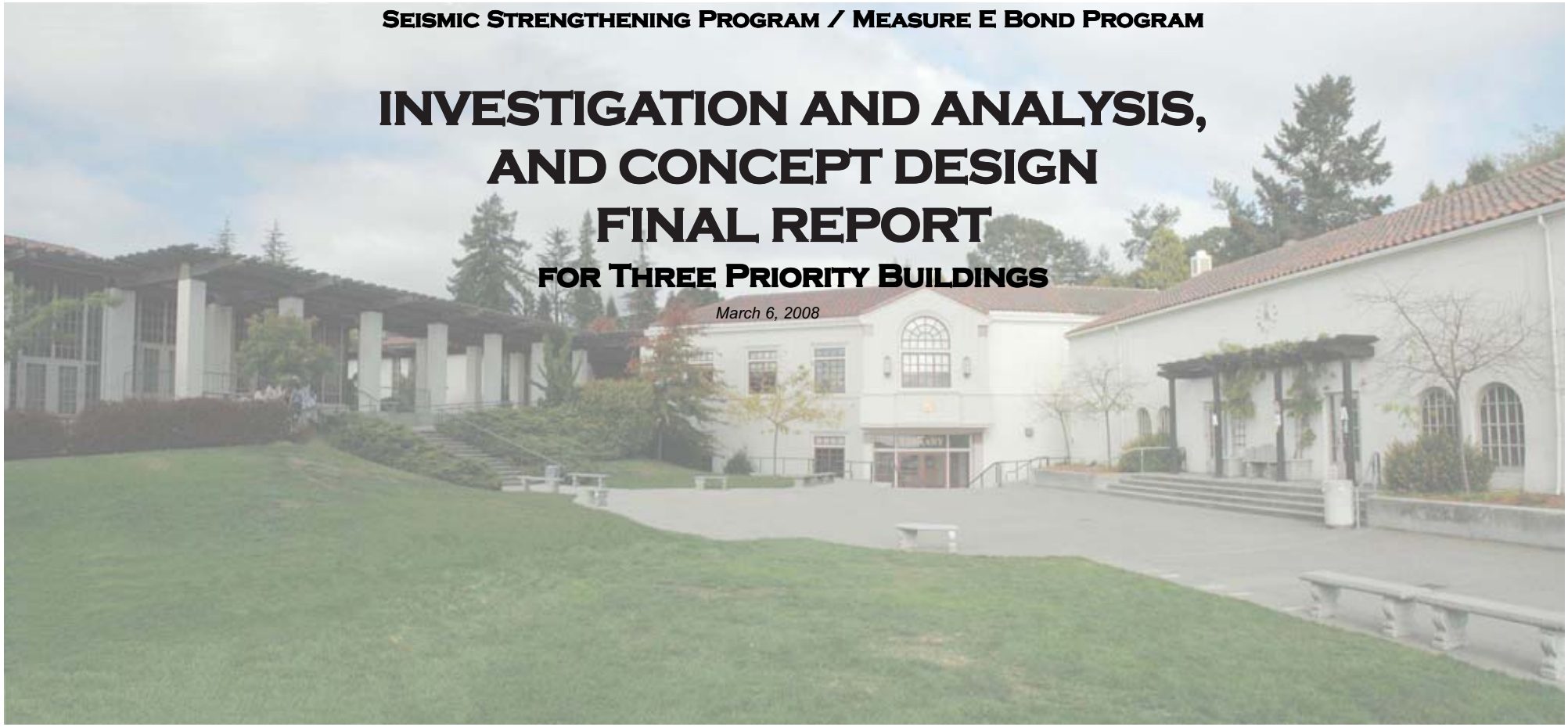
PIEDMONT HIGH SCHOOL

PIEDMONT UNIFIED SCHOOL DISTRICT

SEISMIC STRENGTHENING PROGRAM / MEASURE E BOND PROGRAM



INVESTIGATION AND ANALYSIS, AND CONCEPT DESIGN FINAL REPORT

FOR THREE PRIORITY BUILDINGS

March 6, 2008

R. P. Gallagher Associates, Inc.
Structural Engineering

murakami Nelson
ARCHITECTURAL CORPORATION

PIEDMONT HIGH SCHOOL

PIEDMONT UNIFIED SCHOOL DISTRICT

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CONCEPT DESIGN

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FINAL REPORT

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Building A - Quad / Library

Building B - Student Center

Building C - Auditorium

murakami Nelson
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i. EXECUTIVE SUMMARY

The Concept Designs contained in this report address structural and non-structural seismic hazards, accessibility, and fire/life-safety deficiencies at the three buildings at Piedmont High School that were identified in a Tier One review as high seismic risk structures. It follows an investigative report, dated March 22, 2007.

Of the three buildings, the Quad/Library Building A and the Student Center Building B required corrective measures to meet the seismic performance standards set by the Piedmont Unified School District Technical Advisory Committee. A more detailed analysis of the Auditorium Building C determined the building to comply with the seismic performance standards and no seismic corrective measure were need. However, there are numerous non-structural falling hazards in all three buildings that were identified in the investigative report of March 22, 2007. The Concept Design addresses the cost to mitigate the non-structural seismic hazards.

The campus has addressed many of the accessibility deficiencies in its facilities over the years as it upgraded or modified its' facilities. However, there remain numerous accessibility deficiencies that will need to be corrected. The investigative report of March 22, 2007 identifies the deficiencies. Our Concept Design proposes remediation measures in order to assign a cost. We will need to get definitive responses from DSA in order establish the full magnitude and scope of corrective measures that will be required for each of the three buildings encompass by this Concept Study. Although there are obvious deficiencies common to all of the facilities, such as signage, door clearances, accessible counter heights, etc., these issues may be resolved in a number of different ways and by alternative means based on what can be negotiated with DSA.

The major fire and life safety issue that has a large cost impact is the need for a DSA compliant fire alarm system for each building. Other fire and life safety issues include the installation of low-level exit signage, installation of emergency lighting in various locations, and insuring proper fire ratings at corridor openings.

Once a design concept is selected, there may be an opportunity to negotiate accessibility and fire/life safety alternative solutions with DSA (Department of the State Architect), as this office has jurisdiction over public school construction.

A cost estimate was developed as part of this phase of work. We have included the summary pages in this document. The complete cost estimated is contained under separate cover.

This report will serve as the background for the next phase of work which will be to develop a schematic design.

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A. SUMMARY OF ACCESSIBILITY SCHEMES

General site accessibility:

The main entry to the High School is on Magnolia Avenue, between the Social Science Building D and the Allen Harvey Theatre Building C. A secondary entry is located between the Theatre Building C and the 40's Building G. The main entry is relatively level and deemed accessible. The secondary entry is currently non-compliant. A portion of the path of travel is sloped, lacks proper handrails, and has uneven pavement and cross-slopes. Ramp modifications are needed to comply with accessible ramp criteria.

The High School has no accessible on-site parking. Two accessible parking spaces on the west side of the Gymnasium Building F are only available during off-school hours. As shown on the plans below, the creation of two accessible parking spaces is recommended.

The path of travel from the accessible parking to the Quad Building A, the Student Center Building B, and the Allen Harvey Theatre Building C is along the access road/walkway between the Theatre and the 40's Building G. At the top of the road/walkway the path of travel splits off right to the Student Center and the Library located in the Quad Building, or left to the existing accessible ramp that leads to the Quad Classrooms and the Theatre.

General building accessibility:

The following floor plans show how the code deficiencies described in our Investigative Report can be addressed. In many cases, the proposed remediation can be performed without impacting the surrounding area. For example, replacing door hardware for accessibility, or providing a new accessible sink to replace an existing sink. These items are described in key notes, and their location is shown on the plans. In other cases, the remediation has a minor impact on the adjacent area, for example to accommodate an enlarged toilet room, a new elevator, a new ramp, or to provide adequate clearances in front of a door. These changes are shown, and highlighted, in the concept plans. In a few cases, the changes required to accommodate the proposed remediation can have a major impact. In some cases, we have included alternative solutions, and/or approaches to the problem. These options are not always mutually exclusive from one another. They are shown on the plans, and described below.

Building A – Quad/Library

Building A has a number of minor issues that can be easily corrected and one major issue that requires the enlargement of the existing elevator shaft and foundation to accommodate a new accessible elevator.

The current elevator cab size is not accessible. Our concept scheme provides an elevator that is wheelchair accessible. To address security issues, the elevator entry at the second floor was relocated to the interior of the building. An elevator vestibule area was incorporated to allow the elevator to be secured during off-hours.

The minor accessibility issues include correction of deficient room door clearances, providing accessible room and directional signage, correction of protruding fixtures and equipment, provisions for accessible counters and sinks, and provisions for accessible lockers.

Building B – Student Center

Building B has similar minor issues as Building A, including correction of deficient door hardware, providing accessible room and directional signage, correction of protruding fixtures and equipment, and provisions for accessible counters. The two major deficiencies are the lack of toilets and accessible primary entrances to the cafeteria and the counseling offices. Toilet need to be added for students and staff. We have taken over the storage room to provide accessible boy's and girl's toilet rooms. We have convert the room at the northeast corner from food service to staff unisex toilet and locker facilities.

A new accessible ramp was added to an expanded landing area at the cafeteria. A new accessible ramp was added to the new level landing at the counseling offices.

Building C – Auditorium

Building C's two major accessibility issues are the lack of accessible toilet rooms and the lack of dispersed seating for wheelchair disabled. To accommodate the required number of toilets based on the number of seats in the auditorium, we expanded the existing toilet room footprint into the existing ticket office and the northeast entry area, as well as outward.

To address the dispersed seating issue, we developed two options. Option One utilizes the existing accessible ramp system south of the Auditorium and adds a ramp at the middle entry and a wheelchair lift at the lower entry. A canopy is added to the ramp system for weather protection. Option Two adds an enclosed structure to the south wall and utilizes a series of chair lifts to provide access to the middle and lower level seating.

To provide disable access to the stage pit, a chair lift is added at the lower level. In addition, the lower level is remodeled to provide accessible men and women's toilets.

As with other buildings at the High School, the minor accessibility issues include correction of deficient room door clearances, providing accessible room and directional signage, correction of protruding fixtures and equipment, and corrective measures to stair handrails.

SUMMARY OF FIRE AND LIFE SAFETY SCHEMES:

The three buildings A, B, and C are generally life safe. The buildings met exit requirements and have floor and wall assembly resembling and generally equivalent to a rated corridor.

Fire Alarm System

Current code requires that all educational facilities have fire alarm system. All three buildings have fire alarm systems, though of varying vintages and sophistication. A cursory review of the existing fire alarm system with maintenance and administrative staff suggests that a replacement fire alarm should be considered at each building to allow for a centralized annunciated system for the campus. In the Schematic Design phase, a comprehensive evaluation by a fire and life safety consultant will be needed.

Supplemental to the Fire Alarm is the need to install magnetic hold-opens at all corridor doors to maintain protection of openings. Currently, a majority of the fire rated doors have been outfitted with dog-leg type door stops. These dog-leg stops defeat the self-closing feature of the door and as such, the fire protection. The dog-leg stops will need to be removed.

Fire Sprinkler System

Current code requires that all educational facilities have fire sprinklers throughout. The Quad/Library Building A is fully sprinklered and the Auditorium Building C has partial fire sprinkler systems. Their acceptability to DSA will need to be confirmed in the Schematic Phase. The Student Center Building B do not require fire sprinklers.

Low Level Exit Lighting

Current code requires that all educational facilities have low-level exit lighting. Building A needs to have low-level exit lighting installed. The Student Center and Auditorium are “assembly” occupancies and is not required to have low level exit lighting.

ACCESSIBILITY GENERAL NOTES:

1. SITE ACCESSIBLE PATH OF TRAVEL TO PRIMARY ENTRANCE IS GENERALLY IN COMPLIANCE. EXCEPTIONS ARE: 1) STUDENT CENTER, WHERE ACCESSIBLE ENTRY IS IN THE REAR OF THE BUILDING; 2) QUAD BUILDING, WHERE VERTICAL ACCESS REQUIRES EXITING THE BUILDING, TRAVERSING THE SITE TO ACCESS ADJACENT FLOOR.

2. SIGNAGE THROUGHOUT IS NOT COMPLIANT. DIRECTIONAL SIGNAGE IS MISSING. ALL ROOM IDENTIFICATION SIGNAGE WHERE PROVIDED IS NON COMPLIANT.

3. NO ACCESSIBLE PATH OF TRAVEL SIGNAGE.

ACCESSIBILITY KEY NOTES:

01 (E) NON COMPLIANT PARKING TO BE DESIGNATED ACCESSIBLE LOADING / DROP-OFF ZONE.

02 REMOVE (E) DOOR.

03 ADD WALL AND PAIR OF 3'-0" DOORS.

04 REMODEL FOOD SERVICE W/ (N) DOOR, SERVICE COUNTER INCLUDING ONE ACCESSIBLE COUNTER SPACE, ROLL-UP COUNTER DOOR, COMMERCIAL SINK, (N) LIGHTING & OUTLETS, PLUS ALLOWANCE FOR UNKNOWN HEALTH CODE REQUIREMENTS.

05A1 REMOVE (E) DOOR AND PROVIDE (N) 4'-0" WIDE DOOR WITH SIDELIGHT.

05A2 RELOCATE (E) LOCKER TO ACHIEVE REQUIRED CLEAR SPACE AT DOOR.

05A3 REPLACE (E) DOOR AND FRAME WITH 3'-0" WIDE DOOR AND FRAME.

05B1 REMOVE (E) FILL-IN DOOR, FRAME AND WALL.

05B2 PROVIDE ACCESSIBILITY SIGNAGE.

05B3 SHORTEN COUNTER TO PROVIDE REQUIRED 18" CLEARANCE ON PULL SIDE OF DOOR.

05B4 REPLACE THRESHOLD WITH ACCESSIBLE PROFILE & EXTEND VERTICAL RODS.

05C OVERLAY (E) CONCRETE SLAB TO RAISE DOOR LANDING TO COMPLY WITH ACCESSIBILITY REQUIREMENTS.

06A EXTEND HANDRAIL TO ACHIEVE REQUIRED 12" EXTENSION AT TOP OF STAIRS AND TREAD +12" AT BOTTOM OF STAIRS.

07 DEMO (E) STAIR AND LANDING. PATCH AS REQUIRED.

08 DEMO (E) ELEVATOR. ENLARGE SHAFT AND PROVIDE (N) ACCESSIBLE ELEVATOR IN NEW SHAFT ENCLOSURE.

09A PROVIDE ACCESSIBLE SINK AND KNEE SPACE AT COUNTER.

09B PROVIDE ACCESSIBLE FAUCET HANDLES AND WRAP HOT WATER SUPPLY AND DRAIN PIPE.

10 REMOVE (E) QUENUE LINE RAILING.

11A REMOVE SEATING AND INFILL FLOOR TO PROVIDE A 2ND ACCESSIBLE SEATING SPACE.

ACCESSIBILITY KEY NOTES (CONT.):

11B REMOVE SEATING AND INFILL FLOOR TO PROVIDE TWO ACCESSIBLE SEATING SPACES.

12 TELEPHONE NOT ACCESSIBLE. REPLACE (E) TELEPHONE BOOTH WITH (N) ACCESSIBLE TELEPHONE BOOTH.

13 PROVIDE ACCESSIBLE COUNTER WITH KNEE SPACE, MIN. 36"

14A DEMO (E) TOILET ROOM. EXPAND SIZE BY TAKING OVER TICKET BOOTH ROOM. PROVIDE (N) ACCESSIBLE TOILET ROOM.

14B DEMO (E) TOILET ROOM. EXPAND SIZE BY TAKING OVER EXTERIOR CORNER OF BUILDING. PROVIDE (N) ACCESSIBLE TOILET ROOM.

14C DEMO (E) STORAGE AND PORTION OF FOOD SERVICE AND PROVIDE (N) ACCESSIBLE TOILET ROOM.

14D DEMO (E) FOOD SERVICE AND PROVIDE (N) UNISEX STAFF TOILET AND STAFF LOCKER ROOM, INCLUDING (N) LOCKERS.

15 PROVIDE ALLOWANCE FOR UNKNOWN SCOPE OF WORK TO REMODEL KITCHEN FOR HEALTH CODE COMPLIANCE TRIGGER BY ACCESSIBILITY UPGRADES.

16 REMOVE OR OVERLAY (E) STAIR & LANDING TO ACHIEVE CODE COMPLIANT LANDING & STAIRS.

17 PROVIDE SIDEWALK CURBCUT.

18 PROVIDE (N) COMPLIANT SIGNAGE PER GENERAL NOTE

19 (N) ASSISTED LISTENING DEVICE

20 STAGE NOT ACCESSIBLE

21A RE-PAINT STAIR WARNING STRIPES AT TREADS AS REQUIRED
EXTERIOR STAIRS: PROVIDE WARNING STRIPE AT UPPER APPROACH AND EVERY TREAD
INTERIOR STAIRS: PROVIDE WARNING STRIPE AT UPPER APPROACH AND LOWER TREAD

21B PROVIDE CUT-IN CARPET STRIPE OF CONTINUOUS COLOR AT TOP AND LAST TREAD

22 MODIFY OR REPLACE TRANSACTION COUNTER TO PROVIDE A 36" WIDE ACCESSIBLE LOWERED COUNTER SPACE WITH KNEE SPACE

23 REMOVE (E) DRINKING FOUNTAIN

24 ELEVATOR MACHINE ROOM UPDATED FOR NEW EQUIPMENT

25 REDUCE CONFERENCE ROOM FROM 8'-6" x 11'-0" TO 8'-2" x 9'-2"

26 (E) WINDOW CONVERTED TO (N) DOOR OPENING

27 ROOF OVER (E) TRELLIS WITH PLYWOOD OVER 2x FRAMING. ROOF COVER TO BE SINGLE-PLY PVC MEMBRANE ROOF.

28 (N) REMOVABLE BOLLARDS

29 CUT BACK PLANTER AREA AND DEVELOP 3 PARKING SPACES: 1 FOR STAFF, 1 VAN ACCESSIBLE, 1 ACCESSIBLE

ACCESSIBILITY KEY NOTES (CONT.):

30 REMOVE (E) DECORATIVE CEILING PANELS AND WOOD TRIM AS REQUIRED TO ACCOMPLISH SEISMIC STRENGTHING WORK.

31 REMOVE (E) TEMPORARY ROOF TO ACCOMPLISH SEISMIC WORK. RE-INSTALL CLAY TILE ROOF SYSTEM.

32 REMOVE (E) LOW SLOPE ROOF TO ACCOMPLISH SEISMIC WORK. RE-INSTALL (N) MEMBRANE ROOF WITH (N) DRAINS TIED TO (E) STORM DRAIN SYSTEM AND (N) OVERFLOW DRAIN SYSTEM. RE-ESTABLISH ROOF VENTS, HVAC UNIT, AND RELATED MECHANICAL AND ELECTRICAL ITEMS.

33 REMOVE (E) LAND-BOUND GUTTER SYSTEM TO ACCOMPLISH SEISMIC WORK. PROVIDE ALLOWANCE TO REVISE, RESLOPE AND RE-CONFIGURE ROOF DRAINAGE DESIGN TO ENSURE PROPER DRAINAGE AND OVERFLOW PROTECTION.

LIFE SAFETY NOTES:

01 NOT USED

02 NOT USED

03 PROVIDE NEW FIRE ALARM SYSTEM.

04 PROVIDE FIRE ALARM AND FIRE SPRINKLER SYSTEM.

05 PROVIDE FLOOR LEVEL EXIT LIGHT SYSTEM.

06 PROVIDE NEW FIRE SPRINKLER SYSTEM

07 PROVIDE NEW FIRE ALARM SYSTEM

08 NOT USED

09 NOT USED

10 NOT USED

11 EXTEND FIRE SPRINKLER COVERAGE TO UNDERSIDE OF MEZZANINE ADDITION

12 NOT USED

13 NOT USED

14 ADD ONE 4'x4' SMOKE HATCH AT ROOF TO COMPLY WITH CBC.

15 NOT USED

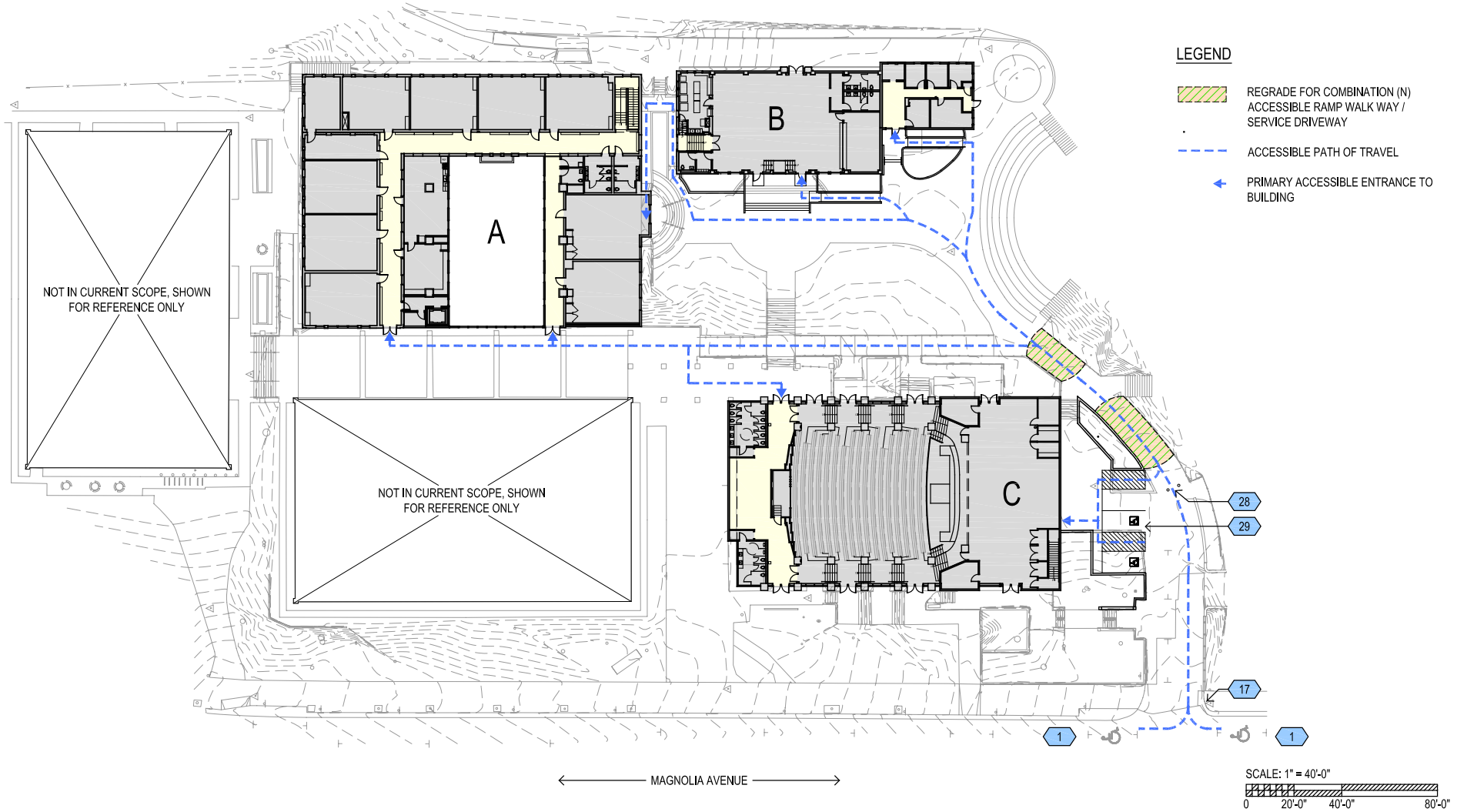
16 NOT USED

17 PROVIDE NEW CONCRETE LANDING AND STAIRS

18 NOT USED

19 PROVIDE EMERGENCY LIGHTING.

20 REPLACE (E) NON COMPLIANT GUARDRAIL WITH NEW GUARDRAIL

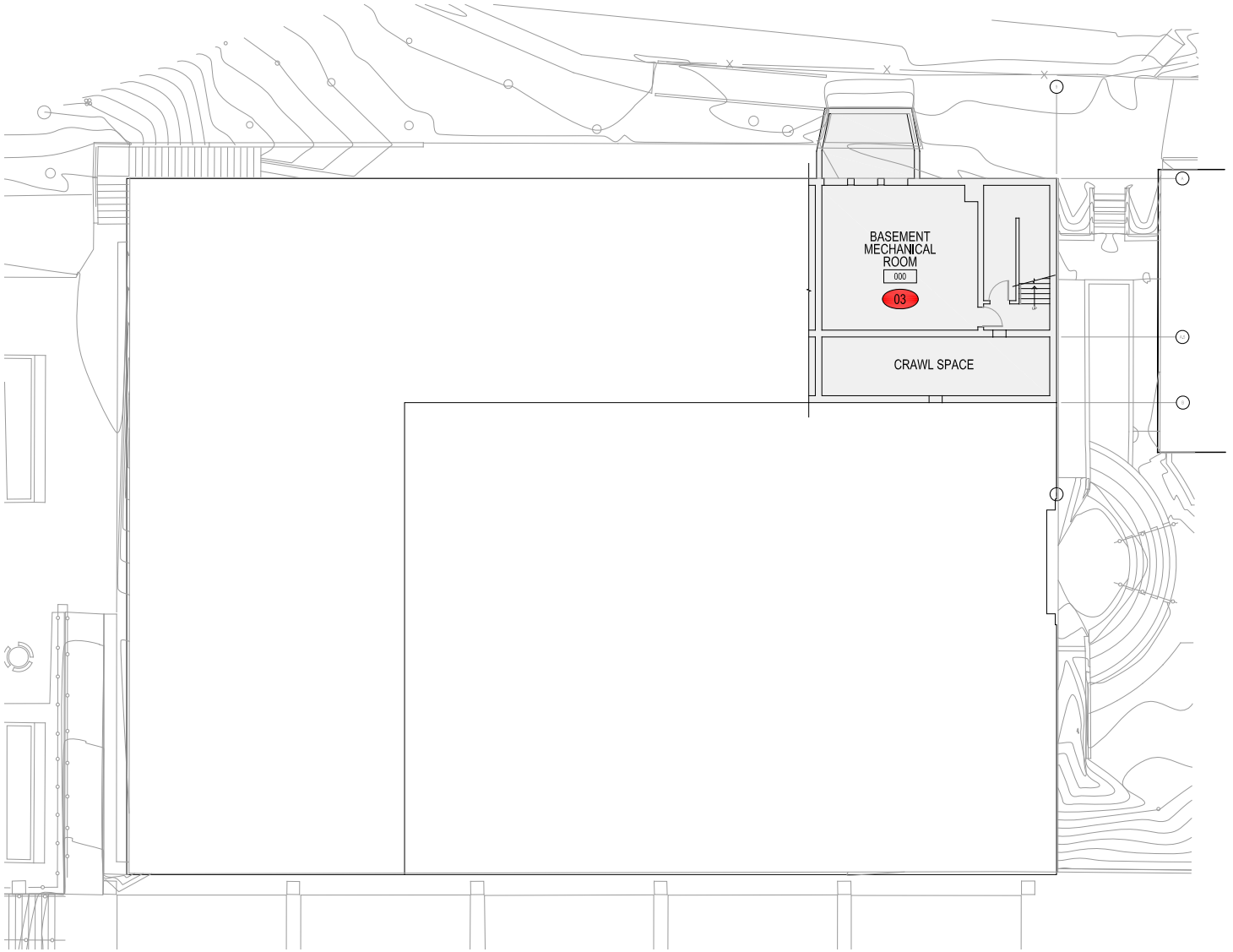


SITE PLAN - ON-SITE PARKING

PIEDMONT HIGH SCHOOL
PIEDMONT UNIFIED SCHOOL DISTRICT

concept design: on-site parking

2.0



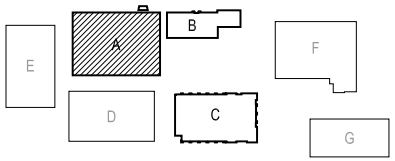
LEGEND

- (E) WALL, NO WORK
- (N) WALL
- (N) ARCHITECTURAL IMPROVEMENT
- (E) CORRIDOR
- STRUCTURAL IMPROVEMENT, SEE STRUCTURAL DRAWINGS
- (N) OR MODIFIED FOUNDATION, SEE STRUCTURAL DRAWINGS

TRUE NORTH
REFERENCE NORTH

SCALE: 1/16" = 1'-0"
0 8'-0" 16'-0" 32'-0"

KEY PLAN:

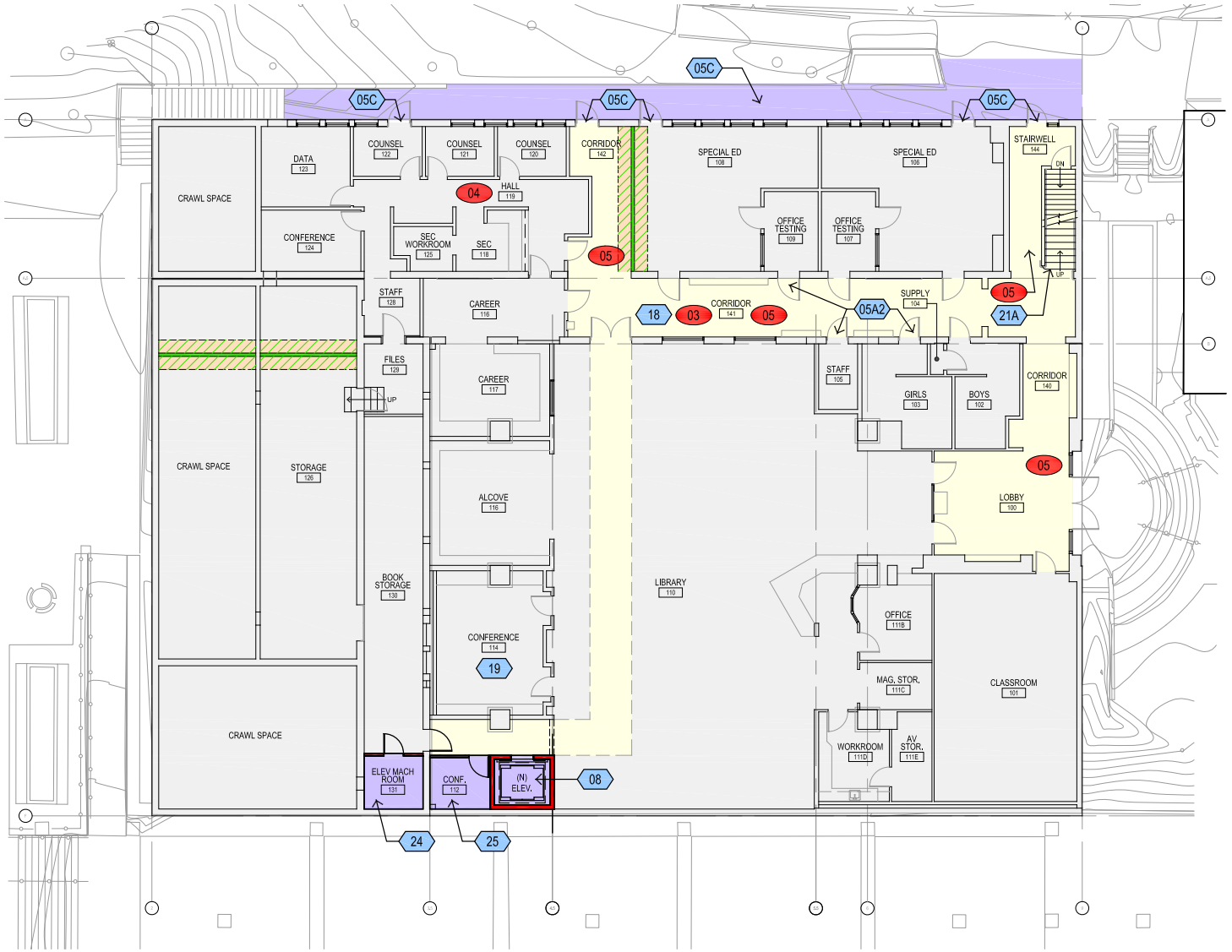


BUILDING A - BASEMENT - QUAD BUILDING / LIBRARY

PIEDMONT HIGH SCHOOL
PIEDMONT UNIFIED SCHOOL DISTRICT

concept design: quad building

3.0



LEGEND

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- (N) WALL
- (N) ARCHITECTURAL IMPROVEMENT
- (E) CORRIDOR
- STRUCTURAL IMPROVEMENT, SEE STRUCTURAL DRAWINGS
- (N) OR MODIFIED FOUNDATION, SEE STRUCTURAL DRAWINGS

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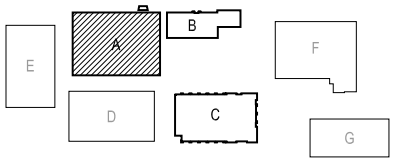
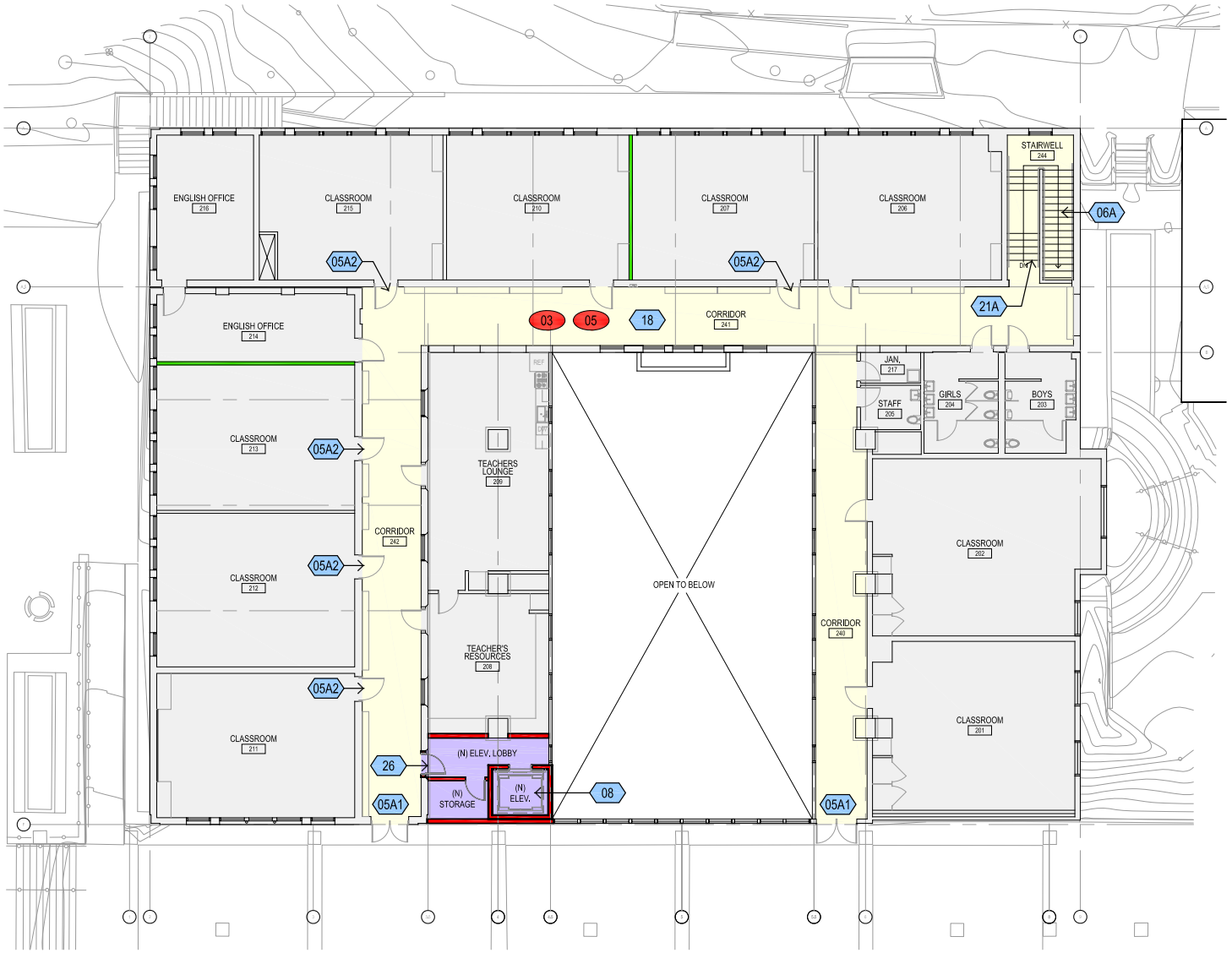


BUILDING A - FIRST FLOOR - QUAD BUILDING / LIBRARY

PIEDMONT HIGH SCHOOL
PIEDMONT UNIFIED SCHOOL DISTRICT

concept desing: quad building

3.1



BUILDING A - SECOND FLOOR - QUAD BUILDING / LIBRARY

LEGEND

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- (N) ARCHITECTURAL IMPROVEMENT
- (E) CORRIDOR
- STRUCTURAL IMPROVEMENT, SEE STRUCTURAL DRAWINGS
- (N) OR MODIFIED FOUNDATION, SEE STRUCTURAL DRAWINGS

TRUE NORTH
REFERENCE NORTH

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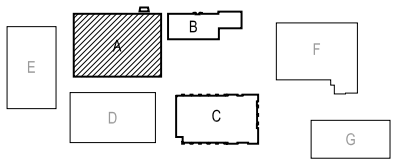
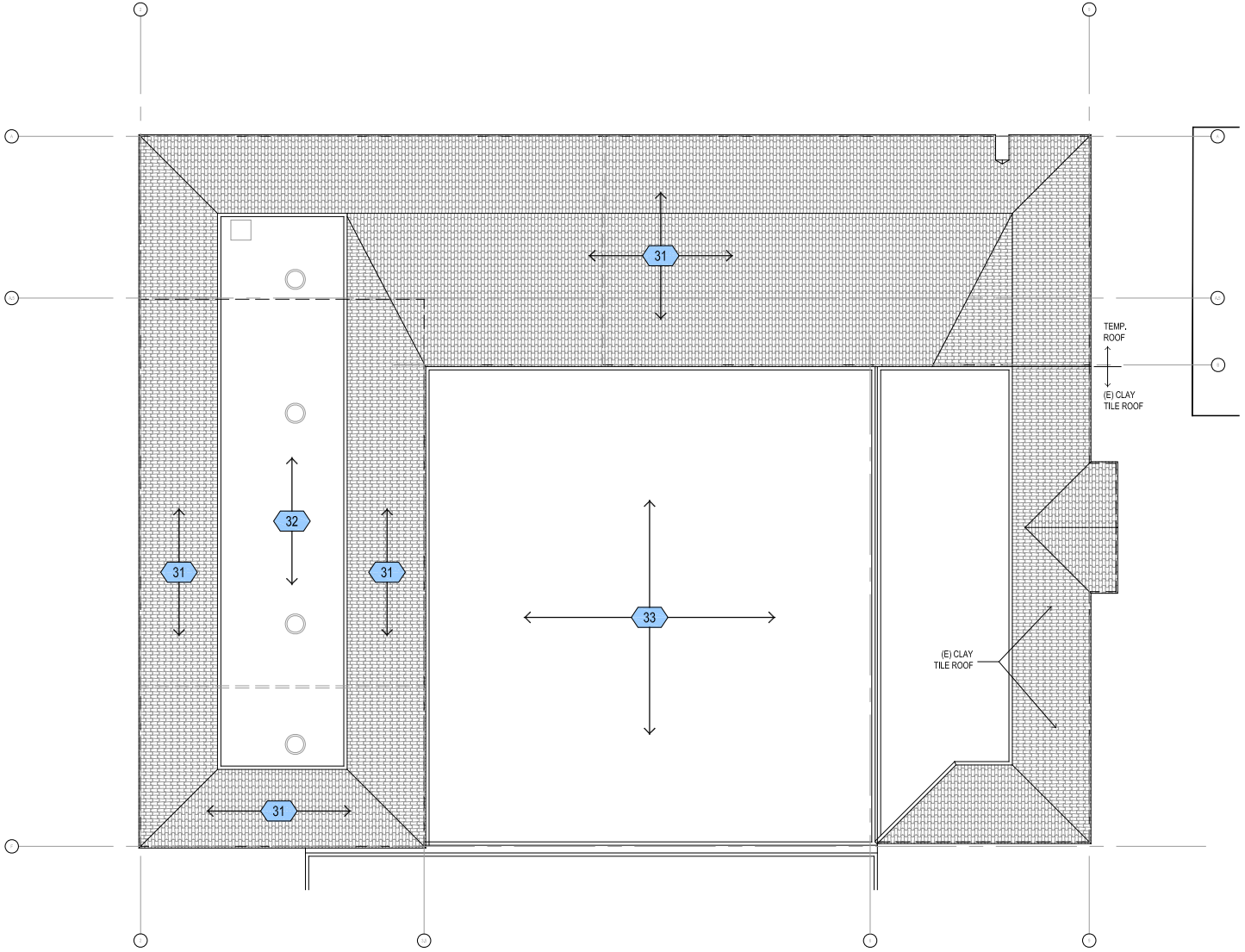


PIEDMONT HIGH SCHOOL
PIEDMONT UNIFIED SCHOOL DISTRICT

concept design: quad building



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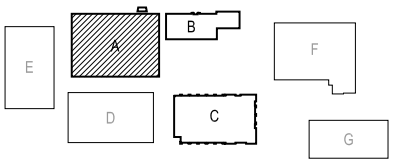
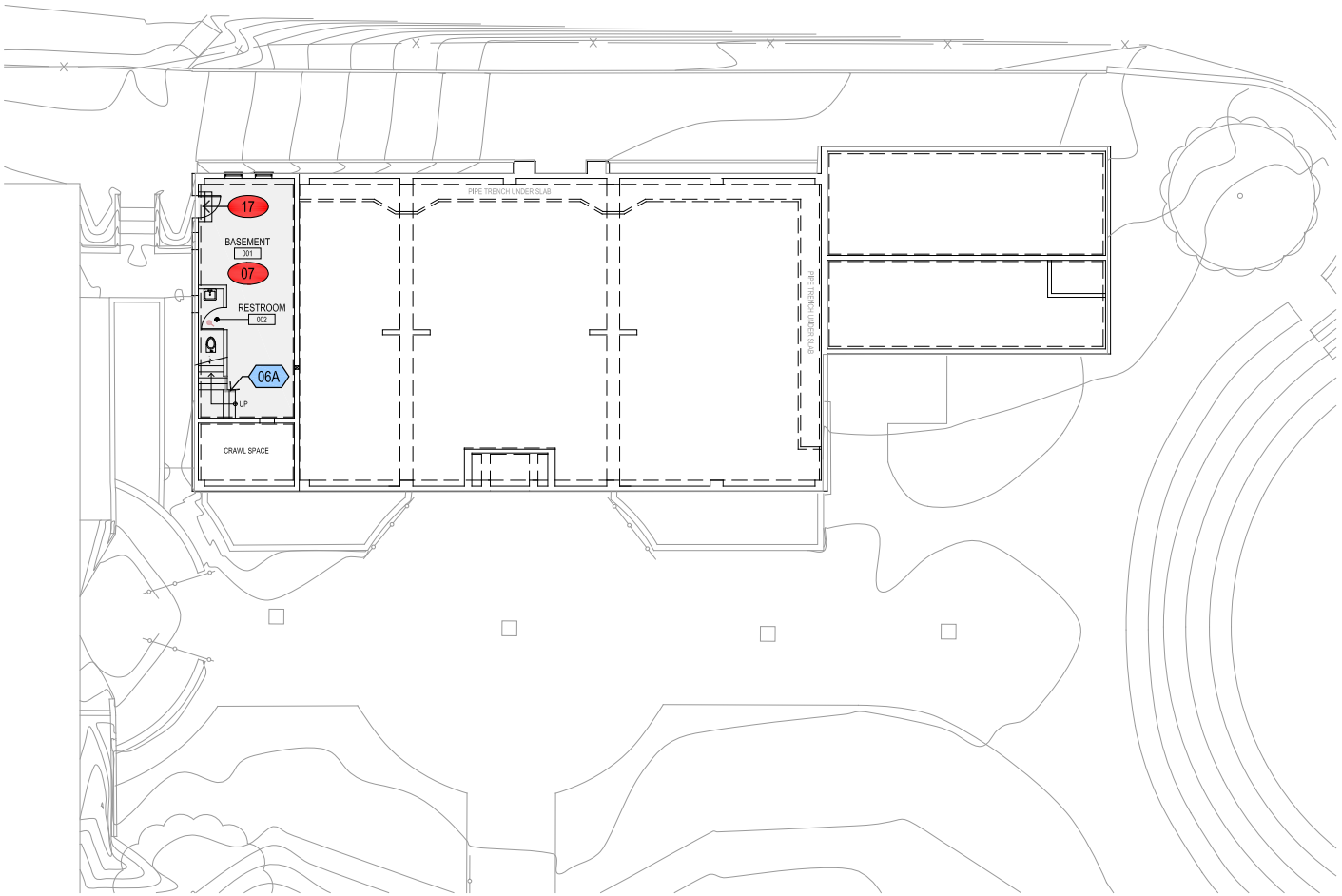


BUILDING A - ROOF PLAN - QUAD BUILDING / LIBRARY

PIEDMONT HIGH SCHOOL
PIEDMONT UNIFIED SCHOOL DISTRICT

concept design: quad building



LEGEND

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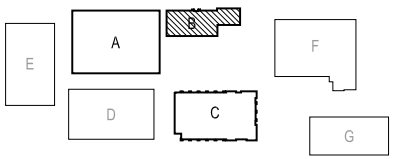
- (N) WALL
- (N) ARCHITECTURAL IMPROVEMENT
- (N) RAMP
- (N) LANDSCAPE

TRUE NORTH
REFERENCE NORTH

SCALE: 1/16" = 1'-0"

0 8'-0" 16'-0" 32'-0"

KEY PLAN:

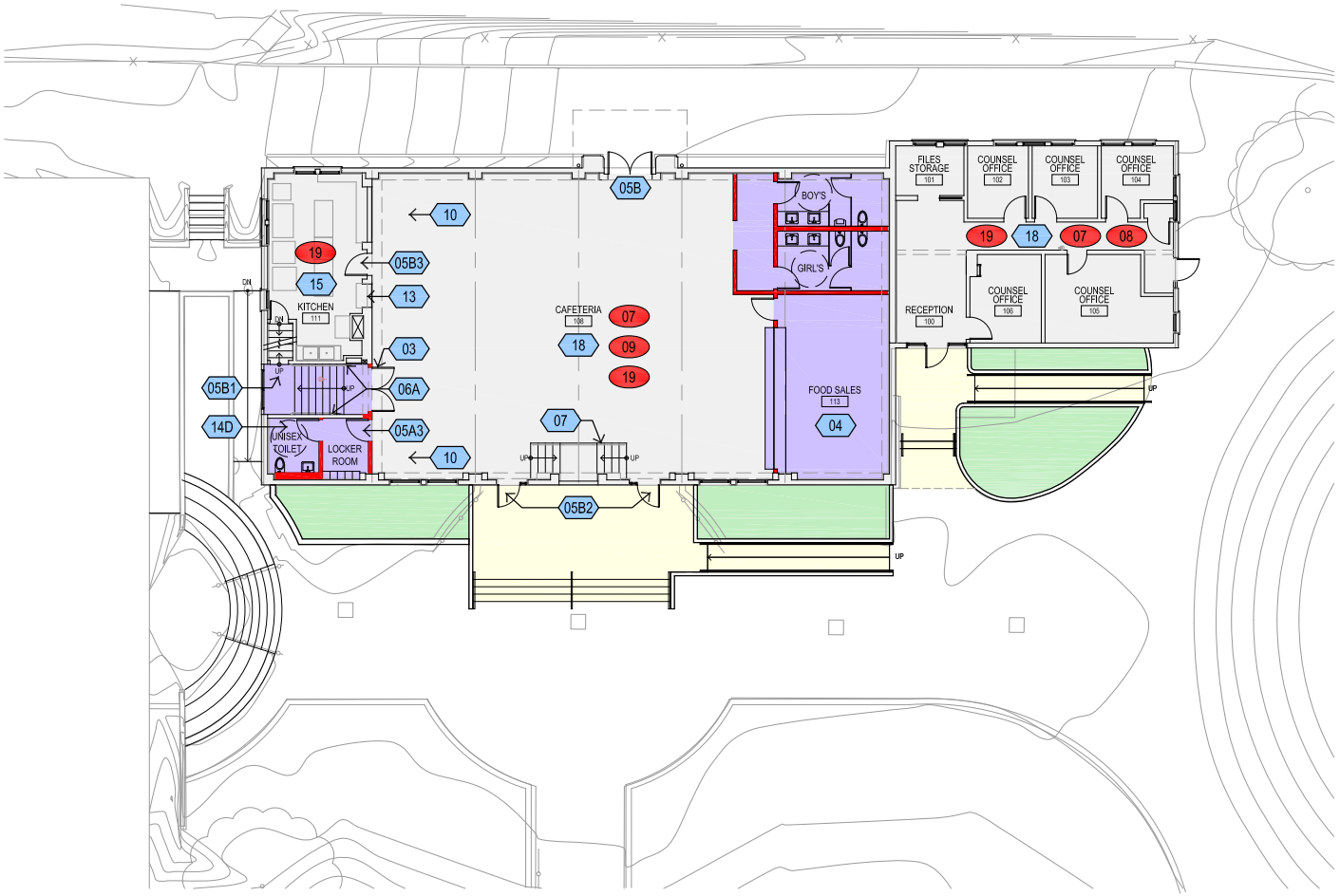


BUILDING B - BASEMENT - STUDENT CENTER

PIEDMONT HIGH SCHOOL
PIEDMONT UNIFIED SCHOOL DISTRICT

concept design: student center

4.0



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- (N) ARCHITECTURAL IMPROVEMENT
- (N) RAMP
- (N) LANDSCAPE

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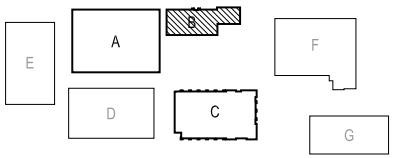
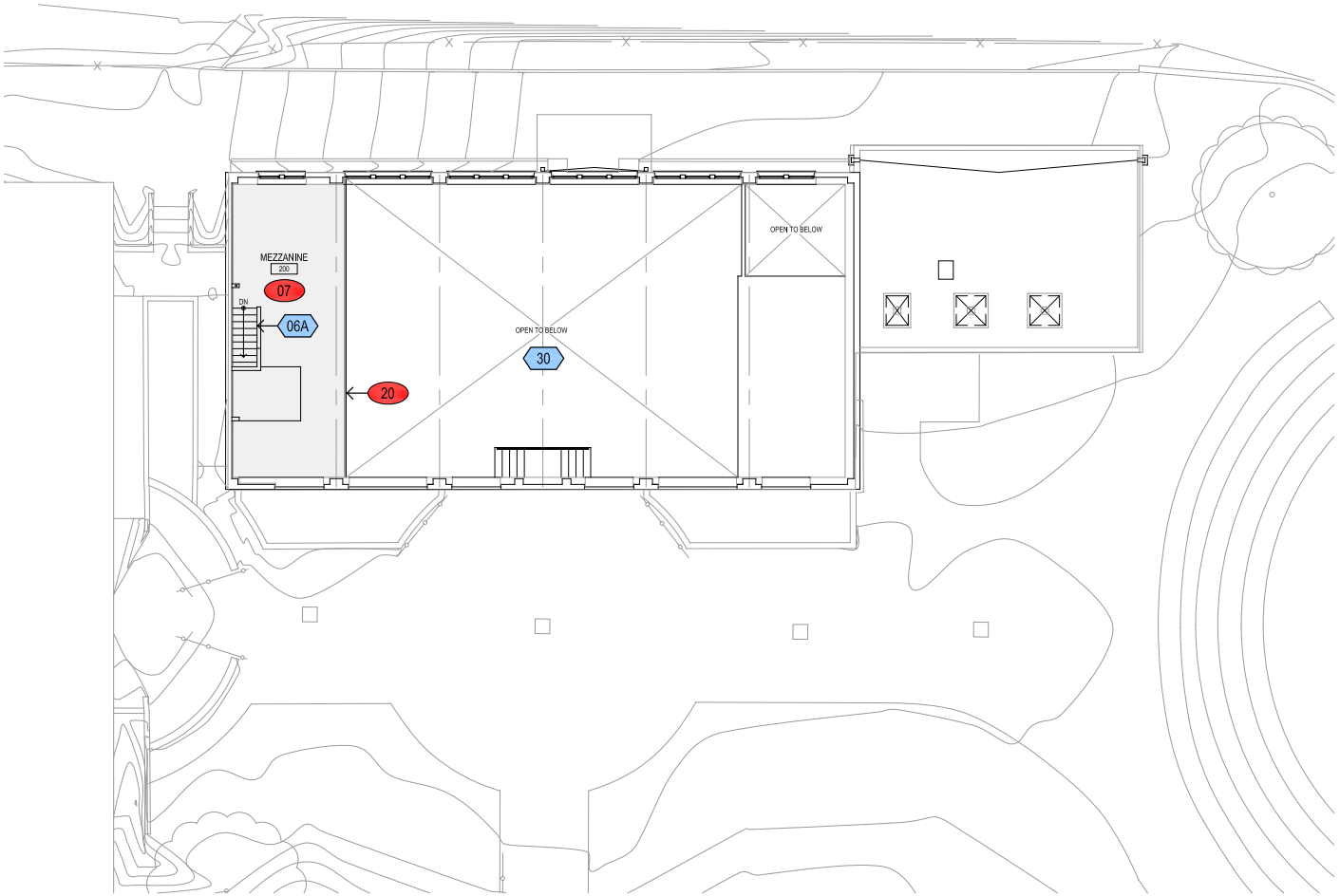


