Washington State School Seismic Safety Assessments Project

SEISMIC UPGRADES CONCEPT DESIGN REPORT

Totem Middle School – Main Building

Marysville School District

June 2019

PREPARED FOR

PREPARED BY

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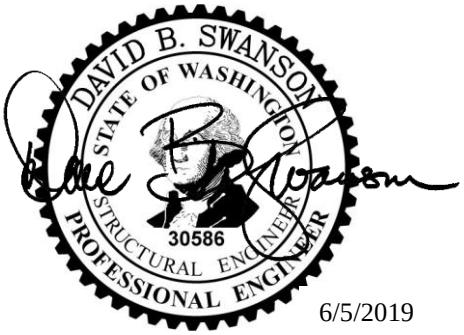

6/5/2019

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EXECUTIVE SUMMARY

This report documents the findings of a seismic evaluation of the Totem Middle School Main Building in Marysville, Washington. This school building is a single-story, rectangular, 22,000-square-foot stack-bond concrete masonry structure with a wood-framed roof, most of which was constructed in 1966. The western half the library at the northwest corner of the building was constructed in 1962 of similar construction. The building features multiple classrooms, a science lab, a library, and various administrative spaces on either side of a 14-foot corridor that runs lengthwise down the middle of the building. The roof framing system consists primarily of wood sheathing supported by open-web wood joists with metal webs spanning from exterior walls to interior corridor walls. The lateral system consists of plywood roof diaphragms, concrete masonry unit (CMU) shear walls, and plywood-sheathed wood shear walls.

Reid Middleton performed a Tier 1 screening in accordance with the ASCE 41-17 standard *Seismic Evaluation and Retrofit of Existing Buildings*. The evaluation included field observations and review of record drawings to verify the existing construction. The structural seismic evaluation indicated that the building has multiple seismic deficiencies; the most susceptible ones being out-of-plane wall anchorage and bracing, continuous diaphragm cross-ties, wood ledgers susceptible to cross-grain bending, and double-wythe exterior masonry walls around the library.

Conceptual seismic upgrade recommendations for the structural systems are provided to improve the performance of the building to meet the designated performance criteria of ASCE 41-17. Sketches for the concept-level seismic upgrades are provided in Appendix B. The structural upgrades include strongbacking of the masonry cavity walls in the library, out-of-plane wall anchorage and bracing for the exterior and interior masonry walls, plywood roof sheathing over the library, and adding plywood to select wood-framed partitions to become shear walls. The recommendations for nonstructural upgrades are to further investigate the integrated ceiling system and lighting fixtures in the main corridor to mitigate the risk of obstructions impeding the paths of egress as students and faculty evacuate the building following a seismic event.

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Acronyms

ADA	Americans with Disabilities Act
ASCE	American Society of Civil Engineers
BPOE	Basic Performance Objective for Existing Buildings
BSE	Basic Safety Earthquake
BU	Built-Up
CMU	Concrete Masonry Unit
CP	Collapse Prevention
DNR	Department of Natural Resources
DCR	Demand-to-Capacity Ratio
EERI	Earthquake Engineering Research Institute
EPAT	EERI Earthquake Performance Assessment Tool
FEMA	Federal Emergency Management Agency
GWB	Gypsum Wallboard
IBC	International Building Code
ICOS	Information and Condition of Schools
IEBC	International Existing Building Code
IO	Immediate Occupancy
LS	Life Safety
MCE	Maximum Considered Earthquake
MEP	Mechanical/Electrical/Plumbing
NFPA	National Fire Protection Association
OSHA	Occupational Safety and Health Administration
OSPI	Office of the Superintendent of Public Instruction
PBEE	Performance-Based Earthquake Engineering
PR	Position Retention
ROM	Rough Order-of-Magnitude
SSSSC	School Seismic Safety Steering Committee
UBC	Uniform Building Code
USGS	United States Geological Survey
WF	Wide Flange
WGS	Washington Geological Survey

Reference List

Codes and References

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FEMA E-74, *Reducing the Risks of Nonstructural Earthquake Damage.* Prepared by https://www.fema.gov/fema-e-74-reducing-risks-nonstructural-earthquake-damage

FEMA Earthquake School Hazard Hunt Game and Poster. Prepared by https://www.fema.gov/media-library/assets/documents/90409

Promoting Seismic Safety: Guidance for Advocates. Prepared by https://www.fema.gov/media-library/assets/documents/3229

Drawings

Mallis & DeHart Architects, January 23, 1962, existing drawings titled "Plans for Additions to Marysville Senior High School for Marysville School District No, 305," Snohomish County, Washington (Library, "Unit A")

Mallis & DeHart Architects, June 9, 1966, existing drawings titled "Plans for Additions to Marysville Senior High School for Marysville School District No, 305," Snohomish County, Washington (Main Building, "Unit H")

1.0 Introduction

1.1 Background

The Washington Geological Survey (WGS), a division of the Department of Natural Resources (DNR), is conducting a seismic assessment of 222 school buildings and 5 fire stations across Washington State to better understand the current level of seismic risk of Washington State's public-school buildings. The two main components of this project are: (1) geologic site characterization, and (2) the seismic assessment of buildings. As a part of the seismic assessments, Tier 1 screening of structural systems and nonstructural assessments were performed in accordance with the American Society of Civil Engineers' (ASCE) Standard 41-17 *Seismic Evaluation and Retrofit of Existing Buildings*. Concept-level seismic upgrades were developed to address the identified deficiencies of a select number of school buildings to evaluate seismic upgrade strategies, feasibilities, and implementation costs.

Fifteen school buildings were selected in consultation with WGS and the School Seismic Safety Steering Committee (SSSSC) to receive concept-level seismic upgrade designs utilizing the ASCE 41 Tier 1 evaluation results. This report documents the concept-level seismic upgrade design for one of those school buildings. The concept-level seismic upgrades will include structural and nonstructural seismic upgrade recommendations, with concept-level sketches and rough order-of-magnitude (ROM) construction costs determined for each building. The fifteen school buildings were selected from the list of schools with the intent of representing a variety of regions, building uses, construction eras, and construction materials.

The overall goal of the project is to provide a better understanding of the current seismic risk of our state's K-12 school buildings and what needs to be done to improve the buildings in accordance with ASCE 41 to meet seismic performance objectives.

The seismic evaluation consists of a Tier 1 screening for the structural systems performed in accordance with ASCE 41-17.

1.2 Scope of Services

The project is being performed in several distinct and overlapping phases of work. The scope of this report is as listed in the following sections.

1.2.1 Information Review

1. Project Research: Reid Middleton and their project team researched available school building records, such as relevant site data and record drawings, in advance of the field investigations. This research included searching school building records and contacting the districts and/or the Office of Superintendent of Public Instruction (OSPI) to obtain building plans, seismic reports, condition reports, property records, or related construction information useful for the project.

2. Site Geologic Data: Site geological data provided by the WGS, including site shear wave velocities, was utilized to determine the project Site Class in accordance with ASCE 41, which is included in the Tier 1 checklists and concept-level seismic upgrades design work.

1.2.2 Field Investigations

1. Field Investigations: Each of the identified buildings was visited to observe the building's age, condition, configuration, and structural systems for the purposes of the ASCE 41 Tier 1 seismic evaluations. This task included confirmation of general information in building records or layout drawings and visual observation of the structural condition of the facilities. Engineer field reports, notes, photographs, and videos of the facilities were prepared and utilized to record and document information gathered in the field investigation work.

2. Limitations Due to Access and Worker Safety: Field observations at each site were typically performed by an individual engineer. Observation efforts were limited to areas and building elements that were readily observable and safely accessible. Observations requiring access to confined spaces, potential hazardous material exposure, access by unsecured ladder, work around energized equipment or mechanical hazards, access to areas requiring Occupational Safety and Health Administration (OSHA) fall-protection, steep or unstable slopes, deteriorated structural assemblies, or other conditions deemed potentially unsafe by the engineer were not performed. Removal of finishes (e.g., gypsum board, lathe and plaster, brick veneer, roofing materials) for access to concealed conditions or to expose elements that could not otherwise be visually observed and assessed was not performed. Material testing or sampling was not performed. The ASCE checklist items that were not documented due to access limitations are noted.

1.2.3 Seismic Evaluations

1. Preliminary Seismic Evaluations: Preliminary seismic assessments of the structural and nonstructural systems of the school buildings were performed in accordance with ASCE 41-17 Tier 1 Evaluation Procedures.

2. Concept-Level Designs: Further seismic evaluation work was performed to provide concept-level seismic retrofits and/or upgrade designs for the selected school buildings based on the results of the Tier 1 seismic evaluations. The concept-level seismic upgrades design work included narrative descriptions of proposed seismic retrofits and/or upgrade schemes and concept sketches depicting the extent and type of recommended structural upgrades.

3. Cost Estimating: Through the concept-level seismic upgrades design process, ProDims provided opinions of probable construction costs for the concept-level seismic upgrade designs for the selected school buildings. These concept-level seismic upgrade designs and the associated opinions of probable construction costs are intended to be

representative samples that can be extrapolated to estimate the overall capital needs of seismically upgrading Washington State schools.

1.2.4 Reporting and Documentation

1. Project Reports: A preliminary seismic evaluation report on the overall Tier 1 seismic assessment of the schools will be provided to DNR/WGS and OSPI. The Tier 1 seismic evaluation of each building was documented by a standard report format that provides a summary of the structural systems of the building, Tier 1 checklist, building sketches/plans (if available), and site photographs. The reports will summarize the seismic evaluation, with concept-level seismic upgrade sketches and opinions of probable construction costs for seismic upgrades for each school building.

2. Building Photography: Photos and videos were taken of each building during on-site walkthroughs to document the existing building configurations, conditions, and structural systems.

3. Record Drawings: Record drawings and other information that was collected during the evaluation process are available for DNR/WGS, OSPI, and the school districts.

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2.0 Seismic Evaluation Procedures and Criteria

2.1 ASCE 41 Seismic Evaluation and Retrofit Overview

The current standard for seismic evaluation and retrofit (upgrades) of existing buildings is ASCE 41-17. ASCE 41 provides screening and evaluation procedures used to identify potential seismic deficiencies that may require further investigation or hazard mitigation. It presents a three-tiered review process, implemented by first following a series of predefined checklists and "quick check" structural calculations. Each successive tier is designed to perform an increasingly refined evaluation procedure for seismic deficiencies identified in previous tiers in the process. The flow chart in Figure 2.1 illustrates the evaluation process.

TIER 1 – Screening Phase
- Checklists of evaluation statements to quickly identify potential deficiencies
- Requires field investigation and/or review of record drawings
- Analysis limited to "Quick Checks" of global elements
- May proceed to Tier 2, Tier 3, or rehabilitation design if deficiencies are identified

TIER 2 – Evaluation Phase
- "Full Building" or "Deficiency Only" evaluation
- Address all Tier 1 seismic deficiencies
- Analysis more refined than Tier 1, but limited to simplified linear procedures
- Identify buildings not requiring rehabilitation

TIER 3 – Detailed Evaluation Phase
- Component-based evaluation of entire building using reduced ASCE 41 forces
- Advanced analytical procedures available if Tier 1 and/or Tier 2 evaluations are judged to be overly conservative
- Complex analysis procedures may result in construction savings equal to many times their cost

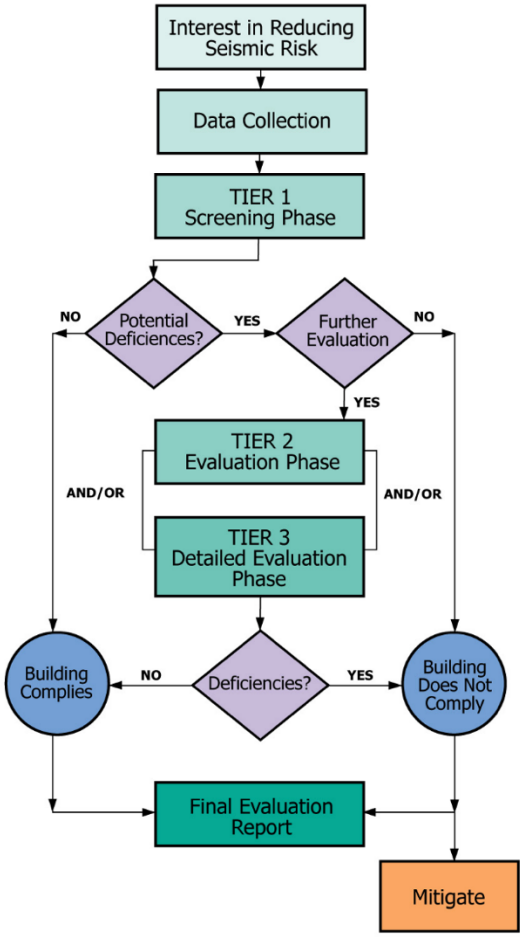

Figure 2-1. Flow Chart and Description of ASCE 41 Seismic Evaluation Procedure.

The Tier 1 checklists in ASCE 41 are specific to each common building type and contain seismic evaluation statements based on observed structural damage in past earthquakes. These checklists screen for potential seismic deficiencies by examining the lateral-force-resisting systems and details of construction that have historically caused poor seismic performance in similar buildings. Tier 1 screenings include basic "Quick Check" analyses for primary components of the lateral system: in this building's case, the masonry shear wall stresses and wall anchorage.

Tier 1 screenings also include prescriptive checks for proper seismic detailing of connections, diaphragm spans and continuity, and overall system configuration.

Tier 2 evaluations then follow with more-detailed structural and seismic calculations and assessments to either confirm the potential deficiencies identified in the Tier 1 review or demonstrate their adequacy. A Tier 3 evaluation involves an even more detailed analysis and advanced structural and seismic computations to review each structural component's seismic demand and capacity. A Tier 3 evaluation is similar in scope and complexity to the types of analyses often required to design a new building in accordance with the International Building Code (IBC), with a comprehensive analysis aimed at evaluating each component's seismic performance. Generally, Tier 3 evaluations are not practical for typical and regular-type buildings due to the rigorous and complicated calculations and procedures. As indicated in the Scope of Services, this evaluation included a Tier 1 screening of the structural systems.

2.2 Seismic Evaluation and Retrofit Criteria

Performance-Based Earthquake Engineering (PBEE) can be defined as the engineering of a structure to resist different levels of earthquake demand in order to meet the needs and performance objectives of building owners and other stakeholders. ASCE 41 employs a PBEE design methodology that allows building owners, design professionals, and the local building code authorities to establish seismic hazard levels and performance goals for individual buildings.

2.2.1 Totem Middle School Seismicity

Seismic hazards for the United States have been quantified by the United States Geological Survey (USGS). The information has been used to create seismic hazard maps, which are currently used in building codes to determine the design-level earthquake magnitudes for building design.

The Level of Seismicity is categorized as Very Low, Low, Moderate, or High based on the probabilistic ground accelerations. Ground accelerations and mass generate inertial (seismic) forces within a building (Force = mass x acceleration). Ground acceleration therefore is the parameter that classifies the level of seismicity. From geographic region to region, as the ground accelerations increase, so does the level of seismicity (from low to high). Where this building is located, the design short-period spectral acceleration, S_{DS}, is 0.799 g, and the design 1-second period spectral acceleration, $S_{D1,}$ is 0.462 g. Based on ASCE 41 Table 2-4, the Level of Seismicity for this building is classified as **High**.

The ASCE 41 Basic Performance Objective for Existing Buildings (BPOE) makes use of the Basic Safety Earthquake – 1E (BSE-1E) seismic hazard level and the Basic Safety Earthquake – 2E (BSE-2E). The BSE-1E earthquake is defined by ASCE 41 as the probabilistic ground motion with a 20 percent probability of exceedance in 50 years, or otherwise characterized as a ground motion acceleration with a probabilistic 225-year return period. The BSE-2E earthquake is defined by ASCE 41 as the probabilistic ground motion with a 5 percent probability of exceedance in 50 years, or otherwise characterized as a ground motion acceleration with a

probabilistic 975-year return period. The BSE-2N seismic hazard level is the Maximum Considered Earthquake (MCE) ground motion used in current codes for the design of new buildings and is also used in ASCE 41 to classify the Level of Seismicity for a building. The BSE-2N has a statistical ground motion acceleration with 2 percent probability of exceedance in 50 years, or otherwise characterized as a ground motion acceleration with a probabilistic 2,475-year return period.

Table 2.2.1-1 provides the spectral accelerations for the 225-year, 975-year, and 2,475-year return interval events specific to Totem Middle School that are considered in this study.

Table 2.2.1-1. Spectral Acceleration Parameters (Not Site-Modified).

BSE-1E 20%/50 (225-year) Event		BSE-1N 2/3 of 2,475-year Event		BSE-2E 5%/50 (975-year) Event		BSE-2N 2%/50 (2,475-year) Event	
0.2 Seconds	0.416 g	0.2 Seconds	0.769 g	0.2 Seconds	0.83 g	0.2 Seconds	1.154 g
1.0 Seconds	0.153 g	1.0 Seconds	0.297 g	1.0 Seconds	0.324 g	1.0 Seconds	0.446 g

2.2.2 Totem Middle School Structural Performance Objective

The school building is an Educational Group E occupancy (Risk Category III) structure and has not been identified as a critical structure requiring immediate use following an earthquake. However, Risk Category III buildings are structures that represent a substantial hazard to human life in the event of failure. According to ASCE 41, the BPOE for Risk Category III structures is the Damage Control structural performance level at the BSE-1E seismic hazard level and the Limited Safety structural performance level at the BSE-2E seismic hazard level. The ASCE 41 Tier 1 evaluations were conducted in accordance with ASCE 41 requirements and ASCE 41 seismic performance levels. Concept-level upgrades were developed for the **Life Safety** structural performance level at the **BSE-1N** seismic hazard level in accordance with DNR direction, the project scope of work, and the project legislative language.

At the Life-Safety performance level, the building may sustain damage while still protecting occupants from life-threatening injuries and allowing occupants to exit the building. Structural and nonstructural components may be extensively damaged, but some margin against the onset of partial or total collapse remains. Injuries to occupants or persons in the immediate vicinity may occur during an earthquake; however, the overall risk of life-threatening injury as a result of structural damage is anticipated to be low. Repairs may be required before reoccupying the building, and, in some cases, repairs may be economically unfeasible.

Knowledge Factor

A knowledge factor, *k*, is an ASCE 41 prescribed factor that is used to account for uncertainty in the as-built data considering the selected Performance Objective and data collection processes (availability of existing drawings, visual observation, and level of materials testing). No in-situ testing of building materials was performed; however, some material properties and existing construction information were provided in the existing record drawings. If the concept design is

developed further, additional materials tests and site investigations will be required to substantiate assumptions about the existing framing systems.

ASCE 41 Classified Building Type

Use of ASCE 41 for seismic evaluations requires buildings to be classified from a group of common building types historically defined in previous seismic evaluation standards (ATC-14, FEMA 310, and ASCE 31-03). The school is classified in ASCE 41 Table 3-1 as a Reinforced Masonry shear wall building with flexible diaphragms, **RM1**. Reinforced masonry shear wall buildings (RM1) include those that have bearing shear walls constructed of reinforced masonry with elevated floor and roof framing structural systems consisting of wood framing.

2.3 Report Limitations

The professional services described in this report were performed based on available record drawing information and limited visual observation of the structure. No other warranty is made as to the professional advice included in this report. This report provides an overview of the seismic evaluation results and does not address programming and planning issues. This report has been prepared for the exclusive use of DNR/WGS and is not intended for use by other parties, as it may not contain sufficient information for purposes of other parties or their uses.

3.0 Building Description & Seismic Evaluation Findings

3.1 Building Overview

3.1.1 Building Description

Original Year Built: 1966
Building Code: 1964 UBC

Number of Stories: 1
Floor Area: 22,384 SF

FEMA Building Type: RM1
ASCE 41 Level of Seismicity: High
Site Class: D

The Totem Middle School Main Building is located on a flat site at the south-central area of the Totem Middle School complex. The rectangular building has a footprint of 241 feet by 97 feet. The Main Building consists of a 2,800-square-foot library constructed in 1962, and a 19,600-square-foot addition in 1966 that expanded the building footprint to the south and east. The library construction consists of double-wythe masonry cavity walls on the exterior and a glulam timber roof construction. The 1966 main building addition consists of stack-bond, reinforced concrete masonry exterior walls and interior corridor walls that serve as bearing walls and shear walls for the wood-framed roof above. The building has classroom and admin spaces on each side of a main corridor that runs lengthwise down the middle of the building.

The roof framing over the classroom areas consists of wood sheathing supported by open-web wood joists with metal webs. Over the library, the roof framing consists of dimension framing and clear spanning glulam girders bearing on steel columns embedded in the masonry walls. The lateral system of the building consists of plywood roof diaphragms, CMU shear walls, and plywood-sheathed wood shear walls in the transverse direction.

3.1.2 Building Use

The Main Building has multiple classrooms, a science lab, a library, and various administrative spaces. The building has a small 400-square-foot fan room above the middle corridor in the middle of the building.

3.1.3 Structural System

Table 3.1.3-1. Structural System Descriptions.

Structural System	Description
Structural Roof over Library	The portion of the library built in 1962 is 1-inch diagonal sheathing lap over 2x12s at 16 inches on center spanning to pitched and arched glulam beams that bear on pipe columns embedded in concrete masonry walls. The portion of library added on in 1966 is of similar construction, except it is sheathed with plywood instead of 1-inch diagonal sheathing.
Structural Roof over Classrooms and Admin	Roof is sheathed with 5/8-inch and 3/4-inch plywood on the north half and south half, respectively, over tapered open-web joists spaced at 32 inches and 48 inches on center on the north half and south half, respectively. The roof over the corridors is framed with 2x8s at 16 inches on center.
Structural Floor(s)	The main floor is a 4-inch-thick concrete slab on grade reinforced with welded wire mesh. The small fan room over the corridor is a 3-inch concrete slab over 12-inch-deep steel bar joists at 24 inches on center.
Foundations	Foundations consist of cast-in-place concrete strip footings supporting the masonry bearing walls and shear walls and thickened slab footings under the transverse wood shear walls.
Gravity System	The gravity system primarily consists of a wood-framed roof spanning in the north-south direction from the exterior to the interior corridor and supported by reinforced CMU bearing walls.
Lateral System	The lateral system consists of a plywood roof diaphragm supported by stack-bond reinforced masonry shear walls along the exterior and interior corridor, and by transverse plywood-sheathed wood-framed shear walls between the classrooms. The masonry shear walls are the exterior walls of the building, the interior corridor walls running down the length of the building, and an interior transverse shear wall separating the library and the science lab. The exterior walls of the 1962 library is an unreinforced double-wythe CMU cavity wall.

3.1.4 Structural System Visual Condition

Table 3.1.4-1. Structural System Condition Descriptions.

Structural System	Description
Structural Roof	No visible signs of corrosion, damage, or deterioration.
Structural Roof	Did not observe signs of corrosion, damage, or deterioration. Also did not see any significant areas of water-damaged ceiling tiles.

Table 3.1.4-1. Structural System Condition Descriptions.

Structural System	Description
Foundations	Foundations and slabs on grade appear to be in good condition. Did not observe signs of damage, distress, or settlement.
Masonry Walls	The masonry walls appear to be in good condition. Did not observe signs of damage, deterioration, or distress in the masonry walls or mortar joints.

3.2 Seismic Evaluation Findings

3.2.1 Structural Seismic Deficiencies

The structural seismic deficiencies identified during the Tier 1 evaluation are summarized below. Commentary for each deficiency is provided based on this evaluation.

Table 3.2.1-1. Identified Structural Seismic Deficiencies Based on Tier 1 Checklists.

Deficiency	Description
Adjacent Buildings	The covered walkway attached to this structure is immediately adjacent to the covered walkway attached to the adjacent structure.
Reinforcing Steel	The minimum of 0.0007 in either of the two directions is not satisfied. Vertical reinforcing steel consists of #4 at 48 inches on center, which produces a reinforcing ratio of 0.00055.
Foundation Dowels	The south, west, and north masonry cavity walls of the 1962 library were not detailed to have vertical dowels connecting the 8-inch masonry backup wall to the foundation.
Cross Ties	Continuous cross-ties are not present in longitudinal (east-west) direction.
Wall Anchorage	Exterior and interior masonry bearing walls were not detailed to have out-of-plane anchorage or bracing to the roof diaphragm.
Wood Ledgers	The lower roof that frames in to the east face of the masonry wall, between the library and science lab, is supported by a 3x ledger without wall anchor ties directly attached to the diaphragm.

3.2.2 Structural Checklist Items Marked as “U”nknown

Where building structural component seismic adequacy was unknown due to lack of available information or limited observation, the structural checklist items were marked as “unknown”. These items require further investigation if definitive determination of compliance or

noncompliance is desired. The unknown structural checklist items identified during the Tier 1 evaluation are summarized below. Commentary for each unknown item is provided based on the evaluation.

Table 3.2.2-1. Identified Structural Checklist Items Marked as Unknown.

Deficiency	Description
Liquefaction	"Low to moderate" liquefaction potential is identified per ICOS based on state geologic mapping. Requires further investigation by a licensed geotechnical engineer to determine liquefaction potential.
Slope Failure	Requires further investigation by a licensed geotechnical engineer to determine susceptibility to slope failure. The structure appears to be located on a relatively flat site.
Surface Fault Rupture	Requires further investigation by a licensed geotechnical engineer to determine whether site is near locations of expected surface fault ruptures.
Load Path and Transfer to Shear Walls	The panel edge nailing and extent of the plywood sheathing on the pony stud walls on top of the masonry bearing walls. These plywood-sheathed walls transfer the seismic forces from the roof diaphragm to the masonry shear walls and should be further investigated to determine if this is a complete load path.

3.2.3 Nonstructural Seismic Deficiencies

Table 3.2.3-1 summarizes the seismic deficiencies in the nonstructural systems. The Tier 1 screening checklists are provided in Appendix A.

Table 3.2.3-1. Identified Nonstructural Seismic Deficiencies based on Tier 1 Checklists.

Deficiency	Description
M-1 Masonry Veneer Ties	The west, north, and south walls of the 1962 library are masonry cavity walls with a 4-inch CMU veneer (outer cavity) that was not detailed to have out-of-plane anchor ties to the 8-inch CMU backing wall.
M-3 Weakened Planes	Veneer out -of-plane anchor ties are not specified in the existing drawings.
M-4 Unreinforced Masonry Backup	The 8-inch masonry backup wall does not have vertical reinforcing to span from the ground to the roof diaphragm.
M-6 Masonry Backup Anchorage	The 8-inch masonry backup wall does not have out-of-plane connections to the roof diaphragm.

3.2.4 Nonstructural Checklist Items Marked as "U"nknown

Where building nonstructural component seismic adequacy was unknown due to lack of available information or limited observation, the nonstructural checklist items were marked as "unknown". These items require further investigation if definitive determination of compliance or noncompliance is desired. The unknown nonstructural checklist items identified during the Tier 1 evaluation are summarized below. Commentary for each unknown item is provided based on the evaluation.

Some nonstructural deficiencies may be able to be mitigated by school district staff. Other nonstructural components that require substantial mitigation may be more appropriately included in a long-term mitigation strategy. Some typical conceptual details for the seismic upgrade of nonstructural components can be found in the FEMA E-74 Excerpts appendix.

Table 3.2.4-1. Identified Nonstructural Checklist Items Marked as Unknown.

Deficiency	Description
LSS-1 Fire Suppression Piping; LSS-2 Flexible Couplings; and LSS-5 Sprinkler Ceiling Clearance	A fire suppression system was not observed. The school district should verify if the building contains a fire suppression system. If so, based on age of the building, it is likely that the seismic bracing, coupling, and sprinkler head clearances of the fire suppression piping does not comply with current NFPA 13 requirements.
LSS-3 Emergency Power	Facility staff should verify if emergency power is being used to power or control Life Safety systems, and if so, further investigate to see if this equipment is adequately anchored or braced.
HM-1 Hazardous Material Equipment; HM-2 Hazardous Material Storage; HM-3 Hazardous Material Distribution; HM-4 Shutoff Valves	It is unknown if the structure contains hazardous materials. Maintenance and facility staff should verify presence of hazardous materials, including natural gas, and if present, further investigate the equipment, piping, coupling, and shutoff valves to mitigate seismic risk.
P-4 Light Partitions Supported by Ceilings	Light-frame partition walls along paths of egress (exiting/egress corridor walls) should be investigated and checked for proper seismic bracing at the top of the walls to mitigate the risk of toppling and becoming obstructions in the paths of egress.

Table 3.2.4-1. Identified Nonstructural Checklist Items Marked as Unknown.

Deficiency	Description
C-2 Suspended Gypsum	Based on review of the existing drawings and site visit, gypsum wallboard (GWB) ceilings occur in the restrooms and the utility rooms. Based on the age of the building it is likely that large areas of GWB ceilings are noncompliant if they are not directly attached to the roof structure. Most ceilings on the interior of the building appear to be acoustic tile ceilings. Further investigation should be performed for the GWB ceiling construction in the restrooms or other occupied areas with large GWB ceiling areas, especially over paths of egress. Supplemental bracing or reconstruction of these GWB areas may be appropriate to mitigate seismic risk.
C-3 Integrated Ceilings	Integrated suspended ceiling systems above paths of egress (exiting/egress corridors) should be investigated and checked for proper seismic bracing and edge clearance detailing to mitigate the risk of becoming fallen obstructions in the paths of egress.
LF-1 Independent Support	The light fixtures in the main corridor are supported within an integrated ceiling system, which is over a path of egress. Maintenance and facility staff should verify that each fixture is independently supported to the roof structure from opposite corners and add wire supports as necessary.
CF-2 Tall Narrow Contents	The book shelves in the library are backed up to the walls of the library, but it is unknown if these shelving units are anchored to the backing walls. Maintenance and facility staff should verify that the tops of the shelving units are braced or anchored to the nearest backing wall or provide overturning base restraint
ME-1 Fall-Prone Equipment, ME-2 In-Line Equipment, ME-3 Tall-Narrow Equipment	This was not able to be verified during the site investigation. Further investigation should be performed to see if bracing or anchoring of fall-prone and overhead falling hazard equipment exists. Additional bracing may be appropriate to mitigate seismic risk.

4.0 Conclusion and Recommendations

4.1 Seismic-Structural Upgrade Recommendations

Concept-level seismic upgrade recommendations to improve the lateral-force-resisting system were developed. The sketches in Appendix B depict the concept-level structural upgrade recommendations outlined in this section. The following concept recommendations are intended to address the structural deficiencies noted in Table 3.2.1-1. This concept-level seismic upgrade design represents just one of several alternative seismic upgrade design solutions and is based on preliminary seismic evaluation and analysis results. Final analysis and design for seismic upgrades must include a more detailed seismic evaluation of the building in its present or future configuration. Proposed seismic upgrades include the following.

4.1.1 Strongbacking of Existing Masonry Cavity Walls in the Library

The south, west, and north exterior masonry cavity walls of the western half of the library that was constructed in 1962 is recommended to be strengthened for out-of-plane and in-plane seismic forces with anchor ties and plywood-sheathed metal stud strongback walls. The anchor ties for the outer cavity walls are recommended to be rosette anchors with threaded rods spaced at 4 feet on center each way for the entire wall elevation. The metal stud strongback walls are recommended to be full height along the masonry cavity wall, anchored to the inside face of the masonry with light-gage clips, and connected at the top to the existing wood roof diaphragm to resist out-of-plane seismic forces due to the weight of the 4-inch and 8-inch CMU cavity wall. For in-plane shear strength, the metal strongback wall should be sheathed and fastened as a plywood shear wall.

4.1.2 New Transverse Wood Shear Walls

To reduce long roof diaphragm spans and high diaphragm ratios, select existing partition walls should be strengthened with plywood sheathing to serve as new interior shear walls to resist seismic loads in the north-south direction. The conceptual foundation plan in Appendix B shows proposed shear wall locations. These new shear walls will also require a new strip foundation to be saw-cut and installed in the existing slab on grade.

4.1.3 Verification of Existing Transverse Wood Shear Walls

The interior plywood-sheathed shear walls in the north-south direction that are shown in the existing drawings are key contributors to the building's lateral system to resist wind and seismic loads in the north-south direction and for keeping the diaphragm length-to-depth aspect ratios to a reasonable ratio. It is recommended that selective demolition at the lower 2 feet of the shear walls in representative locations be performed to verify the presence of sill plate anchor bolts, plywood sheathing, and plywood panel edge nailing.

4.1.4 Roof Diaphragm Sheathing at the Western Half of the Library

The western half of the library was constructed in 1962 and has a diaphragm that consists of 1-inch diagonal sheathing over flat 2x4s at 16 inches on center. The diaphragm strength and stiffness can be enhanced by overlaying the diagonal sheathing with 1/2-inch plywood sheathing. This can be performed as part of a future re-roofing project.

4.1.5 Wall Anchorage and Bracing to the Roof Diaphragm

Wall anchorage and bracing should be added to the exterior CMU walls, the interior CMU corridor walls, and the CMU interior wall between the library and science lab. For the north and south exterior walls and the interior corridor walls, 2x struts can be anchored to the existing sill plate on top of the CMU walls and fastened to the existing open-web joists to anchor the walls to the roof diaphragm. Along the east and west exterior CMU walls, 2x diagonal bracing, blocking, and metal strapping should be added to not only brace the tops of the CMU walls, but to adequately develop the anchorage forces into the roof diaphragm. At the walls around the library, the CMU walls should be anchored with tension ties such as Simpson LTT that anchor to the wall and fasten to the roof framing. These out-of-plane anchorage enhancements can also be performed as part of a future re-roofing project to take advantage of the access provided to the top of the existing plywood roof sheathing for the nailing to the blocking and strapping required.

4.1.6 Load Path to the Exterior Masonry Shear Walls

The roof diaphragm forces are transferred to the masonry shear walls through a plywood-sheathed pony stud wall that sits on top of the CMU. The existing drawings detailed the plywood sheathing extending to the sill plate nailer on top of the CMU wall. However, there are let-in 2x joists for the covered walkway at the bottom of the pony wall that may have interfered with the plywood-to-sill-plate connection at the top of the CMU wall. Furthermore, a nailing pattern was not specified for the plywood sheathing to the pony wall top plates, sill plate, or panel edges to transfer the roof diaphragm forces to the masonry shear walls. It is recommended that this sheathed pony wall construction be further investigated to determine and ensure a complete load path from the roof diaphragm to the masonry shear walls. This will require selective demolition of the exterior soffit finish and removal of interior ceiling tiles to provide viewing access.

4.2 Nonstructural Upgrade Recommendations

Table 3.2.1-2 identifies several nonstructural deficiencies that do not meet the performance objective selected for Totem Middle School. It is recommended that these deficiencies be addressed to provide nonstructural performance consistent with the performance of the upgraded structural lateral–force-resisting system. As-built information for the existing nonstructural systems, such as fire sprinklers, mechanical ductworks, and piping, are not available for review. Only limited visual observation of the systems was performed during field investigation due to limited access or visibility to observe existing conditions. The conceptual mitigation strategies provided in this study are preliminary only. The final analysis and design for seismic rehabilitation should include a detailed field investigation.

4.2.1 Architectural Systems

This section addresses existing construction that, while not posing specific hazards during a seismic event, would be affected by the seismic improvements proposed.

For any remodel project of an existing building, the International Existing Building Code (IEBC) would be applicable. The intent of the IEBC is to provide flexibility to permit the use of alternative approaches to achieve compliance with minimum requirements to safeguard the public health, safety, and welfare insofar as they are affected by the work being done. Elements of the exterior building envelope being affected by the seismic work would also be required to be brought up to the current Washington State Energy Code per Chapter 5, where applicable.

It should also be noted that, as a part of any upgrade to existing buildings, the IEBC will require that any altered primary function spaces (classrooms, gyms, entrances, offices) and routes to these spaces, be made accessible to the current accessibility standards of the Americans with Disabilities Act (ADA), unless technically infeasible. This would include, but is not limited to: accessible restrooms, paths of travel, entrances and exits, parking, signage, and fire alarm systems. Under no circumstances should the facility be made less accessible. The IEBC does, however, have exceptions for areas that do not contain a primary function (storage room, utility rooms) and states that costs of providing the accessible route are not required to exceed 20 percent of the costs of the alterations affecting the area of Primary Function. As with any major renovation and modernization, an ADA study would be recommended to determine the extent to which an existing facility needs to be improved to be in compliance with the ADA.

Strongback Seismic Walls at the Library

A five-foot portion of the existing furred tile ceiling will need to be removed for access to masonry above at the new strongback walls and anchors. It may be difficult to match the existing acoustic ceiling tiles that are currently installed. Given the age and condition of the tiles, it may be best to replace all existing ceiling tiles in the library as a part of an overall modernization project.

Transverse Shear Walls and Roof Diaphragm

New shear walls will require removal of the flooring materials at least three feet out from the walls in order to construct the new foundations. The flooring appears to be vinyl composition tiles and, given the age of the building, the tile and/or adhesive could contain asbestos. An asbestos survey of the building would be recommended prior to any demolition.

Existing electrical outlets, switches, and other items will need to be reinstalled in new 2x6 stud shear walls with 5/8-inch gypsum board on both sides. Paint and new rubber base would be installed to match adjacent wall finishes.

Verification of Existing Transverse Shear Walls

Given the extent of additional nailing and new roof sheathing, this work would best be done in conjunction with a building reroof.

Where investigation of the existing shear walls are proposed, the drywall will need to be patched after the anchor bolt inspection. This will include painting of the entire wall and installation of new rubber base.

Roof Diaphragm Sheathing at the Library

A future reroof project may require additional roof insulation as part of alterations. The drawings show batt insulation laid above the interior ceiling surfaces, creating an unconditioned attic space above. As part of a reroof project, we recommend installing an above-roof continuous rigid insulation of R-38 over the entire roof to comply with current energy code. Any mechanical equipment curbs should be raised to accommodate the thicker insulation. Alternately, additional batt insulation above the ceilings at the bottom of the trusses would need to be added to increase the existing R-13 insulation to an R-49.

Anchorage and Bracing to Roof Diaphragm

Access to the roof structure to install wall anchorage will require the removal and reinstallation of exterior soffits at the library with painted exterior-grade plywood.

Ceilings in all the classrooms will need to be removed along the exterior walls and interior corridor walls. Theses ceilings are glued or stapled on acoustic tile over wood furring strips to the bottom chord of the roof trusses with attic insulation on top. Due to the age and condition of the existing ceiling tiles, replacement of all ceiling tile in the classrooms is recommended.

Load Path to Exterior Masonry Shear Walls

Suspended ceiling panels and T-Bar grid in the exit corridors will likely need to be removed for access to the trusses above the masonry walls. Ceiling panels appear to be newer and could be salvaged and reinstalled in a new T-Bar grid, with additional panels to match and replace any damaged panels.

Ceiling in Paths of Egress

The suspended ceiling in the main corridor is an integrated acoustical ceiling system, likely with a suspended metal T-grid. Because this corridor is a main path of egress, it is recommended that the ceiling grid support system be further investigated and checked for proper seismic bracing and compression support for every 12 square feet of area and proper edge clearance detailing at the corridor walls. Preventing the risk of a fallen integrated ceiling system will mitigate the risk of obstructions impeding the paths of egress as students and faculty evacuate the building following a seismic event.

Lighting Fixtures in Paths of Egress

The light fixtures observed in the main corridor are supported within an integrated ceiling system that is over a main path of egress. Maintenance and facility staff should verify that each fixture is independently supported to the roof structure from opposite corners and add wire supports as necessary.

Contents and Furnishings

Buildings often contain various tall and narrow furniture, such as shelving and storage units, that are freestanding away from any backing walls. High book shelving in the library, for example, can be highly susceptible to toppling if not anchored properly to the backing walls or to each other, and can become a life safety hazard. It is recommended that maintenance and facility staff verify that the tops of the shelving units are braced or anchored to the nearest backing wall or provide overturning base restraint. Heavy items weighing more than 20 pounds on upper shelves or cabinet furniture should also be restrained by netting or cabling to avoid becoming falling hazards to students or faculty below.

4.2.2 Mechanical Systems

The main seismic concerns for mechanical equipment are sliding, swinging, and overturning. Inadequate lateral restraint or anchorage can shift equipment off its supports, topple equipment to the ground, or dislodge overhead equipment, making them falling hazards. Investigation of above-ceiling mechanical equipment and systems was not part of this study, but an initial investigation for the presence of mechanical equipment bracing can be performed by maintenance and facility staff to see if equipment weighing more than 20 pounds with a center of mass more than 4 feet above the adjacent floor level is laterally braced. If bracing is not present, and the equipment poses a falling hazard to students and faculty below, further investigation is recommended by a structural engineer.

4.3 Opinion of Conceptual Construction Costs

A preliminary opinion of probable construction costs to perform the concept-level seismic upgrade recommendations provided in this report is included in Appendix C. The input for these preliminary probable costs are the Tier 1 checklists and the preliminary concept-level seismic upgrades design recommendations and sketches. These preliminary concept-level design sketches depict a design concept that could be implemented to improve the seismic safety of the building structure. It is important to note that this preliminary seismic upgrades design concept is based on the results of the Tier 1 seismic screening checklists and engineering design judgement and has not been substantiated by detailed structural analyses and calculations. Consequently, the costs presented in this concept-level design report are very preliminary in nature and are only intended to be utilized in their aggregate form with the entire statewide school seismic safety assessments study.

For this preliminary opinion of probable construction costs, an estimate of the current year (2019) construction costs of the probable scope of work was developed. These costs were developed based on the Tier 1 checklist, concept-level seismic upgrade design sketches, and project narratives. Then a -20 percent (low) to +50 percent (high) range variance was used to develop the construction cost estimate range for the concept-level scope of work. The -20 percent to +50 percent range variance guidance is from Table 1 of the AACE International Recommended Practice 56R-08, *Cost Estimate Classification System for Class 5 Estimates*. The variable cost range of a Class 5 estimate is due to the limited design completeness and is defined as 0 percent to 2 percent Project Definition Deliverables.

The estimated structural and nonstructural construction cost to mitigate the deficiencies identified in the Tier 1 checklists of the Totem Middle School Main Building ranges between approximately $1.5M and $2.7M (-20 percent/+50 percent). The estimated construction cost to seismically upgrade this building is approximately $1.8M. On a per-square-foot basis, the seismic upgrade construction cost is estimated to be approximately $82 per square foot in 2019 dollars, with a variance range between $66 per square foot and $123 per square foot.

This preliminary opinion of construction cost includes labor, materials, equipment, and general contractor general conditions (mobilization), overhead, and profit. This is based on a public sector design-bid-build project delivery method. Project delivery methods such as negotiated, State of Washington GC/CM, and design-build are not the basis of the construction costs. Owner's project costs not included in the construction cost estimate are building permits, design fees, change order contingencies, escalation at a recommended 4.1 percent* per year to the midpoint of construction (currently unknown), materials testing/inspection, project planning and design schedule delay contingencies, and owner's overall project contingency. Additional owner's project costs would likely include owner's general overhead costs, including project management, financing/bond costs, administration/contract/accounting costs, review of plans, value engineering studies, equipment, fixtures, furnishings and technology, and relocation of the school staff and students during construction. These additional costs are not included in this preliminary concept-level design construction cost estimate.

Costs of all types excluded from the construction costs are site work, construction of replacement facilities, and mitigation of seismic risks for existing facilities and building code changes that occur over time after this report. Future planning budgets should not be set on the basis of the preliminary construction costs estimate based on the concept-level design ideas presented in this report. For budget planning purposes, it is highly recommended that a seismic upgrade budget be determined after the owner defines the scope of work and obtains the services of an A/E design team to study the proposed seismic mitigation strategies and to refine the concept-level seismic upgrades design approach contained in this report.

*-4.1%/year escalation rate for planning purposes should be compounded annually to the midpoint of construction and is sourced from *Engineering News Record (ENR),* November, 2017, the most recent rate representative of the escalation of construction costs throughout the state of Washington.

Table 4.3.1. Seismic Upgrades Opinion of Probable Construction Costs.

Building	FEMA Bldg Type	ASCE 41 Level of Seismicity / Site Class	Structural Performance Objective	Bldg Gross Area	Estimated Seismic Upgrade Cost Range $/SF (Total)	Estimated Seismic Upgrade Cost/SF (Total)
Totem Middle School Main Bldg	RM1	High / D	**Structural**			
			Life Safety	22,384 SF	$39 ($863K) - $73 ($1.62M)	$49 ($1.08M)
			Nonstructural			
			Life Safety	22,384 SF	$27 ($586K) - $50 ($1.10M)	$33 ($733K)
			Total			
				22,384 SF	$66 ($1.45M) - $123 ($2.72M)	$82 ($1.81M)

·W: Wood-Framed; URM: Unreinforced Masonry; RM: Reinforced Masonry; C: Reinforced Concrete; PC: Precast concrete; S: Steel-framed

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Appendix A: Field Investigation Report and Tier 1 Checklists

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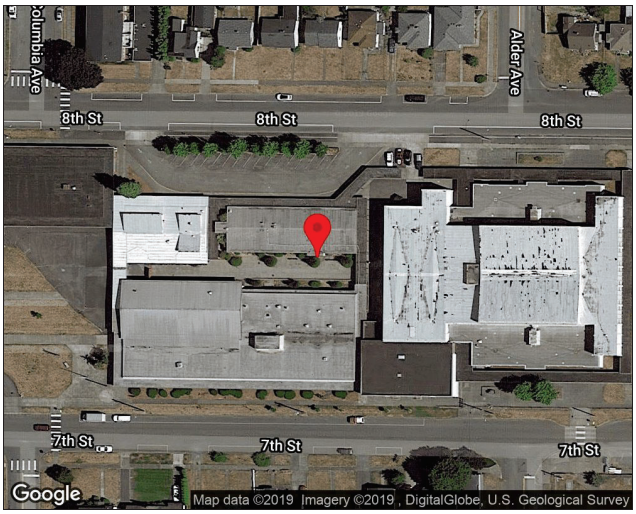
1. Marysville, Totem Middle School, Main Building

1.1 Building Description

Building Name:	Main Building
Facility Name:	Totem Middle School
District Name:	Marysville
ICOS Latitude:	48.055
ICOS Longitude:	-122.174
ICOS County/District ID:	31025
ICOS Building ID:	19455
ASCE 41 Bldg Type:	RM1
Enrollment:	556
Gross Sq. Ft. :	22,384
Year Built:	1966
Number of Stories:	1
$S_{XS\ BSE\text{-}2E}$:	0.969
$S_{X1\ BSE\text{-}2E}$:	0.568
ASCE 41 Level of Seismicity:	High
Site Class:	D
V_{S30}(m/s):	246
Liquefaction Potential:	low to moderate
Tsunami Risk:	Moderate
Structural Drawings Available:	Yes
Evaluating Firm:	Reid Middleton, Inc.



The Totem Middle School Main Building is a single-story, 22,000 square foot stack-bond concrete masonry structure, most of which was constructed in 1966. The building is located on a flat site at the south central area of the Totem Middle School complex, and is rectangular in plan with a 241ft x 97 ft footprint. The building has a 14-ft wide corridor centered down length of the building with classroom and admin spaces on each side. The building features multiple classrooms, a science lab, a library, and various administrative spaces. 2,800 sf of the library at the northwest corner of the building was constructed in 1962. The main building has a small 400 sf fan room above the middle corridor in the middle of the building. This building is identified as “Unit H” on the existing drawings. The roof framing primarily consists of wood sheathing supported by open-web wood joists with metal webs. The lateral system consists of plywood roof diaphragms, CMU shear walls and plywood sheathed wood shear walls. In the library area, the roof framing consists of 2x joists and glulam girders that span to steel columns embedded in the masonry walls.

1.1.1 Building Use

The building contains classrooms, a science lab, a library, and various administrative spaces.

1.1.2 Structural System

Table 1.1-1. Structural System Description of Totem Middle School

Structural System	Description
Structural Roof	The roof structure of the building except at the Library consists of plywood sheathing supported by tapered open-web joists which are supported by concrete masonry bearing walls and 2x8 @ 16" oc over the corridor. Existing drawings indicate that plywood sheathing is 5/8" thick and ¾" thick on the north half and south half respectively, and fully blocked, and is attached to the joists with 10d nails spaced at 6" on-center around all panel edges and 12" on-center at the panel interior. The open-web joists are spaced at 32" and 48" oc on the north half and south half respectively, and have Douglas Fir wood chords and cold-rolled steel tube web members. According to the existing drawings the joist depth varies from 44" deep at exterior walls and slopes to the interior corridor bearing walls with a slope of 1/4":12". The open-web joists are bottom chord bearing at the interior corridor walls, on a 2x8 sill plate anchor bolted to the top of the masonry wall with ½" AB @ 48" oc. The portion of Library built in 1962 is 1" diagonal sheathing lap over 2x12's @ 16" oc spanning to pitched and arched glulam beams which bear on pipe columns embedded in concrete masonry walls. The portion of library added on in 1966 is of similar construction except it was sheathed with plywood instead of 1" diagonal sheathing. The plywood is 5/8" thick, the joists are 2x12 spaced at 16" on-center, and the glue-laminated timber beams are 9" wide and arched. The covered walkway is constructed with tapered 2x @ 16" oc attached to the exterior wall and supported along the perimeter with steel wide flange beams and partial height CMU columns with tube steel king posts.
Structural Floor(s)	The main floor is a 4" thick concrete slab-on-grade reinforced with 6x6 wire mesh. The fan room over the corridor is a 3-inch concrete slab over 12-inch deep steel bar joists @ 24" oc that bears on the corridor masonry walls and steel W8 girders.
Foundations	The exterior and interior concrete masonry walls are supported by concrete stem walls on 16" wide conventional strip footings founded a minimum of 1'-6" below grade and reinforced with (2) #5 continuous reinforcing bars.
Gravity System	The gravity system consists of wood-framed roof supported by CMU masonry bearing walls and conventional strip footings as described above.
Lateral System	The lateral system consists of plywood roof diaphragm supported by stack-bond reinforced masonry shear walls along the exterior and interior corridor, and by transverse plywood sheathed wood framed shear walls between the classrooms. The masonry shear walls are the exterior walls of the building, the interior corridor walls running down the length of the building, and an interior transverse shear wall separating the library and the science lab.

1.1.3 Structural System Visual Condition

Table 1.1-2. Structural System Condition Description of Totem Middle School

Structural System	Description
Structural Roof	No visible signs of corrosion, damage or deterioration.
Structural Floor(s)	No visible signs of corrosion, damage or deterioration.
Foundations	No visible signs of corrosion, damage or deterioration.
Gravity System	No visible signs of corrosion, damage or deterioration.
Lateral System	No visible signs of corrosion, damage or deterioration.

1.2 Seismic Evaluation Findings

1.2.1 Structural Seismic Deficiencies

The structural seismic deficiencies identified during the Tier 1 evaluation are summarized below. Commentary for each deficiency is also provided based on this evaluation.

Table 1-3. Identified Structural Seismic Deficiencies for Marysville Totem Middle School Main Building

Deficiency	Description
Adjacent Buildings	The covered walkway attached to this structure is immediately adjacent to the covered walkway attached to the adjacent structure.
Reinforcing Steel	The minimum of 0.0007 in either of the two directions is not satisfied. Vertical reinforcing steel consists of #4 @ 48\, which produces a reinforcing ratio of 0.00055. Further investigation and a Tier 2 analysis should be performed to determine if existing wall reinforcing has sufficient strength to achieve the desired performance objective.
Wall Anchorage	Exterior and interior masonry bearing walls were not detailed to have anchorage hardware to the open-web roof joists to resist out-of-plane loading. The masonry walls at the end of the building parallel to the open-web joists are also not anchored or braced to the roof diaphragm.
Wood Ledgers	Roof structure primarily bears on 2x8 sill plates on top of wall and does not ledger off the side. However along the masonry wall between the library and science lab, the lower roof with open-web joists frames into the side of the masonry wall, that extends further up for the higher library roof. This condition is shown on the existing drawings with a 3x ledger and anchor bolts without wall anchor ties directly attached to the diaphragm.
Cross Ties	Continuous cross ties are not present in longitudinal (east-west) direction. Clear spanning open-web joist can serve as continuous cross ties assuming exterior and interior corridor masonry shear walls and continuous bond beam at the top of the wall serve as chords.

1.2.2 Structural Checklist Items Marked as 'U'nknown

Where building structural component seismic adequacy was unknown due to lack of available information or limited observation, the structural checklist items were marked as “unknown”. These items require further investigation if definitive determination of compliance or noncompliance is desired. The unknown structural checklist items identified during the Tier 1 evaluation are summarized below. Commentary for each unknown item is also provided based on the evaluation.

Table 1-4. Identified Structural Checklist Items Marked as Unknown for Marysville Totem Middle School Main Building

Unknown Item	Description
Load Path	The drawings detail a load path from the roof diaphragm to the plywood sheathed pony walls to the sill plate nailer on top of the CMU wall. However, this needs to be further investigated and will require selective demolition of the exterior soffit finish to verify if the plywood wall sheathing extends to the sill plate nailer and to verify the plywood panel nailing. Similar investigation needed in the interior corridor to verify plywood sheathed pony wall connection to the interior corridor shear walls.
Liquefaction	The liquefaction potential of site soils is unknown at this time given available information. \low to moderate\ liquefaction potential is identified per ICOS based on state geologic mapping. Requires further investigation by a licensed geotechnical engineer to determine liquefaction potential.
Slope Failure	Requires further investigation by a licensed geotechnical engineer to determine susceptibility to slope failure. The structure appears to be located on a relatively flat site.
Surface Fault Rupture	Requires further investigation by a licensed geotechnical engineer to determine whether site is near locations of expected surface fault ruptures.
Transfer to Shear Walls	The drawings detail a load path from the roof diaphragm to plywood sheathed 2x4 stud walls. However the plywood panel edge nailing and nailing to the top and bottom plates is not specified. Also there are let in 2x joists for the covered walkway at the bottom of the pony wall which may have interfered with the plywood to sill plate connection at the top of the CMU wall. This is likely to be non-compliant and needs to be further investigated at the exterior and interior masonry shear walls to verify if the plywood wall sheathing extends to the sill plate nailer and to verify the plywood panel nailing. Note this will require selective demolition of the exterior soffit finish to provide viewing access.

1.3.1 Nonstructural Seismic Deficiencies

The nonstructural seismic deficiencies identified during the Tier 1 evaluation are summarized below. Commentary for each deficiency is also provided based on this evaluation. Some nonstructural deficiencies may be able to be mitigated by school district staff. Other nonstructural components that require more substantial mitigation may be more appropriately included in a long-term mitigation strategy. Some typical conceptual details for the seismic upgrade of nonstructural components can be found in the FEMA E-74 Excerpts appendix.

Table 1-5. Identified Nonstructural Seismic Deficiencies for Marysville Totem Middle School Main Building

Deficiency	Description
M-1 Ties. HR-not required; LS-LMH; PR-LMH.	The west, north, and south walls of the 1962 library are masonry cavity walls with a 4\ CMU veneer (outer cavity) with no out -of-plane anchor ties specified.
M-3 Weakened Planes. HR-not required; LS-LMH; PR-LMH.	Veneer out -of-plane anchor ties are not specified in the existing drawings.
M-4 Unreinforced Masonry Backup. HR-LMH; LS-LMH; PR-LMH.	The 8 inch masonry backup wall does not have vertical reinforcing to span from the ground to the roof diaphragm.
M-6 Anchorage. HR-not required; LS-MH; PR-MH.	The 8\ masonry backup wall does not have out-of-plane connections to the roof diaphragm on either side of the wall.

1.3.2 Nonstructural Checklist Items Marked as 'U'nknown

Where building nonstructural component seismic adequacy was unknown due to lack of available information or limited observation, the nonstructural checklist items were marked as “unknown”. These items require further investigation if definitive determination of compliance or noncompliance is desired. The unknown nonstructural checklist items identified during the Tier 1 evaluation are summarized below. Commentary for each unknown item is also provided based on the evaluation.

Some nonstructural deficiencies may be able to be mitigated by school district staff. Other nonstructural components that require more substantial mitigation may be more appropriately included in a long-term mitigation strategy. Some typical conceptual details for the seismic upgrade of nonstructural components can be found in the FEMA E-74 Excerpts appendix.

