

# VALUE ENGINEERING TRAINING STUDY REPORT

Jodeco Road Interchange - Park and Ride Lot

Project No. CSMSL-0007-00(955)

Henry County

PI No. 0007955

October 22, 2009

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OWNER:



Georgia Department of Transportation  
600 West Peachtree Street  
Atlanta, GA 30308  
(404.631.1770)

VALUE ENGINEERING  
INSTRUCTOR:



MACTEC Engineering and Consulting, Inc.  
3200 Town Point Drive NW, Suite 100  
Kennesaw, GA 30144  
(770.421.3400)

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Jodeco Road Interchange – Park and Ride Lot

Project No. CSMSL-0007-00(955)  
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**October 22, 2009**

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## **EXECUTIVE SUMMARY**

## EXECUTIVE SUMMARY

# VALUE ENGINEERING TRAINING STUDY REPORT

Jodeco Road Interchange – Park and Ride Lot

Project No. CSMSL-0007-00(955)  
PI No. 0007955

**October 22, 2009**

### **Study Background**

This report presents the results of a value engineering (VE) study for the construction of a park and ride facility at the I-75 / Jodeco Road interchange in Henry County. The study was conducted as part of a VE training session held for GDOT staff on October 5 to 9, 2009.

The Atlanta region has experienced robust population growth over the last decade. The metro Atlanta area has taken steps in meeting the transportation challenges. One such step is the development of regional bus service along with supporting facilities such as park and ride lots. This project consists of constructing a park and ride facility on an 8.41 acre site located in the vicinity of the Jodeco Road interchange with I-75 in Henry County. The new facility would consist of 1,075 parking spaces, a Fare Systems shelter, 3 bus pavilions, site lighting and a security camera system. The project also includes paving Holloway Road which needs improvements to handle the expected traffic demands. Some portions of Holloway Road are currently unpaved. The estimated construction cost of the project is \$3,312,677, the R/W estimate is \$3,461,000, and reimbursable utilities are \$104,064 yielding a total project cost of \$6,877,741. On Monday, October 5, 2009, the design team gave an overview of the project to the VE team and on Friday, October 9, 2009, the VE team presented their recommendations.

This report presents the VE team's recommendations and all back-up information for consideration by the decision-makers. This **Executive Summary** includes a brief description of each recommendation. The **Study Identification** section contains information about the project and the team. The **Recommendations** section presents a more detailed description and support information about each recommendation. The **Appendix** includes a complete record of the team's activities and findings as well as the worksheets developed during the information, creative and evaluation phases of the study. The reader is encouraged to review all sections of the report in order to obtain a complete understanding of the VE process.

## VE-11

### DEVELOPMENT PHASE - EXECUTIVE SUMMARY

**Project:** Jodeco Road Park and Ride Lot  
**Location:** I-75 and Jodeco Road

**Team:** 3  
**Date:** October 8, 2009

#### INTRODUCTION

This report presents the results of a Value Engineering (VE) Study conducted on a proposed Park N Ride Lot Facility to be located on an 8.41 Acre site located in Henry County. This proposed location is bordered on the west by I-75, on the south by Holloway Road and on the north and east by undeveloped parcels. The facility infrastructure will consist of approximately 1072 spaces (1051 standard and 21 handicap spaces), 3 Bus Pavilions, a Fare Systems Shelter for ticket vending and access to the site from various locations. Lighting facilities, security Cameras and ITS units will be included in the parking lot area. The design is in the early preliminary design phase and the total estimated cost is \$6,877,741 (Construction = \$3,312,677, ROW = \$3,461,000 and Reimbursable Utilities = \$104,064). The VE study was conducted from October 5 – 9, 2009 at the GDOT Central Office Location in Atlanta, Georgia using a 6 person VE Team.

This report presents the team's recommendations and all back-up information for consideration by GDOT Management.

#### CONSIDERATIONS

The project being evaluated under this study has GRTA Funding for Construction and is currently scheduled for FY 2010. Right of Way has been approved as well as the Environmental Document.

#### RESULTS OBTAINED

The VE Team focused their efforts on the high cost items of the project and developed nine independent recommendations. A detailed write-up of each recommendation is contained in the respective portion of this report. A summary of the recommendations and design suggestions follow.

**VE-10**

<b>DEVELOPMENT PHASE - SUMMARY OF COST SAVINGS</b>						
<b>Project:</b> GRTA Jodeco Park and Ride Lot					<b>Team No.:</b> 3	
<b>Location:</b> I-75 and Jodeco Road, Henry County					<b>Date:</b> 10-9-09	
<b>Idea No.</b>	<b>Creative Idea Description</b>	<b>Original Initial Cost</b>	<b>Proposed Initial Cost</b>	<b>Initial Cost Savings</b>	<b>Future Savings</b>	<b>Total Life Cycle Savings</b>
A-3	Concrete-Bus Lane Only	178,000.00	205,000.00	(-27,000)	79,000.00	52,000.00
B-6	Replace Pond with Open Flat Channel	615,000.00	270,000.00	345,000.00		
B-7	Redesign parking lot and utilize Holloway Road (Note: Cost is for total project.)	6,900,000	6,950,000	(-50,000)		
C-3	Exterior or perimeter ditch	802,000	777,000	25,000		
D-4/ E-1	Combine bus shelters with Fare Systems Shelter	550,000.00	470,000.00	80,000.00		
F2/Q1	Reduce some/all C&G incl. islands and perimeter; Stripe Islands	28,000	500	27,500		
F-4	24" Instead of 30"	205,000.00	165,000.00	40,000.00		
I-1	Verify traffic control estimate	98,000.00	50,000.00	48,000.00		
M-1	Rip rap instead of flume	40,500	29,500	11,000		

## STUDY IDENTIFICATION

## VE-1

# STUDY IDENTIFICATION

<b>Project:</b> CSMSL-0007-00(955)	<b>Date:</b> October 5-9, 2009
<b>Location:</b> I-75 and Jodeco Road, Henry County	

## VE Team Members

<b>Name:</b>	<b>Position:</b>	<b>Organization:</b>	<b>Telephone:</b>
Robert Reid	Asst. Group Manager	GDOT	(404) 631-1803
Brandon Kirby	Project Manager	GDOT	(678) 343-0816
Phillip Magoon	DE III Urban Design	GDOT	(404) 631-1716
Dexter Whaley	DE II-Urban Design	GDOT	(404) 631-1694
Michelle Wright	Project Manager	GDOT	(912) 271-7562
Carlos Baker	DEI-Traffic Operations	GDOT	(404) 635-8151

## Project Description

Construction of an 8.41-acre park and ride facility in Henry County at the I-75 NB and Jodeco Road Interchange

The lot consists of approximately 1070 parking spaces and includes bus pavilions and a fare systems shelter. The lot is to be serviced by a.m. and p.m. transit.

