PHASE **2**

Washington State
School Seismic Safety Assessments Project

PORT TOWNSEND HIGH SCHOOL MATH-SCIENCE ANNEX

Port Townsend School District

SEISMIC UPGRADES CONCEPT DESIGN REPORT

June 2021

PREPARED FOR

PREPARED BY

DYKEMAN · rolluda architects architecture planning interiordesign · PD PRODIMS · WSP · DCI ENGINEERS · wrk engineers STRUCTURAL & EARTHQUAKE ENGINEERING · Reid Middleton

This page intentionally left blank.

WASHINGTON STATE SCHOOL SEISMIC SAFETY ASSESSMENTS PROJECT

SEISMIC UPGRADES CONCEPT DESIGN REPORT

Port Townsend High School – Math-Science Annex

Port Townsend School District

June 2021

Prepared for:

State of Washington
Department of Natural Resources and Office of Superintendent of Public Instruction

Prepared by:

Brian Y. Matsumoto, P.E., S.E.
Reid Middleton, Inc.

728 134th Street SW, Suite 200
Everett, WA 98204
425-741-3800
File No. 262019.082
www.reidmiddleton.com

Contributions by:

DYKEMAN PRODIMS

Copyright© 2021 by Reid Middleton, Inc. All rights reserved.

This page intentionally left blank.

EXECUTIVE SUMMARY

This report documents the findings of a seismic evaluation of the Math Science Annex building at Port Townsend High School in Port Townsend, Washington. The Math Science Annex building was originally constructed in 1928 and is a two-story building with exterior unreinforced hollow clay tile masonry bearing walls and wood-framed floors and roof. According to a 2007 study and survey, this building underwent a significant modernization in 1984 that included seismic upgrades such as out-pf-plane wall anchoring and addition of concrete shear walls. This building also received a single-story classroom addition in 1996 that also reconfigured the interior concrete shear walls that were added in 1984. In 2019, the building received an elevator tower addition in which it was discovered that the original exterior walls were constructed of brittle hollow clay tile with brick veneer.

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 the brittle hollow clay tile exterior bearing walls and shear walls, and long-span wood diaphragms.

Conceptual seismic upgrade recommendations for the structural systems are provided to improve the performance of the building to meet the Life Safety structural performance objective criteria of ASCE 41-17. Sketches for the concept-level seismic upgrades are provided in Appendix B. The structural upgrades include strongbacking and in-plane strengthening of the exterior hollow clay tile unreinforced masonry (URM) walls; new transverse shear walls and cross walls to reduce diaphragm spans, increase diaphragm stiffness, and reduce demands on existing out-of-plane wall anchors; and improved load path connections to existing interior concrete shear walls. The recommendations for nonstructural upgrades are to further investigate the independent support of lighting fixtures in the acoustical tile ceilings and to further investigate ceilings in the paths of egress to mitigate the risk of obstructions impeding the paths of egress as students and faculty evacuate the building following a seismic event.

An opinion of probable construction costs is provided in Appendix C. It is our opinion that the total cost (construction costs plus soft costs) to upgrade the structure would range between $1.19M and $2.24M with the baseline estimated total cost being $1.49M.

This page intentionally left blank.

Table of Contents

Page No.

EXECUTIVE SUMMARY

1.0 INTRODUCTION....5

1.1 BACKGROUND....5
1.2 SCOPE OF SERVICES....5

2.0 SEISMIC EVALUATION PROCEDURES AND CRITERIA....9

2.1 ASCE 41 SEISMIC EVALUATION AND RETROFIT OVERVIEW....9
2.2 SEISMIC EVALUATION AND RETROFIT CRITERIA....10
2.3 REPORT LIMITATIONS....12

3.0 BUILDING DESCRIPTION & SEISMIC EVALUATION FINDINGS....13

3.1 BUILDING OVERVIEW....13
3.2 SEISMIC EVALUATION FINDINGS....15

4.0 RECOMMENDATIONS AND CONSIDERATIONS....21

4.1 SEISMIC-STRUCTURAL UPGRADE RECOMMENDATIONS....21
4.2 FOUNDATIONS AND GEOTECHNICAL CONSIDERATIONS....22
4.3 TSUNAMI CONSIDERATIONS....23
4.4 NONSTRUCTURAL RECOMMENDATIONS AND CONSIDERATIONS....23
4.5 OPINION OF PROBABLE CONCEPTUAL SEISMIC UPGRADES COSTS....26