Table 1-6. Identified Nonstructural Checklist Items Marked as Unknown for Marysville Totem Middle School Main Building

Unknown Item	Description
LSS-1 Fire Suppression Piping. HR-not required; LS-LMH; PR-LMH.	We did not see any fire suppression system during our site visit and did not see any fire suppression systems in the existing drawings. School district to verify if the building contains a fire suppression system. If the building does have a fire suppression system, based on age of the building, it is likely that the seismic bracing, coupling, and sprinkler head clearances of the fire suppression piping does not comply with current NFPA 13 requirements.
LSS-2 Flexible Couplings. HR-not required; LS-LMH; PR-LMH.	See comments above.
LSS-3 Emergency Power. HR-not required; LS-LMH; PR-LMH.	Use of emergency power was not verified with maintenance or facility staff. Facility staff should verify if this is being used to power or control Life Safety systems, and if so, further investigate to see if this equipment is adequately anchored or braced.
LSS-5 Sprinkler Ceiling Clearance. HR-not required; LS-MH; PR-MH.	See comments above.
HM-1 Hazardous Material Equipment. HR-LMH; LS-LMH; PR-LMH.	It is unknown if equipment is mounted on vibration isolators. Maintenance and facility staff should verify presence of hazardous materials to mitigate seismic risk.
HM-2 Hazardous Material Storage. HR-LMH; LS-LMH; PR-LMH.	Unknown whether the building has hazardous materials. Maintenance and facility staff should verify presence of hazardous materials to mitigate seismic risk. Restraining breakable containers that hold hazardous material by latched doors, shelf lips, wires, or other methods may be appropriate to mitigate seismic risk.
HM-3 Hazardous Material Distribution. HR-MH; LS-MH; PR-MH.	Unknown whether the building has hazardous materials. Maintenance and facility staff should verify presence of hazardous materials and natural gas to mitigate seismic risk. If so, verify mechanical and gas piping is seismically braced and anchored to mitigate seismic risk.
HM-4 Shutoff Valves. HR-MH; LS-MH; PR-MH.	It is unknown if the structure contains natural gas or other hazardous materials. Maintenance and facility staff should verify presence of hazardous materials and natural gas and if so, verify automatic shutoff valves are provided to mitigate seismic risk.
HM-5 Flexible Couplings. HR-LMH; LS-LMH; PR-LMH.	Unknown whether the building has hazardous materials. Maintenance and facility staff should verify presence of hazardous materials and natural gas to mitigate seismic risk. If occurs, verify mechanical and gas piping has flexible couplings.
P-4 Light Partitions Supported by Ceilings. HR-not required; LS-not required; PR-MH.	Although this is not required to be evaluated for the life safety performance level, it is recommended that light-frame partition walls along paths of egress (exiting/egress corridor walls) should be investigated and checked for proper seismic bracing at the top of the walls to mitigate the risk of toppling and becoming obstructions in the paths of egress.

Unknown Item	Description
C-2 Suspended Gypsum Board. HR-not required; LS-MH; PR-LMH.	Based on our review of the existing drawings and site visit, GWB ceilings occur in the restrooms and the utility rooms. Based on the age of the building it is likely that large areas of GWB ceilings are noncompliant if they are not directly attached to the roof structure. Most ceilings on the interior of the building appear to be acoustic tile ceilings. Further investigation should be performed for the GWB ceiling construction in the restrooms or other occupied areas with large GWB ceiling areas, especially over paths of egress. Supplemental bracing or reconstruction of these GWB areas may be appropriate to mitigate seismic risk.
C-3 Integrated Ceilings. HR-not required; LS-not required; PR-MH.	Although this is not required to be evaluated for the life safety performance level, it is recommended that integrated suspended ceiling systems above paths of egress (exiting/egress corridors) should be investigated and checked for proper seismic bracing and edge clearance detailing to mitigate the risk of becoming fallen obstructions in the paths of egress.
LF-1 Independent Support. HR-not required; LS-MH; PR-MH.	We observed that light fixtures in the main corridor are supported within an integrated ceiling system, which is over a path of egress. Maintenance and facility staff should verify that each fixture is independently supported to the roof structure from opposite corners and add wire supports as necessary. Lighting observed in the classroom areas do not appear to be supported by a suspended ceiling grid.
CF-2 Tall Narrow Contents. HR-not required; LS-H; PR-MH.	The book shelves in the library are backed up to the walls of the library but it is unknown if these shelving units are anchored to the backing walls. Maintenance and facility staff should verify that the tops of the shelving units are braced or anchored to the nearest backing wall or provide overturning base restraint.
ME-1 Fall-Prone Equipment. HR-not required; LS-H; PR-H.	Not able to verify during site investigation. Further investigation should be performed. Bracing or anchoring of equipment may be appropriate to mitigate seismic risk.
ME-2 In-Line Equipment. HR-not required; LS-H; PR-H.	Not able to verify during site investigation. Further investigation should be performed. Bracing or anchoring of equipment may be appropriate to mitigate seismic risk.
ME-3 Tall Narrow Equipment. HR-not required; LS-H; PR-MH.	Not able to verify during site investigation. Further investigation should be performed. Brace tops of equipment taller than 6 feet to nearest backing wall or provide overturning base restraint.

Photos:

Figure 1-1. Main Building, Southwest Entrance

Figure 1-2. Main Building, West Wall

Figure 1-3. Main Building, Classroom Interior

Figure 1-4. Main Building, Hallway Interior

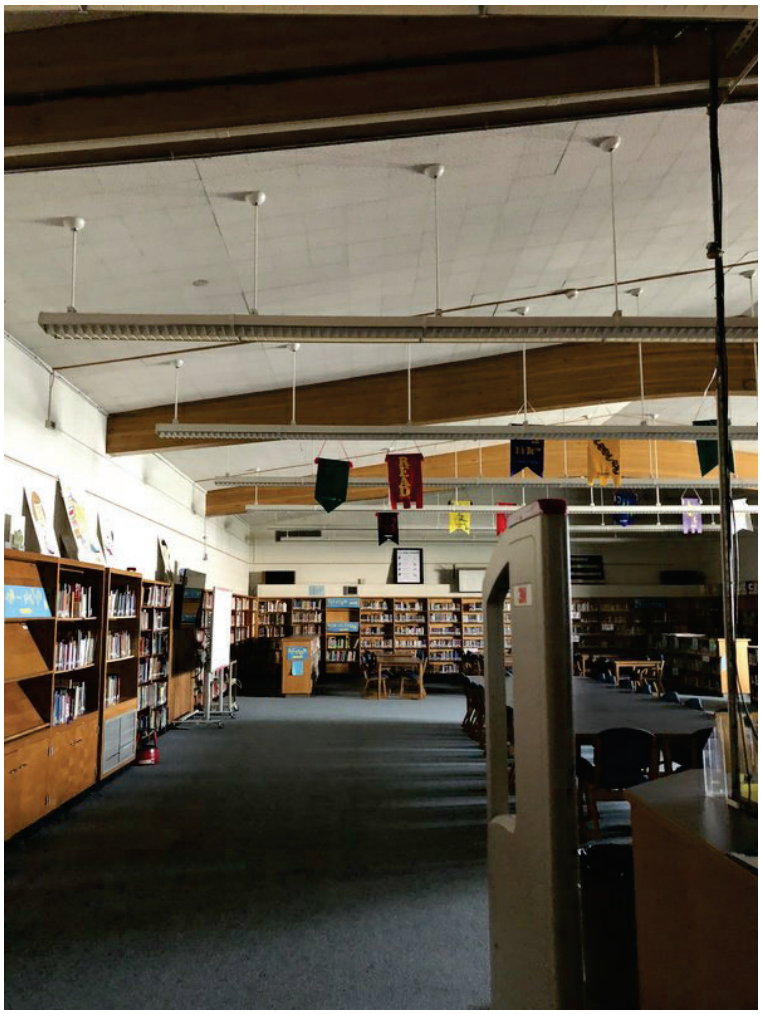


Figure 1-5. Main Building, Library Interior

Figure 1-6. Main Building, Covered Entrance

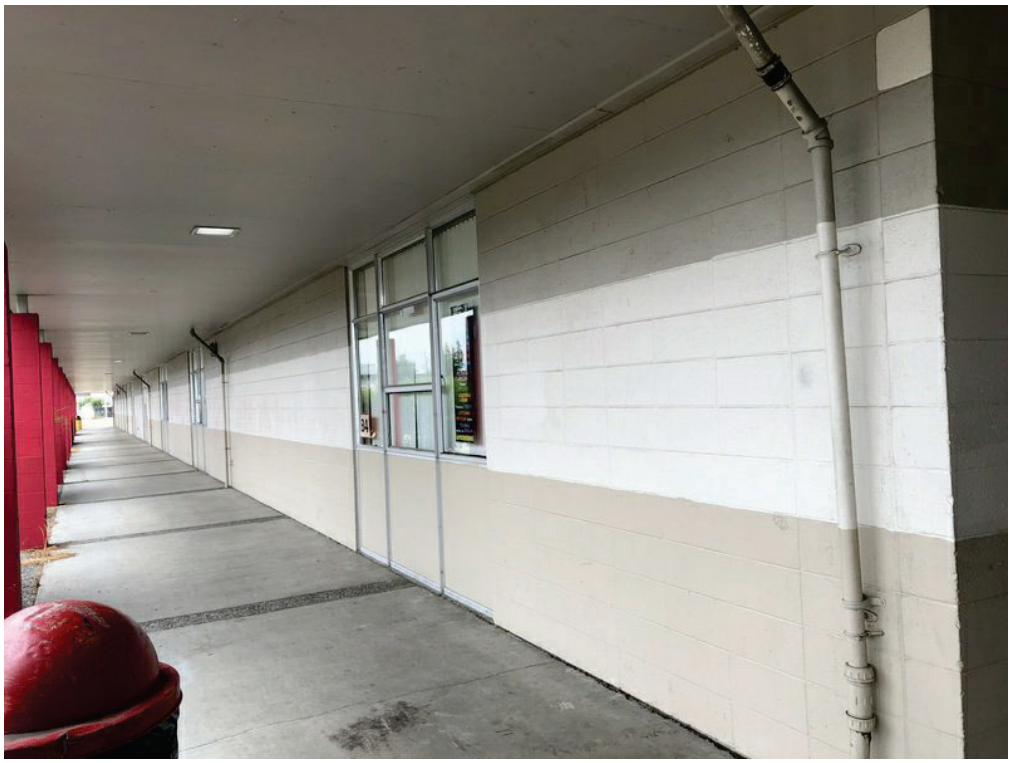


Figure 1-7. South Exterior Wall with Stack Bond Masonry and Exterior Covered Walkway

Figure 1-8. North Exterior Wall with Stack Bond Masonry

Marysville, Totem Middle School, Main Building

17-2 Collapse Prevention Basic Configuration Checklist

Building record drawings have been reviewed, when available, and a non-destructive field investigation has been performed for the subject building. Each of the required checklist items are marked Compliant (C), Noncompliant (NC), Not Applicable (N/A), or Unknown (U). Items marked Compliant indicate conditions that satisfy the performance objective, whereas items marked Noncompliant or Unknown indicate conditions that do not. Certain statements might not apply to the building being evaluated.

Low Seismicity

Building System - General

EVALUATION ITEM	EVALUATION STATEMENT	C	NC	N/A	U	COMMENT
Load Path	The structure contains a complete, well-defined load path, including structural elements and connections, that serves to transfer the inertial forces associated with the mass of all elements of the building to the foundation. (Tier 2: Sec. 5.4.1.1; Commentary: Sec. A.2.1.10)				X	The drawings detail a load path from the roof diaphragm to the plywood sheathed pony walls to the sill plate nailer on top of the CMU wall. However, this needs to be further investigated and will require selective demolition of the exterior soffit finish to verify if the plywood wall sheathing extends to the sill plate nailer and to verify the plywood panel nailing. Similar investigation needed in the interior corridor to verify plywood sheathed pony wall connection to the interior corridor shear walls.
Adjacent Buildings	The clear distance between the building being evaluated and any adjacent building is greater than 0.25% of the height of the shorter building in low seismicity, 0.5% in moderate seismicity, and 1.5% in high seismicity. (Tier 2: Sec. 5.4.1.2; Commentary: Sec. A.2.1.2)		X			The covered walkway attached to this structure is immediately adjacent to the covered walkway attached to the adjacent structure.
Mezzanines	Interior mezzanine levels are braced independently from the main structure or are anchored to the seismic-force-resisting elements of the main structure. (Tier 2: Sec. 5.4.1.3; Commentary: Sec. A.2.1.3)	X				The fan room over the corridor is detailed to be tied in to the masonry corridor walls and the main roof diaphragm on each side.

Building System - Building Configuration

EVALUATION ITEM	EVALUATION STATEMENT	C	NC	N/A	U	COMMENT

Weak Story	The sum of the shear strengths of the seismic-force-resisting system in any story in each direction is not less than 80% of the strength in the adjacent story above. (Tier 2: Sec. 5.4.2.1; Commentary: Sec. A.2.2.2)			X		Since this is a one story structure, this check does not apply.
Soft Story	The stiffness of the seismic-force-resisting system in any story is not less than 70% of the seismic-force-resisting system stiffness in an adjacent story above or less than 80% of the average seismic-force-resisting system stiffness of the three stories above. (Tier 2: Sec. 5.4.2.2; Commentary: Sec. A.2.2.3)			X		Since this is a one story structure, this check does not apply.
Vertical Irregularities	All vertical elements in the seismic-force-resisting system are continuous to the foundation. (Tier 2: Sec. 5.4.2.3; Commentary: Sec. A.2.2.4)	X				Vertical elements appear to be continuous to the foundation.
Geometry	There are no changes in the net horizontal dimension of the seismic-force-resisting system of more than 30% in a story relative to adjacent stories, excluding one-story penthouses and mezzanines. (Tier 2: Sec. 5.4.2.4; Commentary: Sec. A.2.2.5)			X		The building is a one story structure.
Mass	There is no change in effective mass of more than 50% from one story to the next. Light roofs, penthouses, and mezzanines need not be considered. (Tier 2: Sec. 5.4.2.5; Commentary: Sec. A.2.2.6)			X		The building is a one story structure.
Torsion	The estimated distance between the story center of mass and the story center of rigidity is less than 20% of the building width in either plan dimension. (Tier 2: Sec. 5.4.2.6; Commentary: Sec. A.2.2.7)	X				Both the distribution of mass and seismic-force-resisting elements appear to be reasonably symmetric in both orthogonal directions. Also the roof diaphragm is a flexible wood roof diaphragm with masonry shear walls on all four sides.

Moderate Seismicity (Complete the Following Items in Addition to the Items for Low Seismicity)

Geologic Site Hazards

EVALUATION ITEM	EVALUATION STATEMENT	C	NC	N/A	U	COMMENT
Liquefaction	Liquefaction-susceptible, saturated, loose granular soils that could jeopardize the building's seismic performance do not exist in the foundation soils at depths within 50 ft (15.2 m) under the building. (Tier 2: Sec. 5.4.3.1; Commentary: Sec. A.6.1.1)				X	The liquefaction potential of site soils is unknown at this time given available information. Low to moderate liquefaction potential is identified per ICOS based on state geologic mapping. Requires further investigation by a licensed geotechnical engineer to determine liquefaction potential.
Slope Failure	The building site is located away from potential earthquake-induced slope failures or rockfalls so that it is unaffected by such failures or is capable of accommodating any predicted movements without failure. (Tier 2: Sec. 5.4.3.1; Commentary: Sec. A.6.1.2)				X	Requires further investigation by a licensed geotechnical engineer to determine susceptibility to slope failure. The structure appears to be located on a relatively flat site.
Surface Fault Rupture	Surface fault rupture and surface displacement at the building site are not anticipated. (Tier 2: Sec. 5.4.3.1; Commentary: Sec. A.6.1.3)				X	Requires further investigation by a licensed geotechnical engineer to determine whether site is near locations of expected surface fault ruptures.

High Seismicity (Complete the Following Items in Addition to the Items for Low and Moderate Seismicity)

Foundation Configuration

EVALUATION ITEM	EVALUATION STATEMENT	C	NC	N/A	U	COMMENT
Overturning	The ratio of the least horizontal dimension of the seismic-force-resisting system at the foundation level to the building height (base/height) is greater than 0.6Sa. (Tier 2: Sec. 5.4.3.3; Commentary: Sec. A.6.2.1)	X				Aspect ratio (base/height) is approximately 6. 0.6Sa = 0.41
Ties Between Foundation Elements	The foundation has ties adequate to resist seismic forces where footings, piles, and piers are not restrained by beams, slabs, or soils classified as Site Class A, B, or C. (Tier 2: Sec. 5.4.3.4; Commentary: Sec. A.6.2.2)	X				All foundation elements are continuous around the perimeter of the structure and are interconnecting.

17-34 Collapse Prevention Structural Checklist for Building Types RM1 and RM2

Building record drawings have been reviewed, when available, and a non-destructive field investigation has been performed for the subject building. Each of the required checklist items are marked Compliant (C), Noncompliant (NC), Not Applicable (N/A), or Unknown (U). Items marked Compliant indicate conditions that satisfy the performance objective, whereas items marked Noncompliant or Unknown indicate conditions that do not. Certain statements might not apply to the building being evaluated.

Low and Moderate Seismicity

Seismic-Force-Resisting System

EVALUATION ITEM	EVALUATION STATEMENT	C	NC	N/A	U	COMMENT
Redundancy	The number of lines of shear walls in each principal direction is greater than or equal to 2. (Tier 2: Sec. 5.5.1.1; Commentary: Sec. A.3.2.1.1)	X				
Shear Stress Check	The shear stress in the reinforced masonry shear walls, calculated using the Quick Check procedure of Section 4.4.3.3, is less than 70 lb/in.2 (0.48 MPa). (Tier 2: Sec. 5.5.3.1.1; Commentary: Sec. A.3.2.4.1)	X				
Reinforcing Steel	The total vertical and horizontal reinforcing steel ratio in reinforced masonry walls is greater than 0.002 of the wall with the minimum of 0.0007 in either of the two directions; the spacing of reinforcing steel is less than 48 in. (1220 mm), and all vertical bars extend to the top of the walls. (Tier 2: Sec. 5.5.3.1.3; Commentary: Sec. A.3.2.4.2)		X			The minimum of 0.0007 in either of the two directions is not satisfied. Vertical reinforcing steel consists of #4 @ 48 inches, which produces a reinforcing ratio of 0.00055. Further investigation and a Tier 2 analysis should be performed to determine if existing wall reinforcing has sufficient strength to achieve the desired performance objective.

Stiff Diaphragms

EVALUATION ITEM	EVALUATION STATEMENT	C	NC	N/A	U	COMMENT
Topping Slab	Precast concrete diaphragm elements are interconnected by a continuous reinforced concrete topping slab. (Tier 2: Sec. 5.6.4; Commentary: Sec. A.4.5.1)			X		

Connections

EVALUATION ITEM	EVALUATION STATEMENT	C	NC	N/A	U	COMMENT

Wall Anchorage	Exterior concrete or masonry walls that are dependent on the diaphragm for lateral support are anchored for out-of-plane forces at each diaphragm level with steel anchors, reinforcing dowels, or straps that are developed into the diaphragm. Connections have strength to resist the connection force calculated in the Quick Check procedure of Section 4.4.3.7. (Tier 2: Sec. 5.7.1.1; Commentary: Sec. A.5.1.1)		X			Exterior and interior masonry bearing walls were not detailed to have anchorage hardware to the open-web roof joists to resist out-of-plane loading. The masonry walls at the end of the building parallel to the open-web joists are also not anchored or braced to the roof diaphragm.
Wood Ledgers	The connection between the wall panels and the diaphragm does not induce cross-grain bending or tension in the wood ledgers. (Tier 2: Sec. 5.7.1.3; Commentary: Sec. A.5.1.2)		X			Roof structure primarily bears on 2x8 sill plates on top of wall and does not ledger off the side. However along the masonry wall between the library and science lab, the lower roof with open-web joists frames into the side of the masonry wall, that extends further up for the higher library roof. This condition is shown on the existing drawings with a 3x ledger and anchor bolts without wall anchor ties directly attached to the diaphragm.

Transfer to Shear Walls	Diaphragms are connected for transfer of seismic forces to the shear walls. (Tier 2: Sec. 5.7.2; Commentary: Sec. A.5.2.1)				X	The drawings detail a load path from the roof diaphragm to plywood sheathed 2x4 stud walls. However the plywood panel edge nailing and nailing to the top and bottom plates is not specified. Also there are let in 2x joists for the covered walkway at the bottom of the pony wall which may have interfered with the plywood to sill plate connection at the top of the CMU wall. This is likely to be non-compliant and needs to be further investigated at the exterior and interior masonry shear walls to verify if the plywood wall sheathing extends to the sill plate nailer and to verify the plywood panel nailing. Note this will require selective demolition of the exterior soffit finish to provide viewing access.
Topping Slab to Walls or Frames	Reinforced concrete topping slabs that interconnect the precast concrete diaphragm elements are doweled for transfer of forces into the shear wall or frame elements. (Tier 2: Sec. 5.7.2; Commentary: Sec. A.5.2.)			X		
Foundation Dowels	Wall reinforcement is doweled into the foundation. (Tier 2: Sec. 5.7.3.4; Commentary: Sec. A.5.3.5)	X				
Girder-Column Connection	There is a positive connection using plates, connection hardware, or straps between the girder and the column support. (Tier 2: Sec. 5.7.4.1; Commentary: Sec. A.5.4.1)	X				

High Seismicity **(Complete the Following Items in Addition to the Items for Low and Moderate Seismicity)**

Stiff Diaphragms

EVALUATION ITEM	EVALUATION STATEMENT	C	NC	N/A	U	COMMENT
Openings at Shear Walls	Diaphragm openings immediately adjacent to the shear walls are less than 25% of the wall length. (Tier 2: Sec. 5.6.1.3; Commentary: Sec. A.4.1.4)			X		

Openings at Exterior Masonry Shear Walls	Diaphragm openings immediately adjacent to exterior masonry shear walls are not greater than 8 ft (2.4 m) long. (Tier 2: Sec. 5.6.1.3; Commentary: Sec. A.4.1.6)			X		

Flexible Diaphragms

EVALUATION ITEM	EVALUATION STATEMENT	C	NC	N/A	U	COMMENT
Cross Ties	There are continuous cross ties between diaphragm chords. (Tier 2: Sec. 5.6.1.2; Commentary: Sec. A.4.1.2)		X			Continuous cross ties are not present in longitudinal (east-west) direction. Clear spanning open-web joist can serve as continuous cross ties assuming exterior and interior corridor masonry shear walls and continuous bond beam at the top of the wall serve as chords.
Openings at Shear Walls	Diaphragm openings immediately adjacent to the shear walls are less than 25% of the wall length. (Tier 2: Sec. 5.6.1.3; Commentary: Sec. A.4.1.4)			X		
Openings at Exterior Masonry Shear Walls	Diaphragm openings immediately adjacent to exterior masonry shear walls are not greater than 8 ft (2.4 m) long. (Tier 2: Sec. 5.6.1.3; Commentary: Sec. A.4.1.6)			X		
Straight Sheathing	All straight-sheathed diaphragms have aspect ratios less than 2-to-1 in the direction being considered. (Tier 2: Sec. 5.6.2; Commentary: Sec. A.4.2.1)			X		
Spans	All wood diaphragms with spans greater than 24 ft (7.3 m) consist of wood structural panels or diagonal sheathing. (Tier 2: Sec. 5.6.2; Commentary: Sec. A.4.2.2)	X				
Diagonally Sheathed and Unblocked Diaphragms	All diagonally sheathed or unblocked wood structural panel diaphragms have horizontal spans less than 40 ft (12.2 m) and aspect ratios less than or equal to 4 to-1. (Tier 2: Sec. 5.6.2; Commentary: Sec. A.4.2.3)	X				This is likely compliant as the existing drawings indicate a blocked diaphragm throughout, however this should be further investigated to confirm. Diaphragm aspect ratios are less than 2:1 but there are a few transverse diaphragms at the east and west ends that are 74 ft and 84 ft respectively.
Other Diaphragms	Diaphragms do not consist of a system other than wood, metal deck, concrete, or horizontal bracing. (Tier 2: Sec. 5.6.5; Commentary: Sec. A.4.7.1)	X				

Connections

EVALUATION ITEM	EVALUATION STATEMENT	C	NC	N/A	U	COMMENT
Stiffness of Wall Anchors	Anchors of concrete or masonry walls to wood structural elements are installed taut and are stiff enough to limit the relative movement between the wall and the diaphragm to no greater than 1/8 in. (3 mm) before engagement of the anchors. (Tier 2: Sec. 5.7.1.2; Commentary: Sec. A.5.1.4)			X		N/A only because anchors to the masonry walls have not been detailed. See comments for required wall anchorage above.

Marysville, Totem Middle School, Main Building

17-38 Nonstructural Checklist

Notes:
C = Compliant, NC = Noncompliant, N/A = Not Applicable, and U = Unknown.
Performance Level: HR = Hazards Reduced, LS = Life Safety, and PR = Position Retention.
Level of Seismicity: L = Low, M = Moderate, and H = High

Life Safety Systems

EVALUATION ITEM	EVALUATION STATEMENT	C	NC	N/A	U	COMMENT
LSS-1 Fire Suppression Piping. HR-not required; LS-LMH; PR-LMH.	Fire suppression piping is anchored and braced in accordance with NFPA-13. (Tier 2: Sec. 13.7.4; Commentary: Sec. A.7.13.1)				X	We did not see any fire suppression system during our site visit and did not see any fire suppression systems in the existing drawings. School district to verify if the building contains a fire suppression system. If the building does have a fire suppression system, based on age of the building, it is likely that the seismic bracing, coupling, and sprinkler head clearances of the fire suppression piping does not comply with current NFPA 13 requirements.
LSS-2 Flexible Couplings. HR-not required; LS-LMH; PR-LMH.	Fire suppression piping has flexible couplings in accordance with NFPA-13. (Tier 2: Sec. 13.7.4; Commentary: Sec. A.7.13.2)				X	See comments above.
LSS-3 Emergency Power. HR-not required; LS-LMH; PR-LMH.	Equipment used to power or control Life Safety systems is anchored or braced. (Tier 2: Sec. 13.7.7; Commentary: Sec. A.7.12.1)				X	Use of emergency power was not verified with maintenance or facility staff. Facility staff should verify if this is being used to power or control Life Safety systems, and if so, further investigate to see if this equipment is adequately anchored or braced.
LSS-4 Stair and Smoke Ducts. HR-not required; LS-LMH; PR-LMH.	Stair pressurization and smoke control ducts are braced and have flexible connections at seismic joints. (Tier 2: Sec. 13.7.6; Commentary: Sec. A.7.14.1)			X		Building is a one-story structure.

LSS-5 Sprinkler Ceiling Clearance. HR-not required; LS-MH; PR-MH.	Penetrations through panelized ceilings for fire suppression devices provide clearances in accordance with NFPA-13. (Tier 2: Sec. 13.7.4; Commentary: Sec. A.7.13.3)				X	See comments above.
LSS-6 Emergency Lighting. HR-not required; LS-not required; PR-LMH	Emergency and egress lighting equipment is anchored or braced. (Tier 2: Sec. 13.7.9; Commentary: Sec. A.7.3.1)			X		Not required for life safety performance level.

Hazardous Materials

EVALUATION ITEM	EVALUATION STATEMENT	C	NC	N/A	U	COMMENT
HM-1 Hazardous Material Equipment. HR-LMH; LS-LMH; PR-LMH.	Equipment mounted on vibration isolators and containing hazardous material is equipped with restraints or snubbers. (Tier 2: Sec. 13.7.1; Commentary: Sec. A.7.12.2)				X	It is unknown if equipment is mounted on vibration isolators. Maintenance and facility staff should verify presence of hazardous materials to mitigate seismic risk.
HM-2 Hazardous Material Storage. HR-LMH; LS-LMH; PR-LMH.	Breakable containers that hold hazardous material, including gas cylinders, are restrained by latched doors, shelf lips, wires, or other methods. (Tier 2: Sec. 13.8.3; Commentary: Sec. A.7.15.1)				X	Unknown whether the building has hazardous materials. Maintenance and facility staff should verify presence of hazardous materials to mitigate seismic risk. Restraining breakable containers that hold hazardous material by latched doors, shelf lips, wires, or other methods may be appropriate to mitigate seismic risk.
HM-3 Hazardous Material Distribution. HR-MH; LS-MH; PR-MH.	Piping or ductwork conveying hazardous materials is braced or otherwise protected from damage that would allow hazardous material release. (Tier 2: Sec. 13.7.3, 13.7.5; Commentary: Sec. A.7.13.4)				X	Unknown whether the building has hazardous materials. Maintenance and facility staff should verify presence of hazardous materials and natural gas to mitigate seismic risk. If so, verify mechanical and gas piping is seismically braced and anchored to mitigate seismic risk.

HM-4 Shutoff Valves. HR-MH; LS-MH; PR-MH.	Piping containing hazardous material, including natural gas, has shutoff valves or other devices to limit spills or leaks. (Tier 2: Sec. 13.7.3, 13.7.5; Commentary: Sec. A.7.13.3)				X	It is unknown if the structure contains natural gas or other hazardous materials. Maintenance and facility staff should verify presence of hazardous materials and natural gas and if so, verify automatic shutoff valves are provided to mitigate seismic risk.
HM-5 Flexible Couplings. HR-LMH; LS-LMH; PR-LMH.	Hazardous material ductwork and piping, including natural gas piping, have flexible couplings. (Tier 2: Sec. 13.7.3, 13.7.5; Commentary: Sec. A.7.15.4)				X	Unknown whether the building has hazardous materials. Maintenance and facility staff should verify presence of hazardous materials and natural gas to mitigate seismic risk. If occurs, verify mechanical and gas piping has flexible couplings.
HM-6 Piping or Ducts Crossing Seismic Joints. HR-MH; LS-MH; PR-MH.	Piping or ductwork carrying hazardous material that either crosses seismic joints or isolation planes or is connected to independent structures has couplings or other details to accommodate the relative seismic displacements. (Tier 2: Sec. 13.7.3, 13.7.5, 13.7.6; Commentary: Sec. A.7.13.6)			X		The building does not appear to contain seismic joints, isolation planes, or independent structures.

Partitions

EVALUATION ITEM	EVALUATION STATEMENT	C	NC	N/A	U	COMMENT
P-1 Unreinforced Masonry. HR-LMH; LS-LMH; PR-LMH.	Unreinforced masonry or hollow-clay tile partitions are braced at a spacing of at most 10 ft (3.0 m) in Low or Moderate Seismicity, or at most 6 ft (1.8 m) in High Seismicity. (Tier 2: Sec. 13.6.2; Commentary: Sec. A.7.1.1)			X		Based on our review of the existing drawings and site visit, this building did not appear to have URM or HCT partitions.
P-2 Heavy Partitions Supported by Ceilings. HR-LMH; LS-LMH; PR-LMH.	The tops of masonry or hollow-clay tile partitions are not laterally supported by an integrated ceiling system. (Tier 2: Sec. 13.6.2; Commentary: Sec. A.7.2.1)			X		Based on our review of the existing drawings and site visit, this building did not appear to have URM or HCT partitions.
P-3 Drift. HR-not required; LS-MH; PR-MH.	Rigid cementitious partitions are detailed to accommodate the following drift ratios: in steel moment frame, concrete moment frame, and wood frame buildings, 0.02; in other buildings, 0.005. (Tier 2: Sec. 13.6.2; Commentary: Sec. A.7.1.2)			X		Based on our review of the existing drawings and site visit, this building did not appear to have rigid cementitious partitions such as lath and plaster or stucco.

P-4 Light Partitions Supported by Ceilings. HR-not required; LS-not required; PR-MH.	The tops of gypsum board partitions are not laterally supported by an integrated ceiling system. (Tier 2: Sec. 13.6.2; Commentary: Sec. A.7.2.1)				X	Although this is not required to be evaluated for the life safety performance level, it is recommended that light-frame partition walls along paths of egress (exiting/egress corridor walls) should be investigated and checked for proper seismic bracing at the top of the walls to mitigate the risk of toppling and becoming obstructions in the paths of egress.
P-5 Structural Separations. HR-not required; LS-not required; PR-MH.	Partitions that cross structural separations have seismic or control joints. (Tier 2: Sec. 13.6.2; Commentary: Sec. A.7.1.3)			X		Not required for life safety performance level.
P-6 Tops. HR-not required; LS-not required; PR-MH.	The tops of ceiling-high framed or panelized partitions have lateral bracing to the structure at a spacing equal to or less than 6 ft (1.8 m). (Tier 2: Sec. 13.6.2; Commentary: Sec. A.7.1.4)			X		Not required for life safety performance level.

Ceilings

EVALUATION ITEM	EVALUATION STATEMENT	C	NC	N/A	U	COMMENT
C-1 Suspended Lath and Plaster. HR-H; LS-MH; PR-LMH.	Suspended lath and plaster ceilings have attachments that resist seismic forces for every 12 ft2 (1.1 m2) of area. (Tier 2: Sec. 13.6.4; Commentary: Sec. A.7.2.3)			X		Based on our review of the existing drawings and site visit, this building did not appear to have suspended lath and plaster ceilings

C-2 Suspended Gypsum Board. HR-not required; LS-MH; PR-LMH.	Suspended gypsum board ceilings have attachments that resist seismic forces for every 12 ft2 (1.1 m2) of area. (Tier 2: Sec. 13.6.4; Commentary: Sec. A.7.2.3)				X	Based on our review of the existing drawings and site visit, GWB ceilings occur in the restrooms and the utility rooms. Based on the age of the building it is likely that large areas of GWB ceilings are noncompliant if they are not directly attached to the roof structure. Most ceilings on the interior of the building appear to be acoustic tile ceilings. Further investigation should be performed for the GWB ceiling construction in the restrooms or other occupied areas with large GWB ceiling areas, especially over paths of egress. Supplemental bracing or reconstruction of these GWB areas may be appropriate to mitigate seismic risk.
C-3 Integrated Ceilings. HR-not required; LS-not required; PR-MH.	Integrated suspended ceilings with continuous areas greater than 144 ft2 (13.4 m2) and ceilings of smaller areas that are not surrounded by restraining partitions are laterally restrained at a spacing no greater than 12 ft (3.6 m) with members attached to the structure above. Each restraint location has a minimum of four diagonal wires and compression struts, or diagonal members capable of resisting compression. (Tier 2: Sec. 13.6.4; Commentary: Sec. A.7.2.2)				X	Although this is not required to be evaluated for the life safety performance level, it is recommended that integrated suspended ceiling systems above paths of egress (exiting/egress corridors) should be investigated and checked for proper seismic bracing and edge clearance detailing to mitigate the risk of becoming fallen obstructions in the paths of egress.
C-4 Edge Clearance. HR-not required; LS-not required; PR-MH.	The free edges of integrated suspended ceilings with continuous areas greater than 144 ft2 (13.4 m2) have clearances from the enclosing wall or partition of at least the following: in Moderate Seismicity, 1/2 in. (13 mm); in High Seismicity, 3/4 in. (19 mm). (Tier 2: Sec. 13.6.4; Commentary: Sec. A.7.2.4)			X		Not required for life safety performance level.

C-5 Continuity Across Structure Joints. HR-not required; LS-not required; PR-MH.	The ceiling system does not cross any seismic joint and is not attached to multiple independent structures. (Tier 2: Sec. 13.6.4; Commentary: Sec. A.7.2.5)			X		Not required for life safety performance level.
C-6 Edge Support. HR-not required; LS-not required; PR-H.	The free edges of integrated suspended ceilings with continuous areas greater than 144 ft2 (13.4 m2) are supported by closure angles or channels not less than 2 in. (51 mm) wide. (Tier 2: Sec. 13.6.4 ; Commentary: Sec. A.7.2.6)			X		Not required for life safety performance level.
C-7 Seismic Joints. HR-not required; LS-not required; PR-H.	Acoustical tile or lay-in panel ceilings have seismic separation joints such that each continuous portion of the ceiling is no more than 2,500 ft2 (232.3 m2) and has a ratio of long-to-short dimension no more than 4-to-1. (Tier 2: Sec. 13.6.4; Commentary: Sec. A.7.2.7)			X		Not required for life safety performance level.

Light Fixtures

EVALUATION ITEM	EVALUATION STATEMENT	C	NC	N/A	U	COMMENT
LF-1 Independent Support. HR-not required; LS-MH; PR-MH.	Light fixtures that weigh more per square foot than the ceiling they penetrate are supported independent of the grid ceiling suspension system by a minimum of two wires at diagonally opposite corners of each fixture. (Tier 2: Sec. 13.6.4, 13.7.9; Commentary: Sec. A.7.3.2)				X	We observed that light fixtures in the main corridor are supported within an integrated ceiling system, which is over a path of egress. Maintenance and facility staff should verify that each fixture is independently supported to the roof structure from opposite corners and add wire supports as necessary. Lighting observed in the classroom areas do not appear to be supported by a suspended ceiling grid.
LF-2 Pendant Supports. HR-not required; LS-not required; PR-H.	Light fixtures on pendant supports are attached at a spacing equal to or less than 6 ft. Unbraced suspended fixtures are free to allow a 360-degree range of motion at an angle not less than 45 degrees from horizontal without contacting adjacent components. Alternatively, if rigidly supported and/or braced, they are free to move with the structure to which they are attached without damaging adjoining components. Additionally, the connection to the structure is capable of accommodating the movement without failure. (Tier 2: Sec. 13.7.9; Commentary: Sec. A.7.3.3)			X		Not required for life safety performance level.
LF-3 Lens Covers. HR-not required; LS-not required; PR-H.	Lens covers on light fixtures are attached with safety devices. (Tier 2: Sec. 13.7.9; Commentary: Sec. A.7.3.4)			X		Not required for life safety performance level.

Cladding and Glazing

EVALUATION ITEM	EVALUATION STATEMENT	C	NC	N/A	U	COMMENT
CG-1 Cladding Anchors. HR-MH; LS-MH; PR-MH.	Cladding components weighing more than 10 lb/ft2 (0.48 kN/m2) are mechanically anchored to the structure at a spacing equal to or less than the following: for Life Safety in Moderate Seismicity, 6 ft (1.8 m); for Life Safety in High Seismicity and for Position Retention in any seismicity, 4 ft (1.2 m) (Tier 2: Sec. 13.6.1; Commentary: Sec. A.7.4.1)			X		The building does not appear to have any cladding components.
CG-2 Cladding Isolation. HR-not required; LS-MH; PR-MH.	For steel or concrete moment-frame buildings, panel connections are detailed to accommodate a story drift ratio by the use of rods attached to framing with oversize holes or slotted holes of at least the following: for Life Safety in Moderate Seismicity, 0.01; for Life Safety in High Seismicity and for Position Retention in any seismicity, 0.02, and the rods have a length-to-diameter ratio of 4.0 or less. (Tier 2: Sec. 13.6.1; Commentary: Sec. A.7.4.3)			X		The building does not appear to have any cladding components.
CG-3 Multi-Story Panels. HR-MH; LS-MH; PR-MH.	For multi-story panels attached at more than one floor level, panel connections are detailed to accommodate a story drift ratio by the use of rods attached to framing with oversize holes or slotted holes of at least the following: for Life Safety in Moderate Seismicity, 0.01; for Life Safety in High Seismicity and for Position Retention in any seismicity, 0.02, and the rods have a length-to-diameter ratio of 4.0 or less. (Tier 2: Sec. 13.6.1; Commentary: Sec. A.7.4.4)			X		The building does not appear to have any cladding components.
CG-4 Threaded Rods. HR-not required; LS-MH; PR-MH.	Threaded rods for panel connections detailed to accommodate drift by bending of the rod have a length-to-diameter ratio greater than 0.06 times the story height in inches for Life Safety in Moderate Seismicity and 0.12 times the story height in inches for Life Safety in High Seismicity and Position Retention in any seismicity. (Tier 2: Sec. 13.6.1; Commentary: Sec. A.7.4.9)			X		The building does not appear to have any cladding components.
CG-5 Panel Connections. HR-MH; LS-MH; PR-MH.	Cladding panels are anchored out of plane with a minimum number of connections for each wall panel, as follows: for Life Safety in Moderate Seismicity, 2 connections; for Life Safety in High Seismicity and for Position Retention in any seismicity, 4 connections. (Tier 2: Sec. 13.6.1.4; Commentary: Sec. A.7.4.5)			X		The building does not appear to have any cladding components.

CG-6 Bearing Connections. HR-MH; LS-MH; PR-MH.	Where bearing connections are used, there is a minimum of two bearing connections for each cladding panel. (Tier 2: Sec. 13.6.1.4; Commentary: Sec. A.7.4.6)			X		The building does not appear to have any cladding components.
CG-7 Inserts. HR-MH; LS-MH; PR-MH.	Where concrete cladding components use inserts, the inserts have positive anchorage or are anchored to reinforcing steel. (Tier 2: Sec. 13.6.1.4; Commentary: Sec. A.7.4.7)			X		The building does not appear to have any cladding components.
CG-8 Overhead Glazing. HR-not required; LS-MH; PR-MH.	Glazing panes of any size in curtain walls and individual interior or exterior panes more than 16 ft2 (1.5 m2) in area are laminated annealed or laminated heat-strengthened glass and are detailed to remain in the frame when cracked. (Tier 2: Sec. 13.6.1.5; Commentary: Sec. A.7.4.8)			X		Overhead glazing panes of the Main Building appear to be less than 16 sf. However, based on the age of the building, it is likely that the glazing on the windows are laminated or detailed to remain in the frame. Glazing film is recommended on overhead glazing panes to reduce risk of glass shards becoming an overhead falling hazard.

Masonry Veneer

EVALUATION ITEM	EVALUATION STATEMENT	C	NC	N/A	U	COMMENT
M-1 Ties. HR-not required; LS-LMH; PR-LMH.	Masonry veneer is connected to the backup with corrosion-resistant ties. There is a minimum of one tie for every 2-2/3 ft2 (0.25 m2), and the ties have spacing no greater than the following: for Life Safety in Low or Moderate Seismicity, 36 in. (914 mm); for Life Safety in High Seismicity and for Position Retention in any seismicity, 24 in. (610 mm). (Tier 2: Sec. 13.6.1.2; Commentary: Sec. A.7.5.1)		X			The west, north, and south walls of the 1962 library are masonry cavity walls with a 4" CMU veneer (outer cavity) with no out -of-plane anchor ties specified.
M-2 Shelf Angles. HR-not required; LS-LMH; PR-LMH.	Masonry veneer is supported by shelf angles or other elements at each floor above the ground floor. (Tier 2: Sec. 13.6.1.2; Commentary: Sec. A.7.5.2)			X		This is a single-story building.
M-3 Weakened Planes. HR-not required; LS-LMH; PR-LMH.	Masonry veneer is anchored to the backup adjacent to weakened planes, such as at the locations of flashing. (Tier 2: Sec. 13.6.1.2; Commentary: Sec. A.7.5.3)		X			Veneer out -of-plane anchor ties are not specified in the existing drawings.
M-4 Unreinforced Masonry Backup. HR-LMH; LS-LMH; PR-LMH.	There is no unreinforced masonry backup. (Tier 2: Sec. 13.6.1.1, 13.6.1.2; Commentary: Sec. A.7.7.2)		X			The 8 inch masonry backup wall does not have vertical reinforcing to span from the ground to the roof diaphragm.

M-5 Stud Tracks. HR-not required; LS-MH; PR-MH.	For veneer with coldformed steel stud backup, stud tracks are fastened to the structure at a spacing equal to or less than 24 in. (610 mm) on center. (Tier 2: Sec. 13.6.1.1, 13.6.1.2; Commentary: Sec. A.7.6.)			X		There is no coldformed steel stud backup.
M-6 Anchorage. HR-not required; LS-MH; PR-MH.	For veneer with concrete block or masonry backup, the backup is positively anchored to the structure at a horizontal spacing equal to or less than 4 ft along the floors and roof. (Tier 2: Sec. 13.6.1.1, 13.6.1.2; Commentary: Sec. A.7.7.1)		X			The 8" masonry backup wall does not have out-of-plane connections to the roof diaphragm on either side of the wall.
M-7 Weep Holes. HR-not required; LS-not required; PR-MH.	In veneer anchored to stud walls, the veneer has functioning weep holes and base flashing. (Tier 2: Sec. 13.6.1.2; Commentary: Sec. A.7.5.6)			X		Not required for life safety performance level.
M-8 Openings. HR-not required; LS-not required; PR-MH.	For veneer with cold-formed-steel stud backup, steel studs frame window and door openings. (Tier 2: Sec. 13.6.1.1, 13.6.1.2; Commentary: Sec. A.7.6.2)			X		Not required for life safety performance level.

Parapets, Cornices, Ornamentation, and Appendages

EVALUATION ITEM	EVALUATION STATEMENT	C	NC	N/A	U	COMMENT
PCOA-1 URM Parapets or Cornices. HR-LMH; LS-LMH; PR-LMH.	Laterally unsupported unreinforced masonry parapets or cornices have height-tothickness ratios no greater than the following: for Life Safety in Low or Moderate Seismicity, 2.5; for Life Safety in High Seismicity and for Position Retention in any seismicity, 1.5. (Tier 2: Sec. 13.6.5; Commentary: Sec. A.7.8.1)			X		No unreinforced masonry parapets or cornices.
PCOA-2 Canopies. HR-not required; LS-LMH; PR-LMH.	Canopies at building exits are anchored to the structure at a spacing no greater than the following: for Life Safety in Low or Moderate Seismicity, 10 ft (3.0 m); for Life Safety in High Seismicity and for Position Retention in any seismicity, 6 ft (1.8 m). (Tier 2: Sec. 13.6.6; Commentary: Sec. A.7.8.2)			X		There are no canopies. The covered walkway is constructed with tapered 2x @ 16" oc attached to the exterior wall.
PCOA-3 Concrete Parapets. HR-H; LS-MH; PR-LMH.	Concrete parapets with height-to-thickness ratios greater than 2.5 have vertical reinforcement. (Tier 2: Sec. 13.6.5; Commentary: Sec. A.7.8.3)			X		There are no concrete parapets.
PCOA-4 Appendages. HR-MH; LS-MH; PR-LMH.	Cornices, parapets, signs, and other ornamentation or appendages that extend above the highest point of anchorage to the structure or cantilever from components are reinforced and anchored to the structural system at a spacing equal to or less than 6 ft (1.8 m). This evaluation statement item does not apply to parapets or cornices covered by other evaluation statements. (Tier 2: Sec. 13.6.6; Commentary: Sec. A.7.8.4)			X		There does not appear to be any cornices, parapets, signs and other ornamentation or appendages.

Masonry Chimneys

EVALUATION ITEM	EVALUATION STATEMENT	C	NC	N/A	U	COMMENT
MC-1 URM Chimneys. HR-LMH; LS-LMH; PR-LMH.	Unreinforced masonry chimneys extend above the roof surface no more than the following: for Life Safety in Low or Moderate Seismicity, 3 times the least dimension of the chimney; for Life Safety in High Seismicity and for Position Retention in any seismicity, 2 times the least dimension of the chimney. (Tier 2: Sec. 13.6.7; Commentary: Sec. A.7.9.1)			X		No unreinforced masonry chimney in the building.
MC-2 Anchorage. HR-LMH; LS-LMH; PR-LMH.	Masonry chimneys are anchored at each floor level, at the topmost ceiling level, and at the roof. (Tier 2: Sec. 13.6.7; Commentary: Sec. A.7.9.2)			X		No unreinforced masonry chimney in the building.

Stairs

EVALUATION ITEM	EVALUATION STATEMENT	C	NC	N/A	U	COMMENT
S-1 Stair Enclosures. HR-not required; LS-LMH; PR-LMH.	Hollow-clay tile or unreinforced masonry walls around stair enclosures are restrained out of plane and have height-to-thickness ratios not greater than the following: for Life Safety in Low or Moderate Seismicity, 15-to-1; for Life Safety in High Seismicity and for Position Retention in any seismicity, 12-to-1. (Tier 2: Sec. 13.6.2, 13.6.8; Commentary: Sec. A.7.10.1)			X		This is a one-story building without a stair enclosure.
S-2 Stair Details. HR-not required; LS-LMH; PR-LMH.	The connection between the stairs and the structure does not rely on post-installed anchors in concrete or masonry, and the stair details are capable of accommodating the drift calculated using the Quick Check procedure of Section 4.4.3.1 for moment-frame structures or 0.5 in. for all other structures without including any lateral stiffness contribution from the stairs. (Tier 2: Sec. 13.6.8; Commentary: Sec. A.7.10.2)			X		This is a one-story building without stairs.

Contents and Furnishings

EVALUATION ITEM	EVALUATION STATEMENT	C	NC	N/A	U	COMMENT
CF-1 Industrial Storage Racks. HR-LMH; LS-MH; PR-MH.	Industrial storage racks or pallet racks more than 12 ft high meet the requirements of ANSI/RMI MH 16.1 as modified by ASCE 7, Chapter 15. (Tier 2: Sec. 13.8.1; Commentary: Sec. A.7.11.1)			X		We did not see industrial storage racks in our site visit.

CF-2 Tall Narrow Contents. HR-not required; LS-H; PR-MH.	Contents more than 6 ft (1.8 m) high with a height-to-depth or height-to-width ratio greater than 3-to-1 are anchored to the structure or to each other. (Tier 2: Sec. 13.8.2; Commentary: Sec. A.7.11.2)				X	The book shelves in the library are backed up to the walls of the library but it is unknown if these shelving units are anchored to the backing walls. Maintenance and facility staff should verify that the tops of the shelving units are braced or anchored to the nearest backing wall or provide overturning base restraint.
CF-3 Fall-Prone Contents. HR-not required; LS-H; PR-H.	Equipment, stored items, or other contents weighing more than 20 lb (9.1 kg) whose center of mass is more than 4 ft (1.2 m) above the adjacent floor level are braced or otherwise restrained. (Tier 2: Sec. 13.8.2; Commentary: Sec. A.7.11.3)			X		We did not see freestanding tall narrow contents however, maintenance and facility staff should verify that heavy items on upper shelves are restrained by netting or cabling to avoid becoming falling hazards.
CF-4 Access Floors. HR-not required; LS-not required; PR-MH.	Access floors more than 9 in. (229 mm) high are braced. (Tier 2: Sec. 13.6.10; Commentary: Sec. A.7.11.4)			X		Not required for life safety performance level.
CF-5 Equipment on Access Floors. HR-not required; LS-not required; PR-MH.	Equipment and other contents supported by access floor systems are anchored or braced to the structure independent of the access floor. (Tier 2: Sec. 13.7.7 13.6.10; Commentary: Sec. A.7.11.5)			X		Not required for life safety performance level.
CF-6 Suspended Contents. HR-not required; LS-not required; PR-H.	Items suspended without lateral bracing are free to swing from or move with the structure from which they are suspended without damaging themselves or adjoining components. (Tier 2: Sec. 13.8.2; Commentary: Sec. A.7.11.6)			X		Not required for life safety performance level.

Mechanical and Electrical Equipment

EVALUATION ITEM	EVALUATION STATEMENT	C	NC	N/A	U	COMMENT
ME-1 Fall-Prone Equipment. HR-not required; LS-H; PR-H.	Equipment weighing more than 20 lb (9.1 kg) whose center of mass is more than 4 ft (1.2 m) above the adjacent floor level, and which is not in-line equipment, is braced. (Tier 2: Sec. 13.7.1 13.7.7; Commentary: Sec. A.7.12.4)				X	Not able to verify during site investigation. Further investigation should be performed. Bracing or anchoring of equipment may be appropriate to mitigate seismic risk.

ME-2 In-Line Equipment. HR-not required; LS-H; PR-H.	Equipment installed in line with a duct or piping system, with an operating weight more than 75 lb (34.0 kg), is supported and laterally braced independent of the duct or piping system. (Tier 2: Sec. 13.7.1; Commentary: Sec. A.7.12.5)				X	Not able to verify during site investigation. Further investigation should be performed. Bracing or anchoring of equipment may be appropriate to mitigate seismic risk.
ME-3 Tall Narrow Equipment. HR-not required; LS-H; PR-MH.	Equipment more than 6 ft (1.8 m) high with a height-to-depth or height-to-width ratio greater than 3-to-1 is anchored to the floor slab or adjacent structural walls. (Tier 2: Sec. 13.7.1 13.7.7; Commentary: Sec. A.7.12.6)				X	Not able to verify during site investigation. Further investigation should be performed. Brace tops of equipment taller than 6 feet to nearest backing wall or provide overturning base restraint.
ME-4 Mechanical Doors. HR-not required; LS-not required; PR-MH.	Mechanically operated doors are detailed to operate at a story drift ratio of 0.01. (Tier 2: Sec. 13.6.9; Commentary: Sec. A.7.12.7)			X		Not required for life safety performance level.
ME-5 Suspended Equipment. HR-not required; LS-not required; PR-H.	Equipment suspended without lateral bracing is free to swing from or move with the structure from which it is suspended without damaging itself or adjoining components. (Tier 2: Sec. 13.7.1, 13.7.7; Commentary: Sec. A.7.12.8)			X		Not required for life safety performance level.
ME-6 Vibration Isolators. HR-not required; LS-not required; PR-H.	Equipment mounted on vibration isolators is equipped with horizontal restraints or snubbers and with vertical restraints to resist overturning. (Tier 2: Sec. 13.7.1; Commentary: Sec. A.7.12.9)			X		Not required for life safety performance level.
ME-7 Heavy Equipment. HR-not required; LS-not required; PR-H.	Floor supported or platform-supported equipment weighing more than 400 lb (181.4 kg) is anchored to the structure. (Tier 2: Sec. 13.7.1, 13.7.7; Commentary: Sec. A.7.12.10)			X		Not required for life safety performance level.
ME-8 Electrical Equipment. HR-not required; LS-not required; PR-H.	Electrical equipment is laterally braced to the structure. (Tier 2: Sec. 13.7.7; Commentary: Sec. A.7.12.11)			X		Not required for life safety performance level.
ME-9 Conduit Couplings. HR-not required; LS-not required; PR-H.	Conduit greater than 2.5 in. (64 mm) trade size that is attached to panels, cabinets, or other equipment and is subject to relative seismic displacement has flexible couplings or connections. (Tier 2: Sec. 13.7.8; Commentary: Sec. A.7.12.12)			X		Not required for life safety performance level.

Piping

EVALUATION ITEM	EVALUATION STATEMENT	C	NC	N/A	U	COMMENT
PP-1 Flexible Couplings. HR-not required; LS-not required; PR-H.	Fluid and gas piping has flexible couplings. (Tier 2: Sec. 13.7.3, 13.7.5; Commentary: Sec. A.7.13.2)			X		Not required for life safety performance level.

PP-2 Fluid and Gas Piping. HR-not required; LS-not required; PR-H.	Fluid and gas piping is anchored and braced to the structure to limit spills or leaks. (Tier 2: Sec. 13.7.3, 13.7.5; Commentary: Sec. A.7.13.4)			X		Not required for life safety performance level.
PP-3 C-Clamps. HR-not required; LS-not required; PR-H.	One-sided C-clamps that support piping larger than 2.5 in. (64 mm) in diameter are restrained. (Tier 2: Sec. 13.7.3, 13.7.5; Commentary: Sec. A.7.13.5)			X		Not required for life safety performance level.
PP-4 Piping Crossing Seismic Joints. HR-not required; LS-not required; PR-H.	Piping that crosses seismic joints or isolation planes or is connected to independent structures has couplings or other details to accommodate the relative seismic displacements. (Tier 2: Sec. 13.7.3, 13.7.5; Commentary: Sec. A.7.13.6)			X		Not required for life safety performance level.

Ducts

EVALUATION ITEM	EVALUATION STATEMENT	C	NC	N/A	U	COMMENT
D-1 Duct Bracing. HR-not required; LS-not required; PR-H.	Rectangular ductwork larger than 6 ft2 (0.56 m2) in cross-sectional area and round ducts larger than 28 in. (711 mm) in diameter are braced. The maximum spacing of transverse bracing does not exceed 30 ft (9.2 m). The maximum spacing of longitudinal bracing does not exceed 60 ft (18.3 m). (Tier 2: Sec. 13.7.6; Commentary: Sec. A.7.14.2)			X		Not required for life safety performance level.
D-2 Duct Support. HR-not required; LS-not required; PR-H.	Ducts are not supported by piping or electrical conduit. (Tier 2: Sec. 13.7.6; Commentary: Sec. A.7.14.3)			X		Not required for life safety performance level.
D-3 Ducts Crossing Seismic Joints. HR-not required; LS-not required; PR-H.	Ducts that cross seismic joints or isolation planes or are connected to independent structures have couplings or other details to accommodate the relative seismic displacements. (Tier 2: Sec. 13.7.6; Commentary: Sec. A.7.14.4)			X		Not required for life safety performance level.

