

8 May 2017

BOARD of EDUCATION – ALAMEDA UNIFIED SCHOOL DISTRICT

Gary K. Lym – President  
Gary Harris – Vice President  
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Anne McKereghan – Trustee  
Jennifer Williams – Trustee ,  
Sean McPhetridge - Superintendent

Dear Board Members:

I, Tuncer Toprakci, am a resident of Alameda, CA. I have taken interest in the proposed closure option for the Lum Elementary School located at 1801 Sandcreek Way, Alameda, California. My involvement is mainly as a resident and a Tax Payer. Additionally, I desire to provide my personal opinions on the subject matter based on my broad experience gained as a California Licensed Structural and Civil Engineer with over 43 years of experience in this field with a broad knowledge and experience in Earthquake Engineering. My professional experience information is provided at the end of this letter.

**A. Purpose:**

The purpose of this letter is to provide my opinions on the subject matter for the benefit of the Alameda School District (AUSD) and the Alameda Community. It is based on my personal review of the available Engineering Reports for the Potential Liquefaction at the subject school campus and other documentation(s) provided on the AUSD web site that I downloaded on 28 April 2017 after becoming aware of the subject matter on the same day. The subject Engineering documents are:

1. Miller Pacific's Geotechnical Report dated March 17, 2017;
2. RGH Consultants' April 24, 2017 dated Peer Review of the Geotechnical Report;
3. ZFA Structural Engineers' April 24, 2017 dated letter to AUSD.

This letter is intended to provide my personal and professional opinions without getting involved with the potential effects, positive or negative, on the students, their parents and the Lum Community. It is my understanding that others will be discussing this matter with the AUSD.

Although my involvement is totally based on my personal desire and without being contracted by any involved party, this letter should serve the purpose for which it is intended. In regards to my personal professional opinions, my comments are intended to be in line with the degree of care and skill ordinarily exercised under similar circumstances by reputable professionals without assuming any liability as a professional. No other warranty, expressed or implied is made as to the professional opinions included in this letter.

**B. Opinions as a Resident and a Tax Payer:**

As it is currently stated in the available Engineering reports, the mentioned liquefaction will negatively impact the Alameda properties values including my residence due to the expected panic/concerns that it will create. To the best of my knowledge this item is not studied or if available, is not released to the public at this time.

As a tax payer, I am concerned about the cost of the "closure" action without any additional technical and non-technical studies on the continuing usage of the Lum Elementary School.

**C. Summary of Professional Opinions:**

It is my opinion that the current technical liquefaction documents and the related conclusions are not sufficient enough to support such a drastic decision to close the subject school without additional independent Engineering studies and Structural evaluations.

It should be noted that even if liquefaction occurs at Lum Elementary Campus, there are several solutions to improve the Structural components of the currently existing structures to minimize the predicted differential settlements and provide expected level of Life-Safety to all occupants per the relevant codes and regulations applicable to the existing school buildings. The subject existing buildings seem to be a good candidate for this option due to their inherent Structural Design characteristics and require due diligent additional Engineering studies. New construction is also an option to eliminate the "risk" by proper design of the foundations and the structural components.

The "risk" of liquefaction is well documented and is a known fact in the State of California. Even though the potential liquefaction is a very serious and important hazard, the Lum Elementary campus and balance of the City of Alameda is no different than the whole of the California Coastal regions and some inland areas of the State of California.

In general, I tend to agree with findings of the Geotechnical Report. However, the report seems to lack independent methodology/calculations, such as but not limited to the Standard Penetration Tests, (SPT) just to verify the correctness of the predicted differential settlement magnitudes. Even though SPT has its own limitations, it would suffice,

It should be noted that, as it is commonly practiced in our field, I tried to contact the ZFA Structural Engineers (ZFA) as a Professional courtesy and as an fellow Engineer to obtain more information on the items which are not clear or not provided in the above mentioned technical reports prior to making my professional opinions public. ZFA provided understandable reasons for not wishing to discuss the matter directly with me. I respect their position.

Following are my technical comments.

**C1.** From a technical point of view, following items should be mentioned and/or re-stated for the benefit of all involved parties:

1. The mentioned settlement and differential settlements are not verified by another method other than the CPT method. For their correctness. This verification should have been done prior to a critical recommendation to "close" the subject school;
  2. The existing buildings have been in existence/use for about fifty-six (56) years. These buildings should have been evaluated and retrofitted per the applicable Division of State Architect (DSA) requirements that were mandated several times during their existence. Therefore, they should be in conformance with the DSA requirements and other relevant/applicable Codes and Regulations. It is unfortunate that ZFA did not provide any information in this regard prior to recommending the "closure" of the subject campus.
  3. Contrary to what is stated in ZFA letter, DSA does not necessarily require the closure of a school campus without a detailed evaluation. If there is such an evaluation document, it should have been made available to the public and to other professionals. To the best of my knowledge, DSA does not limit repairs/upgrades to only non-structural in nature unless it is verified by in-depth evaluations of the existing structures. If the existing buildings really fall under such requirement, the DSA would not have allowed these buildings to continue to be used as classrooms;
  4. Some comments and samples in ZFA's presentation are not relevant to the structures at the Lum campus. The sample structures with small foot print used to demonstrate effects of liquefaction cannot be relevant to Lum Classroom buildings which have considerably larger foot print and different Structural features.
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5. In order for liquefaction to occur, following has to be present at the same time:

- Sandy/Silty/Clay (their layer thickness is a critical factor);
- **Pressurized** water;
- Strong Earthquake activity.