Appendix List

APPENDIX A: ASCE 41 TIER 1 SCREENING REPORT
APPENDIX B: CONCEPT-LEVEL SEISMIC UPGRADE FIGURES
APPENDIX C: OPINION OF PROBABLE CONSTRUCTION COSTS
APPENDIX D: EARTHQUAKE PERFORMANCE ASSESSMENT TOOL (EPAT) WORKSHEET
APPENDIX E: PORT TOWNSEND HIGH SCHOOL MATH-SCIENCE ANNEX BUILDING EXISTING DRAWINGS
APPENDIX F: FEMA E-74 NONSTRUCTURAL SEISMIC BRACING EXCERPTS

Figure List

FIGURE 2-1. FLOW CHART AND DESCRIPTION OF ASCE 41 SEISMIC EVALUATION PROCEDURE....9

Table List

TABLE 2.2.1-1. SPECTRAL ACCELERATION PARAMETERS (SITE CLASS D)....11
TABLE 3.1.3-1. STRUCTURAL SYSTEM DESCRIPTIONS....13
TABLE 3.1.4-1. STRUCTURAL SYSTEM CONDITION DESCRIPTIONS....14
TABLE 3.2.1-1. IDENTIFIED STRUCTURAL SEISMIC DEFICIENCIES BASED ON TIER 1 CHECKLISTS....15
TABLE 3.2.2-1. IDENTIFIED STRUCTURAL CHECKLIST ITEMS MARKED AS UNKNOWN....16
TABLE 3.2.3-1. IDENTIFIED NONSTRUCTURAL SEISMIC DEFICIENCIES BASED ON TIER 1 CHECKLISTS....17
TABLE 3.2.4-1. IDENTIFIED NONSTRUCTURAL CHECKLIST ITEMS MARKED AS UNKNOWN....18
TABLE 4.5.3-1. SEISMIC UPGRADES OPINION OF PROBABLE CONSTRUCTION COSTS....29

This page intentionally left blank.

Acronyms

AACE	Association for the Advancement of Cost Engineering
ACT	Acoustical Ceiling Tile
ADA	Americans with Disabilities Act
ASCE	American Society of Civil Engineers
A-E	Architect-Engineer
BPOE	Basic Performance Objective for Existing Buildings
BSE	Basic Safety Earthquake
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
GC/CM	General Contractor / Construction Manager
GWB	Gypsum Wallboard
HCT	Hollow Clay Tile
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 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
URM	Unreinforced Masonry
USGS	United States Geological Survey
WF	Wide Flange
WGS	Washington Geological Survey
WSSSSAP	Washington State School Seismic Safety Assessments Project

Reference List

Codes and References

2018 IBC, *2018 International Building Code,* prepared by the International Code Council, Washington, D.C.

AACE International Recommended Practice No. 56R-08, 2020, *Cost Estimate Classification System*, prepared by the Association for the Advancement of Cost Engineering International, Fairmont, West Virginia.

ASCE 7-16, 2017, *Minimum Design Loads for Buildings and Other Structures*, prepared by the Structural Engineering Institute of the American Society of Civil Engineers, Reston, Virginia.

ASCE 41-17, 2017, *Seismic Evaluation and Retrofit of Existing Buildings*, prepared by the Structural Engineering Institute of the American Society of Civil Engineers, Reston, Virginia.

FEMA E-74, 2011, *Reducing the Risks of Nonstructural Earthquake Damage: A Practical Guide*, prepared by Applied Technology Council, Redwood City, California.

Structural Engineers of Northern California, 2017, Earthquake Performance Rating System ASCE 41-13 Translation Procedure: The Buildings Ratings Committee, a sub-committee of the Existing Buildings Committee of The Structural Engineers Association of Northern California.

Structural Engineers of Northern California, 2015, Earthquake Performance Rating System User's Guide: The Buildings Ratings Committee, a sub-committee of the Existing Buildings Committee of The Structural Engineers Association of Northern California.

