ls	50,000	50,000
Subtotal				130,000
Markup	25.0%			32,500
			Total Cost	**162,500**

VA - 17

	Quantity	Unit	Unit Cost	Total
Pipe	440	lf	150.00	66,000
Subtotal				66,000
Markup	25.0%			16,500
			Total Cost	**82,500**

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Arcadia Drive to 44th Street
Phoenix, Arizona

March 7 & 8, 2011

SECTION 3: VALUE ENGINEERING PROCESS

- Function Analysis System Technique Diagram
- 30% VA Workshop Agenda
- VA Workshop Attendance List
- Force Field Analysis
- Engineer's Cost Estimate

2-DAY VALUE ANALYSIS CONFERENCE AGENDA
30% DESIGN REPORT PHASE
LAFAYETTE INTERCEPTOR DRAIN AND OUTLET

Workshop Location:
Flood Control District of Maricopa County
Adobe & Buckhorn-Mesa Conference Rooms
2801 West Durango St., Phoenix, AZ

March 7 & 8, 2011

DAY 1 – March 7, 2011 (Adobe Conference Room)

8:00 a.m. **INFORMATION / ORIENTATION PHASE - INTRODUCTION TO WORKSHOP**
(VA Team Leader, John Pucetas)

Welcome & Opening Remarks
Team Member Introductions
Agenda Review and Modifications
Objectives of Workshop
Questions & Comments

9:30 **INFORMATION / ORIENTATION PHASE - PROJECT BRIEFING**
(Bobbie Ohler & Olsson Associates)

Owner Goals & Expectations
Project Design: History & evolution
Key project issues
Presentation of design including: hydrology, structures, constructability, etc

Project Cost Review: Cost Estimate vs. FCDMC budget

Project Schedule, Phasing (future Arcadia Drive phase), Constructability Issues

10:45 **BREAK**

11:00 **FUNCTION PHASE**

Function Analysis: Function Identification, "Verb/Noun", FAST Diagram
Function – Cost Relationship Charts
Identify high cost to worth relationships for further consideration

12:00 **LUNCH (on your own)**

1:00 **FORCE FIELD ANALYSIS**

Best Project Features
Features of Concern

2:00 **CREATIVE PHASE**

Brainstorm alternative means to accomplish the high cost / worth functions and improve "Features of Concern"
Identify opportunities to achieve best balance of life-cycle cost, performance & durability, while meeting required functions
No Judgment!

4:00 **ANALYSIS PHASE**

Evaluate Ideas By Comparison
Select most promising alternatives for further development

4:30 **ADJOURN DAY 1**

DAY 2 – March 8, 2011 (Buckhorn-Mesa Conference Room)

8:00 **CREATIVE PHASE**

Additional Creative Idea generation

8:30 **DEVELOPMENT/COSTING PHASE**

Review of Proposal Forms and Final Products
Team Member Proposal Development Assignments
Cost Estimates of Alternatives
Sketches of Alternatives
Life Cycle Cost Calculations (as appropriate)
Written Proposals

12:00 **LUNCH (on your own)**

1:00 **PRESENTATION PHASE**

Presentation Preparation
Summarize & Check Proposals
Print & Copy Summary Sheets
Organize VA Presentation

2:30 **VA PRESENTATION**

Purpose of presentation: "Sell Ideas"
Summary of VA Process
VA Proposals, Benefits & Cost Savings (by VA Team Members)
Comments & Discussion

3:30 **IMPLEMENTATION PHASE**

Process for Accepting / Rejecting Recommendations
Develop Implementation Schedule of Events

4:00 **CLOSING REMARKS**
ADJOURN/CELEBRATION!!!

ATTENDANCE LIST

Value Analysis Workshop

Project: **Lafayette Interceptor Drain and Outlet**
Flood Control District of Maricopa County
Location: **Phoenix, Arizona**
Date: **March 7 & 8, 2011**

PARTICIPANTS:

Name/ Title:	Organization/Address:	Phone / Cell / e-mail:
Flood Control District of Maricopa County		
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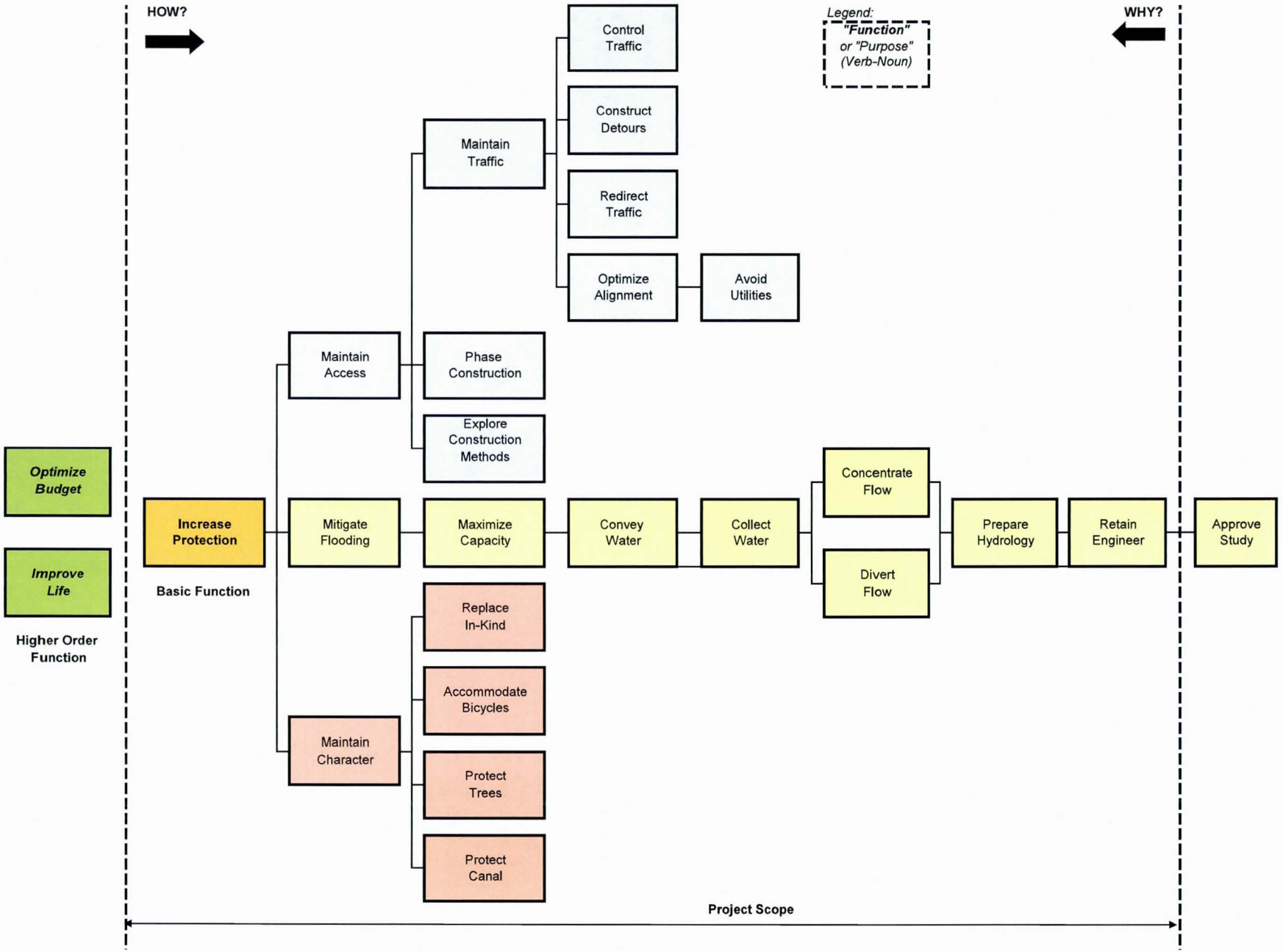
Lafayette Interceptor Drain and Outlet

Arcadia Drive to 44th Street

Function Analysis System Technique (FAST) Diagram



LAFAYETTE INTERCEPTOR DRAIN AND OUTLET
ARCADIA DRIVE TO 44TH STREET
FCD PROJECT NO. 2010C030

PRELIMINARY COST ESTIMATE

Item No.	Item Description	Unit	Unit Cost	Quantity				Cost			
				Base Design	Optional Arcadia	East LID (Lafayette)	East LID (50th St)	Base Design	Optional Arcadia	East LID (Lafayette)	East LID (50th St)
336-1	PERMANENT PAVEMENT REPLACEMENT	SY	$ 50.00	9,400	2,725	4,125	3,520	$ 470,000	$ 136,250	$ 206,250	$ 176,000
340-1	6" ROLL CURB & GUTTER	LF	$ 15.00	2,500				$ 37,500			
404-1	TRAFFIC CONTROL	LS		1	1	1	1	$ 140,000	$ 38,000	$ 50,000	$ 42,000
505-1	JUNCTION STRUCTURE NO. 1	EA	$ 25,000.00	1				$ 25,000			
505-2	JUNCTION STRUCTURE NO. 2	EA	$ 30,000.00	1				$ 30,000			
505-3	JUNCTION STRUCTURE NO. 3	EA	$ 10,000.00	1				$ 10,000			
505-4	CURB OPENING CATCH BASIN	EA	$ 7,500.00	25	4	6	4	$ 187,500	$ 30,000	$ 45,000	$ 30,000
505-5	DROP INLET	EA	$ 5,000.00	2				$ 10,000			
618-1	24" RGRCP	LF	$ 150	800	100	240	160	$ 120,000	$ 15,000	$ 36,000	$ 24,000
618-2	30" RGRCP	LF	$ 175								
618-3	36" RGRCP	LF	$ 200	603				$ 120,600			
618-4	42" RGRCP	LF	$ 225	1,176		2,845	2,845	$ 264,600		$ 640,125	$ 640,125
618-5	48" RGRCP	LF	$ 275	118		2,476	1,742	$ 32,450		$ 680,900	$ 479,050
618-6	54" RGRCP	LF	$ 325								
618-7	60" RGRCP	LF	$ 375	80				$ 30,000			
618-8	72" RGRCP	LF	$ 425	2,140				$ 909,500			
618-9	78" RGRCP	LF	$ 475	80	2,216			$ 38,000	$ 1,052,600		
618-10	84" RGRCP	LF	$ 525	2,825				$ 1,483,125			
618-11	90" RGRCP	LF	$ 550								
618-12	96" RGRCP	LF	$ 675								
618-13	102" RGRCP	LF	$ 750	978				$ 733,500			
618-14	PIPE PLUG	EA	$ 1,500	5	1	1	1	$ 7,500	$ 1,500	$ 1,500	$ 1,500
625-1	STORM DRAIN MANHOLE (MAG DET 520/521)	EA	$ 7,500	10	4	10	8	$ 75,000	$ 30,000	$ 75,000	$ 60,000
	SUBTOTAL							***$ 4,724,275***	***$ 1,303,350***	***$ 1,734,775***	***$ 1,452,675***
	CONTINGENCY	25%						***$ 1,181,069***	***$ 325,838***	***$ 433,694***	***$ 363,169***
	TOTAL							**$ 5,905,344**	**$ 1,629,188**	**$ 2,168,469**	**$ 1,815,844**