Appendix A:
Study Team Members

Study Team

POINT OF CONTACT Name	ORGANIZATION Name Address	Phone Fax E-mail	Role in Project
David Shiver	**Bay Area Economics** 1285 66th Street Emeryville, CA 94608	510-547-9380 p 510-547-9388 f dshiver@bae1.com	Principal and Co-Principal Investigator; LCCA analysis
Cherilyn Widell	**Seraph LLC** **105 North Water St.** **Chestertown, MD 21620**	443-480-2862 m 410-778-3701 p 410-778-3701 f cwidell809@yahoo.com	Principal and Co-Principal Investigator Historic Preservation
Rachael Terada Jennifer Martin	**Center for Resource Solutions** 1012 Torney Ave. 2nd Fl. San Francisco, CA 94129	415-561-2100 p 415-561-2105 f rcanapa@resource-solutions.org	Scope 1, 2 & 3 GHG emission estimations; CO_2e pricing estimates
Douglass C. Reed	**Preservation Associates, Inc.** 9604 Anderson Road Mercersburg, PA 17236	301-730-2699 P Doug@preservationassociatesinc.com	Historic Structure Consultant Cost estimating
S. Patrick Sparks, P.E.	**Sparks Engineering, Inc.** 403 North Mays Street Round Rock, TX 78664	512-310-7727 p 512-589-1190 m 512-310-9999 f psparks@sparksengineering.com	Structural and civil engineering
Roger L. Catlett, P.E.	**Comfort Design, Inc.** 620 Pennsylvania Ave. Winchester, VA 22601	540-665-2846 p 540-533-0501 m 540-665-0038 f cdi2@comcast.net	Mechanical engineering
Paul John Neidinger	**Independent practitioner** 307 Redwood Street San Antonio, TX 78209	210-792-5698 p 210-376-9723 mpneidinger@gmail.com	Architect

Appendix B:
Scope 3 GHG Emission Calculations

The attached print-out is a representative example of the GHG estimation calculations used for FEW 222-03. For an electronic version, please contact one of the Co-Principal Investigators of this Study listed in Appendix A. This example indicates which GHG calculation tool was utilized for various building assemblies and/or components.

F. E. Warren Building 222-03 Full Modernization with HPS

Category	Product	Quantity	Unit	kg CO2e per unit	Source	metric tons CO2e
SUBSTRUCTURE						**84.5**
Foundation Wall	Cast-in-place concrete (R-7.5 XPS Continuous insulation)	-	Sq ft	8.92	Athena	-
	Cast-in-place concrete (R-7.5 EPS Continuous insulation)	-	Sq ft	8.73	Athena	-
	Concrete block (R-7.5 XPS Continuous insulation)	-	Sq ft	15.33	Athena	-
	Concrete block (R-7.5 EPS Continuous insulation)	-	Sq ft	15.14	Athena	-
Foundation Slab	4" Poured Concrete Slab	-	Sq ft	4.06	Athena	-
	6" Poured Concrete Slab	-	Sq ft	6.09	Athena	-
Footing	Poured Concrete Footing	156	Volume (yd3)	338.61	Athena	**52.8**
Concrete Repairs		-				-
	Epoxy/adhesives for concrete repairs	26,840	$	1.18	EIO-LCA	**31.7**
	Concrete leveling	-	$	1.190	EIO-LCA	-
Drainage	Site drains	-	$	0.44	EIO-LCA	-
Waterproofing	Waterproofing	-	$	1.090	EIO-LCA	-
SHELL						**452.0**
COLUMNS AND BEAMS						
Average Across All Column and Beam Systems		-		1.72	Athena	-
Assuming Non Load-Bearing Exterior Wall	Concrete column / Concrete beam	-	Sq ft	7.97	Athena	-
	Concrete column / Glulam beam	-	Sq ft	3.45	Athena	-
	Concrete column / LVL beam	-	Sq ft	3.33	Athena	-
	Concrete column / WF beam	-	Sq ft	5.10	Athena	-
	Glulam column / Glulam beam	-	Sq ft	0.76	Athena	-
	Glulam column / LVL beam	-	Sq ft	0.63	Athena	-
	Glulam column / WF beam	-	Sq ft	2.40	Athena	-
	HSS column / Glulam beam	-	Sq ft	0.94	Athena	-
	HSS column / LVL beam	-	Sq ft	0.82	Athena	-
	HSS column / WF beam	-	Sq ft	2.59	Athena	-
	LVL column / Glulam beam	-	Sq ft	0.75	Athena	-
	LVL column / LVL beam	-	Sq ft	0.63	Athena	-
	Softwood column / Glulam beam	-	Sq ft	0.75	Athena	-
	Softwood column / LVL beam	-	Sq ft	0.63	Athena	-
	WF column / Glulam beam	-	Sq ft	0.86	Athena	-
	WF column / LVL beam	-	Sq ft	0.73	Athena	-
	WF column / WF beam	-	Sq ft	2.50	Athena	-
	Pre-Engineered Building System Short Span	-	Sq ft	0.72	Athena	-
	Pre-Engineered Building System Long Span	-	Sq ft	1.10	Athena	-
Assuming Load-Bearing Exterior wall	Concrete column / Concrete beam	-	Sq ft	6.12	Athena	-
	Concrete column / Glulam beam	-	Sq ft	2.42	Athena	-
	Concrete column / LVL beam	-	Sq ft	2.32	Athena	-
	Concrete column / WF beam	-	Sq ft	3.77	Athena	-
	Glulam column / Glulam beam	-	Sq ft	0.61	Athena	-
	Glulam column / LVL beam	-	Sq ft	0.52	Athena	-
	Glulam column / WF beam	-	Sq ft	1.96	Athena	-
	HSS column / Glulam beam	-	Sq ft	0.74	Athena	-
	HSS column / LVL beam	-	Sq ft	0.64	Athena	-
	HSS column / WF beam	21,684	Sq ft	2.09	Athena	**45.3**
	LVL column / Glulam beam	-	Sq ft	0.61	Athena	-
	LVL column / LVL beam	-	Sq ft	0.51	Athena	-
	Softwood column / Glulam beam	-	Sq ft	0.61	Athena	-
	Softwood column / LVL beam	-	Sq ft	0.51	Athena	-
	WF column / Glulam beam	-	Sq ft	0.68	Athena	-
	WF column / LVL beam	-	Sq ft	0.58	Athena	-
	WF column / WF beam	-	Sq ft	2.03	Athena	-
	Pre-Engineered Building System Short Span	-	Sq ft	0.72	Athena	-
	Pre-Engineered Building System Long Span	-	Sq ft	1.1	Athena	-
Repairs/Maintenance						
	Metalwork	-	$	1.780	EIO-LCA	-
	Waterproofing	-	$	1.090	EIO-LCA	-
	Grout	-	$	1.190	EIO-LCA	-
INTERMEDIATE FLOORS						
Average across all intermediate floor assemblies		-	Sq ft	4.38	Athena	-
	Glulam (no innter ceiling finish)	-	Sq ft	1.39	Athena	-
	Precast Hollowcore (no innter ceiling finish)	-	Sq ft	6.09	Athena	-
	Wood I-joist (no innter ceiling finish)	-	Sq ft	0.92	Athena	-
	Open-web Steel Joist (no innter ceiling finish)	-	Sq ft	3.6	Athena	-
	Open-web Steel Joist w/ concrete topping (no innter ceiling finish)	-	Sq ft	5.58	Athena	-
	Precast Double-T (no innter ceiling finish)		Sq ft	5.16	Athena	-
	Precast Double-T w/ concrete topping (no innter ceiling finish)	-	Sq ft	7.46	Athena	-
	Steel Joist (no innter ceiling finish)	-	Sq ft	4	Athena	-
	Steel Joist w/ plywood decking (no innter ceiling finish)	-	Sq ft	4.21	Athena	-
	Suspended Concrete Slab (no innter ceiling finish)	-	Sq ft	13.24	Athena	-
	Wood Joist (no innter ceiling finish)	-	Sq ft	0.75	Athena	-
	Wood Joist w/ plywood decking (no innter ceiling finish)	-	Sq ft	1.08	Athena	-
	Wood Chord and Steel Web truss (no innter ceiling finish)	-	Sq ft	2.68	Athena	-
	Wood Truss (no innter ceiling finish)	-	Sq ft	1.23	Athena	-
	Glulam (gypsum board; latex paint)	-	Sq ft	1.96	Athena	-
	Precast Hollowcore (gypsum board; latex paint)	-	Sq ft	6.66	Athena	-

F. E. Warren Building 222-03 Full Modernization with HPS

Category	Product	Quantity	Unit	kg CO2e per unit	Source	metric tons CO2e
	Wood I-joist (gypsum board; latex paint)	-	Sq ft	1.48	Athena	-
	Open-web Steel Joist (gypsum board; latex paint)	-	Sq ft	4.17	Athena	-
	Open-web Steel Joist w/ concrete topping (gypsum board; latex paint)	-	Sq ft	6.14	Athena	-
	Precast Double-T (gypsum board; latex paint)	-	Sq ft	5.72	Athena	-
	Precast Double-T w/ concrete topping (gypsum board; latex paint)	-	Sq ft	8.03	Athena	-
	Steel Joist (gypsum board; latex paint)	-	Sq ft	4.57	Athena	-
	Steel Joist w/ plywood decking (gypsum board; latex paint)	-	Sq ft	4.78	Athena	-
	Suspended Concrete Slab (gypsum board; latex paint)	9,918	Sq ft	13.8	Athena	**136.9**
	Wood Joist (gypsum board; latex paint)	-	Sq ft	1.32	Athena	-
	Wood Joist w/ plywood decking (gypsum board; latex paint)	-	Sq ft	1.65	Athena	-
	Wood Chord and Steel Web truss (gypsum board; latex paint)	-	Sq ft	3.25	Athena	-
	Wood Truss (gypsum board; latex paint)	-	Sq ft	1.79	Athena	-
	Steel decking	-	$	3.11	EIO-LCA	-
Repairs/Maintenance						
	Concrete leveling	-	$	1.190	EIO-LCA	-
	4" Poured Concrete Floor	-	Sq ft	4.06	Athena	-
EXTERIOR WALLS						
Average across exterior wall assemblies		-	Sq ft	13.5	Athena	-
8" Concrete Block		-	Sq ft	22.51	Athena	-
	Brick cladding : **Concrete Block** : Continuous insulation + Polyethylene membrane	-	Sq ft	18.75	Athena	-
	Steel Cladding : **Concrete Block** : Continuous Insulation + Polyethylene Membrane	-	Sq ft	30.18	Athena	-
	Stucco Cladding : **Concrete Block** : Continuous Insulation + Polyethylene Membrane	-	Sq ft	17.65	Athena	-
	EIFS : **Concrete Block** : Polyethylene Membrane	-	Sq ft	24.68	Athena	-
	Precast Concrete Cladding : **Concrete Block** : Continuous Insulation + Polyethylene Membrane	-	Sq ft	25.38	Athena	-
	Brick Cladding : **Concrete Block**: Continuous Insulation + Polyethylene Membrane : Gypsum Board + Latex Paint	-	Sq ft	19.32	Athena	-
	Steel Cladding : **Concrete Block** : Continuous Insulation + Polyethylene Membrane : Gypsum Board + Latex Paint	-	Sq ft	30.74	Athena	-
	Stucco Cladding : **Concrete Block**: Continuous Insulation + Polyethylene Membrane : Gypsum Board + Latex Paint	-	Sq ft	18.22	Athena	-
	EIFS : **Concrete Block** : Polyethylene Membrane : Gypsum Board + Latex Paint	-	Sq ft	25.25	Athena	-
	Precast concrete cladding : **Concrete Block** : Continuous insulation + Polyethylene membrane : Gypsum board + Latex paint	-	Sq ft	25.95	Athena	-
	Concrete Block : Continuous insulation + Polyethylene membrane : Gypsum board + Latex paint	-	Sq ft	16.11	Athena	-
	Concrete Block : Continuous insulation + Polyethylene membrane : 2x4 steel stud wall (16"oc) : Gypsum board + Latex paint	-	Sq ft	17.9	Athena	-
	6" Concrete block : 2 coats Latex paint	-	Sq ft	14.67	Athena	-
6" Cast-In-Place Concrete		-	Sq ft	14.27	Athena	-
	Brick cladding : **Cast-in-place-concrete** : Continuous insulation + Latex paint	-	Sq ft	10.51	Athena	-
	Steel cladding : **Cast-in-place-concrete** : Continuous insulation + Latex paint	-	Sq ft	21.94	Athena	-
	Stucco cladding : **Cast-in-place-concrete** : Continuous insulation + Latex paint	-	Sq ft	9.41	Athena	-
	EIFS : **Cast-in-place-concrete** : Latex paint	-	Sq ft	16.44	Athena	-
	Precast concrete cladding : **Cast-in-place-concrete** : Continuous insulation + Latex paint	-	Sq ft	17.14	Athena	-
	Brick cladding : **Cast-in-place-concrete** : Continuous insulation + Polyethylene membrane : Gypsum board + Latex paint	-	Sq ft	11.08	Athena	-
	Steel cladding : **Cast-in-place-concrete** : Continuous insulation + Polyethylene membrane : Gypsum board + Latex paint	-	Sq ft	22.5	Athena	-
	Stucco cladding : **Cast-in-place-concrete** : Continuous insulation + Polyethylene membrane : Gypsum board + Latex paint	-	Sq ft	9.98	Athena	-
	EIFS : **Cast-in-place-concrete** : Gypsum board + Polyethylene membrane + Latex paint	-	Sq ft	17.71	Athena	-
	Precast concrete cladding : **Cast-in-place-concrete** : Continuous insulation + Polyethylene membrane : Gypsum board + Latex paint	-	Sq ft	7.87	Athena	-
	Cast-in-place-concrete : Continuous insulation + Polyethylene membrane : 2x4 steel stud wall (16"oc) : Gypsum board + Latex paint	-	Sq ft	9.66	Athena	-
8" Concrete Tilt-Up		-	Sq ft	16.01	Athena	-
	Brick cladding : **Concrete Tilt-up** : Continuous insulation + Polyethylene membrane	-	Sq ft	12.25	Athena	-
	Steel cladding : **Concrete Tilt-up** : Continuous insulation + Polyethylene membrane	-	Sq ft	23.68	Athena	-
	Stucco cladding : **Concrete Tilt-up** : Continuous insulation + Polyethylene membrane	-	Sq ft	11.15	Athena	-
	EIFS : **Concrete Tilt-up** : Polyethylene Membrane	-	Sq ft	18.18	Athena	-
	Precast Concrete Cladding : **Concrete Tilt-up** : Continuous Insulation + Polyethylene Membrane	-	Sq ft	18.88	Athena	-
	Brick Cladding : **Concrete Tilt-up**: Continuous Insulation + Polyethylene Membrane : Gypsum Board + Latex Paint	-	Sq ft	12.82	Athena	-
	Steel Cladding : **Concrete Tilt-up** : Continuous Insulation + Polyethylene Membrane : Gypsum Board + Latex Paint	-	Sq ft	24.24	Athena	-
	Stucco Cladding : **Concrete Block**: Continuous Insulation + Polyethylene Membrane : Gypsum Board + Latex Paint	-	Sq ft	11.72	Athena	-
	EIFS : **Concrete Tilt-up** : Polyethylene Membrane : Gypsum Board + Latex Paint	-	Sq ft	18.75	Athena	-
	Precast concrete cladding : **Concrete Tilt-up** : Continuous insulation + Polyethylene membrane : Gypsum board + Latex paint	-	Sq ft	19.45	Athena	-
	Concrete Tilt-up : Continuous insulation + Polyethylene membrane : Gypsum board + Latex paint	-	Sq ft	9.61	Athena	-
	Concrete Tilt-up : Continuous insulation + Polyethylene membrane : 2x4 steel stud wall (16"oc) : Gypsum board + Latex paint	-	Sq ft	11.4	Athena	-
Insulated Concrete Forms		-	Sq ft	15.5	Athena	-
	Brick Cladding : **Insulated Concrete Form** : Gypsum board + Latex paint	-	Sq ft	13.36	Athena	-
	Steel cladding : **Insulated Concrete Form** : Gypsum board + Latex paint	-	Sq ft	24.78	Athena	-
	Stucco cladding : **Insulated Concrete Form** : Gypsum board + Latex paint	-	Sq ft	12.26	Athena	-
	Vinyl cladding : **Insulated Concrete Form** : Gypsum board + Latex paint	-	Sq ft	11.86	Athena	-
	Wood cladding : **Insulated Concrete Form** : Gypsum board + Latex paint	-	Sq ft	10.75	Athena	-
	Precast concrete cladding : **Insulated Concrete Form** : Gypsum board + Latex paint	-	Sq ft	19.99	Athena	-
2x4 Steel Stud Wall		-	Sq ft	9.11	Athena	-

F. E. Warren Building 222-03 Full Modernization with HPS

Category	Product	Quantity	Unit	kg CO2e per unit	Source	metric tons CO2e
	Brick cladding : R-7.5 Continuous insulation sheathing : **2x4 Steel stud 16" o.c.** : R-13 Cavity insulation + Polyethylene membrane : Gypsum board + Latex paint	-	Sq ft	6.56	Athena	-
	Steel cladding (26 ga.) : R-7.5 Continuous insulation sheathing : **2x4 Steel stud 16" o.c.** : R-13 Cavity insulation + Polyethylene membrane : Gypsum board + Latex paint	-	Sq ft	17.98	Athena	-
	Stucco cladding : R-7.5 Continuous insulation sheathing : **2x4 Steel stud 16" o.c.** : R-13 Cavity insulation + Polyethylene membrane : Gypsum board + Latex paint	-	Sq ft	5.46	Athena	-
	Vinyl cladding : R-7.5 Continuous insulation sheathing : **2x4 Steel stud 16" o.c.** : R-13 Cavity insulation + Polyethylene membrane : Gypsum board + Latex paint	-	Sq ft	5.06	Athena	-
	Wood cladding : R-7.5 Continuous insulation sheathing : **2x4 Steel stud 16" o.c.** : R-13 Cavity insulation + Polyethylene membrane : Gypsum board + Latex paint	-	Sq ft	3.95	Athena	-
	EIFS : Gypboard sheathing : **2x4 Steel stud 16" o.c.** : Polyethylene membrane + Gypsum board + Latex paint	-	Sq ft	13.17	Athena	-
	Precast concrete cladding : : R-7.5 Continuous insulation sheathing : **2x4 Steel stud 16" o.c.** : R-13 Cavity insulation + Polyethylene membrane : Gypsum board + Latex paint	-	Sq ft	13.19	Athena	-
	Brick cladding : R-7.5 Continuous insulation sheathing : **2x4 Steel stud 24" o.c.** : R-13 Cavity insulation + Polyethylene membrane : Gypsum board + Latex paint	-	Sq ft	6.11	Athena	-
	Steel cladding (26 ga.) : R-7.5 Continuous insulation sheathing : **2x4 Steel stud 24" o.c.** : R-13 Cavity insulation + Polyethylene membrane : Gypsum board + Latex paint	-	Sq ft	17.53	Athena	-
	Stucco cladding : R-7.5 Continuous insulation sheathing : **2x4 Steel stud 24" o.c.** : R-13 Cavity insulation + Polyethylene membrane : Gypsum board + Latex paint	-	Sq ft	5.01	Athena	-
	Vinyl cladding : R-7.5 Continuous insulation sheathing : **2x4 Steel stud 24" o.c.** : R-13 Cavity insulation + Polyethylene membrane : Gypsum board + Latex paint	-	Sq ft	4.61	Athena	-
	Wood cladding : R-7.5 Continuous insulation sheathing : **2x4 Steel stud 24" o.c.** : R-13 Cavity insulation + Polyethylene membrane : Gypsum board + Latex paint	-	Sq ft	3.49	Athena	-
	EIFS : Gypboard sheathing : **2x4 Steel stud 24" o.c.** : R-13 Cavity insulation + Polyethylene membrane : Gypsum board + Latex paint	-	Sq ft	12.72	Athena	-
	Precast concrete cladding : R-7.5 Continuous insulation sheathing : **2x4 Steel stud 24" o.c.** : R-13 Cavity insulation + Polyethylene membrane : Gypsum board + Latex paint	-	Sq ft	12.74	Athena	-
2x6 Wood Stud Wall		-	Sq ft	7.14	Athena	-
	Brick cladding : Wood structural panel sheathing : **2x6 Wood Stud 16" o.c.** : R-19 Cavity insulation + Polyethylene membrane : Gypsum board + Latex paint	-	Sq ft	5.12	Athena	-
	Steel cladding (26 ga.) : Wood structural panel sheathing : **2x6 Wood Stud 16" o.c.** : R-19 Cavity insulation + Polyethylene membrane : Gypsum board + Latex paint	-	Sq ft	16.54	Athena	-
	Stucco cladding : Wood structural panel sheathing : **2x6 Wood Stud 16" o.c.** : R-19 Cavity insulation + Polyethylene membrane : Gypsum board + Latex paint	-	Sq ft	4.02	Athena	-
	Vinyl cladding : Wood structural panel sheathing : **2x6 Wood Stud 16" o.c.** : R-19 Cavity insulation + Polyethylene membrane : Gypsum board + Latex paint	-	Sq ft	3.62	Athena	-
	Wood cladding : Wood structural panel sheathing : **2x6 Wood Stud 16" o.c.** : R-19 Cavity insulation + Polyethylene membrane : Gypsum board + Latex paint	-	Sq ft	2.51	Athena	-
	EIFS : Wood structural panel sheathing : **2x6 Wood Stud 16" o.c.** : Polyethylene membrane + Gypsum board + Latex paint	-	Sq ft	11.28	Athena	-
	Brick cladding : Wood structural panel sheathing : **2x6 Wood Stud 24" o.c.** : R-19 Cavity insulation + Polyethylene membrane : Gypsum board + Latex paint	-	Sq ft	5.03	Athena	-
	Steel cladding (26 ga.) : Wood structural panel sheathing : **2x6 Wood Stud 24" o.c.** : R-19 Cavity insulation + Polyethylene membrane : Gypsum board + Latex paint	-	Sq ft	16.46	Athena	-
	Stucco cladding : Wood structural panel sheathing : **2x6 Wood Stud 24" o.c.** : R-19 Cavity insulation + Polyethylene membrane : Gypsum board + Latex paint	-	Sq ft	3.93	Athena	-
	Vinyl cladding : Wood structural panel sheathing : **2x6 Wood Stud 24" o.c.** : R-19 Cavity insulation + Polyethylene membrane : Gypsum board + Latex paint	-	Sq ft	3.53	Athena	-
	Wood cladding : Wood structural panel sheathing : **2x6 Wood Stud 24" o.c.** : R-19 Cavity insulation + Polyethylene membrane : Gypsum board + Latex paint	-	Sq ft	2.42	Athena	-
	EIFS : Wood structural panel sheathing : **2x6 Wood Stud 24" o.c.** : Polyethylene membrane + Gypsum board + Latex paint	-	Sq ft	11.2	Athena	-
Structural Insulated Panel (SIP)		-	Sq ft	8.5	Athena	-
	Brick cladding + Builders' paper : **5.5" Structural Insulated Panel** : Gypsum board + latex paint	-	Sq ft	7.25	Athena	-
	Steel cladding + Builders' paper : **5.5" Structural Insulated Panel** : Gypsum board + latex paint	-	Sq ft	18.68	Athena	-
	Stucco cladding + Builders' paper : **5.5" Structural Insulated Panel** : Gypsum board + latex paint	-	Sq ft	6.16	Athena	-
	Vinyl cladding + Builders' paper : **5.5" Structural Insulated Panel** : Gypsum board + latex paint	-	Sq ft	5.76	Athena	-
	Wood cladding + Builders' paper : **5.5" Structural Insulated Panel** : Gypsum board + latex paint	-	Sq ft	4.64	Athena	-
Curtainwall		-	Sq ft	14.68	Athena	-
	Curtainwall - Opaque Glazing (with insulated backpan)	-	Sq ft	18.5	Athena	-
	Curtainwall - Metal Spandrel Panel (with insulated backpan)	-	Sq ft	10.87	Athena	-
Pre-Engineered Building System		-	Sq ft	14.48	Athena	-
	Single skin metal wall panel : Fiberglass insulation	-	Sq ft	14.48	Athena	-
Wall Strengthening						
	Wall strengthening - Kevlar	-	$	1.700	EIO-LCA	-
Façade	Clay brick (4") unpainted	-	Sq ft	3.16	Athena	-
Repairs/Maintenance		-				-
	Brick and stonework repair (mortar)	21,514	$	1.19	EIO-LCA	**25.6**
	Brick and stonework repair (anchors)	22,500	$	0.602	EIO-LCA	**13.5**
	Paint	1,728	$	0.988	EIO-LCA	**1.7**
	Woodwork, repairs	24,660	$	0.558	EIO-LCA	**13.8**
	Steel studs	-	$	3.110	EIO-LCA	-
	Epoxy/adhesives for concrete repairs	-	$	1.180	EIO-LCA	-
	Insulation - polystyrene	7,258	$	1.150	EIO-LCA	**8.3**
WINDOWS AND DOORS						
Average across all windows		-	Sq ft	49.63	Athena	-

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Category	Product	Quantity	Unit	kg CO2e per unit	Source	metric tons CO2e
Window Frame Type (All windows assume double-pane, Low-E, Argon-filled glazing).		-				-
	Aluminium	-	Sq ft	86.23	Athena	-
	Vinyl-clad wood	-	Sq ft	40.07	Athena	-
	Vinyl	-	Sq ft	41.21	Athena	-
	Wood	-	Sq ft	50.67	Athena	-
	Curtainwall viewable glazing	3,107	Sq ft	29.97	Athena	**93.1**
	Wood shutters	-	$	0.558	EIO-LCA	-
Door types		-				-
	Wood	-	$	0.558	EIO-LCA	-
	Steel	-	$	0.735	EIO-LCA	-
Awnings		-				-
	Awnings	-	$	0.550	EIO-LCA	-
ROOFS						
Average across all roof types		-	Sq ft	11.21	Athena	-
Precast Hollow-core Concrete		-	Sq ft	14.15	Athena	-
	EPDM membrane : R-20 Continuous insulation + Polyethylene membrane : **Precast hollow-core concrete** : Latex paint	-	Sq ft	9.63	Athena	-
	PVC membrane : R-20 Continuous insulation + Polyethylene membrane : **Precast hollow-core concrete** : Latex paint	-	Sq ft	14.01	Athena	-
	Modified bitumen membrane : R-20 Continuous insulation + Polyethylene membrane : **Precast hollow-core concrete** : Latex paint	-	Sq ft	14.49	Athena	-
	4-ply built-up roofing system : R-20 Continuous insulation + Polyethylene membrane : **Precast hollow-core concrete** : Latex paint	-	Sq ft	23.44	Athena	-
	Steel roofing system : R-20 Continuous insulation + Polyethylene membrane : **Precast hollow-core concrete** : Latex paint	-	Sq ft	9.18	Athena	-
Precast Concrete Double-T		-	Sq ft	12.42	Athena	-
	EPDM membrane : R-20 Continuous insulation + Polyethylene membrane : **Precast double-T** : Latex paint	-	Sq ft	7.9	Athena	-
	PVC membrane : R-20 Continuous insulation + Polyethylene membrane : **Precast double-T** : Latex paint	-	Sq ft	12.27	Athena	-
	Modified bitumen membrane : R-20 Continuous insulation + Polyethylene membrane : **Precast double-T** : Latex paint	-	Sq ft	12.76	Athena	-
	4-ply built-up roofing system : R-20 Continuous insulation + Polyethylene membrane : **Precast double-T** : Latex paint	-	Sq ft	21.71	Athena	-
	Steel roofing system : R-20 Continuous insulation + Polyethylene membrane : **Precast double-T** : Latex paint	-	Sq ft	7.45	Athena	-
Suspended Concrete Slab		-	Sq ft	21.45	Athena	-
	EPDM membrane : R-20 Continuous insulation + Polyethylene membrane : **Suspended concrete slab** : Latex paint	-	Sq ft	16.93	Athena	-
	PVC membrane : R-20 Continuous insulation + Polyethylene membrane : **Suspended concrete slab** : Latex paint	-	Sq ft	21.3	Athena	-
	Modified bitumen membrane : R-20 Continuous insulation + Polyethylene membrane : **Suspended concrete slab** : Latex paint	-	Sq ft	21.79	Athena	-
	4-ply built-up roofing system : R-20 Continuous insulation + Polyethylene membrane : **Suspended concrete slab** : Latex paint	-	Sq ft	30.73	Athena	-
	Steel roofing system : R-20 Continuous insulation + Polyethylene membrane : **Suspended concrete slab** : Latex paint	-	Sq ft	16.48	Athena	-
Open-web Steel Joist		-	Sq ft	10.33	Athena	-
	EPDM membrane : R-20 Continuous insulation + Polyethylene membrane : **Open-web steel joist w/ steel decking** : Gypsum board + Latex paint	-	Sq ft	6.93	Athena	-
	PVC membrane : R-20 Continuous insulation + Polyethylene membrane : **Open-web steel joist w/ steel decking** : Gypsum board + Latex paint	-	Sq ft	11.31	Athena	-
	Modified bitumen membrane : R-20 Continuous insulation + Polyethylene membrane : **Open-web steel joist w/ steel decking** : Gypsum board + Latex paint	-	Sq ft	11.8	Athena	-
	4-ply built-up roofing system : R-20 Continuous insulation + Polyethylene membrane : **Open-web steel joist w/ steel decking** : Gypsum board + Latex paint	-	Sq ft	20.74	Athena	-
	Steel roofing system : R-20 Continuous insulation + Polyethylene membrane : **Open-web steel joist w/ steel decking** : Gypsum board + Latex paint	-	Sq ft	6.48	Athena	-
	EPDM membrane : R-20 Continuous insulation + Polyethylene membrane : **Open-web steel joist w/ wood decking** : Gypsum board + Latex paint	-	Sq ft	4.69	Athena	-
	PVC membrane : R-20 Continuous insulation + Polyethylene membrane : **Open-web steel joist w/ wood decking** : Gypsum board + Latex paint	-	Sq ft	9.06	Athena	-
	Modified bitumen membrane : R-20 Continuous insulation + Polyethylene membrane : **Open-web steel joist w/ wood decking** : Gypsum board + Latex paint	-	Sq ft	9.55	Athena	-
	4-ply built-up roofing system : R-20 Continuous insulation + Polyethylene membrane : **Open-web steel joist w/ wood decking** : Gypsum board + Latex paint	-	Sq ft	18.49	Athena	-
	Steel roofing system : R-20 Continuous insulation + Polyethylene membrane : **Open-web steel joist w/ wood decking** : Gypsum board + Latex paint	-	Sq ft	4.24	Athena	-
Glulam Joist with Plank Decking		-	Sq ft	9.53	Athena	-
	EPDM membrane : R-20 Continuous insulation + Polyethylene membrane : Glulam joist w/ plank decking : Gypsum board + Latex paint	-	Sq ft	5.01	Athena	-
	PVC membrane : R-20 Continuous insulation + Polyethylene membrane : Glulam joist w/ plank decking : Gypsum board + Latex paint	-	Sq ft	9.39	Athena	-
	Modified bitumen membrane : R-20 Continuous insulation + Polyethylene membrane : Glulam joist w/ plank decking : Gypsum board + Latex paint	-	Sq ft	9.88	Athena	-
	4-ply built-up roofing system : R-20 Continuous insulation + Polyethylene membrane : Glulam joist w/ plank decking : Gypsum board + Latex paint	-	Sq ft	18.82	Athena	-

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Category	Product	Quantity	Unit	kg CO2e per unit	Source	metric tons CO2e
	Steel roofing system : R-20 Continuous insulation + Polyethylene membrane : Glulam joist w/ plank decking : Gypsum board + Latex paint	-	Sq ft	4.56	Athena	-
Wood I-joist with WSP Decking		-	Sq ft	9.1	Athena	-
	EPDM membrane : R-20 Continuous insulation + Polyethylene membrane : **Wood I-joist w/ wood decking** : Gypsum board + Latex paint	-	Sq ft	4.58	Athena	-
	PVC membrane : R-20 Continuous insulation + Polyethylene membrane : **Wood I-joist w/ wood decking** : Gypsum board + Latex paint	-	Sq ft	8.96	Athena	-
	Modified bitumen membrane : R-20 Continuous insulation + Polyethylene membrane : **Wood I-joist w/ wood decking** : Gypsum board + Latex paint	-	Sq ft	9.44	Athena	-
	4-ply built-up roofing system : R-20 Continuous insulation + Polyethylene membrane : **Wood I-joist w/ wood decking** : Gypsum board + Latex paint	-	Sq ft	18.39	Athena	-
	Steel roofing system : R-20 Continuous insulation + Polyethylene membrane : **Wood I-joist w/ wood decking** : Gypsum board + Latex paint	-	Sq ft	4.13	Athena	-
Solid Wood Joist with WSP Decking		-	Sq ft	9.22	Athena	-
	EPDM membrane : R-20 Continuous insulation + Polyethylene membrane : **Wood joist w/ wood decking** : Gypsum board + Latex paint	-	Sq ft	4.7	Athena	-
	PVC membrane : R-20 Continuous insulation + Polyethylene membrane : **Wood joist w/ wood decking** : Gypsum board + Latex paint	-	Sq ft	9.08	Athena	-
	Modified bitumen membrane : R-20 Continuous insulation + Polyethylene membrane : **Wood joist w/ wood decking** : Gypsum board + Latex paint	-	Sq ft	9.57	Athena	-
	4-ply built-up roofing system : R-20 Continuous insulation + Polyethylene membrane : **Wood joist w/ wood decking** : Gypsum board + Latex paint	-	Sq ft	18.51	Athena	-
	Steel roofing system : R-20 Continuous insulation + Polyethylene membrane : **Wood joist w/ wood decking** : Gypsum board + Latex paint	-	Sq ft	4.26	Athena	-
Wood Chord/Steel Web Truss with WSP Decking		-	Sq ft	10.91	Athena	-
	EPDM membrane : R-20 Continuous insulation + Polyethylene membrane : **Wood chord/Steel web truss w/ wood decking** : Gypsum board + Latex paint	-	Sq ft	6.39	Athena	-
	PVC membrane : R-20 Continuous insulation + Polyethylene membrane : **Wood chord/Steel web truss w/ wood decking** : Gypsum board + Latex paint	-	Sq ft	10.77	Athena	-
	Modified bitumen membrane : R-20 Continuous insulation + Polyethylene membrane : **Wood chord/Steel web truss w/ wood decking** : Gypsum board + Latex paint	-	Sq ft	11.25	Athena	-
	4-ply built-up roofing system : R-20 Continuous insulation + Polyethylene membrane : **Wood chord/Steel web truss w/ wood decking** : Gypsum board + Latex paint	-	Sq ft	20.2	Athena	-
	Steel roofing system : R-20 Continuous insulation + Polyethylene membrane : **Wood chord/Steel web truss w/ wood decking** : Gypsum board + Latex paint	-	Sq ft	5.94	Athena	-
Wood Truss (Flat) with WSP Decking		-	Sq ft	9.38	Athena	-
	EPDM membrane : R-20 Continuous insulation + Polyethylene membrane : **Flat wood truss w/ wood decking** : Gypsum board + Latex paint	-	Sq ft	4.86	Athena	-
	PVC membrane : R-20 Continuous insulation + Polyethylene membrane : **Flat wood truss w/ wood decking** : Gypsum board + Latex paint	-	Sq ft	9.24	Athena	-
	Modified bitumen membrane : R-20 Continuous insulation + Polyethylene membrane : **Flat wood truss w/ wood decking** : Gypsum board + Latex paint	-	Sq ft	9.72	Athena	-
	4-ply built-up roofing system : R-20 Continuous insulation + Polyethylene membrane : **Flat wood truss w/ wood decking** : Gypsum board + Latex paint	-	Sq ft	18.67	Athena	-
	Steel roofing system : R-20 Continuous insulation + Polyethylene membrane : **Flat wood truss w/ wood decking** : Gypsum board + Latex paint	-	Sq ft	4.41	Athena	-
Wood Truss (4:12 Pitch) with WSP Decking		-	Sq ft	5.07	Athena	-
	30-yr. fibreglass shingles : **Pitched wood truss w/ wood decking** : R-20 Cavity insulation + Polyethylene membrane : Gypsum board + Latex paint	-	Sq ft	3.54	Athena	-
	30-yr. organic shingles : **Pitched wood truss w/ wood decking** : R-20 Cavity insulation + Polyethylene membrane : Gypsum board + Latex paint	-	Sq ft	3.8	Athena	-
	Clay tile roof : **Pitched wood truss w/ wood decking** : R-20 Cavity insulation + Polyethylene membrane : Gypsum board + Latex paint	-	Sq ft	8.78	Athena	-
	Steel roof : **Pitched wood truss w/ wood decking** : R-20 Cavity insulation + Polyethylene membrane : Gypsum board + Latex paint	-	Sq ft	4.17	Athena	-
Pre-Engineered Building System		-	Sq ft	12.22	Athena	-
	Standing seam metal roofing : Metal roof panel assembly : Cavity insulation	-	Sq ft	12.22	Athena	-
Steel Decking	Steel decking	-	$	3.11	EIO-LCA	-
Lighting	Skylight tubes	-	$	1.450	EIO-LCA	-
Roofing Repairs		-				
	Replacement corrugated roofing	-	$	1.090	EIO-LCA	-
	Replacement metal roofing panels	-	$	0.735	EIO-LCA	-
	Slate shingles	100,300	$	0.629	EIO-LCA	**63.1**
	Woodwork, repairs	3,632	$	0.558	EIO-LCA	**2.0**
	Epoxy/adhesives	3,065	$	1.180	EIO-LCA	**3.6**
	Flashing and Ventilators - copper	15,100	$	0.880	EIO-LCA	**13.3**
	Gutters - copper	380	$	0.880	EIO-LCA	**0.3**
	Sheathing - polystyrene	2,460	$	1.150	EIO-LCA	**2.8**
	Underlayment - waterproofing	26,198	$	1.090	EIO-LCA	**28.6**
INTERIORS						**52.7**
Average across interior walls		-	Sq ft	4.85	Athena	-
	2X4 Wood stud wall 16" o.c. : 5/8" Gypsum board + 2 coats Latex paint	10,200	Sq ft	1.29	Athena	**13.2**
	2X4 Wood stud wall 24" o.c. : 5/8" Gypsum board + 2 coats Latex paint	-	Sq ft	1.26	Athena	-
	2X4 Wood stud wall 24" o.c. : 2x5/8" Gypsum board + 2 coats Latex paint	-	Sq ft	2.03	Athena	-

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Category	Product	Quantity	Unit	kg CO2e per unit	Source	metric tons CO2e
	1-5/8" x 3-5/8" Steel stud 16" o.c. : 5/8" Gypsum board + 2 coats Latex paint	-	Sq ft	1.81	Athena	-
	1-5/8" x 3-5/8" Steel stud 24" o.c. : 5/8" Gypsum board + 2 coats Latex paint	-	Sq ft	1.65	Athena	-
	1-5/8" x 3-5/8" Steel stud 24" o.c. : 2x5/8" Gypsum board + 2 coats Latex paint	-	Sq ft	2.41	Athena	-
	6" Concrete block : 5/8" Gypsum board + 2 coats Latex paint	-	Sq ft	15.43	Athena	-
	6" Concrete block : 2 coats Latex paint	-	Sq ft	14.67	Athena	-
	Clay brick (4") unpainted	-	Sq ft	3.16	Athena	-
Stairs		-				-
	Metal/concrete stairs	-	$	0.735	EIO-LCA	-
	Wood stairs	6,250	$	0.558	EIO-LCA	**3.5**
Woodwork and Accessories		-				-
	Woodwork, including floors	29,350	$	0.558	EIO-LCA	**16.4**
	Metal cabinets	992	$	1.230	EIO-LCA	**1.2**
	Metal accessories	1,610	$	0.735	EIO-LCA	**1.2**
Signage		-				-
	Signage	421	$	0.614	EIO-LCA	**0.3**
Repairs/Maintenance		-				-
	Paint	-	$	0.988	EIO-LCA	-
	Insulation - polystyrene	-	$	1.150	EIO-LCA	-
	Fiberglass board	-	$	1.340	EIO-LCA	-
Floor finishes		-				-
	Carpet	-	$	0.735	EIO-LCA	-
	Tile	-	$	1.220	EIO-LCA	-
	Epoxy/adhesives	-	$	1.180	EIO-LCA	-
Door types		-				-
	Wood	30,480	$	0.558	EIO-LCA	**17.0**
SERVICES						**436.5**
Conveying						
	Elevator	90,800	$	0.702	EIO-LCA	**63.7**
	Concrete for ADA ramp	2	Volume (yd3)	338.61	Athena	**0.6**
Plumbing		-				-
	Plumbing	130,815	$	0.44	EIO-LCA	**57.6**
	Rainwater collection system	-	$	0.945	EIO-LCA	-
	Solar hot water heater	-	$	0.751	EIO-LCA	-
HVAC		-				-
	HVAC	215,000	$	0.493	EIO-LCA	**106.0**
	Geothermal groundsource heat pump	-	$	0.530	EIO-LCA	-
Fire Protection		-				-
	Dry pipe sprinkler systems, steel	46,250	$	1.78	EIO-LCA	**82.3**
Electrical and Communications		-				-
	Electrical	199,222	$	0.511	EIO-LCA	**101.8**
	Communication and Alarm Systems, including wiring	36,100	$	0.668	EIO-LCA	**24.1**
	Fire Alarm Command Center	730	$	0.276	EIO-LCA	**0.2**
	Communications Cabling	310	$	0.668	EIO-LCA	**0.2**
	Solar Photovoltaic (PV) system	-	$	0.557	EIO-LCA	-
	Electric Vehicle Charging Station	-	$	0.370	EIO-LCA	-
EQUIPMENT & FURNISHINGS						-
	Solar Photovoltaic (PV) system supporting components	-	$	0.557	EIO-LCA	-
	Electric Vehicle Charging Station	-	$	0.370	EIO-LCA	-
SPECIAL CONSTRUCTION						-
	Integrated construction for Solar PV	-	$		EIO-LCA	-
	Supplemental cooling system	-	$	0.493	EIO-LCA	-
	Rollup door	-	$	0.735	EIO-LCA	-
BUILDING SITEWORK						**6.6**
Demolition	Dump truck loads (Heavy Duty Vehicle - Articulated - Diesel - Year 1960-present)	2,229	miles	1.722	WRI GHG	**3.8**
Site Improvements						
	Concrete sidwalk	-	Volume (yd3)	338.61	Athena	-
	Concrete on deck	-	Volume (yd3)	338.61	Athena	-
	Asphalt pavement	1,406	$	1.45	EIO-LCA	**2.0**
	Planting irrigation	700	$	1.06	EIO-LCA	**0.7**
	Aggregate for earthwork	-	$	1.25	EIO-LCA	-
	Site lighting	-	$	1.450	EIO-LCA	-
New Utilities		-				
	Electric	-	$	0.511	EIO-LCA	-
	Sewer	-	$	0.440	EIO-LCA	-
	Water, Fire, Domestic	-	$	0.440	EIO-LCA	-
	Natural Gas	-	$	1.060	EIO-LCA	-
COLLATERAL EQUIPMENT						-
GRAND TOTAL						**1,032.3**

Appendix C:
Carbon Pricing Detail

The attached print-out provided the pricing data used in this Study. Low, medium, and high per CO2e ton prices are presented annually and with the average over the period of analysis.

Carbon Pricing Scenarios (2005$/metric ton)

	Forecasted Price Per Metric Ton (2005$)		
Year	Low	Medium	High
2012	$ -	$ 15.00	$ 15.00
2013	$ 11.97	$ 16.16	$ 25.17
2014	$ 12.57	$ 17.31	$ 35.34
2015	$ 13.20	$ 18.47	$ 45.51
2016	$ 13.86	$ 19.55	$ 48.14
2017	$ 14.55	$ 20.62	$ 50.76
2018	$ 15.28	$ 21.70	$ 53.39
2019	$ 16.04	$ 22.78	$ 56.01
2020	$ 16.85	$ 23.85	$ 58.63
2021	$ 17.69	$ 25.18	$ 61.89
2022	$ 18.57	$ 26.52	$ 65.14
2023	$ 19.50	$ 27.85	$ 68.40
2024	$ 20.48	$ 29.18	$ 71.65
2025	$ 21.50	$ 30.52	$ 74.91
2026	$ 22.57	$ 32.18	$ 78.89
2027	$ 23.70	$ 33.85	$ 82.86
2028	$ 24.89	$ 35.52	$ 86.84
2029	$ 26.13	$ 37.18	$ 90.82
2030	$ 27.44	$ 38.85	$ 94.80
2031	$ 28.81	$ 41.01	$ 100.00
2032	$ 30.25	$ 43.16	$ 105.20
2033	$ 31.77	$ 45.31	$ 110.40
2034	$ 33.35	$ 47.47	$ 115.59
2035	$ 35.02	$ 49.62	$ 120.79
2036	$ 36.77	$ 52.34	$ 127.33
2037	$ 38.61	$ 55.06	$ 133.86
2038	$ 40.54	$ 57.78	$ 140.39
2039	$ 42.57	$ 60.50	$ 146.92
2040	$ 44.70	$ 63.22	$ 153.45
2041	$ 46.93	$ 66.66	$ 161.68
2042	$ 49.28	$ 70.10	$ 169.90
Average:	$ 25.66	$ 36.92	$ 88.70

Sources: Center for Resource Solutions; BAE 2012.

Appendix C:
Carbon Pricing Detail

The attached print-out provided the pricing data used in this Study. Low, medium, and high per CO2e ton prices are presented annually and with the average over the period of analysis.

Appendix D:
Cost Estimation Systems Review

This Appendix was prepared by Preservation Associates and is taken from the original Demonstration Plan.

Cost Estimation System Review

The following list of ten final cost estimating programs selected for further analysis has not yet been entirely completed. We reviewed over 100 cost estimating programs located on the Internet through on-line searches and specific site acquisition. Our goal is to select and use an on-line available cost-estimating program that the DoD could easily switch to if that was their desire. From a brief scan of each program located, we have selected the following ten finalists.

Our list of selection criteria for considering any cost estimating program consisted of federal agency use, flexibility, customization potential, preliminary budget estimating potential, estimating potential without fully detailed plans and specifications, specific mention of renovation project use, though such mentions were absent in the vast majority of programs found and parametric modeling. Clearly the estimating program development and support industry has not targeted restoration, rehabilitation or renovation projects. Very few programs have any real experience with such existing building construction projects. Only three programs listed below either list or are known to have experience and data based numbers that fit some applications that target our project building types.

Our intention as seen at the end of this preliminary submission of this addendum is to further research the ten finalist programs. In some cases we have already tried the down loadable free trials of the software. In other cases we still intend to download the free trial versions to get a better handle on their capabilities.

At this time, the ten final programs currently under consideration are listed following this paragraph. They are selected for intensive review with web site designer comments, pros and cons as well as decisions listed by Reed and James. Each of the ten programs They will remain as potential programs and not exclusively so until we have actually developed one building and applied the information to an estimating process.

Our goal is to select and use an on-line available cost estimating program that the DoD could easily switch to if that was their desire.

Final Ten Cost Estimating Programs: selected for intensive review with web site designer comments, pros and cons as well as decisions listed by Reed and James.

To date, my top four picks are RS Means, CostLink/AE, US Cost Success Estimator and PACES.

COST LINK/AE
http://www.bsdsoftlink.com/costlinkae/ae.htm

The following comments were taken directly from their web site.

“BSD CostLink®/AE provides quick, easy, and modifiable cost estimates using built-in RS Means Cost Data. It was created exclusively for design professionals (and building owners) who like to keep things simple without sacrificing accuracy or flexibility.

Welcome to a cost-estimating package specifically designed for architects, engineers, and others who are doing budgets, cost plans, and design development estimates. CostLink/AE is designed for design professionals by design professionals. Let's face it, you don't want to spend lots of time learning or using a complex cost estimating system. You only have time for a cost estimating system that is quick, easy, and modifiable—and doesn't take much time to learn. Enter CostLink/AE:

QUICK: Create a reliable, accurate, and detailed cost estimate in 10 minutes or less! CostLink/AE provides a simple front-end cost modeling interface that allows rapid creation of a cost estimate at the very earliest stages of a project. Because your estimate is a "living" document, you can continually refine and modify it as your project evolves.

EASY: With CostLink/AE's unique front-end Cost Modeling interface (based on the reliable, built-in RS Means cost data that you've come to trust), you simply:

- Pick one of the 75 building models that are similar to your project.

Reisdential	Educational	Health/Day Care	Business	Office	Govt, Public Facility	Social, Recreation, Entertainment	Hospitality	Religion	Transport, Auto	Industrial
Apartment, 1-3 Story	Auditorium	Day Care Center	Bank	Medical Office, 1-Story	Courthouse, 1 Story	Bowling Alley	Hotel, 4-7 Story	Church	Auto Sales	Factory, 1 Story
Apartment, 4-7 Story	College Classroom, 2-3 Story	Hospital, 2-3 Story	Convenience Store	Medical Office, 2 Story	Courthouse, 2-3 Story	Community Center	Hotel, 8-24 Story	Religious Education	Auto Repair Garage	Factory, 3 Story
Apartment, 8-24 Story	College Dormitory, 2-3 Story	Hospital, 4-8 Story	Department Store, 1 Story	Office, 1 Story	Fire Station, 1 Story	Country Club	Motel, 1 Story		Bus Terminal	Warehouse
College Dormitory, 2-3 Story	College Dormitory, 4-8 Story	Medical Office, 1-Story	Department Store, 3 Story	Office, 2-4 Story	Fire Station, 2 Story	Gymnasium	Motel, 2-3 Story		Car Wash	Warehouse, Mini
College Dormitory, 4-8 Story	College Laboratory	Medical Office, 2 Story	Funeral Home	Office, 5-10 Story	Jail	Movie Theater	Restaurant		Hangar, Aircraft	
Fraternity/ Sorority House	College Student Union	Nursing Home	Laundromat	Office, 11-20 Story	Library	Racquetball Court			Parking Garage	
Nursing Home	Elementary School	Assisted Living Facility, 1-Story	Restaurant	Telephone Exchange	Police Station	Rink, Hockey/ Indoor Soccer			Parking Garage, Underground	
	Fraternity/ Sorority House	Outpatient Surgical Center	Restaurant, Fast Food	Computer /Data Center	Post Office	Social Club			Service Station	
	Gymnasium		Retail Store		Town Hall, 1 Story	Swimming Pool, Enclosed				
	High School, 2-3 Story		Supermarket		Town Hall, 2-3 Story					
	Jr High School, 2-3 Story									
	Library									
	Vocational School									

- Note: Some building types are shown in more than one category.

- Select the frame and enclosure systems.
- Enter the gross area and building perimeter.
- Select optional additive items from a list appropriate to your building type.
- If necessary, adjust project location and various mark-ups.

CostLink/AE then automatically generates an instant cost estimate for you. You can immediately view or print the estimate in as much or as little detail as necessary with our flexible data display options.

Built-in RS Means data: With RS Means cost data built-in and seamlessly integrated with your cost estimate, we've already done most of the work for you.

MODIFIABLE: Your estimate can be refined and updated quickly and easily as your project evolves. You can refine your estimate by changing quantities, by making simple drag-and-drop material substitutions from the built-in RS Means databases, or by adding materials and systems common to your project type—all with minimal input time and effort.
11,000 installed assembly costs, 20,000 installed line item costs, 75 parametric models, prebuilt templates for assembling your cost estimates by UniFormat, MasterFormat, or any customized work breakdown structure; cost factors for over 700 U.S. locations."

PROS:

- Uses R.S. Means cost data
- Does not require detailed plans and specs
- Building Systems Design, Inc. in business since 1983
- Good reputation; partners with the AIA, CSI, and R.S. Means
- Parametric cost modeling: Parametric modeling seems to be very useful from the point of view of the projects to be estimated, as that approach is based more on areas than a lot of specific line items.

CONS:

- May perhaps be too simple for our type of project
- Seems more geared to new construction, no emphasis on restoration or rehabilitation
- May lack sufficient building models for use on a military base
- Lacks numerous work component, labor and material cost items for restoration and rehabilitation projects

Decision:

The CostLink/AE Estimating program will be used to cross check estimates with the RSMeans programs. If CostLink/AE works well for our purposes, we may switch to using the CostLink program as the primary estimating program and use RSMeans as the cross check, back-up system. CostLink/AE should allow us to quickly estimate the various projects. However, the drawback is the number of inputs we would need to calculate and enter into the system for the specific special works needed in all restoration, rehabilitation and even into renovation projects.

We may only need to work up one set of the specific numbers for both the R. S. Means Estimating System and the CostLink/AE system. If that is the case, we will use both the CostLink/AE System as well as the R. S. Means Cost Estimating System cross checking all estimates for accuracy.

RS MEANS Construction Data Systems

http://www.meanscostworks.com/

There are three methods available for estimating from RSMeans: Manuals for hand calculations or field referencing costs; CDs of various programs for estimating, bidding, job accounting, construction management, etc; or the new CostWorks on-line interactive estimating program.

The following comments were taken directly from their web site concerning the on-line CostWorks program.

"What is MeansCostWorks.com?
It is 24/7 online access to the famous RSMeans database of construction and square foot costs, combined with comprehensive estimating capabilities that can be tailored to your specific needs. MeansCostWorks.com offers all 85,000 RSMeans UNIT PRICES, 25,000 BUILDING ASSEMBLIES and 42,000 FACILITIES REPAIR & REMODELING COSTS covering every category of construction. You can estimate with open shop or union labor costs, SI Metric or U.S. Customary units, traditional 16-Division or new 50-Division CSI format. Costs can be adjusted automatically for local materials and labor cost conditions.

How does it work?
You simply subscribe and set up your estimating and cost book preferences. You can then make a reliable Construction Cost estimate or Square Foot estimate using the simplified Means cost tables, or simply look up selected line items as needed. You can customize, save, preview, create reports, export data to Excel and share your estimates online with other project team members.

Who is MeansCostWorks.com for?
MeansCostWorks.com is for any professional who wants fast access to accurate construction cost data with estimating functions, such as estimators, contractors, designers, engineers, architects, facilities professionals, government officials, universities."

PROS:

- Longest established construction database company in US
- Industry standard cost databases
- Ease of use with internet resident documents

- Paired with other data based programs used by federal agencies including DoD

CONS:

- Developed mainly for construction companies
- Requires detailed knowledge of materials used in the project
- Perhaps too detailed and comprehensive for conceptual projects
- Has PC based CD program for estimating
- Has manuals for use in field and for hand calculations for older buildings that aid in building library of custom numbers needed for estimating older structures.

Decision:
RS Means has developed and supports three ways to bid projects. The CostWorks online program listed above is one system. You can purchase CDs and perform bids and estimates on your own computer off-line, or, if needed, purchase the data manuals and perform bids and estimates in the field or office by hand calculation. Often this is a necessary exercise for older, historic buildings. We have tried the 2-week trial period of CostWorks, but there was so much work in developing our own library of historic building work components, we switched to the manuals and performed to estimate by hand and then entered the data into the CD computer version of the program. We found we were able to calculate the estimates to within reasonable expectations. It is our intention to utilize this program of manuals and CDs by RS Means and cross check the results with CostLink/AE listed above.

Eos ADVISER

http://www.eosgroup.com/

The following comments were taken directly from their web site.

"Eos Group leverages the Sage Timberline Office construction estimating software as an enterprise estimating platform for market-leading firms in the Building, Industrial, Process, Transportation, Environmental and Energy markets. Our goal is to improve your business through increased productivity and improved efficiency - a successful combination of Sage Timberline Office construction estimating software, and Eos Group software and professional services.

Eos Explorer:
As a comprehensive tool that manages all the different aspects of the preconstruction estimating process, Eos Explorer addresses the request, creation, management, verification, review and reporting work processes related to estimating. Eos Explorer is a highly-configurable collaboration platform, allowing your preconstruction team to have input and visibility into the estimate development process. It provides a comprehensive overview of all project estimates, including

resource planning, tracking development stages (Conceptual, Schematic, etc.), estimating volume, project types and estimate status (Awarded, Lost, etc.).

With Eos Explorer, you can (Features):

- Control user capabilities and data access through a comprehensive security system
- Manage an unlimited number of estimates across a single or multi-office estimating department
- Control the estimate creation process including enforcement of corporate standards and establishing required fields
- Track all estimating-related files (Microsoft Excel® & Word®, PDF, JPG, etc.)
- Create and manage unlimited, user-defined job classifications for use in categorizing, retrieving and reporting across estimates
- Track unlimited, user-defined company types (Architect, Civil Engineer, Owner's Rep) or user-defined resources (Senior Estimator, Electrical Estimator) and utilization rates across estimates
- Search for estimates in the repository based on user-defined attributes (job size, project characteristic, region, etc.)
- Archive and retrieve past estimates and related documents
- Export directly into Microsoft Excel®, Outlook® & Project®

Benefits

The benefits of Eos Explorer can create efficiencies throughout your entire company.

- Gain control of the estimate management process
- Create and manage a master list of all estimates - even across multiple offices
- Establish required fields when creating new estimates
- Enforce the use of templates to ensure consistency
- Control which users can view and edit specific estimate folders
- Search and locate estimates on your local computer, in your regional office, or across multiple offices
- Assign estimating staff to estimates and track resource utilization
- Validate estimates through rules-based diagnostics
- Generate trending reports, perform won/lost analysis, or track volume per estimator
- Generate estimate trending reports across estimate types, project types, clients and time periods
- Create enterprise bid schedules in MS Project® to plan and forecast estimates and resource utilization.

Eos Adviser:

Eos Advisor is a web-based budget estimating solution built for the pre-construction and design-build markets. It is a quick and easy way to access your company's historical data to establish conceptual or feasibility estimates and benchmarking studies. In just a few short steps, you can

generate averages, as well as ranges of normalized costs for each element of a given project. Advisor addresses all the categories of the design/build markets and can automatically adjust for location and time adjustment, escalating historical costs to present-day or future costs.

Advisor allows estimators, project managers and business development staff to quickly search past budgets and adjust current projects for inflation, job size and location, and supports the benchmarking process so they can make better decisions and reduce risks.

With Advisor, you can (Features):

- Import and store an unlimited number of projects from detailed estimating and cost management systems
- Add an unlimited number of attributes to projects for use in classifying and retrieving them
- Browse historical data using a user-defined classification system (vertical industry, building types, etc.)
- Search for historical data based on user-defined attributes (job size, project characteristic, region, etc.)
- Define an unlimited number of cost elements and cost categories
- Compare selected budgets and/or cost elements side-by-side in chart or table format
- Export directly into Microsoft Excel on the user's machine

Benefits

The benefits of Advisor are both powerful and useful:

- Produce better budget estimates faster than your competition, and cheaper than you're doing them now
- Respond to new business opportunities with defensible data based on your history
- Reduce risks by performing 'sanity checks' (benchmarking) in minutes, rather than hours or days
- Provide enterprise-wide access to historical data through centralized storage of historical projects
- Collect proprietary data into an open, common repository accessible by industry-standard tools
- Make the most of existing investments by leveraging existing data and technologies
- Reduce IT costs through a centralized management and a zero-install (thin) client deployment”

PROS:

- Very well thought through and complete system
- Has different programs for different uses (e.g., Eos Advisor for budget estimates, Eos Explorer for more detailed projects)

- Can use historical data from previous projects (a benefit only when your company has a database of previous work)
- Uses Sage Timberline software for actual construction estimating (see #7 below)
- Eos Group, Inc. founded in 1995

CONS:

- Developed for larger companies with large projects and multiple projects to estimate and bid which could be useful for military base facility managers
- Apparently need to get several different software packages for our purposes
- Also lacks specific information necessary for restoration, rehabilitation and renovation type projects

Decision:
Eos Advisor and Eos Explorer are both very good systems. The Eos Advisor is specifically oriented to budget estimates. If there was a data base already available for use with this system relating to the existing buildings we are to review I would select this system first or possibly second over the others depending on the reliability of the data base. However, without an established data base, it may prove too time consuming beyond what is already necessary to produce for the development of 24 accurate estimates.

MAXWELL SYSTEMS QUESTMX ESTIMATOR

http://questestimating.maxwellsystems.com//index.php?action=maxwell/products/estimation/quest

The following comments were taken directly from their web site.

"QuestMX Estimator, the industry's premier all-in-one takeoff and estimating solution, provides tools that help you bid more jobs, win more work, and increase profitability. Beginning with digitized takeoff and concluding with generating the final bid, QuestMX offers unique features to ensure accuracy and efficiency.

Learn more about the key capabilities of QuestMX Estimator:

- Digitized Takeoff
- Notepad
- Database
- Estimate
- Summary
- Bid Day and Proposals
- Change Orders
- Purchase Orders
- 3-D Visual Assemblies

- Integration with Accounting

Key Benefits:

- Takeoff and estimating solution in a single convenient application
- Complete more estimates and detailed bids in a fraction of the time it's taking you now
- Improve accuracy of estimates and avoid costly mistakes
- Increase efficiency and speed across the entire estimating process"

Two of the seven reasons given on their website as to why you should choose them:

1. You need construction-specific solutions that improve the way you do business.
Maxwell Systems has earned its reputation as an innovator of software solutions, exclusively serving the construction industry including General Construction; Subcontractor, Specialty Trade, and Service; Heavy Construction, and Property Management. For more than 30 years, we've been a trusted leader with the knowledge and stability to meet the changing needs of an evolving industry. Our award-winning software is leading the industry in trade-specific solutions that meet the business requirements of construction company owners and empower the workforce with tools that streamline processes and maximize profits for every project.