Drawings

Reed Reinvald Johnson Willows Architects, April 17, 1996, drawings titled "Port Townsend High School Phase III Modernization," Port Townsend, Washington

Reed Reinvald Johnson Willows Architects, April 17, 1996, partial set of detail book titled "Port Townsend High School Phase III Modernization," Port Townsend, Washington (pages 90.01 – 90.11, 91.01 – 91.11, 92.01-92.03, and 93.01 – 93.09)

1.0 Introduction

1.1 Background

In 2018-2019, the Washington Geological Survey (WGS), a division of the Department of Natural Resources (DNR), led a Washington State School Seismic Safety Assessments Project (WSSSSAP) that seismically and geologically screened 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. This first phase of the WSSSSAP was executed with the help of Washington State's Office of Superintendent of Public Instruction (OSPI) and Reid Middleton, along with their team of structural engineers, architects, and cost estimators.

Building upon the success of Phase 1, WGS, OSPI, and Reid Middleton's team embarked on Phase 2 of this project to seismically and geologically screen another 339 school buildings and 2 fire stations, mostly located in the high-seismic risk regions of Washington State. Similar to Phase 1, the two main components of Phase 2 of this seismic safety assessments 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.

Seventeen school buildings were selected in consultation with WGS and OSPI 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 17 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, 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: Field 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, lath 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 41 checklist items that were not documented due to access limitations are noted.

1.2.3 Seismic Evaluations and Conceptual Upgrades Design

1. Seismic Evaluations: Limited 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. Conceptual Upgrades Design: 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. Architectural Review: The seismic upgrade concept developed by the structural engineers was reviewed by Dykeman Architects for general guidance and consideration of the architectural aspects of the seismic upgrade. The architects discussed the seismic upgrade concepts with the structural engineer and reviewed existing drawings that were available, pictures taken during the engineer's field investigations, and the ASCE 41 Tier 1 Screening reports. However, field visits by the architect and meetings with the school district and facilities personnel to discuss phasing and programming requirements were not included in the project scope of work. The architectural considerations are discussed in Section 4.4 Nonstructural Recommendations and Considerations. These conceptual designs were reviewed with high-level recommendations. Future planning for seismic improvements should include further review with a design team.

4. Cost Estimating: Through the concept-level seismic upgrades report process, ProDims, LLC, 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. Conceptual Upgrade Design Reports: Buildings that were selected to receive a conceptual upgrade design will have a report prepared that will include an introduction summarizing the overall findings and recommendations, along with individual sections documenting each building's seismic evaluation, list of deficiencies, conceptual seismic upgrade sketches and opinions of probable construction costs.

2. Building Photography: Photos were taken of each building during on-site walkthroughs to document the existing building configurations, conditions, and structural systems. These are available upon request through DNR/WGS.

3. Existing Drawings: Select and available existing drawings and other information were collected during the evaluation process. These are available upon request through DNR/WGS.

This page intentionally left blank.

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

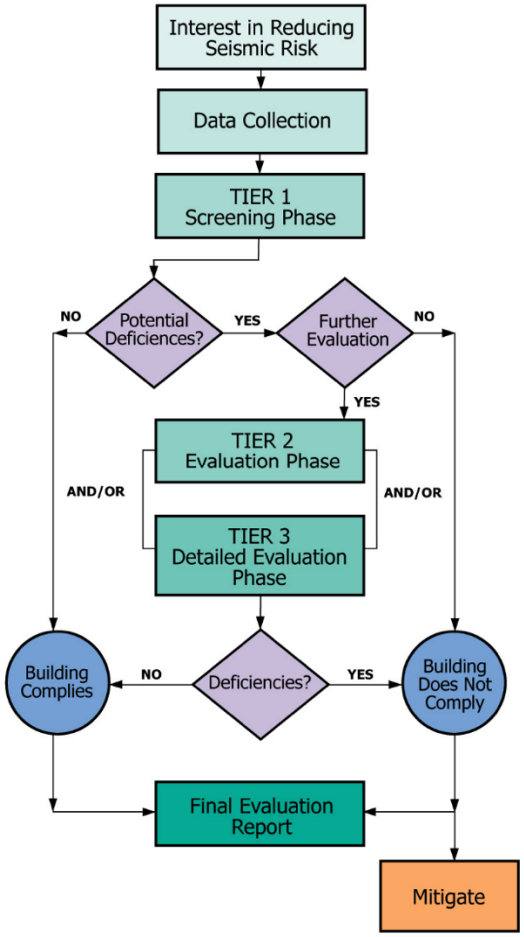


Figure 2-1. Flow Chart and Description of ASCE 41 Seismic Evaluation Procedure.