BUILDING B - MAIN LEVEL - STUDENT CENTER

PIEDMONT HIGH SCHOOL
PIEDMONT UNIFIED SCHOOL DISTRICT

concept design: student center

4.1



LEGEND

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- (N) ARCHITECTURAL IMPROVEMENT
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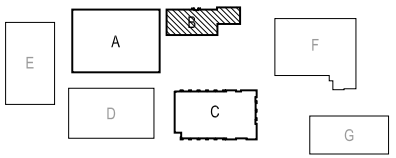
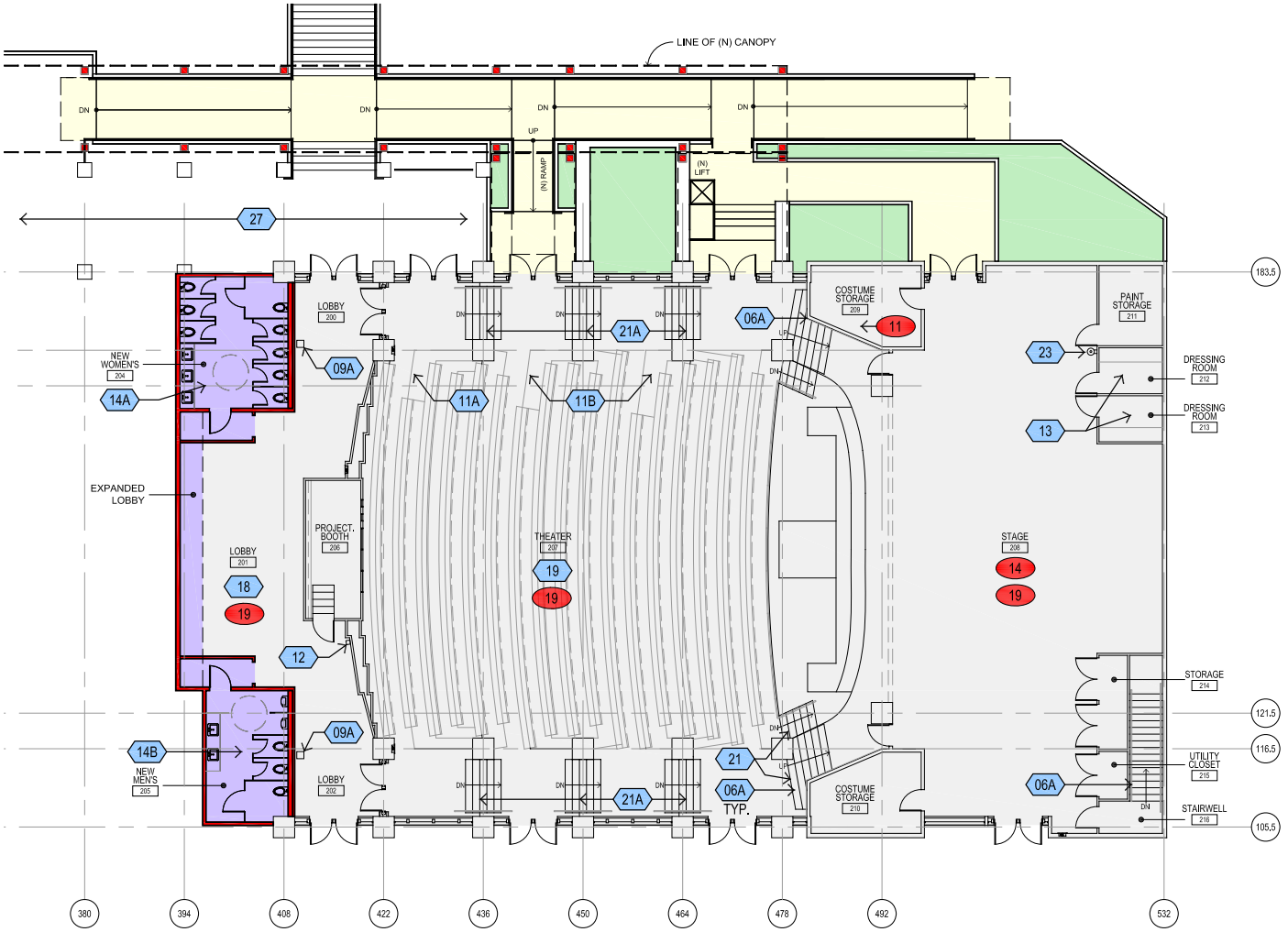


BUILDING B - MEZZANINE - STUDENT CENTER



BUILDING C - MAIN LEVEL - ALLEN HARVEY THEATER - OPTION NO. 1

MAJOR ISSUES:

DSA REQUIRES 6 DISPERSED SEATS IN THE THEATER. THE CURRENT THEATER HAS 2 IN THE REAR ONLY

THEATER DOES DOT HAVE COMPLIANT ACCESSIBLE TOILETS

CONCEPT DESIGN OPTION NO. 1

ISSUE:
DISPERSE SEATING

CONCEPT DESIGN OPTION NO. 1 PROVIDES NEW RAMP & WHEEL CHAIR LIFT WITH COVERED WALKWAY ALONG THE ENTIRE PATH OF TRAVEL FROM LOBBY TO THE ACCESSIBLE SEATING

BASED ON PAST EXPERIENCE, THIS MAY BE THE MINIMUM MITIGATION MEASURES DSA WILL ACCEPT

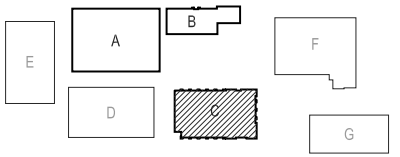
LEGEND

- (E) WALL, NO WORK
- (N) WALL
- (N) ARCHITECTURAL IMPROVEMENT
- (N) RAMP
- (N) LANDSCAPE

TRUE NORTH
REFERENCE NORTH

SCALE: 1/16" = 1'-0"
0 8'-0" 16'-0" 32'-0"

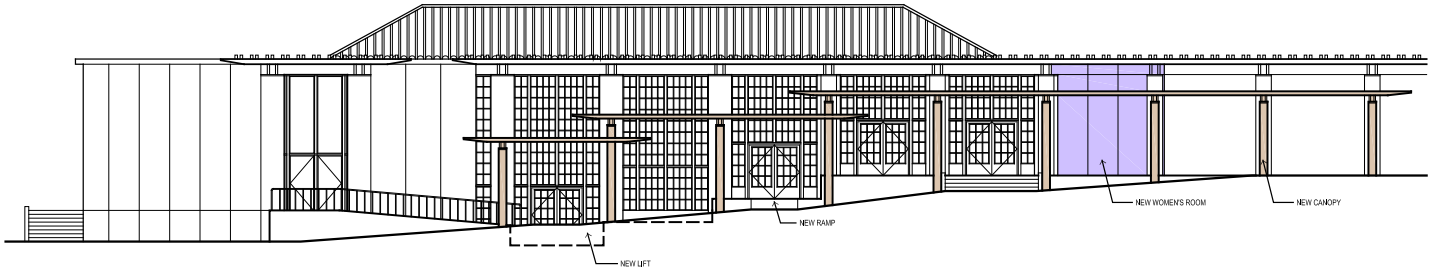
KEY PLAN:



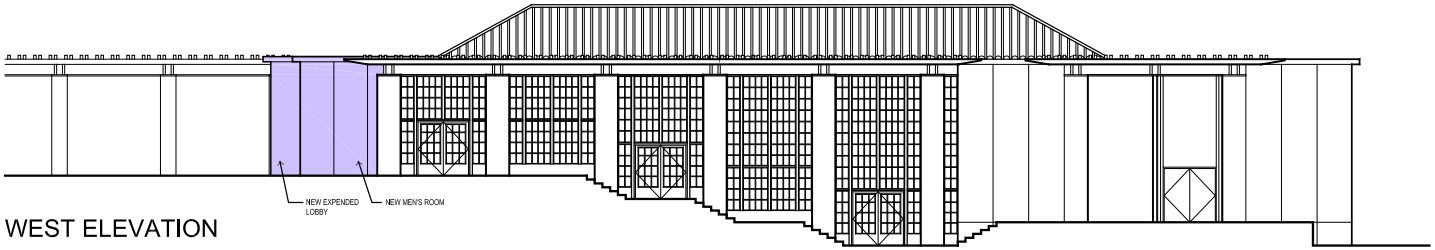
PIEDMONT HIGH SCHOOL
PIEDMONT UNIFIED SCHOOL DISTRICT

concept design: auditorium

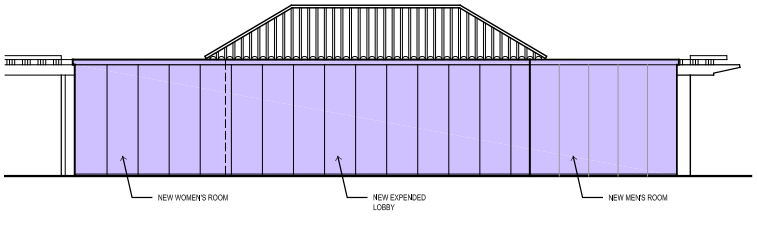
5.0



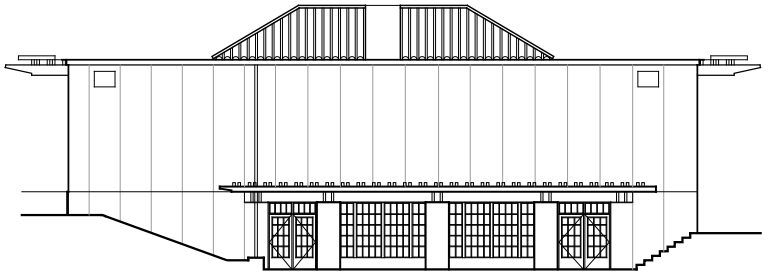
EAST ELEVATION



WEST ELEVATION



NORTH ELEVATION



SOUTH ELEVATION

(N) CANOPY

(N) ARCHITECTURAL IMPROVEMENT

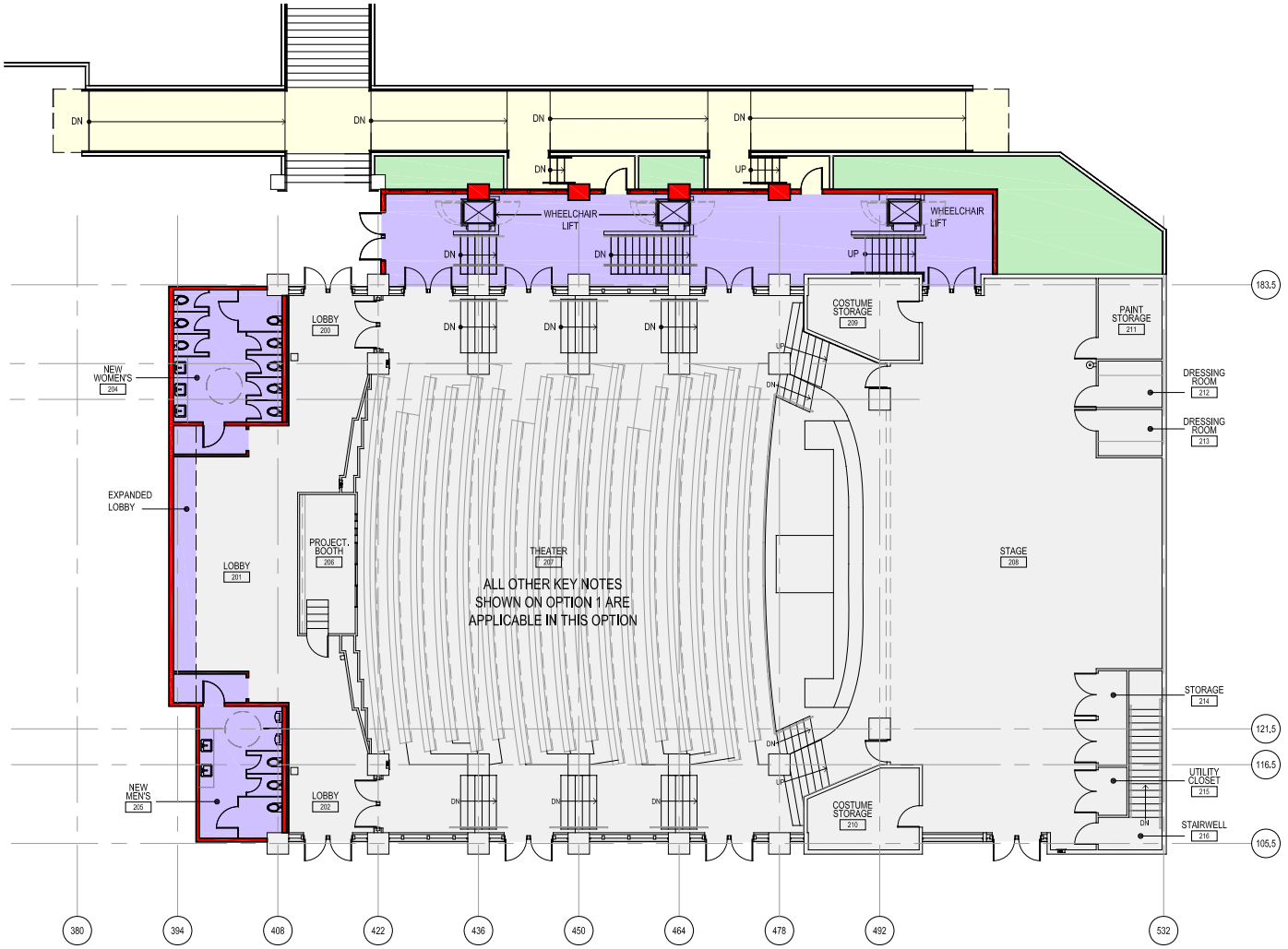
SCALE: 1/16" = 1'-0"

0 8'-0" 16'-0" 32'-0"

BUILDING C - EXTERIOR ELEVATION - ALLEN HARVEY THEATER - OPTION NO. 1

concept design: auditorium

5.1



BUILDING C - MAIN LEVEL - ALLEN HARVEY THEATER - OPTION NO. 2

MAJOR ISSUES:

DSA REQUIRES 6 DISPERSED SEATS IN THE THEATER. THE CURRENT THEATER HAS 2 IN THE REAR ONLY

THEATER DOES DOT HAVE COMPLIANT ACCESSIBLE TOILETS

CONCEPT DESIGN OPTION NO. 2

ISSUE:
DISPERSE SEATING

CONCEPT DESIGN OPTION NO. 2 CREATES AN EXPANSION ON THE SOUTH SIDE OF THE THEATER TO ALLOW WHEELCHAIR ACCESS TO SEATING WITHIN A WEATHER PROTECTED ENVIRONMENT. THIS WOULD BE PROPOSED ONLY IF OPTION 1 WAS NOT ACCEPTABLE TO DSA.

THE EXPANSION SPACE WOULD PROVIDE ACCESSIBILITY AS WELL AS ADDITIONAL LOBBY / LOUNGE SPACE.

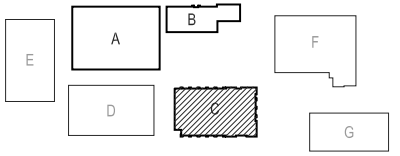
LEGEND

- (E) WALL, NO WORK
- (N) WALL
- (N) ARCHITECTURAL IMPROVEMENT
- (N) RAMP
- (N) LANDSCAPE

TRUE NORTH
REFERENCE NORTH

SCALE: 1/16" = 1'-0"
0 8'-0" 16'-0" 32'-0"

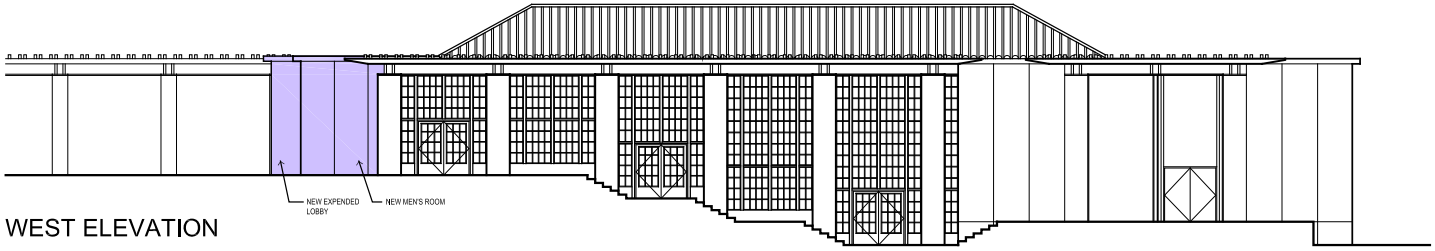
KEY PLAN:



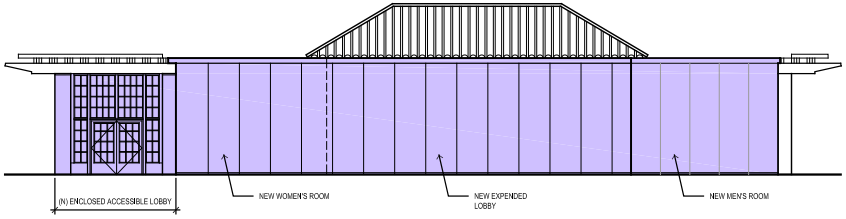
PIEDMONT HIGH SCHOOL
PIEDMONT UNIFIED SCHOOL DISTRICT

concept design: auditorium

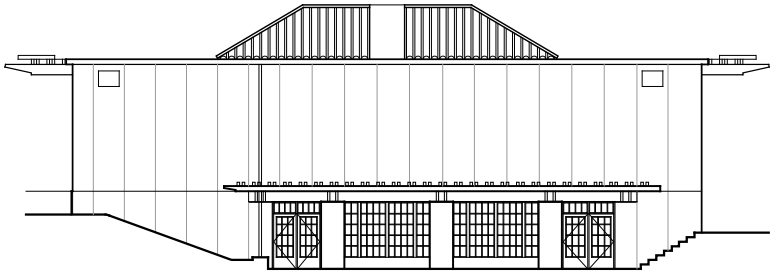
EAST ELEVATION



WEST ELEVATION



NORTH ELEVATION



SOUTH ELEVATION

(N) ARCHITECTURAL IMPROVEMENT

SCALE: 1/16" = 1'-0"

0 8'-0" 16'-0" 32'-0"

BUILDING C - EXTERIOR ELEVATION - ALLEN HARVEY THEATER - OPTION NO. 2

concept design: auditorium

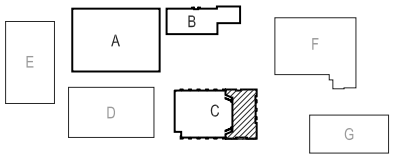
LEGEND

- (E) WALL, NO WORK
- (N) WALL
- (N) ARCHITECTURAL IMPROVEMENT
- (N) RAMP

TRUE NORTH
REFERENCE NORTH

SCALE: 1/16" = 1'-0"
0 8'-0" 16'-0" 32'-0"

KEY PLAN:



BUILDING C - LOWER LEVEL - ALLEN HARVEY THEATER

PIEDMONT HIGH SCHOOL
PIEDMONT UNIFIED SCHOOL DISTRICT

concept design: auditorium

Summary of Seismic Strengthening Schemes for the Quad/Library and Student Center at the High School

A seismic evaluation of the Quad/Library and the Student Center was performed using the Tier 2 procedures of ASCE 31. Significant deficiencies were found, and strengthening concepts have been developed. These are summarized below.

Criteria

The strengthening concepts were developed using the provisions of ASCE 41 for the Life Safety performance level. The BSE-1 site-specific spectra was used as the ground shaking hazard.

Quad/Library

The recommended strengthening scheme is as follows. The existing roof diaphragm of straight sheathing is removed and replaced with new plywood sheathing. The attic level diaphragm, consisting of weak horizontal x-bracing, is replaced with a new, stronger horizontal steel bracing system. Two new concrete shear walls are added, one in each wing. These extend from foundations to the roof.

Student Center

The existing roof sheathing is replaced with new plywood sheathing. The wall-roof connections are strengthened with new steel brackets, and the truss seats are rebuilt to connect the trusses more strongly to the walls.

GENERAL NOTES:

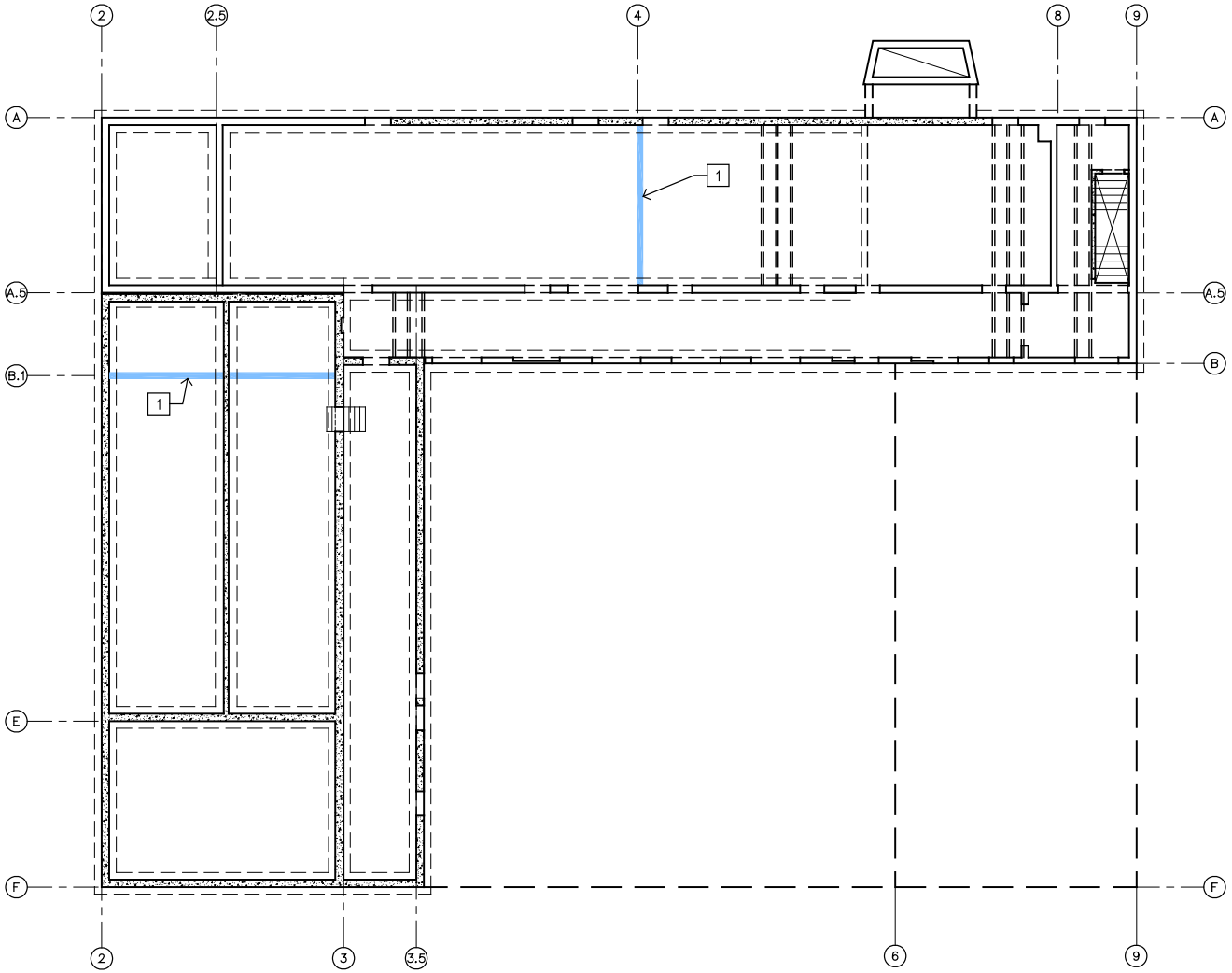
1. ALL CONSTRUCTION SHOWN IS EXISTING UNLESS SPECIFICALLY NOTED AS NEW OR (N)
2. THESE DRAWINGS SHOW THE SEISMIC UPGRADE RECOMMENDATION FOR BUILDING A & B.
3. SEISMIC UPGRADE CRITERIA IS ASCE41 FOR THE LIFE SAFETY PERFORMANCE LEVEL WITH THE BSE-1 SPECTRA. SEE GEOMATRIX CONSULTANTS REPORT OF 3/14/07 FOR BSE-1 SPECTRA.

STRUCTURAL KEY NOTES:

1. (N) 10" CONCRETE SHEAR WALL WITH CONCRETE FOOTING AGAINST FIRM SOIL OR ROCK.
2. REMOVE EXISTING STEEL X-BRACING AND REPLACE WITH (N) BRACING AS SHOWN.
3. REMOVE EXISTING STEEL X-BRACING BETWEEN LINES A.6 AND E. ALL STEEL BEAMS TO REMAIN. INSTALL (N) BRACING AS SHOWN.
4. INSTALL (N) SHOTCRETE WALLS ON TOP OF EXISTING CONCRETE WALLS AT THREE (3) LOCATIONS.
5. (N) SHOTCRETE WALLS AT TWO (2) LOCATIONS.
6. REMOVE EXISTING ROOFING AND 1x6 STRAIGHT SHEATHING. ADD (N) ¾" STRUCT. 1 PLYWOOD OVER EXISTING RAFTERS.
7. REMOVE NONSTRUCTURAL WOOD STUD WALLS IN ATTIC AT FOUR (4) LOCATIONS.
8. (N) 8" SHOTCRETE WALL AT TWO (2) LOCATIONS. SEE S-A2 FOR LOCATIONS.
9. INSTALL (N) 8" SHOTCRETE WALLS ON TOP OF EXISTING CONCRETE WALLS AT THREE (3) LOCATIONS.
10. REMOVE (E) TILE ROOF AND 1x DIAGONAL SHEATHING. INSTALL (N) 2x FLAT FILLERS AS SHOWN. INSTALL (N) ½ IN. STRUCT. 1 BLOCKED PLY ROOF ON TOP OF (N) 2x'S W/ 8d @ 2 ½ IN. AT ALL BOUNDARIES AND CONTINUOUS EDGES, 8d @ 4 AT NON-CONTINUOUS EDGES, AND 8d @ 12 AT INTERMEDIATE SUPPORTS.
11. INSTALL (N) ⅝ IN. Ø EPOXY BOLTS AT 4'-0" OC BTWN. 2x WALL TOP PL AND CONC. OVER DISTANCE SHOWN.
12. INSTALL (N) ⅝ IN. Ø EPOXY BOLTS @ 3'-0" OC BTWN. 2x WALL TOP PL AND CONC. CONTINUOUSLY ALONG LINES 1 & 7.
13. INSTALL (N) ½ IN. STRUCT. 1 BLOCKED SHEATHING OVER (E) DIAGONAL SHEATHING W/ 8d @ 6 IN. OC AT ALL EDGES AND 8d @ 12 IN. OC AT ALL INTERMEDIATE SUPPORTS.
14. INSTALL 2 (N) CS16 x 8'-8" STRAPS @ EA. SIDE OF OPENING. NAIL EA. STRAP W/ 2 ROWS 8d x 1 ½ IN. @ 4 IN. OC FULL LENGTH.
15. ANCHOR WALL @ 4'-0" O.C. W/ STRAP-TIES. NEW FRAMING AND HARDWARE.
16. ANCHOR WALL @ 4'-0" O.C. W/ THREADED RODS AND ADD SOLID BLOCKING BETWEEN JOISTS.
17. ANCHOR WALL TO ROOF TRUSS.

STRUCTURAL KEY NOTES (CONT.):

18. INSTALL (N) T.S. CROSS-TIES & SHIM (E) 8x PURLINS.
19. ANCHOR (E) MEZZANINE OR CEILING TO CONC. WALL W/ (N) PHD'S AS SHOWN.



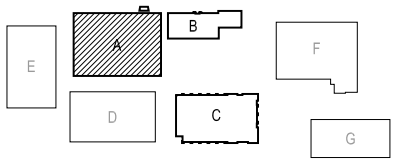
LEGEND:

- (N) SHEAR WALL
- (N) SHEAR WALL EXTENSION
- (N) STEEL BRACING
- (N) ROOF DIAPHRAGM
- (E) MEZZANINE
- STRENGTHENED CONNECTION

TRUE NORTH
REFERENCE NORTH

SCALE: 1/16" = 1'-0"
0 8'-0" 16'-0" 32'-0"

KEY PLAN:

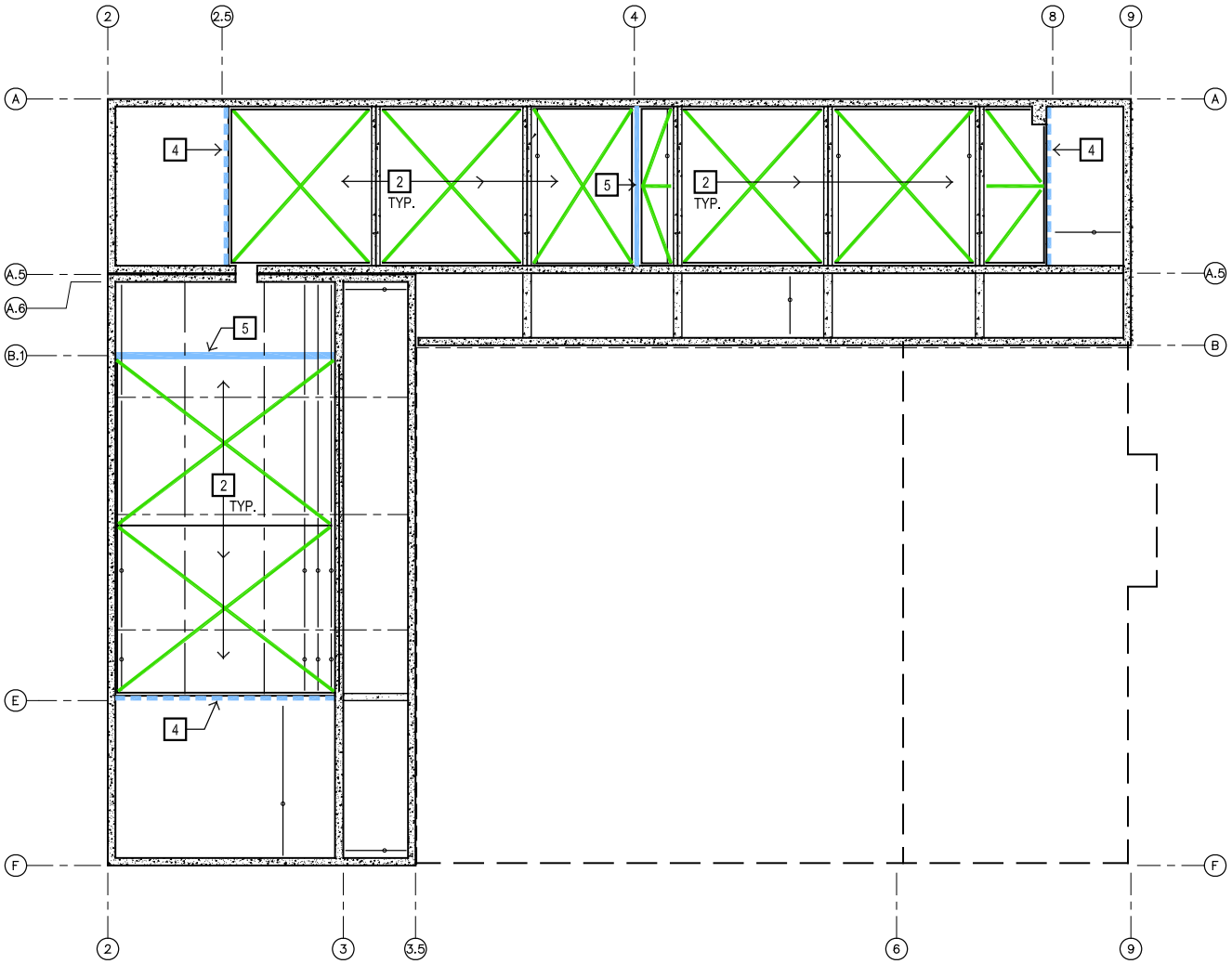


BUILDING A - FIRST FLOOR - QUAD BUILDING / LIBRARY

PIEDMONT HIGH SCHOOL
PIEDMONT UNIFIED SCHOOL DISTRICT

concept design: structural

8.0



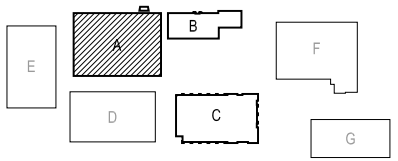
LEGEND:

- (N) SHEAR WALL
- (N) SHEAR WALL EXTENSION
- (N) STEEL BRACING
- (N) ROOF DIAPHRAGM
- (E) MEZZANINE
- STRENGTHENED CONNECTION

TRUE NORTH
REFERENCE NORTH

SCALE: 1/16" = 1'-0"
0 8'-0" 16'-0" 32'-0"

KEY PLAN:

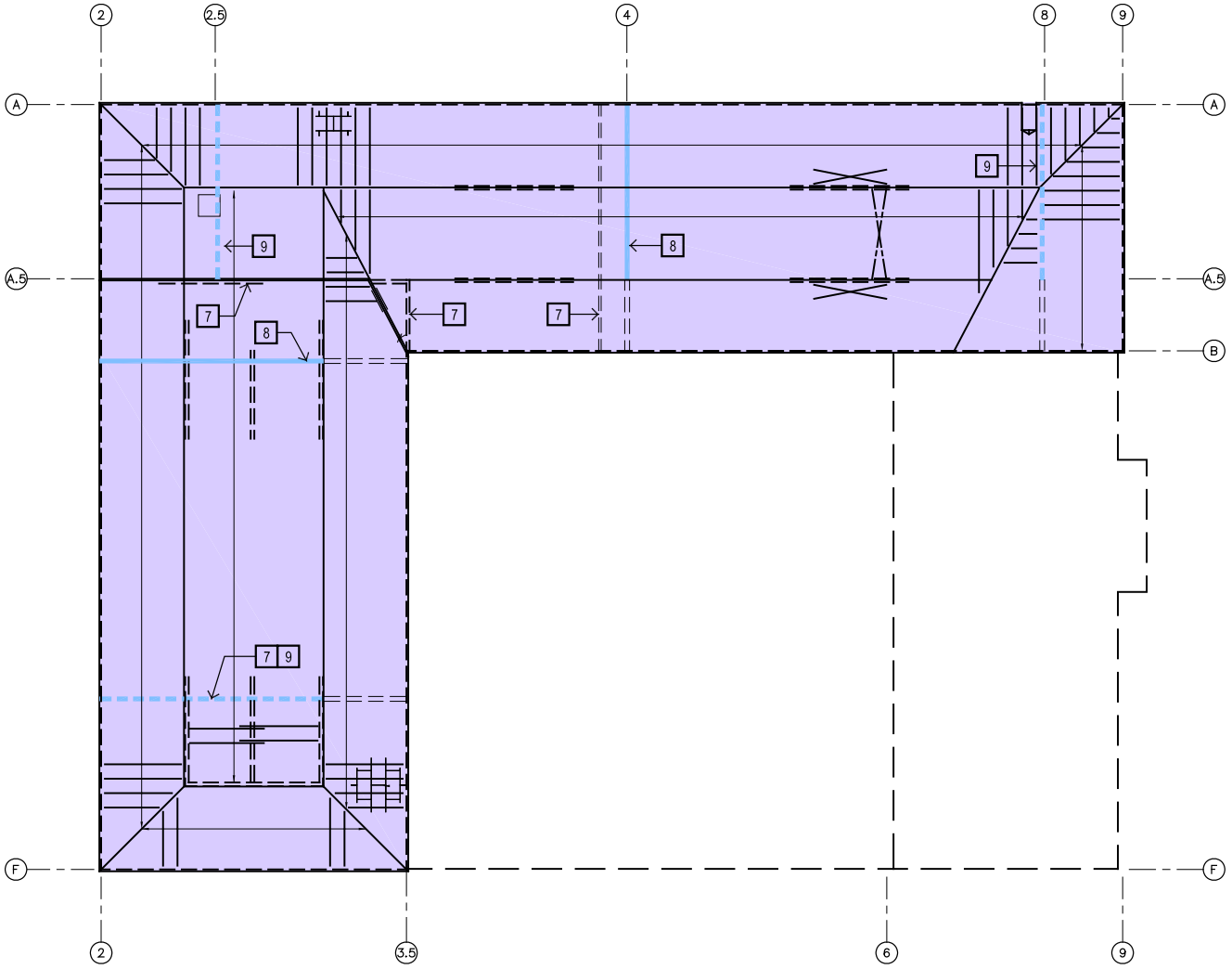


BUILDING A - ATTIC - QUAD BUILDING / LIBRARY

PIEDMONT HIGH SCHOOL
PIEDMONT UNIFIED SCHOOL DISTRICT

concept design: structural

8.1



BUILDING A - ROOF - QUAD BUILDING / LIBRARY

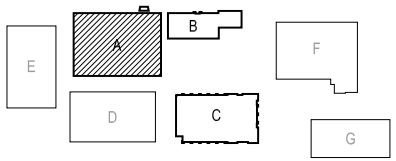
LEGEND:

- (N) SHEAR WALL
- (N) SHEAR WALL EXTENSION
- (N) STEEL BRACING
- (N) ROOF DIAPHRAGM
- (E) MEZZANINE
- STRENGTHENED CONNECTION

TRUE NORTH
REFERENCE NORTH

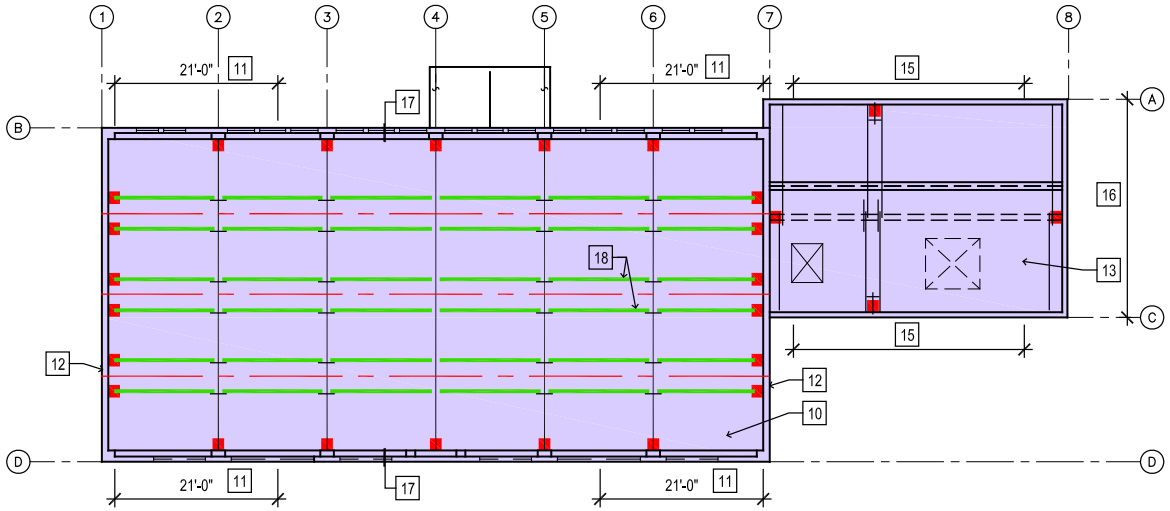
SCALE: 1/16" = 1'-0"
0 8'-0" 16'-0" 32'-0"

KEY PLAN:

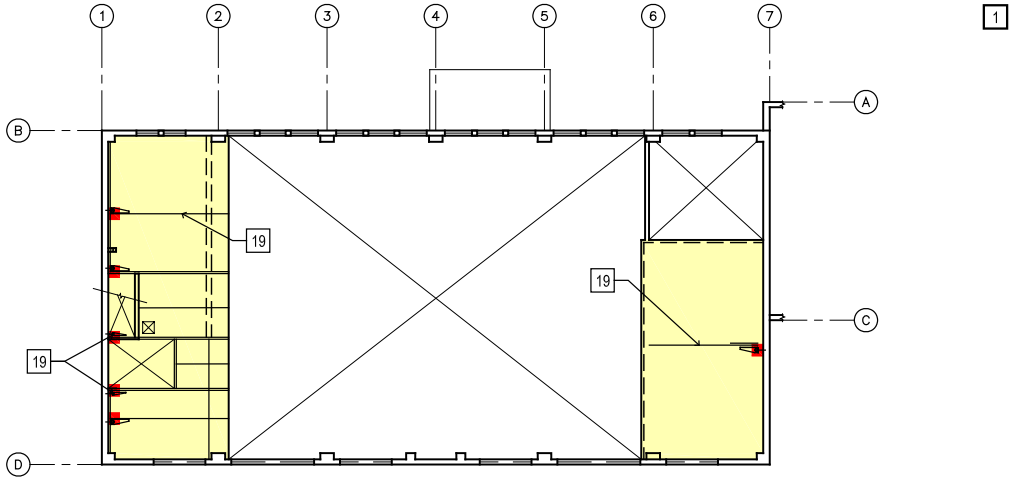


PIEDMONT HIGH SCHOOL
PIEDMONT UNIFIED SCHOOL DISTRICT

concept design: structural



BUILDING B - ROOF - STUDENT CENTER



BUILDING B - MEZZANINE - STUDENT CENTER

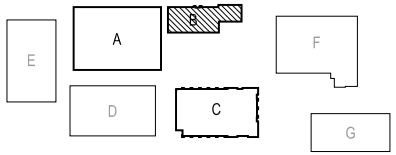
LEGEND:

- (N) SHEAR WALL
- (N) SHEAR WALL EXTENSION
- (N) STEEL BRACING
- (N) ROOF DIAPHRAGM
- (E) MEZZANINE
- STRENGTHENED CONNECTION

TRUE NORTH
REFERENCE NORTH

SCALE: 1/16" = 1'-0"
0 8'-0" 16'-0" 32'-0"

KEY PLAN:



PIEDMONT HIGH SCHOOL
PIEDMONT UNIFIED SCHOOL DISTRICT

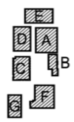
concept design: structural

9.0

PIEDMONT SEISMIC SAFETY PROGRAM
PIEDMONT UNIFIED SCHOOL DISTRICT
PROJECT STATUS
MARCH 31, 2008

murakami/Nelson Architectural Corp.
Job No.: 0629 - PUSD Seismic

School / Site: Piedmont High School — Abbreviation: PHS



Building Designation	Building Name	Seismic Tier 1	Revised Seismic Tier 1	Letter From Forell & Elsesser on Seismic Performance*	ATI Report (Accessibility / Seismic Performance)	Included in Scope Of Work (for m/N)	Qualitative Seismic Assessment by R.P. Gallagher	Qualitative Seismic Assessment by Peer Reviewer	Benchmark Building	Seismic Tier 2	Seismic Non-Structural Hazard Report	ADA / Access Evaluation	Life Safety Evaluation	Materials Testing Spring 2007	Materials Testing Summer 2007	Materials Testing Fall 2007	Materials Testing Winter 2007	Destructive Testing Spring 2007	Destructive Testing Summer 2007	Destructive Testing Fall 2007	Destructive Testing Winter 2007
A	Quad Building / Library	●			●	●	×			●	●	●	●	●				●			
B	Student Center / Cafeteria	●			●	●	×			●	●	●	●	●				●			
C	Auditorium	○			●	●	×			●	●	●	●	×				×			

Building Designation	Slope Stability Analysis / Site Specific Spectra	Peer Review at Investigation and Analysis	Peer Review Non-Structural	Peer Review at Concept Design	Peer Review at Schematic Design	Peer Review at Design Development	Peer Review at 100% Construction Documents	Existing Hazardous Materials Reports in m/N possession	Hazardous Materials Report by Hazard Management Services, Inc.	Topographical Survey	Title Report	Boundary Survey	Existing Geotechnical Reports	Existing Structural Calculations in m/N possession	Existing Specifications in m/N possession	Measured Drawings - Architectural	Measured Drawings - Structural
A	●	●	●	●	○	○	○	●	○	●	○	×	●	×	×	●	●
B	●	●	●	●	○	○	○	●	○	●	○	×	×	×	×	×	×
C	●	●	●	●	○	○	○	●	○	●	○	×	×	×	×	×	×

Building Designation	DSA Dwgs in m/N possession	DSA Drawing Date	DSA Number for Drawings	Drawings	Architect	Concept Plan	Cost Estimate (1)	Refined Concept Plan / Vision	Cost Estimate (2)	Comments
A	●	6/5/1996	64149	Modernization	David Wade Byrens	●	●	×	×	
	●	4/25/1988	49857	Repair	Keith Eric Johnson					
	●	11/26/1975	38432	Addition	Reid & Tarics Assoc.					
	●	5/10/1954	11955	Electrical Work	Romaine W. Meyers					
B	●	6/5/1996	64149	Modernization	David Wade Byrens	●	●	×	×	
	●	4/25/1988	49857	Repair	Keith Eric Johnson					
	●	5/3/1977	40144	Alterations	Reid & Tarics Assoc.					
	●	11/26/1975	38432	Alterations	Reid & Tarics Assoc.					
	○	5/10/1954	11955	Electrical Work	Romaine W. Meyers					
	●	3/18/1938	2319	Original	WM. H. & Harold H. Weeks					
C	●	4/25/1988	49857	Repair	Keith Eric Johnson	●	●	×	×	
	●	11/26/1975	38432	Original Construction	Reid & Tarics Assoc.					

LEGEND

- ○ NEEDED/IN PROGRESS
- ● YES / OK / COMPLETE
- ○ DO NOT HAVE
- ● NON CONCLUSIVE
- × NOT NECESSARY
- ○ Pending Authorization
- ● NO
- Shaded Area Indicates Tier 2 Seismic Analysis.

PIEDMONT HIGH SCHOOL

PIEDMONT UNIFIED SCHOOL DISTRICT

SEISMIC STRENGTHENING PROGRAM / MEASURE E BOND PROGRAM

INVESTIGATION AND ANALYSIS

FOR THREE PRIORITY BUILDINGS

FINAL REPORT

February 8, 2008

Building A - Quad / Library

Building B - Student Center

Building C - Auditorium

murakami Nelson
ARCHITECTURAL CORPORATION

EXECUTIVE SUMMARY

PIEDMONT HIGH SCHOOL PRIORITY BUILDINGS
EVALUATION AND ANALYSIS

murakami/Nelson has been retained by the Piedmont Unified School District to evaluate buildings at the five school campuses and district corporation yard for seismic safety and related accessibility and fire & life safety deficiencies and to design corrections of those deficiencies as part of the Measure E Bond Program. As part of this global objective we have evaluated the three priority buildings at the Piedmont High School - the Quad Building/Library, the Alan Harvey Theater and the Student Center.

The project is divided into three phases - Evaluation and Analysis, Concept Design and Design/ Construction Document/Construction. This Evaluation and Analysis phase has identified deficiencies; later phases of the project will conceptualize and design corrections of those deficiencies.

To assist us in this effort we have assembled a consultant team comprised of R. P. Gallagher Associates for structural engineering, Geomatrix for geo-hazard and site spectra analysis, Applied Materials Engineering for materials testing and inspection and Sandis for surveying. We have been assisted by Capital Program Management (CPM), the District's Program Manager; School Superintendent Constance Hubbard and Assistant Superintendent Michael Brady; Principal Randall Booker; District staff and maintenance staff. In support of the Bond process we have met with the District's Technical Advisory Committee (TAC), the Structural Subcommittee of the TAC, the Steering Committee and the Citizen's Oversight Committee (COC). We also have met with the Division of the State Architect (DSA) and with Maryann Phipps, the Peer Reviewer selected for the High School Buildings.

SEISMIC EVALUATION

This project is classified by DSA as a voluntary seismic upgrade which allows the School District to select the criteria for the evaluation and the upgrade in conformance with recognized standards and with DSA's concurrence. This process requires that a peer reviewer be retained to independently verify the results of the study and the proposed mitigations. The buildings were evaluated for life safety risk using ASCE Standard 31, a recognized standard.

Tier 2 Seismic Analyses and Tier 1 Non-Structural Seismic Hazards Studies have been completed for the three buildings. None of the buildings meet the life safety criteria of ASCE 31. The findings of the structural study are as follows:

Quad building – This building is comprised of five separate structures. The original Quad building and its addition, both believed to be constructed in the 1930's, have very weak roof and attic diaphragms, and both do not meet ASCE 31 life safety standards. Both are significant life safety risks. The library and library mezzanine meet ASCE 31 criteria. The library addition does not meet the standard because some of its steel connections do not fully incorporate new steel design standards, but the risk to occupants is not believed to be great.

Student Services Center – The Student Center does not meet ASCE 31 criteria. It has an overstressed high roof diaphragm, and the connections of the roof to the walls are not sufficiently strong. It can be significantly damaged in an earthquake, but is not believed to be a collapse hazard.

Alan Harvey Theater – The theater generally meets ASCE 31 life safety criteria, except that some of the connections of the roof framing to the large concrete columns are overstressed. These and several other roof connections need to be strengthened. This structure is unlikely to collapse in a major earthquake.

The three buildings were also surveyed for nonstructural hazards. The sprinkler piping in the original Quad building wings is not seismically braced and may fail in an earthquake. Other concerns include broken roof tile that can become a falling hazard and unanchored gas lines on roof of Quad building. In general, tall bookcases and storage cabinets through out the three buildings are anchored, with a few exceptions.

