

DONALD LUM ELEMENTARY SCHOOL

REPAIR AND REPLACEMENT STUDY

Alameda Unified School District



17 January 2018

1495.05



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Consultant Team

Architect: Quattrocchi Kwok Architects, Santa Rosa, CA

Structural Engineer: ZFA Structural Engineers, Santa Rosa, CA

Geotechnical Engineers: Miller Pacific Consulting Engineers, Petaluma, CA

Consulting Cost Estimator: Dan Bartlett, San Francisco, CA

PROJECT BACKGROUND

The Donald Lum Elementary School is a campus in the Alameda Unified School District (AUSD), located in Alameda, California. The campus consists of five buildings connected by covered walkways as well as blacktop, landscaping and parking areas. The buildings are wood and steel framing with wood and masonry vertical elements.

Miller Pacific Engineering Group performed soil testing at the site and subsequent liquefaction analysis. In their March 17, 2017 report, "Geotechnical Engineering Investigation-Evaluation of Liquefaction Risk and Liquefaction Induced Settlement Potential at Donald D. Lum Elementary School Campus", Miller Pacific found a high risk of liquefaction at the site with potential earthquake induced settlement of 5 to 10 inches due to soil liquefaction, with differential settlement of 3 to 7 inches across a given building footprint.

To evaluate the effects of liquefaction at the site, ZFA Structural Engineers analyzed perimeter and interior footings in their April 24, 2017 and May 17, 2017 reports. ZFA concluded that the existing shallow spread footings were not designed for such a loss of bearing and lack sufficient capacity to sustain the loss of bearing. The reports identify that the campus' lightly framed structures are susceptible to collapse due to these seismically induced foundation failures. The April 24, 2017 ZFA report states:

... the buildings will sustain more damage than they would otherwise be expected to during a large seismic event including partial building collapse and inoperable doors, thus severely limiting emergency exiting from the buildings. Both of these impacts are potential life-safety concerns.

The ZFA report concludes:

Unfortunately, given that the liquefiable soil occurs from near the surface down to approximately 50 feet, there does not appear to be a feasible mitigation technique for these existing buildings.

Based on the engineering reports, in May 2017 the AUSD Board of Trustees relocated Lum Elementary students to other AUSD schools.

Study Purpose

In September 2017, the District contracted with Quattrocchi Kwok Architects (QKA) and ZFA Structural Engineers to study the feasibility for the repair and replacement of the Donald Lum Elementary School. Specifically, the study investigates conceptual structural *repair* approaches and their costs to ameliorate the impacts of the site's liquefiable soils on the existing buildings as well as approaches to *replace* the school using enhanced foundations. Additionally, because of the potential for student enrollment growth, the District requested the study provide costs for a replacement campus at 150% of the school's current size.

EXECUTIVE SUMMARY

Below is a summary of findings for the three options studied.

Construction Budget Assumptions:

The costs below include building upgrades, new construction, enhanced foundations and site development. Costs are based on today's construction market and do not include escalation or new furniture. As a planning study, a design contingency of 20% is included within the costs. Additionally, non-construction or *soft-costs* at 30% of construction are included for costs such as testing, inspection, state and local agency fees, design & engineering and other costs associated with construction.

Summary Findings:

Option	Gross Bld. Area (SF)	Number of Classrooms	Number of Students	Budget Projection (Const. & Soft Costs)
ONE – Seismic Upgrade of Existing Campus	40,840	25	483	\$34.4 million
TWO – Campus Replacement	44,385	25	483	\$32.8 million
THREE – Enlarged Campus Replacement	67,110	38	up to 750	\$47.4 million

Conclusions:

As this report describes, the Option One work to seismically upgrade the existing campus is extensive and highly invasive. No room, finish or infrastructure system is untouched. Because of the difficulty of installing in existing buildings deep piles, concrete grade beams and new concrete slabs (up to 12-inches thick), the project costs *exceed* a similarly sized new campus on enhanced foundations.

In evaluating whether a building should be seismically upgraded or replaced, the State agency charged with funding public schools, the Office of Public School Construction (OPSC), will not fund seismic upgrades and related upgrade costs for more than 50% of a building's "replacement cost". Once the 50% replacement cost is exceeded, buildings should be replaced. For Lum Elementary School the cost of seismically upgrading the buildings is over 210% of the 50% replacement cost. Even with the best of value engineering exercises the seismic upgrade costs will never meet the replacement cost threshold.

Should the seismic upgrade of Lum Elementary School be considered, the campus is left with undersized classrooms, administration and multi-use/kitchen spaces. The cost to enlarge these important spaces would further increase costs for the seismic upgrade. Additionally, the seismic upgrade of existing buildings is more likely to have cost overruns due to unforeseen conditions than new construction.

Options 2 and 3 provide alternatives that demolish the existing campus and install new buildings on enhanced foundations of concrete piles, grade beams and thickened structural slabs. Foundation systems such as this are not uncommon for school sites underlain by liquefiable soils. New construction on enhanced foundations are acceptable to the Division of State Architect (DSA).

Regardless of which Option is selected, once completed the campus will comply with current seismic safety and DSA requirements.

When considering rehousing students at Lum Elementary, due to Option One costs, extended schedule and potential for cost overruns, plus the ability to provide properly sized spaces in other options, it is recommended that Options 2 or 3 be pursued.

EXISTING CAMPUS

At the time of its closing, the Donald Lum Elementary School housed 483 students in 25 classrooms. The school's existing areas are follows:

Building	Basic Spaces	No. Clsrms.	Gross Area	
Building 1	Classrooms & Toilet Rooms	5	6,880 SF	
Building 2	Classrooms & Toilet Rooms	5	6,880 SF	
Building 3	Classrooms & Toilet Rooms	5	6,880 SF	
Building 4	Library/Media & Classrooms	5	7,050 SF	Library not counted as classroom
Building 5	Administration & Multi Use/ Kitchen	0	7,550 SF	
Portables	Classrooms (excl. preschool portable)	5	5,600 SF	
TOTALS		25	40,840 SF	

The AUSD 2014 Facility Master Plan for the campus identified additional classrooms for growth, classroom modernization, infrastructure improvements, improved administration and multi-use spaces and significant accessibility upgrades to toilet rooms and site paving.



OPTION ONE

SEISMIC UPGRADE TO EXISTING CAMPUS

Option One provides a campus-wide seismic upgrade including code required upgrades for structural, fire-life safety and accessibility to the buildings and site. The objective of this option is to study the cost implications to retain existing buildings and upgrade to meet minimum Division of State Architect requirements for a seismic retrofit. For the seismic upgrade work, only costs associated with the foundation upgrade were studied, however it is expected there will be DSA required upgrades to structural framing members and connections. Additionally, seismic upgrades to existing buildings triggers requirements for fire-life safety and accessibility upgrades to meet current code.

Upon completion of the seismic upgrade work, existing campus deficiencies will remain including undersized classrooms, library, administration and multi-use/kitchen along with low toilet room fixture counts. For purposes of comparison to a replacement campus, no area was added to ameliorate these space deficiencies, but it is highly recommended that these be addressed should the seismic upgrade option be pursued. No additional area was provided in Option One.