## Project Constraints

Depth of pond-groundwater, 1000 parking spaces, mandatory I-75 ramp access, aesthetically pleasing facility

## VE RECOMMENDATIONS

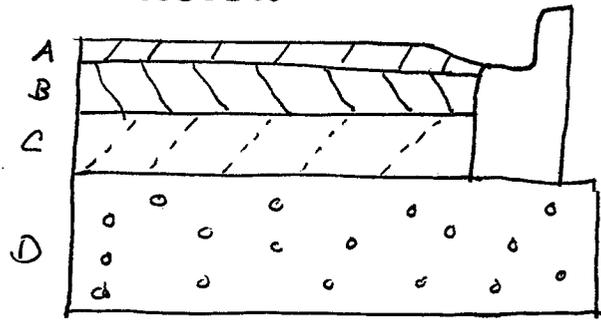


SKETCH

Project: Juleco Road Park-N-Ride  
(Bus lane w/in lot)

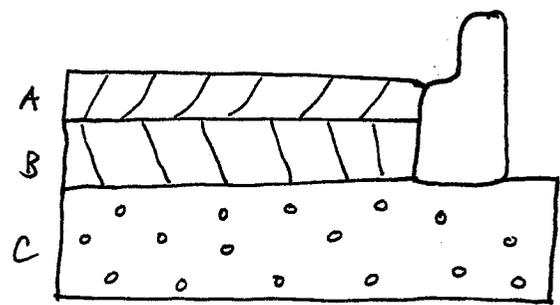
Idea No.: A-3  
Client:  
Sheet of

ORIGINAL



A = 135 lb/sy - 9.5mm  
B = 220 lb/sy - 19mm  
C = 330 lb/sy - 25mm  
D = 8" GAB

PROPOSED



A = 4.25" PCCP  
B = 220 lb/sy - 19mm  
C = 8" GAB

The desire is to have same grade as typical section if possible.

**VE-9B**

<b>COST WORKSHEET</b>							
<b>Project: GRTA Jodeco Park and Ride Lot</b>					Idea No.: A-3 Client: GDOT Sheet     of		
CONSTRUCTION ELEMENT		ORIGINAL ESTIMATE			NEW ESTIMATE		
Item	Unit	No. Units	Cost/Unit	Total Cost	No. Units	Cost/Unit	Total Cost
<b>Current Design:</b>							
9.5 mm RAC	ton	366	67.59	24738			
19 mm RAC	ton	586	63.63	37287			
25 mm RAC	ton	879	63.09	55456			
8" GAB	ton	2343	22.01	51569			
<b>VE Concept:</b>							
4.25" PCCP	Sy				5325	20.00	106500
19 mm RAC	ton				586	63.63	37287
8" GAB	ton				2343	22.01	51569
<b>Subtotal:</b>				169050			195356
<b>Mark-up ( 5%)</b>				8453			9768
<b>Total</b>				177503			205124
<b>Total Rounded</b>				<b>178000</b>			<b>205000</b>

VE-9C

## CALCULATIONS

**Project:** *GRTA Jodeco Park and Ride Lot*

Idea No. : A-3

Client: GDOT

Sheet of

Original design: Assumed (1) overlay and general pothole maintenance.  
(Milling and overlay for 20 years)

Alternate Design - Assumed minor joint repairs.

See attached calculations

**VE-9D**

**Life Cycle Cost Analysis – Present Worth Method  
Future Cost Calculation**

**PROJECT: GRTA Jodeco Park and Ride Lot**

Creative Idea No. A-3

Sheet: of

Discount Rate: 4%

Economic Life: 20 Years

	A	B	C	D
	Original Design		Alternate Design	
	Cost	PW	Cost	PW
<b>1. Single Expenditures:</b> (i.e., stage Construction, Major Maintenance)				
a. Year <u>10</u> PWF <u>0.676</u>	25000	16900	5000	3380
b. Year ____ PWF ____				
c. Year <u>20</u> PWF <u>0.456</u>	30000	13680	5000	2280
d. Salvage / Unused Service Life Year ____ PWF ____				
<b>1. Total Future Single Costs:</b>		30580		5660
<b>2. Annual Costs:</b>				
a. General Maintenance PWF' = 13.59	5000	67950	1000	13590
b. Other Annual Costs PWF' =				
<b>2. Total Future Annual Costs</b>		67950		13590
<b>3. Total Future Costs: (1 + 2)</b>		98530		19250
<b>4. Total Future Cost Savings on a Present Worth Basis (3B-3D)</b>		79280		
<b>5. Total Future Cost Savings on an Annual Basis (4B X crf_) (crf = .074)</b>		5867		



# SKETCH

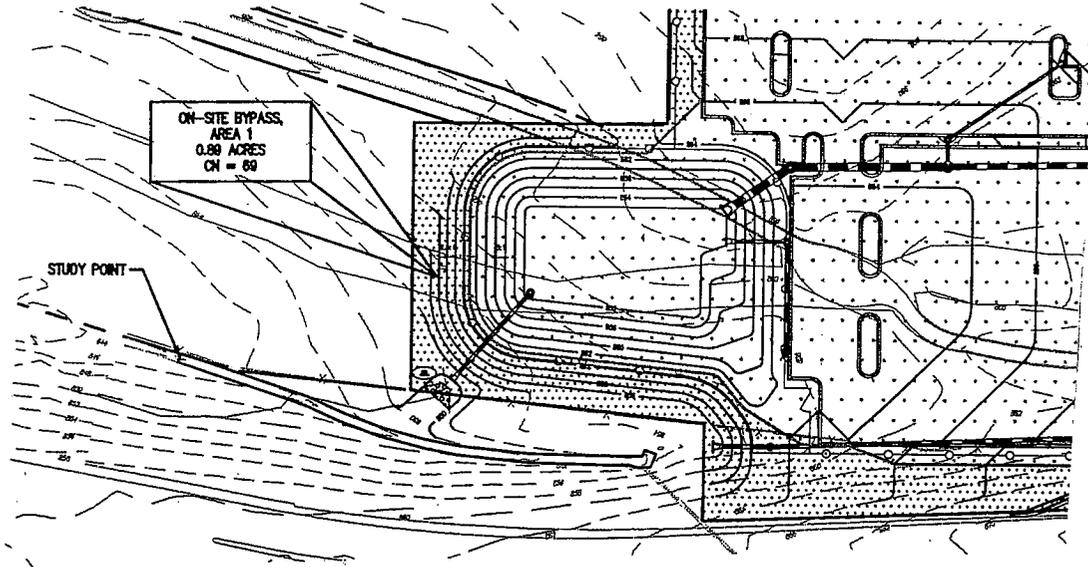
Project: *Jadeco Park - N - Ride (GRTA)*

Idea No. : 8-6

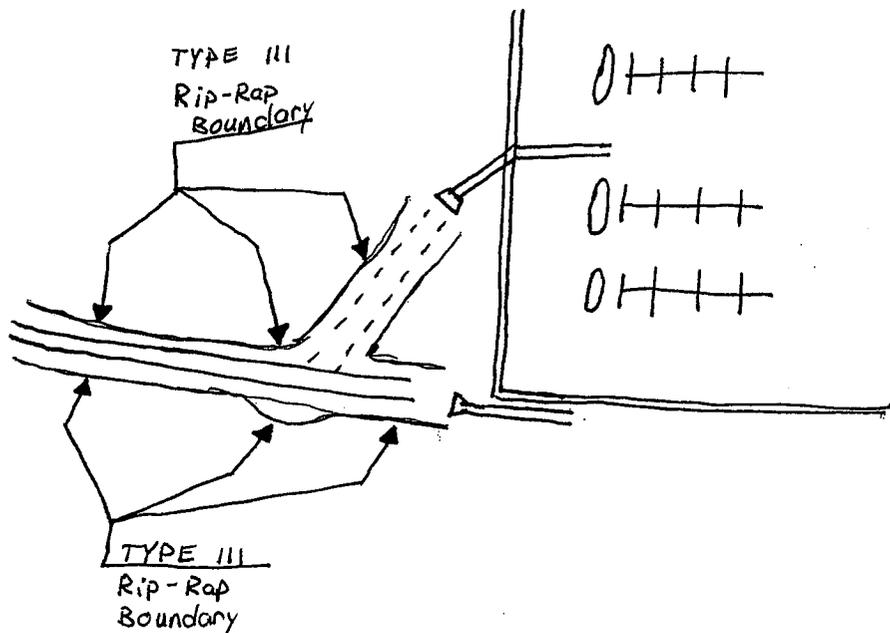
Client::