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. 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 Site Class Definition

The building site class definition quantifies the site soil's propensity to amplify or attenuate earthquake ground motion propagating from underlying rock. Site class has a direct impact on the seismic design forces utilized to design and evaluate a structure. There are six distinct site classes defined in ASCE 7-16, Site Class A through Site Class F, that range from hard rock to soils that fail such as liquefiable soils. Buildings located on soft or loose soils will typically sustain more damage than similar buildings located on stiff soils or rock, all other things being equal. The Washington State Department of Natural Resources measured the time-averaged shear-wave velocity at each site to 30 meters (100 feet) below the ground surface, Vs30. This measured shear-wave velocity was used to determine the site class. The site for this building was determined to be **Site Class D**.

2.2.2 Port Townsend High 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 0.90 g, and the design 1-second period spectral acceleration, S_{D1}, is 0.594 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 Port Townsend High School that are considered in this study.

Table 2.2.1-1. Spectral Acceleration Parameters (Site Class D).

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	0.683 g	0.2 Seconds	0.90 g	0.2 Seconds	1.111 g	0.2 Seconds	1.35 g
1.0 Seconds	0.347 g	1.0 Seconds	0.594 g	1.0 Seconds	0.699 g	1.0 Seconds	0.891 g

2.2.3 Port Townsend High 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 Math-Science Annex is classified in ASCE 41 Table 3-1 as an unreinforced masonry shear wall building with flexible diaphragms, **URM**. Unreinforced masonry shear wall buildings (URM) include those that have bearing shear walls constructed of unreinforced masonry with elevated floor and roof framing structural systems consisting of wood framing. Although the single-story wood-framed addition in 1996 is classified as a W2 building (wood diaphragms and wood-framed shear walls sheathed with plywood), the Math-Science Annex was screened and studied primarily as an URM building for the purposes of this report.

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: 1928
Building Code: Unknown

Number of Stories: 2
Floor Area: 13,169 SF

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

The Math Science Annex at Port Townsend High School, which was originally constructed in 1928, is a two-story building with exterior unreinforced hollow clay tile (HCT) masonry bearing walls and wood-framed floors and roof. According to a 2007 study and survey, this building underwent a significant modernization in 1984 that included seismic upgrades such as out-of-plane wall anchoring and addition of concrete shear walls. This building also received a single-story classroom addition in 1996 that also reconfigured the interior concrete shear walls that were added in 1984. In 2019, the building received an elevator tower addition in which it was discovered that the original exterior walls were constructed of brittle HCT with brick veneer. This elevator addition was not seismically evaluated based on design to current seismic codes.

Original construction drawings or structural drawings from the major 1984 modernization were not available to review. However, architectural and structural drawings from the 1996 modernization were available for review.

3.1.2 Building Use

The Math Science Annex consists of classrooms, including science classroom spaces.

3.1.3 Structural System

Table 3.1.3-1. Structural System Descriptions.

Structural System	Description
Structural Roof	It is assumed that roof framing consists of wood shiplap supported by 2x joists spanning in the north-south direction from exterior URM/HCT walls to interior corridor bearing walls. Based on a 1996 architectural wall section, and locations of rosette anchors on the exterior walls, the second

Table 3.1.3-1. Structural System Descriptions.

Structural System	Description
	floor ceiling framing may be structural and may be used to support the roof framing. This should be further investigated. The roof of the 1996 addition is plywood sheathing over engineered wood I-joists supported by wood stud bearing walls.
Structural Floor(s)	The second floor likely consists of wood shiplap supported by 2x joists spanning in the north-south direction from exterior URM/HCT walls to interior corridor beams and bearing walls. The first floor framing over a crawlspace also likely consists of wood shiplap supported by 2x joists spanning in the north-south direction and supported by concrete stem walls and footings. The first floor of the 1996 addition is framed with plywood sheathing over engineered wood I- joists spanning over crawlspace to concrete foundation stem walls.
Foundations	Shallow cast-in-place concrete footings and stem walls.
Gravity System	The gravity system of the original building is wood framing with unreinforced HCT masonry bearing walls at the exterior and interior girders. The gravity system of the 1996 addition is wood framing with wood stud bearing walls. The 2019 elevator addition is steel framed with second floor deck and topping.
Lateral System	The lateral system of the original building consists of exterior unreinforced HCT masonry shear walls, reinforced concrete shear walls (in the east-west direction only), and flexible floor and roof diaphragms. The lateral system of the 1996 addition consists of plywood shear walls and a plywood roof diaphragm. The lateral system of the 2019 elevator addition is Sure-Board sheathed metal shear walls.