GEO-HAZARDS AND SITE SPECTRA

Geomatrix has conducted a geo-hazards study for all five school campuses. That study states that the Hayward fault "dominates the ground motion hazard for the PUSD school sites." Their report noted that the school sites are all roughly the same distance from that fault and will experience similar ground motions during an earthquake. The sites were evaluated for site stability, liquefaction and surface rupture; none of these failure mechanisms will be a factor at these sites. All the sites have a thin layer of fill or soil deposits over rock; therefore, rock site conditions were used to characterize the ground motions at all sites. Geomatrix also developed site specific spectra for ground motions that will be used in the design of mitigations of the seismic deficiencies.

ACCESSIBILITY EVALUATION

The three priority buildings were evaluated for accessibility conformance with the ADA and the related ADAAG regulations and the 2001 California Building Code. The evaluation process included review of applicable codes, review of existing documents, creating measured drawings in the case of the Quad building and site investigations to verify actual field conditions. The buildings in general had a number of deficiencies. The theater in particular has significant barriers to access that will likely have to be corrected as part of the seismic project.

Quad - The elevator needs to be replaced with larger elevator, create an elevator vestibule separate form the corridor system or library. Create a path of travel from the elevator to lower level rooms acceptable to DSA. Both entry doors at second floor will need to be replaced with wider doors. There is no compliant signage in the building. Thresholds at doors are too high. Otherwise most Accessibility issue shave been addressed during the 1996 remodel.

Student Center - There are no accessible toilet rooms for staff and no toilet rooms in the building for students. The nearest student accessible toilet facilities exceed the travel distance DSA allows. Using that location would also require a student to leave the building to use the toilet room. The queue lines to get food are not accessible. The kitchen and its equipment are non-accessible. (It should be noted that the kitchen is not in compliance with the Health Code). The mezzanine although currently used for storage would not be accessible for other uses. There is no accessible path of travel into the food service area or the counseling offices. Most doors in the counseling office area do not have lever handles. The building does not have compliant signage.

Alan Harvey Theater - Seating is not accessible except for two wheelchair spaces at the rear of the auditorium. A theater with 500 seats requires 6 accessible wheelchair spaces distributed throughout the theater. The stairs are not complaint, striping and handrails at ramps stairs and transitions. Aisle lighting appears to be inadequate. The orchestra pit is not accessible. There is no permanent

assistive listening system. The stage is not accessible from the lower level dressing rooms unless one exits the theater and re-enters via a side door. To get to the stage level dressing rooms one would have to enter from the exterior side stage door.

The toilet rooms do not meet fixture count for men or women, nor are they accessible. The drinking fountains and telephone are not accessible. The projection booth is not accessible; however, DSA may consider that a specialized space and not require it to be accessible.

At the lower level the dressing rooms and toilet rooms are not accessible. The transaction counter in Adult Education is not accessible.

Fire & Life Safety Evaluation

The buildings were evaluated for life safety in conformance with the 2001 California Building Code. In general the buildings have a number of life safety deficiencies. The evaluation process included review of applicable codes, review of existing documents, creating measured drawings in the case of the Quad building and site investigations to verify actual field conditions.

Quad - Except few issues width of existing stairs low level lighting, and a new fire alarm system. The elevator needs to be replaced with larger elevator and create and elevator vestibule path of travel to lower level rooms acceptable to DSA. Both entry doors at second floor are too narrow. There is no compliant signage in the building

Student Center - A full fire alarm system and low level exit lighting are required because the Center is a related E occupancy. (This interpretation will be verified with DSA.) It will also require emergency lighting emergency lighting. There are stair width and landing size issues. The handrails to and guardrails at the mezzanine are not compliant.

Alan Harvey Theater - The "theater" is classified by the building code as an auditorium (A2.1 Occupancy). Deficiencies identified are a lack of low level lighting, emergency lighting or a full fire alarm system. The smoke vent over stage is too small. There is a mezzanine has been added at some time without obtaining DSA approval. Also it appears offices have been added to the lower level of the theater without DSA approval.

Conclusions

- It is recommended that the buildings be seismically strengthened to correct the structural deficiencies found. It is proposed that FEMA 356 criteria will be used for the initial strengthening design. This is the generally recognized criteria for strengthening existing buildings.

- Based on structural, accessibility and fire & life safety evaluations, we believe it is feasible to strengthen and mitigate the deficiencies in the buildings and at the same time preserve their basic functional and architectural character. However, the overall feasibility of this project remains to be evaluated during the next, conceptual design phase of the work.

- Lastly, if the two older wings of the Quad building continue to be used prior to seismic strengthening, then the heavy roof tile should be removed and replaced with a light-weight temporary roof as an interim safety measure.

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1. INTRODUCTION

1. INTRODUCTION

A. Project Scope

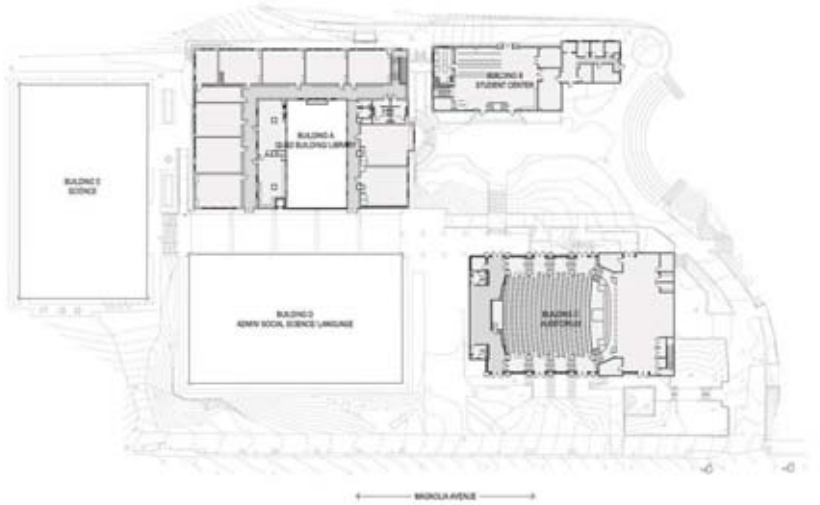
In March of 2006, the City of Piedmont voters passed Measure E, a $56 million bond to address seismic safety in the Piedmont Unified School District (PUSD).

To assist the District in managing the seismic program, the PUSD has engaged Capital Program Management, Inc. (CPM), to oversee program planning and implementation. The School Board has formed a Steering Committee to oversee the management of all bond projects and serve as a communications hub; a Technical Advisory Committee to advise the Steering Committee and about the technical aspects of the project and a Citizens Oversight Committee to ensure that funds are appropriately and prudently spent. Additionally, an extensive public engagement effort has been set up to both educate the community about the progress of the project and to elicit comments and feedback.

murakami/Nelson was selected to evaluate the school buildings, develop design solutions, prepare construction documents and oversee construction of the projects. Assisting us in this effort is R. P. Gallagher Associates. The initial work effort has focused on three priority buildings at Piedmont High School. They are the Library/Quad Building (Building A), the Student Center (Building B), and the Allen Harvey Auditorium (Building C). This report summarizes the investigative efforts of the design team to understand the existing conditions of the three priority buildings. *murakami*/Nelson has reviewed the priority buildings and identified accessibility and life safety deficiencies. R. P. Gallagher has completed their Tier 2 seismic and Tier 1 non-structural hazards analysis of these buildings. This report documents our findings.

The basis of this report are existing approved drawings from the Department of the State Architect (DSA), field investigations conducted by *murakami*/Nelson, R.P. Gallagher Associates, and the ATI "Accessibility Review" dated 09/01/05 provided by the District, an existing conditions topographic survey by Sandis and a material testing and investigation study by Applied Materials Engineering (AME). After reviewing existing documentation and verifying existing conditions *murakami*/Nelson created electronic drawing base files to serve as the framework for the project.

Additionally with the assistance of R.P. Gallagher Asssociates, we prepared measured drawings of the "Quad Building" (The original building and the first addition) for which no documents were found by the Division of the State Architect (DSA) or the Piedmont Unified School District.



B. Application of California Building Code

Since there are often code interpretations with use of the California Building Code, the School District engaged DSA in a discussion about the PUSD Voluntary Seismic Upgrade Program. In May 2006 DSA representatives attended a special meeting of the School Board to discuss the District's program and how individual projects would involve compliance with fire, life safety and accessibility requirements of the California Building Code. *murakami*/Nelson continued that discussion with a follow on meeting with DSA on February 9, 2007. At that meeting DSA indicated a willingness to work with the District on the extent of compliance with the current California Building Code. Such determinations would be made on a case by case basis and relate to the specifics of each project.

C. Future Considerations

During the next Concept Design phase of the project, programmatic, maintenance and sustainability issues will be considered where those issues can be solved as an integral part of the Bond project. Where those issues are not integrally linked to the seismic work, then the District may decide to use Modernization or other funding sources to solve those problems.

Aeiral view of the Piedmont High School campus

D. Building Descriptions

Piedmont High School was originally built in 1921. Since its design by W.H. Weeks, the school has undergone several reconstructions to accommodate expansions, earthquake retrofitting, and dryrot repairs. In 1974, portions of the school were declared unsafe, under the State's earthquake laws. The school buildings were demolished, except for the original library, the Quad building, and the administration building. Two classroom buildings, a gymnasium, and an auditorium were built. These make up the seven major buildings which occupy the site currently. Three of these, buildings A, B & C, were identified as "priority buildings" during the District's Tier 1 life-safety risk evaluation process.

Building A. **The Library/Quad Building**, built in the 1930's, has had four additions, resulting in five distinct structures. The original building was rectangular, with the long axis oriented north-south. In the late 30's or early 40's, the first addition created more classrooms and formed the L configuration of the building. In the mid 70's, a third structure was built. At this time, the library was relocated from Building B to this new facility. In the mid 90's, the final two structures, the library expansion and the mezzanine space was constructed.

Building B. **The Student Center Building**, built in the late 1930's, is the original location of the library before it's relocation to Building A. The vacated space was converted to a Student Lounge. Although no drawings were available, a commercial kitchen was added prior to 1997, when a proposed remodel of the kitchen area was proposed, but never implemented. The current Student Center is a cafeteria, with pre-prepared food and snacks. The kitchen is used for food warming only.

Building C. **The Allen Harvey Auditorium Building**, built in the mid 1970's., is a performing arts auditorium with stage, projection booth, and lobby area. Below the stage area are performer's dressing rooms and toilet facilities. The original workshop area has been converted to the Adult Education Office and the remainder of the space is used for shipping, receiving, and storage. No DSA-approved drawings are available that show this converted use.

Building D. The Science/Language Building, built in the mid 1970's, is a non-priority building and will be analyzed for non-structural seismic hazards, accessibility and life-safety during the next phase of the project (concept design).

Building E. The Science Building, built in mid 1970's, is a non-priority building and will be analyzed for non-structural seismic hazards, accessibility and life-safety during the next phase of the project (concept design).

Building F. The Gymnasium Building, built in the mid-1970's, is a non-priority building and will be analyzed for non-structural seismic hazards, accessibility and life-safety during the next phase of the project (concept design).

Building G. The Administration / Art / Milliennium High Building, built in 1960's, is a non-priority building and will be analyzed for non-structural seismic hazards, accessibility and life-safety during the next phase of the project (concept design).

2. ADA / ACCESIBILITY

2. ADA /ACCESSIBILITY.

Background:

School facilities in California are required by federal and state law to provide equal access for students, teachers, staff and visitors. At the Federal level the empowering legislation is the Americans with Disabilities Act or ADA. Under that law ADAAG regulations were written to describe the accessibility requirements for the entire country. The ADAAG regulations are enforced by civil action. At the State level accessibility is governed by the California Building Code. In the case of public school buildings the California Building Code is enforced by the Division of the State Architect or DSA.

The State of California is in the process of getting the California Building Code certified by the Department of Justice as meeting ADAAG. Until that occurs architects must comply with both the ADAAG and the California Building Code. *murakami*/Nelson has used both documents in evaluating the priority buildings at Havens.

The California Building Code requires whenever more than $120,000 (*adjusted for inflation each year*) worth of work other than for maintenance or replacement of finishes is done in any three year period for an existing building, that access compliance work be included as part of that project. Section 1134B of the California Building Code requires that alteration work within an existing building comply with the current Code and that additional access work, as stipulated in the Code, be done beyond the area of the alteration.

Because seismic upgrade projects often affect areas throughout a school the State Attorney General has issued an interpretation (DSA Document 96-01) that access work triggered by a seismic strengthening project need only provide an accessible primary entrance, sanitary facilities, signs, telephone (if provided), drinking fountain and an accessible path of travel to those facilities, but not a accessible path of travel to the area of all the alterations as Section 1134B.2 of the Building Code requires. Use of this interpretation by DSA on the Piedmont Seismic project remains to be resolved.

In any event the voluntary seismic strengthening work the District is planning will trigger substantial compliance with the access requirements of Section 1134. Furthermore, if State modernization funds are used for the projects, then all the requirements of Section 1134 would be triggered.

Summary & Analysis

This report has made use of the ATI report, with field verification of existing conditions.

Piedmont High School has had numerous changes implemented over its 86 year history. With the major new construction that occurred in the mid 1970's, the accessibility of the site and within the buildings were greatly enhanced, though accessibility issue do exist and the site and building are not fully compliant with current code and ADA requirements. See Appendix A for code review summary.

Main entry point on to campus

Exisitng accessible parking

Existing accessible parking

Site:

Piedmont High School is bound by the City park to its east and south sides, the Piedmont Middle School to its west, and the primary access to the school site, Magnolia Avenue to its north. There are two on-street parking stalls designated as accessible at the northwest corner of the school and two parking stalls on-site near the Gymnasium. The two on-street parking spaces are not ideal, due to the steepest of the sidewalk and street. The two on-site parking space are remote and not near the primary entries to the site. Magnolia Avenue is the main drop-off and loading zone for the majority of the students. No accessible drop-off/loading zone has been provided for the physically impaired student. There are two accessible entry points onto the school campus. The school utilizes a series of ramps to provide accessibility to most of the buildings on the campus. Access to the Building F, the Gymnasium requires the use of an elevator along the path of travel. Access to the Building B, the Student Center primary entrance is not available and requires the physically impaired to go around to the rear of the building to enter. Additionally, the path of travel to the rear of the building involves walkways that exceed 5% grade. Therefore those walkways are technically ramps and must comply with ramp standards or be reconfigured to be less than a 5% slope, if this route is to be utilized as an accessible path of travel.

Many of the exterior stairs are not compliant, lacking handrails on one side or intermediate railings, lacking proper extensions, and/or lacking proper contrasting striping on the stair treads. The ramps are lacking guide rail edge protection. The diameter of most of the handrailing is non-compliant.

There is very little directional or informational signage throughout the site. Accessibility signage is non-existent and will need to be provided.

Covered Thoroughfare between Bldg. A & D

Ramp to Plaza between Bldg. A & E

Plaza surrounded by Bldgs. A, B, & C

Sloped walk (and fire lane) from accessible on-street parking

Ramp next to Building C

Ramp to Library Entry in Bldg. A

Buildings:

Building A - Quad Building/Library

The Quad Building/Library was renovated in the mid 90's. As a part of that renovation, a majority of the accessibility deficiencies were mitigated. In reviewing the current facility, there are still some accessibility issues that may need to be addressed as follows:

1) The Library, one classroom, special education rooms, and former counseling offices located on the first floor require persons in wheelchairs to exit the building, travel over 600 feet exposed to weather, to gain access to the second floor of the building. Ambulatory users of the building can use the stairs within the building. DSA will require that the existing elevator be upgraded to provide compliant vertical access for persons in wheelchairs. Although there is an existing elevator, it does not meet correct size, layout, and signaling requirements.
2) The two pairs of entry doors on the north side of the Quad building are not a compliant width and will need to be replaced.
3) Thresholds at the south side exit doors exceed heights required to meet accessibility.
4) Existing hall lockers are projecting into the required 18-inch clear space required for accessibility at entry doors to the classrooms.
5) The building lacks proper signage.
6) Assistive listening device may be required in the Library conference rooms.

Building A - Thresholds at south side exit doors too high


Building A - Lockers projects into the required clear space at classroom entry


Building A - Entry doors at second floor are too narrow.


Building A - Stair striping at many treads are woren


Building B - Needs accessible ramp at primary entrance to Cafeteria


Building B - Need accessible ramp to Counselor's Offices


Building B - Counselor's Office hall way - doors need lever handles and hall cleared of obtructions.


Building B - Kitchen not accessible for employees


Building B - Stair railing not compliant


Building B - Cafeteria service counters & queue line railing are not accessible

Building B – Student Center

The Student Center has two occupancies. The main building serves as a cafeteria. The annex building is counseling offices. Based on current functions, the building has numerous accessibility deficiencies as follows:

1) Primary building entrance to both to the cafeteria and the counseling offices is not compliant. The cafeteria's accessible entry is in the rear of the building which is not acceptable. A ramp to the primary entry is required. Entry to the counseling offices requires traversing a walkway that is greater than 1:20 and requires a ramp.
2) Doors lack lever handles and will be required by DSA.
3) The building lacks proper signage.
4) Entry stairs to the Cafeteria require additional handrails due to the width of the stair. Also, the striping of the treads required for the visually-impaired is worn and needs to be renewed.
5) In the Cafeteria, service counters are not accessible. The queue line railing spacing is too narrow and no turning width is provided.
6) The kitchen is not accessible for its employees.
7) The building lacks accessible toilet facilities and the path of travel to a toilet in the nearest building exceeds the 200 ft that is sometimes granted on a case by case basis. DSA will require toilet facilities.
8) The employees toilet is in the basement and not accessible.

Building C – Auditorium

The Auditorium is a 500 seat venue and is used extensively. It has a number of accessibility issues that will need to be addressed. The lack of dispersed seating for the physically disabled will be the most challenging of these issues that will need to be resolved. Currently, there are two accessible seating available in the rear of the auditorium. Based on the seat count, DSA will require accessible seating be provided at the front, middle and rear of the auditorium. This will result in the loss of some seating and a required path of travel to be developed to the accessible seating. Due to the steep rake of the seating and the location of the aisles, an exterior path of travel and chair lifts system may need to be considered. However, DSA will need to be convinced that such a solution is reasonable and provides equal access.

Additional access issues are as follows:

1) The men and women's toilet are not accessible. A wheelchair accessible stall needs to be installed to meet current requirements. This change would result in the lost of an existing water closet, if only the existing space was utilized. However, Chapter 29 of the California Building Code requires that for the size of this facility, a minimum of four water closets are required in the men's room, and eight water closets are required in the women's room. In the Men's restroom, 50% of the water closets may be replaced by urinals. Although there is another set of restrooms on the lower floor, those restrooms are not available to the occupants of the auditorium and therefore may not be considered in the count by the reviewing agency. It is probable that the boundaries of the current restrooms will need to be expanded significantly.
2) Stairs throughout the interior are non-compliant. Some stairs are lacking handrails on one side or intermediate railings, some lacking proper extensions, and most lacking proper contrasting striping on the stair treads.
3) The two drinking fountains in the lobby area are no longer compliant. Current requirements call for a hi / low fountain. In addition, since the fountain project more than 4-inches from the wall, guardrailing is required on each side of the fountains. An additional drinking fountain is located at the stage near the dressing room. This fountain, if operational, would need to comply with the same requirements.
4) The pay telephone booth in the lobby is non-compliant. An accessible enclosure and guard railing are required.
5) The auditorium does not have an assistive listening system (ALS) installed. A permanent ALS is required with enough receivers to accommodate 4% of the seating capacity. ALS signage with need to be posted. Accommodations will be needed to house the equipment and charging station.
6) Fire extinguisher cabinets are mounted too high through the building and will need to be lowered.
7) Light switches are mounted too high. Lighting revision will trigger the requirement to lower switches in the areas of changes.
8) On the lower floor, the two toilet rooms serve the dressing rooms, the Adult Education Offices, and Shipping and Receiving. These toilet rooms are not accessible and will need to be made accessible since the upper toilet rooms are unavailable when the auditorium is not open. The toilet rooms will need to be expanded or converted to unisex toilet rooms if the occupant load allows it.
9) The lower floor dressing rooms are not accessible. The hallway and the doorway are too narrow, without required door clearances. The counter sink is not compliant, lacking required clearance and protection.
10) Access to the Orchestra Pit requires traversing stairs, whether from the auditorium side or from the lower floor. If the Orchestra Pit is used, access will need to be provided.

Building C - Wheelchair seating needs to be through, not just at the rear.

Building C - No wheelchair access to the Orchestra Pit.

Building C - Stair railing not compliant; no stair striping

Building C - No toilets are compliant and lack space to comply without expanding room size.

Building C - Dressing Room entry not compliant

Building C - Drinking fountains should be Hi-Low type; Fire Extinguisher Calbinets are mounted too high; the Telephone Booth is not accessible.

Building C - Transaction counter not compliant

Building C - Staff sink not accessible

ACCESSIBILITY NOTES:

GENERAL NOTES:

1. SITE ACCESSIBLE PATH OF TRAVEL TO PRIMARY ENTRANCE IS GENERALLY IN COMPLIANCE. EXCEPTIONS ARE: 1) STUDENT CENTER, WHERE ACCESSIBLE ENTRY IS IN THE REAR OF THE BUILDING; 2) QUAD BUILDING, WHERE VERTICAL ACCESS REQUIRES EXITING THE BUILDING, TRAVERSING THE SITE TO ACCESS ADJACENT FLOOR.

2. SIGNAGE THROUGHOUT IS NOT COMPLIANT. DIRECTIONAL SIGNAGE IS MISSING. ALL ROOM IDENTIFICATION SIGNAGE WHERE PROVIDED IS NON COMPLIANT.

3. NO ACCESSIBLE PATH OF TRAVEL SIGNAGE.

01 ACCESSIBLE PARKING SPACE DOES NOT COMPLY AS AN ACCESSIBLE DROP-OFF / LOADING SPACE.

02 ACCESSIBILITY SITE SIGNAGE IS NOT COMPLIANT.

03 WALK WAY TOO STEEP.

04 NO ACCESSIBLE ROUTE (RAMP) @ STAIR.

05A ENTRANCE / EXIT DOOR ASSEMBLY NOT ACCESSIBLE: MAJOR BARRIERS SUCH AS INSUFFICIENT WIDTH OF OPENING, LANDINGS TOO SMALL, INSUFFICIENT CLEAR SPACE, ETC./ MAY ALSO INCLUDE 05B DEFICIENCIES.

05B ENTRANCE / EXIT DOOR ASSEMBLY NOT ACCESSIBLE: MINOR BARRIER SUCH AS OPERATING HARDWARE, EXCESSIVE CLOSING FORCE, THRESHOLD, ETC.

06 HANDRAILS NOT ACCESSIBLE.

07 ORCHESTRA PIT NOT ACCESSIBLE.

08 ELEVATOR NOT ACCESSIBLE.

09 DRINKING FOUNTAIN NOT ACCESSIBLE.

10 STAIR & HANDRAILS NOT ACCESSIBLE.

11 THEATER SEATING NOT ACCESSIBLE COMPLIANT.

12 TELEPHONE NOT ACCESSIBLE.

13 CABINETRY & COUNTERS NOT ACCESSIBLE.

14 BATHROOM NOT ACCESSIBLE.

15 KITCHEN NOT ACCESSIBLE.

16 LANDING TOO SMALL.

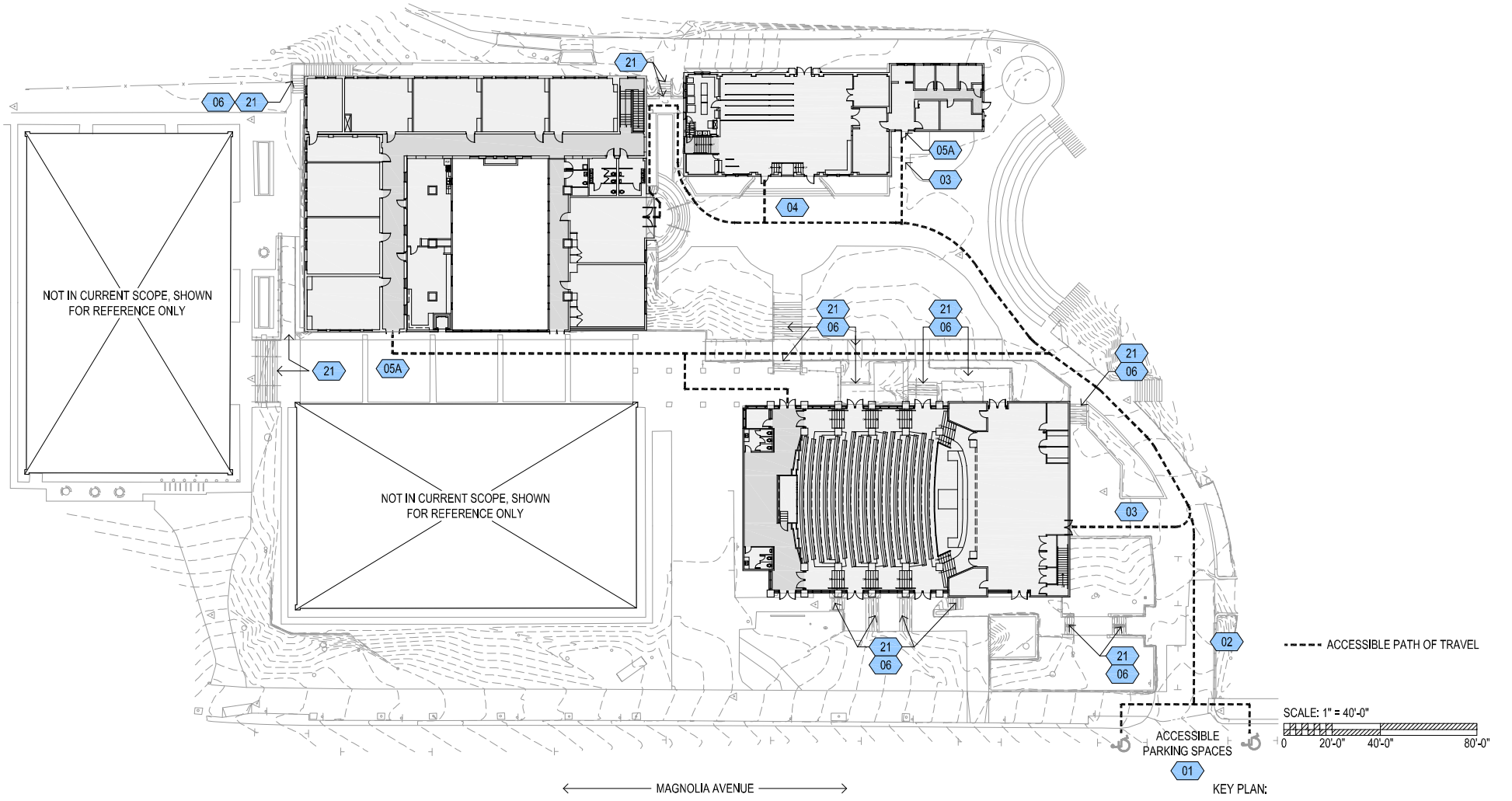
17 SINK NOT ACCESSIBLE.

18 SIGNAGE NOT COMPLIANT.

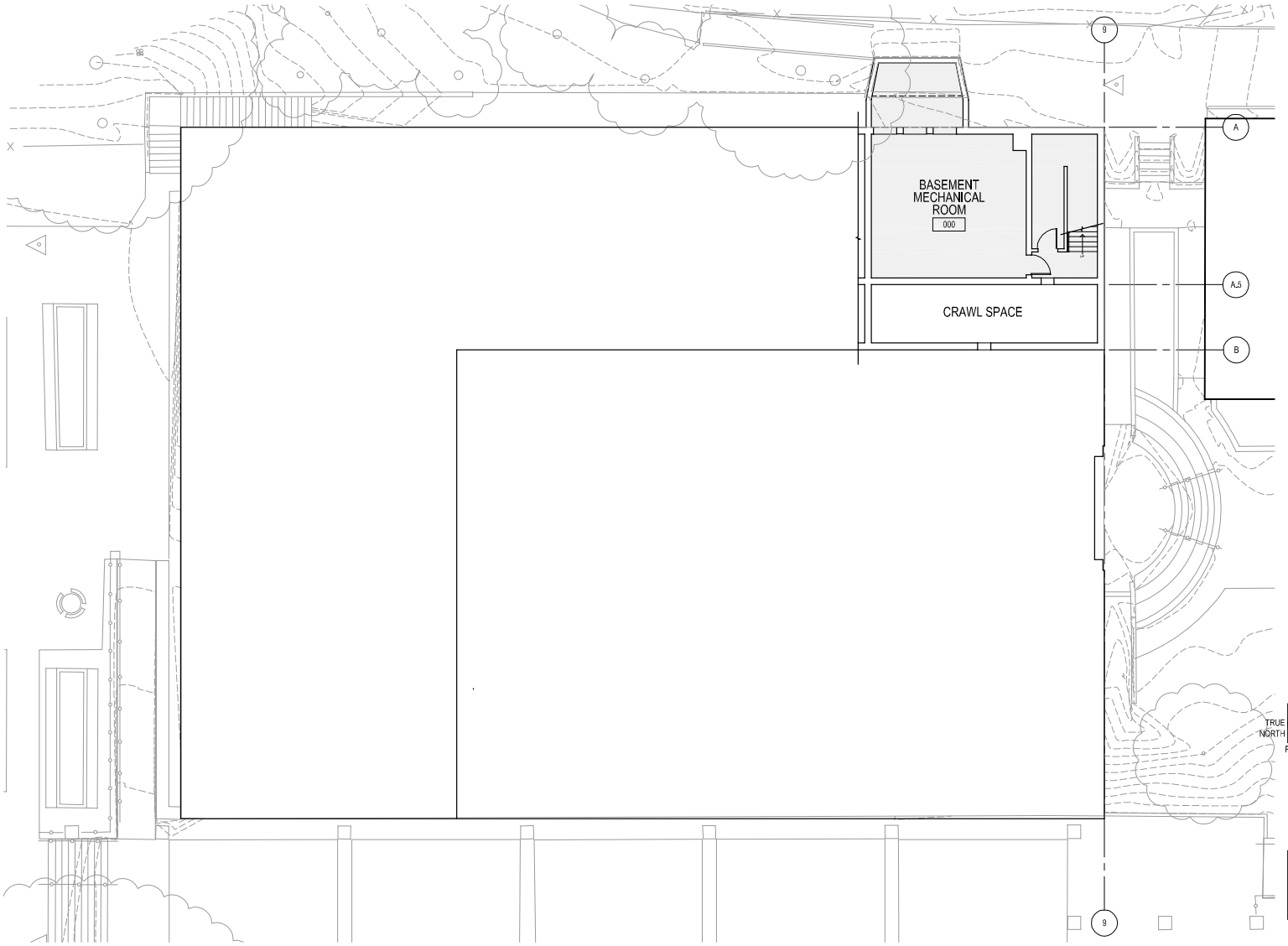
19 NO ASSISTED LISTENING PROVIDED.

20 STAGE NOT ACCESSIBLE.

21 LACKING OR WORN STAIR WARNING STRIPES AT TOP AND BOTTOM TREADS.



SITE ACCESS PLAN



TRUE NORTH
REFERENCE NORTH

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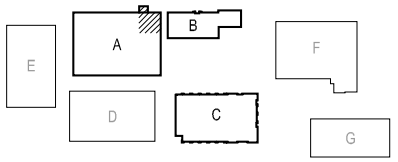
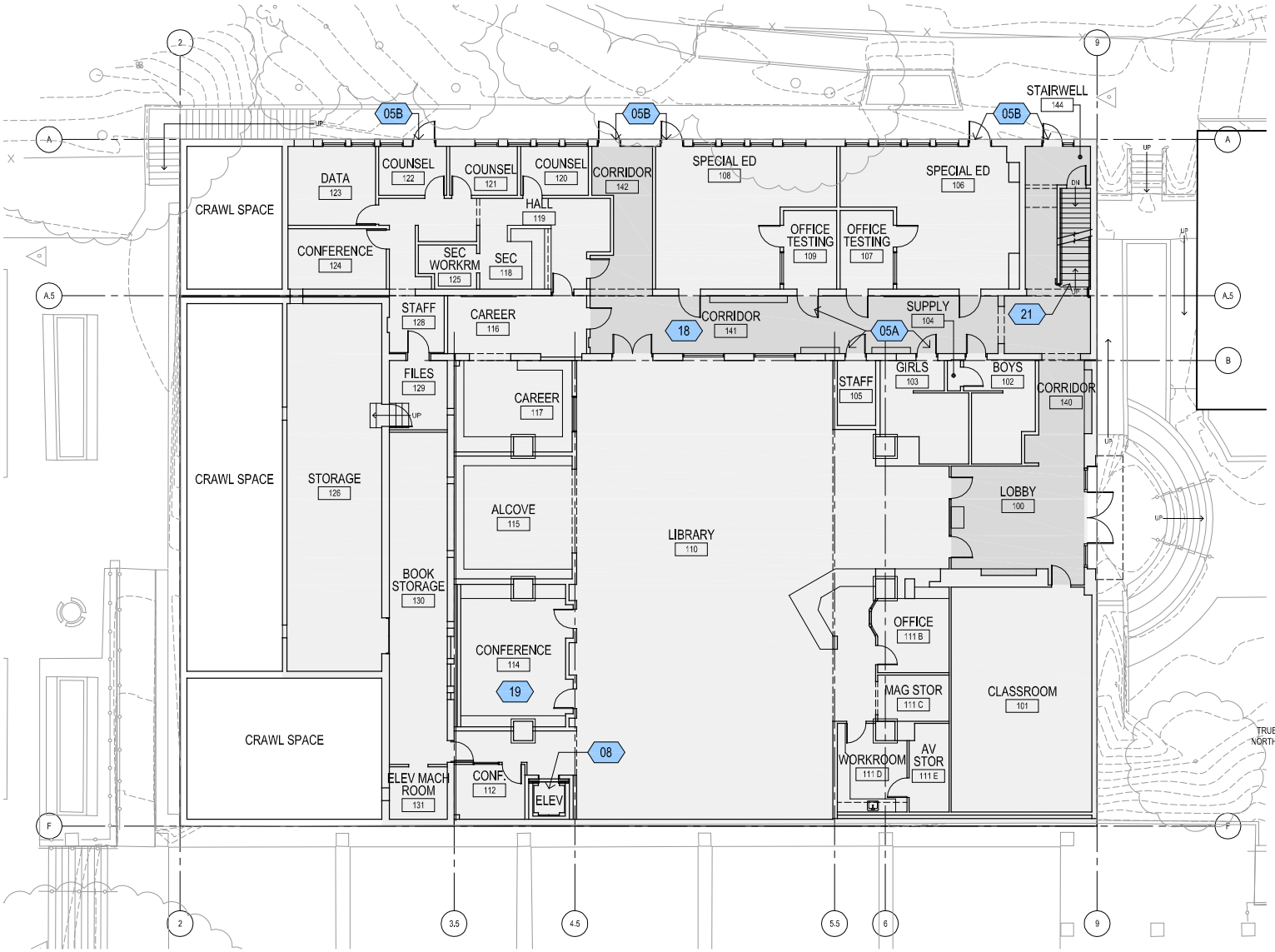
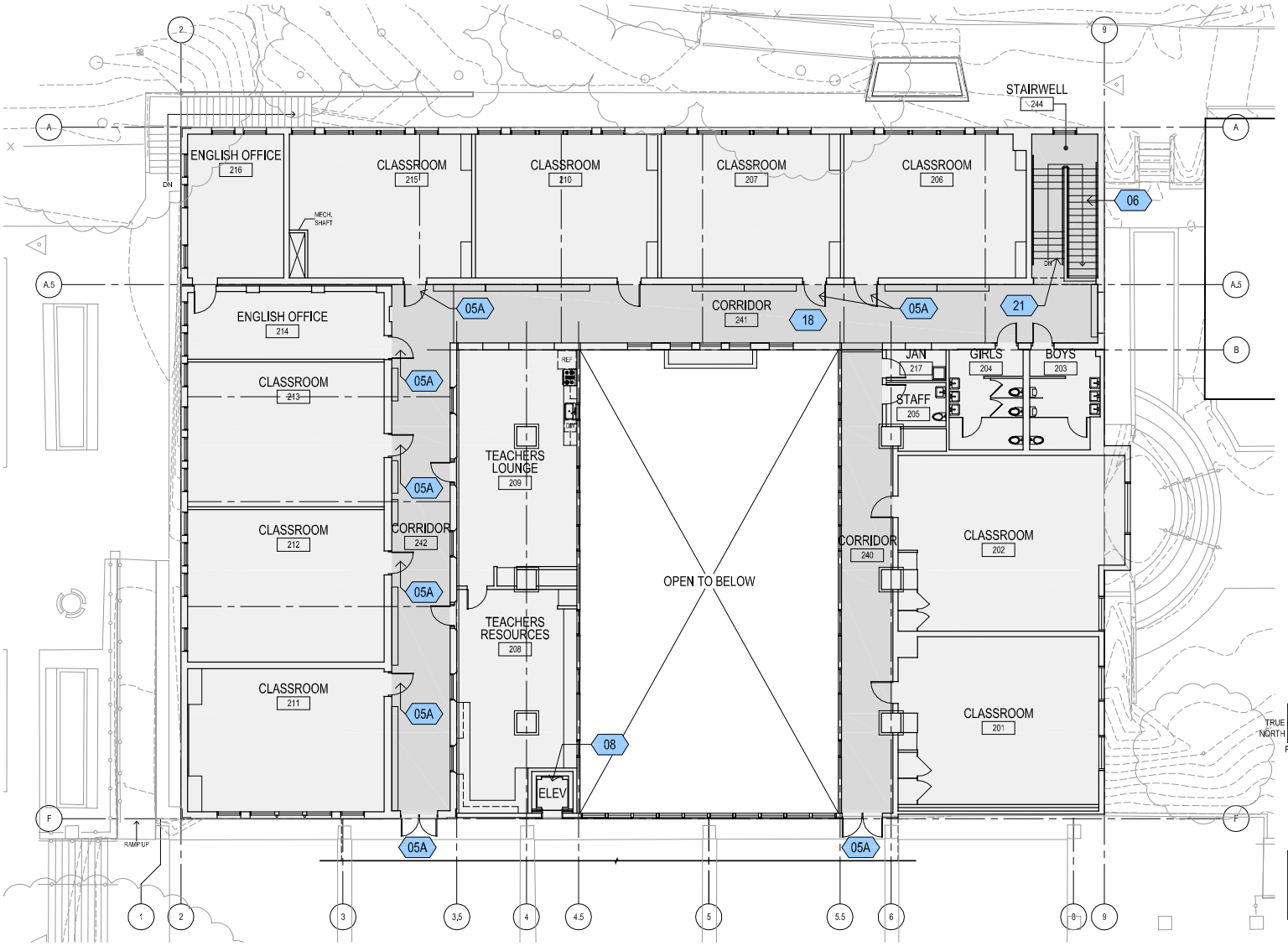
KEY PLAN:



BUILDING A - BASEMENT



BUILDING A - 1ST FLOOR



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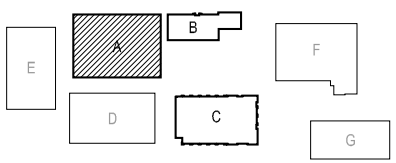
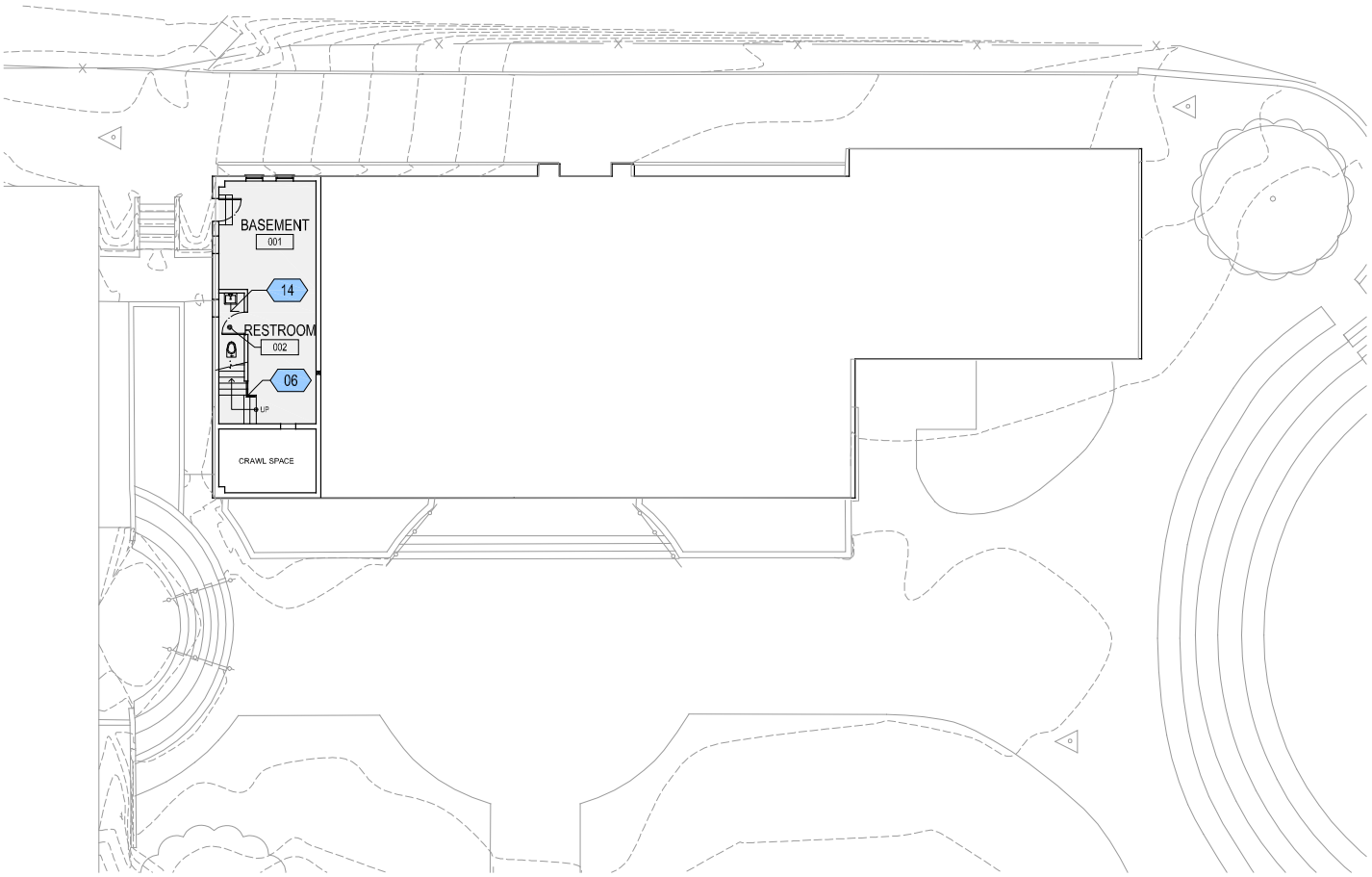
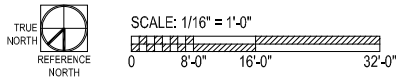


BUILDING A - 2ND FLOOR



BUILDING B - BASEMENT



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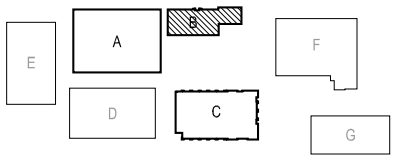

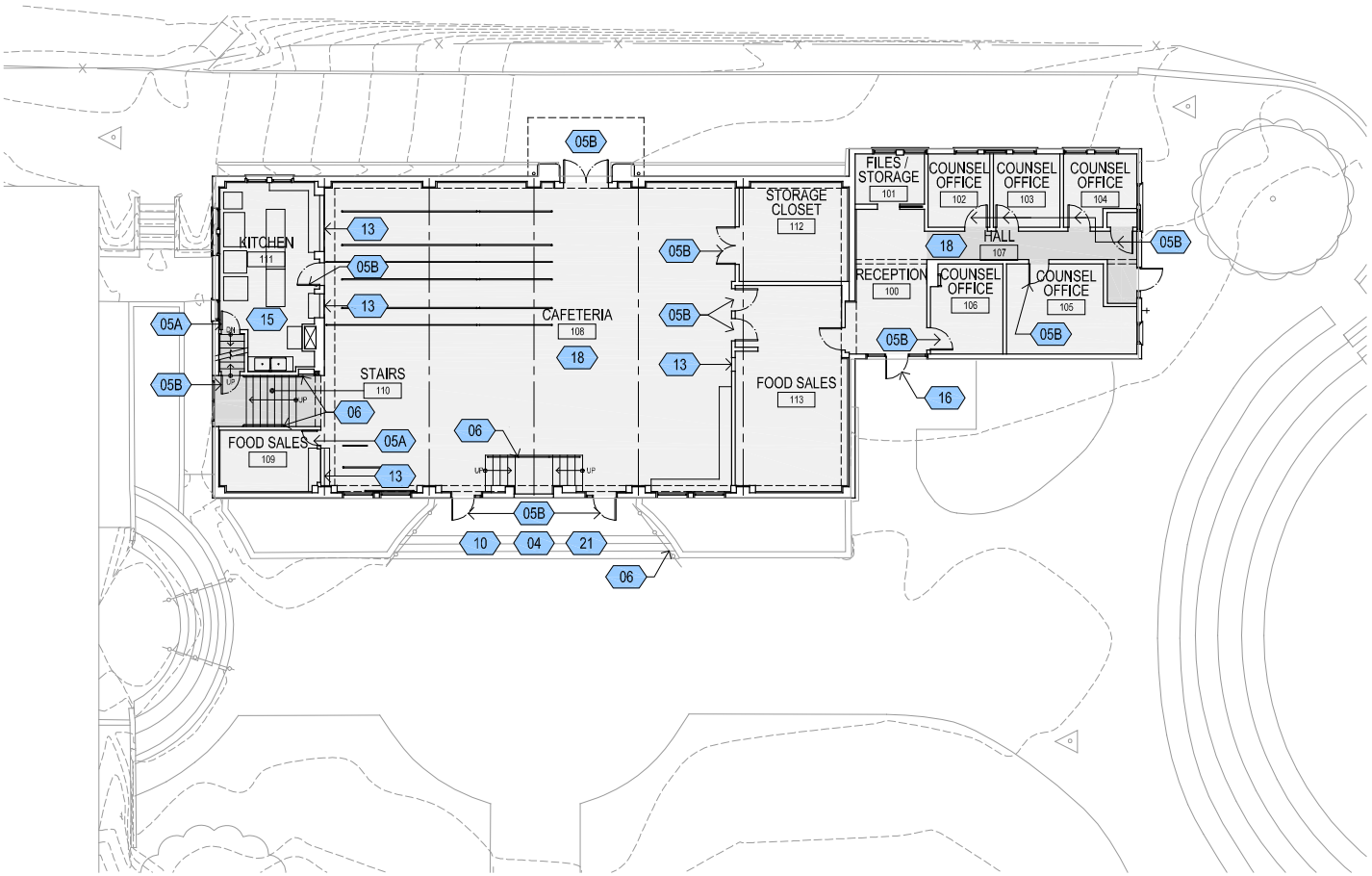

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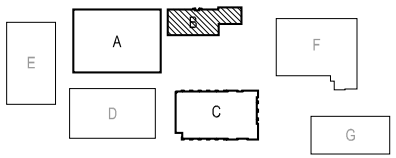
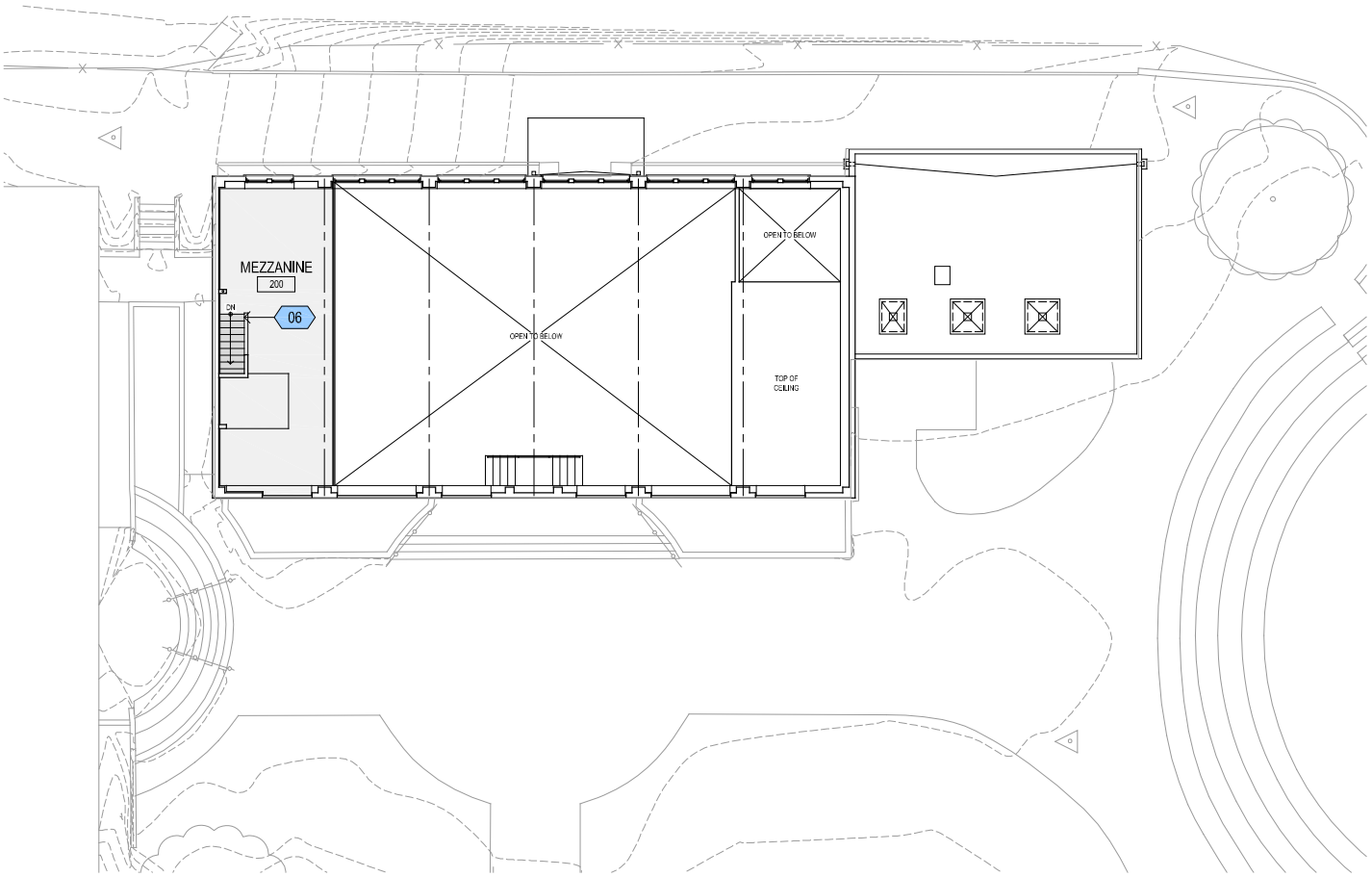


BUILDING B - MAIN LEVEL

ada / accessibility



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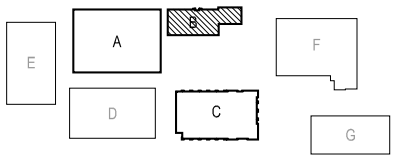
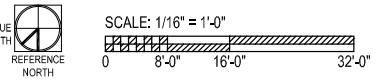


BUILDING B - MEZZANINE



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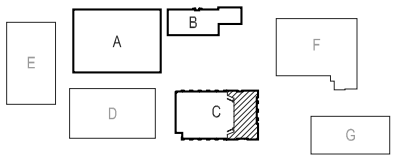
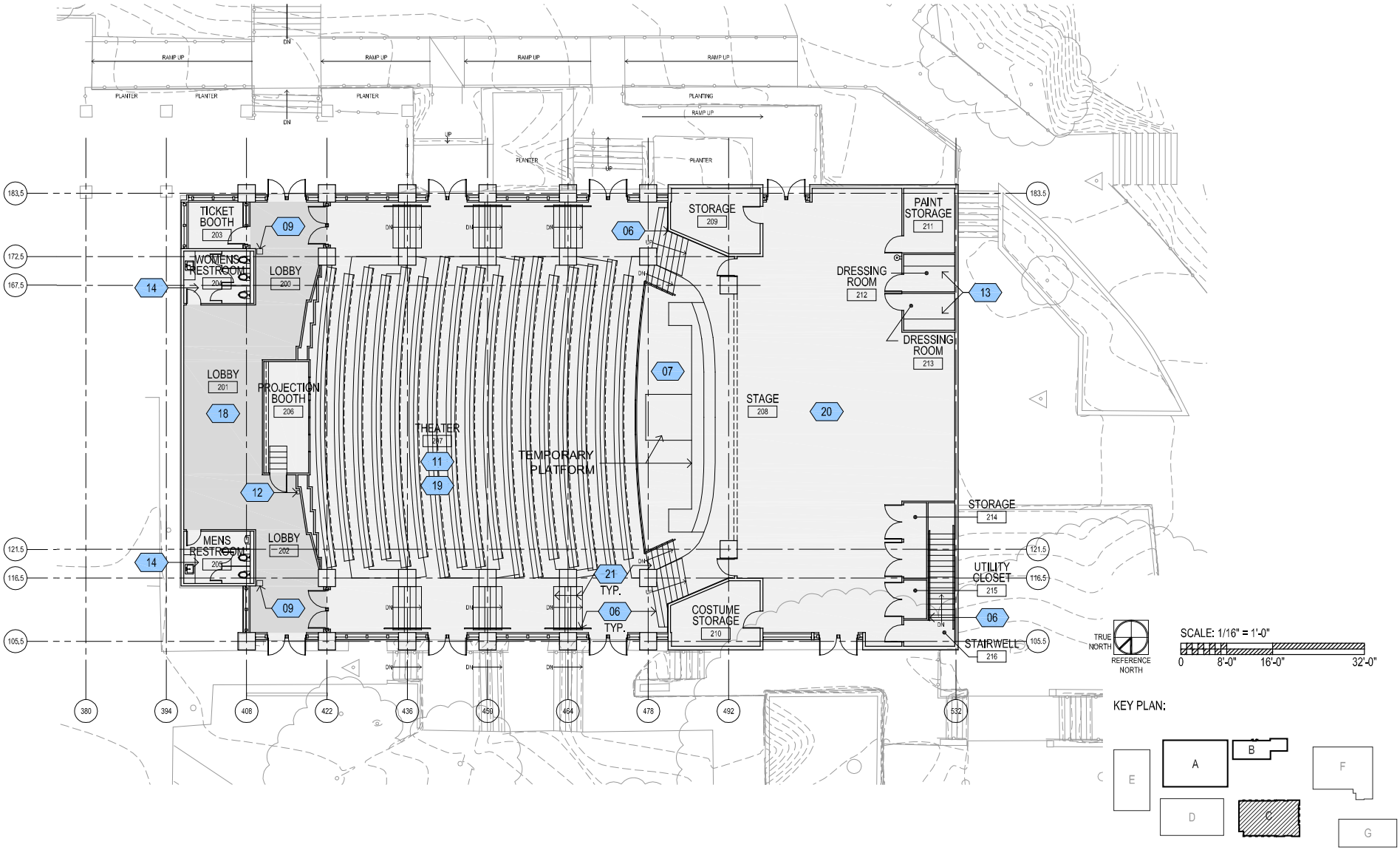


BUILDING C - LOWER LEVEL



BUILDING C - UPPER LEVEL

3. FIRE / LIFE SAFETY

3. FIRE/LIFE-SAFETY

A. Background:

As with accessibility, fire and life-safety is governed by the California Building Code and is enforced by the Division of the State Architect (DSA). Unlike the accessibility regulations the fire and life-safety regulations are spread throughout the Code; however, most of the pertinent regulations are in Chapters 5 and 10. There is no overarching life safety regulation like ADAAG for fire and life safety. Life Safety is not an area where the School District, the design professional or DSA would compromise; however, there will be areas of negotiation about what is acceptable given the fact that the existing buildings may be constructed differently from what would be built today under current codes. Nonetheless, a primary objective of the project, in addition to seismic safety and accessibility will be to increase fire and life-safety at the schools.