Maxwell Systems is truly unique by addressing the entire construction project lifecycle — from digital takeoff through final cash payment. We offer contractors end-to-end, integrated software solutions that enable a new level of continuity and productivity across the company, as well as allow construction business owners to achieve better insight, analysis, and financial oversight for strategic and timely decision making.

2. You want easy-to-learn, easy-to-use software without sacrificing robust functionality.
Our solution-centric approach to software development and service allows us to partner with customers to best ensure each has the training and knowledge to use the software as it best suits their unique needs. We provide "blended training" so that you can choose from learning in a classroom setting at one of our regional facilities, learning online through individual or group sessions, or learning the software by having one of our training professionals come to your office and train on your own system. There is training that's convenient for any customer, any need, and any location.

Our solutions are mature with advanced functionality and broad capabilities. They are proven solutions with hundreds of installs every year. Industry professionals, customer feedback, and years of experience have shaped the industry-specific software solutions that Maxwell Systems offers today. An end-to-end software solution is available for any size business, and each solution is

tailored to fit a specific industry segment. So contractors are sure to find the ideal software solution to help run their business with improved efficiency and accuracy whether at the office, warehouse, field, or plant."

PROS:

- Maxwell Systems has been in business since 1975
- The program has digital take-off as an integral feature
- Estimating, Job Accounting and Project Management

CONS:

- Geared towards construction companies
- It is not clear how well this works for conceptual projects without plans and specs

Decision:
The "QuestMX Estimator" appears to be a good system, but it also lacks the requisite cost items for restoration, rehabilitation and renovation. There is no established data. Lacking any clear indication the system works well and quickly with planning level plans and specification, the QuestMX Estimator system was not chosen for this project.

QUICK BID

http://www.oncenter.com/products/qb/index.html

The following comments were taken directly from their web site.

"By doing away with the manual takeoff process and automating all of your calculations, On-Screen Takeoff and Quick Bid can help you drastically reduce missed items and miscalculations. Everyone knows that these two mistakes can be very costly and bite into your profits.
With On-Screen Takeoff, you will be able to view, measure, and markup plans on the screen. Measuring square footage, perimeters, and volumes of simple and complex rooms has never been easier. Once you have marked all of your walls, doors, flooring, roofing, electrical, etc… you can then import of this data from OST into Quick Bid.

Once the takeoff is complete, contractors import the information to Quick Bid to create accurate bids and well organized reports. With this construction software, estimators and contractors can easily track material and labor costs, burdens, tax, and overhead. You can quickly apply material pricing from predefined databases. In addition, Quick Bid allows you to calculate and adjust on-the-fly labor rates, tax, profit, and misc expenditures.

INCREASE ACCURACY AND PROFITS

- Minimize data-entry mistakes and calculation errors
- Avoid bidding too low or too high by knowing the cost of the job before submitting it
- Quickly fine-tune labor production
- Evaluate detailed cost information
- Break down labor by crew, unit, price, lump sum price, production, or man-days
- Analyze material, labor rates, change orders, and alternates
- Add indirect and direct expenses, contingencies and any special conditions
- Control material costs by conditions linked directly with On-Screen Takeoff® quantity detail

SAVE TIME IN THE BID PROCESS

- Automatically calculate material and instantly generate materials lists
- Easily update price quotes and quickly recalculate last-minute addendum changes
- Minimize time for change orders and alternates
- Assemblies:
    - Access a library of assemblies that store condition specific material information and labor production with a click of a button
    - Click here to learn about some of the current manufacturers that have contributed assemblies to Quick Bid users.
- eQuote:
    - Submit and receive material quote requests from suppliers quickly via this email feature.
    - Click here to learn more about eQuote

STAY ORGANIZED

- Document and organize information to track and analyze changes as the project evolves
- Create reports that provide an explanation of all costs associated with the intended scope(s) of work
- Compare unit price of bid against historical cost data
- Single out conditions by area, section, division, floor, room etc
- The ability to have multiple users in a database at the same time providing consistency and control over projects"

PROS:

- Easily handles large projects
- Ease of use with coordinated take-off program
- Customizable
- Digitized take-off

CONS:

- Geared towards contractors bidding on jobs

- It is not clear how well this works for conceptual projects without detailed plans and specs
- Does not appear to have much data on restoration, rehabilitation or renovation
- Not clear on how well budget estimates can be put together

Decision:
Lacking the necessary data base needed for restoration, rehabilitation or renovation projects and not appearing to be as customizable as needed to input necessary data if chosen, we are not selecting this product.

PLAN SWIFT

http://www.planswift.com/

The following comments were taken directly from their web site.

"Top 10 Reasons to Buy PlanSwift:

- PlanSwift is very easy to learn. Just point and click!
- Most estimators can estimate 10X as fast using PlanSwift vs. traditional methods (ruler & highlighter).
- Astounding accuracy. Precisely trace/digitize items on the plan using your mouse or a digitizer.
- Create an audit trail...if it's colored, it's counted!
- Save $ on gas, printing, and shipping costs. No more driving to pick up plans...just email them.
- Top rated customer support...we have REAL ESTIMATORS on staff who can speak your lingo!
- Go Green! Go Paperless! It's cheaper, faster, and more environmentally friendly.
- Best value for your $. As shown in our testimonials, you get the most features for the best price.
- Extremely customizable & powerful. The software can be customized to suit your exact needs. You can do your takeoff + estimate in the same software.
- PlanSwift is becoming the platform. Because of its integration capabilities and our SDK (Software Developers Kit), many online planrooms and estimating software partners are creating integrations which will allow you as a customer to have a positive, integrated experience. Check out our partner's page."

PROS:

- Customizable
- Widely used
- Do take-off and estimate in the same program

CONS:

- Geared towards contractors bidding on jobs
- It is not clear how well this works for conceptual projects without plans and specs companies

Decision:
PlanSwift by Tech Unlimited, Inc. does appear to be a good selection for many estimating applications, and lacking better website information concerning budget preparations, we decided not to use the Plan Swift program.

SAGE TIMBERLINE MASTER BUILDER/OFFICE

http://www.sagecre.com/products/master_builder/estimating
http://www.sagecre.com/products/timberline_office

The following comments were taken directly from their web site.

"Save time, curb risk, and maximize profits by automating your estimating. Sage estimating solutions give you multiple take-off options, industry-specific pricing databases, and integration with our accounting modules. With Sage Timberline Office construction software you have the tools to build winning estimates and profitability into each job.

Sage Timberline Office construction bid software solutions get extra muscle from a full range of industry-specific databases. Packed with thousands of items, these databases are easily modified so you can enhance them with your own unique items, formulas, and assemblies. You can also choose to integrate with RSMeans or update prices from Trade Service Corporation.

Estimating Basic:
This is the minimal version, and is not appropriate for our project.

Estimating Standard:
Built to accommodate company growth, Estimating Standard serves as the foundation of proven reliability, functionality, and flexibility. Maximize productivity and profitability by creating more bids in less time. You'll win more jobs and curb risks with the assurance of accurate and error-free estimates. The Database Builder Wizard walks you through the time-consuming task of set up to get you operational quickly.

Database Builder Wizard

Let the Database Wizard walk you through and streamline the customization setup of your database to get you up and running quickly and efficiently. You'll get the power you need to create twice as many estimates compared to generic spreadsheets—meeting deadlines with ease while presenting the kind of comprehensive, precise estimates that win you more jobs and increase revenue.

Easy to Learn
Estimating Standard includes a comprehensive online help system that slashes the learning curve as you use software help to walk step-by-step through many of the common estimating tasks. You can also do key word searches, review the table of contents, and locate by topic answers to your questions. These capabilities make Estimating Standard extremely easy to learn—a good tool for getting new estimators up to speed quickly.

Key Efficiencies
Estimating Standard combines key estimating efficiencies with all the ease and intuitive point-and-click, drag-and-drop technology available. Take advantage of industry-specific databases including RS Means for even more estimating muscle. And, with Explorer, you can sort estimates by estimator, bid date, estimate number, and job type with the Estimating Explorer management tool.

Advanced Spreadsheet Capability
With Estimating Standard's spreadsheet, everything you need to build an estimate is available with the click of a mouse. Estimating Standard makes it easy to analyze and fine-tune your estimates. You can rename and move columns around. Open and compare several estimates at once. Even drag items from one spreadsheet into another for quick creation of new or alternate estimates.

Want to view your work by location? You can do that too. In fact, with the click of a mouse you can look at your estimate by division or item, takeoff order, assembly, bid item or other user-defined Work Breakdown Structure (WBS) code. You can also create and save unlimited, personalized views of the spreadsheet while you work. So later, you can see the estimate just the way you need to during review. Plus, estimates can be viewed in full detail or summarized to the major estimate divisions.

Ever forget to save your work? Don't worry. Unlike typical memory-based spreadsheets, Estimating Standard's disk-based spreadsheet resides on your hard drive. So you never have to save your estimate. Or worry about losing your work.

Fast Takeoff

There's more than one way to do takeoff. Estimating Standard gives you several—all designed to give you more accurate estimates, in less time:

- Quick takeoff—Simply drag one or more items from the database directly into the spreadsheet. Enter dimensions and the software automatically calculates all quantities for you.
- Item takeoff—If you want to work with database items before they go into your estimate, you can drag them into the item takeoff window. When you're ready, just click the OK button to add them to your spreadsheet.
- Smart Assemblies—To save lots of time, you can take off all the items of a wall, door, concrete slab or other building component in just one step. Estimating databases include a variety of common assemblies that you can modify. Or you can build your own.

Estimating Explorer

The key to estimate control is organization. Estimating Explorer eliminates time-intensive searches by automatically creating an up-to-date master list and description of every estimate in your system. Within seconds you can sort your estimates by estimator, bid date, estimate number or a variety of other criteria to locate an estimate. Once you do, you're just one click away from the estimate's spreadsheet.

Managing your estimates also means understanding the big picture. Estimating Explorer not only organizes your estimates, but gives you the tools to stand back and analyze your work. Need to know what your estimating volume is by estimator? Or your year-to-date estimate volume? You can find these and many other answers using Estimating Explorer's management reports and graphs. Estimate information can also be linked to Microsoft Excel or Access for further analysis or custom graphing.

Presentation-quality reports

These days, your numbers have to look good. With Estimating Standard, you can produce professional-looking, easy to-understand reports for clients and upper management. Not only can you control the look of your reports, you can control the content. You can create custom headers and footers and include graphics. And Estimating Standard's WYSIWYG (what you see is what you get) reporting lets you quickly strip, add to and tweak the estimate report just the way you want. Then print. Professional reporting has never been simpler.

Estimating Extended:

Sage Timberline Office estimating software offers the most comprehensive package of estimating

tools available. Starting with the power of the Estimating Standard module, Extended offers greater takeoff, analysis, and productivity capabilities such as Model Estimating, an advanced conceptual estimating tool. Create detailed, accurate conceptual estimates quickly through an onscreen project questionnaire—Model Estimating does the rest.

Simplified Setup
Spend less time getting started and more time growing your business with Sage Timberline Office estimating software. The time-consuming task of setting up and building a database has been streamlined with the Database Builder Wizard. The Wizard walks you through the necessary steps of establishing your database more quickly and efficiently, saving you time and money and allowing you to quickly take full advantage of the Estimating software sooner.

Slash takeoff time
Estimating Extended offers estimators several ways to take off estimates in less time. With quick takeoff, you simply drag individual or groups of items from the cost database directly into the spreadsheet on the screen. Enter dimensions, and Sage Timberline Office estimating software calculates all quantities for you. Or, if you prefer, you can use item takeoff to work with items prior to pulling them into the spreadsheet.

For ultimate time-savings, Smart Assemblies or Model Takeoff is your tool, letting you take off all the items in a wall, door, concrete slab or an entire building core and shell all at once. A takeoff audit trail is also included in Estimating Extended, so you can double-check your work at any time.

Manage complex estimating with variable pricing
Choose the materials pricing and labor production rates that make the most sense for the job whether that means the default settings or your own custom prices and rates. You're able to store up to 20 different prices for a single item and 10 different labor production rates.

Create detailed conceptual estimates in minutes
Model Estimating helps you generate detailed conceptual estimates by answering a series of basic questions about a project. You simply respond to an on-screen survey and let Model Estimating tap into the first-of-a-kind Knowledgebase of Sage Timberline Office estimating software: Electrical, Commercial or Residential, to produce fast, precise estimates. Backed by extensive detail, everything you need to support your bid, concept, or estimate is there in black and white—costs, quantities, crews, hours, and waste factors.

And with Model Estimating, you can easily modify and monitor your estimate as changes are made to the design or project plan. You'll know exactly how those changes impact your estimate, before they add up to a budget issue,

Keep bids and quotes within reach
The subcontractor bid grid of Sage Timberline Office estimating software offers a simple way to store, analyze and select subcontractor bids and quotes by individual or groups of items. Log each subcontractor's name, bid quantity, unit price, total bid amount, and any notes in the pop-up grid. Then just click on the bid you'd like to use, and the estimate instantly calculates the item based on your decision. What if you change your mind? Simply check a replacement bid, and the substitution is made instantly.

See it all from a new angle
With Work Breakdown Structure (WBS) codes, you can organize estimates a variety of ways: by Phase Drawing detail or Location, like Floor 1 or 2. Just define and assign your own WBS codes to any estimate item, either in the database or during takeoff. With the ability to attach up to 12 WBS codes to each item, your analysis and reporting possibilities are endless with Sage Timberline Office estimating software. Not only can you work with an estimate in any order you choose, you can change the order instantly using the sequencing tabs at the bottom of the spreadsheet.

Easily make adjustments
Whether it's during analysis or at the last minute, making adjustments to an estimate is a snap in Estimating Extended. The software's adjust columns feature lets you revise all, or a portion of, the quantities, amounts, and prices contained within a column at once. Calculate by a percentage, by multiplying or dividing and amount, by replacing an amount, or by spreading an amount proportionally over the selection.
On bid day, when time is everything, adjustments can be easily made through the Estimating Extended totals page. Log in last-minute cuts and adds, and the software automatically generates the change throughout all the affected areas of the estimate. Or use the adjust job totals feature to match a pre-defined job total or cost per unit, or to play with the final numbers.

Go global
Estimating Extended makes it easy for you to take off an estimate in one system of measurement and deliver it in another. With Sage Timberline Office estimating software, estimates can automatically be converted from Imperial units to metric units or vice versa.

Estimating Explorer

The key to estimate control is organization. Estimating Explorer eliminates time-intensive searches by automatically creating an up-to-date master list and description of every estimate in your system. Within seconds you can sort your estimates by estimator, bid date, estimate number or a variety of other criteria to locate an estimate. Once you do, you're just one click away from the estimate's spreadsheet

Managing your estimates also means understanding the big picture. Estimating Explorer not only organizes your estimates, but gives you the tools to stand back and analyze your work. Need to know what your estimating volume is by estimator? Or your year-to-date estimate volume? You can find these and many other answers using Estimating Explorer's management reports and graphs. Estimate information can also be linked to Microsoft Excel or Access for further analysis or custom graphing.

Present your work with flair

With so much riding on it, it's critical that the work you produce for clients and upper management be professional-looking and easy to understand. Estimating Extended reports are just that, with the ability to include different type fonts and sizes, bolding, italics and colors. Using Sage Timberline Office estimating software, you can create custom headers and footers, including graphics, and use WYSIWYG (what you see is what you get) reporting to quickly strip, add to and tweak an estimate report just the way you want.

Sage Timberline Office estimating software also delivers a number of advanced reports to help in estimate analysis.

Print the cost variance report to quickly see where costs and quantities have varied between two similar projects. Or view the cost comparison report to zero in on where unit costs have changed between conceptual, interim, and final estimates on a project.

Estimating Modules

Our complete line of job estimating software modules make it simple to customize your system for your specific needs and requirements. No matter what size your company is, or what kind of construction or real estate business you're involved in, our modules will help streamline your estimating processes and boost your productivity. Note: For use with Estimating Standard or Estimating Extended only.

Estimating Databases

Choose to jumpstart your database building efforts by tapping into a variety of pre-build industry-specific estimating databases. Easily modified, these databases contain thousands of items which can be updated with your own prices and productivity factors. Incorporating your company's own estimating procedures and policies as they relate to unique items, formulas, assemblies, and productivity factors will ensure you generate more precise estimates with improved efficiency."

PROS:

- Widely used, well-respected program
- Many ways to customize

CONS:

- Geared towards construction companies
- Intended for use by companies doing many estimates
- Marketing information does not mention renovation projects specifically
- It is not clear how well this works with conceptual projects that do not have detailed plans and specs

Decision:
Website lacks specific information on existing building estimating. We did not choose this product.

US COST SUCCESS ESTIMATOR

http://www.uscost.com/successestimator.asp

The following comments were taken directly from their web site.

> **"Powerful, Flexible Estimating Software**
> Since 1991 Success Estimator has been used by architects, engineers, construction managers, owners and government agencies worldwide. Its unparalleled combination of off-the-shelf estimating functionality and customization capability make it the ideal solution for any organization with unique estimating requirements. From user-defined parametric cost models to detailed "bottom-up" estimates, Success Estimator's ability to conform to your company's methods & procedures is simply unmatched.
> **Features and Benefits**
> **LOOK-UP TOOL**
> Easily search among thousands of cost items or assemblies using partial text based descriptions in seconds. The user is also given the unit cost information for the item / assembly and can also quantify it prior to adding it to the project.
> **CITY INDEX TOOL**

Increase the accuracy of your R.S. Means based projects by instantly applying the Means city index factors based on state, city and zip code. Adjust labor, equipment and material costs for all line items.

PARAMETRIC COST MODELS

Success Estimator's powerful modeling capabilities allow companies to use their own specific legacy data and engineering algorithms to develop meaningful, accurate cost models. As more information becomes available, information in the model can be adjusted at a very detailed level, taking the estimate from feasibility to 100% completion.

CENTRALIZED COST DATA

Use R.S. Means, Richardson's and your company's legacy cost data individually or in combination on any estimate thereby insuring the most accurate and up-to-date information is being used.

ASSEMBLIES

Generate estimates faster than ever before by utilizing one of the many R.S. Means Assemblies libraries or build unique custom assemblies with your company's legacy cost information.

ESTIMATE ANALYSIS

Compare actuals to estimates, variances across multiple projects or cost trends on commodities by using one of the numerous macros shipped as part of Success Estimator. Use the Success Estimator Visual Basic programming language to write custom macros directly in the base application.

CONNECTIVITY

Seamlessly integrate Success Estimator as part of your overall cost controls program. Shipped as part of the base application, AutomationTool allows integration and interoperability with other enterprise applications such as CAD, Accounting, Project Management, Inventory Management and various SQL databases.

SCHEDULE EXCHANGE

Schedule Exchange provides the enterprise with a flexible data exchange engine allowing for the seamless synchronization of your Primavera® Schedule and your Success Estimator estimate, not only saving time, but increasing the efficiency of both applications.

SUPERIOR SUPPORT & SERVICES

Every Success Estimator sale is backed by the cost professionals at U.S. COST. For over 20 years our team of estimators, engineers, developers and analysts have provided exceptional professional services supporting our clients throughout the entire estimating process.

PUBLISH ESTIMATES TO SUCCESS ENTERPRISE

Combine Success Estimator & Success Enterprise to form a powerful, global estimating

suite. Enable all estimating stake holders to have access to the entire estimating enterprise via any internet-connected computer.
Call 1.800.955.1385 inside U.S. or 770.481.1600 outside U.S. for a free on-line presentation or more information. Or email us at sales@uscost.com "

↑ Top

Why use Success? Just ask our clients

Architect of the Capitol
Bechtel
Federal Aviation Admin.
HNTB
Lockheed Martin
NASA
U.S. Department of Defense
U.S. Department of Energy
U.S. Department of State
U.S. General Services Admin.
U.S. Marine Corps
U.S. Navy"

PROS:

- U. S. Cost, Inc. has been in business since 1983
- Customizable
- History of government use including Department of Defense
- Parametric cost modeling. Parametric modeling seems to be very useful from the point of view of the projects to be estimated, as that approach is based more on areas than a lot of specific line items.

CONS:

- Marketing information does not mention renovation projects specifically
- It is not clear how well this works with conceptual projects that do not have detailed plans and specs

Decision:
As with all the other cost estimating programs listed in this addendum, the program is long on new construction and short on capabilities with older existing building construction activities.
However, this program has many good attributes and we may try the free on-line program to test its capabilities.

WINESTIMATOR

http://www.winest.com/products/estimatingsoftware/default.aspx

The following comments were taken directly from their web site.

"WinEst eTeam is the professional estimator's solution for efficient project cost estimating teamwork. It is designed for companies where collaborative estimating is important.

With WinEst eTeam, estimates can be produced and shared from anywhere, across the hall or across the globe.

Estimators of all disciplines can collaborate on the same estimate at the same time, across networks or the Internet."

Additional eTeam Benefits:

Collaborative Communication

- Enables multiple estimator teamwork, sharing and input, on the same estimate, at the same time.
- File security and access controls help safely accommodate and coordinate multiple estimators

What If Analysis

- Apply estimate items to base or up to 700 alternates.
- Control alternate status within the estimate: pending, approved, denied.

Internet Connectivity

- Easily email estimates between project team members
- Share cost knowledge databases and estimate information via the web.
- Broadcast RFI's to select vendors, supplies or subs based on a variety of criteria.

Interfaces

- Built-in flexible export design tool allows multiple application interfaces.

Multiple Document Interface

- Open multiple estimates at a time and easily drag and drop items between multiple estimates.

Reports and Forms

- Customizable reports.

- Business forms tools allow flexible creation of customized HTML and RTF-based business forms and documents."

PROS:

- Takeoff program available as an add-on
- Customizable
- Ability for multiple users to work on the estimate simultaneously

CONS:

- Marketing information does not mention renovation projects specifically
- It is not clear how well this works with conceptual projects that do not have detailed plans and specs

Decision:
We did not choose this program since there were others that met our program needs for final testing.

PACES

http://www.fecpractice.com/?p=PACES

The following comments were taken directly from their web site.

"The Financial and Economic consulting (FEC) Practice is a section of ERA / AECOM dedicated to assisting clients with making sound investment, financial, and economic decisions concerning their facilities, environmental, and transportation costs. Our clients typically have a long-term stake in their facilities and infrastructure and want to obtain the maximum return on their investment dollars.

PACES is used by federal agencies and private-sector companies to develop budgetary facility and site work construction, renovation, and life cycle cost estimates.

PACES software is a parametric cost engineering tool used to help plan and budget facility and infrastructure construction and renovation costs. PACES uses pre-engineered model parameters and construction criteria to accurately predict construction costs with limited design information.

In PACES, quantities can be changed at various places within the model to reflect project specific conditions. The use of the parametric models helps avoid errors and omissions that are commonly associated with traditional cost estimating procedures, particularly during planning and early design phases."

PROS:

- Federal track record, used for many federal projects (including DoD projects)
- Geared towards the type of adaptive reuse projects targeted for this project
- Seems to be geared to projects that haven't been designed yet (no plans and specs)
- Renovation projects are specially targeted
- Has a condition assessment feature that integrates into cost estimation program
- Is compatible with Success Estimator Version 6.6.18
- Parametric cost modeling. Parametric modeling seems to be very useful from the point of view of the projects to be estimated, as that approach is based more on areas than a lot of specific line items.

CONS:

- Does not appear to have readily updateable cost data, although a new version is supposed to be coming out in the next month or two
- Does not have as widespread a user group as some of the other programs (but a pro is that a large part of its user group is federal agencies)

Decision:
We may need to download and try the free on-line sample version for a week. They have specific mention of renovation work capabilities and a large federal agency user group.

Addendum submitted by

Douglass C. Reed

Appendix E:
LEED Point Calculation Detail

Attached, are print-outs for each of the 18 LEED Point calculations for new construction and modernization Project Alternatives.

Table III-5. LEED Certification: FTBL 001 All Project Alternatives

Category	02 Demo and New Construction	03 Modernization with HPS	04 Modernization with ATFP	Maximum Points
Sustainable Sites	11	11	11	26
Water Efficiency	2	2	2	10
Energy and Atmosphere	19	21	21	35
Materials and Resources	4	9	9	14
Indoor Environmental Quality	14	13	13	15
Innovation and Design Process	1	1	1	6
Regional Priority Credits	1	1	1	4
Total	**52**	**58**	**58**	**110**
Certification Level	**Silver**	**Silver**	**Silver**	**NA**

Sources: Center for Resource Solutions; Comfort Design; BAE Urban Economics, 2012.

LEED 2009 for New Construction and Major Renovations

Project Checklist

Fort Bliss Building 001-02

Y	?	N			
11	**3**	**12**	**Sustainable Sites**	Possible Points:	**26**
Y			Prereq 1	Construction Activity Pollution Prevention	
1	-	-	Credit 1	Site Selection	1
-	-	5	Credit 2	Development Density and Community Connectivity	5
-	-	1	Credit 3	Brownfield Redevelopment	1
-	-	6	Credit 4.1	Alternative Transportation—Public Transportation Access	6
1	-	-	Credit 4.2	Alternative Transportation—Bicycle Storage and Changing Rooms	1
3	-	-	Credit 4.3	Alternative Transportation—Low-Emitting and Fuel-Efficient Vehicle	3
2	-	-	Credit 4.4	Alternative Transportation—Parking Capacity	2
1	-	-	Credit 5.1	Site Development—Protect or Restore Habitat	1
1	-	-	Credit 5.2	Site Development—Maximize Open Space	1
1	-	-	Credit 6.1	Stormwater Design—Quantity Control	1
-	1	-	Credit 6.2	Stormwater Design—Quality Control	1
-	1	-	Credit 7.1	Heat Island Effect—Non-roof	1
-	1	-	Credit 7.2	Heat Island Effect—Roof	1
1	-	-	Credit 8	Light Pollution Reduction	1
2	**6**	**0**	**Water Efficiency**	Possible Points:	**10**
Y			Prereq 1	Water Use Reduction—20% Reduction	
-	4	-	Credit 1	Water Efficient Landscaping	2 to 4
-	2	-	Credit 2	Innovative Wastewater Technologies	2
2	-	-	Credit 3	Water Use Reduction	2 to 4
19	**9**	**0**	**Energy and Atmosphere**	Possible Points:	**35**
Y			Prereq 1	Fundamental Commissioning of Building Energy Systems	
Y			Prereq 2	Minimum Energy Performance	0
Y			Prereq 3	Fundamental Refrigerant Management	
15	-	-	Credit 1	Optimize Energy Performance	1 to 19
4	-	-	Credit 2	On-Site Renewable Energy	1 to 7
-	2	-	Credit 3	Enhanced Commissioning	2
-	2	-	Credit 4	Enhanced Refrigerant Management	2
-	3	-	Credit 5	Measurement and Verification	3
-	2	-	Credit 6	Green Power	2
4	**2**	**12**	**Materials and Resources**	Possible Points:	**14**
Y			Prereq 1	Storage and Collection of Recyclables	**0**
-	-	3	Credit 1.1	Building Reuse—Maintain Existing Walls, Floors, and Roof	1 to 3
-	-	3	Credit 1.2	Building Reuse—Maintain 50% of Interior Non-Structural Elements	1
-	-	3	Credit 2	Construction Waste Management	1 to 2
-	-	3	Credit 3	Materials Reuse	1 to 2

Y	?	N			
			Materials and Resources, Continued		
2	-	-	Credit 4	Recycled Content	1 to 2
2	-	-	Credit 5	Regional Materials	1 to 2
-	1	-	Credit 6	Rapidly Renewable Materials	1
-	1	-	Credit 7	Certified Wood	1
14	**1**	**0**	**Indoor Environmental Quality**	Possible Points:	**15**
Y			Prereq 1	Minimum Indoor Air Quality Performance	**0**
Y			Prereq 2	Environmental Tobacco Smoke (ETS) Control	**0**
1	-	-	Credit 1	Outdoor Air Delivery Monitoring	1
1	-	-	Credit 2	Increased Ventilation	1
1	-	-	Credit 3.1	Construction IAQ Management Plan—During Construction	1
1	-	-	Credit 3.2	Construction IAQ Management Plan—Before Occupancy	1
1	-	-	Credit 4.1	Low-Emitting Materials—Adhesives and Sealants	1
1	-	-	Credit 4.2	Low-Emitting Materials—Paints and Coatings	1
1	-	-	Credit 4.3	Low-Emitting Materials—Flooring Systems	1
1	-	-	Credit 4.4	Low-Emitting Materials—Composite Wood and Agrifiber Products	1
1	-	-	Credit 5	Indoor Chemical and Pollutant Source Control	1
1	-	-	Credit 6.1	Controllability of Systems—Lighting	1
1	-	-	Credit 6.2	Controllability of Systems—Thermal Comfort	1
-	1	-	Credit 7.1	Thermal Comfort—Design	1
1	-	-	Credit 7.2	Thermal Comfort—Verification	1
1	-	-	Credit 8.1	Daylight and Views—Daylight	1
1	-	-	Credit 8.2	Daylight and Views—Views	1
1	**0**	**5**	**Innovation and Design Process**	Possible Points:	**6**
-	-	1	Credit 1.1	Innovation in Design: Specific Title	1
-	-	1	Credit 1.2	Innovation in Design: Specific Title	1
-	-	1	Credit 1.3	Innovation in Design: Specific Title	1
-	-	1	Credit 1.4	Innovation in Design: Specific Title	1
-	-	1	Credit 1.5	Innovation in Design: Specific Title	1
1	-	-	Credit 2	LEED Accredited Professional	1
1	**0**	**0**	**Regional Priority Credits**	Possible Points:	**4**
1	-	-	Credit 1.1	Regional Priority: Specific Credit	1
-	-	-	Credit 1.2	Regional Priority: Specific Credit	1
-	-	-	Credit 1.3	Regional Priority: Specific Credit	1
-	-	-	Credit 1.4	Regional Priority: Specific Credit	1
52	21	29	**Total**	Possible Points:	**110**

Certified 40 to 49 points Silver 50 to 59 points Gold 60 to 79 points Platinum 80 to 110

LEED 2009 for New Construction and Major Renovations

Project Checklist

Fort Bliss Building 001-03

Y	?	N			
11	**3**	**12**	**Sustainable Sites**	Possible Points:	**26**
Y			Prereq 1	Construction Activity Pollution Prevention	
1	-	-	Credit 1	Site Selection	1
-	-	5	Credit 2	Development Density and Community Connectivity	5
-	-	1	Credit 3	Brownfield Redevelopment	1
-	-	6	Credit 4.1	Alternative Transportation—Public Transportation Access	6
1	-	-	Credit 4.2	Alternative Transportation—Bicycle Storage and Changing Rooms	1
3	-	-	Credit 4.3	Alternative Transportation—Low-Emitting and Fuel-Efficient Vehicle	3
2	-	-	Credit 4.4	Alternative Transportation—Parking Capacity	2
1	-	-	Credit 5.1	Site Development—Protect or Restore Habitat	1
1	-	-	Credit 5.2	Site Development—Maximize Open Space	1
1	-	-	Credit 6.1	Stormwater Design—Quantity Control	1
-	1	-	Credit 6.2	Stormwater Design—Quality Control	1
-	1	-	Credit 7.1	Heat Island Effect—Non-roof	1
-	1	-	Credit 7.2	Heat Island Effect—Roof	1
1	-	-	Credit 8	Light Pollution Reduction	1
2	**6**	**0**	**Water Efficiency**	Possible Points:	**10**
Y			Prereq 1	Water Use Reduction—20% Reduction	
-	4	-	Credit 1	Water Efficient Landscaping	2 to 4
-	2	-	Credit 2	Innovative Wastewater Technologies	2
2	-	-	Credit 3	Water Use Reduction	2 to 4
21	**9**	**0**	**Energy and Atmosphere**	Possible Points:	**35**
Y			Prereq 1	Fundamental Commissioning of Building Energy Systems	
Y			Prereq 2	Minimum Energy Performance	0
Y			Prereq 3	Fundamental Refrigerant Management	
17	-	-	Credit 1	Optimize Energy Performance	1 to 19
4	-	-	Credit 2	On-Site Renewable Energy	1 to 7
-	2	-	Credit 3	Enhanced Commissioning	2
-	2	-	Credit 4	Enhanced Refrigerant Management	2
-	3	-	Credit 5	Measurement and Verification	3
-	2	-	Credit 6	Green Power	2
9	**5**	**0**	**Materials and Resources**	Possible Points:	**14**
Y			Prereq 1	Storage and Collection of Recyclables	**0**
3	-	-	Credit 1.1	Building Reuse—Maintain Existing Walls, Floors, and Roof	1 to 3
-	1	-	Credit 1.2	Building Reuse—Maintain 50% of Interior Non-Structural Elements	1
-	2	-	Credit 2	Construction Waste Management	1 to 2
2	-	-	Credit 3	Materials Reuse	1 to 2

Y	?	N			
			Materials and Resources, Continued		
2	-	-	Credit 4	Recycled Content	1 to 2
2	-	-	Credit 5	Regional Materials	1 to 2
-	1	-	Credit 6	Rapidly Renewable Materials	1
-	1	-	Credit 7	Certified Wood	1
13	**2**	**0**	**Indoor Environmental Quality**	Possible Points:	**15**
Y			Prereq 1	Minimum Indoor Air Quality Performance	**0**
Y			Prereq 2	Environmental Tobacco Smoke (ETS) Control	**0**
1	-	-	Credit 1	Outdoor Air Delivery Monitoring	1
1	-	-	Credit 2	Increased Ventilation	1
1	-	-	Credit 3.1	Construction IAQ Management Plan—During Construction	1
1	-	-	Credit 3.2	Construction IAQ Management Plan—Before Occupancy	1
1	-	-	Credit 4.1	Low-Emitting Materials—Adhesives and Sealants	1
1	-	-	Credit 4.2	Low-Emitting Materials—Paints and Coatings	1
1	-	-	Credit 4.3	Low-Emitting Materials—Flooring Systems	1
1	-	-	Credit 4.4	Low-Emitting Materials—Composite Wood and Agrifiber Products	1
1	-	-	Credit 5	Indoor Chemical and Pollutant Source Control	1
1	-	-	Credit 6.1	Controllability of Systems—Lighting	1
1	-	-	Credit 6.2	Controllability of Systems—Thermal Comfort	1
-	1	-	Credit 7.1	Thermal Comfort—Design	1
1	-	-	Credit 7.2	Thermal Comfort—Verification	1
1	-	-	Credit 8.1	Daylight and Views—Daylight	1
-	1	-	Credit 8.2	Daylight and Views—Views	1
1	**0**	**5**	**Innovation and Design Process**	Possible Points:	**6**
-	-	1	Credit 1.1	Innovation in Design: Specific Title	1
-	-	1	Credit 1.2	Innovation in Design: Specific Title	1
-	-	1	Credit 1.3	Innovation in Design: Specific Title	1
-	-	1	Credit 1.4	Innovation in Design: Specific Title	1
-	-	1	Credit 1.5	Innovation in Design: Specific Title	1
1	-	-	Credit 2	LEED Accredited Professional	1
1	**0**	**0**	**Regional Priority Credits**	Possible Points:	**4**
1	-	-	Credit 1.1	Regional Priority: Specific Credit	1
-	-	-	Credit 1.2	Regional Priority: Specific Credit	1
-	-	-	Credit 1.3	Regional Priority: Specific Credit	1
-	-	-	Credit 1.4	Regional Priority: Specific Credit	1
58	25	17	**Total**	Possible Points:	**110**

Certified 40 to 49 points Silver 50 to 59 points Gold 60 to 79 points Platinum 80 to 110

LEED 2009 for New Construction and Major Renovations

Project Checklist

Fort Bliss Building 001-04

Sustainable Sites — Possible Points: 26

Y	?	N			
Y			Prereq 1	Construction Activity Pollution Prevention	
1	-	-	Credit 1	Site Selection	1
-	-	5	Credit 2	Development Density and Community Connectivity	5
-	-	1	Credit 3	Brownfield Redevelopment	1
-	-	6	Credit 4.1	Alternative Transportation—Public Transportation Access	6
1	-	-	Credit 4.2	Alternative Transportation—Bicycle Storage and Changing Rooms	1
3	-	-	Credit 4.3	Alternative Transportation—Low-Emitting and Fuel-Efficient Vehicle	3
2	-	-	Credit 4.4	Alternative Transportation—Parking Capacity	2
1	-	-	Credit 5.1	Site Development—Protect or Restore Habitat	1
1	-	-	Credit 5.2	Site Development—Maximize Open Space	1
1	-	-	Credit 6.1	Stormwater Design—Quantity Control	1
-	1	-	Credit 6.2	Stormwater Design—Quality Control	1
-	1	-	Credit 7.1	Heat Island Effect—Non-roof	1
-	1	-	Credit 7.2	Heat Island Effect—Roof	1
1	-	-	Credit 8	Light Pollution Reduction	1

Water Efficiency — Possible Points: 10

Y			Prereq 1	Water Use Reduction—20% Reduction	
-	4	-	Credit 1	Water Efficient Landscaping	2 to 4
-	2	-	Credit 2	Innovative Wastewater Technologies	2
2	-	-	Credit 3	Water Use Reduction	2 to 4

Energy and Atmosphere — Possible Points: 35

Y			Prereq 1	Fundamental Commissioning of Building Energy Systems	
Y			Prereq 2	Minimum Energy Performance	0
Y			Prereq 3	Fundamental Refrigerant Management	
17	-	-	Credit 1	Optimize Energy Performance	1 to 19
4	-	-	Credit 2	On-Site Renewable Energy	1 to 7
-	2	-	Credit 3	Enhanced Commissioning	2
-	2	-	Credit 4	Enhanced Refrigerant Management	2
-	3	-	Credit 5	Measurement and Verification	3
-	2	-	Credit 6	Green Power	2

Materials and Resources — Possible Points: 14

Y			Prereq 1	Storage and Collection of Recyclables	**0**
3	-	-	Credit 1.1	Building Reuse—Maintain Existing Walls, Floors, and Roof	1 to 3
-	1	-	Credit 1.2	Building Reuse—Maintain 50% of Interior Non-Structural Elements	1
-	2	-	Credit 2	Construction Waste Management	1 to 2
2	-	-	Credit 3	Materials Reuse	1 to 2

Materials and Resources, Continued

Y	?	N			
2	-	-	Credit 4	Recycled Content	1 to 2
2	-	-	Credit 5	Regional Materials	1 to 2
-	1	-	Credit 6	Rapidly Renewable Materials	1
-	1	-	Credit 7	Certified Wood	1

Indoor Environmental Quality — Possible Points: 15

Y			Prereq 1	Minimum Indoor Air Quality Performance	**0**
Y			Prereq 2	Environmental Tobacco Smoke (ETS) Control	**0**
1	-	-	Credit 1	Outdoor Air Delivery Monitoring	1
1	-	-	Credit 2	Increased Ventilation	1
1	-	-	Credit 3.1	Construction IAQ Management Plan—During Construction	1
1	-	-	Credit 3.2	Construction IAQ Management Plan—Before Occupancy	1
1	-	-	Credit 4.1	Low-Emitting Materials—Adhesives and Sealants	1
1	-	-	Credit 4.2	Low-Emitting Materials—Paints and Coatings	1
1	-	-	Credit 4.3	Low-Emitting Materials—Flooring Systems	1
1	-	-	Credit 4.4	Low-Emitting Materials—Composite Wood and Agrifiber Products	1
1	-	-	Credit 5	Indoor Chemical and Pollutant Source Control	1
1	-	-	Credit 6.1	Controllability of Systems—Lighting	1
1	-	-	Credit 6.2	Controllability of Systems—Thermal Comfort	1
-	1	-	Credit 7.1	Thermal Comfort—Design	1
1	-	-	Credit 7.2	Thermal Comfort—Verification	1
1	-	-	Credit 8.1	Daylight and Views—Daylight	1
-	1	-	Credit 8.2	Daylight and Views—Views	1

Innovation and Design Process — Possible Points: 6

-	-	1	Credit 1.1	Innovation in Design: Specific Title	1
-	-	1	Credit 1.2	Innovation in Design: Specific Title	1
-	-	1	Credit 1.3	Innovation in Design: Specific Title	1
-	-	1	Credit 1.4	Innovation in Design: Specific Title	1
-	-	1	Credit 1.5	Innovation in Design: Specific Title	1
1	-	-	Credit 2	LEED Accredited Professional	1

Regional Priority Credits — Possible Points: 4

1	-	-	Credit 1.1	Regional Priority: Specific Credit	1
-	-	-	Credit 1.2	Regional Priority: Specific Credit	1
-	-	-	Credit 1.3	Regional Priority: Specific Credit	1
-	-	-	Credit 1.4	Regional Priority: Specific Credit	1

Total — Possible Points: 110

58	25	17

Certified 40 to 49 points Silver 50 to 59 points Gold 60 to 79 points Platinum 80 to 110

Table III-11 LEED Certification: FTBL 115 All Project Alternatives

Category	02 Demo and New Construction	03 Modernization with HPS	04 Modernization with ATFP	Maximum Points
Sustainable Sites	11	11	11	26
Water Efficiency	2	2	2	10
Energy and Atmosphere	19	17	17	35
Materials and Resources	4	9	9	14
Indoor Environmental Quality	14	13	13	15
Innovation and Design Process	1	1	1	6
Regional Priority Credits	1	1	1	4
Total	**52**	**54**	**54**	**110**
Certification Level	**Silver**	**Silver**	**Silver**	**NA**

Sources: Center for Resource Solutions; Comfort Design; BAE Urban Economics, 2012.

LEED 2009 for New Construction and Major Renovations

Project Checklist

Fort Bliss Building 115-02

Y	?	N			
11	**3**	**12**	**Sustainable Sites**	Possible Points:	**26**
Y			Prereq 1	Construction Activity Pollution Prevention	
1	-	-	Credit 1	Site Selection	1
-	-	5	Credit 2	Development Density and Community Connectivity	5
-	-	1	Credit 3	Brownfield Redevelopment	1
-	-	6	Credit 4.1	Alternative Transportation—Public Transportation Access	6
1	-	-	Credit 4.2	Alternative Transportation—Bicycle Storage and Changing Rooms	1
3	-	-	Credit 4.3	Alternative Transportation—Low-Emitting and Fuel-Efficient Vehicles	3
2	-	-	Credit 4.4	Alternative Transportation—Parking Capacity	2
1	-	-	Credit 5.1	Site Development—Protect or Restore Habitat	1
1	-	-	Credit 5.2	Site Development—Maximize Open Space	1
1	-	-	Credit 6.1	Stormwater Design—Quantity Control	1
-	1	-	Credit 6.2	Stormwater Design—Quality Control	1
-	1	-	Credit 7.1	Heat Island Effect—Non-roof	1
-	1	-	Credit 7.2	Heat Island Effect—Roof	1
1	-	-	Credit 8	Light Pollution Reduction	1
2	**6**	**0**	**Water Efficiency**	Possible Points:	**10**
Y			Prereq 1	Water Use Reduction—20% Reduction	
-	4	-	Credit 1	Water Efficient Landscaping	2 to 4
-	2	-	Credit 2	Innovative Wastewater Technologies	2
2	-	-	Credit 3	Water Use Reduction	2 to 4
19	**9**	**0**	**Energy and Atmosphere**	Possible Points:	**35**
Y			Prereq 1	Fundamental Commissioning of Building Energy Systems	
Y			Prereq 2	Minimum Energy Performance	0
Y			Prereq 3	Fundamental Refrigerant Management	
15	-	-	Credit 1	Optimize Energy Performance	1 to 19
4	-	-	Credit 2	On-Site Renewable Energy	1 to 7
-	2	-	Credit 3	Enhanced Commissioning	2
-	2	-	Credit 4	Enhanced Refrigerant Management	2
-	3	-	Credit 5	Measurement and Verification	3
-	2	-	Credit 6	Green Power	2
4	**2**	**12**	**Materials and Resources**	Possible Points:	**14**
Y			Prereq 1	Storage and Collection of Recyclables	**0**
-	-	3	Credit 1.1	Building Reuse—Maintain Existing Walls, Floors, and Roof	1 to 3
-	-	3	Credit 1.2	Building Reuse—Maintain 50% of Interior Non-Structural Elements	1
-	-	3	Credit 2	Construction Waste Management	1 to 2
-	-	3	Credit 3	Materials Reuse	1 to 2

Y	?	N			
			Materials and Resources, Continued		
2	-	-	Credit 4	Recycled Content	1 to 2
2	-	-	Credit 5	Regional Materials	1 to 2
-	1	-	Credit 6	Rapidly Renewable Materials	1
-	1	-	Credit 7	Certified Wood	1
14	**1**	**0**	**Indoor Environmental Quality**	Possible Points:	**15**
Y			Prereq 1	Minimum Indoor Air Quality Performance	**0**
Y			Prereq 2	Environmental Tobacco Smoke (ETS) Control	**0**
1	-	-	Credit 1	Outdoor Air Delivery Monitoring	1
1	-	-	Credit 2	Increased Ventilation	1
1	-	-	Credit 3.1	Construction IAQ Management Plan—During Construction	1
1	-	-	Credit 3.2	Construction IAQ Management Plan—Before Occupancy	1
1	-	-	Credit 4.1	Low-Emitting Materials—Adhesives and Sealants	1
1	-	-	Credit 4.2	Low-Emitting Materials—Paints and Coatings	1
1	-	-	Credit 4.3	Low-Emitting Materials—Flooring Systems	1
1	-	-	Credit 4.4	Low-Emitting Materials—Composite Wood and Agrifiber Products	1
1	-	-	Credit 5	Indoor Chemical and Pollutant Source Control	1
1	-	-	Credit 6.1	Controllability of Systems—Lighting	1
1	-	-	Credit 6.2	Controllability of Systems—Thermal Comfort	1
-	1	-	Credit 7.1	Thermal Comfort—Design	1
1	-	-	Credit 7.2	Thermal Comfort—Verification	1
1	-	-	Credit 8.1	Daylight and Views—Daylight	1
1	-	-	Credit 8.2	Daylight and Views—Views	1
1	**0**	**5**	**Innovation and Design Process**	Possible Points:	**6**
-	-	1	Credit 1.1	Innovation in Design: Specific Title	1
-	-	1	Credit 1.2	Innovation in Design: Specific Title	1
-	-	1	Credit 1.3	Innovation in Design: Specific Title	1
-	-	1	Credit 1.4	Innovation in Design: Specific Title	1
-	-	1	Credit 1.5	Innovation in Design: Specific Title	1
1	-	-	Credit 2	LEED Accredited Professional	1
1	**0**	**0**	**Regional Priority Credits**	Possible Points:	**4**
1	-	-	Credit 1.1	Regional Priority: Specific Credit	1
-	-	-	Credit 1.2	Regional Priority: Specific Credit	1
-	-	-	Credit 1.3	Regional Priority: Specific Credit	1
-	-	-	Credit 1.4	Regional Priority: Specific Credit	1
52	21	29	**Total**	Possible Points:	**110**

Certified 40 to 49 points Silver 50 to 59 points Gold 60 to 79 points Platinum 80 to 110

LEED 2009 for New Construction and Major Renovations

Project Checklist

Fort Bliss Building 115-03

Y	?	N			
11	**3**	**12**	**Sustainable Sites**	Possible Points:	**26**
Y			Prereq 1	Construction Activity Pollution Prevention	
1	-	-	Credit 1	Site Selection	1
-	-	5	Credit 2	Development Density and Community Connectivity	5
-	-	1	Credit 3	Brownfield Redevelopment	1
-	-	6	Credit 4.1	Alternative Transportation—Public Transportation Access	6
1	-	-	Credit 4.2	Alternative Transportation—Bicycle Storage and Changing Rooms	1
3	-	-	Credit 4.3	Alternative Transportation—Low-Emitting and Fuel-Efficient Vehicle	3
2	-	-	Credit 4.4	Alternative Transportation—Parking Capacity	2
1	-	-	Credit 5.1	Site Development—Protect or Restore Habitat	1
1	-	-	Credit 5.2	Site Development—Maximize Open Space	1
1	-	-	Credit 6.1	Stormwater Design—Quantity Control	1
-	1	-	Credit 6.2	Stormwater Design—Quality Control	1
-	1	-	Credit 7.1	Heat Island Effect—Non-roof	1
-	1	-	Credit 7.2	Heat Island Effect—Roof	1
1	-	-	Credit 8	Light Pollution Reduction	1
2	**6**	**0**	**Water Efficiency**	Possible Points:	**10**
Y			Prereq 1	Water Use Reduction—20% Reduction	
-	4	-	Credit 1	Water Efficient Landscaping	2 to 4
-	2	-	Credit 2	Innovative Wastewater Technologies	2
2	-	-	Credit 3	Water Use Reduction	2 to 4
17	**9**	**0**	**Energy and Atmosphere**	Possible Points:	**35**
Y			Prereq 1	Fundamental Commissioning of Building Energy Systems	
Y			Prereq 2	Minimum Energy Performance	0
Y			Prereq 3	Fundamental Refrigerant Management	
13	-	-	Credit 1	Optimize Energy Performance	1 to 19
4	-	-	Credit 2	On-Site Renewable Energy	1 to 7
-	2	-	Credit 3	Enhanced Commissioning	2
-	2	-	Credit 4	Enhanced Refrigerant Management	2
-	3	-	Credit 5	Measurement and Verification	3
-	2	-	Credit 6	Green Power	2
9	**5**	**0**	**Materials and Resources**	Possible Points:	**14**
Y			Prereq 1	Storage and Collection of Recyclables	**0**
3	-	-	Credit 1.1	Building Reuse—Maintain Existing Walls, Floors, and Roof	1 to 3
-	1	-	Credit 1.2	Building Reuse—Maintain 50% of Interior Non-Structural Elements	1
-	2	-	Credit 2	Construction Waste Management	1 to 2
2	-	-	Credit 3	Materials Reuse	1 to 2

Y	?	N			
			Materials and Resources, Continued		
2	-	-	Credit 4	Recycled Content	1 to 2
2	-	-	Credit 5	Regional Materials	1 to 2
-	1	-	Credit 6	Rapidly Renewable Materials	1
-	1	-	Credit 7	Certified Wood	1
13	**2**	**0**	**Indoor Environmental Quality**	Possible Points:	**15**
Y			Prereq 1	Minimum Indoor Air Quality Performance	**0**
Y			Prereq 2	Environmental Tobacco Smoke (ETS) Control	**0**
1	-	-	Credit 1	Outdoor Air Delivery Monitoring	1
1	-	-	Credit 2	Increased Ventilation	1
1	-	-	Credit 3.1	Construction IAQ Management Plan—During Construction	1
1	-	-	Credit 3.2	Construction IAQ Management Plan—Before Occupancy	1
1	-	-	Credit 4.1	Low-Emitting Materials—Adhesives and Sealants	1
1	-	-	Credit 4.2	Low-Emitting Materials—Paints and Coatings	1
1	-	-	Credit 4.3	Low-Emitting Materials—Flooring Systems	1
1	-	-	Credit 4.4	Low-Emitting Materials—Composite Wood and Agrifiber Products	1
1	-	-	Credit 5	Indoor Chemical and Pollutant Source Control	1
1	-	-	Credit 6.1	Controllability of Systems—Lighting	1
1	-	-	Credit 6.2	Controllability of Systems—Thermal Comfort	1
-	1	-	Credit 7.1	Thermal Comfort—Design	1
1	-	-	Credit 7.2	Thermal Comfort—Verification	1
1	-	-	Credit 8.1	Daylight and Views—Daylight	1
-	1	-	Credit 8.2	Daylight and Views—Views	1
1	**0**	**5**	**Innovation and Design Process**	Possible Points:	**6**
-	-	1	Credit 1.1	Innovation in Design: Specific Title	1
-	-	1	Credit 1.2	Innovation in Design: Specific Title	1
-	-	1	Credit 1.3	Innovation in Design: Specific Title	1
-	-	1	Credit 1.4	Innovation in Design: Specific Title	1
-	-	1	Credit 1.5	Innovation in Design: Specific Title	1
1	-	-	Credit 2	LEED Accredited Professional	1
1	**0**	**0**	**Regional Priority Credits**	Possible Points:	**4**
1	-	-	Credit 1.1	Regional Priority: Specific Credit	1
-	-	-	Credit 1.2	Regional Priority: Specific Credit	1
-	-	-	Credit 1.3	Regional Priority: Specific Credit	1
-	-	-	Credit 1.4	Regional Priority: Specific Credit	1
54	**25**	**17**	**Total**	Possible Points:	**110**

Certified 40 to 49 points Silver 50 to 59 points Gold 60 to 79 points Platinum 80 to 110

LEED 2009 for New Construction and Major Renovations

Project Checklist

Fort Bliss Building 115-04

Sustainable Sites — Possible Points: 26

Y	?	N			
Y			Prereq 1	Construction Activity Pollution Prevention	
1	-	-	Credit 1	Site Selection	1
-	-	5	Credit 2	Development Density and Community Connectivity	5
-	-	1	Credit 3	Brownfield Redevelopment	1
-	-	6	Credit 4.1	Alternative Transportation—Public Transportation Access	6
1	-	-	Credit 4.2	Alternative Transportation—Bicycle Storage and Changing Rooms	1
3	-	-	Credit 4.3	Alternative Transportation—Low-Emitting and Fuel-Efficient Vehicles	3
2	-	-	Credit 4.4	Alternative Transportation—Parking Capacity	2
1	-	-	Credit 5.1	Site Development—Protect or Restore Habitat	1
1	-	-	Credit 5.2	Site Development—Maximize Open Space	1
1	-	-	Credit 6.1	Stormwater Design—Quantity Control	1
-	1	-	Credit 6.2	Stormwater Design—Quality Control	1
-	1	-	Credit 7.1	Heat Island Effect—Non-roof	1
-	1	-	Credit 7.2	Heat Island Effect—Roof	1
1	-	-	Credit 8	Light Pollution Reduction	1

Water Efficiency — Possible Points: 10

Y			Prereq 1	Water Use Reduction—20% Reduction	
-	4	-	Credit 1	Water Efficient Landscaping	2 to 4
-	2	-	Credit 2	Innovative Wastewater Technologies	2
2	-	-	Credit 3	Water Use Reduction	2 to 4

Energy and Atmosphere — Possible Points: 35

Y			Prereq 1	Fundamental Commissioning of Building Energy Systems	
Y			Prereq 2	Minimum Energy Performance	0
Y			Prereq 3	Fundamental Refrigerant Management	
13	-	-	Credit 1	Optimize Energy Performance	1 to 19
4	-	-	Credit 2	On-Site Renewable Energy	1 to 7
-	2	-	Credit 3	Enhanced Commissioning	2
-	2	-	Credit 4	Enhanced Refrigerant Management	2
-	3	-	Credit 5	Measurement and Verification	3
-	2	-	Credit 6	Green Power	2

Materials and Resources — Possible Points: 14

Y			Prereq 1	Storage and Collection of Recyclables	**0**
3	-	-	Credit 1.1	Building Reuse—Maintain Existing Walls, Floors, and Roof	1 to 3
-	1	-	Credit 1.2	Building Reuse—Maintain 50% of Interior Non-Structural Elements	1
-	2	-	Credit 2	Construction Waste Management	1 to 2
2	-	-	Credit 3	Materials Reuse	1 to 2

Materials and Resources, Continued

Y	?	N			
2	-	-	Credit 4	Recycled Content	1 to 2
2	-	-	Credit 5	Regional Materials	1 to 2
-	1	-	Credit 6	Rapidly Renewable Materials	1
-	1	-	Credit 7	Certified Wood	1

Indoor Environmental Quality — Possible Points: 15

Y			Prereq 1	Minimum Indoor Air Quality Performance	**0**
Y			Prereq 2	Environmental Tobacco Smoke (ETS) Control	**0**
1	-	-	Credit 1	Outdoor Air Delivery Monitoring	1
1	-	-	Credit 2	Increased Ventilation	1
1	-	-	Credit 3.1	Construction IAQ Management Plan—During Construction	1
1	-	-	Credit 3.2	Construction IAQ Management Plan—Before Occupancy	1
1	-	-	Credit 4.1	Low-Emitting Materials—Adhesives and Sealants	1
1	-	-	Credit 4.2	Low-Emitting Materials—Paints and Coatings	1
1	-	-	Credit 4.3	Low-Emitting Materials—Flooring Systems	1
1	-	-	Credit 4.4	Low-Emitting Materials—Composite Wood and Agrifiber Products	1
1	-	-	Credit 5	Indoor Chemical and Pollutant Source Control	1
1	-	-	Credit 6.1	Controllability of Systems—Lighting	1
1	-	-	Credit 6.2	Controllability of Systems—Thermal Comfort	1
-	1	-	Credit 7.1	Thermal Comfort—Design	1
1	-	-	Credit 7.2	Thermal Comfort—Verification	1
1	-	-	Credit 8.1	Daylight and Views—Daylight	1
-	1	-	Credit 8.2	Daylight and Views—Views	1

Innovation and Design Process — Possible Points: 6

-	-	1	Credit 1.1	Innovation in Design: Specific Title	1
-	-	1	Credit 1.2	Innovation in Design: Specific Title	1
-	-	1	Credit 1.3	Innovation in Design: Specific Title	1
-	-	1	Credit 1.4	Innovation in Design: Specific Title	1
-	-	1	Credit 1.5	Innovation in Design: Specific Title	1
1	-	-	Credit 2	LEED Accredited Professional	1

Regional Priority Credits — Possible Points: 4

1	-	-	Credit 1.1	Regional Priority: Specific Credit	1
-	-	-	Credit 1.2	Regional Priority: Specific Credit	1
-	-	-	Credit 1.3	Regional Priority: Specific Credit	1
-	-	-	Credit 1.4	Regional Priority: Specific Credit	1

Total — Possible Points: 110

54	25	17	**Total**

Certified 40 to 49 points Silver 50 to 59 points Gold 60 to 79 points Platinum 80 to 110

Table III-19 LEED Certification: SJCA 061 All Project Alternatives

Category	02 Demo and New Construction	03 Modernization with HPS	04 Modernization with AT/FP	Maximum Points
Sustainable Sites	11	11	11	26
Water Efficiency	2	2	2	10
Energy and Atmosphere	20	22	22	35
Materials and Resources	4	9	9	14
Indoor Environmental Quality	14	13	13	15
Innovation and Design Process	1	1	1	6
Regional Priority Credits	1	1	1	4
Total	**53**	**59**	**59**	**110**
Certification Level	**Silver**	**Silver**	**Silver**	**NA**

Sources: Center for Resource Solutions; Comfort Design; BAE Urban Economics, 2012.

