SBCCD LCC Narrative

January 14, 2014

Life Cycle Costing (LCC) is being performed per San Bernardino College District facilities, in response to Measure M Bond community communications reporting and ongoing accreditation activities. This effort has begun with the New Science Building at Crafton Hills College. Additional facilities will be similarly analyzed in an arranged priority order to benefit SBCCD budgeting efforts, accreditation needs, and construction project decision efforts.

Both Valley College (SBVC) and Crafton Hills College (CHC) will have facilities analyzed in the LCC process. The first facility is at CHC and this narrative focuses on information received during that process, primarily related to CHC.

The Measure M Project List for CHC facilities includes (years listed in parenthesis indicate anticipated year of completion, asterisks denote facilities selected for LCC analysis):

1. PE and Athletic Complex (2013)*
2. Performing Arts Center Renovation (2014)
3. Maintenance and Operations Building Renovation (2015)
4. New Science Building (2015)*
5. New Crafton Center (2015)*
6. Student Services A Renovation (2015)*
7. College Center Renovation (2015)
8. New Emergency Services Building (2015)
9. Lab/Administration (LADM) Building Renovation (2016)*
10. OE2 Building*

The Measure M Project List for SBVC facilities includes:

1. Campus signage and ADA Access
2. Central Plant Project*
3. Business Building Renovation*
4. Physical Education and Athletics Complex
5. Stadium/Field Improvements
6. Auditorium Renovation*
7. Technical Building Renovation*
8. Gym*

Air conditioning and heating generally represent a large percentage of energy used by a building. The CHC New Science Building is supplied chilled water (CHW) and heating water (HHW) from the new CHC Central Plant. Air conditioning and heating energy are not included in this

analysis for the New Science Building. Those energy values will appear at the Central Plant and it will have its own energy analysis. Decisions are completed for the design of the New Science Building and it will be connected to the CHC Central Plant. Future CHC buildings, still in a design phase or to be designed in the future will approach this LCC analysis differently and LCC analysis for buildings having air conditioning equipment and boilers will include that energy use and equipment in the LCC analysis.

Also, the energy used in the New Science Building, since it does not include energy for air conditioning and heating will be "less" per square foot of building area than buildings having equipment for air conditioning and heating within those buildings. This must be considered when comparisons are made between different buildings.

CHW and HHW energy are used in the New Science Building. Since this energy is supplied as a "Campus Infrastructure Cost and Asset" it is not included in the Science Building LCC. Similarly, the 1.3 MW Concentrator Photovoltaic (CPV) Systems are designed to produce 90 – 95% of the campus' electrical energy needs. CPV is also a Campus Infrastructure Cost and Asset. Both of these systems, the CPV and the Central Plant will save energy costs for CHC, but their costs must also be paid from their savings, first. To allocate these costs to the Science Building would not provide beneficial information to the Life Cycle Cost analysis of the New Science Building.

Relevant to the LCC analysis is the cost and budgeting of energy. With the CPV and Central Plant energy costs being, as yet, varying in efficiency and cost/benefit; and given that both CPV and Central Plant savings are allocated toward paying for their capital outlay; they are excluded from the LCC analysis. While the New Science Center does not have chiller(s) nor boiler(s) it does have split Dx cooling equipment and it does have air handling equipment. There are also no pumps for CHW and HHW in the New Science Building. Energy use projections are based on the equipment indicated on the construction documents, using the understandings stated here.

Utility energy costs are average, based on history and projections. These will change significantly as CPV costs stabilize with greater SBCCD experience and once capital costs are relieved. Similarly, the Central Plant benefits will also become more fully realized and normalized. Thermal Energy Storage (TES) is also a factor at the Valley College campus. These factors affect the cost of electricity. Further, buildings being connected and removed from the electrical grid affect the average cost of electricity. These variables result in our use of the following costs for energy in this analysis:

Electricity	$0.177 / kWh
Natural Gas	$0.81 / Therm
Water/Sewer	$4.09 / HCF

Kitchell/BRj Project Memo

11711 Sand Canyon Road, Yucaipa, CA 92399 Phone (909) 435-4159 - FAX (909) 794-8901

DATE: July 23, 2013 No – M CHC GEN 043

TO: Timothy Oliver
Interim Vice Chancellor
San Bernardino Community College District (SBCCD)

FROM: Brooke Duncan
Project Manager
Kitchell/BRj (KBS)

RE: **SBCCD Incentives**
ARUP New Contract for Life Cycle Cost Analysis

SCOPE:
SBCCD approval to execute a new contract to ARUP for assistance in the District's efforts to formulate Life Cycle Cost studies for the major projects listed below.