Elevators

EVALUATION ITEM	EVALUATION STATEMENT	C	NC	N/A	U	COMMENT
EL-1 Retainer Guards. HR-not required; LS-H; PR-H.	Sheaves and drums have cable retainer guards. (Tier 2: Sec. 13.7.11; Commentary: Sec. A.7.16.1)			X		The building does not appear to have any elevators.
EL-2 Retainer Plate. HR-not required; LS-H; PR-H.	A retainer plate is present at the top and bottom of both car and counterweight. (Tier 2: Sec. 13.7.11; Commentary: Sec. A.7.16.2)			X		The building does not appear to have any elevators.
EL-3 Elevator Equipment. HR-not required; LS-not required; PR-H.	Equipment, piping, and other components that are part of the elevator system are anchored. (Tier 2: Sec. 13.7.11; Commentary: Sec. A.7.16.3)			X		Not required for life safety performance level.

EL-4 Seismic Switch. HR-not required; LS-not required; PR-H.	Elevators capable of operating at speeds of 150 ft/min or faster are equipped with seismic switches that meet the requirements of ASME A17.1 or have trigger levels set to 20% of the acceleration of gravity at the base of the structure and 50% of the acceleration of gravity in other locations. (Tier 2: Sec. 13.7.11; Commentary: Sec. A.7.16.4)			X		Not required for life safety performance level.
EL-5 Shaft Walls. HR-not required; LS-not required; PR-H.	Elevator shaft walls are anchored and reinforced to prevent toppling into the shaft during strong shaking. (Tier 2: Sec. 13.7.11; Commentary: Sec. A.7.16.5)			X		Not required for life safety performance level.
EL-6 Counterweight Rails. HR-not required; LS-not required; PR-H.	All counterweight rails and divider beams are sized in accordance with ASME A17.1. (Tier 2: Sec. 13.7.11; Commentary: Sec. A.7.16.6)			X		Not required for life safety performance level.
EL-7 Brackets. HR-not required; LS-not required; PR-H.	The brackets that tie the car rails and the counterweight rail to the structure are sized in accordance with ASME A17.1. (Tier 2: Sec. 13.7.11; Commentary: Sec. A.7.16.7)			X		Not required for life safety performance level.
EL-8 Spreader Bracket. HR-not required; LS-not required; PR-H.	Spreader brackets are not used to resist seismic forces. (Tier 2: Sec. 13.7.11; Commentary: Sec. A.7.16.8)			X		Not required for life safety performance level.
EL-9 Go-Slow Elevators. HR-not required; LS-not required; PR-H.	The building has a go-slow elevator system. (Tier 2: Sec. 13.7.11; Commentary: Sec. A.7.16.9)			X		Not required for life safety performance level.

Appendix B: Concept-Level Seismic Upgrade Figures

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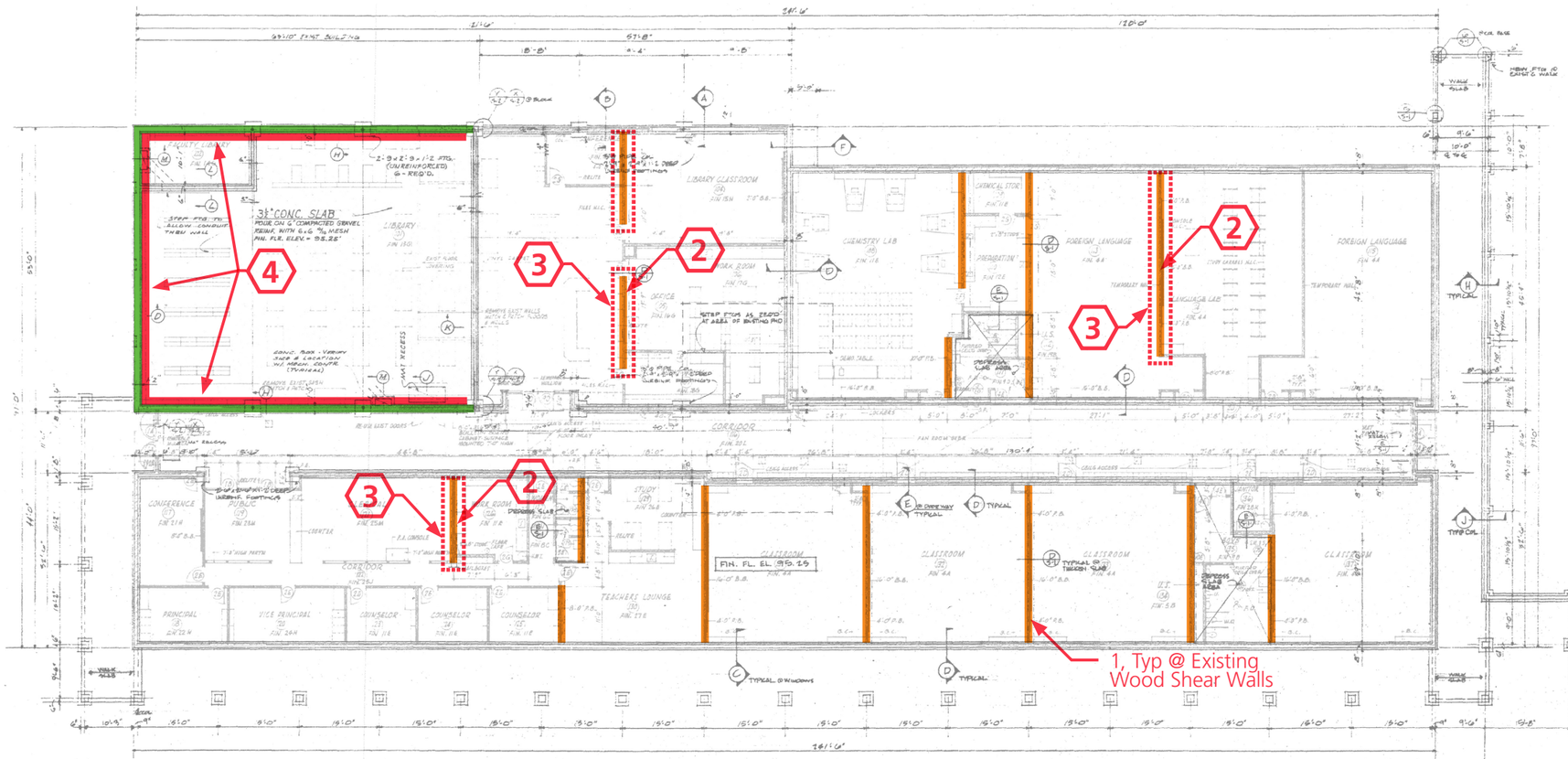


1 Verify Existing Shear Wall Construction By Removing Lower 2 Feet Of GWB On Each Side Of Wall & Verify Shear Wall Sill Plate Anchor Bolts & Plywood Panel Nailing

2 New 2"X6" Shear Wall w/ 1/2" Plywood Sheathing & Sill Plate Anchor Bolts @ 24" OC

3 New 2'-6" Wide X 1'-0" Deep Strip Footing Sawcut In Existing Slab

4 Strongback Existing Unreinforced Masonry Cavity Wall w/ 6"X18" GA Metal Studs @ 16" OC & Sheathe Inside Face w/ 1/2" Plywood For In-Plan Shear Strengthening, Install Rosette Anchors @ 48" OC Each Way Through Wall Cavity, See Sk-6

Existing Wood Shear Wall

New Shear Wall

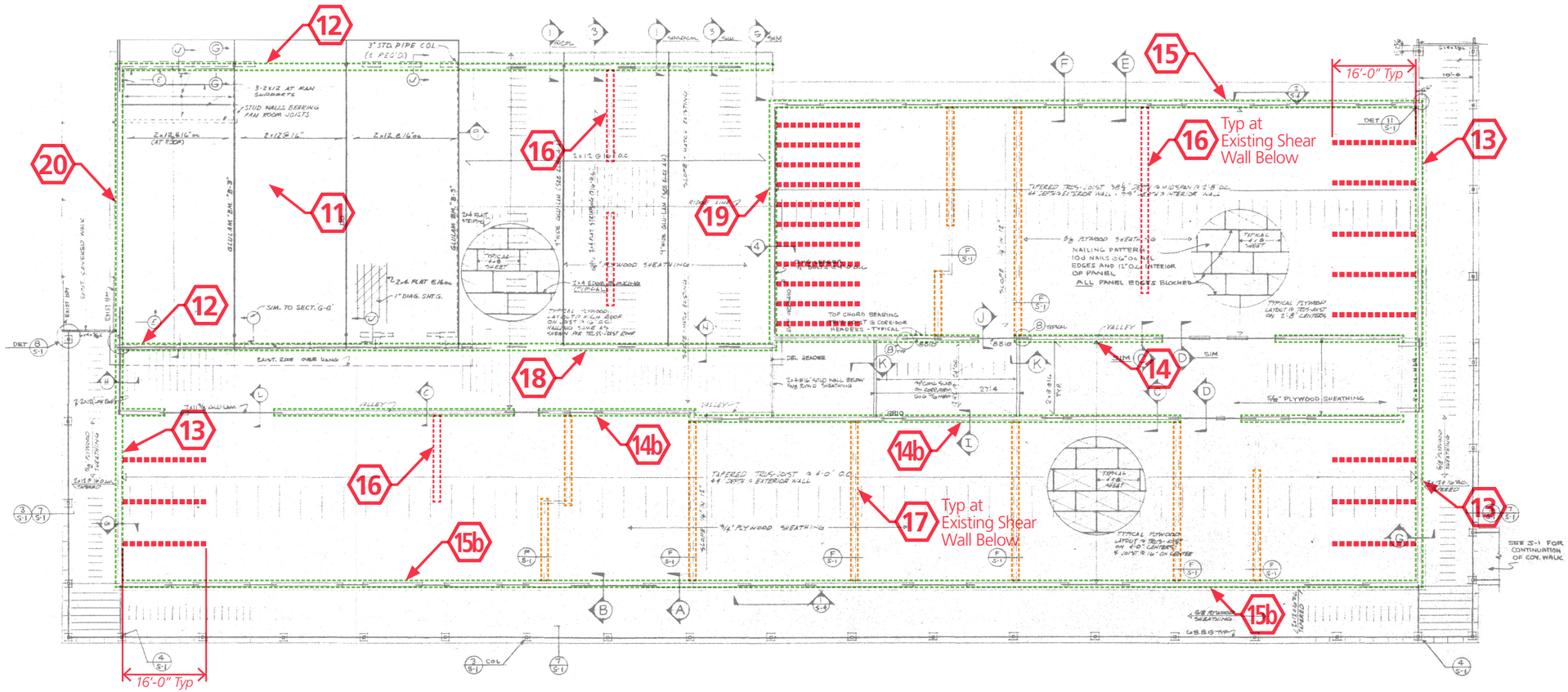
Existing Masonry Cavity Wall

N

ReidMiddleton

Totem Elementary School Seismic Upgrades – Main Building
Washington State School Seismic Safety Assessments Project – Marysville School District – June 2019

Figure 1 - Main Floor Strengthening Plan



11 Sheathe & Nail 1962 Roof w/ 1/2" Plywood Over Existing Diagonal Sheathing

12 Install Out-Of-Plane Wall Anchors & Blocking Per Detail SK-1

13 Install Out-Of-Plane Wall Anchors, Blocking, & Strapping Over Roof Sheathing @ 8'-0" OC Per Detail SK-2

14 Install Out-Of-Plane Wall Anchors @ 5'-4" Oc (@ 8'-0" Oc At 14B) Per Detail SK-3

15 Install Out-Of-Plane Wall Anchors @ 5'-4" OC (@ 8'-0" OC At 15B) Per SK-4

16 Nail Roof Diaphragm To New Shear Walls Below w/ (2)Rows 10D @ 6" OC

17 Nail Roof Diaphragm To Existing Shear Walls Below w/ (2)Rows 10D @ 6" OC

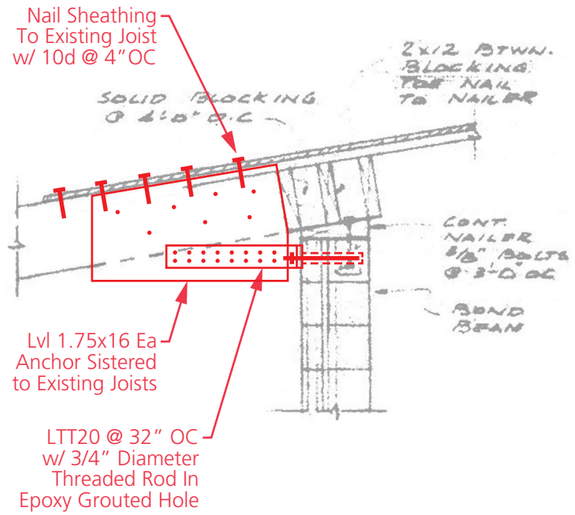
18 Install Out-Of-Plane Wall Anchors & Blocking Per Detail Sk-5

19 Install Out-Of-Plane Wall Anchors, Blocking, & Strapping Over Roof Sheathing @ 4'-0" OC Per Detail SK-6

20 Install Out-Of-Plane Wall Anchors & Blocking Per Detail Sk-7

N

Figure 2 - Roof Strengthening Plan



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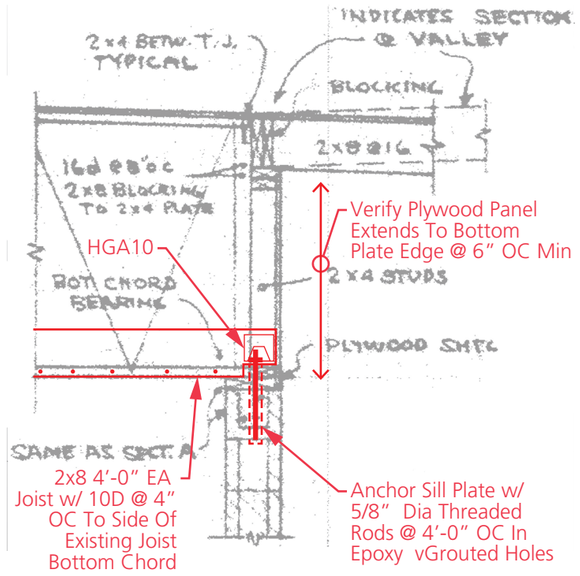

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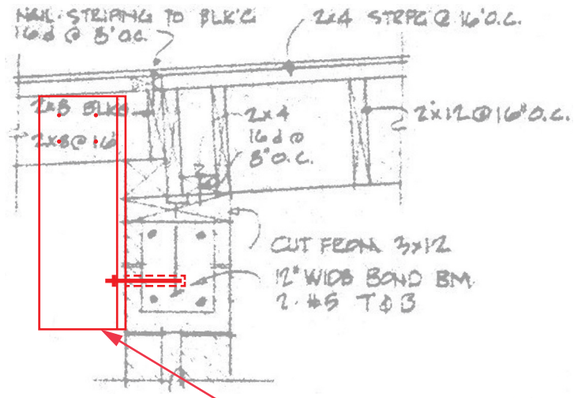

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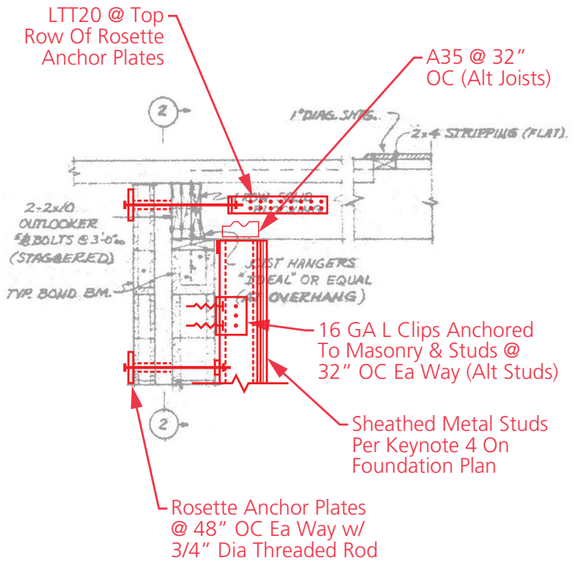

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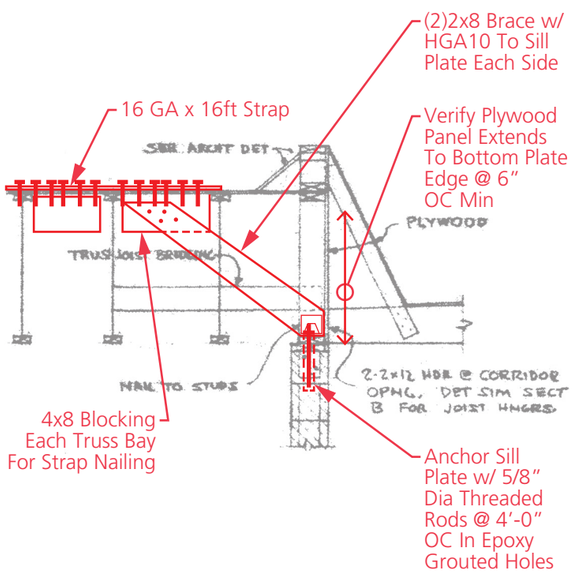

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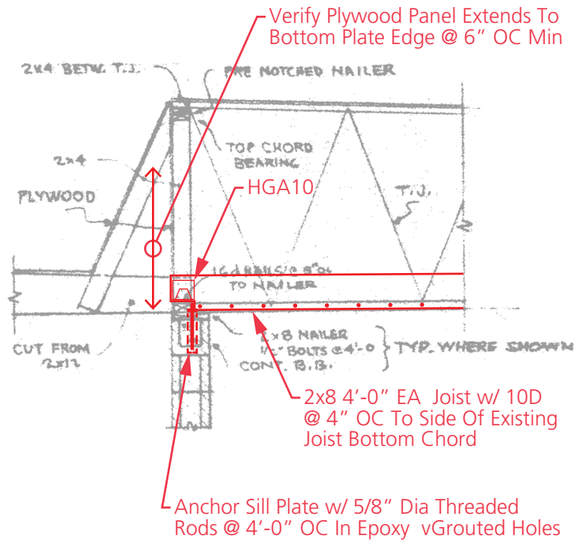

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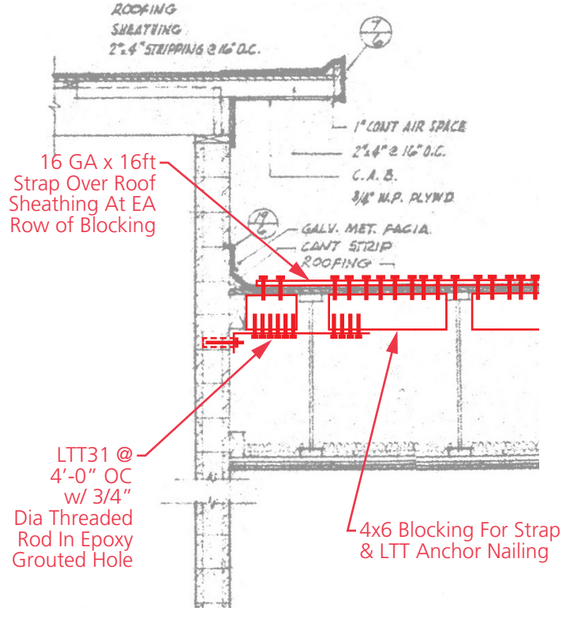

SK-6

ReidMiddleton

Totem Elementary School Seismic Upgrades – Main Building
Washington State School Seismic Safety Assessments Project – Marysville School District – June 2019

Figure 3 - Conceptual Sections

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Appendix C: Opinion of Probable Construction Costs

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520 Kirkland Way, Suite 301
Kirkland, WA 98033
tel: (425) 828-0500
fax: (425) 828-0700
www.prodims.com

Name:	**Wa State School Seismic Safety Assessment**
Second Name:	**Totem Middle School**
Location:	**State of Washington**
Design Phase:	**ROM Cost Estimates**
Date of Estimate:	**April 27, 2019**
Date of Revision:	
Month of Cost Basis:	**1Q, 2019**

Totem Middle School

Master Estimate Summary

Project Name		Total Estimated Construction Cost
Totem Middle School	**Structural Costs**	**$1,078,446**
Totem Middle School	**Non-Structural Costs**	**$733,122**
TOTAL ESTIMATED CONSTRUCTION COST		**$1,811,568**

Estimate Assumptions:

The ROM Construction Cost estimates are based on the Concept Design Report for the Project.
Construction Escalation is not included. Costs are current as of month of Cost Basis noted Above

Estimate Qualifications:

The ROM estimates are not be relied on solely for proforma development and financial decisions.
Further design work is required to determine construction budgets.
All Buildings Estimated to the 5' foot line for Utilities, All Sitework is estimated to go with any combination of the buildings and alternatives.
The ROM estimates do not include any Hazardous Material Abatement/Disposal.
For Construction Cost Markups they are additive, not cumulative. Percentages are added to the previous subtotal rather than the direct cost subtotal.
Owner Soft Costs are not included in the estimates. Soft costs can include design fees, sales tax, permits, owner's contingency and FF+E.
Estimated labor is based on an 8 hour per day shift 5 days a week. Accelerated schedule work of overtime has not been included.
Estimated labor is based on working on unoccupied facility without phased construction.
Estimate is based on a competitive public bid with at least 3 bona fide submitted and unrescinded general contractor bids.
Estimate is based on a competitive public bid with a minimum 6 week bidding schedule and no significant addendums within 2 weeks of bid opening.
State of Washington General Contractor/ Construction Manager (GC/CM) contracts typically raises construction costs. It is Not Included in this estimate.
Estimated construction cost is for the entire project. This estimate is not intended to be used for other projects.
Please consult the cost estimator for any modifications to this estimate. Unilaterally adding and deleting markups, scope of work, schedule, specifications, plans and bid forms could incorrectly restate the project construction cost.
Construction reserve contingency for change orders is not included in the estimate.
Sole source supply of materials and/ or installers typically results in a 40% to 100% premium on costs over open specifications.

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Structural Costs

Name: Wa State School Seismic Safety Assessment
Second Name: Totem Middle School
Location: Marysville, WA
Design Phase: ROM Cost Estimates
Date of Estimate: April 27, 2019
Date of Revision:
Month of Cost Basis: 4Q, 2018, 1Q, 2019

Areas	sqft
Building Area	22,000
Total Areas	22,000

Totem Middle School

Construction Cost Estimate

Subtotal Direct Cost From the Estimate Detail Below $ 823,241

	Percentage of Previous Subtotal	Amount	Running Subtotal
Scope Contingency	10.0%	$ 82,324	$ 905,565
General Conditions	10.0%	$ 82,324	$ 987,889
Home Office Overhead	5.0%	$ 41,162	$ 1,029,051
Profit	6.0%	$ 49,394	$ 1,078,446
Escalation Not Included-Costs in 1Q, 2019 Dollars	0.0%	$ -	$ 1,078,446
Washington State Sales Tax	0.0%	$ -	$ 1,078,446

Total Markups Applied to the Direct Cost 31.00%
Markups are multiplied from each subtotal- They are not multiplied from the direct cost

		$/sqft
TOTAL ESTIMATED CONSTRUCTION COST-->	**$ 1,078,446**	**$ 49.02**
-20% TOTAL ESTIMATED CONSTRUCTION COST VARIANCE -->	**$ 862,756**	**$ 39.22**
+50% TOTAL ESTIMATED CONSTRUCTION COST VARIANCE -->	**$ 1,617,668**	**$ 73.53**

Please see the Master Summary for Assumptions and Qualifications for ROM Cost Estimates

Direct Cost of Construction

WBS	Description	Quantity	U of M	Labor	Labor Total	Material	Material Total	Equipment	Equipment Total	Total $/U of M	Direct Cost
1 - Seismic Retrofit											
Foundations											
	New Footing Extension System for Shotcrete Walls - Excavation, Backfill, Formwork, Concrete, Reinforcing and detailing.	8.7	cuyd	$ 464.00	$ 4,022.88	$ 261.00	$ 2,262.87	$ 43.50	$ 377.15	$ 768.50	$ 6,662.90
Substructure											
	Remove and Reinstall Slab on Grade System with Reinforcing, New Flooring System at Thickened Slab Installation	420	sqft	$ 13.20	$ 5,544.00	$ 10.80	$ 4,536.00	$ 1.44	$ 604.80	$ 25.44	$ 10,684.80
Superstructure											
Roof Systems											
	LVL Blocking/LTT20 with Anchor Bolt	46	each	$ 278.40	$ 12,806.40	$ 201.60	$ 9,273.60	$ 28.80	$ 1,324.80	$ 508.80	$ 23,404.80
	4x8 Blocking/16 GA Strap with Anchor Bolt and Plywood Panel Verification	19	each	$ 377.00	$ 7,163.00	$ 273.00	$ 5,187.00	$ 39.00	$ 741.00	$ 689.00	$ 13,091.00
	2x8 Blocking/HGA Clip with Anchor Bolt and Plywood Panel Verification	53	each	$ 359.60	$ 19,058.80	$ 260.40	$ 13,801.20	$ 37.20	$ 1,971.60	$ 657.20	$ 34,831.60
	2x8 Blocking/HGA Clip with Anchor Bolt and Plywood Panel Verification	53	each	$ 360.18	$ 19,089.54	$ 260.82	$ 13,823.46	$ 37.26	$ 1,974.78	$ 658.26	$ 34,887.78
	Angle 8x4x7/16 with Anchor Bolt	46	each	$ 301.60	$ 13,873.60	$ 218.40	$ 10,046.40	$ 31.20	$ 1,435.20	$ 551.20	$ 25,355.20
	4x6 Blocking/LTT Anchor and 16 GA Strap with Anchor Bolt	11	each	$ 458.20	$ 5,040.20	$ 331.80	$ 3,649.80	$ 47.40	$ 521.40	$ 837.40	$ 9,211.40
	LTT Anchor with Bolt and Rosette	14	each	$ 353.80	$ 4,953.20	$ 256.20	$ 3,586.80	$ 36.60	$ 512.40	$ 646.60	$ 9,052.40
	Add Plywood Sheathing/Edge Blocking at Roof System	22,000	sqft	$ 2.31	$ 50,765.00	$ 1.24	$ 27,335.00	$ 0.21	$ 4,686.00	$ 3.76	$ 82,786.00
Exterior Closure											
Exterior Wall System											
	Strongback Existing Unreinforced Masonry Wall w/ 6"X18 GA Metal Studs @ 16" OC & w/ 1/2" Plywood and Install Rosette Anchors @ 48" oc Each Way. Including Batt Insulation and GWB	2,450	sqft	$ 12.93	$ 31,666.25	$ 10.58	$ 25,908.75	$ 1.41	$ 3,454.50	$ 24.91	$ 61,029.50

WBS	Description	Quantity	U of M	Labor	Labor Total	Material	Material Total	Equipment	Equipment Total	Total $/U of M	Direct Cost
Roofing System											
	Remove Existing Roofing System	22,000	sqft	$ 2.02	$ 44,352.00	$ 0.08	$ 1,848.00	$ 0.13	$ 2,772.00	$ 2.23	$ 48,972.00
	Install New Roofing System - Including Roof Membrane, New Insulation, Coverboard and Flashing and Trim for a Complete System	22,000	sqft	$ 10.02	$ 220,374.00	$ 8.53	$ 187,726.00	$ 1.11	$ 24,486.00	$ 19.66	$ 432,586.00
Interiors											
	Interior Wall/Door/Casework/Specialties Systems										
	New 2x6 Wood Stud Wall System with 1/2" Plywood Sheathing and Anchor Bolts and New GWB each side - Plus Removal of Existing Partitions	1,260	sqft	$ 11.48	$ 14,469.84	$ 8.32	$ 10,478.16	$ 1.19	$ 1,496.88	$ 20.99	$ 26,444.88
	Remove and Reinstall Lower 2' of GWB after verification of sill plate anchor bolts and plywood panel nailing at Interior Walls	964	sqft	$ 2.66	$ 2,560.38	$ 1.49	$ 1,440.22	$ 0.25	$ 240.04	$ 4.40	$ 4,240.64
Subtotal of the Direct Cost of Construction		**Totem Middle School**									**$ 823,241**

PRODIMS
PROJECT MANAGEMENT SERVICES

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Kirkland, WA 98033
Phone: 425-828-0500 Fax: 425-828-0700
www.prodims.com

Non-Structural Costs

Name: **Wa State School Seismic Safety Assessment**
Second Name: **Totem Middle School**
Location: **Marysville, WA**
Design Phase: **ROM Cost Estimates**
Date of Estimate: **April 27, 2019**
Date of Revision:
Month of Cost Basis: **4Q, 2018, 1Q, 2019**

Areas	sqft
Building Area	22,000
Total Areas	**22,000**

Totem Middle School

Construction Cost Estimate

Subtotal Direct Cost From the Estimate Detail Below $ 559,635

	Percentage of Previous Subtotal	Amount	Running Subtotal
Scope Contingency	10.0%	$ 55,964	$ 615,599
General Conditions	10.0%	$ 55,964	$ 671,562
Home Office Overhead	5.0%	$ 27,982	$ 699,544
Profit	6.0%	$ 33,578	$ 733,122
Escalation Not Included-Costs in 1Q, 2019 Dollars	0.0%	$ -	$ 733,122
Washington State Sales Tax	0.0%	$ -	$ 733,122

Total Markups Applied to the Direct Cost 31.00%
Markups are multiplied from each subtotal- They are not multiplied from the direct cost

		$/sqft
TOTAL ESTIMATED CONSTRUCTION COST-->	**$ 733,122**	**$ 33.32**
-20% TOTAL ESTIMATED CONSTRUCTION COST VARIANCE -->	**$ 586,498**	**$ 26.66**
+50% TOTAL ESTIMATED CONSTRUCTION COST VARIANCE -->	**$ 1,099,683**	**$ 49.99**

Please see the Master Summary for Assumptions and Qualifications for ROM Cost Estimates

Direct Cost of Construction

WBS	Description	Quantity	U of M	Labor	Labor Total	Material	Material Total	Equipment	Equipment Total	Total $/U of M	Direct Cost
	2- Non- Structural Demo/Restoration*										
	Interiors and M/E/P/FP systems										
	Interior Wall/Door/Casework/Specialties Systems										
	New Flooring Finishes for Installation of Seismic Work	22,000	sqft	$ 2.59	$ 57,035.00	$ 1.66	$ 36,465.00	$ 0.26	$ 5,610.00	$ 4.51	$ 99,110.00
	New Wall Finishes for Installation of Seismic Work	9,790	sqft	$ 2.14	$ 20,901.65	$ 1.37	$ 13,363.35	$ 0.21	$ 2,055.90	$ 3.71	$ 36,320.90
	Reinforce Light Fixtures with Additional Attachments	22,000	sqft	$ 1.28	$ 28,182.00	$ 0.82	$ 18,018.00	$ 0.13	$ 2,772.00	$ 2.23	$ 48,972.00
	New Ceilings and Finishes for Installation of Seismic Work	22,000	sqft	$ 3.36	$ 73,810.00	$ 2.15	$ 47,190.00	$ 0.33	$ 7,260.00	$ 5.83	$ 128,260.00
	Mechanical/Electrical/Fire Protection Systems	22,000	sqft	$ 5.82	$ 128,145.99	$ 4.77	$ 104,846.72	$ 0.64	$ 13,979.56	$ 11.23	$ 246,972.27

*Allows 30 percent of existing nonstructural systems M/E/P/FP require upgrades/replacement.

Subtotal of the Direct Cost of Construction	**Totem Middle School**										**$ 559,635**

Appendix D: Earthquake Performance Assessment Tool (EPAT) Worksheet

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Washington Schools Earthquake Performance Assessment Tool (EPAT)
MAIN PAGE

Full District Name	Marysville		
Point of Contact	Brandon Klepper		
Telephone	360-965-0095		
E-Mail	brandon_klepper@msvl.k12.wa.us		
File Name	Marysville, Totem Middle School, Main Building EPAT.xlsm	**File Date:**	7/6/2018

District	Marysville
Facility Name	Totem Middle School
Building Part Name	Main Building

Earthquake Ground Motion (% g)		**Earthquake Hazards**	
20% in 50 year PGA	24.2%	**Site Class**	D
10% in 50 year PGA	31.6%	**Ground Shaking Hazard**	High
2% in 50 year PGA	50.2%	**Liquefaction Potential**	Low to Moderate
Percentile S_s *Among all WA Campuses*	44%	**Combined Earthquake Hazard Level**	High

Total Building Part Area (Square Feet)	**Building Evaluated By**	**Input Data by Person(s)**
22,384	DNR, Reid Middleton	Tim Green, Reid Middleton

The Earthquake Ground Motion and Earthquake Hazard Hazards data shown above are primarily for use and interpretation by engineers.

Refer to the EPAT User Guide for technical explanations of the Earthquake Ground Motion and the Earthquake Hazards information.

Washington Schools Earthquake Performance Assessment Tool (EPAT)
BUILDING DATA PAGE

Facility Name	Totem Middle School
Building Name	Main Building
Building Use	Educational

Data Entry Item	User Entered Values	Default Values	Used for BCA
Seismic Data			
Decimal Latitude	48.054966	48.054966	48.054966
Decimal Longitude	-122.175125	-122.175125	-122.175125
Site Class (Soil/Rock Type)	D	D-E	D
Liquefaction Potential	Low to Moderate	Low to Moderate	Low to Moderate
Geographic Region for Seismic Zones	Puget Sound	Puget Sound	Puget Sound
Building Structural Data			
HAZUS Building Type***	RM1	Reinforced Masonry Bearing Walls w/ Wood or Metal Diaphragms	RM1
Number of Stories (Excluding Basement)***	1		1
Year Built***	1966		1966
Code for Building Design (if known)	UBC	**Use the Drop-Down menus to Select Data Entries for the Bright Green Shaded data cells.**	UBC
Design Code Year (if known)	<1973		<1973
Severe Vertical Irregularity***	No		No
Moderate Vertical Irregularity***	No		No
Plan (Horizontal) Irregularity***	No		No

*** **Mandatory Data Entry**

Washington Schools Earthquake Performance Assessment Tool (EPAT)
RESULTS SUMMARY

District Name	Marysville	**Existing Building Life Safety Risk & Priority for Retrofit or Replacement**
School Name	Totem Middle School	
Building Name	Main Building	Very High

Building Data

HAZUS Building Type	RM1	Reinforced Masonry Bearing Walls w/ Wood or Metal Diaphragms
Year Built	1966	These parameters determine the capacity of the existing building to withstand earthquake forces.
Building Design Code	<1973 UBC	
Existing Building Code Level	Pre	
Geographic Area	Puget Sound	
Severe Vertical Irregularity	No	Buildings with irregularities have greater earthquake damage than otherwise similar buildings that are regular.
Moderate Vertical Irregularity	No	
Plan Irregularity	No	

Seismic Data

Earthquake Ground Shaking Hazard Level	High	Frequency and severity of earthquakes at this site
Percentile S_s Among WA K-12 Campuses	44%	Earthquake ground shaking hazard is higher than 44% of WA campuses.
Site Class (Soil or Rock Type)	D	Stiff Soil
Liquefaction Potential	Low to Moderate	Liquefaction increases the risk of major damage to a building
Combined Earthquake Hazard Level	High	Earthquake ground shaking and liquefaction potential

Severe Earthquake Event (Design Basis Earthquake Ground Motion)[1]

Building State	Building Damage Estimate[2]	Probability Building is not Repairable[3]	Life Safety[4] Risk Level	Most Likely Post-Earthquake Tagging[5]
Existing Building	70%	69%	Very High	Red
Life Safety Retrofit Building	15%	7.7%	Very Low	Green/Yellow
Current Code Building	12%	5.0%	Very Low	Green

1. 2/3rds of the 2% in 50 year ground motion
2. Percentage of building replacement value.
3. Probability building is in the Extensive or Complete damage states. For existing buildings, the probability that the building is not economically repairable may be higher: some buildings in the Moderate Damage state are also likely to be demolished.
4. Based on probability of Complete Damage State.
5. Most likely post-earthquake damage state per ATC-20.

Source for the Data Entered into the Tool

Building Evaluated By:	DNR, Reid Middleton
Person(s) Who Entered Data in EPAT:	Tim Green, Reid Middleton
User Overrides of Default Parameters:	Building Design Code Year, Latitude, Longitude, Site Class, Liquefaction, Geographic Region

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Appendix E: Totem Middle School Main Building Existing Drawings

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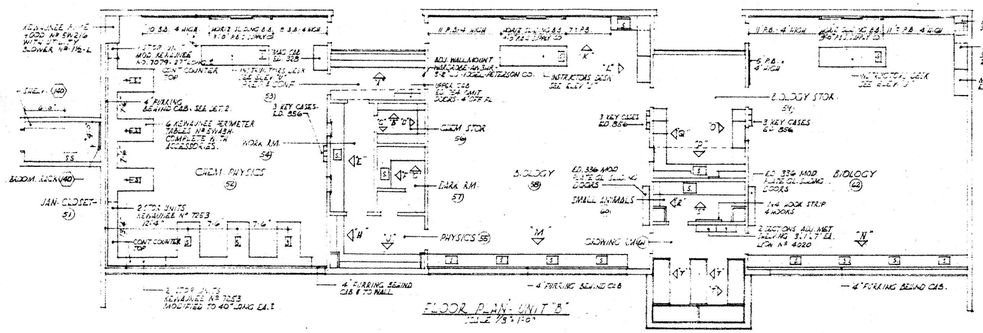
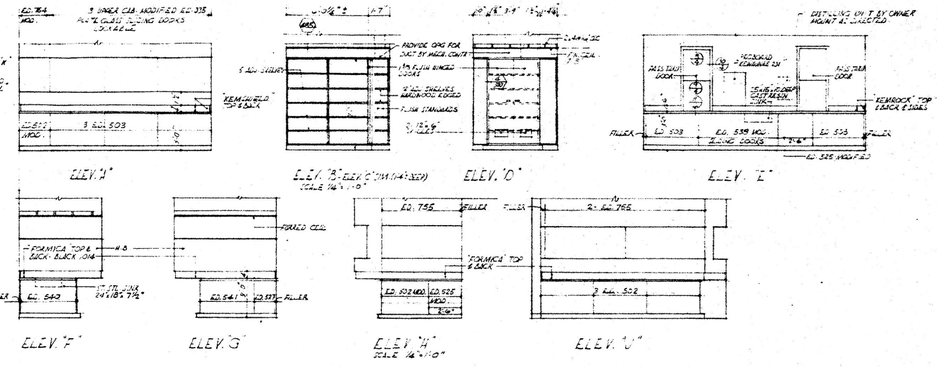
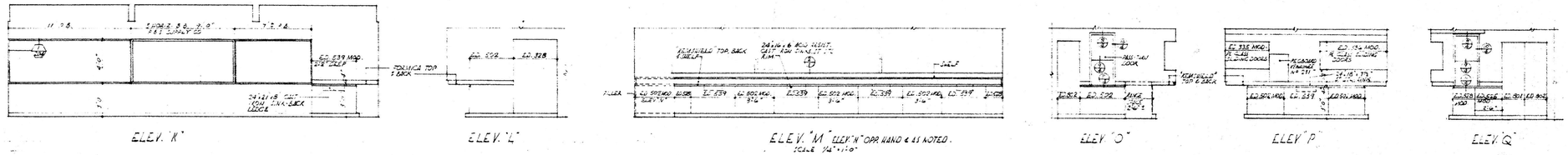
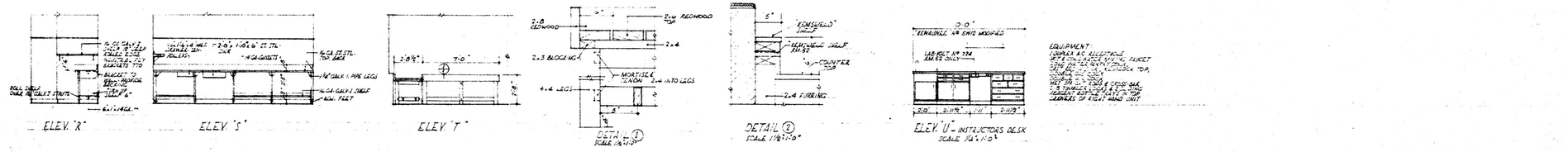
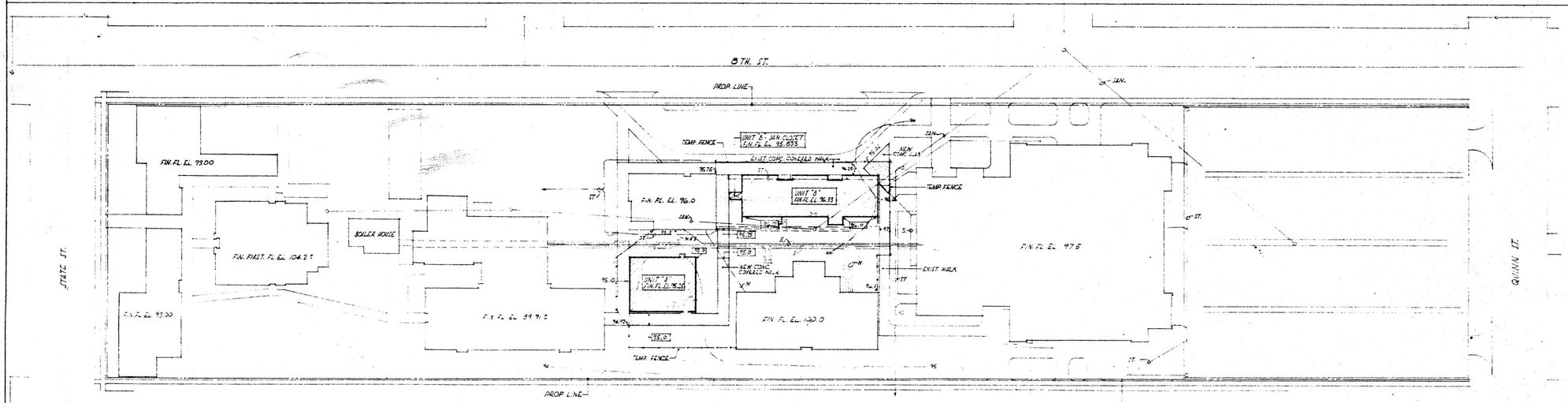










LEGEND:
LOCATION OF UNDERGROUND UTILITIES FROM PLANS. FOR PROTECTION OF EXIST. LINES, ETC.

S - STEAM
W - WATER
SS - SAN. SEWER
SD - STORM SEWER
E - ELECTR. CAB., TELEPHONE, ETC. CONDUIT

——96—— EXIST. GRADE
96± EXIST. ELEV.
[96.0] NEW FIN. GRADE

INDEX TO DRAWINGS

KEY TO MATERIAL INDICATIONS

LARGE SCALE	SMALL SCALE	MATERIAL
		EARTH
		CONCRETE BLOCK
		TILE
		CONCRETE
		PLASTER
		ACOUSTICAL MATERIAL
		INSULATION
		WOOD (FINISH)
		PLYWOOD
		WOOD (ROUGH)
		METAL
		GLASS

GENERAL NOTES

1. REPETITIVE FEATURES DRAWN ONLY ONCE SHALL BE COMPLETED AS IF DRAWN IN FULL.
2. FIN. 2B: WHERE THIS OR SIMILAR SYMBOL APPEARS ON THE DRAWINGS OR IN THE FINISH SCHEDULE, THE NUMBER "2" DESIGNATES THE COMBINATION OF FINISH MATERIALS USED IN THE SPACE & THE LETTER "B" DESIGNATES THE TYPE OF PAINT FINISH.
3. (9/5) WHERE THIS OR SIMILAR SYMBOL APPEARS ON THE DRAWINGS THE UPPER NUMBER "9" REFERS TO THE NUMBER ON THE DETAIL WHILE THE LOWER NUMBER "5" DESIGNATES THE NUMBER OF THE ARCHITECTURAL (A) DRAWING ON WHICH THE DETAIL APPEARS.
4. (4/W8) WHERE THIS OR SIMILAR SYMBOL APPEARS ON THE DRAWINGS THE UPPER NUMBER "4" REFERS TO THE NUMBER OF THE DETAIL WHILE THE LOWER NUMBER "W8" DESIGNATES THE TYPICAL STANDARD DRAWING ON WHICH THE DETAIL APPEARS. (THE TYPICAL STANDARD DRAWINGS ARE BOUND IN THE SPECIFICATIONS)
5. BUILDING CODE: THIS PROJECT IS TO BE CONSTRUCTED IN CONFORMITY WITH THE UNIFORM BUILDING CODE.
6. WOOD PARTITIONS SHALL BE CONSTRUCTED OF 2x4 STUDDING SPACED 16" O.C. UNLESS OTHERWISE NOTED.

PLOT PLAN - UNIT "B" INTERIORS
SCHEDULES

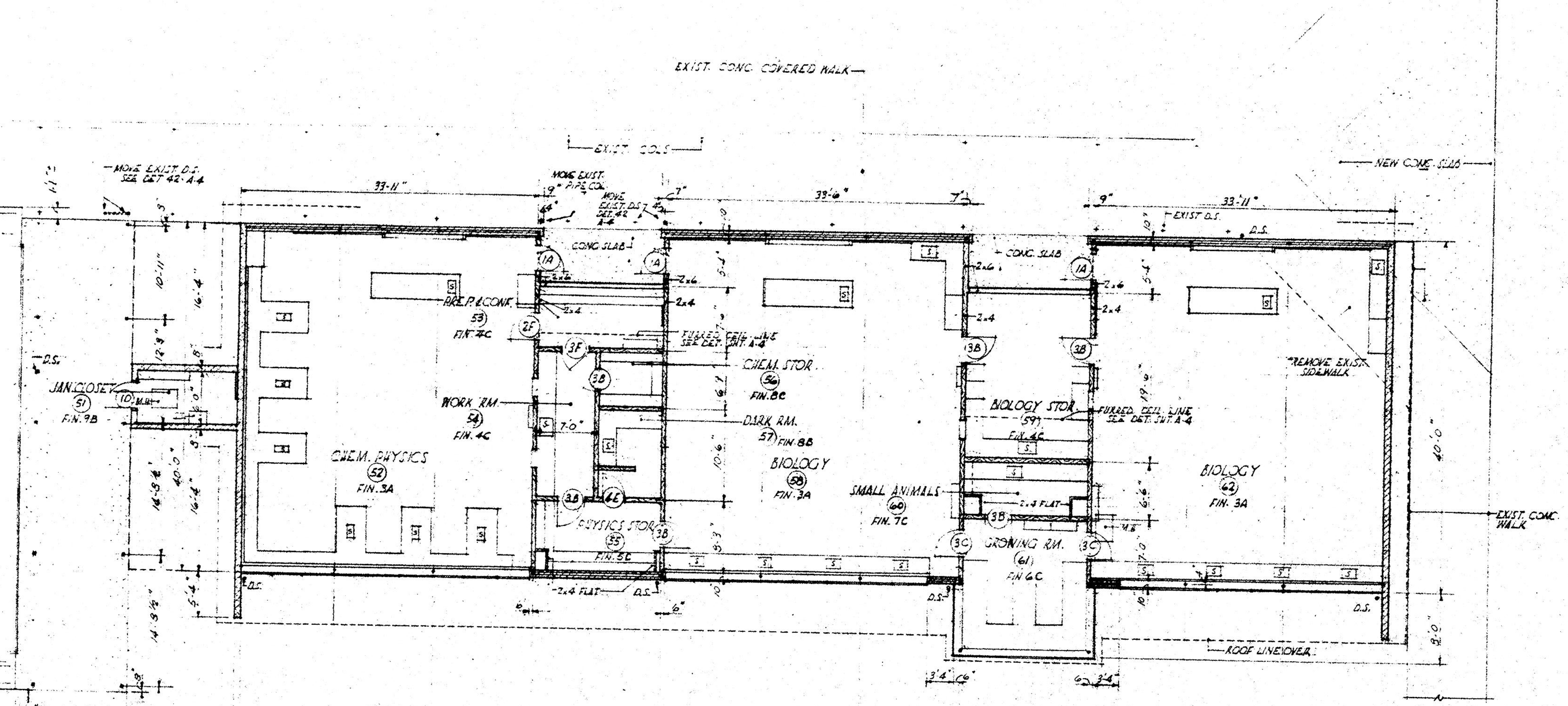
MALLIS & DeHART REGISTERED ARCHITECTS 1962
L. L. No. 173 STATE OF WASHINGTON REGISTERED ARCHITECTS
MEMBER OF AMERICAN INSTITUTE OF ARCHITECTS

DESIGN B.C.
TRACED B.C.
CHECKED S.S.
REVISED 1/23/62
DATE 11/22/61
SHEET A 1 OF 4

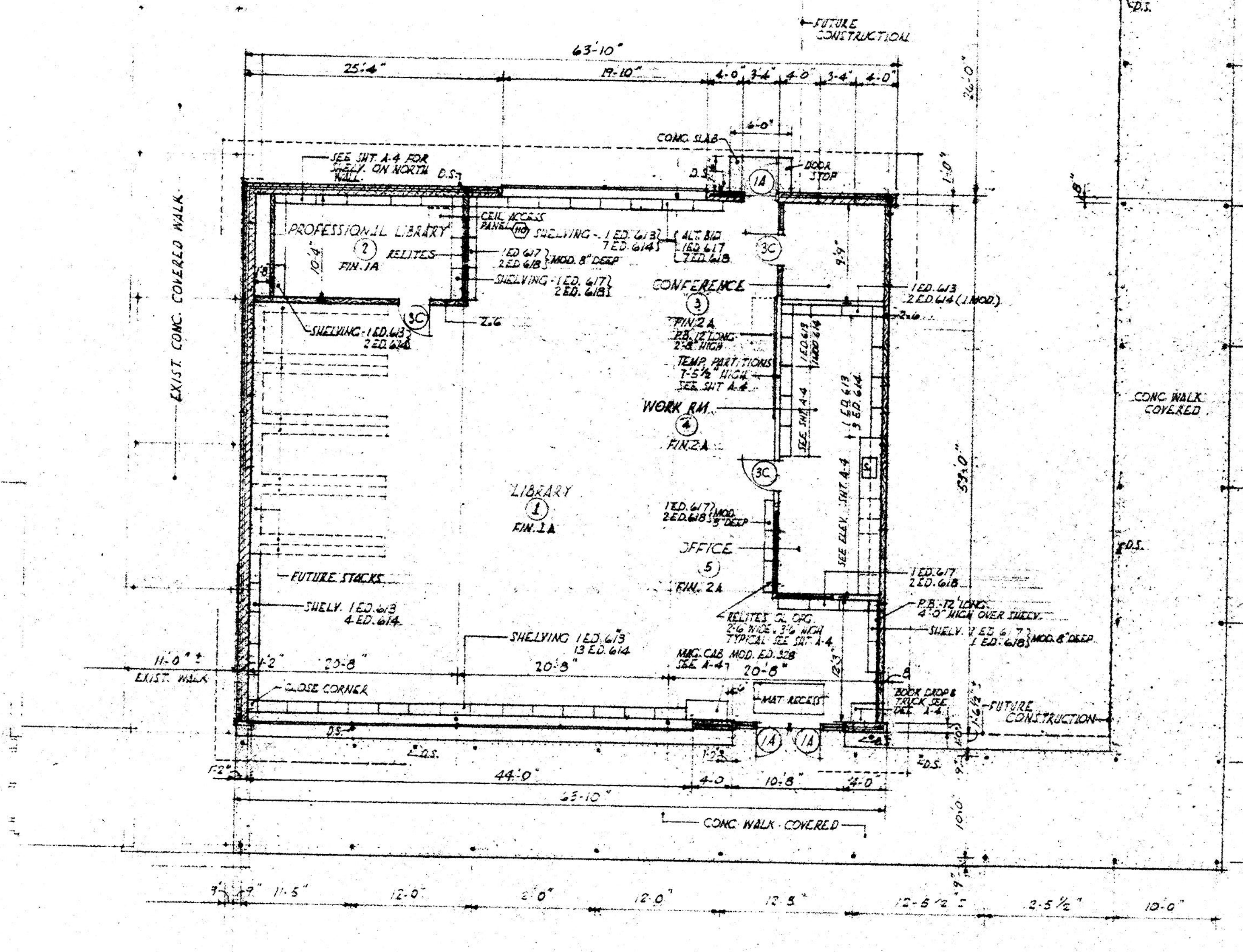
PLANS FOR ADDITIONS TO
MARYSVILLE SENIOR HIGH SCHOOL
AT MARYSVILLE WASHINGTON
FOR MARYSVILLE SCHOOL DISTRICT No. 25
SNOHOMISH COUNTY, WASHINGTON

MALLIS & DeHART ARCHITECTS
451 LYON BUILDING SEATTLE 4, WASHINGTON

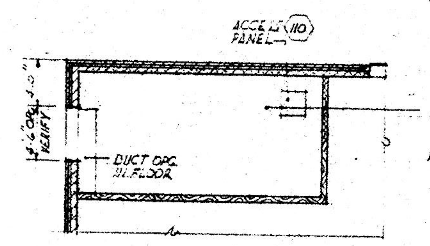
REGISTERED ARCHITECT
L. L. No. 173
Malcolm Henry DeHart
STATE OF WASHINGTON



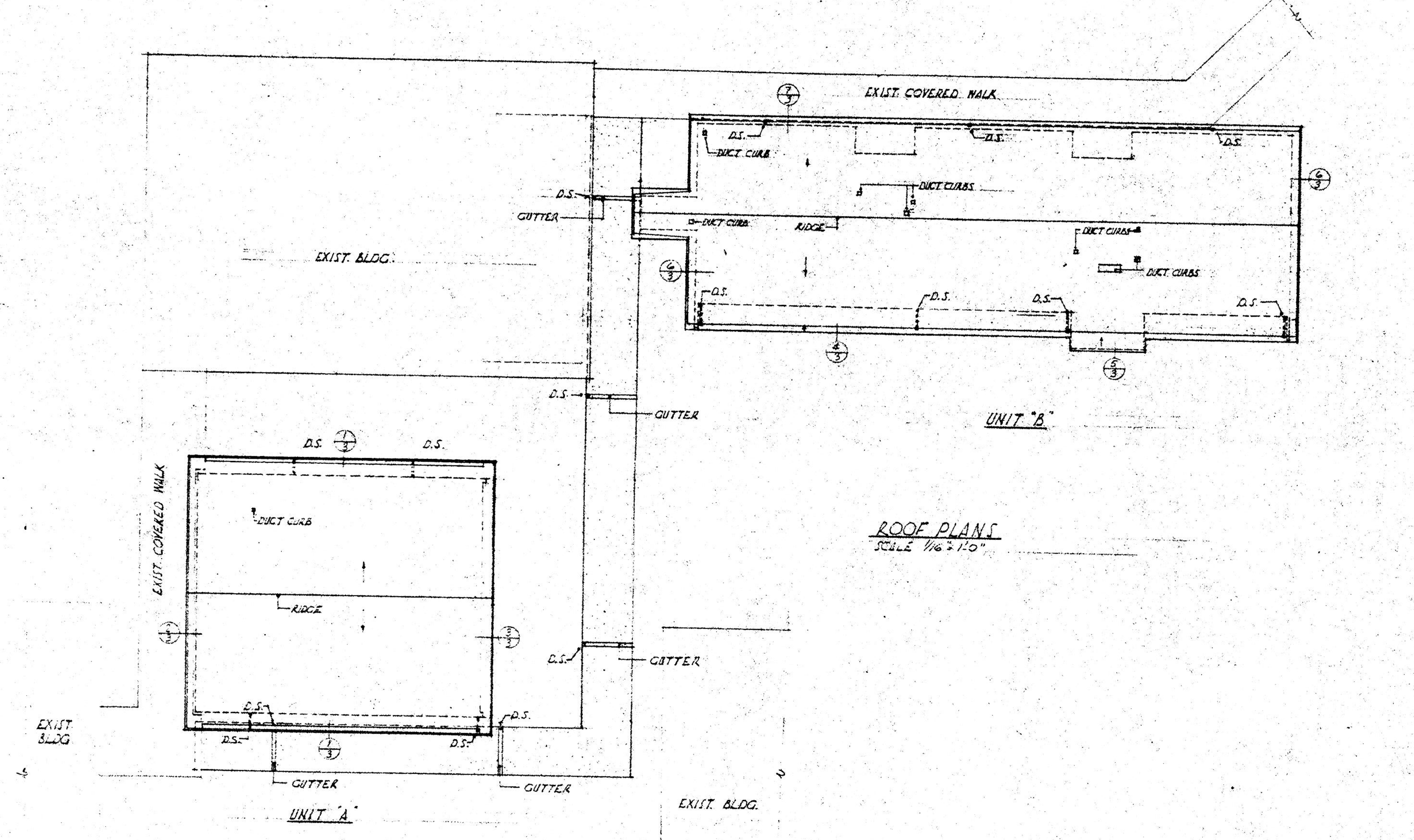
FLOOR PLAN - UNIT "B"
SCALE 1/8" = 1'-0"
NOTE: SEE A-1 FOR INTERIOR LAYOUT



FLOOR PLAN - UNIT "A"
SCALE 1/8" = 1'-0"