Sheet of

ORIGINAL



PROPOSED



**VE-9B**

<b>COST WORKSHEET</b>							
<b>Project: <i>GRTA Jodeco Park and Ride Lot</i></b>					Idea No.: B-6 Client: GDOT Sheet     of		
CONSTRUCTION ELEMENT		ORIGINAL ESTIMATE			NEW ESTIMATE		
Item	Unit	No. Units	Cost/Unit	Total Cost	No. Units	Cost/Unit	Total Cost
<b>Current Design:</b>							
Grading complete	LS	1	475785	475785			
Fencing	LF	3200	21.76	69632			
Gate	EA	2	1029.25	2058			
24" pipe	LF	67	53.45	3581			
24" FES	EA	2	643.26	1287			
Flume (Class B concrete)	CY	101	399.76	40376			
<b>VE Concept:</b>							
Grading complete	LS				1	40000	40000
Fencing	LF				3100	21.76	67456
Type III Rip Rap, 18"	SY				375	43.64	16365
Gate	EA				1	1029.25	1029.25
24" pipe	LF				0	53.45	0
24" FES	EA				0	643.26	0
Flume (Class B concrete)	CY				50	399.76	19988
<b>Subtotal:</b>				613167			269688
<b>Mark-up ( -%)</b>							
<b>Total</b>				613167			269688
<b>Total Rounded</b>				<b>615000</b>			<b>270000</b>

VE-9C

## CALCULATIONS

**Project:** *GRTA Jodeco Park and Ride Lot*

Idea No. : B-6

Client: GDOT

Sheet of

### Assumptions:

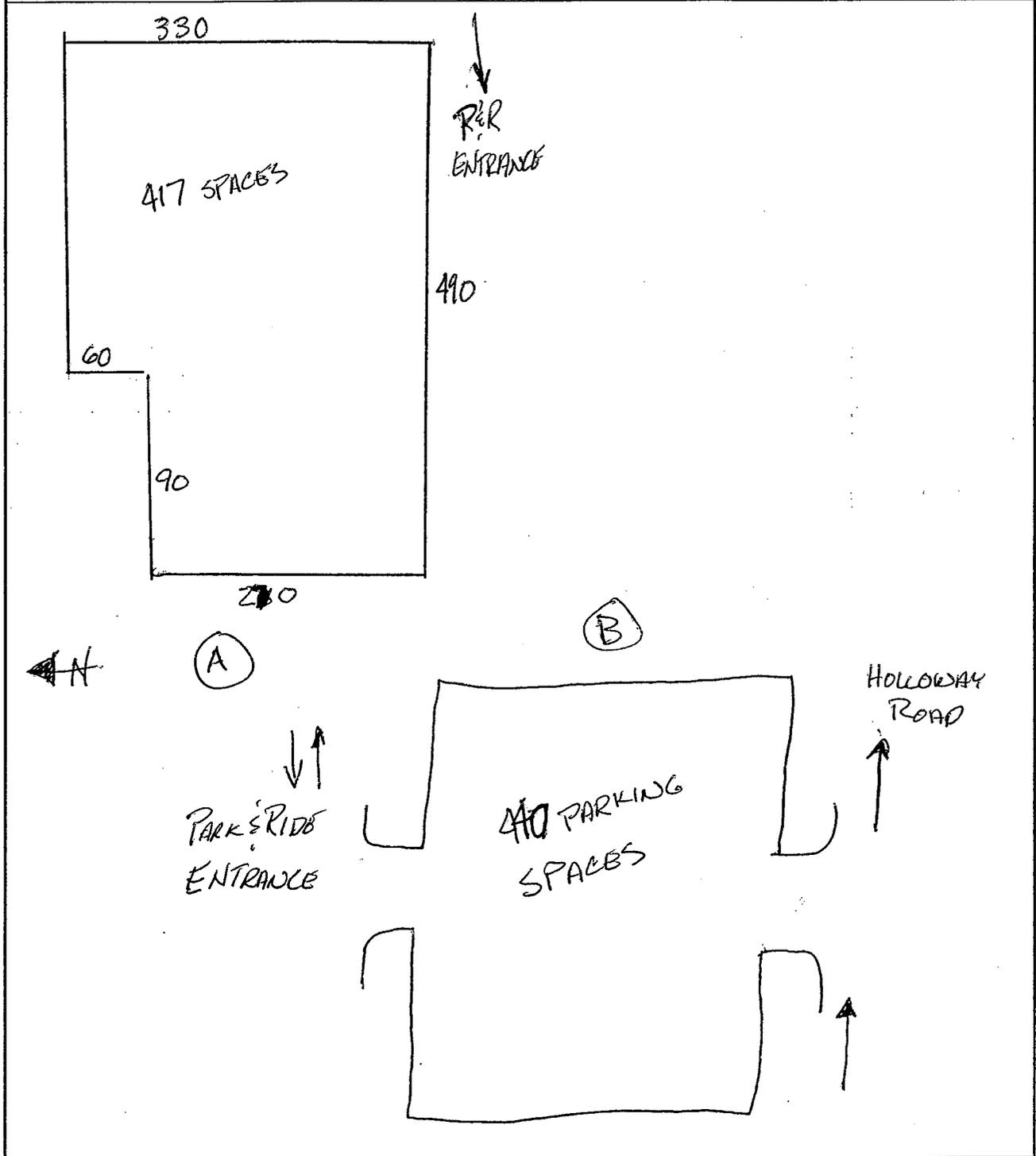
- Retrofit is at pond
- Grading & maintenance of pond = \$40,000
- Rip Rap area = 6' x 550'  $\approx$  375 yd<sup>2</sup>
- 1 gate at pond
- 100' less fence
- Only changed 24" pipe (reduced it by 67')
- Class B concrete flume is 48 yd<sup>3</sup>, not 98 yd<sup>3</sup>

<b>DEVELOPMENT AND RECOMMENDATION PHASE</b>			
<b>Project: <i>GRTA Jodeco Park and Ride Lot</i></b>			
<b>Idea No.:</b> B-7	<b>Sheet No.:</b> of	<b>CREATIVE IDEA:</b>	
Comp By:	Date: 10/08/09	Checked By:	Date:
<p><b>Original Concept:</b> Construct parking spaces north and south of Park and Ride entrance.</p>			
<p><b>Proposed Change:</b> Construct <u>all</u> parking spaces to the south of the P&amp;R entrance, provide right out only exit to Patrick Henry Parkway.</p>			
<p><b>Justification:</b> The 3 lots north of the P&amp;R entrance require 3.6 acres of property. The 4.2 acres of undeveloped property located between the P&amp;R entrance and Holloway Rd may be acquired to construct more parking spaces. This relocation will help to avoid the bedrock outcropping discovered north of the entrance. It will also help to reduce the quantity of borrow. The easternmost lot would be designed to encourage parking for the vanpool ridership relocated when the P&amp;R lot is constructed. Finally any additional acreage may be utilized to increase parking capacity.</p>			
LIFE CYCLE COST SUMMARY	INITIAL Project Cost	FUTURE Project Cost	TOTAL Present Worth Cost
<b>INITIAL COST:</b> Original	6900000		
Proposed	6950000		
Savings	(50000)		
<b>FUTURE COST:</b> Savings			
<b>TOTAL PRESENT WORTH SAVINGS</b>			(50000)