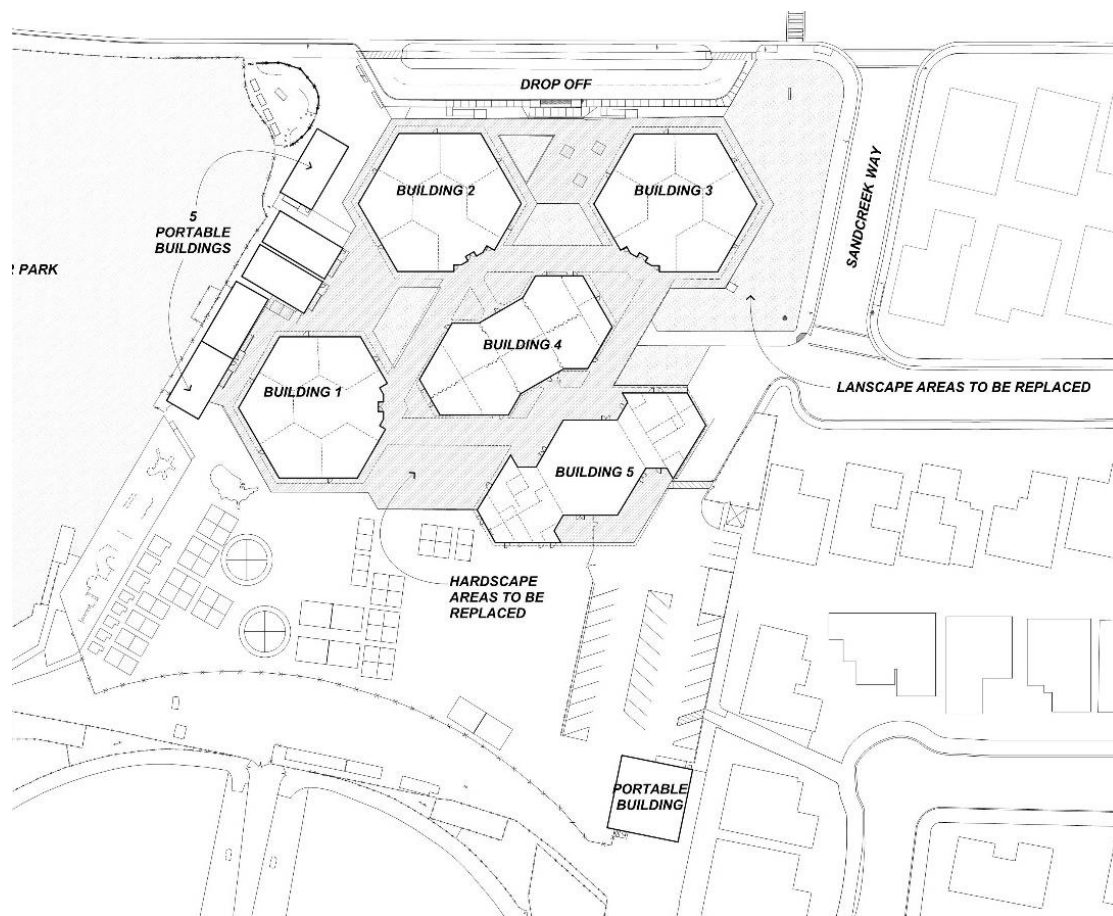
Scope of Campus Seismic Upgrade

The work required to seismically upgrade the existing campus buildings is extensive and highly invasive. No room, finish or infrastructure system is untouched. The extent of seismic upgrade triggers requirements for fire-life safety and accessibility upgrades to meet current codes. These fire-life safety and accessibility upgrades are included in the Option One scope and cost estimates. As the cost estimates show, the work for Option One far exceeds the State standard to trigger building replacement; when the upgrade costs exceed 50% of the replacement cost.

ZFA Structural Engineers' narrative and sketches for the seismic upgrade are in the Appendix and describes the extent of the foundation upgrades. In general, the work requires:

- Use of deep driven precast concrete piles as recommended by the Geotechnical Engineer
- Removal of portions of covered walks, exterior walls and large areas of roof framing to provide access for heavy pile-driving equipment
- Removal of all 4 and 5-inch concrete slab-on-grade floors and replace with 10 and 12-inch new structural slabs, including under existing walls. New slabs provided with double mats of reinforcing steel
- Installation of numerous concrete grade beams, including under existing walls
- Installation of adhesive dowels from new grade beams to existing foundations
- Removal of all interior finishes and many non-structural walls to allow access
- Replacement of most or all building plumbing, gas piping and electrical/signal systems
- Removal and subsequent replacement of mechanical mezzanine and equipment.
- Interior demolition of current toilet rooms and reconfiguration for accessibility
- New roof framing and roofing
- Interior finishes, fixtures and most casework replaced
- Existing portable classrooms provided with new concrete pile and grade beam foundations including moving and reinstalling the portables
- Due to the amount of construction disruption and need for improved accessibility, all existing paving is replaced with new, however the blacktop area is presumed to be reused for the upgraded campus

Building	Spaces Seismically Upgraded	No. Clrms.	Gross Area
4-Pods & Portables	Classrooms, Library, Toilets & Support	25	33,290 SF Library not count as clsrn.
Admin. & MU	Administration, Multi-Use, Stage & Kitchen	0	7,550 SF
TOTAL		25	40,840 SF
Area of concrete flatwork to be replaced:		31,800 SF	
Landscape area to be replaced:		14,650 SF	



OPTION ONE – Campus Diagram

DSA Minimum Seismic, Fire-Life Safety and Accessibility Upgrades

PROJECT COST BUDGET

OPTION ONE – Seismic Upgrade to Existing Campus

Below is an estimated Project Budget for Option One. With the similarity of seismic upgrade work to all permanent buildings, the detailed cost estimate for Classroom Building 1 was used as a cost bases for the other permanent buildings.

Building	Area	\$/SF	Cost
Classroom Building 1	6,880 SF	592.93	\$4,079,361
Classroom Building 2	6,880 SF	592.93	4,079,361
Classroom Building 3	6,880 SF	592.93	4,079,361
Classroom Building 4	7,050 SF	592.93	4,180,159
Administration & Multi-Use Building 5	7,550 SF	592.93	4,476,624
Portable Buildings	5,600 SF	221.62	1,241,085
Subtotal Buildings	40,840 SF		\$22,135,949
Covered Walkway	10,070 SF	303.28	3,054,032
Sitework	46,450 SF	27.52	1,278,498
Subtotal Sitework			\$4,332,530
			\$26,468,479
Non-Construction Costs	30%		\$7,940,544
TOTAL OPTION ONE - Seismic Upgrade to Existing Campus January 2018			\$34,409,023

The construction costs above are for January 2018 and do not include escalation to future year of construction. Additionally, non-construction or "*soft-costs*" are included for costs such as testing, inspection, state and local agency fees, design & engineering and other costs associated with construction. No allowance is provided for new furniture or equipment.

Included in Construction Costs:

Contractor General Conditions	9.00%
Contractor's Fee	7.00%
Design Contingency	20.00%
Escalation to Future Construction	0.00%

See Appendix A for further estimate detail

OPTION TWO

CAMPUS REPLACEMENT – At Existing Enrollment

Option Two provides a replacement campus equal in student capacity and facilities to the existing campus including number of classrooms, size of administration and multi-use/kitchen building and similar area of site improvements. This allows a side-by-side comparison between seismically upgrading the existing campus and a comparably sized campus replacement.

The area of existing permanent classrooms range between 855 and 940 square feet and are below current State standards of 960 square feet. The replacement campus Option Two uses 960 square foot classrooms, as this will be required in a replacement school. Similarly, the replacement campus provides larger toilet room areas, as this will be required by code at time of the new construction. Thus, the replacement Option Two contains more square footage than the repair Option One.

The current sizes of the library, administration and multi-use/kitchen are smaller than desired for a 483-student campus. While we highly recommend enlarging these spaces, should the replacement campus option be selected, for sake of comparison with seismically upgrading the campus, these support facilities areas were left at the existing campus' size, as it is not strictly required for them to be enlarged at the time of new construction.

Scope of Campus Replacement

The campus replacement option includes demolition of existing buildings including portable classrooms and construction of new two-story classrooms. A new single-story administration and multi-use/kitchen building would also be constructed. Due to the amount of construction disruption and need for improved accessibility, all existing paving and landscaping are replaced with new, however the blacktop area is presumed to be reused for the replacement campus.

The ZFA Structural Engineers' narrative and sketches for the replacement campus are in the Appendix and describe the enhanced foundation needed for the replacement campus. In general, the foundations will be deep precast concrete piles with grade beams and thickened slabs. This foundation system is consistent with the geotechnical engineer's recommendations due to the site's liquefiable soils.

While reflective of the needed replacement building areas, the replacement campus diagram is for study and estimating purposes only and is not intended to be the actual design. The new classroom buildings provide State standard 960 square foot classroom, and are two-story construction; to mitigate the area of expensive foundations and to preserve site area. The new classroom buildings are anticipated as pre-engineered buildings, consistent with recent District classroom projects. As noted above, areas for the administration and multi-use/kitchen match the existing areas for cost comparison purposes only.

Building	Basic Spaces	No. Clrms.	Gross Area	
3-Classroom Wings	Classrooms, Library, Toilets & Support	25	36,835 SF	Library not counted as clsm.
Admin. & MU	Administration, Multi-Use, Stage & Kitchen	0	7,550 SF	
TOTAL		25	44,385 SF	

New Landscape/Hardscape Areas 68,280 SF



OPTION TWO – Replacement Campus Diagram

This replacement campus diagram is for study & estimating purposes only and is not intended to be the actual design

PROJECT COST BUDGET

OPTION TWO – Campus Replacement

Below is an estimated Project Budget for Option Two. The estimated cost of new two-story classroom buildings is based on a high quality pre-engineered building with deep concrete piles, two-foot by three-foot grades beams and thickened concrete slab as indicated in the ZFA report, located in the Appendix. The new Administration and Multi-Use building is estimated based on site-built construction on a similar enhanced foundation system.

Building	Area		\$/SF	Cost
Two Story Classroom Buildings (Folia)	36,835	SF	468.00	\$17,238,780
Admin & Multi-Use	7,550	SF	650.00	4,907,500
Subtotal Buildings	44,385	SF		\$22,146,280
Sitework	68,280	SF	45.29	3,092,685
Subtotal Sitework				\$3,092,685
				\$25,238,965
Non-Construction Costs	30%			\$7,571,689
TOTAL OPTION TWO - Campus Replacement January 2018				\$32,810,654

The construction costs above are for January 2018 and do not include escalation to future year of construction. Non-construction or "*soft-costs*" are included for costs such as testing, inspection, state and local agency fees, design & engineering and other costs associated with construction. No allowance is provided for new furniture or equipment.

Included in Construction Costs:

Contractor General Conditions	9.00%
Contractor's Fee	7.00%
Design Contingency	20.00%
Escalation to Future Construction	0.00%

See Appendix A for further estimate detail

OPTION THREE

ENLARGED CAMPUS REPLACEMENT

Option Three provides a replacement campus enlarged from the existing classroom count by 50% to accommodate an increased student capacity. This provides an increase from the existing 25-classrooms to 38-classrooms including standard classrooms, special education and specialty classrooms such as art, science and music. Additionally, the library, administration and multi-use/kitchen spaces are similarly enlarged to accommodate the increased student capacity. Using the current enrollment of 483 students, the enlarged campus can accommodate up to 750-students. The replacement campus uses 960 square foot classrooms and code complying toilet rooms, as these will be required in a replacement school.