FAN ROOM (10) OVER PROF. LIBRARY (2)
SCALE 1/8" = 1'-0"



ROOF PLANS
SCALE 1/16" = 1'-0"

SCHEDULE OF INTERIOR FINISH MATERIAL

TYPE	FLOOR	BASE	SHOE	WAINSCOT MATERIAL	WAINSCOT HEIGHT	WAIN. CAP	WALLS	CEILING	TRIM	REMARKS
1	A.T.	R	-	-	-	-	BLK & PLAS. BD.	AC.T. *	MET. & F.	* PLAS. BD. BACKING
2.	A.T.	R	-	-	-	-	PLAS. BD. *	-	F	* & BLK. RM. 3
3.	V.A.	R	-	-	-	-	BLK & PLAS. BD.	AC.T. *	MET. & F.	* ON STRIPPING
4.	V.A.	R	-	-	-	-	PLAS. BD.	AC.T. *	F	* ON STRIPPING
5	V.A.	R	-	-	-	-	PLAS. BD. & BLK.	DECKING	F	
6	Q.T.	Q.T.	-	H.B. *	6'-0"	MET.	BLK. & PLAS. BD.	DECKING	F.	* FRAME WALLS ONLY
7	Q.T.	Q.T.	-	H.B.	6'-0"	MET.	PLAS. BD.	DECKING	F.	
8.	V.A.	R.	-	-	-	-	PLAS. BD.	PLAS. BD.*		ON 2x4 FURRED CEIL.
9	CEM.	-	-	-	-	-	BLK.	DECKING	MET.	
10	F.	F.	-	-	-	-	BLK. & PLAS. BD.	PLAS. BD.	F	

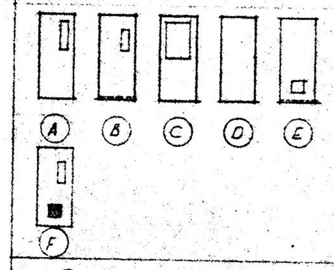
SCHEDULE OF INTERIOR PAINT FINISH

TYPE	FLOOR	BASE & SHOE	WAINSCOT	WAINSCOT CAP	WALLS	CEILING	TRIM	REMARKS
A	-	-	-	-	P.	-	S & V.	
B.	-	-	-	-	P.	P.	S & V.	
C.	-	-	E. **	-	E.	E. *	E.	* RMS. 55, 56, 60 & 61. & FURRED PLAS. BD. RM 53 ** RMS. 60 & 61

NOTES:
ENAMEL ALL METAL DOORS, TRIM, COLS.
STAIN ALL GLU-LAM BEAMS

DOOR SCHEDULE

DOOR TYPE



DOOR SIZES

NO.	SIZE	THICKNESS	REMARKS
1.	3'-0" x 7'-0"	1 3/4"	HOLLOW METAL
2.	3'-2" x 7'-0	1 3/4"	WOOD
3	3'-0" x 7'-0"	1 3/4"	WOOD
4.	2'-6" x 7'-0	1 3/4"	LIGHTPROOF

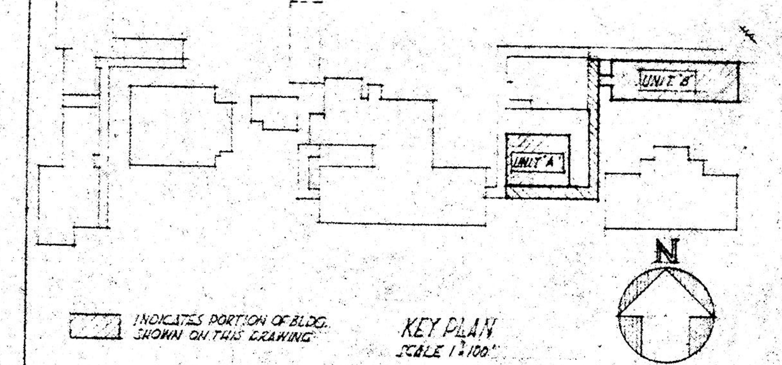
NOTE
NUMBER DENOTES SIZE
LETTER DENOTES TYPE

KEY TO DOOR SYMBOLS

ROOM LIST & CEILING HEIGHTS

NO.	TITLE	CEIL. HEIGHT	NO.	TITLE	CEIL. HEIGHT	NO.	TITLE	CEIL. HEIGHT
	UNIT "A"			UNIT "B"				
1.	LIBRARY	VARIES	51.	JAN. CLOSET	VARIES	60.	SMALL ANIMALS	S 11'-2½"
2.	PROF. LIBRARY	8'-9"	52.	CHEM. PHYSICS	VARIES	61.	GROWING RM.	S 10'-10"
3.	CONFERENCE	-	53.	PREP. CONF.	S 11'-0½"	62.	BIOLOGY	VARIES
4.	WORK ROOM	-	54.	WORK ROOM	VARIES			
5.	OFFICE	-	55.	PHYSICS STOR.	S 10'-8"			
			56.	CHEM. STOR.	7'-8"			
10.	FAN ROOM	VARIES	57.	DARK ROOM	7'-8"			
			58.	BIOLOGY	VARIES			
			59.	BIOLOGY STOR.	VARIES			

CEILING HEIGHTS ARE INDICATED AS FOLLOWS:
A. BY DIMENSION
B. BY DIMENSION PREFIXED BY LETTER "S" INDICATING SLOPING CEILING, DIMENSION TO HIGH POINT.
C. VARIES FOR CEILING HEIGHT REFER TO APPLICABLE 1/8" SCALE SECTION AND/OR DETAIL



INDICATES PORTION OF BLDG. SHOWN ON THIS DRAWING

KEY PLAN
SCALE 1" = 100'

FLOOR & ROOF PLANS - UNITS "A" & "B"
SCHEDULES

MALLIS & DE HART — LICENSE RENEWED TO JUNE 1, 1962 — T.L. No. 173 — STATE OF WASHINGTON — REGISTERED ARCHITECTS

REGISTERED ARCHITECT
Joseph Henry DeHart
STATE OF WASHINGTON

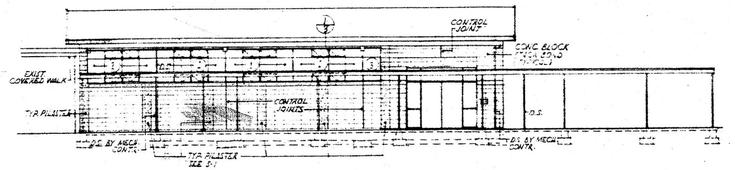
MEMBER OF AMERICAN INSTITUTE OF ARCHITECTS

DRAWN B.C.
TRACED B.C.
CHECKED S.S.
REVISED 1/22/62
DATE 11/22/61

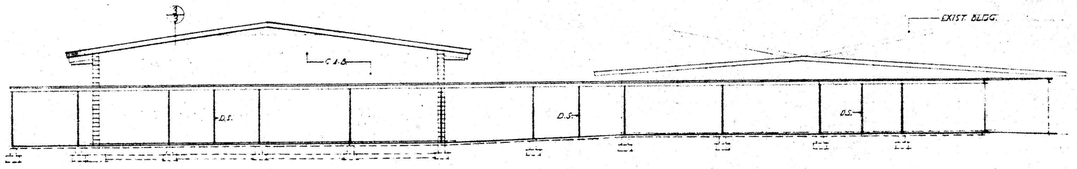
PLANS FOR ADDITIONS TO
MARYSVILLE SENIOR HIGH SCHOOL
AT MARYSVILLE WASHINGTON
FOR MARYSVILLE SCHOOL DISTRICT No. 305
SNOHOMISH COUNTY, WASHINGTON

A SHEET 2 OF 4

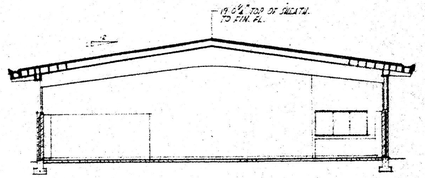
MALLIS & DeHART ARCHITECTS
631 LYON BUILDING SEATTLE 4, WASHINGTON



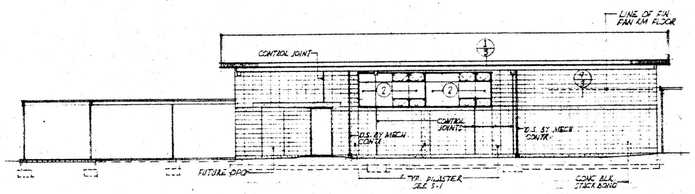
SOUTH ELEVATION - UNIT "A"



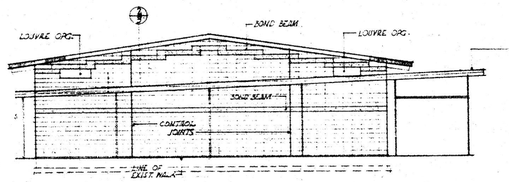
EAST ELEVATION - UNIT "A"
SCALE 1/8"=1'-0"



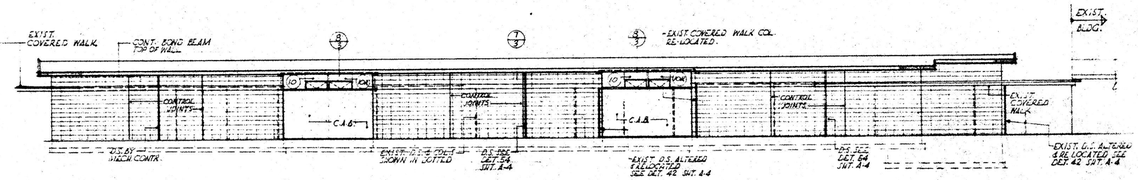
SECTION "A-A"



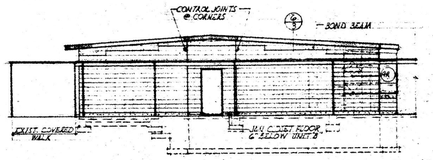
NORTH ELEVATION - UNIT "A"
SEE SHT. A-4 FOR ALT. BID NO. 1



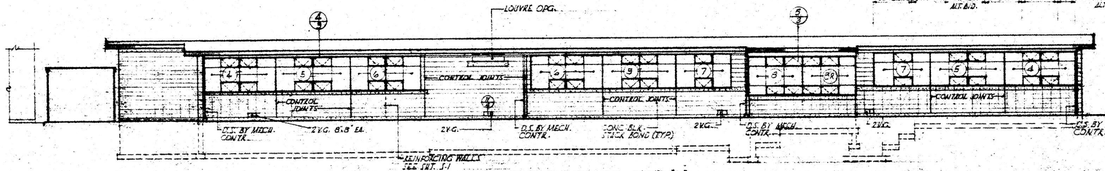
WEST ELEVATION - UNIT "A"
SCALE 1/8"=1'-0"



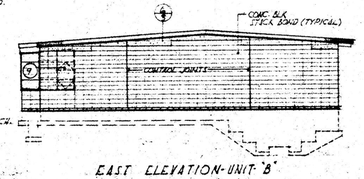
NORTH ELEVATION UNIT "B"



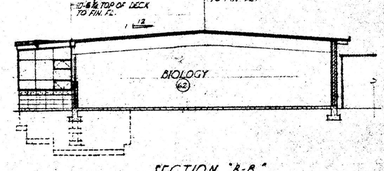
WEST ELEVATION - UNIT "B"



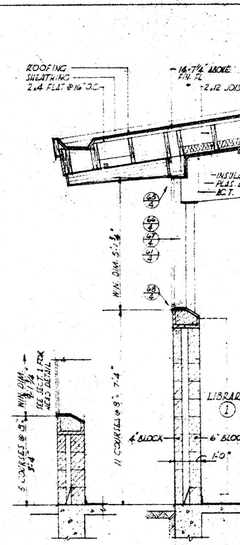
SOUTH ELEVATION - UNIT "B"
SCALE 1/8"=1'-0"



EAST ELEVATION - UNIT "B"



SECTION "B-B"

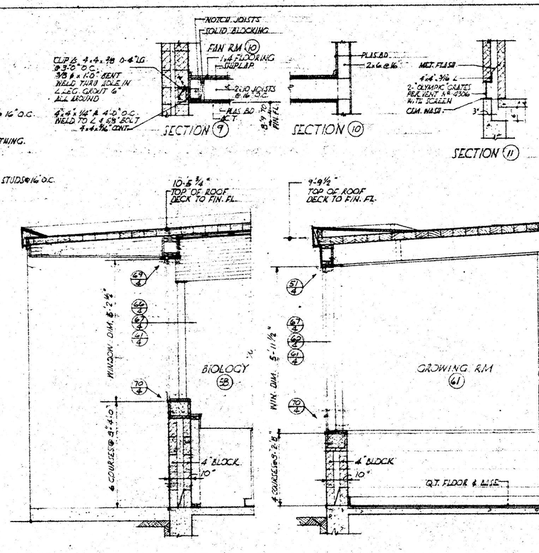


SECTION (14)
ALT. BID NO. 1

SECTION (1)

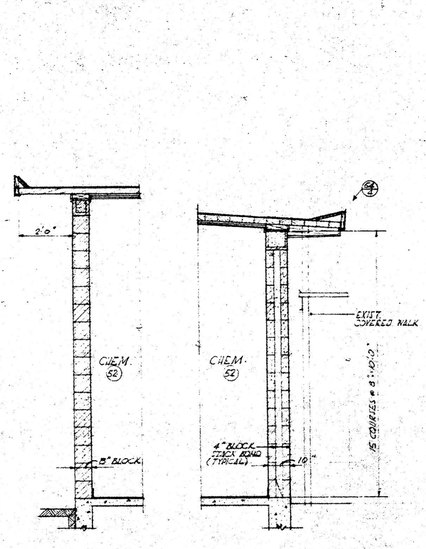
SECTION (2)

SECTION (3)



SECTION (4)

SECTION (5)



SECTION (6)

SECTION (7)

SECTION (8)

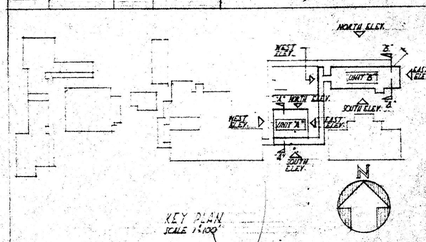
WALL SECTIONS
SCALE ½"=1'-0"

METAL SASH SCHEDULE

MARK	SIZE	GLASS	REMARKS
1	10'-1⅛" x 5'-1⅛"	CLEAR	
2	9'-3⅛" x 5'-1⅛"	CLEAR	
3	7'-5⅛" x 5'-1⅛"	CLEAR	
4	10'-8⅛" x 2'-7"	CLEAR	
5	10'-1⅛" x 5'-1⅛"	CLEAR	
6	10'-5⅜" x 2'-7"	CLEAR	
7	8'-3⅛" x 5'-1⅛"	CLEAR	
8	7'-3⅛" x 5'-1⅛"	CLEAR	
9	7'-8⅛" x 5'-7⅛"	CLEAR	* 5'-9 HIGH POINT
10	6'-11⅛" x 2'-11"	CLEAR	
11	4'-9" x 7'-1⅛"	CLEAR	ALT. BID NO. 2
12	4'-9" x 7'-1⅛"	CLEAR	ALT. BID NO. 3

NOTES

1. ALL VENTS TO BE 1'-8" HIGH.



ELEVATIONS
WALL SECTIONS

MALLIS & DeHART ARCHITECTS 1962
STATE OF WASHINGTON REGISTERED ARCHITECTS
MEMBER OF AMERICAN INSTITUTE OF ARCHITECTS

DRAWN A.C.
TRACED B.C.
CHECKED J.S.
REVISED 1/23/62
DATE 11/22/61

PLANS FOR ADDITIONS TO
MARYSVILLE SENIOR HIGH SCHOOL
AT MARYSVILLE, WASHINGTON
FOR MARYSVILLE SCHOOL DISTRICT NO. 25
SNOHOMISH COUNTY, WASHINGTON

SHEET A 3 OF 4

MALLIS & DeHART ARCHITECTS
631 LYON BUILDING SEATTLE 4, WASHINGTON

REGISTERED ARCHITECT
STATE OF WASHINGTON
No. 379
William Harry Gaffert

RUBBER BASE AT QT OR VINYL FL PLAS BD WALL

RUBBER BASE AT QT OR VINYL FL BLOCK WALL

QT BASE QT FLOOR PLAS BD WALL

QT BASE QT FLOOR BLOCK WALL

BLOCK BASE CEM. FLOOR BLOCK WALL

FIR BASE FIR FLOOR BLOCK OR PLAS BD WALL

BASE DETAILS
SCALE 1/2" = 1'-0"

DET. ① TYP. HEAD JAMB ELEV.

DET. ② HEAD & MULL DOOR OR RELITE

DET. ③ JAMB HEAD SIM. TO ELEV. 2

DET. ④ HEAD & JAMB DOOR TO DARK ROM 57

DET. ⑤ MULL RELITES IN UNIT "A"

DET. ⑥ CORNER MULL

INTERIOR DOOR & RELITE DETAILS
SCALE 1½" = 1'-0"

DOOR TYPES

NOTE: ALL DOORS TO HAVE SAFETY GLASS SEE STANDARD SPEC. No 500 FOR DOOR DETAILS

TYP. DETAIL ⑦
WALL & BEAM INTERSECTION
SCALE 1½" = 1'-0"

FURRED CEIL. RMS. 56 & 57
SCALE 1½" = 1'-0"

FURRED DUCTS RMS 53 & 59
SCALE 1½" = 1'-0"

DET. ⑧ HEAD RAIL

DET. ⑨ HEAD

DET. ⑩ JAMB

DET. ⑪ SILL

PASS THRU DOORS RMS. 54 & 57
SCALE 1½" = 1'-0"

ELEV. A-A - OFFICE ⑤
SCALE 1½" = 1'-0"

ELEV. B-B WORK ④
SCALE 1½" = 1'-0"

ELEV. C-C PROF. LIB. ②

ELEV. D-D LIB. ①

ELEV. G-G LIBRARY ①

DET. ⑫
SCALE 1½" = 1'-0"

DETAIL ⑬
SCALE 1½" = 1'-0"

ELEVATION

ELEVATION

PLAN
SOUTH ENTRANCE - UNIT "A"
SCALE 1/2" = 1'-0"

PLAN
NORTH ENTRANCES - UNIT "B"
SCALE 1/2" = 1'-0"

DETAIL ㉖ HEAD

DETAIL ㉗ JAMB

DETAIL ㉘ MULL

DETAIL ㉙ SILL

DETAIL ㉚ HEAD

DETAIL ㉛ HEAD

ENTRANCE DETAILS
SCALE 1½" = 1'-0"

DETAIL ㉜ HEAD

DETAIL ㉝ HEAD

DETAIL ㉞ HEAD

DETAIL ㉟ EAVE

DETAIL ㊱ CORNER MULL

DETAIL ㊲

DETAIL ㊳

DETAIL ㊴

DETAIL ㊵

DETAIL ㊶

DETAIL ㊷

COVERED WALK DETAILS
SCALE 1½" = 1'-0"

TYPICAL SECTION
SCALE 1½" = 1'-0"

DETAIL ㊸ HEAD

DETAIL ㊹ RAKE

DETAIL ㊺ JAMB

DETAIL ㊻ MULLION

DETAIL ㊼ SILL

DETAIL ㊽ EAVE

DETAIL ㊾ TYP. MUNTIN
VERTICAL & HORIZONTAL

DETAIL ㊿ HEAD

DETAIL (51) SILL
SCALE 1½" = 1'-0"

NORTH ELEVATION - UNIT "A" ALT. BID No 1.
SCALE 1/8" = 1'-0"

WINDOW & EAVE DETAILS - ENTRANCES
INTERIOR & EXTERIOR DETAILS

PLANS FOR ADDITIONS TO
MARYSVILLE SENIOR HIGH SCHOOL
AT MARYSVILLE, WASHINGTON
FOR MARYSVILLE SCHOOL DISTRICT No 25
SNOHOMISH COUNTY, WASHINGTON

DRAWN E.C.
TRACED E.C.
CHECKED S.S.
REVISED 1/28/63
DATE 11/22/62

SHEET A 4 OF 4

MALLIS & DeHART ARCHITECTS
631 LYON BUILDING SEATTLE 4, WASHINGTON

MALLIS & DeHART ENGINEERING DIVISION 1962
T.L. No. 179 STATE OF WASHINGTON REGISTERED ARCHITECT
MEMBER OF AMERICAN INSTITUTE OF ARCHITECTS

T.L. 179 REGISTERED ARCHITECT Joseph Henry DeHart STATE OF WASHINGTON

GENERAL NOTES

THE FOLLOWING NOTES APPLY EXCEPT WHERE SHOWN OTHERWISE

CODE UNIFORM BUILDING CODE

LIVE LOADS
ROOF ..... 25 PSF
STAIRS & CORRIDORS ..... 100 PSF
CLASS ROOMS ..... 60 PSF

FOUNDATIONS
MAXIMUM SOIL PRESSURE ..... 4000 ..... PSF.
FOOTINGS EXTEND TO FIRM UNDISTURBED SOIL.
EXTERIOR FOOTINGS ..... 1'-6" ..... MIN. BELOW FINISHED GRADE.
BACKFILL THOROUGHLY COMPACTED PER SPECIFICATIONS.
PROVIDE 2 - #5 MIN. BOTTOM OF ALL WALLS AND FOOTINGS.

CONCRETE
STRUCTURAL CONCRETE STRESS f'_c = 2500 psi, f_c = 1125 psi (5 SACK/CU. YD.)
REINFORCING STEEL DEFORMED, INTERMEDIATE GRADE f_s = 20,000 psi. A.S.T.M. A-15.
RE-STEEL DETAILS SHALL BE PREPARED BY AN ENGINEER APPROVED BY THE ARCHITECT AND CONFORM TO STANDARD PRACTICE OUTLINED IN A.C.I. REPORT 315-51. MARKED RE-BARS MUST BE IDENTIFIED BY A SYSTEM OF COLORED PAINT DENOTING NUMBERS (TAGS NOT ACCEPTED).
CONCRETE COVER ON REINF.:

FOOTINGS	3"	BEAMS & COLS.	1½" (TO STRPS. & TIES)
WALLS & COLS. (EARTH FACE)	3"	SLABS	¾"
WALLS (EXPOSED TO WEATHER)	1½"		
WALLS (INSIDE FACE)	1"		

LAP ALL REINF. 30 DIAM. AT SPLICES EXCEPT COL. VERTS. 27 DIAM.
CHAMFER EXPOSED CORNERS OF COLUMNS AND BEAMS ¾".

SLABS & BEAMS
STEEL SHALL BE RIGIDLY SUPPORTED USING CONCRETE BLOCKS OR OTHER APPROVED METHODS. #5 RAISER BARS ALL SLABS.
WHERE SLAB STEEL IS PARALLEL TO A BEAM OR WALL PROVIDE #4 x 5'-0" AT 12" O.C. IN TOP OF SLAB ACROSS BEAM OR WALL. WHERE SLAB IS ON ONE SIDE ONLY, TOP BARS SHALL BE #4 x 3'-0" AT 12" O.C.
SLAB TEMPERATURE STEEL:

4" THICK & UNDER	#3 AT 18" O.C.
4½" TO 7" THICK	#4 AT 18" O.C.
7½" TO 9" THICK	#4 AT 15" O.C.

AT OPENINGS OVER 18" SQUARE, PROVIDE 2 BARS SAME SIZE AS MAIN STEEL EXTENDING 30 DIAM. PAST OPENING AT EACH SIDE AND DIAGONALLY AT CORNERS.
WHERE BEAM OR SLAB STEEL IS INDICATED AS BENT UP, IT SHALL BE BENT UP AT THE 1/6 POINT OF CLEAR SPAN FOR SIMPLE SUPPORTS AND 1/5 POINT FOR CONT. SUPPORTS EXTENDING INTO ADJACENT SPAN A DISTANCE = 1/8 GREATER SPAN.
NON STRUCT. SLABS POURED ON EARTH 3½" THICK REINF. WITH 6x6 10/10 MESH.

WALLS
REINFORCE AS FOLLOWS:

7" WALL & UNDER	#5 AT 18" O.C. H. "S AT 18" on V.
8" WALL	#5 AT 12" O.C. H. "S AT 18" on V.
10" WALL	#4 AT 12" O.C. H.E.F., "S @ 18 on V.E.F.
12" WALL	#5 AT 18" O.C. H.E.F., "S @ 18 on V E.F.
ALL OTHER WALLS	½ OF ½" HOR. & VERT.

AT OPENINGS PROVIDE 2 - #5 EXTRA BARS AT TOP, BOTTOM AND EACH SIDE EXTENDING 30 DIAM. BEYOND CORNERS AND 2 - #5 x 4'-0" DIAGONALS AT EACH CORNER, EXCEPT 6" WALLS 1 - #5 DIAGONAL INSTEAD OF 2.
AT CORNERS AND INTERSECTIONS, EXTEND HOR. WALL STEEL TO 2" FROM OUTSIDE FACE AND LAP WITH ELBOW BARS (30 DIAM.) OF SAME SIZE AND SPACING. LAP OUTSIDE FACE ONLY AT CORNERS.
WALL STUBS SHALL BE 1'-6" LONG, SAME SIZE AND SPACING AS VERTICAL STEEL.
WHERE WALLS WITHOUT VERT. REINF. ARE POURED SEPARATE FROM FOOTING PROVIDE #4 x 1'-6" STUBS AT 18" O.C.

STRUCTURAL STEEL
STRUCTURAL GRADE A.S.T.M. SPEC A-7. f_s = 20,000 psi.
PIPE COLUMNS A.S.T.M. A-53 MIN. YIELD 30,000 psi.
ALL STEEL, EXCEPT STEEL EMBEDDED IN CONCRETE, SHALL BE GIVEN ONE COAT OF APPROVED PAINT BEFORE LEAVING SHOP.
WELDS 3/16" MIN. CONT. FILLET BY CERTIFIED WELDERS. HEAVY COATED ELECTRODES.
SHOP CONN. MAY BE WELDED OR RIVETED AND FIELD CONNS. BOLTED AND EQUIVALENT TO SERIES "B" CONN. A.I.S.C. MANUAL STEEL CONST. FOR NO. OF BOLTS.
THE ERECTION OF ALL STRUCT. STEEL SHALL BE SECURED FROM COLLAPSING WITH TEMPORARY BRACING UNTIL PERMANENT STIFFENING IS INSTALLED.

TIMBER
STRUCTURAL TIMBER & LUMBER 1500 f STRESS GRADE DOUGLAS FIR (CONSTRUCTION OR INDUSTRIAL GRADE) PARA. 123b, 123h, 124b, 125b & 183b W.C.L.A. GRADING RULES #15.

1" ROOF AND WALL SHEATHING AND SUBFLOORS LAID DIAGONALLY.

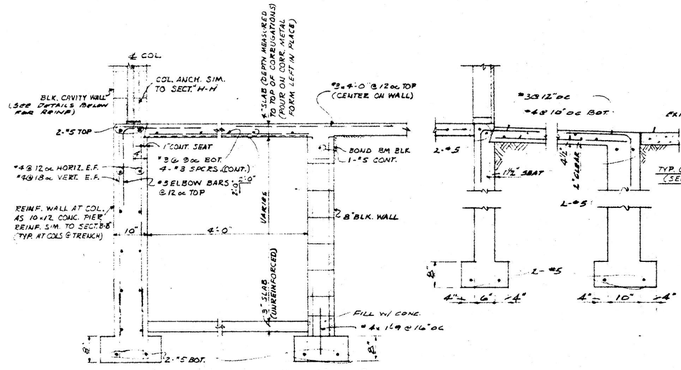
BOLT HEADS AND NUTS BEARING AGAINST WOOD TO BE PROVIDED WITH M. L. WASHERS EXCEPT ON SILL PLATES & STEEL BEAM NAILERS USE CUT WASHERS.
NAILERS TO STEEL BEAMS SHALL BE ATTACHED WITH ¾" BOLTS @ 3'-0" O.C. STAG.
WOOD BEARING ON OR INSTALLED WITHIN 1" OF MASONRY OR CONCRETE TO BE TREATED WITH AN APPROVED PRESERVATIVE.

CONCRETE MASONRY
CONCRETE OR PUMICE BLOCKS LOAD BEARING GRADE "A" A.S.T.M. SPEC. C90-52.
BLOCKS SHALL BE LAID UP IN CEMENT LIME MORTAR - ONE PART LIME PUTTY, ONE PART PORTLAND CEMENT AND NOT MORE THAN SIX PARTS SAND, BY VOLUME.
REINFORCE WALLS HORIZONTALLY WITH K-WEB OR EQUAL EMBEDDED IN MORTAR EVERY COURSE (8" C.M.U.). LAP 12" MIN. AT CORNERS AND INTERSECTIONS. CUT DIAGONAL WEB STEEL AND BEND WITH LONGITUDINAL BARS 12" AROUND CORNER. BLOCKS TO BE DOVETAILED TOGETHER.
SEE PLANS FOR BOND BEAM AND LINTEL DETAILS.

GLUE-LAM MEMBERS
GLUED LAMINATED BEAMS DOUGLAS FIR DRIED TO MOISTURE CONTENT 8 to 10%.
STRESS GRADE COMBINATION #11 OR BETTER.
GLUE SHALL BE LAUCHKS CASEIN NO. 888 OR EQUAL AND SHALL CONTAIN A MOLD INHIBITOR. SEE ARCHT. SPECS. FOR FURTHER SPECIFICATIONS.
THE FABRICATOR SHALL BE APPROVED BY THE ARCHITECT.

STEEL DECK
SHALL BE DESIGNED, MANUFACTURED AND INSTALLED PER METAL ROOF DECK INSTITUTE SPECS TO SUPPORT ..... 35 ..... psf TOTAL LOAD AT MAX. LIVE LOAD DEFLECTION OF L/240.
ANCHORAGE TO SUPPORTS TO BE SUFFICIENT TO RESIST A 30 psf UPLIFT.
WELDING PATTERN AT THE SUPPORTS, PERIMETER AND FOR DIAPHRAGM ACTON TO RESIST A LATERAL SHEAR FORCE OF 350 # /LIN. FT. TO BE SUBMITTED TO THE ARCHITECT FOR APPROVAL.
MANUFACTURER TO PROVIDE STEEL HEADER AT OPENINGS THRU DECK TO SATISFACTORILY DISTRIBUTE LOADS TO SUPPORTING MEMBERS.

T&G DECKING
DOUGLAS FIR, SELECT DEX. PER PARA. 4276 WCLA RULES #15. ALL BOARDS TO BEAR ON AT LEAST ONE SUPPORT. EVERY THIRD BOARD TO BE CONTINUOUS BETWEEN SUPPORTS. SPLICES IN INTERMEDIATE BOARDS TO BE NOT LESS THAN 3'-0" APART FOR 3" (&TO SPLICE 8 SUPTS ONLY). ALL BOARDS HORIZONTALLY NAILED AT 30" MAX. O.C. WITH 8" SPIKES IN PRE BORED HOLES, FIRST SPIKE AT 10" MAX. FROM END OF BOARD. VERTICAL NAILING TO BE 1 60d & 2 40d AND 1 60d FACE NAIL FOR 3" AND 1 60d BLIND AND 1 60d FACE NAIL FOR 4" AT EACH SUPPORT.



SECTION A-A

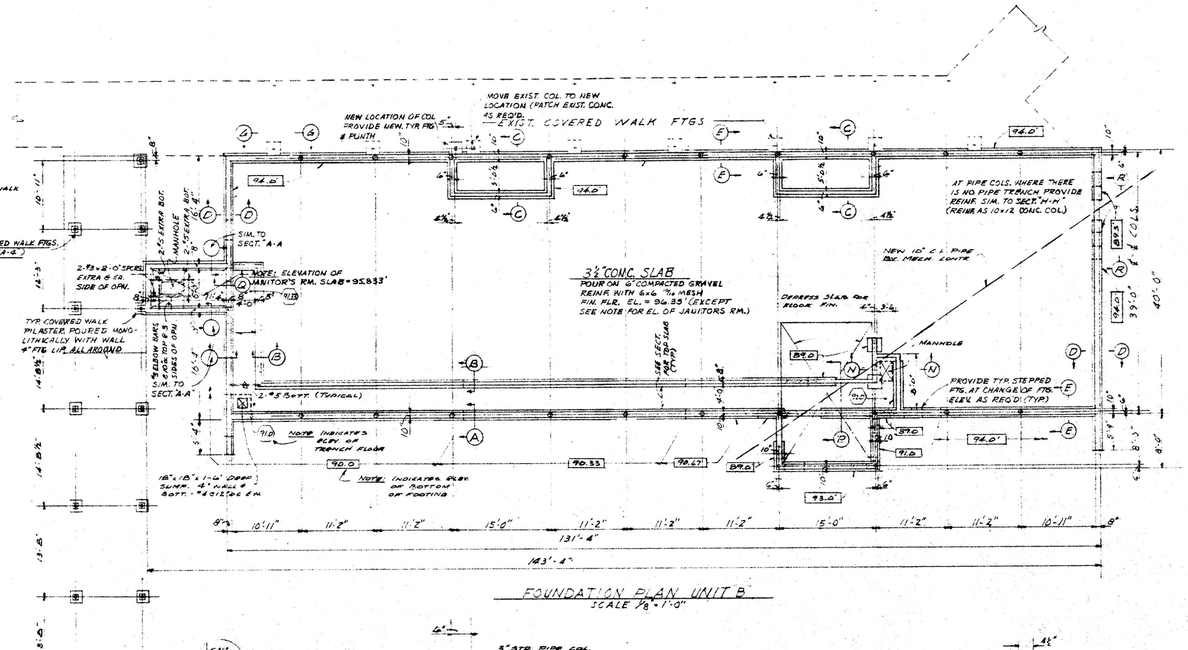
SECTION B-B

SECTION C-C

TYP PIPE TRENCH DETAILS

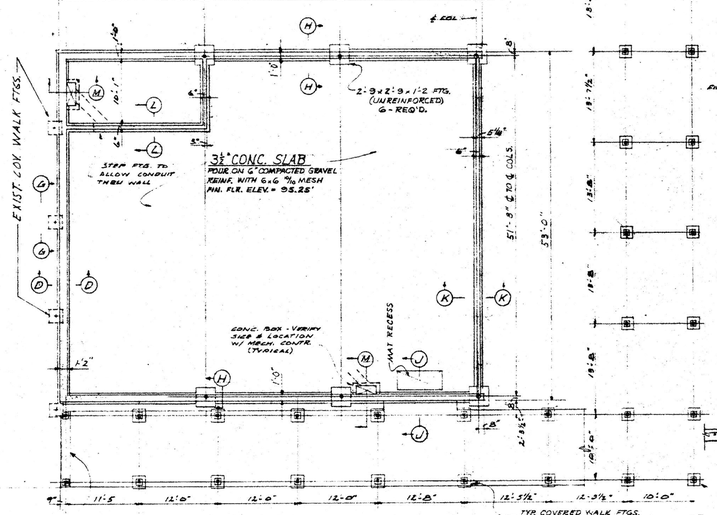
SCALE 3/4" = 1'-0"

NOTE: WALL FOOTING ELEV. 93.0
COL FOOTING ELEV. 92.5



FOUNDATION PLAN UNIT B

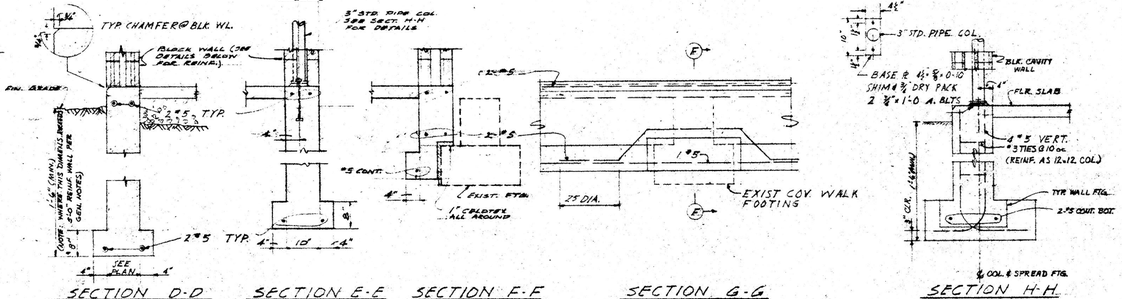
SCALE 1/8" = 1'-0"



AT END BAY OF NEW COVERED WALK PROVIDE 12'-0 WIDE x 11'-0" LONG x 12" DEEP FTG. WITH 2 TYP. PLINTHS TO BEAR 2 TYP. TUBE COLS. BOT. OF THIS FTG. AT 1'-6" BELOW FIN. GRADE

FOUNDATION PLAN UNIT A

SCALE 1/8" = 1'-0"



SECTION D-D
TYP. WALL DETAIL
SCALE ½" = 1'-0"

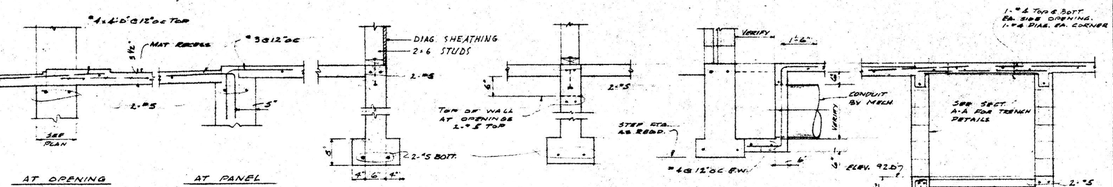
SECTION E-E

SECTION F-F

SECTION G-G

SECTION H-H

SCALE ½" = 1'-0"



SECTION J-J
TYP. ENTRY DETAILS

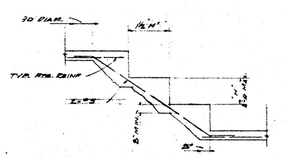
SECTION K-K

SECTION L-L

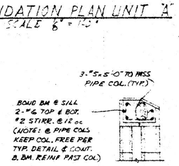
SECTION M-M

SECTION N-N

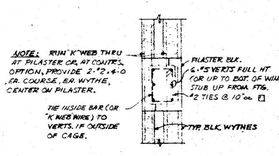
SCALE ½" = 1'-0"



TYP. STEPPED FTG DETAIL



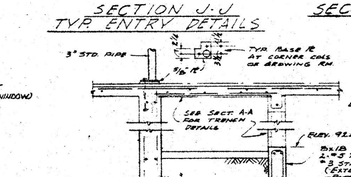
TYP BOND BM. & SILL
PROVIDE @ AT WINDOW SILLS UNITS A & B.



TYP. CONC. BLK. PILASTER DETAIL

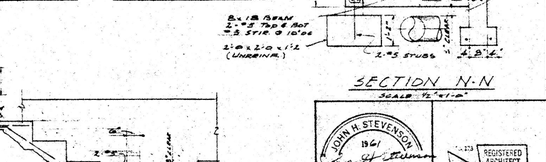
PROVIDE WHERE "TYP. PILASTER" IS CALLED OUT ON ARCHIT. ELEVATIONS. (DO NOT LOCATE @ PIPE COL.)
(UNIT "A" ONLY)

NOTE: AT UNIT 'D' WALLS BELOW WINDOWS, PROVIDE 1-#2 VERT. FULL HT. EA. WYTHE TO GRILL IN EVERY 2'-0" BLK. VOID. (GROUT W/ 4 STIR OUT OF FORM)



SECTION P-P

SECTION Q-Q



SECTION R-R
TYP. DET. AT EXISTING PIPES

GENERAL STRUCTURAL NOTES
FOUNDATION PLANS & DETAILS

JOHN H. STEVENSON 1961 — REGISTERED STRUCTURAL ENGINEER — STATE OF WASHINGTON

REGISTERED ARCHITECT — JAMES R. 'JIM' DEHART — STATE OF WASHINGTON

MALLIS & DeHART — ARCHITECTS — 1962 — REGISTERED ARCHITECTS — STATE OF WASHINGTON — C.T.No. 173

MEMBER OF AMERICAN INSTITUTE OF ARCHITECTS

DRAWN CTS
TRACED
CHECKED G.E.C.
REVISED 11/21/62
DATE 11/21/61

PLANS FOR ADDITIONS TO
MARYSVILLE SENIOR HIGH SCHOOL
AT MARYSVILLE, WASHINGTON
FOR MARYSVILLE SCHOOL DISTRICT NO. 25
SNOHOMISH COUNTY, WASHINGTON

SHEET S-1 OF 2

MALLIS & DeHART ARCHITECTS
631 LYON BUILDING SEATTLE 4, WASHINGTON

BLOCK SIZE	REINF.
6-8	#5 @ 32"ctr
8-8	#5 @ 32"ctr
8-16	#5 @ 32"ctr

½" CLEAR

8"HIGH B.BM.

½" CLEAR TYP.

CONCRETE BLOCK BOND BEAMS

BLOCK SIZE	REINF.	MAX. SPAN
6-8	2-#5 @ TOP & BOTT.	5'-4"
8-8	2-#5 @ TOP & BOTT.	5'-4"
8-16	1-#5 @ TOP & BOT.	10'-8"

STD. BLOCK - TOP HALF OF WEB REM.

8"HIGH LINTEL

16"HIGH LINTEL

CONCRETE BLOCK LINTELS

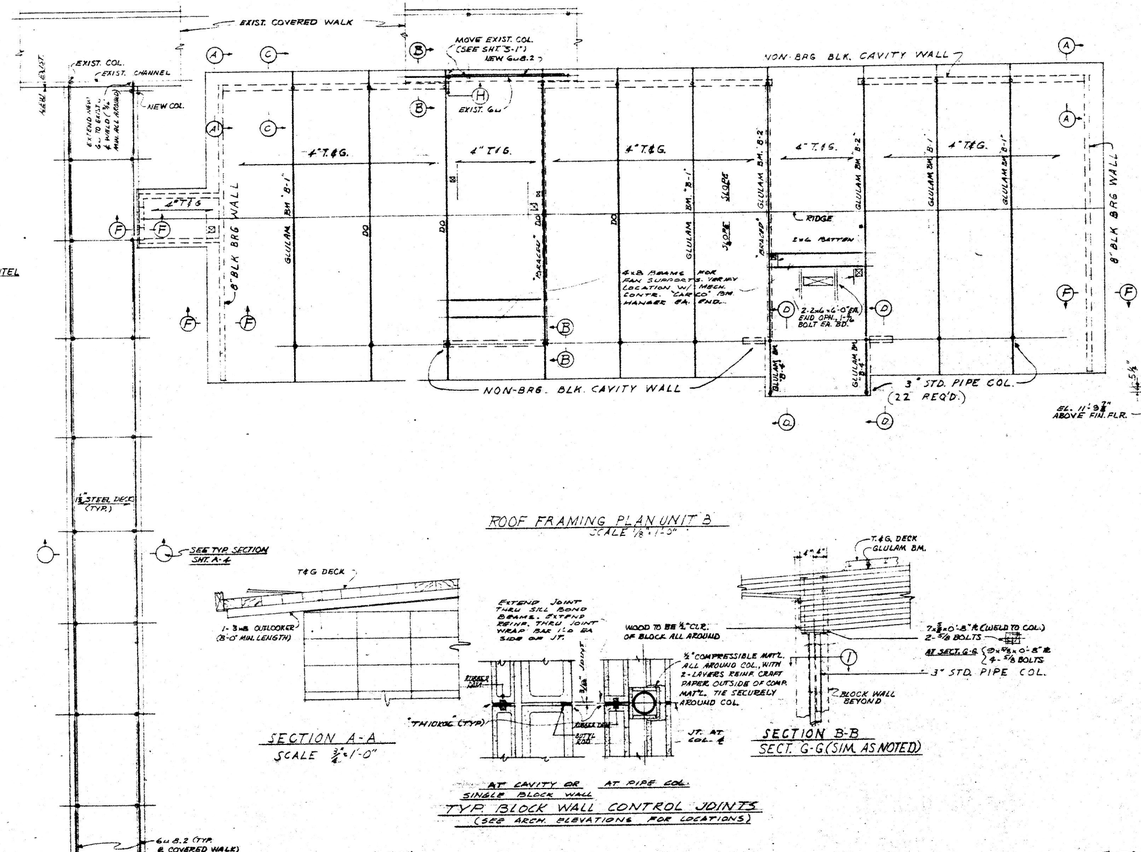
2-ELBOW BARS (SAME SIZE AS TYP. REINF.)

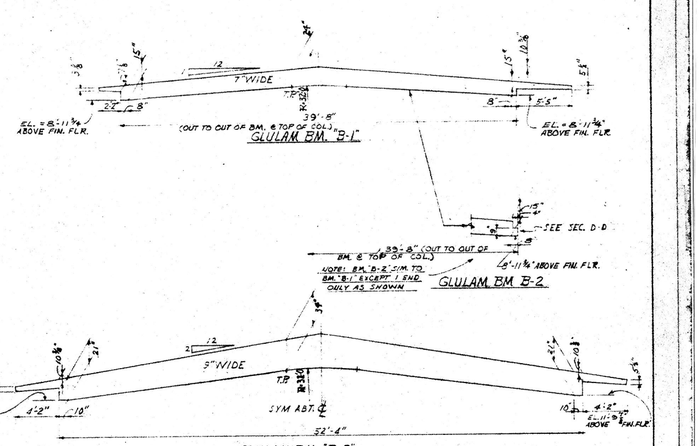
TYP. B. BMS. & REINF.

TYP. STEPPED B.M. & BEAM

NOTES:

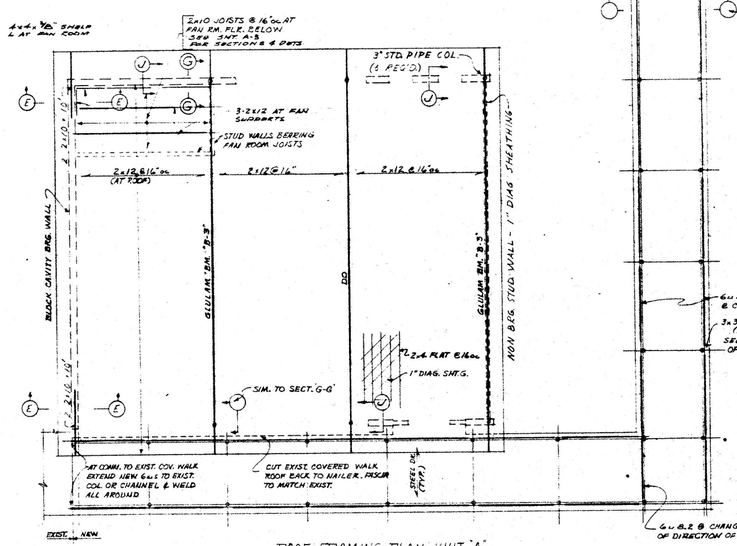
1. FILL ALL BOND BEAM & LINTEL BLOCKS WITH 2500 PSI CONC. (⅜" MAX. AGG. SIZE).
2. FILL ALL JAMB VOIDS WITH GROUT & PROVIDE 1-#4 VERT. FULL HT. PER SIDE OF OPENINGS.
3. ALL U-TELL TO HAVE 8" MIN. BRG.
4. PROVIDE CONT. BOND BMS. AS NOTED ON ARCH'S. ELEVATIONS.





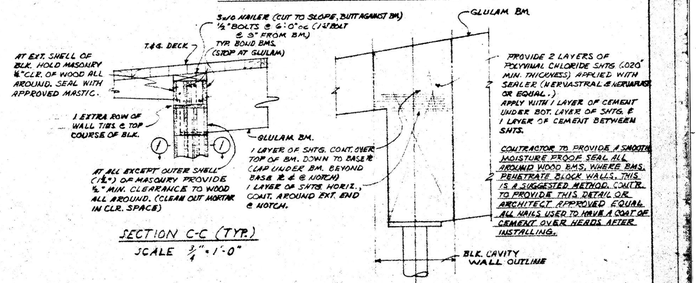
NOTE: ALL OUTLOOKER DEPTHS SHOWN INCL. ⅜ CUTER BD. (SEE SECT. D-D FOR BM. B-2)

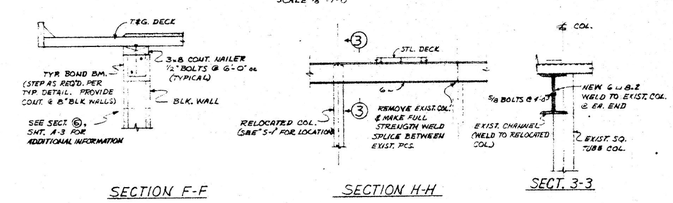
GLULAM BEAM ELEVATIONS

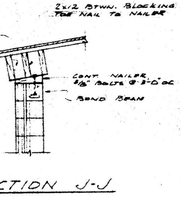


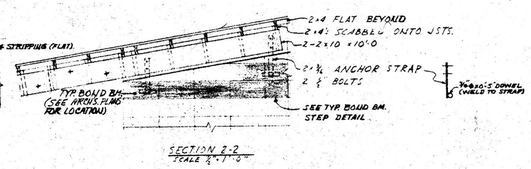
ROOF FRAMING PLAN - UNIT 'A'
SCALE ⅛"=1'-0"

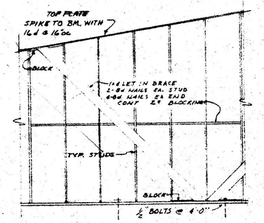
ROOF FRAMING PLAN UNIT B
SCALE ⅛"=1'-0"











ROOF FRAMING PLANS UNITS A & B

JOHN H. STEVENSON 1964 REGISTERED STRUCTURAL ENGINEER STATE OF WASHINGTON

No. 173 REGISTERED ARCHITECT Joseph Henry DeHart STATE OF WASHINGTON

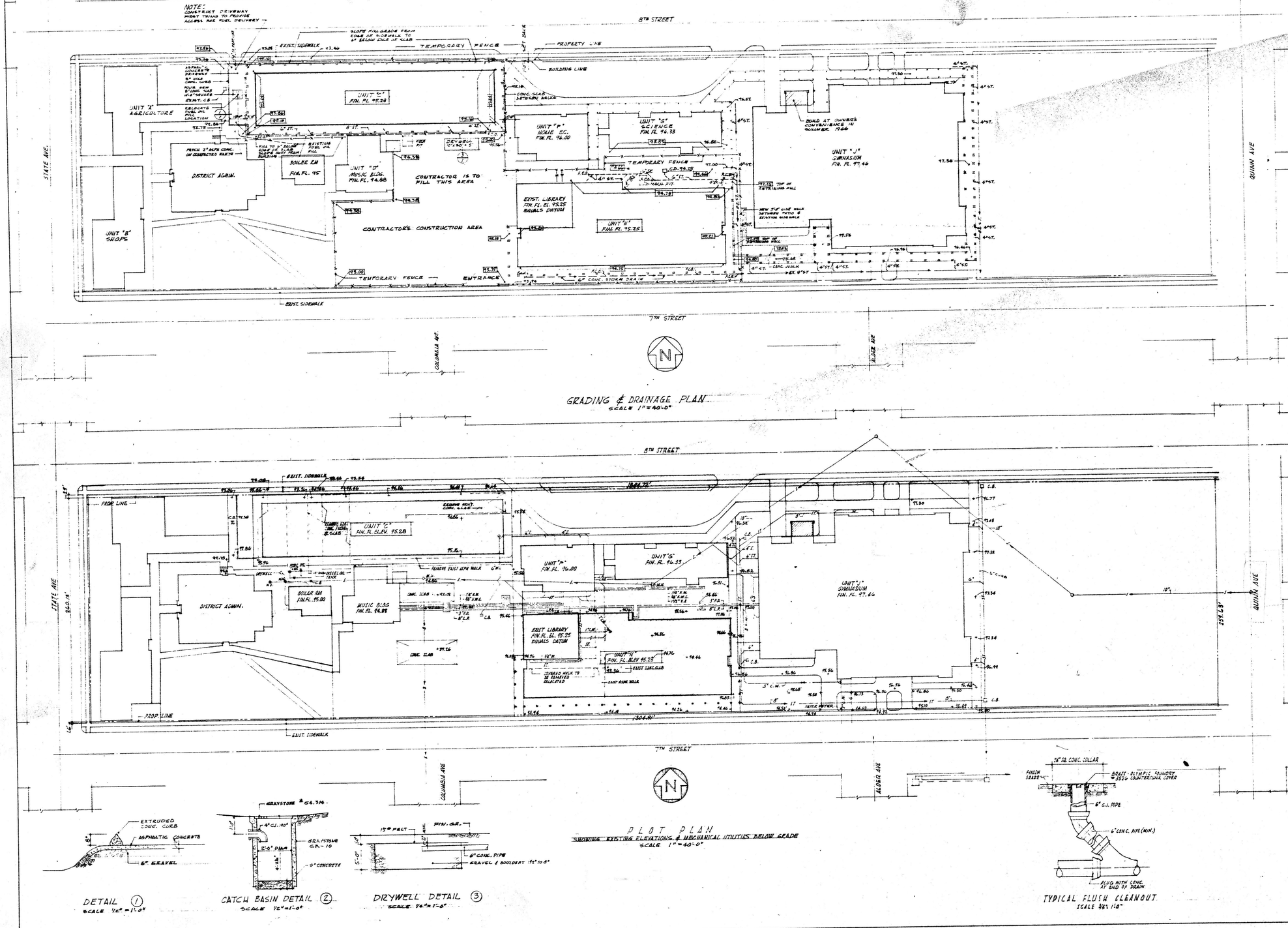
MALLIS & DeHART SEATTLE-TACOMA DISTRICT 1962 No. 173 STATE OF WASHINGTON REGISTERED ARCHITECTS

MEMBER OF AMERICAN INSTITUTE OF ARCHITECTS

DRAWN C.F.S.
TRACED
CHECKED G.E.C.
REVISED 1-26-62
DATE 11-22-61
SHEET S2 OF 2

PLANS FOR ADDITIONS TO MARYSVILLE SENIOR HIGH SCHOOL AT MARYSVILLE, WASHINGTON FOR MARYSVILLE SCHOOL DISTRICT NO 305 SNOHOMISH COUNTY, WASHINGTON

MALLIS & DeHART ARCHITECTS
631 LYON BUILDING SEATTLE 4, WASHINGTON



GRADING & DRAINAGE PLAN
SCALE 1"=40'-0"

PLOT PLAN
SHOWING EXISTING ELEVATIONS & MECHANICAL UTILITIES BELOW GRADE
SCALE 1"=40'-0"

DETAIL (1)
SCALE 1/2"=1'-0"

CATCH BASIN DETAIL (2)
SCALE 1/2"=1'-0"

DRYWELL DETAIL (3)
SCALE 1/2"=1'-0"

TYPICAL FLUSH CLEANOUT
SCALE 1/2"=1'-0"

INDEX TO DRAWINGS

KEY TO MATERIAL INDICATIONS

LARGE SCALE	SMALL SCALE	MATERIAL
		EARTH
		CONCRETE BLOCK
		TILE
		CONCRETE
		INSUL. PANELS
		PLASTER
		PLAS. BD.