NARRATIVE:
Life-cycle cost analysis (LCCA) is a method for assessing the total cost of facility ownership. It takes into account all costs of acquiring, owning, and disposing of a building or building system. It is particularly suitable for the evaluation of building design alternatives that satisfy a required level of building performance but may have different initial investment costs, different operating, maintenance and repair costs and different uses.

The District has requested comparative quotes from the project Architects and ARUP. ARUP has provided the best valued proposal for the scope of work that includes:

- (6) Six projects at Crafton Hills College: Science Building, Occupational Education 2, Student Services A, LADM, PE Complex and Crafton Center.
- (5) Five projects at Valley College: Auditorium, Business Building, Central Plant, GYM and Technical Building.
- Scope: Initial cost of systems, energy consumption costs, maintenance and custodial costs, life expectancy, replacement costs and total cost of ownership over 25 years.

These studies are required for bond funded projects to communicate value and sustainable stewardship to the community. Two paths are recommended to the projects that are already designed and the projects that can be considered for alterative design approaches.

RECOMMENDATION:
Kitchell/BRj recommends that SBCCD approve ARUP contract in the amount of $265,665.00.

Upon approval, Kitchell/BRj will direct ARUP to proceed with the service in an effort to deliver a timely deliverable and to start the evaluation immediately. A formal contract will be prepared and forwarded to the next available Board meeting for final approval.

BUDGET INFORMATION/FISCAL IMPACT:

Funding Source: District Contingency Fund

Crafton Hills College: $136,515.00

Valley College: $129,150.00

Total: $265,665.00

7/24/13

☑ I concur with this recommendation ☐ I do not concur with this recommendation	Diana Johnson 7/24/13 Diana Johnson, Program Manager, KBS	
☑ I concur with this recommendation ☐ I do not concur with this recommendation	8/1/13 Timothy Oliver, Interim Vice Chancellor of Fiscal Services, SBCCD	NS 7/30/13

Attachments: Proposal
Cc: File

Crafton Hills College

Life Cycles Cost Analysis

	New Science Bldg		OE2		SSA		LADM		PE Complex		CRAFTON CENTER	
	NTD	ARUP	STEINBERG	ARUP	PMSM	ARUP	PMSM	ARUP	STEINBERG	ARUP		ARUP
Initial Cost of System	x	x	x	x	x	x	x	x	x	x		x
Energy Consumption Costs	x	x	x	x	x	x	x	x	x	x		x
Maintenance & Custodial Costs	x	x	x	x	x	x	x	x	x	x		x
Life Expectancy	x	x	x	x	x	x	x	x	x	x		x
Replacement Costs	x	x	x	x	x	x	x	x	x	x		x
Cost of Ownership	x	x	x	x	x	x	x	x	x	x		x
FEE	$30,835	$29,565	$38,665	$26,540	$19,700	$11,100	$23,200	$20,995	$32,265	$20,805		$27,510

CHC ARUP Total: 136,515
CHC Architect Total: 144,665

Valley College

Life Cycles Cost Analysis

	AUDITORIUM		BUS BLDG RENO		CENTRAL PLANT		GYM		TECH BLDG	
	NTD	ARUP	DLR	ARUP	P2S	ARUP	HMC	ARUP	HMC	ARUP
Initial Cost of System	x	x	x	x	x	x	x	x	x	x
Energy Consumption Costs	x	x	x	x	x	x	x	x	x	x
Maintenance & Custodial Costs	x	x	x	x	x	x	x	x	x	x
Life Expectancy	x	x	x	x	x	x	x	x	x	x
Replacement Costs	x	x	x	x	x	x	x	x	x	x
Cost of Ownership	x	x	x	x	x	x	x	x	x	x
FEE	$27,685	$26,400	$33,500	$24,400	$19,500	$26,500	$35,000	$26,400	$25,000	$25,450

VC ARUP Total: 129,150
VC Architect Total: 140,685

ARUP Grand Total: 265,665
Architect Grand Total: 285,350

Your ref
Our ref 600927-08
File ref

ARUP

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Brooke Duncan,
Sr. Project Manager
Kitchell/BRj/Seville
11711 Sand Canyon Road
Yucaipa, CA 92399

June 7th, 2013

Dear Brooke,

San Bernardino Community College District, Crafton Hills - Life Cycle Costing

Rev 1, June 14th, 2013: Update per comments received from KBS via e-mail on June 12th.