3.1.4 Structural System Visual Condition

Table 3.1.4-1. Structural System Condition Descriptions.

Structural System	Description
Structural Roof	Roof appears to be in satisfactory condition.
Structural Floor(s)	Floor system appears to be in satisfactory condition.
Foundations	Foundations are not visible but there are no visible indications of damage or distress.
Gravity System	Gravity system appears to be in satisfactory condition.
Lateral System	Lateral system appears to be in satisfactory condition.

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
Shear Stress Check	Wall shear stress per quick check does not appear to be compliant. Exterior walls HCT with brick veneer. Lateral system strengthening for in-plane shear of exterior shear walls is recommended to mitigate seismic risk.
Transfer to Shear Walls	Likely non-compliant relative to original 1928 construction. Additional diaphragm to shear wall connections may be appropriate to mitigate seismic risk.
Proportions	HCT exterior walls do not meet this requirement. HCT is brittle and strongbacking of walls is recommended to mitigate seismic risk.
Diagonally Sheathed and Unblocked Diaphragms	It is unknown if original diaphragm is diagonally sheathed but span in east-west direction exceeds 40 feet. Also, diaphragm span of 1996 wood framed addition also exceeds 40 feet. Further investigation and analysis are recommended. Additional interior shear walls to reduce diaphragm spans and demand may be appropriate to mitigate seismic risk.
Beam, Girder, and Truss Supports	HCT exterior walls are bearing walls for second floor and roof joists. HCT walls are brittle and should not be used for bearing. Supplement bearing walls are recommended to mitigate seismic risk. Steel girders at second floor, however, that are supporting walls, floor, and roof above bear on steel columns independent of the HCT walls.

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
Load Path	Load path is unknown for the original 1928 construction and further investigation should be performed to determine diaphragm connections to the exterior HCT walls. Additional diaphragm to shear wall connections may be appropriate to mitigate seismic risk. Load path to the concrete shear walls reconfigured in 1996 exists, as does the load path for the 1996 condition.
Liquefaction	The liquefaction potential of site soils is unknown at this time given available information. Very low 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.
Surface Fault Rupture	Requires further investigation by a licensed geotechnical engineer to determine whether site is near locations of expected surface fault ruptures.
Wall Anchorage	Rosette anchors are visible on the exterior at the second floor, second floor ceiling framing level, and at the roof level. These were added during the 1984 modernization; however, no drawings were available to review the connection of these wall anchors to the floor, ceiling, and roof framing or diaphragms. Further investigation should be performed. Additional out-of-plane anchoring may be appropriate to mitigate seismic risk.
Wood Ledgers	Likely non-compliant relative to original 1928 construction. Further investigation should be performed. Additional blocking and strapping may be appropriate to mitigate seismic risk.
Cross Ties	Cross-ties to develop the out-of-plane anchors that were added in 1984 are unknown due to unavailable 1984 drawings. Further investigation should be performed to determine if rosette anchor forces are adequately transferred to the elevated diaphragms.

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

Deficiency	Description
	Additional blocking, strapping, and connections may be appropriate to mitigate seismic risk.
Spans	It is unknown if the original building diaphragms are straight sheathed or diagonally sheathed. Diaphragm spans for lateral loads in the east-west direction are less than 24 feet. However, diaphragm spans for lateral loads in the north-south direction exceed 24 feet, therefore the orientation of sheathing should be further investigated.
Stiffness of Wall Anchors	No available information. Further investigation should be performed. Additional shear wall anchoring may be appropriate to mitigate seismic risk.