LEED 2009 for New Construction and Major Renovations

Project Checklist

Saint Juliens Creek Annex Building 61-02

Y	?	N			
11	3	12	**Sustainable Sites**	Possible Points:	**26**
Y			Prereq 1	Construction Activity Pollution Prevention	
1	-	-	Credit 1	Site Selection	1
-	-	5	Credit 2	Development Density and Community Connectivity	5
-	-	1	Credit 3	Brownfield Redevelopment	1
-	-	6	Credit 4.1	Alternative Transportation—Public Transportation Access	6
1	-	-	Credit 4.2	Alternative Transportation—Bicycle Storage and Changing Rooms	1
3	-	-	Credit 4.3	Alternative Transportation—Low-Emitting and Fuel-Efficient Vehicles	3
2	-	-	Credit 4.4	Alternative Transportation—Parking Capacity	2
1	-	-	Credit 5.1	Site Development—Protect or Restore Habitat	1
1	-	-	Credit 5.2	Site Development—Maximize Open Space	1
1	-	-	Credit 6.1	Stormwater Design—Quantity Control	1
-	1	-	Credit 6.2	Stormwater Design—Quality Control	1
-	1	-	Credit 7.1	Heat Island Effect—Non-roof	1
-	1	-	Credit 7.2	Heat Island Effect—Roof	1
1	-	-	Credit 8	Light Pollution Reduction	1
2	6	0	**Water Efficiency**	Possible Points:	**10**
Y			Prereq 1	Water Use Reduction—20% Reduction	
-	4	-	Credit 1	Water Efficient Landscaping	2 to 4
-	2	-	Credit 2	Innovative Wastewater Technologies	2
2	-	-	Credit 3	Water Use Reduction	2 to 4
20	9	0	**Energy and Atmosphere**	Possible Points:	**35**
Y			Prereq 1	Fundamental Commissioning of Building Energy Systems	
Y			Prereq 2	Minimum Energy Performance	0
Y			Prereq 3	Fundamental Refrigerant Management	
15	-	-	Credit 1	Optimize Energy Performance	1 to 19
5	-	-	Credit 2	On-Site Renewable Energy	1 to 7
-	2	-	Credit 3	Enhanced Commissioning	2
-	2	-	Credit 4	Enhanced Refrigerant Management	2
-	3	-	Credit 5	Measurement and Verification	3
-	2	-	Credit 6	Green Power	2
4	2	12	**Materials and Resources**	Possible Points:	**14**
Y			Prereq 1	Storage and Collection of Recyclables	**0**
-	-	3	Credit 1.1	Building Reuse—Maintain Existing Walls, Floors, and Roof	1 to 3
-	-	3	Credit 1.2	Building Reuse—Maintain 50% of Interior Non-Structural Elements	1
-	-	3	Credit 2	Construction Waste Management	1 to 2
-	-	3	Credit 3	Materials Reuse	1 to 2

Y	?	N			
			Materials and Resources, Continued		
2	-	-	Credit 4	Recycled Content	1 to 2
2	-	-	Credit 5	Regional Materials	1 to 2
-	1	-	Credit 6	Rapidly Renewable Materials	1
-	1	-	Credit 7	Certified Wood	1
14	1	0	**Indoor Environmental Quality**	Possible Points:	**15**
Y			Prereq 1	Minimum Indoor Air Quality Performance	**0**
Y			Prereq 2	Environmental Tobacco Smoke (ETS) Control	**0**
1	-	-	Credit 1	Outdoor Air Delivery Monitoring	1
1	-	-	Credit 2	Increased Ventilation	1
1	-	-	Credit 3.1	Construction IAQ Management Plan—During Construction	1
1	-	-	Credit 3.2	Construction IAQ Management Plan—Before Occupancy	1
1	-	-	Credit 4.1	Low-Emitting Materials—Adhesives and Sealants	1
1	-	-	Credit 4.2	Low-Emitting Materials—Paints and Coatings	1
1	-	-	Credit 4.3	Low-Emitting Materials—Flooring Systems	1
1	-	-	Credit 4.4	Low-Emitting Materials—Composite Wood and Agrifiber Products	1
1	-	-	Credit 5	Indoor Chemical and Pollutant Source Control	1
1	-	-	Credit 6.1	Controllability of Systems—Lighting	1
1	-	-	Credit 6.2	Controllability of Systems—Thermal Comfort	1
-	1	-	Credit 7.1	Thermal Comfort—Design	1
1	-	-	Credit 7.2	Thermal Comfort—Verification	1
1	-	-	Credit 8.1	Daylight and Views—Daylight	1
1	-	-	Credit 8.2	Daylight and Views—Views	1
1	0	5	**Innovation and Design Process**	Possible Points:	**6**
-	-	1	Credit 1.1	Innovation in Design: Specific Title	1
-	-	1	Credit 1.2	Innovation in Design: Specific Title	1
-	-	1	Credit 1.3	Innovation in Design: Specific Title	1
-	-	1	Credit 1.4	Innovation in Design: Specific Title	1
-	-	1	Credit 1.5	Innovation in Design: Specific Title	1
1	-	-	Credit 2	LEED Accredited Professional	1
1	0	0	**Regional Priority Credits**	Possible Points:	**4**
1	-	-	Credit 1.1	Regional Priority: Specific Credit	1
-	-	-	Credit 1.2	Regional Priority: Specific Credit	1
-	-	-	Credit 1.3	Regional Priority: Specific Credit	1
-	-	-	Credit 1.4	Regional Priority: Specific Credit	1
53	21	29	**Total**	Possible Points:	**110**

Certified 40 to 49 points Silver 50 to 59 points Gold 60 to 79 points Platinum 80 to 110

LEED 2009 for New Construction and Major Renovations

Project Checklist

Saint Juliens Creek Annex Building 61-03

Y	?	N			
11	**3**	**12**	**Sustainable Sites**	Possible Points:	**26**
Y			Prereq 1	Construction Activity Pollution Prevention	
1	-	-	Credit 1	Site Selection	1
-	-	5	Credit 2	Development Density and Community Connectivity	5
-	-	1	Credit 3	Brownfield Redevelopment	1
-	-	6	Credit 4.1	Alternative Transportation—Public Transportation Access	6
1	-	-	Credit 4.2	Alternative Transportation—Bicycle Storage and Changing Rooms	1
3	-	-	Credit 4.3	Alternative Transportation—Low-Emitting and Fuel-Efficient Vehicle	3
2	-	-	Credit 4.4	Alternative Transportation—Parking Capacity	2
1	-	-	Credit 5.1	Site Development—Protect or Restore Habitat	1
1	-	-	Credit 5.2	Site Development—Maximize Open Space	1
1	-	-	Credit 6.1	Stormwater Design—Quantity Control	1
-	1	-	Credit 6.2	Stormwater Design—Quality Control	1
-	1	-	Credit 7.1	Heat Island Effect—Non-roof	1
-	1	-	Credit 7.2	Heat Island Effect—Roof	1
1	-	-	Credit 8	Light Pollution Reduction	1
2	**6**	**0**	**Water Efficiency**	Possible Points:	**10**
Y			Prereq 1	Water Use Reduction—20% Reduction	
-	4	-	Credit 1	Water Efficient Landscaping	2 to 4
-	2	-	Credit 2	Innovative Wastewater Technologies	2
2	-	-	Credit 3	Water Use Reduction	2 to 4
22	**9**	**0**	**Energy and Atmosphere**	Possible Points:	**35**
Y			Prereq 1	Fundamental Commissioning of Building Energy Systems	
Y			Prereq 2	Minimum Energy Performance	0
Y			Prereq 3	Fundamental Refrigerant Management	
17	-	-	Credit 1	Optimize Energy Performance	1 to 19
5	-	-	Credit 2	On-Site Renewable Energy	1 to 7
-	2	-	Credit 3	Enhanced Commissioning	2
-	2	-	Credit 4	Enhanced Refrigerant Management	2
-	3	-	Credit 5	Measurement and Verification	3
-	2	-	Credit 6	Green Power	2
9	**5**	**0**	**Materials and Resources**	Possible Points:	**14**
Y			Prereq 1	Storage and Collection of Recyclables	**0**
3	-	-	Credit 1.1	Building Reuse—Maintain Existing Walls, Floors, and Roof	1 to 3
-	1	-	Credit 1.2	Building Reuse—Maintain 50% of Interior Non-Structural Elements	1
-	2	-	Credit 2	Construction Waste Management	1 to 2
2	-	-	Credit 3	Materials Reuse	1 to 2

Y	?	N			
			Materials and Resources, Continued		
2	-	-	Credit 4	Recycled Content	1 to 2
2	-	-	Credit 5	Regional Materials	1 to 2
-	1	-	Credit 6	Rapidly Renewable Materials	1
-	1	-	Credit 7	Certified Wood	1
13	**2**	**0**	**Indoor Environmental Quality**	Possible Points:	**15**
Y			Prereq 1	Minimum Indoor Air Quality Performance	**0**
Y			Prereq 2	Environmental Tobacco Smoke (ETS) Control	**0**
1	-	-	Credit 1	Outdoor Air Delivery Monitoring	1
1	-	-	Credit 2	Increased Ventilation	1
1	-	-	Credit 3.1	Construction IAQ Management Plan—During Construction	1
1	-	-	Credit 3.2	Construction IAQ Management Plan—Before Occupancy	1
1	-	-	Credit 4.1	Low-Emitting Materials—Adhesives and Sealants	1
1	-	-	Credit 4.2	Low-Emitting Materials—Paints and Coatings	1
1	-	-	Credit 4.3	Low-Emitting Materials—Flooring Systems	1
1	-	-	Credit 4.4	Low-Emitting Materials—Composite Wood and Agrifiber Products	1
1	-	-	Credit 5	Indoor Chemical and Pollutant Source Control	1
1	-	-	Credit 6.1	Controllability of Systems—Lighting	1
1	-	-	Credit 6.2	Controllability of Systems—Thermal Comfort	1
-	1	-	Credit 7.1	Thermal Comfort—Design	1
1	-	-	Credit 7.2	Thermal Comfort—Verification	1
1	-	-	Credit 8.1	Daylight and Views—Daylight	1
-	1	-	Credit 8.2	Daylight and Views—Views	1
1	**0**	**5**	**Innovation and Design Process**	Possible Points:	**6**
-	-	1	Credit 1.1	Innovation in Design: Specific Title	1
-	-	1	Credit 1.2	Innovation in Design: Specific Title	1
-	-	1	Credit 1.3	Innovation in Design: Specific Title	1
-	-	1	Credit 1.4	Innovation in Design: Specific Title	1
-	-	1	Credit 1.5	Innovation in Design: Specific Title	1
1	-	-	Credit 2	LEED Accredited Professional	1
1	**0**	**0**	**Regional Priority Credits**	Possible Points:	**4**
1	-	-	Credit 1.1	Regional Priority: Specific Credit	1
-	-	-	Credit 1.2	Regional Priority: Specific Credit	1
-	-	-	Credit 1.3	Regional Priority: Specific Credit	1
-	-	-	Credit 1.4	Regional Priority: Specific Credit	1
59	25	17	**Total**	Possible Points:	**110**

Certified 40 to 49 points Silver 50 to 59 points Gold 60 to 79 points Platinum 80 to 110

LEED 2009 for New Construction and Major Renovations

Project Checklist

Saint Juliens Creek Annex Building 61-04

Y	?	N			
11	**3**	**12**	**Sustainable Sites**	Possible Points:	**26**
Y			Prereq 1	Construction Activity Pollution Prevention	
1	-	-	Credit 1	Site Selection	1
-	-	5	Credit 2	Development Density and Community Connectivity	5
-	-	1	Credit 3	Brownfield Redevelopment	1
-	-	6	Credit 4.1	Alternative Transportation—Public Transportation Access	6
1	-	-	Credit 4.2	Alternative Transportation—Bicycle Storage and Changing Rooms	1
3	-	-	Credit 4.3	Alternative Transportation—Low-Emitting and Fuel-Efficient Vehicles	3
2	-	-	Credit 4.4	Alternative Transportation—Parking Capacity	2
1	-	-	Credit 5.1	Site Development—Protect or Restore Habitat	1
1	-	-	Credit 5.2	Site Development—Maximize Open Space	1
1	-	-	Credit 6.1	Stormwater Design—Quantity Control	1
-	1	-	Credit 6.2	Stormwater Design—Quality Control	1
-	1	-	Credit 7.1	Heat Island Effect—Non-roof	1
-	1	-	Credit 7.2	Heat Island Effect—Roof	1
1	-	-	Credit 8	Light Pollution Reduction	1
2	**6**	**0**	**Water Efficiency**	Possible Points:	**10**
Y			Prereq 1	Water Use Reduction—20% Reduction	
-	4	-	Credit 1	Water Efficient Landscaping	2 to 4
-	2	-	Credit 2	Innovative Wastewater Technologies	2
2	-	-	Credit 3	Water Use Reduction	2 to 4
22	**9**	**0**	**Energy and Atmosphere**	Possible Points:	**35**
Y			Prereq 1	Fundamental Commissioning of Building Energy Systems	
Y			Prereq 2	Minimum Energy Performance	0
Y			Prereq 3	Fundamental Refrigerant Management	
17	-	-	Credit 1	Optimize Energy Performance	1 to 19
5	-	-	Credit 2	On-Site Renewable Energy	1 to 7
-	2	-	Credit 3	Enhanced Commissioning	2
-	2	-	Credit 4	Enhanced Refrigerant Management	2
-	3	-	Credit 5	Measurement and Verification	3
-	2	-	Credit 6	Green Power	2
9	**5**	**0**	**Materials and Resources**	Possible Points:	**14**
Y			Prereq 1	Storage and Collection of Recyclables	**0**
3	-	-	Credit 1.1	Building Reuse—Maintain Existing Walls, Floors, and Roof	1 to 3
-	1	-	Credit 1.2	Building Reuse—Maintain 50% of Interior Non-Structural Elements	1
-	2	-	Credit 2	Construction Waste Management	1 to 2
2	-	-	Credit 3	Materials Reuse	1 to 2

Y	?	N			
			Materials and Resources, Continued		
2	-	-	Credit 4	Recycled Content	1 to 2
2	-	-	Credit 5	Regional Materials	1 to 2
-	1	-	Credit 6	Rapidly Renewable Materials	1
-	1	-	Credit 7	Certified Wood	1
13	**2**	**0**	**Indoor Environmental Quality**	Possible Points:	**15**
Y			Prereq 1	Minimum Indoor Air Quality Performance	**0**
Y			Prereq 2	Environmental Tobacco Smoke (ETS) Control	**0**
1	-	-	Credit 1	Outdoor Air Delivery Monitoring	1
1	-	-	Credit 2	Increased Ventilation	1
1	-	-	Credit 3.1	Construction IAQ Management Plan—During Construction	1
1	-	-	Credit 3.2	Construction IAQ Management Plan—Before Occupancy	1
1	-	-	Credit 4.1	Low-Emitting Materials—Adhesives and Sealants	1
1	-	-	Credit 4.2	Low-Emitting Materials—Paints and Coatings	1
1	-	-	Credit 4.3	Low-Emitting Materials—Flooring Systems	1
1	-	-	Credit 4.4	Low-Emitting Materials—Composite Wood and Agrifiber Products	1
1	-	-	Credit 5	Indoor Chemical and Pollutant Source Control	1
1	-	-	Credit 6.1	Controllability of Systems—Lighting	1
1	-	-	Credit 6.2	Controllability of Systems—Thermal Comfort	1
-	1	-	Credit 7.1	Thermal Comfort—Design	1
1	-	-	Credit 7.2	Thermal Comfort—Verification	1
1	-	-	Credit 8.1	Daylight and Views—Daylight	1
-	1	-	Credit 8.2	Daylight and Views—Views	1
1	**0**	**5**	**Innovation and Design Process**	Possible Points:	**6**
-	-	1	Credit 1.1	Innovation in Design: Specific Title	1
-	-	1	Credit 1.2	Innovation in Design: Specific Title	1
-	-	1	Credit 1.3	Innovation in Design: Specific Title	1
-	-	1	Credit 1.4	Innovation in Design: Specific Title	1
-	-	1	Credit 1.5	Innovation in Design: Specific Title	1
1	-	-	Credit 2	LEED Accredited Professional	1
1	**0**	**0**	**Regional Priority Credits**	Possible Points:	**4**
1	-	-	Credit 1.1	Regional Priority: Specific Credit	1
-	-	-	Credit 1.2	Regional Priority: Specific Credit	1
-	-	-	Credit 1.3	Regional Priority: Specific Credit	1
-	-	-	Credit 1.4	Regional Priority: Specific Credit	1
59	25	17	**Total**	Possible Points:	**110**

Certified 40 to 49 points Silver 50 to 59 points Gold 60 to 79 points Platinum 80 to 110

Table III-27 LEED Certification: SJCA 168 All Project Alternatives

Category	02 Demo and New Construction	03 Modernization with HPS	04 Modernization with AT/FP	Maximum Points
Sustainable Sites	11	11	11	26
Water Efficiency	2	2	2	10
Energy and Atmosphere	20	22	22	35
Materials and Resources	4	9	9	14
Indoor Environmental Quality	14	13	13	15
Innovation and Design Process	1	1	1	6
Regional Priority Credits	1	1	1	4
Total	**53**	**59**	**59**	**110**
Certification Level	**Silver**	**Silver**	**Silver**	**NA**

Sources: Center for Resource Solutions; Comfort Design; BAE Urban Economics, 2012.

LEED 2009 for New Construction and Major Renovations

Project Checklist

Saint Juliens Creek Annex Building 168-02

Sustainable Sites — Possible Points: 26

Y	?	N				
Y			Prereq 1	Construction Activity Pollution Prevention		
1	-	-	Credit 1	Site Selection	1	
-	-	5	Credit 2	Development Density and Community Connectivity	5	
-	-	1	Credit 3	Brownfield Redevelopment	1	
-	-	6	Credit 4.1	Alternative Transportation—Public Transportation Access	6	
1	-	-	Credit 4.2	Alternative Transportation—Bicycle Storage and Changing Rooms	1	
3	-	-	Credit 4.3	Alternative Transportation—Low-Emitting and Fuel-Efficient Vehicle	3	
2	-	-	Credit 4.4	Alternative Transportation—Parking Capacity	2	
1	-	-	Credit 5.1	Site Development—Protect or Restore Habitat	1	
1	-	-	Credit 5.2	Site Development—Maximize Open Space	1	
1	-	-	Credit 6.1	Stormwater Design—Quantity Control	1	
-	1	-	Credit 6.2	Stormwater Design—Quality Control	1	
-	1	-	Credit 7.1	Heat Island Effect—Non-roof	1	
-	1	-	Credit 7.2	Heat Island Effect—Roof	1	
1	-	-	Credit 8	Light Pollution Reduction	1	

Water Efficiency — Possible Points: 10

Y					
Y			Prereq 1	Water Use Reduction—20% Reduction	
-	4	-	Credit 1	Water Efficient Landscaping	2 to 4
-	2	-	Credit 2	Innovative Wastewater Technologies	2
2	-	-	Credit 3	Water Use Reduction	2 to 4

Energy and Atmosphere — Possible Points: 35

Y					
Y			Prereq 1	Fundamental Commissioning of Building Energy Systems	
Y			Prereq 2	Minimum Energy Performance	0
Y			Prereq 3	Fundamental Refrigerant Management	
15	-	-	Credit 1	Optimize Energy Performance	1 to 19
5	-	-	Credit 2	On-Site Renewable Energy	1 to 7
-	2	-	Credit 3	Enhanced Commissioning	2
-	2	-	Credit 4	Enhanced Refrigerant Management	2
-	3	-	Credit 5	Measurement and Verification	3
-	2	-	Credit 6	Green Power	2

Materials and Resources — Possible Points: 14

Y					
Y			Prereq 1	Storage and Collection of Recyclables	**0**
-	-	3	Credit 1.1	Building Reuse—Maintain Existing Walls, Floors, and Roof	1 to 3
-	-	3	Credit 1.2	Building Reuse—Maintain 50% of Interior Non-Structural Elements	1
-	-	3	Credit 2	Construction Waste Management	1 to 2
-	-	3	Credit 3	Materials Reuse	1 to 2

Materials and Resources, Continued

Y	?	N			
2	-	-	Credit 4	Recycled Content	1 to 2
2	-	-	Credit 5	Regional Materials	1 to 2
-	1	-	Credit 6	Rapidly Renewable Materials	1
-	1	-	Credit 7	Certified Wood	1

Indoor Environmental Quality — Possible Points: 15

Y					
Y			Prereq 1	Minimum Indoor Air Quality Performance	**0**
Y			Prereq 2	Environmental Tobacco Smoke (ETS) Control	**0**
1	-	-	Credit 1	Outdoor Air Delivery Monitoring	1
1	-	-	Credit 2	Increased Ventilation	1
1	-	-	Credit 3.1	Construction IAQ Management Plan—During Construction	1
1	-	-	Credit 3.2	Construction IAQ Management Plan—Before Occupancy	1
1	-	-	Credit 4.1	Low-Emitting Materials—Adhesives and Sealants	1
1	-	-	Credit 4.2	Low-Emitting Materials—Paints and Coatings	1
1	-	-	Credit 4.3	Low-Emitting Materials—Flooring Systems	1
1	-	-	Credit 4.4	Low-Emitting Materials—Composite Wood and Agrifiber Products	1
1	-	-	Credit 5	Indoor Chemical and Pollutant Source Control	1
1	-	-	Credit 6.1	Controllability of Systems—Lighting	1
1	-	-	Credit 6.2	Controllability of Systems—Thermal Comfort	1
-	1	-	Credit 7.1	Thermal Comfort—Design	1
1	-	-	Credit 7.2	Thermal Comfort—Verification	1
1	-	-	Credit 8.1	Daylight and Views—Daylight	1
1	-	-	Credit 8.2	Daylight and Views—Views	1

Innovation and Design Process — Possible Points: 6

-	-	1	Credit 1.1	Innovation in Design: Specific Title	1
-	-	1	Credit 1.2	Innovation in Design: Specific Title	1
-	-	1	Credit 1.3	Innovation in Design: Specific Title	1
-	-	1	Credit 1.4	Innovation in Design: Specific Title	1
-	-	1	Credit 1.5	Innovation in Design: Specific Title	1
1	-	-	Credit 2	LEED Accredited Professional	1

Regional Priority Credits — Possible Points: 4

1	-	-	Credit 1.1	Regional Priority: Specific Credit	1
-	-	-	Credit 1.2	Regional Priority: Specific Credit	1
-	-	-	Credit 1.3	Regional Priority: Specific Credit	1
-	-	-	Credit 1.4	Regional Priority: Specific Credit	1

Total — Possible Points: 110

53	21	29	**Total**

Certified 40 to 49 points Silver 50 to 59 points Gold 60 to 79 points Platinum 80 to 110

LEED 2009 for New Construction and Major Renovations

Project Checklist

Saint Juliens Creek Annex Building 168-03

Sustainable Sites — Possible Points: 26

Y	?	N			
Y			Prereq 1	Construction Activity Pollution Prevention	
1	-	-	Credit 1	Site Selection	1
-	-	5	Credit 2	Development Density and Community Connectivity	5
-	-	1	Credit 3	Brownfield Redevelopment	1
-	-	6	Credit 4.1	Alternative Transportation—Public Transportation Access	6
1	-	-	Credit 4.2	Alternative Transportation—Bicycle Storage and Changing Rooms	1
3	-	-	Credit 4.3	Alternative Transportation—Low-Emitting and Fuel-Efficient Vehicles	3
2	-	-	Credit 4.4	Alternative Transportation—Parking Capacity	2
1	-	-	Credit 5.1	Site Development—Protect or Restore Habitat	1
1	-	-	Credit 5.2	Site Development—Maximize Open Space	1
1	-	-	Credit 6.1	Stormwater Design—Quantity Control	1
-	1	-	Credit 6.2	Stormwater Design—Quality Control	1
-	1	-	Credit 7.1	Heat Island Effect—Non-roof	1
-	1	-	Credit 7.2	Heat Island Effect—Roof	1
1	-	-	Credit 8	Light Pollution Reduction	1

Water Efficiency — Possible Points: 10

Y	?	N			
Y			Prereq 1	Water Use Reduction—20% Reduction	
-	4	-	Credit 1	Water Efficient Landscaping	2 to 4
-	2	-	Credit 2	Innovative Wastewater Technologies	2
2	-	-	Credit 3	Water Use Reduction	2 to 4

Energy and Atmosphere — Possible Points: 35

Y	?	N			
Y			Prereq 1	Fundamental Commissioning of Building Energy Systems	
Y			Prereq 2	Minimum Energy Performance	0
Y			Prereq 3	Fundamental Refrigerant Management	
17	-	-	Credit 1	Optimize Energy Performance	1 to 19
5	-	-	Credit 2	On-Site Renewable Energy	1 to 7
-	2	-	Credit 3	Enhanced Commissioning	2
-	2	-	Credit 4	Enhanced Refrigerant Management	2
-	3	-	Credit 5	Measurement and Verification	3
-	2	-	Credit 6	Green Power	2

Materials and Resources — Possible Points: 14

Y	?	N			
Y			Prereq 1	Storage and Collection of Recyclables	**0**
3	-	-	Credit 1.1	Building Reuse—Maintain Existing Walls, Floors, and Roof	1 to 3
-	1	-	Credit 1.2	Building Reuse—Maintain 50% of Interior Non-Structural Elements	1
-	2	-	Credit 2	Construction Waste Management	1 to 2
2	-	-	Credit 3	Materials Reuse	1 to 2

Materials and Resources, Continued

Y	?	N			
2	-	-	Credit 4	Recycled Content	1 to 2
2	-	-	Credit 5	Regional Materials	1 to 2
-	1	-	Credit 6	Rapidly Renewable Materials	1
-	1	-	Credit 7	Certified Wood	1

Indoor Environmental Quality — Possible Points: 15

Y	?	N			
Y			Prereq 1	Minimum Indoor Air Quality Performance	**0**
Y			Prereq 2	Environmental Tobacco Smoke (ETS) Control	**0**
1	-	-	Credit 1	Outdoor Air Delivery Monitoring	1
1	-	-	Credit 2	Increased Ventilation	1
1	-	-	Credit 3.1	Construction IAQ Management Plan—During Construction	1
1	-	-	Credit 3.2	Construction IAQ Management Plan—Before Occupancy	1
1	-	-	Credit 4.1	Low-Emitting Materials—Adhesives and Sealants	1
1	-	-	Credit 4.2	Low-Emitting Materials—Paints and Coatings	1
1	-	-	Credit 4.3	Low-Emitting Materials—Flooring Systems	1
1	-	-	Credit 4.4	Low-Emitting Materials—Composite Wood and Agrifiber Products	1
1	-	-	Credit 5	Indoor Chemical and Pollutant Source Control	1
1	-	-	Credit 6.1	Controllability of Systems—Lighting	1
1	-	-	Credit 6.2	Controllability of Systems—Thermal Comfort	1
-	1	-	Credit 7.1	Thermal Comfort—Design	1
1	-	-	Credit 7.2	Thermal Comfort—Verification	1
1	-	-	Credit 8.1	Daylight and Views—Daylight	1
-	1	-	Credit 8.2	Daylight and Views—Views	1

Innovation and Design Process — Possible Points: 6

-	-	1	Credit 1.1	Innovation in Design: Specific Title	1
-	-	1	Credit 1.2	Innovation in Design: Specific Title	1
-	-	1	Credit 1.3	Innovation in Design: Specific Title	1
-	-	1	Credit 1.4	Innovation in Design: Specific Title	1
-	-	1	Credit 1.5	Innovation in Design: Specific Title	1
1	-	-	Credit 2	LEED Accredited Professional	1

Regional Priority Credits — Possible Points: 4

1	-	-	Credit 1.1	Regional Priority: Specific Credit	1
-	-	-	Credit 1.2	Regional Priority: Specific Credit	1
-	-	-	Credit 1.3	Regional Priority: Specific Credit	1
-	-	-	Credit 1.4	Regional Priority: Specific Credit	1

Total — Possible Points: 110

59	25	17	

Certified 40 to 49 points Silver 50 to 59 points Gold 60 to 79 points Platinum 80 to 110

LEED 2009 for New Construction and Major Renovations

Project Checklist

Saint Juliens Creek Annex Building 168-04

Y	?	N			
11	**3**	**12**	**Sustainable Sites**	Possible Points:	**26**
Y	?	N			
Y			Prereq 1	Construction Activity Pollution Prevention	
1	-	-	Credit 1	Site Selection	1
-	-	5	Credit 2	Development Density and Community Connectivity	5
-	-	1	Credit 3	Brownfield Redevelopment	1
-	-	6	Credit 4.1	Alternative Transportation—Public Transportation Access	6
1	-	-	Credit 4.2	Alternative Transportation—Bicycle Storage and Changing Rooms	1
3	-	-	Credit 4.3	Alternative Transportation—Low-Emitting and Fuel-Efficient Vehicles	3
2	-	-	Credit 4.4	Alternative Transportation—Parking Capacity	2
1	-	-	Credit 5.1	Site Development—Protect or Restore Habitat	1
1	-	-	Credit 5.2	Site Development—Maximize Open Space	1
1	-	-	Credit 6.1	Stormwater Design—Quantity Control	1
-	1	-	Credit 6.2	Stormwater Design—Quality Control	1
-	1	-	Credit 7.1	Heat Island Effect—Non-roof	1
-	1	-	Credit 7.2	Heat Island Effect—Roof	1
1	-	-	Credit 8	Light Pollution Reduction	1
2	**6**	**0**	**Water Efficiency**	Possible Points:	**10**
Y			Prereq 1	Water Use Reduction—20% Reduction	
-	4	-	Credit 1	Water Efficient Landscaping	2 to 4
-	2	-	Credit 2	Innovative Wastewater Technologies	2
2	-	-	Credit 3	Water Use Reduction	2 to 4
22	**9**	**0**	**Energy and Atmosphere**	Possible Points:	**35**
Y			Prereq 1	Fundamental Commissioning of Building Energy Systems	
Y			Prereq 2	Minimum Energy Performance	0
Y			Prereq 3	Fundamental Refrigerant Management	
17	-	-	Credit 1	Optimize Energy Performance	1 to 19
5	-	-	Credit 2	On-Site Renewable Energy	1 to 7
-	2	-	Credit 3	Enhanced Commissioning	2
-	2	-	Credit 4	Enhanced Refrigerant Management	2
-	3	-	Credit 5	Measurement and Verification	3
-	2	-	Credit 6	Green Power	2
9	**5**	**0**	**Materials and Resources**	Possible Points:	**14**
Y			Prereq 1	Storage and Collection of Recyclables	**0**
3	-	-	Credit 1.1	Building Reuse—Maintain Existing Walls, Floors, and Roof	1 to 3
-	1	-	Credit 1.2	Building Reuse—Maintain 50% of Interior Non-Structural Elements	1
-	2	-	Credit 2	Construction Waste Management	1 to 2
2	-	-	Credit 3	Materials Reuse	1 to 2

Y	?	N			
			Materials and Resources, Continued		
Y	?	N			
2	-	-	Credit 4	Recycled Content	1 to 2
2	-	-	Credit 5	Regional Materials	1 to 2
-	1	-	Credit 6	Rapidly Renewable Materials	1
-	1	-	Credit 7	Certified Wood	1
13	**2**	**0**	**Indoor Environmental Quality**	Possible Points:	**15**
Y			Prereq 1	Minimum Indoor Air Quality Performance	**0**
Y			Prereq 2	Environmental Tobacco Smoke (ETS) Control	**0**
1	-	-	Credit 1	Outdoor Air Delivery Monitoring	1
1	-	-	Credit 2	Increased Ventilation	1
1	-	-	Credit 3.1	Construction IAQ Management Plan—During Construction	1
1	-	-	Credit 3.2	Construction IAQ Management Plan—Before Occupancy	1
1	-	-	Credit 4.1	Low-Emitting Materials—Adhesives and Sealants	1
1	-	-	Credit 4.2	Low-Emitting Materials—Paints and Coatings	1
1	-	-	Credit 4.3	Low-Emitting Materials—Flooring Systems	1
1	-	-	Credit 4.4	Low-Emitting Materials—Composite Wood and Agrifiber Products	1
1	-	-	Credit 5	Indoor Chemical and Pollutant Source Control	1
1	-	-	Credit 6.1	Controllability of Systems—Lighting	1
1	-	-	Credit 6.2	Controllability of Systems—Thermal Comfort	1
-	1	-	Credit 7.1	Thermal Comfort—Design	1
1	-	-	Credit 7.2	Thermal Comfort—Verification	1
1	-	-	Credit 8.1	Daylight and Views—Daylight	1
-	1	-	Credit 8.2	Daylight and Views—Views	1
1	**0**	**5**	**Innovation and Design Process**	Possible Points:	**6**
-	-	1	Credit 1.1	Innovation in Design: Specific Title	1
-	-	1	Credit 1.2	Innovation in Design: Specific Title	1
-	-	1	Credit 1.3	Innovation in Design: Specific Title	1
-	-	1	Credit 1.4	Innovation in Design: Specific Title	1
-	-	1	Credit 1.5	Innovation in Design: Specific Title	1
1	-	-	Credit 2	LEED Accredited Professional	1
1	**0**	**0**	**Regional Priority Credits**	Possible Points:	**4**
1	-	-	Credit 1.1	Regional Priority: Specific Credit	1
-	-	-	Credit 1.2	Regional Priority: Specific Credit	1
-	-	-	Credit 1.3	Regional Priority: Specific Credit	1
-	-	-	Credit 1.4	Regional Priority: Specific Credit	1
59	**25**	**17**	**Total**	Possible Points:	**110**

Certified 40 to 49 points Silver 50 to 59 points Gold 60 to 79 points Platinum 80 to 110

Table III-35 LEED Certification: FEW 222 All Project Alternatives

Category	02 New Construction	03 Modernization with HPS	04 Modernization with AT/FP	Maximum Points
Sustainable Sites	11	11	11	26
Water Efficiency	4	2	2	10
Energy and Atmosphere	15	16	16	35
Materials and Resources	4	9	9	14
Indoor Environmental Quality	15	13	13	15
Innovation and Design Process	1	1	1	6
Regional Priority Credits	1	1	1	4
Total	**51**	**53**	**53**	**110**
Certification Level	**Silver**	**Silver**	**Silver**	**NA**

Note: 2009 LEED fro New Construction and Major Renovations Project Checklist

Sources: Center for Resource Solutions; Comfort Design; BAE Urban Economics, 2012.

LEED 2009 for New Construction and Major Renovations

Project Checklist

F.E.Warren Building 222-02

Y	?	N			
11	**3**	**12**	**Sustainable Sites**	Possible Points:	**26**
Y	?	N			
Y			Prereq 1	Construction Activity Pollution Prevention	
1	-	-	Credit 1	Site Selection	1
-	-	5	Credit 2	Development Density and Community Connectivity	5
-	-	1	Credit 3	Brownfield Redevelopment	1
-	-	6	Credit 4.1	Alternative Transportation—Public Transportation Access	6
1	-	-	Credit 4.2	Alternative Transportation—Bicycle Storage and Changing Rooms	1
3	-	-	Credit 4.3	Alternative Transportation—Low-Emitting and Fuel-Efficient Vehicles	3
2	-	-	Credit 4.4	Alternative Transportation—Parking Capacity	2
1	-	-	Credit 5.1	Site Development—Protect or Restore Habitat	1
1	-	-	Credit 5.2	Site Development—Maximize Open Space	1
1	-	-	Credit 6.1	Stormwater Design—Quantity Control	1
-	1	-	Credit 6.2	Stormwater Design—Quality Control	1
-	1	-	Credit 7.1	Heat Island Effect—Non-roof	1
-	1	-	Credit 7.2	Heat Island Effect—Roof	1
1	-	-	Credit 8	Light Pollution Reduction	1

4	**6**	**0**	**Water Efficiency**	Possible Points:	**10**
Y			Prereq 1	Water Use Reduction—20% Reduction	
-	4	-	Credit 1	Water Efficient Landscaping	2 to 4
-	2	-	Credit 2	Innovative Wastewater Technologies	2
4	-	-	Credit 3	Water Use Reduction	2 to 4

15	**9**	**0**	**Energy and Atmosphere**	Possible Points:	**35**
Y			Prereq 1	Fundamental Commissioning of Building Energy Systems	
Y			Prereq 2	Minimum Energy Performance	0
Y			Prereq 3	Fundamental Refrigerant Management	
11	-	-	Credit 1	Optimize Energy Performance	1 to 19
4	-	-	Credit 2	On-Site Renewable Energy	1 to 7
-	2	-	Credit 3	Enhanced Commissioning	2
-	2	-	Credit 4	Enhanced Refrigerant Management	2
-	3	-	Credit 5	Measurement and Verification	3
-	2	-	Credit 6	Green Power	2

4	**2**	**12**	**Materials and Resources**	Possible Points:	**14**
Y			Prereq 1	Storage and Collection of Recyclables	**0**
-	-	3	Credit 1.1	Building Reuse—Maintain Existing Walls, Floors, and Roof	1 to 3
-	-	3	Credit 1.2	Building Reuse—Maintain 50% of Interior Non-Structural Elements	1
-	-	3	Credit 2	Construction Waste Management	1 to 2
-	-	3	Credit 3	Materials Reuse	1 to 2

			Materials and Resources, Continued		
Y	?	N			
2	-	-	Credit 4	Recycled Content	1 to 2
2	-	-	Credit 5	Regional Materials	1 to 2
-	1	-	Credit 6	Rapidly Renewable Materials	1
-	1	-	Credit 7	Certified Wood	1

15	**0**	**0**	**Indoor Environmental Quality**	Possible Points:	**15**
Y			Prereq 1	Minimum Indoor Air Quality Performance	**0**
Y			Prereq 2	Environmental Tobacco Smoke (ETS) Control	**0**
1	-	-	Credit 1	Outdoor Air Delivery Monitoring	1
1	-	-	Credit 2	Increased Ventilation	1
1	-	-	Credit 3.1	Construction IAQ Management Plan—During Construction	1
1	-	-	Credit 3.2	Construction IAQ Management Plan—Before Occupancy	1
1	-	-	Credit 4.1	Low-Emitting Materials—Adhesives and Sealants	1
1	-	-	Credit 4.2	Low-Emitting Materials—Paints and Coatings	1
1	-	-	Credit 4.3	Low-Emitting Materials—Flooring Systems	1
1	-	-	Credit 4.4	Low-Emitting Materials—Composite Wood and Agrifiber Products	1
1	-	-	Credit 5	Indoor Chemical and Pollutant Source Control	1
1	-	-	Credit 6.1	Controllability of Systems—Lighting	1
1	-	-	Credit 6.2	Controllability of Systems—Thermal Comfort	1
1	-	-	Credit 7.1	Thermal Comfort—Design	1
1	-	-	Credit 7.2	Thermal Comfort—Verification	1
1	-	-	Credit 8.1	Daylight and Views—Daylight	1
1	-	-	Credit 8.2	Daylight and Views—Views	1

1	**0**	**5**	**Innovation and Design Process**	Possible Points:	**6**
-	-	1	Credit 1.1	Innovation in Design: Specific Title	1
-	-	1	Credit 1.2	Innovation in Design: Specific Title	1
-	-	1	Credit 1.3	Innovation in Design: Specific Title	1
-	-	1	Credit 1.4	Innovation in Design: Specific Title	1
-	-	1	Credit 1.5	Innovation in Design: Specific Title	1
1	-	-	Credit 2	LEED Accredited Professional	1

1	**0**	**0**	**Regional Priority Credits**	Possible Points:	**4**
1	-	-	Credit 1.1	Regional Priority: Specific Credit	1
-	-	-	Credit 1.2	Regional Priority: Specific Credit	1
-	-	-	Credit 1.3	Regional Priority: Specific Credit	1
-	-	-	Credit 1.4	Regional Priority: Specific Credit	1

51	20	29	**Total**	Possible Points:	**110**

Certified 40 to 49 points Silver 50 to 59 points Gold 60 to 79 points Platinum 80 to 110

LEED 2009 for New Construction and Major Renovations

Project Checklist

F.E.Warren Building 222-03

Y	?	N			
11	**3**	**12**	**Sustainable Sites**	**Possible Points:**	**26**
Y			Prereq 1	Construction Activity Pollution Prevention	
1	-	-	Credit 1	Site Selection	1
-	-	5	Credit 2	Development Density and Community Connectivity	5
-	-	1	Credit 3	Brownfield Redevelopment	1
-	-	6	Credit 4.1	Alternative Transportation—Public Transportation Access	6
1	-	-	Credit 4.2	Alternative Transportation—Bicycle Storage and Changing Rooms	1
3	-	-	Credit 4.3	Alternative Transportation—Low-Emitting and Fuel-Efficient Vehicles	3
2	-	-	Credit 4.4	Alternative Transportation—Parking Capacity	2
1	-	-	Credit 5.1	Site Development—Protect or Restore Habitat	1
1	-	-	Credit 5.2	Site Development—Maximize Open Space	1
1	-	-	Credit 6.1	Stormwater Design—Quantity Control	1
-	1	-	Credit 6.2	Stormwater Design—Quality Control	1
-	1	-	Credit 7.1	Heat Island Effect—Non-roof	1
-	1	-	Credit 7.2	Heat Island Effect—Roof	1
1	-	-	Credit 8	Light Pollution Reduction	1
2	**6**	**0**	**Water Efficiency**	**Possible Points:**	**10**
Y			Prereq 1	Water Use Reduction—20% Reduction	
-	4	-	Credit 1	Water Efficient Landscaping	2 to 4
-	2	-	Credit 2	Innovative Wastewater Technologies	2
2	-	-	Credit 3	Water Use Reduction	2 to 4
16	**9**	**0**	**Energy and Atmosphere**	**Possible Points:**	**35**
Y			Prereq 1	Fundamental Commissioning of Building Energy Systems	
Y			Prereq 2	Minimum Energy Performance	0
Y			Prereq 3	Fundamental Refrigerant Management	
12	-	-	Credit 1	Optimize Energy Performance	1 to 19
4	-	-	Credit 2	On-Site Renewable Energy	1 to 7
-	2	-	Credit 3	Enhanced Commissioning	2
-	2	-	Credit 4	Enhanced Refrigerant Management	2
-	3	-	Credit 5	Measurement and Verification	3
-	2	-	Credit 6	Green Power	2
9	**5**	**0**	**Materials and Resources**	**Possible Points:**	**14**
Y			Prereq 1	Storage and Collection of Recyclables	**0**
3	-	-	Credit 1.1	Building Reuse—Maintain Existing Walls, Floors, and Roof	1 to 3
-	1	-	Credit 1.2	Building Reuse—Maintain 50% of Interior Non-Structural Elements	1
-	2	-	Credit 2	Construction Waste Management	1 to 2
2	-	-	Credit 3	Materials Reuse	1 to 2

Y	?	N			
			Materials and Resources, Continued		
2	-	-	Credit 4	Recycled Content	1 to 2
2	-	-	Credit 5	Regional Materials	1 to 2
-	1	-	Credit 6	Rapidly Renewable Materials	1
-	1	-	Credit 7	Certified Wood	1
13	**2**	**0**	**Indoor Environmental Quality**	**Possible Points:**	**15**
Y			Prereq 1	Minimum Indoor Air Quality Performance	**0**
Y			Prereq 2	Environmental Tobacco Smoke (ETS) Control	**0**
1	-	-	Credit 1	Outdoor Air Delivery Monitoring	1
1	-	-	Credit 2	Increased Ventilation	1
1	-	-	Credit 3.1	Construction IAQ Management Plan—During Construction	1
1	-	-	Credit 3.2	Construction IAQ Management Plan—Before Occupancy	1
1	-	-	Credit 4.1	Low-Emitting Materials—Adhesives and Sealants	1
1	-	-	Credit 4.2	Low-Emitting Materials—Paints and Coatings	1
1	-	-	Credit 4.3	Low-Emitting Materials—Flooring Systems	1
1	-	-	Credit 4.4	Low-Emitting Materials—Composite Wood and Agrifiber Products	1
1	-	-	Credit 5	Indoor Chemical and Pollutant Source Control	1
1	-	-	Credit 6.1	Controllability of Systems—Lighting	1
1	-	-	Credit 6.2	Controllability of Systems—Thermal Comfort	1
-	1	-	Credit 7.1	Thermal Comfort—Design	1
1	-	-	Credit 7.2	Thermal Comfort—Verification	1
1	-	-	Credit 8.1	Daylight and Views—Daylight	1
-	1	-	Credit 8.2	Daylight and Views—Views	1
1	**0**	**5**	**Innovation and Design Process**	**Possible Points:**	**6**
-	-	1	Credit 1.1	Innovation in Design: Specific Title	1
-	-	1	Credit 1.2	Innovation in Design: Specific Title	1
-	-	1	Credit 1.3	Innovation in Design: Specific Title	1
-	-	1	Credit 1.4	Innovation in Design: Specific Title	1
-	-	1	Credit 1.5	Innovation in Design: Specific Title	1
1	-	-	Credit 2	LEED Accredited Professional	1
1	**0**	**0**	**Regional Priority Credits**	**Possible Points:**	**4**
1	-	-	Credit 1.1	Regional Priority: Specific Credit	1
-	-	-	Credit 1.2	Regional Priority: Specific Credit	1
-	-	-	Credit 1.3	Regional Priority: Specific Credit	1
-	-	-	Credit 1.4	Regional Priority: Specific Credit	1
53	**25**	**17**	**Total**	**Possible Points:**	**110**

Certified 40 to 49 points Silver 50 to 59 points Gold 60 to 79 points Platinum 80 to 110

LEED 2009 for New Construction and Major Renovations

Project Checklist

F.E.Warren Building 222-04

Sustainable Sites — Possible Points: 26

Y	?	N			
Y			Prereq 1	Construction Activity Pollution Prevention	
1	-	-	Credit 1	Site Selection	1
-	-	5	Credit 2	Development Density and Community Connectivity	5
-	-	1	Credit 3	Brownfield Redevelopment	1
-	-	6	Credit 4.1	Alternative Transportation—Public Transportation Access	6
1	-	-	Credit 4.2	Alternative Transportation—Bicycle Storage and Changing Rooms	1
3	-	-	Credit 4.3	Alternative Transportation—Low-Emitting and Fuel-Efficient Vehicles	3
2	-	-	Credit 4.4	Alternative Transportation—Parking Capacity	2
1	-	-	Credit 5.1	Site Development—Protect or Restore Habitat	1
1	-	-	Credit 5.2	Site Development—Maximize Open Space	1
1	-	-	Credit 6.1	Stormwater Design—Quantity Control	1
-	1	-	Credit 6.2	Stormwater Design—Quality Control	1
-	1	-	Credit 7.1	Heat Island Effect—Non-roof	1
-	1	-	Credit 7.2	Heat Island Effect—Roof	1
1	-	-	Credit 8	Light Pollution Reduction	1

Water Efficiency — Possible Points: 10

Y					
Y			Prereq 1	Water Use Reduction—20% Reduction	
-	4	-	Credit 1	Water Efficient Landscaping	2 to 4
-	2	-	Credit 2	Innovative Wastewater Technologies	2
2	-	-	Credit 3	Water Use Reduction	2 to 4

Energy and Atmosphere — Possible Points: 35

Y			Prereq 1	Fundamental Commissioning of Building Energy Systems	
Y			Prereq 2	Minimum Energy Performance	0
Y			Prereq 3	Fundamental Refrigerant Management	
12	-	-	Credit 1	Optimize Energy Performance	1 to 19
4	-	-	Credit 2	On-Site Renewable Energy	1 to 7
-	2	-	Credit 3	Enhanced Commissioning	2
-	2	-	Credit 4	Enhanced Refrigerant Management	2
-	3	-	Credit 5	Measurement and Verification	3
-	2	-	Credit 6	Green Power	2

Materials and Resources — Possible Points: 14

Y			Prereq 1	Storage and Collection of Recyclables	**0**
3	-	-	Credit 1.1	Building Reuse—Maintain Existing Walls, Floors, and Roof	1 to 3
-	1	-	Credit 1.2	Building Reuse—Maintain 50% of Interior Non-Structural Elements	1
-	2	-	Credit 2	Construction Waste Management	1 to 2
2	-	-	Credit 3	Materials Reuse	1 to 2

Materials and Resources, Continued

Y	?	N			
2	-	-	Credit 4	Recycled Content	1 to 2
2	-	-	Credit 5	Regional Materials	1 to 2
-	1	-	Credit 6	Rapidly Renewable Materials	1
-	1	-	Credit 7	Certified Wood	1

Indoor Environmental Quality — Possible Points: 15

Y			Prereq 1	Minimum Indoor Air Quality Performance	**0**
Y			Prereq 2	Environmental Tobacco Smoke (ETS) Control	**0**
1	-	-	Credit 1	Outdoor Air Delivery Monitoring	1
1	-	-	Credit 2	Increased Ventilation	1
1	-	-	Credit 3.1	Construction IAQ Management Plan—During Construction	1
1	-	-	Credit 3.2	Construction IAQ Management Plan—Before Occupancy	1
1	-	-	Credit 4.1	Low-Emitting Materials—Adhesives and Sealants	1
1	-	-	Credit 4.2	Low-Emitting Materials—Paints and Coatings	1
1	-	-	Credit 4.3	Low-Emitting Materials—Flooring Systems	1
1	-	-	Credit 4.4	Low-Emitting Materials—Composite Wood and Agrifiber Products	1
1	-	-	Credit 5	Indoor Chemical and Pollutant Source Control	1
1	-	-	Credit 6.1	Controllability of Systems—Lighting	1
1	-	-	Credit 6.2	Controllability of Systems—Thermal Comfort	1
-	1	-	Credit 7.1	Thermal Comfort—Design	1
1	-	-	Credit 7.2	Thermal Comfort—Verification	1
1	-	-	Credit 8.1	Daylight and Views—Daylight	1
-	1	-	Credit 8.2	Daylight and Views—Views	1

Innovation and Design Process — Possible Points: 6

-	-	1	Credit 1.1	Innovation in Design: Specific Title	1
-	-	1	Credit 1.2	Innovation in Design: Specific Title	1
-	-	1	Credit 1.3	Innovation in Design: Specific Title	1
-	-	1	Credit 1.4	Innovation in Design: Specific Title	1
-	-	1	Credit 1.5	Innovation in Design: Specific Title	1
1	-	-	Credit 2	LEED Accredited Professional	1

Regional Priority Credits — Possible Points: 4

1	-	-	Credit 1.1	Regional Priority: Specific Credit	1
-	-	-	Credit 1.2	Regional Priority: Specific Credit	1
-	-	-	Credit 1.3	Regional Priority: Specific Credit	1
-	-	-	Credit 1.4	Regional Priority: Specific Credit	1

Total — Possible Points: 110

53	25	17	**Total**

Certified 40 to 49 points Silver 50 to 59 points Gold 60 to 79 points Platinum 80 to 110

Table III-43 LEED Certification: FEW 323 All Project Alternatives

Category	02 Demo and New Construction	03 Modernization with HPS	04 Modernization with ATFP plus Solar PV	Maximum Points
Sustainable Sites	11	11	11	26
Water Efficiency	2	2	2	10
Energy and Atmosphere	21	20	25	35
Materials and Resources	4	9	9	14
Indoor Environmental Quality	14	13	13	15
Innovation and Design Process	1	1	2	6
Regional Priority Credits	1	1	1	4
Total	**54**	**57**	**63**	**110**
Certification Level	**Silver**	**Silver**	**Gold**	**NA**

Note: 2009 LEED fro New Construction and Major Renovations Project Checklist

Sources: Center for Resource Solutions; Comfort Design; BAE Urban Economics, 2012.

LEED 2009 for New Construction and Major Renovations

Project Checklist

F.E.Warren Building 323-02

Sustainable Sites — Possible Points: 26

Y	?	N			
11	3	12			
Y			Prereq 1	Construction Activity Pollution Prevention	
1	-	-	Credit 1	Site Selection	1
-	-	5	Credit 2	Development Density and Community Connectivity	5
-	-	1	Credit 3	Brownfield Redevelopment	1
-	-	6	Credit 4.1	Alternative Transportation—Public Transportation Access	6
1	-	-	Credit 4.2	Alternative Transportation—Bicycle Storage and Changing Rooms	1
3	-	-	Credit 4.3	Alternative Transportation—Low-Emitting and Fuel-Efficient Vehicles	3
2	-	-	Credit 4.4	Alternative Transportation—Parking Capacity	2
1	-	-	Credit 5.1	Site Development—Protect or Restore Habitat	1
1	-	-	Credit 5.2	Site Development—Maximize Open Space	1
1	-	-	Credit 6.1	Stormwater Design—Quantity Control	1
-	1	-	Credit 6.2	Stormwater Design—Quality Control	1
-	1	-	Credit 7.1	Heat Island Effect—Non-roof	1
-	1	-	Credit 7.2	Heat Island Effect—Roof	1
1	-	-	Credit 8	Light Pollution Reduction	1

Water Efficiency — Possible Points: 10

Y	?	N			
2	6	0			
Y			Prereq 1	Water Use Reduction—20% Reduction	
-	4	-	Credit 1	Water Efficient Landscaping	2 to 4
-	2	-	Credit 2	Innovative Wastewater Technologies	2
2	-	-	Credit 3	Water Use Reduction	2 to 4

Energy and Atmosphere — Possible Points: 35

Y	?	N			
21	6	0			
Y			Prereq 1	Fundamental Commissioning of Building Energy Systems	
Y			Prereq 2	Minimum Energy Performance	0
Y			Prereq 3	Fundamental Refrigerant Management	
14	-	-	Credit 1	Optimize Energy Performance	1 to 19
4	-	-	Credit 2	On-Site Renewable Energy	1 to 7
-	2	-	Credit 3	Enhanced Commissioning	2
-	2	-	Credit 4	Enhanced Refrigerant Management	2
3	-	-	Credit 5	Measurement and Verification	3
-	2	-	Credit 6	Green Power	2

Materials and Resources — Possible Points: 14

Y	?	N			
4	2	12			
Y			Prereq 1	Storage and Collection of Recyclables	**0**
-	-	3	Credit 1.1	Building Reuse—Maintain Existing Walls, Floors, and Roof	1 to 3
-	-	3	Credit 1.2	Building Reuse—Maintain 50% of Interior Non-Structural Elements	1
-	-	3	Credit 2	Construction Waste Management	1 to 2
-	-	3	Credit 3	Materials Reuse	1 to 2

Materials and Resources, Continued

Y	?	N			
2	-	-	Credit 4	Recycled Content	1 to 2
2	-	-	Credit 5	Regional Materials	1 to 2
-	1	-	Credit 6	Rapidly Renewable Materials	1
-	1	-	Credit 7	Certified Wood	1

Indoor Environmental Quality — Possible Points: 15

Y	?	N			
14	1	0			
Y			Prereq 1	Minimum Indoor Air Quality Performance	**0**
Y			Prereq 2	Environmental Tobacco Smoke (ETS) Control	**0**
1	-	-	Credit 1	Outdoor Air Delivery Monitoring	1
1	-	-	Credit 2	Increased Ventilation	1
1	-	-	Credit 3.1	Construction IAQ Management Plan—During Construction	1
1	-	-	Credit 3.2	Construction IAQ Management Plan—Before Occupancy	1
1	-	-	Credit 4.1	Low-Emitting Materials—Adhesives and Sealants	1
1	-	-	Credit 4.2	Low-Emitting Materials—Paints and Coatings	1
1	-	-	Credit 4.3	Low-Emitting Materials—Flooring Systems	1
1	-	-	Credit 4.4	Low-Emitting Materials—Composite Wood and Agrifiber Products	1
1	-	-	Credit 5	Indoor Chemical and Pollutant Source Control	1
1	-	-	Credit 6.1	Controllability of Systems—Lighting	1
1	-	-	Credit 6.2	Controllability of Systems—Thermal Comfort	1
-	1	-	Credit 7.1	Thermal Comfort—Design	1
1	-	-	Credit 7.2	Thermal Comfort—Verification	1
1	-	-	Credit 8.1	Daylight and Views—Daylight	1
1	-	-	Credit 8.2	Daylight and Views—Views	1

Innovation and Design Process — Possible Points: 6

1	0	5			
-	-	1	Credit 1.1	Innovation in Design: Specific Title	1
-	-	1	Credit 1.2	Innovation in Design: Specific Title	1
-	-	1	Credit 1.3	Innovation in Design: Specific Title	1
-	-	1	Credit 1.4	Innovation in Design: Specific Title	1
-	-	1	Credit 1.5	Innovation in Design: Specific Title	1
1	-	-	Credit 2	LEED Accredited Professional	1

Regional Priority Credits — Possible Points: 4

1	0	0			
1	-	-	Credit 1.1	Regional Priority: Specific Credit	1
-	-	-	Credit 1.2	Regional Priority: Specific Credit	1
-	-	-	Credit 1.3	Regional Priority: Specific Credit	1
-	-	-	Credit 1.4	Regional Priority: Specific Credit	1

Total — Possible Points: 110

54	18	29	**Total**

Certified 40 to 49 points Silver 50 to 59 points Gold 60 to 79 points Platinum 80 to 110

LEED 2009 for New Construction and Major Renovations

Project Checklist

F.E.Warren Building 323-03

Sustainable Sites — Possible Points: 26

Y	?	N			
Y			Prereq 1	Construction Activity Pollution Prevention	
1	-	-	Credit 1	Site Selection	1
-	-	5	Credit 2	Development Density and Community Connectivity	5
-	-	1	Credit 3	Brownfield Redevelopment	1
-	-	6	Credit 4.1	Alternative Transportation—Public Transportation Access	6
1	-	-	Credit 4.2	Alternative Transportation—Bicycle Storage and Changing Rooms	1
3	-	-	Credit 4.3	Alternative Transportation—Low-Emitting and Fuel-Efficient Vehicle	3
2	-	-	Credit 4.4	Alternative Transportation—Parking Capacity	2
1	-	-	Credit 5.1	Site Development—Protect or Restore Habitat	1
1	-	-	Credit 5.2	Site Development—Maximize Open Space	1
1	-	-	Credit 6.1	Stormwater Design—Quantity Control	1
-	1	-	Credit 6.2	Stormwater Design—Quality Control	1
-	1	-	Credit 7.1	Heat Island Effect—Non-roof	1
-	1	-	Credit 7.2	Heat Island Effect—Roof	1
1	-	-	Credit 8	Light Pollution Reduction	1

Water Efficiency — Possible Points: 10

Y					
Y			Prereq 1	Water Use Reduction—20% Reduction	
-	4	-	Credit 1	Water Efficient Landscaping	2 to 4
-	2	-	Credit 2	Innovative Wastewater Technologies	2
2	-	-	Credit 3	Water Use Reduction	2 to 4

Energy and Atmosphere — Possible Points: 35

Y					
Y			Prereq 1	Fundamental Commissioning of Building Energy Systems	
Y			Prereq 2	Minimum Energy Performance	0
Y			Prereq 3	Fundamental Refrigerant Management	
16	-	-	Credit 1	Optimize Energy Performance	1 to 19
4	-	-	Credit 2	On-Site Renewable Energy	1 to 7
-	2	-	Credit 3	Enhanced Commissioning	2
-	2	-	Credit 4	Enhanced Refrigerant Management	2
-	3	-	Credit 5	Measurement and Verification	3
-	2	-	Credit 6	Green Power	2

Materials and Resources — Possible Points: 14

Y					
Y			Prereq 1	Storage and Collection of Recyclables	**0**
3	-	-	Credit 1.1	Building Reuse—Maintain Existing Walls, Floors, and Roof	1 to 3
-	1	-	Credit 1.2	Building Reuse—Maintain 50% of Interior Non-Structural Elements	1
-	2	-	Credit 2	Construction Waste Management	1 to 2
2	-	-	Credit 3	Materials Reuse	1 to 2

Materials and Resources, Continued

Y	?	N			
2	-	-	Credit 4	Recycled Content	1 to 2
2	-	-	Credit 5	Regional Materials	1 to 2
-	1	-	Credit 6	Rapidly Renewable Materials	1
-	1	-	Credit 7	Certified Wood	1

Indoor Environmental Quality — Possible Points: 15

Y					
Y			Prereq 1	Minimum Indoor Air Quality Performance	**0**
Y			Prereq 2	Environmental Tobacco Smoke (ETS) Control	**0**
1	-	-	Credit 1	Outdoor Air Delivery Monitoring	1
1	-	-	Credit 2	Increased Ventilation	1
1	-	-	Credit 3.1	Construction IAQ Management Plan—During Construction	1
1	-	-	Credit 3.2	Construction IAQ Management Plan—Before Occupancy	1
1	-	-	Credit 4.1	Low-Emitting Materials—Adhesives and Sealants	1
1	-	-	Credit 4.2	Low-Emitting Materials—Paints and Coatings	1
1	-	-	Credit 4.3	Low-Emitting Materials—Flooring Systems	1
1	-	-	Credit 4.4	Low-Emitting Materials—Composite Wood and Agrifiber Products	1
1	-	-	Credit 5	Indoor Chemical and Pollutant Source Control	1
1	-	-	Credit 6.1	Controllability of Systems—Lighting	1
1	-	-	Credit 6.2	Controllability of Systems—Thermal Comfort	1
-	1	-	Credit 7.1	Thermal Comfort—Design	1
1	-	-	Credit 7.2	Thermal Comfort—Verification	1
1	-	-	Credit 8.1	Daylight and Views—Daylight	1
-	1	-	Credit 8.2	Daylight and Views—Views	1

Innovation and Design Process — Possible Points: 6

-	-	1	Credit 1.1	Innovation in Design: Specific Title	1
-	-	1	Credit 1.2	Innovation in Design: Specific Title	1
-	-	1	Credit 1.3	Innovation in Design: Specific Title	1
-	-	1	Credit 1.4	Innovation in Design: Specific Title	1
-	-	1	Credit 1.5	Innovation in Design: Specific Title	1
1	-	-	Credit 2	LEED Accredited Professional	1

Regional Priority Credits — Possible Points: 4

1	-	-	Credit 1.1	Regional Priority: Specific Credit	1
-	-	-	Credit 1.2	Regional Priority: Specific Credit	1
-	-	-	Credit 1.3	Regional Priority: Specific Credit	1
-	-	-	Credit 1.4	Regional Priority: Specific Credit	1

Total — Possible Points: 110

57	25	17

Certified 40 to 49 points Silver 50 to 59 points Gold 60 to 79 points Platinum 80 to 110

LEED 2009 for New Construction and Major Renovations

Project Checklist

F.E.Warren Building 323-04

Y	?	N		Sustainable Sites	Possible Points: 26
Y			Prereq 1	Construction Activity Pollution Prevention	
1	-	-	Credit 1	Site Selection	1
-	-	5	Credit 2	Development Density and Community Connectivity	5
-	-	1	Credit 3	Brownfield Redevelopment	1
-	-	6	Credit 4.1	Alternative Transportation—Public Transportation Access	6
1	-	-	Credit 4.2	Alternative Transportation—Bicycle Storage and Changing Rooms	1
3	-	-	Credit 4.3	Alternative Transportation—Low-Emitting and Fuel-Efficient Vehicles	3
2	-	-	Credit 4.4	Alternative Transportation—Parking Capacity	2
1	-	-	Credit 5.1	Site Development—Protect or Restore Habitat	1
1	-	-	Credit 5.2	Site Development—Maximize Open Space	1
1	-	-	Credit 6.1	Stormwater Design—Quantity Control	1
-	1	-	Credit 6.2	Stormwater Design—Quality Control	1
-	1	-	Credit 7.1	Heat Island Effect—Non-roof	1
-	1	-	Credit 7.2	Heat Island Effect—Roof	1
1	-	-	Credit 8	Light Pollution Reduction	1

Y	?	N		Water Efficiency	Possible Points: 10
Y			Prereq 1	Water Use Reduction—20% Reduction	
-	4	-	Credit 1	Water Efficient Landscaping	2 to 4
-	2	-	Credit 2	Innovative Wastewater Technologies	2
2	-	-	Credit 3	Water Use Reduction	2 to 4

Y	?	N		Energy and Atmosphere	Possible Points: 35
Y			Prereq 1	Fundamental Commissioning of Building Energy Systems	
Y			Prereq 2	Minimum Energy Performance	0
Y			Prereq 3	Fundamental Refrigerant Management	
16	-	-	Credit 1	Optimize Energy Performance	1 to 19
7	-	-	Credit 2	On-Site Renewable Energy	1 to 7
-	2	-	Credit 3	Enhanced Commissioning	2
-	2	-	Credit 4	Enhanced Refrigerant Management	2
-	3	-	Credit 5	Measurement and Verification	3
2	-	-	Credit 6	Green Power	2

Y	?	N		Materials and Resources	Possible Points: 14
Y			Prereq 1	Storage and Collection of Recyclables	**0**
3	-	-	Credit 1.1	Building Reuse—Maintain Existing Walls, Floors, and Roof	1 to 3
-	1	-	Credit 1.2	Building Reuse—Maintain 50% of Interior Non-Structural Elements	1
-	2	-	Credit 2	Construction Waste Management	1 to 2
2	-	-	Credit 3	Materials Reuse	1 to 2

Y	?	N		Materials and Resources, Continued	
2	-	-	Credit 4	Recycled Content	1 to 2
2	-	-	Credit 5	Regional Materials	1 to 2
-	1	-	Credit 6	Rapidly Renewable Materials	1
-	1	-	Credit 7	Certified Wood	1

Y	?	N		Indoor Environmental Quality	Possible Points: 15
Y			Prereq 1	Minimum Indoor Air Quality Performance	**0**
Y			Prereq 2	Environmental Tobacco Smoke (ETS) Control	**0**
1	-	-	Credit 1	Outdoor Air Delivery Monitoring	1
1	-	-	Credit 2	Increased Ventilation	1
1	-	-	Credit 3.1	Construction IAQ Management Plan—During Construction	1
1	-	-	Credit 3.2	Construction IAQ Management Plan—Before Occupancy	1
1	-	-	Credit 4.1	Low-Emitting Materials—Adhesives and Sealants	1
1	-	-	Credit 4.2	Low-Emitting Materials—Paints and Coatings	1
1	-	-	Credit 4.3	Low-Emitting Materials—Flooring Systems	1
1	-	-	Credit 4.4	Low-Emitting Materials—Composite Wood and Agrifiber Products	1
1	-	-	Credit 5	Indoor Chemical and Pollutant Source Control	1
1	-	-	Credit 6.1	Controllability of Systems—Lighting	1
1	-	-	Credit 6.2	Controllability of Systems—Thermal Comfort	1
-	1	-	Credit 7.1	Thermal Comfort—Design	1
1	-	-	Credit 7.2	Thermal Comfort—Verification	1
1	-	-	Credit 8.1	Daylight and Views—Daylight	1
-	1	-	Credit 8.2	Daylight and Views—Views	1

Y	?	N		Innovation and Design Process	Possible Points: 6
-	1	-	Credit 1.1	Innovation in Design: Specific Title	1
-	1	-	Credit 1.2	Innovation in Design: Specific Title	1
-	1	-	Credit 1.3	Innovation in Design: Specific Title	1
1	-	-	Credit 1.4	Innovation in Design: Specific Title	1
-	1	-	Credit 1.5	Innovation in Design: Specific Title	1
1	-	-	Credit 2	LEED Accredited Professional	1

Y	?	N		Regional Priority Credits	Possible Points: 4
1	-	-	Credit 1.1	Regional Priority: Specific Credit	1
-	-	-	Credit 1.2	Regional Priority: Specific Credit	1
-	-	-	Credit 1.3	Regional Priority: Specific Credit	1
-	-	-	Credit 1.4	Regional Priority: Specific Credit	1

Y	?	N		Total	Possible Points: 110
63	27	12			

Certified 40 to 49 points Silver 50 to 59 points Gold 60 to 79 points Platinum 80 to 110

Table III-43 LEED Certification: FEW 323 All Project Alternatives

Category	02 Demo and New Construction	03 Modernization with HPS	04 Modernization with ATFP plus Solar PV	Maximum Points
Sustainable Sites	11	11	11	26
Water Efficiency	2	2	2	10
Energy and Atmosphere	21	20	25	35
Materials and Resources	4	9	9	14
Indoor Environmental Quality	14	13	13	15
Innovation and Design Process	1	1	2	6
Regional Priority Credits	1	1	1	4
Total	**54**	**57**	**63**	**110**
Certification Level	**Silver**	**Silver**	**Gold**	**NA**

Note: 2009 LEED fro New Construction and Major Renovations Project Checklist

Sources: Center for Resource Solutions; Comfort Design; BAE Urban Economics, 2012.