Scope of Campus Replacement

Similar to Option Two, the campus replacement option includes demolition of existing buildings including portable classrooms and construction of new two-story classrooms. A new single-story administration, multi-use/kitchen building would also be constructed. Due to the amount of construction disruption and need for improved accessibility, all existing paving and landscaping are replaced with new, however the blacktop area is presumed to be reused for the replacement campus. To increase play area for the larger campus, the current playground blacktop is expanded on the southern edge of the campus.

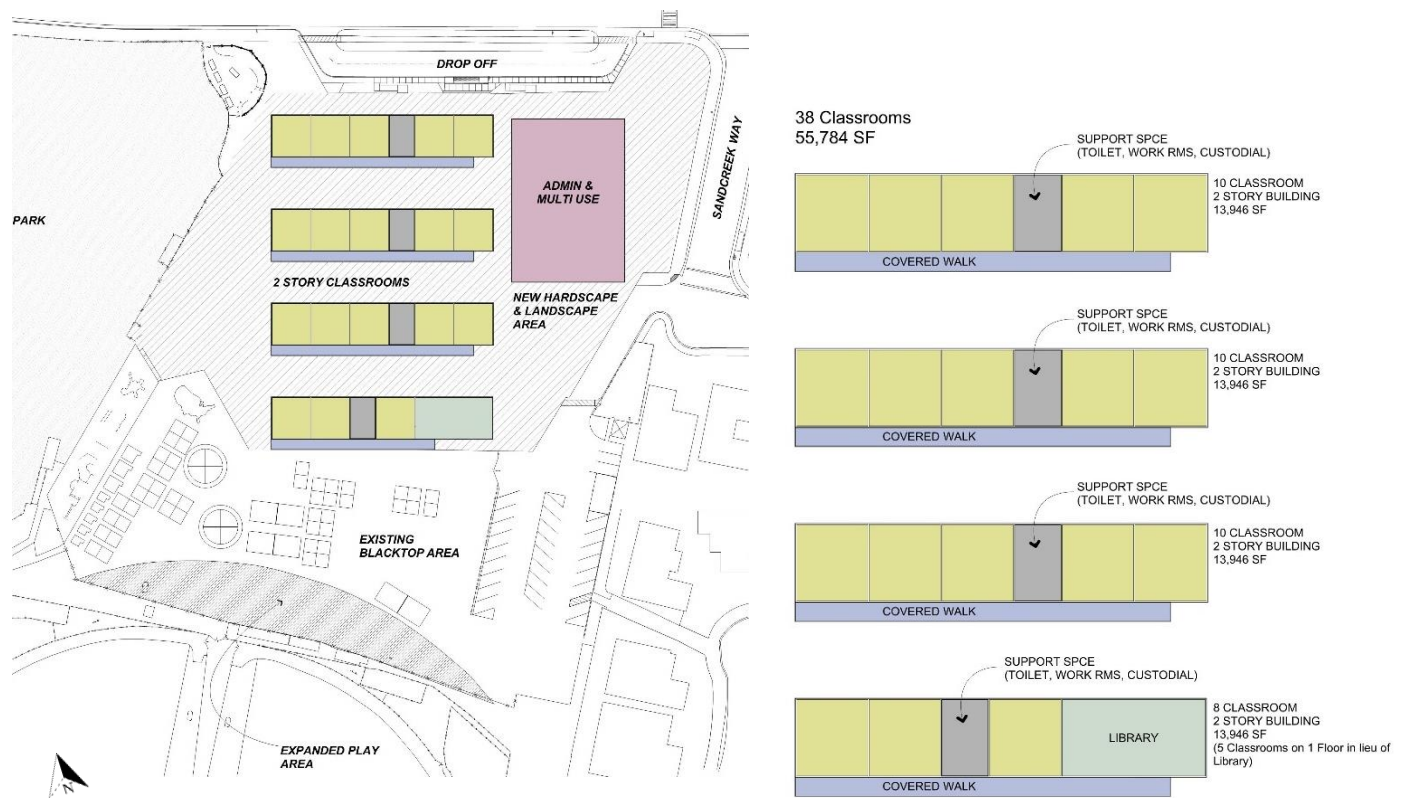
The ZFA Structural Engineers' narrative and sketches for the replacement campus are in the Appendix and describe the enhanced foundations needed for the replacement campus. In general, the foundations will be deep precast concrete piles with grade beams and thickened slabs. This foundation system is consistent with the geotechnical engineer's recommendations due to the site's liquefiable soils.

While reflective of the needed replacement building areas, the replacement campus diagram is for study and estimating purposes only and is not intended to be the actual design. The new classroom buildings provide State standard 960 square foot classroom, and are two-story construction; to mitigate the area of expensive foundations and to preserve site area. The new classroom buildings are anticipated as pre-engineered buildings, consistent with recent District classroom projects.

Building	Basic Spaces	No. Clsrms.	Gross Area	
4-Classroom Wings	Classrooms, Library, Toilets & Support	38	55,785 SF	Library not counted as clsrms.
Admin. & MU	Administration, Multi-Use, Stage & Kitchen	0	11,325 SF	
TOTAL		38	67,110 SF	

New Landscape/Hardscape Areas 60,000 SF

To increase playground space, the new landscape/hardscape area includes expanded site area and retaining wall along the southern edge of campus.



OPTION THREE – 50% Increase Replacement Campus Diagram

This replacement campus diagram is for study & estimating purposes only and is not intended to be the actual design

PROJECT COST BUDGET

OPTION THREE – Enlarged Campus Replacement

Below is an estimated Project Budget for Option Three. The estimated cost of new two-story classroom buildings is based on a high quality pre-engineered building with deep concrete piles, two-foot by three-foot grades beams and thickened concrete slab as indicated in the ZFA report, located in the Appendix. The new Administration and Multi-Use building is estimated based on site-built construction on a similar enhanced foundation system.

Building	Area		\$/SF	Cost
Two Story Classroom Buildings (Folia)	55,785	SF	468.00	\$26,107,380
Admin & Multi-Use	11,325	SF	650.00	7,361,250
Subtotal Buildings	67,110	SF		\$33,468,630
Sitework	60,000	SF	49.99	2,999,236
Subtotal Sitework				\$2,999,236
				\$36,467,866
Non-Construction Costs	30%			\$10,940,360
TOTAL OPTION THREE				
Enlarged Campus Replacement - January 2018				\$47,408,226

The construction costs above are for January 2018 and do not include escalation to future year of construction. Non-construction or "*soft-costs*" are included for costs such as testing, inspection, state and local agency fees, design & engineering and other costs associated with construction. No allowance is provided for new furniture or equipment.

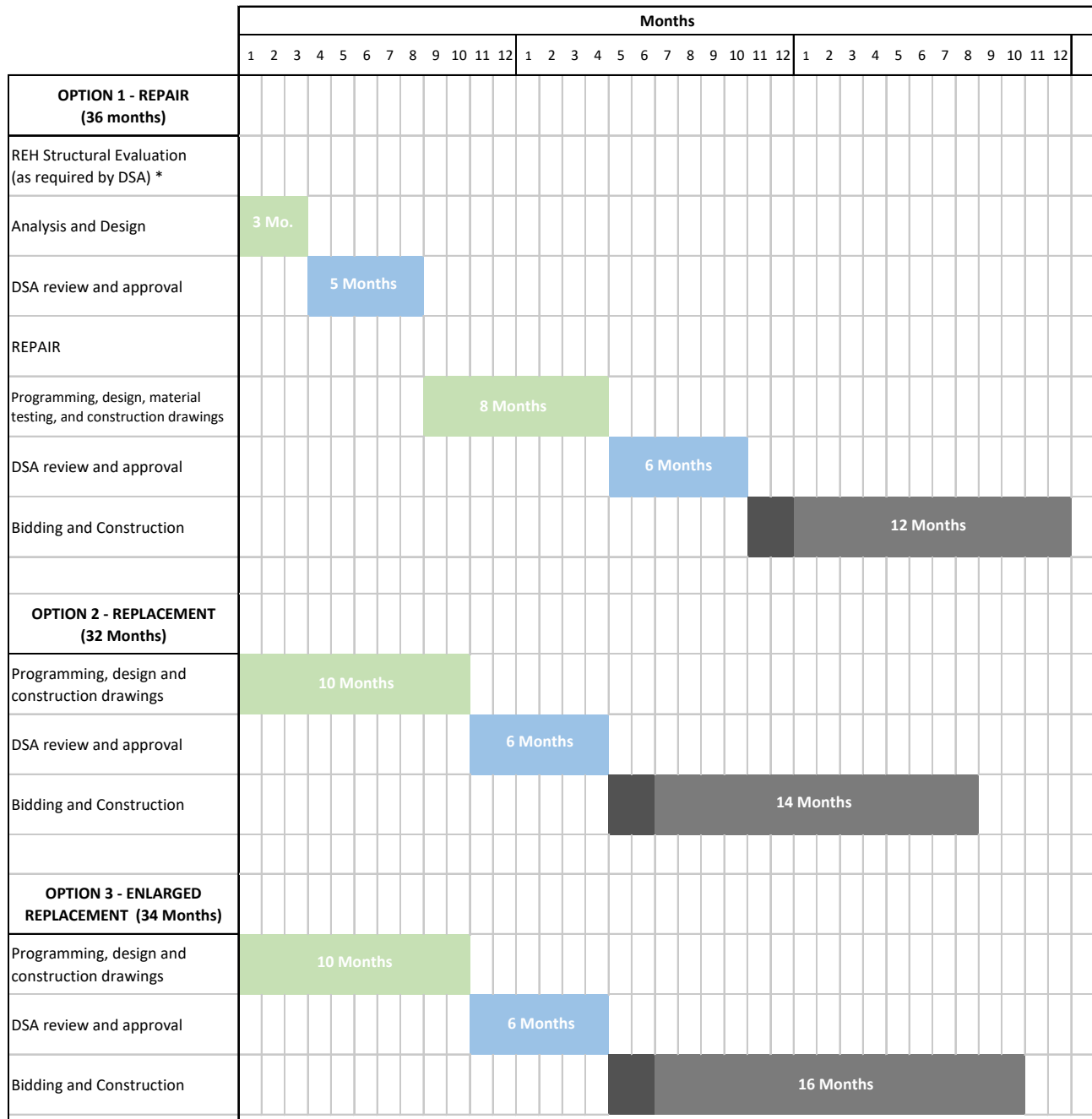
Included in Construction Costs:

Contractor General Conditions	9.00%
Contractor's Fee	7.00%
Design Contingency	20.00%
Escalation to Future Construction	0.00%

See Appendix A for further estimate detail

OUTLINE PROJECT SCHEDULES

These schedules indicate the approximate time to implement the three options.