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
LF-1 Independent Support. HR-not required; LS-MH; PR-MH.	It is unclear how much the light fixtures weigh. However, it appears that the light fixtures are not suspended independently from the ceiling by at least two wires at diagonally opposite corners. Adding wires for suspending the light fixtures may be appropriate to mitigate seismic risk.
M-4 Unreinforced Masonry Backup. HR-LMH; LS-LMH; PR-LMH.	The backup for the exterior brick is HCT unreinforced masonry. Strongbacking of exterior HCT walls is recommended to mitigate seismic risk.

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. HR-not required; LS- LMH; PR-LMH.	No available record drawing information on fire suppression piping and unable to verify during site investigation. Sprinklers only occur on the first floor. Further investigation required to determine compliance with NFPA 13. Bracing for fire suppression piping may be appropriate to mitigate seismic risk.
LSS-2 Flexible Couplings. HR-not required; LS-LMH; PR-LMH.	No available record drawing information on fire suppression piping and unable to verify during site investigation. Sprinklers only occur on the first floor. Further investigation required to determine compliance with NFPA 13. Flexible coupling for fire suppression piping may be appropriate to mitigate seismic risk.
LSS-3 Emergency Power. HR- not required; LS-LMH; PR-LMH.	Use of emergency power was not verified with maintenance or facility staff. Evaluation of emergency power equipment may be appropriate to mitigate seismic risk.
HM-1 Hazardous Material Equipment. HR-LMH; LS-LMH; PR-LMH.	It is unknown if equipment is mounted on vibration isolators. Further investigation may be appropriate to mitigate seismic risk.
HM-2 Hazardous Material Storage. HR-LMH; LS-LMH; PR-LMH.	It is unknown if hazardous materials are stored in the science classrooms but this can be verified by facilities personnel. 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. There may be gas lines present. Further investigation of mechanical piping should be performed. Bracing and anchoring of piping may be appropriate 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. Further investigation of mechanical piping should be performed. Providing shutoff valves may be appropriate to mitigate seismic risk.
HM-5 Flexible Couplings. HR-LMH; LS-LMH; PR-LMH.	It is unknown whether the building has hazardous materials. There may be gas lines present. Further investigation of mechanical piping should be performed. Flexible coupling for piping and ductwork may be appropriate to mitigate seismic risk.

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

Deficiency	Description
C-1 Suspended Lath and Plaster. HR-H; LS-MH; PR- LMH.	Most ceilings are acoustical ceiling tile (ACT): however, it is unknown if the stair areas have a suspended lath and plaster ceiling. It is unlikely that the ceiling is braced for seismic forces. Further investigation should be performed, as this is a path of egress. Bracing for ceilings may be appropriate to mitigate seismic risk.
C-2 Suspended Gypsum Board. HR-not required; LS- MH; PR-LMH.	Most ceilings are ACT; however, it is unknown if the stair areas have a suspended gypsum board ceiling. It is unlikely that the ceiling is braced for seismic forces. Further investigation should be performed, as this is a path of egress. Bracing for ceilings may be appropriate to mitigate seismic risk.
M-1 Ties. HR-not required; LS-LMH; PR-LMH.	The connection of the original brick to the HCT exterior walls is unknown. Observation from the engineers of the 2019 elevator addition noted an air gap between the brick and HCT. Research of archaic HCT wall construction literature shows brick veneer interlaced with HCT coursing; however, this should be verified.
M-3 Weakened Planes. HR- not required; LS-LMH; PR-LMH.	Details of original construction are not available. Further investigation is required to evaluate this statement.
M-6 Anchorage. HR-not required; LS-MH; PR-MH.	The connection of the original brick to the HCT exterior walls is unknown. Research of archaic HCT wall construction literature shows brick veneer interlaced with HCT coursing; however, this should be verified.
PCOA-1 URM Parapets or Cornices. HR-LMH; LS-LMH; PR-LMH.	The unreinforced parapet details are unknown. Further investigation should be performed. Reinforcement for the parapets may be appropriate to mitigate seismic risk.
S-1 Stair Enclosures. HR-not required; LS-LMH; PR-LMH.	The details of the stair enclosure are unclear. It is likely noncompliant. Further investigation should be performed. Additional bracing or strongbacking for the wall around stair enclosures may be appropriate to mitigate seismic risk.
S-2 Stair Details. HR-not required; LS-LMH; PR-LMH.	The details of the stair connection to the floors are unknown. Further investigation should be performed. Additional anchoring from stairs to the structure may be appropriate to mitigate seismic risk.
CF-2 Tall Narrow Contents. HR-not required; LS-H; PR-MH.	Not able to verify all tall and narrow contents during site investigation. Tall narrow contents such as shelving units and cabinets should be braced at the tops to the nearest backing wall.