Appendix F:
Life-Cycle Cost Analysis Detail

Attached, are print-outs for each of the 24 LCCA calculations made for this Study.

Life Cycle Cost Analysis (LCCA) Spreadsheet

Fort Bliss, El Paso TX

ESTCP SI 0931
LCCA Demonstration

Historic Building 1

Mission: General Administrative Office

Prepared by:
BAE Urban Economics, Inc.

December 2012

Table III-7: Life Cycle Cost Analysis Summary: FTBL 001

Project Alternative	Non Discounted Costs by Component: Initial Investment	Recurring	Residual Value	Total Costs: Non Discounted	Discounted - No GHG Factor	Discounted - w/GHG Factor
FTBL 001-01: Sustainment-Status Quo	$ 1,413,053	$ 4,412,233	$ -	$ 5,825,286	$ 4,633,189	$ 4,957,645
FTBL 001-02: Demolition and New Construction	$ 8,707,799	$ 3,934,495	$ (3,769,689)	$ 8,872,605	$ 9,314,907	$ 9,592,548
FTBL 001-03: Modernization with HPS	$ 7,030,562	$ 3,923,858	$ (3,102,498)	$ 7,851,923	$ 8,038,442	$ 8,282,166
FTBL 001-04: Modernization with AT/FP	$ 7,639,083	$ 3,934,102	$ (3,316,482)	$ 8,256,703	$ 8,522,780	$ 8,777,667

Notes:

Study Period (years):	30
Real Discount Rate:	2.00%
Average CO2e Value/MT (undiscounted)	$ 37.36
Base Date:	10/01/12

Sources: Preservation Associates; BAE Urban Economics, 2012.

Table III-8: Greenhouse Gas Valuation Summary: FTBL 001

Project Alternative	GHG Emissions by Scope (MT CO2e): Scope 1	Scope 2	Scope 3	Total	GHG Value: Non Discounted	Discounted
FTBL 001-01: Sustainment-Status Quo	-	12,301.18	202.16	12,503.34	$ 467,078	$ 324,456
FTBL 001-02: Demolition and New Construction	-	8,364.93	1,584.75	9,949.68	$ 371,050	$ 277,641
FTBL 001-03: Modernization with HPS	-	8,277.29	830.94	9,108.23	$ 339,946	$ 243,725
FTBL 001-04: Modernization with AT/FP	-	8,361.69	958.85	9,320.55	$ 347,822	$ 254,887

Notes:

Study Period (years):	30
Real Discount Rate:	2.00%
Average CO2e Value/MT (undiscounted)	$ 37.36
Base Date:	10/01/12

Sources: Center for Resource Solutions; BAE Urban Economics, 2012.

Table 3: Alternatives Summary: FTBL 001

Project Alternative	Building GSF		Building Features		Construction Cost	
	Total	Footprint	LEED	AT/FP	Total	Per SF
FTBL 001-01: Sustainment-Status Quo	22,842	15,256	n/a	No	$ 1,413,053	$ 62
FTBL 001-02: Demolition and New Construction	22,842	15,256	52	Yes	$ 8,707,799	$ 381
FTBL 001-03: Modernization with HPS	22,842	15,256	58	Yes	$ 7,030,562	$ 308
FTBL 001-04: Modernization with AT/FP	22,842	15,256	58	Yes+	$ 7,639,083	$ 334

Note:

+ Current prescriptive practices and treatments.

Sources: Preservation Associates; Center for Resource Solutions; BAE Urban Economics, 2012.

Table 4: Construction Cost Summary: FTBL 001

	Cost Estimate			
Category	**01. Sustainment-Status Quo**	**02. Demolition and New Construction**	**03. Modernization with HPS**	**04. Modernization with AT/FP**
Demolition	$ -	$ 733,457	$ 467,586	$ 623,448
Substructure	$ 25,200	$ 611,156	$ 96,075	$ 96,075
Shell	$ 468,688	$ 1,970,836	$ 1,198,916	$ 1,434,634
Interiors	$ 289,724	$ 555,379	$ 558,420	$ 592,859
Services	$ 219,443	$ 2,109,824	$ 2,241,489	$ 2,238,235
Sitework	$ -	$ 643,075	$ 328,375	$ 320,428
Special Construction	$ -	$ 18,666	$ 18,666	$ 29,391
Hard Cost Subtotal	**$ 1,003,055**	**$ 6,087,014**	**$ 4,909,527**	**$ 5,335,070**
General conditions (25%)	$ 250,764	$ 1,545,306	$ 1,246,996	$ 1,355,570
Security escalation (2%)	$ -	$ 94,210	$ 82,197	$ 87,656
USACE design (7%)	$ 87,767	$ 540,857	$ 436,449	$ 474,450
USACE SOIH (5.7%)	$ 71,468	$ 440,412	$ 355,394	$ 386,337
Soft Cost Subtotal	**$ 409,999**	**$ 2,620,785**	**$ 2,121,035**	**$ 2,304,013**
Construction Cost Total	**$ 1,413,053**	**$ 8,707,799**	**$ 7,030,562**	**$ 7,639,083**
Construction Cost PSF	**$62**	**$ 381**	**$ 308**	**$ 334**
% Difference from FTBL 02	**-84%**	**N/A**	**-19%**	**-12%**

Sources: Preservation Associates; BAE Urban Economics Inc. 2012.

Table 5: NPV Calculation 001-01: Sustainment-Status Quo

	One Time							Recurring			Residual Value		Net Present Value			
Mid Year	New Construction	Sustainment	Temporary Facilities	Relocation	Demo	Site Preparation	Environmental Remediation	Utilities	Repairs Maintenance	Other Operations	Building	Land	Undiscounted Sum	NPV Factor	Mid-Year	Cum NPV
2012	$ -	$ -	$ -	$ -	$ -	$ -	$ -		$ -		$ -	$ -	$ -	0.99	$ -	$ -
2013	$ -	$ 1,413,053	$ -	$ -	$ -	$ -	$ -	$ 54,200	$ 29,403	$ 63,472	$ -	$ -	$ 1,560,127	0.97	$ 1,514,467	$ 1,514,467
2014	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 54,200	$ 29,403	$ 63,472	$ -	$ -	$ 147,074	0.95	$ 139,971	$ 1,654,438
2015	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 54,200	$ 29,403	$ 63,472	$ -	$ -	$ 147,074	0.93	$ 137,226	$ 1,791,664
2016	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 54,200	$ 29,403	$ 63,472	$ -	$ -	$ 147,074	0.91	$ 134,535	$ 1,926,199
2017	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 54,200	$ 29,403	$ 63,472	$ -	$ -	$ 147,074	0.90	$ 131,897	$ 2,058,096
2018	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 54,200	$ 29,403	$ 63,472	$ -	$ -	$ 147,074	0.88	$ 129,311	$ 2,187,408
2019	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 54,200	$ 29,403	$ 63,472	$ -	$ -	$ 147,074	0.86	$ 126,776	$ 2,314,183
2020	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 54,200	$ 29,403	$ 63,472	$ -	$ -	$ 147,074	0.85	$ 124,290	$ 2,438,473
2021	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 54,200	$ 29,403	$ 63,472	$ -	$ -	$ 147,074	0.83	$ 121,853	$ 2,560,326
2022	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 54,200	$ 29,403	$ 63,472	$ -	$ -	$ 147,074	0.81	$ 119,464	$ 2,679,789
2023	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 54,200	$ 29,403	$ 63,472	$ -	$ -	$ 147,074	0.80	$ 117,121	$ 2,796,911
2024	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 54,200	$ 29,403	$ 63,472	$ -	$ -	$ 147,074	0.78	$ 114,825	$ 2,911,735
2025	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 54,200	$ 29,403	$ 63,472	$ -	$ -	$ 147,074	0.77	$ 112,573	$ 3,024,308
2026	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 54,200	$ 29,403	$ 63,472	$ -	$ -	$ 147,074	0.75	$ 110,366	$ 3,134,674
2027	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 54,200	$ 29,403	$ 63,472	$ -	$ -	$ 147,074	0.74	$ 108,202	$ 3,242,876
2028	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 54,200	$ 29,403	$ 63,472	$ -	$ -	$ 147,074	0.72	$ 106,080	$ 3,348,956
2029	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 54,200	$ 29,403	$ 63,472	$ -	$ -	$ 147,074	0.71	$ 104,000	$ 3,452,956
2030	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 54,200	$ 29,403	$ 63,472	$ -	$ -	$ 147,074	0.69	$ 101,961	$ 3,554,917
2031	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 54,200	$ 29,403	$ 63,472	$ -	$ -	$ 147,074	0.68	$ 99,962	$ 3,654,879
2032	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 54,200	$ 29,403	$ 63,472	$ -	$ -	$ 147,074	0.67	$ 98,002	$ 3,752,881
2033	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 54,200	$ 29,403	$ 63,472	$ -	$ -	$ 147,074	0.65	$ 96,080	$ 3,848,961
2034	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 54,200	$ 29,403	$ 63,472	$ -	$ -	$ 147,074	0.64	$ 94,196	$ 3,943,157
2035	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 54,200	$ 29,403	$ 63,472	$ -	$ -	$ 147,074	0.63	$ 92,349	$ 4,035,506
2036	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 54,200	$ 29,403	$ 63,472	$ -	$ -	$ 147,074	0.62	$ 90,538	$ 4,126,045
2037	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 54,200	$ 29,403	$ 63,472	$ -	$ -	$ 147,074	0.60	$ 88,763	$ 4,214,808
2038	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 54,200	$ 29,403	$ 63,472	$ -	$ -	$ 147,074	0.59	$ 87,023	$ 4,301,830
2039	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 54,200	$ 29,403	$ 63,472	$ -	$ -	$ 147,074	0.58	$ 85,316	$ 4,387,147
2040	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 54,200	$ 29,403	$ 63,472	$ -	$ -	$ 147,074	0.57	$ 83,644	$ 4,470,790
2041	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 54,200	$ 29,403	$ 63,472	$ -	$ -	$ 147,074	0.56	$ 82,003	$ 4,552,794
2042	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 54,200	$ 29,403	$ 63,472	$ -	$ -	$ 147,074	0.55	$ 80,396	$ 4,633,189
TOTALS	$ -	$ 1,413,053	$ -	$ -	$ -	$ -	$ -	$ 1,625,989	$ 882,077	$ 1,904,166	$ -	$ -	$ 5,825,286		$ 4,633,189	$ 4,633,189

Notes:

Project Alternative Summary

Capital Costs	$ 1,413,053
Recurring Costs	$ 4,412,233
Residual Value	$ -
Non Discounted Sum	$ 5,825,286
Cum NPV	$ 4,633,189

Key Assumptions:

Discount Rate	2.00%	
Study Period	30	years
BaseYear	2012	
Report Output	Constant Dollars	
Cost per sq. ft.	$62	
Construction Period (years)	1	
Building Size (sq. ft.)	22,842	

Repairs and Maintenance	$ 1.29	
Other Operations	$ 2.78	
Cleaning per sq. ft.	$ 1.12	
Roads and Grounds	$ 0.27	
Administrative	$ 1.39	
BOMA Expense CPI Adjustment	2.16%	
Effective utitlities per sq. ft.	$ 2.37	Not from BOMA; calculated based on option-specific energy usage.

Source: BAE Urban Economics, 2012.

Table 6: Schedule of Recurring Expenditures: FTBL 001-01 Sustainment-Status Quo

Year	Total Annual Expenditures	Electrical			Natural Gas			Water/Sewer (a)					Other
		Total Cost	kWh	$/kWh	Total Cost	MMBtu	$/MMBtu	Total Cost	Water	$/Kgal	Waste	$/Kgal	
2012	$ 54,200	$ 49,766	829,432	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2013	$ 54,200	$ 49,766	829,432	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2014	$ 54,200	$ 49,766	829,432	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2015	$ 54,200	$ 49,766	829,432	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2016	$ 54,200	$ 49,766	829,432	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2017	$ 54,200	$ 49,766	829,432	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2018	$ 54,200	$ 49,766	829,432	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2019	$ 54,200	$ 49,766	829,432	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2020	$ 54,200	$ 49,766	829,432	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2021	$ 54,200	$ 49,766	829,432	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2022	$ 54,200	$ 49,766	829,432	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2023	$ 54,200	$ 49,766	829,432	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2024	$ 54,200	$ 49,766	829,432	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2025	$ 54,200	$ 49,766	829,432	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2026	$ 54,200	$ 49,766	829,432	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2027	$ 54,200	$ 49,766	829,432	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2028	$ 54,200	$ 49,766	829,432	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2029	$ 54,200	$ 49,766	829,432	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2030	$ 54,200	$ 49,766	829,432	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2031	$ 54,200	$ 49,766	829,432	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2032	$ 54,200	$ 49,766	829,432	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2033	$ 54,200	$ 49,766	829,432	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2034	$ 54,200	$ 49,766	829,432	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2035	$ 54,200	$ 49,766	829,432	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2036	$ 54,200	$ 49,766	829,432	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2037	$ 54,200	$ 49,766	829,432	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2038	$ 54,200	$ 49,766	829,432	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2039	$ 54,200	$ 49,766	829,432	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2040	$ 54,200	$ 49,766	829,432	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2041	$ 54,200	$ 49,766	829,432	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2042	$ 54,200	$ 49,766	829,432	$ 0.060	$ -		$ 5.39	$ 4,434					$ -

Notes:

(a) Water and sewer combined and calculated on square foot basis based upon BOMA ERR data.

CPI adjustment factor:	2.16%	bring 2011 BOMA ERR data to 2012 dollars.
Water/sewer utility expense	$0.19	per sq. ft.
Building total sq. ft.	22,842	

Source: BAE Urban Economics, 2012.

Table 7: Depreciation Schedule & Residual Value FTBL 001-01 Sustainment-Status Quo

Period	Depreciation Schedule	Residual Value
2012	$ -	$ -
2013	$ 1,413,053	$ -
2014	$ 1,342,400	$ -
2015	$ 1,271,748	$ -
2016	$ 1,201,095	$ -
2017	$ 1,130,442	$ -
2018	$ 1,059,790	$ -
2019	$ 989,137	$ -
2020	$ 918,485	$ -
2021	$ 847,832	$ -
2022	$ 777,179	$ -
2023	$ 706,527	$ -
2024	$ 635,874	$ -
2025	$ 565,221	$ -
2026	$ 494,569	$ -
2027	$ 423,916	$ -
2028	$ 353,263	$ -
2029	$ 282,611	$ -
2030	$ 211,958	$ -
2031	$ 141,305	$ -
2032	$ 70,653	$ -
2033	$ -	$ -
2034	$ -	$ -
2035	$ -	$ -
2036	$ -	$ -
2037	$ -	$ -
2038	$ -	$ -
2039	$ -	$ -
2040	$ -	$ -
2041	$ -	$ -
2042	$ -	$ -

Note:

Useful life of asset: 20.0 years

Source: BAE Urban Economics, Inc. 2012.

Table 8: NPV Calculation FTBL 001-02: Demolition and New Construction

	One Time							Recurring			Residual Value		Net Present Value			
Mid Year	New Construction	Major Repair	Temporary Facilities	Relocation	Demo	Site Preparation	Environmental Remediation	Utilities	Repairs Maintenance	Other Operations	Building	Land	Undiscounted Sum	NPV Factor	Mid-Year	Cum NPV
2012	$ -	$ -	$ -	$ -	$ 733,457	$ -	$ -	$ -	$ -		$ -	$ -	$ 733,457	0.99	$ 726,230	$ 726,230
2013	$ 7,974,342	$ -	$ -	$ -	$ -	$ -	$ -	$ 38,275	$ 29,403	$ 63,472	$ -	$ -	$ 8,105,492	0.97	$ 7,868,268	$ 8,594,498
2014	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 38,275	$ 29,403	$ 63,472	$ -	$ -	$ 131,150	0.95	$ 124,815	$ 8,719,313
2015	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 38,275	$ 29,403	$ 63,472	$ -	$ -	$ 131,150	0.93	$ 122,368	$ 8,841,681
2016	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 38,275	$ 29,403	$ 63,472	$ -	$ -	$ 131,150	0.91	$ 119,968	$ 8,961,650
2017	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 38,275	$ 29,403	$ 63,472	$ -	$ -	$ 131,150	0.90	$ 117,616	$ 9,079,266
2018	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 38,275	$ 29,403	$ 63,472	$ -	$ -	$ 131,150	0.88	$ 115,310	$ 9,194,575
2019	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 38,275	$ 29,403	$ 63,472	$ -	$ -	$ 131,150	0.86	$ 113,049	$ 9,307,624
2020	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 38,275	$ 29,403	$ 63,472	$ -	$ -	$ 131,150	0.85	$ 110,832	$ 9,418,457
2021	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 38,275	$ 29,403	$ 63,472	$ -	$ -	$ 131,150	0.83	$ 108,659	$ 9,527,116
2022	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 38,275	$ 29,403	$ 63,472	$ -	$ -	$ 131,150	0.81	$ 106,529	$ 9,633,644
2023	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 38,275	$ 29,403	$ 63,472	$ -	$ -	$ 131,150	0.80	$ 104,440	$ 9,738,084
2024	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 38,275	$ 29,403	$ 63,472	$ -	$ -	$ 131,150	0.78	$ 102,392	$ 9,840,476
2025	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 38,275	$ 29,403	$ 63,472	$ -	$ -	$ 131,150	0.77	$ 100,384	$ 9,940,860
2026	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 38,275	$ 29,403	$ 63,472	$ -	$ -	$ 131,150	0.75	$ 98,416	$ 10,039,276
2027	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 38,275	$ 29,403	$ 63,472	$ -	$ -	$ 131,150	0.74	$ 96,486	$ 10,135,762
2028	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 38,275	$ 29,403	$ 63,472	$ -	$ -	$ 131,150	0.72	$ 94,594	$ 10,230,356
2029	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 38,275	$ 29,403	$ 63,472	$ -	$ -	$ 131,150	0.71	$ 92,739	$ 10,323,096
2030	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 38,275	$ 29,403	$ 63,472	$ -	$ -	$ 131,150	0.69	$ 90,921	$ 10,414,017
2031	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 38,275	$ 29,403	$ 63,472	$ -	$ -	$ 131,150	0.68	$ 89,138	$ 10,503,155
2032	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 38,275	$ 29,403	$ 63,472	$ -	$ -	$ 131,150	0.67	$ 87,390	$ 10,590,546
2033	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 38,275	$ 29,403	$ 63,472	$ -	$ -	$ 131,150	0.65	$ 85,677	$ 10,676,223
2034	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 38,275	$ 29,403	$ 63,472	$ -	$ -	$ 131,150	0.64	$ 83,997	$ 10,760,220
2035	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 38,275	$ 29,403	$ 63,472	$ -	$ -	$ 131,150	0.63	$ 82,350	$ 10,842,570
2036	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 38,275	$ 29,403	$ 63,472	$ -	$ -	$ 131,150	0.62	$ 80,735	$ 10,923,305
2037	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 38,275	$ 29,403	$ 63,472	$ -	$ -	$ 131,150	0.60	$ 79,152	$ 11,002,457
2038	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 38,275	$ 29,403	$ 63,472	$ -	$ -	$ 131,150	0.59	$ 77,600	$ 11,080,058
2039	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 38,275	$ 29,403	$ 63,472	$ -	$ -	$ 131,150	0.58	$ 76,079	$ 11,156,136
2040	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 38,275	$ 29,403	$ 63,472	$ -	$ -	$ 131,150	0.57	$ 74,587	$ 11,230,723
2041	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 38,275	$ 29,403	$ 63,472	$ -	$ -	$ 131,150	0.56	$ 73,124	$ 11,303,848
2042	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 38,275	$ 29,403	$ 63,472	$ (3,769,689)	$ -	$ (3,638,539)	0.55	$ (1,988,941)	$ 9,314,907
TOTALS	$ 7,974,342	$ -	$ -	$ -	$ 733,457	$ -	$ -	$ 1,148,251	$ 882,077	$ 1,904,166	$ (3,769,689)	$ -	$ 8,872,605		$ 9,314,907	$ 9,314,907

NOTES:

Project Alternative Summary

Capital Costs	$ 8,707,799
Recurring Costs	$ 3,934,495
Residual Value	$ (3,769,689)
Non Discounted Sum	$ 8,872,605
Cum NPV	$ 9,314,907

Key Assumptions:

Discount Rate	2.00%		Repairs and Maintenance	$ 1.29
Study Period	30	years	Other Operations	$ 2.78
BaseYear	2012		Cleaning per sq. ft.	$ 1.12
Report Output	Constant Dollars		Roads and Grounds	$ 0.27
Cost per sq. ft.	$381		Administrative	$ 1.39
Construction Period (years)	1		BOMA Expense CPI Adjustment	2.16%
Building Size (sq. ft.)	22,842		Effective utitlities per sq. ft.	$ 1.68

Not from BOMA; calculated based on option-specific energy usage.

Source: BAE Urban Economics, 2012.

Table 9: Schedule of Recurring Expenditures: FTBL 001-02 Demolition and New Construction

Year	Total Annual Expenditures	Electrical			Natural Gas			Water/Sewer (a)					Other
		Total Cost	kWh	$/kWh	Total Cost	MMBtu	$/MMBtu	Total Cost	(Kgal)	$/Kgal	(Kgal)	$/Kgal	
2012	$ 38,275	$ 33,841	564,022	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2013	$ 38,275	$ 33,841	564,022	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2014	$ 38,275	$ 33,841	564,022	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2015	$ 38,275	$ 33,841	564,022	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2016	$ 38,275	$ 33,841	564,022	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2017	$ 38,275	$ 33,841	564,022	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2018	$ 38,275	$ 33,841	564,022	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2019	$ 38,275	$ 33,841	564,022	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2020	$ 38,275	$ 33,841	564,022	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2021	$ 38,275	$ 33,841	564,022	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2022	$ 38,275	$ 33,841	564,022	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2023	$ 38,275	$ 33,841	564,022	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2024	$ 38,275	$ 33,841	564,022	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2025	$ 38,275	$ 33,841	564,022	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2026	$ 38,275	$ 33,841	564,022	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2027	$ 38,275	$ 33,841	564,022	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2028	$ 38,275	$ 33,841	564,022	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2029	$ 38,275	$ 33,841	564,022	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2030	$ 38,275	$ 33,841	564,022	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2031	$ 38,275	$ 33,841	564,022	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2032	$ 38,275	$ 33,841	564,022	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2033	$ 38,275	$ 33,841	564,022	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2034	$ 38,275	$ 33,841	564,022	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2035	$ 38,275	$ 33,841	564,022	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2036	$ 38,275	$ 33,841	564,022	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2037	$ 38,275	$ 33,841	564,022	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2038	$ 38,275	$ 33,841	564,022	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2039	$ 38,275	$ 33,841	564,022	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2040	$ 38,275	$ 33,841	564,022	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2041	$ 38,275	$ 33,841	564,022	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2042	$ 38,275	$ 33,841	564,022	$ 0.060	$ -		$ 5.39	$ 4,434					$ -

Notes:

(a) Water and sewer combined and calculated on square foot basis based upon BOMA ERR data.

CPI adjustment factor:	2.16%	bring 2011 BOMA ERR data to 2012 dollars.
Water/sewer utility expense	$0.19	per sq. ft.
Building total sq. ft.	22,842	

Source: BAE Urban Economics, 2012.

Table 10: Depreciation Schedule & Residual Value: FTBL 001-02 Demolition and New Construction

Period	Depreciation Schedule	Residual Value
2012	$ -	$ -
2013	$ 7,974,342	$ -
2014	$ 7,829,354	$ -
2015	$ 7,684,366	$ -
2016	$ 7,539,378	$ -
2017	$ 7,394,390	$ -
2018	$ 7,249,402	$ -
2019	$ 7,104,414	$ -
2020	$ 6,959,426	$ -
2021	$ 6,814,438	$ -
2022	$ 6,669,450	$ -
2023	$ 6,524,462	$ -
2024	$ 6,379,474	$ -
2025	$ 6,234,486	$ -
2026	$ 6,089,498	$ -
2027	$ 5,944,510	$ -
2028	$ 5,799,522	$ -
2029	$ 5,654,534	$ -
2030	$ 5,509,546	$ -
2031	$ 5,364,558	$ -
2032	$ 5,219,570	$ -
2033	$ 5,074,582	$ -
2034	$ 4,929,594	$ -
2035	$ 4,784,605	$ -
2036	$ 4,639,617	$ -
2037	$ 4,494,629	$ -
2038	$ 4,349,641	$ -
2039	$ 4,204,653	$ -
2040	$ 4,059,665	$ -
2041	$ 3,914,677	$ -
2042	$ 3,769,689	$ 3,769,689

Note:

Useful life of asset: 55.0 years

Source: BAE Urban Economics, Inc. 2012.

Table 11: NPV Calculation FTBL 001-03: Modernization with HPS

	One Time							Recurring			Residual Value		Net Present Value			
Mid Year	New Construction	Modernization	Temporary Facilities	Relocation	Demo	Site Preparation	Environmental Remediation	Utilities	Repairs Maintenance	Other Operations	Building	Land	Undiscounted Sum	NPV Factor	Mid-Year	Cum NPV
2012	$ -	$ -	$ -	$ -	$ 467,586	$ -	$ -	$ -	$ -		$ -	$ -	$ 467,586	0.99	$ 462,979	$ 462,979
2013	$ -	$ 6,562,976	$ -	$ -	$ -	$ -	$ -	$ 37,921	$ 29,403	$ 63,472	$ -	$ -	$ 6,693,772	0.97	$ 6,497,864	$ 6,960,843
2014	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 37,921	$ 29,403	$ 63,472	$ -	$ -	$ 130,795	0.95	$ 124,478	$ 7,085,321
2015	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 37,921	$ 29,403	$ 63,472	$ -	$ -	$ 130,795	0.93	$ 122,037	$ 7,207,358
2016	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 37,921	$ 29,403	$ 63,472	$ -	$ -	$ 130,795	0.91	$ 119,644	$ 7,327,002
2017	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 37,921	$ 29,403	$ 63,472	$ -	$ -	$ 130,795	0.90	$ 117,298	$ 7,444,300
2018	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 37,921	$ 29,403	$ 63,472	$ -	$ -	$ 130,795	0.88	$ 114,998	$ 7,559,298
2019	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 37,921	$ 29,403	$ 63,472	$ -	$ -	$ 130,795	0.86	$ 112,743	$ 7,672,042
2020	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 37,921	$ 29,403	$ 63,472	$ -	$ -	$ 130,795	0.85	$ 110,533	$ 7,782,574
2021	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 37,921	$ 29,403	$ 63,472	$ -	$ -	$ 130,795	0.83	$ 108,365	$ 7,890,940
2022	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 37,921	$ 29,403	$ 63,472	$ -	$ -	$ 130,795	0.81	$ 106,241	$ 7,997,180
2023	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 37,921	$ 29,403	$ 63,472	$ -	$ -	$ 130,795	0.80	$ 104,157	$ 8,101,338
2024	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 37,921	$ 29,403	$ 63,472	$ -	$ -	$ 130,795	0.78	$ 102,115	$ 8,203,453
2025	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 37,921	$ 29,403	$ 63,472	$ -	$ -	$ 130,795	0.77	$ 100,113	$ 8,303,566
2026	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 37,921	$ 29,403	$ 63,472	$ -	$ -	$ 130,795	0.75	$ 98,150	$ 8,401,715
2027	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 37,921	$ 29,403	$ 63,472	$ -	$ -	$ 130,795	0.74	$ 96,225	$ 8,497,941
2028	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 37,921	$ 29,403	$ 63,472	$ -	$ -	$ 130,795	0.72	$ 94,339	$ 8,592,279
2029	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 37,921	$ 29,403	$ 63,472	$ -	$ -	$ 130,795	0.71	$ 92,489	$ 8,684,768
2030	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 37,921	$ 29,403	$ 63,472	$ -	$ -	$ 130,795	0.69	$ 90,675	$ 8,775,443
2031	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 37,921	$ 29,403	$ 63,472	$ -	$ -	$ 130,795	0.68	$ 88,897	$ 8,864,341
2032	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 37,921	$ 29,403	$ 63,472	$ -	$ -	$ 130,795	0.67	$ 87,154	$ 8,951,495
2033	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 37,921	$ 29,403	$ 63,472	$ -	$ -	$ 130,795	0.65	$ 85,445	$ 9,036,940
2034	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 37,921	$ 29,403	$ 63,472	$ -	$ -	$ 130,795	0.64	$ 83,770	$ 9,120,710
2035	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 37,921	$ 29,403	$ 63,472	$ -	$ -	$ 130,795	0.63	$ 82,127	$ 9,202,838
2036	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 37,921	$ 29,403	$ 63,472	$ -	$ -	$ 130,795	0.62	$ 80,517	$ 9,283,355
2037	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 37,921	$ 29,403	$ 63,472	$ -	$ -	$ 130,795	0.60	$ 78,938	$ 9,362,293
2038	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 37,921	$ 29,403	$ 63,472	$ -	$ -	$ 130,795	0.59	$ 77,390	$ 9,439,683
2039	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 37,921	$ 29,403	$ 63,472	$ -	$ -	$ 130,795	0.58	$ 75,873	$ 9,515,556
2040	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 37,921	$ 29,403	$ 63,472	$ -	$ -	$ 130,795	0.57	$ 74,385	$ 9,589,942
2041	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 37,921	$ 29,403	$ 63,472	$ -	$ -	$ 130,795	0.56	$ 72,927	$ 9,662,868
2042	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 37,921	$ 29,403	$ 63,472	$ (3,102,498)	$ -	$ (2,971,703)	0.55	$ (1,624,427)	$ 8,038,442
TOTALS	$ -	$ 6,562,976	$ -	$ -	$ 467,586	$ -	$ -	$ 1,137,615	$ 882,077	$ 1,904,166	$ (3,102,498)	$ -	$ 7,851,923		$ 8,038,442	$ 8,038,442

Notes:

Project Alternative Summary

Capital Costs	$ 7,030,562
Recurring Costs	$ 3,923,858
Residual Value	$ (3,102,498)
Non Discounted Sum	$ 7,851,923
Cum NPV	$ 8,038,442

Key Assumptions:

Discount Rate	2.00%		Repairs and Maintenance	$ 1.29	
Study Period	30	years	Other Operations	$ 2.78	
BaseYear	2012		Cleaning per sq. ft.	$ 1.12	
Report Output	Constant Dollars		Roads and Grounds	$ 0.27	
Cost per sq. ft.	$308		Administrative	$ 1.39	
Construction Period (years)	1		BOMA Expense CPI Adjustment	2.16%	
Building Size (sq. ft.)	22,842		Effective utitlities per sq. ft.	$ 1.66	Not from BOMA; calculated based on option-specific energy usage.

Source: BAE Urban Economics, 2012.

Table 12: Schedule of Recurring Expenditures: FTBL 001-03 Modernization with HPS

Year	Total Annual Expenditures	Electrical			Natural Gas			Water/Sewer (a)					Other
		Total Cost	kWh	$/kWh	Total Cost	MMBtu	$/MMBtu	Total Cost	Water	$/Kgal	Waste	$/Kgal	
2012	$ 37,921	$ 33,487	558,113	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2013	$ 37,921	$ 33,487	558,113	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2014	$ 37,921	$ 33,487	558,113	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2015	$ 37,921	$ 33,487	558,113	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2016	$ 37,921	$ 33,487	558,113	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2017	$ 37,921	$ 33,487	558,113	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2018	$ 37,921	$ 33,487	558,113	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2019	$ 37,921	$ 33,487	558,113	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2020	$ 37,921	$ 33,487	558,113	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2021	$ 37,921	$ 33,487	558,113	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2022	$ 37,921	$ 33,487	558,113	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2023	$ 37,921	$ 33,487	558,113	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2024	$ 37,921	$ 33,487	558,113	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2025	$ 37,921	$ 33,487	558,113	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2026	$ 37,921	$ 33,487	558,113	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2027	$ 37,921	$ 33,487	558,113	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2028	$ 37,921	$ 33,487	558,113	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2029	$ 37,921	$ 33,487	558,113	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2030	$ 37,921	$ 33,487	558,113	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2031	$ 37,921	$ 33,487	558,113	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2032	$ 37,921	$ 33,487	558,113	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2033	$ 37,921	$ 33,487	558,113	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2034	$ 37,921	$ 33,487	558,113	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2035	$ 37,921	$ 33,487	558,113	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2036	$ 37,921	$ 33,487	558,113	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2037	$ 37,921	$ 33,487	558,113	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2038	$ 37,921	$ 33,487	558,113	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2039	$ 37,921	$ 33,487	558,113	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2040	$ 37,921	$ 33,487	558,113	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2041	$ 37,921	$ 33,487	558,113	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2042	$ 37,921	$ 33,487	558,113	$ 0.060	$ -		$ 5.39	$ 4,434					$ -

Notes:

(a) Water and sewer combined and calculated on square foot basis based upon BOMA ERR data.

CPI adjustment factor:	2.16%	bring 2011 BOMA ERR data to 2012 dollars.
Water/sewer utility expense	$0.19	per sq. ft.
Building total sq. ft.	22,842	

Source: BAE Urban Economics, 2012.

Table 13: Depreciation Schedule & Residual Value: FTBL 001-03 Modernization with HPS

Period	Depreciation Schedule	Residual Value
2012	$ -	$ -
2013	$ 6,562,976	$ -
2014	$ 6,443,650	$ -
2015	$ 6,324,323	$ -
2016	$ 6,204,996	$ -
2017	$ 6,085,669	$ -
2018	$ 5,966,342	$ -
2019	$ 5,847,015	$ -
2020	$ 5,727,688	$ -
2021	$ 5,608,362	$ -
2022	$ 5,489,035	$ -
2023	$ 5,369,708	$ -
2024	$ 5,250,381	$ -
2025	$ 5,131,054	$ -
2026	$ 5,011,727	$ -
2027	$ 4,892,401	$ -
2028	$ 4,773,074	$ -
2029	$ 4,653,747	$ -
2030	$ 4,534,420	$ -
2031	$ 4,415,093	$ -
2032	$ 4,295,766	$ -
2033	$ 4,176,439	$ -
2034	$ 4,057,113	$ -
2035	$ 3,937,786	$ -
2036	$ 3,818,459	$ -
2037	$ 3,699,132	$ -
2038	$ 3,579,805	$ -
2039	$ 3,460,478	$ -
2040	$ 3,341,152	$ -
2041	$ 3,221,825	$ -
2042	$ 3,102,498	$ 3,102,498

Note:

Useful life of asset: 55.0 years

Source: BAE Urban Economics, Inc. 2012.

Table 14: NPV Calculation FTBL 001-04: Modernization with AT/FP

	One Time							Recurring			Residual Value		Net Present Value			
Mid Year	New Construction	Modernization	Temporary Facilities	Relocation	Demo	Site Preparation	Environmental Remediation	Utilities	Repairs Maintenance	Other Operations	Building	Land	Undiscounted Sum	NPV Factor	Mid-Year	Cum NPV
2012	$ -	$ -	$ -	$ -	$ 623,448	$ -	$ -	$ -	$ -		$ -	$ -	$ 623,448	0.99	$ 617,305	$ 617,305
2013	$ -	$ 7,015,635	$ -	$ -	$ -	$ -	$ -	$ 38,262	$ 29,403	$ 63,472	$ -	$ -	$ 7,146,772	0.97	$ 6,937,606	$ 7,554,912
2014	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 38,262	$ 29,403	$ 63,472	$ -	$ -	$ 131,137	0.95	$ 124,803	$ 7,679,714
2015	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 38,262	$ 29,403	$ 63,472	$ -	$ -	$ 131,137	0.93	$ 122,356	$ 7,802,070
2016	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 38,262	$ 29,403	$ 63,472	$ -	$ -	$ 131,137	0.91	$ 119,956	$ 7,922,026
2017	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 38,262	$ 29,403	$ 63,472	$ -	$ -	$ 131,137	0.90	$ 117,604	$ 8,039,631
2018	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 38,262	$ 29,403	$ 63,472	$ -	$ -	$ 131,137	0.88	$ 115,298	$ 8,154,929
2019	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 38,262	$ 29,403	$ 63,472	$ -	$ -	$ 131,137	0.86	$ 113,038	$ 8,267,967
2020	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 38,262	$ 29,403	$ 63,472	$ -	$ -	$ 131,137	0.85	$ 110,821	$ 8,378,788
2021	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 38,262	$ 29,403	$ 63,472	$ -	$ -	$ 131,137	0.83	$ 108,648	$ 8,487,436
2022	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 38,262	$ 29,403	$ 63,472	$ -	$ -	$ 131,137	0.81	$ 106,518	$ 8,593,954
2023	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 38,262	$ 29,403	$ 63,472	$ -	$ -	$ 131,137	0.80	$ 104,429	$ 8,698,384
2024	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 38,262	$ 29,403	$ 63,472	$ -	$ -	$ 131,137	0.78	$ 102,382	$ 8,800,765
2025	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 38,262	$ 29,403	$ 63,472	$ -	$ -	$ 131,137	0.77	$ 100,374	$ 8,901,139
2026	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 38,262	$ 29,403	$ 63,472	$ -	$ -	$ 131,137	0.75	$ 98,406	$ 8,999,545
2027	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 38,262	$ 29,403	$ 63,472	$ -	$ -	$ 131,137	0.74	$ 96,477	$ 9,096,022
2028	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 38,262	$ 29,403	$ 63,472	$ -	$ -	$ 131,137	0.72	$ 94,585	$ 9,190,607
2029	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 38,262	$ 29,403	$ 63,472	$ -	$ -	$ 131,137	0.71	$ 92,730	$ 9,283,337
2030	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 38,262	$ 29,403	$ 63,472	$ -	$ -	$ 131,137	0.69	$ 90,912	$ 9,374,249
2031	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 38,262	$ 29,403	$ 63,472	$ -	$ -	$ 131,137	0.68	$ 89,129	$ 9,463,378
2032	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 38,262	$ 29,403	$ 63,472	$ -	$ -	$ 131,137	0.67	$ 87,382	$ 9,550,760
2033	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 38,262	$ 29,403	$ 63,472	$ -	$ -	$ 131,137	0.65	$ 85,668	$ 9,636,429
2034	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 38,262	$ 29,403	$ 63,472	$ -	$ -	$ 131,137	0.64	$ 83,989	$ 9,720,417
2035	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 38,262	$ 29,403	$ 63,472	$ -	$ -	$ 131,137	0.63	$ 82,342	$ 9,802,759
2036	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 38,262	$ 29,403	$ 63,472	$ -	$ -	$ 131,137	0.62	$ 80,727	$ 9,883,486
2037	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 38,262	$ 29,403	$ 63,472	$ -	$ -	$ 131,137	0.60	$ 79,144	$ 9,962,631
2038	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 38,262	$ 29,403	$ 63,472	$ -	$ -	$ 131,137	0.59	$ 77,593	$ 10,040,223
2039	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 38,262	$ 29,403	$ 63,472	$ -	$ -	$ 131,137	0.58	$ 76,071	$ 10,116,294
2040	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 38,262	$ 29,403	$ 63,472	$ -	$ -	$ 131,137	0.57	$ 74,580	$ 10,190,874
2041	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 38,262	$ 29,403	$ 63,472	$ -	$ -	$ 131,137	0.56	$ 73,117	$ 10,263,991
2042	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 38,262	$ 29,403	$ 63,472	$ (3,316,482)	$ -	$ (3,185,345)	0.55	$ (1,741,211)	$ 8,522,780
TOTALS	$ -	$ 7,015,635	$ -	$ -	$ 623,448	$ -	$ -	$ 1,147,859	$ 882,077	$ 1,904,166	$ (3,316,482)	$ -	$ 8,256,703		$ 8,522,780	$ 8,522,780

Notes:

Project Alternative Summary

Capital Costs	$ 7,639,083
Recurring Costs	$ 3,934,102
Residual Value	$ (3,316,482)
Non Discounted Sum	$ 8,256,703
Cum NPV	$ 8,522,780

Key Assumptions:

Discount Rate	2.00%		Repairs and Maintenance	$ 1.29
Study Period	30	years	Other Operations	$ 2.78
BaseYear	2012		Cleaning per sq. ft.	$ 1.12
Report Output	Constant Dollars		Roads and Grounds	$ 0.27
Cost per sq. ft.	$334		Administrative	$ 1.39
Construction Period (years)	1		BOMA Expense CPI Adjustment	2.16%
Building Size (sq. ft.)	22,842		Effective utitlities per sq. ft.	$ 1.68

Not from BOMA; calculated based on option-specific energy usage.

Source: BAE Urban Economics, 2012.

Table 15: Schedule of Recurring Expenditures: FTBL 001-04 Modernization with AT/FP

Year	Total Annual Expenditures	Electrical			Natural Gas			Water/Sewer (a)					Other
		Total Cost	kWh	$/kWh	Total Cost	MMBt	$/MMBtu	Total Cost	Water	$/Kgal	Waste	$/Kgal	
2012	$ 38,262	$ 33,828	563,804	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2013	$ 38,262	$ 33,828	563,804	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2014	$ 38,262	$ 33,828	563,804	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2015	$ 38,262	$ 33,828	563,804	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2016	$ 38,262	$ 33,828	563,804	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2017	$ 38,262	$ 33,828	563,804	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2018	$ 38,262	$ 33,828	563,804	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2019	$ 38,262	$ 33,828	563,804	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2020	$ 38,262	$ 33,828	563,804	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2021	$ 38,262	$ 33,828	563,804	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2022	$ 38,262	$ 33,828	563,804	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2023	$ 38,262	$ 33,828	563,804	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2024	$ 38,262	$ 33,828	563,804	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2025	$ 38,262	$ 33,828	563,804	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2026	$ 38,262	$ 33,828	563,804	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2027	$ 38,262	$ 33,828	563,804	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2028	$ 38,262	$ 33,828	563,804	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2029	$ 38,262	$ 33,828	563,804	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2030	$ 38,262	$ 33,828	563,804	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2031	$ 38,262	$ 33,828	563,804	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2032	$ 38,262	$ 33,828	563,804	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2033	$ 38,262	$ 33,828	563,804	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2034	$ 38,262	$ 33,828	563,804	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2035	$ 38,262	$ 33,828	563,804	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2036	$ 38,262	$ 33,828	563,804	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2037	$ 38,262	$ 33,828	563,804	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2038	$ 38,262	$ 33,828	563,804	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2039	$ 38,262	$ 33,828	563,804	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2040	$ 38,262	$ 33,828	563,804	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2041	$ 38,262	$ 33,828	563,804	$ 0.060	$ -		$ 5.39	$ 4,434					$ -
2042	$ 38,262	$ 33,828	563,804	$ 0.060	$ -		$ 5.39	$ 4,434					$ -

Notes:

(a) Water and sewer combined and calculated on square foot basis based upon BOMA ERR data.

CPI adjustment factor:	2.16%	bring 2011 BOMA ERR data to 2012 dollars.
Water/sewer utility expense	$0.19	per sq. ft.
Building total sq. ft.	22,842	

Source: BAE Urban Economics, 2012.

Table 16: Depreciation Schedule & Residual Value: FTBL 001-04 Modernization with AT/FP

Period	Depreciation Schedule	Residual Value
2012	$ -	$ -
2013	$ 7,015,635	$ -
2014	$ 6,888,078	$ -
2015	$ 6,760,521	$ -
2016	$ 6,632,964	$ -
2017	$ 6,505,407	$ -
2018	$ 6,377,850	$ -
2019	$ 6,250,293	$ -
2020	$ 6,122,736	$ -
2021	$ 5,995,179	$ -
2022	$ 5,867,622	$ -
2023	$ 5,740,065	$ -
2024	$ 5,612,508	$ -
2025	$ 5,484,951	$ -
2026	$ 5,357,394	$ -
2027	$ 5,229,837	$ -
2028	$ 5,102,280	$ -
2029	$ 4,974,723	$ -
2030	$ 4,847,166	$ -
2031	$ 4,719,609	$ -
2032	$ 4,592,052	$ -
2033	$ 4,464,495	$ -
2034	$ 4,336,938	$ -
2035	$ 4,209,381	$ -
2036	$ 4,081,824	$ -
2037	$ 3,954,267	$ -
2038	$ 3,826,710	$ -
2039	$ 3,699,153	$ -
2040	$ 3,571,596	$ -
2041	$ 3,444,039	$ -
2042	$ 3,316,482	$ 3,316,482

Note:
Useful life of asset: 55.0 years

Source: BAE Urban Economics, Inc. 2012.

Table 17: South U.S. Urban Consumer Price Index

Year	Index (1982=100)	Annual CPI % Change
1993	140.80	3.15%
1994	144.70	2.77%
1995	149.00	2.97%
1996	153.60	3.09%
1997	156.90	2.15%
1998	158.90	1.27%
1999	162.00	1.95%
2000	167.20	3.21%
2001	171.10	2.33%
2002	173.30	1.29%
2003	177.30	2.31%
2004	181.80	2.54%
2005	188.30	3.58%
2006	194.70	3.40%
2007	200.36	2.91%
2008	208.68	4.15%
2009	207.85	-0.40%
2010	211.34	1.68%
2011	218.62	3.44%
2012	223.34	2.16%
Annual Average 20-years:		**2.5%**
LCCA Assumption:		**0.0%**

Source: U.S. Department of Labor, Bureau of Labor Statistics;
BAE Urban Economics, Inc. 2012.

Table 18: Discount Rates and Factors

	Discount Factors			
Year	End of Year	Mid-Year	Beginning of Year	Calander Year
1	0.9804	0.9901	1.0000	2012
2	0.9612	0.9707	0.9804	2013
3	0.9423	0.9517	0.9612	2014
4	0.9238	0.9330	0.9423	2015
5	0.9057	0.9147	0.9238	2016
6	0.8880	0.8968	0.9057	2017
7	0.8706	0.8792	0.8880	2018
8	0.8535	0.8620	0.8706	2019
9	0.8368	0.8451	0.8535	2020
10	0.8203	0.8285	0.8368	2021
11	0.8043	0.8123	0.8203	2022
12	0.7885	0.7963	0.8043	2023
13	0.7730	0.7807	0.7885	2024
14	0.7579	0.7654	0.7730	2025
15	0.7430	0.7504	0.7579	2026
16	0.7284	0.7357	0.7430	2027
17	0.7142	0.7213	0.7284	2028
18	0.7002	0.7071	0.7142	2029
19	0.6864	0.6933	0.7002	2030
20	0.6730	0.6797	0.6864	2031
21	0.6598	0.6663	0.6730	2032
22	0.6468	0.6533	0.6598	2033
23	0.6342	0.6405	0.6468	2034
24	0.6217	0.6279	0.6342	2035
25	0.6095	0.6156	0.6217	2036
26	0.5976	0.6035	0.6095	2037
27	0.5859	0.5917	0.5976	2038
28	0.5744	0.5801	0.5859	2039
29	0.5631	0.5687	0.5744	2040
30	0.5521	0.5576	0.5631	2041
31	0.5412	0.5466	0.5521	2042

Notes:

30-Year real discount rate	2.0%
Mid-year factor:	1.0100

Sources: Office of Management and Budget, OMB Circular A-94, Appendix C; BAE Urban Economics, 2012.

Life Cycle Cost Analysis (LCCA) Spreadsheet

Fort Bliss, El Paso TX

ESTCP SI 0931
LCCA Demonstration

Historic Building 115

Mission: General Administrative Office

Prepared by:
BAE Urban Economics, Inc.

December 2012

Table III-15: Life Cycle Cost Analysis Summary: FTBL 115

	Non Discounted Costs by Component			Total Costs		
Project Alternative	Initial Investment	Recurring	Residual Value	Non Discounted	Discounted - No GHG Factor	Discounted - w/GHG Factor
FTBL 115-01: Sustainment-Status Quo	$ 613,479	$ 1,695,225	$ -	$ 2,308,704	$ 1,848,623	$ 1,957,488
FTBL 115-02: Demolition and New Construction	$ 5,166,222	$ 1,480,271	$ (2,300,273)	$ 4,346,220	$ 4,857,655	$ 4,956,278
FTBL 115-03: Modernization with HPS	$ 3,625,554	$ 1,477,960	$ (1,645,759)	$ 3,457,755	$ 3,715,117	$ 3,791,391
FTBL 115-04: Modernization with AT/FP	$ 3,905,689	$ 1,478,874	$ (1,755,478)	$ 3,629,085	$ 3,928,686	$ 4,009,546

NOTES:

Study Period (years):	30
Real Discount Rate:	2.00%
Average CO2e Value/MT (undiscounted)	$ 37.36
Base Date:	10/01/12

Sources: Preservation Associates; BAE Urban Economics, 2012.

Table III-16: Greenhouse Gas Valuation Summary: FTBL 115

	GHG Emissions by Scope (MT CO2e)				GHG Value	
Project Alternative	Scope 1	Scope 2	Scope 3	Total	Non Discounted	Discounted
FTBL 115-01: Sustainment-Status Quo	-	4,120.90	72.44	4,193.34	$ 156,646	$ 108,865
FTBL 115-02: Demolition and New Construction	-	2,349.82	1,009.51	3,359.33	$ 125,068	$ 98,622
FTBL 115-03: Modernization with HPS	-	2,330.77	443.09	2,773.86	$ 103,444	$ 76,274
FTBL 115-04: Modernization with AT/FP	-	2,338.31	530.26	2,868.57	$ 106,944	$ 80,860

Notes:

Study Period (years):	30
Real Discount Rate:	2.00%
Average CO2e Value/MT (undiscounted)	$ 37.36
Base Date:	10/01/12

Sources: Center for Resource Solutions; BAE Urban Economics, 2012.

Table 3: Alternatives Summary: FTBL 115

	Building GSF		Building Features		Construction Cost	
Project Alternative	**Total**	**Footprint**	**LEED**	**AT/FP**	**Total**	**Per SF**
FTBL 115-01: Sustainment-Status Quo	9,351	5,700	n/a	No	$ 613,479	$ 66
FTBL 115-02: Demolition and New Construction	9,351	5,700	52	Yes	$ 5,166,222	$ 552
FTBL 115-03: Modernization with HPS	9,351	5,700	54	Yes	$ 3,625,554	$ 388
FTBL 115-04: Modernization with AT/FP	9,351	5,700	54	Yes+	$ 3,905,689	$ 418

Note:

Table 4: Construction Cost Summary: FTBL 115

	Cost Estimate			
Category	**01. Sustainment- Status Quo**	**02. Demolition and New Construction**	**03. Modernization with HPS**	**04. Modernization with AT/FP**
Demolition	$ -	$ 300,261	$ 144,142	$ 192,178
Substructure	$ 39,040	$ 301,890	$ 13,040	$ 13,040
Shell	$ 188,982	$ 1,345,742	$ 707,346	$ 855,655
Interiors	$ 76,815	$ 172,760	$ 131,440	$ 140,104
Services	$ 130,640	$ 1,172,127	$ 1,188,715	$ 1,174,583
Sitework	$ -	$ 305,088	$ 338,584	$ 343,702
Special Construction	$ -	$ 9,333	$ 9,333	$ 9,333
Hard cost subtotal	**$ 435,477**	**$ 3,607,201**	**$ 2,532,599**	**$ 2,728,596**
General conditions (25%)	$ 108,869	$ 916,810	$ 643,399	$ 693,113
Security escalation (2%)	$ -	$ 60,037	$ 40,997	$ 43,854
USACE design (7%)	$ 38,104	$ 320,883	$ 225,190	$ 242,589
USACE SOIH (5.7%)	$ 31,028	$ 261,291	$ 183,369	$ 197,537
Soft cost subtotal	**$ 178,001**	**$ 1,559,021**	**$ 1,092,955**	**$ 1,177,093**
Construction cost total	**$ 613,479**	**$ 5,166,222**	**$ 3,625,554**	**$ 3,905,689**
Construction cost PSF	**$ 66**	**$ 552**	**$ 388**	**$ 418**
% Difference from 02	**-88%**	**N/A**	**-30%**	**-24%**

Sources: Preservation Associates; BAE Urban Economics Inc. 2012.

Table 5: NPV Calculation 001-01: Sustainment-Status Quo

	One Time							Recurring			Residual Value		Net Present Value			
Mid Year	New Construction	Sustainment	Temporary Facilities	Relocation	Demo	Site Preparation	Environmental Remediation	Utilities	Repairs Maintenance	Other Operations	Building	Land	Undiscounted Sum	NPV Factor	Mid-Year	Cum NPV
2012	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -		$ -	$ -	$ -	0.99	$ -	$ -
2013	$ -	$ 613,479	$ -	$ -	$ -	$ -	$ -	$ 18,487	$ 12,037	$ 25,984	$ -	$ -	$ 669,986	0.97	$ 650,378	$ 650,378
2014	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 18,487	$ 12,037	$ 25,984	$ -	$ -	$ 56,508	0.95	$ 53,778	$ 704,156
2015	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 18,487	$ 12,037	$ 25,984	$ -	$ -	$ 56,508	0.93	$ 52,724	$ 756,879
2016	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 18,487	$ 12,037	$ 25,984	$ -	$ -	$ 56,508	0.91	$ 51,690	$ 808,569
2017	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 18,487	$ 12,037	$ 25,984	$ -	$ -	$ 56,508	0.90	$ 50,676	$ 859,246
2018	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 18,487	$ 12,037	$ 25,984	$ -	$ -	$ 56,508	0.88	$ 49,683	$ 908,928
2019	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 18,487	$ 12,037	$ 25,984	$ -	$ -	$ 56,508	0.86	$ 48,709	$ 957,637
2020	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 18,487	$ 12,037	$ 25,984	$ -	$ -	$ 56,508	0.85	$ 47,753	$ 1,005,390
2021	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 18,487	$ 12,037	$ 25,984	$ -	$ -	$ 56,508	0.83	$ 46,817	$ 1,052,207
2022	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 18,487	$ 12,037	$ 25,984	$ -	$ -	$ 56,508	0.81	$ 45,899	$ 1,098,107
2023	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 18,487	$ 12,037	$ 25,984	$ -	$ -	$ 56,508	0.80	$ 44,999	$ 1,143,106
2024	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 18,487	$ 12,037	$ 25,984	$ -	$ -	$ 56,508	0.78	$ 44,117	$ 1,187,222
2025	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 18,487	$ 12,037	$ 25,984	$ -	$ -	$ 56,508	0.77	$ 43,252	$ 1,230,474
2026	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 18,487	$ 12,037	$ 25,984	$ -	$ -	$ 56,508	0.75	$ 42,404	$ 1,272,878
2027	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 18,487	$ 12,037	$ 25,984	$ -	$ -	$ 56,508	0.74	$ 41,572	$ 1,314,450
2028	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 18,487	$ 12,037	$ 25,984	$ -	$ -	$ 56,508	0.72	$ 40,757	$ 1,355,207
2029	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 18,487	$ 12,037	$ 25,984	$ -	$ -	$ 56,508	0.71	$ 39,958	$ 1,395,165
2030	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 18,487	$ 12,037	$ 25,984	$ -	$ -	$ 56,508	0.69	$ 39,174	$ 1,434,340
2031	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 18,487	$ 12,037	$ 25,984	$ -	$ -	$ 56,508	0.68	$ 38,406	$ 1,472,746
2032	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 18,487	$ 12,037	$ 25,984	$ -	$ -	$ 56,508	0.67	$ 37,653	$ 1,510,399
2033	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 18,487	$ 12,037	$ 25,984	$ -	$ -	$ 56,508	0.65	$ 36,915	$ 1,547,314
2034	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 18,487	$ 12,037	$ 25,984	$ -	$ -	$ 56,508	0.64	$ 36,191	$ 1,583,505
2035	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 18,487	$ 12,037	$ 25,984	$ -	$ -	$ 56,508	0.63	$ 35,482	$ 1,618,987
2036	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 18,487	$ 12,037	$ 25,984	$ -	$ -	$ 56,508	0.62	$ 34,786	$ 1,653,773
2037	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 18,487	$ 12,037	$ 25,984	$ -	$ -	$ 56,508	0.60	$ 34,104	$ 1,687,876
2038	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 18,487	$ 12,037	$ 25,984	$ -	$ -	$ 56,508	0.59	$ 33,435	$ 1,721,311
2039	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 18,487	$ 12,037	$ 25,984	$ -	$ -	$ 56,508	0.58	$ 32,779	$ 1,754,091
2040	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 18,487	$ 12,037	$ 25,984	$ -	$ -	$ 56,508	0.57	$ 32,137	$ 1,786,228
2041	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 18,487	$ 12,037	$ 25,984	$ -	$ -	$ 56,508	0.56	$ 31,507	$ 1,817,734
2042	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 18,487	$ 12,037	$ 25,984	$ -	$ -	$ 56,508	0.55	$ 30,889	$ 1,848,623
TOTALS	$ -	$ 613,479	$ -	$ -	$ -	$ -	$ -	$ 554,600	$ 361,102	$ 779,523	$ -	$ -	$ 2,308,704		$ 1,848,623	$ 1,848,623

Notes:

Project Alternative Summary

Capital Costs	$ 613,479
Recurring Costs	$ 1,695,225
Residual Value	$ -
Non Discounted Sum	$ 2,308,704
Cum NPV	$ 1,848,623

Key Assumptions:

Discount Rate	2.00%		
Study Period	30	years	
BaseYear	2012		
Report Output	Constant Dollars		
Cost per sq. ft.	$66		
Construction Period (years)	1		
Building Size (sq. ft.)	9,351		

Repairs and Maintenance	$ 1.29	
Other Operations	$ 2.78	
Cleaning per sq. ft.	$ 1.12	
Roads and Grounds	$ 0.27	
Administrative	$ 1.39	
BOMA Expense CPI Adjustment	2.16%	
Effective utitlities per sq. ft.	$ 1.98	Not from BOMA; calculated based on treatment specific energy usage.