B. Summary & Analysis

The three priority buildings at Piedmont High School were also analyzed for fire/life safety code compliance. These findings are summarized in Appendix B: Code Analysis, as well as on the drawings in this section. This report identifies deficiencies. The next phase of the project will offer conceptual solutions to these deficiencies.

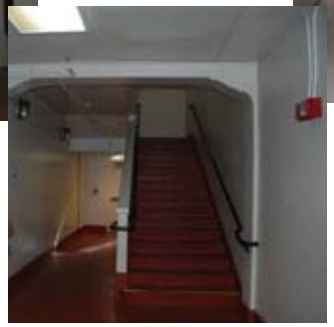
Of critical importance are construction type and allowable floor areas; individual and cumulative occupancies and occupant loads, which determine required exiting and area separations.

<u>The Site</u>

There are three driveways that come off of Magnolia Avenue that provide access for the Fire Department. None are designated as fire lanes. We will be meeting with the Piedmont Fire Department to review the school for fire department access, as well as any other concerns of the Fire Department.

Building A - Entry Doors at Second Floor

Building A - Corridor



Building A - Stair 244

<u>Building A - Quad Building</u>

The renovations of the Quad Building in the mid 90's mitigated a number of fire and life safety deficiencies. The corridors were brought up to the required one hour fire rating. The entire building has fire sprinklers. However, there remain a number of fire and life safety issues that will need to be addressed.

Section 305.9 of the 2001 California Building Code requires that all educational facilities known as E-occupancy, have a State Fire Marshal approved and listed fire alarm system. Although the Quad Building has a fire alarm system with manual pull station, it does not meet the current code requirements. The new work will trigger the need to replace the existing system.

Section 1007.3.12 of the 2001 California Building Code requires that all educational facilities known as E-occupancy have floor level exit signs with illumination at all corridors. The new work will trigger the need to add these exit signs. In addition, tactile exit signage is required at locations identified in Sec. 1003.2.8.6.1.

The two pairs of exit doors on the north wall of the second floor do not meet minimum required exit door width of 3'-0". As mentioned above, the door width was also an accessibility deficiency, too.

The Counseling Offices on the First Floor require a State Fire Marshal approved and listed fire alarm system or the hallway will need to be a one-hour fire rated corridor. Since the Quad Building will need a new fire alarm system due to its occupancy group, this issue should be a non-issue.

Stairwell No.244 does not meet the required stair width per Sec. 1007.3.6. The shortfall in width is 4-inches and the stairs are existing. DSA may allow this condition to remain, especially since the building will have fire sprinklers and new fire alarm system.

Building B – Student Center Building

Section 305.9 of the 2001 California Building Code requires that all educational facilities (E-occupancies), have a State Fire Marshal approved and listed fire alarm system. Although the Student Center Building is an A-3, assembly occupancy, it serves an educational community and will be subject to the requirement of an E-occupancy based on Sec 305.9.3. In addition, the annex building houses counselor offices, an E-occupancy. The existing fire alarm system with manual pull station, does not meet the current code requirements. The new work will trigger the need to replace the existing system.

The Counseling Offices in the annex requires a State Fire Marshal approved and listed fire alarm system or the hallway will need to be a one-hour fire rated corridor. Since the Student Center Building will need a new fire alarm system due to its occupancy group, this issue should be a non-issue.

Other deficiencies that will need to be address are the need for tactile exit signs and the posting of room capacity.

Building B - Cafeteria looking east

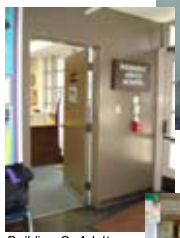
Building B - Kitchen looking south

Building B - Entry at Conselors' Offices

Building B - Cafeteria looking west

Building C - Auditorium seating

Building C - Lobby



Building C- Adult School Entrance

Building C - Shipping & Receiving

Building C - View of Stage

Building C – Auditorium Building

Section 305.9 of the 2001 California Building Code requires that all educational facilities (E-occupancies), have a State Fire Marshal approved and listed fire alarm system. Although the Auditorium Building is an A-2, assembly occupancy, it serves an educational community and will be subject to the requirement of an E-occupancy based on Sec 305.9.3. The existing fire alarm system with manual pull station, does not meet the current code requirements. The new work will trigger the need to replace the existing system.

In the original construction drawings, the lower level was designated as accessory functions of the auditorium (i.e. dressing rooms, toilets, workshop, workshop office, storage and holding area). In our site review of the facility, we noted the lower level workshop areas have been converted to an Adult Education Office and Shipping and Receiving Office and storage space. The change in occupancy of these spaces to B-occupancy should have been done with DSA approved construction drawings. We have no drawings stamped by DSA for these changes.

At this phase of the work, we have no mechanical or electrical consultants to assess those systems. However, based on our observations, it appears that the Auditorium Building does not have emergency lighting as required by current code.

The Auditorium Building is partially fire sprinklered. We will need to assess the adequacy of the system, the adequacy of the coverage, and whether agencies having jurisdiction will require any modifications or changes. In addition, the ceiling of the Stage area has two smoke hatches. An assessment of the adequacy of this system will be needed. We noted that a mezzanine has been added in Storage Room 113. The new mezzanine blocks adequate sprinkler coverage to the floor area below the mezzanine. Extension of the sprinkler system will be required, pending DSA's decision of allowing the mezzanine to remain, since it appears it was done without DSA approvals.

LIFE SAFETY NOTES:

01 STAIRWAY WIDTH NOT COMPLIANT (CBC 1007.3.6).

02 EXIT DOORWAY WIDTH NOT COMPLIANT (CBC 1003.6.1.3).

03 NO SFM APPROVED FIRE ALARM SYSTEM (CBC 305.9).

04 NON-COMPLIANT OFFICE SUITE REQUIRES FIRE ALARM & SPRINKLERS (CBC 1004.3.4.3, EXCEPTION 4).

05 FLOOR LEVEL EXIT LIGHT REQUIRED.

06 TACTILE EXIT SIGN REQUIRED.

07 NON-COMPLIANT BUILDING PROTECTION (CBC 305.9.3), GROUP E OCCUPANCIES REQUIRED FIRE ALARM SYSTEM.

08 NON-COMPLIANT HALLWAY (CBC 1004.3.4.3), CORRIDOR MUST BE 1-HR. RATED OR PROVIDED WITH FIRE ALARM & SPRINKLER TO BE NON-RATED.

09 ROOM CAPACITY NOT POSTED (CBC 1007.2.6).

10 FIRE LANE MAY BE REQUIRED BY PIEDMONT FIRE DEPT. WE WILL CONFIRM IN UPCOMMING MEETING WITH PIEDMONT FIRE DEPT.

11 SPRINKLER COVERAGE COMPROMISED BY ADDITION OF MEZZANINE.

12 NON-COMPLIANT FIRE ALARM SYSTEM.

13 CONFIRM FIRE SPRINKLERS COMPLY WITH CBC.

14 CONFIRM SMOKE HATCHES COMPLY WITH CBC.

15 CONFIRM MEANS OF EGRESS LIGHTING (MIN. 1 FC) COMPLIES WITH CBC.

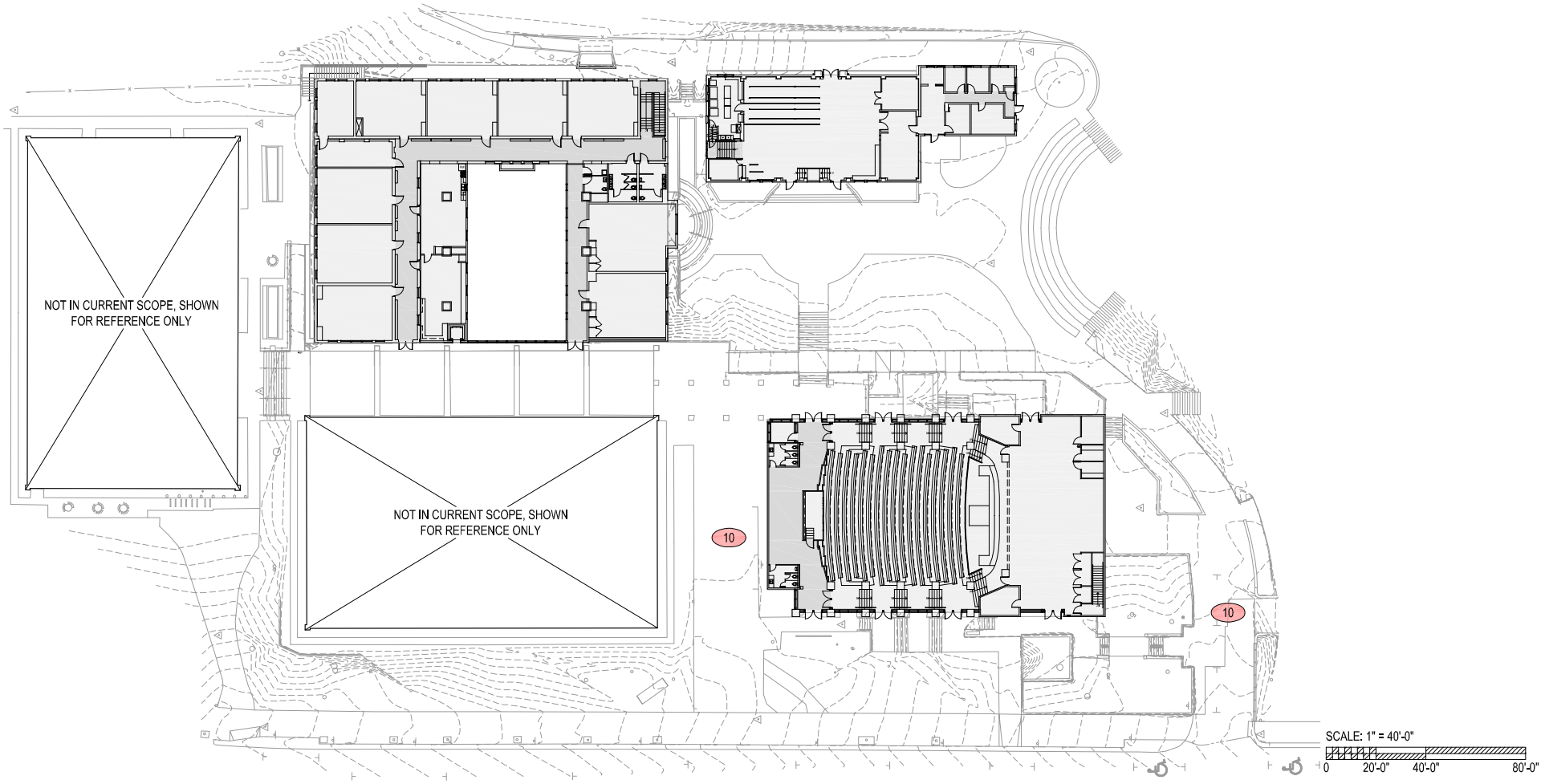
16 BASEMENT EXITS ARE REQUIRED TO EXIT DIRECTLY TO EXTERIOR IN E OCCUPANCY. (CBC 1007.3.9).

17 LANDING REQUIRED ON EACH SIDE OF DOOR (CBC 1003.3.1.6).

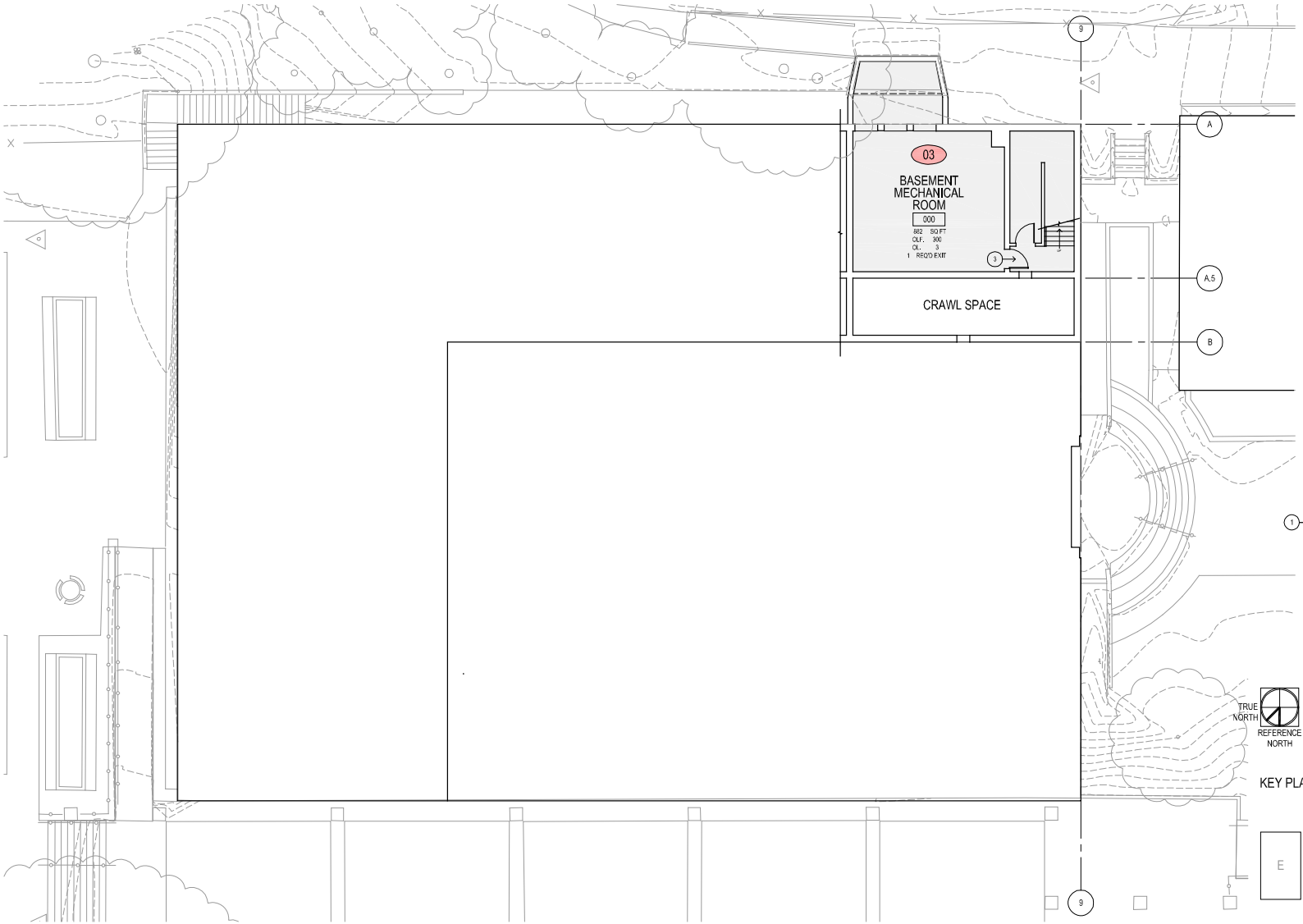
18 HANDRAILS AT STAIRS NOT COMPLIANT (CBC 1003.3.3).

19 NO EMERGENCY LIGHTING.

20 GUARDRAIL NOT COMPLIANT.


NOT IN CURRENT SCOPE, SHOWN
FOR REFERENCE ONLY
NOT IN CURRENT SCOPE, SHOWN
FOR REFERENCE ONLY
10
10
SCALE: 1" = 40'-0"
0
20'-0"
40'-0"
80'-0"
MAGNOLIA AVENUE
TRUE
NORTH
REFERENCE
NORTH
KEY PLAN:
A
B
C
D
E
F
G

SITE PLAN



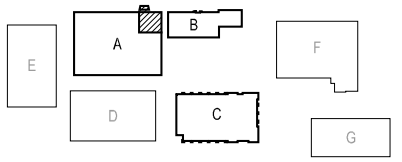
LEGEND

(1)→ ACCUMULATIVE TOTAL NO. OF OCCUPANTS PASSING THROUGH OPENING

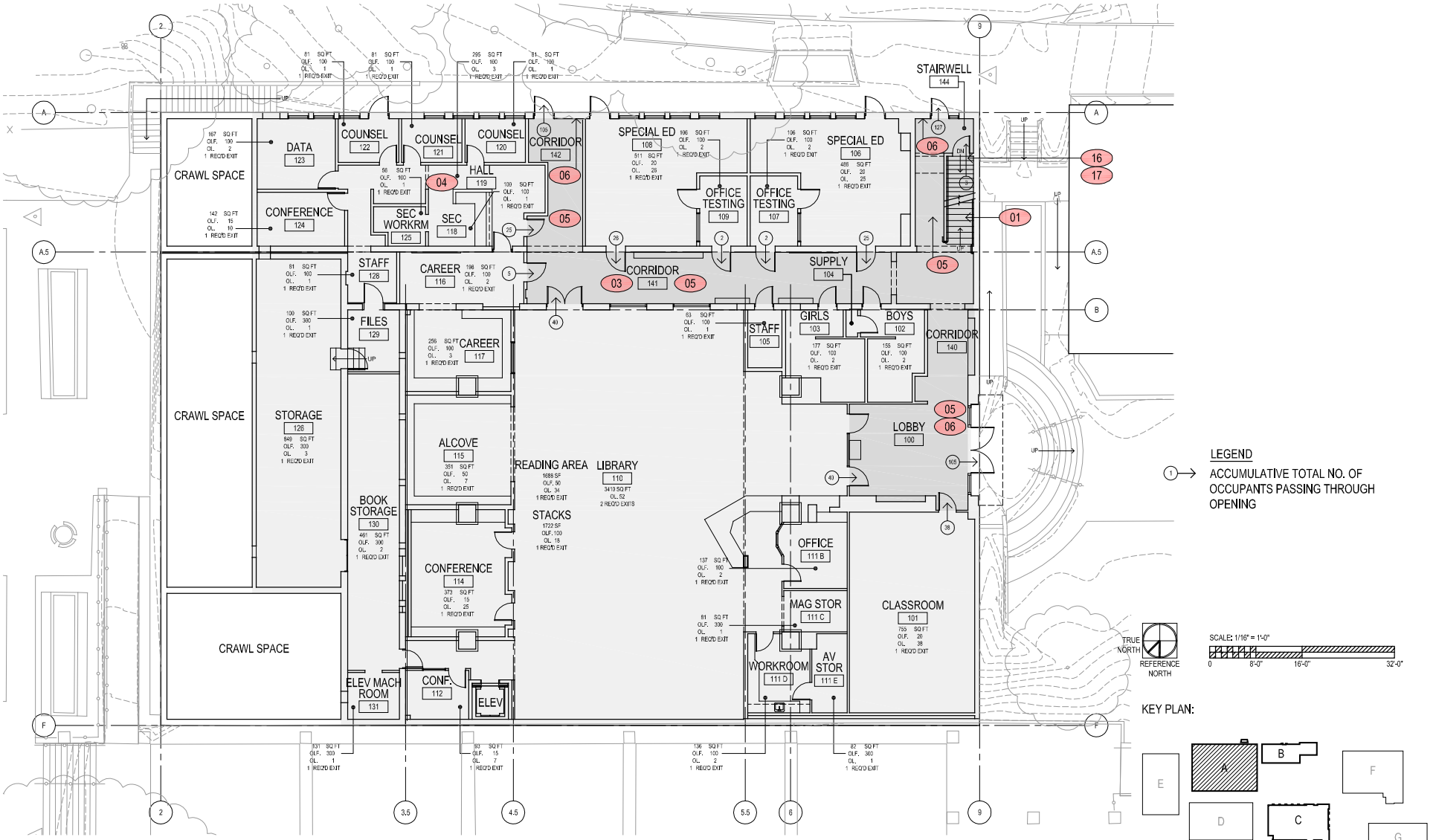
TRUE NORTH
REFERENCE NORTH

SCALE: 1/16" = 1'-0"
0 8'-0" 16'-0" 32'-0"

KEY PLAN:

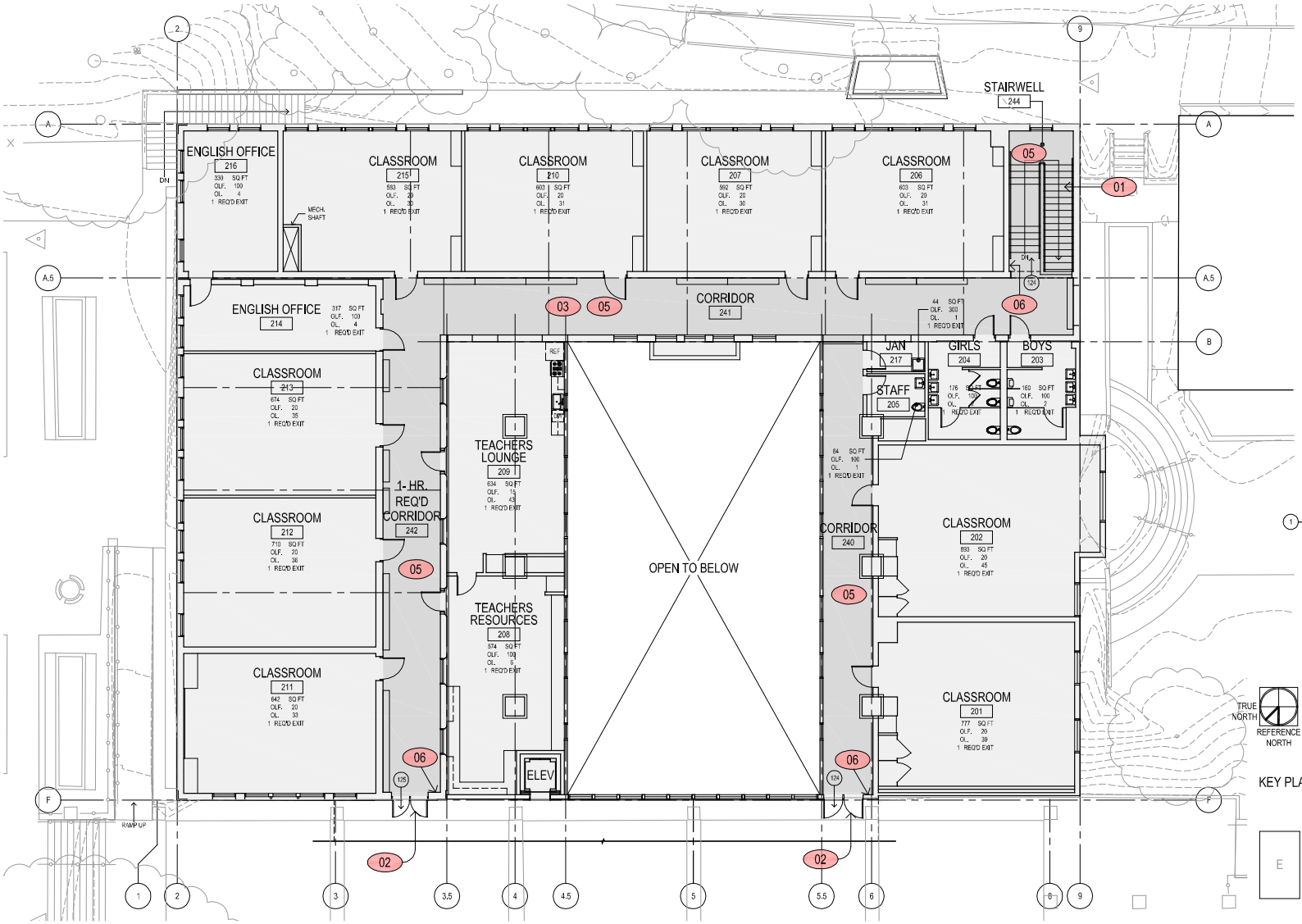


BUILDING A - BASEMENT



BUILDING A - 1ST FLOOR

life safety



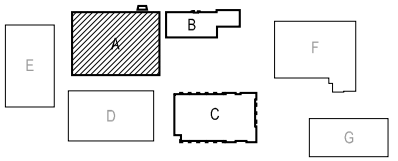
LEGEND

(1) → ACCUMULATIVE TOTAL NO. OF OCCUPANTS PASSING THROUGH OPENING

TRUE NORTH
REFERENCE NORTH

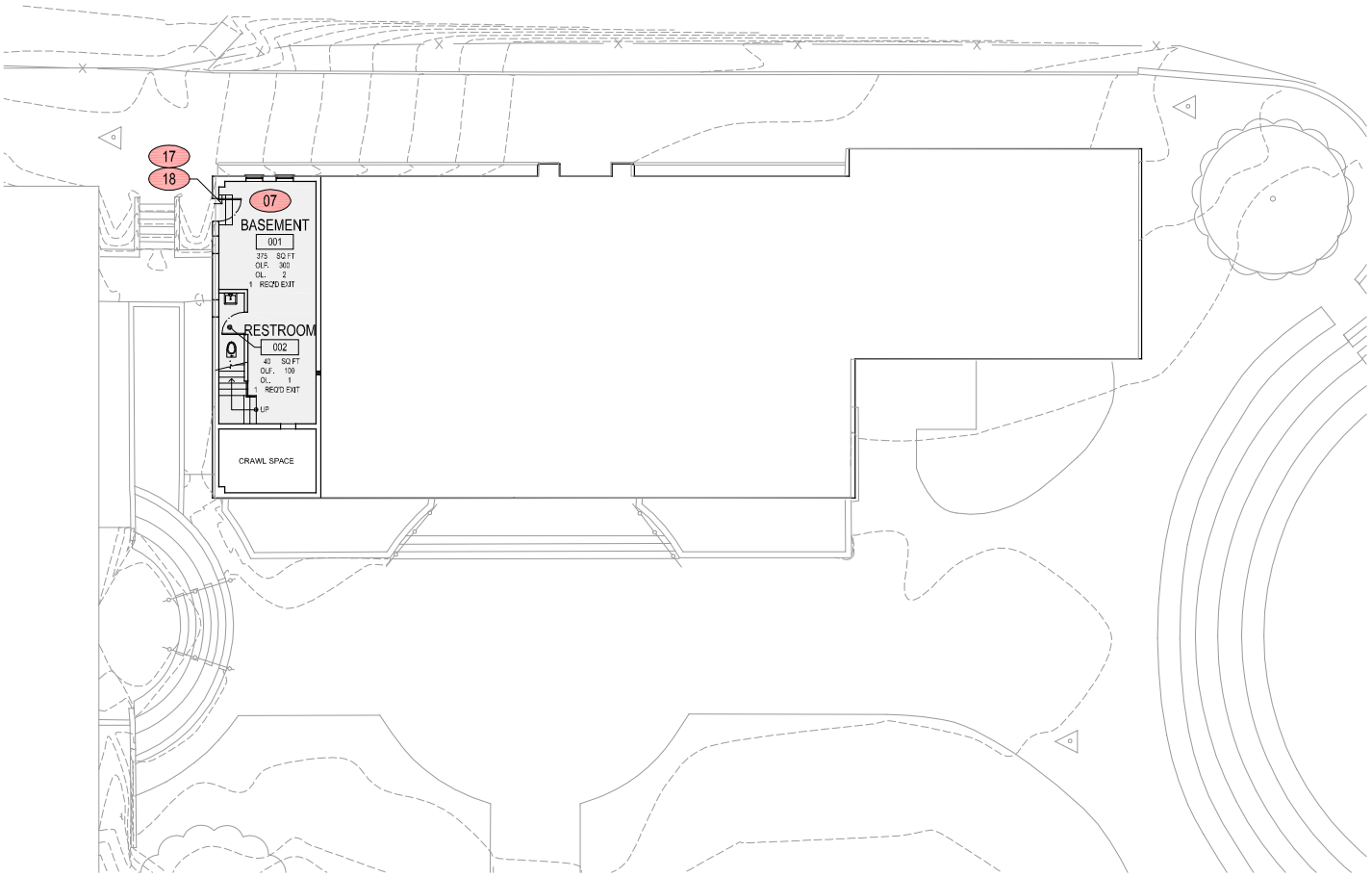
SCALE: 1/16" = 1'-0"
0 8'-0" 16'-0" 32'-0"

KEY PLAN:



BUILDING A - 2ND FLOOR

life safety



LEGEND

① → ACCUMULATIVE TOTAL NO. OF OCCUPANTS PASSING THROUGH OPENING

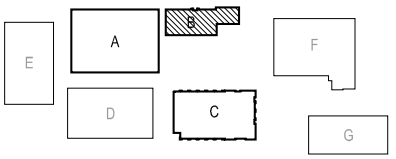
TRUE NORTH

REFERENCE NORTH

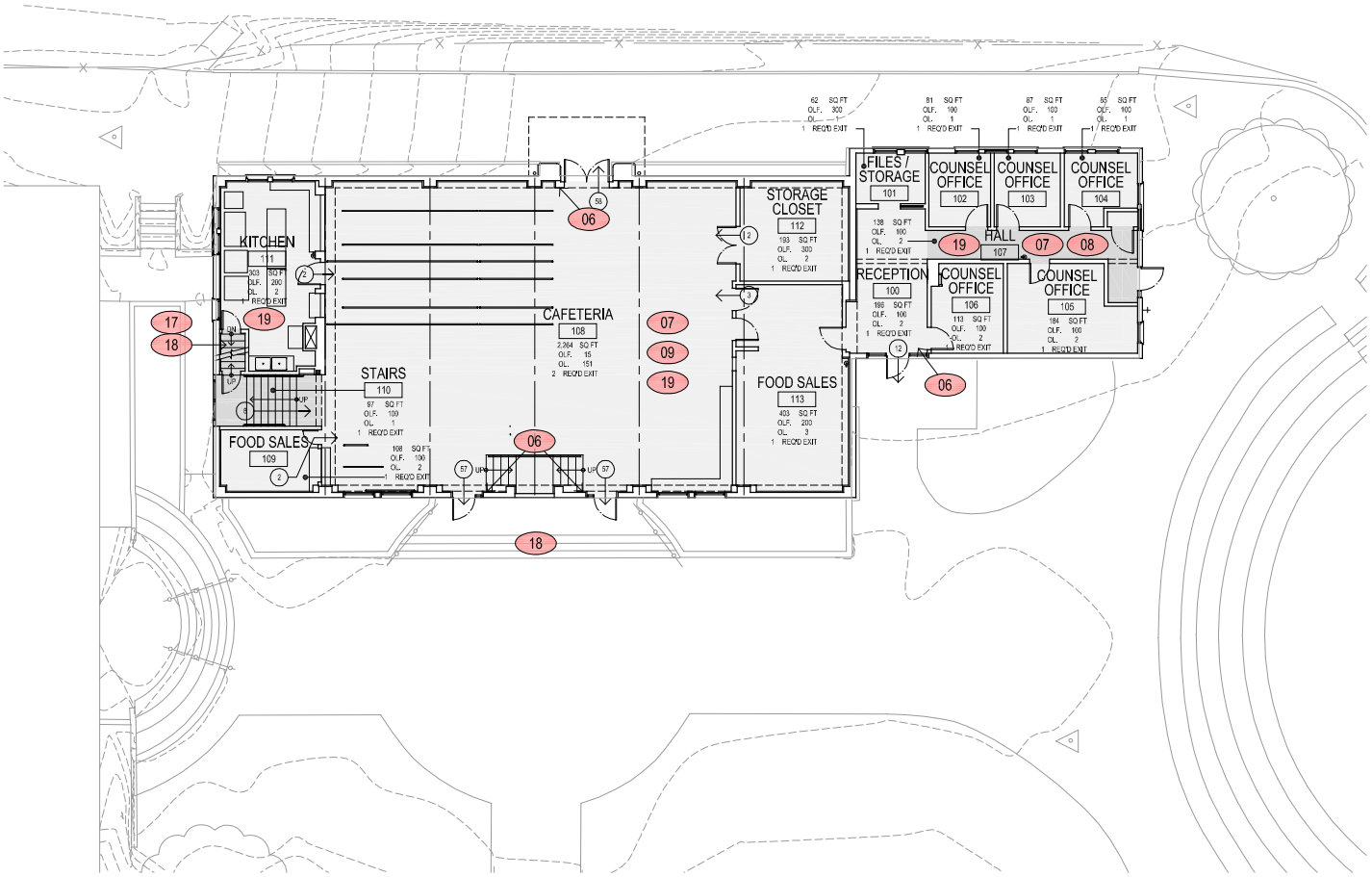
SCALE: 1/16" = 1'-0"

0 8'-0" 16'-0" 32'-0"

KEY PLAN:



BUILDING B - BASEMENT



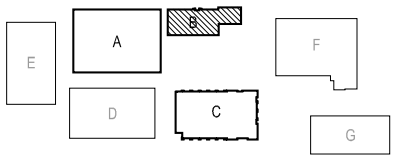
LEGEND

(1)→ ACCUMULATIVE TOTAL NO. OF OCCUPANTS PASSING THROUGH OPENING

TRUE NORTH
REFERENCE NORTH

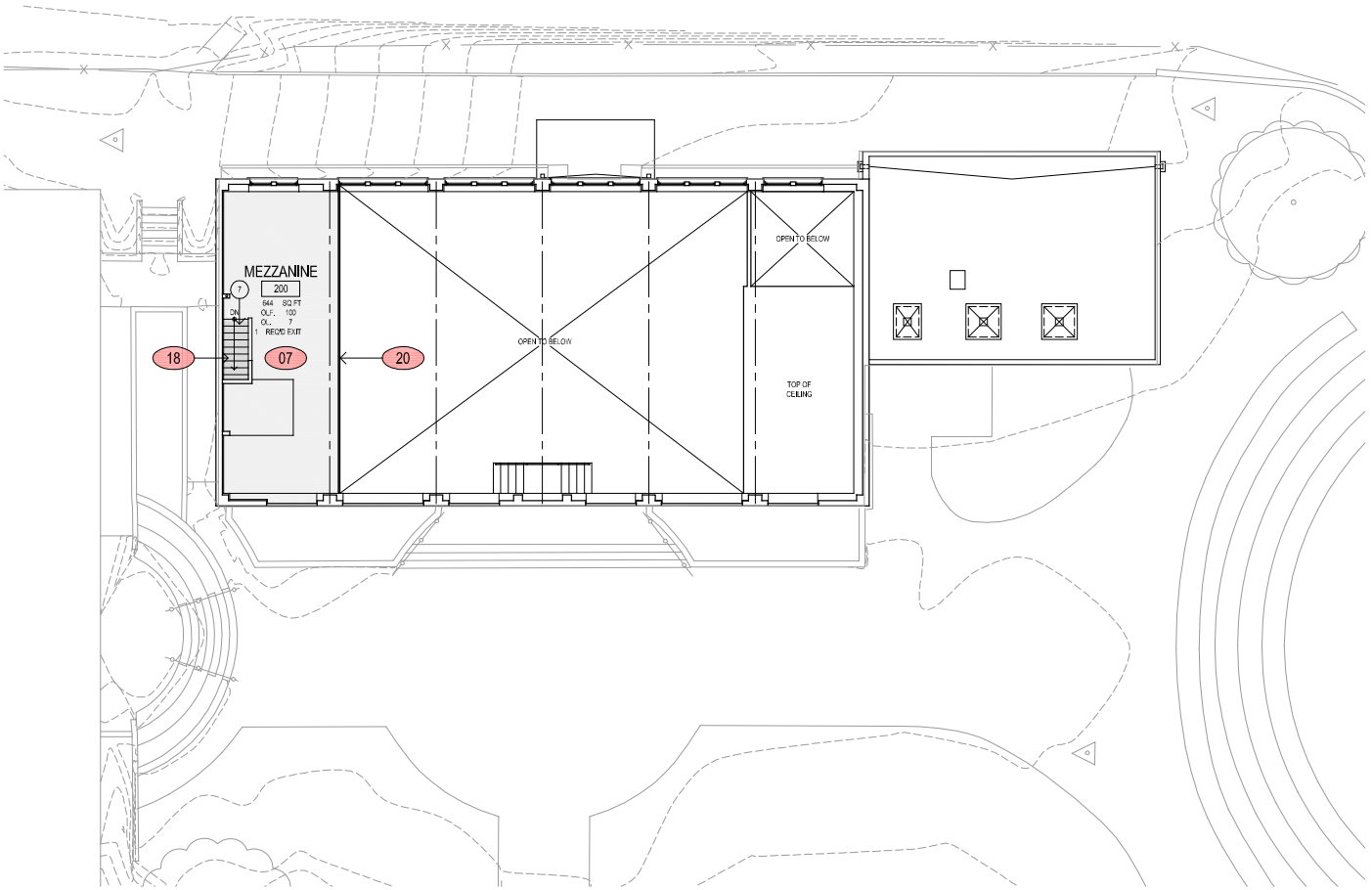
SCALE: 1/16" = 1'-0"
0 8'-0" 16'-0" 32'-0"

KEY PLAN:



BUILDING B - MAIN LEVEL

life safety



BUILDING B - MEZZANINE

LEGEND

① → ACCUMULATIVE TOTAL NO. OF OCCUPANTS PASSING THROUGH OPENING

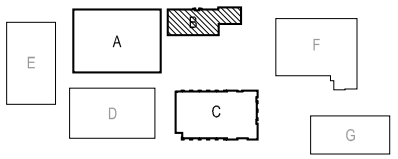
TRUE NORTH

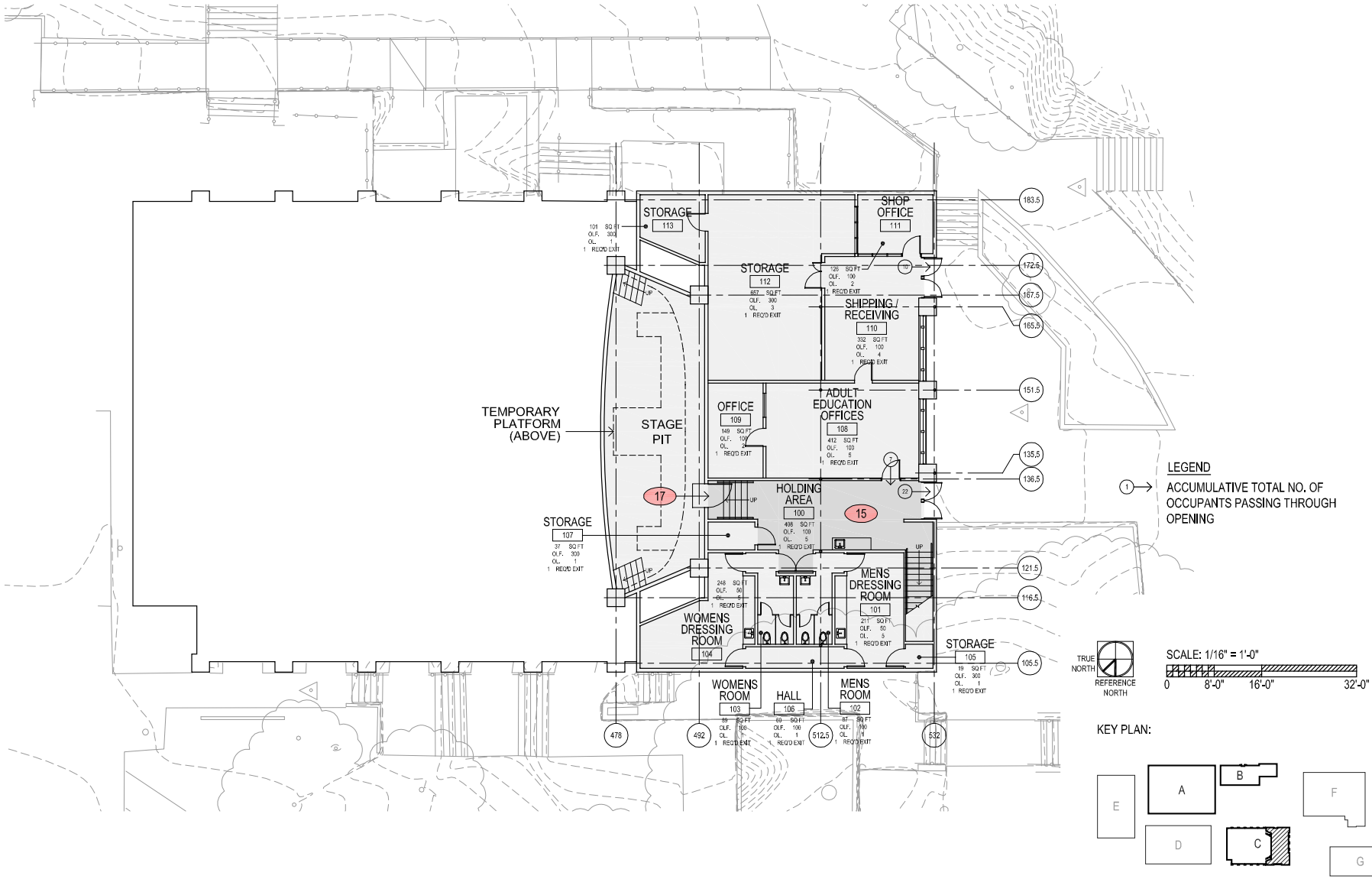
REFERENCE NORTH

SCALE: 1/16" = 1'-0"

0 8'-0" 16'-0" 32'-0"

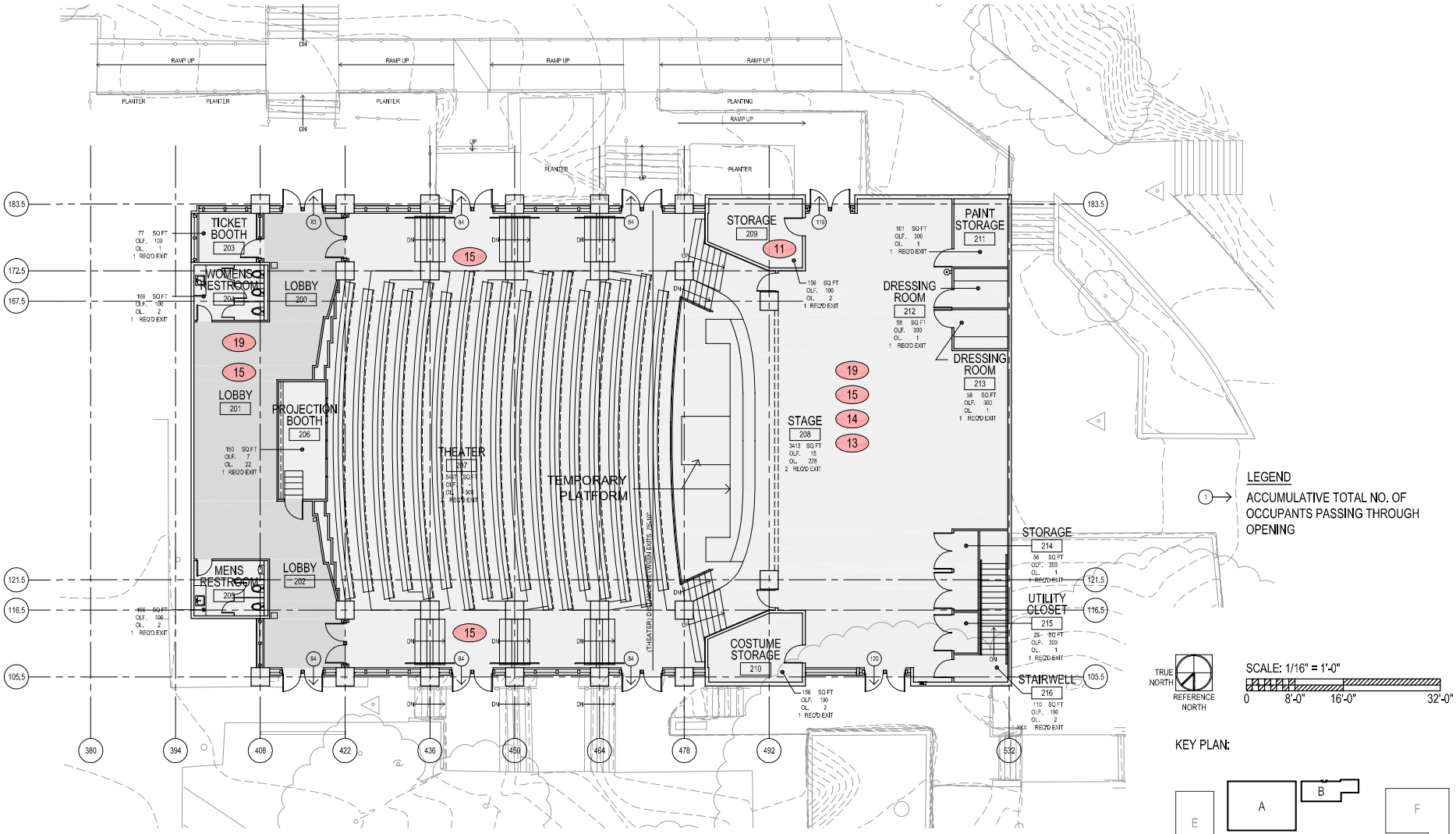
KEY PLAN:





BUILDING C - LOWER LEVEL

life safety



BUILDING C - UPPER LEVEL

life safety

4. STRUCTURAL TIER 2 REPORT

Seismic Evaluation of Three Buildings at Piedmont High School, Piedmont Piedmont Unified School District

Prepared for
murakami/Nelson Architects, Inc.
Oakland, CA

December 19, 2007

Prepared by
R. P. Gallagher Associates, Inc.
Structural Engineers
Oakland,

Executive Summary

Three buildings at Piedmont High School (Quad building, Student Center, and Alan Harvey Theater) were evaluated for life safety risk in a major earthquake. The evaluation criteria used was ASCE Standard 31 "Seismic Evaluation of Existing Buildings," published in 2003 by the American Society of Civil Engineers. This document is the generally recognized criteria for assessing the life safety risk of existing buildings.

Results of the evaluation indicate that the three buildings do not meet the life safety criteria of ASCE 31. The principal seismic deficiencies of each structure are summarized below:

Quad building – This building is comprised of five separate structures. The original Quad building and its addition, two of the five structures and both believed to be constructed in the 1930's, have very weak roof and attic diaphragms, and both do not meet ASCE 31 life safety standards. Both are significant life safety risks. The library and library mezzanine meet ASCE 31 criteria. The library addition does not because some of its steel connections do not fully incorporate new steel design standards, but the risk to occupants is not believed to be great.

Student Center – The Student Center does not meet ASCE 31 criteria. It has an overstressed high roof diaphragm, and the connections of the roof to the walls are not sufficiently strong. It can be significantly damaged in an earthquake but is not believed to be a collapse hazard.

Alan Harvey Theater – The Theater generally meets ASCE 31 life safety criteria, except that some of the connections of the roof framing to the large concrete columns are overstressed. These and several other roof connections need to be strengthened. This structure is unlikely to collapse in a major earthquake.

The three buildings were also surveyed for nonstructural hazards. The sprinkler piping in the original Quad building wings is not seismically braced and may fail in an earthquake. Other concerns include broken roof tile that can become a falling hazard and unanchored gas lines on roof of the Quad building. In general, tall bookcases and storage cabinets through out the three buildings are anchored, with a few exceptions.

It is recommended that the buildings be seismically strengthened to correct the deficiencies found. The criteria of FEMA 356 "Prestandard and Commentary for the Rehabilitation of Buildings" published by the Federal Emergency Management Agency can be used. This is the generally recognized criteria for strengthening existing buildings.

If the two older wings of the Quad building are to continued to be used prior to seismic strengthening, the heavy roof tile should be removed and replaced with a light-weight temporary roof as an interim safety measure.