Thank you for the opportunity to submit a proposal for consulting services related to completing life cycle cost studies for six projects at Crafton Hills College. We understand that these studies are required for bond funded projects to communicate value and sustainable stewardship to the community and well as indicate a balance between first cost and operational costs.
We firmly believe that our prior experience on similar project types coupled with our knowledge of the buildings at Crafton Hills and knowledge of design and client teams will allow us to deliver this scope efficiently and to a high quality.

1 Scope of work

A Life Cycle Cost Analysis (LCCA) shall be performed /updated on design alternatives for Building Envelope, HVAC Systems and Equipment, Plumbing and Electrical (normal and low-voltage) Systems as directed by facilities staff or KBS.

Due to some of the buildings being close to receiving DSA approvals whilst others are at an earlier stage of design, we propose to undertake two approaches as follows;

Path A: This will be for those buildings where there are no more design options being evaluated. Our approach here will be to document the expected LCC at 25 years with no alternates being considered. For the purpose of this proposal, we have assumed that this applies to all buildings.

Path B: This path will apply to those projects that are at an earlier stage of design where LCC evaluations of design alternatives will help inform the design process. For these projects, we've assumed that we'll be performing the LCCA at 100% SD and 100% DD as

well as documenting a final LCCA. We've assumed that up to three alternatives will be evaluated at the SD and DD stages as directed by the Campus / KBS. An alternative may include for example evaluating lighting options to compare a less and more efficient technology or evaluating glazing to again compare a less or more efficient option. (Note that per revision 1 of this proposal and in line with comments from KBS, all projects have been changed to Track A. This track B section has been retained for information only).

The LCCA shall include:

- Initial cost of systems;
- Energy consumption costs;
- Maintenance and custodial costs;
- Life expectancy (may require life expectancy of subsystems);
- Replacement costs (if applicable);
- Total cost of ownership over twenty-five (25) years.

We have assumed that the following will be made available to us;

- Cost estimates prepared by the design teams or KBS – we will assume these are accurate representations of construction cost for each building.
- Energy model outputs and source files for the Path A buildings. Again, we will assume these are accurate representations of the final systems included within the building.
- Responses from the facilities team to a request for information that we'll be developing. This request will include details on current maintenance programs, current custodial costs and contact details for some of the contracting firms used by the Campus.
  Industry benchmarks or publically available information will be utilized as needed to supplement the information above.

We will identify escalation percentages to use for maintenance, energy and construction costs and confirm these with Facilities / KBS.

We have assumed that we will prepare energy models for the LADM Renovation and SSA Renovation. Remaining energy cost numbers will be derived from the T-24 compliance models that the building design teams have already developed for each project.

We have assumed that the majority of construction costing will be completed by the design team's cost estimator, however, we have assumed that the design alternatives may be completed by Arup. We will either use our own in house cost estimation group for this work or appoint a sub-consultant – CP O'Halloran Associates Inc., a local firm we've collaborated with on many previous projects.

We propose to begin our scope by using one of the Track A buildings as a "pilot" project to lock down process, detail and format, confirming these with Facilities and KBS before moving onto the other projects.

2 Meetings

We have assumed the following meetings;

- Kick off meeting with the Campus and KBS to discuss scope and anticipated schedule
- Meeting with facilities to discuss our request for information
- Progress meeting with KBS and Facilities once we have developed our approach for one of the Path A buildings to ensure this meets the campuses requirements. This will be designated as a "pilot" project and the process and templates developed will be replicated on the remaining buildings
- A final meeting with Facilities and KBS to discuss the results of the "pilot" project.
- ~~A meeting with the design teams of the Path B buildings at the 100% SD stage to understand what design alternatives we should evaluate~~
- ~~A meeting with the design teams of the Path B buildings at the 100% DD stage to understand what design alternatives we should evaluate~~
- A progress meeting when we are approximately 50% of the way through ~~both~~ Track A ~~and Track B~~ buildings
- A final meeting to present results from all buildings

We are estimating a total of 12 meetings above.