Source: BAE Urban Economics, 2012.

Table 6: Schedule of Recurring Expenditures: FTBL 115-01 Sustainment -Status Quo

Year	Total Annual Expenditures	Electrical			Natural Gas			Water/Sewer (a)					Other
		Total Cost	kWh	$/kWh	Total Cost	MMBtu	$/MMBtu	Total Cost	Water	$/Kgal	Waste	$/Kgal	
2012	$ 1,815	$ -		$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2013	$ 18,487	$ 16,672	277,860	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2014	$ 18,487	$ 16,672	277,860	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2015	$ 18,487	$ 16,672	277,860	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2016	$ 18,487	$ 16,672	277,860	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2017	$ 18,487	$ 16,672	277,860	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2018	$ 18,487	$ 16,672	277,860	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2019	$ 18,487	$ 16,672	277,860	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2020	$ 18,487	$ 16,672	277,860	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2021	$ 18,487	$ 16,672	277,860	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2022	$ 18,487	$ 16,672	277,860	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2023	$ 18,487	$ 16,672	277,860	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2024	$ 18,487	$ 16,672	277,860	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2025	$ 18,487	$ 16,672	277,860	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2026	$ 18,487	$ 16,672	277,860	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2027	$ 18,487	$ 16,672	277,860	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2028	$ 18,487	$ 16,672	277,860	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2029	$ 18,487	$ 16,672	277,860	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2030	$ 18,487	$ 16,672	277,860	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2031	$ 18,487	$ 16,672	277,860	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2032	$ 18,487	$ 16,672	277,860	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2033	$ 18,487	$ 16,672	277,860	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2034	$ 18,487	$ 16,672	277,860	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2035	$ 18,487	$ 16,672	277,860	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2036	$ 18,487	$ 16,672	277,860	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2037	$ 18,487	$ 16,672	277,860	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2038	$ 18,487	$ 16,672	277,860	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2039	$ 18,487	$ 16,672	277,860	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2040	$ 18,487	$ 16,672	277,860	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2041	$ 18,487	$ 16,672	277,860	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2042	$ 18,487	$ 16,672	277,860	$ 0.060	$ -		$ 5.39	$ 1,815					$ -

Notes:

(a) Water and sewer combined and calculated on square foot basis based upon BOMA ERR data.

CPI adjustment factor:	2.16%	bring 2011 BOMA ERR data to 2012 dollars.
Water/sewer utility expense	$0.19	per sq. ft.
Building total sq. ft.	9,351	

Source: BAE Urban Economics, 2012.

Table 7: Depreciation Schedule & Residual Value FTBL 115-01 Sustainment-Status Quo

Period	Depreciation Schedule	Residual Value
2012	$ -	$ -
2013	$ 613,479	$ -
2014	$ 572,580	$ -
2015	$ 531,682	$ -
2016	$ 490,783	$ -
2017	$ 449,884	$ -
2018	$ 408,986	$ -
2019	$ 368,087	$ -
2020	$ 327,189	$ -
2021	$ 286,290	$ -
2022	$ 245,391	$ -
2023	$ 204,493	$ -
2024	$ 163,594	$ -
2025	$ 122,696	$ -
2026	$ 81,797	$ -
2027	$ 40,899	$ -
2028	$ -	$ -
2029	$ -	$ -
2030	$ -	$ -
2031	$ -	$ -
2032	$ -	$ -
2033	$ -	$ -
2034	$ -	$ -
2035	$ -	$ -
2036	$ -	$ -
2037	$ -	$ -
2038	$ -	$ -
2039	$ -	$ -
2040	$ -	$ -
2041	$ -	$ -
2042	$ -	$ -

Note:
Useful life of asset: 15.0 years

Source: BAE Urban Economics, Inc. 2012.

Table 8: NPV Calculation 115-02: Demolition and New Construction

	One Time							Recurring			Residual Value		Net Present Value			
Mid Year	New Construction	Modernization	Temporary Facilities	Relocation	Demo	Site Preparation	Environmental Remediation	Utilities	Repairs Maintenance	Other Operations	Building	Land	Undiscounted Sum	NPV Factor	Mid-Year	Cum NPV
2012	$ -	$ -	$ -	$ -	$ 300,261	$ -	$ -	$ -	$ -		$ -	$ -	$ 300,261	0.99	$ 297,302	$ 297,302
2013	$ 4,865,961	$ -	$ -	$ -	$ -	$ -	$ -	$ 11,322	$ 12,037	$ 25,984	$ -	$ -	$ 4,915,304	0.97	$ 4,771,447	$ 5,068,749
2014	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 11,322	$ 12,037	$ 25,984	$ -	$ -	$ 49,342	0.95	$ 46,959	$ 5,115,708
2015	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 11,322	$ 12,037	$ 25,984	$ -	$ -	$ 49,342	0.93	$ 46,038	$ 5,161,746
2016	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 11,322	$ 12,037	$ 25,984	$ -	$ -	$ 49,342	0.91	$ 45,136	$ 5,206,882
2017	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 11,322	$ 12,037	$ 25,984	$ -	$ -	$ 49,342	0.90	$ 44,251	$ 5,251,133
2018	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 11,322	$ 12,037	$ 25,984	$ -	$ -	$ 49,342	0.88	$ 43,383	$ 5,294,516
2019	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 11,322	$ 12,037	$ 25,984	$ -	$ -	$ 49,342	0.86	$ 42,532	$ 5,337,048
2020	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 11,322	$ 12,037	$ 25,984	$ -	$ -	$ 49,342	0.85	$ 41,698	$ 5,378,746
2021	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 11,322	$ 12,037	$ 25,984	$ -	$ -	$ 49,342	0.83	$ 40,881	$ 5,419,627
2022	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 11,322	$ 12,037	$ 25,984	$ -	$ -	$ 49,342	0.81	$ 40,079	$ 5,459,706
2023	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 11,322	$ 12,037	$ 25,984	$ -	$ -	$ 49,342	0.80	$ 39,293	$ 5,498,999
2024	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 11,322	$ 12,037	$ 25,984	$ -	$ -	$ 49,342	0.78	$ 38,523	$ 5,537,522
2025	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 11,322	$ 12,037	$ 25,984	$ -	$ -	$ 49,342	0.77	$ 37,767	$ 5,575,290
2026	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 11,322	$ 12,037	$ 25,984	$ -	$ -	$ 49,342	0.75	$ 37,027	$ 5,612,316
2027	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 11,322	$ 12,037	$ 25,984	$ -	$ -	$ 49,342	0.74	$ 36,301	$ 5,648,617
2028	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 11,322	$ 12,037	$ 25,984	$ -	$ -	$ 49,342	0.72	$ 35,589	$ 5,684,206
2029	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 11,322	$ 12,037	$ 25,984	$ -	$ -	$ 49,342	0.71	$ 34,891	$ 5,719,098
2030	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 11,322	$ 12,037	$ 25,984	$ -	$ -	$ 49,342	0.69	$ 34,207	$ 5,753,305
2031	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 11,322	$ 12,037	$ 25,984	$ -	$ -	$ 49,342	0.68	$ 33,536	$ 5,786,841
2032	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 11,322	$ 12,037	$ 25,984	$ -	$ -	$ 49,342	0.67	$ 32,879	$ 5,819,720
2033	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 11,322	$ 12,037	$ 25,984	$ -	$ -	$ 49,342	0.65	$ 32,234	$ 5,851,954
2034	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 11,322	$ 12,037	$ 25,984	$ -	$ -	$ 49,342	0.64	$ 31,602	$ 5,883,556
2035	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 11,322	$ 12,037	$ 25,984	$ -	$ -	$ 49,342	0.63	$ 30,982	$ 5,914,539
2036	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 11,322	$ 12,037	$ 25,984	$ -	$ -	$ 49,342	0.62	$ 30,375	$ 5,944,914
2037	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 11,322	$ 12,037	$ 25,984	$ -	$ -	$ 49,342	0.60	$ 29,779	$ 5,974,693
2038	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 11,322	$ 12,037	$ 25,984	$ -	$ -	$ 49,342	0.59	$ 29,195	$ 6,003,889
2039	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 11,322	$ 12,037	$ 25,984	$ -	$ -	$ 49,342	0.58	$ 28,623	$ 6,032,512
2040	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 11,322	$ 12,037	$ 25,984	$ -	$ -	$ 49,342	0.57	$ 28,062	$ 6,060,573
2041	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 11,322	$ 12,037	$ 25,984	$ -	$ -	$ 49,342	0.56	$ 27,512	$ 6,088,085
2042	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 11,322	$ 12,037	$ 25,984	$ (2,300,273)	$ -	$ (2,250,930)	0.55	$ (1,230,430)	$ 4,857,655
TOTALS	$ 4,865,961	$ -	$ -	$ -	$ 300,261	$ -	$ -	$ 339,646	$ 361,102	$ 779,523	$ (2,300,273)	$ -	$ 4,346,220		$ 4,857,655	$ 4,857,655

Notes:

Alternative 1 Summary:

Capital Costs	$ 5,166,222
Recurring Costs	$ 1,480,271
Residual Value	$ (2,300,273)
Non Discounted Sum	$ 4,346,220
Cum NPV	$ 4,857,655

Key Assumptions:

Discount Rate	2.00%	Repairs and Maintenance	$ 1.29
Study Period	25 years	Other Operations	$ 2.78
BaseYear	2012	Cleaning per sq. ft.	$ 1.12
Report Output	Constant Dollars	Roads and Grounds	$ 0.27
Cost per sq. ft.	$0	Administrative	$ 1.39
Construction Period (years)	1	BOMA Expense CPI Adjustment	2.16%
Building Size (sq. ft.)	9,351	Effective utitlities per sq. ft.	$ 1.21

Not from BOMA; calculated based on treatment specific energy usage.

Source: BAE Urban Economics, 2012.

Table 9: Schedule of Recurring Expenditures: FTBL 115-02 Demolition and New Construction

Year	Total Annual Expenditures	Electrical			Natural Gas			Water/Sewer (a)					Other
		Total Cost	kWh	$/kWh	Total Cost	MMBtu	$/MMBtu	Total Cost	Water	$/Kgal	Waste	$/Kgal	
2012	$ 1,815	$ -		$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2013	$ 11,322	$ 9,506	158,441	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2014	$ 11,322	$ 9,506	158,441	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2015	$ 11,322	$ 9,506	158,441	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2016	$ 11,322	$ 9,506	158,441	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2017	$ 11,322	$ 9,506	158,441	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2018	$ 11,322	$ 9,506	158,441	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2019	$ 11,322	$ 9,506	158,441	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2020	$ 11,322	$ 9,506	158,441	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2021	$ 11,322	$ 9,506	158,441	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2022	$ 11,322	$ 9,506	158,441	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2023	$ 11,322	$ 9,506	158,441	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2024	$ 11,322	$ 9,506	158,441	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2025	$ 11,322	$ 9,506	158,441	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2026	$ 11,322	$ 9,506	158,441	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2027	$ 11,322	$ 9,506	158,441	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2028	$ 11,322	$ 9,506	158,441	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2029	$ 11,322	$ 9,506	158,441	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2030	$ 11,322	$ 9,506	158,441	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2031	$ 11,322	$ 9,506	158,441	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2032	$ 11,322	$ 9,506	158,441	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2033	$ 11,322	$ 9,506	158,441	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2034	$ 11,322	$ 9,506	158,441	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2035	$ 11,322	$ 9,506	158,441	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2036	$ 11,322	$ 9,506	158,441	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2037	$ 11,322	$ 9,506	158,441	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2038	$ 11,322	$ 9,506	158,441	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2039	$ 11,322	$ 9,506	158,441	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2040	$ 11,322	$ 9,506	158,441	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2041	$ 11,322	$ 9,506	158,441	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2042	$ 11,322	$ 9,506	158,441	$ 0.060	$ -		$ 5.39	$ 1,815					$ -

Notes:

(a) Water and sewer combined and calculated on square foot basis based upon BOMA ERR data.

CPI adjustment factor:	2.16%	bring 2011 BOMA ERR data to 2012 dollars.
Water/sewer utility expense	$0.19	per sq. ft.
Building total sq. ft.	9,351	

Source: BAE Urban Economics, 2012.

Table 10: Depreciation Schedule & Residual Value FTBL 115-02 Demolition and New Construction

Period	Depreciation Schedule	Residual Value
2012	$ -	$ -
2013	$ 4,865,961	$ -
2014	$ 4,777,489	$ -
2015	$ 4,689,017	$ -
2016	$ 4,600,545	$ -
2017	$ 4,512,073	$ -
2018	$ 4,423,601	$ -
2019	$ 4,335,129	$ -
2020	$ 4,246,657	$ -
2021	$ 4,158,185	$ -
2022	$ 4,069,713	$ -
2023	$ 3,981,241	$ -
2024	$ 3,892,769	$ -
2025	$ 3,804,297	$ -
2026	$ 3,715,825	$ -
2027	$ 3,627,353	$ -
2028	$ 3,538,881	$ -
2029	$ 3,450,409	$ -
2030	$ 3,361,937	$ -
2031	$ 3,273,465	$ -
2032	$ 3,184,993	$ -
2033	$ 3,096,521	$ -
2034	$ 3,008,049	$ -
2035	$ 2,919,577	$ -
2036	$ 2,831,105	$ -
2037	$ 2,742,633	$ -
2038	$ 2,654,161	$ -
2039	$ 2,565,689	$ -
2040	$ 2,477,217	$ -
2041	$ 2,388,745	$ -
2042	$ 2,300,273	$ 2,300,273

Note:

Useful life of asset: 55.0 years

Source: BAE Urban Economics, Inc. 2012.

Table 11: NPV Calculation 115-03: Modernization with HPS

	One Time							Recurring			Residual Value		Net Present Value			
Mid Year	New Construction	Modernization	Temporary Facilities	Relocation	Demo	Site Preparation	Environmental Remediation	Utilities	Repairs Maintenance	Other Operations	Building	Land	Undiscounted Sum	NPV Factor	Mid-Year	Cum NPV
2012	$ -	$ -	$ -	$ -	$ 144,142	$ -	$ -	$ -	$ -		$ -	$ -	$ 144,142	0.99	$ 142,722	$ 142,722
2013	$ -	$ 3,481,412	$ -	$ -	$ -	$ -	$ -	$ 11,244	$ 12,037	$ 25,984	$ -	$ -	$ 3,530,678	0.97	$ 3,427,345	$ 3,570,067
2014	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 11,244	$ 12,037	$ 25,984	$ -	$ -	$ 49,265	0.95	$ 46,886	$ 3,616,952
2015	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 11,244	$ 12,037	$ 25,984	$ -	$ -	$ 49,265	0.93	$ 45,966	$ 3,662,919
2016	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 11,244	$ 12,037	$ 25,984	$ -	$ -	$ 49,265	0.91	$ 45,065	$ 3,707,984
2017	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 11,244	$ 12,037	$ 25,984	$ -	$ -	$ 49,265	0.90	$ 44,181	$ 3,752,165
2018	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 11,244	$ 12,037	$ 25,984	$ -	$ -	$ 49,265	0.88	$ 43,315	$ 3,795,481
2019	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 11,244	$ 12,037	$ 25,984	$ -	$ -	$ 49,265	0.86	$ 42,466	$ 3,837,947
2020	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 11,244	$ 12,037	$ 25,984	$ -	$ -	$ 49,265	0.85	$ 41,633	$ 3,879,580
2021	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 11,244	$ 12,037	$ 25,984	$ -	$ -	$ 49,265	0.83	$ 40,817	$ 3,920,397
2022	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 11,244	$ 12,037	$ 25,984	$ -	$ -	$ 49,265	0.81	$ 40,017	$ 3,960,413
2023	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 11,244	$ 12,037	$ 25,984	$ -	$ -	$ 49,265	0.80	$ 39,232	$ 3,999,645
2024	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 11,244	$ 12,037	$ 25,984	$ -	$ -	$ 49,265	0.78	$ 38,463	$ 4,038,108
2025	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 11,244	$ 12,037	$ 25,984	$ -	$ -	$ 49,265	0.77	$ 37,708	$ 4,075,816
2026	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 11,244	$ 12,037	$ 25,984	$ -	$ -	$ 49,265	0.75	$ 36,969	$ 4,112,785
2027	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 11,244	$ 12,037	$ 25,984	$ -	$ -	$ 49,265	0.74	$ 36,244	$ 4,149,030
2028	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 11,244	$ 12,037	$ 25,984	$ -	$ -	$ 49,265	0.72	$ 35,534	$ 4,184,563
2029	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 11,244	$ 12,037	$ 25,984	$ -	$ -	$ 49,265	0.71	$ 34,837	$ 4,219,400
2030	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 11,244	$ 12,037	$ 25,984	$ -	$ -	$ 49,265	0.69	$ 34,154	$ 4,253,554
2031	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 11,244	$ 12,037	$ 25,984	$ -	$ -	$ 49,265	0.68	$ 33,484	$ 4,287,038
2032	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 11,244	$ 12,037	$ 25,984	$ -	$ -	$ 49,265	0.67	$ 32,828	$ 4,319,865
2033	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 11,244	$ 12,037	$ 25,984	$ -	$ -	$ 49,265	0.65	$ 32,184	$ 4,352,049
2034	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 11,244	$ 12,037	$ 25,984	$ -	$ -	$ 49,265	0.64	$ 31,553	$ 4,383,602
2035	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 11,244	$ 12,037	$ 25,984	$ -	$ -	$ 49,265	0.63	$ 30,934	$ 4,414,536
2036	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 11,244	$ 12,037	$ 25,984	$ -	$ -	$ 49,265	0.62	$ 30,328	$ 4,444,863
2037	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 11,244	$ 12,037	$ 25,984	$ -	$ -	$ 49,265	0.60	$ 29,733	$ 4,474,596
2038	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 11,244	$ 12,037	$ 25,984	$ -	$ -	$ 49,265	0.59	$ 29,150	$ 4,503,746
2039	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 11,244	$ 12,037	$ 25,984	$ -	$ -	$ 49,265	0.58	$ 28,578	$ 4,532,324
2040	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 11,244	$ 12,037	$ 25,984	$ -	$ -	$ 49,265	0.57	$ 28,018	$ 4,560,342
2041	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 11,244	$ 12,037	$ 25,984	$ -	$ -	$ 49,265	0.56	$ 27,469	$ 4,587,811
2042	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 11,244	$ 12,037	$ 25,984	$ (1,645,759)	$ -	$ (1,596,493)	0.55	$ (872,694)	$ 3,715,117
TOTALS	$ -	$ 3,481,412	$ -	$ -	$ 144,142	$ -	$ -	$ 337,335	$ 361,102	$ 779,523	$ (1,645,759)	$ -	$ 3,457,755		$ 3,715,117	$ 3,715,117

Notes:

Alternative 1 Summary:

Capital Costs	$ 3,625,554
Recurring Costs	$ 1,477,960
Residual Value	$ (1,645,759)
Non Discounted Sum	$ 3,457,755
Cum NPV	$ 3,715,117

Key Assumptions:

Discount Rate	2.00%		Repairs and Maintenance	$ 1.29
Study Period	25	years	Other Operations	$ 2.78
BaseYear	2012		Cleaning per sq. ft.	$ 1.12
Report Output	Constant Dollars		Roads and Grounds	$ 0.27
Cost per sq. ft.	$372		Administrative	$ 1.39
Construction Period (years)	1		BOMA Expense CPI Adjustment	2.16%
Building Size (sq. ft.)	9,351		Effective utitlities per sq. ft.	$ 1.20

Not from BOMA; calculated based on treatment specific energy usage

Source: BAE Urban Economics, 2012.

Table 12: Schedule of Recurring Expenditures: 115-03 Modernization with HPS

Year	Total Annual Expenditures	Electrical			Natural Gas			Water/Sewer (a)					Other
		Total Cost	kWh	$/kWh	Total Cost	MMBtu	$/MMBtu	Total Cost	Water	$/Kgal	Waste	$/Kgal	
2012	$ 1,815	$ -		$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2013	$ 11,244	$ 9,429	157,157	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2014	$ 11,244	$ 9,429	157,157	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2015	$ 11,244	$ 9,429	157,157	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2016	$ 11,244	$ 9,429	157,157	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2017	$ 11,244	$ 9,429	157,157	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2018	$ 11,244	$ 9,429	157,157	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2019	$ 11,244	$ 9,429	157,157	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2020	$ 11,244	$ 9,429	157,157	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2021	$ 11,244	$ 9,429	157,157	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2022	$ 11,244	$ 9,429	157,157	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2023	$ 11,244	$ 9,429	157,157	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2024	$ 11,244	$ 9,429	157,157	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2025	$ 11,244	$ 9,429	157,157	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2026	$ 11,244	$ 9,429	157,157	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2027	$ 11,244	$ 9,429	157,157	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2028	$ 11,244	$ 9,429	157,157	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2029	$ 11,244	$ 9,429	157,157	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2030	$ 11,244	$ 9,429	157,157	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2031	$ 11,244	$ 9,429	157,157	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2032	$ 11,244	$ 9,429	157,157	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2033	$ 11,244	$ 9,429	157,157	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2034	$ 11,244	$ 9,429	157,157	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2035	$ 11,244	$ 9,429	157,157	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2036	$ 11,244	$ 9,429	157,157	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2037	$ 11,244	$ 9,429	157,157	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2038	$ 11,244	$ 9,429	157,157	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2039	$ 11,244	$ 9,429	157,157	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2040	$ 11,244	$ 9,429	157,157	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2041	$ 11,244	$ 9,429	157,157	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2042	$ 11,244	$ 9,429	157,157	$ 0.060	$ -		$ 5.39	$ 1,815					$ -

Notes:

(a) Water and sewer combined and calculated on square foot basis based upon BOMA ERR data.

CPI adjustment factor:	2.16%	bring 2011 BOMA ERR data to 2012 dollars.
Water/sewer utility expense	$0.19	per sq. ft.
Building total sq. ft.	9,351	

Source: BAE Urban Economics, 2012.

Table 13: Depreciation Schedule & Residual Value FTBL 115-03 Modernization with HPS

Period	Depreciation Schedule	Residual Value
2012	$ -	$ -
2013	$ 3,481,412	$ -
2014	$ 3,418,114	$ -
2015	$ 3,354,816	$ -
2016	$ 3,291,517	$ -
2017	$ 3,228,219	$ -
2018	$ 3,164,920	$ -
2019	$ 3,101,622	$ -
2020	$ 3,038,324	$ -
2021	$ 2,975,025	$ -
2022	$ 2,911,727	$ -
2023	$ 2,848,428	$ -
2024	$ 2,785,130	$ -
2025	$ 2,721,832	$ -
2026	$ 2,658,533	$ -
2027	$ 2,595,235	$ -
2028	$ 2,531,936	$ -
2029	$ 2,468,638	$ -
2030	$ 2,405,340	$ -
2031	$ 2,342,041	$ -
2032	$ 2,278,743	$ -
2033	$ 2,215,444	$ -
2034	$ 2,152,146	$ -
2035	$ 2,088,847	$ -
2036	$ 2,025,549	$ -
2037	$ 1,962,251	$ -
2038	$ 1,898,952	$ -
2039	$ 1,835,654	$ -
2040	$ 1,772,355	$ -
2041	$ 1,709,057	$ -
2042	$ 1,645,759	$ 1,645,759

Note:

Useful life of asset: 55.0 years

Source: BAE Urban Economics, Inc. 2012.

Table 14: NPV Calculation 115-04: Modernization with AT/FP

	One Time							Recurring			Residual Value		Net Present Value			
Mid Year	New Construction	Modernization	Temporary Facilities	Relocation	Demo	Site Preparation	Environmental Remediation	Utilities	Repairs Maintenance	Other Operations	Building	Land	Undiscounted Sum	NPV Factor	Mid-Year	Cum NPV
2012	$ -	$ -	$ -	$ -	$ 192,178	$ -	$ -	$ -	$ -		$ -	$ -	$ 192,178	0.99	$ 190,285	$ 190,285
2013	$ -	$ 3,713,511	$ -	$ -	$ -	$ -	$ -	$ 11,275	$ 12,037	$ 25,984	$ -	$ -	$ 3,762,806	0.97	$ 3,652,680	$ 3,842,965
2014	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 11,275	$ 12,037	$ 25,984	$ -	$ -	$ 49,296	0.95	$ 46,915	$ 3,889,880
2015	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 11,275	$ 12,037	$ 25,984	$ -	$ -	$ 49,296	0.93	$ 45,995	$ 3,935,875
2016	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 11,275	$ 12,037	$ 25,984	$ -	$ -	$ 49,296	0.91	$ 45,093	$ 3,980,968
2017	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 11,275	$ 12,037	$ 25,984	$ -	$ -	$ 49,296	0.90	$ 44,209	$ 4,025,176
2018	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 11,275	$ 12,037	$ 25,984	$ -	$ -	$ 49,296	0.88	$ 43,342	$ 4,068,518
2019	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 11,275	$ 12,037	$ 25,984	$ -	$ -	$ 49,296	0.86	$ 42,492	$ 4,111,011
2020	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 11,275	$ 12,037	$ 25,984	$ -	$ -	$ 49,296	0.85	$ 41,659	$ 4,152,669
2021	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 11,275	$ 12,037	$ 25,984	$ -	$ -	$ 49,296	0.83	$ 40,842	$ 4,193,512
2022	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 11,275	$ 12,037	$ 25,984	$ -	$ -	$ 49,296	0.81	$ 40,041	$ 4,233,553
2023	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 11,275	$ 12,037	$ 25,984	$ -	$ -	$ 49,296	0.80	$ 39,256	$ 4,272,809
2024	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 11,275	$ 12,037	$ 25,984	$ -	$ -	$ 49,296	0.78	$ 38,486	$ 4,311,296
2025	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 11,275	$ 12,037	$ 25,984	$ -	$ -	$ 49,296	0.77	$ 37,732	$ 4,349,027
2026	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 11,275	$ 12,037	$ 25,984	$ -	$ -	$ 49,296	0.75	$ 36,992	$ 4,386,019
2027	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 11,275	$ 12,037	$ 25,984	$ -	$ -	$ 49,296	0.74	$ 36,267	$ 4,422,286
2028	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 11,275	$ 12,037	$ 25,984	$ -	$ -	$ 49,296	0.72	$ 35,556	$ 4,457,841
2029	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 11,275	$ 12,037	$ 25,984	$ -	$ -	$ 49,296	0.71	$ 34,858	$ 4,492,700
2030	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 11,275	$ 12,037	$ 25,984	$ -	$ -	$ 49,296	0.69	$ 34,175	$ 4,526,875
2031	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 11,275	$ 12,037	$ 25,984	$ -	$ -	$ 49,296	0.68	$ 33,505	$ 4,560,379
2032	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 11,275	$ 12,037	$ 25,984	$ -	$ -	$ 49,296	0.67	$ 32,848	$ 4,593,227
2033	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 11,275	$ 12,037	$ 25,984	$ -	$ -	$ 49,296	0.65	$ 32,204	$ 4,625,431
2034	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 11,275	$ 12,037	$ 25,984	$ -	$ -	$ 49,296	0.64	$ 31,572	$ 4,657,003
2035	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 11,275	$ 12,037	$ 25,984	$ -	$ -	$ 49,296	0.63	$ 30,953	$ 4,687,957
2036	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 11,275	$ 12,037	$ 25,984	$ -	$ -	$ 49,296	0.62	$ 30,346	$ 4,718,303
2037	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 11,275	$ 12,037	$ 25,984	$ -	$ -	$ 49,296	0.60	$ 29,751	$ 4,748,054
2038	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 11,275	$ 12,037	$ 25,984	$ -	$ -	$ 49,296	0.59	$ 29,168	$ 4,777,222
2039	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 11,275	$ 12,037	$ 25,984	$ -	$ -	$ 49,296	0.58	$ 28,596	$ 4,805,818
2040	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 11,275	$ 12,037	$ 25,984	$ -	$ -	$ 49,296	0.57	$ 28,035	$ 4,833,853
2041	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 11,275	$ 12,037	$ 25,984	$ -	$ -	$ 49,296	0.56	$ 27,486	$ 4,861,339
2042	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 11,275	$ 12,037	$ 25,984	$ (1,755,478)	$ -	$ (1,706,182)	0.55	$ (932,653)	$ 3,928,686
TOTALS	$ -	$ 3,713,511	$ -	$ -	$ 192,178	$ -	$ -	$ 338,249	$ 361,102	$ 779,523	$ (1,755,478)	$ -	$ 3,629,085		$ 3,928,686	$ 3,928,686

Notes:

Alternative 1 Summary:

Capital Costs	$ 3,905,689
Recurring Costs	$ 1,478,874
Residual Value	$ (1,755,478)
Non Discounted Sum	$ 3,629,085
Cum NPV	$ 3,928,686

Key Assumptions:

Discount Rate	2.00%		Repairs and Maintenance	$ 1.29
Study Period	25	years	Other Operations	$ 2.78
BaseYear	2012		Cleaning per sq. ft.	$ 1.12
Report Output	Constant Dollars		Roads and Grounds	$ 0.27
Cost per sq. ft.	$397		Administrative	$ 1.39
Construction Period (years)	1		BOMA Expense CPI Adjustment	2.16%
Building Size (sq. ft.)	9,351		Effective utitlities per sq. ft.	$ 1.21

Not from BOMA; calculated based on treatment specific energy usage

Source: BAE Urban Economics, 2012.

Table 15: Schedule of Recurring Expenditures: 115-04 Modernization with AT/FP

Year	Total Annual Expenditures	Electrical			Natural Gas			Water/Sewer (a)					Other
		Total Cost	kWh	$/kWh	Total Cost	MMBtu	$/MMBtu	Total Cost	Water	$/Kgal	Waste	$/Kgal	
2012	$ 1,815	$ -		$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2013	$ 11,275	$ 9,460	157,665	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2014	$ 11,275	$ 9,460	157,665	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2015	$ 11,275	$ 9,460	157,665	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2016	$ 11,275	$ 9,460	157,665	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2017	$ 11,275	$ 9,460	157,665	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2018	$ 11,275	$ 9,460	157,665	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2019	$ 11,275	$ 9,460	157,665	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2020	$ 11,275	$ 9,460	157,665	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2021	$ 11,275	$ 9,460	157,665	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2022	$ 11,275	$ 9,460	157,665	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2023	$ 11,275	$ 9,460	157,665	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2024	$ 11,275	$ 9,460	157,665	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2025	$ 11,275	$ 9,460	157,665	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2026	$ 11,275	$ 9,460	157,665	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2027	$ 11,275	$ 9,460	157,665	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2028	$ 11,275	$ 9,460	157,665	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2029	$ 11,275	$ 9,460	157,665	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2030	$ 11,275	$ 9,460	157,665	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2031	$ 11,275	$ 9,460	157,665	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2032	$ 11,275	$ 9,460	157,665	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2033	$ 11,275	$ 9,460	157,665	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2034	$ 11,275	$ 9,460	157,665	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2035	$ 11,275	$ 9,460	157,665	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2036	$ 11,275	$ 9,460	157,665	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2037	$ 11,275	$ 9,460	157,665	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2038	$ 11,275	$ 9,460	157,665	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2039	$ 11,275	$ 9,460	157,665	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2040	$ 11,275	$ 9,460	157,665	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2041	$ 11,275	$ 9,460	157,665	$ 0.060	$ -		$ 5.39	$ 1,815					$ -
2042	$ 11,275	$ 9,460	157,665	$ 0.060	$ -		$ 5.39	$ 1,815					$ -

Notes:

(a) Water and sewer combined and calculated on square foot basis based upon BOMA ERR data.

CPI adjustment factor:	2.16%	bring 2011 BOMA ERR data to 2012 dollars.
Water/sewer utility expense	$0.19	per sq. ft.
Building total sq. ft.	9,351	

Source: BAE Urban Economics, 2012.

Table 16: Depreciation Schedule & Residual Value FTBL 115-04 Modernization with AT/FP

Period	Depreciation Schedule	Residual Value
2012	$ -	$ -
2013	$ 3,713,511	$ -
2014	$ 3,645,992	$ -
2015	$ 3,578,474	$ -
2016	$ 3,510,956	$ -
2017	$ 3,443,437	$ -
2018	$ 3,375,919	$ -
2019	$ 3,308,400	$ -
2020	$ 3,240,882	$ -
2021	$ 3,173,364	$ -
2022	$ 3,105,845	$ -
2023	$ 3,038,327	$ -
2024	$ 2,970,809	$ -
2025	$ 2,903,290	$ -
2026	$ 2,835,772	$ -
2027	$ 2,768,253	$ -
2028	$ 2,700,735	$ -
2029	$ 2,633,217	$ -
2030	$ 2,565,698	$ -
2031	$ 2,498,180	$ -
2032	$ 2,430,662	$ -
2033	$ 2,363,143	$ -
2034	$ 2,295,625	$ -
2035	$ 2,228,106	$ -
2036	$ 2,160,588	$ -
2037	$ 2,093,070	$ -
2038	$ 2,025,551	$ -
2039	$ 1,958,033	$ -
2040	$ 1,890,515	$ -
2041	$ 1,822,996	$ -
2042	$ 1,755,478	$ 1,755,478

Note:

Useful life of asset: 55.0 years

Source: BAE Urban Economics, Inc. 2012.

Table 17: South U.S. Urban Consumer Price Index

Year	Index (1982=100)	Annual CPI % Change
1993	140.80	3.15%
1994	144.70	2.77%
1995	149.00	2.97%
1996	153.60	3.09%
1997	156.90	2.15%
1998	158.90	1.27%
1999	162.00	1.95%
2000	167.20	3.21%
2001	171.10	2.33%
2002	173.30	1.29%
2003	177.30	2.31%
2004	181.80	2.54%
2005	188.30	3.58%
2006	194.70	3.40%
2007	200.36	2.91%
2008	208.68	4.15%
2009	207.85	-0.40%
2010	211.34	1.68%
2011	218.62	3.44%
2012	223.34	2.16%
Annual Average 20-years:		**2.5%**
LCCA Assumption:		**0.0%**

Source: U.S. Department of Labor, Bureau of Labor Statistics; BAE Urban Economics, Inc. 2012.

Table 18: Discount Rates and Factors

	Discount Factors			
Year	End of Year	Mid-Year	Beginning of Year	Calander Year
1	0.9804	0.9901	1.0000	2012
2	0.9612	0.9707	0.9804	2013
3	0.9423	0.9517	0.9612	2014
4	0.9238	0.9330	0.9423	2015
5	0.9057	0.9147	0.9238	2016
6	0.8880	0.8968	0.9057	2017
7	0.8706	0.8792	0.8880	2018
8	0.8535	0.8620	0.8706	2019
9	0.8368	0.8451	0.8535	2020
10	0.8203	0.8285	0.8368	2021
11	0.8043	0.8123	0.8203	2022
12	0.7885	0.7963	0.8043	2023
13	0.7730	0.7807	0.7885	2024
14	0.7579	0.7654	0.7730	2025
15	0.7430	0.7504	0.7579	2026
16	0.7284	0.7357	0.7430	2027
17	0.7142	0.7213	0.7284	2028
18	0.7002	0.7071	0.7142	2029
19	0.6864	0.6933	0.7002	2030
20	0.6730	0.6797	0.6864	2031
21	0.6598	0.6663	0.6730	2032
22	0.6468	0.6533	0.6598	2033
23	0.6342	0.6405	0.6468	2034
24	0.6217	0.6279	0.6342	2035
25	0.6095	0.6156	0.6217	2036
26	0.5976	0.6035	0.6095	2037
27	0.5859	0.5917	0.5976	2038
28	0.5744	0.5801	0.5859	2039
29	0.5631	0.5687	0.5744	2040
30	0.5521	0.5576	0.5631	2041
31	0.5412	0.5466	0.5521	2042

Notes:

30-Year real discount rate	2.0%
Mid-year factor:	1.0100

Sources: Office of Management and Budget, OMB Circular A-94, Appendix C; BAE Urban Economics, 2012.

Life Cycle Cost Analysis (LCCA) Spreadsheet

St. Juliens Creek Annex, Chesapeake VA

ESTCP SI 0931
LCCA Demonstration

Historic Building 61

Mission: General Administrative Office

Prepared by:
BAE Urban Economics, Inc.

December 2012

Table III-23: Life Cycle Cost Analysis Summary: SJCA 061

Alternative	Non Discounted Costs by Component: Initial Investment	Non Discounted Costs by Component: Recurring	Non Discounted Costs by Component: Residual Value	Total Costs: Non Discounted	Total Costs: Discounted - No GHG Factor	Total Costs: Discounted - w/GHG Factor
SJCA 061-01: Status Quo - Sustainment	$ 2,242,713	$ 1,953,301	$ -	$ 4,196,014	$ 3,620,942	$ 3,720,197
SJCA 061-02: Demolition and New Construction	$ 4,570,115	$ 1,645,186	$ (2,004,815)	$ 4,210,485	$ 4,562,966	$ 4,653,509
SJCA 061-03: Modernization with HPS	$ 3,812,517	$ 1,645,186	$ (1,793,037)	$ 3,664,666	$ 3,937,295	$ 4,011,507
SJCA 061-04: Modernization with AT/FP	$ 4,260,220	$ 1,645,186	$ (2,003,646)	$ 3,901,760	$ 4,256,812	$ 4,337,150

Notes:

Study Period (years):	30
Real Discount Rate:	2.00%
Average CO2e Value/MT (undiscounted)	$ 37.25
Base Date:	10/01/12

Source: BAE Urban Economics, 2012.

Table III-24: Greenhouse Gas Valuation Summary: SJCA 061

Alternative	GHG Emissions by Scope (MT CO2e): Scope 1	Scope 2	Scope 3	Total	GHG Value: Non Discounted	Discounted
SJCA 061-01: Status Quo - Sustainment	-	3,755.18	67.42	3,822.60	$ 142,795	$ 99,255
SJCA 061-02: Demolition and New Construction	-	2,138.00	940.68	3,078.68	$ 114,612	$ 90,543
SJCA 061-03: Modernization with HPS	-	2,127.96	529.69	2,657.65	$ 99,064	$ 74,212
SJCA 061-04: Modernization with AT/FP	-	2,138.00	660.05	2,798.05	$ 104,252	$ 80,338

Notes:

Study Period (years):	30
Real Discount Rate:	2.00%
Average CO2e Value/MT (undiscounted)	$ 37.25
Base Date:	10/01/12

Sources: Center for Resource Solutions; BAE Urban Economics, 2012.

Table 3: Alternatives Summary: SJCA 061

	Building GSF		Building Features		Construction Cost	
Project Alternative	**Total**	**Footprint**	**LEED**	**AT/FP**	**Total**	**Per SF**
SJCA 061-01: Sustainment - Status Quo	10,251	10,251	n/a	No	$ 2,242,713	$ 219
SJCA 061-02: Demolition & New Construction	10,251	10,251	53	Yes	$ 4,570,115	$ 446
SJCA 061-03: Modernization with HPS	10,251	10,251	59	Yes	$ 3,812,517	$ 372
SJCA 061-04: Modernization with AT/FP	10,251	10,251	59	Yes+	$ 4,260,220	$ 416

+ Current prescriptive practices and treatments.

Sources: Preservation Associates; Center for Resource Solutions; BAE Urban Economics, 2012.

Table 4: Construction Cost Summary: SJCA 061

	Cost Estimate			
Category	**01. Sustainment-Status Quo**	**02. Demolition and New Construction**	**03. Modernization with HPS**	**04. Modernization with AT/FP**
Demolition	$ -	$ 329,160	$ 19,555	$ 21,738
Substructure	$ 1,239,602	$ 344,080	$ 122,560	$ 186,560
Shell	$ 56,842	$ 935,110	$ 745,847	$ 1,011,890
Interiors	$ 64,309	$ 267,828	$ 325,465	$ 324,813
Services	$ 385,160	$ 1,008,470	$ 1,112,653	$ 1,093,885
Sitework	$ -	$ 326,362	$ 347,314	$ 348,942
Special Construction	$ -	$ 10,800	$ 10,800	$ 10,800
Hard cost subtotal	**$ 1,745,913**	**$ 3,221,809**	**$ 2,684,194**	**$ 2,998,628**
General conditions (25%)	$ 261,887	$ 818,284	$ 682,635	$ 762,797
Security escalation (2%)	$ -	$ 51,326	$ 46,346	$ 52,559
USACE design (6%)	$ 120,468	$ 245,485	$ 204,791	$ 228,839
USACE SOIH (5.7%)	$ 114,445	$ 233,211	$ 194,551	$ 217,397
Soft cost subtotal	**$ 496,800**	**$ 1,348,305**	**$ 1,128,323**	**$ 1,261,592**
Construction cost total	**$ 2,242,713**	**$ 4,570,115**	**$ 3,812,517**	**$ 4,260,220**
Construction cost PSF	**$219**	**$ 446**	**$ 372**	**$ 416**
% Difference from 02	**-51%**	**N/A**	**-17%**	**-7%**

Sources: Preservation Associates; Center for Resource Solutions; BAE Urban Economics, 2012.

Table 5: NPV Calculations 061-01 Sustainment-Status Quo

	One Time							Recurring			Residual Value		Net Present Value			
Mid Year	New Construction	Major Repair	Temporary Facilities	Relocation	Demo	Site Preparation	Environmental Remediation	Utilities	Repairs Maintenance	Other Operations	Building	Land	Undiscounted Sum	NPV Factor	Mid-Year	Cum NPV
2012	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -		$ -	$ -	$ -	0.99	$ -	$ -
2013	$ -	$ 2,242,713	$ -	$ -	$ -	$ -	$ -	$ 25,420	$ 13,928	$ 25,762	$ -	$ -	$ 2,307,823	0.97	$ 2,240,280	$ 2,240,280
2014	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 25,420	$ 13,928	$ 25,762	$ -	$ -	$ 65,110	0.95	$ 61,965	$ 2,302,245
2015	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 25,420	$ 13,928	$ 25,762	$ -	$ -	$ 65,110	0.93	$ 60,750	$ 2,362,995
2016	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 25,420	$ 13,928	$ 25,762	$ -	$ -	$ 65,110	0.91	$ 59,559	$ 2,422,554
2017	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 25,420	$ 13,928	$ 25,762	$ -	$ -	$ 65,110	0.90	$ 58,391	$ 2,480,945
2018	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 25,420	$ 13,928	$ 25,762	$ -	$ -	$ 65,110	0.88	$ 57,246	$ 2,538,191
2019	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 25,420	$ 13,928	$ 25,762	$ -	$ -	$ 65,110	0.86	$ 56,124	$ 2,594,315
2020	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 25,420	$ 13,928	$ 25,762	$ -	$ -	$ 65,110	0.85	$ 55,023	$ 2,649,338
2021	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 25,420	$ 13,928	$ 25,762	$ -	$ -	$ 65,110	0.83	$ 53,944	$ 2,703,283
2022	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 25,420	$ 13,928	$ 25,762	$ -	$ -	$ 65,110	0.81	$ 52,887	$ 2,756,169
2023	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 25,420	$ 13,928	$ 25,762	$ -	$ -	$ 65,110	0.80	$ 51,850	$ 2,808,019
2024	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 25,420	$ 13,928	$ 25,762	$ -	$ -	$ 65,110	0.78	$ 50,833	$ 2,858,852
2025	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 25,420	$ 13,928	$ 25,762	$ -	$ -	$ 65,110	0.77	$ 49,836	$ 2,908,688
2026	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 25,420	$ 13,928	$ 25,762	$ -	$ -	$ 65,110	0.75	$ 48,859	$ 2,957,547
2027	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 25,420	$ 13,928	$ 25,762	$ -	$ -	$ 65,110	0.74	$ 47,901	$ 3,005,449
2028	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 25,420	$ 13,928	$ 25,762	$ -	$ -	$ 65,110	0.72	$ 46,962	$ 3,052,410
2029	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 25,420	$ 13,928	$ 25,762	$ -	$ -	$ 65,110	0.71	$ 46,041	$ 3,098,451
2030	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 25,420	$ 13,928	$ 25,762	$ -	$ -	$ 65,110	0.69	$ 45,138	$ 3,143,590
2031	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 25,420	$ 13,928	$ 25,762	$ -	$ -	$ 65,110	0.68	$ 44,253	$ 3,187,843
2032	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 25,420	$ 13,928	$ 25,762	$ -	$ -	$ 65,110	0.67	$ 43,385	$ 3,231,228
2033	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 25,420	$ 13,928	$ 25,762	$ -	$ -	$ 65,110	0.65	$ 42,535	$ 3,273,763
2034	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 25,420	$ 13,928	$ 25,762	$ -	$ -	$ 65,110	0.64	$ 41,701	$ 3,315,464
2035	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 25,420	$ 13,928	$ 25,762	$ -	$ -	$ 65,110	0.63	$ 40,883	$ 3,356,347
2036	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 25,420	$ 13,928	$ 25,762	$ -	$ -	$ 65,110	0.62	$ 40,081	$ 3,396,428
2037	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 25,420	$ 13,928	$ 25,762	$ -	$ -	$ 65,110	0.60	$ 39,296	$ 3,435,724
2038	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 25,420	$ 13,928	$ 25,762	$ -	$ -	$ 65,110	0.59	$ 38,525	$ 3,474,249
2039	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 25,420	$ 13,928	$ 25,762	$ -	$ -	$ 65,110	0.58	$ 37,770	$ 3,512,019
2040	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 25,420	$ 13,928	$ 25,762	$ -	$ -	$ 65,110	0.57	$ 37,029	$ 3,549,048
2041	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 25,420	$ 13,928	$ 25,762	$ -	$ -	$ 65,110	0.56	$ 36,303	$ 3,585,351
2042	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 25,420	$ 13,928	$ 25,762	$ -	$ -	$ 65,110	0.55	$ 35,591	$ 3,620,942
TOTALS	$ -	$ 2,242,713	$ -	$ -	$ -	$ -	$ -	$ 762,587	$ 417,849	$ 772,864	$ -	$ -	$ 4,196,014		$ 3,620,942	$ 3,620,942

NOTES:

Project Alternative Summary

Capital Costs	$ 2,242,713
Recurring Costs	$ 1,953,301
Residual Value	$ -
Non Discounted Sum	$ 4,196,014
Cum NPV	$ 3,620,942

Key Assumptions:

Discount Rate	2.00%		
Study Period	30	years	
BaseYear	2012		
Report Output	Constant Dollars		
Cost per sq. ft.	$219		
Construction Period (years)	1		
Building Size (sq. ft.)	10,251		

Repairs and Maintenance	$ 1.36	
Other Operations	$ 2.51	
Cleaning per sq. ft.	$ 0.74	
Roads and Grounds	$ 0.51	
Administrative	$ 1.27	
BOMA Expense CPI Adjustment	2.16%	
Effective utitlities per sq. ft.	$ 2.48	Not from BOMA; calculated based on treatment specific energy usage.

SOURCE: BAE Urban Economics, 2012.

Table 6: Schedule of Recurring Expenditures SJCA 061-01 Sustainment-Status Quo

Year	Total Annual Expenditures	Electrical			Natural Gas			Water/Sewer (a)					Other
		Total Cost	kWh	$/kWh	Total Cost	MMBtu	$/MMBtu	Total Cost	Water (Kgal)	$/Kgal	Waste	$/Kgal	
2012	$ 25,420	$ 23,849	290,838	$ 0.082	$ -		$ -	$ 1,571					$ -
2013	$ 25,420	$ 23,849	290,838	$ 0.082	$ -		$ -	$ 1,571					$ -
2014	$ 25,420	$ 23,849	290,838	$ 0.082	$ -		$ -	$ 1,571					$ -
2015	$ 25,420	$ 23,849	290,838	$ 0.082	$ -		$ -	$ 1,571					$ -
2016	$ 25,420	$ 23,849	290,838	$ 0.082	$ -		$ -	$ 1,571					$ -
2017	$ 25,420	$ 23,849	290,838	$ 0.082	$ -		$ -	$ 1,571					$ -
2018	$ 25,420	$ 23,849	290,838	$ 0.082	$ -		$ -	$ 1,571					$ -
2019	$ 25,420	$ 23,849	290,838	$ 0.082	$ -		$ -	$ 1,571					$ -
2020	$ 25,420	$ 23,849	290,838	$ 0.082	$ -		$ -	$ 1,571					$ -
2021	$ 25,420	$ 23,849	290,838	$ 0.082	$ -		$ -	$ 1,571					$ -
2022	$ 25,420	$ 23,849	290,838	$ 0.082	$ -		$ -	$ 1,571					$ -
2023	$ 25,420	$ 23,849	290,838	$ 0.082	$ -		$ -	$ 1,571					$ -
2024	$ 25,420	$ 23,849	290,838	$ 0.082	$ -		$ -	$ 1,571					$ -
2025	$ 25,420	$ 23,849	290,838	$ 0.082	$ -		$ -	$ 1,571					$ -
2026	$ 25,420	$ 23,849	290,838	$ 0.082	$ -		$ -	$ 1,571					$ -
2027	$ 25,420	$ 23,849	290,838	$ 0.082	$ -		$ -	$ 1,571					$ -
2028	$ 25,420	$ 23,849	290,838	$ 0.082	$ -		$ -	$ 1,571					$ -
2029	$ 25,420	$ 23,849	290,838	$ 0.082	$ -		$ -	$ 1,571					$ -
2030	$ 25,420	$ 23,849	290,838	$ 0.082	$ -		$ -	$ 1,571					$ -
2031	$ 25,420	$ 23,849	290,838	$ 0.082	$ -		$ -	$ 1,571					$ -
2032	$ 25,420	$ 23,849	290,838	$ 0.082	$ -		$ -	$ 1,571					$ -
2033	$ 25,420	$ 23,849	290,838	$ 0.082	$ -		$ -	$ 1,571					$ -
2034	$ 25,420	$ 23,849	290,838	$ 0.082	$ -		$ -	$ 1,571					$ -
2035	$ 25,420	$ 23,849	290,838	$ 0.082	$ -		$ -	$ 1,571					$ -
2036	$ 25,420	$ 23,849	290,838	$ 0.082	$ -		$ -	$ 1,571					$ -
2037	$ 25,420	$ 23,849	290,838	$ 0.082	$ -		$ -	$ 1,571					$ -
2038	$ 25,420	$ 23,849	290,838	$ 0.082	$ -		$ -	$ 1,571					$ -
2039	$ 25,420	$ 23,849	290,838	$ 0.082	$ -		$ -	$ 1,571					$ -
2040	$ 25,420	$ 23,849	290,838	$ 0.082	$ -		$ -	$ 1,571					$ -
2041	$ 25,420	$ 23,849	290,838	$ 0.082	$ -		$ -	$ 1,571					$ -
2042	$ 25,420	$ 23,849	290,838	$ 0.082	$ -		$ -	$ 1,571					$ -

Notes:

(a) Water and sewer combined and calculated on square foot basis based upon BOMA ERR data.

CPI adjustment factor:	2.16%	bring 2011 BOMA ERR data to 2012 dollars.
Water/sewer utility expense	$0.15	per sq. ft.
Building total sq. ft.	10,251	

Source: BAE Urban Economics, 2012.

Table 7: Depreciation Schedule & Residual Value SJCA 061-01: Sustainment-Status Quo

Period	Depreciation Schedule	Residual Value
2012	$ -	$ -
2013	$ 2,242,713	$ -
2014	$ 2,130,577	$ -
2015	$ 2,018,442	$ -
2016	$ 1,906,306	$ -
2017	$ 1,794,170	$ -
2018	$ 1,682,035	$ -
2019	$ 1,569,899	$ -
2020	$ 1,457,764	$ -
2021	$ 1,345,628	$ -
2022	$ 1,233,492	$ -
2023	$ 1,121,357	$ -
2024	$ 1,009,221	$ -
2025	$ 897,085	$ -
2026	$ 784,950	$ -
2027	$ 672,814	$ -
2028	$ 560,678	$ -
2029	$ 448,543	$ -
2030	$ 336,407	$ -
2031	$ 224,271	$ -
2032	$ 112,136	$ -
2033	$ 0	$ -
2034	$ -	$ -
2035	$ -	$ -
2036	$ -	$ -
2037	$ -	$ -
2038	$ -	$ -
2039	$ -	$ -
2040	$ -	$ -
2041	$ -	$ -
2042	$ -	$ -

NOTE:

Useful life of asset: 20.0 years

Source: BAE Urban Economics, Inc. 2012.

Table 8: NPV Calculation 061-02: Demolition and New Construction

	One Time							Recurring			Residual Value		Net Present Value			
Mid Year	New Construction	Major Repair	Temporary Facilities	Relocation	Demo	Site Preparation	Environmental Remediation	Utilities	Repairs e	Other Operations	Building	Land	Undiscounted Sum	NPV Factor	Mid-Year	Cum NPV
2012	$ -	$ -	$ -	$ -	$ 329,160	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 329,160	0.99	$ 325,917	$ 325,917
2013	$ -	$ 4,240,955	$ -	$ -	$ -	$ -	$ -	$ 15,149	$ 13,928	$ 25,762	$ -	$ -	$ 4,295,795	0.97	$ 4,170,069	$ 4,495,986
2014	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,149	$ 13,928	$ 25,762	$ -	$ -	$ 54,840	0.95	$ 52,191	$ 4,548,176
2015	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,149	$ 13,928	$ 25,762	$ -	$ -	$ 54,840	0.93	$ 51,167	$ 4,599,344
2016	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,149	$ 13,928	$ 25,762	$ -	$ -	$ 54,840	0.91	$ 50,164	$ 4,649,508
2017	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,149	$ 13,928	$ 25,762	$ -	$ -	$ 54,840	0.90	$ 49,180	$ 4,698,688
2018	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,149	$ 13,928	$ 25,762	$ -	$ -	$ 54,840	0.88	$ 48,216	$ 4,746,904
2019	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,149	$ 13,928	$ 25,762	$ -	$ -	$ 54,840	0.86	$ 47,271	$ 4,794,175
2020	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,149	$ 13,928	$ 25,762	$ -	$ -	$ 54,840	0.85	$ 46,344	$ 4,840,519
2021	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,149	$ 13,928	$ 25,762	$ -	$ -	$ 54,840	0.83	$ 45,435	$ 4,885,954
2022	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,149	$ 13,928	$ 25,762	$ -	$ -	$ 54,840	0.81	$ 44,544	$ 4,930,498
2023	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,149	$ 13,928	$ 25,762	$ -	$ -	$ 54,840	0.80	$ 43,671	$ 4,974,169
2024	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,149	$ 13,928	$ 25,762	$ -	$ -	$ 54,840	0.78	$ 42,815	$ 5,016,984
2025	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,149	$ 13,928	$ 25,762	$ -	$ -	$ 54,840	0.77	$ 41,975	$ 5,058,959
2026	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,149	$ 13,928	$ 25,762	$ -	$ -	$ 54,840	0.75	$ 41,152	$ 5,100,111
2027	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,149	$ 13,928	$ 25,762	$ -	$ -	$ 54,840	0.74	$ 40,345	$ 5,140,456
2028	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,149	$ 13,928	$ 25,762	$ -	$ -	$ 54,840	0.72	$ 39,554	$ 5,180,010
2029	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,149	$ 13,928	$ 25,762	$ -	$ -	$ 54,840	0.71	$ 38,778	$ 5,218,789
2030	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,149	$ 13,928	$ 25,762	$ -	$ -	$ 54,840	0.69	$ 38,018	$ 5,256,807
2031	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,149	$ 13,928	$ 25,762	$ -	$ -	$ 54,840	0.68	$ 37,273	$ 5,294,079
2032	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,149	$ 13,928	$ 25,762	$ -	$ -	$ 54,840	0.67	$ 36,542	$ 5,330,621
2033	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,149	$ 13,928	$ 25,762	$ -	$ -	$ 54,840	0.65	$ 35,825	$ 5,366,447
2034	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,149	$ 13,928	$ 25,762	$ -	$ -	$ 54,840	0.64	$ 35,123	$ 5,401,569
2035	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,149	$ 13,928	$ 25,762	$ -	$ -	$ 54,840	0.63	$ 34,434	$ 5,436,004
2036	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,149	$ 13,928	$ 25,762	$ -	$ -	$ 54,840	0.62	$ 33,759	$ 5,469,763
2037	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,149	$ 13,928	$ 25,762	$ -	$ -	$ 54,840	0.60	$ 33,097	$ 5,502,860
2038	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,149	$ 13,928	$ 25,762	$ -	$ -	$ 54,840	0.59	$ 32,448	$ 5,535,308
2039	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,149	$ 13,928	$ 25,762	$ -	$ -	$ 54,840	0.58	$ 31,812	$ 5,567,120
2040	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,149	$ 13,928	$ 25,762	$ -	$ -	$ 54,840	0.57	$ 31,188	$ 5,598,308
2041	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,149	$ 13,928	$ 25,762	$ -	$ -	$ 54,840	0.56	$ 30,577	$ 5,628,884
2042	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,149	$ 13,928	$ 25,762	$ (2,004,815)	$ -	$ (1,949,976)	0.55	$ (1,065,918)	$ 4,562,966
TOTALS	$ -	$ 4,240,955	$ -	$ -	$ 329,160	$ -	$ -	$ 454,472	$ 417,849	$ 772,864	$ (2,004,815)	$ -	$ 4,210,485		$ 4,562,966	$ 4,562,966

NOTES:

Alternative 1 Summary:

Capital Costs	$ 4,570,115
Recurring Costs	$ 1,645,186
Residual Value	$ (2,004,815)
Non Discounted Sum	$ 4,210,485
Cum NPV	$ 4,562,966

Key Assumptions:

Discount Rate	2.00%	Repairs and Maintenance	$ 1.36
Study Period	30 years	Other Operations	$ 2.51
BaseYear	2012	Cleaning per sq. ft.	$ 0.74
Report Output	Constant Dollars	Roads and Grounds	$ 0.51
Cost per sq. ft.	$414	Administrative	$ 1.27
Construction Period (years)	1	BOMA Expense CPI Adjustment	2.16%
Building Size (sq. ft.)	10,251	Effective utitlities per sq. ft.	$ 1.48

Not from BOMA; calculated based on treatment specific energy usage.

Source: BAE Urban Economics, Inc. 2012.