Based on structural considerations alone, we believe it is economically feasible to strengthen the buildings and at the same time preserve their basic functional and architectural character. However, the overall feasibility of this project remains to be evaluated during the next, conceptual phase of the work.

CONTENTS

1. Introduction

This report summarizes the seismic evaluation of three buildings at Piedmont High School in Piedmont. The school is located at 800 Magnolia Avenue. The three buildings studied are the Quad building, the Student Center building, and the Alan Harvey Theater. The purpose of the study was to assess the vulnerability of the buildings for life-safety risk in a major earthquake.

Construction of two of the buildings and part of the third (Quad building) was done under the jurisdiction of the California Division of State Architect (DSA) and occurred after passage of the landmark 1933 Field Act by the California legislature. The dates of the construction of the two original "wings" of the Quad building are unknown but are believed to be the 1930's. Both of these structures may have been reviewed by DSA.

The Field Act required that the buildings be designed for seismic forces. Since enactment of the Act, and particularly since the 1971 San Fernando, CA earthquake, the state-of-the art seismic design has improved substantially with contributions from new research, better materials, improved training of structural engineers, and knowledge gained from investigations of earthquake damaged buildings. It is now recognized that many older buildings, even post Field Act California school buildings, are seismically vulnerable.

The evaluations summarized in this report represent an assessment of the three buildings using the latest seismic evaluation methodology. The study consisted of a detailed structural evaluation of each building. This included preparation of structural calculations and evaluation of the structural system to withstand the imposed seismic forces without collapse or creation of a serious life safety risk.

The evaluation presented also includes a survey of nonstructural hazards. The purpose of this was to identity potential falling and other hazards that may be triggered by a major earthquake.

The report is organized as follows. The criteria used in the evaluation is described in Section 2. A description of each building and the results of the evaluation are presented in Sections 3, 4, and 5, respectively, for the Quad building, the Student Center building, and the Alan Harvey Theater. Nonstructural hazard are discussed in Section 6. Section 7 provides a summary and recommendations.

2. Evaluation Criteria

Building Structural Systems

The buildings were evaluated using the criteria of ASCE Standard 31-03 "Seismic Evaluation of Existing Buildings" (Ref. 1). This is the state-of-the-art criteria used for the seismic evaluation of existing buildings. It is used to establish whether there is a significant life-safety risk.

Each building was given a Tier 2 evaluation for the Life Safety performance level using the Linear Static Procedure (LSP). This required a detailed seismic analysis of the building's structural system. In this approach, the ground shaking hazard at the site is first determined, and then the building is evaluated for its ability to withstand these motions without unacceptable behavior. The Tier 2 evaluation was recommended in an earlier Tier 1 study performed for Piedmont USD by Janiele Maffei, Structural Engineer (Ref. 2).

Nonstructural Components

Nonstructural elements and equipment were also investigated. These were evaluated in a site survey using the Tier 1 criteria of ASCE 31, supplemented by additional guidance developed by DSA and other state agencies (Ref. 3).

Earthquake Ground Motions

Earthquake ground motions for the site were obtained from the seismic ground shaking maps found on the CD-ROM Seismic Design Parameters (Ref. 4). These ground shaking maps were developed by the U.S. Geological Survey under the National Earthquake Hazards Reduction Program (NEHRP). Ground motions at the site were determined for the Maximum Considered Earthquake (MCE). This represents an earthquake with only 2-percent chance of being exceeded in 50 years (i.e., an earthquake with a 2,500 year return period). At this location, the MCE has a peak ground acceleration of 0.77g; however, only 2/3 of this level of motion (0.51g) is required to be used in the evaluations done under ASCE 31. Site class D (default class) was used.

The school is located approximately 1 mile west of the Hayward fault. This is a large fault and believed capable of a magnitude 7.0 or larger earthquake. This would produce very strong shaking at the site.

Demand-Capacity Ratios

Results of the evaluation of each building are presented as demand to capacity ratios (D/C). These are provided for the main structural elements (i.e., structural members and connections) that make up the seismic force-resisting system of each building. A D/C ratio of 1.0 or less indicates that the element satisfies the ASCE 31 criteria. Demand is the combined earthquake and dead load force applied to a structural element, and capacity is the element's usable strength. D/C ratios greater than about 1.1 to 1.2 indicate a deficient element that may need to be strengthened or replaced. Elements with D/C ratios of 2.0 or greater are considered seriously overstressed. Generally, such large D/C ratios indicate a serious deficiency unless there are other structural elements present that can take up the slack when the element with the high D/C ratio fails or is no longer effective.

3. Quad Building

3.1 Overview of the Building

The Quad building (also known as Building A) is composed of five separate structures (see Figure 1). The original building (Figure 2), for which there are no drawings, was believed built in the 1930's. An addition to this building (Figure 3) was built a short time afterwards.

In the mid-1970's, the library was built. This is a separate structure located between the wings of the original Quad buildings. This is the third of the five structures.

In the mid-1990's, the library addition (Figure 4) was constructed. This consisted of a two-story building west of the library and a new mezzanine located in the library adjacent the east wing of the original building. These are the fourth and fifth of the five structures that comprise the Quad building.

Summarized below are descriptions of the five structures, a summary of the results of the evaluation of each, and a discussion of the results. The original Quad building is discussed in Section 3.2. The Quad building addition is discussed in Section 3.3. The library is discussed in Section 3.4, the library addition in Section 3.5, and the library mezzanine in Section 3.6.

3.2 Original Quad Building

Description. The original Quad building is essentially a concrete structure with a wood roof. It has 10 inch thick concrete walls and a floor system consisting of a 3 inch concrete slab integral with 12 inch deep joists. The roof has conventional wood frame construction with Spanish tile on the mansards around the perimeter and built-up roofing with gravel on the center portion. The building is a partial two story structure about 42' wide by 82' long. The east side is one story, and the west side is two stories. Interior partitions and ceilings are plaster on wood studs or framing. Foundations appear to be concrete strip footings.

The second floor ceiling has unusual construction. Several 18 inch deep I-beams span transversely across the building. These support the ceiling joists. There are also two rows of 10 inch deep I-beams spanning between the 18 inch beams. These support the two bearing walls that support the middle portion of the roof. Just above the joists are horizontal steel angles that laterally brace the I-beams at roughly their third points. These do not extend all the way across the building (i.e., from Line 2 to Line 3), and consequently form an incomplete horizontal diaphragm system.

Except at one location in the roof, lateral forces in both directions are resisted by the concrete walls acting as shear walls. There is a straight sheathed, wood framed wall on Line A.5 between the roof and the attic level at the south end of the roof diaphragm that serves as a weak shear wall. The roof diaphragm consists of straight 1x6 wood sheathing (Figure 6). At the attic level, horizontal steel angle x-bracing, located just above the plane of the second floor ceiling, braces this level (Figure 7).

The building was inspected by structural engineers from our office on November 20, 2006 and again on February 22, 2007. No obvious structural distress or settlement was noted. In fact, the concrete walls of the building appear to be in excellent condition for their age.

As-built Information. Measured drawings were prepared by Murakami/Nelson showing floor and roof plans and wall elevations (Ref. 5). Structural as-built information such as roof framing members sizes and spacings, configuration of the horizontal steel bracing, and size and spacing of the concrete cross ties in the attic was obtained by our firm. This is summarized on the structural "as-built" drawings (Ref. 6).

During the 2006 December school break, a testing laboratory conducted exploration of the original Quad building and its addition. The purpose of this work was to obtain structural information for the Tier 2 evaluations. Information obtained included such things as the thickness of concrete walls and floors, reinforcement size and spacing, and details on the connection of the wood frame roof to the concrete wall. This work is summarized in the exploration report (Ref. 7).

Results of Evaluation. The original Quad building was found to have some very significant structural deficiencies and does not meet the Tier 2 life safety criteria. The principal problems are the weak roof and attic diaphragms and the lack of an adequate transverse shear wall to support the south end of the roof diaphragm.

The roof diaphragm spans from Line A.5 to Line F, a distance of 82 feet. There is an expansion joint in the roof along Line A.5. Consequently, the only support for the south end of the diaphragm (at Line A.5) is the very weak straight sheathed shear wall. Even considering this very questionable wall as being effective, the D/C ratio for shear in the transverse direction for the roof diaphragm is 4.60. In the longitudinal direction it is 2.70. Figure 6 shows diaphragm D/C ratios. In addition, the sill anchor bolts anchoring the roof to the tops of the concrete walls are also significantly over-stressed with a D/C of 1.37.

At the attic level, the diaphragm consists of horizontal steel angle x-bracing connected to the transverse 18 inch deep I-beams (Figure 7). This is overstressed under transverse seismic forces with a D/C ratio of 3.42 in tension (controlled by bolt shear in the bolted connections at each member end). In the longitudinal direction, because the horizontal x-bracing does not extend from Lines 2 to 3 (and also from Line 3 to 3.5), there essentially is no structural diaphragm. The attic level diaphragm is important because it transmits the out-of-plane seismic forces to the in-plane shear walls.

The second floor diaphragm essentially meets criteria with D/C ratios in shear of 1.05 for the transverse direction and 0.18 for the longitudinal direction.

The wood "shear wall" in the attic on Line A.5 is greatly overloaded with a D/C ratio in shear of at least 4.60, assuming the wall is complete, which it is not because of boards removed for an access way and a duct. D/C ratios for in-plane shears in the transverse and longitudinal concrete shear walls are 1.18 and 0.32, respectively. The largest D/C ratios for in-plane bending in the wall-piers are 0.53 and 0.21 for the transverse and longitudinal shear walls, respectively.

Under out-of-plane forces, typical D/C ratios are 0.28 at piers having 2-#6 boundary bars and 1.16 at the 10" thick walls that are reinforced with # 4 bars at 24" o.c. on each face.

Discussion of Results. The deficiencies found in both the roof and attic level diaphragms are very serious. ASCE 31 arbitrarily limits the spans of straight sheathed diaphragms (also known

as transverse sheathing) to 24 feet. The longitudinal span (for transverse forces) is 82 feet. The horizontal x-braced diaphragm at the attic level is also greatly overstressed in the transverse direction with a D/C 3.42. In the longitudinal direction, the attic diaphragm is incomplete.

The straight sheathed shear wall on Line A.5, which appears to be a nonstructural wall, is obviously very weak, and this leaves the south end of the diaphragm essentially without adequate support for transverse (E/W) seismic forces.

To fix the problems, both the roof and attic level diaphragms need to be greatly, strengthened. The roof could be sheathed with plywood (plywood overlaid on the existing straight sheathing) and the attic diaphragm can be strengthened by adding a new horizontal steel bracing system in both directions. To reduce roof, attic and floor diaphragm spans, a new concrete shear wall at Line B can be installed.

3.3 Addition to Original Quad Building

Description. The Addition has construction very similar to the original Quad building. It is a two story structure about 34' wide by 141' long. There is a basement mechanical room at the west end. No drawings are available for the addition. Information was obtained that indicates that this structure was designated Addition No. 1 and had DSA Application No. 1441. The two structures (original Quad building and the addition) form an L-shape. There is a 5 inch expansion joint between the structures. This occurs on Lines A.5 and 3.5. There is also an expansion joist between the addition and the library.

When the addition was built, the roof of the two structures was separated by an expansion joint approximately on Lines A.5. Lateral forces on the roof are resisted by a roof diaphragm with 1x6 straight sheathing spanning the length of the addition. There is a wood framed, straight sheathed wall that forms a very weak "shear wall" at roughly midspan of the diaphragm. This was not considered in our analysis.

At the attic level there is a horizontal steel angle x-braced diaphragm that spans from Line 2.5 to Line 9 (Figure 5). In addition, there are 19" deep x 14" wide concrete beams that connect the tops of the three longitudinal shear walls on Lines A, A.5 and B.

Below the attic level, lateral forces in both directions are resisted by 10 inch thick concrete walls acting as shear walls. These are relatively lightly reinforced. Interior walls are plaster on wood stud. Ceilings are plaster on 1x boards spanning between the ceiling or floor joists. The second floor consists of a 3 inch concrete slab on 12 inch deep joists spaced at 24" o.c. Foundations are believed to be strip footings under the concrete walls.

As-built Information. As-built information for addition was obtained at the same time as for the original building. See the discussion above the under the original Quad building.

Results of Evaluation. The Quad Addition does not meet the Tier 2 life safety criteria and has some very significant deficiencies. The principal problems are the same as for the original building. The roof and attic diaphragms are very weak, and there is a lack of interior transverse shear walls to reduce diaphragm span and load.

The roof diaphragm has D/C ratios for shear of 13.20 in the transverse direction and 3.97 in the longitudinal direction (Figure 6). With a longitudinal span of 141', the diaphragm

greatly exceeds the arbitrary 24' limit of ASCE 31 for diaphragms with straight sheathing. The aspect ratio of 4 to 1 also exceeds the 2 to 1 limit to ASCE 31.

At the attic level, the horizontal steel X-bracing has a D/C of 11.1 in tension under transverse seismic forces (Figure 7). This indicates that there is essentially no effective diaphragm at the attic level. This is a major deficiency.

The second floor diaphragm, which spans 102' between the shear walls on Lines 2.5 and 8, has a D/C of 1.52 in shear. This occurs in the 3 inch thick concrete slab.

Maximum in-plane shears in the transverse and longitudinal shear walls have D/C ratios of 1.66 and 0.75, respectively. The largest D/C ratios for in-plane bending in the wall-piers for the transverse and longitudinal shear walls are 0.29 and 1.15, respectively.

Under out-of-plane forces, typical D/C ratios are 0.25 at piers having 2 # 6 boundary bars and 1.16 at the 10" thick walls that are reinforced with # 4 bars at 24" o.c. on each face.

Discussion of Results. The results of the evaluation indicate a serious problem caused by the weak roof and attic diaphragms. With the lack of a functioning diaphragm at the attic level, the only mechanisms to resist the roof from moving transversely (N/S) in an earthquake are the three longitudinal concrete walls on Lines A, A.5 and B in weak axis bending and the three transverse wood stud and plaster partitions located between the shear walls on Lines 2.5 and 8. Unfortunately, these transverse walls lack sufficient strength to act as effective shear walls.

Similar to the original building, the roof and attic diaphragms will need to be greatly strengthened. This can be done by adding plywood sheathing over the existing straight sheathing on the roof, installing new horizontal steel bracing at the attic level, and building a new transverse concrete shear wall at Line 5 (by replacing an existing plaster and wood stud partition).

3.4 Library

Description. The library is a single story high-bay structure about 72' by 67' in plan (Ref. 8). Construction consists of six 3'-0" square reinforced concrete columns supporting a wood frame roof. Roof framing consists of large glulam beams supporting 3x8 purlins overlain with 3/4 inch plywood sheathing.

The six large concrete columns are cantilevered from their grade beams, and these comprise the lateral force-resisting elements of the structure. The columns have ductile detailing with closely spaced column ties, and this is a very good seismic feature. The large grade beams that serve as foundations are also designed to resist the moments imposed on them by the cantilevered columns. The roof sheathing serves as a horizontal diaphragm. The library is separated from the two original wings by 2-inch wide expansion joints, and the library addition with a 4-inch joint.

Results of Evaluation. The library structure meets the life safety requirements of ASCE 31. In general, the principal structural elements are well with the ASCE 31 limits.

Maximum D/C ratios for the roof diaphragm in shear are 0.60 and 0.33 for the N/S and E/W directions, respectively. The large 3 foot square concrete columns on Line 4 have D/C

ratios of 0.32 in bending and 0.11 in shear. The two columns in Line E have D/C ratios of 0.26 in bending and 0.09 in shear. Foundation grade beams are well within allowables.

Connections between the roof and the large columns are more highly stressed but within allowable limits. The connection on Lines 4 and E have D/C ratios of 1.00 and 0.74, respectively.

Discussion of Results. The library meets the ASCE 31 life safety criteria, and seismic strengthening is not required. It should be noted that due to the flexibility of the cantilevered columns, pounding between the library and the two original wings of the Quad building may occur during strong ground motion. This was not evaluated in the Tier 2 studies.

3.5 Library Addition

Description. The library addition consists of a two-story steel frame structure about 40' by 70' in plan (Ref. 9) built in the mid-1990's. The second floor consists of light-weight concrete fill on 18 gage metal deck. The roof consists of 18 gage metal deck supported by steel beams. Exterior walls are metal stud and stucco. Interior walls are gypsum board on metal stud. Foundations consist of a system of grade beams and short drilled piers. There is a 4 inch wide expansion joint between the library addition and the library, and between the library addition and the Quad building.

Lateral forces in the N/S direction are resisted by steel moment frames along Lines 7 and 9. The beam-column connections at the second floor level are strengthened by flange cover plates and doubler plates. Lateral forces in the E/W direction are resisted by chevron braced frames along Lines C.1, D, and F. The braced frames along Lines C.1 and F extend to the roof level. The braced frame along Line D extends only to the second floor level.

Benchmark Building Status. ASCE 31 states that buildings meeting the building code provisions for new construction after certain dates can be considered to meet life safety requirements. The specific edition (date) of the building code provisions varies depending on the type of construction. ASCE 31 requires that buildings be reviewed to verify that they were designed, detailed, and constructed in conformance with the applicable benchmark code provisions.

For steel braced frame construction, the benchmark code for new construction is the 1988 UBC. Since the library addition was required to meet the provisions of the 1995 CBC, the braced frame system qualifies as a "benchmark building".

For steel moment frame construction, the ASCE 31 benchmark code for new construction is the 1994 UBC as modified by emergency provisions for steel moment frames issued in September 1994. The latter required tests of the beam-column connections. At the time that the building was designed, DSA required conformance with IR 27-8 in place of such tests. There is no evidence of connection tests in the DSA files we reviewed.

Results of Evaluation. The braced frame along Line C.1 was spot checked for conformance with the 1988 UBC. This review included a check of the column and diagonal member sizes and certain key connections. These reviews indicated that the braced frames were designed to meet the 1988 UBC requirements.

The moment frames were evaluated using the Tier 2 requirements of ASCE 31. D/C ratios for drift are 0.56 and 0.64 at the second floor and roof, respectively. D/C ratios for various

connections at the second floor were calculated. In general, these are low. For example, maximum D/C ratios for the beam column-connections at Lines 7/C and 7/D are 0.42 and 0.40, respectively. Panel zone shear at these same connections is 0.17 and 0.11, respectively. Consequently, we believe the moment frames were conservatively designed. A review of the design drawings and the DSA files during construction indicates several specific locations of concern as follows:

(1) There are several locations in the moment frames where significant changes in flange cross section occur at or directly next to the beam plastic hinge locations.

(2) The shear connections between the sloping upper roof and the main roof diaphragm are not shown on the drawings.

(3) The construction files indicate significant blockouts in the foundation grade beams at key locations, including directly below the anchorage of one braced frame. It is not clear if the brace frame is anchored to the top of the grade beam or the top of the floor slab.

Discussion of Results. While the library addition essentially meets ASCE 31 life safety criteria and does not appear to pose any significant risk, there are aspects of its construction that should be verified. A Tier 3 evaluation of the specific areas of concern listed above, and of the beam column connection of the movement frames should be done.

3.6 Library Mezzanine

Description. The mezzanine is a one-story braced steel frame structure approximately 20' by 70' in plan (Ref. 9). It was built at the same time as the library addition (mid-1990's). The top of the mezzanine is at the same level as the second floor of the Quad building. Space on the mezzanine floor is occupied by the teacher's lounge and resources rooms. Interior walls are gypsum board and metal stud. The floor consists of 18 gage metal deck with light-weight concrete fill. Foundations consist of short drilled piers. There is a 4 inch expansion joint between the mezzanine and the Quad building. The structure appears to be designed under the provisions of the CBC that correspond to the 1991 UBC.

Lateral forces in both directions are resisted by the steel chevron bracing. Transverse bracing consists of three bays of 4x4 steel tube braces, and longitudinal bracing consists of two bays of 5x5 steel tube braces.

Results of Evaluation. The structural system of the mezzanine was reviewed and accepted by DSA in June 1996. Spot checks of certain connections indicated that the braced frames were designed in accordance with the 1988 UBC. No specific areas of concem were found.

Discussion of Results. The library mezzanine meets the life safety criteria of ASCE 31, and seismic strengthening is not required.

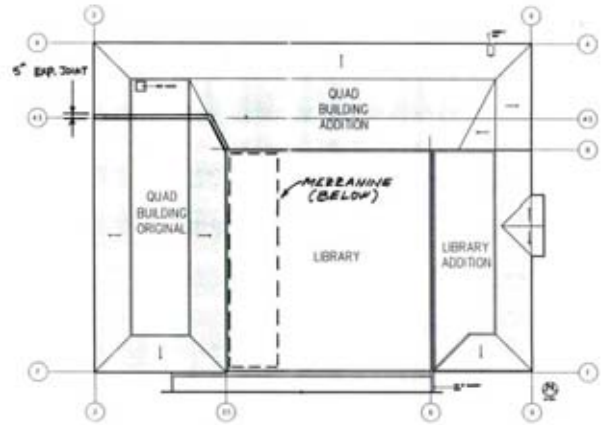


Figure 1 – Roof plan showing the five structures that make up the Quad building. The mezzanine is located within the library.

Figure 2 – One-story east side of the Quad building. Note the heavy Spanish tile roof.

Figure 3 – Two-story south side of the Quad building.

Figure 4 – The west entrance to the Quad building is the Library Addition.

Figure 5 – View of Quad building attic showing some of the horizontal steel bracing used in the attic level diaphragms.

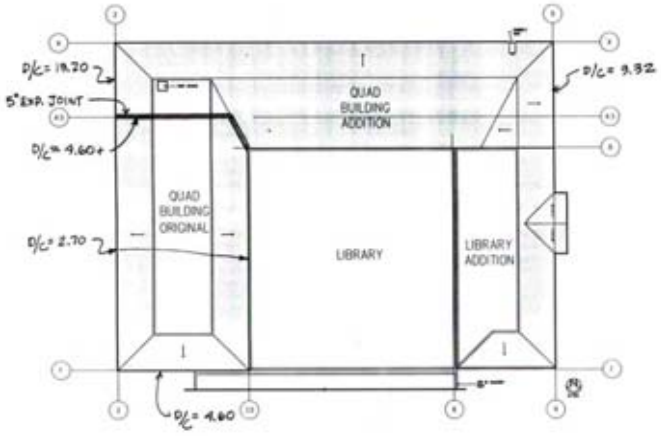


Figure 6 – Roof plan of the Quad building showing demand to capacity ratios (D/C) for the roof diaphragms.

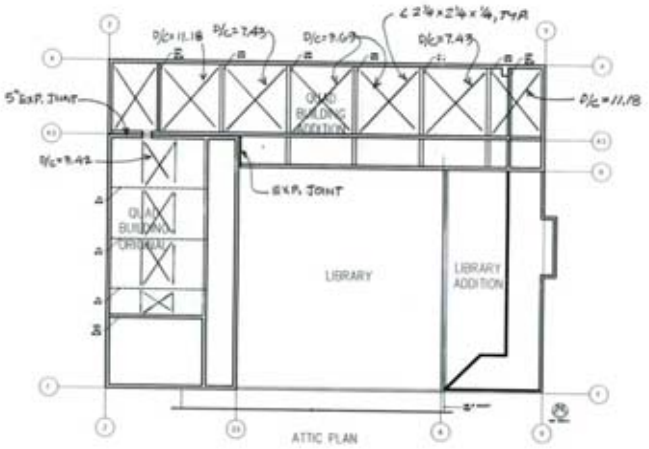


Figure 7 – Attic plan of Quad building showing demand to capacity ratios (D/C) for attic diaphragm tension bracing.

4. Student Center

Description

The Student Center (Building B) was built in the late 1930's. Originally, it was the school library. Later it was converted to its present use. The main, high roof portion of the building is one story and 43' x 86' in plan. There is a mezzanine across the east end of the high roof portion. The area below the mezzanine has been enclosed to create a snack bar. There is a basement area located below the first floor across the east end of the building. There is a low enclosed storage area across the west end of the high roof area. On the west side of the building is the low roof one-story area that houses the Special Education Office. This is 28' x 39' in plan and is structurally connected to the high roof portion of the structure.

Construction consists of 8 and 10 inch thick reinforced concrete walls with wood frame roofs. The roof of the high-bay portion is supported by five heavy timber trusses with 8x8 cased purlins spanning between trusses. There are 4 x6 subpurlins at 2'- 0" o.c. resting on the 8x8 purlins. The roof trusses are supported on concrete pilasters which are part of the north and south walls of the high roof area. The roof of the Special Education Office consists of 2 x10 rafters at 16" o.c. Both high and low roofs are sheathed with 1x6 diagonal sheathing.

The upper level windows on Line 1 (north side of the building) have been infilled. There is no information on the nature of this infill. It was assumed that the infill consisted of wood framing with exterior stucco and interior gypsum board, however this needs to be verified.

Lateral forces in both directions are resisted by the concrete walls acting as shear walls. The pilasters on Lines 3 and 5 (see Figure 10) of the north and south walls of the high roof area are rigidly connected to large grade beams located below the main floor. This creates two lateral force-resisting frames that help to resist seismic forces in the north-south direction. The heavy grade beams and the provision of extra reinforcing in these pilasters indicates that such support was intended by the original designer.

Foundations consist of reinforced concrete strip footings located all around the building. At the two transverse frames, the grade beams are relatively large.

A site visit and inspection of the construction was made by two structural engineers from our office on November 20, 2006. In general, the building was found to be in good structural condition. No signs of settlement or structural deterioration were noted.

Both the original architectural and structural drawings for the building (Ref. 10) were available, and these were used in the evaluation.

Figures 8 and 9 show views of the building, and Figure 10 shows the floor plan. Figure 10 is also used to show demand to capacity ratios (D/C) for in-plane shear forces in the principal shear walls.

Results of the Evaluation

The building does not meet the life safety requirements of ASCE 31. A number of structural deficiencies were found, and these are discussed below.

Under transverse (N/S) seismic forces, the high roof diaphragm has D/C ratios in shear of 1.34 to 1.60 depending on analysis assumptions. For what may be the most realistic assumption, we considered plastic hinges to form at the base of the pilasters of the two transverse frames (on Lines 3 and 5). This reduced the amount of shear carried by diaphragm, and gave the lower value (1.34). The sill bolts connecting the wood roof to the top of the concrete walls are also overstressed in shear with D/C ratios of 3.03 to 3.61 under transverse forces, and 1.48 under longitudinal forces.

The low roof diaphragm over the Special Education Office has a maximum D/C ratio of 0.80 in shear. The sill bolts along the north wall of this office are deficient with a D/C of 1.80. The sill bolts along the other perimeter walls of the Special Education Office are not shown on the original drawings. It is likely that these bolts are also deficient.

The drawings indicate that the roof and ceiling joists of the low roof are set into pockets in the north and south perimeter walls. In the past, this type of construction has lead to decay damage to the joist ends. The joists should be examined for the possibility of such damage.

The D/C ratios for shear walls are indicated on Figure 10. The shear walls are adequate for in-plane shear forces. D/C ratios for bending in the wall piers under in-plane seismic forces vary from 1.39 to 1.06.

Out-of-plane seismic forces on the concrete walls cause problems in several places. The concrete reinforcing in the east and west walls of the high roof area (Lines 1 and 7) are significantly overstressed with D.C ratios of 2.59 and 2.89, respectively. Anchor bolts for the main roof trusses are over stressed in shear with D/C ratios of 1.31 to 1.33. Anchorage of the 8x8 purlins to the high roof end walls is overstressed with D/C ratios of 1.16 to 1.46.

In the low roof portion, straps anchoring the 2 x10 rafters to the concrete walls at every third rafter are overstressed in tension with D/C ratios of 2.16 to 2.65 under N/S forces. Under E/W forces, the anchorage detail used utilizes cross-grain bending in the wood ledgers. This is an extremely weak connection with essentially no strength. Therefore, these walls are considered to have virtually no anchorage to the low roof diaphragm.

Discussion of Results

The principal problems are the overstressed roof diaphragm and the inadequate anchorage of the concrete walls to both the high and low roofs.

The overstressed high roof diaphragm can be fixed by adding plywood sheathing over the existing 1 x 6 diagonal sheathing. Improvement of the wall-roof connections will require installation of new, stronger anchors or reinforcement of the existing connections. An alternative procedure for the high roof area would be to add horizontal steel bracing in the plane of the bottom chords of the roof trusses. Such bracing could prevent overstress in the high roof diaphragm and strengthen the wall-roof anchorage at the same time.

Figure 8 – View of the Student Center building. The high roof portion was originally the school library. The low roof portion on the right houses the Special Education Offices.

Figure 9 – Rear (south side) of the Student Center. The original windows on the north side have been infilled (see Figure 8).

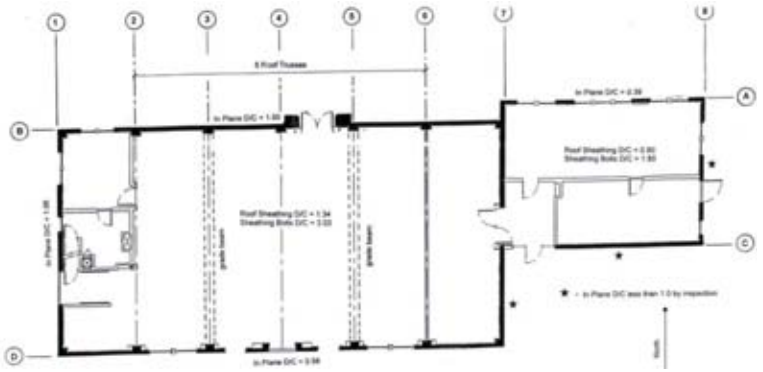


Figure 10 – Floor plan of the Student Center. Demand to capacity ratios (D/C) for the principal shear walls are also indicated.

5. Alan Harvey Theater

Description

The Alan Harvey Theater (Building C) was built in the mid-1970's. It is largely a one-story high roof structure with lobby, projection room, and a large auditorium/theatre area that cover most of the building's footprint. There is a partial basement at its west (stage) end. The lower portion houses the Piedmont Adult School, and the stage and backstage area is directly above. Overall building dimensions are 81' x 135' in plan.

Construction is complex with a wood frame roof supported on large glulam beams, that in turn are supported on 3'- 0" square reinforced concrete columns at the middle of the building and wood frame bearing walls at the ends. The roof is sheathed with 3/4-inch plywood which is heavily nailed in some locations.

Lateral forces in both directions are resisted by the plywood sheathed roof diaphragm connected to the wood shear walls and the concrete columns that are cantilevered from large foundation grade beams. In the transverse (N/S) direction, there are large plywood shear walls on Lines 1 and 5 and cantilevered concrete columns on Lines 2 and 3. Longitudinal (E/W) seismic forces are resisted by the cantilevered concrete columns on Lines A and B. It should be noted that some of the theater's large concrete columns support large gravity forces, but these are not a part of the lateral force-resisting system.

Architectural and structural drawings for the original construction (Ref. 11) were available and were used in our evaluations. The original building construction quality is excellent. The theaterdoes not appear to have had any significant modifications or additions to the original construction.

The trellis on the north and south sides of the auditorium, which is connected to the theater structure, was investigated as part of the Tier 2 evaluation. This is supported by cantilever pipe columns embedded in the ground. The portion of the trellis not supported by the pipe columns bears on and is secured to the 4x16 timber beams projecting from the roof. We did not investigate the portion of the trellis east of the auditorium as this is a separate structure.

On November 20, 2006, two structural engineers from our office toured the building and examined the construction. In general, the structure appears to be in good condition. No signs of any structural deterioration or settlement were noted. However, there is some visible wood rot on the equipment screen on the roof and on some members of the wood trellis around the theater.

Figures 11 and 12 show views of the building, and Figure 13 provides a floor plan. Demand to capacity ratios (D/C) for the concrete piers and shear walls are also given on Figure 13.

Results of the Evaluation

The theater does not meet the ASCE 31 life safety criteria, but the deficiencies found are not major, although some strengthening should be done. The principal concerns are the connection of the roof to the tops of the concrete columns. This and other results are discussed below.

The three roof diaphragms span between Lines 1 and 2, 2 and 3, and 3 and 5. Diaphragms shears are within limits with D/C ratios of 0.79, 0.82 and 0.30, respectively. Chord D/C ratios are 0.70 for transverse seismic forces, and 1.19 to 2.83 for longitudinal forces, the latter because the details or locations of the chord splices are not specifically shown on the drawings. The bolted collector connections that interconnect the three glulam beams on Line 2 are overstressed with D/C ratios of 1.74.

Transverse (N/S) seismic forces are carried by plywood shear walls and the large cantilevered concrete columns. The plywood shear walls on Lines 1 and 5 have D/C ratios of 0.91 and 0.67, respectively. The cantilever concrete column and grade beam system on Line 2 has maximum D/C's of 0.39 in shear and 0.57 in bending. The columns on Line 3 have maximum D/C's of 0.18 in shear and 0.23 in bending. Grade beams are within allowables.

Longitudinal (E/W) forces are resisted by the cantilevered column and grade beam systems on Lines A and B. Maximum D/C ratios for the columns are 0.30 in shear and 0.38 in bending. Grade beams are within allowables.

The trellis on the north and south sides of the auditorium cantilever from the structure on 4x16 timber beams. A small portion of the trellis is supported by pipe columns, encased in stucco enclosures, that are embedded in the ground. The cantilevered pipe columns supporting the trellis and the connections of the trellis to the theater roof meet ASCE 31 criteria.

Discussion of Results

Fortunately, the large concrete columns and grade beams that provide the primary lateral force resistance of the theater have adequate reinforcing and ductile detailing. These conform to the ASCE 31 criteria and require no strengthening. Some of the roof connections including those that secure the roof to the tops of the columns and the collector connections on Line 2 will require strengthening to meet life safety performance levels.

Figure 11 – South Side of the Alan Harvey Theater.

Figure 12 – Southwest corner of Alan Harvey Theater. Wall on left is a stucco wall and not a plywood sheathed shear wall.

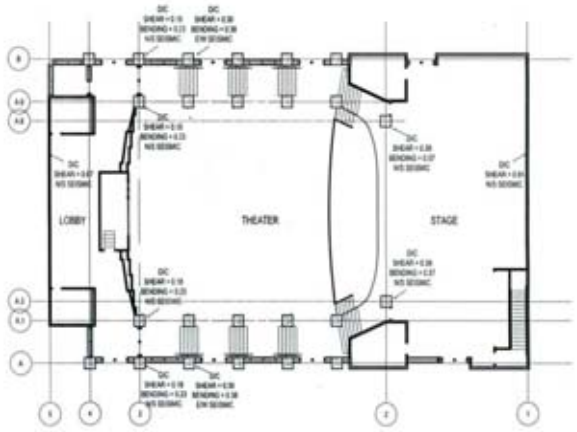


Figure 13 – Floor plan of the Alan Harvey Theater. Demand to capacity ratios (D/C) for the shear walls and concrete columns are also indicated.

6. Nonstructural Hazard Survey

Survey Methodology

This section describes the survey conducted for nonstructural hazards and presents the results. The purpose of the survey was to identify potential falling and other hazards.

Nonstructural components consist of things that are brought into a building after it has been constructed (e.g. , furnishings, bookshelves, and building contents) as well as items that were installed when the building was built (e.g. , mechanical and electrical equipment and fixtures, ceilings, and partitions). These can become hazards when they break, fall, slide or overturn. When this happens they can cause injury, block exits, and create secondary hazards such as chemical spills, gas leaks and postearthquake fires.

A nonstructural hazard survey of the three buildings was done using ASCE 31 Tier 1 procedures. The Basic, Intermediate and Supplement Nonstructural Component Checklists were used. The survey involved a room-by-room inspection of each building by a structural engineer experienced in seismic design. The survey was conducted on December 18, 19 and 20, 2006.

Tables 1, 2, and 3 summarize results for the Quad building, Student Center, and Alan Harvey Theater, respectively. The tables identify the items examined, the estimated vulnerability of the item, and observations about each. The survey was entirely visual, and no drawings were reviewed or calculations prepared. The levels of vulnerability used are defined as follows:

Vulnerability	Characteristics
High (H)	Noncompliant under ASCE 31 Tier 1 procedures. Possesses little or no seismic resistance; item may break, fall, slide or overturn during strong shaking. High probability of damage under strong shaking. May cause injury to persons in vicinity.
Moderate (M)	Possesses some seismic resistance, but not as much as an item rated low.
Low (L)	Compliant under ASCE 31 Tier 1 procedures. Possesses good seismic resistance, should resist moderate shaking without damage. Low probability of damage under strong shaking. Unlikely to cause injury to persons in vicinity.

Building Contents on Tables and Shelves

In addition to the survey results given in Tables 1, 2 and 3, it should be noted that in virtually all areas of the school there are unrestrained contents. These include such things as stored materials and books on shelves, and computer monitors on desks. While these are a threat to fall to the floor and may result in economic loss, they are generally not considered

serious life-safety-hazards. Exceptions include the unsecured computers and monitors stored on the tops of shelves in the library storage room.

Bookcases and Storage Cabinets

There are a number of bookcases and storage cabinets located throughout the school. The great majority of these are secured to walls and are unlikely to overturn, although contents may fall out. A few cabinets and bookcases are free-standing and unanchored. Those over 4 feet tall with height to depth ratios of 3.0 or greater are considered a hazard to overturn (Refs. 1 and 3).

File Cabinets

There are a number of file cabinets located throughout the three buildings. Virtually all of these are four drawer cabinets with locks on the drawers. There are a few cabinets without drawer locks, and these are a definite hazard to overturn when the drawers shift outward. These were rated as high risk (H) because of the overturning hazard.

Many file cabinets are situated where they are a low risk of injury to persons in the vicinity or are “wedged in” or otherwise placed such that it is very unlikely that they will overturn. The ASCE 31 Tier 1 Supplemented Nonstructural Checklist requires that “file cabinets arrange in groups shall be attached to one another.” This requirement, however, is for the Immediate Occupancy (I/O) performance level. None of the file cabinets we observed were connected together.

Emergency Gas Shutoff

The buildings have gas lines that supply gas to heaters, oven/ranges, and boilers. We were unable to observe most lines because they are concealed. Although two of the buildings (Quad building and Alan Harvey Theater) have fire sprinklers, it would be desirable to install (if not already done) an earthquake-activated gas shutoff valve at the PG&E meter. This would automatically shutoff the flow of gas and could prevent a postearthquake fire.

Table 1 – Nonstructural Survey Results for the Quad Building (Building A)

Item	Vulnerability	Comments
Roof		
1. Carrier HVAC unit AC-1	L	Largest unit on roof. Anchored, flexible gas line.
2. Intercity A/C units CU-5 and CU-6	L	Two of these both anchored.
3. Carrier HVAC unit AC-4	L	Medium sized unit. Anchored, flexible gas line.
4. Carrier HVAC unit AC-2	L	Anchored, flexible gas line.
5. Intercity A/C units CU-7 and CU-8	L	Small units, anchored.
6. Carrier HVAC unit AC-3	L	Anchored, flexible gas line.
7. Natural gas line	H	Line is not anchored to roof and therefore does not meet the ASDE 31 Tier 1 criteria. It does have a flexible connection over the expansion joint between the library building and original Quad building.
8. Roof tile	L-H	Individual tiles on sloped portion of roof are wired to nails in 1 x 6 sheathing and considered low risk (L). Some cap tiles are broken and loose, and these are potentially falling hazards and rated high risk (H).

Item	Vulnerability	Comments
Attic (of original 1930's buildings)		
1. Sprinkler piping	H	Lines range from 1" to about 3" in diameter. Long straight run in Addition No. 1 has Victaulic couplings and is not braced. In general, sprinkler piping lacks seismic braces.
2. Ducts/fans	Unknown	Various small ducts connecting to roof HVAC units with possible fans/blowers inside. Difficult to assess, but these do not seen to be a significant hazard.
Classroom 39		
1. Fluorescent light fixtures	L	Ceiling-mounted
2. TV	L-M	Wall-mounted, appears to be engineered, TV on swivel.
3. File cabinets	L-M	Two 4 drawer units, not restrained but not big hazard.
Classroom 38		
1. Fluorescent light fixtures	L	Ceiling-mounted
2. TV	L-M	Wall-mounted, appears to be engineered, TV on swivel.
3. File cabinets	L-M	Three 4 drawer units
4. Bookcase	M-H	Anchored to wall on only one side. Needs better anchoraged.
Rooms between Rooms 36 and 37		
1. Fluorescent light fixtures	L	Ceiling-mounted
2. Prefab steel shelving	H	Unrestrained unit 87" H x 18"D. H/D = 4.8
3. APC UPS	H	Unrestrained small unit on top of steel storage cabinet

Item	Vulnerability	Comments
4. Steel storage cabinet	L-M	Unrestrained unit 72” H x 36” W x 24” D. H/D = 3.0
5. Storage shelf	M-H	Unrestrained L-shaped unit.
6. Bookcase	H	Unrestrained unit 72” H x 78” W x 11” D. H/D= 6.5
Classroom 37		
1. Fluorescent light fixtures	L	Ceiling-mounted
2. TV	L-M	Wall-mounted, appears to be engineered, TV on swivel.
3. Bookcase	L	6’ high unit secured to wall.
4. Bookcase	H	Unrestrained unit 60” H x 36” W x 11” D. H/D = 5.5
Classroom 36		
1. Fluorescent light fixtures	L	Ceiling-mounted
2. TV	L-M	Wall-mounted unit, appears to be engineered, TV on swivel.
3. File cabinets	L-M	Two 4 drawer units
Classroom 35		
1. Fluorescent light fixtures	L	Ceiling-mounted
2. TV	L	Wall-mounted unit, appears to be engineered, TV on swivel.
Classroom 34		
1. Fluorescent light fixtures	L	Ceiling-mounted
2. TV	L	Wall-mounted unit, appears to be engineered, TV on swivel.
3. Bookcase	H	Unrestrained unit 64” H x 32” W x 10½” D. H/D=6.1

Item	Vulnerability	Comments
4. File cabinet	L-M	4 drawer unit.
Classroom 33		
1. Fluorescent light fixtures	L	Ceiling-mounted
2. TV	L-M	Wall-mounted, appears to be engineered, TV on swivel.
3. TV (mobile)	M-H	TV on mobile stand is unrestrained and can fall off.
4. File cabinet	H	Single 4 drawer file cabinet without locks on drawers, can easily tip over.
5. Bookcase	L	Wall-mounted
Corridor at Upper Level		
1. Fluorescent light fixtures	L	Ceiling-mounted
2. Lockers	L	Many of these apparently secured to walls.
3. Windows at stair landing	Unknown	Three panes high, may be ordinary glass.
4. Windows in corridor	L	Wire glass
Custodian Closet (Upper Level)		
1. Fluorescent light fixtures	L	Cable-hung
2. Electrical panels	L	Secured to wall.
3. Transformer	L	Secured to unistrut frame that is secured to wall.
4. Supply shelving	M-H	Unrestrained tall unit
5. Water heater	L	Short gas unit, strapped to wall.

Item	Vulnerability	Comments
Faculty Lounge (Upper Level)		
1. Fluorescent light fixtures	L	Cable-hung
2. Oven range	M	Unrestrained electric unit.
3. Refrigerator	M	Unrestrained.
Xerox Room		
1. Fluorescent light fixtures	L	Cable-hung
2. Xerox machines	L-M	Two large units. Both are unrestrained, but unlikely to overturn.
Classroom 32		
1. Fluorescent light fixtures	L	Cable-hung
2. Metal storage cabinet	H	Unrestrained 66" D x 24" W x 18" D unit. H/D =3.7.
3. Mobile TV stand and TV	H	Unrestrained
4. Heater	L	Located in closet, well anchored.
Classroom 31		
1. Fluorescent light fixtures	L	Cable-hung
2. Bookcase	H	Unrestrained unit 84"H x 48" W x 9" D. Fastener pulled out of wall. H/D= 9.3
3. Metal storage cabinet	M-H	Unrestrained unit 72" H x 36" W x 18" D. H/D = 4.0.
4. File cabinet	H	Wood 4 drawer file cabinet without drawer locks.
5. File cabinet	L-M	4 drawer legal size cabinet with drawer locks.
6. Heater	L	Located in closet and well anchored.

Item	Vulnerability	Comments
Classroom 30B		
1. Fluorescent light fixtures	L	Cable-hung
2. Bookcase	H	Unanchored unit 72" H x 42" W x 9" D. H/D = 8.0
3. Storage cabinet	L	Secured to wall, 7' high.
4. Bookshelf (wall mounted)	L	Two of these, both secured to wall
5. File cabinet	L	4 drawer unit with locks.
Classroom 30A		
1. Fluorescent light fixtures	L	Cable-hung
2. Bookcase	L	Two wall-mounted units.
3. File cabinets	L-M	Two 4 drawer units with locks.
Corridor at Lower Level		
1. Fluorescent light fixtures	L	Ceiling-mounted
2. Lockers	L	Secured to walls
3. Main entry	L	Overhead glass is tempered.
Classroom 30		
1. Fluorescent light fixtures	L	Cable-hung
2. TV	L-M	Wall-mounted, also has two restraining cables.
3. Bookcase	H	Unrestrained unit 60" H x 38" W x 12" D. H/D= 5.0
4. Bookcase	H	Unrestrained unit 61" H x 27½" W x 12½" D. H/D= 4.9

Item	Vulnerability	Comments
Library		
1. Fluorescent light fixtures	L	Three rows of these, cable hung.
2. Free standing bookcases	L-M	Nine units anchored to floor. 91" H x 22½" D.
3. Bookcases against wall	L	Secured to wall
4. Built-in bookcases	L	
5. Small fluorescent light fixtures	L	Cable hung fixtures. These are located in small rooms off main library reading room.
Book Storage Room (located off Library)		
1. Fluorescent light fixtures	L	Mounted to under-side of concrete floor joists.
2. Bookcases (wood)	L-M	Seven rows of these. Many heavy things stored on top, and these are falling hazards.
3. Bookshelves (metal)	L	Secured to back wall of room.
4. Water heater	H	Small electric unit situated on platform mounted to wall. Unit is unrestrained and can fall off platform.
5. Magazine shelves	L	7' high wood bookcases secured to wall.
Counseling Office		
1. Fluorescent light fixtures	L	Cable-hung
2. Bookcases (wood)	H	Two of these, both not fastened to wall. 72" H x 36" W x 12"D. H/D= 6.0
3. File cabinets	L	Three 4 drawer units that are "wedged in" and considered low risk.

Item	Vulnerability	Comments
College and Career Center		
1. Fluorescent light fixtures	L	Cable-hung.
2. Bookshelves	L	Several of these, varying in size, secured to walls
3. Storage cabinets	L	Built-in units
Basement Mechanical Room		
1. American Standard boiler	Unknown	Large gas unit that has a rigid gas line. Could not see anchorage. Anchorage must be verified or installed.
2. Metal shelving	M-H	Unrestrained prefab X-braced units.
3. Pump	L	Anchored
4. Sprinkler piping	L-M	Located at bottom of stairs, braced.
Elevator		
1. Elevator	Unknown	Believed to be a hydraulic unit. Runs between library (lower level) and second floor (upper level).

Table 2 - Nonstructural Survey Results for the Student Center (Building B)

Item	Vulnerability	Comments
Cafeteria		
1. Fluorescent light fixtures	M-H	Four rows of large fixtures. These are hung from ceiling on metal tubes. It appears that tubes have rigid connections at top, wires restrain longitudinal movements but not transverse. Very suspect.
2. Vending machines	M	Unrestrained units 80" H x 36" W x 26" D and 72" H x 36" W x 30" D. H/D = 3.1 and 2.4
3. Windows over exit doors	M	Windows appear to be ordinary glass. Wire glass used in doors.
Balcony		
1. Fluorescent lights fixtures	L-M	Three are ceiling hung with cable, one has stems with ball and socket top connections.
2. Storage cabinet	M	Very large wood unit on large platform appears unrestrained.
Kitchen Area		
1. Fluorescent light fixtures	L	Ceiling-mounted
2. Oven	H	Tall unrestrained unit 75" H x 38" W x 33" D with flexible gas line.
3. Oven/range	H	Unrestrained unit with flexible gas line.
4. Hobart refrigerator	M	Unrestrained unit 83" H x 55" W x 32" D. H/D = 2.6
5. True refrigerator	M	Unrestrained unit 83" H x 27" W x 29" D. H/D = 3.1

Item	Vulnerability	Comments
Basement		
1. Fluorescent light fixtures	M	Two of these, rod hung inexpensive fixtures.
2. Water heater	H	Unrestrained electric unit.
3. Sturtevant fan	M-H	Large fan/blower on angle iron frame that is not anchored to floor.
4. Ducts	L-M	Difficult to assess
5. Storage shelf	H	Unrestrained 89" H x 106" W x 11½" D unit against wall. H/D = 7.7
Storage Area (West End)		
1. Fluorescent light fixtures	L	Ceiling-mounted
2. Northland refrigerator	L-M	Unanchored unit 72" H x 35" W x 27" D. H/D = 2.7
3. Delfield refrigerator	L-M	Three of these, all unrestrained and on rollers 80" H x 50" W x 32"D. H/D=2.5
4. Storage shelves	L	Built-in units
5. Light metal shelving	M	Unanchored
Chair Storage Room (West End)		
1. Fluorescent light fixtures	L	Single large fixture supported by unistrut.
2. Storage shelves	L	Built-in units along walls.
Special Education Office (West End)		
1. Fluorescent light fixtures	L	Ceiling-mounted
2. Bookshelf (Room 1)	H	Unrestrained unit 72" H x 25" W x 11" D. H/D = 6.5

Item	Vulnerability	Comments
3. File cabinets	L-M	A number of 4 drawer files. Not restrained. Most have drawer locks.

Table 3 - Nonstructural Survey Results for the Alan Harvey Theater (Building C)

Item	Vulnerability	Comments
Roof		
1. HVAC unit	M	Very large mechanical unit mounted on six vibration isolation devices (VID). Each VID is secured to curb (not visible) with two lag screws or bolts. One VID has no bolts to connect it to curb.
2. Gas line	H	Gas line to HVAC unit is rigidly connected. Needs flexible connection.
3. Ducts	H	A number of large ducts on roof. These have variety of sizes (e.g., 60x26, 56x20, 38x15 and 42x8). Individual legs supporting ducts are not fastened at all to wood sleepers but life safety risk is minor.
4. Roof tile	L	Tile on equipment screen is wired to nails.
5. Flood light	L	Large flood light, secured to trellis.
6. Light fixtures	L	Twelve small fixtures secured to trellis.
Theater		
1. Stage lights	L	These seem well secured to glulam beams.
2. Ceiling lights	L	Small incandescent lights fastened to ceilings.
3. Speakers (sides of stage)	L	Two of these, both mounted to wall will steel brackets.

Item	Vulnerability	Comments
4. Speakers (over stage)	L	Three of these, all restrained with cables
Lobby		
1. Ceiling lights	L	Ceiling-mounted incandescent.
2. Entry/exits	L	Overhead glass is tempered.
Projector Room		
1. Lights	L	Ceiling-mounted incandescent.
Stage		
1. Lights	Unknown	Typical stage lights mounted on pipes, not rated.
2. Curtains	Unknown	Typical hanging curtains of various sizes.
Mechanical/Electrical Room		
1. Blower and duct	L	Secured
2. Transformer	L	Anchored
Piedmont Adult School (Lower Level)		
1. Fluorescent light fixtures	L	Ceiling-mounted.
2. Light steel shelving	L-H	Located in supply rooms. Most of the shelves are secured to walls and rated (L), but shelving on east wall is unsecured and rated (H).
3. Wood bookshelf	H	Unrestrained unit 84" H x 32" W x 11" D. H/D=7.6
4. Refrigerator	M	Unrestrained

Item	Vulnerability	Comments
5. Metal storage cabinets	M	A number of these. All are unrestrained. Units are 78" H x 36" W x 24" D, and 72" H x 36" W x 18" D. H/D=3.3 and 4.0
6. File cabinets	L-M	A number of 4 drawer files with drawer locks.

