



***CRITICAL THINKING.
SOLUTIONS DELIVERED.***

Terminal Facility Realignment: A Business Case Approach

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Outline

- § Introduction
- § Business Case Analysis Approach
- § Model Inputs
- § Data Adjustment
- § Model Outputs
- § Acknowledgements



Introduction

- § The Federal Aviation Administration (FAA) Modernization and Reform Act of 2012 (P.L. 112-095) requires the FAA to submit a report known as the National Facilities Realignment and Consolidation Report
- § Report will present FAA's vision for future facility realignments and consolidations
- § Goal of FAA is to support transition to the Next Generation Air Transportation System by analyzing capital, operating, maintenance, and administrative costs
- § Focus will start on optimizing investments with an emphasis on improving facility conditions



Introduction (cont'd)

§ FAA and Labor Unions established an agreed-upon four step process to develop potential Terminal facility realignment scenarios





Introduction (cont'd)

- § This presentation describes Step 3 of the FAA's Terminal Facility Realignment process, the business case analysis approach
- § Objective of the business case is to provide a quantitative assessment of cost and benefits of each realignment opportunity
- § The business case will provide economic metrics to determine the financial impact of each alternative
- § Metrics serve as an input into general decision criteria for realignment opportunities



Business Case Analysis Approach

- § The business case will compare operationally-viable realignment scenarios against a proposed legacy case to determine the expected return on investment for each potential scenario
- § A Microsoft Excel business case model has been developed to represent these scenarios



Model Inputs

§ Several inputs factor into model development

§ These main inputs include:

- Schedule data
- Construction cost data
- Personnel Cost and Benefits (PC&B) data
- Air Traffic Estimate Training data
- Permanent Change of Station (PCS) data



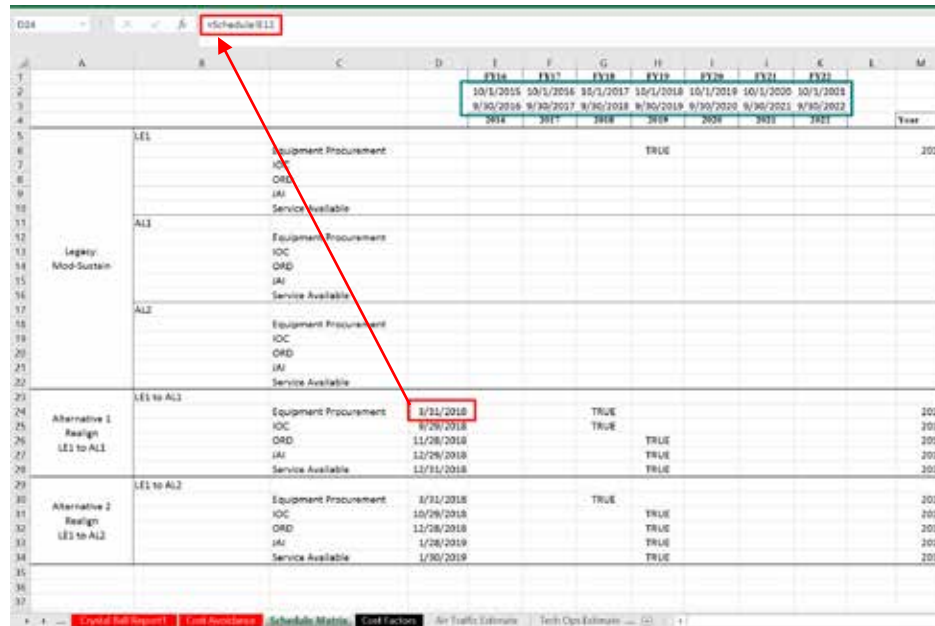
Schedule

§ Risk-adjusted schedule provided by MCR analyst laying out significant facility information factoring into analysis including equipment procurement, facility initial operating capability, and service availability

Alt 1 - LE1 to AL1					
Program Ops handoff date LE1 to AL1		20-Apr-17	Insert Date or ("D+6")		
No.	Activity	Duration	Start	Finish	Notes
	PLANNING- PHASE I Site Selection, Engineering Study				
	IMPLEMENTATION - PHASE II Site Adapt, Engineering	N/A			No plants design required
	IMPLEMENTATION - PHASE III Construction	N/A			No construction required
	IMPLEMENTATION - Phase IV Equipment/Utilities Installation	275	31-Mar-18	31-Dec-18	STARS, FDIO, Surveillance, IDS, Voice Switch Systems Adaptation & Training
28	Electronics Engineering	255	20-May-17	30-Jan-18	Begin 30 Days after handoff
28b	Procure Electronics Equipment	180	17-Sep-17	31-Mar-18	Assumes 6 mo. Acquisition of Minor and/or Available Equipment during Electronics Engineering
29	Installation/Checkout - Electronics	180	31-Mar-18	27-Sep-18	Sustain LE1 ATCT/BB w/o TRACON Function ; assume 6 mo. install; avg. duration
30	Initial Operating Capability (IOC)	1	28-Sep-18	29-Sep-18	
31	Operational Readiness Demonstration (ORD)	80	28-Sep-18	28-Nov-18	FAA Order requires 30 days. Include 30 additional days for Mgmt. Reserve
32	Conduct Joint Acceptance Inspections (JAI) - Electronics System	30	29-Nov-18	29-Dec-18	
33	Service Available	1	30-Dec-18	31-Dec-18	
	IMPLEMENTATION - Phase V Disposition	151	30-Dec-18	30-May-19	
34	Demolition Design Including Procurement	0	30-Dec-18	30-Dec-18	No Demolition = N/A
35	Electronics Equipment Removal	90	30-Dec-18	30-Mar-19	Begin after Svc Avail. Start - Remove ARTS II-E
36	Demolition/ Renovation of Existing Facility	0	31-Mar-19	31-Mar-19	No Demolition / Renovation... = N/A
37	Complete EDDA on Restored Site. - N/A	0	1-Apr-19	1-Apr-19	N/A
39	Project Closeout	80	31-Mar-19	30-May-19	Begin at end of Elec.Equip. Removal
Notes: 1. Durations are calendar days					

Schedule (cont'd)

§ Inserted schedule links directly to what is known as the “Schedule Matrix”



			FY16	FY17	FY18	FY19	FY20	FY21	FY22	Year
			10/1/2015	10/1/2016	10/1/2017	10/1/2018	10/1/2019	10/1/2020	10/1/2021	
			9/30/2016	9/30/2017	9/30/2018	9/30/2019	9/30/2020	9/30/2021	9/30/2022	
			2016	2017	2018	2019	2020	2021	2022	
	LE1	Equipment Procurement				TRUE				2019
		IOC								
		ORD								
		IAI								
		Service Available								
	AL1	Equipment Procurement								
		IOC								
		ORD								
		IAI								
		Service Available								
	AL2	Equipment Procurement								
		IOC								
		ORD								
		IAI								
		Service Available								
	LE1 to AL1	Equipment Procurement			8/31/2018		TRUE			2018
		IOC			9/26/2018		TRUE			2018
		ORD			11/28/2018			TRUE		2019
		IAI			12/26/2018			TRUE		2019
		Service Available			12/31/2018			TRUE		2019
	LE1 to AL2	Equipment Procurement			8/31/2018		TRUE			2018
		IOC			10/26/2018			TRUE		2018
		ORD			12/28/2018			TRUE		2019
		IAI			1/28/2019			TRUE		2019
		Service Available			1/30/2019			TRUE		2019

§ See at the top of the above image in the red rectangle how there is a link established directly back to the Schedule tab for the Equipment Procurement category for the respective date