3 Deliverables

We will provide a brief memo summarizing the Life Cycle Cost implications of each of the design alternatives that we evaluate.

The final LCCA for each building shall be provided in a report.

Formatting options for this report should be discussed during the kick off meeting – we would like to understand how our work will be communicated to the wider community as this will greatly influence the report format and the level of detail included.

4 Schedule

We propose to discuss schedule at the kick off meeting but we estimate that it will take four to five weeks per building to develop the final LCCA following receipt of all information and data from KBS, Facilities and the Design Team. More intense buildings – such as the New Science Center, may take up to six weeks. We have the capacity to evaluate two building simultaneously, making the overall schedule between 15 to 20 weeks. We strongly recommend that the project is started using the "pilot building" approach so that all process and format decisions can be confirmed.

5 Fees

Since some of the scope described previously is variable, we would propose to complete this work under a time and materials agreement to an upper limit and using the following rates;

Principal	$210
Project Manager	$195
Cost Estimator	$180
Senior Consultant	$190
Engineer	$165
A/V Consultant	$165
Administrative Assistant	$75

Our proposed upper limit for this work is as described in the schedule below.

Project	Track	Recommended upper limit
PE Complex	A	$20,805
Crafton Center	A	$27,510
New Science Building	A	$29,565
LADM	A	$20,995
SSA	A	$11,100
OE2	A	$26,540
	Total	$136,515

Upper limits assume that all buildings will be within Arup scope. There are meetings and effort that has been assumed to be common so that economies of scale can be realized.

Specifically, we are assuming that the first "pilot project" will be utilized to gather rates, escalations, contractor costs, maintenance frequencies and all of the other information that will be needed to develop the LCCA. The pilot project will also be used to define the level of detail needed and the format of the deliverable, as well as the set-up of calculation spreadsheets. This information will then be applied to the remaining buildings. It is assumed that the added effort spent on the pilot project will be reclaimed through more efficient workflow on the later projects.

6 Expenses

Expenses will be per our current agreement with the District. Sub-consultant costs will be invoiced direct to the District and are included in our T&M limits on the previous page.

7 Terms and Conditions

We assume this work will be completed under the terms and conditions that are currently being utilized for our LEED and Commissioning work with the District. We note however that due to staffing changes, a need for additional skills on this LCCA project and two iterations of salary reviews since we signed these terms and conditions in March, 2012, Exhibit A – the hourly rate schedule will need updating for the LCCA scope.

We also note that the results from our LCCA work will be as accurate as we can make them based on the input information we receive. There are many factors that can affect the

total cost of ownership of buildings which are out of our control. Estimates provided by Arup are non-binding and not guaranteed.

We trust that this proposal is in line with your expectations Brooke and are happy to discuss should you have any comments. If you are in agreement, please sign the authorization on the following page and return this to us.

We look forward to continuing to collaborate with you and SBCCD.

Yours sincerely,

Martin Howell
Associate

cc Mark Seaburg - Arup

Authorization: If the terms of this proposal are acceptable, please sign and return a signed copy of this proposal to us. This proposal and agreement shall be valid for 60 days from the date of the proposal.

Kitchell/BRj/Seville

11711 Sand Canyon Road

Yucaipa, CA 92399

Brooke Duncan, Sr. Project Manager

Signed:_____

Date:_____

Return to:
Arup North America Limited
12777 West Jefferson Blvd
Los Angeles, CA 90066
Attn: Martin Howell

Your ref
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Brooke Duncan,
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11711 Sand Canyon Road
Yucaipa, CA 92399

June 7th, 2013

Dear Brooke,

San Bernardino Community College District, Valley College - Life Cycle Costing

Rev 1, June 14th, 2013: Update per comments received from KBS via e-mail on June 12th.

Thank you for the opportunity to submit a proposal for consulting services related to completing life cycle cost studies for six projects at Valley College. We understand that these studies are required for bond funded projects to communicate value and sustainable stewardship to the community and well as indicate a balance between first cost and operational costs.

We firmly believe that our prior experience on similar project types coupled with our knowledge of the buildings at Valley College and knowledge of design and client teams will allow us to deliver this scope efficiently and to a high quality.