Table 9: Schedule of Recurring Expenditures: SJCA 061-02 Demolition and New Construction

Year	Total Annual Expenditures	Electrical			Natural Gas			Water/Sewer (a)					Other
		Total Cost	kWh	$/kWh	Total Cost	MMBtu	$/MMBtu	Total Cost	Water	$/Kgal	Waste	$/Kgal	
2012	$ 15,149	$ 13,578	165,588	$ 0.082	$ -		$ -	$ 1,571					$ -
2013	$ 15,149	$ 13,578	165,588	$ 0.082	$ -		$ -	$ 1,571					$ -
2014	$ 15,149	$ 13,578	165,588	$ 0.082	$ -		$ -	$ 1,571					$ -
2015	$ 15,149	$ 13,578	165,588	$ 0.082	$ -		$ -	$ 1,571					$ -
2016	$ 15,149	$ 13,578	165,588	$ 0.082	$ -		$ -	$ 1,571					$ -
2017	$ 15,149	$ 13,578	165,588	$ 0.082	$ -		$ -	$ 1,571					$ -
2018	$ 15,149	$ 13,578	165,588	$ 0.082	$ -		$ -	$ 1,571					$ -
2019	$ 15,149	$ 13,578	165,588	$ 0.082	$ -		$ -	$ 1,571					$ -
2020	$ 15,149	$ 13,578	165,588	$ 0.082	$ -		$ -	$ 1,571					$ -
2021	$ 15,149	$ 13,578	165,588	$ 0.082	$ -		$ -	$ 1,571					$ -
2022	$ 15,149	$ 13,578	165,588	$ 0.082	$ -		$ -	$ 1,571					$ -
2023	$ 15,149	$ 13,578	165,588	$ 0.082	$ -		$ -	$ 1,571					$ -
2024	$ 15,149	$ 13,578	165,588	$ 0.082	$ -		$ -	$ 1,571					$ -
2025	$ 15,149	$ 13,578	165,588	$ 0.082	$ -		$ -	$ 1,571					$ -
2026	$ 15,149	$ 13,578	165,588	$ 0.082	$ -		$ -	$ 1,571					$ -
2027	$ 15,149	$ 13,578	165,588	$ 0.082	$ -		$ -	$ 1,571					$ -
2028	$ 15,149	$ 13,578	165,588	$ 0.082	$ -		$ -	$ 1,571					$ -
2029	$ 15,149	$ 13,578	165,588	$ 0.082	$ -		$ -	$ 1,571					$ -
2030	$ 15,149	$ 13,578	165,588	$ 0.082	$ -		$ -	$ 1,571					$ -
2031	$ 15,149	$ 13,578	165,588	$ 0.082	$ -		$ -	$ 1,571					$ -
2032	$ 15,149	$ 13,578	165,588	$ 0.082	$ -		$ -	$ 1,571					$ -
2033	$ 15,149	$ 13,578	165,588	$ 0.082	$ -		$ -	$ 1,571					$ -
2034	$ 15,149	$ 13,578	165,588	$ 0.082	$ -		$ -	$ 1,571					$ -
2035	$ 15,149	$ 13,578	165,588	$ 0.082	$ -		$ -	$ 1,571					$ -
2036	$ 15,149	$ 13,578	165,588	$ 0.082	$ -		$ -	$ 1,571					$ -
2037	$ 15,149	$ 13,578	165,588	$ 0.082	$ -		$ -	$ 1,571					$ -
2038	$ 15,149	$ 13,578	165,588	$ 0.082	$ -		$ -	$ 1,571					$ -
2039	$ 15,149	$ 13,578	165,588	$ 0.082	$ -		$ -	$ 1,571					$ -
2040	$ 15,149	$ 13,578	165,588	$ 0.082	$ -		$ -	$ 1,571					$ -
2041	$ 15,149	$ 13,578	165,588	$ 0.082	$ -		$ -	$ 1,571					$ -
2042	$ 15,149	$ 13,578	165,588	$ 0.082	$ -		$ -	$ 1,571					$ -

Notes:

(a) Water and sewer combined and calculated on square foot basis based upon BOMA ERR data.

CPI adjustment factor:	2.16%	bring 2011 BOMA ERR data to 2012 dollars.
Water/sewer utility expense	$0.15	per sq. ft.
Building total sq. ft.	10,251	

SOURCE: BAE Urban Economics, 2012.

Table 10: Depreciation Schedule & Residual Value: SJCA 061-02 Demolition and New Construction

Period	Depreciation Schedule	Residual Value
2012	$ -	$ -
2013	$ 4,240,955	$ -
2014	$ 4,163,847	$ -
2015	$ 4,086,738	$ -
2016	$ 4,009,630	$ -
2017	$ 3,932,522	$ -
2018	$ 3,855,414	$ -
2019	$ 3,778,305	$ -
2020	$ 3,701,197	$ -
2021	$ 3,624,089	$ -
2022	$ 3,546,981	$ -
2023	$ 3,469,872	$ -
2024	$ 3,392,764	$ -
2025	$ 3,315,656	$ -
2026	$ 3,238,547	$ -
2027	$ 3,161,439	$ -
2028	$ 3,084,331	$ -
2029	$ 3,007,223	$ -
2030	$ 2,930,114	$ -
2031	$ 2,853,006	$ -
2032	$ 2,775,898	$ -
2033	$ 2,698,790	$ -
2034	$ 2,621,681	$ -
2035	$ 2,544,573	$ -
2036	$ 2,467,465	$ -
2037	$ 2,390,356	$ -
2038	$ 2,313,248	$ -
2039	$ 2,236,140	$ -
2040	$ 2,159,032	$ -
2041	$ 2,081,923	$ -
2042	$ 2,004,815	$ 2,004,815

NOTE:

Useful life of asset: 55.0 years

SOURCE: BAE Urban Econmics, Inc.

Table 11: NPV Calculation 061-03: Modernization with HPS

	One Time							Recurring			Residual Value		Net Present Value			
Mid Year	New Construction	Modernization	Temporary Facilities	Relocation	Demo	Site Preparation	Environmental Remediation	Utilities	Repairs e	Other Operations	Building	Land	Undiscounted Sum	NPV Factor	Mid-Year	Cum NPV
2012	$ -	$ -	$ -	$ -	$ 19,555	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 19,555	0.99	$ 19,362	$ 19,362
2013	$ -	$ 3,792,962	$ -	$ -	$ -	$ -	$ -	$ 15,149	$ 13,928	$ 25,762	$ -	$ -	$ 3,847,802	0.97	$ 3,735,187	$ 3,754,550
2014	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,149	$ 13,928	$ 25,762	$ -	$ -	$ 54,840	0.95	$ 52,191	$ 3,806,741
2015	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,149	$ 13,928	$ 25,762	$ -	$ -	$ 54,840	0.93	$ 51,167	$ 3,857,908
2016	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,149	$ 13,928	$ 25,762	$ -	$ -	$ 54,840	0.91	$ 50,164	$ 3,908,072
2017	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,149	$ 13,928	$ 25,762	$ -	$ -	$ 54,840	0.90	$ 49,180	$ 3,957,252
2018	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,149	$ 13,928	$ 25,762	$ -	$ -	$ 54,840	0.88	$ 48,216	$ 4,005,469
2019	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,149	$ 13,928	$ 25,762	$ -	$ -	$ 54,840	0.86	$ 47,271	$ 4,052,739
2020	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,149	$ 13,928	$ 25,762	$ -	$ -	$ 54,840	0.85	$ 46,344	$ 4,099,083
2021	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,149	$ 13,928	$ 25,762	$ -	$ -	$ 54,840	0.83	$ 45,435	$ 4,144,518
2022	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,149	$ 13,928	$ 25,762	$ -	$ -	$ 54,840	0.81	$ 44,544	$ 4,189,063
2023	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,149	$ 13,928	$ 25,762	$ -	$ -	$ 54,840	0.80	$ 43,671	$ 4,232,734
2024	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,149	$ 13,928	$ 25,762	$ -	$ -	$ 54,840	0.78	$ 42,815	$ 4,275,548
2025	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,149	$ 13,928	$ 25,762	$ -	$ -	$ 54,840	0.77	$ 41,975	$ 4,317,523
2026	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,149	$ 13,928	$ 25,762	$ -	$ -	$ 54,840	0.75	$ 41,152	$ 4,358,675
2027	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,149	$ 13,928	$ 25,762	$ -	$ -	$ 54,840	0.74	$ 40,345	$ 4,399,020
2028	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,149	$ 13,928	$ 25,762	$ -	$ -	$ 54,840	0.72	$ 39,554	$ 4,438,574
2029	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,149	$ 13,928	$ 25,762	$ -	$ -	$ 54,840	0.71	$ 38,778	$ 4,477,353
2030	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,149	$ 13,928	$ 25,762	$ -	$ -	$ 54,840	0.69	$ 38,018	$ 4,515,371
2031	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,149	$ 13,928	$ 25,762	$ -	$ -	$ 54,840	0.68	$ 37,273	$ 4,552,644
2032	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,149	$ 13,928	$ 25,762	$ -	$ -	$ 54,840	0.67	$ 36,542	$ 4,589,185
2033	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,149	$ 13,928	$ 25,762	$ -	$ -	$ 54,840	0.65	$ 35,825	$ 4,625,011
2034	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,149	$ 13,928	$ 25,762	$ -	$ -	$ 54,840	0.64	$ 35,123	$ 4,660,134
2035	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,149	$ 13,928	$ 25,762	$ -	$ -	$ 54,840	0.63	$ 34,434	$ 4,694,568
2036	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,149	$ 13,928	$ 25,762	$ -	$ -	$ 54,840	0.62	$ 33,759	$ 4,728,327
2037	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,149	$ 13,928	$ 25,762	$ -	$ -	$ 54,840	0.60	$ 33,097	$ 4,761,424
2038	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,149	$ 13,928	$ 25,762	$ -	$ -	$ 54,840	0.59	$ 32,448	$ 4,793,872
2039	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,149	$ 13,928	$ 25,762	$ -	$ -	$ 54,840	0.58	$ 31,812	$ 4,825,684
2040	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,149	$ 13,928	$ 25,762	$ -	$ -	$ 54,840	0.57	$ 31,188	$ 4,856,872
2041	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,149	$ 13,928	$ 25,762	$ -	$ -	$ 54,840	0.56	$ 30,577	$ 4,887,448
2042	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,149	$ 13,928	$ 25,762	$ (1,793,037)	$ -	$ (1,738,197)	0.55	$ (950,153)	$ 3,937,295
TOTALS	$ -	$ 3,792,962	$ -	$ -	$ 19,555	$ -	$ -	$ 454,472	$ 417,849	$ 772,864	$ (1,793,037)	$ -	$ 3,664,666		$ 3,937,295	$ 3,937,295

NOTES:

Alternative 1 Summary:

Capital Costs	$ 3,812,517
Recurring Costs	$ 1,645,186
Residual Value	$ (1,793,037)
Non Discounted Sum	$ 3,664,666
Cum NPV	$ 3,937,295

Key Assumptions:

Discount Rate	2.00%	Repairs and Maintenance	$ 1.36
Study Period	30 years	Other Operations	$ 2.51
BaseYear	2012	Cleaning per sq. ft.	$ 0.74
Report Output	Constant Dollars	Roads and Grounds	$ 0.51
Cost per sq. ft.	$370	Administrative	$ 1.27
Construction Period (years)	1	BOMA Expense CPI Adjustment	2.16%
Building Size (sq. ft.)	10,251	Effective utitlities per sq. ft.	$ 1.48

Not from BOMA; calculated based on treatment specific energy usage.

Source: BAE Urban Economics, 2012.

Table 12: Schedule of Recurring Expenditures: 061-03 Modernization with HPS

Year	Total Annual Expenditures	Electrical			Natural Gas			Water/Sewer (a)					Other
		Total Cost	kWh	$/kWh	Total Cost	MMBtu	$/MMBtu	Total Cost	Water	$/Kgal	Waste	$/Kgal	
2012	$ 15,149	$ 13,578	165,588	$ 0.082	$ -		$ -	$ 1,571					$ -
2013	$ 15,149	$ 13,578	165,588	$ 0.082	$ -		$ -	$ 1,571					$ -
2014	$ 15,149	$ 13,578	165,588	$ 0.082	$ -		$ -	$ 1,571					$ -
2015	$ 15,149	$ 13,578	165,588	$ 0.082	$ -		$ -	$ 1,571					$ -
2016	$ 15,149	$ 13,578	165,588	$ 0.082	$ -		$ -	$ 1,571					$ -
2017	$ 15,149	$ 13,578	165,588	$ 0.082	$ -		$ -	$ 1,571					$ -
2018	$ 15,149	$ 13,578	165,588	$ 0.082	$ -		$ -	$ 1,571					$ -
2019	$ 15,149	$ 13,578	165,588	$ 0.082	$ -		$ -	$ 1,571					$ -
2020	$ 15,149	$ 13,578	165,588	$ 0.082	$ -		$ -	$ 1,571					$ -
2021	$ 15,149	$ 13,578	165,588	$ 0.082	$ -		$ -	$ 1,571					$ -
2022	$ 15,149	$ 13,578	165,588	$ 0.082	$ -		$ -	$ 1,571					$ -
2023	$ 15,149	$ 13,578	165,588	$ 0.082	$ -		$ -	$ 1,571					$ -
2024	$ 15,149	$ 13,578	165,588	$ 0.082	$ -		$ -	$ 1,571					$ -
2025	$ 15,149	$ 13,578	165,588	$ 0.082	$ -		$ -	$ 1,571					$ -
2026	$ 15,149	$ 13,578	165,588	$ 0.082	$ -		$ -	$ 1,571					$ -
2027	$ 15,149	$ 13,578	165,588	$ 0.082	$ -		$ -	$ 1,571					$ -
2028	$ 15,149	$ 13,578	165,588	$ 0.082	$ -		$ -	$ 1,571					$ -
2029	$ 15,149	$ 13,578	165,588	$ 0.082	$ -		$ -	$ 1,571					$ -
2030	$ 15,149	$ 13,578	165,588	$ 0.082	$ -		$ -	$ 1,571					$ -
2031	$ 15,149	$ 13,578	165,588	$ 0.082	$ -		$ -	$ 1,571					$ -
2032	$ 15,149	$ 13,578	165,588	$ 0.082	$ -		$ -	$ 1,571					$ -
2033	$ 15,149	$ 13,578	165,588	$ 0.082	$ -		$ -	$ 1,571					$ -
2034	$ 15,149	$ 13,578	165,588	$ 0.082	$ -		$ -	$ 1,571					$ -
2035	$ 15,149	$ 13,578	165,588	$ 0.082	$ -		$ -	$ 1,571					$ -
2036	$ 15,149	$ 13,578	165,588	$ 0.082	$ -		$ -	$ 1,571					$ -
2037	$ 15,149	$ 13,578	165,588	$ 0.082	$ -		$ -	$ 1,571					$ -
2038	$ 15,149	$ 13,578	165,588	$ 0.082	$ -		$ -	$ 1,571					$ -
2039	$ 15,149	$ 13,578	165,588	$ 0.082	$ -		$ -	$ 1,571					$ -
2040	$ 15,149	$ 13,578	165,588	$ 0.082	$ -		$ -	$ 1,571					$ -
2041	$ 15,149	$ 13,578	165,588	$ 0.082	$ -		$ -	$ 1,571					$ -
2042	$ 15,149	$ 13,578	165,588	$ 0.082	$ -		$ -	$ 1,571					$ -

Notes:

(a) Water and sewer combined and calculated on square foot basis based upon BOMA ERR data.

CPI adjustment factor:	2.16%	bring 2011 BOMA ERR data to 2012 dollars.
Water/sewer utility expense	$0.15	per sq. ft.
Building total sq. ft.	10,251	

Source: BAE Urban Economics, 2012.

Table 13: Depreciation Schedule & Residual Value: SJCA 061-03 Modernization with HPS

Period	Depreciation Schedule	Residual Value
2012	$ -	$ -
2013	$ 3,792,962	$ -
2014	$ 3,723,999	$ -
2015	$ 3,655,036	$ -
2016	$ 3,586,073	$ -
2017	$ 3,517,110	$ -
2018	$ 3,448,147	$ -
2019	$ 3,379,184	$ -
2020	$ 3,310,221	$ -
2021	$ 3,241,258	$ -
2022	$ 3,172,295	$ -
2023	$ 3,103,333	$ -
2024	$ 3,034,370	$ -
2025	$ 2,965,407	$ -
2026	$ 2,896,444	$ -
2027	$ 2,827,481	$ -
2028	$ 2,758,518	$ -
2029	$ 2,689,555	$ -
2030	$ 2,620,592	$ -
2031	$ 2,551,629	$ -
2032	$ 2,482,666	$ -
2033	$ 2,413,703	$ -
2034	$ 2,344,740	$ -
2035	$ 2,275,777	$ -
2036	$ 2,206,814	$ -
2037	$ 2,137,851	$ -
2038	$ 2,068,888	$ -
2039	$ 1,999,925	$ -
2040	$ 1,930,962	$ -
2041	$ 1,862,000	$ -
2042	$ 1,793,037	$ 1,793,037

NOTE:

Useful life of asset: 55 years

Source: BAE Urban Economics, Inc.

Table 14: NPV Calculation; Project Alternative 061-04: Modernization with AT/FP

	One Time							Recurring			Residual Value		Net Present Value			
Mid Year	New Construction	Major Repair	Temporary Facilities	Relocation	Demo	Site Preparation	Environmental Remediation	Utilities	Repairs e	Other Operations	Building	Land	Undiscounted Sum	NPV Factor	Mid-Year	Cum NPV
2012	$ -	$ -	$ -	$ -	$ 21,738	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 21,738	0.99	$ 21,524	$ 21,524
2013	$ -	$ 4,238,482	$ -	$ -	$ -	$ -	$ -	$ 15,149	$ 13,928	$ 25,762	$ -	$ -	$ 4,293,321	0.97	$ 4,167,668	$ 4,189,192
2014	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,149	$ 13,928	$ 25,762	$ -	$ -	$ 54,840	0.95	$ 52,191	$ 4,241,383
2015	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,149	$ 13,928	$ 25,762	$ -	$ -	$ 54,840	0.93	$ 51,167	$ 4,292,550
2016	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,149	$ 13,928	$ 25,762	$ -	$ -	$ 54,840	0.91	$ 50,164	$ 4,342,714
2017	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,149	$ 13,928	$ 25,762	$ -	$ -	$ 54,840	0.90	$ 49,180	$ 4,391,895
2018	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,149	$ 13,928	$ 25,762	$ -	$ -	$ 54,840	0.88	$ 48,216	$ 4,440,111
2019	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,149	$ 13,928	$ 25,762	$ -	$ -	$ 54,840	0.86	$ 47,271	$ 4,487,382
2020	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,149	$ 13,928	$ 25,762	$ -	$ -	$ 54,840	0.85	$ 46,344	$ 4,533,726
2021	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,149	$ 13,928	$ 25,762	$ -	$ -	$ 54,840	0.83	$ 45,435	$ 4,579,161
2022	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,149	$ 13,928	$ 25,762	$ -	$ -	$ 54,840	0.81	$ 44,544	$ 4,623,705
2023	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,149	$ 13,928	$ 25,762	$ -	$ -	$ 54,840	0.80	$ 43,671	$ 4,667,376
2024	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,149	$ 13,928	$ 25,762	$ -	$ -	$ 54,840	0.78	$ 42,815	$ 4,710,191
2025	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,149	$ 13,928	$ 25,762	$ -	$ -	$ 54,840	0.77	$ 41,975	$ 4,752,166
2026	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,149	$ 13,928	$ 25,762	$ -	$ -	$ 54,840	0.75	$ 41,152	$ 4,793,318
2027	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,149	$ 13,928	$ 25,762	$ -	$ -	$ 54,840	0.74	$ 40,345	$ 4,833,663
2028	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,149	$ 13,928	$ 25,762	$ -	$ -	$ 54,840	0.72	$ 39,554	$ 4,873,217
2029	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,149	$ 13,928	$ 25,762	$ -	$ -	$ 54,840	0.71	$ 38,778	$ 4,911,995
2030	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,149	$ 13,928	$ 25,762	$ -	$ -	$ 54,840	0.69	$ 38,018	$ 4,950,013
2031	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,149	$ 13,928	$ 25,762	$ -	$ -	$ 54,840	0.68	$ 37,273	$ 4,987,286
2032	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,149	$ 13,928	$ 25,762	$ -	$ -	$ 54,840	0.67	$ 36,542	$ 5,023,828
2033	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,149	$ 13,928	$ 25,762	$ -	$ -	$ 54,840	0.65	$ 35,825	$ 5,059,653
2034	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,149	$ 13,928	$ 25,762	$ -	$ -	$ 54,840	0.64	$ 35,123	$ 5,094,776
2035	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,149	$ 13,928	$ 25,762	$ -	$ -	$ 54,840	0.63	$ 34,434	$ 5,129,210
2036	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,149	$ 13,928	$ 25,762	$ -	$ -	$ 54,840	0.62	$ 33,759	$ 5,162,969
2037	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,149	$ 13,928	$ 25,762	$ -	$ -	$ 54,840	0.60	$ 33,097	$ 5,196,066
2038	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,149	$ 13,928	$ 25,762	$ -	$ -	$ 54,840	0.59	$ 32,448	$ 5,228,514
2039	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,149	$ 13,928	$ 25,762	$ -	$ -	$ 54,840	0.58	$ 31,812	$ 5,260,326
2040	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,149	$ 13,928	$ 25,762	$ -	$ -	$ 54,840	0.57	$ 31,188	$ 5,291,514
2041	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,149	$ 13,928	$ 25,762	$ -	$ -	$ 54,840	0.56	$ 30,577	$ 5,322,091
2042	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,149	$ 13,928	$ 25,762	$ (2,003,646)	$ -	$ (1,948,806)	0.55	$ (1,065,279)	$ 4,256,812
TOTALS	$ -	$ 4,238,482	$ -	$ -	$ 21,738	$ -	$ -	$ 454,472	$ 417,849	$ 772,864	$ (2,003,646)	$ -	$ 3,901,760		$ 4,256,812	$ 4,256,812

NOTES:

Alternative 1 Summary:

Capital Costs	$ 4,260,220
Recurring Costs	$ 1,645,186
Residual Value	$ (2,003,646)
Non Discounted Sum	$ 3,901,760
Cum NPV	$ 4,256,812

Key Assumptions:

Discount Rate	2.00%		Repairs and Maintenance	$ 1.36
Study Period	30	years	Other Operations	$ 2.51
BaseYear	2012		Cleaning per sq. ft.	$ 0.74
Report Output	Constant Dollars		Roads and Grounds	$ 0.51
Cost per sq. ft.	$413		Administrative	$ 1.27
Construction Period (years)	1		BOMA Expense CPI Adjustment	2.16%
Building Size (sq. ft.)	10,251		Effective utitlities per sq. ft.	$ 1.48

Not from BOMA; calculated based on treatment specific energy usage.

Source: BAE Urban Economics, 2012.

Table 15: Schedule of Recurring Expenditures: 061-04 Modernization with AT/FP

Year	Total Annual Expenditures	Electrical			Natural Gas			Water/Sewer (a)					Other
		Total Cost	kWh	$/kWh	Total Cost	MMBtu	$/MMBtu	Total Cost	Water	$/Kgal	Waste	$/Kgal	
2012	$ 15,149	$ 13,578	165,588	$ 0.082	$ -		$ -	$ 1,571					$ -
2013	$ 15,149	$ 13,578	165,588	$ 0.082	$ -		$ -	$ 1,571					$ -
2014	$ 15,149	$ 13,578	165,588	$ 0.082	$ -		$ -	$ 1,571					$ -
2015	$ 15,149	$ 13,578	165,588	$ 0.082	$ -		$ -	$ 1,571					$ -
2016	$ 15,149	$ 13,578	165,588	$ 0.082	$ -		$ -	$ 1,571					$ -
2017	$ 15,149	$ 13,578	165,588	$ 0.082	$ -		$ -	$ 1,571					$ -
2018	$ 15,149	$ 13,578	165,588	$ 0.082	$ -		$ -	$ 1,571					$ -
2019	$ 15,149	$ 13,578	165,588	$ 0.082	$ -		$ -	$ 1,571					$ -
2020	$ 15,149	$ 13,578	165,588	$ 0.082	$ -		$ -	$ 1,571					$ -
2021	$ 15,149	$ 13,578	165,588	$ 0.082	$ -		$ -	$ 1,571					$ -
2022	$ 15,149	$ 13,578	165,588	$ 0.082	$ -		$ -	$ 1,571					$ -
2023	$ 15,149	$ 13,578	165,588	$ 0.082	$ -		$ -	$ 1,571					$ -
2024	$ 15,149	$ 13,578	165,588	$ 0.082	$ -		$ -	$ 1,571					$ -
2025	$ 15,149	$ 13,578	165,588	$ 0.082	$ -		$ -	$ 1,571					$ -
2026	$ 15,149	$ 13,578	165,588	$ 0.082	$ -		$ -	$ 1,571					$ -
2027	$ 15,149	$ 13,578	165,588	$ 0.082	$ -		$ -	$ 1,571					$ -
2028	$ 15,149	$ 13,578	165,588	$ 0.082	$ -		$ -	$ 1,571					$ -
2029	$ 15,149	$ 13,578	165,588	$ 0.082	$ -		$ -	$ 1,571					$ -
2030	$ 15,149	$ 13,578	165,588	$ 0.082	$ -		$ -	$ 1,571					$ -
2031	$ 15,149	$ 13,578	165,588	$ 0.082	$ -		$ -	$ 1,571					$ -
2032	$ 15,149	$ 13,578	165,588	$ 0.082	$ -		$ -	$ 1,571					$ -
2033	$ 15,149	$ 13,578	165,588	$ 0.082	$ -		$ -	$ 1,571					$ -
2034	$ 15,149	$ 13,578	165,588	$ 0.082	$ -		$ -	$ 1,571					$ -
2035	$ 15,149	$ 13,578	165,588	$ 0.082	$ -		$ -	$ 1,571					$ -
2036	$ 15,149	$ 13,578	165,588	$ 0.082	$ -		$ -	$ 1,571					$ -
2037	$ 15,149	$ 13,578	165,588	$ 0.082	$ -		$ -	$ 1,571					$ -
2038	$ 15,149	$ 13,578	165,588	$ 0.082	$ -		$ -	$ 1,571					$ -
2039	$ 15,149	$ 13,578	165,588	$ 0.082	$ -		$ -	$ 1,571					$ -
2040	$ 15,149	$ 13,578	165,588	$ 0.082	$ -		$ -	$ 1,571					$ -
2041	$ 15,149	$ 13,578	165,588	$ 0.082	$ -		$ -	$ 1,571					$ -
2042	$ 15,149	$ 13,578	165,588	$ 0.082	$ -		$ -	$ 1,571					$ -

Notes:

(a) Water and sewer combined and calculated on square foot basis based upon BOMA ERR data.

CPI adjustment factor:	2.16%	bring 2011 BOMA ERR data to 2012 dollars.
Water/sewer utility expense	$0.15	per sq. ft.
Building total sq. ft.	10,251	

Source: BAE Urban Economics, 2012.

Table 16: Depreciation Schedule & Residual Value: SJCA 061-04 Modernization with AT/FP

Period	Depreciation Schedule	Residual Value
2012	$ -	$ -
2013	$ 4,238,482	$ -
2014	$ 4,161,418	$ -
2015	$ 4,084,355	$ -
2016	$ 4,007,292	$ -
2017	$ 3,930,228	$ -
2018	$ 3,853,165	$ -
2019	$ 3,776,102	$ -
2020	$ 3,699,038	$ -
2021	$ 3,621,975	$ -
2022	$ 3,544,912	$ -
2023	$ 3,467,849	$ -
2024	$ 3,390,785	$ -
2025	$ 3,313,722	$ -
2026	$ 3,236,659	$ -
2027	$ 3,159,595	$ -
2028	$ 3,082,532	$ -
2029	$ 3,005,469	$ -
2030	$ 2,928,405	$ -
2031	$ 2,851,342	$ -
2032	$ 2,774,279	$ -
2033	$ 2,697,216	$ -
2034	$ 2,620,152	$ -
2035	$ 2,543,089	$ -
2036	$ 2,466,026	$ -
2037	$ 2,388,962	$ -
2038	$ 2,311,899	$ -
2039	$ 2,234,836	$ -
2040	$ 2,157,772	$ -
2041	$ 2,080,709	$ -
2042	$ 2,003,646	$ 2,003,646

NOTE:
Useful life of asset: 55.0 years

Source: BAE Urban Economics, Inc.

Table 17: South U.S. Urban Consumer Price Index

Year	Index (1982=100)	Annual CPI % Change
1993	140.80	3.15%
1994	144.70	2.77%
1995	149.00	2.97%
1996	153.60	3.09%
1997	156.90	2.15%
1998	158.90	1.27%
1999	162.00	1.95%
2000	167.20	3.21%
2001	171.10	2.33%
2002	173.30	1.29%
2003	177.30	2.31%
2004	181.80	2.54%
2005	188.30	3.58%
2006	194.70	3.40%
2007	200.36	2.91%
2008	208.68	4.15%
2009	207.85	-0.40%
2010	211.34	1.68%
2011	218.62	3.44%
2012	223.34	2.16%
Annual Average 20-years:		**2.5%**
LCCA Assumption:		**0.0%**

Sources: U.S. Department of Labor, Bureau of Labor Statistics;
BAE Urban Economics, Inc. 2012.

Table 18: Discount Rates and Factors

	Discount Factors			
Year	End of Year	Mid-Year	Beginning of Year	Calander Year
1	0.9804	0.9901	1.0000	2012
2	0.9612	0.9707	0.9804	2013
3	0.9423	0.9517	0.9612	2014
4	0.9238	0.9330	0.9423	2015
5	0.9057	0.9147	0.9238	2016
6	0.8880	0.8968	0.9057	2017
7	0.8706	0.8792	0.8880	2018
8	0.8535	0.8620	0.8706	2019
9	0.8368	0.8451	0.8535	2020
10	0.8203	0.8285	0.8368	2021
11	0.8043	0.8123	0.8203	2022
12	0.7885	0.7963	0.8043	2023
13	0.7730	0.7807	0.7885	2024
14	0.7579	0.7654	0.7730	2025
15	0.7430	0.7504	0.7579	2026
16	0.7284	0.7357	0.7430	2027
17	0.7142	0.7213	0.7284	2028
18	0.7002	0.7071	0.7142	2029
19	0.6864	0.6933	0.7002	2030
20	0.6730	0.6797	0.6864	2031
21	0.6598	0.6663	0.6730	2032
22	0.6468	0.6533	0.6598	2033
23	0.6342	0.6405	0.6468	2034
24	0.6217	0.6279	0.6342	2035
25	0.6095	0.6156	0.6217	2036
26	0.5976	0.6035	0.6095	2037
27	0.5859	0.5917	0.5976	2038
28	0.5744	0.5801	0.5859	2039
29	0.5631	0.5687	0.5744	2040
30	0.5521	0.5576	0.5631	2041
31	0.5412	0.5466	0.5521	2042

Notes:

30-Year real discount rate	2.0%
Mid-year factor:	1.0100

Sources: Office of Management and Budget, OMB Circular A-94, Appendix C; BAE Urban Economics, 2012.

Life Cycle Cost Analysis (LCCA) Spreadsheet

St. Juliens Creek Annex, Chesapeake VA

ESTCP SI 0931
LCCA Demonstration

Non-Historic Building 168

Mission: General Administrative Office

Prepared by:
BAE Urban Economics, Inc.

December 2012

Table III-31: Life Cycle Cost Analysis Summary: SJCA 168

Alternative	Non Discounted Costs by Component: Initial Investment	Recurring	Residual Value	Total Costs: Non Discounted	No GHG Factor	Discounted - w/GHG Factor
SJCA 168-01: Status Quo - Sustainment	$ 359,745	$ 1,976,528	$ -	$ 2,336,274	$ 1,810,253	$ 1,911,792
SJCA 168-02: Demolition and New Construction	$ 4,807,667	$ 1,658,285	$ (2,117,113)	$ 4,348,840	$ 4,741,864	$ 4,832,630
SJCA 168-03: Modernization with HPS	$ 3,537,950	$ 1,656,126	$ (1,657,701)	$ 3,536,374	$ 3,753,056	$ 3,827,062
SJCA 168-04: Modernization with AT/FP	$ 3,525,624	$ 1,662,772	$ (1,650,219)	$ 3,538,177	$ 3,751,201	$ 3,826,888

Notes

Study Period (years):	30
Real Discount Rate:	2.00%
Average CO2e Value/MT (undiscounted)	$ 37.27
Base Date:	10/01/12

Source: BAE Urban Economics, 2012.

Table III-32: Greenhouse Gas Valuation Summary: SJCA 168

Alternative	GHG Emissions by Scope (MT CO2e): Scope 1	Scope 2	Scope 3	Total	GHG Value: Non Discounted	Discounted
SJCA 168-01: Status Quo - Sustainment	-	3,877.09	43.93	3,921.02	$ 146,484	$ 101,539
SJCA 168-02: Demolition and New Construction	-	2,206.49	897.60	3,104.09	$ 115,580	$ 90,766
SJCA 168-03: Modernization with HPS	-	2,195.42	476.47	2,671.90	$ 99,620	$ 74,005
SJCA 168-04: Modernization with AT/FP	-	2,206.76	483.36	2,690.11	$ 100,297	$ 75,687

Notes:

Study Period (years):	30
Real Discount Rate:	2.00%
Average CO2e Value/MT (undiscounted)	$ 37.27
Base Date:	10/01/12

Sources: Center for Resource Solutions; BAE Urban Economics, 2012.

Table 3: Alternatives Summary: SJCA 168

	Building GSF		Building Features		Construction Cost	
Project Alternative	**Total**	**Footprint**	**LEED**	**AT/FP**	**Total**	**Per SF**
SJCA 168-01: Sustainment - Status Quo	10,251	10,251	n/a	No	$ 359,745	$ 35
SJCA 168-02: Demolition & New Construction	10,251	10,251	53	Yes	$ 4,807,667	$ 469
SJCA 168-03: Modernization with HPS	10,251	10,251	59	Yes	$ 3,537,950	$ 345
SJCA 168-04: Modernization with AT/FP	10,251	10,251	59	Yes+	$ 3,525,624	$ 344

Note:

+ Current prescriptive practices and treatments.

Sources: Preservation Associates; Center for Resource Solutions; BAE Urban Economics, 2012.

Table 4: Construction Cost Summary: SJCA 168

	Cost Estimate			
Category	**01. Sustainment-Status Quo**	**02. Demolition and New Construction**	**03. Modernization with HPS**	**04. Modernization with AT/FP**
Demolition	$ -	$ 329,160	$ 31,275	$ 34,775
Substructure	$ 66,000	$ 395,787	$ 63,960	$ 127,960
Shell	$ 28,830	$ 961,102	$ 626,067	$ 613,731
Interiors	$ 77,248	$ 267,828	$ 339,650	$ 339,650
Services	$ 85,573	$ 978,953	$ 1,104,111	$ 1,048,060
Sitework	$ -	$ 322,787	$ 273,487	$ 265,633
Special Construction	$ -	$ 10,800	$ 51,636	$ 51,636
Hard cost subtotal	**$ 257,651**	**$ 3,266,417**	**$ 2,490,186**	**$ 2,481,445**
General conditions (25%)	$ 64,413	$ 934,234	$ 633,474	$ 631,267
Security escalation (2%0	$ -	$ 60,490	$ 43,708	$ 43,621
USACE design (6%)	$ 19,324	$ 280,270	$ 190,042	$ 189,380
USACE SOIH (5.7%)	$ 18,358	$ 266,257	$ 180,540	$ 179,911
Soft cost subtotal	**$ 102,094**	**$ 1,541,250**	**$ 1,047,764**	**$ 1,044,178**
Construction cost total	**$ 359,745**	**$ 4,807,667**	**$ 3,537,950**	**$ 3,525,624**
Construction cost PSF	**$ 35**	**$ 469**	**$ 345**	**$ 344**
% Difference from 02	**-93%**	**N/A**	**-26%**	**-27%**

Sources: Preservation Associates; Center for Resource Solutions; BAE Urban Economics, 2012.

Table 5: NPV Calculation 168-01 Sustainment-Status Quo

	One Time							Recurring			Residual Value		Net Present Value			
Mid Year	New Construction	Major Repair	Temporary Facilities	Relocation	Demo	Site Preparation	Environmental Remediation	Utilities	Repairs Maintenance	Other Operations	Building	Land	Undiscounted Sum	NPV Factor	Mid-Year	Cum NPV
2012	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -		$ -	$ -	$ -	0.99	$ -	$ -
2013	$ -	$ 359,745	$ -	$ -	$ -	$ -	$ -	$ 26,194	$ 13,928	$ 25,762	$ -	$ -	$ 425,630	0.97	$ 413,173	$ 413,173
2014	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 26,194	$ 13,928	$ 25,762	$ -	$ -	$ 65,884	0.95	$ 62,702	$ 475,875
2015	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 26,194	$ 13,928	$ 25,762	$ -	$ -	$ 65,884	0.93	$ 61,473	$ 537,347
2016	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 26,194	$ 13,928	$ 25,762	$ -	$ -	$ 65,884	0.91	$ 60,267	$ 597,615
2017	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 26,194	$ 13,928	$ 25,762	$ -	$ -	$ 65,884	0.90	$ 59,085	$ 656,700
2018	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 26,194	$ 13,928	$ 25,762	$ -	$ -	$ 65,884	0.88	$ 57,927	$ 714,627
2019	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 26,194	$ 13,928	$ 25,762	$ -	$ -	$ 65,884	0.86	$ 56,791	$ 771,418
2020	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 26,194	$ 13,928	$ 25,762	$ -	$ -	$ 65,884	0.85	$ 55,678	$ 827,096
2021	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 26,194	$ 13,928	$ 25,762	$ -	$ -	$ 65,884	0.83	$ 54,586	$ 881,682
2022	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 26,194	$ 13,928	$ 25,762	$ -	$ -	$ 65,884	0.81	$ 53,516	$ 935,197
2023	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 26,194	$ 13,928	$ 25,762	$ -	$ -	$ 65,884	0.80	$ 52,466	$ 987,663
2024	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 26,194	$ 13,928	$ 25,762	$ -	$ -	$ 65,884	0.78	$ 51,437	$ 1,039,101
2025	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 26,194	$ 13,928	$ 25,762	$ -	$ -	$ 65,884	0.77	$ 50,429	$ 1,089,530
2026	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 26,194	$ 13,928	$ 25,762	$ -	$ -	$ 65,884	0.75	$ 49,440	$ 1,138,970
2027	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 26,194	$ 13,928	$ 25,762	$ -	$ -	$ 65,884	0.74	$ 48,471	$ 1,187,440
2028	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 26,194	$ 13,928	$ 25,762	$ -	$ -	$ 65,884	0.72	$ 47,520	$ 1,234,961
2029	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 26,194	$ 13,928	$ 25,762	$ -	$ -	$ 65,884	0.71	$ 46,589	$ 1,281,549
2030	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 26,194	$ 13,928	$ 25,762	$ -	$ -	$ 65,884	0.69	$ 45,675	$ 1,327,224
2031	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 26,194	$ 13,928	$ 25,762	$ -	$ -	$ 65,884	0.68	$ 44,779	$ 1,372,004
2032	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 26,194	$ 13,928	$ 25,762	$ -	$ -	$ 65,884	0.67	$ 43,901	$ 1,415,905
2033	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 26,194	$ 13,928	$ 25,762	$ -	$ -	$ 65,884	0.65	$ 43,041	$ 1,458,946
2034	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 26,194	$ 13,928	$ 25,762	$ -	$ -	$ 65,884	0.64	$ 42,197	$ 1,501,142
2035	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 26,194	$ 13,928	$ 25,762	$ -	$ -	$ 65,884	0.63	$ 41,369	$ 1,542,511
2036	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 26,194	$ 13,928	$ 25,762	$ -	$ -	$ 65,884	0.62	$ 40,558	$ 1,583,070
2037	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 26,194	$ 13,928	$ 25,762	$ -	$ -	$ 65,884	0.60	$ 39,763	$ 1,622,832
2038	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 26,194	$ 13,928	$ 25,762	$ -	$ -	$ 65,884	0.59	$ 38,983	$ 1,661,816
2039	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 26,194	$ 13,928	$ 25,762	$ -	$ -	$ 65,884	0.58	$ 38,219	$ 1,700,034
2040	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 26,194	$ 13,928	$ 25,762	$ -	$ -	$ 65,884	0.57	$ 37,469	$ 1,737,504
2041	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 26,194	$ 13,928	$ 25,762	$ -	$ -	$ 65,884	0.56	$ 36,735	$ 1,774,239
2042	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 26,194	$ 13,928	$ 25,762	$ -	$ -	$ 65,884	0.55	$ 36,014	$ 1,810,253
TOTALS	$ -	$ 359,745	$ -	$ -	$ -	$ -	$ -	$ 785,815	$ 417,849	$ 772,864	$ -	$ -	$ 2,336,274		$ 1,810,253	$ 1,810,253

NOTES:

Project Alternative Summary

Capital Costs	$ 359,745
Recurring Costs	$ 1,976,528
Residual Value	$ -
Non Discounted Sum	$ 2,336,274
Cum NPV	$ 1,810,253

Key Assumptions:

Discount Rate	2.00%	
Study Period	30	years
BaseYear	2012	
Report Output	Constant Dollars	
Cost per sq. ft.	$35	
Construction Period (years)	1	
Building Size (sq. ft.)	10,251	

Repairs and Maintenance	$ 1.36	
Other Operations	$ 2.51	
Cleaning per sq. ft.	$ 0.74	
Roads and Grounds	$ 0.51	
Administrative	$ 1.27	
BOMA Expense CPI Adjustment	2.16%	
Effective utitlities per sq. ft.	$ 2.56	Not from BOMA; calculated based on treatment specific energy usage.

Source: BAE Urban Economics, 2012.

Table 6: Schedule of Recurring Expenditures SJCA 168-01 Sustainment-Status Quo

Year	Total Annual Expenditures	Electrical			Natural Gas			Water/Sewer (a)					Other
		Total Cost	kWh	$/kWh	Total Cost	MMBtu	$/MMBtu	Total Cost	Water	$/Kgal	Waste	$/Kgal	
2012	$ 26,194	$ 24,623	300,280	$0.082	$ -		$ -	$ 1,571					$ -
2013	$ 26,194	$ 24,623	300,280	$0.082	$ -		$ -	$ 1,571					$ -
2014	$ 26,194	$ 24,623	300,280	$0.082	$ -		$ -	$ 1,571					$ -
2015	$ 26,194	$ 24,623	300,280	$0.082	$ -		$ -	$ 1,571					$ -
2016	$ 26,194	$ 24,623	300,280	$0.082	$ -		$ -	$ 1,571					$ -
2017	$ 26,194	$ 24,623	300,280	$0.082	$ -		$ -	$ 1,571					$ -
2018	$ 26,194	$ 24,623	300,280	$0.082	$ -		$ -	$ 1,571					$ -
2019	$ 26,194	$ 24,623	300,280	$0.082	$ -		$ -	$ 1,571					$ -
2020	$ 26,194	$ 24,623	300,280	$0.082	$ -		$ -	$ 1,571					$ -
2021	$ 26,194	$ 24,623	300,280	$0.082	$ -		$ -	$ 1,571					$ -
2022	$ 26,194	$ 24,623	300,280	$0.082	$ -		$ -	$ 1,571					$ -
2023	$ 26,194	$ 24,623	300,280	$0.082	$ -		$ -	$ 1,571					$ -
2024	$ 26,194	$ 24,623	300,280	$0.082	$ -		$ -	$ 1,571					$ -
2025	$ 26,194	$ 24,623	300,280	$0.082	$ -		$ -	$ 1,571					$ -
2026	$ 26,194	$ 24,623	300,280	$0.082	$ -		$ -	$ 1,571					$ -
2027	$ 26,194	$ 24,623	300,280	$0.082	$ -		$ -	$ 1,571					$ -
2028	$ 26,194	$ 24,623	300,280	$0.082	$ -		$ -	$ 1,571					$ -
2029	$ 26,194	$ 24,623	300,280	$0.082	$ -		$ -	$ 1,571					$ -
2030	$ 26,194	$ 24,623	300,280	$0.082	$ -		$ -	$ 1,571					$ -
2031	$ 26,194	$ 24,623	300,280	$0.082	$ -		$ -	$ 1,571					$ -
2032	$ 26,194	$ 24,623	300,280	$0.082	$ -		$ -	$ 1,571					$ -
2033	$ 26,194	$ 24,623	300,280	$0.082	$ -		$ -	$ 1,571					$ -
2034	$ 26,194	$ 24,623	300,280	$0.082	$ -		$ -	$ 1,571					$ -
2035	$ 26,194	$ 24,623	300,280	$0.082	$ -		$ -	$ 1,571					$ -
2036	$ 26,194	$ 24,623	300,280	$0.082	$ -		$ -	$ 1,571					$ -
2037	$ 26,194	$ 24,623	300,280	$0.082	$ -		$ -	$ 1,571					$ -
2038	$ 26,194	$ 24,623	300,280	$0.082	$ -		$ -	$ 1,571					$ -
2039	$ 26,194	$ 24,623	300,280	$0.082	$ -		$ -	$ 1,571					$ -
2040	$ 26,194	$ 24,623	300,280	$0.082	$ -		$ -	$ 1,571					$ -
2041	$ 26,194	$ 24,623	300,280	$0.082	$ -		$ -	$ 1,571					$ -
2042	$ 26,194	$ 24,623	300,280	$0.082	$ -		$ -	$ 1,571					$ -

Notes:

(a) Water and sewer combined and calculated on square foot basis based upon BOMA ERR data.

CPI adjustment factor:	2.16%	bring 2011 BOMA ERR data to 2012 dollars.
Water/sewer utility expense	$0.15	per sq. ft.
Building total sq. ft.	10,251	

Source: BAE Urban Economics, 2012.

Table 7: Depreciation Schedule & Residual Value SJCA 168-01: Sustainment-Status Quo

Period	Depreciation Schedule	Residual Value
2012	$ -	$ -
2013	$ 359,745	$ -
2014	$ 335,762	$ -
2015	$ 311,779	$ -
2016	$ 287,796	$ -
2017	$ 263,813	$ -
2018	$ 239,830	$ -
2019	$ 215,847	$ -
2020	$ 191,864	$ -
2021	$ 167,881	$ -
2022	$ 143,898	$ -
2023	$ 119,915	$ -
2024	$ 95,932	$ -
2025	$ 71,949	$ -
2026	$ 47,966	$ -
2027	$ 23,983	$ -
2028	$ -	$ -
2029	$ -	$ -
2030	$ -	$ -
2031	$ -	$ -
2032	$ -	$ -
2033	$ -	$ -
2034	$ -	$ -
2035	$ -	$ -
2036	$ -	$ -
2037	$ -	$ -
2038	$ -	$ -
2039	$ -	$ -
2040	$ -	$ -
2041	$ -	$ -
2042	$ -	$ -

Note:
Useful life of asset: 15.0 years

Source: BAE Urban Economics, Inc. 2012.

Table 8: NPV Calculation 168-02: Demolition and New Construction

	One Time							Recurring			Residual Value		Net Present Value			
Mid Year	New Construction	Major Repair	Temporary Facilities	Relocation	Demo	Site Preparation	Environmental Remediation	Utilities	Repairs	Other Operations	Building	Land	Undiscounted Sum	NPV Factor	Mid-Year	Cum NPV
2012	$ -	$ -	$ -	$ -	$ 329,160	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 329,160	0.99	$ 325,917	$ 325,917
2013	$ -	$ 4,478,508	$ -	$ -	$ -	$ -	$ -	$ 15,586	$ 13,928	$ 25,762	$ -	$ -	$ 4,533,784	0.97	$ 4,401,093	$ 4,727,010
2014	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,586	$ 13,928	$ 25,762	$ -	$ -	$ 55,276	0.95	$ 52,606	$ 4,779,616
2015	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,586	$ 13,928	$ 25,762	$ -	$ -	$ 55,276	0.93	$ 51,575	$ 4,831,191
2016	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,586	$ 13,928	$ 25,762	$ -	$ -	$ 55,276	0.91	$ 50,564	$ 4,881,754
2017	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,586	$ 13,928	$ 25,762	$ -	$ -	$ 55,276	0.90	$ 49,572	$ 4,931,326
2018	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,586	$ 13,928	$ 25,762	$ -	$ -	$ 55,276	0.88	$ 48,600	$ 4,979,926
2019	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,586	$ 13,928	$ 25,762	$ -	$ -	$ 55,276	0.86	$ 47,647	$ 5,027,574
2020	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,586	$ 13,928	$ 25,762	$ -	$ -	$ 55,276	0.85	$ 46,713	$ 5,074,286
2021	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,586	$ 13,928	$ 25,762	$ -	$ -	$ 55,276	0.83	$ 45,797	$ 5,120,083
2022	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,586	$ 13,928	$ 25,762	$ -	$ -	$ 55,276	0.81	$ 44,899	$ 5,164,982
2023	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,586	$ 13,928	$ 25,762	$ -	$ -	$ 55,276	0.80	$ 44,019	$ 5,209,001
2024	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,586	$ 13,928	$ 25,762	$ -	$ -	$ 55,276	0.78	$ 43,155	$ 5,252,156
2025	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,586	$ 13,928	$ 25,762	$ -	$ -	$ 55,276	0.77	$ 42,309	$ 5,294,466
2026	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,586	$ 13,928	$ 25,762	$ -	$ -	$ 55,276	0.75	$ 41,480	$ 5,335,945
2027	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,586	$ 13,928	$ 25,762	$ -	$ -	$ 55,276	0.74	$ 40,666	$ 5,376,612
2028	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,586	$ 13,928	$ 25,762	$ -	$ -	$ 55,276	0.72	$ 39,869	$ 5,416,481
2029	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,586	$ 13,928	$ 25,762	$ -	$ -	$ 55,276	0.71	$ 39,087	$ 5,455,568
2030	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,586	$ 13,928	$ 25,762	$ -	$ -	$ 55,276	0.69	$ 38,321	$ 5,493,889
2031	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,586	$ 13,928	$ 25,762	$ -	$ -	$ 55,276	0.68	$ 37,569	$ 5,531,458
2032	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,586	$ 13,928	$ 25,762	$ -	$ -	$ 55,276	0.67	$ 36,833	$ 5,568,291
2033	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,586	$ 13,928	$ 25,762	$ -	$ -	$ 55,276	0.65	$ 36,111	$ 5,604,402
2034	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,586	$ 13,928	$ 25,762	$ -	$ -	$ 55,276	0.64	$ 35,403	$ 5,639,804
2035	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,586	$ 13,928	$ 25,762	$ -	$ -	$ 55,276	0.63	$ 34,708	$ 5,674,512
2036	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,586	$ 13,928	$ 25,762	$ -	$ -	$ 55,276	0.62	$ 34,028	$ 5,708,540
2037	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,586	$ 13,928	$ 25,762	$ -	$ -	$ 55,276	0.60	$ 33,361	$ 5,741,901
2038	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,586	$ 13,928	$ 25,762	$ -	$ -	$ 55,276	0.59	$ 32,706	$ 5,774,607
2039	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,586	$ 13,928	$ 25,762	$ -	$ -	$ 55,276	0.58	$ 32,065	$ 5,806,672
2040	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,586	$ 13,928	$ 25,762	$ -	$ -	$ 55,276	0.57	$ 31,436	$ 5,838,109
2041	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,586	$ 13,928	$ 25,762	$ -	$ -	$ 55,276	0.56	$ 30,820	$ 5,868,929
2042	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,586	$ 13,928	$ 25,762	$ (2,117,113)	$ -	$ (2,061,837)	0.55	$ (1,127,065)	$ 4,741,864
TOTALS	$ -	$ 4,478,508	$ -	$ -	$ 329,160	$ -	$ -	$ 467,572	$ 417,849	$ 772,864	$ (2,117,113)	$ -	$ 4,348,840		$ 4,741,864	$ 4,741,864

Notes:

Project Alternative Summary

Capital Costs	$ 4,807,667
Recurring Costs	$ 1,658,285
Residual Value	$ (2,117,113)
Non Discounted Sum	$ 4,348,840
Cum NPV	$ 4,741,864

Key Assumptions:

Discount Rate	2.00%		Repairs and Maintenance	$ 1.36
Study Period	25	years	Other Operations	$ 2.51
BaseYear	2012		Cleaning per sq. ft.	$ 0.74
Report Output	Constant Dollars		Roads and Grounds	$ 0.51
Cost per sq. ft.	$437		Administrative	$ 1.27
Construction Period (years)	1		BOMA Expense CPI Adjustment	2.16%
Building Size (sq. ft.)	10,251		Effective utitlities per sq. ft.	$ 1.52

Not from BOMA; calculated based on treatment specific energy usag

Source: BAE Urban Economics, 2012.

Table 9: Schedule of Recurring Expenditures: SJCA 168-02 Demolition and New Construction

Year	Total Annual Expenditures	Electrical			Natural Gas			Water/Sewer (a)					Other
		Total Cost	kWh	$/kWh	Total Cost	MMBtu	$/MMBtu	Total Cost	Water	$/Kgal	Waste	$/Kgal	
2012	$ 15,586	$ 14,015	170,913	$ 0.082	$ -		$ -	$ 1,571					$ -
2013	$ 15,586	$ 14,015	170,913	$ 0.082	$ -		$ -	$ 1,571					$ -
2014	$ 15,586	$ 14,015	170,913	$ 0.082	$ -		$ -	$ 1,571					$ -
2015	$ 15,586	$ 14,015	170,913	$ 0.082	$ -		$ -	$ 1,571					$ -
2016	$ 15,586	$ 14,015	170,913	$ 0.082	$ -		$ -	$ 1,571					$ -
2017	$ 15,586	$ 14,015	170,913	$ 0.082	$ -		$ -	$ 1,571					$ -
2018	$ 15,586	$ 14,015	170,913	$ 0.082	$ -		$ -	$ 1,571					$ -
2019	$ 15,586	$ 14,015	170,913	$ 0.082	$ -		$ -	$ 1,571					$ -
2020	$ 15,586	$ 14,015	170,913	$ 0.082	$ -		$ -	$ 1,571					$ -
2021	$ 15,586	$ 14,015	170,913	$ 0.082	$ -		$ -	$ 1,571					$ -
2022	$ 15,586	$ 14,015	170,913	$ 0.082	$ -		$ -	$ 1,571					$ -
2023	$ 15,586	$ 14,015	170,913	$ 0.082	$ -		$ -	$ 1,571					$ -
2024	$ 15,586	$ 14,015	170,913	$ 0.082	$ -		$ -	$ 1,571					$ -
2025	$ 15,586	$ 14,015	170,913	$ 0.082	$ -		$ -	$ 1,571					$ -
2026	$ 15,586	$ 14,015	170,913	$ 0.082	$ -		$ -	$ 1,571					$ -
2027	$ 15,586	$ 14,015	170,913	$ 0.082	$ -		$ -	$ 1,571					$ -
2028	$ 15,586	$ 14,015	170,913	$ 0.082	$ -		$ -	$ 1,571					$ -
2029	$ 15,586	$ 14,015	170,913	$ 0.082	$ -		$ -	$ 1,571					$ -
2030	$ 15,586	$ 14,015	170,913	$ 0.082	$ -		$ -	$ 1,571					$ -
2031	$ 15,586	$ 14,015	170,913	$ 0.082	$ -		$ -	$ 1,571					$ -
2032	$ 15,586	$ 14,015	170,913	$ 0.082	$ -		$ -	$ 1,571					$ -
2033	$ 15,586	$ 14,015	170,913	$ 0.082	$ -		$ -	$ 1,571					$ -
2034	$ 15,586	$ 14,015	170,913	$ 0.082	$ -		$ -	$ 1,571					$ -
2035	$ 15,586	$ 14,015	170,913	$ 0.082	$ -		$ -	$ 1,571					$ -
2036	$ 15,586	$ 14,015	170,913	$ 0.082	$ -		$ -	$ 1,571					$ -
2037	$ 15,586	$ 14,015	170,913	$ 0.082	$ -		$ -	$ 1,571					$ -
2038	$ 15,586	$ 14,015	170,913	$ 0.082	$ -		$ -	$ 1,571					$ -
2039	$ 15,586	$ 14,015	170,913	$ 0.082	$ -		$ -	$ 1,571					$ -
2040	$ 15,586	$ 14,015	170,913	$ 0.082	$ -		$ -	$ 1,571					$ -
2041	$ 15,586	$ 14,015	170,913	$ 0.082	$ -		$ -	$ 1,571					$ -
2042	$ 15,586	$ 14,015	170,913	$ 0.082	$ -		$ -	$ 1,571					$ -

Notes:

(a) Water and sewer combined and calculated on square foot basis based upon BOMA ERR data.

CPI adjustment factor:	2.16%	bring 2011 BOMA ERR data to 2012 dollars.
Water/sewer utility expense	$0.15	per sq. ft.
Building total sq. ft.	10,251	

Source: BAE Urban Economics, 2012.

Table 10: Depreciation Schedule & Residual Value: SJCA 168-02 Demolition and New Construction

Period	Depreciation Schedule	Residual Value
2012	$ -	$ -
2013	$ 4,478,508	$ -
2014	$ 4,397,080	$ -
2015	$ 4,315,653	$ -
2016	$ 4,234,225	$ -
2017	$ 4,152,798	$ -
2018	$ 4,071,371	$ -
2019	$ 3,989,943	$ -
2020	$ 3,908,516	$ -
2021	$ 3,827,088	$ -
2022	$ 3,745,661	$ -
2023	$ 3,664,234	$ -
2024	$ 3,582,806	$ -
2025	$ 3,501,379	$ -
2026	$ 3,419,951	$ -
2027	$ 3,338,524	$ -
2028	$ 3,257,096	$ -
2029	$ 3,175,669	$ -
2030	$ 3,094,242	$ -
2031	$ 3,012,814	$ -
2032	$ 2,931,387	$ -
2033	$ 2,849,959	$ -
2034	$ 2,768,532	$ -
2035	$ 2,687,105	$ -
2036	$ 2,605,677	$ -
2037	$ 2,524,250	$ -
2038	$ 2,442,822	$ -
2039	$ 2,361,395	$ -
2040	$ 2,279,968	$ -
2041	$ 2,198,540	$ -
2042	$ 2,117,113	$ 2,117,113

Note:

Useful life of asset: 55.0 years

Source: BAE Urban Economics, Inc. 2012.

Table 11: NPV Calculation 168-03: Modernization with HPS

	One Time							Recurring			Residual Value		Net Present Value			
Mid Year	New Construction	Major Repair	Temporary Facilities	Relocation	Demo	Site Preparation	Environmental Remediation	Utilities	Repairs Maintenance	Other Operations	Building	Land	Undiscounted Sum	NPV Factor	Mid-Year	Cum NPV
2012	$ -	$ -	$ -	$ -	$ 31,275	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 31,275	0.99	$ 30,967	$ 30,967
2013	$ -	$ 3,506,674	$ -	$ -	$ -	$ -	$ -	$ 15,514	$ 13,928	$ 25,762	$ -	$ -	$ 3,561,879	0.97	$ 3,457,633	$ 3,488,600
2014	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,514	$ 13,928	$ 25,762	$ -	$ -	$ 55,204	0.95	$ 52,538	$ 3,541,138
2015	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,514	$ 13,928	$ 25,762	$ -	$ -	$ 55,204	0.93	$ 51,508	$ 3,592,645
2016	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,514	$ 13,928	$ 25,762	$ -	$ -	$ 55,204	0.91	$ 50,498	$ 3,643,143
2017	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,514	$ 13,928	$ 25,762	$ -	$ -	$ 55,204	0.90	$ 49,508	$ 3,692,650
2018	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,514	$ 13,928	$ 25,762	$ -	$ -	$ 55,204	0.88	$ 48,537	$ 3,741,187
2019	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,514	$ 13,928	$ 25,762	$ -	$ -	$ 55,204	0.86	$ 47,585	$ 3,788,772
2020	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,514	$ 13,928	$ 25,762	$ -	$ -	$ 55,204	0.85	$ 46,652	$ 3,835,424
2021	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,514	$ 13,928	$ 25,762	$ -	$ -	$ 55,204	0.83	$ 45,737	$ 3,881,161
2022	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,514	$ 13,928	$ 25,762	$ -	$ -	$ 55,204	0.81	$ 44,840	$ 3,926,002
2023	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,514	$ 13,928	$ 25,762	$ -	$ -	$ 55,204	0.80	$ 43,961	$ 3,969,963
2024	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,514	$ 13,928	$ 25,762	$ -	$ -	$ 55,204	0.78	$ 43,099	$ 4,013,062
2025	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,514	$ 13,928	$ 25,762	$ -	$ -	$ 55,204	0.77	$ 42,254	$ 4,055,317
2026	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,514	$ 13,928	$ 25,762	$ -	$ -	$ 55,204	0.75	$ 41,426	$ 4,096,742
2027	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,514	$ 13,928	$ 25,762	$ -	$ -	$ 55,204	0.74	$ 40,613	$ 4,137,356
2028	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,514	$ 13,928	$ 25,762	$ -	$ -	$ 55,204	0.72	$ 39,817	$ 4,177,173
2029	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,514	$ 13,928	$ 25,762	$ -	$ -	$ 55,204	0.71	$ 39,036	$ 4,216,209
2030	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,514	$ 13,928	$ 25,762	$ -	$ -	$ 55,204	0.69	$ 38,271	$ 4,254,480
2031	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,514	$ 13,928	$ 25,762	$ -	$ -	$ 55,204	0.68	$ 37,521	$ 4,292,000
2032	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,514	$ 13,928	$ 25,762	$ -	$ -	$ 55,204	0.67	$ 36,785	$ 4,328,785
2033	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,514	$ 13,928	$ 25,762	$ -	$ -	$ 55,204	0.65	$ 36,064	$ 4,364,849
2034	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,514	$ 13,928	$ 25,762	$ -	$ -	$ 55,204	0.64	$ 35,356	$ 4,400,205
2035	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,514	$ 13,928	$ 25,762	$ -	$ -	$ 55,204	0.63	$ 34,663	$ 4,434,868
2036	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,514	$ 13,928	$ 25,762	$ -	$ -	$ 55,204	0.62	$ 33,983	$ 4,468,852
2037	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,514	$ 13,928	$ 25,762	$ -	$ -	$ 55,204	0.60	$ 33,317	$ 4,502,169
2038	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,514	$ 13,928	$ 25,762	$ -	$ -	$ 55,204	0.59	$ 32,664	$ 4,534,833
2039	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,514	$ 13,928	$ 25,762	$ -	$ -	$ 55,204	0.58	$ 32,023	$ 4,566,856
2040	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,514	$ 13,928	$ 25,762	$ -	$ -	$ 55,204	0.57	$ 31,395	$ 4,598,252
2041	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,514	$ 13,928	$ 25,762	$ -	$ -	$ 55,204	0.56	$ 30,780	$ 4,629,032
2042	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,514	$ 13,928	$ 25,762	$ (1,657,701)	$ -	$ (1,602,496)	0.55	$ (875,975)	$ 3,753,056
TOTALS	$ -	$ 3,506,674	$ -	$ -	$ 31,275	$ -	$ -	$ 465,412	$ 417,849	$ 772,864	$ (1,657,701)	$ -	$ 3,536,374		$ 3,753,056	$ 3,753,056

Notes:

Project Alternative Summary

Capital Costs	$ 3,537,950
Recurring Costs	$ 1,656,126
Residual Value	$ (1,657,701)
Non Discounted Sum	$ 3,536,374
Cum NPV	$ 3,753,056

Key Assumptions:

Discount Rate	2.00%	
Study Period	25	years
BaseYear	2007	
Report Output	Constant Dollars	
Cost per sq. ft.	$342	
Construction Period (years)	1	
Building Size (sq. ft.)	10,251	

Repairs and Maintenance	$ 1.36	
Other Operations	$ 2.51	
Cleaning per sq. ft.	$ 0.74	
Roads and Grounds	$ 0.51	
Administrative	$ 1.27	
BOMA Expense CPI Adjustment	2.16%	
Effective utitlities per sq. ft.	$ 1.51	Not from BOMA; calculated based on treatment specific energy usage

Source: BAE Urban Economics, 2012.