§ Matrix processes each linked date and returns "TRUE" if the date falls within a particular fiscal year range (shown in green); actual fiscal year the date falls within is then printed in the far right column for each schedule category



Schedule (cont'd)

- § Schedule Matrix uses fiscal year output categories to populate various other parts of model
- § Example: Service Available date utilized to generate cost variable relating to when PCS relocations occur

Transition_Year_Alt1_LE1		='Schedule Matrix'!M28									
	A	B	C	D	E	F	G	H	I	J	K
69											
70	PCS Cost Factors										
71	Assume PCS relocations occur in:										
72		Alternative 1	LE1	Service Available							2019
73			AL1	Service Available							2019
74		Alternative 2	LE1	Service Available							2019
75			AL2	Service Available							2019



Construction Costs

- § Cost data provided by MCR analyst in Then-Year thousands of dollars (TY \$K)
- § Includes varying facilities and equipment (F&E) recurring and non-recurring costs

LEI Legacy	S804 Detail Costs Estimate (TY \$K)		2016	2017	2018	2019	2020	2021
WBS No.	Elements	Description						
4.1	Project Program Management							
4.1	HQ		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
4.1	SA		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
4.2	Design / Engineering							
4.2	Design							
4.2	A&E Facility Design Phase			0.0%				
4.2	Facility Design Review			0.0%				
4.2	Facility BIM service							
4.2	Facility Security Design							
4.2	Engineering - NISC	Terminal, Surveillance / Weather, Communications, NavAids	\$ -					
4.2	Enterprise Engineering Services and Cost Agreement (EESCA)	telecommunications plan						
4.2	Facility Life Cycle/Sustainment Plan		\$ -	\$ -	\$ -			\$ -
4.2	Design Phase - Materials / Services	US Bank Card purchases					0	
4.3	EOSH Services							
4.3	EOSH Services	FLS, EOSH services						
4.4	Environment							
4.4	Site Selection - Env Assessment	Site Selection, EDDA, EA		\$ -	\$ -			
4.5	Construction			0.0%				
4.5	Aviad							
4.5	Photovoltaic Array							
4.5	Change Orders			0 \$				
4.5	A&E Support Facility Construction Phase	continued service		0 \$				
4.5	Construction Phase - Materials / Services			0 \$				
4.5	US Bank Card purchases							
3.3.5	Facility Equipment, Furniture			0				
3.3.5	Slatwall		\$ -	\$ -				
3.3.5	Controller Chairs							
3.3.5	Admin Furniture							
3.3.5	PBX					0		
3.3.5	Facility Security Equipment							
3.3.5	Power Generation	Ancillary Equipment						
3.3.5	Miscellaneous							
3.3.5	Schedule A/B and test equipment	US Bank Card purchases						
3.3.5	Equipment Racks							
3.3.5	Automation Equipment							
3.3.5	STARS Cost	STARS 3 ICW 2 TDW		2,755.2				
3.3.5	EFSTs							
3.3.5	ARMT							
3.3.5	EDDO							



Construction Costs (cont'd)

- § Given construction data copied into pre-existing construction tab of same name
- § Below example shows how LE1 (legacy) data matches to the LE1 construction tab

PROFESSIONAL COST DATA						
LE1 - STARS Detail Cost Estimate (TY \$K)						
WBS v4.1	WBS v5.0	Elements	Description	FY17	FY18	
4.1	3.7.1	Project Program Management				
4.1	3.7.1	HQ		..	..
4.1	3.7.1	SA		..	..
4.2	3.7.3	Design / Engineering		..	..
4.2	3.7.3	Design		..	..
4.2	3.7.3	A&E Facility Design Phase		..	..
4.2	3.7.3	Facility Design Review		..	..
4.2	3.7.3	Facility BIM service		..	..
4.2	3.7.3	Facility Security Design		..	..
4.2	3.7.3	Engineering - NISC	Terminal, Surveillance / Weather, Communications, NavAids	..	..
4.2	3.7.3	Enterprise Engineering Services and Cost Agreement (EESCA), telecommunications plan		..	..
4.2	3.7.3	Facility Life Cycle/Sustainment Plan		..	..
4.2	3.7.3	Design Phase - Materials / Services	US Bank Card purchases	..	..
4.3	3.7.2	EOSSH Services		..	..
4.3	3.7.2	EOSSH Services	FLS, EOSSH services	..	..
4.4	3.7.4	Environment		..	..
4.4	3.7.4	Site Selection - Env Assessment	Site Selection, EDDA, EA	..	..
4.5	3.7.5	Construction		..	..
4.5	3.7.5	Award		..	..
4.5	3.7.5	Photovoltaic Array		..	..
4.5	3.7.5	Change Orders		..	..
4.5	3.7.5	A&E Support Facility Construction Phase	continued service	..	..
4.5	3.7.5	Construction Phase - Materials / Services	US Bank Card purchases	..	..
3.1.1.3	3.1.1.3	Facility Equipment, Furniture		..	..
3.1.1.3	3.1.1.3	Starwall		..	..
3.1.1.3	3.1.1.3	Controller Chairs		..	..
3.1.1.3	3.1.1.3	Admin Furniture		..	..
3.1.1.3	3.1.1.3	PBX		..	..
3.1.1.3	3.1.1.3	Facility Security Equipment		..	..
3.1.1.3	3.1.1.3	Power Generation	Auxiliary Equipment	..	..
3.1.1.3	3.1.1.3	Miscellaneous		..	..



Personnel Cost & Benefits (PC&B)

- § PC&B data is provided by the Office of Labor and Analysis (ALA) for use in this business case model
- § This data breaks down the salary, cash, and premiums and benefits totals associated with each type of personnel at a particular facility (with values presented in TY\$)
- § Values are split between multiple categories including tower downgrades, staffing transfers, and locality transfers just to name a few



PC&B (cont'd)

§ Example image of copied source data in business case model

LE1 to AL1 - AL1 Schedule Efficiencies delta									
CPCs	2016	2017	2018	2019	2020	2021	2022	2023	
Salary	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Cash	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Premiums and Benefits	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Total	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
SSS	2016	2017	2018	2019	2020	2021	2022	2023	
Salary	\$0	\$0	\$0	\$0	-\$51,880	-\$50,150	-\$49,361	-\$50,047	
Cash	\$0	\$0	\$0	\$0	-\$778	-\$738	-\$707	-\$694	
Premiums and Benefits	\$0	\$0	\$0	\$0	-\$17,380	-\$16,800	-\$16,536	-\$16,766	
Total	\$0	\$0	\$0	\$0	-\$70,037	-\$67,689	-\$66,603	-\$67,506	
TMC	2016	2017	2018	2019	2020	2021	2022	2023	
Salary	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
Cash	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
Premiums and Benefits	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
Total	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
MSS2	2016	2017	2018	2019	2020	2021	2022	2023	
Salary	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
Cash	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
Premiums and Benefits	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
Total	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
MSS3	2016	2017	2018	2019	2020	2021	2022	2023	
Salary	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
Cash	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
Premiums and Benefits	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
Total	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
MSS4	2016	2017	2018	2019	2020	2021	2022	2023	
Salary	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
Cash	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
Premiums and Benefits	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
Total	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
TechOps	2016	2017	2018	2019	2020	2021	2022	2023	
Salary	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
Cash	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
Premiums and Benefits	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
Total	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	



Air Traffic Estimate Training

- § Air Traffic Estimate Training data is provided by the project lead located at Crown Consulting
- § This data presents categorical air traffic controller total training hours on different airspaces
- § Training hour categories include On-the-Job Familiarization (OJF) hours, On-the-Job Training hours (OJT), and Classroom training hours