Notes:

* REH is an DSA review process that is required for the approval of rehabilitation and repair project evaluation and Design Criteria Report. The REH process must be completed and approved by DSA prior to commencing the repair project itself.

APPENDIX

Foundation Narrative & Diagrams by ZFA Structural Engineers

Cost Estimating Report by Consulting Cost Estimator Dan Bartlett

ZFA STRUCTURAL ENGINEERS

Donald Lum ES - Foundation Exercise

Notes	SCH/CSW	17135.01	12/6/17	S1
SECTION	Page / Tot	Page / Tot	Date	Page

Scope

The purpose of the following drawings are to provide hypothetical foundation plans to compare retrofitting the existing building foundations vs constructing new buildings. These plans are for hypothetical cost estimation purposes only.

Due to thick liquefiable soil layers underlying the campus, significant post-liquefaction differential settlement has been identified by the Geotechnical Engineer. The existing buildings are constructed with conventional shallow foundations and slabs-on-grade which are not capable of accommodating the differential settlement without structural damage and reduced serviceability of the structures (e.g. inoperable doors & windows).

The use of precast concrete piles is per recommendations provided by the Geotechnical Engineer.

Covered Walkways

The campus buildings are inter-connected with a series of covered walkways. These walkways are founded on either shallow pad footings or short piers. Foundation remediation is likely required for these elements due to the liquefaction hazard, however that remediation is out of the scope of this report.

Exterior concrete flatwork immediately surrounding the buildings is not within the scope of this report (except that which is integral to the existing Admin & Multi-Purpose Building). Settlement compatibility of the flatwork and the stiffened (E) building slab/foundation will likely need to be addressed.

Equipment Access

Portions of exterior walls and roof framing will need to be removed to provide access for pile-driving heavy equipment. The plans within this report include assumed areas that will need to be removed for access, however additional areas of removal may be required based on size of contractor-provided equipment.

Access through the site will need to be provided for pile-driving and other heavy-equipment. Portions of the covered walkways will likely need to be removed entirely for access.

Material Specifications

At grade beams & structural slab:

Concrete = 4,000psi

Reinforcing = ASTM A615 or A706, Grade 60

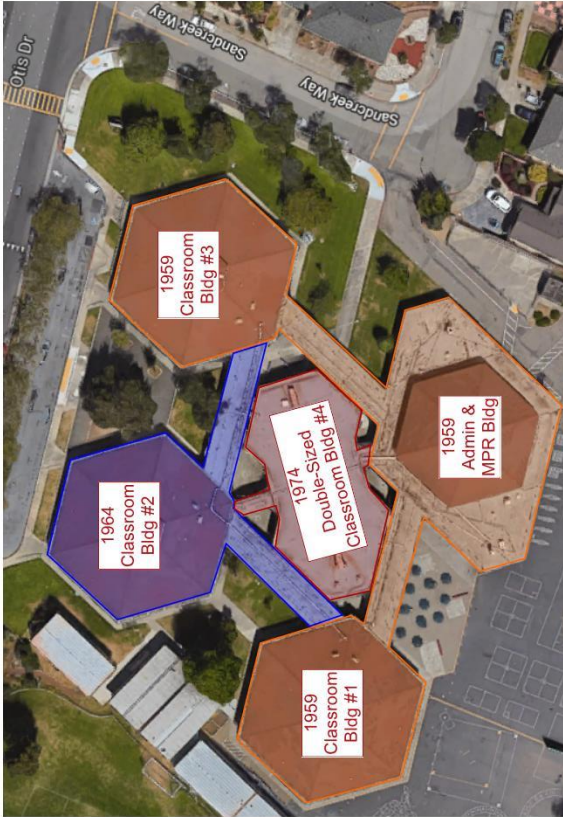
Precast concrete piles: contact Geotechnical Engineer for specification

Adhesive Dowels

Where new grade beams are in contact with existing continuous footings or pad footings, provide horizontal #5 adhesive dowels top & bottom spaced at 16"oc. At pad footings reduce dowel spacing to 12"oc.

Dimensions

Approximate dimensional scales are as indicated at plan views. For more precise dimensions, reference original construction drawings.



SHEET INDEX

- S1 - Notes
- S2 - (E) Classroom Building - Foundation Retrofit
- S3 - (E) Double-Sized Classroom Bldg - Foundation Retrofit
- S4 - (E) Admin & Multi-Purpose Building - Foundation Retrofit
- S5 - (N) Building Foundation

ZFA STRUCTURAL ENGINEERS

Donald Lum ES - Foundation Exercise

TITLE PROJECT NAME
SCH/CSW 17135.01 DATE 12/6/17
JOB
PAGE 2 OF 2 S2

(E) Classroom Building - Foundation Retrofit

SECTION

To allow for pile-driving equipment access, remove & replace (E) roof framing as required except for structural steel beams, typical

16"x32" grade beam, each side of (E) footing
OR
Remove (E) footing for single 32"x32" grade beam
TOTAL REINF: (8) #8 T&B - #4 stirrups @ 12"oc

48"x32" grade beam - (10) #8 T&B, #4 stirrups @ 10"oc

Replace entire interior portion of (E) 4" slab on grade with 10" structural slab - #6 @ 12"oc primary, #5 @ 24"oc transverse, T&B

(E) storefront or wood-framed wall, typical

(E) 8" CMU wall, diagonally hatched, typical

30"x36" grade beam - (6) #7 T&B, #4 stirrup @ 16"oc

18"x32" grade beam - (4) #6 T&B, #4 stirrup @ 16"oc

14" SQ x 90ft precast concrete pile, typical

(E) pad footing, typical

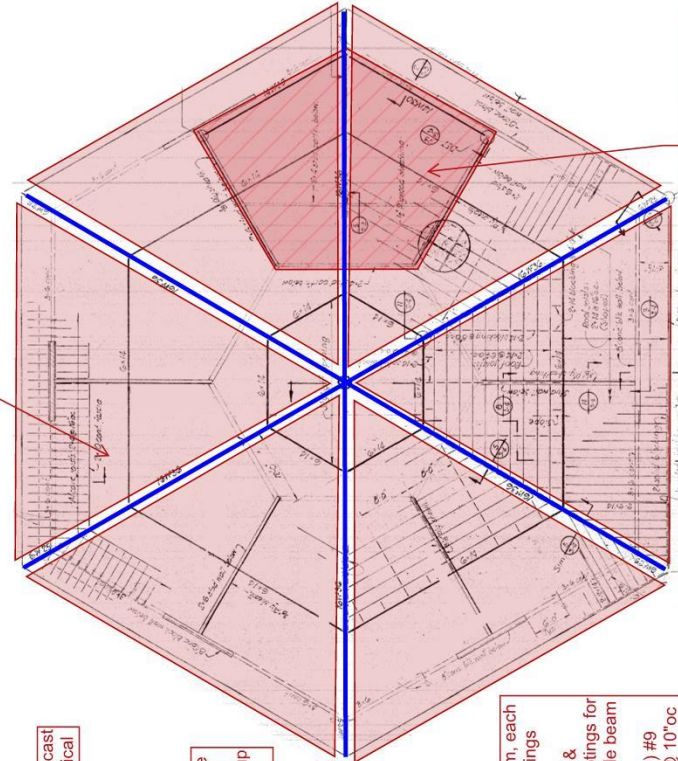
(E) continuous footing, typical

24"x36" grade beam, each side of (E) pad footings
OR
Shore (E) columns & remove (E) pad footings for single 48"x36" grade beam
TOTAL REINF: (10) #9 T&B - #4 stirrups @ 10"oc

To allow for pile-driving equipment access, remove & replace (E) interior walls and portions of exterior walls as required, typical

FOUNDATION PLAN
1/16" = 1'-0"

ROOF FRAMING PLAN
1/16" = 1'-0"