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

Deficiency	Description
CF-3 Fall-Prone Contents. HR-not required; LS-H; PR-H.	Not able to verify all conditions of fall prone contents during site investigation. Heavy items on upper shelves and cabinets should be moved down to lower shelves or to the ground or restrained by netting or cabling to avoid becoming falling hazards.
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.

4.0 Recommendations and Considerations

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 Hollow Clay Tile Exterior Walls

The typical exterior wall and bearing walls at the first and second floors is 13 inches consisting of HCT with brick veneer. Based upon photos from the 2019 elevator tower addition, it appears the HCT pattern may be 'Denison Interlocking Tiles' with interlaced brick veneer. HCT is brittle; during large seismic events, HCT walls are susceptible to brittle failures and loss of capacity, which would consequently result in loss of vertical support. It is recommended that these walls receive strongbacking to resist lateral loads that will also serve as supplemental bearing support for the second floor and roof framing above. The strongbacking can consist of metal studs that are anchored to the HCT with metal clips. See Typical Wall Section in Figure 1 in Appendix B. It is recommended that these walls also be sheathed with Sure-Board® sheathing (a steel sheet and gypsum wallboard composite product), or similar product, to provide in-plane shear capacity along the exterior walls. See Section 4.1.5 below for additional recommendations for in-plane shear strengthening of the HCT exterior walls.

4.1.2 New Transverse Wood Shear Walls / Cross Walls

To reduce the roof and second floor diaphragm spans and demands, select existing partition walls should be strengthened with plywood sheathing to serve as new interior shear walls or cross walls to resist seismic loads in the north-south direction. See Figures 1 and 2 in Appendix B, which show proposed shear wall / cross wall locations. This layout of additional shear walls would also reduce the diaphragm aspect ratios and be a significant improvement to the diaphragm stiffness and reduce demands on the existing out-of-plane wall anchorage that was installed as part of the 1984 modernization. The proposed strengthening of the wall that separates the classrooms of the 1996 addition is to provide added strength and stiffness to help buttress the original 1928 building, in addition to reducing the span and demands of the potentially unblocked 54-foot-long roof diaphragm.

4.1.3 Roof Diaphragm Sheathing Overlay

The existing roof framing is unknown, but based on the year of construction, it is assumed that the roof is sheathed with wood shiplap supported by 2x joists spanning in the north-south

direction from exterior URM/HCT walls to interior corridor bearing walls. It is also not known if a plywood-sheathing overlay was added in the 1984 modernization, similar to other buildings that were part of the 1984 modernization. Therefore, for the purposes of this report and estimate, it is recommended that the existing roof diaphragm be overlayed, strengthened, and stiffened with 1/2-inch plywood sheathing. This can be performed as part of a future re-roofing project, and the type of sheathing below the existing roofing should be verified during the design phase of the re-roofing project or seismic upgrade, where over 90% of the cost is to remove and replace the roofing system.

4.1.4 Load Path to Existing Concrete Shear Walls

The interior concrete shear walls along grid BC were added in the 1996 modernization. The shear wall is approximately 6 feet long; however, according to the existing detail, it may only have four 5/8-inch-diameter lag screw fasteners to transfer lateral loads to the concrete shear wall. It is recommended that a supplemental connection be installed to transfer diaphragm loads to the interior concrete shear walls along this grid. See Detail 1 of Figure 1 in Appendix B.

4.1.5 Load Path to the Exterior Hollow Clay Tile Masonry Shear Walls

Due to unavailable original 1928 drawings or 1984 modernization drawings, it is not known how the second floor and roof diaphragm forces are transferred to the exterior HCT masonry shear walls. As part of a seismic upgrade to implement recommendations presented in this report, the connection of the diaphragm to the exterior walls should be further. If an adequate ledger connection exists, connections to the Sure-Board® sheathed strongback stud walls should be considered to support in-plane plane shear in addition to out-of-plane support of the HCT walls. If added clips are not desired, another potential solution to consider and research is a structurally bonded spray foam insulation that bonds to the HCT and metal studs, transfers tension and shear to the studs, and provides a vapor barrier and insulation in the strongbacking stud cavity. Alternately, the diaphragm transfer connection can be made directly to the top track of the strongbacking and Sure-Board® sheathed shear walls described in Section 4.1.1 above.