Air Traffic Estimate (cont'd)

§ Pictured below is sample air traffic source data from the Waterloo (ALO) realignment business case

PCS and Training Source File

ALO to CID	
Transferring ALO Controllers train on CID Airspace: Average	
Classroom training- total hours	120
OJF	260
OJT	300
	680
CID Controllers train on ALO Radar/Handoff:	
Classroom training- total hours	60 placeholder
OJF	10 placeholder
OJT	30
	100
ALO to DSM	
Transferring ALO Controllers train on DSM Airspace:	
Classroom training- total hours	132
OJF	16
OJT	600
	748
DSM Controllers train on ALO Radar/Handoff:	
Classroom training- total hours	60 placeholder
OJF	10 placeholder
OJT	30
	100





Air Traffic Estimate (cont'd)

§ The data copies directly into the model Cost Factors tab

Cost Factors tab

Training Cost Factors		
Year training occurs for all legacy cases		2019
Alternative 1 Training Year		2019
Alternative 2 Training Year		2019
On the Job Familiarization (OJF) Hours		
ALO controllers on CID airspace		260
ALO controllers on DSM airspace		16
CID controllers on ALO airspace		2
DSM controllers on ALO airspace		2
On the Job Training (OJT) Hours		
ALO controllers on CID airspace		300
ALO controllers on DSM airspace		600
CID controllers on ALO airspace		80
DSM controllers on ALO airspace		80
OJT Total Hours = OJF + OJT		
ALO controllers on CID airspace		560
ALO controllers on DSM airspace		616
CID controllers on ALO airspace		82
DSM controllers on ALO airspace		82
Classroom Hours Required		
ALO controllers on CID airspace		120
ALO controllers on DSM airspace		132
CID controllers on ALO airspace		104
DSM controllers on ALO airspace		104
Training Total Cost		
Legacy		\$ -
Alternative 1		\$ 364,065
Alternative 2		\$ 434,799





Air Traffic Estimate (cont'd)

§ After inserting into appropriate spot in Cost Factors, data is linked directly into Air Traffic Estimate tab of model

Air Traffic Estimate tab



Air Traffic Estimates						
Data and Assumptions						
Number of Controllers (Also includes FIMS)		Value				
# of OD CPCs to be trained		39				
# of DSM CPCs to be trained		39				
# of ALO CPCs to be trained		6				
ALO Remaining AT	none	10				
Percentage of OT to cover training (BFOT)	Distribution	Value	Low	Most Likely	High	Units
	Triangular	25%	15%	29%	35%	percent
Training Time		Distribution	Value	Mean	Standard Deviation	
STARS Training Hours	STARS at CID, DSM Remote STARS	Normal	33	32	4	
OJT Training Hours Required	ALO controllers on CID airspace	Normal	32	32	4	
	ALO controllers on DSM airspace	Normal	563	560	84.0	
	CID controllers on ALO airspace	Normal	615	616	92.4	
	DSM controllers on ALO airspace	Normal	82	82	12.3	
Classroom Hours Required	ALO controllers on CID airspace	none	128			
	ALO controllers on DSM airspace	none	131			
	CID controllers on ALO airspace	none	104			
	DSM controllers on ALO airspace	none	104			



Permanent Change of Station (PCS)

- § PCS data is also provided by the project lead
- § This data is comprised of lodging per diem rates, meals and incidental expenses rates, home sale expenses, and other travel cost factors
- § This data populates the business case model in a similar fashion as the Air Traffic Estimate data



PCS (cont'd)

§ The following example illustrates the flow of the PCS data throughout the model

PCS and Training Source File

	Home sale median	per diem	M&IE
Rochester	200,000	115	64
Waterloo	123,000	89	51
Minneapolis	225,000	140	64
Des Moines	130,000	101	59
Cedar Rapids	100,000	91	54

Standard Info PCS Summ of Train Rqmts Tech Ops Training Airspace Training Air Traffic e





PCS (cont'd)

§ Similar to the Air Traffic Estimate, the data is directly inserted into the Cost Factors tab

Cost Factors tab

Travel Cost Factors			
Lodging			
GSA Lodging Allowance			
	CID		\$ 91.00
	DSM		\$ 101.00
	OKC		\$ 96.00
Lodging cost = GSA Lodging Allowance + 20% taxes			
	CID		\$ 109.20
	DSM		\$ 121.20
	OKC		\$ 117.60
GSA M&IE			
	CID		\$ 54.00
	DSM		\$ 59.00
	OKC		\$ 59.00
One-Way Mileage			
	ALO-CID		55
	ALO-DSM		130
Round-Trip Mileage			
	ALO-CID		110
	ALO-DSM		260
Oklahoma City			
	Airfare		\$ 650.00
	Daily car rental		\$ 90.00
	Other OKC Travel Costs		\$ 200.00
	POV Cost per mile		0.547
PCS Cost Factors			
Assume PCS relocations occur in:			
Alternative 1	ALO	Service Available	2019
	CID	Service Available	2019
Alternative 2	ALO	Service Available	2020
	DSM	Service Available	2020
Home Prices			
	ALO		\$ 123,000
	CID		\$ 100,000
	DSM		\$ 130,000
Potential # of people moving			
Alternative 1			6
Alternative 2			6
Most Likely Cost per PCS move			
Alternative 1	CID	see PCS tab	\$ 184,848
Alternative 2	DSM		\$ 188,095





PCS (cont'd)

§ PCS has its own unique tab giving a high level summary of the data linked from the Cost Factors tab

PCS tab



Estimated PCS Costs for ALO to CID				
Expense	Number	Units	Allowance	Anticipated Cost
House Hunting Expenses				\$1,213
Round Trip Mileage	1	235	\$0.54	\$127
M&IE	2	5	\$54.00	\$540
Lodging	1	5	\$109.20	\$546
Temporary Quarters				\$7,185
1st 30 Days Employee PD	1	30	\$145.00	\$4,350
Spouse PD	1	30	\$40.50	\$1,215
Dependant PD	2	30	\$27.00	\$1,620
2nd 30 Days Employee PD	1	0	\$122.40	\$0
Spouse PD	1	0	\$27.00	\$0
Dependant PD	2	0	\$21.60	\$0
Transportation of Goods				\$12,975
Weight (Pounds)		15000	\$0.70	\$10,500
One-Way Mileage CID		55	\$5.00	\$275
Storage		44	\$50.00	\$2,200
Home Sale Expenses at ALO				
Estimated \$123000		\$123,000	10%	\$12,300
Home Purchase Expenses at CID				
Estimated \$100000		\$100,000	5%	\$5,000
Miscellaneous Expense				\$1,406
RITA				\$7,569
Grand Total				\$49,848



Data Adjustment (Deflation)

- § Construction and PC&B data both received in TY\$ and must be normalized (deflated) to Base-Year dollars (BY\$) for comparison and economic analysis purposes
- § Cost team deflates the costs using the Office of Management and Budget (OMB) inflation rates as a reference (inflation rates shown below)