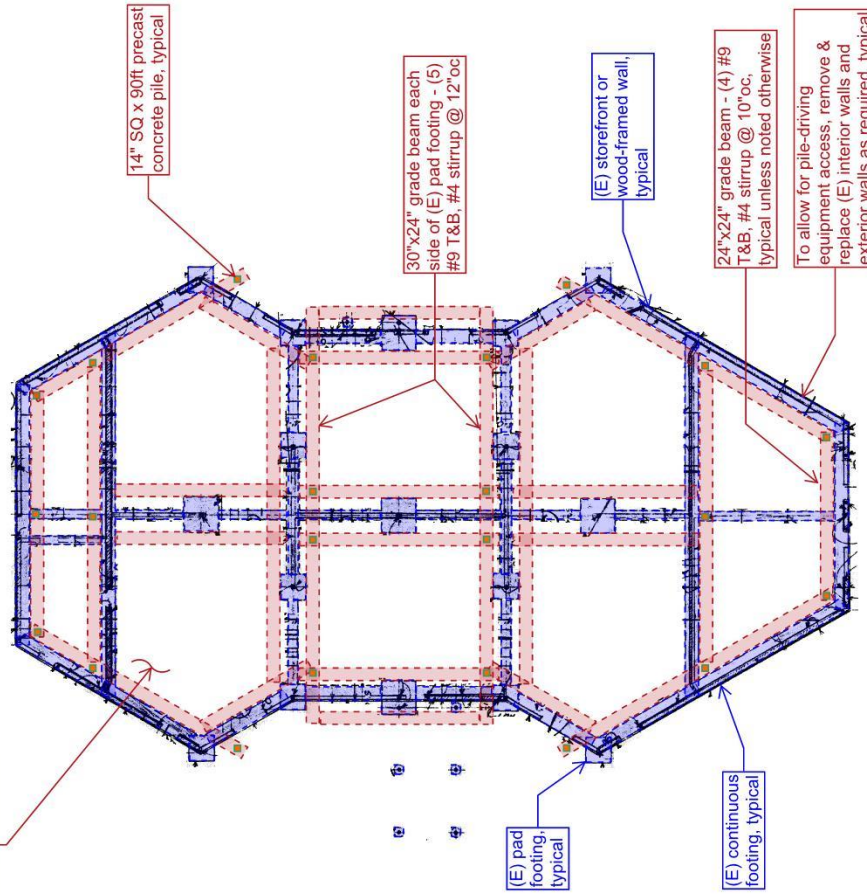
To allow for pile-driving equipment access, remove & replace all (E) mechanical mezzanine framing, typical

ZFA STRUCTURAL ENGINEERS

Donald Lum ES - Foundation Exercise

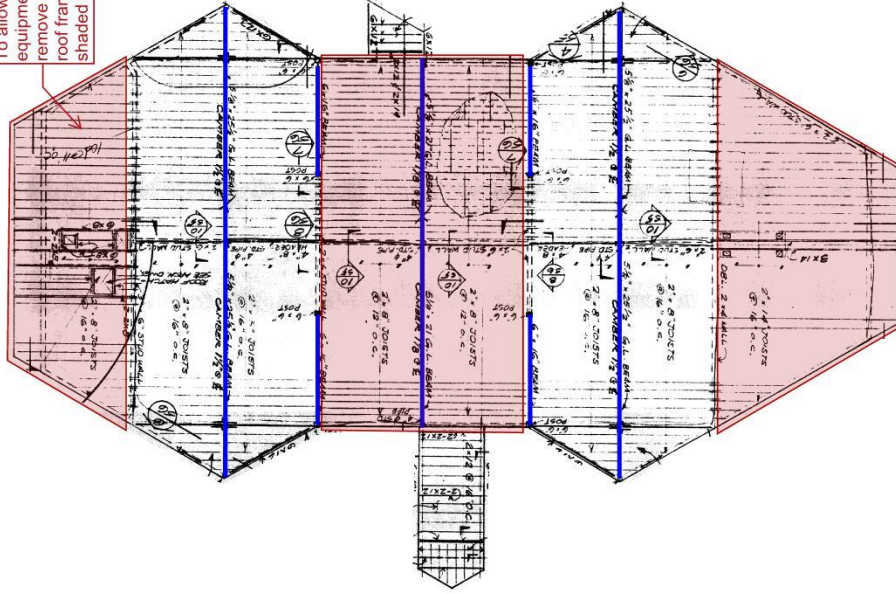
TITLE / PROJECT NAME	SCH/CSW	DATE	PAGE
(E) Double-Sized Classroom Bldg - Foundation Retrofit	17135.01	12/6/17	S3
SECTION	NOV / FOR		

Replace entirety of interior 5" concrete slab on grade with 12" structural slab - #7 @ 12"oc primary, #5 @ 24"oc transverse, T&B



FOUNDATION PLAN
1/16" = 1'-0"

To allow for pile-driving equipment access, remove & replace (E) roof framing, typical (3) shaded areas



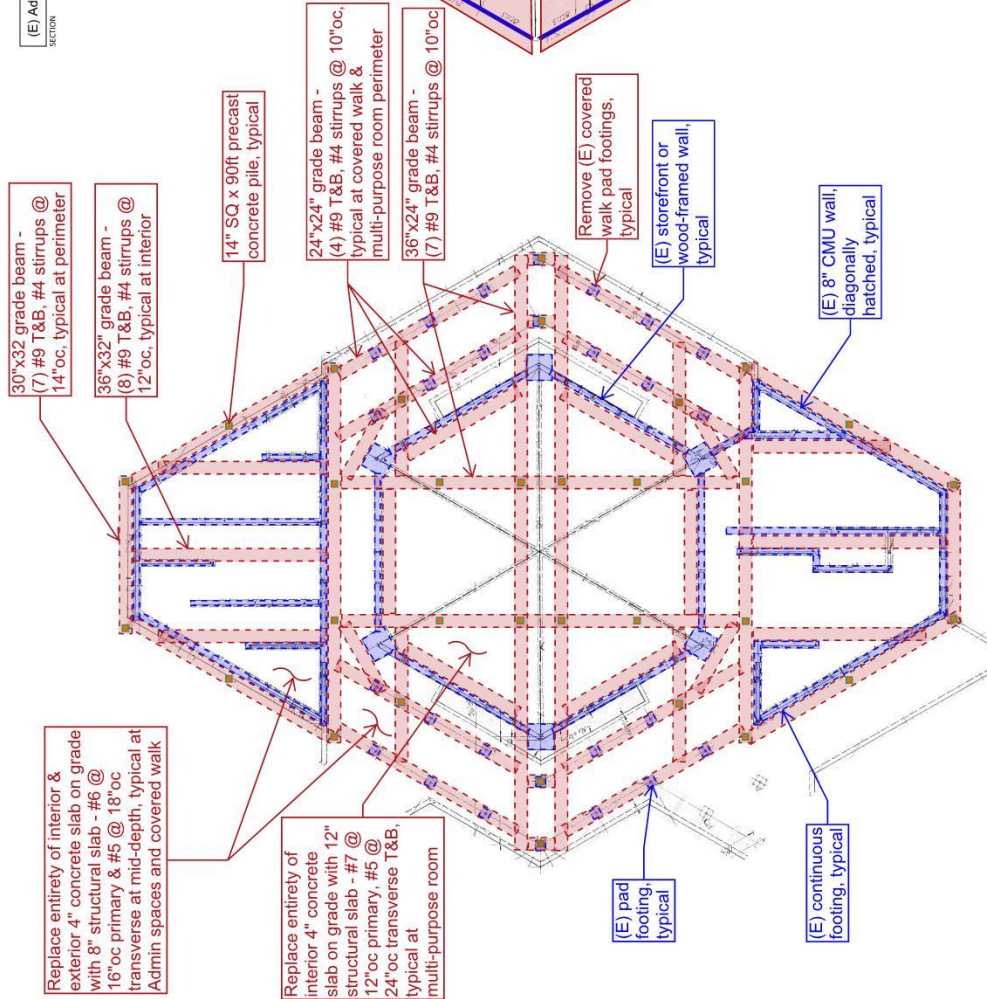
ROOF FRAMING PLAN
1/16" = 1'-0"

ZFA STRUCTURAL ENGINEERS

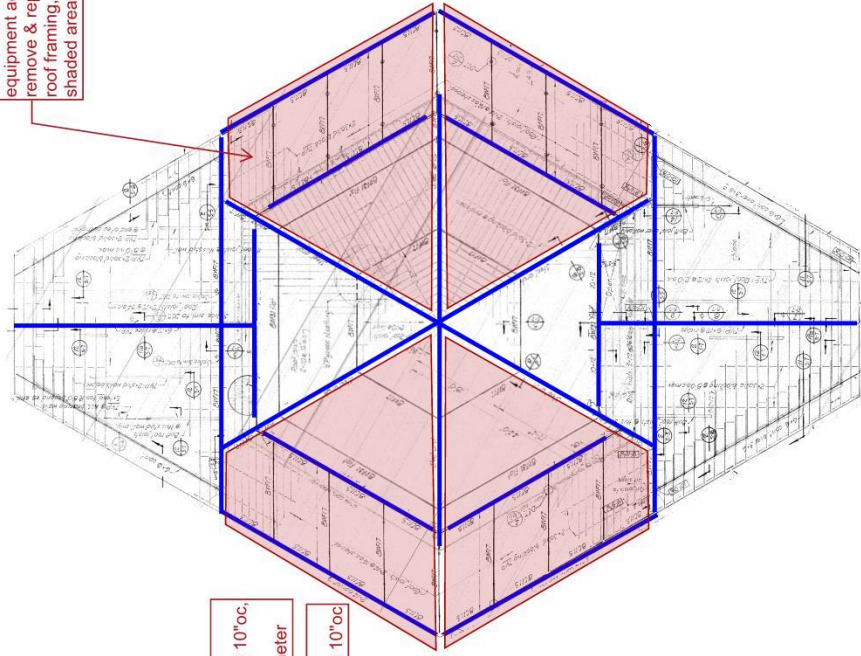
Donald Lum ES - Foundation Exercise

PROJECT NAME	DATE	PAGE
(E) Admin & Multi-Purpose Building - Foundation Retrofit	12/6/17	S4
SCH/CSW	17135.01	
NO. / FOR		