# SKETCH

Project: **GRITA JODECO  
PARK & RIDE LOT**

Idea No.: **B-7**  
Client:  
Sheet of





VE-9C

## CALCULATIONS

**Project:** *GRTA Jodeco Park and Ride Lot*

Idea No. :  
Client: GDOT  
Sheet of

Area of relocated parking =  $(400 \times 330) + (270 \times 90) = 156300$  sf

$156300$  sf / (1 ac / 43560 sf) = 3.6 acres      Acres available = 4.12 acres

See attached sheet for Holloway Road pavement quantities.

VE-9C.2

IDEA: B-7

		Depth of 9.5mm	Depth of 19mm	Depth of 25mm	# of Layers		Depth of GAB
Inches		1.25	2	3	3	Inches	8
lbs/sy		110	110	110			
		135	220	330			

Sheet #	Pave Area (ft <sup>2</sup> )	Pave Area (yd <sup>2</sup> )	9.5 mm (ton)	19 mm (ton)	25 mm (ton)	Bitum. Tack Coat (gal)	Aggr. Base Area (ft <sup>2</sup> )	Aggr. Base (ton)
	12800	1422	96	156	235	213	12800	632
		0	0	0	0	0	0	0
		0	0	0	0	0	0	0
		0	0	0	0	0	0	0
		0	0	0	0	0	0	0
		0	0	0	0	0	0	0
		0	0	0	0	0	0	0
		0	0	0	0	0	0	0
		0	0	0	0	0	0	0
		0	0	0	0	0	0	0
		0	0	0	0	0	0	0
		0	0	0	0	0	0	0
		0	0	0	0	0	0	0
		0	0	0	0	0	0	0
		0	0	0	0	0	0	0
		0	0	0	0	0	0	0
			96	156	235	213		632

Cost		\$67.59	\$63.63	\$63.09	\$1.94		\$22.01
Totals		\$6,488.64	\$9,954.56	\$14,805.12	\$413.87		\$13,912.49

Total \$45,574.68

VE-9

<b>DEVELOPMENT AND RECOMMENDATION PHASE</b>			
<b>Project: <i>GRTA Jodeco Park and Ride Lot</i></b>			
<b>Idea No.:</b> C-3	<b>Sheet No.:</b> of	<b>CREATIVE IDEA:</b> Exterior/ perimeter ditch in lieu of a portion of Curb & Gutter	
Comp By:	Date: 10/08/09	Checked By:	Date:
<p><b>Original Concept:</b> Curb &amp; Gutter around Park and Ride lot.</p>          <p><b>Proposed Change:</b> replace a portion of C&amp;G in SE quadrant with an open channel ditch</p>          <p><b>Justification:</b> Channels water away from P&amp;R lot, reduces number of drainage structures, quantity of pipe, less maintenance of C&amp;G</p>			
LIFE CYCLE COST SUMMARY	INITIAL Project Cost	FUTURE Project Cost	TOTAL Present Worth Cost
<b>INITIAL COST:</b> Original	801508		
Proposed	776135		
Savings	25373		
<b>FUTURE COST:</b> Savings			
<b>TOTAL PRESENT WORTH SAVINGS</b>			<b>25373</b>

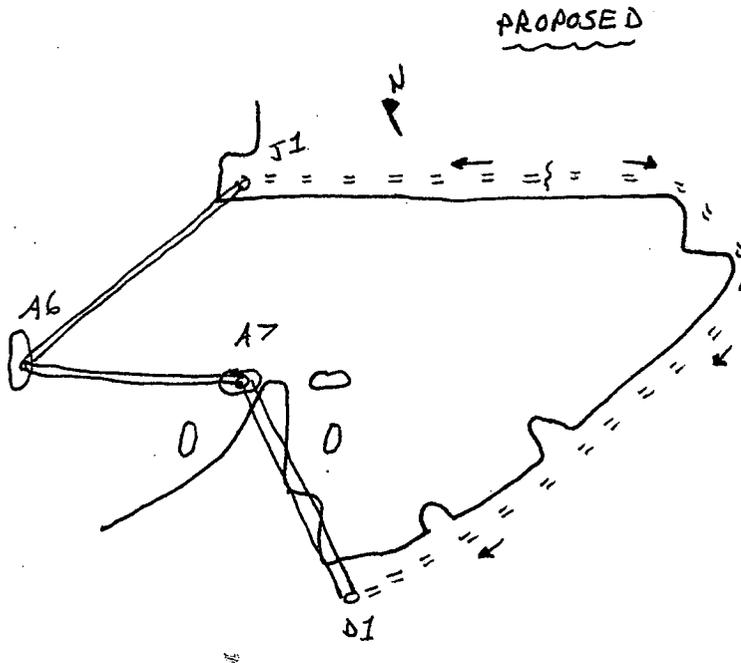
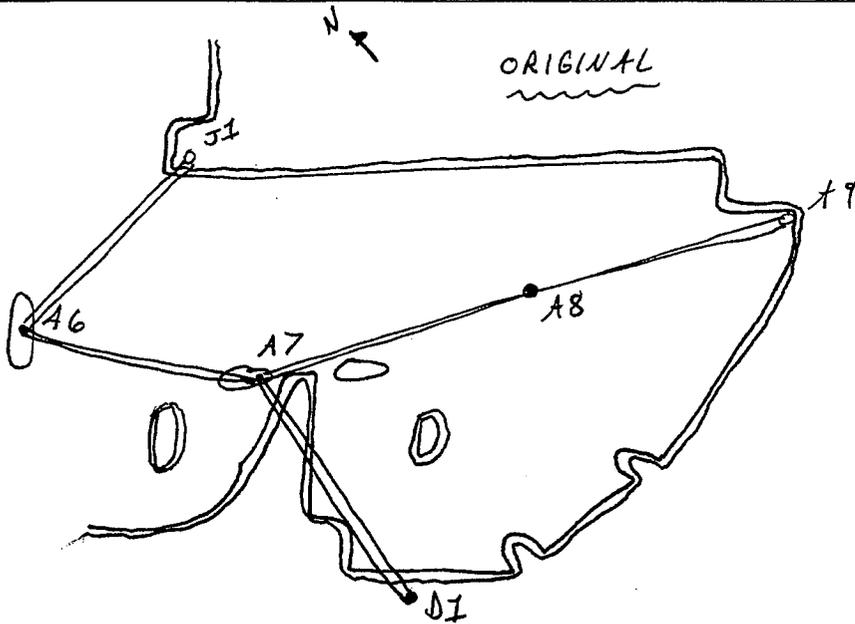
# SKETCH

Project: Jodeco Park-N-Ride (GRTA)

Idea No.: C-3

Client::