7. Summary and Recommendations

Summary

An ASCE 31 Tier 2 seismic evaluation of three buildings at Piedmont High School was performed for the Life Safety performance level. The buildings are the Quad building (Building A), the Student Center (Building B), and the Alan Harvey Theater (Building C). A nonstructural seismic hazard survey was also conducted. Results are summarized below.

Quad building: The building consists of five separate structures. These are isolated from each other by expansion joints and were evaluated as individual structures. Results for each are summarized below.

Original Quad building – This building does not meet the ASCE 31 life safety criteria. The roof and attic diaphragms are greatly overstressed, and the structure maybe a risk to occupants in a major earthquake.

Quad building addition – The addition has construction similar to the original Quad building. The roof and attic diaphragms are greatly overstressed, and the structure does not meet ASCE 31 life safety criteria by a significant margin. Occupants maybe at risk in a major earthquake.

Library – The library meets the ASCE 31 life safety criteria.

Library Addition – The library addition does not meet the ASCE 31 criteria. A few items, including the connections of beams and columns do not fully conform to the post-Northridge earthquake steel design standards that are included in ASCE 31. The risk to occupants, however, is not believed to be great.

Library Mezzanine – The mezzanine meets ASCE 31 life safety criteria.

Student Center: The Student Center does not meet ASCE 31 life safety criteria. The high roof diaphragm is moderately overstressed, and the walls are not adequately connected to the roof. The building is not believed to be a collapse hazard, but it can suffer structural damage and needs to be strengthened.

Alan Harvey Theater: The Alan Harvey Theater generally meets the life safety criteria of ASCE 31, except that some of the connections on the roof, including the connection of the roof to the large concrete columns, are moderately overstressed. These should be strengthened. This building is unlikely to collapse in an earthquake.

Nonstructural Survey: Some nonstructural hazards were found. These include loose and broken roof tile on the Quad building, unanchored gas line on the roof of the Quad building, unbraced sprinkler piping also in the Quad building, and some unrestrained gas appliances such as ovens and ranges. It should be noted, however, that many nonstructural elements are anchored. For example, the vast majority of tall bookcases and storage cabinets located throughout the school are secured against overturning. There are, however, a number of building contents that are unsecured, and these can topple to the floor. The life safety risk associated with most, but not all of these, is believed to be small.

Recommendations

To mitigate the seismic deficiencies found, we recommend that the following be done:

(1) The original Quad building and its addition have very significant seismic deficiencies, and these two structures should have a high priority for seismic strengthening. If the two older wings are to remain in use prior to seismic strengthening, we recommend that the heavy Spanish tile be removed and replaced with a light-weight temporary roof membrane.

(2) The buildings should be strengthened to the Life Safety performance level of FEMA 356 "Prestandard and Commentary for the Seismic Rehabilitation of Buildings" (Ref. 12). This is the accepted standard for the seismic rehabilitation of existing buildings and has been accepted by DSA in the past. The document represents the next step in an evaluation and rehabilitation process that starts with an ASCE 31 evaluation. If ASCE Standard 41-06 (Ref. 13) becomes finalized in time for the upgrade work, this and the 2006 changes proposed to Title 24 (effective in 2008) for seismic strengthening of existing buildings should be used as the upgrade criteria. ASCE 41 is an updated version of FEMA 356.

(3) Additional exploration and testing of the Quad building will be required for conceptual design studies. In particular, wall reinforcement and wall pier boundary reinforcement needs to be established throughout. Exploration of some aspects the Student Center will also be required. For example, the construction of the infill walls on the north side of the building is not shown on the drawings and needs to be determined.

(4) The nonstructural hazards identified in Tables 1 through 3 should be given a Tier 2 evaluation and/or abated, particularly those items designated as having a high (H) vulnerability that can cause injury to persons in the vicinity.

Finally, it should be noted that the above recommendations will need to be considered in light of ADA and fire and life safety considerations. These were not studied or considered in the work summarized in this report. This evaluation is being conducted by the architect for the project.

Based on structural considerations alone, we believe it is economically feasible to strengthen the deficient buildings and at the same time preserve their basic functional and architectural character.

8. References

1. ASCE/SEI Standard 31-03, “Seismic Evaluation of Existing Buildings,” Structural Engineering Institute, American Society of Civil Engineers, 2003.

2. “Piedmont High School and Havens Elementary School Seismic Evaluations,” prepared by Janiele Maffei, Structural Engineer, Piedmont, August 1, 2004.

3. “Guide and Checklist for Nonstructural Earthquake Hazards in California School,” a Project of the California Governor’s Office of Emergency Services, Division of State Architect, Seismic Safety Commission, and Department of Education, January 2003.

4. “Seismic Design Parameters,” prepared by U.S. Geological Survey, Federal Emergency Management Agency, and Building Seismic Safety Council, Version 3.10, February 2001 (CD-ROM).

5. Measured drawings of Quad building, prepared by Murakami/Nelson Architects, Oakland, 2007.

6. “As-built Structural drawings for Original Quad Buildings,” prepared by R. P. Gallagher Associates, Inc., Structural Engineers, Oakland, March 2007.

7. “Material Testing, Quad Building at Piedmont High School, Magnolia Avenue, Piedmont, CA,” report prepared by Applied Materials & Engineering, Inc., Oakland, January 2, 2007.

8. Architectural and structural drawings for Library & Quad Building prepared by Reid & Tarics Associates, Architects and Engineers, San Francisco, 1975, DSA Application No. 38432.

9. Architectural and structural drawings for Library/English Building 30 (Library Addition), prepared by David Wade Byrens Architecture, Oakland, and GKO Messinger & Associates Structural Engineers, Oakland,1995, DSA No. Application 64149.

10. Architectural and structural drawings (A1-A10, S1-S4) for Library Building for Piedmont High School (now Student Center), prepared by Wm. H. & Harold H. Weeks, Architects, San Francisco, 1938, DSA Application No. 2319.

11. Architectural and structural drawings for the Auditorium, prepared by Reid & Tarics Associates, Architects and Engineers, San Francisco, 1975, DSA Application No. 38432.

12. FEMA 356 “Prestandard and Commentary for the Seismic Rehabilitation of Buildings,” Federal Emergency Management Agency, November 2000.

13. ASCE/SEI Standard 41-06, “Seismic Rehabilitation of Existing Buildings”, prepublication edition, Structural Engineering Institute, American Society of Civil Engineers, 2006.

5. SOILS ENGINEER'S DESIGN RESPONSE SPECTRA REPORT

Geomatrix

Memorandum

TO:	John Nelson murakami/Nelson	**DATE:**	May 10, 2007
FROM:	John Egan	**PROJECT NO.:**	12941.000
CC:		**PROJECT NAME:**	Piedmont Schools Seismic Evaluation

SUBJECT: Earthquake Design Response Spectra and Geohazards Assessment

SUMMARY

Earthquake ground shaking hazard at Piedmont Unified School District (PUSD) school sites was assessed for possible future earthquakes on active faults in the San Francisco Bay region. The Hayward fault, situated approximately 1¾ to 2¾ km [1 to 1¾ miles] east-northeast of the PUSD school sites dominates the earthquake ground shaking hazard; at this proximity to the fault, differences in the ground motion hazard amongst the school sites are not significant. Design-level response spectra were developed in general accordance with the structural design criteria being implemented by the PUSD for this project. For the design basis earthquake ground shaking level (designated as BSE-1), the response spectrum is characterized by a peak horizontal ground acceleration (PGA) of 0.67g. In comparison, we note that ground shaking recorded at the Piedmont Middle School during the M_W 6.9 1989 Loma Prieta earthquake was characterized by peak horizontal ground accelerations almost an order of magnitude lower than that of the BSE-1 level (i.e., PGAs of 0.07g to 0.08g).

In addition to earthquake ground shaking hazard, geologic hazards involving ground failure, including the potential for surface fault rupture, soil liquefaction, and slope instability, were assessed during this study for the PUSD school sites. This assessment is based on our interpretation of conditions at the school sites from published maps and data relevant to the sites, including information on topography, geology, seismicity, and faults, and unpublished geotechnical investigation reports prepared by others, as well as our ground reconnaissance of the sites conducted during the present study. Based on the available information and observations, we are of the opinion that hazard to the PUSD schools due to surface fault rupture, soil liquefaction, and site instability is very low to negligible.

INTRODUCTION

This memorandum presents recommendations for design-level response spectra for utilization in seismic safety and retrofit evaluations of Piedmont Unified School District (PUSD) school buildings being conducted by the murakami/Nelson team for future earthquakes in the

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San Francisco Bay region. We also have assessed the potential for experiencing effects at the school sites associated with earthquake-related geologic and geotechnical hazards (e.g., surface fault rupture, liquefaction-related phenomena, site instability).

Conditions at the school sites were interpreted based on available geologic and geotechnical information for the sites and vicinity, as well as ground reconnaissance of the sites conducted during our study. We reviewed published maps and data relevant to the sites, including information on topography, geology, seismicity, and faults, and unpublished geotechnical investigation reports by others provided by PUSD through murakami/Nelson; these latter reports included logs of exploratory borings drilled at some of the sites. Reports of ground shaking effects in the Piedmont vicinity from historical earthquakes in the region were also reviewed.

GENERAL APPROACH

We have developed design-level response spectra, designated as BSE-2 and BSE-1, to be in general accordance with the structural design criteria being implemented by the School District for this project; those criteria were provided to us by fax on January 18, 2007. In developing these spectra, we have considered results from both probabilistic ground motion analysis (commonly referred to as a probabilistic seismic hazard assessment or PSHA) and deterministic ground motion analysis. These analyses analytically combine information on the locations and geometries of the school sites relative to potential seismic sources (i.e., faults) in the San Francisco Bay region, the maximum earthquake magnitude capabilities interpreted for those seismic sources, spatial and temporal characteristics of earthquake occurrence on the sources, and source-to-site ground motion attenuation (based on published empirical relationships) appropriate to the tectonic environment and interpreted subsurface conditions at the sites, as well as uncertainties associated with each of these components.

REGIONAL FAULTS

The San Francisco Bay region is considered one of the more seismically active regions of the world, based on its record of historical earthquakes and its position astride the North American-Pacific plate boundary (i.e., the San Andreas fault zone and other active faults). The major faults that comprise the 80-km [50-mile] -wide plate boundary include, from west to east, the Seal Cove-San Gregorio, San Andreas, Hayward-Rodgers Creek, and Calaveras faults (see Figure 1). Each of these faults is a potential source of earthquakes that could produce significant ground shaking at the PUSD school sites. Other Holocene faults that may be sources for earthquakes capable of producing ground shaking at the sites include the Concord-Green Valley, Clayton-Marsh Creek-Greenville, and West Napa faults, as well as the Mount Diablo Thrust.

The Hayward fault, situated approximately 1¾ to 2¾ km [1 to 1¾ miles] to the east-northeast (see Figure 2), dominates earthquake ground motion hazard for the PUSD school sites. The San Andreas fault, situated approximately 27 km [17 miles] to the west-southwest of the site, also contributes significantly to seismic hazard at the sites because of its larger earthquake

magnitude capability and longer duration ground shaking associated with those larger magnitude events.

HISTORICAL SEISMICITY

During the past 200 years, numerous small-magnitude and at least fifteen moderate- to large-magnitude (i.e., M6+) earthquakes have occurred in the San Francisco Bay region (Toppozada and Parke, 1982a, 1982b; Ellsworth, 1990; Working Group on Northern California Earthquake Potential [WGNCEP], 1996; Working Group on California Earthquake Probabilities [WGCEP], 1999, 2003). Ground shaking experienced in Piedmont from most of the historic earthquakes in the region has been of generally imperceptible or quite small amplitude and produced effects observed in the Piedmont vicinity that may be categorized as I through V on the Modified Mercalli Intensity (MMI) scale. There have been, however, more than a dozen events in the region that have produced ground shaking strong enough in Piedmont to produce MMI effects greater than V (MMI VI corresponds to the lowest intensity level with which some damage (slight) is associated, although fragile contents may be broken at MMI V).

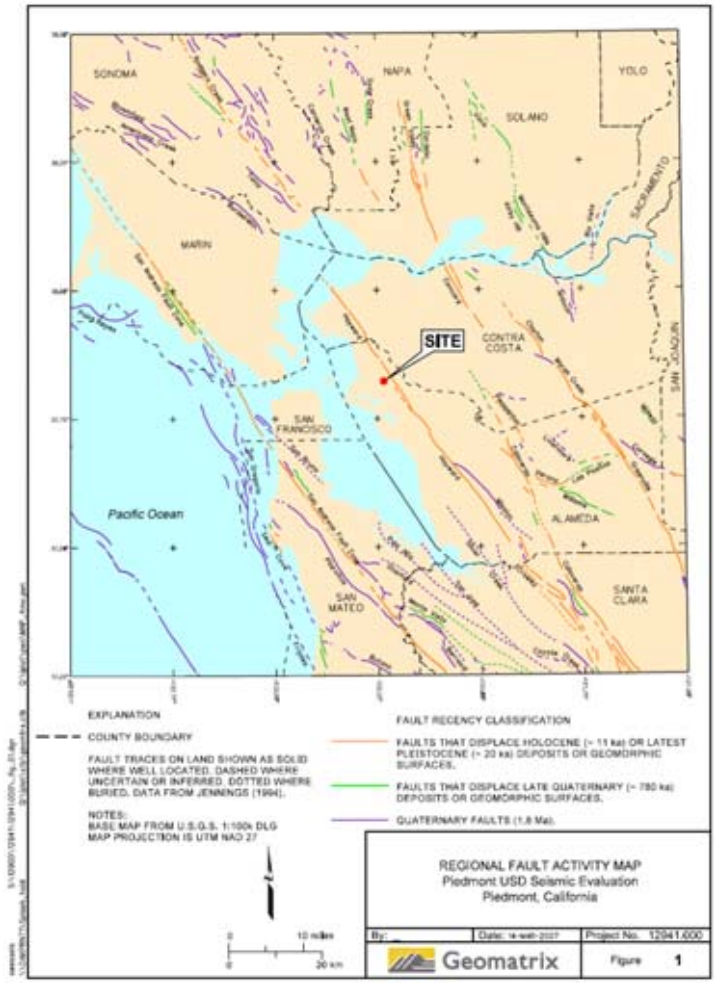
The first significant earthquake reported to have affected the region had a magnitude of approximately 7.5 (estimated from felt intensities), occurring on the Peninsula segment of the San Andreas fault in 1838 (Toppozada and Borchardt, 1998). A series of smaller earthquakes between 1850 and 1865 damaged various sections of the Bay Area, with the 1865 shock centered near the Santa Cruz Mountains being the most damaging (Townley and Allen, 1939).

In 1868, the Hayward fault produced an earthquake having an estimated magnitude of 6.9. Although the effects of this earthquake were poorly documented, surface rupture apparently extended from near Montclair (WGCEP, 2003) southward to the Warm Springs area of Fremont. Significant damage, including liquefaction and settlement in low-lying areas, apparently occurred along the surface rupture between Oakland and Fremont (Lawson, 1908).

During the M_W 7.9[1] 1906 San Francisco earthquake, the San Andreas fault ruptured from Shelter Cove near Cape Mendocino southward to near San Juan Bautista. Maximum lateral displacements of 15 to 20 feet [4.6 to 6.1 m] occurred north of the Golden Gate at Olema in Marin County (Lawson, 1908). Landslides, liquefaction, and ground settlement occurred throughout the Bay Area and in the vicinity of the surface rupture as result of this earthquake.

Earthquakes in the region during the past 50 years include the 1957 Daly City earthquake on the San Andreas fault (M_L 5.3); the two Santa Rosa earthquakes of 1969 on the Healdsburg-Rodgers Creek fault (M_L 5.6 and 5.7); the Coyote Lake and Morgan Hill earthquakes of 1979 and 1984 on the Calaveras fault (M_L 5.9 and 6.1, respectively); the 1980 Livermore earthquake on the Greenville fault (M_L 5.8); the 1989 M_W 6.9 Loma Prieta earthquake in the southern Santa Cruz Mountains; the 1999 M_L 5.0 earthquake near Bolinas; and the 2000 M_L 5.2 Yountville earthquake.

[1] M_W – Moment magnitude; M_L – Local or Richter magnitude.



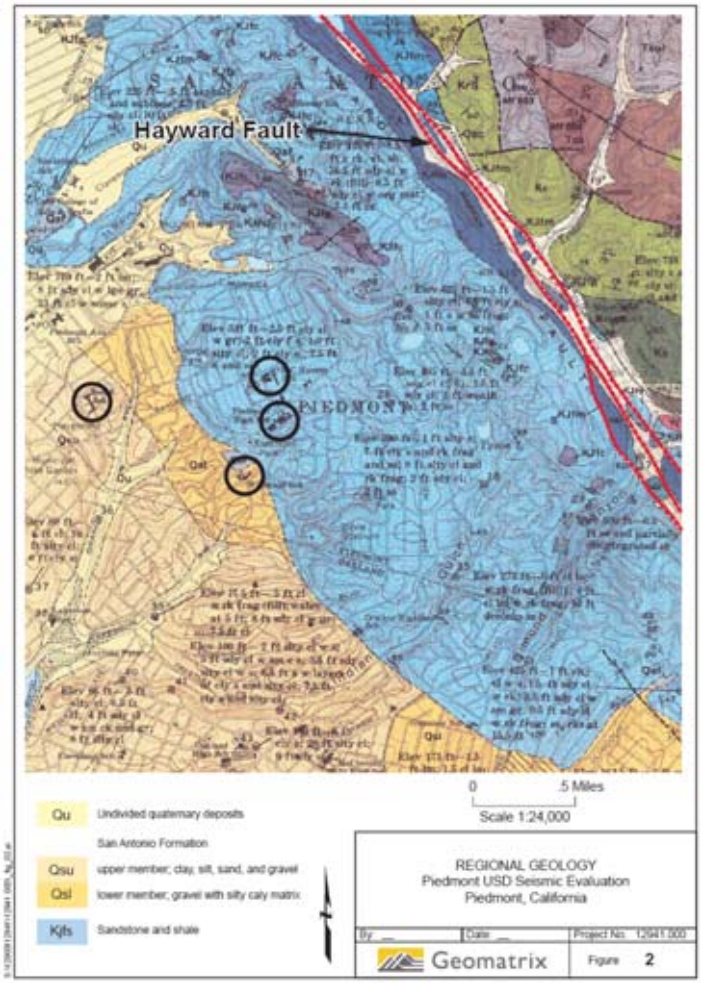
The October 1989 Loma Prieta earthquake, that ruptured on or near the San Andreas fault zone approximately 75 km [47 mi] south of Piedmont, caused significant damage in areas of fill and soft soils, such as in the Marina District of San Francisco and at the Port of Oakland; little damage occurred to structures founded on rock or stiff alluvium in Oakland or San Francisco. We note that ground shaking was recorded at the Piedmont Middle School during the earthquake. That recorded ground shaking was characterized by peak horizontal ground accelerations (PGA) of 0.07g to 0.08g (Shakal and others, 1989). Modified Mercalli Intensity (MMI) effects of VII were reported for Piedmont for this event.

Based on the estimates of MMI reported for the Piedmont vicinity, significantly stronger ground shaking than was experienced in 1989 was quite likely experienced by the school sites during at least the two historic Bay region events mentioned above. The M_W 6.9 Hayward earthquake in October 1868 produced MMI VIII effects in the Piedmont area; to the south, MMI IX+ effects were experienced in near-fault areas of San Leandro (Toppozada and others, 1981; 1982a). The great M_W 7.9 San Francisco earthquake in April 1906 also produced MMI VIII effects in the Piedmont area (Toppozada and Parke, 1982b). Both of these events likely also produced substantially longer ground shaking durations than was experienced during the Loma Prieta earthquake.

The Working Group on California Earthquake Probabilities (WGCEP, 2003) concluded that there is a 62 percent probability that a major (M_W 6.7 or larger) earthquake will occur in the greater Bay region during the 30-year time period between 2003 and 2032. The report also concludes that there is an 80 percent probability that a large (M_W 6.0 to 6.7) earthquake will occur during the same period. The implications of this study are that there is a high likelihood that ground motions stronger than those recorded during the 1989 Loma Prieta earthquake will occur at the PUSD school sites during the next 25 to 30 years.

SITE CONDITIONS

Geologic maps (i.e., Radbruch, 1969; Dibblee, 2005), our site reconnaissance, and available logs of borings drilled by others at the school sites (Harza, 1994; 1995a,b,c,d; 1997a,b) indicate that subsurface conditions at the school sites typically consist of a thin veneer of fill or Pleistocene-age soil deposits overlying Franciscan formation sandstone and/or shale rock at relatively shallow depths (see Figure 2). Given these conditions, it is our opinion that ground motion attenuation relationships developed for rock site conditions are appropriate to characterize the potential ground shaking at the school sites. For this study, we have utilized the published empirical attenuation relationships developed by Abrahamson and Silva (1997), Boore and others (1997), Campbell (1997), Sadigh and others (1997), and Idriss (1995). These attenuation relationships describe the variation of peak ground acceleration and response spectral accelerations at specific structural periods of vibration and damping ratios with earthquake magnitude and distance and were developed on the basis of statistical analyses of ground motions recorded during earthquakes at many locations in California, as well as in other parts of the western United States and foreign countries having similar tectonic environments.



EARTHQUAKE GROUND SHAKING

As mentioned previously, we have considered results from both probabilistic ground motion analyses (PSHA) and deterministic ground motion analyses (DSHA) in developing design-level response spectra for this project.

School Sites' Hazard Comparisons. Based on our evaluations and experience with other sites near the Hayward fault and in the general vicinity, as well as elsewhere in the Bay region, we expect that differences in the ground motion hazard amongst the school sites are not significant. We therefore are of the opinion that a single, common set of design-level response spectra (BSE-2 and BSE-1) is appropriate to all of the sites for conducting seismic safety and retrofit evaluations of the school buildings.

PSHA results presented by the California Geological Survey (CGS) (Cao and others, 2003) for each of the schools' site coordinates, corresponding to a 10% probability of exceedance in 50 years (475-year return period) and firm rock site conditions, are summarized in Table 1.

TABLE 1

SUMMARY OF CGS HAZARD RESULTS FOR THE PUSD SCHOOL SITES

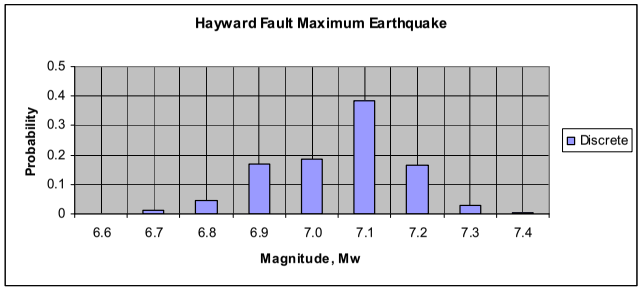
School	Closest Distance to Hayward Fault (km)	Ground Motion Hazard for P_E=10% in 50 Years and Firm Rock Site Conditions (5%-damped)		
		PGA (g)	S_a (g) @ T=0.2s	S_a (g) @ T=1s
Havens	1.7	0.779	1.811	0.686
High School	1.8	0.779	1.809	0.685
Middle School	1.9	0.777	1.807	0.684
Wildwood	2.2	0.774	1.800	0.681
Beach	2.7	0.772	1.794	0.679

We note that these results demonstrate the very small difference in estimated ground shaking hazard (less than 1%) amongst the sites.

Deterministic estimates of possible horizontal peak ground accelerations and response spectral accelerations at the PUSD school sites were developed assuming the occurrence of possible maximum magnitude earthquakes rupturing through the closest point on the Hayward fault zone from the sites. The WGCEP (2003) defines three segments for the Hayward-Rodgers Creek fault zone: the south Hayward, north Hayward, and Rodgers Creek. The boundary between the south and north Hayward segments has been taken by the WGCEP (2003) to lie at Montclair, or approximately the closest point on the Hayward fault from the PUSD school sites; the Rodgers Creek fault segment lies north of San Pablo Bay. The WGCEP (2003) has characterized five possible rupture scenarios ruptures involving either the south Hayward or north Hayward segments, individually or in combination, each associated with a likelihood of that rupture

scenario occurring and probabilistic distributions for characteristic maximum earthquake magnitudes for that scenario. These scenario likelihoods and magnitude distributions were incorporated in conducting the deterministic ground motion analyses to estimate the ground shaking characteristics representative of the possible range of maximum earthquake capability of the Hayward fault near Piedmont; this possible range of maximum earthquake capability is illustrated on Figure 3.

FIGURE 3



The ground motion attenuation relationships mentioned previously were used in these deterministic analyses. The results of deterministic analyses indicate a median response spectrum characterized by median peak horizontal ground accelerations of 0.67g; this ground motion level corresponds to the BSE-1 design-level in the structural design criteria being implemented by the PUSD for this project. To obtain the MCE or BSE-2 design-level ground shaking response spectrum in accordance with these structural design criteria, the median deterministic response spectrum was multiplied by a factor 1.5.

RECOMMENDED DESIGN-LEVEL RESPONSE SPECTRA

Based on the considerations mentioned previously and results from probabilistic and deterministic ground motion analyses for the sites, we recommend the response spectra presented in Table 2 and Figure 4 below to represent the design levels BSE-2 and BSE-1 for use in seismic safety and retrofit evaluations being conducted for the PUSD schools.

Near-Field Effects Considerations. Although the sites are situated in relatively-close proximity to the Hayward fault zone, we understand, based on discussions with the design/evaluation team, that the school buildings are relative short-period structures (i.e., $T \leq 1$ sec.); so, we anticipate that potential near-field rupture directivity and fault normal/parallel effects that can be significant to longer period horizontal-component ground motions will be small or insignificant at the

periods of the buildings. We have not, therefore, included explicit evaluation of these effects in our analyses.

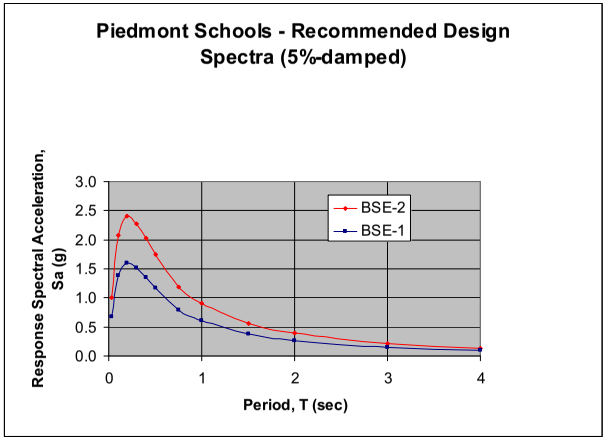
Vertical Response Spectra Considerations. As mentioned previously, the Piedmont school sites are is situated in close proximity to the Hayward fault, which dominates ground motion hazard at the sites. Near-field strong motion recordings obtained from earthquakes that have occurred over the past three decades have exhibited vertical motions equal to or exceeding the horizontal motions (e.g., Egan and others, 1994; Abrahamson and Silva, 1997; Campbell and Bozorgnia, 2003). Of relevance to the Piedmont school sites, examination by these and other authors of available ground motion data from moderate to large ($M_W \geq 6.5$) California earthquakes indicates: (1) within about 15 km of fault ruptures, peak ground accelerations and higher frequency ($T < 0.2$ sec) response spectral ordinates for the vertical component approximately equal or exceed those of the horizontal components; and (2) there appears to be little distance dependence for longer period motions ($T > 0.3$ sec), with average vertical to horizontal ratios for spectral ordinates of about one-half or less for all distance ranges examined.

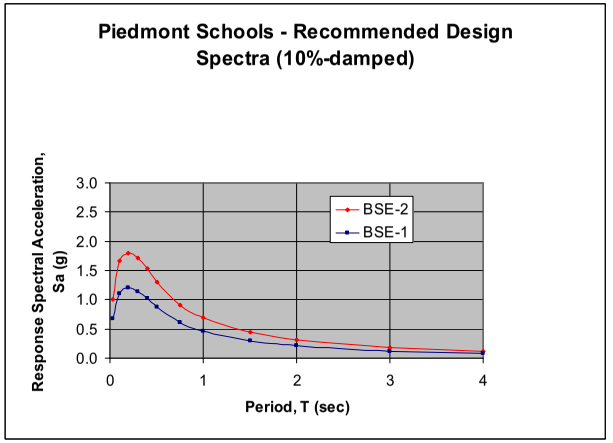
TABLE 2

RECOMMENDED DESIGN-LEVEL BSE-2 AND BSE-1 HORIZONTAL-COMPONENT RESPONSE SPECTRA FOR THE PUSD SCHOOL SITES.

Period, T (sec)	Response Spectral Acceleration, S_a (g) 5%-damped		Response Spectral Acceleration, S_a (g) 10%-damped	
	BSE-2	BSE-1	BSE-2	BSE-1
PGA	1.005	0.670	1.005	0.670
0.03	1.005	0.670	1.005	0.670
0.1	2.071	1.381	1.657	1.105
0.2	2.404	1.603	1.803	1.202
0.3	2.281	1.521	1.711	1.141
0.4	2.035	1.357	1.526	1.017
0.5	1.747	1.165	1.310	0.873
0.75	1.192	0.794	0.905	0.603
1	0.913	0.609	0.699	0.466
1.5	0.565	0.376	0.443	0.296
2	0.390	0.260	0.312	0.208
3	0.218	0.145	0.181	0.121
4	0.139	0.093	0.120	0.080

FIGURE 4





OTHER COMPARATIVE RESPONSE SPECTRA

For comparison purposes, we have also evaluated response spectral ordinates associated with a number of probabilistic hazard levels and several deterministic events of significance to ground shaking at the sites. These include:

- Probabilistic hazard levels of 2%, 10%, and 20% in 50 years.
- Characteristic maximum magnitude earthquakes assigned to the Hayward fault. The 2002 Working Group on California Earthquake Probabilities (United States Geological Survey [USGS], 2003) selected Montclair as the segmentation point between the northern and southern segments of the Hayward fault; Montclair lies essentially at the closest location of the fault to the school sites. Therefore, characteristic maximum magnitude earthquakes assigned by the CGS/USGS to the northern Hayward fault segment (M_W 6.5), to the southern Hayward fault segment (M_W 6.7), and to the Hayward fault as a whole (M_W 6.9) may be considered as rupturing the fault at the closest distance of the fault to the school sites. We note that the October 21, 1868, earthquake that ruptured the southern portions of the Hayward fault is interpreted to have been a M_W 6.9 event; there is some uncertainty as to extent of surface rupture for this event, but trenching evidence suggests it extended at least as far north as Montclair.
- Characteristic maximum magnitude earthquake assigned to the San Andreas fault based on the fault rupture that occurred in 1906 (M_W 7.9).

Response spectral ordinates for these various hazard levels and characteristic and/or historic events are summarized in Table 3 and Figure 5 below.

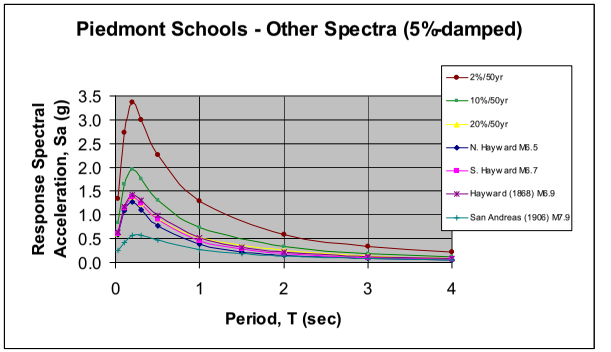
Geomatrix
John Nelson
murakami/Nelson
May10, 2007

TABLE 3

COMPARATIVE HORIZONTAL-COMPONENT RESPONSE SPECTRA ESTIMATED FOR SELECTED HAZARD LEVELS AND CHARACTERISTIC AND/OR HISTORIC EARTHQUAKES AFFECTING THE PIEDMONT SCHOOL SITES.

Period, T (sec)	Response Spectral Acceleration, S_a (g) 5%-damped						
	Probability of Exceedance (P_E) in 50 years			Hayward Fault			San Andreas Fault
	2%	10%	20%	Northern M_W 6.5	Southern M_W 6.7	Historic (1868) M_W 6.9	Historic (1906) M_W 7.9
PGA	1.34	0.84	0.61	0.58	0.61	0.63	0.25
0.03	1.34	0.84	0.61	0.58	0.61	0.63	0.25
0.1	2.73	1.65	1.15	1.08	1.14	1.17	0.42
0.2	3.36	1.96	1.37	1.27	1.37	1.43	0.58
0.3	2.99	1.76	1.24	1.11	1.23	1.31	0.57
0.5	2.26	1.31	0.93	0.78	0.90	0.98	0.46
1	1.29	0.74	0.52	0.38	0.46	0.51	0.27
1.5	-	-	-	0.22	0.28	0.32	0.18
2	0.58	0.34	0.24	0.15	0.19	0.21	0.13
3	0.33	0.19	0.14	0.08	0.10	0.12	0.08
4	0.21	0.12	0.09	0.05	0.07	0.08	0.05

FIGURE 5



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GEOLOGIC HAZARDS

Geologic hazards considered during this study for the PUSD school sites include the potential for surface fault rupture, soil liquefaction, and slope instability.

Surface Fault Rupture. There have been no active or potentially active faults identified in the immediate vicinity of the PUSD school sites according to the California Geological Survey and the site is not located within a State of California Special Fault Studies Zone. The nearest active fault is the Hayward fault, situated no closer than approximately 1¾ km [1 mile] to any of the school sites (see Figure 2). Additionally, reconnaissance observations of the sites and surrounding areas do not indicate the presence of geologic conditions, geomorphic features or lineaments suggestive of active or inactive faulting crossing the sites. Based on this information, we are of the opinion that surface fault rupture hazard to the PUSD school sites is negligible.

Liquefaction. Liquefaction is a soil behavior phenomenon in which a soil loses a substantial amount of strength due to high excess pore-water pressure generated by strong earthquake ground shaking. Recently deposited (geologically) and relatively unconsolidated soils and artificial fills located below the ground water surface are considered susceptible to liquefaction (Youd and Perkins, 1978). Typically, susceptible soils include relatively clean, loose, uniformly graded silt and sand deposits (National Research Council, 1985).

As discussed previously in this report, the geologic and geotechnical data gathered during this study indicate that the surficial soils, if present, are Pleistocene-age deposits. These soils are considered to have very low susceptibility to earthquake-induced liquefaction. We note that no evidence of liquefaction and/or related effects was reported for the PUSD school sites or vicinity for the 1868 Hayward earthquake or the great 1906 San Francisco earthquake (Lawson, 1908; Youd and Hoose, 1978), nor for the 1989 Loma Prieta earthquake (Tinsley and others, 1998). We are of the opinion, therefore, that the hazard due to potential soil liquefaction to the PUSD school sites is negligible.

Site Stability. Lateral spreading, which is the lateral displacement of surficial soils, is usually associated with the liquefaction of underlying soils. With the potential liquefaction hazard at the site judged to be negligible, we expect that the potential for lateral spreading to occur and affect the school buildings to be of similar hazard level. The soil deposits and rock materials underlying the school sites are considered to be quite competent and not susceptible to significant strength changes that would affect site stability. No ground cracking, hummocky topography, displaced flatwork, slope creep affecting tree growth, or other significant evidence of ground deformation or site instability was observed at the school sites or in slopes adjacent to the school sites during our ground reconnaissance. We do note that at Beach Elementary School, the retaining wall along the Linda Avenue (west) side of the playground and the retaining wall along Howard Avenue at the top of the slope on the west side of the school are cracked and some portions of the walls have rotated outward about the base of the wall. It is our opinion that this localized wall

distress represent long-term wall maintenance and repair/replacement issues, rather than being indicative of global site instability. In addition, there are no mapped landslides (Nilsen, 1975) nor reports of ground failure at the sites or in their immediate vicinities during historical earthquakes (Youd and Hoose, 1978), and Miles and Keefer (2001) map the relative seismic landslide hazard for the Havens, Wildwood, Middle School, and High School sites as negligible to low, with the Beach site as moderate. We are of the opinion that hazard to the PUSD schools due to site instability is very low.

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6. MATERIALS TESTING & INVESTIGATION REPORT

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980 41st Street
Oakland, CA 94608
Tel: (510) 420-8190
FAX: (510) 420-8186
e-mail: info@appmateng.com

January 2, 2007

Mr. John Nelson
MURAKAMI NELSON
100 Filbert Street
Oakland, CA 94607

Project No. 106820C

Fax Transmittal: (510) 893-5244

Subject: Materials Testing
Quad Building At Piedmont High School
Magnolia Ave., Piedmont, CA.

Dear Mr. Nelson:

As requested, Applied Materials & Engineering, Inc. (AME) has completed materials testing and investigation of the library and Quad building located at Piedmont High School in Piedmont, California. The purpose of our testing and investigation was to determine materials strength of concrete walls at specified locations and to investigate pre-selected structural elements.

PROCEDURES & RESULTS

1. Concrete Core Compressive Strength

A total of nine (9) concrete core samples (C1 through C9) were removed and tested for compressive strength per ASTM C42 (dry). Locations (approximate) of removed cores are shown in Figures 1 and 2.

Results of the compressive strength tests are given in Table I.

2. Reinforcing Steel (Rebar) Survey And Exposures

A pachometer and GPR (radar) equipment were used to survey spacing of reinforcing steel and number of curtains at nineteen (19) locations (R1 through R19). In addition, exposures were made for determination of reinforcing size and concrete cover. Locations (approximate) of steel survey and exposures are shown in Figures 1 through 3.

Results of these surveys and exposures are given in Table II.

3. Wall And Slab Thickness Measurements

Wall thickness was determined at nineteen (19) locations (W1 through W19). In addition, slab thickness was determined at five (5) locations (S1 through S5). Locations (approximate) of thickness measurements are shown in Figures 1 and 2.

Thickness measurements at pre-selected wall and slab location are given in Table III.

4. Field Verification

a. Roof Sheathing

Exposures were performed at four (4) locations on the roof (RS1 through RS4) to determine roof sheathing type, nailing pattern and nail size. Locations (approximate) of roof sheathing exposures are shown in Figure 3. See Photo 2 for typical sheathing observed.

Based on our examination, the roof sheathing was the same at each location, as follows:
Sheathing Type: 1' x 6" Douglas Fir, solid, perpendicular to rafters
Nailing Pattern: Two nails at each rafter
Nail Size: 0.134" diameter x 2.50" long, common

b. Roof Framing To Wall Connection

Documentation of roof framing to wall connection was performed at four (4) locations (RF1 through RF4). Locations (approximate) of roof framing/wall connection are shown in Figure 3.

Result of this documentation are shown in Sketches 1 and 2.

c. Brick In-Fill Wall

Thickness of the in-fill brick wall was determined by drilling a 3/8" diameter hole through the wall at one (1) location (B1). In addition, exposures were performed to determine reinforcing size, spacing, and doweling into adjacent concrete. Location of in-fill wall examined is shown in Figure 2.

Based on our examination of the in-fill wall, we have determined the following:
Wall thickness: 8 inches
Spacing of reinforcing steel (rebar): Vertical 12" o.c; Horizontal 12" o.c.
Size of reinforcing Steel: ½" round deformed
Doweling at adjacent concrete: Vertical rebar of the brick wall is not doweled into concrete at top or bottom. However, horizontal rebar is attached with a "hook" type connection. See Photos 3 and 4 for hook connection.

d. Attachment Of Roof Tile

The method of attachment of roof tiles was determined at four (4) locations (RT1 through RT4). Locations (approximate) of roof tile examination are shown in Figure 3. See Photo 1 for typical roof tile attachment.

Based on our examination, the method of attachment was the same at each location and as follows:
Pan Attachment: 0.19" diameter x 1.50" long, copper nail
Cap Attachment: 0.065" diameter copper wire

Please call if you have questions regarding the above.

Sincerely,

APPLIED MATERIALS & ENGINEERING, INC. **Reviewed by:**

Dean Wilson
Project Manager

Mohammed Faiyaz
Laboratory Manager

APPLIED MATERIALS & ENGINEERING, INC.

TABLE I

CONCRETE CORE COMPRESSIVE STRENGTH TEST RESULTS

Library And Quad Building, Piedmont High School

AME Project No. 106820C

Core ID	Level	Element	As Received Height (in.)	Diameter (in.)	Capped Height (in.)	Area ($in.^2$)	Correction Ratio	Ultimate Load (lbs)	Ultimate Compressive Strength (psi)
C1	1st	Wall	6.08	2.73	5.48	5.85	1.00	26,650	4560
C2	1st	Wall	7.01	2.73	5.58	5.85	1.00	27,960	4780
C3	1st	Wall	6.04	2.73	5.59	5.85	1.00	23,790	4070
C4	1st	Wall	6.01	2.73	5.40	5.85	1.00	24,360	4160
C5	2nd	Wall	6.02	2.73	5.45	5.85	1.00	23,980	4100
C6	2nd	Wall	7.02	2.73	5.46	5.85	1.00	29,490	5040
C7	2nd	Wall	5.38	2.73	4.67	5.85	0.97	31,060	5150
C8	2nd	Wall	7.01	2.73	5.45	5.85	1.00	26,230	4480
C9	2nd	Wall	4.27	2.73	3.92	5.85	0.95	25,800	4190

TABLE II

REINFORCING STEEL SURVEY AND EXPOSURE RESULTS

Library And Quad Building, Piedmont High School

AME Project No. 106820C

Survey ID	Element	Level	Curtain (D)ouble, (S)ingle	Bar Size & Spacing
R1	Wall	1st	D	Vertical: ½" round deformed @ 24" o.c. w/1½" concrete cover Horizontal: 3/8" round deformed @ 8" o.c.
R2	Wall	1st	D	Vertical: ½" round deformed @ 10" to 12" o.c. w/2" concrete cover Horizontal: 3/8" round deformed @ 7" to 8" o.c.
R3	Wall	1st	D	Vertical: ½" square deformed @ 24" o.c. w/1½" concrete cover Horizontal: 5/8" round deformed @ 10" to 14" o.c.
R4	Wall	1st	D	Vertical: ½" round deformed @ 12" to 14" o.c. w/1¼" concrete cover Horizontal: 3/8" round deformed @ 6" to 8" o.c.
R5	Wall	1st	D	Vertical: ½" round deformed @ 11" to 14" o.c. w/1¼" concrete cover Horizontal: 3/8" round deformed @ 7" to 9" o.c.
R6	Trim Bar	1st	-	¾" round deformed w/1½" concrete cover, 3" from window edge
R7	Trim Bar	1st	-	¾" round deformed w/2" concrete cover, 2" from door edge
R8	Cord Bar	2nd (Floor Level)	-	1 1/8" square deformed w/2¼" concrete cover, 9" up from top of 1st level window and second bar 6" down from bottom of 2nd level window.
R9	Wall	2nd	D	Vertical: ½" round deformed @ 22" to 24" o.c. w/1½" concrete cover Horizontal: 3/8" round deformed @ 7" to 9" o.c.
R10	Wall	2nd	D	Vertical: ½" round deformed @ 24" o.c. w/1¼" concrete cover Horizontal: 3/8" round deformed @ 7" to 8" o.c.
R11	Wall	2nd	D	Vertical: ½" round deformed @ 24" o.c. w/1½" concrete cover Horizontal: 3/8" round deformed @ 7" to 8" o.c.
R12	Wall	2nd	D	Vertical: ½" round deformed @ 24" o.c. w/1½" concrete cover Horizontal: 3/8" round deformed @ 6" to 10" o.c.
R13	Wall	2nd	D	Vertical: ½" round deformed @ 24" o.c. w/2" concrete cover Horizontal: 3/8" round deformed @ 8" o.c.
R14	Trim Bar	2nd	-	¾" round deformed w/3" concrete cover, 3" from window edge
R15	Trim Bar	2nd	-	¾" round deformed w/2" concrete cover, 2" from window edge
R16	Trim Bar	2nd	-	¾" round deformed w/2" concrete cover, 3" from window edge
R17	Cord Bar	2nd (Ceiling)	-	¾" round deformed w/3" concrete cover, 3" above 2nd level window, no other "large" horizontal bars detected in this area.
R18	Parapet/Wall	Roof	D	Vertical: ½" round deformed @ 24" o.c. w/2" concrete cover Horizontal: 3/4" round deformed, at top of wall
R19	Parapet/Wall	Roof	D	Vertical: ½" round deformed @ 24" o.c. w/1½" concrete cover Horizontal: 3/4" round deformed, at top of wall

TABLE III

WALL AND SLAB THICKNESS MEASUREMENT RESULTS

Library And Quad Building, Piedmont High School

AME Project No. 106820C

WALL		
Survey ID	Level	Measured Thickness (in.)
W1	1st	10
W2	1st	10
W3	1st	10
W4	1st	10
W5	1st	10
W6	1st	10
W7	1st	8
W8	1st	10
W9	1st	10
W10	1st	11
W11	2nd	10
W12	2nd	10
W13	2nd	Not a concrete wall
W14	2nd	10
W15	2nd	10
W16	2nd	10
W17	2nd	10
W18	Parapet/Roof	10
W19	Parapet/Roof	10
SLAB		
S1	1st	5½
S2	2nd	3
S3	2nd	5
S4	2nd	5
S5	2nd	3

Photo 1: Typical roof tile attachment.

Photo 2: Close-up showing nailing of 1 x 6 roof sheathing, note: two nails each board into rafter.

Photo 3: Exposure of horizontal bar at brick in-fill.

Photo 4: Close-up showing horizontal "hooked" bar at adjacent concrete column.

Library & Quad Building
Piedmont High School
Piedmont, CA.

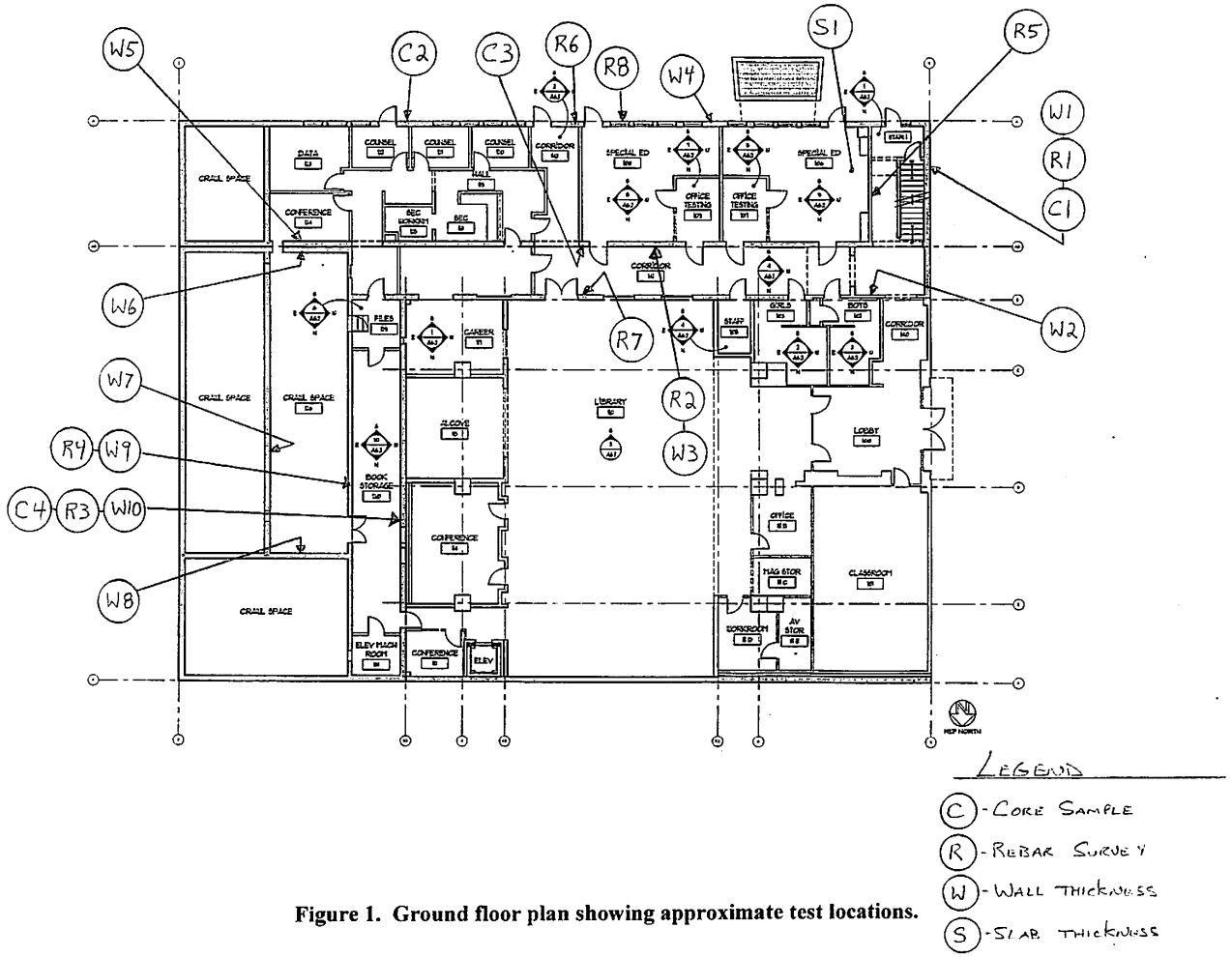


Figure 1. Ground floor plan showing approximate test locations.

Library & Quad Building
Piedmont High School
Piedmont, CA.