To allow for pile-driving equipment access, remove & replace (E) roof framing, typical (4) shaded areas



FOUNDATION PLAN
0.05" = 1'-0"

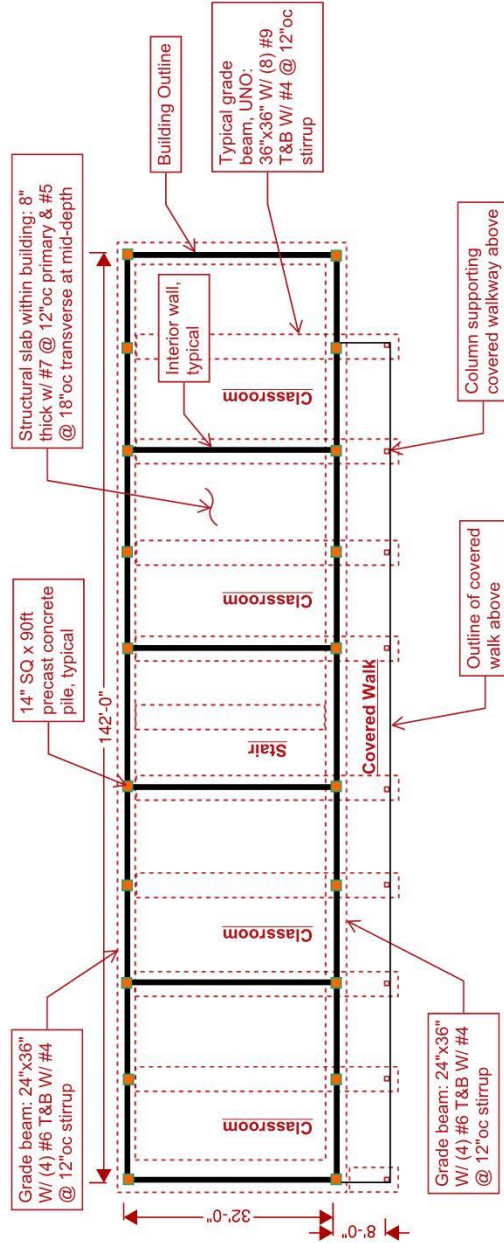


ROOF FRAMING PLAN
0.05" = 1'-0"

ZFA STRUCTURAL ENGINEERS

Donald Lum ES - Foundation Exercise

PROJECT NAME	DATE	PAGE
(N) Building Foundation	17135.01	S5
DESIGNER	DATE	
NBB/CSW	12/6/17	



FOUNDATION PLAN
1/16" = 1'-0"

NOTES:
Foundation design based on approximate weight and live loads of a two-story wood-framed shear wall superstructure.
For a single-story structure, the foundation configuration is the same (the majority of the building weight comes from the 1st floor structural slab & grade beam which is the same regardless of number of stories), except the covered walk portion may be omitted.

OPTION ONE

**Lum Repair & Replacement Study
Alameda Unified School District
Alameda, CA
Replacement Cost Estimate**

Project Summary

PROJECT COST BUDGET: Option One - Seismic Upgrade to Existing Campus

Building	Area		\$/SF	Cost
Classroom Building 1	6,880	SF	592.93	\$4,079,361
Classroom Building 2	6,880	SF	592.93	4,079,361
Classroom Building 3	6,880	SF	592.93	4,079,361
Classroom Building 4	7,050	SF	592.93	4,180,159
Administration & Multi-Use Building 5	7,550	SF	592.93	4,476,624
Portable Buildings	5,600	SF	221.62	1,241,085
Subtotal Buildings	40,840	SF		\$22,135,949
Covered Walkway	10,070	SF	303.28	3,054,032
Sitework	46,450	SF	27.52	1,278,498
Subtotal Sitework				\$4,332,530
				\$26,468,479
Non-Construction Costs	30%			\$7,940,544
TOTAL OPTION ONE - Seismic Upgrade to Existing Campus January 2018				\$34,409,023

Note: Estimate excludes construction contingency, FF & E, and soft costs.

**Lum Repair & Replacement Study
Alameda Unified School District
Alameda, CA
Replacement Cost Estimate**

Classroom Building 1 Summary (6,880 SF)

	Cost	Cost/SF
1.0 Foundations	\$610,800	\$88.78
2.0 Vertical Structure	0	0.00
3.0 Floor & Roof Structures	382,125	55.54
4.0 Exterior Closure	299,475	43.53
5.0 Roofing & Waterproofing	185,000	26.89
6.0 Interior Partitions, Doors & Glazing	141,000	20.49
7.0 Floor, Wall & Ceiling Finishes	235,425	34.22
8.0 Function Equipment & Specialties	216,775	31.51
9.0 Conveying Systems	0	0.00
10.0 Plumbing	138,420	20.12
11.0 Heating, Ventilating & Air Conditioning	275,200	40.00
12.0 Fire Protection Systems	48,160	7.00
13.0 Electrical Systems	309,600	45.00
14.0 Site Preparation & Demolition	72,765	10.58
15.0 Site Paving, Structures & Landscaping	0	0.00
16.0 Utilities on Site	0	0.00
Subtotal Costs	\$2,914,745	\$423.65
General Conditions	9.00% 262,327	
Contractor's Fee	7.00% 222,395	
Design Contingency	20.00% 679,893	
Escalation to Construction Midpoint	0.00% 0	
Total Construction Cost January 2018	\$4,079,361	\$592.93

Note: Estimate excludes construction contingency, FF & E, and soft costs.

Lum Repair & Replacement Study
Alameda Unified School District
Alameda, CA
Replacement Cost Estimate

Classroom Building 1 Estimate

	Quantity		Unit Price	Cost
1.0 Foundations				
Reinforced Concrete Foundations				
Excavate & Haul	450	CY	100.00	\$45,000
Formwork	1,840	LF	20.00	36,800
Reinf Steel 175#/CY	63,000	#	2.50	157,500
Concrete & Placing	360	CY	300.00	108,000
Dowels Connect (N) to (E) Grade beams	400	EA	50.00	20,000
Roughen Exist Conc	1,000	LF	15.00	15,000
Bonding Agent	1,000	LF	2.00	2,000
Demo Exist Footing	1,200	CF	25.00	30,000
Shore Columns	12	EA	500.00	6,000
Precast Concrete Piles 14" SQ x 90'	18	EA	7,500.00	135,000
Miscellaneous	1	LS	55,500.00	55,500
Subtotal 1.0 Foundations				\$610,800
2.0 Vertical Structure				
			None	
Subtotal 2.0 Vertical Structure				\$0
3.0 Floor & Roof Structures				
Remove/Replace Reinforced Concrete SOG 10"	8,385	SF	25.00	\$209,625
Remove/Replace for Heavy Pile-driving Equipment Access				
Mezzanine Floor Structure	1,100	SF	75.00	82,500
Roof Structure	1,200	SF	75.00	90,000
Subtotal 3.0 Floor & Roof structures				\$382,125
4.0 Exterior Closure				
Exterior Wall Assembly	2,000	SF	50.00	\$100,000
Paint CMU Walls	700	SF	2.50	1,750
Soffits	1,850	SF	2.50	4,625
Windows and Glazing	1,660	SF	85.00	141,100
Exterior Doors, Frames, & Hardware				
Flush Half Lite Single	7	Ea	3,000.00	21,000
Flush Half Lite Double	1	EA	6,000.00	6,000
Exterior Miscellaneous	1	LS	25,000.00	25,000

Subtotal 4.0 Exterior Closure					\$299,475
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5.0 Roofing & Waterproofing

Remove/Replace Roofing	9,250	SF	20.00	\$185,000	
Subtotal 5.0 Roofing & Waterproofing					\$185,000

6.0 Interior Partitions, Doors & Glazing

Partitions					
Studs, GWB Painted & Insulation	1,550	SF	25.00	\$38,750	
Interior Glazing	850	SF	85.00	72,250	
Interior Doors, Frames & Hardware					
Flush Single	6	Ea	2,500.00	15,000	
Flush Half Lite Single	5	Ea	3,000.00	15,000	
Subtotal 6.0 Interior Partitions, Doors & Glazing					\$141,000

7.0 Floor, Wall & Ceiling Finishes

Floor Finishes					
Resilient	6,390	SF	10.00	\$63,900	
Ceramic Tile	490	SF	18.00	8,820	
Bases					
Resilient	850	LF	5.00	4,250	
Ceramic Tile	170	LF	18.00	3,060	
Wall Finishes					
Ceramic Tile	1,350	SF	18.00	24,300	
GWB to Struct Walls	7,850	SF	6.00	47,100	
Miscellaneous	4,250	SF	5.00	21,250	
Ceiling Finishes					
Suspended Acoustical Tile	6,390	SF	8.00	51,120	
GWB	490	SF	12.50	6,125	
Miscellaneous	1	LS	5,500.00	5,500	
Subtotal 7.0 Floor, Wall & Ceiling Finishes					\$235,425