Sheet of



Eliminate  
 A9, A8  
 A9 → A8, A8 → A7  
 c & g from J1 → D1

~~Add~~ Modify  
 J1 structure to  
 Drop Inlet



VE-9C

## CALCULATIONS

**Project:** *GRTA Jodeco Park and Ride Lot*

Idea No. : C-3

Client: GDOT

Sheet of

### Assumptions:

- Scaled  $\approx 840'$  of 24" C&G that could be eliminated
- \$5000 to grade ditch
- Eliminate A9, A8, & A9→A7
- Grade can be adjusted for positive drainage
- J1, D1 can be adjusted/ changed to catch surface storm water
- Parking lot grade can be adjusted/ inverted to catch water in A7
- 300' of type C for temporary ditch check dams



# SKETCH

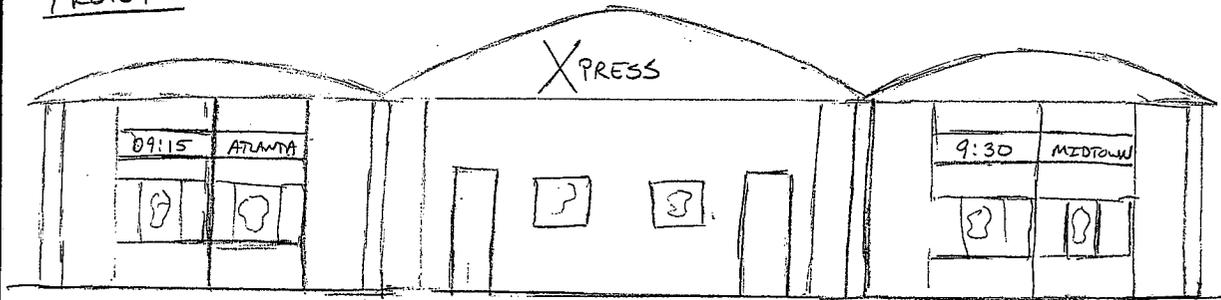
Project: GRTA JODECO PARK AND RIDE LOT

Idea No.: D4/E1

Client::

Sheet of

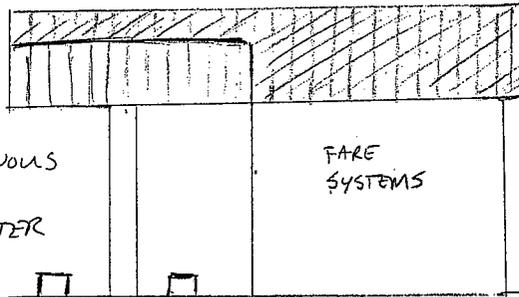
FRONT



SIDE

CONTINUOUS  
BUS  
SHELTER

FARE  
SYSTEMS





VE-9

<b>DEVELOPMENT AND RECOMMENDATION PHASE</b>			
<b>Project: <i>GRTA Jodeco Park and Ride Lot</i></b>			
<b>Idea No.:</b> F-4	<b>Sheet No.:</b> of	<b>CREATIVE IDEA:</b> Use 24" curb and gutter instead of 30"	
Comp By:	Date: 10-8-09	Checked By:	Date:
<p><b>Original Concept:</b></p> <p>Use 30" curb and gutter (C&amp;G) on entrance drive into the park and ride lot and 24" on the interior parking lot</p> <p><b>Proposed Change:</b></p> <p>Use 24" curb and gutter on the entire site.</p> <p><b>Justification:</b></p> <p>The cost estimate shows a higher unit cost for 24" C&amp;G than for 30" C&amp;G. It is believed that this difference is due to GDOT not utilizing significant quantities of 24" c and g. The VE team assumes that there will be an approximate 10% reduction in material cost of C&amp;G under 30" c and g. Use \$14 unit cost in lieu of 17.86 per LF.</p>			
<b>LIFE CYCLE COST SUMMARY</b>	<b>INITIAL Project Cost</b>	<b>FUTURE Project Cost</b>	<b>TOTAL Present Worth Cost</b>
<b>INITIAL COST: Original</b>	196,552		
<b>Proposed</b>	-156,800		
<b>Savings</b>	39,752		
<b>FUTURE COST: Savings</b>			
<b>TOTAL PRESENT WORTH SAVINGS</b>			<b>39,752</b>

**VE-9B**

**COST WORKSHEET**

<b>Project:</b> <i>GRTA Jodeco Park and Ride Lot</i>					Idea No.:		
					Client:: GDOT		
					Sheet of		
CONSTRUCTION ELEMENT		ORIGINAL ESTIMATE			NEW ESTIMATE		
Item	Unit	No. Units	Cost/Unit	Total Cost	No. Units	Cost/Unit	Total Cost
<b>Current Design:</b>							
24" C&G	LF	10,000	17.86	178,600.00			
30" C&G	LF	1,200	14.96	17,952.00			
			total	196,552			
<b>VE Concept:</b>							
24" C&G	LF				11,200	14.00	156,800
<b>Subtotal:</b>				196,552			156,800
<b>Mark-up ( %)</b>				7,862.08			6,272.00
<b>Total</b>				204,414.08			163,072
<b>Total Rounded</b>				<b>205,000.00</b>			<b>165,000.00</b>

<b>DEVELOPMENT AND RECOMMENDATION PHASE</b>			
Project: <i>GRTA Jodeco Park and Ride Lot</i>			
Idea No.:	Sheet No.:	CREATIVE IDEA:	
<del>5</del> <i>I-2</i>	of	<i>VERIFY TRAFFIC CONTROL COSTS</i>	
Comp By:	Date: <i>10/8/09</i>	Checked By:	Date:
Original Concept:			
<i>TRAFFIC CONTROL FOR PARK N RIDE LOT</i>			
Proposed Change:			
Justification:			
<i>LOT TO BE CONSTRUCTED ON NEW LOCATION. MINOR TRAFFIC CONTROL FOR ADDITION OF RIGHT TURN LANE AND BUS SLIP RAMP.</i>			
LIFE CYCLE COST SUMMARY	INITIAL Project Cost	FUTURE Project Cost	TOTAL Present Worth Cost
<u>INITIAL COST:</u> Original	<i>97,673.47</i>		
Proposed	<i>50,000</i>		
Savings	<i>47,674</i>		
<u>FUTURE COST:</u> Savings		<i>0</i>	<i>0</i>
<b>TOTAL PRESENT WORTH SAVINGS</b>			<i>47,674</i>



## DEVELOPMENT AND RECOMMENDATION PHASE

Project: *Jodeco Road Park-n-Ride Lot*

Idea No.:  
*M-1*

Sheet No.:  
of

**CREATIVE IDEA:**

*Replace concrete Flume w/ Type III Rip Rap*

Comp By:

Date:

Checked By:

Date:

Original Concept: *Install concrete flume with Class B concrete near retention pond.*

Proposed Change: *Construct ditch & line with rip rap.*

Justification: *Better erosion control.  
More environmental sensitivity.  
Enhanced aesthetics.  
Increased velocity dissipation.  
Increased seepage into ground.*