Simplified Output														
Year	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028		
Inflation Factor	1.000	1.020	1.040	1.061	1.082	1.104	1.128	1.149	1.172	1.195	1.219	1.243		
	0	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.0
COMPOUND FACTORS FROM BASE TO FUTURE YEAR END														
BASE YEAR OF DOLLARS (Data from 2017)														
Future Year End	Inflation Pct.	Inflation Factor	2017	2016	2015	2014	2013	2012	2011	2010	2009	2008	2007	
2000	2.3%	1.023												
2001	2.3%	1.023												
2002	1.5%	1.015												
2003	2.0%	1.020												
2004	2.7%	1.027												
2005	3.2%	1.032												
2006	3.1%	1.031												
2007	2.7%	1.027												
2008	2.0%	1.020												1.000
2009	0.8%	1.008												1.000 1.008
2010	1.2%	1.012												1.000 1.012 1.020
2011	2.1%	1.021												1.000 1.021 1.033 1.041
2012	1.8%	1.018												1.000 1.018 1.039 1.052 1.060
2013	1.6%	1.016												1.000 1.016 1.035 1.056 1.069 1.077
2014	1.6%	1.016												1.000 1.016 1.033 1.052 1.074 1.087 1.095
2015	1.0%	1.010												1.000 1.010 1.027 1.043 1.063 1.085 1.098 1.106
2016	1.6%	1.016												1.000 1.016 1.026 1.043 1.060 1.080 1.102 1.115 1.124
2017	1.8%	1.018	1.000	1.016	1.034	1.045	1.062	1.079	1.099	1.122	1.135	1.144		1.018 1.034 1.045 1.062 1.079 1.099 1.122 1.135 1.144
2018	2.0%	1.020	1.020	1.038	1.055	1.066	1.083	1.101	1.121	1.144	1.158	1.167		1.020 1.038 1.055 1.066 1.083 1.101 1.121 1.144 1.158 1.167
2019	2.0%	1.020	1.040	1.059	1.076	1.087	1.105	1.123	1.143	1.167	1.181	1.190		1.040 1.059 1.076 1.087 1.105 1.123 1.143 1.167 1.181 1.190
2020	2.0%	1.020	1.061	1.080	1.098	1.109	1.127	1.145	1.166	1.190	1.205	1.214		1.061 1.080 1.098 1.109 1.127 1.145 1.166 1.190 1.205 1.214



Data Adjustment (Deflation cont'd)

§ Deflation for construction data carried out on Construction tab

Construction tab

	Q	F	G	H	I	T
Business Case Data Committee						
LE1 - All Construction Cost Estimate (TY \$K)						
W&S 5.0						
	FY2017	FY2018	FY2019	FY2020		
3.2.1.1	\$	\$	\$	\$	\$	\$
3.7.1	\$	\$	\$	\$	\$	\$
3.7.2	\$	\$	\$	\$	\$	\$
3.7.3	\$	\$	\$	\$	\$	\$
3.7.4	\$	\$	\$	\$	\$	\$
3.7.5	\$	\$	\$	\$	\$	\$
3.7.6	\$	\$	\$	\$	\$	\$
3.7.9	\$	\$	\$	\$	\$	\$
4.10.2	\$	\$	\$	\$	\$	\$
4.10.4	\$	\$	\$	\$	\$	\$
4.10	\$	\$	\$	\$	\$	\$
Subtotal	\$	\$	\$	\$	\$	\$
Check	0	0	0	0		
Three Year to Base Year Adjustment						
LE1 - All Construction Cost Estimate (BYS)						
W&S 5.0						
	FY2017	FY2018	FY2019	FY2020		
3.2.1.1	\$	\$	\$	\$	2,827	\$
3.7.1	\$	\$	\$	\$		\$

Deflation Factors tab

Construction & Personnel Cost Data Deflation Factors						
Year	2017	2018	2019	2020	2021	20
Inflation Rate	0.0%	2.0%	2.0%	2.0%	2.0%	2.0%
Inflation Factor	1.000	1.020	1.040	1.061	1.082	1.103
Deflation Factor	1.000	0.980	0.961	0.942	0.924	0.906



Data Adjustment (Deflation cont'd)

§ Deflation for PC&B data carried out on PC&B Summary tab

TY\$	2017	2018
LE1 Base Case	\$ 2,967,878	\$ 2,768,393
AL1 Base Case	\$ 5,799,023	\$ 5,925,774
AL2 Base Case	\$ 14,461,480	\$ 15,872,475
Alt 1 - Efficiency Level Offset	\$ -	\$ -
Alt 2 - Efficiency Level Offset	\$ 0	\$ -
Alt 1 - Full Integration Cost	\$ 8,766,901	\$ 8,694,167
Alt 1 - LE1 Schedule Efficiencies delta	\$ -	\$ -

43 =C3*'Deflation Factors'!D\$20

	A	B	C
BY\$	2017	2018	
LE1 Base Case	\$ 2,967,878	\$ 2,714,111	:
AL1 Base Case	\$ 5,799,023	\$ 5,809,582	:
AL2 Base Case	\$ 14,461,480	\$ 15,561,250	:
Alt 1 - Efficiency Level Offset	\$ -	\$ -	:
Alt 2 - Efficiency Level Offset	\$ 0	\$ -	:



Data Adjustment (Uncertainty Analysis)

- § Uncertainty analysis in business case model is done once “point” estimate is complete using Crystal Ball Monte Carlo simulation add-in for Excel
- § Crystal Ball formats the random variable cells (called “Assumption Cells” in Crystal Ball) a bright green

– Assumption cells found in Uncertainty Values

Appropriation	WBS #	Uncertainty Value	Distribution Parameters			Standard Deviation	Distribution Type
			Low	Most Likely	High		
F&E	3.1.1.3 Equipment Procurement	1.00	0.90	1.00	1.15		Triangular
F&E	3.1.1.3.1 STARS Credit	1.00	0.80	1.00	1.20		Triangular
F&E	3.7.1 Implementation Planning, Management, and Control	1.00	0.80	1.00	1.20		Triangular
F&E	3.7.2 Environmental and Occupational Safety and Health Compliance	1.00	0.80	1.00	1.20		Triangular
F&E	3.7.3 Implementation Engineering	1.00	0.80	1.00	1.20		Triangular
F&E	3.7.4 Site Selection	1.00	0.90	1.00	1.10		Triangular
F&E	3.7.5 Construction	1.00	0.90	1.00	1.20		Triangular

Data Adjustment (Uncertainty Analysis cont'd)



- § Deflated (BY\$) construction values are directly linked into the Estimate BY tab and occupy the spaces for corresponding WBS elements in "Program F&E" section
- § Uncertainty Values "assumption" factor is applied to each construction cost relative to its WBS element as well

=LE1-All Construction!Q25*VLOOKUP(\$D8,'Uncertainty Values'!\$C\$3:\$D\$34,2,FALSE)					
B	C	D	E	F	G
			2017	2018	2019
0		Alternative 1	\$23,228,381	\$24,519,347	\$25,...
	1 - FE	F&E	\$ -	\$ 434,403	\$ -
	1 - Ind	Indirect	\$ -	\$ -	\$ -
I	1 - OM	O&M	\$23,228,381	\$24,084,943	\$25,...
rding rpe	Risk Report #	Program F&E WBS (BY17\$)	2017	2018	2019
	1 - 3.1.1.3	3.1.1.3 Equipment Procurement	\$ -	\$ -	\$ -
	1 - 3.1.1.3.1	3.1.1.3.1 STARS Credit	\$ -	\$ -	\$ -
	1 - 3.6.5	3.6.5 Training, Training Support, and Personnel Skills - Alt 1	\$ -	\$ 434,403	\$ -
	1 - 3.7.1	3.7.1 Implementation Planning, Management, and Control	\$ -	\$ -	\$ -
	1 - 3.7.2	3.7.2 Environmental and Occupational Safety and Health Compliance	\$ -	\$ -	\$ -
	1 - 3.7.3	3.7.3 Implementation Engineering	\$ -	\$ -	\$ -
	1 - 3.7.4	3.7.4 Site Selection	\$ -	\$ -	\$ -
	1 - 3.7.5	3.7.5 Construction	\$ -	\$ -	\$ -
	1 - 3.7.6	3.7.6 Infrastructure - Telco	\$ -	\$ -	\$ -
	1 - 3.7.9	3.7.9 Site Preparation, Install, Test, JAIC	\$ -	\$ -	\$ -
	1 - 4.18	4.18 Disposition	\$ -	\$ -	\$ -
		Total Program F&E	\$ -	\$ 434,403	\$ -