Table 12: Schedule of Recurring Expenditures: 168-03 Modernization with HPS

Year	Total Annual Expenditures	Electrical			Natural Gas			Water/Sewer (a)					Other
		Total Cost	kWh	$/kWh	Total Cost	MMBtu	$/MMBtu	Total Cost	Water	$/Kgal	Waste	$/Kgal	
2012	$ 15,514	$ 13,943	170,035	$ 0.082	$ -		$ -	$ 1,571					$ -
2013	$ 15,514	$ 13,943	170,035	$ 0.082	$ -		$ -	$ 1,571					$ -
2014	$ 15,514	$ 13,943	170,035	$ 0.082	$ -		$ -	$ 1,571					$ -
2015	$ 15,514	$ 13,943	170,035	$ 0.082	$ -		$ -	$ 1,571					$ -
2016	$ 15,514	$ 13,943	170,035	$ 0.082	$ -		$ -	$ 1,571					$ -
2017	$ 15,514	$ 13,943	170,035	$ 0.082	$ -		$ -	$ 1,571					$ -
2018	$ 15,514	$ 13,943	170,035	$ 0.082	$ -		$ -	$ 1,571					$ -
2019	$ 15,514	$ 13,943	170,035	$ 0.082	$ -		$ -	$ 1,571					$ -
2020	$ 15,514	$ 13,943	170,035	$ 0.082	$ -		$ -	$ 1,571					$ -
2021	$ 15,514	$ 13,943	170,035	$ 0.082	$ -		$ -	$ 1,571					$ -
2022	$ 15,514	$ 13,943	170,035	$ 0.082	$ -		$ -	$ 1,571					$ -
2023	$ 15,514	$ 13,943	170,035	$ 0.082	$ -		$ -	$ 1,571					$ -
2024	$ 15,514	$ 13,943	170,035	$ 0.082	$ -		$ -	$ 1,571					$ -
2025	$ 15,514	$ 13,943	170,035	$ 0.082	$ -		$ -	$ 1,571					$ -
2026	$ 15,514	$ 13,943	170,035	$ 0.082	$ -		$ -	$ 1,571					$ -
2027	$ 15,514	$ 13,943	170,035	$ 0.082	$ -		$ -	$ 1,571					$ -
2028	$ 15,514	$ 13,943	170,035	$ 0.082	$ -		$ -	$ 1,571					$ -
2029	$ 15,514	$ 13,943	170,035	$ 0.082	$ -		$ -	$ 1,571					$ -
2030	$ 15,514	$ 13,943	170,035	$ 0.082	$ -		$ -	$ 1,571					$ -
2031	$ 15,514	$ 13,943	170,035	$ 0.082	$ -		$ -	$ 1,571					$ -
2032	$ 15,514	$ 13,943	170,035	$ 0.082	$ -		$ -	$ 1,571					$ -
2033	$ 15,514	$ 13,943	170,035	$ 0.082	$ -		$ -	$ 1,571					$ -
2034	$ 15,514	$ 13,943	170,035	$ 0.082	$ -		$ -	$ 1,571					$ -
2035	$ 15,514	$ 13,943	170,035	$ 0.082	$ -		$ -	$ 1,571					$ -
2036	$ 15,514	$ 13,943	170,035	$ 0.082	$ -		$ -	$ 1,571					$ -
2037	$ 15,514	$ 13,943	170,035	$ 0.082	$ -		$ -	$ 1,571					$ -
2038	$ 15,514	$ 13,943	170,035	$ 0.082	$ -		$ -	$ 1,571					$ -
2039	$ 15,514	$ 13,943	170,035	$ 0.082	$ -		$ -	$ 1,571					$ -
2040	$ 15,514	$ 13,943	170,035	$ 0.082	$ -		$ -	$ 1,571					$ -
2041	$ 15,514	$ 13,943	170,035	$ 0.082	$ -		$ -	$ 1,571					$ -
2042	$ 15,514	$ 13,943	170,035	$ 0.082	$ -		$ -	$ 1,571					$ -

Notes:

(a) Water and sewer combined and calculated on square foot basis based upon BOMA ERR data.

CPI adjustment factor:	2.16%	bring 2011 BOMA ERR data to 2012 dollars.
Water/sewer utility expense	$0.15	per sq. ft.
Building total sq. ft.	10,251	

Source: BAE Urban Economics, 2012.

Table 13: Depreciation Schedule & Residual Value: SJCA 168-03 Modernization with HPS

Period	Depreciation Schedule	Residual Value
2012	$ -	$ -
2013	$ 3,506,674	$ -
2014	$ 3,442,917	$ -
2015	$ 3,379,159	$ -
2016	$ 3,315,401	$ -
2017	$ 3,251,644	$ -
2018	$ 3,187,886	$ -
2019	$ 3,124,128	$ -
2020	$ 3,060,370	$ -
2021	$ 2,996,613	$ -
2022	$ 2,932,855	$ -
2023	$ 2,869,097	$ -
2024	$ 2,805,340	$ -
2025	$ 2,741,582	$ -
2026	$ 2,677,824	$ -
2027	$ 2,614,066	$ -
2028	$ 2,550,309	$ -
2029	$ 2,486,551	$ -
2030	$ 2,422,793	$ -
2031	$ 2,359,036	$ -
2032	$ 2,295,278	$ -
2033	$ 2,231,520	$ -
2034	$ 2,167,762	$ -
2035	$ 2,104,005	$ -
2036	$ 2,040,247	$ -
2037	$ 1,976,489	$ -
2038	$ 1,912,732	$ -
2039	$ 1,848,974	$ -
2040	$ 1,785,216	$ -
2041	$ 1,721,458	$ -
2042	$ 1,657,701	$ 1,657,701

Note:

Useful life of asset: 55.0 years

Source: BAE Urban Economics, Inc. 2012.

Table 14: NPV Calculation 061-04: Modernization with AT/FP

	One Time							Recurring			Residual Value		Net Present Value			
Mid Year	New Construction	Major Repair	Temporary Facilities	Relocation	Demo	Site Preparation	Environmental Remediation	Utilities	Repairs Maintenance	Other Operations	Building	Land	Undiscounted Sum	NPV Factor	Mid-Year	Cum NPV
2012	$ -	$ -	$ -	$ -	$ 34,775	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 34,775	0.99	$ 34,433	$ 34,433
2013	$ -	$ 3,490,848	$ -	$ -	$ -	$ -	$ -	$ 15,586	$ 13,928	$ 30,249	$ -	$ -	$ 3,550,612	0.97	$ 3,446,696	$ 3,481,128
2014	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,586	$ 13,928	$ 25,762	$ -	$ -	$ 55,276	0.95	$ 52,606	$ 3,533,734
2015	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,586	$ 13,928	$ 25,762	$ -	$ -	$ 55,276	0.93	$ 51,575	$ 3,585,309
2016	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,586	$ 13,928	$ 25,762	$ -	$ -	$ 55,276	0.91	$ 50,564	$ 3,635,873
2017	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,586	$ 13,928	$ 25,762	$ -	$ -	$ 55,276	0.90	$ 49,572	$ 3,685,445
2018	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,586	$ 13,928	$ 25,762	$ -	$ -	$ 55,276	0.88	$ 48,600	$ 3,734,045
2019	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,586	$ 13,928	$ 25,762	$ -	$ -	$ 55,276	0.86	$ 47,647	$ 3,781,692
2020	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,586	$ 13,928	$ 25,762	$ -	$ -	$ 55,276	0.85	$ 46,713	$ 3,828,405
2021	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,586	$ 13,928	$ 25,762	$ -	$ -	$ 55,276	0.83	$ 45,797	$ 3,874,202
2022	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,586	$ 13,928	$ 25,762	$ -	$ -	$ 55,276	0.81	$ 44,899	$ 3,919,101
2023	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,586	$ 13,928	$ 25,762	$ -	$ -	$ 55,276	0.80	$ 44,019	$ 3,963,119
2024	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,586	$ 13,928	$ 25,762	$ -	$ -	$ 55,276	0.78	$ 43,155	$ 4,006,275
2025	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,586	$ 13,928	$ 25,762	$ -	$ -	$ 55,276	0.77	$ 42,309	$ 4,048,584
2026	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,586	$ 13,928	$ 25,762	$ -	$ -	$ 55,276	0.75	$ 41,480	$ 4,090,064
2027	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,586	$ 13,928	$ 25,762	$ -	$ -	$ 55,276	0.74	$ 40,666	$ 4,130,730
2028	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,586	$ 13,928	$ 25,762	$ -	$ -	$ 55,276	0.72	$ 39,869	$ 4,170,599
2029	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,586	$ 13,928	$ 25,762	$ -	$ -	$ 55,276	0.71	$ 39,087	$ 4,209,686
2030	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,586	$ 13,928	$ 25,762	$ -	$ -	$ 55,276	0.69	$ 38,321	$ 4,248,007
2031	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,586	$ 13,928	$ 25,762	$ -	$ -	$ 55,276	0.68	$ 37,569	$ 4,285,577
2032	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,586	$ 13,928	$ 25,762	$ -	$ -	$ 55,276	0.67	$ 36,833	$ 4,322,409
2033	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,586	$ 13,928	$ 25,762	$ -	$ -	$ 55,276	0.65	$ 36,111	$ 4,358,520
2034	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,586	$ 13,928	$ 25,762	$ -	$ -	$ 55,276	0.64	$ 35,403	$ 4,393,922
2035	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,586	$ 13,928	$ 25,762	$ -	$ -	$ 55,276	0.63	$ 34,708	$ 4,428,631
2036	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,586	$ 13,928	$ 25,762	$ -	$ -	$ 55,276	0.62	$ 34,028	$ 4,462,659
2037	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,586	$ 13,928	$ 25,762	$ -	$ -	$ 55,276	0.60	$ 33,361	$ 4,496,019
2038	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,586	$ 13,928	$ 25,762	$ -	$ -	$ 55,276	0.59	$ 32,706	$ 4,528,726
2039	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,586	$ 13,928	$ 25,762	$ -	$ -	$ 55,276	0.58	$ 32,065	$ 4,560,791
2040	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,586	$ 13,928	$ 25,762	$ -	$ -	$ 55,276	0.57	$ 31,436	$ 4,592,227
2041	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,586	$ 13,928	$ 25,762	$ -	$ -	$ 55,276	0.56	$ 30,820	$ 4,623,047
2042	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,586	$ 13,928	$ 25,762	$ (1,650,219)	$ -	$ (1,594,943)	0.55	$ (871,846)	$ 3,751,201
TOTALS	$ -	$ 3,490,848	$ -	$ -	$ 34,775	$ -	$ -	$ 467,572	$ 417,849	$ 777,351	$ (1,650,219)	$ -	$ 3,538,177		$ 3,751,201	$ 3,751,201

Notes

Project Alternative Summary

Capital Costs	$ 3,525,624
Recurring Costs	$ 1,662,772
Residual Value	$ (1,650,219)
Non Discounted Sum	$ 3,538,177
Cum NPV	$ 3,751,201

Key Assumptions:

Discount Rate	2.00%	Repairs and Maintenance	$ 1.36
Study Period	25 years	Other Operations	$ 2.51
BaseYear	2007	Cleaning per sq. ft.	$ 0.74
Report Output	Constant Dollars	Roads and Grounds	$ 0.51
Cost per sq. ft.	$341	Administrative	$ 1.27
Construction Period (years)	1	BOMA Expense CPI Adjustment	2.16%
Building Size (sq. ft.)	10,251	Effective utitlities per sq. ft.	$ 1.52

Not from BOMA; calculated based on treatment specific energy usage

Source: BAE Urban Economics, 2012.

Table 15: Schedule of Recurring Expenditures: 168-04 Modernization with AT/FP

Year	Total Annual Expenditures	Electrical			Natural Gas			Water/Sewer (a)					Other
		Total Cost	kWh	$/kWh	Total Cost	MMBtu	$/MMBtu	Total Cost	Water	$/Kgal	Waste	$/Kgal	
2012	$ 15,586	$ 14,015	170,913	$ 0.082	$ -		$ -	$ 1,571					$ -
2013	$ 15,586	$ 14,015	170,913	$ 0.082	$ -		$ -	$ 1,571					$ -
2014	$ 15,586	$ 14,015	170,913	$ 0.082	$ -		$ -	$ 1,571					$ -
2015	$ 15,586	$ 14,015	170,913	$ 0.082	$ -		$ -	$ 1,571					$ -
2016	$ 15,586	$ 14,015	170,913	$ 0.082	$ -		$ -	$ 1,571					$ -
2017	$ 15,586	$ 14,015	170,913	$ 0.082	$ -		$ -	$ 1,571					$ -
2018	$ 15,586	$ 14,015	170,913	$ 0.082	$ -		$ -	$ 1,571					$ -
2019	$ 15,586	$ 14,015	170,913	$ 0.082	$ -		$ -	$ 1,571					$ -
2020	$ 15,586	$ 14,015	170,913	$ 0.082	$ -		$ -	$ 1,571					$ -
2021	$ 15,586	$ 14,015	170,913	$ 0.082	$ -		$ -	$ 1,571					$ -
2022	$ 15,586	$ 14,015	170,913	$ 0.082	$ -		$ -	$ 1,571					$ -
2023	$ 15,586	$ 14,015	170,913	$ 0.082	$ -		$ -	$ 1,571					$ -
2024	$ 15,586	$ 14,015	170,913	$ 0.082	$ -		$ -	$ 1,571					$ -
2025	$ 15,586	$ 14,015	170,913	$ 0.082	$ -		$ -	$ 1,571					$ -
2026	$ 15,586	$ 14,015	170,913	$ 0.082	$ -		$ -	$ 1,571					$ -
2027	$ 15,586	$ 14,015	170,913	$ 0.082	$ -		$ -	$ 1,571					$ -
2028	$ 15,586	$ 14,015	170,913	$ 0.082	$ -		$ -	$ 1,571					$ -
2029	$ 15,586	$ 14,015	170,913	$ 0.082	$ -		$ -	$ 1,571					$ -
2030	$ 15,586	$ 14,015	170,913	$ 0.082	$ -		$ -	$ 1,571					$ -
2031	$ 15,586	$ 14,015	170,913	$ 0.082	$ -		$ -	$ 1,571					$ -
2032	$ 15,586	$ 14,015	170,913	$ 0.082	$ -		$ -	$ 1,571					$ -
2033	$ 15,586	$ 14,015	170,913	$ 0.082	$ -		$ -	$ 1,571					$ -
2034	$ 15,586	$ 14,015	170,913	$ 0.082	$ -		$ -	$ 1,571					$ -
2035	$ 15,586	$ 14,015	170,913	$ 0.082	$ -		$ -	$ 1,571					$ -
2036	$ 15,586	$ 14,015	170,913	$ 0.082	$ -		$ -	$ 1,571					$ -
2037	$ 15,586	$ 14,015	170,913	$ 0.082	$ -		$ -	$ 1,571					$ -
2038	$ 15,586	$ 14,015	170,913	$ 0.082	$ -		$ -	$ 1,571					$ -
2039	$ 15,586	$ 14,015	170,913	$ 0.082	$ -		$ -	$ 1,571					$ -
2040	$ 15,586	$ 14,015	170,913	$ 0.082	$ -		$ -	$ 1,571					$ -
2041	$ 15,586	$ 14,015	170,913	$ 0.082	$ -		$ -	$ 1,571					$ -
2042	$ 15,586	$ 14,015	170,913	$ 0.082	$ -		$ -	$ 1,571					$ -

Notes:

(a) Water and sewer combined and calculated on square foot basis based upon BOMA ERR data.

CPI adjustment factor:	2.16%	bring 2011 BOMA ERR data to 2012 dollars.
Water/sewer utility expense	$0.15	per sq. ft.
Building total sq. ft.	10,251	

Source: BAE Urban Economics, 2012.

Table 16: Depreciation Schedule & Residual Value: SJCA 168-04 Modernization with AT/FP

Period	Depreciation Schedule	Residual Value
2012	$ -	$ -
2013	$ 3,490,848	$ -
2014	$ 3,427,379	$ -
2015	$ 3,363,909	$ -
2016	$ 3,300,439	$ -
2017	$ 3,236,969	$ -
2018	$ 3,173,499	$ -
2019	$ 3,110,029	$ -
2020	$ 3,046,559	$ -
2021	$ 2,983,089	$ -
2022	$ 2,919,619	$ -
2023	$ 2,856,149	$ -
2024	$ 2,792,679	$ -
2025	$ 2,729,209	$ -
2026	$ 2,665,739	$ -
2027	$ 2,602,269	$ -
2028	$ 2,538,799	$ -
2029	$ 2,475,329	$ -
2030	$ 2,411,859	$ -
2031	$ 2,348,389	$ -
2032	$ 2,284,919	$ -
2033	$ 2,221,449	$ -
2034	$ 2,157,979	$ -
2035	$ 2,094,509	$ -
2036	$ 2,031,039	$ -
2037	$ 1,967,569	$ -
2038	$ 1,904,099	$ -
2039	$ 1,840,629	$ -
2040	$ 1,777,159	$ -
2041	$ 1,713,689	$ -
2042	$ 1,650,219	$ 1,650,219

Note:

Useful life of asset: 55.0 years

Source: BAE Urban Economics, Inc. 2012.

Table 17: South U.S. Urban Consumer Price Index

Year	Index (1982=100)	Annual CPI % Change
1993	140.80	3.15%
1994	144.70	2.77%
1995	149.00	2.97%
1996	153.60	3.09%
1997	156.90	2.15%
1998	158.90	1.27%
1999	162.00	1.95%
2000	167.20	3.21%
2001	171.10	2.33%
2002	173.30	1.29%
2003	177.30	2.31%
2004	181.80	2.54%
2005	188.30	3.58%
2006	194.70	3.40%
2007	200.36	2.91%
2008	208.68	4.15%
2009	207.85	-0.40%
2010	211.34	1.68%
2011	218.62	3.44%
2012	223.34	2.16%
Annual Average 20-years:		**2.5%**
LCCA Assumption:		**0.0%**

Source: U.S. Department of Labor, Bureau of Labor Statistics; BAE Urban Economics, Inc. 2012.

Table 18: Discount Rates and Factors

	Discount Factors			
Year	End of Year	Mid-Year	Beginning of Year	Calander Year
1	0.9804	0.9901	1.0000	2012
2	0.9612	0.9707	0.9804	2013
3	0.9423	0.9517	0.9612	2014
4	0.9238	0.9330	0.9423	2015
5	0.9057	0.9147	0.9238	2016
6	0.8880	0.8968	0.9057	2017
7	0.8706	0.8792	0.8880	2018
8	0.8535	0.8620	0.8706	2019
9	0.8368	0.8451	0.8535	2020
10	0.8203	0.8285	0.8368	2021
11	0.8043	0.8123	0.8203	2022
12	0.7885	0.7963	0.8043	2023
13	0.7730	0.7807	0.7885	2024
14	0.7579	0.7654	0.7730	2025
15	0.7430	0.7504	0.7579	2026
16	0.7284	0.7357	0.7430	2027
17	0.7142	0.7213	0.7284	2028
18	0.7002	0.7071	0.7142	2029
19	0.6864	0.6933	0.7002	2030
20	0.6730	0.6797	0.6864	2031
21	0.6598	0.6663	0.6730	2032
22	0.6468	0.6533	0.6598	2033
23	0.6342	0.6405	0.6468	2034
24	0.6217	0.6279	0.6342	2035
25	0.6095	0.6156	0.6217	2036
26	0.5976	0.6035	0.6095	2037
27	0.5859	0.5917	0.5976	2038
28	0.5744	0.5801	0.5859	2039
29	0.5631	0.5687	0.5744	2040
30	0.5521	0.5576	0.5631	2041
31	0.5412	0.5466	0.5521	2042

Notes:

30-Year real discount rate	2.0%
Mid-year factor:	1.0100

Sources: Office of Management and Budget, OMB Circular A-94, Appendix C; BAE Urban Economics, 2012.

Life Cycle Cost Analysis (LCCA) Spreadsheet

F. E. Warren, Cheyenne WY

ESTCP SI 0931
LCCA Demonstration

Historic Building 222 (loss of interior integrity)

Mission: General Administrative Office

Prepared by:
BAE Urban Economics, Inc.

December 2012

Table III-39: Life Cycle Cost Analysis Summary: FEW 222

	Non Discounted Costs by Component			Total Costs		
Project Alternative	Initial Investment	Recurring	Residual Value	Non Discounted	Discounted - No GHG Factor	Discounted - w/GHG Factor
FEW 222-01: Sustainment-Status Quo	$ 2,799,729	$ 6,052,421	$ -	$ 8,852,150	$ 7,203,043	$ 7,444,412
FEW 222-02: Demolition and New Construction	$ 9,426,338	$ 5,239,738	$ (3,825,087)	$ 10,840,989	$ 10,958,636	$ 11,195,962
FEW 222-03: Modernization with HPS	$ 7,623,391	$ 5,551,534	$ (3,225,178)	$ 9,949,746	$ 9,756,497	$ 9,950,588
FEW 222-04: Modernization with AT/FP	$ 8,558,230	$ 5,553,184	$ (3,626,046)	$ 10,485,368	$ 10,447,755	$ 10,656,506

Notes:

Study Period (years):	30
Real Discount Rate:	2.00%
Average CO2e Value/MT (undiscounted)	$ 36.61
Base Date:	10/01/12

Sources: Preservation Associates; BAE Urban Economics, 2012.

Table III-40: Greenhouse Gas Valuation Summary: FEW 222

	GHG Emissions by Scope (MT CO2e)				GHG Value	
Project Alternative	Scope 1	Scope 2	Scope 3	Total	Non Discounted	Discounted
FEW 222-01: Sustainment-Status Quo	10.13	8,950.99	349.07	9,310.19	$ 340,880	$ 241,369
FEW 222-02: Demolition and New Construction	5.03	6,120.65	2,319.78	8,445.46	$ 309,102	$ 237,326
FEW 222-03: Modernization with HPS	3.17	6,062.94	1,069.66	7,135.77	$ 264,763	$ 194,091
FEW 222-04: Modernization with AT/FP	5.59	6,072.45	1,445.60	7,523.64	$ 276,540	$ 208,752

Notes:

Study Period (years):	30
Real Discount Rate:	2.00%
Average CO2e Value/MT (undiscounted)	$ 36.61
Base Date:	10/01/12

Sources: Center for Resource Solutions; BAE Urban Economics, 2012.

Table 3: Alternatives Summary: FEW 222

	Building GSF		Building Features		Construction Cost	
Project Alternative	**Total**	**Footprint**	**LEED**	**AT/FP**	**Total**	**Per SF**
FEW 222-01: Sustainment-Status Quo	32,526	10,842	n/a	No	$ 2,799,729	$ 86
FEW 222-02: Demolition and New Construction	30,200	10,920	51	Yes	$ 9,426,338	$ 312
FEW 222-03: Modernization with HPS	32,526	10,842	53	Yes	$ 7,623,391	$ 234
FEW 222-04: Modernization with AT/FP	32,526	10,842	53	Yes+	$ 8,558,230	$ 263

Note:

Table 4: Construction Cost Summary: FEW 222

	Cost estimate			
Category	**01. Sustainment-Status Quo**	**Demolition and New Construction**	**03. Modernization with HPS**	**04. Modernization with AT/FP**
Demolition	$ 584,365	$ 1,334,808	$ 800,898	$ 887,748
Services	$ 227,144	$ 2,308,390	$ 2,572,655	$ 2,536,472
Other Costs	$ 1,318,498	$ 3,500,607	$ 2,480,203	$ 3,048,837
Hard cost subtotal	**$ 2,130,006**	**$ 7,143,805**	**$ 5,853,755**	**$ 6,473,057**
General conditions (25%)	$ 409,617	$ 1,451,993	$ 1,125,722	$ 1,326,446
Security escalation (2%)	$ 40,962	$ 116,159	$ 90,058	$ 106,116
USACE design (6.6%)	$ 102,404	$ 383,326	$ 297,191	$ 350,182
USACE SOIH (5.7%)	$ 116,741	$ 331,054	$ 256,665	$ 302,430
Soft cost subtotal	**$ 669,723**	**$ 2,282,533**	**$ 1,769,635**	**$ 2,085,173**
Construction cost total	**$ 2,799,729**	**$ 9,426,338**	**$ 7,623,391**	**$ 8,558,230**
Construction Cost per SF	**$ 86**	**$ 312**	**$ 234**	**$ 263**
% Difference from 02	**-70%**	**N/A**	**-19%**	**-9%**

Sources: Preservation Associates; BAE Urban Economics Inc. 2012.

Table 5: NPV Calculation FEW 222-01: Sustainment-Status Quo

	One Time							Recurring			Residual Value		Net Present Value			
Mid Year	New Construction	Sustainment	Temporary Facilities	Relocation	Demo	Site Preparation	Environmental Remediation	Utilities	Repairs Maintenance	Other s	Building	Land	Undiscounted Sum	NPV Factor	Mid-Year	Cum NPV
2012	$ -	$ -	$ -	$ -	$ 584,365	$ -	$ -	$ -	$ -		$ -	$ -	$ 584,365	0.99	$ 578,607	$ 578,607
2013	$ -	$ 2,215,365	$ -	$ -	$ -	$ -	$ -	$ 58,384	$ 43,474	$ 99,890	$ -	$ -	$ 2,417,112	0.97	$ 2,346,370	$ 2,924,977
2014	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 58,384	$ 43,474	$ 99,890	$ -	$ -	$ 201,747	0.95	$ 192,003	$ 3,116,980
2015	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 58,384	$ 43,474	$ 99,890	$ -	$ -	$ 201,747	0.93	$ 188,238	$ 3,305,218
2016	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 58,384	$ 43,474	$ 99,890	$ -	$ -	$ 201,747	0.91	$ 184,547	$ 3,489,765
2017	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 58,384	$ 43,474	$ 99,890	$ -	$ -	$ 201,747	0.90	$ 180,928	$ 3,670,694
2018	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 58,384	$ 43,474	$ 99,890	$ -	$ -	$ 201,747	0.88	$ 177,381	$ 3,848,075
2019	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 58,384	$ 43,474	$ 99,890	$ -	$ -	$ 201,747	0.86	$ 173,903	$ 4,021,977
2020	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 58,384	$ 43,474	$ 99,890	$ -	$ -	$ 201,747	0.85	$ 170,493	$ 4,192,470
2021	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 58,384	$ 43,474	$ 99,890	$ -	$ -	$ 201,747	0.83	$ 167,150	$ 4,359,620
2022	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 58,384	$ 43,474	$ 99,890	$ -	$ -	$ 201,747	0.81	$ 163,872	$ 4,523,493
2023	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 58,384	$ 43,474	$ 99,890	$ -	$ -	$ 201,747	0.80	$ 160,659	$ 4,684,152
2024	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 58,384	$ 43,474	$ 99,890	$ -	$ -	$ 201,747	0.78	$ 157,509	$ 4,841,661
2025	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 58,384	$ 43,474	$ 99,890	$ -	$ -	$ 201,747	0.77	$ 154,421	$ 4,996,082
2026	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 58,384	$ 43,474	$ 99,890	$ -	$ -	$ 201,747	0.75	$ 151,393	$ 5,147,475
2027	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 58,384	$ 43,474	$ 99,890	$ -	$ -	$ 201,747	0.74	$ 148,424	$ 5,295,899
2028	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 58,384	$ 43,474	$ 99,890	$ -	$ -	$ 201,747	0.72	$ 145,514	$ 5,441,413
2029	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 58,384	$ 43,474	$ 99,890	$ -	$ -	$ 201,747	0.71	$ 142,661	$ 5,584,074
2030	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 58,384	$ 43,474	$ 99,890	$ -	$ -	$ 201,747	0.69	$ 139,864	$ 5,723,938
2031	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 58,384	$ 43,474	$ 99,890	$ -	$ -	$ 201,747	0.68	$ 137,121	$ 5,861,059
2032	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 58,384	$ 43,474	$ 99,890	$ -	$ -	$ 201,747	0.67	$ 134,433	$ 5,995,491
2033	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 58,384	$ 43,474	$ 99,890	$ -	$ -	$ 201,747	0.65	$ 131,797	$ 6,127,288
2034	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 58,384	$ 43,474	$ 99,890	$ -	$ -	$ 201,747	0.64	$ 129,212	$ 6,256,500
2035	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 58,384	$ 43,474	$ 99,890	$ -	$ -	$ 201,747	0.63	$ 126,679	$ 6,383,179
2036	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 58,384	$ 43,474	$ 99,890	$ -	$ -	$ 201,747	0.62	$ 124,195	$ 6,507,374
2037	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 58,384	$ 43,474	$ 99,890	$ -	$ -	$ 201,747	0.60	$ 121,760	$ 6,629,134
2038	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 58,384	$ 43,474	$ 99,890	$ -	$ -	$ 201,747	0.59	$ 119,372	$ 6,748,506
2039	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 58,384	$ 43,474	$ 99,890	$ -	$ -	$ 201,747	0.58	$ 117,032	$ 6,865,537
2040	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 58,384	$ 43,474	$ 99,890	$ -	$ -	$ 201,747	0.57	$ 114,737	$ 6,980,274
2041	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 58,384	$ 43,474	$ 99,890	$ -	$ -	$ 201,747	0.56	$ 112,487	$ 7,092,761
2042	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 58,384	$ 43,474	$ 99,890	$ -	$ -	$ 201,747	0.55	$ 110,281	$ 7,203,043
TOTALS	$ -	$ 2,215,365	$ -	$ -	$ 584,365	$ -	$ -	$ 1,751,524	$ 1,304,207	########	$ -	$ -	$ 8,852,150		$ 7,203,043	$ 7,203,043

Notes:

Project Alternative Summary

Capital Costs	$ 2,799,729
Recurring Costs	$ 6,052,421
Residual Value	$ -
Non Discounted Sum	$ 8,852,150
Cum NPV	$ 7,203,043

Key Assumptions:

Discount Rate	2.00%	
Study Period	30	years
BaseYear	2012	
Report Output	Constant Dollars	
Cost per sq. ft.	$68	
Construction Period (years)	1	
Building Size (sq. ft.)	32,526	

Repairs and Maintenance	$ 1.34	
Other Operations	$ 3.07	
Cleaning per sq. ft.	$ 1.34	
Roads and Grounds	$ 0.67	
Administrative	$ 1.06	
BOMA Expense CPI Adjustmen	2.03%	
Effective utitlities per sq. ft.	$ 1.79	Not from BOMA; calculated based on treatment specific energy usage

Source: BAE Urban Economics, 2012.

Table 6: Schedule of Recurring Expenditures FEW 222-01 Sustainment-Status Quo

Year	Total Annual Expenditures	Electrical			Natural Gas			Water/Sewer (a)					Other
		Total Cost	kWh	$/kWh	Total Cost	MMBtu	$/MMBtu	Total Cost	Water	$/Kgal	Waste	$/Kgal	
2012	$ 58,384	$ 51,747	877,067	$ 0.059	$ -		$ 5.39	$ 6,637					$ -
2013	$ 58,384	$ 51,747	877,067	$ 0.059	$ -		$ 5.39	$ 6,637					$ -
2014	$ 58,384	$ 51,747	877,067	$ 0.059	$ -		$ 5.39	$ 6,637					$ -
2015	$ 58,384	$ 51,747	877,067	$ 0.059	$ -		$ 5.39	$ 6,637					$ -
2016	$ 58,384	$ 51,747	877,067	$ 0.059	$ -		$ 5.39	$ 6,637					$ -
2017	$ 58,384	$ 51,747	877,067	$ 0.059	$ -		$ 5.39	$ 6,637					$ -
2018	$ 58,384	$ 51,747	877,067	$ 0.059	$ -		$ 5.39	$ 6,637					$ -
2019	$ 58,384	$ 51,747	877,067	$ 0.059	$ -		$ 5.39	$ 6,637					$ -
2020	$ 58,384	$ 51,747	877,067	$ 0.059	$ -		$ 5.39	$ 6,637					$ -
2021	$ 58,384	$ 51,747	877,067	$ 0.059	$ -		$ 5.39	$ 6,637					$ -
2022	$ 58,384	$ 51,747	877,067	$ 0.059	$ -		$ 5.39	$ 6,637					$ -
2023	$ 58,384	$ 51,747	877,067	$ 0.059	$ -		$ 5.39	$ 6,637					$ -
2024	$ 58,384	$ 51,747	877,067	$ 0.059	$ -		$ 5.39	$ 6,637					$ -
2025	$ 58,384	$ 51,747	877,067	$ 0.059	$ -		$ 5.39	$ 6,637					$ -
2026	$ 58,384	$ 51,747	877,067	$ 0.059	$ -		$ 5.39	$ 6,637					$ -
2027	$ 58,384	$ 51,747	877,067	$ 0.059	$ -		$ 5.39	$ 6,637					$ -
2028	$ 58,384	$ 51,747	877,067	$ 0.059	$ -		$ 5.39	$ 6,637					$ -
2029	$ 58,384	$ 51,747	877,067	$ 0.059	$ -		$ 5.39	$ 6,637					$ -
2030	$ 58,384	$ 51,747	877,067	$ 0.059	$ -		$ 5.39	$ 6,637					$ -
2031	$ 58,384	$ 51,747	877,067	$ 0.059	$ -		$ 5.39	$ 6,637					$ -
2032	$ 58,384	$ 51,747	877,067	$ 0.059	$ -		$ 5.39	$ 6,637					$ -
2033	$ 58,384	$ 51,747	877,067	$ 0.059	$ -		$ 5.39	$ 6,637					$ -
2034	$ 58,384	$ 51,747	877,067	$ 0.059	$ -		$ 5.39	$ 6,637					$ -
2035	$ 58,384	$ 51,747	877,067	$ 0.059	$ -		$ 5.39	$ 6,637					$ -
2036	$ 58,384	$ 51,747	877,067	$ 0.059	$ -		$ 5.39	$ 6,637					$ -
2037	$ 58,384	$ 51,747	877,067	$ 0.059	$ -		$ 5.39	$ 6,637					$ -
2038	$ 58,384	$ 51,747	877,067	$ 0.059	$ -		$ 5.39	$ 6,637					$ -
2039	$ 58,384	$ 51,747	877,067	$ 0.059	$ -		$ 5.39	$ 6,637					$ -
2040	$ 58,384	$ 51,747	877,067	$ 0.059	$ -		$ 5.39	$ 6,637					$ -
2041	$ 58,384	$ 51,747	877,067	$ 0.059	$ -		$ 5.39	$ 6,637					$ -
2042	$ 58,384	$ 51,747	877,067	$ 0.059	$ -		$ 5.39	$ 6,637					$ -

Notes:

(a) Water and sewer combined and calculated on square foot basis based upon BOMA ERR data.

CPI adjustment factor:	2.03%	bring 2011 BOMA ERR data to 2012 dollars.
Water/sewer utility expense	$0.20	per sq. ft.
Building total sq. ft.	32,526	

Source: BAE Urban Economics, 2012.

Table 7: Depreciation Schedule & Residual Value: FEW 222-01 Demolition and New Construction

Period	Depreciation Schedule	Residual Value
2012	$ -	$ -
2013	$ 2,215,365	$ -
2014	$ 2,104,597	$ -
2015	$ 1,993,828	$ -
2016	$ 1,883,060	$ -
2017	$ 1,772,292	$ -
2018	$ 1,661,524	$ -
2019	$ 1,550,755	$ -
2020	$ 1,439,987	$ -
2021	$ 1,329,219	$ -
2022	$ 1,218,451	$ -
2023	$ 1,107,682	$ -
2024	$ 996,914	$ -
2025	$ 886,146	$ -
2026	$ 775,378	$ -
2027	$ 664,609	$ -
2028	$ 553,841	$ -
2029	$ 443,073	$ -
2030	$ 332,305	$ -
2031	$ 221,536	$ -
2032	$ 110,768	$ -
2033	$ -	$ -
2034	$ -	$ -
2035	$ -	$ -
2036	$ -	$ -
2037	$ -	$ -
2038	$ -	$ -
2039	$ -	$ -
2040	$ -	$ -
2041	$ -	$ -
2042	$ -	$ -

NOTE:
Useful life of asset: 20.0 years

Source: BAE Urban Economics, Inc. 2012.

Table 8: NPV Calculation FEW 222-02: Demolition and New Construction

	One Time							Recurring			Residual Value		Net Present Value			
Mid Year	New Construction	Major Repair	Temporary Facilities	Relocation	Demo	Site Preparation	Environmental Remediation	Utilities	Repairs Maintenance	Other Operations	Building	Land	Undiscounted Sum	NPV Factor	Mid-Year	Cum NPV
2012	$ -	$ -	$ -	$ -	$ 1,334,808	$ -	$ -	$ -	$ -		$ -	$ -	$ 1,334,808	0.99	$ 1,321,656	$ 1,321,656
2013	$ 8,091,531	$ -	$ -	$ -	$ -	$ -	$ -	$ 41,547	$ 40,365	$ 92,746	$ -	$ -	$ 8,266,188	0.97	$ 8,024,261	$ 9,345,917
2014	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 41,547	$ 40,365	$ 92,746	$ -	$ -	$ 174,658	0.95	$ 166,222	$ 9,512,139
2015	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 41,547	$ 40,365	$ 92,746	$ -	$ -	$ 174,658	0.93	$ 162,963	$ 9,675,102
2016	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 41,547	$ 40,365	$ 92,746	$ -	$ -	$ 174,658	0.91	$ 159,767	$ 9,834,869
2017	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 41,547	$ 40,365	$ 92,746	$ -	$ -	$ 174,658	0.90	$ 156,634	$ 9,991,503
2018	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 41,547	$ 40,365	$ 92,746	$ -	$ -	$ 174,658	0.88	$ 153,563	$ 10,145,067
2019	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 41,547	$ 40,365	$ 92,746	$ -	$ -	$ 174,658	0.86	$ 150,552	$ 10,295,619
2020	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 41,547	$ 40,365	$ 92,746	$ -	$ -	$ 174,658	0.85	$ 147,600	$ 10,443,219
2021	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 41,547	$ 40,365	$ 92,746	$ -	$ -	$ 174,658	0.83	$ 144,706	$ 10,587,925
2022	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 41,547	$ 40,365	$ 92,746	$ -	$ -	$ 174,658	0.81	$ 141,869	$ 10,729,794
2023	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 41,547	$ 40,365	$ 92,746	$ -	$ -	$ 174,658	0.80	$ 139,087	$ 10,868,881
2024	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 41,547	$ 40,365	$ 92,746	$ -	$ -	$ 174,658	0.78	$ 136,360	$ 11,005,240
2025	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 41,547	$ 40,365	$ 92,746	$ -	$ -	$ 174,658	0.77	$ 133,686	$ 11,138,926
2026	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 41,547	$ 40,365	$ 92,746	$ -	$ -	$ 174,658	0.75	$ 131,065	$ 11,269,991
2027	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 41,547	$ 40,365	$ 92,746	$ -	$ -	$ 174,658	0.74	$ 128,495	$ 11,398,486
2028	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 41,547	$ 40,365	$ 92,746	$ -	$ -	$ 174,658	0.72	$ 125,975	$ 11,524,461
2029	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 41,547	$ 40,365	$ 92,746	$ -	$ -	$ 174,658	0.71	$ 123,505	$ 11,647,967
2030	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 41,547	$ 40,365	$ 92,746	$ -	$ -	$ 174,658	0.69	$ 121,084	$ 11,769,050
2031	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 41,547	$ 40,365	$ 92,746	$ -	$ -	$ 174,658	0.68	$ 118,709	$ 11,887,760
2032	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 41,547	$ 40,365	$ 92,746	$ -	$ -	$ 174,658	0.67	$ 116,382	$ 12,004,141
2033	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 41,547	$ 40,365	$ 92,746	$ -	$ -	$ 174,658	0.65	$ 114,100	$ 12,118,241
2034	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 41,547	$ 40,365	$ 92,746	$ -	$ -	$ 174,658	0.64	$ 111,862	$ 12,230,104
2035	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 41,547	$ 40,365	$ 92,746	$ -	$ -	$ 174,658	0.63	$ 109,669	$ 12,339,773
2036	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 41,547	$ 40,365	$ 92,746	$ -	$ -	$ 174,658	0.62	$ 107,519	$ 12,447,291
2037	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 41,547	$ 40,365	$ 92,746	$ -	$ -	$ 174,658	0.60	$ 105,411	$ 12,552,702
2038	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 41,547	$ 40,365	$ 92,746	$ -	$ -	$ 174,658	0.59	$ 103,344	$ 12,656,046
2039	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 41,547	$ 40,365	$ 92,746	$ -	$ -	$ 174,658	0.58	$ 101,317	$ 12,757,363
2040	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 41,547	$ 40,365	$ 92,746	$ -	$ -	$ 174,658	0.57	$ 99,331	$ 12,856,694
2041	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 41,547	$ 40,365	$ 92,746	$ -	$ -	$ 174,658	0.56	$ 97,383	$ 12,954,077
2042	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 41,547	$ 40,365	$ 92,746	$ (3,825,087)	$ -	$ (3,650,429)	0.55	$ (1,995,440)	$ 10,958,636
TOTALS	$ 8,091,531	$ -	$ -	$ -	$ 1,334,808	$ -	$ -	$ 1,246,407	$ 1,210,941	$ 2,782,390	$ (3,825,087)	$ -	$ 10,840,989		$ 10,958,636	$ 10,958,636

Notes:

Project Alternative Summary

Capital Costs	$ 9,426,338
Recurring Costs	$ 5,239,738
Residual Value	$ (3,825,087)
Non Discounted Sum	$ 10,840,989
Cum NPV	$ 10,958,636

Key Assumptions:

Discount Rate	2.00%		Repairs and Maintenance	$ 1.34	
Study Period	30	years	Other Operations	$ 3.07	
BaseYear	2012		Cleaning per sq. ft.	$ 1.34	
Report Output	Constant Dollars		Roads and Grounds	$ 0.67	
Cost per sq. ft.	$0		Administrative	$ 1.06	
Construction Period (years)	1		BOMA Expense CPI Adjustment	2.03%	
Building Size (sq. ft.)	30,200		Effective utitlities per sq. ft.	$ 1.38	Not from BOMA; calculated based on treatment specific energy usage

Source: BAE Urban Economics, 2012.

Table 9: Schedule of Recurring Expenditures FEW 222-02 Demolition and New Construction

Year	Total Annual Expenditures	Electrical			Natural Gas			Water/Sewer (a)					Other
		Total Cost	kWh	$/kWh	Total Cost	MMBtu	$/MMBtu	Total Cost	Water	$/Kgal	Waste	$/Kgal	
2012	$ 41,547	$ 35,384	599,735	$ 0.059	$ -		$ 5.39	$ 6,163					$ -
2013	$ 41,547	$ 35,384	599,735	$ 0.059	$ -		$ 5.39	$ 6,163					$ -
2014	$ 41,547	$ 35,384	599,735	$ 0.059	$ -		$ 5.39	$ 6,163					$ -
2015	$ 41,547	$ 35,384	599,735	$ 0.059	$ -		$ 5.39	$ 6,163					$ -
2016	$ 41,547	$ 35,384	599,735	$ 0.059	$ -		$ 5.39	$ 6,163					$ -
2017	$ 41,547	$ 35,384	599,735	$ 0.059	$ -		$ 5.39	$ 6,163					$ -
2018	$ 41,547	$ 35,384	599,735	$ 0.059	$ -		$ 5.39	$ 6,163					$ -
2019	$ 41,547	$ 35,384	599,735	$ 0.059	$ -		$ 5.39	$ 6,163					$ -
2020	$ 41,547	$ 35,384	599,735	$ 0.059	$ -		$ 5.39	$ 6,163					$ -
2021	$ 41,547	$ 35,384	599,735	$ 0.059	$ -		$ 5.39	$ 6,163					$ -
2022	$ 41,547	$ 35,384	599,735	$ 0.059	$ -		$ 5.39	$ 6,163					$ -
2023	$ 41,547	$ 35,384	599,735	$ 0.059	$ -		$ 5.39	$ 6,163					$ -
2024	$ 41,547	$ 35,384	599,735	$ 0.059	$ -		$ 5.39	$ 6,163					$ -
2025	$ 41,547	$ 35,384	599,735	$ 0.059	$ -		$ 5.39	$ 6,163					$ -
2026	$ 41,547	$ 35,384	599,735	$ 0.059	$ -		$ 5.39	$ 6,163					$ -
2027	$ 41,547	$ 35,384	599,735	$ 0.059	$ -		$ 5.39	$ 6,163					$ -
2028	$ 41,547	$ 35,384	599,735	$ 0.059	$ -		$ 5.39	$ 6,163					$ -
2029	$ 41,547	$ 35,384	599,735	$ 0.059	$ -		$ 5.39	$ 6,163					$ -
2030	$ 41,547	$ 35,384	599,735	$ 0.059	$ -		$ 5.39	$ 6,163					$ -
2031	$ 41,547	$ 35,384	599,735	$ 0.059	$ -		$ 5.39	$ 6,163					$ -
2032	$ 41,547	$ 35,384	599,735	$ 0.059	$ -		$ 5.39	$ 6,163					$ -
2033	$ 41,547	$ 35,384	599,735	$ 0.059	$ -		$ 5.39	$ 6,163					$ -
2034	$ 41,547	$ 35,384	599,735	$ 0.059	$ -		$ 5.39	$ 6,163					$ -
2035	$ 41,547	$ 35,384	599,735	$ 0.059	$ -		$ 5.39	$ 6,163					$ -
2036	$ 41,547	$ 35,384	599,735	$ 0.059	$ -		$ 5.39	$ 6,163					$ -
2037	$ 41,547	$ 35,384	599,735	$ 0.059	$ -		$ 5.39	$ 6,163					$ -
2038	$ 41,547	$ 35,384	599,735	$ 0.059	$ -		$ 5.39	$ 6,163					$ -
2039	$ 41,547	$ 35,384	599,735	$ 0.059	$ -		$ 5.39	$ 6,163					$ -
2040	$ 41,547	$ 35,384	599,735	$ 0.059	$ -		$ 5.39	$ 6,163					$ -
2041	$ 41,547	$ 35,384	599,735	$ 0.059	$ -		$ 5.39	$ 6,163					$ -
2042	$ 41,547	$ 35,384	599,735	$ 0.059	$ -		$ 5.39	$ 6,163					$ -

Notes:

(a) Water and sewer combined and calculated on square foot basis based upon BOMA ERR data.

CPI adjustment factor:	2.03%	bring 2011 BOMA ERR data to 2012 dollars.
Water/sewer utility expense	$0.20	per sq. ft.
Building total sq. ft.	30,200	

Source: BAE Urban Economics, 2012.

Table 10: Depreciation Schedule & Residual Value: FEW 222-02 Demolition and New Construction

Period	Depreciation Schedule	Residual Value
2012	$ -	$ -
2013	$ 8,091,531	$ -
2014	$ 7,944,412	$ -
2015	$ 7,797,293	$ -
2016	$ 7,650,174	$ -
2017	$ 7,503,056	$ -
2018	$ 7,355,937	$ -
2019	$ 7,208,818	$ -
2020	$ 7,061,699	$ -
2021	$ 6,914,581	$ -
2022	$ 6,767,462	$ -
2023	$ 6,620,343	$ -
2024	$ 6,473,224	$ -
2025	$ 6,326,106	$ -
2026	$ 6,178,987	$ -
2027	$ 6,031,868	$ -
2028	$ 5,884,749	$ -
2029	$ 5,737,631	$ -
2030	$ 5,590,512	$ -
2031	$ 5,443,393	$ -
2032	$ 5,296,275	$ -
2033	$ 5,149,156	$ -
2034	$ 5,002,037	$ -
2035	$ 4,854,918	$ -
2036	$ 4,707,800	$ -
2037	$ 4,560,681	$ -
2038	$ 4,413,562	$ -
2039	$ 4,266,443	$ -
2040	$ 4,119,325	$ -
2041	$ 3,972,206	$ -
2042	$ 3,825,087	$ 3,825,087

NOTE:
Useful life of asset: 55.0 years

Source: BAE Urban Economics, Inc. 2012.

Table 11: NPV Calculation FEW 222-03: Modernization with HPS

	One Time							Recurring			Residual Value		Net Present Value			
Mid Year	New Construction	Modernization	Temporary Facilities	Relocation	Demo	Site Preparation	Environmental Remediation	Utilities	Repairs Maintenance	Other Operations	Building	Land	Undiscounted Sum	NPV Factor	Mid-Year	Cum NPV
2012	$ -	$ -	$ -	$ -	$ 800,898	$ -	$ -	$ -	$ -		$ -	$ -	$ 800,898	0.99	$ 793,007	$ 793,007
2013	$ -	$ 6,822,493	$ -	$ -	$ -	$ -	$ -	$ 41,688	$ 43,474	$ 99,890	$ -	$ -	$ 7,007,544	0.97	$ 6,802,454	$ 7,595,460
2014	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 41,688	$ 43,474	$ 99,890	$ -	$ -	$ 185,051	0.95	$ 176,113	$ 7,771,573
2015	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 41,688	$ 43,474	$ 99,890	$ -	$ -	$ 185,051	0.93	$ 172,660	$ 7,944,233
2016	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 41,688	$ 43,474	$ 99,890	$ -	$ -	$ 185,051	0.91	$ 169,274	$ 8,113,507
2017	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 41,688	$ 43,474	$ 99,890	$ -	$ -	$ 185,051	0.90	$ 165,955	$ 8,279,463
2018	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 41,688	$ 43,474	$ 99,890	$ -	$ -	$ 185,051	0.88	$ 162,701	$ 8,442,164
2019	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 41,688	$ 43,474	$ 99,890	$ -	$ -	$ 185,051	0.86	$ 159,511	$ 8,601,675
2020	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 41,688	$ 43,474	$ 99,890	$ -	$ -	$ 185,051	0.85	$ 156,383	$ 8,758,058
2021	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 41,688	$ 43,474	$ 99,890	$ -	$ -	$ 185,051	0.83	$ 153,317	$ 8,911,375
2022	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 41,688	$ 43,474	$ 99,890	$ -	$ -	$ 185,051	0.81	$ 150,311	$ 9,061,686
2023	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 41,688	$ 43,474	$ 99,890	$ -	$ -	$ 185,051	0.80	$ 147,363	$ 9,209,049
2024	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 41,688	$ 43,474	$ 99,890	$ -	$ -	$ 185,051	0.78	$ 144,474	$ 9,353,523
2025	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 41,688	$ 43,474	$ 99,890	$ -	$ -	$ 185,051	0.77	$ 141,641	$ 9,495,164
2026	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 41,688	$ 43,474	$ 99,890	$ -	$ -	$ 185,051	0.75	$ 138,864	$ 9,634,028
2027	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 41,688	$ 43,474	$ 99,890	$ -	$ -	$ 185,051	0.74	$ 136,141	$ 9,770,169
2028	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 41,688	$ 43,474	$ 99,890	$ -	$ -	$ 185,051	0.72	$ 133,472	$ 9,903,641
2029	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 41,688	$ 43,474	$ 99,890	$ -	$ -	$ 185,051	0.71	$ 130,855	$ 10,034,495
2030	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 41,688	$ 43,474	$ 99,890	$ -	$ -	$ 185,051	0.69	$ 128,289	$ 10,162,784
2031	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 41,688	$ 43,474	$ 99,890	$ -	$ -	$ 185,051	0.68	$ 125,773	$ 10,288,557
2032	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 41,688	$ 43,474	$ 99,890	$ -	$ -	$ 185,051	0.67	$ 123,307	$ 10,411,864
2033	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 41,688	$ 43,474	$ 99,890	$ -	$ -	$ 185,051	0.65	$ 120,889	$ 10,532,754
2034	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 41,688	$ 43,474	$ 99,890	$ -	$ -	$ 185,051	0.64	$ 118,519	$ 10,651,273
2035	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 41,688	$ 43,474	$ 99,890	$ -	$ -	$ 185,051	0.63	$ 116,195	$ 10,767,468
2036	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 41,688	$ 43,474	$ 99,890	$ -	$ -	$ 185,051	0.62	$ 113,917	$ 10,881,384
2037	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 41,688	$ 43,474	$ 99,890	$ -	$ -	$ 185,051	0.60	$ 111,683	$ 10,993,068
2038	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 41,688	$ 43,474	$ 99,890	$ -	$ -	$ 185,051	0.59	$ 109,493	$ 11,102,561
2039	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 41,688	$ 43,474	$ 99,890	$ -	$ -	$ 185,051	0.58	$ 107,346	$ 11,209,907
2040	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 41,688	$ 43,474	$ 99,890	$ -	$ -	$ 185,051	0.57	$ 105,241	$ 11,315,148
2041	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 41,688	$ 43,474	$ 99,890	$ -	$ -	$ 185,051	0.56	$ 103,178	$ 11,418,326
2042	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 41,688	$ 43,474	$ 99,890	$ (3,225,178)	$ -	$ (3,040,127)	0.55	$ (1,661,830)	$ 9,756,497
TOTALS	$ -	$ 6,822,493	$ -	$ -	$ 800,898	$ -	$ -	$ 1,250,637	$ 1,304,207	$ 2,996,690	$ (3,225,178)	$ -	$ 9,949,746		$ 9,756,497	$ 9,756,497

Notes:

Project Alternative Summary

Capital Costs	$ 7,623,391
Recurring Costs	$ 5,551,534
Residual Value	$ (3,225,178)
Non Discounted Sum	$ 9,949,746
Cum NPV	$ 9,756,497

Key Assumptions:

Discount Rate	2.00%		Repairs and Maintenance	$ 1.34	
Study Period	30	years	Other Operations	$ 3.07	
BaseYear	2012		Cleaning per sq. ft.	$ 1.34	
Report Output	Constant Dollars		Roads and Grounds	$ 0.67	
Cost per sq. ft.	$210		Administrative	$ 1.06	
Construction Period (years)	1		BOMA Expense CPI Adjustment	2.03%	
Building Size (sq. ft.)	32,526		Effective utitlities per sq. ft.	$ 1.28	Not from BOMA; calculated based on treatment specific energy usage

Source: BAE Urban Economics, 2012.

Table 12: Schedule of Recurring Expenditures 222-03 Modernization with HPS

Year	Total Annual Expenditures	Electrical			Natural Gas			Water/Sewer (a)					Other
		Total Cost	kWh	$/kWh	Total Cost	MMBtu	$/MMBtu	Total Cost	Water	$/Kgal	Waste	$/Kgal	
2012	$ 41,688	$ 35,051	594,080	$ 0.059	$ -		$ 5.39	$ 6,637					$ -
2013	$ 41,688	$ 35,051	594,080	$ 0.059	$ -		$ 5.39	$ 6,637					$ -
2014	$ 41,688	$ 35,051	594,080	$ 0.059	$ -		$ 5.39	$ 6,637					$ -
2015	$ 41,688	$ 35,051	594,080	$ 0.059	$ -		$ 5.39	$ 6,637					$ -
2016	$ 41,688	$ 35,051	594,080	$ 0.059	$ -		$ 5.39	$ 6,637					$ -
2017	$ 41,688	$ 35,051	594,080	$ 0.059	$ -		$ 5.39	$ 6,637					$ -
2018	$ 41,688	$ 35,051	594,080	$ 0.059	$ -		$ 5.39	$ 6,637					$ -
2019	$ 41,688	$ 35,051	594,080	$ 0.059	$ -		$ 5.39	$ 6,637					$ -
2020	$ 41,688	$ 35,051	594,080	$ 0.059	$ -		$ 5.39	$ 6,637					$ -
2021	$ 41,688	$ 35,051	594,080	$ 0.059	$ -		$ 5.39	$ 6,637					$ -
2022	$ 41,688	$ 35,051	594,080	$ 0.059	$ -		$ 5.39	$ 6,637					$ -
2023	$ 41,688	$ 35,051	594,080	$ 0.059	$ -		$ 5.39	$ 6,637					$ -
2024	$ 41,688	$ 35,051	594,080	$ 0.059	$ -		$ 5.39	$ 6,637					$ -
2025	$ 41,688	$ 35,051	594,080	$ 0.059	$ -		$ 5.39	$ 6,637					$ -
2026	$ 41,688	$ 35,051	594,080	$ 0.059	$ -		$ 5.39	$ 6,637					$ -
2027	$ 41,688	$ 35,051	594,080	$ 0.059	$ -		$ 5.39	$ 6,637					$ -
2028	$ 41,688	$ 35,051	594,080	$ 0.059	$ -		$ 5.39	$ 6,637					$ -
2029	$ 41,688	$ 35,051	594,080	$ 0.059	$ -		$ 5.39	$ 6,637					$ -
2030	$ 41,688	$ 35,051	594,080	$ 0.059	$ -		$ 5.39	$ 6,637					$ -
2031	$ 41,688	$ 35,051	594,080	$ 0.059	$ -		$ 5.39	$ 6,637					$ -
2032	$ 41,688	$ 35,051	594,080	$ 0.059	$ -		$ 5.39	$ 6,637					$ -
2033	$ 41,688	$ 35,051	594,080	$ 0.059	$ -		$ 5.39	$ 6,637					$ -
2034	$ 41,688	$ 35,051	594,080	$ 0.059	$ -		$ 5.39	$ 6,637					$ -
2035	$ 41,688	$ 35,051	594,080	$ 0.059	$ -		$ 5.39	$ 6,637					$ -
2036	$ 41,688	$ 35,051	594,080	$ 0.059	$ -		$ 5.39	$ 6,637					$ -
2037	$ 41,688	$ 35,051	594,080	$ 0.059	$ -		$ 5.39	$ 6,637					$ -
2038	$ 41,688	$ 35,051	594,080	$ 0.059	$ -		$ 5.39	$ 6,637					$ -
2039	$ 41,688	$ 35,051	594,080	$ 0.059	$ -		$ 5.39	$ 6,637					$ -
2040	$ 41,688	$ 35,051	594,080	$ 0.059	$ -		$ 5.39	$ 6,637					$ -
2041	$ 41,688	$ 35,051	594,080	$ 0.059	$ -		$ 5.39	$ 6,637					$ -
2042	$ 41,688	$ 35,051	594,080	$ 0.059	$ -		$ 5.39	$ 6,637					$ -

Notes:

(a) Water and sewer combined and calculated on square foot basis based upon BOMA ERR data.

CPI adjustment factor:	2.03%	bring 2011 BOMA ERR data to 2012 dollars.
Water/sewer utility expense	$0.20	per sq. ft.
Building total sq. ft.	32,526	

Source: BAE Urban Economics, 2012.

Table 13: Depreciation Schedule & Residual Value: FEW 222-03 Modernization with HPS

Period	Depreciation Schedule	Residual Value
2012	$ -	$ -
2013	$ 6,822,493	$ -
2014	$ 6,698,448	$ -
2015	$ 6,574,402	$ -
2016	$ 6,450,357	$ -
2017	$ 6,326,312	$ -
2018	$ 6,202,266	$ -
2019	$ 6,078,221	$ -
2020	$ 5,954,176	$ -
2021	$ 5,830,130	$ -
2022	$ 5,706,085	$ -
2023	$ 5,582,040	$ -
2024	$ 5,457,994	$ -
2025	$ 5,333,949	$ -
2026	$ 5,209,904	$ -
2027	$ 5,085,858	$ -
2028	$ 4,961,813	$ -
2029	$ 4,837,768	$ -
2030	$ 4,713,722	$ -
2031	$ 4,589,677	$ -
2032	$ 4,465,632	$ -
2033	$ 4,341,586	$ -
2034	$ 4,217,541	$ -
2035	$ 4,093,496	$ -
2036	$ 3,969,450	$ -
2037	$ 3,845,405	$ -
2038	$ 3,721,360	$ -
2039	$ 3,597,314	$ -
2040	$ 3,473,269	$ -
2041	$ 3,349,224	$ -
2042	$ 3,225,178	$ 3,225,178

NOTE:
Useful life of asset: 55.0 years

Source: BAE Urban Economics, Inc. 2012.