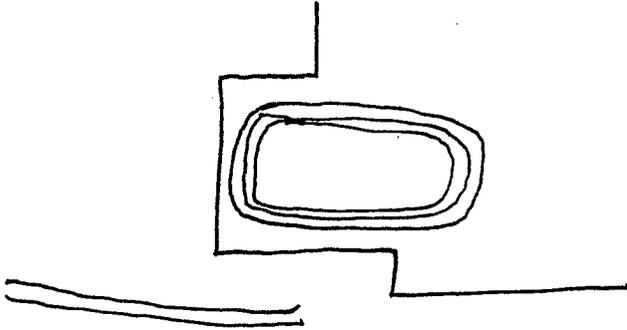
LIFE CYCLE COST SUMMARY	INITIAL Project Cost	FUTURE Project Cost	TOTAL Present Worth Cost
<b>INITIAL COST:</b> Original	<i>40,376</i>		
Proposed	<i>29,371</i>		
Savings	<i>11,005</i>		
<b>FUTURE COST:</b> Savings			
<b>TOTAL PRESENT WORTH SAVINGS</b>			<i>11,000</i>

# SKETCH

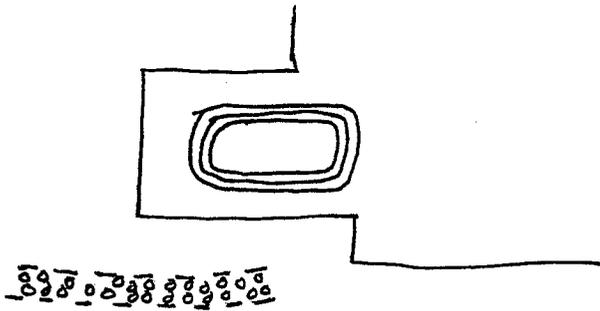
Project: Jodeco Road Park-n-Ride

Idea No. : M-1  
Client::  
Sheet of

ORIGINAL



Proposed



## COST WORKSHEET

Project: *Jodeco Road Park-n-Aide*

Idea No.: *M-1*  
 Client:  
 Sheet of

CONSTRUCTION ELEMENT		ORIGINAL ESTIMATE			NEW ESTIMATE		
Item	Unit	No. Units	Cost/Unit	Total Cost	No. Units	Cost/Unit	Total Cost
<i>CURRENT DESIGN</i>							
<i>Flume - class B</i>	<i>CY</i>	<i>101</i>	<i>399.76</i>	<i>40376</i>			
<i>VE DESIGN</i>							
<i>Type III Rip Rap, 18"</i>	<i>SY</i>				<i>215</i>	<i>43.64</i>	<i>9383</i>
<i>Flume - class B</i>	<i>CY</i>				<i>50</i>	<i>399.76</i>	<i>19988</i>
<b>Subtotal:</b>							
<b>Mark-up ( %)</b>							
<b>Total</b>				<i>40376</i>			<i>29371</i>
<b>Total Rounded</b>				<i>40500</i>			<del><i>29400</i></del>

*29,500*

## CALCULATIONS

Project: Jodeco Road Park-a-Ride

Idea No. : M-1

Client::

Sheet of

*Assumptions:*

- Rip Rap area 5' x 320'
- class B concrete flume is 48 yd<sup>3</sup>, not 98 yd<sup>3</sup>  
(if indeed 98 ⇒ more savings)

<b>DEVELOPMENT AND RECOMMENDATION PHASE</b>			
<b>Project: <i>GRTA Jodeco Park and Ride Lot</i></b>			
<b>Idea No.:</b> Q-1	<b>Sheet No.:</b> 1 of 5	<b>CREATIVE IDEA:</b> Replace some of the Concrete Islands with Stripe Islands	
Comp By:          Date:		Checked By:          Date:	
<p><b>Original Concept:</b></p> <p>To increase safety by proving a clearly defined row. Aesthetically pleasing to the user. Provides a location for drop inlets and provides a physical barrier.</p> <p><b>Proposed Change:</b></p> <p>Reduce the c &amp; g and concrete sidewalk needed on project by replacing some of the concrete islands with striped islands.</p> <p><b>Justification:</b></p> <p>Reduces the amount of c &amp; g and concrete needed. This also provides a clearly defined row and visible barrier with less man hours and material.</p>			
<b>LIFE CYCLE COST SUMMARY</b>	<b>INITIAL Project Cost</b>	<b>FUTURE Project Cost</b>	<b>TOTAL Present Worth Cost</b>
<b>INITIAL COST: Original</b>	26,998		
<b>Proposed</b>	710		
<b>Savings</b>	26,288		26,288
<b>FUTURE COST: Savings</b>		-190	-190
<b>TOTAL PRESENT WORTH SAVINGS</b>			<b>26,098</b>





**VE-9C**

<b>CALCULATIONS</b>	
<b>Project:</b> <i>GRTA Jodeco Park and Ride Lot</i>	Idea No. : 0007955 Client:: <i>GDOT</i> Sheet 4 of 5
Dimension of removed concrete island  1,016 lf of c&g  1016 lf @ \$17.86 per lf = \$ 8,852  258 sy of concrete sidewalk, 4 in  258 sy @ 34.31 per sy = \$ 18,146  \$ 8,852 \$ <u>+ 18,146</u> \$ 26,998 = total	

**VE-9D**

**Life Cycle Cost Analysis – Present Worth Method  
Future Cost Calculation**

**PROJECT:** *GRTA Jodeco Park and Ride Lot*

Creative Idea No. Q-1

Sheet: 5 of 5

Discount Rate: \_\_\_\_\_%  
\_\_\_\_\_ Years

Economic Life: 20

	A	B	C	D
	<b>Original Design</b>		<b>Alternate Design</b>	
	Cost	PW	Cost	PW
<b>1. Single Expenditures:</b> (i.e., stage Construction, Major Maintenance)	26,998	26,998	710	710
a. Year <u>10</u> PWF <u>0.676</u>	1000	676	1420	960
c. Year <u>20</u> PWF <u>.456</u>	800	364.8	2,840	1,295
d. Salvage / Unused Service Life Year _____ PWF _____				
<b>1. Total Future Single Costs:</b>		1040		2,255
<b>2. Annual Costs:</b>				
a. General Maintenance PWF' = 13.59	100	1359	200	2718
b. Other Annual Costs PWF' =				
<b>2. Total Future Annual Costs</b>		1359		2718
<b>3. Total Future Costs: (1 + 2)</b>		2399		4973
<b>4. Total Future Cost Savings on a Present Worth Basis (3B-3D)</b>		-2574		
<b>5. Total Future Cost Savings on an Annual Basis (4B X crf)</b>		-190		

**APPENDIX**

VE-2

## INFORMATION PHASE - SOURCES Approving/Authorizing Persons

Name:	Position:	Telephone:
Marlo Clowers	Project Manager-Innovative Program Delivery	(404) 631-1713

### Personal Contacts

Name:	Telephone:	Notes:
Christopher A.M. Hill, P.E.	(678) 808-8800	URS GDOT Design Consultant
Patrick J. Gallagher, P.E.	(678) 808-8800	URS GDOT Design Consultant

### Documents/Abstracts

Reference:	Notes:
2004 Park and Ride Facilities Guide	
Half-sized set of plans	
Concept report	
Detailed cost estimate	
Preconstruction status report	