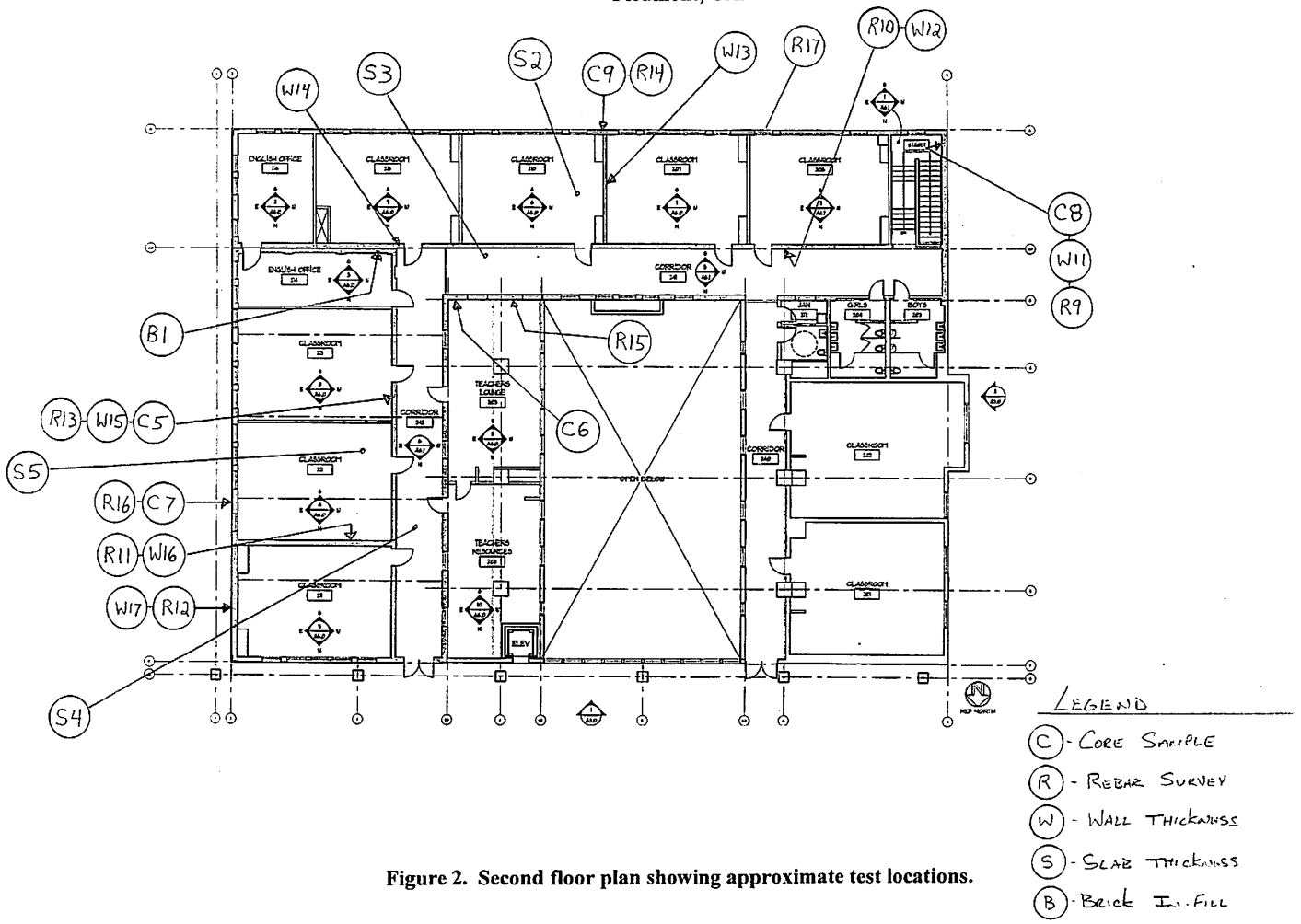
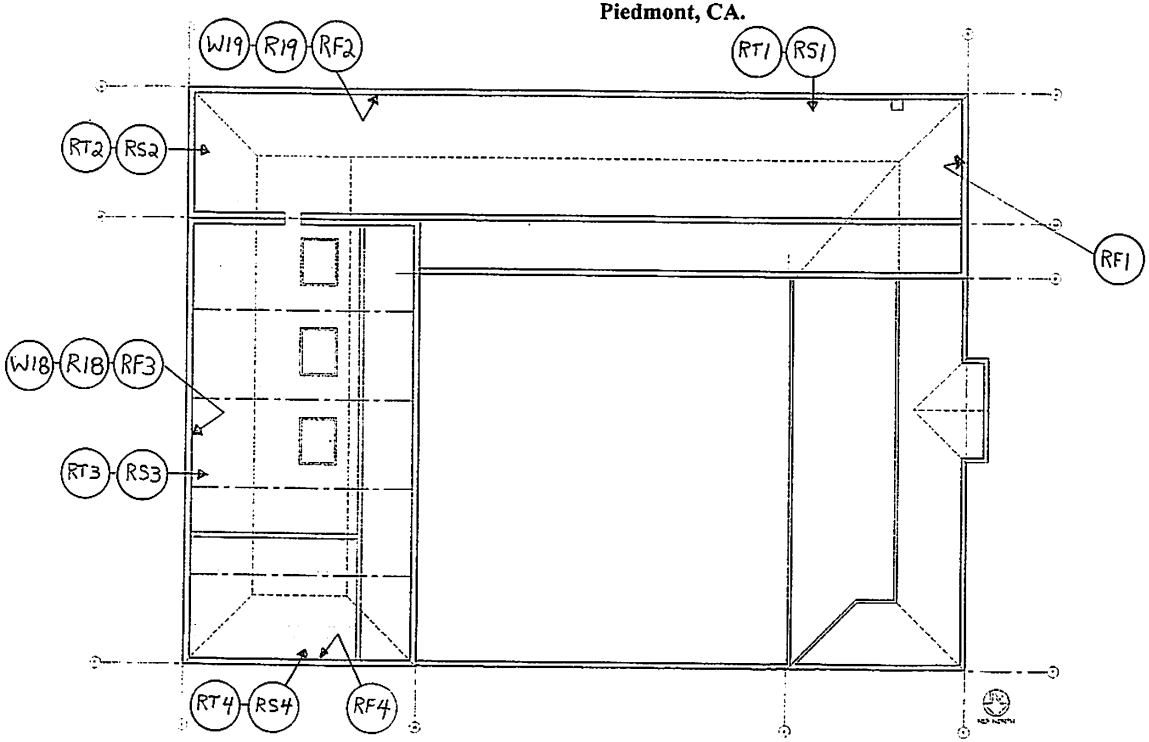


Figure 2. Second floor plan showing approximate test locations.

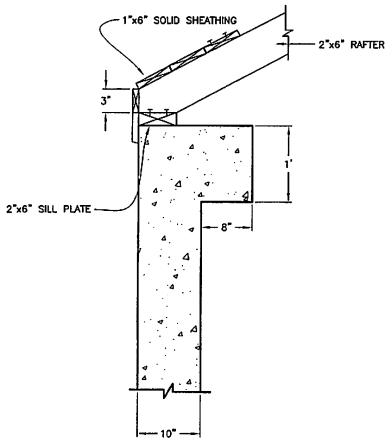
Library & Quad Building
Piedmont High School
Piedmont, CA.



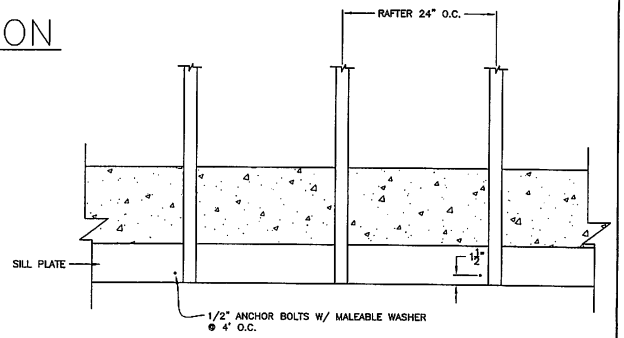
LEGEND

- (RS) ROOF SHEATHING
- (RT) ROOF TILE
- (RF) ROOF FRAMING
- (W) WALL THICKNESS
- (R) REBAR SURVEY

Figure 3. Attic/roof plan showing approximate test locations.



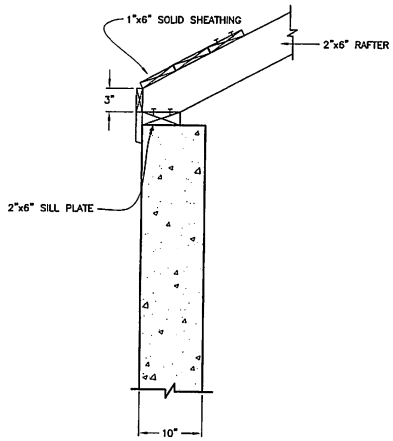
SECTION



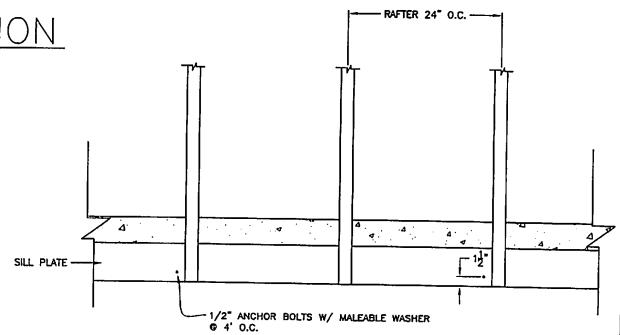
PLAN

AME	PROJECT: LIBRARY & QUAD BUILDING, PIEDMONT HIGH SCHOOL, PIEDMONT, CA.	DRAWN BY B. DAVIS	SHEET NO. SK1
	TITLE: ROOF FRAMING DETAILS(RF1 & RF4)	DATE 1/3/07	PROJECT NO. 106820C
	CLIENT: MURAKAMI NELSON	SCALE N.T.S.	

APPLIED MATERIALS & ENGINEERING INC. (510) 420-8190



SECTION



PLAN

AME	PROJECT: LIBRARY & QUAD BUILDING, PIEDMONT HIGH SCHOOL, PIEDMONT, CA.	DRAWN BY B. DAVIS	SHEET NO. SK2
	TITLE: ROOF FRAMING DETAILS(RF2 & RF3)	DATE 1/3/07	PROJECT NO. 106820C
	CLIENT: MURAKAMI NELSON	SCALE N.T.S.	

APPLIED MATERIALS & ENGINEERING INC. (510) 420-8190

7. APPENDIX

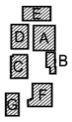
PIEDMONT SEISMIC SAFETY PROGRAM

PIEDMONT UNIFIED SCHOOL DISTRICT

PROJECT STATUS

MARCH 31, 2008

murakami/Nelson Architectural Corp.
Job No.: 0629 - PUSD Seismic

School / Site	Abbreviation	Building Designation	Building Name	Seismic Tier1	Revised Seismic Tier 1	Letter From Floyd & Eliesser on Seismic Performance*	ATI Report (Accessibility / Seismic Performance)	Included in Scope Of Work (for m/N)	Qualitative Seismic Assessment by B.P. Gallagher	Quantitative Seismic Assessment by Peer Reviewer	Benchmark Building	Seismic Tier2	Seismic Non-Structural Hazard Report	ADA / Access Evaluation	Life Safety Evaluation	Materials Testing Spring 2007	Materials Testing Summer 2007	Materials Testing Fall 2007	Materials Testing Winter 2007	Destructive Testing Spring 2007	Destructive Testing Summer 2007	Destructive Testing Fall 2007	Destructive Testing Winter 2007	Slope Stability Analysis - Site Specific Spectra	Peer Review of Investigation and Analysis	Peer Review Non-Structural	Peer Review at Concept Design	Peer Review at Schematic Design	Peer Review at Design Development	Existing Hazardous Materials Reports in m/N Possession	Hazardous Materials Report By Hazard Management Services, Inc.	Title Report	Boundary Survey	Existing Geotechnical Reports	Existing Structural Calculations in m/N possession	Measured Drawings - Architectural	Measured Drawings - Structural	DSA Drawing in m/N possession	DSA Drawing Date	DSA Number for Drawings	Drawings	Architect	Concept Plan	Cost Estimate (1)	Refined Concept Plan + Option	Cost Estimate (2)	Comments
Piedmont High School	PHS																																												
		A	Quad Building / Library	●			●	●	×			●	●	●	●	●				●				●	●	●	●	○	○	○	●	○	●	○	×	●	×	×	●	●	●	6/5/1996	64149	Modernization	David Wade Byrens	●	●	×	×	
																																							●	4/25/1988	49857	Repair	Keith Eric Johnson					
																																							●	11/26/1975	38432	Addition	Reid & Tarics Assoc.					
																																							●	5/10/1954	11955	Electrical Work	Romaine W. Meyers					
		B	Student Center / Cafeteria	●			●	●	×			●	●	●	●	●				●				●	●	●	●	○	○	○	●	○	●	○	×	×	×	×	×	×	●	6/5/1996	64149	Modernization	David Wade Byrens	●	●	×	×	
																																							●	4/25/1988	49857	Repair	Keith Eric Johnson					
																																							●	5/3/1977	40144	Alterations	Reid & Tarics Assoc.					
																																							●	11/26/1975	38432	Alterations	Reid & Tarics Assoc.					
																																							○	5/10/1954	11955	Electrical Work	Romaine W. Meyers					
																																							●	3/18/1938	2319	Original	WM. H. & Harold H. Weeks					
		C	Auditorium	○			●	●	×			●	●	●	●	×				×				●	●	●	●	○	○	○	●	○	●	○	×	×	×	×	×	×	●	4/25/1988	49857	Repair	Keith Eric Johnson	●	●	×	×	
																																							●	11/26/1975	38432	Original Construction	Reid & Tarics Assoc.					

LEGEND

- ○ NEEDED/IN PROGRESS
- ● YES / OK / COMPLETE
- ○ DO NOT HAVE
- ● NON CONCLUSIVE
- × NOT NECESSARY
- ○ Pending Authorization
- ● NO
- Shaded Area Indicates Tier 2 Seismic Analysis.

APPENDIX B: BUILDING CODE ANALYSIS

Calculation of Priority Building Area

Building A:	28,085 sf (including basement)
Building B:	5,484 sf
Building C:	13,948 sf
Total Area:	47,517 sf

Chapter 3: Use or Occupancy

Main Occupancy Group: E-1 (Sec 305)
Accessory Occupancy Groups:

Auditorium/Theatre	A-2.1	Assembly
Administrative	B	Office (less than 25% of Building A)

✓ No occupancy separation required between **E** and **B** Occupancy. (Table 3-B)
CBC 302.1. Exception 2.2: "Administrative and Clerical offices & similar rooms which do not exceed 25 percent of the floor area of the major use."

Chapter 5: Building Limitations

Building A – Quad/Library

Allowable Floor Area

		Allowance	Running Total
-Construction Type V-1 hr: (Table 5-B)		10,500 sf	10,500 sf
-Fire Protection (508):	100%		10,500 sf
-Multi-Story Factor:	100%		21,000 sf
Total allowable floor area:			42,000 sf
✓ Total actual floor area:			28,085 sf

Allowable Height

✓ 50 feet, 2 stories (Type V -1 hr) (Table 5-B)

Wall and Opening Protection (Table 5-A)

✓ Walls: Two-hour less than 5 ft. (considered separate from Building A).
✓ Walls: One-hour less than 10 ft.
✓ Walls: NR elsewhere
✓ Openings: Protected less than 10 ft., not permitted less than 5 ft.

Building B – Student Center

Allowable Floor Area

		Allowance	Running Total
-Construction Type V-N: (Table 5-B)		6,000sf	6,000 sf
-Side yard separation increase:	34%		2,040 sf
-Multi-Story Factor:	100%		8,040 sf
Total allowable floor area:			16,080 sf
✓ Total actual floor area:			5,484 sf

Allowable Height

✓ 40 feet, 1 stories (Type V -N) (Table 5-B)

Wall and Opening Protection (Table 5-A)

✓ Walls: Two-hour less than 5 ft. (considered separate from Building A).
✓ Walls: One-hour less than 20 ft.
✓ Walls: NR elsewhere
✓ Openings: Protected less than 10 ft., not permitted less than 5 ft.

Building C

✓ TYPE V-N not permitted for Auditorium/Theatre, one-hour construction required throughout. (Table 5-A).

Allowable Floor Area

		Allowance	Running Total
-Construction Type V-1 hr.: (Table 5-B)		10,500 sf	10,500 sf
-Side yard separation increase:	68% =	7,218 sf	17,718 sf
-Multi-Story Factor:	100% =	17,718 sf	35,436 sf
Total allowable floor area:			35,436 sf
✓ Total actual floor area:			13,948 sf

Allowable Height

✓ 50 feet, 1 stories (Type V -1 hr.) (Table 5-B)

Wall and Opening Protection (Table 5-A)

✓ Walls: Not permitted less than 5 ft.
✓ Walls: Two-hour less than 10 ft.
✓ Walls: 1 hr. elsewhere
✓ Openings: Protected less than 10 ft., not permitted less than 5 ft.

Chapter 9: Fire Protection Systems

☒ Sprinklers are required for Group E Occupancy (Section 904.2.4.1).
✓ Sprinklers not required for Group A2 Occupancy.

Building A - Quad/Library is fully sprinklered and complies.

✓ Building B – Student Center is an A3 / B occupancy and does not required sprinklers. There are sprinklers in the basement mechanical room.

☒ Building C – Auditorium is an A2.1 / B occupancy. The Auditorium requires sprinklers in the stage area and accessory rooms. The seating area does not require sprinklers. Construction of a mezzanine has blocked adequate coverage and extension of the sprinkler will be required in this area.

Chapter 10: Means of Egress

Exits Required: See plans for room exiting requirements. Cumulative occupant load exiting requirements will be calculated during future concept design phase.

✓ Maximum travel distance to exit in non-sprinklered hallway is 150' (section 1007.3.3).

✓ Hallway width shall be two feet wider than required by Sec. 1003, but not less than 6'. Except when less than 100 occupants 44" min. (Section 1007.3.5).

✓ Stair width shall not be less than 5'. (Section 1007.3.6).

✓ Panic hardware required where occupant load is over 50.

☒ Basement Rooms shall exit directly to the exterior without entering the first floor. (Section 1007.3.9)

Building A - Quad/Library
The building is substantially in compliance. Deficiencies in the means of egress system include stair width that is too narrow, exit doors on the second floor that are too narrow, lack of floor level exit lights, and lack of fire alarm system in the office suite.

Building B – Student Center
The building is substantially in compliance. Deficiencies in the means of egress system include lack of floor level exit lights, lack of fire alarm system in the office suite and the lack of posting of room capacity.

Building C – Auditorium
The building is substantially in compliance. Deficiencies in the means of egress system include lack of fire-rated separation of the storage room under the stairs from the stage to the lower level, lack of contrast striping at the auditorium seating stairs, lack of stair handrails in numerous locations, 1-hr. separation between stage and accessory rooms, and an undersized smoke vent system above the stage area.

E S T R U C T U R E

8331 Kent Court, Suite 100 ▪ El Cerrito, CA 94530 ▪ 510.235.3116 ▪ 510.235.3992 fax ▪ www.estruc.com

April 27, 2007

Constance Hubbard
Superintendent
Piedmont City Unified School District
760 Magnolia Avenue
Piedmont, CA 94611

Reference: Structural Peer Review – Seismic Evaluation
Piedmont High School
[Estructure No. 0701.0]

Dear Ms. Hubbard:

I have conducted a structural peer review of the seismic evaluation of three building on the Piedmont High School campus. This letter summarizes the scope of the peer review and my conclusions.

Conduct of the Peer Review

The peer review was conducted as an independent and objective technical review of the seismic evaluation conducted by R.P. Gallagher Associates, Inc (RPG). The review was undertaken to (1) assess the appropriateness of the evaluation criteria and methodology; (2) provide a review of the structural analysis; and (3) critique RPG's conclusions regarding expected building performance.

The following documents, communications and activities served as the basis of the review:

- Draft Report: *Seismic Evaluation of Three Buildings at Piedmont High School* by R.P. Gallagher Associates, Inc. dated March 5, 2007
- Six volumes of structural calculations: Tier 2 Seismic Calculations for (1) Original Quad Building, (2) Addition #1 to the Quad Building, (3) Library, (4) Library Addition and Mezzanine, (5) Student Center and (6) Allen Harvey Auditorium, prepared by R.P. Gallagher Associates, Inc. dated March 7, 2007
- Available original drawings
- Drawings AS-1 though AS-5 prepared by R.P. Gallagher Associates, Inc. dated March 7, 2007
- Memorandum from Jon Egan of Geomatrix to John Nelson of Murakami/Nelson regarding Design Response Spectra dated March 14, 2007
- A site visit conducted on February 22, 2007
- Meetings and phone conversations with R.P.Gallagher Associates

During a pre-proposal meeting Ron Gallagher provided a general overview of the buildings, the proposed evaluation methodology and preliminary conclusions. A site visit was subsequently conducted with RPG representatives for the purpose of gathering firsthand information on the nature and quality of construction on the Piedmont High School campus. Readily accessible areas of each building were observed and an investigation of the attic space of the Original Quad Building and Quad Building Addition was conducted.

Calculations for each of the buildings were reviewed to determine whether the evaluations were performed in accordance with the selected methodology. Limited calculations were performed to independently verify selected findings.

Comments from the initial review were communicated to RPG during a meeting on March 22, 2007. Responses from RPG were provided both in writing and during subsequent phone conversations. This letter represents the conclusion of the peer review related to the building evaluations.

Peer Review Findings

The main findings of the peer review, grouped by general topic, are summarized below.

Evaluation Criteria and Methodology

1. The seismic evaluation was conducted using ASCE 31, *Seismic Evaluation of Existing Buildings*. ASCE 31 is a national standard and is judged to be acceptable for use as the basis for the Piedmont High School building evaluations.

2. A Tier 2 evaluation for the Life Safety performance level was conducted using the Linear Static Procedure. This type of analysis is judged to be acceptable for the types of buildings on the Piedmont High School campus. The selected performance objective represents an appropriate minimum target goal for the subject buildings.

3. Consistent with the ASCE 31 methodology, the general approach to the evaluation including use of the USGS ground shaking maps and a site class D to characterize the seismic hazard is judged to be acceptable for the evaluations. It is recommended that design of seismic rehabilitation measures, if undertaken, be based on the site specific ground motions by Geomatrix rather than default values.

4. Investigations undertaken to assess the details of construction and properties of material are judged to be sufficiently comprehensive to serve as the basis for the evaluations.

Analysis

1. The general approach taken for determining demands on structural components is judged to be acceptable. As confirmed during a phone conversation with Ron Gallagher, all connections will be treated as force-controlled elements and evaluated accordingly.

Expected Building Performance

1. I concur with the general assessment of building performance in a major earthquake. Key conclusions regarding expected structural performance are summarized below:

    a. The Original Quad Building and Quad Building Addition – In a design earthquake there is expected to be considerable movement and distress in the roof framing, sufficient for roof tiles to become dislodged and for portions of the roof framing to collapse. Because of the strong ceiling framing below, damage to the roof is not expected to pose a high risk to occupants in the building. However, the damage could pose a threat to people outside and immediately adjacent to the building.

    b. Library and Mezzanine – Damage to the library and mezzanine is expected to be concentrated at the seismic joints at the Quad wings. The damage is not expected to pose a life safety concern.

    c. Library – Earthquake damage to the Library is expected to be limited to repairable damage in the steel framing. Some anomalies in the documented construction details suggest the potential for concentrated damage at specific locations. Further destructive investigation would be required to reveal concealed conditions and evaluate related building performance. This additional investigation is judged to be a lower priority than addressing the structural issues in buildings with confirmed life safety concerns.

    d. Student Center – In a large earthquake there is a potential for significant damage to the high and low roof diaphragms and their connections to the concrete walls. The deficiencies pose a moderate seismic life safety risk.

    e. Allen Harvey Auditorium – The structural system in the auditorium is not expected to be damaged to the extent that it would pose a significant life safety concern. Structural damage is expected to be concentrated in the roof diaphragm and its connections to the concrete columns.

2. RPG examined the vulnerability of nonstructural components and contents based on a site walk-through and the ASCE 31 Tier 1 procedures. Vulnerability ratings of low, moderate and high that were assigned on the basis of judgment and experience. Several items rated as posing a high vulnerability, namely unbraced sprinkler lines, tall slender unbraced cabinets/bookcases and tall file cabinets, should be seismically restrained to reduce the potential for causing injury, costly repairs and/or loss of function. I believe that these items should be given a high priority for mitigation.

Summary of Conclusions and Recommendations

R.P. Gallagher's analysis is appropriate for evaluating the probable seismic performance of buildings on the Piedmont High School campus. I concur with the conclusions of the building evaluations which found that that some buildings pose safety risks in a major earthquake.

I believe the the most significant seismic safety concerns are related to the Quad Building and the Quad Addition. The Student Center also poses some structural risk. The nonstructural items of greatest concern are unbraced sprinklers, tall and slender bookcases and cabinets, and tall file cabinets.

Responsibility

This peer review was undertaken to provide a second opinion regarding the seismic evaluation of Piedmont High School. The responsibility for the evaluation and related conclusions remains fully with R.P. Gallagher Associates, Inc.

If you have any questions or require additional information, please contact me.

Thank you for the opportunity to assist you.

Sincerely,

Estructure

Maryann T. Phipps

Maryann T. Phipps

Copies to:
Mike Wasserman, CPM
John Nelson, Murakami/Nelson
Ron Gallagher, R.P. Gallagher

E S T R U C T U R E

8331 Kent Court, Suite 100 El Cerrito, CA 94530 510.235.3116 510.235.3992 fax www.estruc.com

November 13, 2007

Ron Gallagher
R. P. Gallagher Associates Inc.
519 Seventeenth Street
Suite 220
Oakland, CA 94612

Reference: **Peer Review Comments**
ASCE 41 Tier 2 Calculations and Conceptual Retrofit Drawings
Piedmont Unified School District High School Buildings
[Estructure No. 0701.0]

Dear Ron:

I have completed my review of the ASCE 41 Tier 2 calculations and conceptual retrofit drawings for PUSD High School Quad Buildings, Student Center and Allen Harvey Theater. This letter is written to briefly summarize my findings.

1. Quad Building – Original Classrooms and Classroom Addition (Calculations dated October, 2007; drawings dated 10/8/07)
    - With minor exception, I take no exception to the calculations or related conclusions. I believe that the *m* factor used for checking the concrete diaphragms was incorrect, however, the conclusions related to the adequacy of the diaphragms is unchanged. [An *m* factor of 4 was used (page 39 of the original classrooms; page 46 for the addition). I believe that if the diaphragm is controlled by flexure, the *m* factor according to Table 6-20 should be a little less than 2.5. If the diaphragm is controlled by shear, the *m* factor should be 2.5 according to Supplement 1].
    - The concepts depicted on the drawings are appropriate for the selected ASCE 41 S-3/BSE-1design criteria.

2. Quad Building – Library Addition/Mezzanine (Calculations dated October, 2007; drawings dated 10/8/07)
    - I concur with strengthening one braced frame connection, and accept the balance of the building based on its benchmark status.
    - I have reviewed the concepts for strengthening the roof-to-wall connection at Line F. I concur that this work will limit related damage. I do not believe that the current condition poses a safety risk to students or staff in a BSE-1 earthquake. Hence, I believe that the proposed strengthening has a low priority relative to other district-wide work that is being considered.

3. Student Center (calculations dated October 2007; drawings dated 10/8/07)
    - With minor exception, I take no exception to the calculations. The out-of-plane wall bending calculations indicate demand/capacity ratios over 1.0 at two locations. I believe that the wall should be considered deformation-controlled for flexure with an *m* value of 2.5. As such, the out-of-plane wall bending is fully acceptable per ASCE 41.
    - It appears as if there is one page of calculations missing in section L. The ASCE 41 out-of-plane wall anchorage force is not explicitly shown. The forces can be inferred from page SC-61, and they are correct, however, for future reference, it would be useful to show the calculations ($1.2S_{xs}W = 1.92W$)
    - Clarify the spacing and length of the new TS5x5 at the end walls. Can the life safety performance objective be achieved with fewer TS 1½x1½ ties?

4. Allen Harvey Theater (Calculations dated September 6, 2007)
    - Page 10 includes a check of the collector at each column. The maximum column design force of 185k was assumed to be delivered by the collector through all 14 bolts. I believe that the worst case collector design condition is not reflected in these calculations. The attached calculations illustrate what I believe is a more accurate assessment of the collector forces. In the worst case, 173k needs to be delivered through 7 bolts. The adequacy of the collector will need to be evaluated.

Please call me or email me to discuss these comments. If you would prefer to discuss the peer review comments in person, please suggest times for a meeting.

Thank you.

Sincerely,

Estructure

Maryann T. Phipps

Maryann T. Phipps

E S T R U C T U R E

8331 Kent Court, Suite 100 El Cerrito, CA 94530 510.235.3116 510.235.3992 fax www.estruc.com

November 20, 2007

Constance Hubbard
Superintendent
Piedmont City Unified School District
760 Magnolia Avenue
Piedmont, CA 94611

Reference: **Structural Peer Review**
Piedmont High School Buildings 1, 2, Gym and Annex
[Estructure No. 0701.0]

Dear Ms. Hubbard:

In my ongoing structural peer review of the PUSD program I have recently completed review of the Tier 1 seismic evaluations of four building on the Piedmont High School campus: Building 1, Building 2, the Gymnasium and the 40's Building/Annex. This letter summarizes the scope of the peer review and my conclusions.

Conduct of the Peer Review

The peer review was conducted as an independent technical review of the seismic evaluations conducted by Degenkolb Engineers in 2002 under the direction of Janiele Maffei. The review was undertaken to assess the probable performance of the buildings in a Magnitude 6.5 earthquake. The peer review included: (1) examining the ASCE 31/FEMA 310 Tier 1 evaluations prepared by Degenkolb; (2) performing independent structural calculations; (3) forming an opinion regarding expected building performance; and (4) discussing my conclusions with Ron Gallagher.

The following documents served as the basis of the review:

- ASCE 31/FEMA 310 Tier 1 Evaluations by Degenkolb Engineers dated June through October of 2002
- Drawings entitled *Piedmont High School Structural Renovation/Repair* dated April 25, 1988 by Keith Eric Johnson AIA and David Logan Messinger and Associates Structural Engineers
- Drawings entitled *40s Building Modifications* dated January 31, 1997 by David Wade Byrons AIA
- Drawings entitled *Addition to Piedmont Junior High School* dated February 2, 1961 by Carl I. Warnecke AIA and Smith and Moorehead Structural Engineers.

Peer Review Findings

Conclusions regarding the expected structural seismic performance of the buildings are summarized below.

Buildings 1 and 2

Description – Buildings 1 and 2 are structurally similar buildings. The buildings were originally constructed in 1976 and renovated in 1988. Each is a one story building constructed with a plywood roof supported by wood joists and glulam beams which are supported by steel pipe columns and precast concrete walls. Lateral force resistance is provided primarily by the wood roof diaphragm and the precast concrete walls.

Expected Performance – Buildings 1 and 2 satisfy the ASCE 31/FEMA 310 Tier 1 life safety evaluation. Earthquake damage is expected to consist of repairable wall cracking and minor wood crushing at the bolted connection of the walls to the glulam beams. The expected ATC-20 posting is *Inspected* (green tag).

Gymnasium

Description – The gymnasium was originally constructed in 1976 and renovated in 1988. It is a one story building constructed with a plywood roof supported by wood joists and glulam beams which are supported by concrete columns, steel pipe columns and precast concrete walls. Lateral force resistance is provided primarily by the wood roof diaphragm and the precast concrete walls.

Expected Performance – The Gymnasium satisfies the ASCE 31/FEMA 310 Tier 1 life safety evaluation. Earthquake damage is expected to consist of repairable wall cracking and spalling of concrete at the connection of the glulam beams to the reinforced concrete columns. The expected ATC-20 posting is *Inspected* (green tag).

Annex Building (aka 40's Building)

Description – The Annex Building was originally constructed in 1961. It is a three story building of mixed construction. The bottom two stories are construed with reinforced concrete floor slabs and beams supported by reinforced concrete columns and walls. The upper story is constructed with steel frames supporting wood roof joists and plywood sheathing. Lateral force resistance is provided primarily by the wood and concrete roof/floor diaphragms, reinforced concrete shear walls and frame action of the reinforced concrete beans and columns at the lower two floors.

Expected Performance – The Annex Building does not fully satisfy the ASCE 31/FEMA 310 Tier 1 life safety evaluation. Specifically, the reinforced concrete columns at the lower two floors were not designed or detailed to prevent a shear failure. A Tier 2 analysis would be needed to evaluate the deformation demands and ability of the columns to safely withstand the expected deformations. Given the relatively stiff floor diaphragms at the first and second floors and the presence of a considerable number of reinforced concrete walls, the deformation demands are expected to be within an acceptable range. However, a more detailed Tier 2 analysis is required to confirm this. Earthquake damage is expected to consist of cracking and spalling of reinforced concrete columns at the first and second floors and cracking of reinforced concrete walls. The expected ATC-20 posting is *Inspected* (green tag), however, a Tier 2 analysis of the columns is needed for verification.

If you have any questions or require additional information, please contact me.

Thank you for the opportunity to assist you.

Sincerely,

Estructure

Maryann T. Phipps

Copies to:
Priscilla Meckley-Archuleta, CPM
John Nelson, Murakami/Nelson
Ron Gallagher, R.P. Gallagher

FIRST UPDATED REPORT

First American Title Insurance Company National Commercial Services

3721 Douglas Blvd., Suite 151
Roseville, CA 95661

This report has been amended/updated to reflect the following matters:

[ ] No changes made to the report other than the Effective Date

[ ] Property address has been revised

[X] Vesting has been revised

[X] Legal Description has been revised

[X] Taxes have been updated

[ ] Original item number(s) have been removed

[X] New item number(s) Exception 9 have been added

[ ] Original item number(s) have been revised

[X] Other: Updated to report on additional lands.

First American Title

3721 Douglas Blvd., Suite 151
Roseville, CA 95661

Sasha Parker
Sandis Development
605 Castro Street
Mountain View, CA 94041-2011
Phone: (650)969-6900

Escrow Officer:	Carolyn Hunt
Phone:	(916)677-8005
Title Officer:	David Pratt
Phone:	(916)218-6631
Owner:	City of Piedmont
Property:	PIEDMONT HIGH SCHOOL ON MAGNOLIA AVENUE, PIEDMONT, CA 94611

PRELIMINARY REPORT

In response to the above referenced application for a policy of title insurance, this company hereby reports that it is prepared to issue, or cause to be issued, as of the date hereof, a Policy or Policies of Title Insurance describing the land and the estate or interest therein hereinafter set forth, insuring against loss which may be sustained by reason of any defect, lien or encumbrance not shown or referred to as an Exception below or not excluded from coverage pursuant to the printed Schedules, Conditions and Stipulations of said Policy forms.

The printed Exceptions and Exclusions from the coverage of said Policy or Policies are set forth in Exhibit A attached. Copies of the Policy forms should be read. They are available from the office which issued this report.

Please read the exceptions shown or referred to below and the exceptions and exclusions set forth in Exhibit A of this report carefully. The exceptions and exclusions are meant to provide you with notice of matters which are not covered under the terms of the title insurance policy and should be carefully considered.

It is important to note that this preliminary report is not a written representation as to the condition of title and may not list all liens, defects, and encumbrances affecting title to the land.

This report (and any supplements or amendments hereto) is issued solely for the purpose of facilitating the issuance of a policy of title insurance and no liability is assumed hereby. If it is desired that liability be assumed prior to the issuance of a policy of title insurance, a Binder or Commitment should be requested.

Dated as of January 31, 2008 at 7:30 A.M.

The form of Policy of title insurance contemplated by this report is:

ALTA Extended Owner's Policy 1402.06 (6-17-06)

A specific request should be made if another form or additional coverage is desired.

Title to said estate or interest at the date hereof is vested in:

PIEDMONT UNIFIED SCHOOL DISTRICT, FORMERLY PIEDMONT HIGH SCHOOL DISTRICT OF ALAMEDA COUNTY. AS TO PARCELS ONE THROUGH EIGHT;

CITY OF PIEDMONT, A MUNICIPAL CORPORATION, AS TO PARCEL NINE.

The estate or interest in the land hereinafter described or referred to covered by this Report is:

A FEE.

The Land referred to herein is described as follows:

(See attached Legal Description)

At the date hereof exceptions to coverage in addition to the printed Exceptions and Exclusions in said policy form would be as follows:

1. General and special taxes and assessments for the fiscal year 2007-2008 are exempt. If the exempt status is terminated an additional tax may be levied. Account No. 051-4680-001-02, 03 and 04

2. ANY ESCAPED TAX THAT MAY BECOME DUE BY REASON OF ANY NON-EXEMPT USE OR LOSS OF EXEMPT STATUS.

3. The lien of supplemental taxes, if any, assessed pursuant to Chapter 3.5 commencing with Section 75 of the California Revenue and Taxation Code.

4. Any and all offers of dedication, conditions, restrictions, easements, fenceline/boundary discrepancies, notes and/or provisions shown or disclosed by the filed or recorded map referred to in the legal description.

5. Any facts, rights, interests, or claims which are not shown by the public records but which could be ascertained by an inspection of said land or by making inquiry of persons in possession thereof.

6. Easements, claims of easement or encumbrances which are not shown by the public records.

7. Any facts, rights, interests or claims which would be disclosed by a correct ALTA/ACSM survey.

8. Rights of parties in possession.

9. The legal description of record recites an acreage figure, however, any claims for loss or damage by reason of an inaccurate figure will not be covered. Should this transaction be based on acreage, a survey by a licensed entity is recommended.

INFORMATIONAL NOTES

1. According to the latest available equalized assessment roll in the office of the county tax assessor, there is located on the land a(n) EDUCATIONAL FACILITY known as PIEDMONT HIGH SCHOOL AND 800 MAGNOLIA AVENUE, PIEDMONT, CALIFORNIA 94611.

2. According to the public records, there has been no conveyance of the land within a period of twenty-four months prior to the date of this report, except as follows:

   None

3. Should this report be used to facilitate your transaction, we must be provided with the following prior to the issuance of the policy:

   A. WITH RESPECT TO A CORPORATION:
      a. A certificate of good standing of recent date issued by the Secretary of State of the corporation's state of domicile.

      b. A certificate copy of a resolution of the Board of Directors authorizing the contemplated transaction and designating which corporate officers shall have the power to execute on behalf of the corporation.

      c. Requirements which the Company may impose following its review of the above material and other information which the Company may require.

   B. WITH RESPECT TO A CALIFORNIA LIMITED PARTNERSHIP:
      a. A certified copy of the certificate of limited partnership (form LP-1) and any amendments thereto (form LP-2) to be recorded in the public records;

      b. A full copy of the partnership agreement and any amendments;

      c. Satisfactory evidence of the consent of a majority in interest of the limited partners to the contemplated transaction;

d. Requirements which the Company may impose following its review of the above material and other information which the Company may require.

C. WITH RESPECT TO A FOREIGN LIMITED PARTNERSHIP:

a. A certified copy of the application for registration, foreign limited partnership (form LP-5) and any amendments thereto (form LP-6) to be recorded in the public records;

b. A full copy of the partnership agreement and any amendment;

c. Satisfactory evidence of the consent of a majority in interest of the limited partners to the contemplated transaction;

d. Requirements which the Company may impose following its review of the above material and other information which the Company may require.

D. WITH RESPECT TO A GENERAL PARTNERSHIP:

a. A certified copy of a statement of partnership authority pursuant to Section 16303 of the California Corporation Code (form GP-I), executed by at least two partners, and a certified copy of any amendments to such statement (form GP-7), to be recorded in the public records;

b. A full copy of the partnership agreement and any amendments;

c. Requirements which the Company may impose following its review of the above material required herein and other information which the Company may require.

E. WITH RESPECT TO A LIMITED LIABILITY COMPANY:

a. A copy of its operating agreement and any amendments thereto;

b. If it is a California limited liability company, a certified copy of its articles of organization (LLC-1) and any certificate of correction (LLC-11), certificate of amendment (LLC-2), or restatement of articles of organization (LLC-10) to be recorded in the public records;

c. If it is a foreign limited liability company, a certified copy of its application for registration (LLC-5) to be recorded in the public records;

d. With respect to any deed, deed of trust, lease, subordination agreement or other document or instrument executed by such limited liability company and presented for recordation by the Company or upon which the Company is asked to rely, such document or instrument must be executed in accordance with one of the following, as appropriate:

(i) If the limited liability company properly operates through officers appointed or elected pursuant to the terms of a written operating agreement, such documents must be executed by at least two duly elected or appointed officers, as follows: the chairman of the board, the president or any vice president, and any secretary, assistant secretary, the chief financial officer or any assistant treasurer;

(ii) If the limited liability company properly operates through a manager or managers identified in the articles of organization and/or duly elected pursuant to the terms of a written operating agreement, such document must be executed by at least two such managers or by one manager if the limited liability company properly operates with the existence of only one manager.

e. Requirements which the Company may impose following its review of the above material and other information which the Company may require.

F. WITH RESPECT TO A TRUST:

a. A certification pursuant to Section 18500.5 of the California Probate Code in a form satisfactory to the Company.

b. Copies of those excerpts from the original trust documents and amendments thereto which designate the trustee and confer upon the trustee the power to act in the pending transaction.

c. Other requirements which the Company may impose following its review of the material require herein and other information which the Company may require.

G. WITH RESPECT TO INDIVIDUALS:

a. A statement of information.

The map attached, if any, may or may not be a survey of the land depicted hereon. First American Title Insurance Company expressly disclaims any liability for loss or damage which may result from reliance on this map except to the extent coverage for such loss or damage is expressly provided by the terms and provisions of the title insurance policy, if any, to which this map is attached.

LEGAL DESCRIPTION

Real property in the City of PIEDMONT, County of ALAMEDA, State of CALIFORNIA, described as follows:

PARCEL ONE: (PTN 051-4680-001-02)

COMMENCING AT A POINT IN THE NORTHERN BOUNDARY LINE OF LOT 3, IN BLOCK F, DISTANT THEREON SOUTH 64° 4' WEST 48.80 FEET FROM THE MOST NORTHERN CORNER THEREOF, AS SAID LOT AND BLOCK ARE DELINEATED AND SO DESIGNATED ON THAT CERTAIN MAP ENTITLED "REVISED MAP OF PIEDMONT PARK", HEREINAFTER REFERRED TO, AND RUNNING THENCE SOUTH 40° 26' EAST 583.40 FEET; THENCE NORTH 49° 34' EAST 480 FEET; THENCE NORTH 6° 54' 30" WEST 162.82 FEET; THENCE NORTH 25° 19' 40" EAST 329.20 FEET; THENCE NORTH 58° 47' EAST 341.37 FEET; THENCE NORTH 44° 45' EAST 345 FEET; THENCE NORTH 45° 15' WEST 247.63 FEET TO A POINT ON THE SOUTHEASTERN LINE OF MAGNOLIA AVENUE, FORMERLY PIEDMONT AVENUE, AS IT NOW EXISTS IN THE CITY OF PIEDMONT, AND AS SHOWN ON THE AFORESAID MAP; THENCE ALONG THE SAID SOUTHEASTERN LINE OF MAGNOLIA AVENUE, SOUTHWESTERLY ON THE ARC OF A CURVE TO THE LEFT WITH A RADIUS OF 425.60 FEET A DISTANCE OF 45.08 FEET; THENCE ON A LINE TANGENT TO THE LAST NAMED CURVE SOUTH 44° 45' WEST 372.10 FEET; THENCE SOUTHWESTERLY ON THE ARC OF A CURVE TO THE RIGHT TANGENT TO THE LAST NAMED COURSE WITH A RADIUS OF 447.80 FEET A DISTANCE OF 125.31 FEET TO THE NORTHEASTERN CORNER OF LOT "A" IN SAID BLOCK F AS SHOWN ON AFORESAID MAP; THENCE LEAVING SAID SOUTHEASTERN LINE OF MAGNOLIA AVENUE AND ALONG THE EASTERN BOUNDARY LINE OF SAID LOT "A", SOUTH 29° 48' WEST 238.10 FEET TO THE CORNER COMMON TO SAID LOT "A" AND LOTS 13 AND 5 IN SAID BLOCK F, AS SHOWN ON THE AFORESAID MAP AND THENCE ALONG THE NORTHERN BOUNDARY LINE OF THE SAID LOT 6, LOT 4, AND LOT 3 IN SAID BLOCK F, SOUTH 64° 04' WEST 790.60 FEET TO THE POINT OF COMMENCEMENT, AND BEING PORTIONS OF LOTS 3, 4, 5, 6 AND 13 IN BLOCK F, AND A PORTION OF LOT 5 IN BLOCK E, AND ALSO A PORTION OF BUSHY DELL AVENUE, AS SAID LOTS, BLOCKS AND AVENUE ARE DELINEATED AND SO DESIGNATED ON THAT CERTAIN MAP ENTITLED "REVISED MAP OF PIEDMONT PARK", FILED APRIL 25, 1883, IN THE OFFICE OF THE COUNTY RECORDER OF ALAMEDA COUNTY, CALIFORNIA.

EXCEPTING THEREFROM ALL THAT PORTION DESCRIBED AS FOLLOWS:

BEGINNING AT THE MOST EASTERN CORNER OF LOT "a" ON THE SOUTH EASTERN LINE OF MAGNOLIA AVENUE (FORMERLY PIEDMONT AVENUE), AS THE SAID LOT AND AVENUE ARE SHOWN UPON A MAP ENTITLED "REVISED MAP OF PIEDMONT PARK", HEREINAFTER REFERRED TO; AND RUNNING THENCE ALONG THE EASTERN BOUNDARY LINE OF THE SAID LOT "a" SOUTH 29° 48′ WEST 178.50 FEET; THENCE LEAVING SAID BOUNDARY LINE OF SAID LOT "a", SOUTH 60° 12′ EAST 143.30 FEET TO AN ANGLE IN THE SOUTH EASTERN BOUNDARY LINE OF THAT CERTAIN 11.497 ACRE TRACT OF LAND HERETOFORE CONVEYED BY WALLACE M. AND MARY B. ALEXANDER TO PIEDMONT HIGH SCHOOL DISTRICT OF ALAMEDA COUNTY BY DEED DATED AUGUST 15, 1920, RECORDED SEPTEMBER 1, 1920, IN VOLUME 2964 OF DEEDS, AT PAGE 261, RECORDS OF ALAMEDA COUNTY, CALIFORNIA; THENCE ALONG SAID SOUTHEASTERN BOUNDARY LINE NORTH 58° 47′ EAST 267.10 FEET; THENCE LEAVING THE LAST SAID BOUNDARY LINE NORTH 45° 15′ WEST 231.80 FEET TO A POINT ON THE AFORESAID SOUTHEASTERN LINE OF MAGNOLIA AVENUE; AND THENCE ALONG THE LAST SAID LINE SOUTHWESTERLY ON THE ARC OF A CURVE TO THE RIGHT, THE CHORD OF WHICH

BEARS SOUTH 32° 46′ WEST WITH A RADIUS OF 447.80 FEET, A DISTANCE OF 125.31 FEET TO THE POINT OF COMMENCEMENT.

PARCEL TWO: (PTN 051-4680-001-02)

PORTIONS OF LOTS 5, 6 AND 13, BLOCK F, AND A PORTION OF BUSHY DELL AVENUE, "REVISED MAP OF PIEDMONT PARK" FILED APRIL 25, 1883, IN BOOK 6 OF MAPS, PAGE 24, ALAMEDA COUNTY RECORDS; ALSO BEING A PORTION OF THE PARCEL OF LAND DESCRIBED IN THE DEED FROM W. M. ALEXANDER, ET UX., TO THE CITY OF PIEDMONT, A MUNICIPAL CORPORATION, RECORDED MARCH 3, 1922, INSTRUMENT NO. S-188608, BOOK 179, PAGE 62, ALAMEDA COUNTY RECORDS, DESCRIBED AS FOLLOWS:

BEGINNING AT THE INTERSECTION OF THE SOUTHWESTERN LINE OF THE AFOREMENTIONED PARCEL DEEDED TO THE CITY OF PIEDMONT WITH THE NORTHERN LINE OF WILDWOOD AVENUE, FORMERLY HIGHLAND AVENUE, AS SAID AVENUE IS SHOWN ON THE AFOREMENTIONED REVISED MAP OF PIEDMONT PARK; THENCE ALONG SAID SOUTHWESTERN LINE OF THE CITY OF PIEDMONT PARCEL NORTH 6° 54' 30" WEST 464.83 FEET TO AN ANGLE POINT IN THE SAID SOUTHWESTERN LINE; THENCE ALONG THE WESTERN AND NORTHWESTERN LINES OF SAID PARCEL NORTH 25° 19' 40" EAST 329.20 FEET, NORTH 58° 47' EAST 341.37 FEET AND NORTH 44° 45' EAST 312.97 FEET; THENCE SOUTH 45° 15' EAST 22.00 FEET; THENCE SOUTH 44° 45' WEST 161.00 FEET; THENCE SOUTH 37° 50' WEST 19.00 FEET; THENCE SOUTH 44° 45' WEST 420.00 FEET; THENCE SOUTH 20° 45' WEST 310.00 FEET; THENCE SOUTH 69° 15' EAST 45.00 FEET; THENCE SOUTH 24° 15' EAST 25.00 FEET; THENCE SOUTH 69° 15' EAST 102.81 FEET; THENCE SOUTH 33° 24' WEST 419.27 FEET TO THE POINT OF BEGINNING.

PARCEL THREE: (051-4680-001-03)

PORTION OF LOT 13 IN BLOCK F, REVISED MAP OF PIEDMONT PARK, FILED APRIL 25, 1883, IN BOOK 6 OF MAPS, PAGE 24, ALAMEDA COUNTY RECORDS, DESCRIBED AS FOLLOWS:

BEGINNING AT THE MOST EASTERN CORNER OF THE PARCEL OF LAND DESCRIBED IN THE DEED FROM THE CITY OF PIEDMONT, A MUNICIPAL CORPORATION, TO PIEDMONT UNIFIED SCHOOL DISTRICT OF ALAMEDA COUNTY, RECORDED DECEMBER 21, 1954, INSTRUMENT NO. AK115792, BOOK 7515, PAGE 585, ALAMEDA COUNTY RECORDS; THENCE ALONG THE EASTERN LINE OF SAID PARCEL NORTH 38° 43' 40" WEST 102.32 FEET; THENCE SOUTH 45° 15' EAST 101.64 FEET; THENCE SOUTH 44° 45' WEST 11.62 FEET TO THE POINT OF BEGINNING.

PARCEL FOUR: (PTN 051-4680-001-02)

PORTION OF LOT 13 IN BLOCK "F", AS SAID LOT AND BLOCK ARE SHOWN ON THE "REVISED MAP OF PIEDMONT PARK", FILED APRIL 25, 1883, IN BOOK 6 OF MAPS, PAGE 24, IN THE OFFICE OF THE COUNTY RECORDER OF ALAMEDA COUNTY, DESCRIBED AS FOLLOWS:

BEGINNING AT THE MOST EASTERN CORNER OF THE 11.49 ACRE TRACT OF LAND DESCRIBED IN THE DEED BY WALLACE M. ALEXANDER AND MARY B. ALEXANDER TO PIEDMONT HIGH SCHOOL DISTRICT OF ALAMEDA COUNTY, DATED AUGUST 15, 1920, RECORDED SEPTEMBER 1, 1920, IN BOOK 2964 OF DEEDS, AT PAGE 261, ALAMEDA COUNTY RECORDS; AND RUNNING THENCE ALONG THE NORTHEASTERN LINE OF SAID 11.49 ACRE TRACT NORTH 45° 15′ WEST 207 FEET; THENCE NORTH 54° 12′ 53″ EAST 72.99 FEET; THENCE NORTH 89° 10′ EAST 28 FEET; THENCE SOUTH 38° 43′ 40″ EAST 176.54 FEET; AND THENCE SOUTH 44° 45′ WEST 72 FEET TO THE POINT OF BEGINNING.

PARCEL FIVE: (PTN 051-4680-001-02)

BEGINNING AT A POINT ON THE NORTHERN BOUNDARY LINE OF LOT 3 IN BLOCK "F", DISTANT THEREON SOUTH 64° 4' WEST 48.80 FEET FROM THE NORTHEASTERN CORNER THEREOF, AS THE SAID LOT AND BLOCK ARE SHOWN UPON "REVISED MAP OF PIEDMONT PARK", HEREINAFTER REFERRED TO, AND RUNNING THENCE ALONG SAID NORTHERN BOUNDARY LINE OF SAID LOT 3, SOUTH 64° 4' WEST 103.30 FEET TO THE SOUTHWESTERN BOUNDARY OF A STRIP OF LAND 100 FEET WIDE, NOTED IN EXCEPTION IN DEED FROM J. B. LANKTREE, COMMISSIONER, TO THE ANGLO-CALIFORNIA TRUST COMPANY, DATED JULY 1, 1918, RECORDED IN VOLUME 2682 OF DEEDS AT PAGE 65, ALAMEDA COUNTY RECORDS; THENCE LEAVING SAID BOUNDARY LINE AND ALONG SAID SOUTHWESTERN LINE OF SAID 100 FOOT STRIP OF LAND SOUTH 40° 26' EAST 435.83 FEET TO A POINT ON THE NORTHERN LINE OF A PROPOSED ROAD 40 FEET IN WIDTH; THENCE ALONG THE NORTHERN BOUNDARY LINE OF SAID PROPOSED ROAD ON THE ARC OF A CURVE TO THE LEFT, THE CHORD OF WHICH BEARS SOUTH 89° 42' 40" EAST WITH A RADIUS OF 1020 FEET, A DISTANCE OF 132.06 FEET TO A POINT ON THE NORTHEASTERN BOUNDARY LINE OF SAID 100 FOOT STRIP OF LAND; THENCE LEAVING SAID PROPOSED ROAD AND ALONG THE NORTHEASTERN BOUNDARY LINE OF SAID 100 FOOT STRIP OF LAND NORTH 40° 26' WEST 496.05 FEET TO THE POINT OF COMMENCEMENT.