8.0 Function Equipment & Specialties

Millwork				
Casework	330	LF	325.00	\$107,250
Miscellaneous/Backing/Blocking	1	LS	15,000.00	15,000
Specialties				
Toilet Partitions	5	EA	1,500.00	7,500
Urinal Screen	1	EA	500.00	500
Toilet Accessories	13	EA	450.00	5,850
Sink Accessories	5	EA	450.00	2,250
Janitors Sink	1	EA	1,500.00	1,500
ADA Signage	40	EA	150.00	6,000
Marker Boards	5	EA	2,500.00	12,500
Projection Screens	5	EA	1,500.00	7,500
Window Coverings				
Exterior	1,660	SF	17.50	29,050
Interior	850	SF	17.50	14,875
Fire Extinguisher & Cabinets	1	EA	500.00	500
Miscellaneous/Backing/Blocking	1	LS	6,500.00	6,500
Subtotal 8.0 Function Equipment & Specialties				\$216,775

9.0 Conveying Systems

Subtotal 9.0 Conveying Systems	None			\$0
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10.0 Plumbing

Fixtures				
Watercloset, Wall Hung, Flush Valve	6	Ea	2,200.00	\$13,200
Urinal, Wall Hung, Flush Valve	2	Ea	2,075.00	4,150
Lavatory, Wall Hung, Metering Faucet (CW Only)	5	Ea	1,850.00	9,250
Service Sink, Floor Type	1	Ea	1,980.00	1,980
Drinking Fountain, Hi/Lo Type w/ Bottle Filler (Allow	1	Ea	4,500.00	4,500
Science Sink - Student (CW Only) w/ 5 Gal Acid Ta	5	Ea	2,650.00	13,250
Hose Bibb - Interior Type	3	Ea	300.00	900
Hose Bibb - Exterior Wall Type	2	Ea	650.00	1,300
Equipment				
Electric Instantaneous Water Heater	1	Ea	1,050.00	1,050
Waste & Vent Systems				
Floor Drain w/ Piping (Large RR)	3	Ea	2,000.00	6,000
Floor Drain w/ Piping (Mech Room)	1	Ea	2,500.00	2,500
Waste & Vent Rough-In for New Fixture	20	Ea	1,600.00	32,000
Domestic Water Systems				
Cold Water Rough-In for New Fixture	25	Ea	1,050.00	26,250
Hot Water Piping at New Fixture (Where Req'd)	1	Ea	400.00	400
Trap Primer Assembly w/ TP Line (FD's)	4	Ea	750.00	3,000
Natural Gas	6,880	SF	1.50	10,320
Roof and Overflow Drainage			None	
Trade Specialties				
Sleeves, Fire-Seal, I.D. & Misc. Specialties	1	LS	2,350.00	2,350
Testing & Sterilization	1	LS	170.00	170
Miscellaneous	1	LS	5,850.00	5,850
Subtotal 10.0 Plumbing				\$138,420

11.0 Heating, Ventilating & Air Conditioning	6,880	SF	40.00	275,200
Subtotal 11.0 Heating, Ventilating & Air Conditioning				\$275,200

12.0 Fire Protection Systems

Automatic Wet Sprinkler Systems				
Automatic Wet Sprinklers - Complete	6,880	SF	7.00	\$48,160
Subtotal 12.0 Fire Protection Systems				\$48,160

13.0 Electrical Systems	6,880	SF	45.00	\$309,600
Subtotal 13.0 Electrical Systems				\$309,600

14.0 Site Preparation & Demolition

Selective Interior Demolition				
Remove Floor Finishes	6,880	SF	2.25	\$15,480
Remove Ceiling Finishes	6,880	SF	1.50	10,320
Remove Partitions	1,550	SF	2.50	3,875
Remove GWB	7,850	SF	1.50	11,775
Remove Doors & Frames	20	EA	500.00	10,000
Remove Windows	2,510	SF	5.00	12,550
Remove Window Coverings	2,510	SF	1.50	3,765
Miscellaneous Demo, Hauling & Debris Boxes	1	LS	5,000.00	5,000
Subtotal 14.0 Site Preparation & Demolition				\$72,765

15.0 Site Paving, Structures & Landscaping	incl w/Site Estimate			
Subtotal 15.0 Site Paving, Structures & Landscaping				\$0

16.0 Utilities on Site	incl w/Site Estimate			
Subtotal 16.0 Utilities on Site				\$0

Portable Buildings Summary (5,600 SF)

	Cost	Cost/SF
1.0 Foundations	\$497,168	\$88.78
2.0 Vertical Structure	0	0.00
3.0 Floor & Roof Structures	290,000	51.79
4.0 Exterior Closure	0	0.00
5.0 Roofing & Waterproofing	0	0.00
6.0 Interior Partitions, Doors & Glazing	0	0.00
7.0 Floor, Wall & Ceiling Finishes	74,600	13.32
8.0 Function Equipment & Specialties	0	0.00
9.0 Conveying Systems	0	0.00
10.0 Plumbing	0	0.00
11.0 Heating, Ventilating & Air Conditioning	0	0.00
12.0 Fire Protection Systems	0	0.00
13.0 Electrical Systems	25,000	4.46
14.0 Site Preparation & Demolition	0	0.00
15.0 Site Paving, Structures & Landscaping	0	0.00
16.0 Utilities on Site	0	0.00
Subtotal Costs	\$886,768	\$158.35
General Conditions	9.00%	79,809
Contractor's Fee	7.00%	67,660
Design Contingency	20.00%	206,848
Escalation to Construction Midpoint	0.00%	0
Total Construction Cost January 2018	\$1,241,085	\$221.62

Note: Estimate excludes construction contingency, FF & E, and soft costs.

Lum Repair & Replacement Study
Alameda Unified School District
Alameda, CA
Replacement Cost Estimate

Portable Buildings Estimate

	Quantity		Unit Price	Cost
1.0 Foundations				
Reinforced Concrete Foundations	5,600	SF	88.78	\$497,168
Subtotal 1.0 Foundations				\$497,168
2.0 Vertical Structure				
			None	
Subtotal 2.0 Vertical Structure				\$0
3.0 Floor & Roof Structures				
Remove/Replace Reinforced Concrete SOG 10"	5,600	SF	25.00	\$140,000
Remove/Replace Buildings	5	EA	30,000.00	150,000
Subtotal 3.0 Floor & Roof structures				\$290,000
4.0 Exterior Closure				
			None	
Subtotal 4.0 Exterior Closure				\$0
5.0 Roofing & Waterproofing				
Remove/Replace Roofing			None	
Subtotal 5.0 Roofing & Waterproofing				\$0
6.0 Interior Partitions, Doors & Glazing				
			None	
Subtotal 6.0 Interior Partitions, Doors & Glazing				\$0
7.0 Floor, Wall & Ceiling Finishes				
Floor Finishes				
Resilient	5,600	SF	10.00	\$56,000
Bases				
Resilient	680	LF	5.00	3,400
Wall Finishes				
Paint (E) Walls	6,800	SF	1.50	10,200
Miscellaneous	1	LS	5,000.00	5,000
Ceiling Finishes			None	
Subtotal 7.0 Floor, Wall & Ceiling Finishes				\$74,600

8.0 Function Equipment & Specialties	None			
Subtotal 8.0 Function Equipment & Specialties				\$0
9.0 Conveying Systems	None			
Subtotal 9.0 Conveying Systems				\$0
10.0 Plumbing	None			
Subtotal 10.0 Plumbing				\$0
11.0 Heating, Ventilating & Air Conditioning	None			
Subtotal 11.0 Heating, Ventilating & Air Conditioning				\$0
12.0 Fire Protection Systems				
Automatic Wet Sprinkler Systems				
Automatic Wet Sprinklers - Complete	None			
Subtotal 12.0 Fire Protection Systems				\$0
13.0 Electrical Systems				
Reconnect Power	5	EA	5,000.00	\$25,000
Subtotal 13.0 Electrical Systems				\$25,000
14.0 Site Preparation & Demolition	None			
Subtotal 14.0 Site Preparation & Demolition				\$0
15.0 Site Paving, Structures & Landscaping	incl w/Site Estimate			
Subtotal 15.0 Site Paving, Structures & Landscaping				\$0
16.0 Utilities on Site	incl w/Site Estimate			
Subtotal 16.0 Utilities on Site				\$0

Covered Walkway Summary (5,600 SF)

	Cost	Cost/SF
1.0 Foundations	\$1,244,488	\$123.58
2.0 Vertical Structure	0	0.00
3.0 Floor & Roof Structures	679,250	67.45
4.0 Exterior Closure	57,000	5.66
5.0 Roofing & Waterproofing	201,400	20.00
6.0 Interior Partitions, Doors & Glazing	0	0.00
7.0 Floor, Wall & Ceiling Finishes	0	0.00
8.0 Function Equipment & Specialties	0	0.00
9.0 Conveying Systems	0	0.00
10.0 Plumbing	0	0.00
11.0 Heating, Ventilating & Air Conditioning	0	0.00
12.0 Fire Protection Systems	0	0.00
13.0 Electrical Systems	0	0.00
14.0 Site Preparation & Demolition	0	0.00
15.0 Site Paving, Structures & Landscaping	0	0.00
16.0 Utilities on Site	0	0.00
Subtotal Costs	\$2,182,138	\$216.70
General Conditions	9.00%	196,392
Contractor's Fee	7.00%	166,497
Design Contingency	20.00%	509,005
Escalation to Construction Midpoint	0.00%	0
Total Construction Cost January 2018	\$3,054,032	\$303.28

Note: Estimate excludes construction contingency, FF & E, and soft costs.