Data Adjustment (Uncertainty Analysis cont'd)

- § Crystal Ball fills the output (“Forecast”) cells a medium blue
- § Uncertainty analysis fields can be found on far right of model Estimate BY tab

Total Point Estimate	Crystal Ball Forecasts	Forecast (80%)	Delta (80% - Point)	Allocated Risk Dollars	Risk Adjusted Estimate	% Adjustment to Point Estimate
\$ 2,827	\$ 2,827	\$ 2,990	\$ 163	\$ 163	\$ 2,990	105.8%
\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	100.0%
\$ 473,496	\$ 473,496	\$ 336,374	\$ (137,122)	\$ (137,326)	\$ 336,170	71.0%
\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	100.0%
\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	100.0%
\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	100.0%

- § % Adjustment to Point Estimate factor generated for further risk adjustment

Data Adjustment (Uncertainty Analysis cont'd)



- § % Adjustment to Point Estimate factor is generated for each cost element
- § Factor is multiplied by the respective BY\$ values on the adjacent Risk-Adjusted Base Year (RABY) tab, which results in RABY\$ values for further analysis

		="LE1-AL1 Estimate BY"!F10 LE1-AL1 Estimate BY"!\$AD10			
	B	C	D	E	F
	BY\$ value		% Adjustment to Point Estimate	2017	2018
is	0		Alternative 1	\$ 23,228,381	\$ 24,591,265
FE	1 - FE		F&E	\$ -	\$ 506,321
Ind	1 - Ind		Indirect	\$ -	\$ -
OM	1 - OM		O&M	\$ 23,228,381	\$ 24,084,943
Funding Type	Risk Report #	Program F&E WBS (RA-BY17\$)		2017	2018
FE	1 - 3.1.1.3	3.1.1.3 Equipment Procurement		\$ -	\$ -
FE	1 - 3.1.1.3.1	3.1.1.3.1 STARS Credit		\$ -	\$ -
FE	1 - 3.6.5	3.6.5 Training, Training Support, and Personnel Skills - Alt 1		\$ -	\$ 506,321
FE	1 - 3.7.1	3.7.1 Implementation Planning, Management, and Control		\$ -	\$ -
FE	1 - 3.7.2	3.7.2 Environmental and Occupational Safety and Health Compliance		\$ -	\$ -
FE	1 - 3.7.3	3.7.3 Implementation Engineering		\$ -	\$ -
FE	1 - 3.7.4	3.7.4 Site Selection		\$ -	\$ -
FE	1 - 3.7.5	3.7.5 Construction		\$ -	\$ -
FE	1 - 3.7.6	3.7.6 Infrastructure - Telco		\$ -	\$ -
FE	1 - 3.7.9	3.7.9 Site Preparation, Install, Test, JAIC		\$ -	\$ -
FE	1 - 4.18	4.18 Disposition		\$ -	\$ -
		Total Program F&E		\$ -	\$ 506,321



Data Adjustment (Inflation)

§ Cost elements must also be represented in TY\$ in analysis and are inflated on the Estimate Then Year (TY) tab utilizing OMB inflation rates

="LE1-AL1 Estimate BY"!E8* <Inflation FY17>!B\$3			E	F
B	C	D	2017	2018
	BY\$ value	Inflation Factor		
0		Alternative 1	\$23,228,381	\$25,009,734
FE	1 - FE	F&E	\$ -	\$ 443,092
Ind	1 - Ind	Indirect	\$ -	\$ -
OM	1 - OM	O&M	\$23,228,381	\$24,566,642
Funding Type	Risk Report #	Program F&E WBS (TY\$)	2017	2018
FE	1 - 3.1.1.3	3.1.1.3 Equipment Procurement	\$ -	\$ -
FE	1 - 3.1.1.3.1	3.1.1.3.1 STARS Credit	\$ -	\$ -
FE	1 - 3.6.5	3.6.5 Training, Training Support, and Personnel Skills - Alt 1	\$ -	\$ 443,092
FE	1 - 3.7.1	3.7.1 Implementation Planning, Management, and Control	\$ -	\$ -
FE	1 - 3.7.2	3.7.2 Environmental and Occupational Safety and Health Compliance	\$ -	\$ -
FE	1 - 3.7.3	3.7.3 Implementation Engineering	\$ -	\$ -
FE	1 - 3.7.4	3.7.4 Site Selection	\$ -	\$ -
FE	1 - 3.7.5	3.7.5 Construction	\$ -	\$ -
FE	1 - 3.7.6	3.7.6 Infrastructure - Telco	\$ -	\$ -
FE	1 - 3.7.9	3.7.9 Site Preparation, Install, Test, JAIC	\$ -	\$ -
FE	1 - 4.18	4.18 Disposition	\$ -	\$ -
Total Program F&E			\$ -	\$ 443,092



Data Adjustment (Inflation cont'd)

§ There is final Estimate Risk-Adjusted Then Year (RATY) tab representing the inflated RABY cost elements

B		C		D		E	F
RABY\$ value		Inflation Factor				2017	2018
0		Alternative 1				\$23,228,381	\$25,083,090
FE	1 - FE	F&E				\$ -	\$ 516,448
Ind	1 - Ind	Indirect				\$ -	\$ -
OM	1 - OM	O&M				\$23,228,381	\$24,566,642
Funding Type	Risk Report #	Program F&E WBS (RA-TY\$)				2017	2018
FE	1 - 3.1.1.3	3.1.1.3 Equipment Procurement				\$ -	\$ -
FE	1 - 3.1.1.3.1	3.1.1.3.1 STARS Credit				\$ -	\$ -
FE	1 - 3.6.5	3.6.5 Training, Training Support, and Personnel Skills - Alt 1				\$ -	\$ 516,448
FE	1 - 3.7.1	3.7.1 Implementation Planning, Management, and Control				\$ -	\$ -
FE	1 - 3.7.2	3.7.2 Environmental and Occupational Safety and Health Compliance				\$ -	\$ -
FE	1 - 3.7.3	3.7.3 Implementation Engineering				\$ -	\$ -
FE	1 - 3.7.4	3.7.4 Site Selection				\$ -	\$ -
FE	1 - 3.7.5	3.7.5 Construction				\$ -	\$ -
FE	1 - 3.7.6	3.7.6 Infrastructure - Telco				\$ -	\$ -
FE	1 - 3.7.9	3.7.9 Site Preparation, Install, Test, JAIC				\$ -	\$ -
FE	1 - 4.18	4.18 Disposition				\$ -	\$ -
		Total Program F&E				\$ -	\$ 516,448



Data Adjustment (Discount Rate)

- § Final way data is adjusted is through Discount Rate (rates found on Discount Rate tab)
- § The Discount Rate is an OMB standard rate used to convert RABY\$ amounts to a "Present Value" amount for final comparison and economic analysis
- § OMB direction is to use 7% as the rate for Benefit-Cost analyses

Cost Benefit Analysis Discount Factors						
Year	2017	2018	2019	2020	2021	2022
Discount Rate	7.0%					
Year Number	0	1	2	3	4	5
Discount Factor	1.00	0.93	0.87	0.82	0.76	0.71

- § Present Value conversion carried out in two places in model:
 - Economic Analysis tab
 - Cost Avoidance tab



Economic Analysis (EA)