VE-3

**INFORMATION PHASE - COST MODEL**

Project Name: *GRTA Jodeco Park and Ride Lot*

Item	Description	\$ Amount	% of Total Project
A.	Pavement Structure	977,889.45	30.84%
B.	Grading Complete	475,785.26	15.00%
C.	Drainage	324,230.55	10.22%
D.	Fare Systems Shelter	300,000.00	9.46%
E.	Bus Pavilion (includes 3 structures)	250,000.00	7.88%
F.	Curb and Gutter	197,494.75	6.23%
	<b>80% Cost Line</b>	<b>2,525,400.01</b>	
G.	Utilities-Water	119,040.87	3.75%
H.	Reimbursable Utilities	104,064.00	3.28%
I.	Traffic Control	97,673.47	3.08%
J.	Chain Link Fence and Gates	71,690.50	2.26%
K.	Sidewalk	64,113.25	2.02%
L.	Erosion Control	55,791.27	1.76%
M.	Class B Concrete	40,395.08	1.27%
N.	Grassing	27,308.44	0.86%
O.	Handrail	20,266.80	0.64%
P.	Aggregate Surface Course	18,090.00	0.57%
Q.	Striping	13,221.11	0.42%
R.	Signs	11,190.35	0.35%
S.	Precast Bumper Blocks	3,112.82	0.10%
	<b>TOTAL</b>	<b>3,171,357.97</b>	<b>100%</b>

VE-4

**INFORMATION PHASE – FUNCTION ANALYSIS**

**Project:** GRTA Jodeco Park and Ride Lot  
**Project Function:** Access Transit, Combine Riders

ITEM No.	DESCRIPTION	FUNCTION		INITIAL DOLLARS		
		Verb	Noun	Cost	Worth	Comments
A.	Pavement Structure	Provide	Surface	977,889.45	350,000.00	Gravel Surface
		Support	Vehicles			
		Stabilize	Ground			
		Increase	Storage			
		Drain	Water			
B.	Grading Complete	Prepare	Site	475,785.26	400,000.00	Adjust Grade, Reduce Clearing
		Balance	Earthwork			
		Support	Pavement			
		Clear	Area			
		Direct	Water			
		Achieve	Grade			
C.	Drainage	Accommodate	Runoff	324,230.55	300,000.00	Alternate materials
		Provide	Storage			
D.	Fare Systems Shelter	Store	Equipment	300,000.00		
		Attract	Users			
		Provide	Shelter			
		Present	Information			

## INFORMATION PHASE – FUNCTION ANALYSIS

**Project:** GRTA Jodeco Park and Ride Lot

**Project Function:** Access Transit, Combine Riders

ITEM No.	DESCRIPTION	FUNCTION		INITIAL DOLLARS		
		Verb	Noun	Cost	Worth	Comments
E.	Bus Pavilion (includes 3 structures)	Provide	Shelter	250,000.00	200,000.00	Change location, modify shape
		Present	Information			
		Attract	Users			
		Provide	Seating			
		Store	Bicycles			
F.	Curb and Gutter	Channelize	Items	197,494.75	180,000.00	Reduce size and quantity
		Channelize	Runoff			
		Transport	Water			
		Delineate	Edge			
G.	Utilities (Water )	Provide	Service	119,040.87		
H.	Reimbursable Utilities	Continue	Service	104,064.00		
		Replace	Existing			
I.	Traffic Control	Control	Traffic	97,673.47		
		Increase	Safety			
		Provide	Guidance			
J.	Chain Link Fence and Gates	Protect	Property	71,690.50		
		Delineate	Boundary			

## INFORMATION PHASE – FUNCTION ANALYSIS

**Project:** GRTA Jodeco Park and Ride Lot

**Project Function:** Access Transit, Combine Riders

ITEM No.	DESCRIPTION	FUNCTION		INITIAL DOLLARS		
		Verb	Noun	Cost	Worth	Comments
K.	Sidewalk	Provide	Access	64,113.25		
		Direct	Pedestrians			
		Cover	Ground			
		Increase	Safety			
		Attract	Users			
		Allow	Access			
L.	Erosion Control	Prevent	Erosion	55,791.27		
		Control	Runoff			
M.	Class B Concrete (Steps, Flume)	Construct	Steps	40,395.08	0.00	Reduce/Eliminate items
		Construct	Flume			
		Construct	Handrail Foundation			
N.	Grassing	Stabilize	Soil	27,308.44	32,000.00	Place sod in select areas
		Beautify	Area			
		Improve	Appearance			
O.	Handrail	Direct	Users	20,266.80		
		Provide	Safety			

## INFORMATION PHASE – FUNCTION ANALYSIS

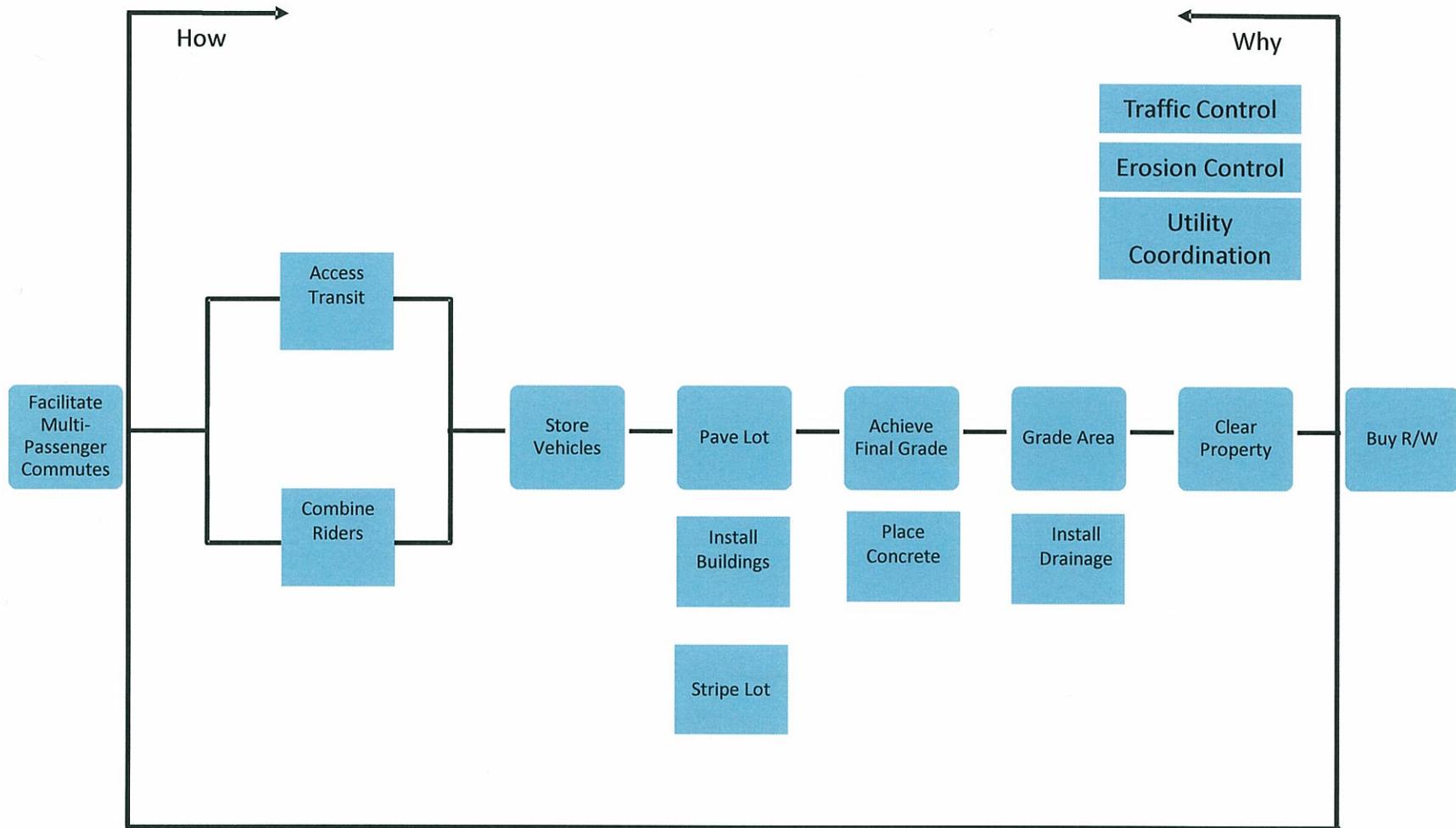
**Project:** GRTA Jodeco Park and Ride Lot