Table 14: NPV Calculation FEW 222-04 Modernization with AT/FP

	One Time							Recurring			Residual Value		Net Present Value			
Mid e	New Construction	Modernization	Temporary Facilities	Relocation	Demo	Site Preparation	Environmental Remediation	Utilities	Repairs Maintenance	Other Operations	Building	Land	Undiscounted Sum	NPV Factor	Mid-Year	Cum NPV
#	$ -	$ -	$ -	$ -	$ 887,748	$ -	$ -	$ -	$ -		$ -	$ -	$ 887,748	0.99	$ 879,002	$ 879,002
#	$ -	$ 7,670,482	$ -	$ -	$ -	$ -	$ -	$ 41,743	$ 43,474	$ 99,890	$ -	$ -	$ 7,855,588	0.97	$ 7,625,678	$ 8,504,679
#	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 41,743	$ 43,474	$ 99,890	$ -	$ -	$ 185,106	0.95	$ 176,165	$ 8,680,845
#	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 41,743	$ 43,474	$ 99,890	$ -	$ -	$ 185,106	0.93	$ 172,711	$ 8,853,556
#	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 41,743	$ 43,474	$ 99,890	$ -	$ -	$ 185,106	0.91	$ 169,325	$ 9,022,880
#	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 41,743	$ 43,474	$ 99,890	$ -	$ -	$ 185,106	0.90	$ 166,004	$ 9,188,885
#	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 41,743	$ 43,474	$ 99,890	$ -	$ -	$ 185,106	0.88	$ 162,749	$ 9,351,634
#	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 41,743	$ 43,474	$ 99,890	$ -	$ -	$ 185,106	0.86	$ 159,558	$ 9,511,193
#	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 41,743	$ 43,474	$ 99,890	$ -	$ -	$ 185,106	0.85	$ 156,430	$ 9,667,622
#	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 41,743	$ 43,474	$ 99,890	$ -	$ -	$ 185,106	0.83	$ 153,362	$ 9,820,985
#	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 41,743	$ 43,474	$ 99,890	$ -	$ -	$ 185,106	0.81	$ 150,355	$ 9,971,340
#	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 41,743	$ 43,474	$ 99,890	$ -	$ -	$ 185,106	0.80	$ 147,407	$ 10,118,747
#	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 41,743	$ 43,474	$ 99,890	$ -	$ -	$ 185,106	0.78	$ 144,517	$ 10,263,264
#	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 41,743	$ 43,474	$ 99,890	$ -	$ -	$ 185,106	0.77	$ 141,683	$ 10,404,948
#	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 41,743	$ 43,474	$ 99,890	$ -	$ -	$ 185,106	0.75	$ 138,905	$ 10,543,853
#	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 41,743	$ 43,474	$ 99,890	$ -	$ -	$ 185,106	0.74	$ 136,182	$ 10,680,034
#	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 41,743	$ 43,474	$ 99,890	$ -	$ -	$ 185,106	0.72	$ 133,511	$ 10,813,546
#	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 41,743	$ 43,474	$ 99,890	$ -	$ -	$ 185,106	0.71	$ 130,893	$ 10,944,439
#	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 41,743	$ 43,474	$ 99,890	$ -	$ -	$ 185,106	0.69	$ 128,327	$ 11,072,766
#	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 41,743	$ 43,474	$ 99,890	$ -	$ -	$ 185,106	0.68	$ 125,811	$ 11,198,576
#	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 41,743	$ 43,474	$ 99,890	$ -	$ -	$ 185,106	0.67	$ 123,344	$ 11,321,920
#	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 41,743	$ 43,474	$ 99,890	$ -	$ -	$ 185,106	0.65	$ 120,925	$ 11,442,845
#	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 41,743	$ 43,474	$ 99,890	$ -	$ -	$ 185,106	0.64	$ 118,554	$ 11,561,400
#	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 41,743	$ 43,474	$ 99,890	$ -	$ -	$ 185,106	0.63	$ 116,230	$ 11,677,629
#	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 41,743	$ 43,474	$ 99,890	$ -	$ -	$ 185,106	0.62	$ 113,951	$ 11,791,580
#	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 41,743	$ 43,474	$ 99,890	$ -	$ -	$ 185,106	0.60	$ 111,716	$ 11,903,296
#	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 41,743	$ 43,474	$ 99,890	$ -	$ -	$ 185,106	0.59	$ 109,526	$ 12,012,822
#	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 41,743	$ 43,474	$ 99,890	$ -	$ -	$ 185,106	0.58	$ 107,378	$ 12,120,200
#	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 41,743	$ 43,474	$ 99,890	$ -	$ -	$ 185,106	0.57	$ 105,273	$ 12,225,473
#	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 41,743	$ 43,474	$ 99,890	$ -	$ -	$ 185,106	0.56	$ 103,209	$ 12,328,681
#	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 41,743	$ 43,474	$ 99,890	$ (3,626,046)	$ -	$ (3,440,940)	0.55	$ (1,880,927)	$ 10,447,755
TOT.	$ -	$ 7,670,482	$ -	$ -	$ 887,748	$ -	$ -	$ 1,252,287	$ 1,304,207	$ 2,996,690	$ (3,626,046)	$ -	$ 10,485,368		$ 10,447,755	$ 10,447,755

Notes:

Project Alternative Summary

Capital Costs	$ 8,558,230
Recurring Costs	$ 5,553,184
Residual Value	$ (3,626,046)
Non Discounted Sum	$ 10,485,368
Cum NPV	$ 10,447,755

Key Assumptions:

Discount Rate	2.00%		Repairs and Maintenance	$ 1.34
Study Period	30	years	Other Operations	$ 3.07
BaseYear	2012		Cleaning per sq. ft.	$ 1.34
Report Output	Constant Dollars		Roads and Grounds	$ 0.67
Cost per sq. ft.	$236		Administrative	$ 1.06
Construction Period (years)	1		BOMA Expense CPI Adjustment	2.03%
Building Size (sq. ft.)	32,526		Effective utitlities per sq. ft.	$ 1.28

Not from BOMA; calculated based on treatment specific energy usage

Source: BAE Urban Economics, 2012.

Table 15: Schedule of Recurring Expenditures FEW 222-04 Modernization with AT/FP

Year	Total Annual Expenditures	Electrical			Natural Gas			Water/Sewer (a)					Other
		Total Cost	kWh	$/kWh	Total Cost	MMBtu	$/MMBtu	Total Cost	Water	$/Kgal	Waste	$/Kgal	
2012	$ 41,743	$ 35,106	595,012	$ 0.059	$ -		$ 5.39	$ 6,637					$ -
2013	$ 41,743	$ 35,106	595,012	$ 0.059	$ -		$ 5.39	$ 6,637					$ -
2014	$ 41,743	$ 35,106	595,012	$ 0.059	$ -		$ 5.39	$ 6,637					$ -
2015	$ 41,743	$ 35,106	595,012	$ 0.059	$ -		$ 5.39	$ 6,637					$ -
2016	$ 41,743	$ 35,106	595,012	$ 0.059	$ -		$ 5.39	$ 6,637					$ -
2017	$ 41,743	$ 35,106	595,012	$ 0.059	$ -		$ 5.39	$ 6,637					$ -
2018	$ 41,743	$ 35,106	595,012	$ 0.059	$ -		$ 5.39	$ 6,637					$ -
2019	$ 41,743	$ 35,106	595,012	$ 0.059	$ -		$ 5.39	$ 6,637					$ -
2020	$ 41,743	$ 35,106	595,012	$ 0.059	$ -		$ 5.39	$ 6,637					$ -
2021	$ 41,743	$ 35,106	595,012	$ 0.059	$ -		$ 5.39	$ 6,637					$ -
2022	$ 41,743	$ 35,106	595,012	$ 0.059	$ -		$ 5.39	$ 6,637					$ -
2023	$ 41,743	$ 35,106	595,012	$ 0.059	$ -		$ 5.39	$ 6,637					$ -
2024	$ 41,743	$ 35,106	595,012	$ 0.059	$ -		$ 5.39	$ 6,637					$ -
2025	$ 41,743	$ 35,106	595,012	$ 0.059	$ -		$ 5.39	$ 6,637					$ -
2026	$ 41,743	$ 35,106	595,012	$ 0.059	$ -		$ 5.39	$ 6,637					$ -
2027	$ 41,743	$ 35,106	595,012	$ 0.059	$ -		$ 5.39	$ 6,637					$ -
2028	$ 41,743	$ 35,106	595,012	$ 0.059	$ -		$ 5.39	$ 6,637					$ -
2029	$ 41,743	$ 35,106	595,012	$ 0.059	$ -		$ 5.39	$ 6,637					$ -
2030	$ 41,743	$ 35,106	595,012	$ 0.059	$ -		$ 5.39	$ 6,637					$ -
2031	$ 41,743	$ 35,106	595,012	$ 0.059	$ -		$ 5.39	$ 6,637					$ -
2032	$ 41,743	$ 35,106	595,012	$ 0.059	$ -		$ 5.39	$ 6,637					$ -
2033	$ 41,743	$ 35,106	595,012	$ 0.059	$ -		$ 5.39	$ 6,637					$ -
2034	$ 41,743	$ 35,106	595,012	$ 0.059	$ -		$ 5.39	$ 6,637					$ -
2035	$ 41,743	$ 35,106	595,012	$ 0.059	$ -		$ 5.39	$ 6,637					$ -
2036	$ 41,743	$ 35,106	595,012	$ 0.059	$ -		$ 5.39	$ 6,637					$ -
2037	$ 41,743	$ 35,106	595,012	$ 0.059	$ -		$ 5.39	$ 6,637					$ -
2038	$ 41,743	$ 35,106	595,012	$ 0.059	$ -		$ 5.39	$ 6,637					$ -
2039	$ 41,743	$ 35,106	595,012	$ 0.059	$ -		$ 5.39	$ 6,637					$ -
2040	$ 41,743	$ 35,106	595,012	$ 0.059	$ -		$ 5.39	$ 6,637					$ -
2041	$ 41,743	$ 35,106	595,012	$ 0.059	$ -		$ 5.39	$ 6,637					$ -
2042	$ 41,743	$ 35,106	595,012	$ 0.059	$ -		$ 5.39	$ 6,637					$ -

Notes:

(a) Water and sewer combined and calculated on square foot basis based upon BOMA ERR data.

CPI adjustment factor:	2.03%	bring 2011 BOMA ERR data to 2012 dollars.
Water/sewer utility expense	$0.20	per sq. ft.
Building total sq. ft.	32,526	

Source: BAE Urban Economics, 2012.

Table 16: Depreciation Schedule & Residual Value: FEW 222-04 Modernization with AT/FP

Period	Depreciation Schedule	Residual Value
2012	$ -	$ -
2013	$ 7,670,482	$ -
2014	$ 7,531,019	$ -
2015	$ 7,391,556	$ -
2016	$ 7,252,092	$ -
2017	$ 7,112,629	$ -
2018	$ 6,973,166	$ -
2019	$ 6,833,702	$ -
2020	$ 6,694,239	$ -
2021	$ 6,554,776	$ -
2022	$ 6,415,312	$ -
2023	$ 6,275,849	$ -
2024	$ 6,136,386	$ -
2025	$ 5,996,922	$ -
2026	$ 5,857,459	$ -
2027	$ 5,717,996	$ -
2028	$ 5,578,532	$ -
2029	$ 5,439,069	$ -
2030	$ 5,299,606	$ -
2031	$ 5,160,143	$ -
2032	$ 5,020,679	$ -
2033	$ 4,881,216	$ -
2034	$ 4,741,753	$ -
2035	$ 4,602,289	$ -
2036	$ 4,462,826	$ -
2037	$ 4,323,363	$ -
2038	$ 4,183,899	$ -
2039	$ 4,044,436	$ -
2040	$ 3,904,973	$ -
2041	$ 3,765,509	$ -
2042	$ 3,626,046	$ 3,626,046

NOTE:
Useful life of asset: 55.0 years

Source: BAE Urban Economics, Inc. 2012.

Table 17: Midwest Urban Consumer Price Index

Year	Index (1982=100)	Annual CPI % Change
1993	140.00	2.56%
1994	144.00	2.86%
1995	148.40	3.06%
1996	153.00	3.10%
1997	156.70	2.42%
1998	159.30	1.66%
1999	162.70	2.13%
2000	168.30	3.44%
2001	172.80	2.67%
2002	174.90	1.22%
2003	178.30	1.94%
2004	182.60	2.41%
2005	188.40	3.18%
2006	193.00	2.44%
2007	198.12	2.65%
2008	205.38	3.66%
2009	204.06	-0.64%
2010	208.05	1.95%
2011	214.74	3.22%
2012	219.10	2.03%
Annual Average 20-years:		**2.4%**
LCCA Assumption:		**0.0%**

Source: U.S. Department of Labor, Bureau of Labor Statistics; BAE Urban Economics, Inc. 2012.

Table 18: Discount Rates and Factors

	Discount Factors			
Year	End of Year	Mid-Year	Beginning of Year	Calander Year
1	0.9804	0.9901	1.0000	2012
2	0.9612	0.9707	0.9804	2013
3	0.9423	0.9517	0.9612	2014
4	0.9238	0.9330	0.9423	2015
5	0.9057	0.9147	0.9238	2016
6	0.8880	0.8968	0.9057	2017
7	0.8706	0.8792	0.8880	2018
8	0.8535	0.8620	0.8706	2019
9	0.8368	0.8451	0.8535	2020
10	0.8203	0.8285	0.8368	2021
11	0.8043	0.8123	0.8203	2022
12	0.7885	0.7963	0.8043	2023
13	0.7730	0.7807	0.7885	2024
14	0.7579	0.7654	0.7730	2025
15	0.7430	0.7504	0.7579	2026
16	0.7284	0.7357	0.7430	2027
17	0.7142	0.7213	0.7284	2028
18	0.7002	0.7071	0.7142	2029
19	0.6864	0.6933	0.7002	2030
20	0.6730	0.6797	0.6864	2031
21	0.6598	0.6663	0.6730	2032
22	0.6468	0.6533	0.6598	2033
23	0.6342	0.6405	0.6468	2034
24	0.6217	0.6279	0.6342	2035
25	0.6095	0.6156	0.6217	2036
26	0.5976	0.6035	0.6095	2037
27	0.5859	0.5917	0.5976	2038
28	0.5744	0.5801	0.5859	2039
29	0.5631	0.5687	0.5744	2040
30	0.5521	0.5576	0.5631	2041
31	0.5412	0.5466	0.5521	2042

Notes:

30-Year real discount rate	2.0%
Mid-year factor:	1.0100

Sources: Office of Management and Budget, OMB Circular A-94, Appendix C; BAE Urban Economics, 2012.

Life Cycle Cost Analysis (LCCA) Spreadsheet

F. E. Warren, Cheyenne WY

ESTCP SI 0931
LCCA Demonstration

Historic Building 323

Mission: General Administrative Office

Prepared by:
BAE Urban Economics, Inc.

December 2012

Table III-47: Life Cycle Cost Analysis Summary: FEW 323

	Non Discounted Costs by Component			Total Costs		
Project Alternative	**Initial Investment**	**Recurring**	**Residual Value**	**Non Discounted**	**Discounted - No GHG Factor**	**Discounted - w/GHG Factor**
FEW 323-01: Sustainment - Status Quo	$ 1,184,186	$ 2,594,721	$ -	$ 3,778,907	$ 3,068,097	$ 3,181,223
FEW 323-02: Demolition, New Construction	$ 4,134,303	$ 2,308,859	$ (1,701,058)	$ 4,742,104	$ 4,800,549	$ 4,905,532
FEW 323-03: Modernization with HPS	$ 2,999,326	$ 2,295,437	$ (1,355,898)	$ 3,938,864	$ 3,869,683	$ 3,950,019
FEW 323-04: Modernization with AT/FP plus Solar PV	$ 4,326,110	$ 2,087,882	$ (2,010,279)	$ 4,403,712	$ 4,645,392	$ 4,700,302
Notes:						
Study Period (years):	30					
Real Discount Rate:	2.00%					
Average CO2e Value/MT (undiscounted)	$ 37.35					
Base Date:	10/01/12					

Sources: Preservation Associates; BAE Urban Economics, 2012.

Table III-48: Greenhouse Gas Valuation Summary: FEW 323

	GHG Emissions by Scope (MT CO2e)				GHG Value	
Project Alternative	**Scope 1**	**Scope 2**	**Scope 3**	**Total**	**Non Discounted**	**Discounted**
FEW 323-01: Sustainment - Status Quo	16.38	4,203.63	119.05	4,339	$ 162,074	$ 113,126
FEW 323-02: Demolition and New Construction	1.24	2,555.39	1,035.79	3,592	$ 133,719	$ 104,983
FEW 323-03: Modernization with HPS	2.47	2,478.00	450.42	2,931	$ 109,216	$ 80,336
FEW 323-04: Modernization with AT/FP plus Solar PV	1.24	1,281.26	579.73	1,862	$ 69,323	$ 54,911
Notes:						
Study Period (years):	30					
Real Discount Rate:	2.00%					
Average CO2e Value/MT (undiscounted)	$ 37.35					
Base Date:	10/01/12					

Sources: Center for Resource Solutions; BAE Urban Economics, 2012.

Table 3: Alternatives Summary: FEW 323

Project Alternative	Building GSF		Building Features		Construction Cost	
	Total	Footprint	LEED	AT/FP	Total	Per SF
FEW 323-01: Sustainment - Status Quo	13,485	10,385	n/a	No	$ 1,184,186	$ 88
FEW 323-02: Demolition, New Construction	13,485	10,385	54	Yes	$ 4,134,303	$ 307
FEW 323-03: Modernization with HPS	13,485	10,385	57	Yes	$ 2,999,326	$ 222
FEW 323-04: Modernization w/ AT/FP + PV System	13,485	10,385	63	Yes+	$ 4,326,110	$ 321

Note:

+ Current prescriptive practices and treatments.

Sources: Preservation Associates; Center for Resource Solutions; BAE Urban Economics, 2012.

Table 4: Construction Cost Summary: FEW 323

	Cost estimate			
Category	**01 Sustainment-Status Quo**	**02 Demolition and New Construction**	**03 Modernization with HPS**	**Modernization with AT/FP plus Solar PV(a)**
Demolition	$ 29,293	$ 535,911	$ 131,080	$ 73,596
Services	$ 348,681	$ 1,014,985	$ 1,144,756	$ 1,496,761
Other Costs	$ 566,739	$ 1,587,779	$ 1,047,568	$ 1,862,071
Hard cost subtotal	**$ 944,713**	**$ 3,138,675**	**$ 2,323,404**	**$ 3,432,428**
General conditions (25%)	$ 146,467	$ 643,171	$ 405,229	$ 746,601
Security escalation (2%)	$ 14,647	$ 51,454	$ 81,046	$ 59,728
USACE design (6%)	$ 36,617	$ 154,361	$ 97,255	$ 44,796
USACE SOIH (5.7%)	$ 41,743	$ 146,643	$ 92,392	$ 42,556
Soft cost subtotal	**$ 239,474**	**$ 995,629**	**$ 675,922**	**$ 893,682**
Construction cost total	**$ 1,184,186**	**$ 4,134,303**	**$ 2,999,326**	**$ 4,326,110**
Construction Cost per SF	**$ 88**	**$ 307**	**$ 222**	**$ 321**
% Difference from 02	**-71%**	**N/A**	**-27%**	**5%**

Notes:

[a] FEW 323-04 costs reflects inclusion of rooftop solar PV system..

Sources: Preservation Associates; BAE Urban Economics Inc. 2012.

Table 5: NPV Calculation FEW 323-01 Sustainment-Status Quo

Mid Year	One Time: New Construction	Major Repair	Temporary Facilities	Relocation	Demo	Site Preparation	Environmental Remediation	Recurring: Utilities	Repairs Maintenance	Other Operations	Residual Value: Building	Land	Net Present Value: Undiscounted Sum	NPV Factor	Mid-Year	Cum NPV
2012	$ -	$ -	$ -	$ -	$ 29,293	$ -	$ -	$ -	$ -		$ -	$ -	$ 29,293	0.99	$ 29,005	$ 29,005
2013	$ -	$ 1,154,893	$ -	$ -	$ -	$ -	$ -	$ 27,054	$ 18,024	$ 41,413	$ -	$ -	$ 1,241,383	0.97	$ 1,205,052	$ 1,234,057
2014	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 27,054	$ 18,024	$ 41,413	$ -	$ -	$ 86,491	0.95	$ 82,313	$ 1,316,370
2015	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 27,054	$ 18,024	$ 41,413	$ -	$ -	$ 86,491	0.93	$ 80,699	$ 1,397,069
2016	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 27,054	$ 18,024	$ 41,413	$ -	$ -	$ 86,491	0.91	$ 79,117	$ 1,476,186
2017	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 27,054	$ 18,024	$ 41,413	$ -	$ -	$ 86,491	0.90	$ 77,565	$ 1,553,751
2018	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 27,054	$ 18,024	$ 41,413	$ -	$ -	$ 86,491	0.88	$ 76,045	$ 1,629,796
2019	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 27,054	$ 18,024	$ 41,413	$ -	$ -	$ 86,491	0.86	$ 74,554	$ 1,704,349
2020	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 27,054	$ 18,024	$ 41,413	$ -	$ -	$ 86,491	0.85	$ 73,092	$ 1,777,441
2021	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 27,054	$ 18,024	$ 41,413	$ -	$ -	$ 86,491	0.83	$ 71,659	$ 1,849,099
2022	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 27,054	$ 18,024	$ 41,413	$ -	$ -	$ 86,491	0.81	$ 70,253	$ 1,919,353
2023	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 27,054	$ 18,024	$ 41,413	$ -	$ -	$ 86,491	0.80	$ 68,876	$ 1,988,229
2024	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 27,054	$ 18,024	$ 41,413	$ -	$ -	$ 86,491	0.78	$ 67,525	$ 2,055,754
2025	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 27,054	$ 18,024	$ 41,413	$ -	$ -	$ 86,491	0.77	$ 66,201	$ 2,121,955
2026	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 27,054	$ 18,024	$ 41,413	$ -	$ -	$ 86,491	0.75	$ 64,903	$ 2,186,859
2027	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 27,054	$ 18,024	$ 41,413	$ -	$ -	$ 86,491	0.74	$ 63,631	$ 2,250,489
2028	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 27,054	$ 18,024	$ 41,413	$ -	$ -	$ 86,491	0.72	$ 62,383	$ 2,312,872
2029	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 27,054	$ 18,024	$ 41,413	$ -	$ -	$ 86,491	0.71	$ 61,160	$ 2,374,032
2030	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 27,054	$ 18,024	$ 41,413	$ -	$ -	$ 86,491	0.69	$ 59,961	$ 2,433,993
2031	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 27,054	$ 18,024	$ 41,413	$ -	$ -	$ 86,491	0.68	$ 58,785	$ 2,492,778
2032	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 27,054	$ 18,024	$ 41,413	$ -	$ -	$ 86,491	0.67	$ 57,632	$ 2,550,410
2033	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 27,054	$ 18,024	$ 41,413	$ -	$ -	$ 86,491	0.65	$ 56,502	$ 2,606,912
2034	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 27,054	$ 18,024	$ 41,413	$ -	$ -	$ 86,491	0.64	$ 55,394	$ 2,662,307
2035	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 27,054	$ 18,024	$ 41,413	$ -	$ -	$ 86,491	0.63	$ 54,308	$ 2,716,615
2036	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 27,054	$ 18,024	$ 41,413	$ -	$ -	$ 86,491	0.62	$ 53,243	$ 2,769,858
2037	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 27,054	$ 18,024	$ 41,413	$ -	$ -	$ 86,491	0.60	$ 52,199	$ 2,822,058
2038	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 27,054	$ 18,024	$ 41,413	$ -	$ -	$ 86,491	0.59	$ 51,176	$ 2,873,233
2039	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 27,054	$ 18,024	$ 41,413	$ -	$ -	$ 86,491	0.58	$ 50,172	$ 2,923,406
2040	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 27,054	$ 18,024	$ 41,413	$ -	$ -	$ 86,491	0.57	$ 49,189	$ 2,972,594
2041	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 27,054	$ 18,024	$ 41,413	$ -	$ -	$ 86,491	0.56	$ 48,224	$ 3,020,818
2042	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 27,054	$ 18,024	$ 41,413	$ -	$ -	$ 86,491	0.55	$ 47,279	$ 3,068,097
TOTALS	$ -	$ 1,154,893	$ -	$ -	$ 29,293	$ -	$ -	$ 811,606	$ 540,713	$ 1,242,402	$ -	$ -	$ 3,778,907		$ 3,068,097	$ 3,068,097

Notes:

Project Alternative Summary

Capital Costs	$ 1,184,186
Recurring Costs	$ 2,594,721
Residual Value	$ -
Non Discounted Sum	$ 3,778,907
Cum NPV	$ 3,068,097

Key Assumptions:

Discount Rate	2.00%		
Study Period	30	years	
BaseYear	2012		
Report Output	Constant Dollars		
Cost per sq. ft.	$86		
Construction Period (years)	1		
Building Size (sq. ft.)	13,485		

Repairs and Maintenance	$ 1.34	
Other Operations	$ 3.07	
Cleaning per sq. ft.	$ 1.34	
Roads and Grounds	$ 0.67	
Administrative	$ 1.06	
BOMA Expense CPI Adjustment	2.03%	
Effective utitlities per sq. ft.	$ 2.01	Not from BOMA; calculated based on treatment specific energy usage

Source: BAE Urban Economics, Inc., 2012.

Table 6: Schedule of Recurring Expenditures FEW 323-01 Sustainment-Status Quo

Year	Total Annual Expenditures	Electrical			Natural Gas			Water/Sewer (a)					Other
		Total Cost	kWh	$/kWh	Total Cost	MMBtu	$/MMBtu	Total Cost	Water	$/Kgal	Waste	$/Kgal	
2012	$ 27,054	$ 24,302	411,895	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2013	$ 27,054	$ 24,302	411,895	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2014	$ 27,054	$ 24,302	411,895	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2015	$ 27,054	$ 24,302	411,895	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2016	$ 27,054	$ 24,302	411,895	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2017	$ 27,054	$ 24,302	411,895	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2018	$ 27,054	$ 24,302	411,895	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2019	$ 27,054	$ 24,302	411,895	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2020	$ 27,054	$ 24,302	411,895	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2021	$ 27,054	$ 24,302	411,895	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2022	$ 27,054	$ 24,302	411,895	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2023	$ 27,054	$ 24,302	411,895	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2024	$ 27,054	$ 24,302	411,895	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2025	$ 27,054	$ 24,302	411,895	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2026	$ 27,054	$ 24,302	411,895	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2027	$ 27,054	$ 24,302	411,895	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2028	$ 27,054	$ 24,302	411,895	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2029	$ 27,054	$ 24,302	411,895	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2030	$ 27,054	$ 24,302	411,895	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2031	$ 27,054	$ 24,302	411,895	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2032	$ 27,054	$ 24,302	411,895	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2033	$ 27,054	$ 24,302	411,895	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2034	$ 27,054	$ 24,302	411,895	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2035	$ 27,054	$ 24,302	411,895	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2036	$ 27,054	$ 24,302	411,895	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2037	$ 27,054	$ 24,302	411,895	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2038	$ 27,054	$ 24,302	411,895	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2039	$ 27,054	$ 24,302	411,895	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2040	$ 27,054	$ 24,302	411,895	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2041	$ 27,054	$ 24,302	411,895	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2042	$ 27,054	$ 24,302	411,895	$ 0.059	$ -		$ 5.39	$ 2,752					$ -

Notes:

(a) Water and sewer combined and calculated on square foot basis based upon BOMA ERR data.

CPI adjustment factor:	2.03%	bring 2011 BOMA ERR data to 2012 dollars.
Water/sewer utility expense	$0.20	per sq. ft.
Building total sq. ft.	13,485	

Source: BAE Urban Economics, 2012.

Table 7: Depreciation Schedule & Residual Value: FEW 323-01 Demolition and New Construction

Period	Depreciation Schedule	Residual Value
2012	$ -	$ -
2013	$ 1,154,893	$ -
2014	$ 1,097,148	$ -
2015	$ 1,039,404	$ -
2016	$ 981,659	$ -
2017	$ 923,914	$ -
2018	$ 866,170	$ -
2019	$ 808,425	$ -
2020	$ 750,680	$ -
2021	$ 692,936	$ -
2022	$ 635,191	$ -
2023	$ 577,446	$ -
2024	$ 519,702	$ -
2025	$ 461,957	$ -
2026	$ 404,212	$ -
2027	$ 346,468	$ -
2028	$ 288,723	$ -
2029	$ 230,979	$ -
2030	$ 173,234	$ -
2031	$ 115,489	$ -
2032	$ 57,745	$ -
2033	$ 0	$ -
2034	$ -	$ -
2035	$ -	$ -
2036	$ -	$ -
2037	$ -	$ -
2038	$ -	$ -
2039	$ -	$ -
2040	$ -	$ -
2041	$ -	$ -
2042	$ -	$ -

NOTE:

Useful life of asset: 20.0 years

Source: BAE Urban Economics, Inc. 2012.

Table 8: NPV Calculation FEW 323-02 Demolition and New Construction

	One Time							Recurring			Residual Value		Net Present Value			
Mid Year	New Construction	Major Repair	Temporary Facilities	Relocation	Demo	Site Preparation	Environmental Remediation	Utilities	Repairs Maintenance	Other Operations	Building	Land	Undiscounted Sum	NPV Factor	Mid-Year	Cum NPV
2012	$ -	$ -	$ -	$ -	$ 535,911	$ -	$ -	$ -	$ -		$ -	$ -	$ 535,911	0.99	$ 530,631	$ 530,631
2013	$ -	$ 3,598,393	$ -	$ -	$ -	$ -	$ -	$ 17,525	$ 18,024	$ 41,413	$ -	$ -	$ 3,675,355	0.97	$ 3,567,788	$ 4,098,418
2014	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 17,525	$ 18,024	$ 41,413	$ -	$ -	$ 76,962	0.95	$ 73,245	$ 4,171,663
2015	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 17,525	$ 18,024	$ 41,413	$ -	$ -	$ 76,962	0.93	$ 71,808	$ 4,243,471
2016	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 17,525	$ 18,024	$ 41,413	$ -	$ -	$ 76,962	0.91	$ 70,400	$ 4,313,872
2017	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 17,525	$ 18,024	$ 41,413	$ -	$ -	$ 76,962	0.90	$ 69,020	$ 4,382,892
2018	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 17,525	$ 18,024	$ 41,413	$ -	$ -	$ 76,962	0.88	$ 67,667	$ 4,450,558
2019	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 17,525	$ 18,024	$ 41,413	$ -	$ -	$ 76,962	0.86	$ 66,340	$ 4,516,898
2020	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 17,525	$ 18,024	$ 41,413	$ -	$ -	$ 76,962	0.85	$ 65,039	$ 4,581,938
2021	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 17,525	$ 18,024	$ 41,413	$ -	$ -	$ 76,962	0.83	$ 63,764	$ 4,645,701
2022	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 17,525	$ 18,024	$ 41,413	$ -	$ -	$ 76,962	0.81	$ 62,514	$ 4,708,215
2023	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 17,525	$ 18,024	$ 41,413	$ -	$ -	$ 76,962	0.80	$ 61,288	$ 4,769,503
2024	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 17,525	$ 18,024	$ 41,413	$ -	$ -	$ 76,962	0.78	$ 60,086	$ 4,829,589
2025	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 17,525	$ 18,024	$ 41,413	$ -	$ -	$ 76,962	0.77	$ 58,908	$ 4,888,497
2026	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 17,525	$ 18,024	$ 41,413	$ -	$ -	$ 76,962	0.75	$ 57,753	$ 4,946,250
2027	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 17,525	$ 18,024	$ 41,413	$ -	$ -	$ 76,962	0.74	$ 56,620	$ 5,002,870
2028	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 17,525	$ 18,024	$ 41,413	$ -	$ -	$ 76,962	0.72	$ 55,510	$ 5,058,380
2029	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 17,525	$ 18,024	$ 41,413	$ -	$ -	$ 76,962	0.71	$ 54,422	$ 5,112,802
2030	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 17,525	$ 18,024	$ 41,413	$ -	$ -	$ 76,962	0.69	$ 53,355	$ 5,166,157
2031	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 17,525	$ 18,024	$ 41,413	$ -	$ -	$ 76,962	0.68	$ 52,309	$ 5,218,465
2032	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 17,525	$ 18,024	$ 41,413	$ -	$ -	$ 76,962	0.67	$ 51,283	$ 5,269,748
2033	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 17,525	$ 18,024	$ 41,413	$ -	$ -	$ 76,962	0.65	$ 50,277	$ 5,320,026
2034	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 17,525	$ 18,024	$ 41,413	$ -	$ -	$ 76,962	0.64	$ 49,292	$ 5,369,317
2035	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 17,525	$ 18,024	$ 41,413	$ -	$ -	$ 76,962	0.63	$ 48,325	$ 5,417,642
2036	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 17,525	$ 18,024	$ 41,413	$ -	$ -	$ 76,962	0.62	$ 47,377	$ 5,465,020
2037	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 17,525	$ 18,024	$ 41,413	$ -	$ -	$ 76,962	0.60	$ 46,448	$ 5,511,468
2038	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 17,525	$ 18,024	$ 41,413	$ -	$ -	$ 76,962	0.59	$ 45,538	$ 5,557,006
2039	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 17,525	$ 18,024	$ 41,413	$ -	$ -	$ 76,962	0.58	$ 44,645	$ 5,601,651
2040	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 17,525	$ 18,024	$ 41,413	$ -	$ -	$ 76,962	0.57	$ 43,769	$ 5,645,420
2041	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 17,525	$ 18,024	$ 41,413	$ -	$ -	$ 76,962	0.56	$ 42,911	$ 5,688,331
2042	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 17,525	$ 18,024	$ 41,413	$ (1,701,058)	$ -	$ (1,624,096)	0.55	$ (887,782)	$ 4,800,549
TOTALS	$ -	$ 3,598,393	$ -	$ -	$ 535,911	$ -	$ -	$ 525,744	$ 540,713	$ 1,242,402	$ (1,701,058)	$ -	$ 4,742,104		$ 4,800,549	$ 4,800,549

Notes:

Project Alternative Summary

Capital Costs	$ 4,134,303
Recurring Costs	$ 2,308,859
Residual Value	$ (1,701,058)
Non Discounted Sum	$ 4,742,104
Cum NPV	$ 4,800,549

Key Assumptions:

Discount Rate	2.00%	
Study Period	30	years
BaseYear	2012	
Report Output	Constant Dollars	
Cost per sq. ft.	$267	
Construction Period (years)	1	
Building Size (sq. ft.)	13,485	

Repairs and Maintenance	$ 1.34	
Other Operations	$ 3.07	
Cleaning per sq. ft.	$ 1.34	
Roads and Grounds	$ 0.67	
Administrative	$ 1.06	
BOMA Expense CPI Adjustment	2.03%	
Effective utitlities per sq. ft.	$ 1.30	Not from BOMA; calculated based on treatment specific energy usage

Source: BAE Urban Economics, 2012.

Table 9: Schedule of Recurring Expenditures FEW 323-02 Demolition and New Construction

Year	Total Annual Expenditures	Electrical			Natural Gas			Water/Sewer (a)					Other
		Total Cost	kWh	$/kWh	Total Cost	MMBtu	$/MMBtu	Total Cost	Water	$/Kgal	Waste	$/Kgal	
2012	$ 17,525	$ 14,773	250,391	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2013	$ 17,525	$ 14,773	250,391	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2014	$ 17,525	$ 14,773	250,391	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2015	$ 17,525	$ 14,773	250,391	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2016	$ 17,525	$ 14,773	250,391	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2017	$ 17,525	$ 14,773	250,391	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2018	$ 17,525	$ 14,773	250,391	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2019	$ 17,525	$ 14,773	250,391	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2020	$ 17,525	$ 14,773	250,391	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2021	$ 17,525	$ 14,773	250,391	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2022	$ 17,525	$ 14,773	250,391	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2023	$ 17,525	$ 14,773	250,391	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2024	$ 17,525	$ 14,773	250,391	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2025	$ 17,525	$ 14,773	250,391	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2026	$ 17,525	$ 14,773	250,391	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2027	$ 17,525	$ 14,773	250,391	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2028	$ 17,525	$ 14,773	250,391	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2029	$ 17,525	$ 14,773	250,391	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2030	$ 17,525	$ 14,773	250,391	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2031	$ 17,525	$ 14,773	250,391	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2032	$ 17,525	$ 14,773	250,391	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2033	$ 17,525	$ 14,773	250,391	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2034	$ 17,525	$ 14,773	250,391	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2035	$ 17,525	$ 14,773	250,391	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2036	$ 17,525	$ 14,773	250,391	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2037	$ 17,525	$ 14,773	250,391	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2038	$ 17,525	$ 14,773	250,391	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2039	$ 17,525	$ 14,773	250,391	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2040	$ 17,525	$ 14,773	250,391	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2041	$ 17,525	$ 14,773	250,391	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2042	$ 17,525	$ 14,773	250,391	$ 0.059	$ -		$ 5.39	$ 2,752					$ -

Notes:

(a) Water and sewer combined and calculated on square foot basis based upon BOMA ERR data.

CPI adjustment factor:	2.03%	bring 2011 BOMA ERR data to 2012 dollars.
Water/sewer utility expense	$0.20	per sq. ft.
Building total sq. ft.	13,485	

Source: BAE Urban Economics, 2012.

Table 10: Depreciation Schedule & Residual Value: FEW 323-02 Demolition and New Construction

Period	Depreciation Schedule	Residual Value
2012	$ -	$ -
2013	$ 3,598,393	$ -
2014	$ 3,532,967	$ -
2015	$ 3,467,542	$ -
2016	$ 3,402,117	$ -
2017	$ 3,336,691	$ -
2018	$ 3,271,266	$ -
2019	$ 3,205,841	$ -
2020	$ 3,140,415	$ -
2021	$ 3,074,990	$ -
2022	$ 3,009,565	$ -
2023	$ 2,944,139	$ -
2024	$ 2,878,714	$ -
2025	$ 2,813,289	$ -
2026	$ 2,747,864	$ -
2027	$ 2,682,438	$ -
2028	$ 2,617,013	$ -
2029	$ 2,551,588	$ -
2030	$ 2,486,162	$ -
2031	$ 2,420,737	$ -
2032	$ 2,355,312	$ -
2033	$ 2,289,886	$ -
2034	$ 2,224,461	$ -
2035	$ 2,159,036	$ -
2036	$ 2,093,610	$ -
2037	$ 2,028,185	$ -
2038	$ 1,962,760	$ -
2039	$ 1,897,334	$ -
2040	$ 1,831,909	$ -
2041	$ 1,766,484	$ -
2042	$ 1,701,058	$ 1,701,058

NOTE:

Useful life of asset: 55.0 years

Source: BAE Urban Economics, Inc. 2012.

Table 11: NPV Calculation FEW 323-03 Modernization with HPS

	One Time							Recurring			Residual Value		Net Present Value			
Mid Year	New Construction	Major Repair	Temporary Facilities	Relocation	Demo	Site Preparation	Environmental Remediation	Utilities	Repairs Maintenance	Other s	Building	Land	Undiscounted Sum	NPV Factor	Mid-Year	Cum NPV
2012	$ -	$ -	$ -	$ -	$ 131,080	$ -	$ -	$ -	$ -		$ -	$ -	$ 131,080	0.99	$ 129,788	$ 129,788
2013	$ -	$ 2,868,246	$ -	$ -	$ -	$ -	$ -	$ 17,077	$ 18,024	$ 41,413	$ -	$ -	$ 2,944,761	0.97	$ 2,858,576	$ 2,988,364
2014	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 17,077	$ 18,024	$ 41,413	$ -	$ -	$ 76,515	0.95	$ 72,819	$ 3,061,183
2015	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 17,077	$ 18,024	$ 41,413	$ -	$ -	$ 76,515	0.93	$ 71,391	$ 3,132,574
2016	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 17,077	$ 18,024	$ 41,413	$ -	$ -	$ 76,515	0.91	$ 69,991	$ 3,202,565
2017	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 17,077	$ 18,024	$ 41,413	$ -	$ -	$ 76,515	0.90	$ 68,619	$ 3,271,184
2018	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 17,077	$ 18,024	$ 41,413	$ -	$ -	$ 76,515	0.88	$ 67,273	$ 3,338,457
2019	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 17,077	$ 18,024	$ 41,413	$ -	$ -	$ 76,515	0.86	$ 65,954	$ 3,404,411
2020	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 17,077	$ 18,024	$ 41,413	$ -	$ -	$ 76,515	0.85	$ 64,661	$ 3,469,072
2021	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 17,077	$ 18,024	$ 41,413	$ -	$ -	$ 76,515	0.83	$ 63,393	$ 3,532,466
2022	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 17,077	$ 18,024	$ 41,413	$ -	$ -	$ 76,515	0.81	$ 62,150	$ 3,594,616
2023	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 17,077	$ 18,024	$ 41,413	$ -	$ -	$ 76,515	0.80	$ 60,932	$ 3,655,547
2024	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 17,077	$ 18,024	$ 41,413	$ -	$ -	$ 76,515	0.78	$ 59,737	$ 3,715,284
2025	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 17,077	$ 18,024	$ 41,413	$ -	$ -	$ 76,515	0.77	$ 58,565	$ 3,773,849
2026	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 17,077	$ 18,024	$ 41,413	$ -	$ -	$ 76,515	0.75	$ 57,417	$ 3,831,267
2027	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 17,077	$ 18,024	$ 41,413	$ -	$ -	$ 76,515	0.74	$ 56,291	$ 3,887,558
2028	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 17,077	$ 18,024	$ 41,413	$ -	$ -	$ 76,515	0.72	$ 55,188	$ 3,942,746
2029	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 17,077	$ 18,024	$ 41,413	$ -	$ -	$ 76,515	0.71	$ 54,105	$ 3,996,851
2030	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 17,077	$ 18,024	$ 41,413	$ -	$ -	$ 76,515	0.69	$ 53,045	$ 4,049,896
2031	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 17,077	$ 18,024	$ 41,413	$ -	$ -	$ 76,515	0.68	$ 52,004	$ 4,101,900
2032	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 17,077	$ 18,024	$ 41,413	$ -	$ -	$ 76,515	0.67	$ 50,985	$ 4,152,885
2033	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 17,077	$ 18,024	$ 41,413	$ -	$ -	$ 76,515	0.65	$ 49,985	$ 4,202,870
2034	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 17,077	$ 18,024	$ 41,413	$ -	$ -	$ 76,515	0.64	$ 49,005	$ 4,251,875
2035	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 17,077	$ 18,024	$ 41,413	$ -	$ -	$ 76,515	0.63	$ 48,044	$ 4,299,919
2036	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 17,077	$ 18,024	$ 41,413	$ -	$ -	$ 76,515	0.62	$ 47,102	$ 4,347,021
2037	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 17,077	$ 18,024	$ 41,413	$ -	$ -	$ 76,515	0.60	$ 46,178	$ 4,393,199
2038	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 17,077	$ 18,024	$ 41,413	$ -	$ -	$ 76,515	0.59	$ 45,273	$ 4,438,472
2039	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 17,077	$ 18,024	$ 41,413	$ -	$ -	$ 76,515	0.58	$ 44,385	$ 4,482,858
2040	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 17,077	$ 18,024	$ 41,413	$ -	$ -	$ 76,515	0.57	$ 43,515	$ 4,526,373
2041	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 17,077	$ 18,024	$ 41,413	$ -	$ -	$ 76,515	0.56	$ 42,662	$ 4,569,035
2042	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 17,077	$ 18,024	$ 41,413	$ (1,355,898)	$ -	$ (1,279,384)	0.55	$ (699,352)	$ 3,869,683
TOTALS	$ -	$ 2,868,246	$ -	$ -	$ 131,080	$ -	$ -	$ 512,322	$ 540,713	########	$ (1,355,898)	$ -	$ 3,938,864		$ 3,869,683	$ 3,869,683

Notes:

Project Alternative Summary

Capital Costs	$ 2,999,326
Recurring Costs	$ 2,295,437
Residual Value	$ (1,355,898)
Non Discounted Sum	$ 3,938,864
Cum NPV	$ 3,869,683

Key Assumptions:

Discount Rate	2.00%		Repairs and Maintenance	$ 1.34	
Study Period	30	years	Other Operations	$ 3.07	
BaseYear	2012		Cleaning per sq. ft.	$ 1.34	
Report Output	Constant Dollars		Roads and Grounds	$ 0.67	
Cost per sq. ft.	$213		Administrative	$ 1.06	
Construction Period (years)	1		BOMA Expense CPI Adjustmer	2.03%	
Building Size (sq. ft.)	13,485		Effective utitlities per sq. ft.	$ 1.27	Not from BOMA; calculated based on treatment specific energy usage

Source: BAE Urban Economics, 2012.

Table 12: Schedule of Recurring Expenditures FEW 323-03 Modernization with HPS

Year	Total Annual Expenditures	Electrical			Natural Gas			Water/Sewer (a)					Other
		Total Cost	kWh	$/kWh	Total Cost	MMBtu	$/MMBtu	Total Cost	Water	$/Kgal	Waste	$/Kgal	
2012	$ 17,077	$ 14,326	242,808	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2013	$ 17,077	$ 14,326	242,808	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2014	$ 17,077	$ 14,326	242,808	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2015	$ 17,077	$ 14,326	242,808	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2016	$ 17,077	$ 14,326	242,808	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2017	$ 17,077	$ 14,326	242,808	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2018	$ 17,077	$ 14,326	242,808	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2019	$ 17,077	$ 14,326	242,808	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2020	$ 17,077	$ 14,326	242,808	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2021	$ 17,077	$ 14,326	242,808	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2022	$ 17,077	$ 14,326	242,808	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2023	$ 17,077	$ 14,326	242,808	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2024	$ 17,077	$ 14,326	242,808	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2025	$ 17,077	$ 14,326	242,808	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2026	$ 17,077	$ 14,326	242,808	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2027	$ 17,077	$ 14,326	242,808	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2028	$ 17,077	$ 14,326	242,808	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2029	$ 17,077	$ 14,326	242,808	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2030	$ 17,077	$ 14,326	242,808	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2031	$ 17,077	$ 14,326	242,808	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2032	$ 17,077	$ 14,326	242,808	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2033	$ 17,077	$ 14,326	242,808	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2034	$ 17,077	$ 14,326	242,808	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2035	$ 17,077	$ 14,326	242,808	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2036	$ 17,077	$ 14,326	242,808	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2037	$ 17,077	$ 14,326	242,808	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2038	$ 17,077	$ 14,326	242,808	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2039	$ 17,077	$ 14,326	242,808	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2040	$ 17,077	$ 14,326	242,808	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2041	$ 17,077	$ 14,326	242,808	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2042	$ 17,077	$ 14,326	242,808	$ 0.059	$ -		$ 5.39	$ 2,752					$ -

Notes:

(a) Water and sewer combined and calculated on square foot basis based upon BOMA ERR data.

CPI adjustment factor:	2.03%	bring 2011 BOMA ERR data to 2012 dollars.
Water/sewer utility expense	$0.20	per sq. ft.
Building total sq. ft.	13,485	

Source: BAE Urban Economics, 2012.

Table 13: Depreciation Schedule & Residual Value: FEW 323-03 Modernization with HPS

Period	Depreciation Schedule	Residual Value
2012	$ -	$ -
2013	$ 2,868,246	$ -
2014	$ 2,816,096	$ -
2015	$ 2,763,946	$ -
2016	$ 2,711,796	$ -
2017	$ 2,659,646	$ -
2018	$ 2,607,496	$ -
2019	$ 2,555,346	$ -
2020	$ 2,503,196	$ -
2021	$ 2,451,047	$ -
2022	$ 2,398,897	$ -
2023	$ 2,346,747	$ -
2024	$ 2,294,597	$ -
2025	$ 2,242,447	$ -
2026	$ 2,190,297	$ -
2027	$ 2,138,147	$ -
2028	$ 2,085,997	$ -
2029	$ 2,033,847	$ -
2030	$ 1,981,697	$ -
2031	$ 1,929,547	$ -
2032	$ 1,877,397	$ -
2033	$ 1,825,247	$ -
2034	$ 1,773,098	$ -
2035	$ 1,720,948	$ -
2036	$ 1,668,798	$ -
2037	$ 1,616,648	$ -
2038	$ 1,564,498	$ -
2039	$ 1,512,348	$ -
2040	$ 1,460,198	$ -
2041	$ 1,408,048	$ -
2042	$ 1,355,898	$ 1,355,898

NOTE:

Useful life of asset: 55.0 years

Source: BAE Urban Economics, Inc. 2012.

Table 14: NPV Calculation FEW 323-04 Modernization with AT/FP plus Solar PV

	One Time							Recurring			Residual Value		Net Present Value			
Mid Year	New Construction	Major Repair	Temporary Facilities	Relocation	Demo	Site Preparation	Environmental Remediation	Utilities	Repairs Maintenance	Other Operations	Building	Land	Undiscounted Sum	NPV Factor	Mid-Year	Cum NPV
2012	$ -	$ -	$ -	$ -	$ 73,596	$ -	$ -	$ -	$ -		$ -	$ -	$ 73,596	0.99	$ 72,871	$ 72,871
2013	$ -	$ 4,252,514	$ -	$ -	$ -	$ -	$ -	$ 10,159	$ 18,024	$ 41,413	$ -	$ -	$ 4,322,110	0.97	$ 4,195,614	$ 4,268,485
2014	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 10,159	$ 18,024	$ 41,413	$ -	$ -	$ 69,596	0.95	$ 66,234	$ 4,334,720
2015	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 10,159	$ 18,024	$ 41,413	$ -	$ -	$ 69,596	0.93	$ 64,936	$ 4,399,655
2016	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 10,159	$ 18,024	$ 41,413	$ -	$ -	$ 69,596	0.91	$ 63,663	$ 4,463,318
2017	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 10,159	$ 18,024	$ 41,413	$ -	$ -	$ 69,596	0.90	$ 62,414	$ 4,525,732
2018	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 10,159	$ 18,024	$ 41,413	$ -	$ -	$ 69,596	0.88	$ 61,190	$ 4,586,923
2019	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 10,159	$ 18,024	$ 41,413	$ -	$ -	$ 69,596	0.86	$ 59,991	$ 4,646,913
2020	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 10,159	$ 18,024	$ 41,413	$ -	$ -	$ 69,596	0.85	$ 58,814	$ 4,705,728
2021	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 10,159	$ 18,024	$ 41,413	$ -	$ -	$ 69,596	0.83	$ 57,661	$ 4,763,389
2022	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 10,159	$ 18,024	$ 41,413	$ -	$ -	$ 69,596	0.81	$ 56,531	$ 4,819,919
2023	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 10,159	$ 18,024	$ 41,413	$ -	$ -	$ 69,596	0.80	$ 55,422	$ 4,875,341
2024	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 10,159	$ 18,024	$ 41,413	$ -	$ -	$ 69,596	0.78	$ 54,335	$ 4,929,677
2025	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 10,159	$ 18,024	$ 41,413	$ -	$ -	$ 69,596	0.77	$ 53,270	$ 4,982,947
2026	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 10,159	$ 18,024	$ 41,413	$ -	$ -	$ 69,596	0.75	$ 52,225	$ 5,035,172
2027	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 10,159	$ 18,024	$ 41,413	$ -	$ -	$ 69,596	0.74	$ 51,201	$ 5,086,373
2028	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 10,159	$ 18,024	$ 41,413	$ -	$ -	$ 69,596	0.72	$ 50,197	$ 5,136,571
2029	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 10,159	$ 18,024	$ 41,413	$ -	$ -	$ 69,596	0.71	$ 49,213	$ 5,185,784
2030	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 10,159	$ 18,024	$ 41,413	$ -	$ -	$ 69,596	0.69	$ 48,248	$ 5,234,032
2031	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 10,159	$ 18,024	$ 41,413	$ -	$ -	$ 69,596	0.68	$ 47,302	$ 5,281,335
2032	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 10,159	$ 18,024	$ 41,413	$ -	$ -	$ 69,596	0.67	$ 46,375	$ 5,327,709
2033	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 10,159	$ 18,024	$ 41,413	$ -	$ -	$ 69,596	0.65	$ 45,465	$ 5,373,175
2034	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 10,159	$ 18,024	$ 41,413	$ -	$ -	$ 69,596	0.64	$ 44,574	$ 5,417,749
2035	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 10,159	$ 18,024	$ 41,413	$ -	$ -	$ 69,596	0.63	$ 43,700	$ 5,461,448
2036	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 10,159	$ 18,024	$ 41,413	$ -	$ -	$ 69,596	0.62	$ 42,843	$ 5,504,292
2037	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 10,159	$ 18,024	$ 41,413	$ -	$ -	$ 69,596	0.60	$ 42,003	$ 5,546,295
2038	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 10,159	$ 18,024	$ 41,413	$ -	$ -	$ 69,596	0.59	$ 41,179	$ 5,587,474
2039	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 10,159	$ 18,024	$ 41,413	$ -	$ -	$ 69,596	0.58	$ 40,372	$ 5,627,846
2040	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 10,159	$ 18,024	$ 41,413	$ -	$ -	$ 69,596	0.57	$ 39,580	$ 5,667,426
2041	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 10,159	$ 18,024	$ 41,413	$ -	$ -	$ 69,596	0.56	$ 38,804	$ 5,706,231
2042	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 10,159	$ 18,024	$ 41,413	$ (2,010,279)	$ -	$ (1,940,683)	0.55	$ (1,060,839)	$ 4,645,392
TOTALS	$ -	$ 4,252,514	$ -	$ -	$ 73,596	$ -	$ -	$ 304,767	$ 540,713	$ 1,242,402	$ (2,010,279)	$ -	$ 4,403,712		$ 4,645,392	$ 4,645,392

Notes:

Project Alternative Summary

Capital Costs	$ 4,326,110
Recurring Costs	$ 2,087,882
Residual Value	$ (2,010,279)
Non Discounted Sum	$ 4,403,712
Cum NPV	$ 4,645,392

Key Assumptions:

Discount Rate	2.00%	Repairs and Maintenance	$ 1.34
Study Period	30 years	Other Operations	$ 3.07
BaseYear	2012	Cleaning per sq. ft.	$ 1.34
Report Output	Constant Dollars	Roads and Grounds	$ 0.67
Cost per sq. ft.	$315	Administrative	$ 1.06
Construction Period (years)	1	BOMA Expense CPI Adjustment	2.03%
Building Size (sq. ft.)	13,485	Effective utitlities per sq. ft.	$ 0.75 Not from BOMA; calculated based on treatment specific energy usage

Source: BAE Urban Economics, 2012.

Table 15: Schedule of Recurring Expenditures FEW 323-04 Modernization with AT/FP plus Solar PV

Year	Total Annual Expenditures	Electrical			Natural Gas			Water/Sewer (a)					Other
		Total Cost	kWh	$/kWh	Total Cost	MMBtu	$/MMBtu	Total Cost	Water	$/Kgal	Waste	$/Kgal	
2012	$ 10,159	$ 7,407	125,545	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2013	$ 10,159	$ 7,407	125,545	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2014	$ 10,159	$ 7,407	125,545	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2015	$ 10,159	$ 7,407	125,545	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2016	$ 10,159	$ 7,407	125,545	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2017	$ 10,159	$ 7,407	125,545	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2018	$ 10,159	$ 7,407	125,545	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2019	$ 10,159	$ 7,407	125,545	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2020	$ 10,159	$ 7,407	125,545	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2021	$ 10,159	$ 7,407	125,545	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2022	$ 10,159	$ 7,407	125,545	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2023	$ 10,159	$ 7,407	125,545	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2024	$ 10,159	$ 7,407	125,545	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2025	$ 10,159	$ 7,407	125,545	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2026	$ 10,159	$ 7,407	125,545	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2027	$ 10,159	$ 7,407	125,545	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2028	$ 10,159	$ 7,407	125,545	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2029	$ 10,159	$ 7,407	125,545	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2030	$ 10,159	$ 7,407	125,545	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2031	$ 10,159	$ 7,407	125,545	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2032	$ 10,159	$ 7,407	125,545	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2033	$ 10,159	$ 7,407	125,545	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2034	$ 10,159	$ 7,407	125,545	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2035	$ 10,159	$ 7,407	125,545	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2036	$ 10,159	$ 7,407	125,545	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2037	$ 10,159	$ 7,407	125,545	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2038	$ 10,159	$ 7,407	125,545	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2039	$ 10,159	$ 7,407	125,545	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2040	$ 10,159	$ 7,407	125,545	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2041	$ 10,159	$ 7,407	125,545	$ 0.059	$ -		$ 5.39	$ 2,752					$ -
2042	$ 10,159	$ 7,407	125,545	$ 0.059	$ -		$ 5.39	$ 2,752					$ -

Notes:

(a) Water and sewer combined and calculated on square foot basis based upon BOMA ERR data.

CPI adjustment factor:	2.03%	bring 2011 BOMA ERR data to 2012 dollars.
Water/sewer utility expense	$0.20	per sq. ft.
Building total sq. ft.	13,485	

Source: BAE Urban Economics, 2012.

Table 16: Depreciation Schedule & Residual Value: FEW 323-04 Modernization with AT/FP plus Solar PV

Period	Depreciation Schedule	Residual Value
2012	$ -	$ -
2013	$ 4,252,514	$ -
2014	$ 4,175,195	$ -
2015	$ 4,097,877	$ -
2016	$ 4,020,558	$ -
2017	$ 3,943,240	$ -
2018	$ 3,865,922	$ -
2019	$ 3,788,603	$ -
2020	$ 3,711,285	$ -
2021	$ 3,633,966	$ -
2022	$ 3,556,648	$ -
2023	$ 3,479,329	$ -
2024	$ 3,402,011	$ -
2025	$ 3,324,693	$ -
2026	$ 3,247,374	$ -
2027	$ 3,170,056	$ -
2028	$ 3,092,737	$ -
2029	$ 3,015,419	$ -
2030	$ 2,938,100	$ -
2031	$ 2,860,782	$ -
2032	$ 2,783,464	$ -
2033	$ 2,706,145	$ -
2034	$ 2,628,827	$ -
2035	$ 2,551,508	$ -
2036	$ 2,474,190	$ -
2037	$ 2,396,871	$ -
2038	$ 2,319,553	$ -
2039	$ 2,242,235	$ -
2040	$ 2,164,916	$ -
2041	$ 2,087,598	$ -
2042	$ 2,010,279	$ 2,010,279

NOTE:

Useful life of asset: 55.0 years

Source: BAE Urban Economics, Inc. 2012.

Table 17: Midwest Urban Consumer Price Index

Year	Index (1982=100)	Annual CPI % Change
1993	140.00	2.56%
1994	144.00	2.86%
1995	148.40	3.06%
1996	153.00	3.10%
1997	156.70	2.42%
1998	159.30	1.66%
1999	162.70	2.13%
2000	168.30	3.44%
2001	172.80	2.67%
2002	174.90	1.22%
2003	178.30	1.94%
2004	182.60	2.41%
2005	188.40	3.18%
2006	193.00	2.44%
2007	198.12	2.65%
2008	205.38	3.66%
2009	204.06	-0.64%
2010	208.05	1.95%
2011	214.74	3.22%
2012	219.10	2.03%
Annual Average 20-years:		**2.4%**
LCCA Assumption:		**0.0%**

Sources: U.S. Department of Labor, Bureau of Labor Statistics; BAE Urban Economics, Inc. 2012.

Table 18: Discount Rates and Factors

Year	Discount Factors: End of Year	Discount Factors: Mid-Year	Discount Factors: Beginning of Year	Calander Year
1	0.9804	0.9901	1.0000	2012
2	0.9612	0.9707	0.9804	2013
3	0.9423	0.9517	0.9612	2014
4	0.9238	0.9330	0.9423	2015
5	0.9057	0.9147	0.9238	2016
6	0.8880	0.8968	0.9057	2017
7	0.8706	0.8792	0.8880	2018
8	0.8535	0.8620	0.8706	2019
9	0.8368	0.8451	0.8535	2020
10	0.8203	0.8285	0.8368	2021
11	0.8043	0.8123	0.8203	2022
12	0.7885	0.7963	0.8043	2023
13	0.7730	0.7807	0.7885	2024
14	0.7579	0.7654	0.7730	2025
15	0.7430	0.7504	0.7579	2026
16	0.7284	0.7357	0.7430	2027
17	0.7142	0.7213	0.7284	2028
18	0.7002	0.7071	0.7142	2029
19	0.6864	0.6933	0.7002	2030
20	0.6730	0.6797	0.6864	2031
21	0.6598	0.6663	0.6730	2032
22	0.6468	0.6533	0.6598	2033
23	0.6342	0.6405	0.6468	2034
24	0.6217	0.6279	0.6342	2035
25	0.6095	0.6156	0.6217	2036
26	0.5976	0.6035	0.6095	2037
27	0.5859	0.5917	0.5976	2038
28	0.5744	0.5801	0.5859	2039
29	0.5631	0.5687	0.5744	2040
30	0.5521	0.5576	0.5631	2041
31	0.5412	0.5466	0.5521	2042

Notes:

30-Year real discount rate	2.0%
Mid-year factor:	1.0100

Sources: Office of Management and Budget, OMB Circular A-94, Appendix C; BAE Urban Economics, 2012.