- § EA data intended to provide top-level overview of major dollar categories used for eventual results summary
- § The six categories are Investment F&E, Indirect F&E, Recurring Telecommunications (Telco), PCS, PC&B, and tech ops salary adjustment

Investment F&E
Indirect F&E
Telco Recurring
Relocating Permanent Staff (PCS)
Controller & Technician PC&B
Tech Ops Salary Adjustment



EA (cont'd)

§ Data categories pull RABY\$ totals from Estimate RABY tab for each alternative

C24			
=LE1-AL1 Estimate RABY!IF19			
	A	B	C
23	LE1-AL1 (Risk Adjusted Base-Year 2017 \$)	2017	2018
24	Investment F&E	\$ -	\$ 336,170
25	Indirect F&E	\$ -	\$ -
26	Telco Recurring	\$ -	\$ -
27	Relocating Permanent Staff (PCS)	\$ -	\$ -
28	Controller & Technician PC&B	\$ 23,228,381	\$ 24,084,943
29	Tech Ops Salary Adjustment	\$ -	\$ -

§ RABY\$ totals then discounted to Present Value dollars (PV\$) beneath through utilization of discount rates

C32			
=C24*'Discount Rate'!CS11			
	A	B	C
31	LE1-AL1 (Present Value \$)	2017	2018
32	Investment F&E	\$ -	\$ 332,184
33	Indirect F&E	\$ -	\$ -
34	Telco Recurring	\$ -	\$ -
35	Relocating Permanent Staff (PCS)	\$ -	\$ -
36	Controller & Technician PC&B	\$ 23,228,381	\$ 23,799,351
37	Tech Ops Salary Adjustment	\$ -	\$ -
38		\$ 23,228,381	\$ 24,131,535



EA (cont'd)

- § Should be noted that for legacy case, controller and technician PC&B is total salary cost for maintaining all legacy facilities (in cases where more than one legacy facility is part of analysis)
- § To account for this, there is additional 'Total legacy case' line summing up costs for all transfer facilities except PC&B, and takes only one total PC&B line (the PC&B will always be the same for any transfer facilities in the legacy case)

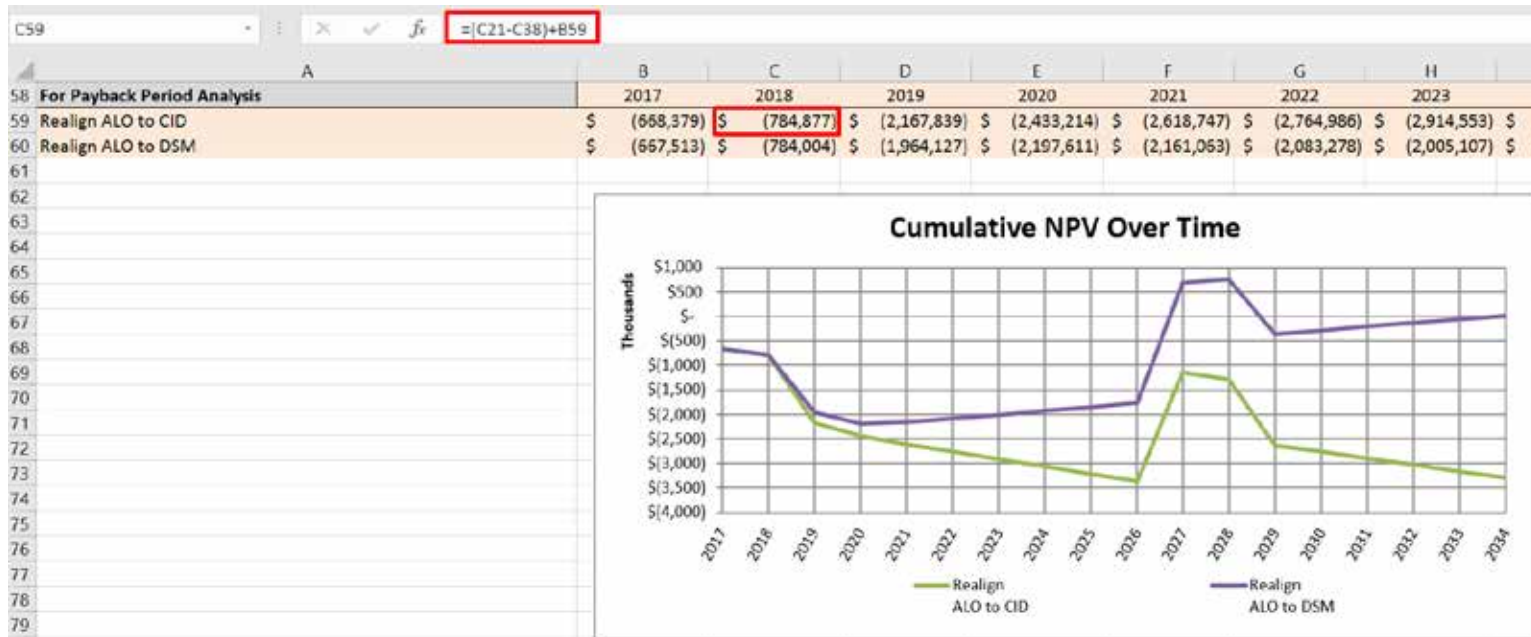
TOTAL LEGACY CASE (RISK ADJ. BASE YEAR \$)	\$ 794,920,046
TOTAL LEGACY CASE (Present Value \$)	\$ 716,394,363

- § Total RABY\$ legacy case value for each year of analysis then converted to PV\$



EA (cont'd)

§ Payback period analysis compares each alternative to the total legacy case to show cumulative Net Present Value (NPV) over time





Cost Avoidance

- § Similar to EA tab, Cost Avoidance tab offers high level overview of various cost categories established within model
- § Categories and associated Present Value (PV) costs are shown in the "Benefits Summary" of tab at top of the page

PV\$	Benefits Summary	
	LE1 to AL1	LE1 to AL2
Investment F&E		
LE1 Legacy Investment F&E avoided choosing alternative	\$ (1,933)	\$ (1,933)
AL1 Investment F&E to achieve realignment	\$ 503,217	
AL2 Investment F&E to achieve realignment		\$ 630,103
Legacy Indirect F&E Cost		
LE1 Delta from Legacy Case	\$ (1,736)	\$ (1,736)
AL1 Delta from Legacy Case	\$ 2,635	\$ -
AL2 Delta from Legacy Case	\$ -	\$ 896
Telco Recurring		
LE1 telco for realignment	\$ -	\$ -
AL1 telco for realignment	\$ -	\$ -
AL2 telco for realignment	\$ -	\$ -
PCS Cost		
LE1 Delta from Legacy Case	\$ 389,933	\$ 394,176
Legacy Personnel Cost and Benefits		
LE1 Scheduling Efficiency	\$ (2,204,447)	\$ (2,123,331)
LE1 Scheduling Inefficiency	\$ -	\$ 395,729
AL1 Scheduling Efficiency	\$ (477,356)	\$ -
AL1 Scheduling Inefficiency	\$ -	\$ -
AL2 Scheduling Efficiency	\$ -	\$ (2,236,479)
AL2 Scheduling Inefficiency	\$ -	\$ 2,263,999
LE1 Level Adjustment	\$ 1,104,559	\$ 7,786,310
AL1 Level Adjustment	\$ -	\$ -
AL2 Level Adjustment	\$ -	\$ -
LE1 Tower Downgrade - Level	\$ (299,344)	\$ (299,344)
LE1 Tower Downgrade - Staffing Efficiency	\$ (465,642)	\$ (232,821)
LE1 Tower Downgrade - Staffing Inefficiency	\$ -	\$ 444,042
LE1 Locality Adjustment	\$ -	\$ 1,392,456
Level/Efficiency Interaction Offset	\$ (240,304)	\$ (1,121,892)
Legacy Personnel Cost and Benefits Total Efficiencies		
LE1 Scheduling Efficiency - Total	\$ (2,670,089)	\$ (2,356,152)
LE1 Scheduling Inefficiency - Total	\$ -	\$ 840,571
Tech Ops Salary Adjustment		
LE1 tech ops adjustment delta	\$ (136,626)	\$ (136,626)