LARGE SCALE	SMALL SCALE	MATERIALS
		ACOUSTIC MATERIAL
		INSULATION
		WOOD FINISH
		PLYWOOD
		WOOD (ROUGH)
		METAL
		GLASS

GENERAL NOTES

1. REPETITIVE FEATURES DRAWN ONLY ONCE SHALL BE CONSIDERED AS IF DRAWN IN FULL.
2. FIN. 2 B UNDER TYPE OR SIMILAR SYMBOL APPEARS ON THE DRAWINGS OR IN THE FINISH SCHEDULE, THE NUMBER "2" DESIGNATES THE COMBINATION OF FINISH MATERIALS USED IN THE SPACE & THE LETTER "B" DENOTES THE TYPE OF PAINT FINISH.
3. WHERE THIS OR SIMILAR SYMBOL APPEARS ON THE DRAWINGS THE UPPER NUMBER "3" REFERS TO THE NUMBER OF THE DETAIL & THE LOWER NUMBER "5" DESIGNATES THE NUMBER OF THE ARCHITECTURAL (A) DRAWING ON WHICH THE DETAIL APPEARS.
4. WHERE THIS OR SIMILAR SYMBOL APPEARS ON THE DRAWINGS THE UPPER NUMBER "4" REFERS TO THE NUMBER OF THE DETAIL WHILE THE LOWER NUMBER "101" DESIGNATES THE TYPICAL STANDARD DRAWING ON WHICH THE DETAIL APPEARS (THE TYPICAL STANDARD DRAWINGS ARE BOUND WITH THE SPECIFICATIONS.)
5. BUILDING CODE: THIS PROJECT IS TO BE CONSTRUCTED IN CONFORMITY WITH THE "UNIFORM BUILDING CODE, 1964 EDITION"
6. WOOD STUD WALLS & PARTITIONS TO BE 2" x 4" ST.-DS & 2'-0" O.C. UNLESS OTHERWISE NOTED
7. ALL CABINET NUMBERS INDICATED ON THE DRAWINGS ARE CATALOGUE NUMBERS OF NEVAMAR CABINETS INC. UNLESS NOTED OTHERWISE. A NUMBER FOLLOWED BY THE LETTER "M" INDICATES CABINET MODIFICATIONS AS INDICATED BY THE DRAWINGS OR NOTES.
8. FIRE STOPPING: NOMINAL 2" MATERIAL AT PAR. 8' INTERVALS VERTICAL IN WALLS.
9. DIMENSIONS OF BLOCK WALLS & PARTITIONS ARE IN GENERAL TO NOMINAL FACE OF BLOCK. ADJUST AS REQUIRED TO CONFORM TO ACTUAL DIMENSIONS OF BLOCK.
10. GRAVITY VENTILATION INCLUDING ALL APPENDAGES THERE TO WITHIN THE BUILDING # ON THE ROOF OR WALLS, IS A PART OF THE GENERAL CONTRACT.

PLOT PLAN INDEX TO DRAWINGS

TL 172 REGISTERED ARCHITECT Robert Henry DeHart STATE OF WASHINGTON

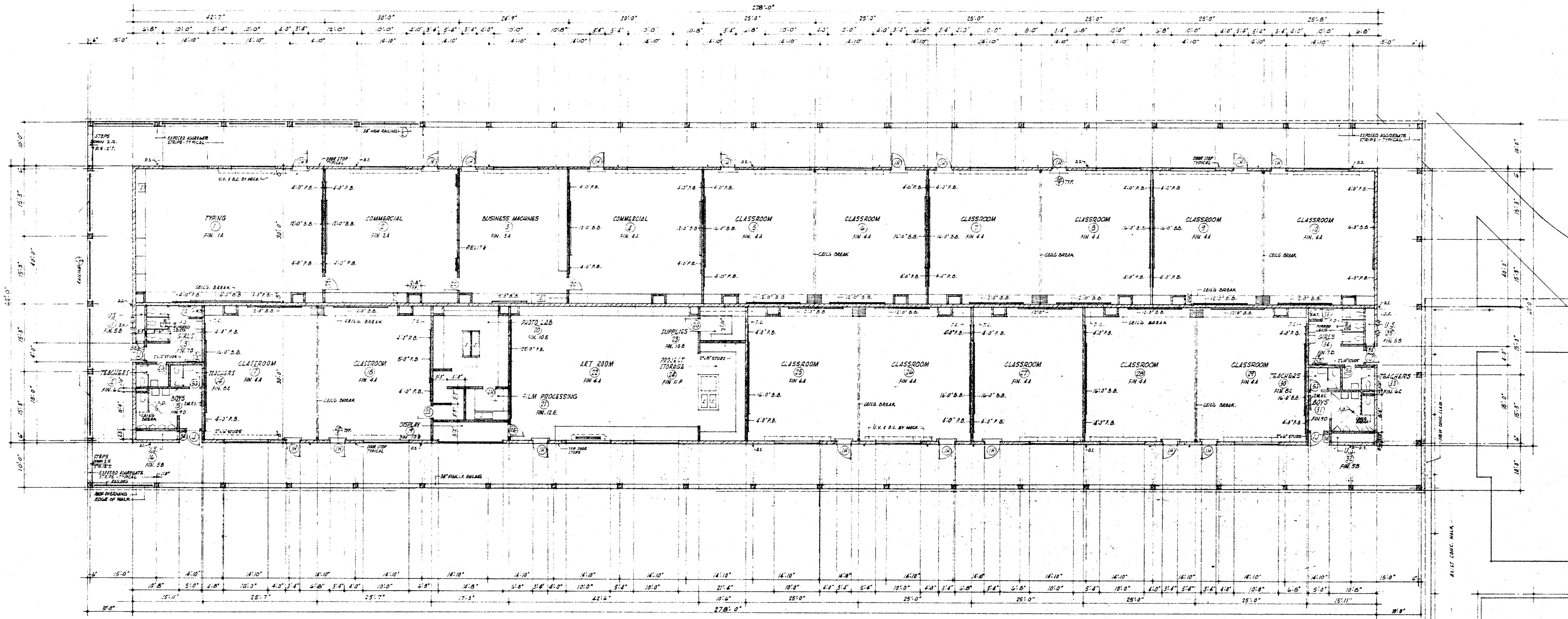
MEMBER OF AMERICAN INSTITUTE OF ARCHITECTS

DRAWN G.R.M. R.J.D.
TRACED
CHECKED
REVISED 6-1-66
DATE 4-11-66

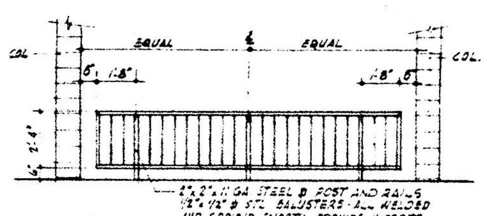
SHEET A1 OF ELEVEN

PLANS FOR ADDITIONS TO
MARYSVILLE SENIOR HIGH SCHOOL
AT MARYSVILLE, WASHINGTON
FOR MARYSVILLE SCHOOL DISTRICT № 25
SNOHOMISH COUNTY, WASHINGTON

MALLIS & DeHART ARCHITECTS
631 LYON BUILDING SEATTLE, WASHINGTON 98104

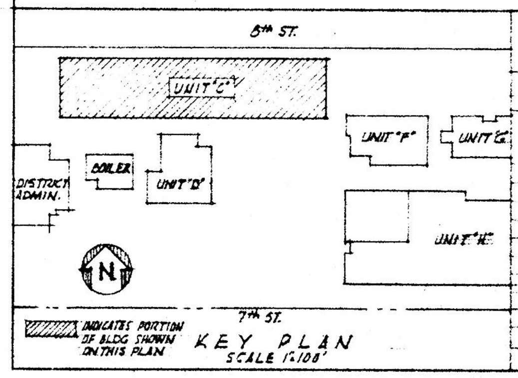


FLOOR PLAN - UNIT "C"
SCALE 1/8" = 1'-0"



2" x 2" x 11 GA. STEEL ⌀ POST AND RAILS
1/2" x 1/2" ⌀ STL. BALUSTERS - ALL WELDED
AND GROUND SMOOTH - PROVIDE INSERTS
IN CONC. & SET IN SULPHER OR APPROVED MATL.

(1) RAILING SCALE 3/4" = 1'-0"



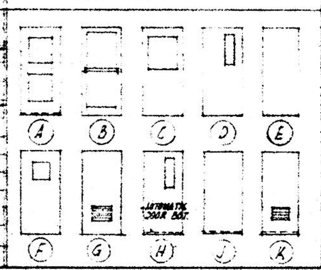
KEY PLAN SCALE 1" = 100'

ROOM LIST AND CEILING HEIGHTS

Nº	TITLE	CEILING HEIGHT	Nº	TITLE	CEILING HEIGHT	Nº	TITLE	CEILING HEIGHT
1	TYPING	9'-4"	15	BOYS	9'-4" & 7'-6"	29	CLASSROOM	9'-4"
2	COMMERCIAL	"	16	UTILITY SPACE	9'-4"	30	TEACHERS	"
3	BUSINESS MACHINES	"	17	CLASSROOM	"	31	BOYS	9'-4" & 7'-6"
4	COMMERCIAL	"	18	CLASSROOM	"	32	UTILITY SPACE	9'-4"
5	CLASSROOM	"	19	DISPLAY	"	33	TEACHERS	"
6	CLASSROOM	"	20	PHOTO LAB		34	GIRLS	9'-4" & 7'-6"
7	CLASSROOM	"	21	FILM PROCESSING	"	35	UTILITY SPACE	9'-4"
8	CLASSROOM	"	22	ARTS ROOM	"			
9	CLASSROOM	"	23	SUPPLIES	"			
10	CLASSROOM	"	24	PROJECT STORAGE	"			
11	UTILITY SPACE	"	25	CLASSROOM	"			
12	TEACHERS	"	26	CLASSROOM	"			
13	GIRLS	9'-4" & 7'-6"	27	CLASSROOM	"			
14	TEACHERS	9'-4"	28	CLASSROOM	"			

DOOR SCHEDULE

DOOR TYPES



DOOR SIZES

Nº	SIZE	THICKNESS	REMARKS
1	3'-0" x 7'-0"	1 3/4"	HOLLOW METAL
2	3'-0" x 7'-0"	1 3/4"	WOOD
4	2'-8" x 7'-0"	1 3/4"	WOOD
5	2'-6" x 7'-0"	1 3/4"	WOOD
6	2'-4" x 7'-0"	1 3/4"	WOOD
7	2'-6" x 4'-0"	1 3/4"	HOLLOW METAL
8	1'-4" x 4'-0"	1 3/4"	HOLLOW METAL
11	2'-6" x 4'-0"	1 3/4"	WOOD

NOTE: UNDERCUT THE FOLLOWING DOORS 1/2" TO ROOM Nº 12, 14, 30, & 33

SCHEDULE OF INTERIOR PAINT FINISH

TYPE	FLOOR	BASE	WAINSCOT	WAIN. CAP	WALLS	CEILING	TRIM	REMARKS
A.			PRE-FIN.		P.		E.	
B.					P.	P.	E.	
C.					E.		E.	
D.					E.	P. *	E.	* PLAS. BD ONLY
E					P		E	
F.					P			

SCHEDULE OF INTERIOR FINISH MATERIAL

TYPE	FLOOR	BASE	WAINSCOT MATERIAL	WAINSCOT HEIGHT	WALLS	CEILING	TRIM	REMARKS
1.	CARPET	R.	B. *	4'-0"	BLK. & PLAS. BD.	AC.T.	MET.	* OVER PLAS. BD. ONLY
2	A.T.	R.	B. *	4'-0"	BLK & PLAS. BD.	AC.T.	MET. & F.	* OVER PLAS. BD. ONLY
3	CARPET	R.	B *	4'-0"	BLK & PLAS. BD.	AC.T.	MET. & F.	* OVER PLAS. BD ONLY
4	A.T.	R.	B *	4'-0"	BLK & PLAS. BD.	AC.T.	MET.	* OVER PLAS. BD ONLY
5	CONC.				BLK & PLAS. BD.	PLAS. BD.	MET.	
6	C.T.	C.T.			BLK. & PLAS. BD.	AC.T.	MET.	
7	C.T.	C.T.	C.T.	7'-0"	BLK. & PLAS. BD.	* AC.T. & PLAS. BD.	MET.	* AC.T. AT 9'-4" HT. ONLY
8	C.T.	C.T.			PLAS. BD.	AC.T.	MET.	
9	C.T.	C.T.	C.T.	7'-0"	BLK & PLAS. BD	AC.T. & PLAS. BD.	MET.	* AC.T. AT 9'-4" HT. ONLY
10	A.T.	R.			BLK. & PLAS. BD.	PLAS. BD.	MET.	
11	A.T.	R.			BLK & PLAS. BD.	AC.T.	MET.	
12	A.T.	R.			PLAS. BD.	AC.T.	MET.	

FLOOR PLAN UNIT "C" & SCHEDULES

TL 173 REGISTERED ARCHITECT
Joseph Henry DeHart
STATE OF WASHINGTON

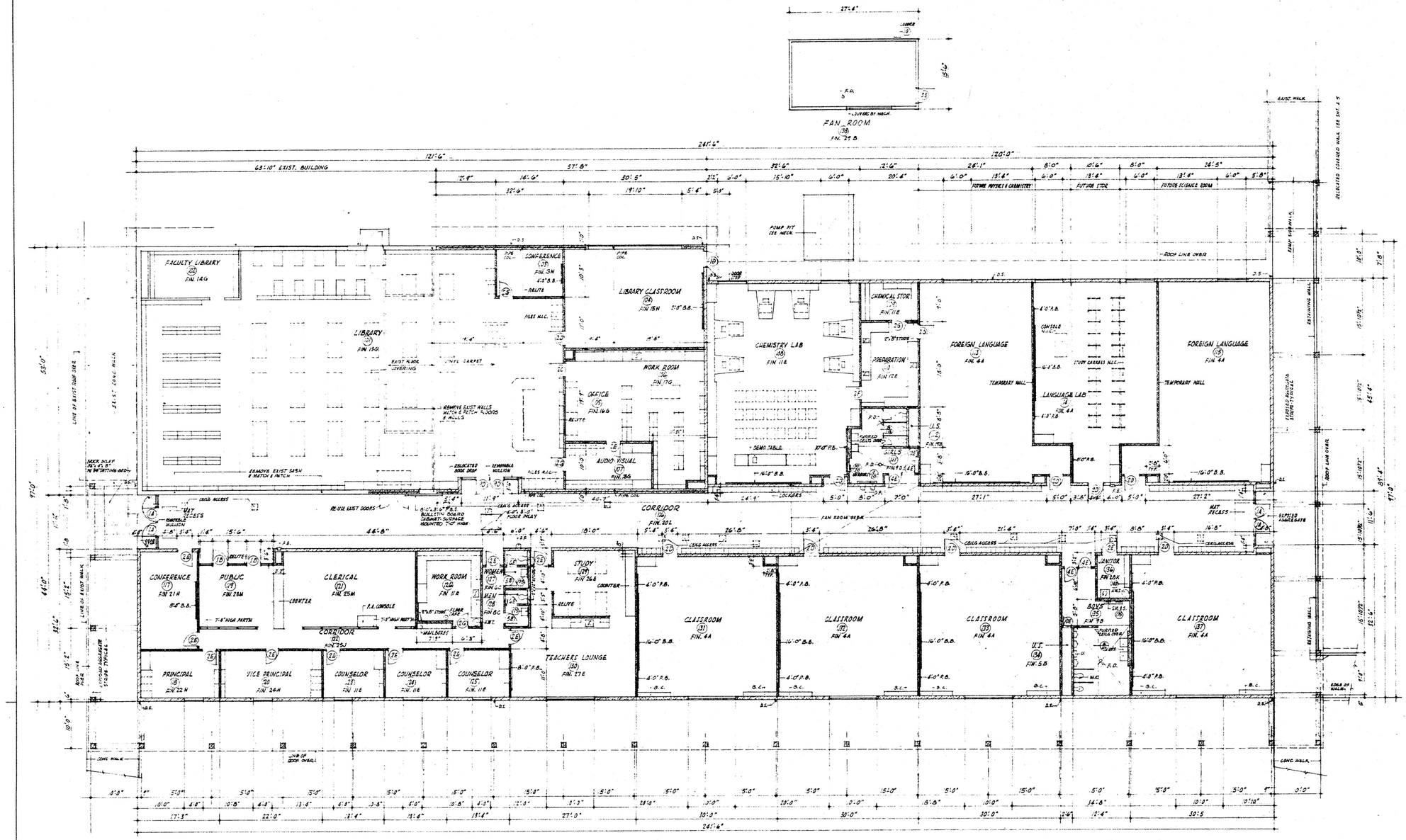
MEMBER OF AMERICAN INSTITUTE OF ARCHITECTS

DRAWN G.R.M.
TRACED
CHECKED
REVISED 6-9-66
DATE 4-11-66

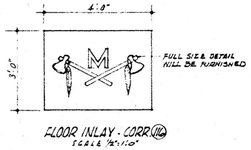
A SHEET 2 OF ELEVEN

PLANS FOR ADDITIONS TO
MARYSVILLE SENIOR HIGH SCHOOL
AT MARYSVILLE, WASHINGTON
FOR MARYSVILLE SCHOOL DISTRICT Nº 25
SNOHOMISH COUNTY, WASHINGTON

MALLIS & DEHART ARCHITECTS
631 LYON BUILDING SEATTLE, WASHINGTON 98104



FLOOR PLAN - UNIT "H"
SCALE 1/8"=1'-0"



FLOOR INLAY - CORR (11a)
SCALE 1"=1'-0"

SCHEDULE OF INTERIOR FINISH MATERIAL

TYPE	FLOOR	BASE	WAINSCOT MATERIAL	WAINSCOT HEIGHT	WALLS	CEILING	TRIM	REMARKS
4	A.T.	R.	—	—	BLOCK & PLAS. BD.	A.C.T.	MET.	* OVER PLAS. BD. ONLY
5	CONC.	—	—	—	BLOCK & PLAS. BD.	PLAS. BD.	MET.	
6	C.T.	C.T.	—	—	BLOCK & PLAS. BD.	A.C.T.	MET.	
8	C.T.	C.T.	—	—	PLAS. BD.	A.C.T.	MET.	
9	C.T.	C.T.	C.T.	7'-0"	BLOCK & PLAS. BD.	PLAS. BD.	MET.	* A.C.T. AT 8'-0" AT. ONLY
11	A.T.	R.	—	—	BLOCK & PLAS. BD.	A.C.T.	MET.	
12	A.T.	R.	—	—	PLAS. BD.	A.C.T.	MET.	
13	2008	R.	—	—	BLOCK & PLAS. BD.	A.C.T.	MET. & P.	* NEW ADDITION ONLY - SEE PLAN AS BUILT.
16	—	—	—	—	—	—	—	
15	V.A.	R.	B.	4'-0"	BLOCK & PLAS. BD.	A.C.T.	MET.	
16	V.A.	R.	—	—	BLOCK & PLAS. BD.	A.C.T.	WATER	
17	V.A.	R.	—	—	BLOCK & PLAS. BD.	A.C.T.	—	
5	V.A.	R.	—	—	BLOCK & PLAS. BD.	A.C.T.	MET.	
19	CONC.	—	—	—	PLAS. BD.	PLAS. BD.	MET.	
20	A.T.	R.	PLASTIC	7'-0"	BLOCK & PLAS. BD.	A.C.T.	MET.	* EXCEPT BEHIND LOCKERS
21	A.T.	R.	—	—	BLOCK & PANELING *	A.C.T.	MET.	* PANELING OVER PLAS. BD.
22	A.T.	R.	—	—	BLOCK & PANELING *	A.C.T.	MET.	* PANELING OVER PLAS. BD.
23	A.T.	R.	—	—	BLOCK & PLAS. BD.	A.C.T.	PLAS. & MET.	
24	A.T.	R.	—	—	BLOCK & PLAS. BD.	A.C.T.	MET.	
25	A.T.	R.	—	—	PLAS. BD.	A.C.T.	MET. & PLAS.	
26	A.T.	R.	—	—	PLAS. BD.	A.C.T.	MET.	
27	A.T.	R.	—	—	BLOCK & PLAS. BD.	A.C.T.	MET. & P.	
28	A.T.	R.	WOOD	5'-0"	BLOCK & PLAS. BD.	PLAS. BD.	MET.	
29	CONC.	CONC.	—	—	PLAS. BD.	PLAS. BD.	MET.	

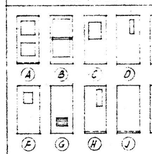
SCHEDULE OF INTERIOR PAINT FINISH

TYPE	FLOOR	BASE	WAINSCOT MAIN CAP	WALLS	CEILING	TRIM	REMARKS
A		PRE-FIN.		P		E.	
B				P	P	E.	
C				E		E.	
D				E	P *	E.	* BU. PLAS. BD. ONLY
E				P		E.	
F				P			
G				P	P *	E.	* STAIN ALL GLU-LAM BMS
H				P & S. *		E.	* STAIN PANELING
J				P & S. *		E. & S. *	* STAIN 4'-0" HIGH ON TOP & PAINTH.
K		E		P	P	E.	
L		PLASTIC		P		E.	
M				P		E. *	* BCBPT. ALUM.
N		PRE-FIN.		P		E.	

NOTE: ENAMEL ALL METAL DOORS, TRIM, & STEEL COLUMNS
STAIN GLU-LAM BEAMS

DOOR SCHEDULE

DOOR TYPES



DOOR SIZES

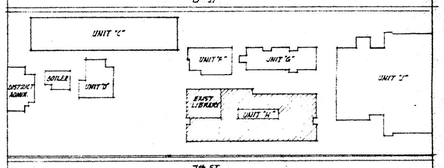
Nº	SIZE	THICKNESS	REMARKS
1	3'-0" x 7'-0"	1¾"	HOLLOW METAL
2	3'-0" x 7'-0"	1¾"	WOOD
3	3'-0" x 6'-8"	1¾"	HOLLOW METAL
4	2'-6" x 7'-0"	1¾"	WOOD
5	2'-8" x 7'-0"	1¾"	WOOD
6	3'-0" x 7'-0"	1¾"	HOLLOW METAL
7	3'-0" x 4'-0"	1¾"	HOLLOW METAL
8	3'-4" x 4'-0"	1¾"	HOLLOW METAL
9	3'-0" x 7'-0"	1¾"	25-35B EXIST. DOOR & WORK FROM LIBRARY ENTRY & GLASS WITH WIRE GLASS
10	1'-4" x 4'-0"		WOOD

(2A) NOTE: NUMBER DENOTES SIZE, LETTER DENOTES TYPE

UNDERCUT THE FOLLOWING DOORS 1¼" TO ROOM Nº 127, 128, & 134

ROOM LIST AND CEILING HEIGHTS

Nº	TITLE	CEILING HEIGHT	Nº	TITLE	CEILING HEIGHT	Nº	TITLE	CEILING HEIGHT
101	LIBRARY	VARIES	116	FOREIGN LANGUAGE	9'-6"	100	STUDY	9'-6"
102	FACULTY LIBRARY	9'-6"	117	CORRIDOR	-	130	TEACHERS LOUNGE	-
103	CONFERENCE	VARIES	117	CONFERENCE	-	131	CLASSROOM	-
104	LIBRARY CLASSROOM	VARIES	118	PRINCIPAL	-	132	CLASSROOM	-
105	OFFICE	VARIES	119	PUBLIC	-	133	CLASSROOM	-
106	WORK ROOM	VARIES	120	VICE PRINCIPAL	-	134	U.S.	-
107	AUDIO VISUAL	VARIES	121	CLERICAL	-	135	BOYS	9'-6" & 8'-0"
108	CHEMISTRY LAB	9'-6"	122	CORRIDOR	-	136	JANITOR	9'-6"
109	CHEMICAL STOR.	9'-6"	123	COUNSELOR	-	137	CLASSROOM	9'-6"
110	PREPARATION	-	124	COUNSELOR	-	138	FAN ROOM	10'-6"
111	GIRLS	9'-6" & 8'-0"	125	COUNSELOR	-			
112	U.S.	9'-6"	126	WORK ROOM	-			
113	FOREIGN LANGUAGE	9'-6"	127	WOMEN	-			
114	LANGUAGE LAB	9'-6"	128	MEN	9'-6"			



INDICATES PORTION OF BLDG SHOWN ON THIS DRAWING

KEY PLAN
SCALE 1/100"

FLOOR PLAN - UNIT "H" & SCHEDULES

REGISTERED ARCHITECT
Joseph Henry DeHart
STATE OF WASHINGTON
EL 1173

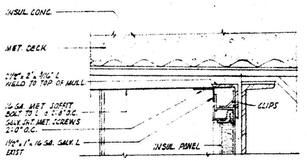
MEMBER OF AMERICAN INSTITUTE OF ARCHITECTS

DRAWN G.R.M.
TRACED
CHECKED
REVISED 6-5-66
DATE 6-11-66

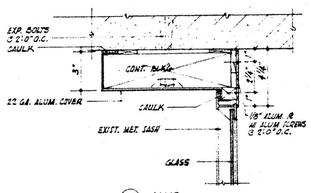
PLANS FOR ADDITIONS TO
MARYSVILLE SENIOR HIGH SCHOOL
AT MARYSVILLE, WASHINGTON
FOR MARYSVILLE SCHOOL DISTRICT Nº25
SNOHOMISH COUNTY, WASHINGTON

SHEET A 3 OF ELEVEN

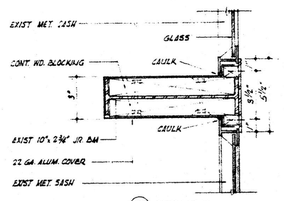
MALLIS & DeHART ARCHITECTS
631 LYON BUILDING SEATTLE, WASHINGTON 98104



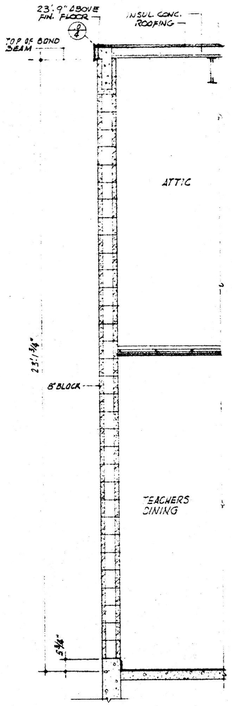
(1) HEAD



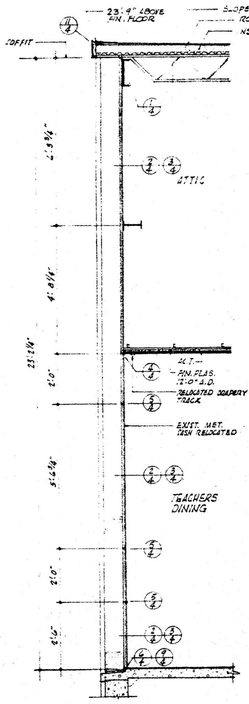
(2) JAMB



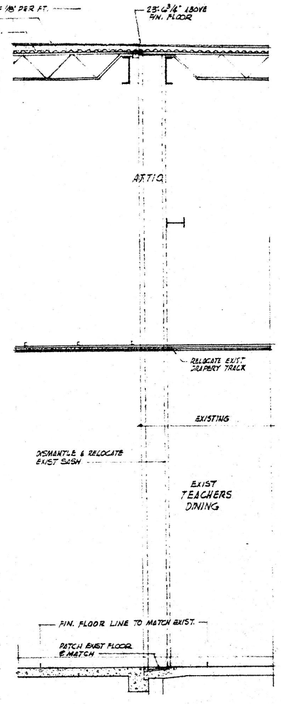
(3) MULLION



(1) EAST & WEST WALLS

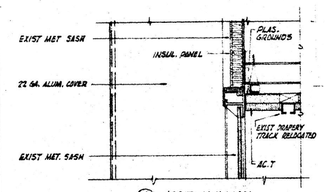


(2) NORTH WALL

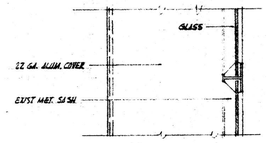


(3) EXIST NORTH WALL

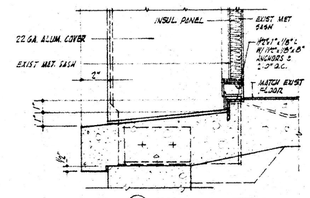
WALL SECTIONS
SCALE 1/2"=1'-0"



(4) HORIZ. MULLION



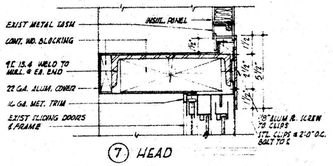
(5) MUNTIN



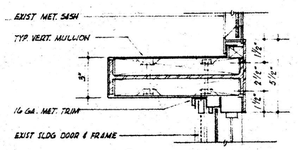
(6) SILL

NOTE: ABOVE DETAILS ARE SHOWN AS "AS BUILT" AND SHALL BE DISMANTLED ACCORDINGLY AND INSTALLED IN NEW LOCATION AS SHOWN ABOVE.

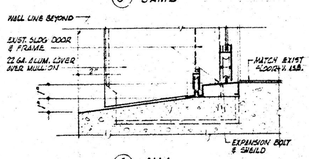
WINDOW DETAILS
SCALE 3"=1'-0"



(7) HEAD



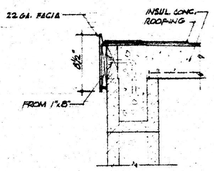
(8) JAMB



(9) SILL

NOTE: ABOVE DETAILS ARE SHOWN AS "AS BUILT" AND SHALL BE DISMANTLED ACCORDINGLY AND INSTALLED IN NEW LOCATION AS SHOWN ABOVE.

SLIDING DOOR DETAILS
SCALE 3"=1'-0"



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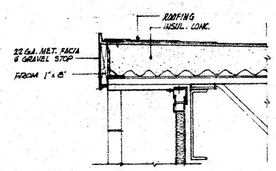
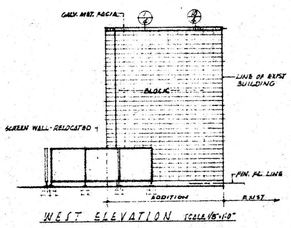
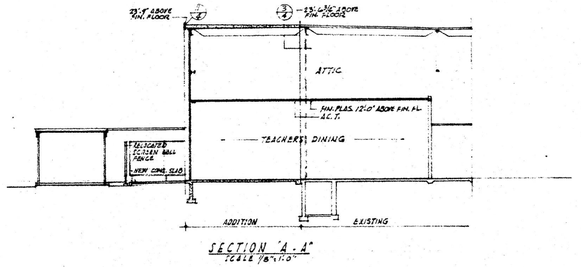


(11)

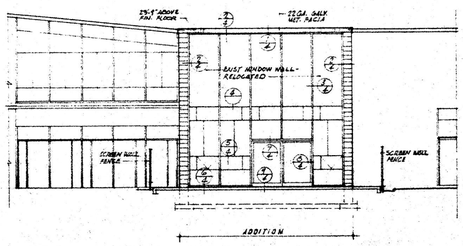
FACIA DETAILS
SCALE 1 1/2"=1'-0"



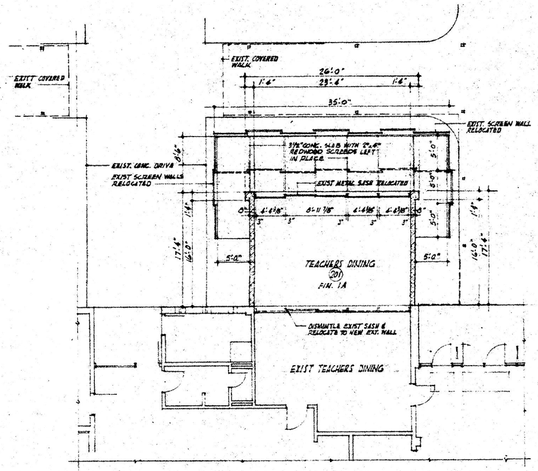
WEST ELEVATION SCALE 1/8"=1'-0"



SECTION "A-A"
SCALE 1/8"=1'-0"



NORTH ELEVATION
SCALE 1/8"=1'-0"



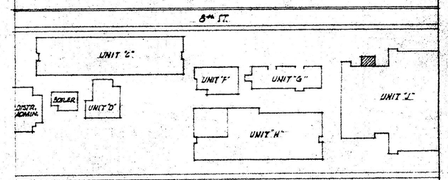
FLOOR PLAN - TEACHERS DINING
SCALE 1/8"=1'-0"

SCHEDULE OF INTERIOR FINISH MATERIAL

TYPE FLOOR	BASE	WAINSCOT MATERIAL	WAINSCOT HEIGHT	WALLS	CEILING	TRIM	REMARKS
40	EXIS.	7		SALK WINDOW WALL	ACT	MET.	

SCHEDULE OF INTERIOR PAINT FINISH

TYPE FLOOR	BASE	WAINSCOT	WAIN. CAP	WALLS	CEILING	TRIM	REMARKS
P				P *	E *		INCLUDING EXIST.



INDICATES POSITION OF BLDG SHOWN ON THIS DRAWING

KEY PLAN
SCALE 1"=100'

FLOOR PLAN, ELEVATIONS, SECTIONS AND DETAILS
UNIT "J"

REGISTERED ARCHITECT
Joseph Henry DeHart
STATE OF WASHINGTON
No. 170

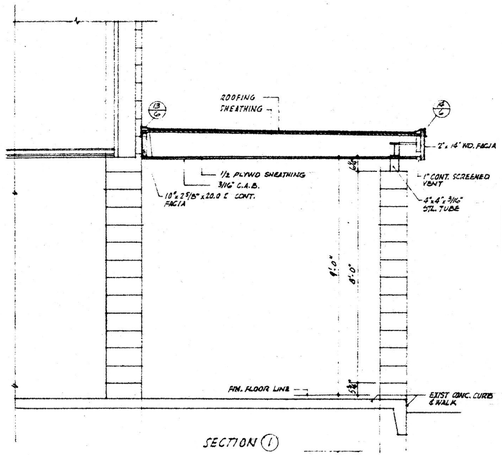
MEMBER OF AMERICAN INSTITUTE OF ARCHITECTS

DRAWN G.D.M.
TRACED
CHECKED
REVISED 6-9-66
DATE 4-11-66

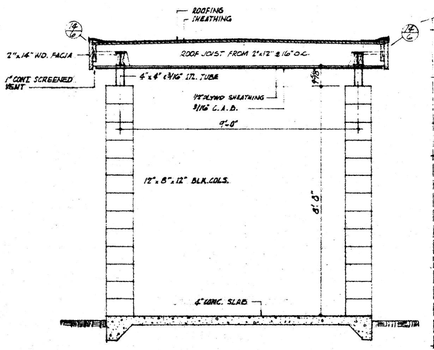
PLANS FOR ADDITIONS TO
MARYSVILLE SENIOR HIGH SCHOOL
AT MARYSVILLE, WASHINGTON
FOR MARYSVILLE SCHOOL DISTRICT No 25
SNOHOMISH COUNTY, WASHINGTON

SHEET A4 OF 11 SHEETS

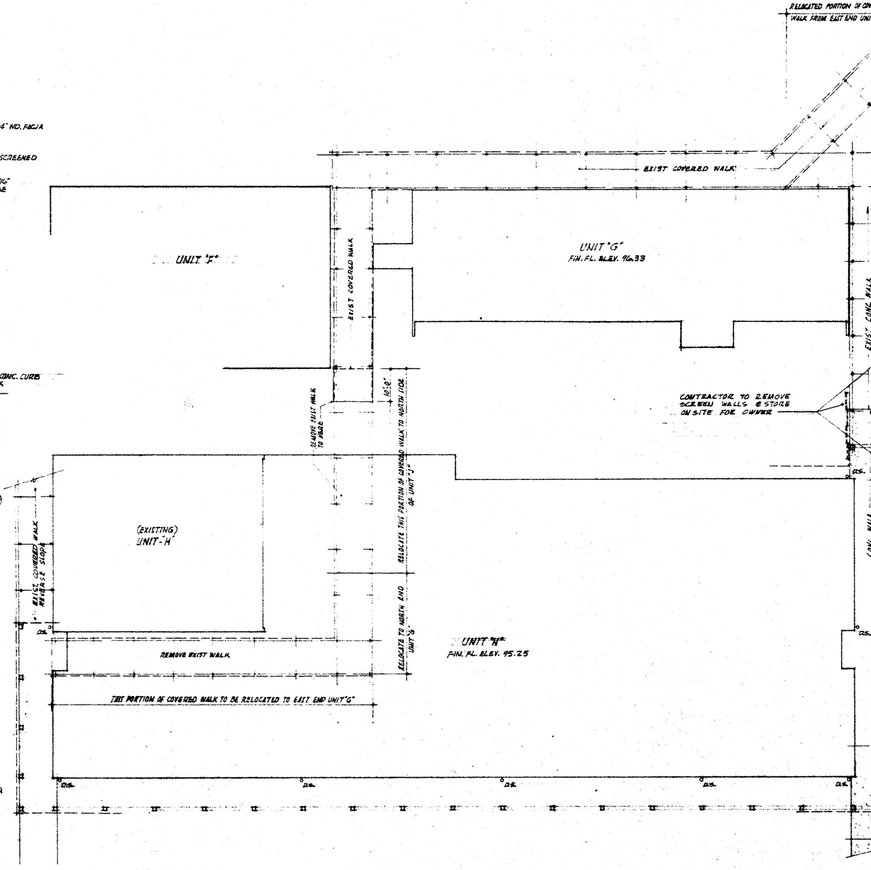
MALLIS & DeHART ARCHITECTS
631 LYON BUILDING SEATTLE, WASHINGTON 98104

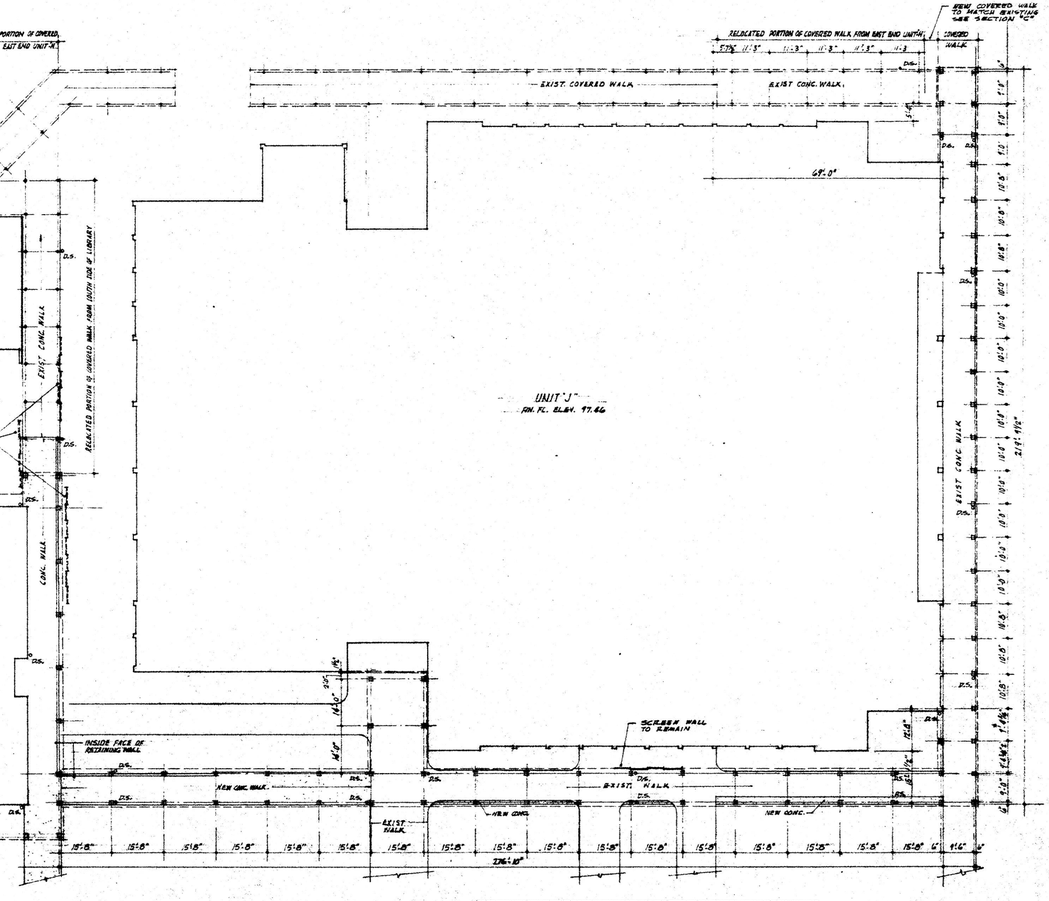


SECTION (1)

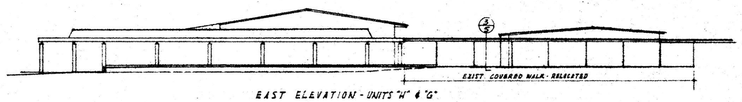


SECTION (2)
SCALE 1/4"=1'-0"

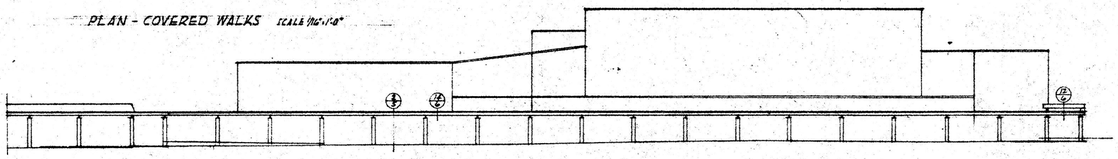




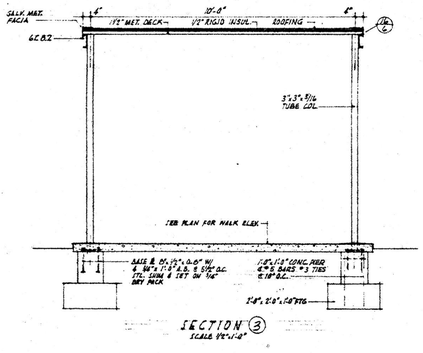
PLAN - COVERED WALKS SCALE 1/16"=1'-0"



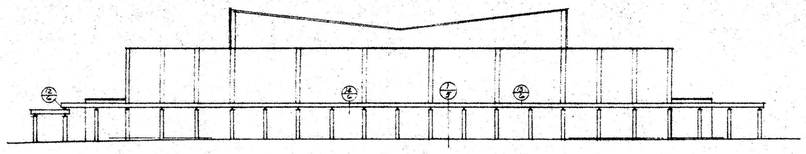
EAST ELEVATION - UNITS "H" & "G"



SOUTH ELEVATION - UNIT "J"



SECTION (3)
SCALE 1/4"=1'-0"



EAST ELEVATION - UNIT J

COVERED WALK - PLANS, ELEVATIONS, & DETAILS

REGISTERED ARCHITECT
Joseph Henry DeHart
STATE OF WASHINGTON
No. 1775

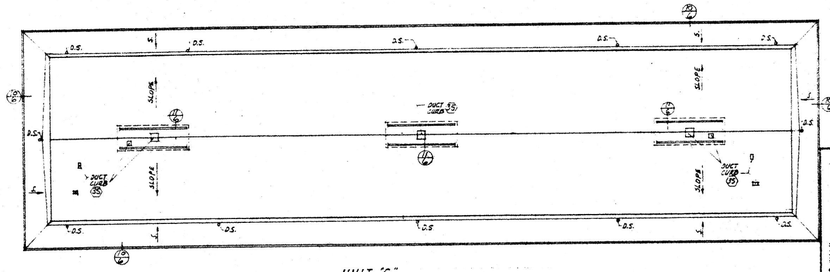
MEMBER OF AMERICAN INSTITUTE OF ARCHITECTS

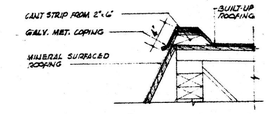
DRAWN G.R.M.
TRACED
CHECKED
REVISED 6-9-66
DATE 4-11-66

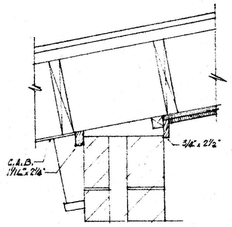
PLANS FOR ADDITIONS TO
MARYSVILLE SENIOR HIGH SCHOOL
AT MARYSVILLE, WASHINGTON
FOR MARYSVILLE SCHOOL DISTRICT N°25
SNOHOMISH COUNTY, WASHINGTON

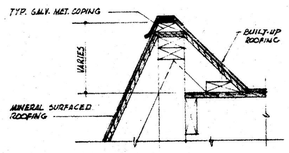
SHEET A 5 OF ELEVEN

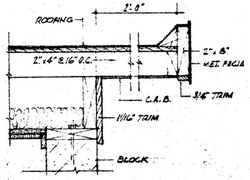
MALLIS & DeHART ARCHITECTS
631 LYON BUILDING SEATTLE, WASHINGTON 98104

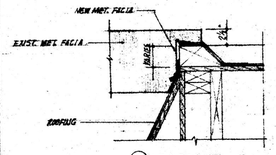


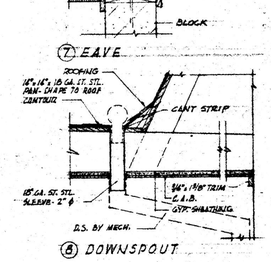


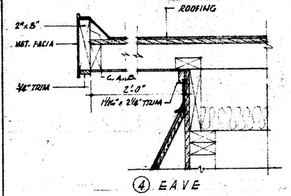


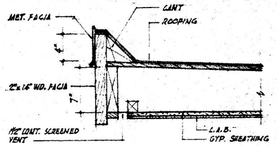


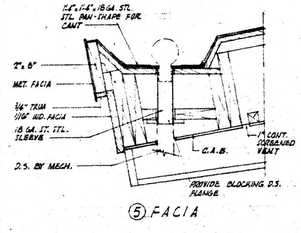


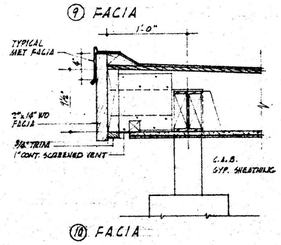




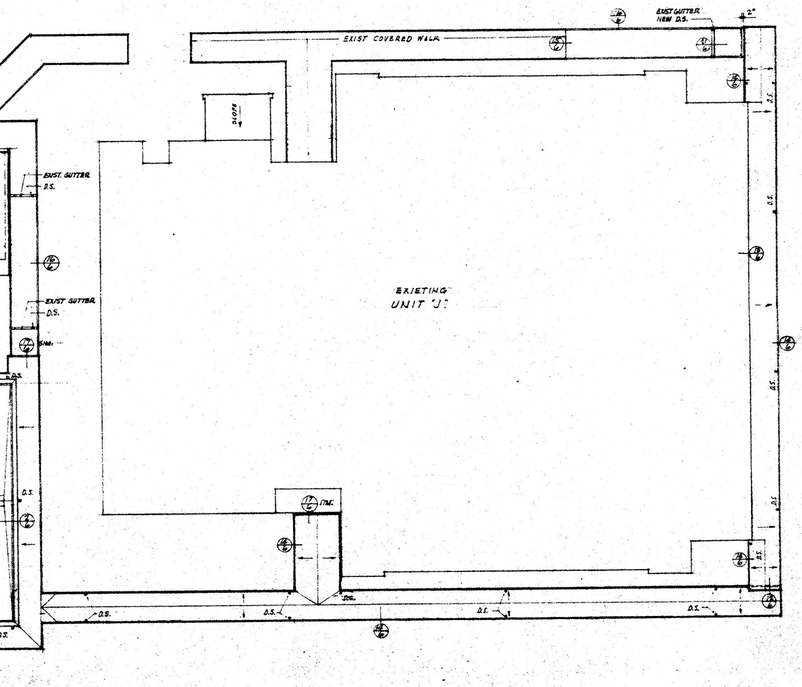


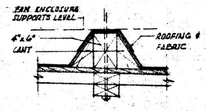


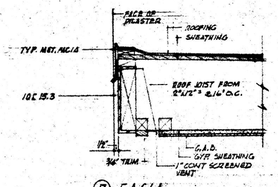


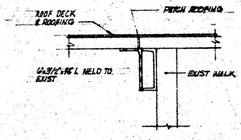


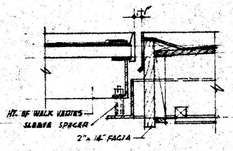
ROOF PLAN
SCALE 1"=20'

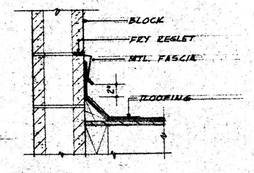


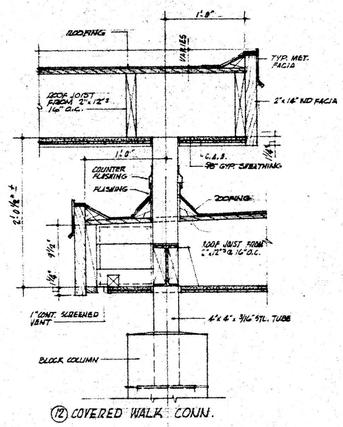


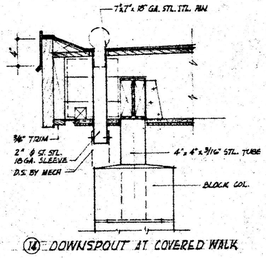


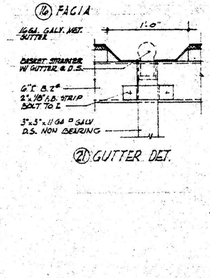


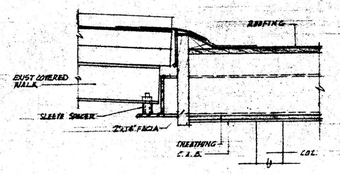


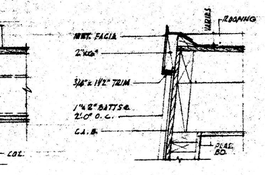












ROOF DETAILS
SCALE 1 1/2"=1'-0"

ROOF PLAN AND EAVE DETAILS

TL 173 REGISTERED ARCHITECT Joseph Henry DeHart STATE OF WASHINGTON

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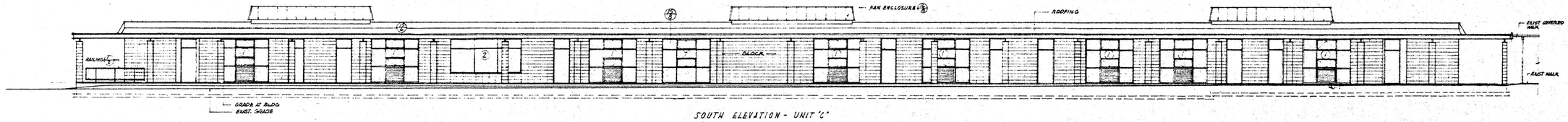
REVISED 6-1-66
DATE 4-11-66

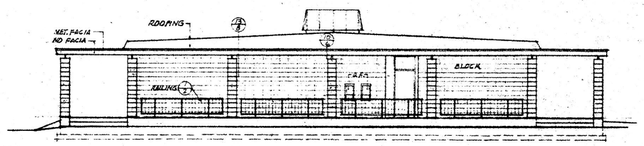
SHEET 6 OF ELEVEN

PLANS FOR ADDITIONS TO
MARYSVILLE SENIOR HIGH SCHOOL
AT MARYSVILLE, WASHINGTON
FOR MARYSVILLE SCHOOL DISTRICT N° 25
SNOHOMISH COUNTY, WASHINGTON

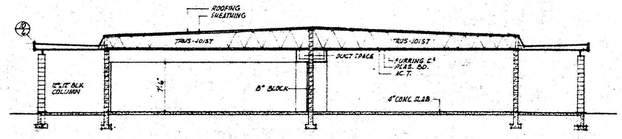
MALLIS & DeHART ARCHITECTS
631 LYON BUILDING SEATTLE, WASHINGTON 98104



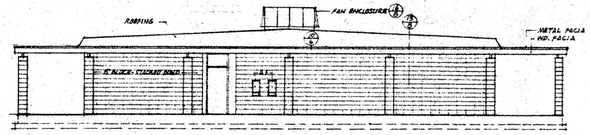
SOUTH ELEVATION - UNIT "C"



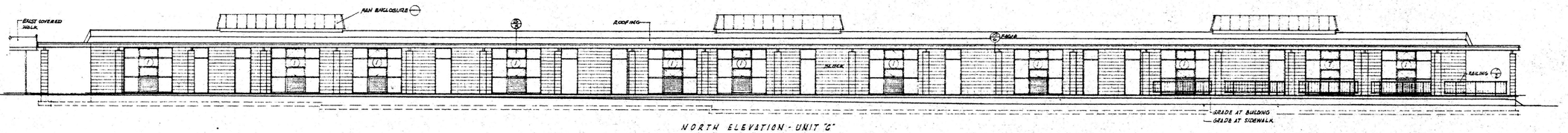
WEST ELEVATION - UNIT "C"



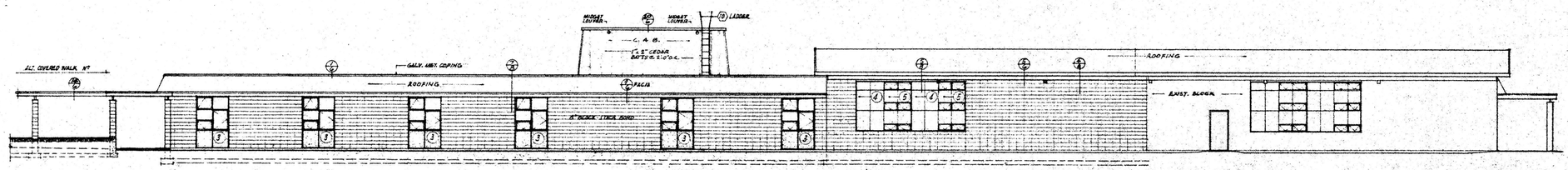
SECTION "A" UNIT "C"



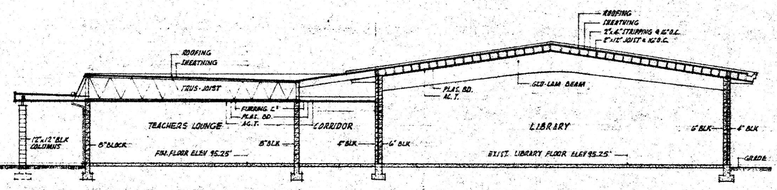
EAST ELEV - UNIT "C"



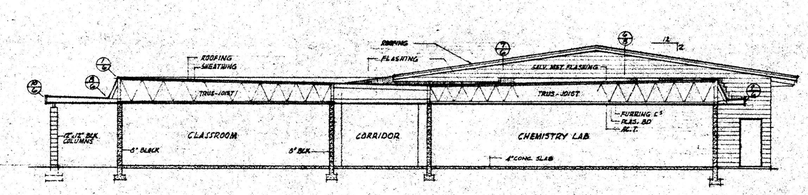
NORTH ELEVATION - UNIT "C"



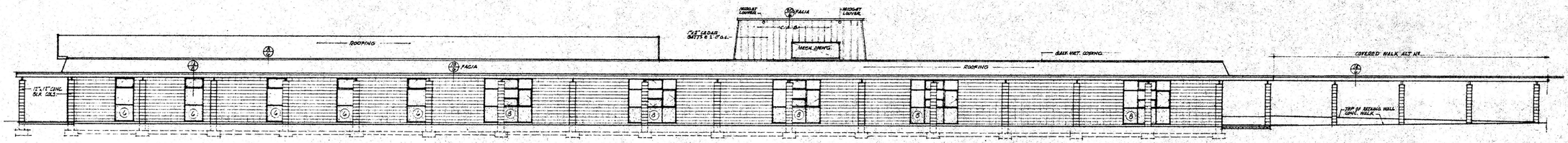
NORTH ELEVATION - UNIT "H"



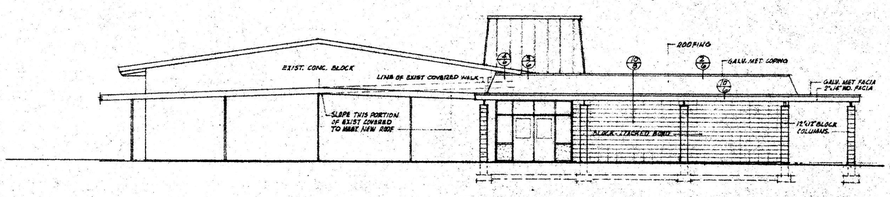
SECTION "B-B" UNIT "H"



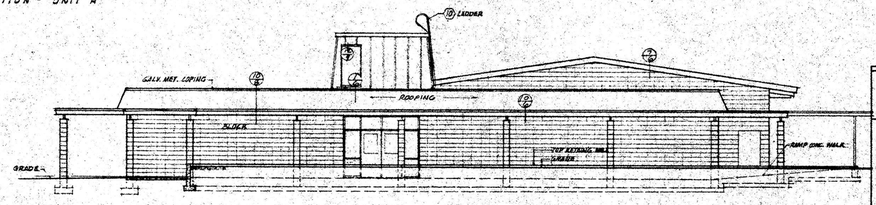
SECTION "C-C" UNIT "H"