In my opinion, the available CPTs do not provide clear information on this.

**C2.** Based on my visual non-destructive observations of the existing buildings on the subject campus, the subject buildings' Structural and other aspects are as following:

1. All classroom buildings have a hexagonal foot print with classrooms located at the perimeter with common room at the center and entry/exit door to the building. All classrooms have additional exit doors at the perimeter walls;
2. Roof framing consists of roof rafters supported by steel girders which are supported with steel columns;
3. The lateral system to resist the forces imposed by Earthquake and/or Wind activities consists of concrete block walls (shear walls) with a length of about one-half (1/2) of the length of the hexagonal walls placed along the perimeter.
4. Per the ZFA comments, the foundation system consists of continuous concrete wall footings. Additionally, it is not unusual if there are enlarged spread concrete footings under the steel columns;
5. Remaining length of the perimeter walls are wood framed/infilled with lots of glass windows.
6. My visual observations did not indicate any kind of distress on shear walls due to the past earthquakes and any form of settlement.

**C3.** Conclusions:

1. Typically the probability of having the predicted differential settlements is very small for the subject buildings;
2. There are options to minimize the predicted differential settlements. One approach is to evaluate the building for smaller settlements and do some retrofit to ensure the building wouldn't collapse. California State University (CSU) Seismic Review Board did utilize this approach at their existing buildings on their campuses. For the light framed buildings like the ones on the Lum Elementary Campus, this approach should not be too difficult and should be acceptable by the DSA;
3. The foundations for the existing buildings were designed per the allowable bearing pressures provided in the California Building Codes in effect at the time of the original design and construction of the subject buildings. It is common practice to expect that the soils below the buildings and footings are further compacted in 56-years thus it is probable that the allowable bearing pressure value is increased. Higher bearing values in comparison to the original values used for sizing of the existing footings would lower the differential settlements. This can only be verified with a new soil engineering investigation and the evaluation of the subject building settlements per the new verified higher bearing pressure magnitude(s).
4. It is surprising to expect that the Wood Middle School will not be affected by the predicted liquefaction occurrence at the Lum Elementary School site which is immediately next door to the middle school site and other school campuses;
5. The conditions at the Lum Elementary school can be improved by retrofitting and/or adding new elements to the classroom building footings & Structural ties and soil conditions one at a time and/or by constructing new classroom buildings with proper foundation systems to minimize the effects of the any strong earthquake activities that may occur, These and other feasible options should be evaluated for their cost/benefit aspects prior to deciding for the "closure" of the subject school.

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In summary, if the following items are **all present** at the subject 1-story buildings, the building can be classified as **safe** even with substantial differential settlements:

1. The existing foundations are tied together or continuous to hold the building together;
2. The existing masonry wall (shear walls) tied to building wall anchors;
3. The existing Structural framing continues across the building to hold the building together.

Therefore, AUSD should be due diligent and obtain a detailed evaluation by a qualified Structural Engineer to verify the presence of above conditions and the report should include the retrofit of the elements if they found to be understrength or lacking.

In closing, I strongly recommend that the AUSD Board to mandate additional reports and evaluations performed by an independent professionals prior to making their final decision.

If you have any questions and/or require additional information, please contact me via my contact information provided on the first page of this letter.

Sincerely,

Tuncer R. Toprakci, S.E.

Resume is provided after the distribution list below.

Distribution via e-mail (Hard copies will be provided on 9 May 2017 meeting):

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## **TUNCER R. TOPRAKCI, S.E.**

Structural Engineering Consultant

**EDUCATION:** University of Southern California, BSCE 1974, MSCE 1975  
Chi Epsilon - Civil Engineering Honorary  
Tau Beta Pi- Engineering Honorary

**REGISTRATION:** Structural Engineer - State of California  
Civil Engineer - State of California

**EXPERIENCE:** Tuncer R. Toprakci - Structural Consultant (2015 - to date)  
TRTSE – TRT Structural Engineering (2006 – 2015)  
Brandow & Johnston Associates (1998 - 2006)  
Wheeler & Gray, Inc. (1990 - 1998)  
Brandow & Johnston Associates (1979 - 1990)  
United Engineers - Turkey (1976 - 1979)  
Brandow & Johnston Associates (1974 - 1976)

Tuncer R. Toprakci currently provides Structural and Earthquake Engineering Consulting and Litigation Support services under his own name. Previously he was the CEO/Owner of the Structural Engineering firm TRTSE where he provided full Structural & Earthquake Engineering design services including Seismic evaluations and Assessments for new and existing structures along with Litigation Support Services & Probable Maximum Loss Studies. Prior to opening his own office(s), he was a Vice President/Principal Engineer for the Brandow & Johnston Associates (BJA) in Los Angeles, California for most of the years since graduating. At BJA and previous companies, he was responsible for project administration, quality control, structural design, system selection and seismic design of major building projects such as hospitals, schools, universities, Federal & State owned structures and commercial buildings. His work included developing preliminary design systems, supervising structural design, preparation of working drawings, specifications and field Structural observation work. He has extensive experience with evaluation and seismic upgrading of existing buildings, design & inspection of entertainment and/or amusement facilities, and sports engineering.

Toprakci also taught engineering classes at the University of Southern California between 1974 and 1985.

**ASSOCIATIONS:** Structural Engineers Association of Southern California  
Consulting Engineers and Land Surveyors of California  
Earthquake Engineering Research Institute