Cost Avoidance (cont'd)

- § Before appearing in Benefits Summary, costs are brought in to respective category locations from Estimate RABY tab for each alternative
- § They are then converted to PV dollars using appropriate discount rate for each year of analysis
- § As name of tab implies, certain costs are avoided through realignment
 - Cost Avoidance is delta between legacy case and realignment case values
- § A sample image for the Program F&E section of the Waterloo (ALO) business case is shown on the next slide outlining this process



Cost Avoidance (cont'd)

C40			
		fx = ALO Estimate RABY!E19	
	A	B	C
38	Program F&E		
39	RA-BY16\$ 2017		
40	Legacy	ALO Program F&E	\$ 2,931,692
41	ALO to CID	ALO Program F&E	
42	ALO to DSM	ALO Program F&E	

C52			
		fx = C40*Discount Rate!B\$11	
	A	B	C
51	PV\$ 2017		
52	Legacy	ALO Program F&E	\$ 2,931,692
53	ALO to CID	ALO Program F&E	\$ -
54	ALO to DSM	ALO Program F&E	\$ -

C64			
		fx = C53-C\$52	
	A	B	C
63	PV\$ 2017		
64	ALO to CID	ALO Cost Avoidance	\$ (2,931,692)
65	ALO to DSM	ALO Cost Avoidance	\$ (2,931,692)



Model Outputs

- § The various analyses performed throughout the model produce certain outputs necessary in making a final recommendation regarding which alternative is the most favorable
- § These critical outputs are contained within the following tabs:
 - Results Summary
 - Executive Summary



Results Summary

- § As the name implies, the Results Summary tab offers a summary of the results of the various analyses that take place throughout the model
- § Structured based on following sections:
 - Alternative Attributes
 - Lifecycle Cost (RATY - \$K)
 - Economic Analysis (Risk Adjusted, Present Value - \$K)
 - Cost/Benefits Breakdown (Present Value - \$K)
 - Economic Metrics (Present Value - \$K)



Alternative Attributes

§ Top section of Results Summary tab showing basic scenario information important to business case

<i>Legacy Realignment Business Case Version 0.1: XX/XX/XXXX</i>	Alternatives		
	Legacy	Realign	Realign
	LE1	LE1 to AL1	LE1 to AL2
Alternative Attributes			
Locality Area			
Locality Rate	14.35%	14.35%	14.35%
Facility Level	LE1 - 5	LE1 - 5 to 6 AL1 - Remain 6	LE1 - 5 to 7 AL1 - Remain 7
Tower Level Adjustment	N/A	LE1 - 5 to 4	LE1 - 5 to 4
Automation System		STARS	STARS
Initial Operating Capability		2018	2019



Lifecycle Cost

§ RATY-\$K cost summary pulled from Estimate RATY tab for each alternative

Lifecycle Cost (RATY-\$K)				
Investment F&E				
Program Mgmt, Planning, Inv. Analysis	\$0.0	\$0.0	\$0.0	\$0.0
Solution Development & Design	\$0.0	\$0.0	\$0.0	\$0.0
Implementation Support & Oversight	\$0.0	\$0.0	\$0.0	\$0.0
Site Acquisition, Eval, & Prep	\$0.0	\$0.0	\$0.0	\$0.0
Construction/Renovation	\$0.0	\$0.0	\$0.0	\$0.0
PME Acquisition	\$2.1	\$3.2	\$1.1	\$1.1
Additional STARS Credit Post-Realignment	\$0.0	\$0.0	\$0.0	\$0.0
Site Prep, Install & Test	\$0.0	\$0.0	\$0.0	\$0.0
Telecommunications	\$0.0	\$0.0	\$0.0	\$0.0
Transition (Training & Overtime)	\$0.0	\$342.9	\$564.7	\$564.7
Disposition	\$0.0	\$0.0	\$0.0	\$0.0
Investment F&E Total Cost	\$2.1	\$346.1	\$565.8	\$565.8
Indirect F&E				
Related Facility Investment F&E		\$0.0	\$0.0	\$0.0
Technology Refresh	\$2.4	\$3.5	\$1.2	\$1.2
Indirect F&E Total Cost	\$2.4	\$3.5	\$1.2	\$1.2
Operations and Maintenance				
Relocating Permanent Staff (PCS)	\$0.0	\$311.4	\$311.4	\$311.4
Telco Recurring	\$0.0	\$0.0	\$0.0	\$0.0
Tech Ops Salary Adjustment	\$1,200.5	\$0.0	\$0.0	\$0.0
Controller & Technician PC&B	\$537,170.2	\$535,696.9	\$549,463.1	\$549,463.1
LE1	\$71,620.6	\$70,828.9	\$83,768.1	\$83,768.1
AL1	\$122,863.7	\$122,538.0	\$122,863.7	\$122,863.7
AL2	\$342,685.9	\$342,685.9	\$344,427.1	\$344,427.1
O&M Total Cost	\$538,370.7	\$536,008.3	\$549,774.3	\$549,774.3



Economic Analysis

§ Displays linked PV - \$K totals from EA tab

Economic Analysis (Risk Adjusted, Present Value-\$K)			
Life Cycle Cost			
Investment F&E		\$1.9	\$503.2
Indirect F&E	Alternative cost totals ("costs")	\$1.7	\$2.6
Telco Recurring		\$0.0	\$0.0
Relocating Permanent Staff		\$0.0	\$389.9
Workforce PC&B OPS	Legacy cost total ("benefits")	\$403,741.7	\$401,159.2
Tech Ops Salary Adjustment		\$135.8	\$0.0
Life-Cycle Cost Total		\$403,881.2	\$402,055.0

§ Establishes “Life-Cycle Total” crucial to final economic analysis



Cost/Benefits Breakdown

- § This section examines delta of realignment (as compared to legacy case) by facility for each major cost category
- § If cost to realign is less than legacy case cost, we realize a cost avoidance (colored green, in parenthesis)
- § If cost of realignment is greater we realize additional costs (colored red)
- § Values are linked directly from the Cost Avoidance "Benefits Summary" section



Cost/Benefits Breakdown (cont'd)