SOUTH ELEVATION - UNIT "H"



WEST ELEV - UNIT "H"



EAST ELEV. - UNIT "H"

BUILDING ELEVATIONS & SECTIONS
SCALE 1/8"=1'-0"

BUILDING ELEVATIONS AND SECTIONS

REGISTERED ARCHITECT
Joseph Henry DeHart
STATE OF WASHINGTON
MEMBER OF AMERICAN INSTITUTE OF ARCHITECTS

DRAWN G.R.M.
TRACED
CHECKED
REVISED 6-7-66
DATE 4-11-66

PLANS FOR ADDITIONS TO
MARYSVILLE SENIOR HIGH SCHOOL
AT MARYSVILLE, WASHINGTON
FOR MARYSVILLE SCHOOL DISTRICT № 25
SNOHOMISH COUNTY, WASHINGTON

SHEET A7 OF ELEVEN

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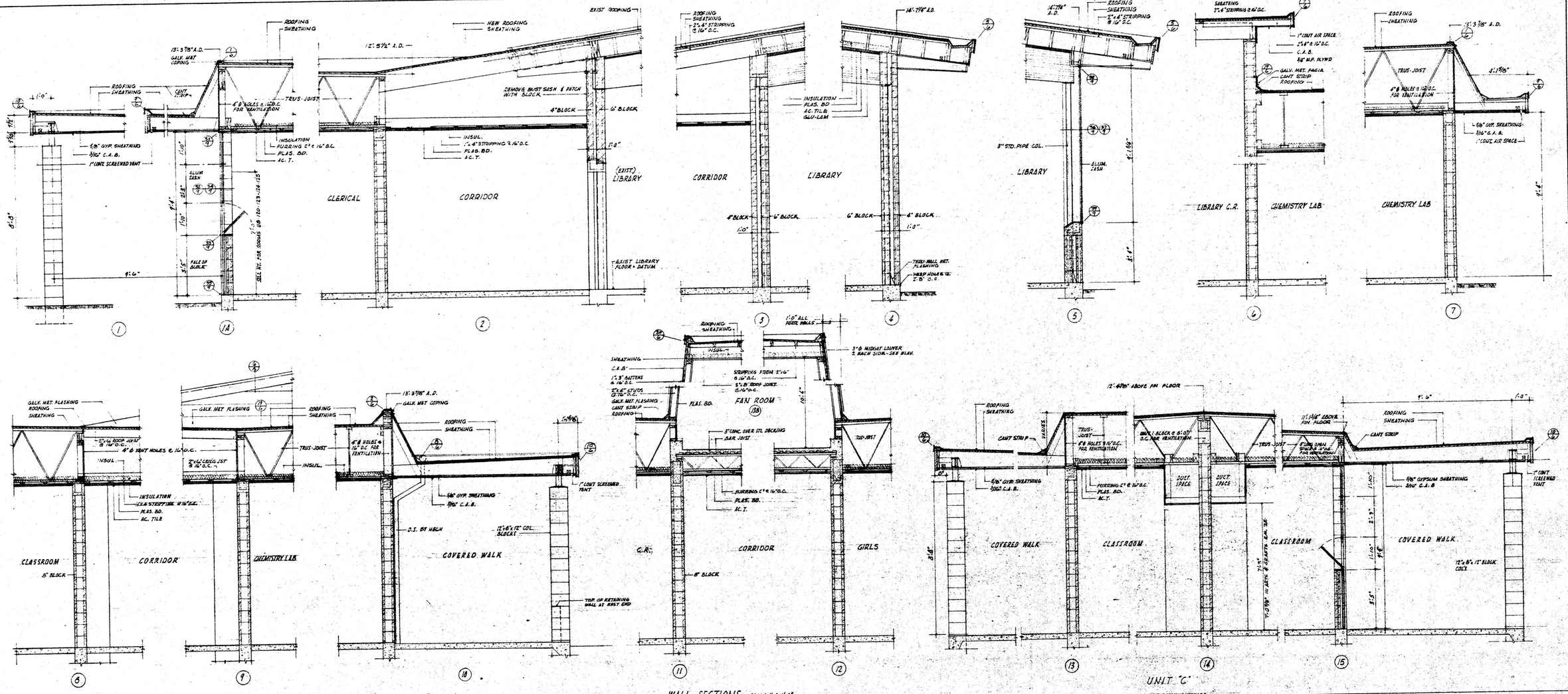

WALL SECTIONS

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REVISED 6-1-62
DATE 6-4-62

SHEET A8 OF ELEVEN

PLANS FOR ADDITIONS TO
MARYSVILLE SENIOR HIGH SCHOOL
AT MARYSVILLE, WASHINGTON
FOR MARYSVILLE SCHOOL DISTRICT N° 25
SNOHOMISH COUNTY, WASHINGTON

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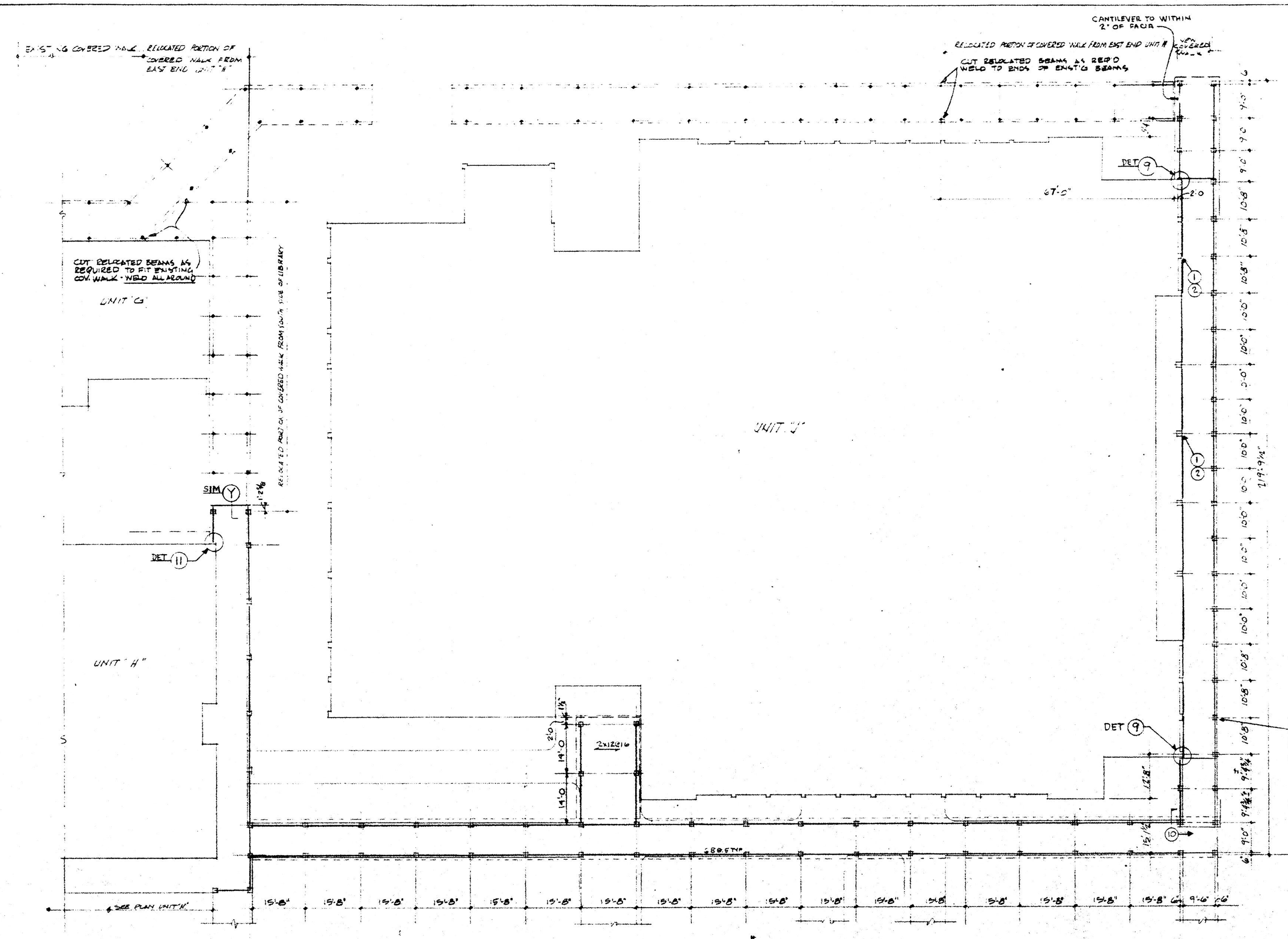
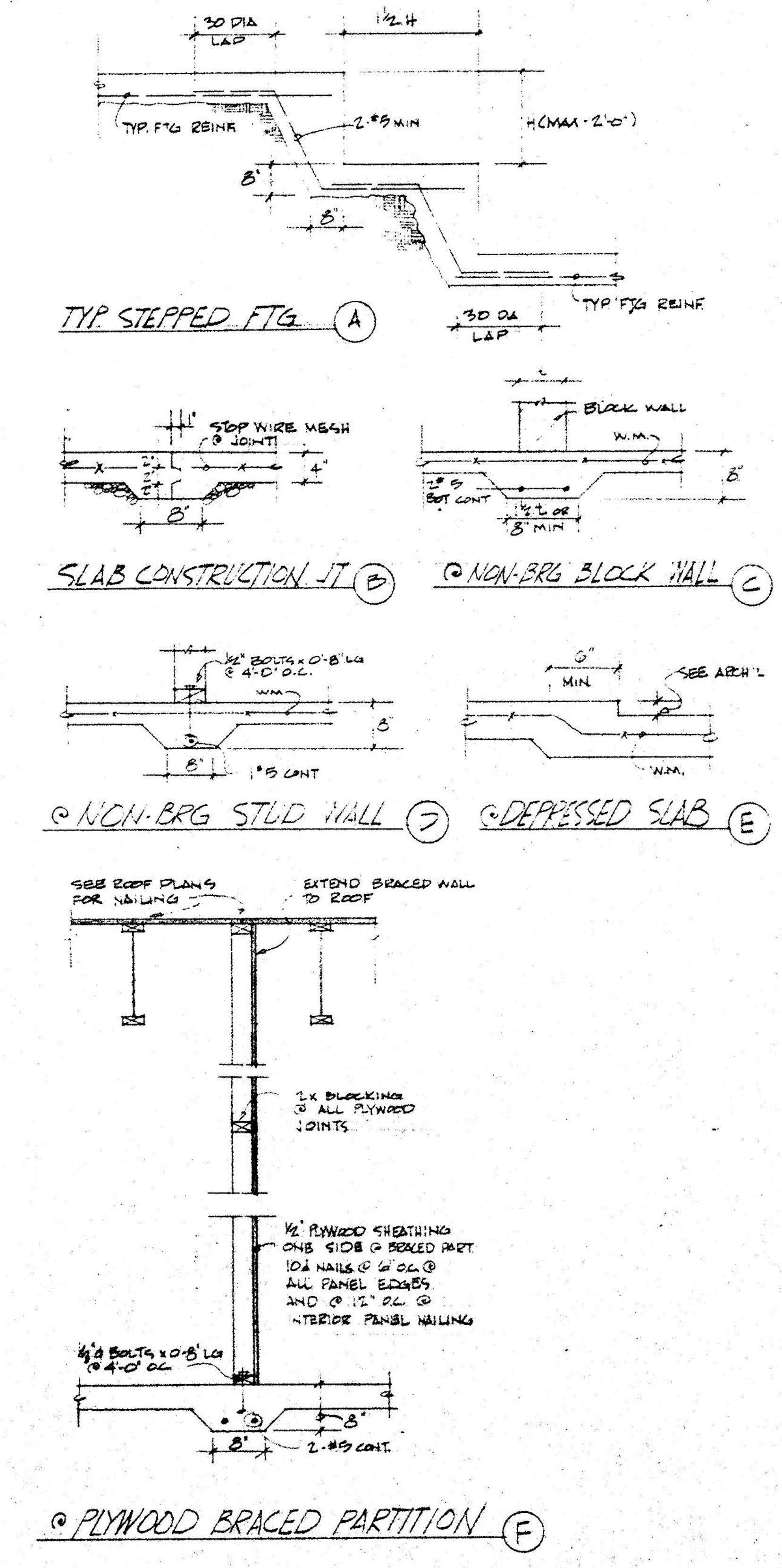


PLAN - COVERED WALKS SCALE 1/16"=1'-0"



GENERAL NOTES

THE FOLLOWING NOTES APPLY EXCEPT WHERE SHOWN OTHERWISE

CODE: UNIFORM BUILDING CODE, 1964

LIVE LOADS

ROOF	25		
CLASSROOMS	40	MECHANICAL SPACE & FAN ROOMS	100

FOUNDATIONS

MAXIMUM SOIL PRESSURE 4000.
EXTERIOR FOOTINGS AND EXTERIOR SPANDREL BEAMS 1'-6" MINIMUM BELOW FINISH GRADE. EXTEND TO FIRM UNDISTURBED BEARING.
BACKFILL TO BE THOROUGHLY COMPACTED PER SPECIFICATIONS.
PROVIDE 2 - #5 CONTINUOUS MINIMUM BOTTOM OF ALL WALLS AND FOOTINGS.

CONCRETE

CLASS OF CONCRETE	COMPRESSIVE STRENGTH 28 DAYS (PSI)	SLUMP (INCHES)	REMARKS
"A"	2500	4 - 5	5½ SACKS/CUBIC YARD MIN.
"B"			
"D"	2500	3 - 4	5½ SACKS/CUBIC YARD MIN.
"E"	2500	3 - 4	5½ SACKS/CUBIC YARD MIN. (3% TO 6% AIR ENTRAINMENT)
"F"	2500	DRY PACK	NON SHRINK ADMIXTURE

EACH CLASS OF CONCRETE SHALL BE USED AS FOLLOWS:

CLASS "A" - FOOTINGS AND FOUNDATION BELOW GROUND FLOOR.
CLASS "B" - STRUCTURAL CONCRETE ABOVE GROUND FLOOR.

CLASS "D" - SLABS ON GRADE AND PIPE TRENCH SLABS.
CLASS "E" - SIDEWALK SLABS, EXTERIOR STAIRS, ETC.
CLASS "F" - SETTING STEEL BEARING PLATES

WALLS

REINFORCE AS FOLLOWS:

THICKNESS	HORIZONTAL	VERTICAL
6" WALL & UNDER	#5 AT 18" O.C.	#5 AT 18" MIN.
7" WALL	#5 AT 15" O.C.	#5 AT 18"
8" WALL	#5 AT 12" O.C.	#5 AT 18"
10" WALL	#4 AT 12" E.F.	#4 AT 18" E.F.
12" WALL	#5 AT 18" E.F.	#5 AT 18" E.F.
14" WALL	#5 AT 15" E.F.	#5 AT 18" E.F.
ALL OTHER WALLS	0.3 OF 1%	0.2 OF 1%

AT OPENINGS PROVIDE 2 - #5 EXTRA BARS AT TOP, BOTTOM AND EACH SIDE EXTENDING 30 DIAMETER BEYOND CORNERS AND 2 - #5 X 4'-0" DIAGONALS AT EACH CORNER, EXCEPT 6" WALLS 1 - #5 DIAGONAL INSTEAD OF 2.
AT CORNERS AND INTERSECTIONS, EXTEND HORIZONTAL WALL STEEL TO 2" FROM OUTSIDE FACE AND LAP WITH ELBOW BARS (30 DIAMETER) OF SAME SIZE AND SPACING. LAP OUTSIDE FACE ONLY AT CORNERS.
WALL STUBS SHALL PROJECT 27 DIAMETERS AND SHALL BE A MINIMUM OF 1'-6" LONG. SAME SIZE AND SPACING AS VERTICAL STEEL.
WHERE WALLS WITHOUT VERTICAL REINFORCING ARE POURED SEPARATE FROM FOOTING PROVIDE #4 X 1'-6" STUBS AT 18" O.C.

MASONRY AND CONCRETE MASONRY

CONCRETE OR LIGHTWEIGHT BLOCKS LOAD BEARING GRADE A.S.T.M. SPECIFICATIONS C90-59
BLOCKS SHALL BE LAID UP IN CEMENT LIME MORTAR AS PER SPECIFICATIONS.
REINFORCE WALLS HORIZONTALLY WITH K-WEB OR EQUAL, EMBEDDED IN MORTAR EVERY COURSE (8" O.C.). LAP 12" MINIMUM AT SPLICES. AT CORNERS AND INTERSECTIONS CUT DIAGONAL WEB STEEL AND BEND WITH LONGITUDINAL BARS 12" AROUND CORNER. BLOCKS TO BE DOVETAILED TOGETHER.-
-SEE PLANS FOR BOND BEAM AND LINTEL DETAILS.

CAVITY WALLS: TIES IN ALTERNATE COURSES SHALL BE STAGGERED. MAXIMUM VERTICAL DISTANCE BETWEEN TIES - 1'-6". MAXIMUM HORIZONTAL DISTANCE - 3'-0".
MASONRY VENEER WALLS: TIES TO MASONRY VENEER TO BE NO. 8 B. & S. GAUGE HARD DRAWN WIRE MINIMUM. EACH TIE SHALL SUPPORT NOT MORE THAN 2 SQUARE FEET OF WALL AREA AND MAXIMUM SPACING EQUAL 2'-0" O.C. HORIZONTAL.

ADMIXTURES

CLASS "B", "C" AND "D" CONCRETE - PLASTIMENT, OR EQUAL, AS PER MANUFACTURER'S SPECIFICATIONS.
CLASS "A" AND "F" - NONE
CLASS "E" - 3% TO 6% AIR ENTRAINMENT TO BE PROVIDED BY AN AIR ENTRAINING ADMIXTURE.

REINFORCING STEEL DEFORMED, INTERMEDIATE GRADE fy = 40,000 PSI. A.S.T.M. A-15. EXCEPT COLUMNS. COLUMN VERTICALS TO BE A.S.T.M. A-432. fy = 60,000 PSI.
REINFORCING STEEL DETAILS SHALL BE PREPARED BY AN ENGINEER APPROVED BY THE ARCHITECT AND CONFORM TO STANDARD PRACTICE OUTLINED IN A.C.I. REPORT 315-51.
MARKED RE-BARS MUST BE IDENTIFIED BY A SYSTEM OF COLORED PAINT DENOTING NUMBERS (TAGS NOT ACCEPTED).

CONCRETE COVER OF REINFORCING:

3" CONCRETE POURED AGAINST EARTH
2" FORMED CONCRETE WITH EARTH BACKFILL
1½" BEAMS AND COLUMNS (STIRRUPS, TIES) WALLS EXPOSED TO WEATHER, SLABS ON MOISTURE BARRIER
1" WALLS, INSIDE FACE; 3/4" FORMED SLAB

LAP ALL REINFORCING 30 DIAMETERS AT SPLICES EXCEPT COLUMN VERTICALS, CLASS "B" AND "C" CONCRETE 30 DIAMETERS, CLASS "A" CONCRETE 40 DIAMETERS.
CHAMFER EXPOSED CORNERS OF COLUMNS AND BEAMS ½".

CONCRETE SLABS
NON STRUCTURAL SLABS POURED ON EARTH 4" THICK REINFORCING WITH 6x6 6/6 MESH. (IN FLAT SHEETS)

STRUCTURAL STEEL

STRUCTURAL GRADE A.S.T.M. A-36, fs = 22,000 PSI.
TUBE OR PIPE COLUMNS, A.S.T.M. A-53, GRADE B, YIELD STRESS 35,000 PSI.
ALL STEEL, EXCEPT STEEL EMBEDDED IN CONCRETE, SHALL BE GIVEN ONE COAT OF APPROVED PAINT BEFORE LEAVING SHOP.
WELDS 3/16" MINIMUM CONTINUOUS FILLET BY CERTIFIED WELDERS, HEAVY COATED ELECTRODES.
SHOP CONNECTIONS MAY BE WELDED OR RIVETED AND FIELD CONNECTIONS BOLTED AND EQUIVALENT TO SERIES "B" CONNECTIONS A.I.S.C. MANUAL STEEL CONSTRUCTION FOR NUMBER OF BOLTS.
FIELD BOLTS TO BE A-307 (MACH. BOLTS).
THE ERECTION OF ALL STRUCTURAL STEEL SHALL BE SECURED FROM COLLAPSING WITH TEMPORARY BRACING UNTIL PERMANENT STIFFENING IS INSTALLED.
WHERE "CINCH" ANCHORS ARE SPECIFIED, THE CONTRACTOR SHALL SUBMIT TO THE STRUCTURAL ENGINEER A SAMPLE OF THE "CINCH" ANCHOR TO BE USED WITH LABORATORY DATA OF PULL-OUT AND SHEAR STRENGTH.

TIMBER

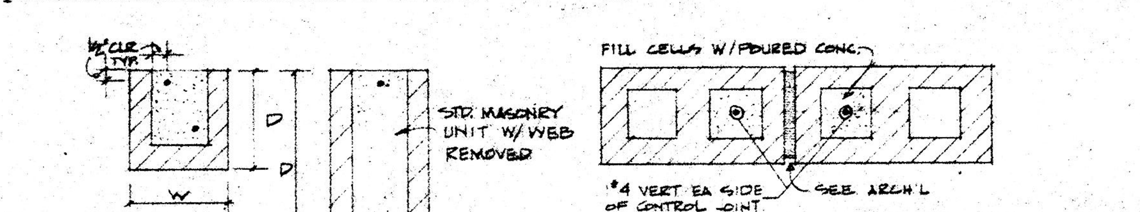
STRUCTURAL TIMBER AND LUMBER 1500 PSI STRESS GRADE DOUGLAS FIR (CONSTRUCTION OR INDUSTRIAL GRADE) PARAGRAPHS 122B, 123B, 124B, 125B AND 153B W.C.L.A. GRADING RULES #15.
1" ROOF AND WALL SHEATHING AND SUBFLOORS LAID DIAGONALLY.
PROVIDE DOUBLE JOISTS UNDER PARTITIONS THAT EXTEND AT LEAST HALF JOIST SPAN.
BOLT HEADS AND NUTS BEARING AGAINST WOOD TO BE PROVIDED WITH M.I. WASHERS EXCEPT ON SILL PLATES AND STEEL BEAM NAILERS USE CUT WASHERS.
NAILERS TO STEEL BEAMS SHALL BE ATTACHED WITH 5/8" BOLTS AT 3'-0" O.C. STAGGERED.
WOOD BEARING ON OR INSTALLED WITHIN 1" OF MASONRY OR CONCRETE TO BE TREATED WITH AN APPROVED PRESERVATIVE.
SOLID BLOCKING OF NOT LESS THAN 2" THICKNESS SHALL BE PROVIDED AT ENDS AND AT ALL SUPPORTS OF JOISTS AND RAFTERS. BETWEEN SUPPORTS PROVIDE BLOCKING OR APPROVED BRIDGING AT 8'-0" O.C. FOR JOISTS, 10'-0" O.C. FOR RAFTERS.

GLUE-LAM MEMBERS

GLUED LAMINATED BEAMS, DOUGLAS FIR DRIED TO A MOISTURE CONTENT 8 TO 12%. STRESS GRADE COMBINATION "1"
GLUE SHALL BE CASEIN, WATER RESISTANT TYPE AND SHALL COMPLY WITH FEDERAL SPECIFICATION MMM-A-125, AND SHALL CONTAIN A MOLD INHIBITOR. SEE ARCHITECT'S SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
THE FABRICATOR SHALL BE APPROVED BY THE ARCHITECT.

STEEL JOISTS

THE DESIGN, DETAILS AND FABRICATION PER ARCHITECT'S SPECIFICATIONS.
JOIST MANUFACTURER TO SUBMIT SHOP DRAWINGS TO THE ARCHITECT FOR APPROVAL.
BRIDGING TO BE LOCATED IN ALL JOIST SPANS IN ACCORDANCE WITH STEEL JOIST INSTITUTE SPACING UNLESS SHOWN OTHERWISE ON PLANS.
BEARING, ANCHORAGE AND STRUT BRIDGING DESIGN TO BE AS SPECIFIED IN S.J.I. SPECIFICATIONS.
SLOPED CHORD JOIST TO BE DESIGNED BY FABRICATOR IN ACCORDANCE WITH GENERAL SPECIFICATIONS.
PROVIDE CEILING EXTENSIONS WHERE REQUIRED. (SEE ARCHITECT'S PLANS).



VERTICAL CONTROL JOINT (MASONRY)

MIN. END BRG = 8"

SIZE	REINF.	MAX SPAN
4x8	1#5 T&B	4'-0"
6x8	1#5 T&B	6'-0"
8x8	1#6 T&B	8'-0"
6x16	1#6 T&B	10'-0"
8x16	1#8 T&B	12'-0"

LINTEL SCHEDULE

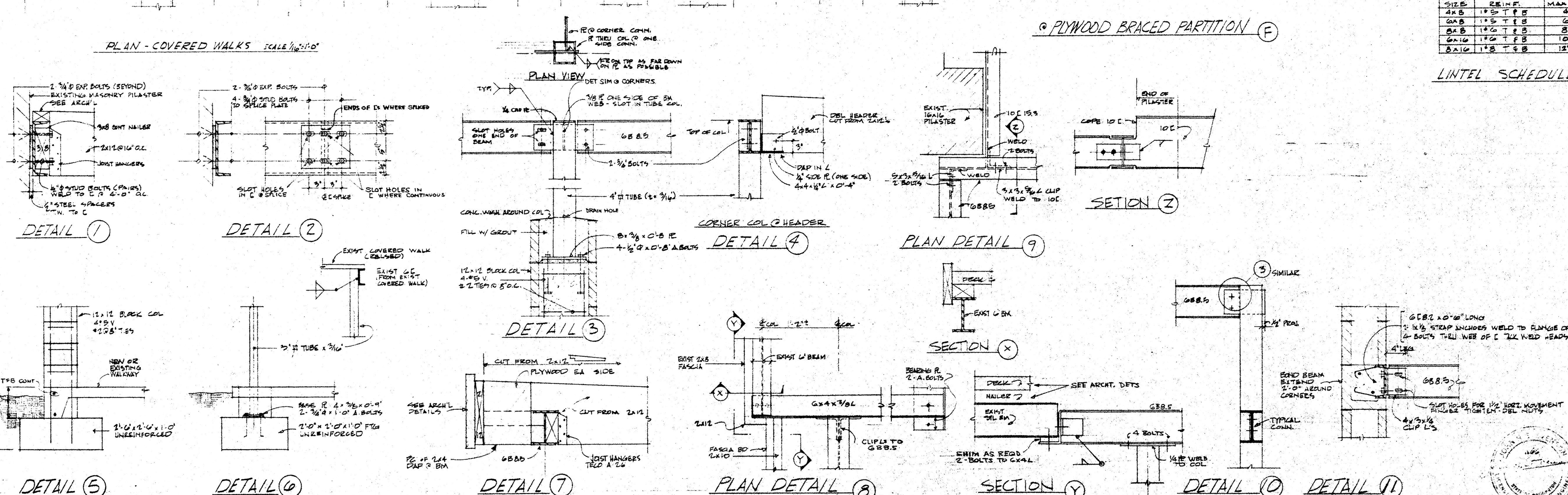
MASONRY REINF. SCHEDULE (UNLESS NOTED)

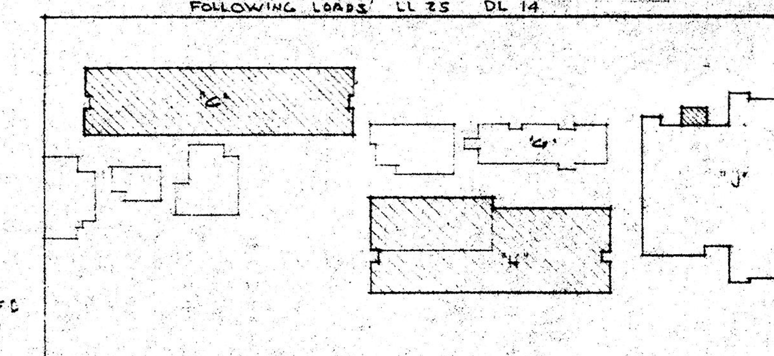
1. ALL 6" AND 8" MASONRY WALLS TO BE REINFORCED WITH #4 @ 48" oc VERTICALLY IN GROUT FILLED CELLS
2. UNREINFORCED WALLS TO HAVE HORIZ. REINF. PER GENERAL NOTES.
3. ALL MASONRY WALLS TO HAVE CONT. BOND BEAM @ TOP OF WALL, TWO COURSES HIGH, REINF. W/ 1 #4 T&B.
4. ALL CORNERS & JAMBS TO HAVE CONT. 1 #4 VERT IN CELLS FILLED W/ POURED CONC. GROUT FULL HEIGHT.
5. BOND BEAM & LINTELS TO BE FILLED W/ 2500 PSI CONC. MAX. AGGREGATE SIZE = ½"ϕ (CLASS A CONCR)

WOOD AND STEEL OPEN WEB ROOF JOISTS
JOISTS TO BE "TRUS-JOIST" OR APPROVED EQUAL.
CHORDS TO BE DOUGLAS FIR, COAST REGION.
WEBS TO BE COLD ROLLED STEEL TUBING.
JOISTS TO BE CAMBERED FOR D.L. ONLY
BRIDGING TO BE PROVIDED AND INSTALLED AS PER MANUFACTURES SPECS, AND SPACED AS FOLLOWS

SPAN →	10-22'	23-33'	34-44'
NO. ROWS	1	2	3

JOIST DESIGN TO BE SUBMITTED TO THE ARCHITECT FOR FOLLOWING LOADS LL 25 DL 14





GENERAL NOTES & TYPICAL DETAILS
COVERED WALKWAY PLAN & DETAILS

REGISTERED ARCHITECT
Joseph Henry DeHart
STATE OF WASHINGTON

MEMBER OF AMERICAN INSTITUTE OF ARCHITECTS

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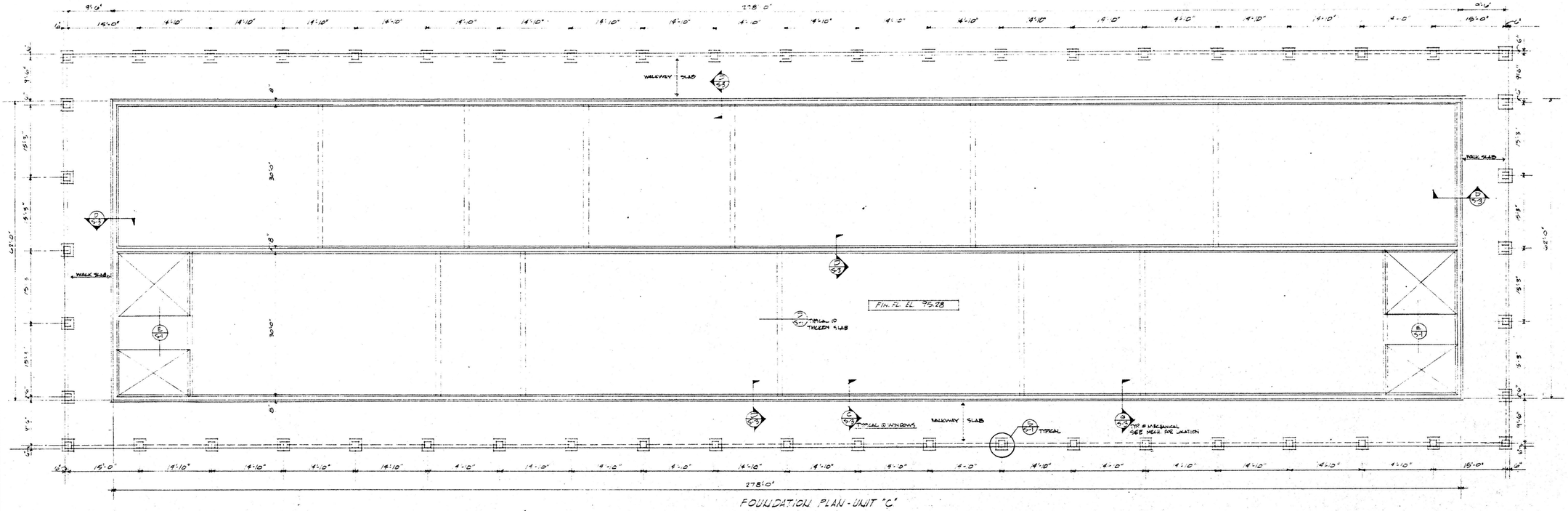
TRACED
CHECKED
REVISED 6-9-66
DATE 4-11-66

SHEET S 1 OF 5

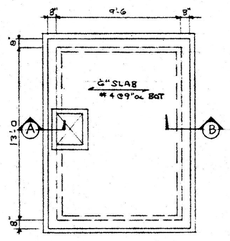
PLANS FOR ADDITIONS TO
MARYSVILLE SENIOR HIGH SCHOOL
AT MARYSVILLE, WASHINGTON
FOR MARYSVILLE SCHOOL DISTRICT Nº 25
SNOHOMISH COUNTY, WASHINGTON

MALLIS & DeHART ARCHITECTS
631 LYON BUILDING SEATTLE 4, WASHINGTON

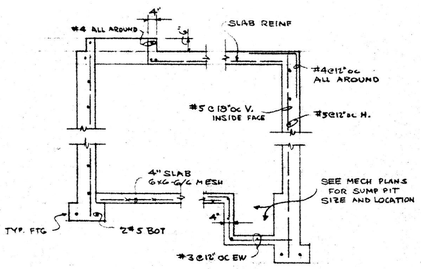


FOUNDATION PLAN - UNIT "C"
SCALE 1/8" = 1'-0"

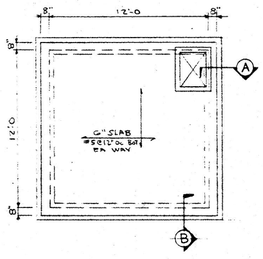
BOTTOM OF WALL FTGS. EL 93.25' TYPICAL



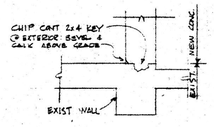
PUMP PIT - UNIT H
SEE MECH PLAN FOR LOCATION



SECTION (A) SECTION (B)



PUMP PIT - UNIT C



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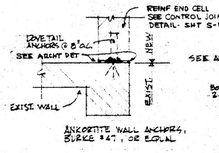

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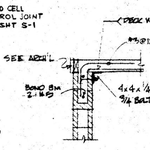

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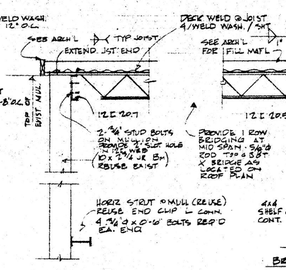

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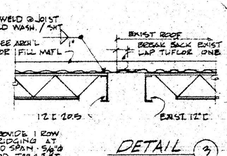

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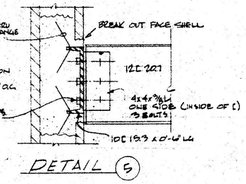

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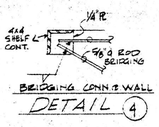

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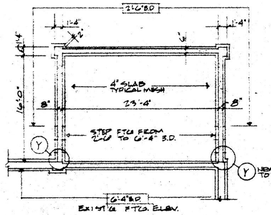
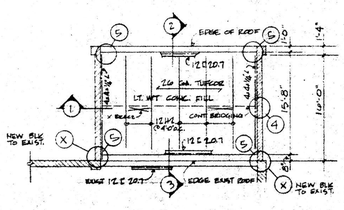
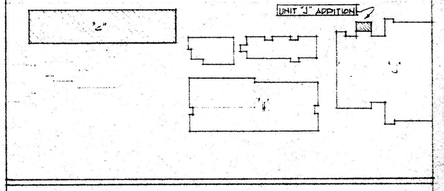


FOUDATION PLAN UNIT J



ROOF FRAMING PLAN UNIT J

UNIT "J" ADDITION



UNIT "C" FOUNDATION PLAN
UNIT "J" PLANS & DETAILS

REGISTERED ARCHITECT STATE OF WASHINGTON

DRAWN
TRACED
CHECKED
REVISED 6-9-66
DATE 4-11-66

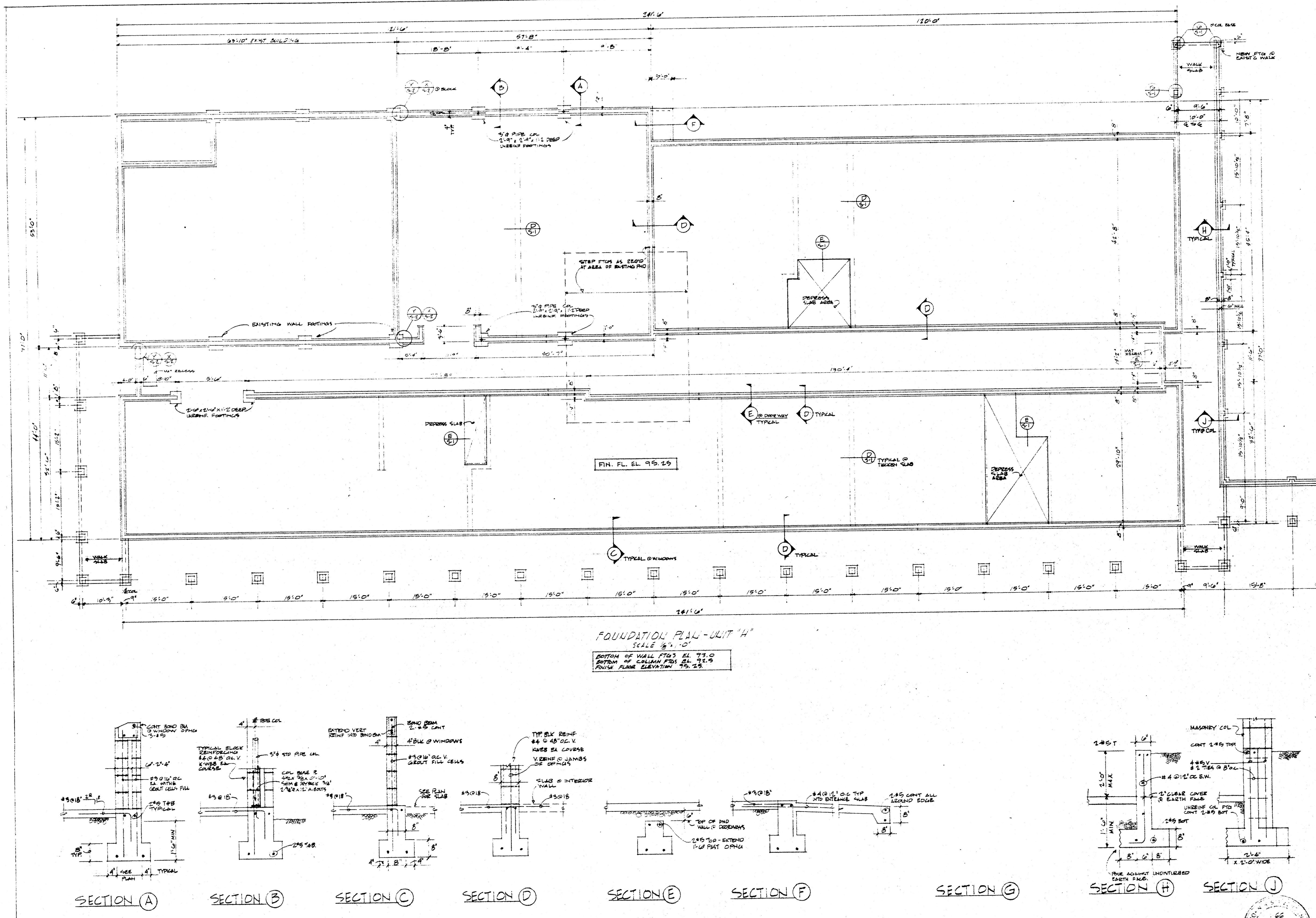
PLANS FOR ADDITIONS TO
MARYSVILLE SENIOR HIGH SCHOOL
AT MARYSVILLE, WASHINGTON
FOR MARYSVILLE SCHOOL DISTRICT № 25
SNOHOMISH COUNTY, WASHINGTON

SHEET S 2 OF 5

MEMBER OF AMERICAN INSTITUTE OF ARCHITECTS

MALLIS & DeHART ARCHITECTS
532 LYON BUILDING SEATTLE 4, WASHINGTON

JOHN A. MALLIS LICENSED ARCHITECT STATE OF WASHINGTON



UNIT "H" FOUNDATION PLAN & DETAILS

PLANS FOR ADDITIONS TO
MARYSVILLE SENIOR HIGH SCHOOL
AT MARYSVILLE, WASHINGTON
FOR MARYSVILLE SCHOOL DISTRICT No 25
SNOHOMISH COUNTY, WASHINGTON

REGISTERED ARCHITECT
Joseph Henry DeHart
STATE OF WASHINGTON

DRAWN
TRACED
CHECKED
REVISED 6-9-66
DATE 4-11-66

SHEET S.3 OF 5

MALLIS & DeHART ARCHITECTS
931 LYON BUILDING SEATTLE 4, WASHINGTON
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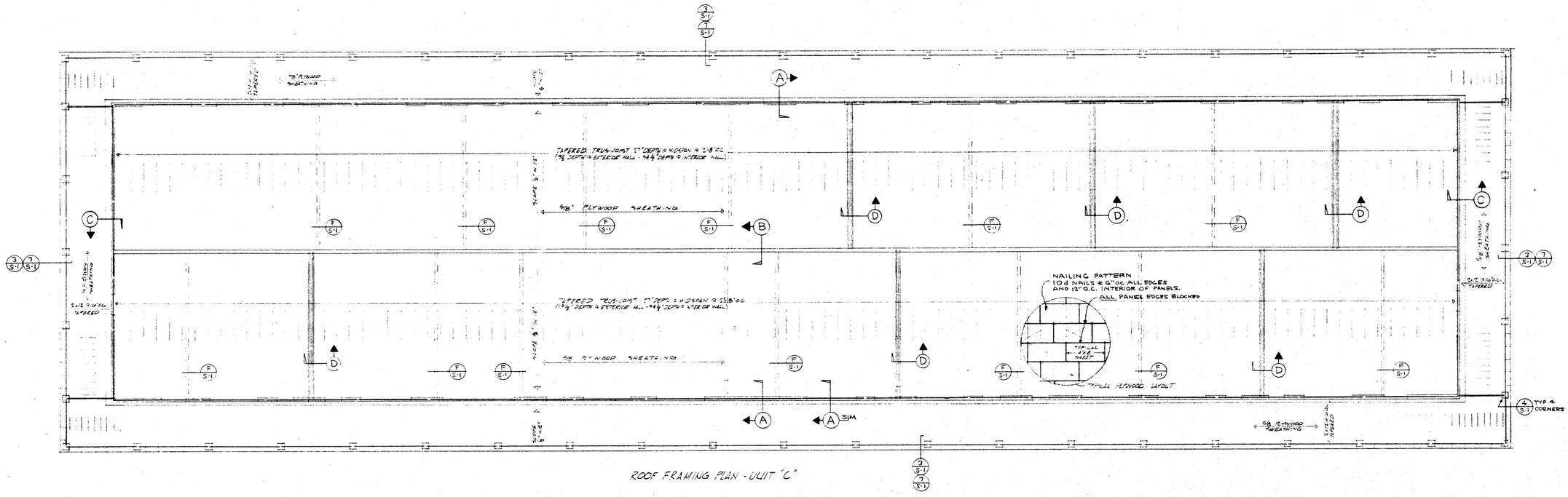
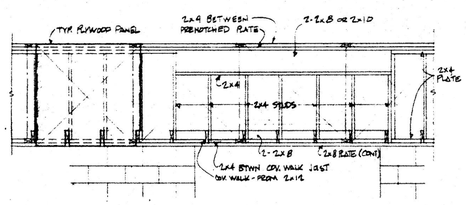
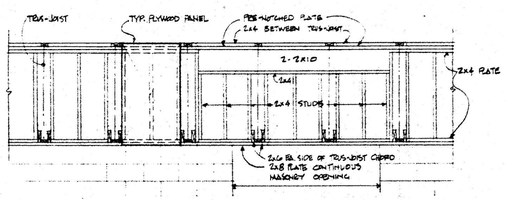
MARYSVILLE SENIOR HIGH SCHOOL - UNIT - FOUN





ELEVATION 1-1 (UNIT "H")

@ SECTIONS (A S-5) & (B S-5)



ELEVATION 2-2 (UNIT "H")

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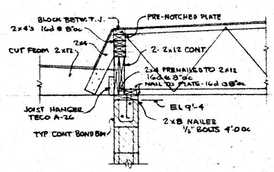

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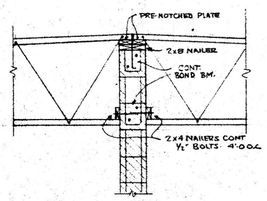

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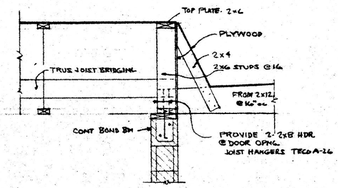

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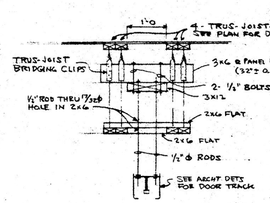
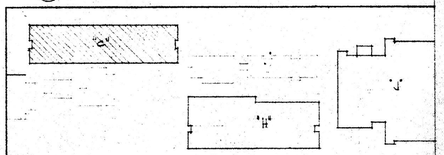


SECTION (D)

@ FOLDING PARTITIONS



UNIT "C" ROOF FRAMING PLAN & DETAILS

REGISTERED ARCHITECT
Joseph Henry DeHart
STATE OF WASHINGTON

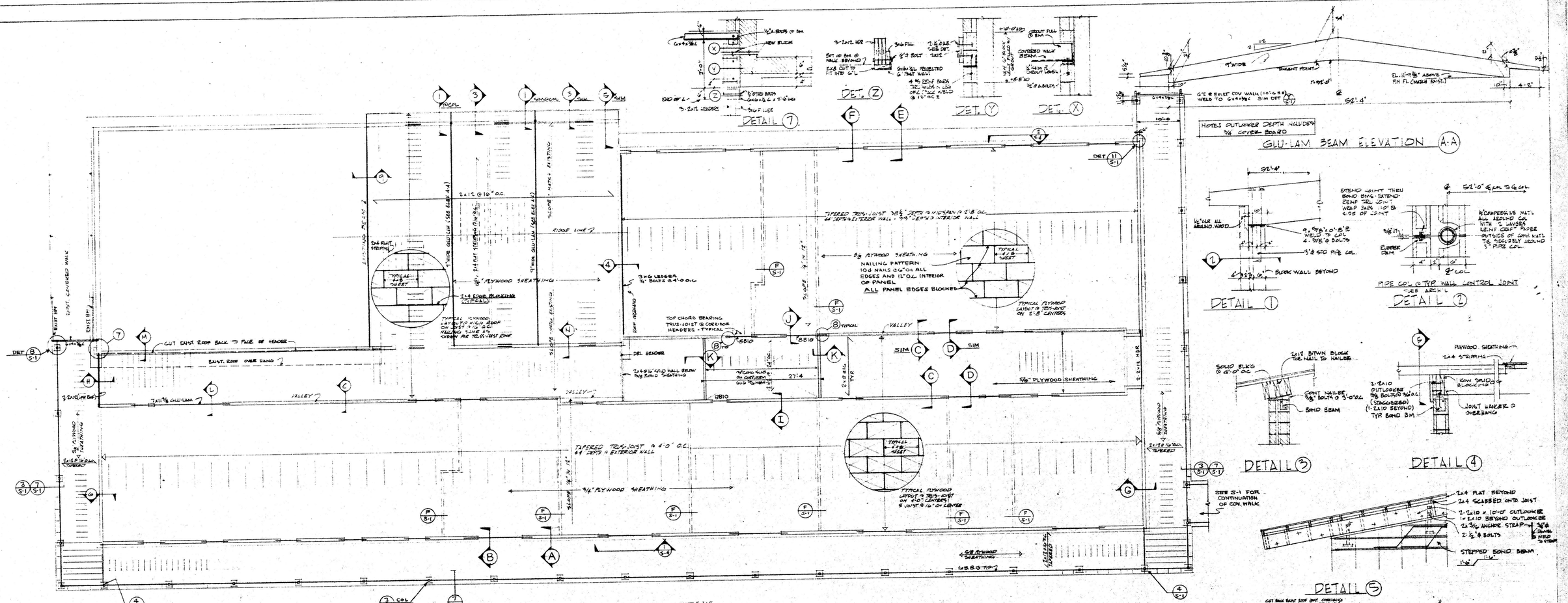
MEMBER OF AMERICAN INSTITUTE OF ARCHITECTS

PLANS FOR ADDITIONS TO
MARYSVILLE SENIOR HIGH SCHOOL
AT MARYSVILLE, WASHINGTON
FOR MARYSVILLE SCHOOL DISTRICT NO 25
SNOHOMISH COUNTY, WASHINGTON

DATE
ISSUED
REVISED 9-1-66
DATE 4-11-66

SHEET 6 OF 5

WALLIS & DEHART ARCHITECTS
411 TYSON BUILDING
EVERETT 1, WASHINGTON



UNIT "H" ROOF FRAMING PLAN & DETAILS

PLANS FOR ADDITIONS TO
MARYSVILLE SENIOR HIGH SCHOOL
AT MARYSVILLE, WASHINGTON
FOR MARYSVILLE SCHOOL DISTRICT NO. 25
SNOHOMISH COUNTY, WASHINGTON

REGISTERED ARCHITECT
WILSON HENRY DEHART
STATE OF WASHINGTON

DRAWN
TRACED
CHECKED
REVISED 6-9-66
DATE 4-11-66

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SHEET S-5 OF 9

MALLIS & DEHART ARCHITECTS
531 LYON BUILDING SEATTLE 4, WASHINGTON

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Appendix F: FEMA E-74 Nonstructural Seismic Bracing Excerpts

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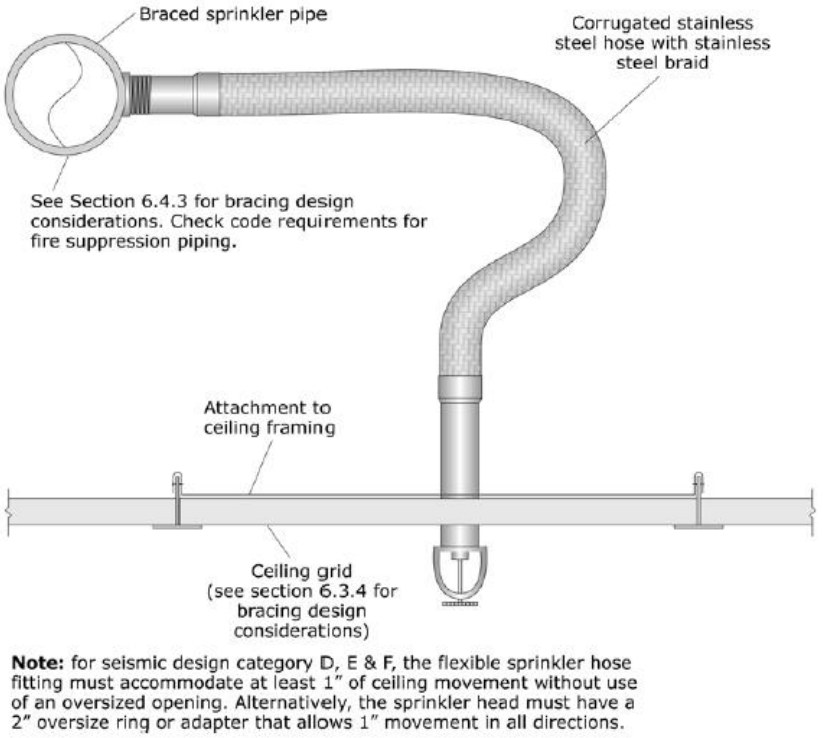


Figure G-1. Flexible Sprinkler Drop.

(FEMA E-74, 2012, Reducing the Risks of Nonstructural Earthquake Damage)

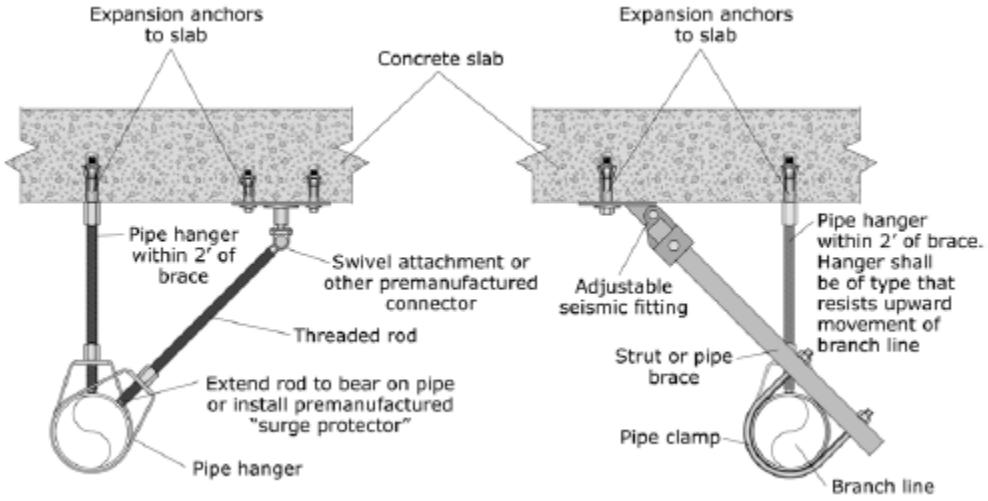


Figure G-2. End of Line Restraint.