Covered Walkway Estimate

	Quantity		Unit Price	Cost
1.0 Foundations				
Reinforced Concrete Foundations				
Excavate & Haul	344	CY	100.00	\$34,375
Formwork	1,840	LF	20.00	36,800
Reinf Steel 175#/CY	48,125	#	2.50	120,313
Concrete & Placing	275	CY	300.00	82,500
Demo Exist Footing	2,500	CF	25.00	62,500
Shore Columns	101	EA	500.00	50,500
Precast Concrete Piles 14" SQ x 90'	101	EA	7,500.00	757,500
Miscellaneous	1	LS	100,000.00	100,000
Subtotal 1.0 Foundations				\$1,244,488
2.0 Vertical Structure				
			None	
Subtotal 2.0 Vertical Structure				\$0
3.0 Floor & Roof Structures				
Remove/Replace Reinforced Concrete SOG 10"	10,070	SF	25.00	\$251,750
Remove/Replace for Heavy Pile-driving Equipment Access				
Roof Structure	5,700	SF	75.00	427,500
Subtotal 3.0 Floor & Roof structures				\$679,250
4.0 Exterior Closure				
Patch/Repair Soffit	5,700	SF	10.00	57,000
Subtotal 4.0 Exterior Closure				\$57,000
5.0 Roofing & Waterproofing				
Remove/Replace Roofing	10,070	SF	20.00	\$201,400
Subtotal 5.0 Roofing & Waterproofing				\$201,400
6.0 Interior Partitions, Doors & Glazing				
			None	
Subtotal 6.0 Interior Partitions, Doors & Glazing				\$0
7.0 Floor, Wall & Ceiling Finishes				
			None	
Subtotal 7.0 Floor, Wall & Ceiling Finishes				\$0

8.0 Function Equipment & Specialties	None	
Subtotal 8.0 Function Equipment & Specialties		\$0
9.0 Conveying Systems	None	
Subtotal 9.0 Conveying Systems		\$0
10.0 Plumbing	None	
Subtotal 10.0 Plumbing		\$0
11.0 Heating, Ventilating & Air Conditioning	None	
Subtotal 11.0 Heating, Ventilating & Air Conditioning		\$0
12.0 Fire Protection Systems		
Automatic Wet Sprinkler Systems		
Automatic Wet Sprinklers - Complete	None	
Subtotal 12.0 Fire Protection Systems		\$0
13.0 Electrical Systems	None	
Subtotal 13.0 Electrical Systems		\$0
14.0 Site Preparation & Demolition	None	
Subtotal 14.0 Site Preparation & Demolition		\$0
15.0 Site Paving, Structures & Landscaping	incl w/Site Estimate	
Subtotal 15.0 Site Paving, Structures & Landscaping		\$0
16.0 Utilities on Site	incl w/Site Estimate	
Subtotal 16.0 Utilities on Site		\$0

**Lum Repair & Replacement Study
Alameda Unified School District
Alameda, CA
Replacement Cost Estimate**

Option One - Site Improvements Summary (46,450 SF)

14.0 Site Preparation & Demolition			\$265,300	\$5.71
15.0 Site Paving, Structures & Landscaping			548,200	11.80
16.0 Utilities on Site			100,000	2.15
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Subtotal Costs			\$913,500	\$19.67
General Conditions	9.00%		82,215	
Contractor's Fee	7.00%		69,700	
Design Contingency	20.00%		213,083	
Escalation to Construction Midpoint	0.00%		0	
<hr/>				
Total Construction Cost January 2018			\$1,278,498	\$27.52

Option One - Site Improvements Estimate

	Quantity		Unit Price	Cost
14.0 Site Preparation & Demolition				
Site Demolition	46,450	SF	2.50	\$116,125
Site Preparation				
Paving Pad Preparation	31,800	SF	2.50	79,500
Erosion Control	46,450	SF	1.50	69,675
				<hr/>
Subtotal 14.0 Site Preparation & Demolition				\$265,300
15.0 Site Paving, Structures & Landscaping				
Pedestrian Paving				
Concrete	21,730	SF	15.00	\$325,950
Site Structures	1	LS	2,500.00	2,500
Landscape & Irrigation	14,650	SF	15.00	219,750
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Subtotal 15.0 Site Paving, Structures & Landscaping				\$548,200
16.0 Utilities on Site - Allow	1	LS	100,000.00	\$100,000
				<hr/>
Subtotal 16.0 Utilities on Site				\$100,000

OPTION TWO

**Lum Repair & Replacement Study
Alameda Unified School District
Alameda, CA
Replacement Cost Estimate**

Project Summary

PROJECT COST BUDGET: Option Two - Campus Replacement

Buildin	Area	\$/SF	Cost
Two Story Classroom Buildings (Folia)	36,835 SF	468.00	\$17,238,780
Admin & Multi-Use	7,550 SF	650.00	4,907,500
Subtotal Buildings	44,385 SF		\$22,146,280
Sitework	68,280 SF	45.29	3,092,685
Subtotal Sitework			\$3,092,685
			\$25,238,965
Non-Construction Costs	30%		\$7,571,689
TOTAL OPTION TWO - Campus Replacement January 2018			\$32,810,654

Note: Estimate excludes construction contingency, FF & E, and soft costs.

Option Two - Site Improvements Summary (68,280 SF)

14.0 Site Preparation & Demolition	\$885,480	\$12.97
15.0 Site Paving, Structures & Landscaping	1,074,275	15.73
16.0 Utilities on Site	250,000	3.66
Subtotal Costs	\$2,209,755	\$32.36
General Conditions	9.00%	198,878
Contractor's Fee	7.00%	168,604
Design Contingency	20.00%	515,447
Escalation to Construction Midpoint	0.00%	0
Total Construction Cost January 2018	\$3,092,685	\$45.29

Option Two - Site Improvements Estimate

	Quantity		Unit Price	Cost
14.0 Site Preparation & Demolition				
Site Demolition	68,280	SF	2.50	\$170,700
Building Demolition				
Permeant Buildings	35,240	SF	10.00	352,400
Portable Buildings	5,600	SF	5.00	28,000
Covered Walkway	10,070	SF	3.00	30,210
Site Preparation				
Building Pad Preparation	33,950	SF	2.50	84,875
Paving Pad Preparation	46,750	SF	2.50	116,875
Erosion Control	68,280	SF	1.50	102,420
Subtotal 14.0 Site Preparation & Demolition				\$885,480
15.0 Site Paving, Structures & Landscaping				
Pedestrian Paving				
Concrete	46,750	SF	15.00	\$701,250
Site Structures	1	LS	50,000.00	50,000
Landscape & Irrigation	21,535	SF	15.00	323,025
Subtotal 15.0 Site Paving, Structures & Landscaping				\$1,074,275
16.0 Utilities on Site - Allow	1	LS	250,000.00	\$250,000
Subtotal 16.0 Utilities on Site				\$250,000

OPTION THREE

**Lum Repair & Replacement Study
Alameda Unified School District
Alameda, CA
Replacement Cost Estimate**

Project Summary

PROJECT COST BUDGET: Option Three - Enlarged Campus Replacement

Building	Area	\$/SF	Cost
Two Story Classroom Buildings (Folia)	55,785 SF	468.00	\$26,107,380
Admin & Multi-Use	11,325 SF	650.00	7,361,250
Subtotal Buildings	67,110 SF		\$33,468,630
Sitework	60,000 SF	49.99	2,999,236
Subtotal Sitework			\$2,999,236
			\$36,467,866
Non-Construction Costs	30%		\$10,940,360
TOTAL OPTION THREE			
Enlarged Campus Replacement - January 2018			\$47,408,226

Option Three - Site Improvements Summary (60,000 SF)

14.0 Site Preparation & Demolition		\$892,985	\$14.88
15.0 Site Paving, Structures & Landscaping		950,000	15.83
16.0 Utilities on Site		300,000	5.00
Subtotal Costs		\$2,142,985	\$35.72
General Conditions	9.00%	192,869	
Contractor's Fee	7.00%	163,510	
Design Contingency	20.00%	499,873	
Escalation to Construction Midpoint	0.00%	0	
Total Construction Cost January 2018		\$2,999,236	\$49.99

Option Three - Site Improvements Estimate

	Quantity		Unit Price	Cost
14.0 Site Preparation & Demolition				
Site Demolition	60,000	SF	2.50	\$150,000
Building Demolition				
Permeant Buildings	35,240	SF	10.00	352,400
Portable Buildings	5,600	SF	5.00	28,000
Covered Walkway	10,070	SF	3.00	30,210
Site Preparation				
Building Pad Preparation	50,200	SF	2.50	125,500
Paving Pad Preparation	46,750	SF	2.50	116,875
Erosion Control	60,000	SF	1.50	90,000
Subtotal 14.0 Site Preparation & Demolition				\$892,985
15.0 Site Paving, Structures & Landscaping				
Pedestrian Paving				
Concrete	41,075	SF	15.00	\$616,125
Site Structures	1	LS	50,000.00	50,000
Landscape & Irrigation	18,925	SF	15.00	283,875
Subtotal 15.0 Site Paving, Structures & Landscaping				\$950,000
16.0 Utilities on Site - Allow	1	LS	300,000.00	\$300,000
Subtotal 16.0 Utilities on Site				\$300,000