PV\$	Benefits Summary	
	LE1 to AL1	LE1 to AL2
Investment F&E		
LE1 Legacy Investment F&E avoided choosing alternative	\$ (1,933)	\$ (1,933)
AL1 Investment F&E to achieve realignment	\$ 563,217	\$ -
AL2 Investment F&E to achieve realignment	\$ -	\$ 630,109
Legacy Indirect F&E Cost		
LE1 Delta from Legacy Case	\$ (1,736)	\$ (1,736)
AL1 Delta from Legacy Case	\$ 2,635	\$ -
AL2 Delta from Legacy Case	\$ -	\$ 896
Telco Recurring		
LE1 telco for realignment	\$ -	\$ -
AL1 telco for realignment	\$ -	\$ -
AL2 telco for realignment	\$ -	\$ -
PCS Cost		
LE1 Delta from Legacy Case	\$ 385,933	\$ 394,176
Legacy Personnel Cost and Benefits		
LE1 Scheduling Efficiency	\$ (2,314,447)	\$ (2,123,331)
LE1 Scheduling Inefficiency	\$ -	\$ 395,729
AL1 Scheduling Efficiency	\$ (477,356)	\$ -
AL1 Scheduling Inefficiency	\$ -	\$ -
AL2 Scheduling Efficiency	\$ -	\$ (2,236,479)
AL2 Scheduling Inefficiency	\$ -	\$ 2,263,599
LE1 Level Adjustment	\$ 1,144,555	\$ 7,786,310
AL1 Level Adjustment	\$ -	\$ -
AL2 Level Adjustment	\$ -	\$ -
LE1 Tower Downgrade - Level	\$ (259,344)	\$ (259,344)
LE1 Tower Downgrade - Staffing Efficiency	\$ (465,642)	\$ (292,822)
LE1 Tower Downgrade - Staffing Inefficiency	\$ -	\$ 444,642
LE1 Locality Adjustment	\$ -	\$ 1,392,456
Level/Efficiency Interaction Offset	\$ (240,314)	\$ (1,121,692)
Legacy Personnel Cost and Benefits Total Efficiencies		
LE1 Scheduling Efficiency - Total	\$ (2,470,895)	\$ (2,356,152)
LE1 Scheduling Inefficiency - Total	\$ -	\$ 842,571
Tech Ops Salary Adjustment		
LE1 tech ops adjustment delta	\$ (136,626)	\$ (136,626)



Cost/Benefits Breakdown (Present Value-\$K)		
Investment F&E		
LE1 Legacy Investment F&E avoided choosing alternative	(\$1.9)	(\$1.9)
AL1 Legacy Investment F&E to achieve realignment	\$563.2	\$0.0
AL2 Legacy Investment F&E to achieve realignment	\$0.0	\$630.1
Legacy Indirect F&E Cost		
LE1 Delta from Legacy Case	(\$1.7)	(\$1.7)
AL1 Delta from Legacy Case	\$2.6	\$0.0
AL2 Delta from Legacy Case	\$0.0	\$0.9
Telco Recurring		
LE1 telco for realignment	\$0.0	\$0.0
AL1 telco for realignment	\$0.0	\$0.0
AL2 telco for realignment	\$0.0	\$0.0
PCS Cost		
LE1 Delta from Legacy Case	\$385.9	\$394.2
Legacy Personnel Cost and Benefits		
LE1 Scheduling Efficiency - Total	(\$2,670.1)	(\$2,356.2)
LE1 Scheduling Inefficiency - Total	\$0.0	\$840.6
AL1 Scheduling Efficiency	(\$477.4)	\$0.0
AL1 Scheduling Inefficiency	\$0.0	\$0.0
AL2 Scheduling Efficiency	\$0.0	(\$2,236.5)
AL2 Scheduling Inefficiency	\$0.0	\$2,264.0
LE1 Level Adjustment	\$1,104.6	\$7,786.3
AL1 Level Adjustment	\$0.0	\$0.0
AL2 Level Adjustment	\$0.0	\$0.0
LE1 Tower Downgrade - Level	(\$299.3)	(\$299.3)
LE1 Locality Adjustment	\$0.0	\$1,392.5
Level/Efficiency Interaction Offset	(\$240.3)	(\$1,121.9)
Tech Ops Salary Adjustment		
LE1 tech ops adjustment delta	(\$135.0)	(\$135.0)
Costs (Removes shared costs)	\$2,000.3	\$3,308.5
Benefits	\$3,826.5	\$6,153.3



Economic Metrics

§ Net Present Value is derived from delta between the legacy life-cycle cost total and the alternative life-cycle cost total from the Economic Analysis section

C86		fx		=B50-C50	
	A	B	C	D	
Economic Metrics (Present Value-\$K)					
Net Present Value (NPV)			\$1,826.2		-\$7,155.2
B/C Ratio			1.913		0.462
Payback Year			N/A		N/A

Delta between benefits and costs

§ The total costs and benefits calculated in Cost/Benefits section are utilized to establish a B/C ratio for final economic analysis (Total Benefits / Total Costs)



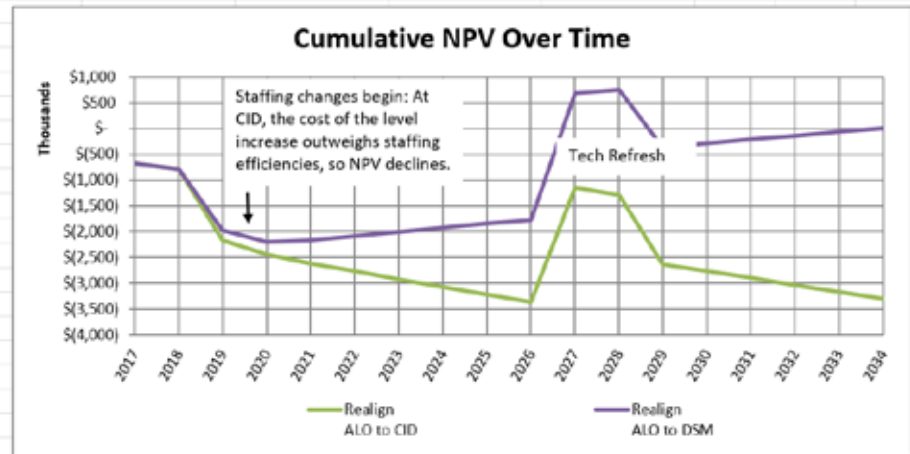
Executive Summary

- § Gives final, compiled summary of economic factors necessary for a final recommendation to be made regarding which alternative should be chosen
- § Lifecycle Cost totals for Investment and Indirect F&E on the Results Summary page are linked in first
- § Followed by an Economic Analysis Summary, which is linked in factors from the Economic Metrics section of the Results Summary (also includes total costs/benefits from cost/benefit breakdown)
- § Alternatives Analysis gives a summary of the alternatives involved in this specific business case and the resulting relevant output
- § Finally, the "Cumulative NPV Over Time" graph is linked in from the EA page to show the unique trends established in each scenario



Executive Summary (cont'd)

	Alternatives		
	Legacy: Mod-Sustain ALO	Realign ALO to CID	Realign ALO to DSM
Cost Summary (Risk Adjusted, Then-Year \$K)			
Investment F&E Total	\$2,930	\$5,244	\$5,225
Indirect F&E Total	\$3,248	\$1,748	\$1,742
O&M Total	\$288,732	\$291,795	\$287,284
Economic Analysis Summary (Risk Adjusted, Present Value \$K)			
Realignment Costs		\$9,777	\$8,712
Cost Savings/Avoidance		\$6,488	\$8,719
Net Present Value (NPV)		-\$3,289	\$7
B/C Ratio		0.7	1.0
Payback Year		N/A	N/A
Alternatives Analysis			
<p>This analysis compares the realignment of ALO to CID, or DSM against the cost of the legacy case (mod sustain ALO). Each option saves the cost of tech refreshing the complete STARS system (because it will be turned in for a minor credit upon realignment); however, there are costs of remote STARS systems, tech, planning, training, and transition. The biggest difference between the alternative lies in the staffing efficiency savings and the level increases. Realigning to CID would save about \$200K in staffing efficiencies and tower downgrades, but it will cost \$2.7M in facility level increases due to the fact that both CID and ALO will be increased by a level. Realigning to DSM will yield greater staffing savings (\$2.7M in staff efficiencies plus \$180K in tower downgrades), and the level increase costs less (\$1.6M) for ALO to increase two levels (with no change at DSM). The option to realign to CID yields a 0.7 BC ratio and a NPV of -\$3.3M. To realign to DSM would yield a 1.0 BC ratio and \$0.0M NPV (essentially a break even investment).</p>			





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Questions?