(FEMA E-74, 2012, Reducing the Risks of Nonstructural Earthquake Damage)

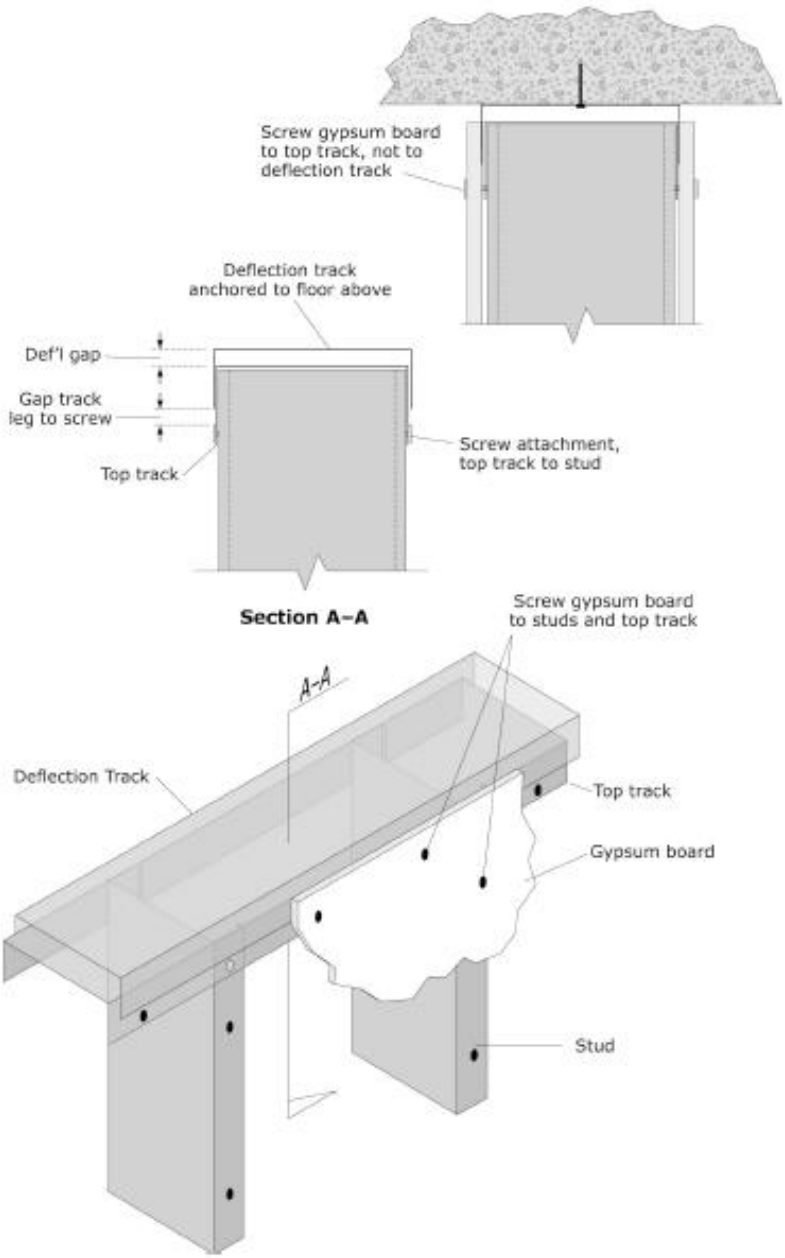


Figure G-3. Mitigation Schemes for Bracing the Tops of Metal Stud Partitions Walls.
(FEMA E-74, 2012, Reducing the Risks of Nonstructural Earthquake Damage)

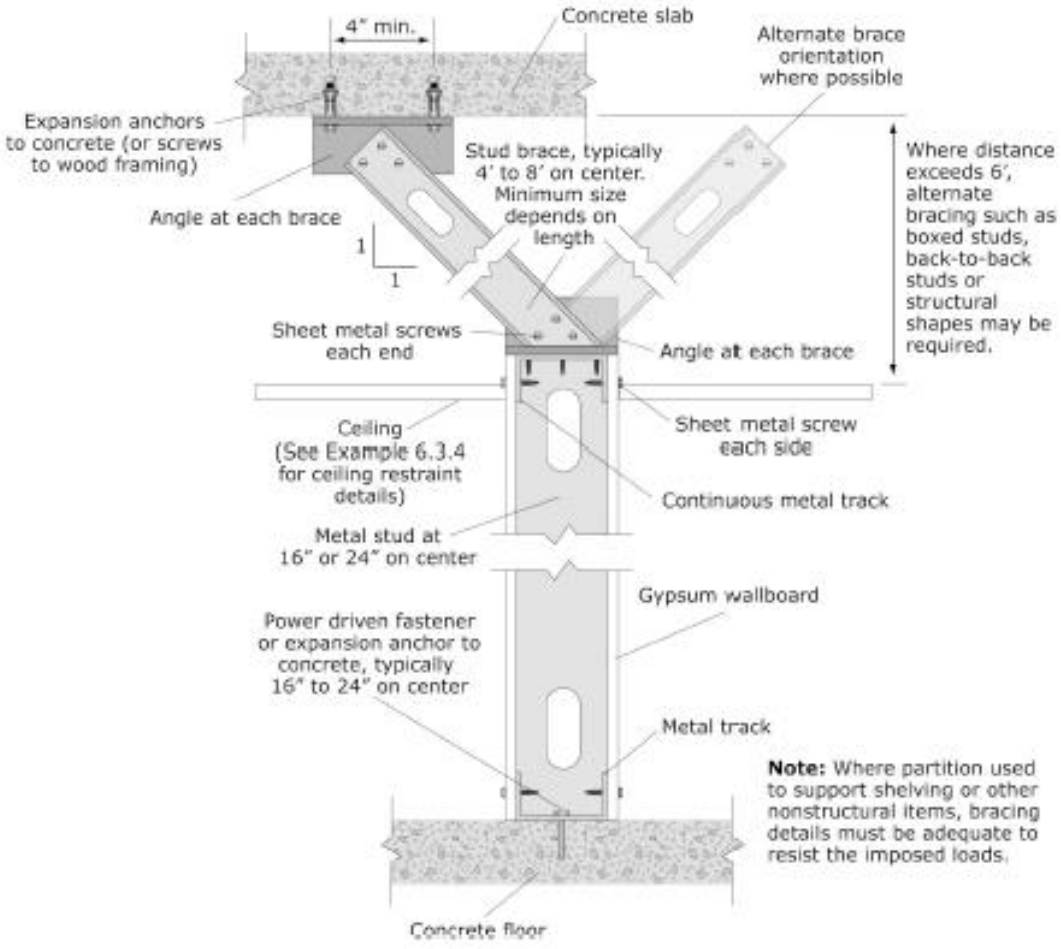
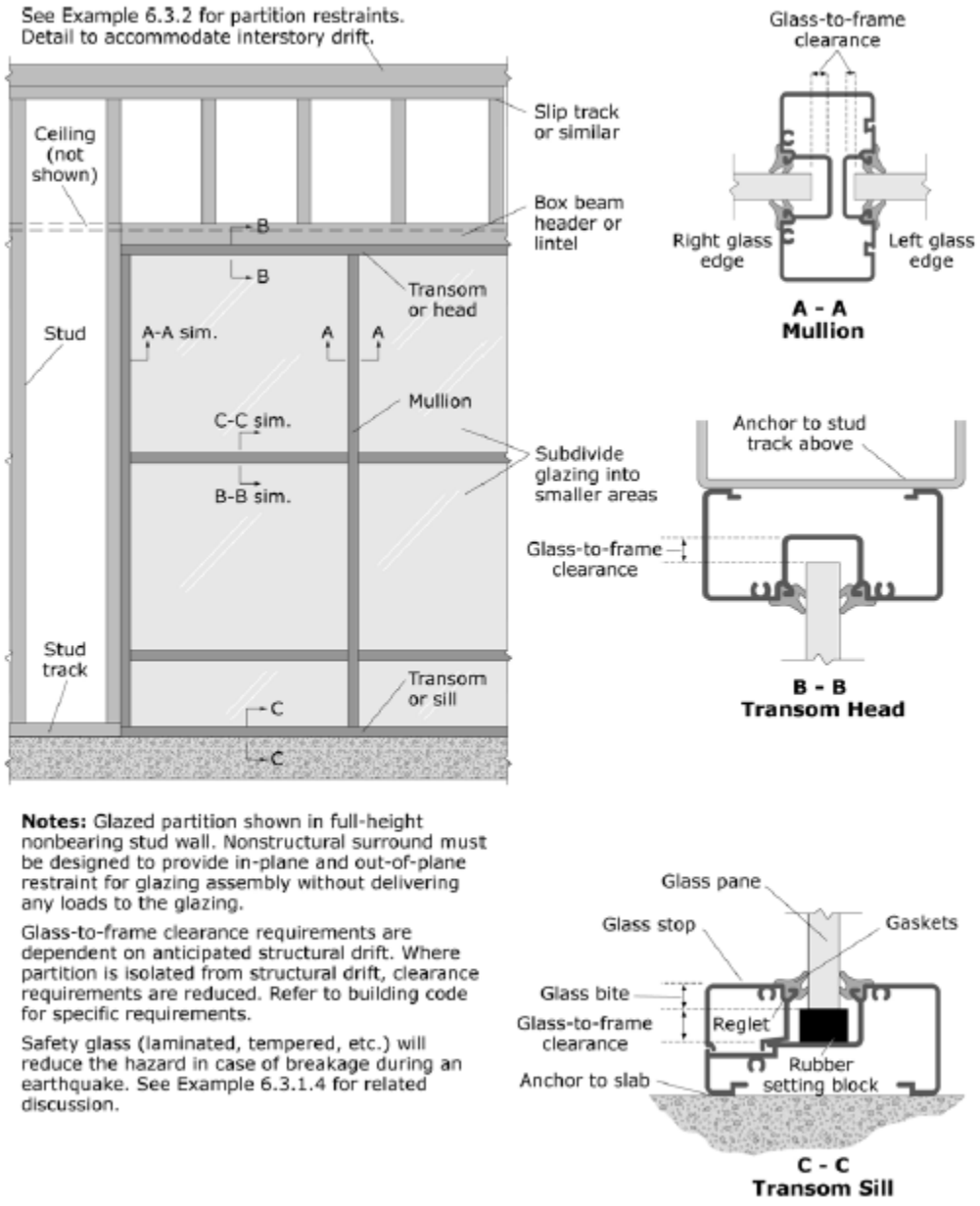


Figure G-4. Mitigation Schemes for Bracing the Tops of Metal Stud Partitions Walls.

(FEMA E-74, 2012, Reducing the Risks of Nonstructural Earthquake Damage)



Notes: Glazed partition shown in full-height nonbearing stud wall. Nonstructural surround must be designed to provide in-plane and out-of-plane restraint for glazing assembly without delivering any loads to the glazing.

Glass-to-frame clearance requirements are dependent on anticipated structural drift. Where partition is isolated from structural drift, clearance requirements are reduced. Refer to building code for specific requirements.

Safety glass (laminated, tempered, etc.) will reduce the hazard in case of breakage during an earthquake. See Example 6.3.1.4 for related discussion.

Figure G-5. Full-height Glazed Partition.

(FEMA E-74, 2012, Reducing the Risks of Nonstructural Earthquake Damage)

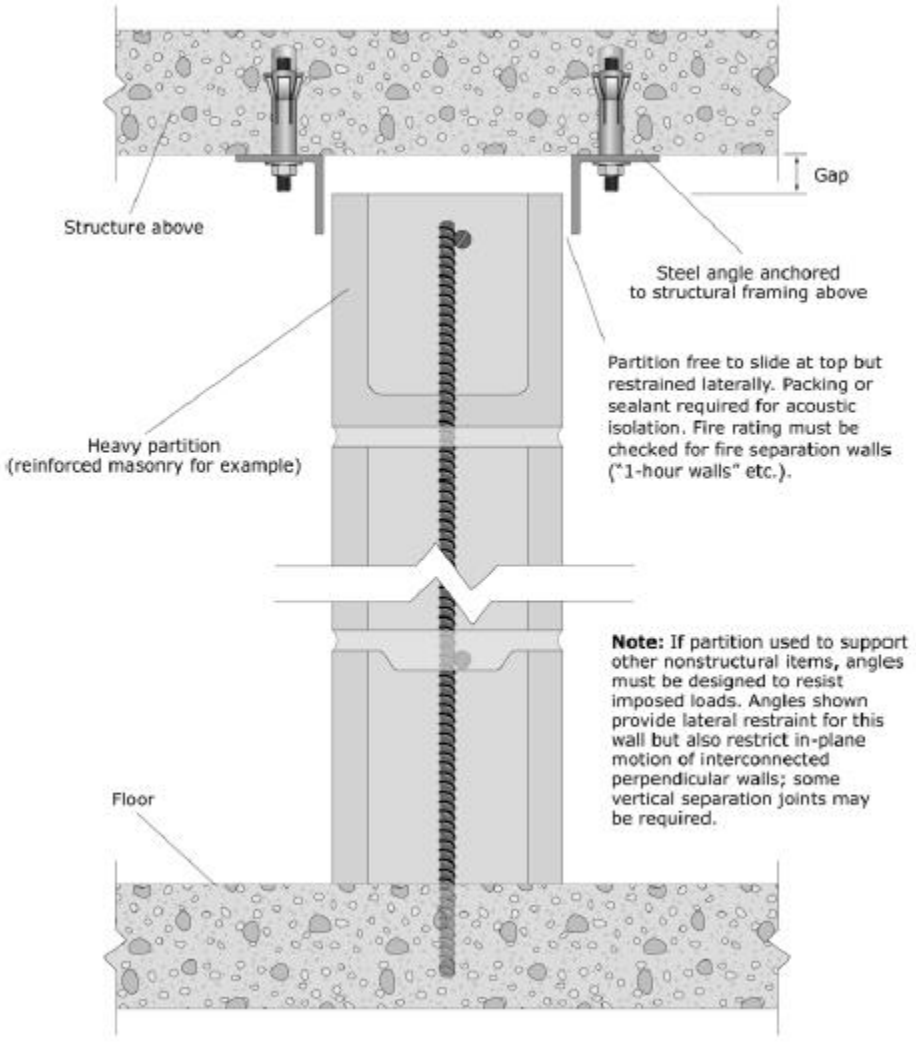


Figure G-6. Full-height Heavy Partition.

(FEMA E-74, 2012, Reducing the Risks of Nonstructural Earthquake Damage)

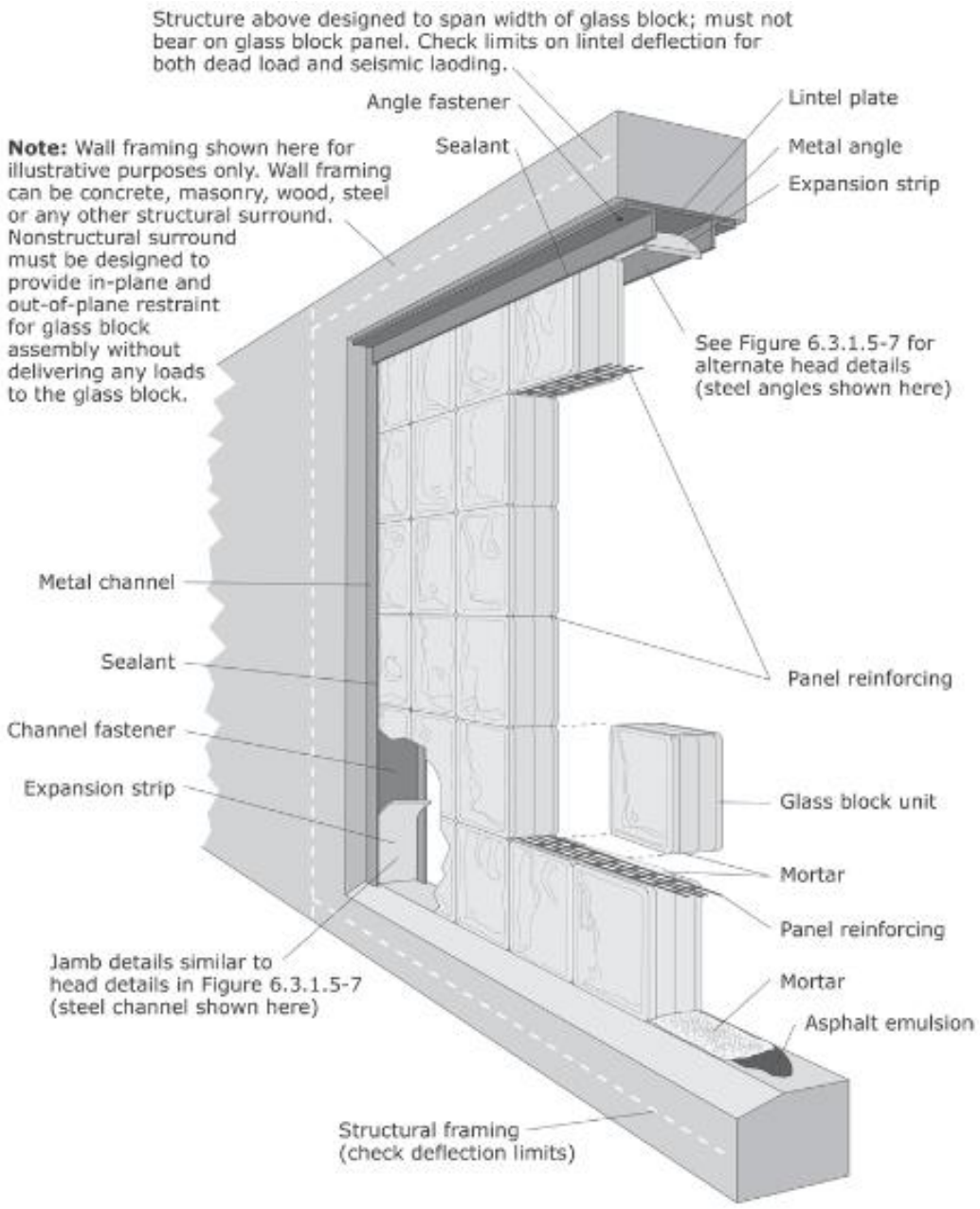


Figure G-7. Typical Glass Block Panel Details.

(FEMA E-74, 2012, Reducing the Risks of Nonstructural Earthquake Damage)

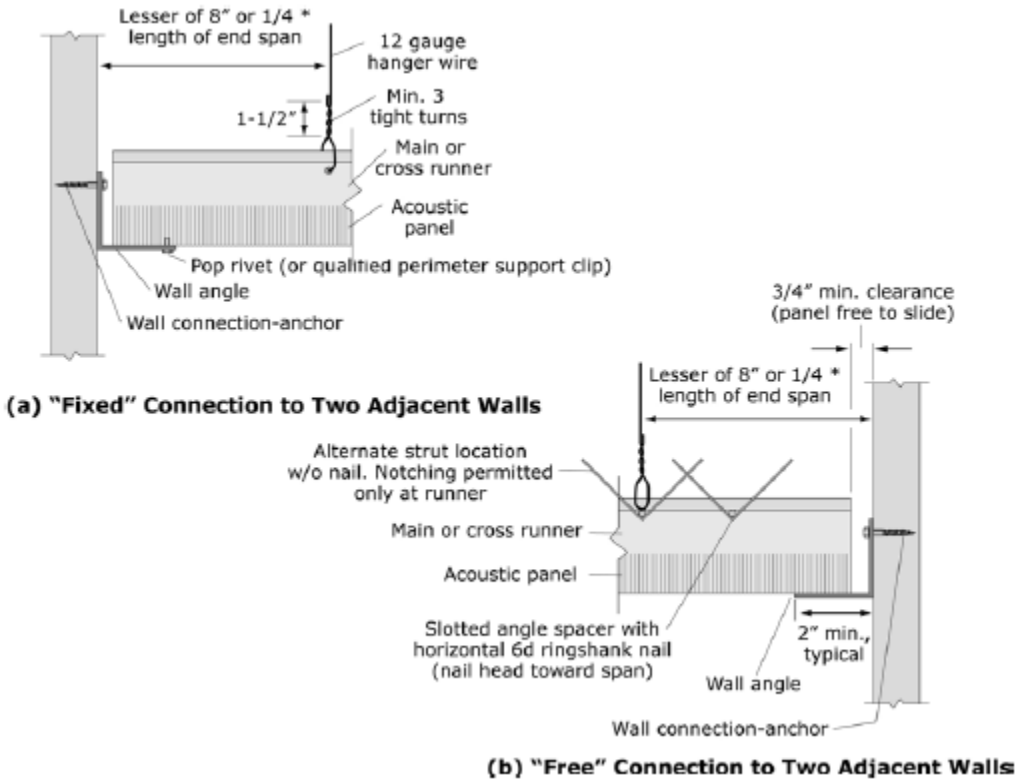
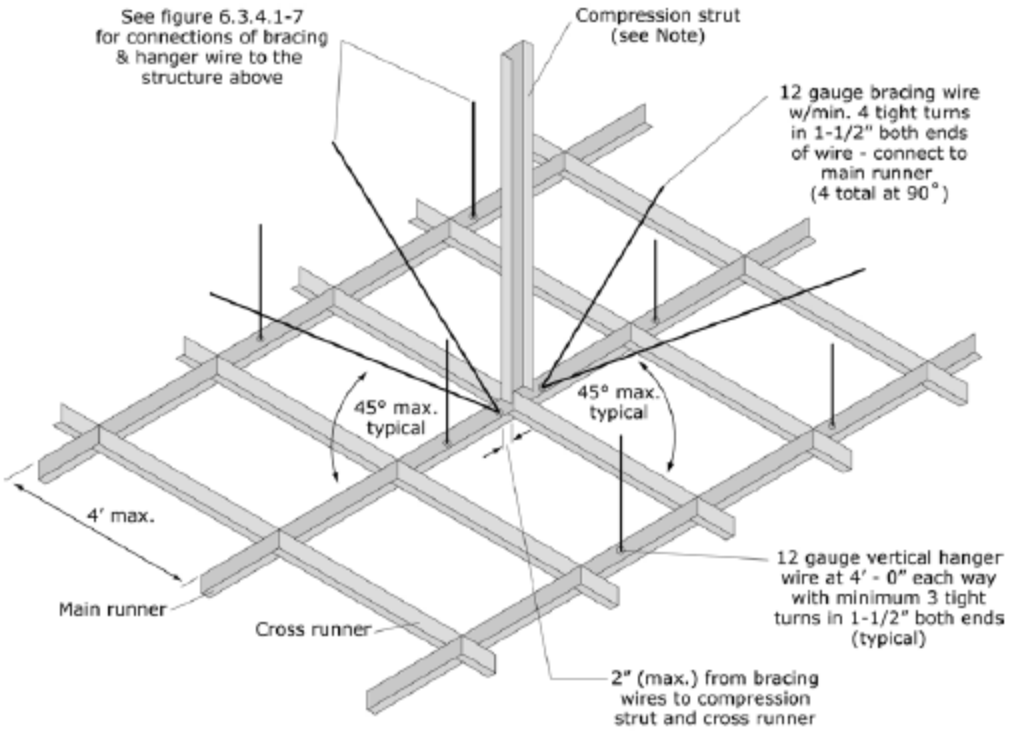


Figure G-8. Suspension System for Acoustic Lay-in Panel Ceilings – Edge Conditions.
(FEMA E-74, 2012, Reducing the Risks of Nonstructural Earthquake Damage)



Note: Compression strut shall not replace hanger wire. Compression strut consists of a steel section attached to main runner with 2 - #12 sheet metal screws and to structure with 2 - #12 screws to wood or 1/4" min. expansion anchor to structure. Size of strut is dependent on distance between ceiling and structure (l/r ≤ 200). A 1" diameter conduit can be used for up to 6', a 1-5/8" X 1-1/4" metal stud can be used for up to 10'

Per DSA IR 25-5, ceiling areas less than 144 sq. ft, or fire rated ceilings less than 96 sq. ft., surrounded by walls braced to the structure above do not require lateral bracing assemblies when they are attached to two adjacent walls. (ASTM E580 does not require lateral bracing assemblies for ceilings less than 1000 sq. ft.; see text.)

Figure G-9. Suspension System for Acoustic Lay-in Panel Ceilings – General Bracing Assembly.
(FEMA E-74, 2012, Reducing the Risks of Nonstructural Earthquake Damage)

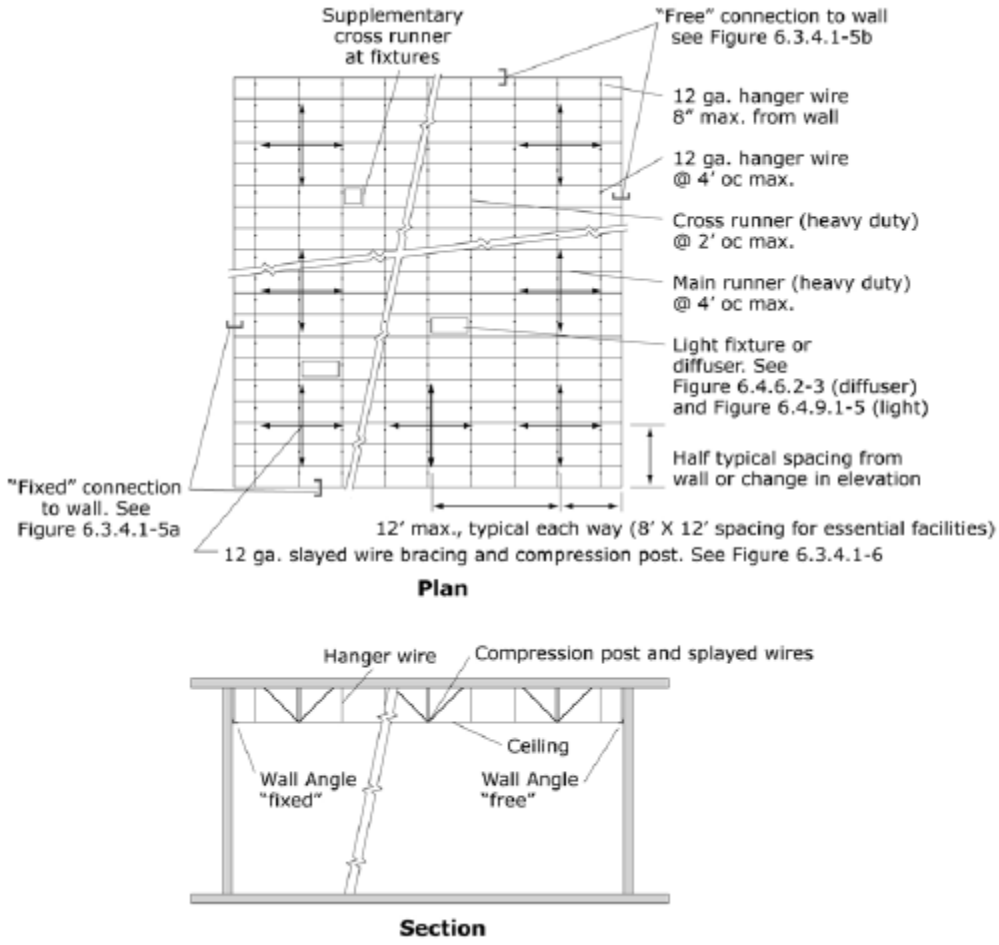


Figure G-10. Suspension System for Acoustic Lay-in Panel Ceilings – General Bracing Layout.

(FEMA E-74, 2012, Reducing the Risks of Nonstructural Earthquake Damage)

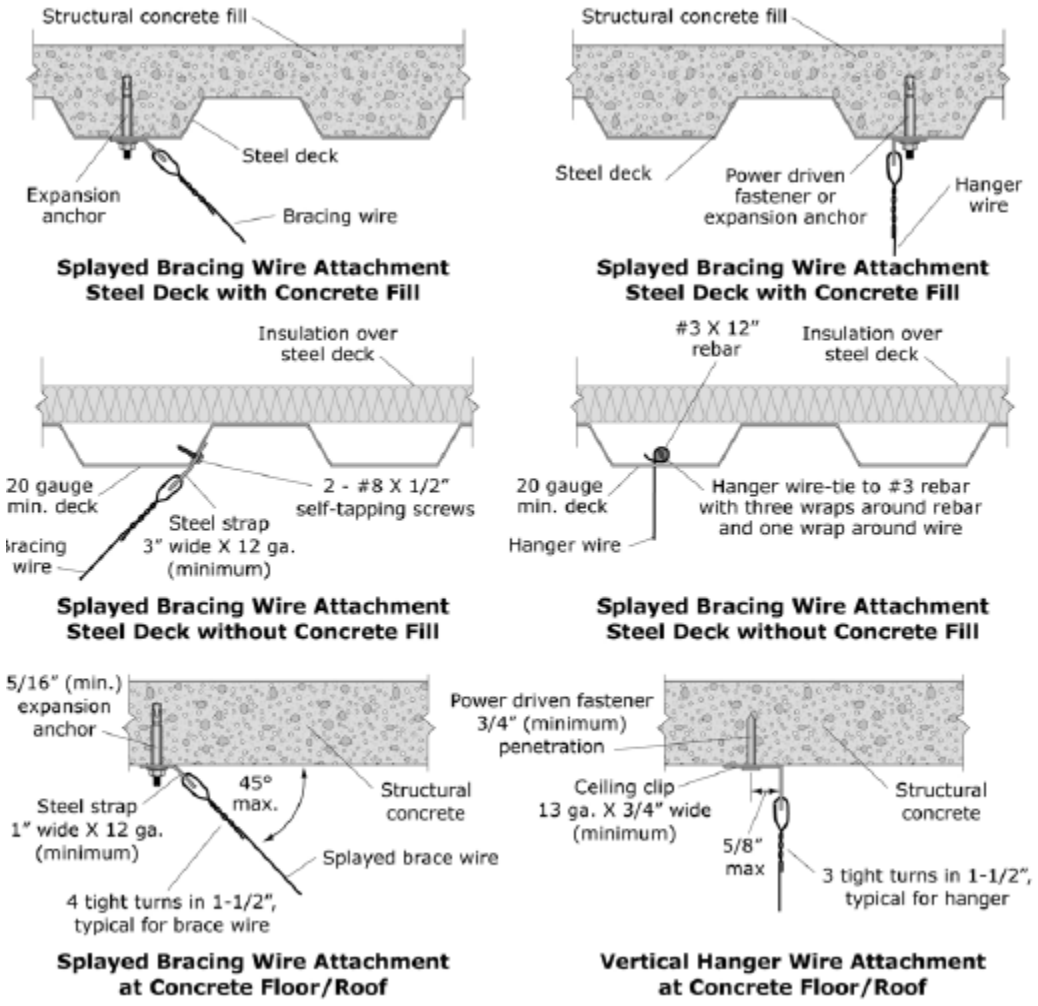
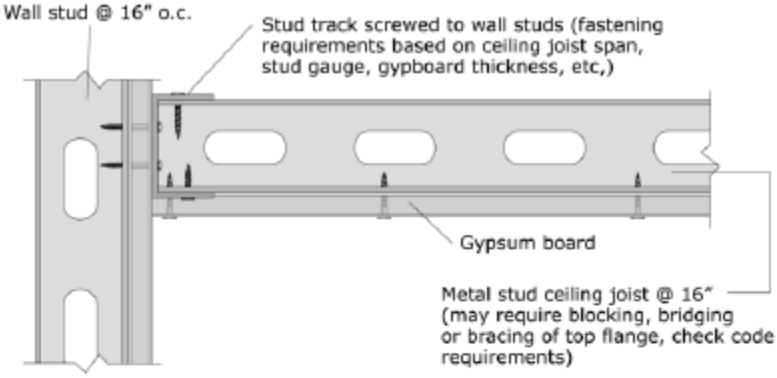
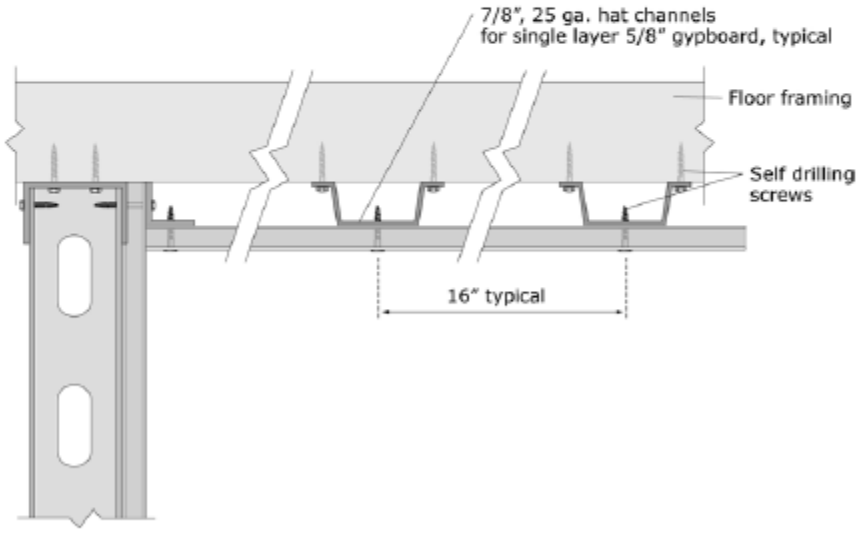


Figure G-11. Suspension System for Acoustic Lay-in Panel Ceilings – Overhead Attachment Details.

(FEMA E-74, 2012, Reducing the Risks of Nonstructural Earthquake Damage)



a) Gypsum board attached directly to ceiling joists



b) Gypsum board attached directly to furring strips (hat channel or similar)

Note: Commonly used details shown; no special seismic details are required as long as furring and gypboard secured. Check for certified assemblies (UL listed, FM approved, etc.) if fire or sound rating required.

Figure G-12. Gypsum Board Ceiling Applied Directly to Structure.

(FEMA E-74, 2012, Reducing the Risks of Nonstructural Earthquake Damage)

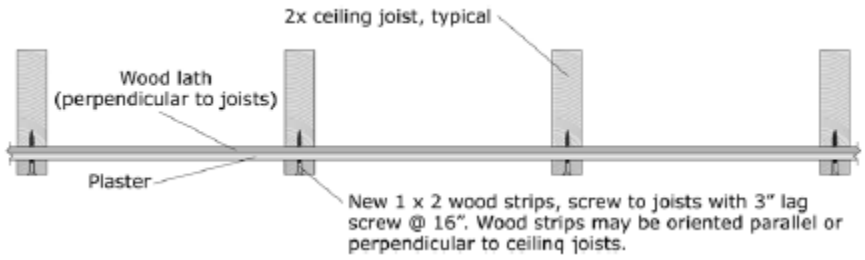


Figure G-13. Retrofit Detail for Existing Lath and Plaster.

(FEMA E-74, 2012, Reducing the Risks of Nonstructural Earthquake Damage)

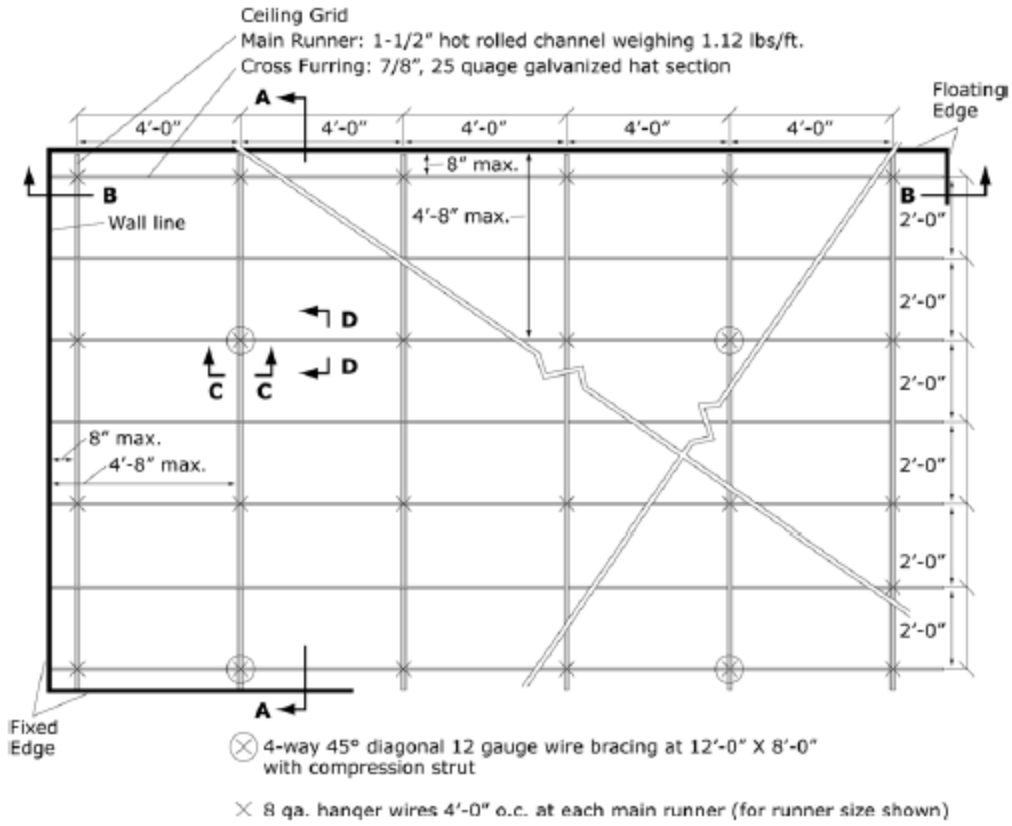


Figure G-14. Diagrammatic View of Suspended Heavy Ceiling Grid and Lateral Bracing.

(FEMA E-74, 2012, Reducing the Risks of Nonstructural Earthquake Damage)

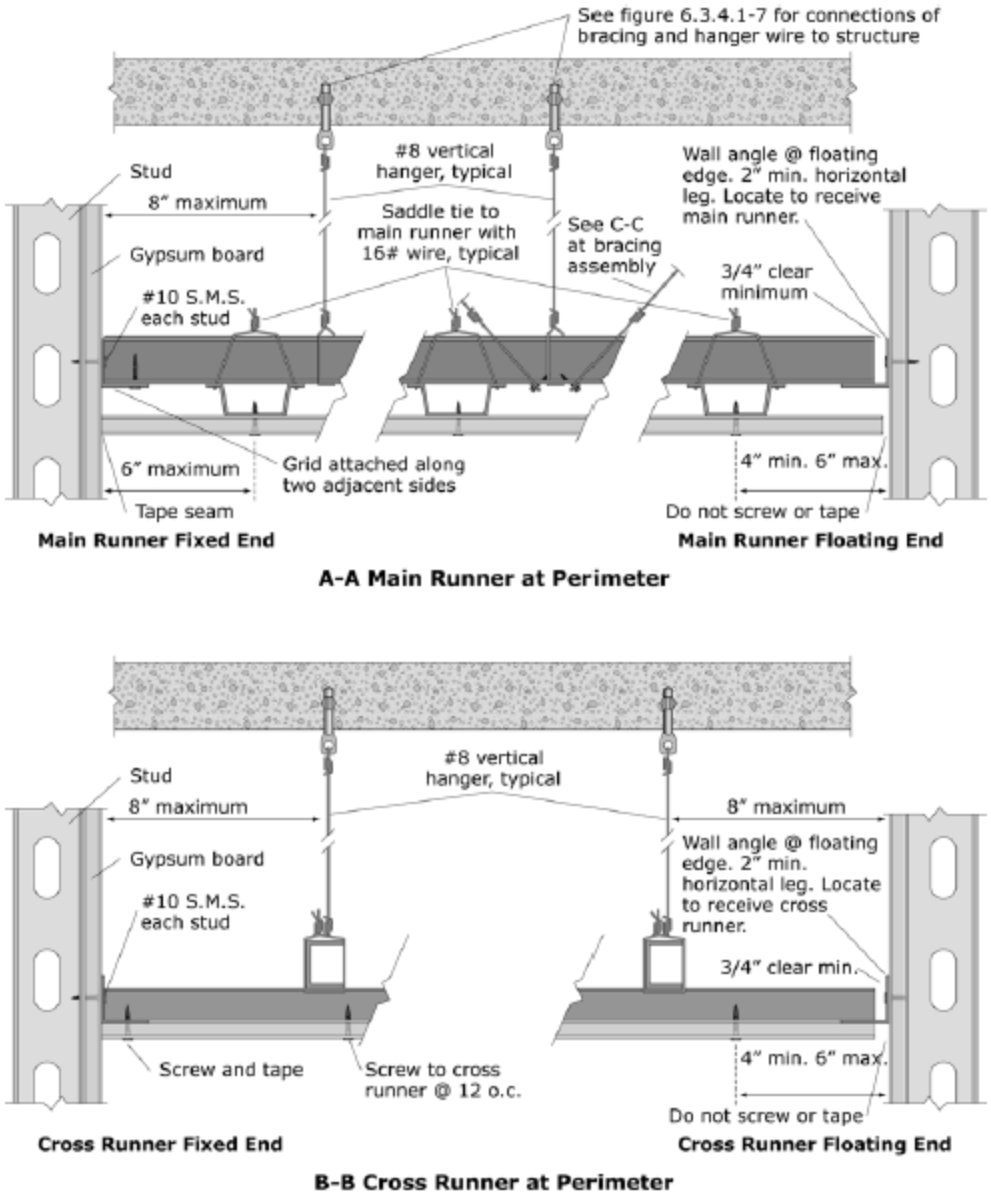
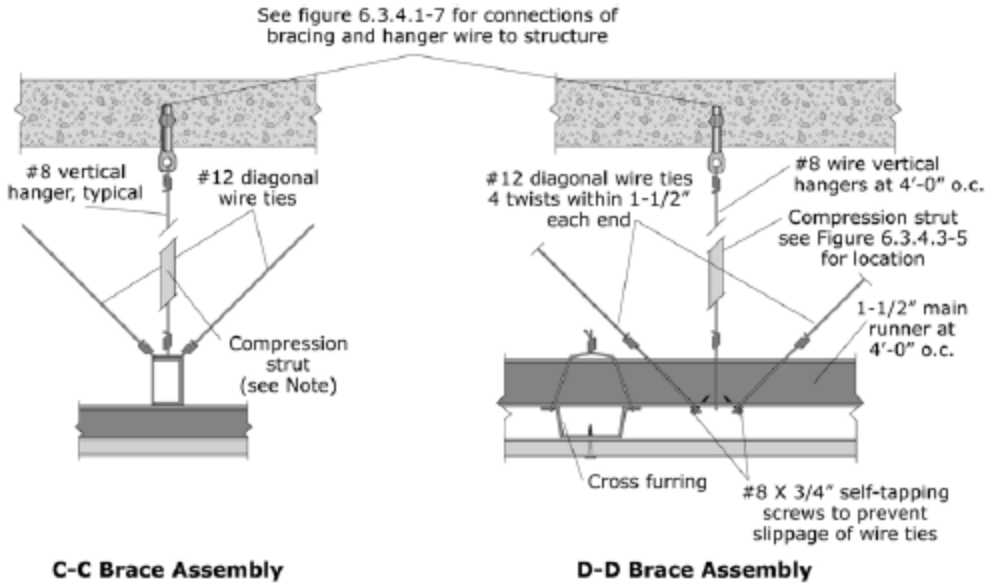


Figure G-15. Perimeter Details for Suspended Gypsum Board Ceiling.

(FEMA E-74, 2012, Reducing the Risks of Nonstructural Earthquake Damage)



Note: Compression strut shall not replace hanger wire. Compresion strut consists of a steel section attached to main runner with 2 - #12 sheet metal screws and to structure with 2 - #12 screws to wood or 1/4" min. expansion anchor to concrete. Size of strut is dependent on distance between ceiling and structure ($l/r \leq 200$). A 1" diameter conduit can be used for up to 6', a 1-5/8" X 1-1/4" metal stud can be used for up to 10'. See figure 6.3.4.1-6 for example of bracing assembly.

Figure G-16. Details for Lateral Bracing Assembly for Suspended Gypsum Board Ceiling.

(FEMA E-74, 2012, Reducing the Risks of Nonstructural Earthquake Damage)

Light Fixtures

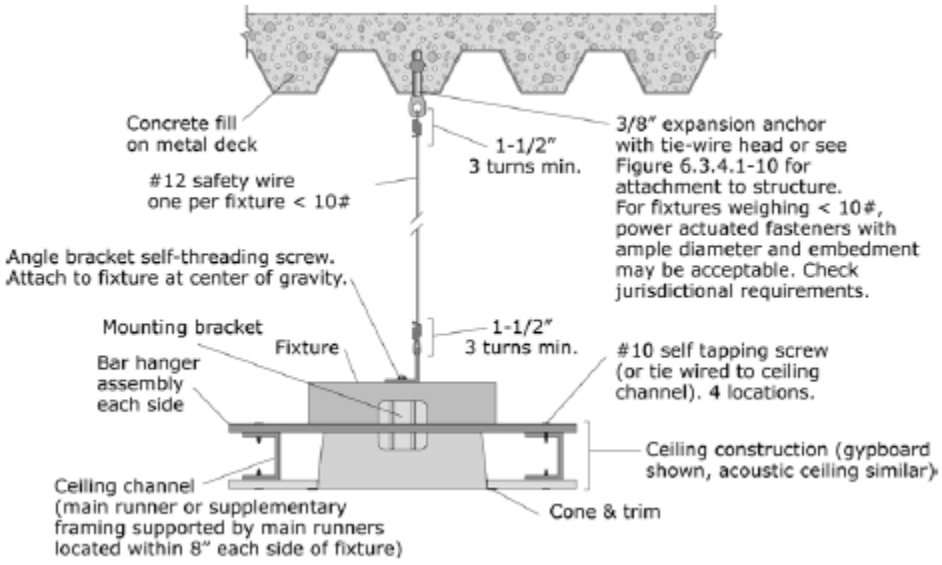


Figure G-17. Recessed Light Fixture in suspended Ceiling (Fixture Weight < 10 pounds).

(FEMA E-74, 2012, Reducing the Risks of Nonstructural Earthquake Damage)

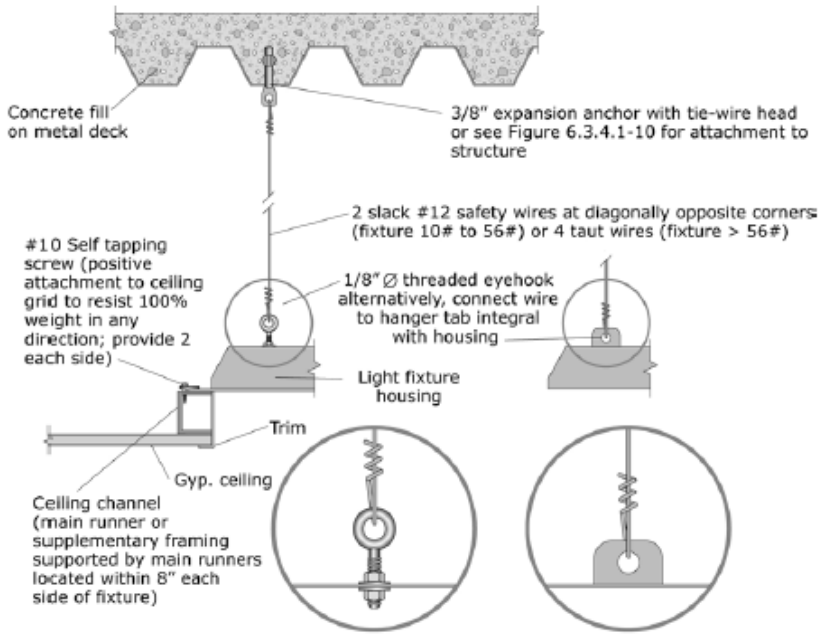


Figure G-18. Recessed Light Fixture in suspended Ceiling (Fixture Weight 10 to 56 pounds).

(FEMA E-74, 2012, Reducing the Risks of Nonstructural Earthquake Damage)

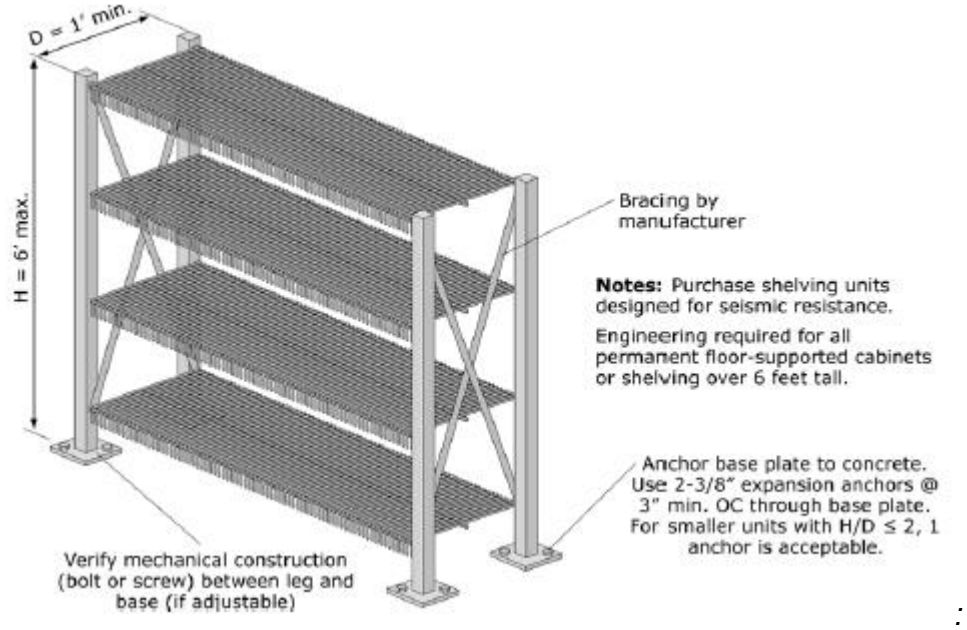


Figure G-19. Light Storage Racks.

(FEMA E-74, 2012, Reducing the Risks of Nonstructural Earthquake Damage)

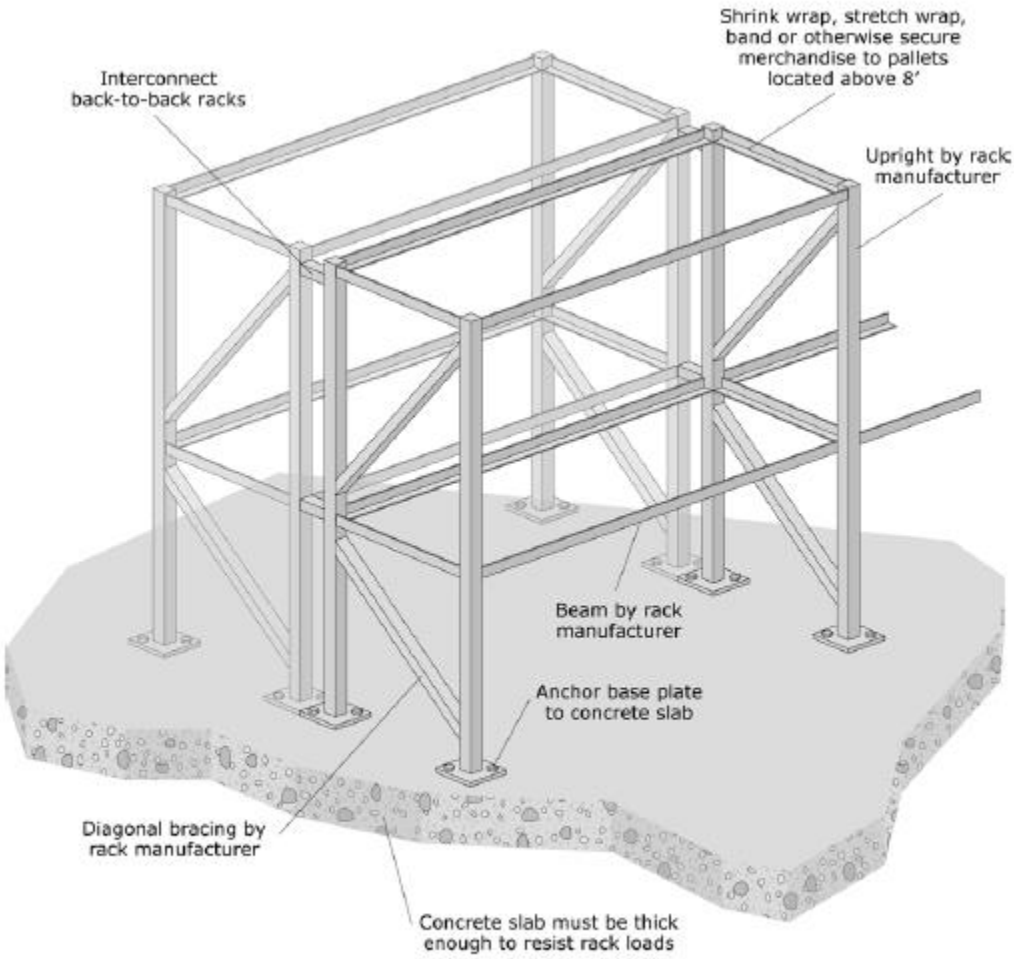


Figure G-20. Industrial Storage Racks.

(FEMA E-74, 2012, Reducing the Risks of Nonstructural Earthquake Damage)

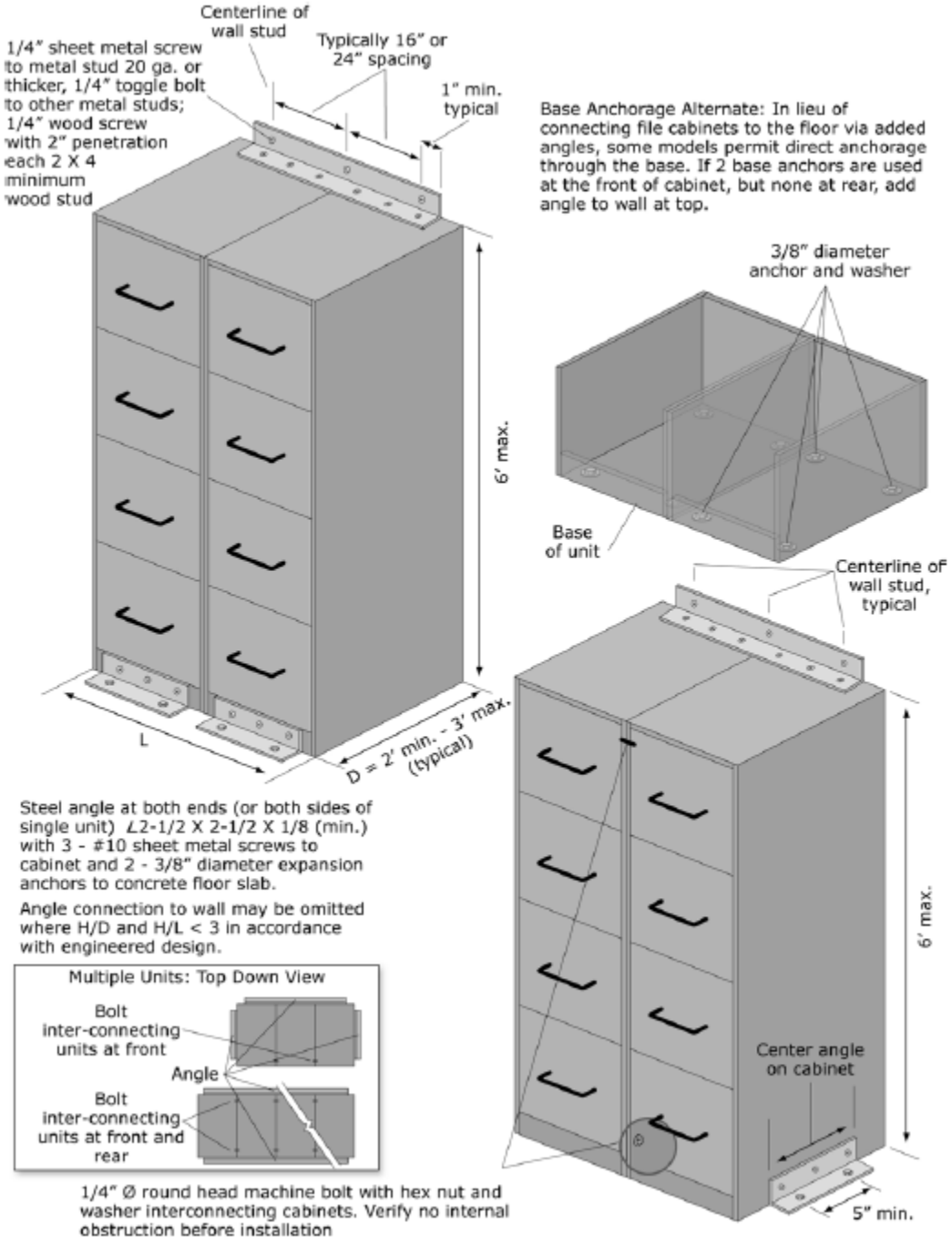


Figure G-21. Wall-mounted File Cabinets.

(FEMA E-74, 2012, Reducing the Risks of Nonstructural Earthquake Damage)

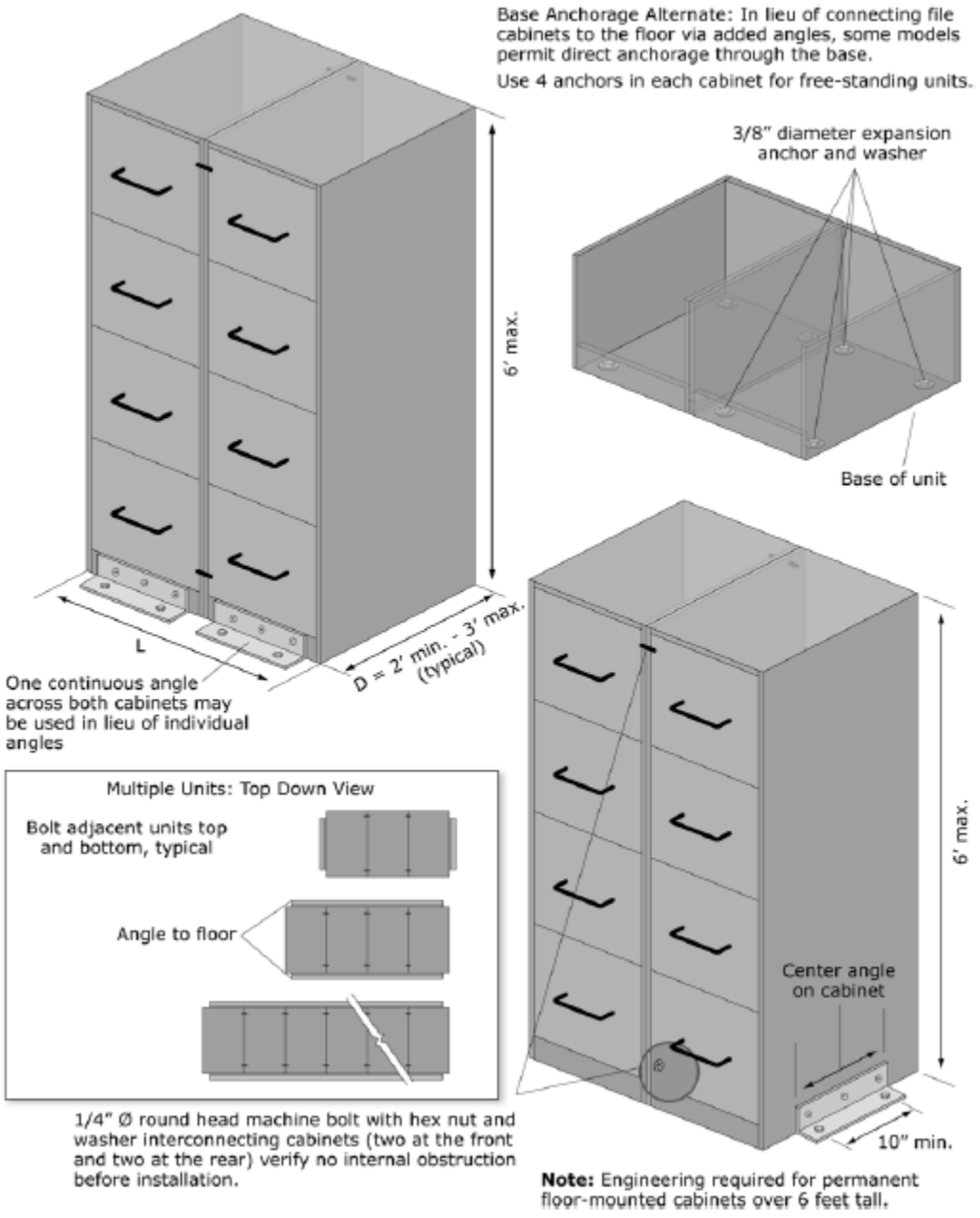


Figure G-22. Base Anchored File Cabinets.