BEING A PORTION OF LOTS 3 AND 4 IN BLOCK "F", PORTION OF LOTS 4 AND 5 IN BLOCK "E", AND A PORTION OF BUSHY DELL AVENUE, AS SAID LOTS, BLOCKS AND AVENUE ARE DELINEATED AND SO DESIGNATED UPON THAT CERTAIN MAP ENTITLED "REVISED MAP OF PIEDMONT PARK" FILED IN THE OFFICE OF THE COUNTY RECORDER OF ALAMEDA COUNTY, APRIL 23, 1883.

PARCEL SIX: (PTN 051-4680-001-02)

BEGINNING AT THE MOST EASTERN CORNER OF LOT "a" ON THE SOUTH EASTERN LINE OF MAGNOLIA AVENUE (FORMERLY PIEDMONT AVENUE), AS THE SAID LOT AND AVENUE ARE SHOWN UPON A MAP ENTITLED "REVISED MAP OF PIEDMONT PARK", HEREINAFTER REFERRED TO; AND RUNNING THENCE ALONG THE EASTERN BOUNDARY LINE OF THE SAID LOT "a" SOUTH 29° 48' WEST 178.50 FEET; THENCE LEAVING SAID BOUNDARY LINE OF SAID LOT "a", SOUTH 60° 12' EAST 143.30 FEET TO AN ANGLE IN THE SOUTH EASTERN BOUNDARY LINE OF THAT CERTAIN 11.497 ACRE TRACT OF LAND HERETOFORE CONVEYED BY WALLACE M. AND MARY B. ALEXANDER TO PIEDMONT HIGH SCHOOL DISTRICT OF ALAMEDA COUNTY BY DEED DATED AUGUST 15, 1920, RECORDED SEPTEMBER 1, 1920, IN VOLUME 2964 OF DEEDS, AT PAGE 261, RECORDS OF ALAMEDA COUNTY, CALIFORNIA; THENCE ALONG SAID SOUTHEASTERN BOUNDARY LINE NORTH 58° 47' EAST 267.10 FEET; THENCE LEAVING THE LAST SAID BOUNDARY LINE NORTH 45° 15' WEST 231.80 FEET TO A POINT ON THE AFORESAID SOUTHEASTERN LINE OF MAGNOLIA AVENUE; AND THENCE ALONG THE LAST SAID LINE SOUTHWESTERLY ON THE ARC OF A CURVE TO THE RIGHT, THE CHORD OF WHICH BEARS SOUTH 32° 46' WEST WITH A RADIUS OF 447.80 FEET, A DISTANCE OF 125.31 FEET TO THE POINT OF COMMENCEMENT.

BEING A PORTION OF LOT 13 IN BLOCK "F" AS THE SAID LOT AND BLOCK ARE DELINEATED AND SO DESIGNATED UPON THAT CERTAIN MAP ENTITLED "REVISED MAP OF PIEDMONT PARK" FILED APRIL 25, 1883, IN THE OFFICE OF THE COUNTY RECORDER OF SAID ALAMEDA COUNTY, AND BEING ALSO A PORTION OF THE AFORESAID 11.497 ACRE TRACT OF LAND.

PARCEL SEVEN: (PTN 051-4680-001-02)

BEGINNING AT THE MOST EASTERN CORNER OF THAT CERTAIN PIECE OR PARCEL OF LAND ONE HUNDRED (100) FEET IN WIDTH,NOTED IN THE EXCEPTION IN THE DEED FROM J. B. LANKTREE, COMMISSIONER, TO THE ANGLO-CALIFORNIA TRUST COMPANY, DATED JULY 1ST, 1918, RECORDED IN VOLUME 2662 OF DEEDS AT PAGE 65, ALAMEDA COUNTY RECORDS, AND ON THE NORTHWESTERN LINE OF WILDWOOD AVENUE, FORMERLY HIGHLAND AVENUE, AS SAID AVENUE IS SHOWN UPON REVISED MAP OF PIEDMONT PARK, HEREINAFTER REFERRED TO; SAID POINT BEING THE MOST SOUTHERN CORNER OF THAT CERTAIN PIECE OR PARCEL OF LAND CONTAINING 27.236 ACRES, HERETOFORE CONVEYED BY THE ANGLO-CALIFORNIA TRUST COMPANY TO WALLACE M. ALEXANDER BY DEED DATED JULY 22, 1920, RECORDED AUGUST 12, 1920, IN VOLUME 2955 OF DEEDS AT PAGE 234 OF SAID ALAMEDA COUNTY RECORDS; AND RUNNING THENCE ALONG THE LINE DIVIDING THE SAID STRIP OF LAND 100 FEET IN WIDTH FROM THE SAID 27.236 ACRE TRACT NORTH 40° 26' WEST 307.35 FEET TO THE MOST EASTERN CORNER OF THAT CERTAIN PIECE OR PARCEL OF LAND CONTAINING 1.047 ACRES, HERETOFORE CONVEYED BY LILA R. HAVENS, TRUSTEE FOR PIEDMONT DEVELOPMENT COMPANY, TO PIEDMONT HIGH SCHOOL DISTRICT OF ALAMEDA COUNTY BY DEED DATED FEBRUARY 8TH, 1921, AND RECORDED MARCH 30TH, 1921, IN VOLUME 3047 OF DEEDS, AT PAGE 395, ALAMEDA COUNTY RECORDS; THENCE ALONG THE SOUTHERN BOUNDARY LINE OF THE SAID 1.047 ACRE TRACT WESTERLY ON THE ARC OF A CURVE TO THE RIGHT, THE CHORD OF WHICH BEARS NORTH 89° 42' 40" WEST WITH A RADIUS OF 1020 FEET, A DISTANCE OF 132.06 FEET TO THE SOUTHWESTERN CORNER THEREOF ON THE SOUTHWESTERN BOUNDARY LINE OF THE AFORESAID STRIP OF LAND 100 FEET IN WIDTH; THENCE ALONG THE LAST SAID SOUTHWESTERN BOUNDARY LINE, SOUTH 40° 26" EAST 393.66 FEET TO THE MOST SOUTHERN CORNER OF SAID STRIP OF LAND 100 FEET IN WIDTH AND ON THE AFORESAID NORTHWESTERN LINE OF WILDWOOD AVENUE; THENCE ALONG THE SAID LINE OF SAID AVENUE, NORTHEASTERLY ON THE ARC OF A CURVE TO THE LEFT WITH A RADIUS OF 108.35 FEET, A DISTANCE OF 64.45 FEET; AND THENCE ON A LINE TANGENT TO THE LAST NAMED CURVE, NORTH 41° 39" EAST 46.91 FEET TO THE POINT OF COMMENCEMENT.

BEING A PORTION OF THE AFORESAID STRIP OF LAND 100 FEET IN WIDTH AND ALSO PORTIONS OF LOTS 4 AND 5 IN BLOCK "E", AS SAID LOTS AND BLOCK ARE DELINEATED AND SO DESIGNATED UPON THAT CERTAIN MAP ENTITLED "REVISED MAP OF PIEDMONT PARK", FILED IN THE RECORDER'S OFFICE OF ALAMEDA COUNTY, APRIL 25TH, 1883.

PARCEL EIGHT: (PTN 051-4680-001-02)

COMMENCING AT A POINT ON THE NORTHERN LINE OF WILDWOOD AVENUE, FORMERLY HIGHLAND AVENUE, DISTANT THEREON NORTHWESTERLY 120.78 FEET FROM THE SOUTHEASTERN CORNER OF LOT 6 IN BLOCK "F", AS SAID AVENUE, LOT AND BLOCK ARE DELINEATED AND SO DESIGNATED ON REVISED MAP OF PIEDMONT PARK, HEREINAFTER REFERRED TO; RUNNING THENCE ALONG SAID NORTHERN LINE OF WILDWOOD AVENUE WESTERLY AND SOUTHWESTERLY ON THE ARC OF A CURVE TO THE LEFT WITH A RADIUS OF 191.33 FEET, A DISTANCE OF 174.81 FEET; THENCE ON A LINE TANGENT TO THE LAST NAMED CURVE SOUTH 41° 39' WEST 154.60 FEET; THENCE LEAVING WILDWOOD AVENUE NORTH 40° 23' WEST 220.0 FEET; THENCE NORTH 49° 34' EAST 480.0 FEET AND THENCE SOUTH 6° 54' 30" EAST 301.18 FEET TO POINT OF COMMENCEMENT.

BEING PORTIONS OF LOT 6 IN BLOCK "F", LOT 5 IN BLOCK "E", AND A PORTION OF BUSHY DELL AVENUE, AS SAID LOTS, BLOCKS AND AVENUE ARE DELINEATED AND SO DESIGNATED ON THAT CERTAIN MAP ENTITLED "REVISED MAP OF PIEDMONT PARK", FILED IN RECORDER'S OFFICE OF ALAMEDA COUNTY, APRIL 25, 1883.

PARCEL NINE: (051-4680-001-04)

COMMENCING AT THE SOUTHEASTERN CORNER OF LOT 6 IN BLOCK "F", AND ON THE NORTHEASTERN LINE OF WILDWOOD AVENUE, FORMERLY HIGHLAND AVENUE, AS SAID LOT, BLOCK AND AVENUE ARE DELINEATED AND SO DESIGNATED ON REVISED MAP OF PIEDMONT PARK, HEREINAFTER REFERRED TO, AND RUNNING THENCE ALONG THE EASTERN BOUNDARY LINE OF THE SAID LOT 6 NORTH 33° 35' EAST 603.80 FEET TO THE CORNER COMMON TO SAID LOT 6, LOT 7 AND LOT 13 IN THE SAID BLOCK "F", AS SHOWN ON THE AFORESAID MAP; THENCE ALONG THE NORTHERN BOUNDARY LINE OF SAID LOT 7 AND SOUTHERN BOUNDARY LINE OF LOT 12 AND LOT 13 SOUTH 80° 35' EAST 90.27 FEET TO THE SOUTHWESTERN CORNER OF THAT CERTAIN 0.287 ACRE TRACT OF LAND HERETOFORE CONVEYED BY MISS RANSOM AND MISS BRIDGES SCHOOL TO PIEDMONT DEVELOPMENT COMPANY BY DEED DATED FEBRUARY 17, 1914, AND RECORDED MARCH 19, 1914, IN VOLUME 2205 OF DEEDS AT PAGE 436,. RECORDS OF ALAMEDA COUNTY; THENCE ALONG THE WESTERN BOUNDARY LINE OF THE SAID 0.287 ACRE TRACT NORTH 27° 49' WEST 129.09 FEET; NORTH 12° 4' EAST 133.91 FEET; NORTH 23° 58' EAST 81.18 FEET; NORTH 30° 27' EAST 169.50 FEET; NORTH 47° 46' 30" EAST 39.65 FEET; NORTH 88° 1' EAST 15.40 FEET TO THE MOST NORTHERN CORNER OF THE SAID 0.287 ACRE TRACT AND ON THE NORTHWESTERN BOUNDARY LINE OF THAT CERTAIN PIECE OR PARCEL OF LAND HERETOFORE CONVEYED BY THE PIEDMONT DEVELOPMENT COMPANY TO MISS RANSOM AND MISS BRIDGES SCHOOL BY DEED DATED MARCH 16, 1914, AND RECORDED APRIL 13, 1914, IN VOLUME 2230 OF DEEDS AT PAGE 450, RECORDS OF ALAMEDA COUNTY; THENCE ALONG THE SAID NORTHWESTERN BOUNDARY LINE OF THE SAID LAND OF MISS RANSOM AND MISS BRIDGES SCHOOL NORTH 47° 52' EAST 16.30 FEET; THENCE LEAVING SAID LAND OF MISS RANSOM AND MISS BRIDGES SCHOOL NORTH 41° 42' 10" EAST 211.50 FEET; THENCE NORTH 45° 42' EAST 155.90 FEET; THENCE NORTH 58° 3' 30" EAST 257.25 FEET TO A POINT ON THE WESTERN BOUNDARY LINE OF THAT CERTAIN PIECE OR PARCEL OF LAND HERETOFORE CONVEYED BY THE PIEDMONT DEVELOPMENT COMPANY TO THE OAKLAND TRACTION COMPANY BY DEED DATED NOVEMBER 19, 1907, RECORDED DECEMBER 5, 1907, IN VOLUME 1412 OF DEEDS, AT PAGE 288, RECORDS OF ALAMEDA COUNTY; THENCE ALONG THE WESTERN BOUNDARY OF THE LAST SAID LAND NORTH 32° WEST 214.87 FEET; THENCE ALONG THE ARC OF A CURVE TO THE LEFT NORTHWESTERLY TANGENT TO THE LAST NAMED COURSE WITH A RADIUS OF 283 FEET, A DISTANCE OF 84.46 FEET TO A POINT ON THE SOUTHERN LINE OF HIGHLAND AVENUE, AS IT NOW EXISTS IN THE CITY OF PIEDMONT; THENCE ALONG SAID LINE OF HIGHLAND AVENUE SOUTH 66° 23' WEST 337.50 FEET TO ITS JUNCTION WITH THE SOUTHERN LINE OF MAGNOLIA AVENUE AS IT NOW EXISTS IN THE CITY OF PIEDMONT; THENCE ALONG SAID LINE OF MAGNOLIA AVENUE SOUTHWESTERLY ON THE ARC OF A CURVE TO THE LEFT TANGENT TO THE LAST NAMED COURSE WITH A RADIUS OF 81.50 FEET, A DISTANCE OF 15.91 FEET; THENCE SOUTHWESTERLY ON THE ARC OF A CURVE TO THE RIGHT REVERSING FROM THE LAST NAMED CURVE WITH A RADIUS OF 80.00 FEET, A DISTANCE OF 32.39 FEET; THENCE SOUTHWESTERLY ON THE ARC OF A CURVE TO THE LEFT REVERSING FROM THE LAST NAMED CURVE WITH A RADIUS OF 425.60 FEET, A DISTANCE OF 204.92 FEET; THENCE LEAVING SAID SOUTHERN LINE OF MAGNOLIA AVENUE SOUTH 45° 15' EAST 247.63 FEET; THENCE SOUTH 44° 45' WEST 345 FEET; THENCE SOUTH 58° 47' WEST 341.37 FEET; THENCE SOUTH 25° 19' 40" WEST 329.20 FEET; THENCE SOUTH 6° 54' 30" EAST 464 FEET TO A POINT ON THE AFORESAID NORTHEASTERN LINE OF WILDWOOD AVENUE; THENCE ALONG SAID LINE OF WILDWOOD AVENUE EASTERLY ON THE ARC OF A CURVE TO THE RIGHT WITH A RADIUS OF 191.33 FEET, A DISTANCE OF 107.58 FEET, AND THENCE ON A LINE TANGENT TO THE LAST NAMED CURVE SOUTH 58° 48' EAST 13.25 FEET TO POINT OF COMMENCEMENT.

BEING PORTIONS OF LOTS 11, 12, 13, 5 AND 6 IN BLOCK "F" AND PORTIONS OF HAZEL

AVENUE AND BUSHY DELL AVENUE, AS SAID LOTS, BLOCK AND AVENUES ARE DELINEATED AND SO DESIGNATED ON THAT CERTAIN MAP ENTITLED "REVISED MAP OF PIEDMONT PARK", FILED APRIL 25, 1883, IN THE OFFICE OF THE COUNTY RECORDER OF ALAMEDA COUNTY, CALIFORNIA.

EXCEPTING THEREFROM THE FOLLOWING PARCELS:
PARCEL A:
PORTIONS OF LOTS 5, 6 AND 13, BLOCK F, AND A PORTION OF BUSHY DELL AVENUE, "REVISED MAP OF PIEDMONT PARK" FILED APRIL 25, 1883, IN BOOK 6 OF MAPS, PAGE 24, ALAMEDA COUNTY RECORDS; ALSO BEING A PORTION OF THE PARCEL OF LAND DESCRIBED IN THE DEED FROM W. M. ALEXANDER, ET UX., TO THE CITY OF PIEDMONT, A MUNICIPAL CORPORATION, RECORDED MARCH 3, 1922, AS INSTRUMENT NO. 2-188608, BOOK 179, PAGE 62, ALAMEDA COUNTY RECORDS, DESCRIBED AS FOLLOWS:
BEGINNING AT THE INTERSECTION OF THE SOUTHWESTERN LINE OF THE AFOREMENTIONED PARCEL DEEDED TO THE CITY OF PIEDMONT WITH THE NORTHERN LINE OF WILDWOOD AVENUE, FORMERLY HIGHLAND AVENUE, AS SAID AVENUE IS SHOWN ON THE AFOREMENTIONED REVISED MAP OF PIEDMONT PARK; THENCE ALONG SAID SOUTHWESTERN LINE OF THE CITY OF PIEDMONT PARCEL NORTH 6° 54' 30" WEST 464.83 FEET TO AN ANGLE POINT IN THE SAID SOUTHWESTERN LINE; THENCE ALONG THE WESTERN AND NORTHWESTERN LINES OF SAID PARCEL NORTH 25° 19' 40" EAST 329.20 FEET, NORTH 58° 47' EAST 341.37 FEET AND NORTH 44° 45' EAST 312.97 FEET; THENCE SOUTH 45° 15' EAST 22.00 FEET; THENCE SOUTH 44° 45' WEST 161.00 FEET; THENCE SOUTH 37° 50' WEST 19.00 FEET; THENCE SOUTH 44° 45' WEST 420.00 FEET; THENCE SOUTH 20° 45' WEST 310.00 FEET; THENCE SOUTH 69° 15' EAST 45.00 FEET; THENCE SOUTH 24° 15' EAST 25.00 FEET; THENCE SOUTH 69° 15' EAST 102.81 FEET; THENCE SOUTH 33° 24' WEST 419.27 FEET TO THE POINT OF BEGINNING.

PARCEL B:
PORTION OF LOT 13 IN BLOCK F, REVISED MAP OF PIEDMONT PARK, FILED APRIL 25, 1883, IN BOOK 6 OF MAPS, PAGE 24, ALAMEDA COUNTY RECORDS, DESCRIBED AS FOLLOWS:
BEGINNING AT THE MOST EASTERN CORNER OF THE PARCEL OF LAND DESCRIBED IN THE DEED FROM THE CITY OF PIEDMONT, A MUNICIPAL CORPORATION, TO PIEDMONT UNIFIED SCHOOL DISTRICT OF ALAMEDA COUNTY, RECORDED DECEMBER 21, 1954, INSTRUMENT NO. AK115792, BOOK 7515, PAGE 585, ALAMEDA COUNTY RECORDS; THENCE ALONG THE EASTERN LINE OF SAID PARCEL NORTH 38° 43' 40" WEST 102.32 FEET; THENCE SOUTH 45° 15' EAST 101.64 FEET; THENCE SOUTH 44° 45' WEST 11.62 FEET TO THE POINT OF BEGINNING.

PARCEL C:
PORTION OF LOT 13 IN BLOCK "F", AS SAID LOT AND BLOCK ARE SHOWN ON THE "REVISED MAP OF PIEDMONT PARK", FILED APRIL 25, 1883, IN BOOK 6 OF MAPS, PAGE 24, IN THE OFFICE OF THE COUNTY RECORDER OF ALAMEDA COUNTY, DESCRIBED AS FOLLOWS:
BEGINNING AT THE MOST EASTERN CORNER OF THE 11.49 ACRE TRACT OF LAND DESCRIBED IN THE DEED BY WALLACE ME. ALEXANDER AND MARY B. ALEXANDER TO PIEDMONT HIGH SCHOOL DISTRICT OF ALAMEDA COUNTY, DATED AUGUST 15, 1920, RECORDED SEPTEMBER 1, 1920, IN BOOK 2964 OF DEEDS, AT PAGE 261, ALAMEDA COUNTY RECORDS; AND RUNNING THENCE ALONG THE NORTHEASTERN LINE OF SAID 11.49 ACRE TRACT NORTH 45° 15' WEST 207 FEET; THENCE NORTH 54° 12' 53" EAST 72.99 FEET; THENCE NORTH 89° 10' EAST 28 FEET; THENCE SOUTH 38° 43' 40" EAST 176.54 FEET; AND THENCE SOUTH 44° 45' WEST 72 FEET TO THE POINT OF BEGINNING.

APN: 051-4680-001

NOTICE I

Section 12413.1 of the California Insurance Code, effective January 1, 1990, requires that any title insurance company, underwritten title company, or controlled escrow company handling funds in an escrow or sub-escrow capacity, wait a specified number of days after depositing funds, before recording any documents in connection with the transaction or disbursing funds. This statute allows for funds deposited by wire transfer to be disbursed the same day as deposit. In the case of cashier's checks or certified checks, funds may be disbursed the next day after deposit. In order to avoid unnecessary delays of three to seven days, or more, please use wire transfer, cashier's checks, or certified checks whenever possible.

If you have any questions about the effect of this new law, please contact your local First American Office for more details.

NOTICE II

As of January 1, 1991, if the transaction which is the subject of this report will be a sale, you as a party to the transaction, may have certain tax reporting and withholding obligations pursuant to the state law referred to below:

In accordance with Sections 18662 and 18668 of the Revenue and Taxation Code, a buyer may be required to withhold an amount equal to three and one-third percent of the sales price in the case of the disposition of California real property interest by either:

1. A seller who is an individual with a last known street address outside of California or when the disbursement instructions authorize the proceeds be sent to a financial intermediary of the seller, OR
2. A corporate seller which has no permanent place of business in California.

The buyer may become subject to penalty for failure to withhold an amount equal to the greater of 10 percent of the amount required to be withheld or five hundred dollars ($500).

However, notwithstanding any other provision included in the California statutes referenced above, no buyer will be required to withhold any amount or be subject to penalty for failure to withhold if:

1. The sales price of the California real property conveyed does not exceed one hundred thousand dollars ($100,000), OR
2. The seller executes a written certificate, under the penalty of perjury, certifying that the seller is a resident of California, or if a corporation, has a permanent place of business in California, OR
3. The seller, who is an individual, executes a written certificate, under the penalty of perjury, that the California real property being conveyed is the seller's principal residence (as defined in Section 1034 of the Internal Revenue Code).

The seller is subject to penalty for knowingly filing a fraudulent certificate for the purpose of avoiding the withholding requirement.

The California statutes referenced above include provisions which authorize the Franchise Tax Board to grant reduced withholding and waivers from withholding on a case-by-case basis.

The parties to this transaction should seek an attorney's, accountant's, or other tax specialist's opinion concerning the effect of this law on this transaction and should not act on any statements made or omitted by the escrow or closing officer.

The Seller May Request a Waiver by Contacting:
Franchise Tax Board
Withhold at Source Unit
P.O. Box 651
Sacramento, CA 95812-0651
(916) 845-4900

Privacy Policy

We Are Committed to Safeguarding Customer Information
In order to better serve your needs now and in the future, we may ask you to provide us with certain information. We understand that you may be concerned about what we will do with such information - particularly any personal or financial information. We agree that you have a right to know how we will utilize the personal information you provide to us. Therefore, together with our parent company, The First American Corporation, we have adopted this Privacy Policy to govern the use and handling of your personal information.

Applicability
This Privacy Policy governs our use of the information which you provide to us. It does not govern the manner in which we may use information we have obtained from any other source, such as information obtained from a public record or from another person or entity. First American has also adopted broader guidelines that govern our use of personal information regardless of its source. First American calls these guidelines its *Fair Information Values*, a copy of which can be found on our website at www.firstam.com.

Types of Information
Depending upon which of our services you are utilizing, the types of nonpublic personal information that we may collect include:

- Information we receive from you on applications, forms and in other communications to us, whether in writing, in person, by telephone or any other means;
- Information about your transactions with us, our affiliated companies, or others; and
- Information we receive from a consumer reporting agency.

Use of Information
We request information from you for our own legitimate business purposes and not for the benefit of any nonaffiliated party. Therefore, we will not release your information to nonaffiliated parties except: (1) as necessary for us to provide the product or service you have requested of us; or (2) as permitted by law. We may, however, store such information indefinitely, including the period after which any customer relationship has ceased. Such information may be used for any internal purpose, such as quality control efforts or customer analysis. We may also provide all of the types of nonpublic personal information listed above to one or more of our affiliated companies. Such affiliated companies include financial service providers, such as title insurers, property and casualty insurers, and trust and investment advisory companies, or companies involved in real estate services, such as appraisal companies, home warranty companies, and escrow companies. Furthermore, we may also provide all the information we collect, as described above, to companies that perform marketing services on our behalf, on behalf of our affiliated companies, or to other financial institutions with whom we or our affiliated companies have joint marketing agreements.

Former Customers
Even if you are no longer our customer, our Privacy Policy will continue to apply to you.

Confidentiality and Security
We will use our best efforts to ensure that no unauthorized parties have access to any of your information. We restrict access to nonpublic personal information about you to those individuals and entities who need to know that information to provide products or services to you. We will use our best efforts to train and oversee our employees and agents to ensure that your information will be handled responsibly and in accordance with this Privacy Policy and First American's *Fair Information Values*. We

currently maintain physical, electronic, and procedural safeguards that comply with federal regulations to guard your nonpublic personal information.

EXHIBIT A
LIST OF PRINTED EXCEPTIONS AND EXCLUSIONS (BY POLICY TYPE)

1. CALIFORNIA LAND TITLE ASSOCIATION STANDARD COVERAGE POLICY - 1990
SCHEDULE B

EXCEPTIONS FROM COVERAGE

This policy does not insure against loss or damage (and the Company will not pay costs, attorneys' fees or expenses) which arise by reason of:

1. Taxes or assessments which are not shown as existing liens by the records of any taxing authority that levies taxes or assessments on real property or by the public records. Proceedings by a public agency which may result in taxes or assessments, or notice of such proceedings, whether or not shown by the records of such agency or by the public records.
2. Any facts, rights, interests, or claims which are not shown by the public records but which could be ascertained by an inspection of the land or which may be asserted by persons in possession thereof.
3. Easements, liens or encumbrances, or claims thereof, which are not shown by the public records.
4. Discrepancies, conflicts in boundary lines, shortage in area, encroachments, or any other facts which a correct survey would disclose, and which are not shown by the public records.
5. (a) Unpatented mining claims; (b) reservations or exceptions in patents or in Acts authorizing the issuance thereof; (c) water rights, claims or title to water, whether or not the matters excepted under (a), (b), or (c) are shown by the public records.

EXCLUSIONS FROM COVERAGE

The following matters are expressly excluded from the coverage of this policy and the Company will not pay loss or damage, costs, attorneys' fees or expenses which arise by reason of:

1. (a) Any law, ordinance or governmental regulation (including but not limited to building and zoning laws, ordinances, or regulations) restricting, regulating, prohibiting or relating to (i) the occupancy, use, or enjoyment of the land; (ii) the character, dimensions or location of any improvement now or hereafter erected on the land; (iii) a separation in ownership or a change in the dimensions or area of the land or any parcel of which the land is or was a part; or (iv) environmental protection, or the effect of any violation of these laws, ordinances or governmental regulations, except to the extent that a notice of the enforcement thereof or a notice of a defect, lien or encumbrance resulting from a violation or alleged violation affecting the land has been recorded in the public records at Date of Policy.
   (b) Any governmental police power not excluded by (a) above, except to the extent that a notice of the exercise thereof or a notice of a defect, lien or encumbrance resulting from a violation or alleged violation affecting the land has been recorded in the public records at Date of Policy.
2. Rights of eminent domain unless notice of the exercise thereof has been recorded in the public records at Date of Policy, but not excluding from coverage any taking which has occurred prior to Date of Policy which would be binding on the rights of a purchaser for value without knowledge.
3. Defects, liens, encumbrances, adverse claims or other matters:
   (a) whether or not recorded in the public records at Date of Policy, but created, suffered, assumed or agreed to by the insured claimant;
   (b) not known to the Company, not recorded in the public records at Date of Policy, but known to the insured claimant and not disclosed in writing to the Company by the insured claimant prior to the date the insured claimant became an insured under this policy;
   (c) resulting in no loss or damage to the insured claimant;
   (d) attaching or created subsequent to Date of Policy; or
   (e) resulting in loss or damage which would not have been sustained if the insured claimant had paid value for the insured mortgage or for the estate or interest insured by this policy.
4. Unenforceability of the lien of the insured mortgage because of the inability or failure of the insured at Date of Policy, or the inability or failure of any subsequent owner of the indebtedness, to comply with applicable "doing business" laws of the state in which the land is situated.
5. Invalidity or unenforceability of the lien of the insured mortgage, or claim thereof, which arises out of the transaction evidenced by the insured mortgage and is based upon usury or any consumer credit protection or truth in lending law.
6. Any claim, which arises out of the transaction vesting in the insured the estate or interest insured by their policy or the transaction creating the interest of the insured lender, by reason of the operation of federal bankruptcy, state insolvency or similar creditors' rights laws.

2. AMERICAN LAND TITLE ASSOCIATION OWNER'S POLICY FORM B - 1970
SCHEDULE OF EXCLUSIONS FROM COVERAGE

1. Any law, ordinance or governmental regulation (including but not limited to building and zoning ordinances) restricting or regulating or prohibiting the occupancy, use or enjoyment of the land, or regulating the character, dimensions or location of any improvement now or hereafter erected on the land, or prohibiting a separation in ownership or a reduction in the dimensions of area of the land, or the effect of any violation of any such law, ordinance or governmental regulation.
2. Rights of eminent domain or governmental rights of police power unless notice of the exercise of such rights appears in the public records at Date of Policy.
3. Defects, liens, encumbrances, adverse claims, or other matters (a) created, suffered, assumed or agreed to by the insured claimant; (b) not known to the Company and not shown by the public records but known to the insured claimant either at Date of Policy or at the date such claimant acquired an estate or interest insured by this policy and not disclosed in writing by the insured claimant to the Company prior to the

date such insured claimant became an insured hereunder; (c) resulting in no loss or damage to the insured claimant; (d) attaching or created subsequent to Date of Policy; or (e) resulting in loss or damage which would not have been sustained if the insured claimant had paid value for the estate or interest insured by this policy.

3. AMERICAN LAND TITLE ASSOCIATION OWNER'S POLICY FORM B - 1970
WITH REGIONAL EXCEPTIONS

When the American Land Title Association policy is used as a Standard Coverage Policy and not as an Extended Coverage Policy the exclusions set forth in paragraph 2 above are used and the following exceptions to coverage appear in the policy.

SCHEDULE B

This policy does not insure against loss or damage by reason of the matters shown in parts one and two following:
Part One

1. Taxes or assessments which are not shown as existing liens by the records of any taxing authority that levies taxes or assessments on real property or by the public records.
2. Any facts, rights, interests, or claims which are not shown by the public records but which could be ascertained by an inspection of said land or by making inquiry of persons in possession thereof.
3. Easements, claims of easement or encumbrances which are not shown by the public records.
4. Discrepancies, conflicts in boundary lines, shortage in area, encroachments, or any other facts which a correct survey would disclose, and which are not shown by public records.
5. Unpatented mining claims; reservations or exceptions in patents or in Acts authorizing the issuance thereof; water rights, claims or title to water.
6. Any lien, or right to a lien, for services, labor or material heretofore or hereafter furnished, imposed by law and not shown by the public records.

4. AMERICAN LAND TITLE ASSOCIATION LOAN POLICY - 1970
WITH A.L.T.A. ENDORSEMENT FORM 1 COVERAGE
SCHEDULE OF EXCLUSIONS FROM COVERAGE

1. Any law, ordinance or governmental regulation (including but not limited to building and zoning ordinances) restricting or regulating or prohibiting the occupancy, use or enjoyment of the land, or regulating the character, dimensions or location of any improvement now or hereafter erected on the land, or prohibiting a separation in ownership or a reduction in the dimensions or area of the land, or the effect of any violation of any such law ordinance or governmental regulation.
2. Rights of eminent domain or governmental rights of police power unless notice of the exercise of such rights appears in the public records at Date of Policy.
3. Defects, liens, encumbrances, adverse claims, or other matters (a) created, suffered, assumed or agreed to by the insured claimant, (b) not known to the Company and not shown by the public records but known to the insured claimant either at Date of Policy or at the date such claimant acquired an estate or interest insured by this policy or acquired the insured mortgage and not disclosed in writing by the insured claimant to the Company prior to the date such insured claimant became an insured hereunder, (c) resulting in no loss or damage to the insured claimant; (d) attaching or created subsequent to Date of Policy (except to the extent insurance is afforded herein as to any statutory lien for labor or material or to the extent insurance is afforded herein as to assessments for street improvements under construction or completed at Date of Policy).
4. Unenforceability of the lien of the insured mortgage because of failure of the insured at Date of Policy or of any subsequent owner of the indebtedness to comply with applicable "doing business" laws of the state in which the land is situated.

5. AMERICAN LAND TITLE ASSOCIATION LOAN POLICY - 1970
WITH REGIONAL EXCEPTIONS

When the American Land Title Association Lenders Policy is used as a Standard Coverage Policy and not as an Extended Coverage Policy, the exclusions set forth in paragraph 4 above are used and the following exceptions to coverage appear in the policy.

SCHEDULE B

This policy does not insure against loss or damage by reason of the matters shown in parts one and two following:
Part One

1. Taxes or assessments which are not shown as existing liens by the records of any taxing authority that levies taxes or assessments on real property or by the public records.
2. Any facts, rights, interests, or claims which are not shown by the public records but which could be ascertained by an inspection of said land or by making inquiry of persons in possession thereof.
3. Easements, claims of easement or encumbrances which are not shown by the public records.
4. Discrepancies, conflicts in boundary lines, shortage in area, encroachments, or any other facts which a correct survey would disclose, and which are not shown by public records.
5. Unpatented mining claims; reservations or exceptions in patents or in Acts authorizing the issuance thereof; water rights, claims or title to water.

6. Any lien, or right to a lien, for services, labor or material theretofore or hereafter furnished, imposed by law and not shown by the public records.

6. AMERICAN LAND TITLE ASSOCIATION LOAN POLICY - 1992
WITH A.L.T.A. ENDORSEMENT FORM 1 COVERAGE
EXCLUSIONS FROM COVERAGE

The following matters are expressly excluded from the coverage of this policy and the Company will not pay loss or damage, costs, attorneys' fees or expenses which arise by reason of:

1. (a) Any law, ordinance or governmental regulation (including but not limited to building and zoning laws, ordinances, or regulations) restricting, regulating, prohibiting or relating to (i) the occupancy, use, or enjoyment of the land; (ii) the character, dimensions or location of any improvement now or hereafter erected on the land; (iii) a separation in ownership or a change in the dimensions or area of the land or any parcel of which the land is or was a part; or (iv) environmental protection, or the effect of any violation of these laws, ordinances or governmental regulations, except to the extent that a notice of the enforcement thereof or a notice of a defect, lien or encumbrance resulting from a violation or alleged violation affecting the land has been recorded in the public records at Date of Policy;
   (b) Any governmental police power not excluded by (a) above, except to the extent that a notice of the exercise thereof or a notice of a defect, lien or encumbrance resulting from a violation or alleged violation affecting the land has been recorded in the public records at Date of Policy.
2. Rights of eminent domain unless notice of the exercise thereof has been recorded in the public records at Date of Policy, but not excluding from coverage any taking which has occurred prior to Date of Policy which would be binding on the rights of a purchaser for value without knowledge.
3. Defects, liens, encumbrances, adverse claims, or other matters:
   (a) whether or not recorded in the public records at Date of Policy, but created, suffered, assumed or agreed to by the insured claimant;
   (b) not known to the Company, not recorded in the public records at Date of Policy, but known to the insured claimant and not disclosed in writing to the Company by the insured claimant prior to the date the insured claimant became an insured under this policy;
   (c) resulting in no loss or damage to the insured claimant;
   (d) attaching or created subsequent to Date of Policy (except to the extent that this policy insures the priority of the lien of the insured mortgage over any statutory lien for services, labor or material or the extent insurance is afforded herein as to assessments for street improvements under construction or completed at date of policy); or
   (e) resulting in loss or damage which would not have been sustained if the insured claimant had paid value for the insured mortgage.
4. Unenforceability of the lien of the insured mortgage because of the inability or failure of the insured at Date of Policy, or the inability or failure of any subsequent owner of the indebtedness, to comply with the applicable "doing business" laws of the state in which the land is situated.
5. Invalidity or unenforceability of the lien of the insured mortgage, or claim thereof, which arises out of the transaction evidenced by the insured mortgage and is based upon usury or any consumer credit protection or truth in lending law.
6. Any statutory lien for services, labor or materials (or the claim of priority of any statutory lien for services, labor or materials over the lien of the insured mortgage) arising from an improvement or work related to the land which is contracted for and commenced subsequent to Date of Policy and is not financed in whole or in part by proceeds of the indebtedness secured by the insured mortgage which at Date of Policy the insured has advanced or is obligated to advance.
7. Any claim, which arises out of the transaction creating the interest of the mortgagee insured by this policy, by reason of the operation of federal bankruptcy, state insolvency, or similar creditors' rights laws, that is based on:
   (i) the transaction creating the interest of the insured mortgagee being deemed a fraudulent conveyance or fraudulent transfer; or
   (ii) the subordination of the interest of the insured mortgagee as a result of the application of the doctrine of equitable subordination; or
   (iii) the transaction creating the interest of the insured mortgagee being deemed a preferential transfer except where the preferential transfer results from the failure:
   (a) to timely record the instrument of transfer; or
   (b) of such recordation to impart notice to a purchaser for value or a judgment or lien creditor.

7. AMERICAN LAND TITLE ASSOCIATION LOAN POLICY - 1992
WITH REGIONAL EXCEPTIONS

When the American Land Title Association policy is used as a Standard Coverage Policy and not as an Extended Coverage Policy the exclusions set forth in paragraph 6 above are used and the following exceptions to coverage appear in the policy.

SCHEDULE B

This policy does not insure against loss or damage (and the Company will not pay costs, attorneys' fees or expenses) which arise by reason of:

1. Taxes or assessments which are not shown as existing liens by the records of any taxing authority that levies taxes or assessments on real property or by the public records.
2. Any facts, rights, interests, or claims which are not shown by the public records but which could be ascertained by an inspection of said land or by making inquiry of persons in possession thereof.
3. Easements, claims of easement or encumbrances which are not shown by the public records.
4. Discrepancies, conflicts in boundary lines, shortage in area, encroachments, or any other facts which a correct survey would disclose, and which are not shown by public records.
5. Unpatented mining claims; reservations or exceptions in patents or in Acts authorizing the issuance thereof; water rights, claims or title to water.

6. Any lien, or right to a lien, for services, labor or material theretofore or hereafter furnished, imposed by law and not shown by the public records.

8. AMERICAN LAND TITLE ASSOCIATION OWNER'S POLICY - 1992
EXCLUSIONS FROM COVERAGE

The following matters are expressly excluded from the coverage of this policy and the Company will not pay loss or damage, costs, attorneys' fees or expenses which arise by reason of:

1. (a) Any law, ordinance or governmental regulation (including but not limited to building and zoning laws, ordinances, or regulations) restricting, regulating, prohibiting or relating to (i) the occupancy, use, or enjoyment of the land; (ii) the character, dimensions or location of any improvement now or hereafter erected on the land; (iii) a separation in ownership or a change in the dimensions or area of the land or any parcel of which the land is or was a part; or (iv) environmental protection, or the effect of any violation of these laws, ordinances or governmental regulations, except to the extent that a notice of the enforcement thereof or a notice of a defect, lien or encumbrance resulting from a violation or alleged violation affecting the land has been recorded in the public records at Date of Policy.
   (b) Any governmental police power not excluded by (a) above, except to the extent that a notice of the exercise thereof or a notice of a defect, lien or encumbrance resulting from a violation or alleged violation affecting the land has been recorded in the public records at Date of Policy.
2. Rights of eminent domain unless notice of the exercise thereof has been recorded in the public records at Date of Policy, but not excluding from coverage any taking which has occurred prior to Date of Policy which would be binding on the rights of a purchaser for value without knowledge.
3. Defects, liens, encumbrances, adverse claims, or other matters:
   (a) created, suffered, assumed or agreed to by the insured claimant;
   (b) not known to the Company, not recorded in the public records at Date of Policy, but known to the insured claimant and not disclosed in writing to the Company by the insured claimant prior to the date the insured claimant became an insured under this policy;
   (c) resulting in no loss or damage to the insured claimant;
   (d) attaching or created subsequent to Date of Policy; or
   (e) resulting in loss or damage which would not have been sustained if the insured claimant had paid value for the estate or interest insured by this policy.
4. Any claim, which arises out of the transaction vesting in the insured the estate or interest insured by this policy, by reason of the operation of federal bankruptcy, state insolvency, or similar creditors' rights laws, that is based on:
   (i) the transaction creating the estate or interest insured by this policy being deemed a fraudulent conveyance or fraudulent transfer; or
   (ii) the transaction creating the estate or interest insured by this policy being deemed a preferential transfer except where the preferential transfer results from the failure:
   (a) to timely record the instrument of transfer; or
   (b) of such recordation to impart notice to a purchaser for value or a judgment or lien creditor.

9. AMERICAN LAND TITLE ASSOCIATION OWNER'S POLICY - 1992
WITH REGIONAL EXCEPTIONS

When the American Land Title Association policy is used as a Standard Coverage Policy and not as an Extended Coverage Policy the exclusions set forth in paragraph 8 above are used and the following exceptions to coverage appear in the policy.

SCHEDULE B

This policy does not insure against loss or damage (and the Company will not pay costs, attorneys' fees or expenses) which arise by reason of:
Part One:

1. Taxes or assessments which are not shown as existing liens by the records of any taxing authority that levies taxes or assessments on real property or by the public records.
2. Any facts, rights, interests, or claims which are not shown by the public records but which could be ascertained by an inspection of said land or by making inquiry of persons in possession thereof.
3. Easements, claims of easement or encumbrances which are not shown by the public records.
4. Discrepancies, conflicts in boundary lines, shortage in area, encroachments, or any other facts which a correct survey would disclose, and which are not shown by public records.
5. Unpatented mining claims; reservations or exceptions in patents or in Acts authorizing the issuance thereof; water rights, claims or title to water.
6. Any lien, or right to a lien, for services, labor or material theretofore or hereafter furnished, imposed by law and not shown by the public records.

10. AMERICAN LAND TITLE ASSOCIATION RESIDENTIAL
TITLE INSURANCE POLICY - 1987
EXCLUSIONS

In addition to the Exceptions in Schedule B, you are not insured against loss, costs, attorneys' fees and expenses resulting from:

1. Governmental police power, and the existence or violation of any law or government regulation. This includes building and zoning ordinances and also laws and regulations concerning:
   * land use
   * land division
   * improvements on the land
   * environmental protection

   This exclusion does not apply to violations or the enforcement of these matters which appear in the public records at Policy Date.
   This exclusion does not limit the zoning coverage described in items 12 and 13 of Covered Title Risks.
2. The right to take the land by condemning it, unless:
   * a notice of exercising the right appears in the public records on the Policy Date
   * the taking happened prior to the Policy Date and is binding on you if you bought the land without knowing of the taking.
3. Title Risks:
   * that are created, allowed, or agreed to by you
   * that are known to you, but not to us, on the Policy Date - unless they appeared in the public records
   * that result in no loss to you
   * that first affect your title after the Policy Date - this does not limit the labor and material lien coverage in Item 8 of Covered Title Risks
4. Failure to pay value for your title.
5. Lack of a right:
   * to any land outside the area specifically described and referred to in Item 3 of Schedule A, or
   * in streets, alleys, or waterways that touch your land

   This exclusion does not limit the access coverage in Item 5 of Covered Title Risks.

11. EAGLE PROTECTION OWNER'S POLICY

CLTA HOMEOWNER'S POLICY OF TITLE INSURANCE - 1998
ALTA HOMEOWNER'S POLICY OF TITLE INSURANCE - 1998

Covered Risks 14 (Subdivision Law Violation). 15 (Building Permit). 16 (Zoning) and 18 (Encroachment of boundary walls or fences) are subject to Deductible Amounts and Maximum Dollar Limits of Liability

EXCLUSIONS

In addition to the Exceptions in Schedule B, you are not insured against loss, costs, attorneys' fees, and expenses resulting from:

1. Governmental police power, and the existence or violation of any law or government regulation. This includes ordinances, laws and regulations concerning:
   a. building
   b. zoning
   c. land use
   d. improvements on the land
   e. land division
   f. environmental protection

   This exclusion does not apply to violations or the enforcement of these matters if notice of the violation or enforcement appears in the Public Records at the Policy Date.
   This exclusion does not limit the coverage described in Covered Risk 14, 15, 16, 17 or 24.
2. The failure of Your existing structures, or any part of them, to be constructed in accordance with applicable building codes. This Exclusion does not apply to violations of building codes if notice of the violation appears in the Public Records at the Policy Date.
3. The right to take the Land by condemning it, unless:
   a. a notice of exercising the right appears in the Public Records at the Policy Date; or
   b. the taking happened before the Policy Date and is binding on You if You bought the Land without Knowing of the taking.
4. Risks:
   a. that are created, allowed, or agreed to by You, whether or not they appear in the Public Records;
   b. that are Known to You at the Policy Date, but not to Us, unless they appear in the Public Records at the Policy Date;
   c. that result in no loss to You; or
   d. that first occur after the Policy Date - this does not limit the coverage described in Covered Risk 7, 8.d, 22, 23, 24 or 25.
5. Failure to pay value for Your Title.
6. Lack of a right:
   a. to any Land outside the area specifically described and referred to in paragraph 3 of Schedule A; and
   b. in streets, alleys, or waterways that touch the Land.

   This exclusion does not limit the coverage described in Covered Risk 11 or 18.

12. AMERICAN LAND TITLE ASSOCIATION LOAN POLICY - 1992 WITH A.L.T.A. ENDORSEMENT FORM 1 COVERAGE
WITH EAGLE PROTECTION ADDED

EXCLUSIONS FROM COVERAGE

The following matters are expressly excluded from the coverage of this policy and the Company will not pay loss or damage, costs, attorneys' fees or expenses which arise by reason of:

1. (a) Any law, ordinance or governmental regulation (including but not limited to building and zoning laws, ordinances, or regulations) restricting, regulating, prohibiting or relating to (i) the occupancy, use, or enjoyment of the Land; (ii) the character, dimensions or location of any improvement now or hereafter erected on the Land; (iii) a separation in ownership or a change in the dimensions or area of the Land or any parcel of which the Land is or was a part; or (iv) environmental protection, or the effect of any violation of these laws, ordinances or governmental regulations, except to the extent that a notice of the enforcement thereof or a notice of a defect, lien or encumbrance resulting from a violation or alleged violation affecting the Land has been recorded in the Public Records at Date of Policy. This exclusion does not limit the coverage provided under insuring provisions 14, 15, 16 and 24 of this policy.
   (b) Any governmental police power not excluded by (a) above, except to the extent that a notice of the exercise thereof or a notice of a defect, lien or encumbrance resulting from a violation or alleged violation affecting the land has been recorded in the Public Records at Date of Policy. This exclusion does not limit the coverage provided under insuring provisions 14, 15, 16 and 24 of this policy.
2. Rights of eminent domain unless notice of the exercise thereof has been recorded in the Public Records at Date of Policy, but not excluding from coverage any taking which has occurred prior to Date of Policy which would be binding on the rights of a purchaser for value without Knowledge.
3. Defects, liens, encumbrances, adverse claims or other matters:
   (a) created, suffered, assumed or agreed to by the Insured Claimant;
   (b) not known to the Company, not recorded in the Public Records at Date of Policy, but Known to the Insured Claimant and not disclosed in writing to the Company by the Insured Claimant prior to the date the Insured Claimant became an Insured under this policy;
   (c) resulting in no loss or damage to the Insured Claimant;
   (d) attaching or created subsequent to Date of Policy (this paragraph (d) does not limit the coverage provided under insuring provisions 7, 8, 16, 17, 19, 20, 21, 23, 24 and 25); or
   (e) resulting in loss or damage which would not have been sustained if the Insured Claimant had paid value for the Insured Mortgage.
4. Unenforceability of the lien of the Insured Mortgage because of the inability or failure of the Insured at Date of Policy, or the inability or failure of any subsequent owner of the indebtedness, to comply with applicable doing business laws of the state in which the Land is situated.
5. Invalidity or unenforceability of the lien of the Insured Mortgage, or claim thereof, which arises out of the transaction evidenced by the Insured Mortgage and is based upon:
   (a) usury, except as provided under insuring provision 10 of this policy; or
   (b) any consumer credit protection or truth in lending law.
6. Taxes or assessments of any taxing or assessment authority which become a lien on the Land subsequent to Date of Policy.
7. Any claim, which arises out of the transaction creating the interest of the mortgagee insured by this policy, by reason of the operation of federal bankruptcy, state insolvency, or similar creditors' rights laws, that is based on:
   (a) the transaction creating the interest of the insured mortgagee being deemed a fraudulent conveyance or fraudulent transfer; or
   (b) the subordination of the interest of the insured mortgagee as a result of the application of the doctrine of equitable subordination; or
   (c) the transaction creating the interest of the insured mortgagee being deemed a preferential transfer except where the preferential transfer results from the failure:
   (i) to timely record the instrument of transfer; or
   (ii) of such recordation to impart notice to a purchaser for value or a judgment or lien creditor.
8. Any claim of invalidity, unenforceability or lack of priority of the lien of the Insured Mortgage as to advances or modifications made after the Insured has Knowledge that the vestee shown in Schedule A is no longer the owner of the estate or interest covered by this policy. This exclusion does not limit the coverage provided under insuring provision 7.
9. Lack of priority of the lien of the Insured Mortgage as to each and every advance made after Date of Policy, and all interest charged thereon, over liens, encumbrances and other matters affecting title, the existence of which are Known to the Insured at:
   (a) The time of the advance; or
   (b) The time a modification is made to the terms of the Insured Mortgage which changes the rate of interest charged, if the rate of interest is greater as a result of the modification than **it would have** been before the modification**.**
   This exclusion does not limit the coverage provided under insuring provision 7.

SCHEDULE B

This policy does not insure against loss or damage (and the Company will not pay costs, attorneys' fees or expenses) which arise by reason of:

1. Environmental protection liens provided for by the following existing statutes, which liens will have priority over the lien of the Insured Mortgage when they arise: NONE.

13. AMERICAN LAND TITLE ASSOCIATION LOAN POLICY - 1992
WITH EAGLE PROTECTION ADDED
WITH REGIONAL EXCEPTIONS

When the American Land Title Association loan policy with EAGLE Protection Added is used as a Standard Coverage Policy and not as an Extended Coverage Policy the exclusions set forth in paragraph 12 above are used and the following exceptions to coverage appear in the policy.

SCHEDULE B

This policy does not insure against loss or damage (and the Company will not pay costs, attorneys' fees or expenses) which arise by reason of:
Part One:

1. Taxes or assessments which are not shown as existing liens by the records of any taxing authority that levies taxes or assessments on real property or by the public records.
2. Any facts, rights, interests, or claims which are not shown by the public records but which could be ascertained by an inspection of said land or by making inquiry of persons in possession thereof.
3. Easements, claims of easement or encumbrances which are not shown by the public records.
4. Discrepancies, conflicts in boundary lines, shortage in area, encroachments, or any other facts which a correct survey would disclose, and which are not shown by public records.
5. Unpatented mining claims; reservations or exceptions in patents or in acts authorizing the issuance thereof; water rights, claims or title to water.
6. Any lien, or right to a lien, for services, labor or material theretofore or hereafter furnished, imposed by law and not shown by the public records.

Part Two:

1. Environmental protection liens provided for by the following existing statutes, which liens will have priority over the lien of the Insured Mortgage when they arise: NONE