**Project Function:** Access Transit, Combine Riders

ITEM No.	DESCRIPTION	FUNCTION		INITIAL DOLLARS		
		Verb	Noun	Cost	Worth	Comments
P.	Aggregate Surface Course	Stabilize	Earth	18,090.00		
		Reduce	Erosion			
		Clean	Tires			
Q.	Striping	Guide	Traffic	13,221.11		
		Provide	Information			
		Direct	Users			
R.	Signs	Guide	Traffic	11,190.35		
		Provide	Information			
		Direct	Users			
S.	Precast Bumper Blocks	Control	Traffic	3,112.82		
		Protect	Sidewalk			
		Prevent	Collisions			

# Fast Diagram

## *GRTA Jodeco Road Park and Ride Lot*



**VE-6 & 7**

<b>CREATIVE PHASE</b> Creative Idea Listing		<b>JUDGMENT PHASE</b> Idea Evaluation	
<b>No.</b>	<b>CREATIVE IDEA</b>	<b>COMMENTS</b>	<b>IDEA RATING</b>
A.	Pavement Structure		
A-1	Pavers	High cost, rough riding surface, aesthetically pleasing, tripping hazards, increased maintenance, less structural support, increased construction time	2
A-2	Concrete-Entire P & R Lot	High cost, less maintenance, more durable, longer life, aesthetically pleasing, rougher riding surface, cracking, less apparent striping	6
A-3	Concrete-Bus Lane Only	High cost (including high cost for mobilization), less maintenance, more durable, longer life, aesthetically pleasing, rougher riding surface, cracking, less apparent striping	8
A-4	Recycled Rubber	Higher cost, higher maintenance, environmentally friendly	1
B.	Grading Complete		
B-1	Partial Clear-Save Trees	Increased maintenance, better aesthetics, greener, possible higher cost to work around	4
B-2	Alternate Grades	Possibly invert to reduce borrow	7
B-3	Alternate Fill Material	Availability unknown, compactability unknown	2

CREATIVE PHASE Creative Idea Listing		JUDGMENT PHASE Idea Evaluation	
No.	CREATIVE IDEA	COMMENTS	IDEA RATING
B-4	Deck	Higher upfront cost, higher liability, provides shade and shelter, must have elevator, allows future expansion, reduces R/W,	3
B-5	Replace Pond with Underground Tanks	Higher cost, limited access for maintenance, unknown underground obstacles incl. rock close to grade,	2
B-6	Replace Pond-Open Flat Channel	Less cost, less R/W, decreased construction time, possible conflict with county govt.	7
B-7	Redesign parking lot and utilize Holloway Road	Additional cost to add asphalt to Holloway Road, less exposure to underground rock, less R/W due to pond being on existing R/W, possible re-eval., schedule impact	8
C	Drainage		
C-1	Alternate pipe material	Less cost, less durability, higher maintenance	5
C-2	Roof	Eliminates most parking lot drainage, very high cost,	1
C-3	Exterior or perimeter ditch	Channels water away from lot, reduces drainage, less maintenance, less aesthetically pleasing	5
C-4	Grates (i.e. driveway grates)	Reduces curb quantities, higher maintenance	3
C-5	Sheet flow	Reduces drainage structures, more outfall exit locations,	3

CREATIVE PHASE Creative Idea Listing		JUDGMENT PHASE Idea Evaluation	
No.	CREATIVE IDEA	COMMENTS	IDEA RATING
D	Fare Systems Shelter		
D-1	Pre-Fab	Faster construction, less cost, restricted design options and manufacturers	6
D-2	Ticket machine (place in pavilions)	Reduced size and cost of shelter, lose storage location for computers	2
D-3	Underground	High cost, requirement for above ground ticket machine, challenging access, requires design change (watertight)	2
D-4	Redesign-combine with bus shelters	Lower cost, increased shelter, lose separate access	8
D-5	Change Material	Possible less cost, possible higher maintenance	5
E	Bus Pavilion		
E-1	Continuous (Combine with fare systems shelter)	See D-4 or one continuous bus pavilion	8
E-2	Change design/material	Increased shelter, possible increased cost	5
E-3	Two-story	Difficult access	1
E-4	Awning	High maintenance, safety concerns, less cost	2
F	Curb And Gutter		
F-1	V-Gutter	More attractive, less effective	4
F-2	Reduce some/all incl. islands and perimeter	Less cost, possibly less effective, less attractive	7

CREATIVE PHASE Creative Idea Listing		JUDGMENT PHASE Idea Evaluation	
No.	CREATIVE IDEA	COMMENTS	IDEA RATING
F-3	Invert Lot=Water Inside	Reduce curb and gutter and earthwork, less cost, water on-site, potential ponding	6
F-4	24" Instead of 30"	Special design drainage structures, less cost	6
G.	Utilities	None	
H.	Reimbursable utilities	None	
I.	Traffic Control		
I-1	Don't build bus lane yet-intersection project does it	Reduce cost, delays bus service via ramp	6
I-2	Verify estimate	Reduce cost, minimum traffic interruptions	10
J.	Chain link fence		
J-1	Less fence	Less cost, less security	4
J-2	Wood	Better aesthetics, higher maintenance, slightly higher cost, less security	1
K.	Sidewalk		
K-1	Reduce sidewalk	Less cost, less safety, less maintenance, less user-friendly, non-ADA compliant	5
K-2	Use asphalt and paint walking area	Less cost, less safety, less user-friendly, non-ADA compliant?	5
L.	Erosion Control	None	
M.	Class B Concrete		

CREATIVE PHASE Creative Idea Listing		JUDGMENT PHASE Idea Evaluation	
No.	CREATIVE IDEA	COMMENTS	IDEA RATING
M-1	Rip rap instead of flume	More effective design, more environmentally friendly	8
M-2	Grass with rock check dams instead of flume	More environmentally friendly, less effective than rip rap	6
N.	Grassing	None	
O.	Handrail	None	
P.	Aggregate Surface Course	None	
Q.	Striping		
Q-1	Stripe Islands	Increase quantity, reduce c & g quantity, less aesthetically pleasing, less safe,	8
Q-2	Colored pavers	High cost, difficult to construct, more attractive	1
R	Signs	None	
R-1	Wood signs	High maintenance, less cost, more attractive, less safe	2
S.	Precast Bumper Blocks		
S-1	Asphalt curb	No color differentiation, less visible, less stable	2
S-2	Alternate material	Possibly less cost, less durable, higher maintenance	4
S-3	Berm	Less cost, easily constructed, less delineation,	3