(FEMA E-74, 2012, Reducing the Risks of Nonstructural Earthquake Damage)

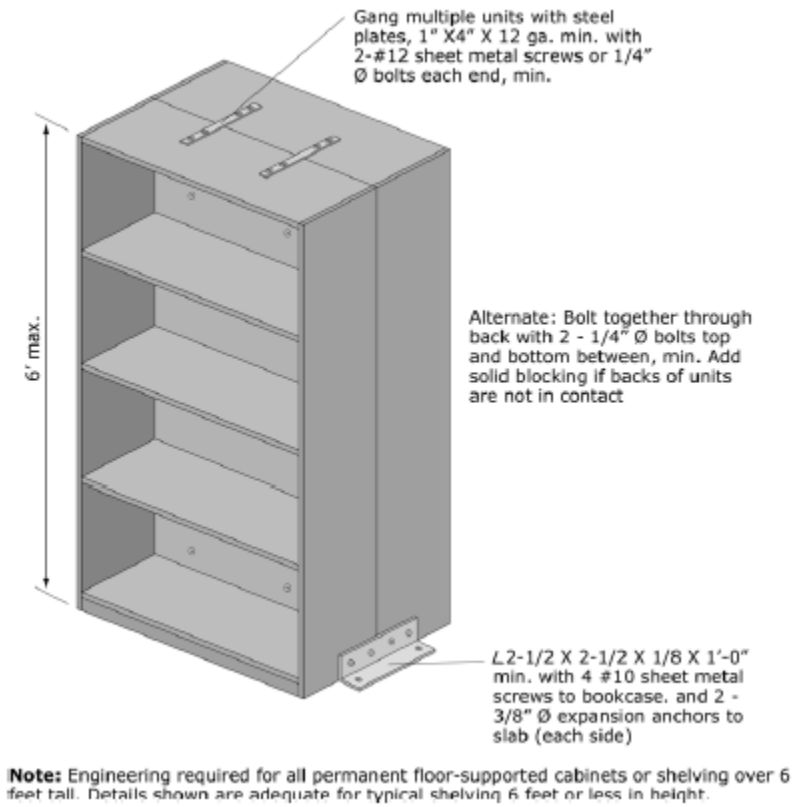


Figure G-23. Anchorage of Freestanding Book Cases Arranged Back to Back.

(FEMA E-74, 2012, Reducing the Risks of Nonstructural Earthquake Damage)

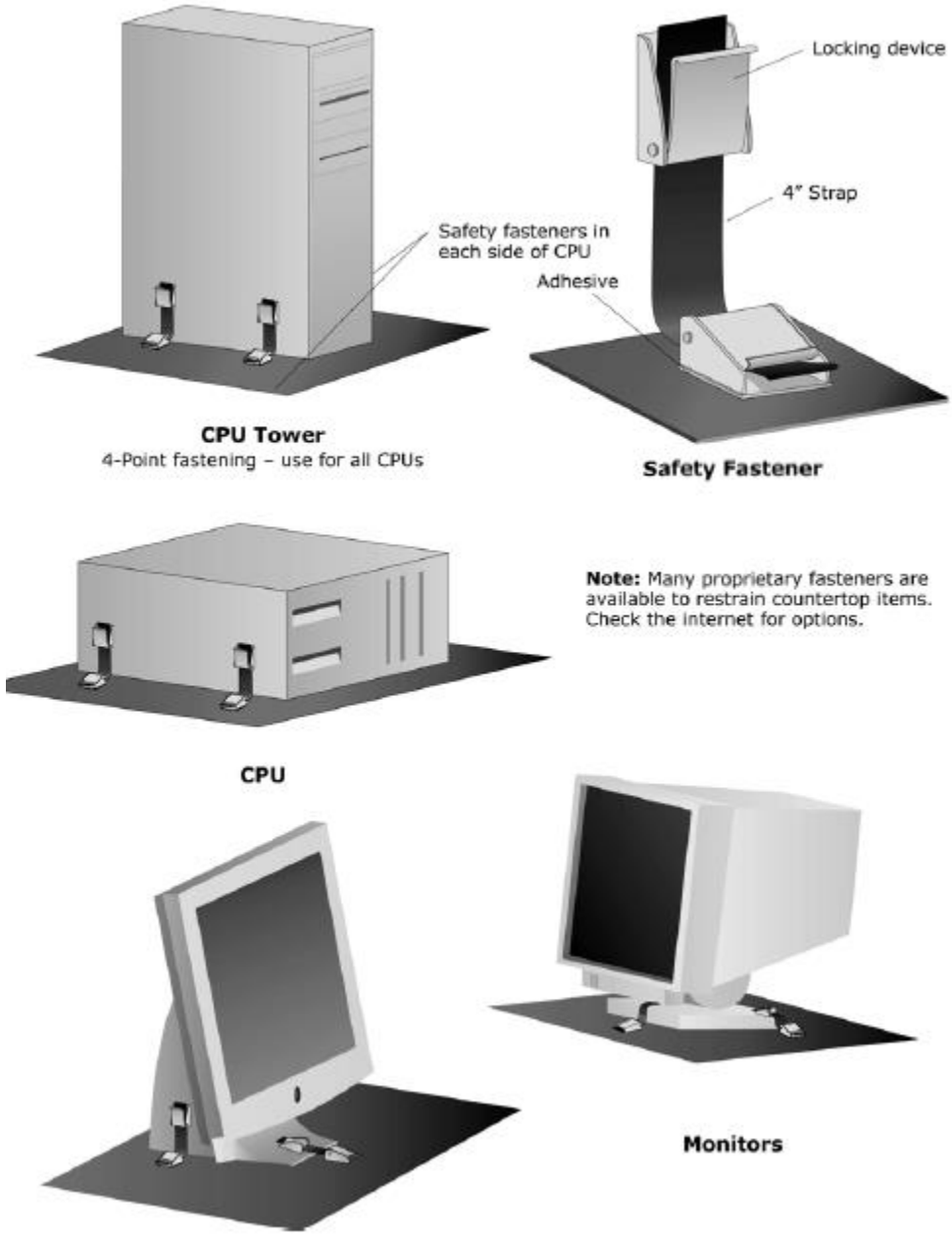
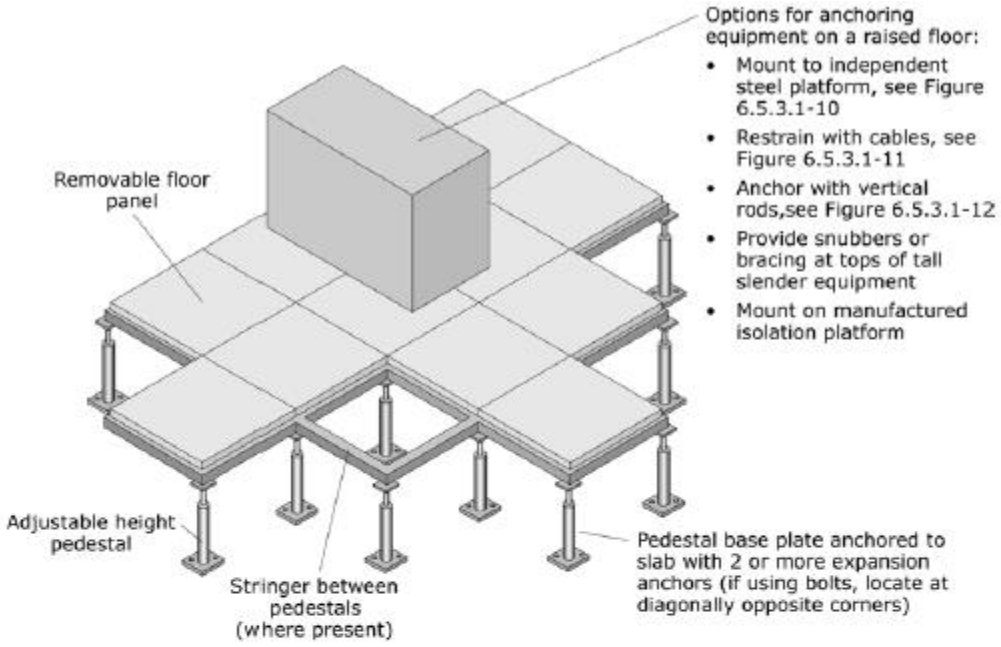
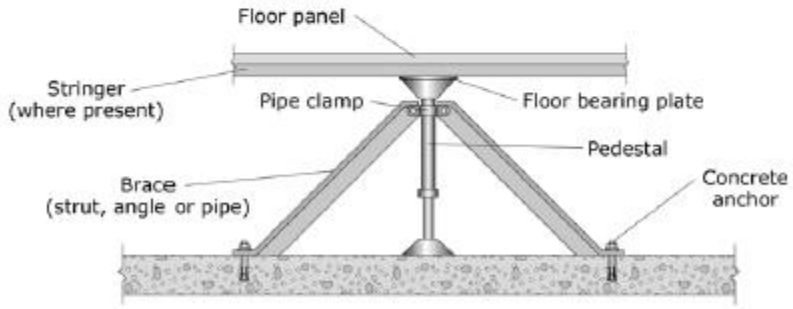


Figure G-24. Desktop Computers and Accessories.

(FEMA E-74, 2012, Reducing the Risks of Nonstructural Earthquake Damage)



Cantilevered Access Floor Pedestal



Braced Access Floor Pedestal
(use for tall floors or where pedestals are not strong enough to resist seismic forces)

Note: For new floors in areas of high seismicity, purchase and install systems that meet the applicable code provisions for "special access floors."

Figure G-25. Equipment Mounted on Access Floor.

(FEMA E-74, 2012, Reducing the Risks of Nonstructural Earthquake Damage)

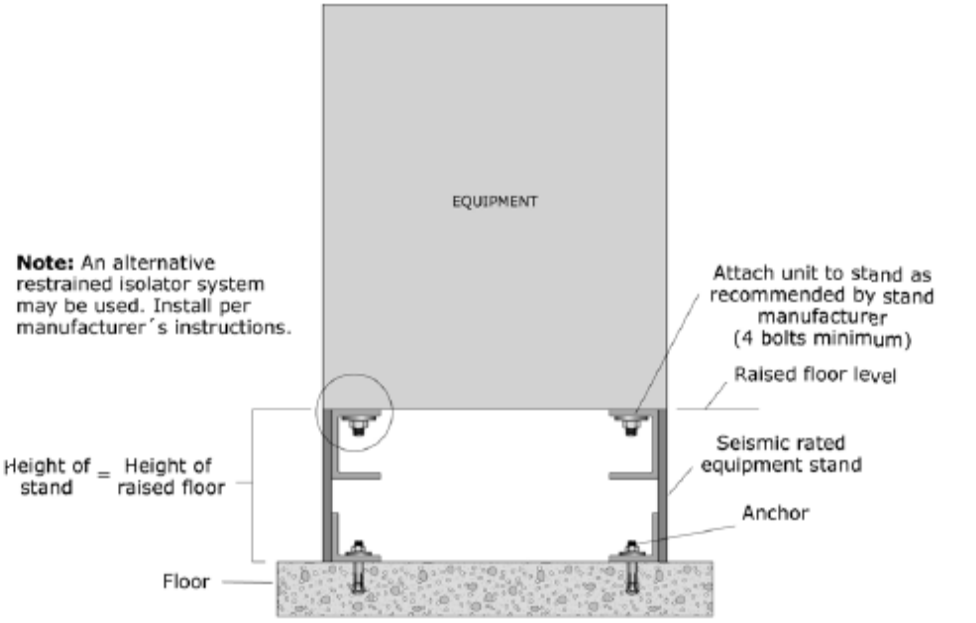


Figure G-26. Equipment Mounted on Access Floor – Independent Base.

(FEMA E-74, 2012, Reducing the Risks of Nonstructural Earthquake Damage)

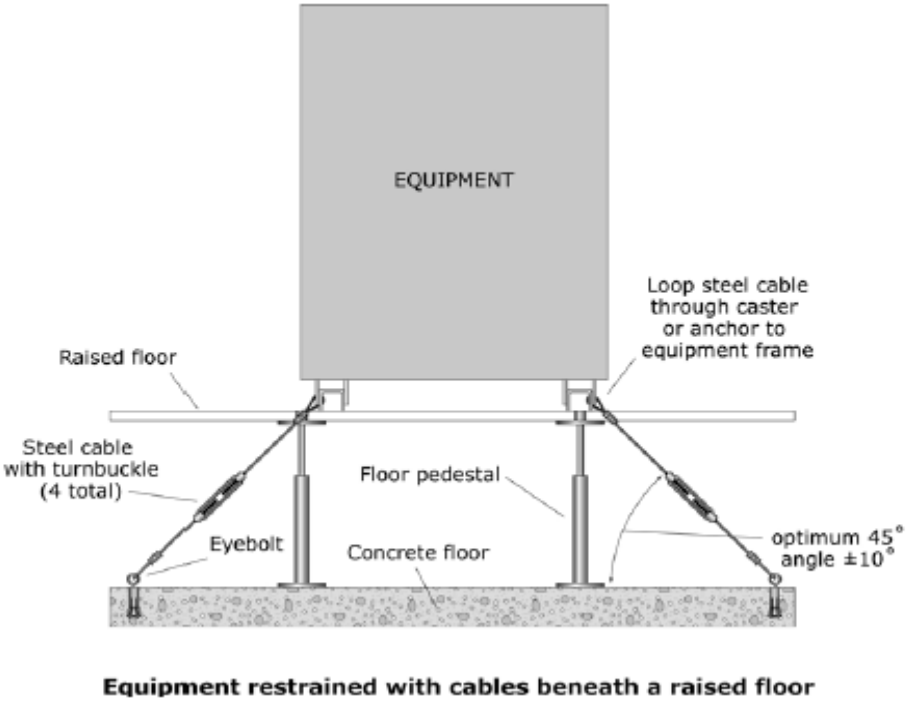


Figure G-27. Equipment Mounted on Access Floor – Cable Braced.

(FEMA E-74, 2012, Reducing the Risks of Nonstructural Earthquake Damage)

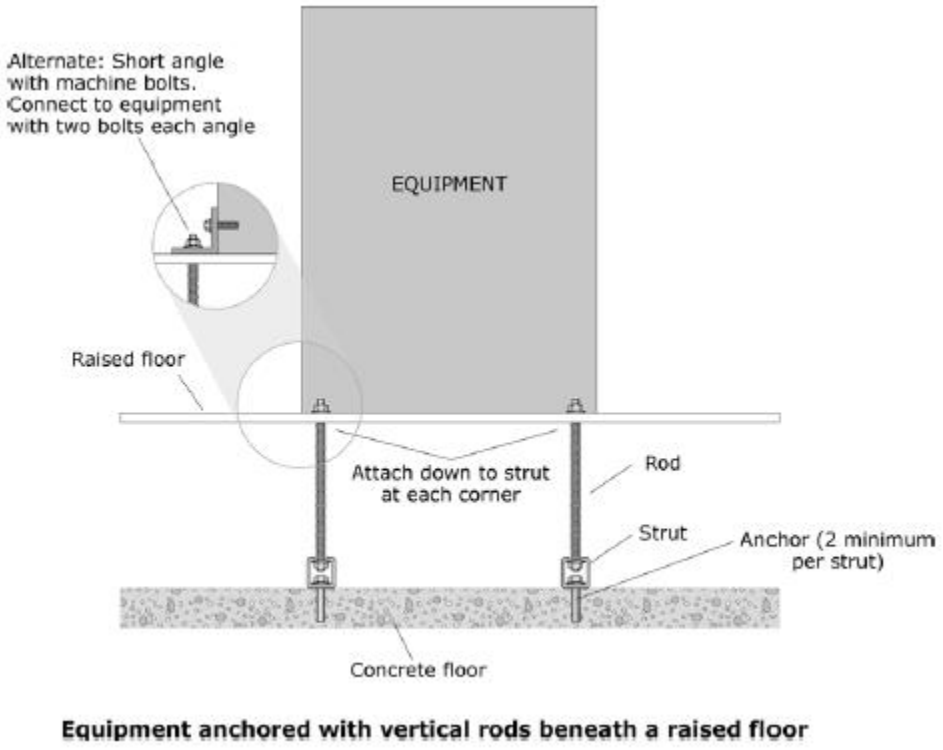
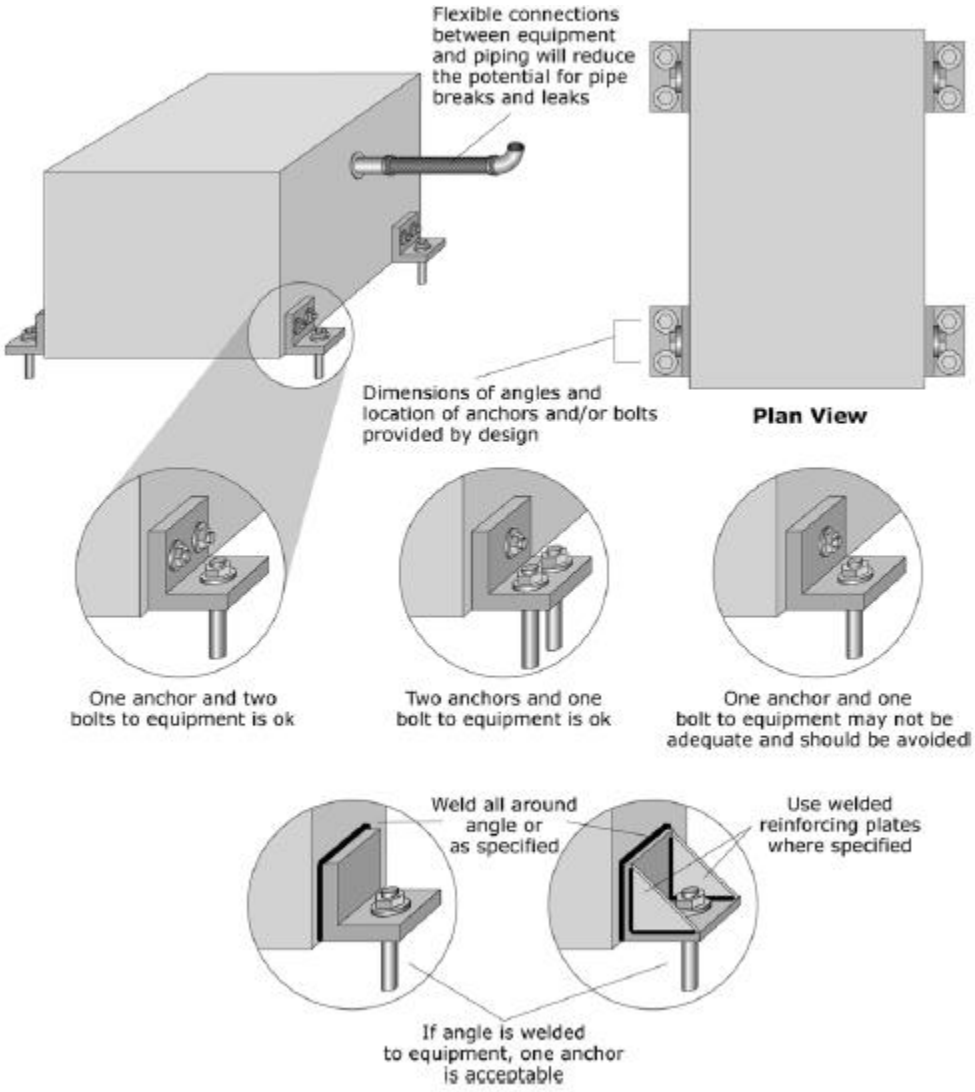


Figure G-28. Equipment Mounted on Access Floor – Tie-down Rods.

(FEMA E-74, 2012, Reducing the Risks of Nonstructural Earthquake Damage)



Note: Rigidly mounted equipment shall have flexible connections for the fuel lines and piping.

Figure G-29. Rigidly Floor-mounted Equipment with Added Angles.
(FEMA E-74, 2012, Reducing the Risks of Nonstructural Earthquake Damage)

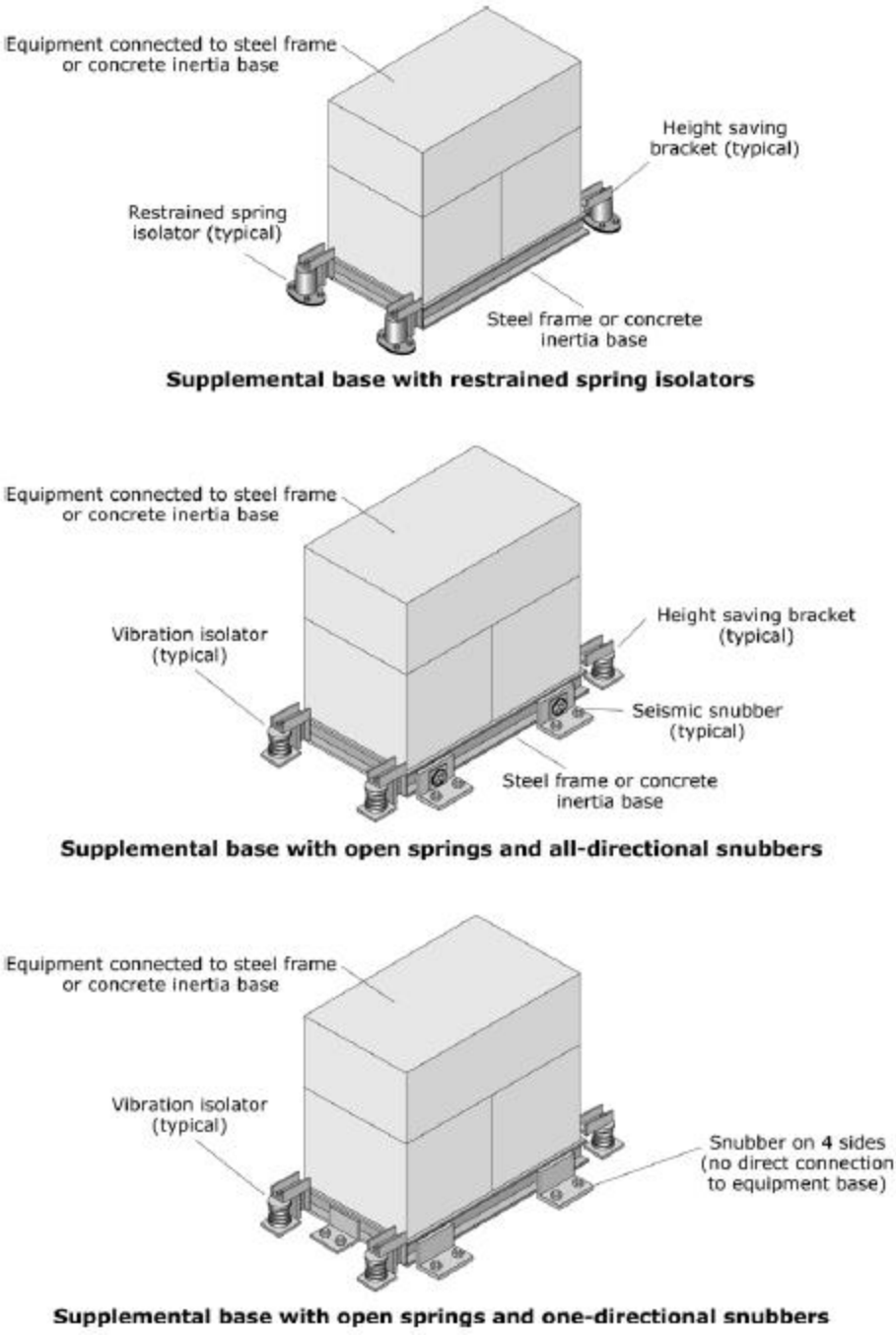


Figure G-30. HVAC Equipment with Vibration Isolation.

(FEMA E-74, 2012, Reducing the Risks of Nonstructural Earthquake Damage)

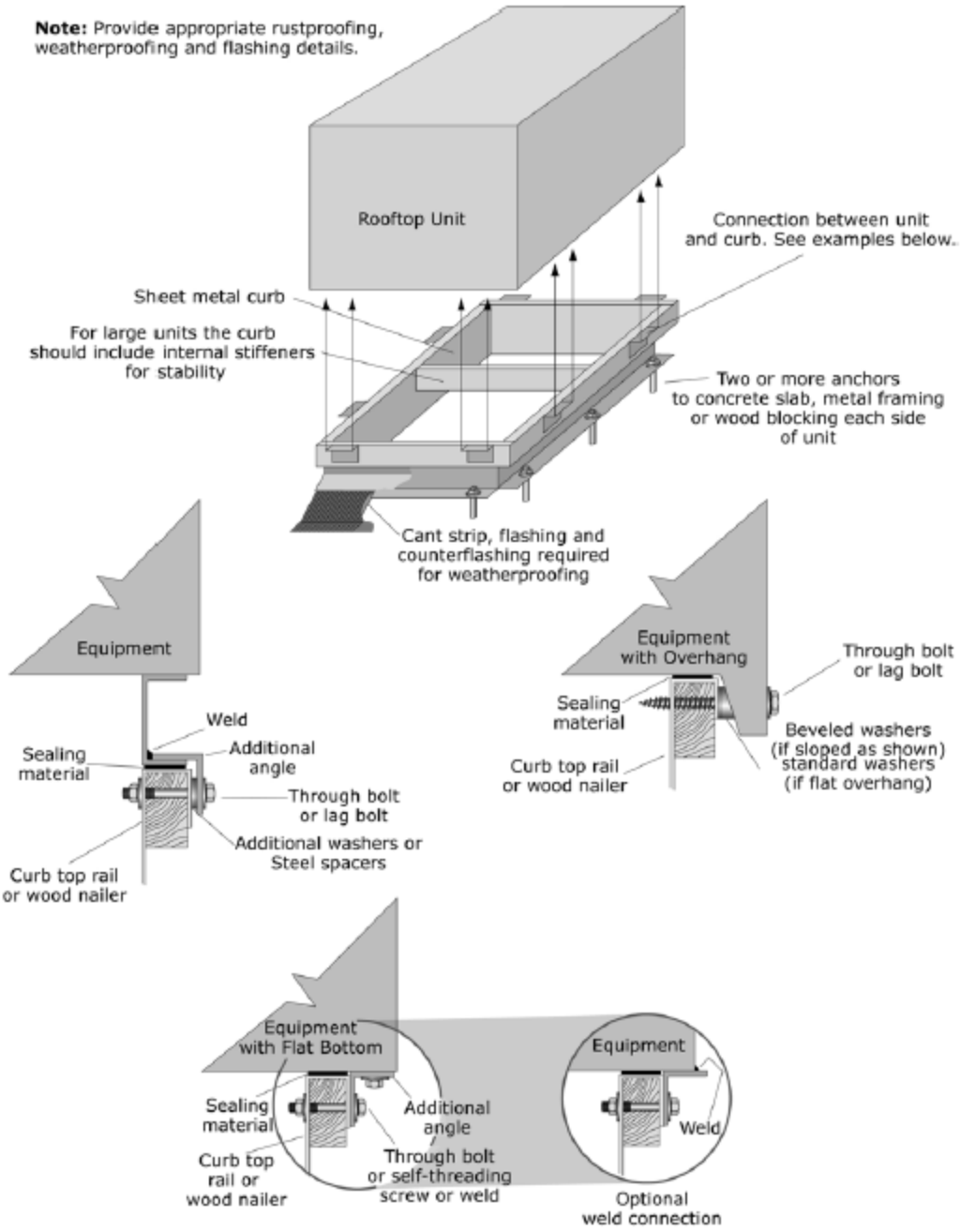


Figure G-31. Rooftop HVAC Equipment.

(FEMA E-74, 2012, Reducing the Risks of Nonstructural Earthquake Damage)

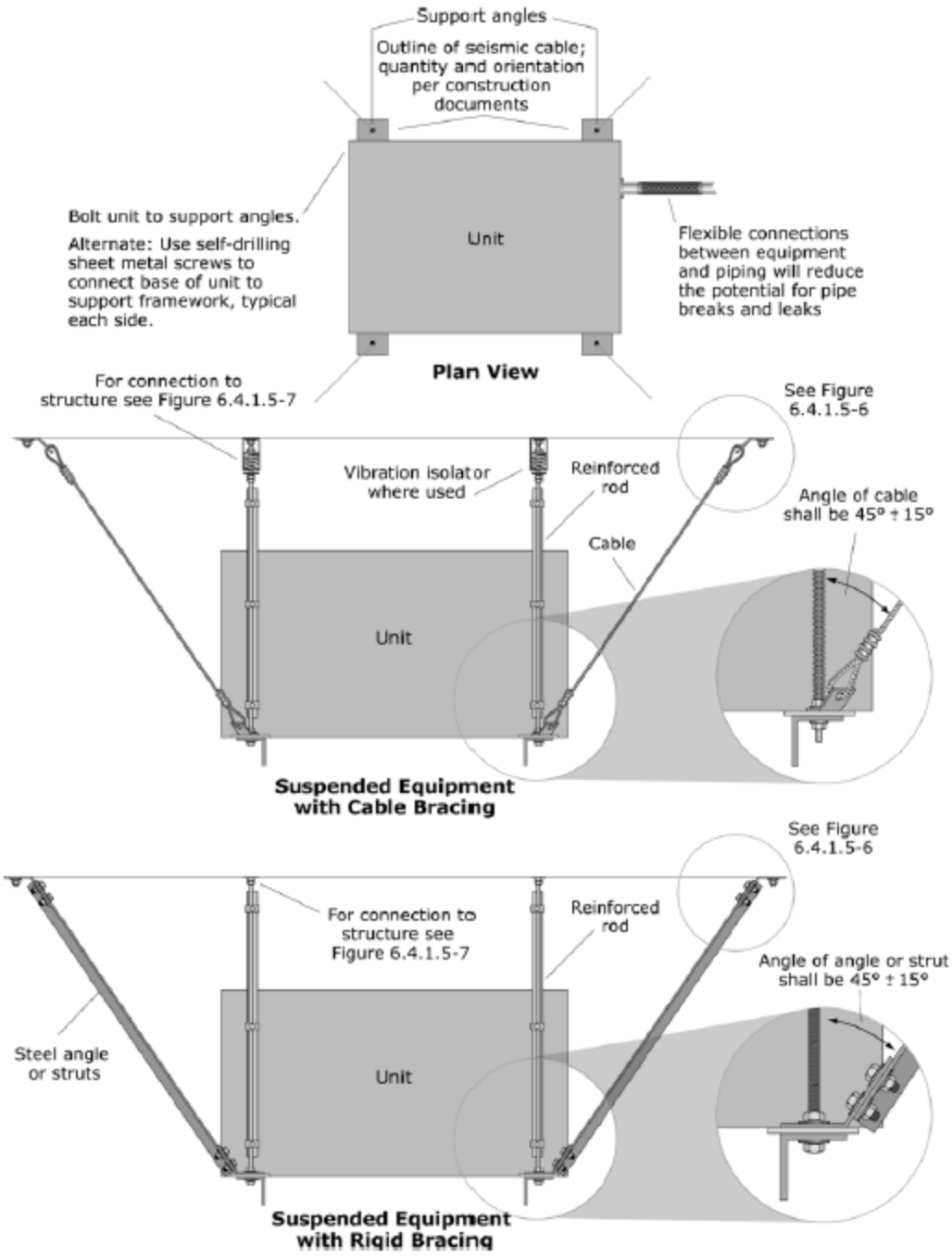


Figure G-32. Suspended Equipment.

(FEMA E-74, 2012, Reducing the Risks of Nonstructural Earthquake Damage)

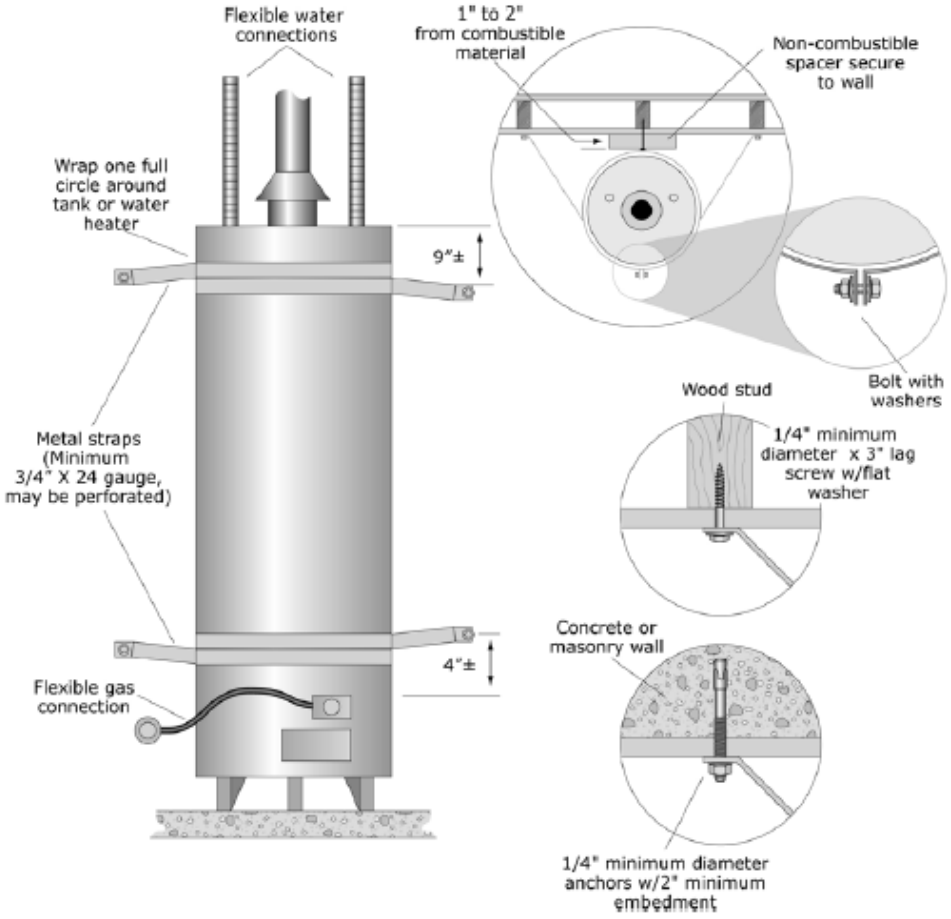


Figure G-33. Water Heater Strapping to Backing Wall.

(FEMA E-74, 2012, Reducing the Risks of Nonstructural Earthquake Damage)

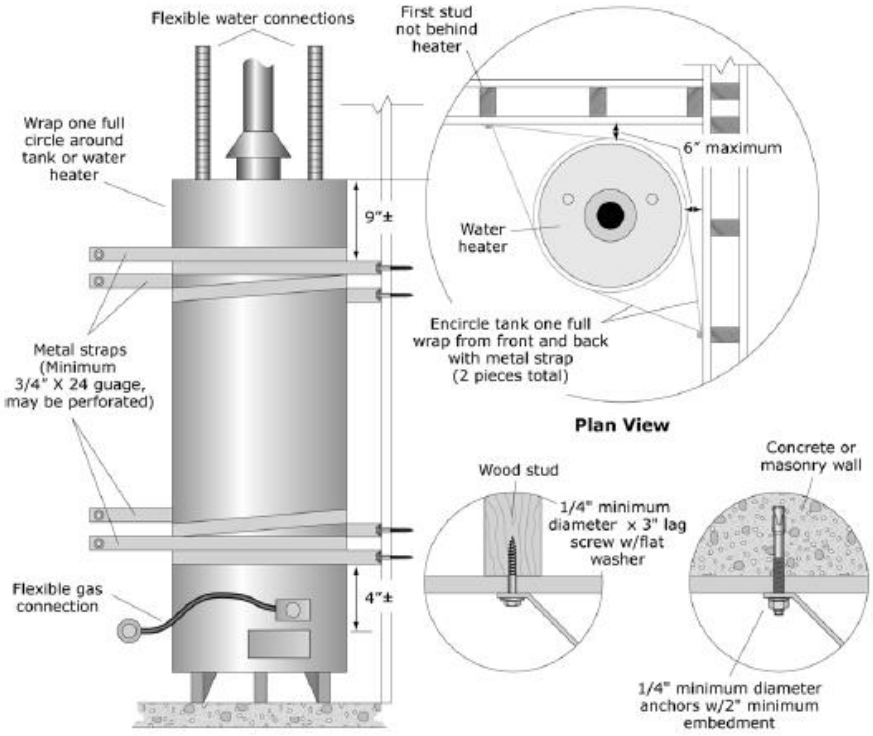


Figure G-34. Water Heater – Strapping at Corner Installation.

(FEMA E-74, 2012, Reducing the Risks of Nonstructural Earthquake Damage)

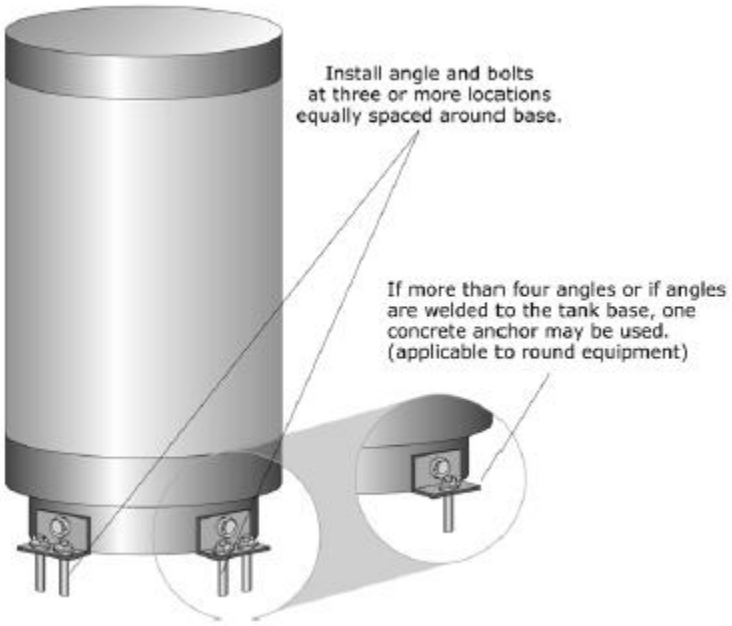


Figure G-35. Water Heater – Base Mounted.

(FEMA E-74, 2012, Reducing the Risks of Nonstructural Earthquake Damage)

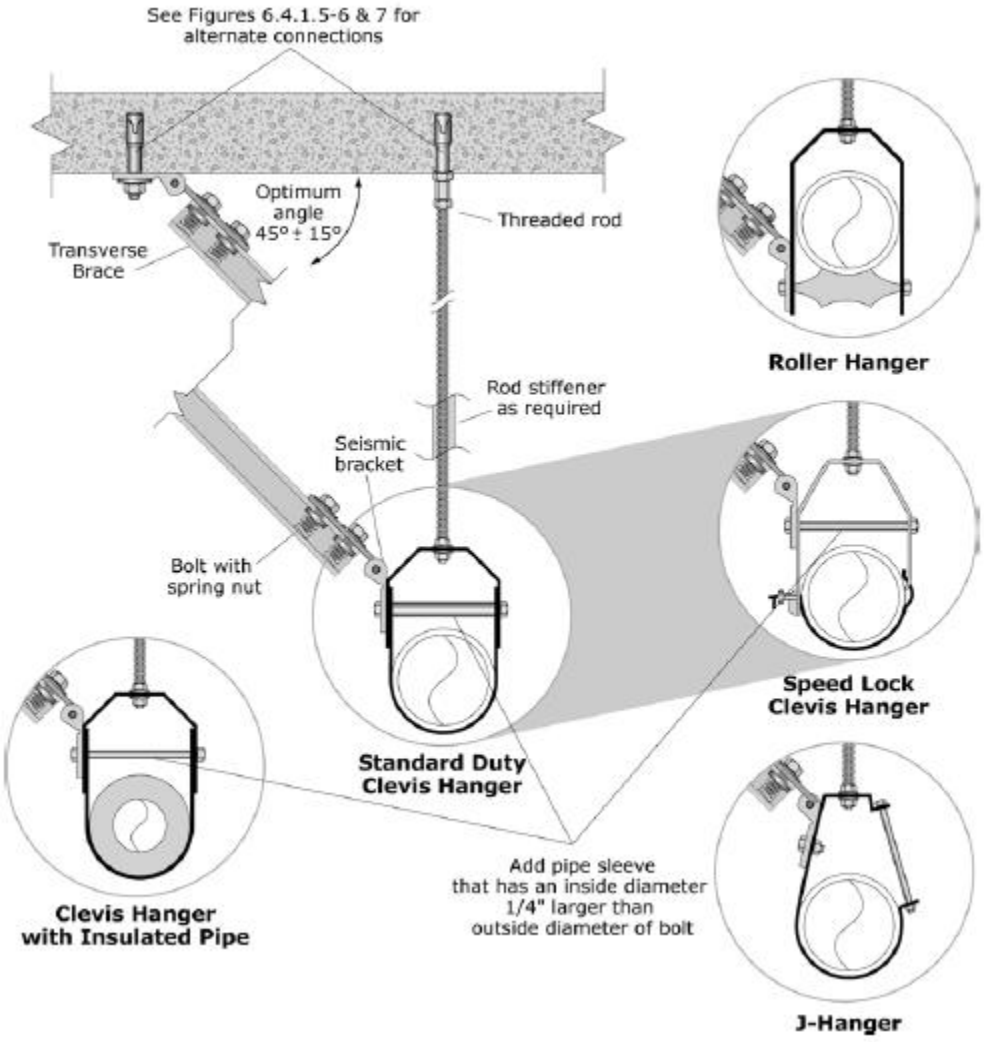


Figure G-36. Rigid Bracing – Single Pipe Transverse.

(FEMA E-74, 2012, Reducing the Risks of Nonstructural Earthquake Damage)

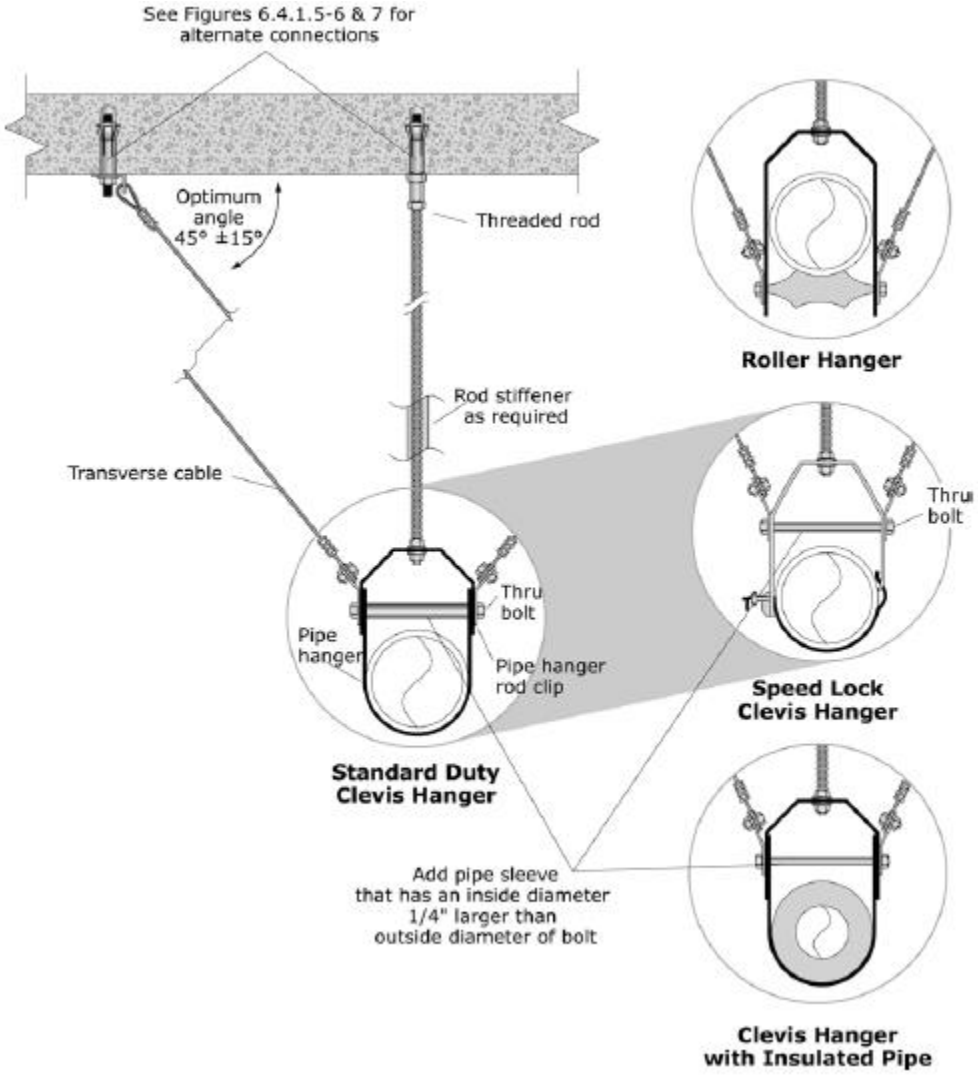


Figure G-37. Cable Bracing – Single Pipe Transverse.

(FEMA E-74, 2012, Reducing the Risks of Nonstructural Earthquake Damage)

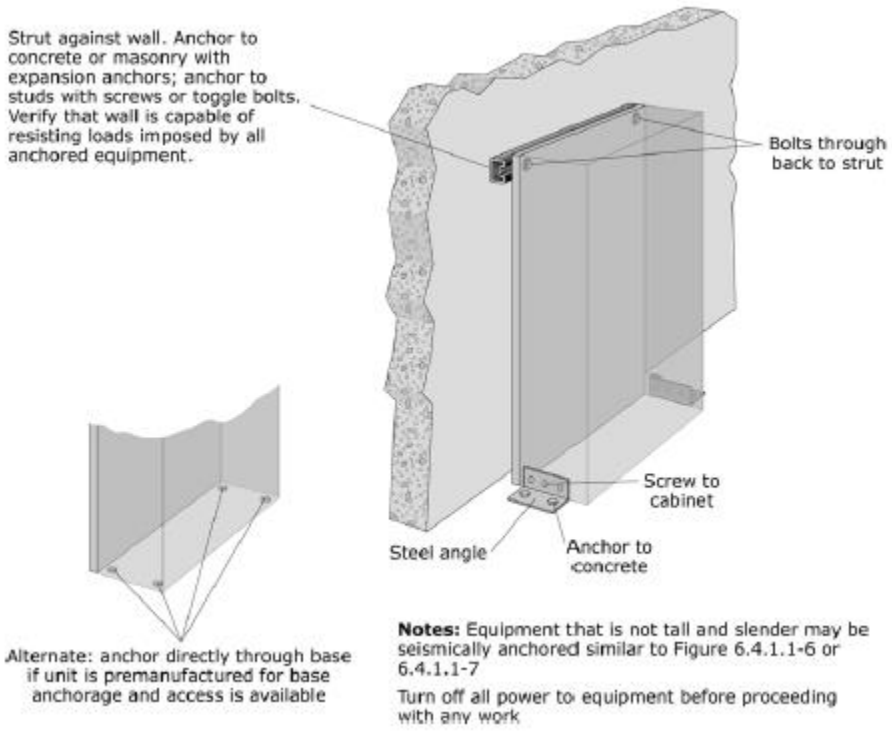


Figure G-38. Electrical Control Panels, Motor Controls Centers, or Switchgear.
(FEMA E-74, 2012, Reducing the Risks of Nonstructural Earthquake Damage)

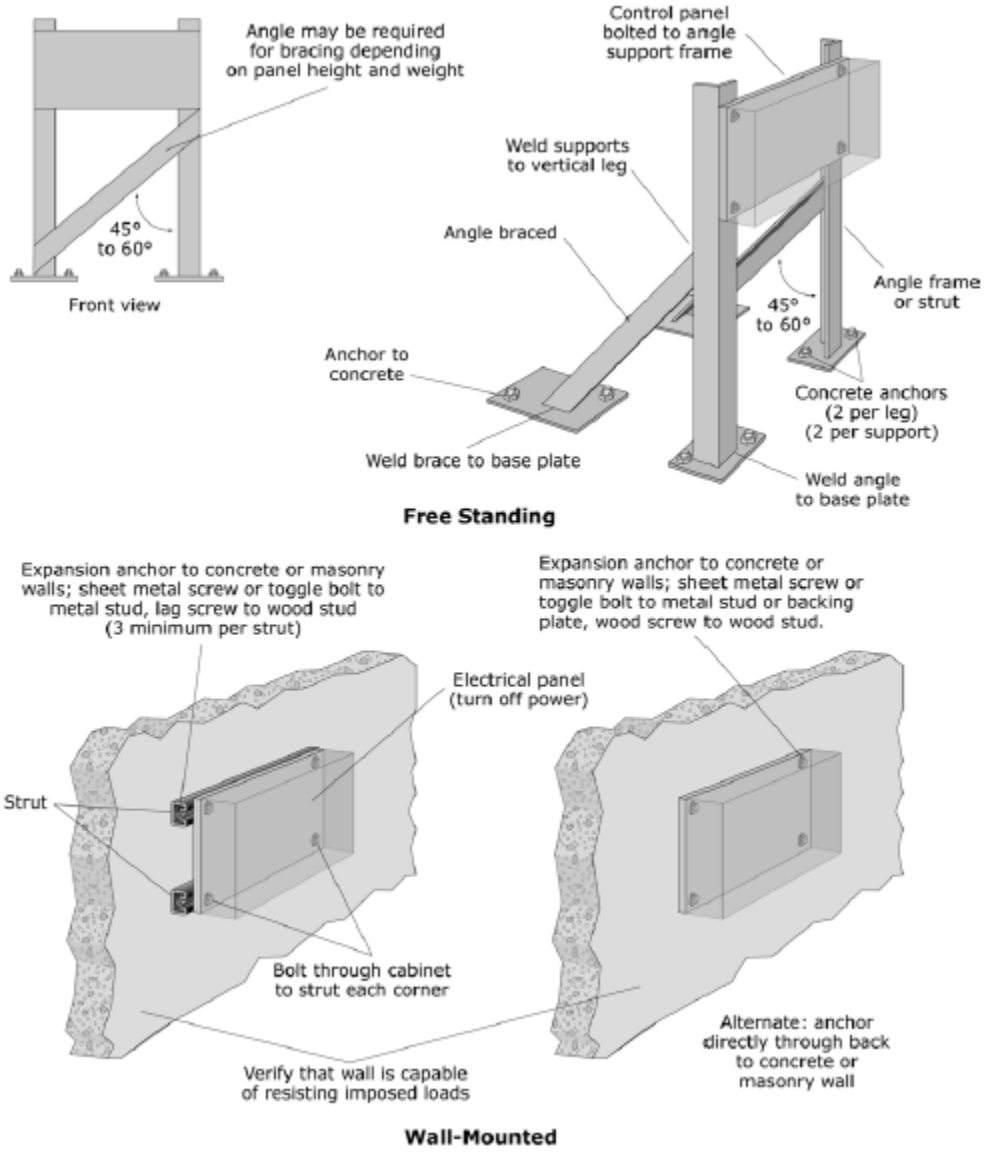


Figure G-39. Freestanding and Wall-mounted Electrical Control Panels, Motor Controls Centers, or Switchgear.

(FEMA E-74, 2012, Reducing the Risks of Nonstructural Earthquake Damage)

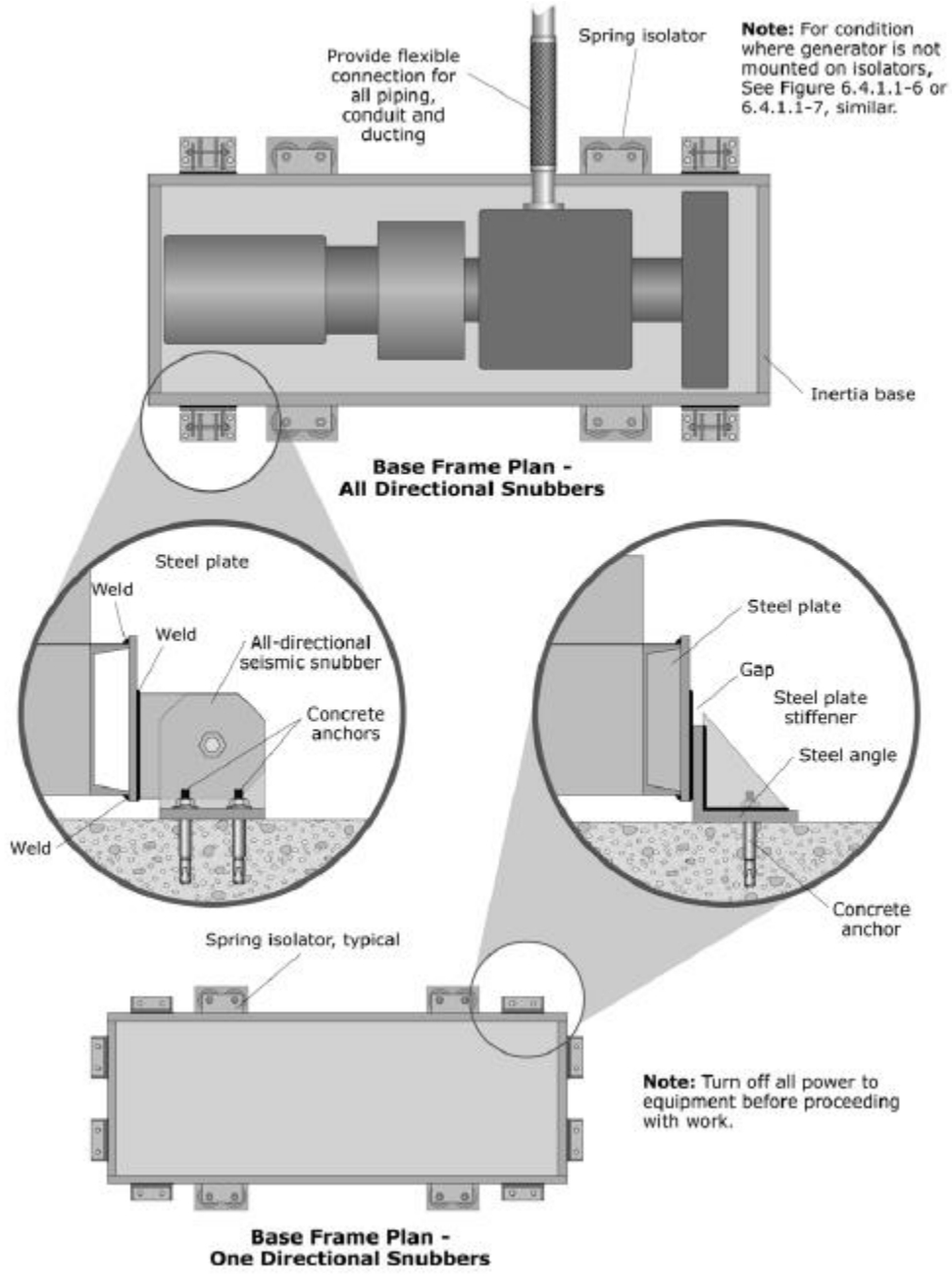


Figure G-40. Emergency Generator.
(FEMA E-74, 2012, Reducing the Risks of Nonstructural Earthquake Damage)

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