1 Scope of work

A Life Cycle Cost Analysis (LCCA) shall be performed/updated on design alternatives for Building Envelope, HVAC Systems and Equipment, Plumbing and Electrical (normal and low-voltage) Systems as directed by facilities staff or KBS.

Due to some of the buildings being close to receiving DSA approvals whilst others are at an earlier stage of design, we propose to undertake two approaches as follows;

Path A: This will be for those buildings where there are no more design options being evaluated. Our approach here will be to document the expected LCC at 25 years with no alternates being considered. For the purpose of this proposal, we have assumed that this applies to the Auditorium, Business Building Renovation and Central Plant.

Path B: This path will apply to those projects that are at an earlier stage of design where LCC evaluations of design alternatives will help inform the design process. For these projects, we've assumed that we'll be performing the LCCA at 100% SD and 100% DD as

well as documenting a final LCCA. We've assumed that up to three alternatives will be evaluated at the SD and DD stages as directed by the Campus / KBS. An alternative may include for example evaluating lighting options to compare a less and more efficient technology or evaluating glazing to again compare a less or more efficient option. The Path B approach will apply to the Tech Building Renovations and the Gym which we assume will require some element of redesign once it restarts.

The LCCA shall include:

- Initial cost of systems;
- Energy consumption costs;
- Maintenance and custodial costs;
- Life expectancy (may require life expectancy of subsystems);
- Replacement costs (if applicable);
- Total cost of ownership over twenty-five (25) years.

We have assumed that the following will be made available to us;

- Cost estimates prepared by the design teams or KBS – we will assume these are accurate representations of construction cost for each building.
- Energy model outputs and source files for the Path A buildings. Again, we will assume these are accurate representations of the final systems included within the building.
- The source (modifiable) energy model for the PE building.
- Responses from the facilities team to a request for information that we'll be developing. This request will include details on current maintenance programs, current custodial costs and contact details for some of the contracting firms used by the Campus.
- Industry benchmarks or publically available information will be utilized as needed to supplement the information above.

We will identify escalation percentages to use for maintenance, energy and construction costs and confirm these with Facilities / KBS.

We have assumed that we will prepare energy models for the Tech Building Renovations as well as isolated energy estimates for up to three design alternatives at the 100% SD and 100% DD stage for these buildings and the Gym. Remaining energy cost numbers will be derived from the T-24 compliance models that the building design teams have already developed for each project.

We have assumed that the majority of construction costing will be completed by the design team's cost estimator, however, we have assumed that the design alternatives may be completed by Arup. We will either use our own in house cost estimation group for this work or appoint a sub-consultant – CP O'Halloran Associates Inc., a local firm we've collaborated with on many previous projects.

We propose to begin our scope by using one of the Track A buildings as a "pilot" project to lock down process, detail and format, confirming these with Facilities and KBS before moving onto the other projects.

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- A final meeting with Facilities and KBS to discuss the results of the "pilot" project.
- A meeting with the design teams of the Path B buildings at the 100% SD stage to understand what design alternatives we should evaluate
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We are estimating a total of 10 meetings above.

3 Deliverables

We will provide a brief memo summarizing the Life Cycle Cost implications of each of the design alternatives that we evaluate.

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Formatting options for this report should be discussed during the kick off meeting – we would like to understand how our work will be communicated to the wider community as this will greatly influence the report format and the level of detail included.

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Business Building	A	$24,400
Central Plant	A	$26,500
Tech Building Renovations	B	$25,450
Gym	B	$26,400
	Total	$129,150

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6 Expenses

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We trust that this proposal is in line with your expectations Brooke and are happy to discuss should you have any comments. If you are in agreement, please sign the authorization on the following page and return this to us.

We look forward to continuing to collaborate with you and SBCCD.

Yours sincerely,

Martin Howell
Associate

cc Mark Seaburg - Arup

Authorization: If the terms of this proposal are acceptable, please sign and return a signed copy of this proposal to us. This proposal and agreement shall be valid for 60 days from the date of the proposal.

Kitchell/BRj/Seville

11711 Sand Canyon Road

Yucaipa, CA 92399

Brooke Duncan, Sr. Project Manager

Signed:_____

Date:_____

Return to:
Arup North America Limited
12777 West Jefferson Blvd
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Attn: Martin Howell