4.2 Foundations and Geotechnical Considerations

A detailed geotechnical analysis of the site soils was not included in the scope of this study. As a result, the geotechnical seismic effects on the existing building and its foundations, such as the presence of liquefiable soils and allowable soil bearing pressures, are unknown at this time. However, based on state of Washington liquefaction mapping, the building is located on soils classified with a very low susceptibility to liquefaction. Future seismic upgrade projects should consider doing a geotechnical investigation to verify that the underlying soils are not susceptible to liquefaction and to determine the nature of the liquefaction hazard and the characteristics of the site soils. Foundation mitigation and ground improvement may be required and the recommended geotechnical investigation could have a major impact on the scope of work required for seismic retrofit

Liquefaction is the tendency of certain soils to saturate and lose its strength during strong earthquake shaking, causing it to flow and deform similar to a liquid. Liquefaction, when it

occurs, drastically decreases the soil bearing capacity and tends to lead to large differential settlement of soil across a building's footprint. Liquefaction can also cause soils to spread laterally and can dramatically affect a building's response to earthquake motions, all of which can significantly compromise the overall stability of the building and possibly lead to isolated or widespread collapse in extreme cases. Existing foundations damaged as a result of liquefiable soils also make the building much more difficult to repair after an earthquake.

Buildings that are not founded on a raft foundation or deep foundation system (such as grade beams and piles), and those with conventional strip footings and isolated spread footings that are not interconnected well with tie beams, are especially vulnerable to liquefiable soils. Mitigation techniques used to improve structures in liquefiable soils vary based on the type and amount of liquefiable soils and may include ground improvements to densify the soil (aggregate piers, compaction piling, jet grouting), installation of deep foundations (pin piling, augercast piling, micro-piling), and installation of tie beams between existing footings.

4.3 Tsunami Considerations

The building is not located in a tsunami inundation zone according to Washington State Department of Natural Resources tsunami inundation mapping. It is not necessary to consider tsunamis when planning seismic upgrades to this building.

4.4 Nonstructural Recommendations and Considerations

Table 3.2.3-1 identifies several nonstructural deficiencies that do not meet the performance objective selected for Port Townsend High School Math-Science Annex building. 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.

4.4.1 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.

Energy Code

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.

Accessibility

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.

Hazardous Materials Survey

It is recommended that all existing construction be surveyed for the presence of hazardous materials. Elements such as floor tile, adhesive, and pipe insulation could contain asbestos. Lead may be present in paint and light fixtures may contain PCB ballasts. A hazardous materials survey and abatement of the buildings should be performed prior to the start of any demolition work

Strongbacking of Existing Hollow Clay Tile Exterior Walls

Where vertical strongbacks are indicated along the building perimeter, existing casework, other fixed elements, and wall finishes will need to be removed to allow for construction. Vertical strongback metal studs installed along the building perimeter should be filled with R-21 batt insulation to meet the current energy code and covered with a vapor barrier. A layer of 5/8-inch gypsum wallboard should be installed over the gypsum-sheathing product and painted. Alternatively, where the new strongback studs are in toilet rooms, water-resistant gypsum wallboard should be used. Plumbing fixtures will need to be removed and reinstalled to allow for construction. Existing electrical outlets, switches, casework, and other items will need to be reinstalled in the new stud walls. Paint and new wall base should be installed to match adjacent wall finishes.

The existing ceilings and lighting in rooms to receive strongbacking should be removed to allow for installation of the studs, which need to tie-in to the floor and roof diaphragm above. In classrooms, a new suspended ceiling system should be installed with 2x4 recessed LED light fixtures. In toilet rooms, the existing ceiling should be replaced with 1/2-inch gypsum wallboard, painted, and new 1x4 recessed LED light fixtures should be installed.

Existing floor finishes may remain, provided the floors are protected.

Transverse Wood Shear Walls / Cross Walls

Where new plywood sheathing is called for on existing stud walls, the existing wall finishes will need to be removed and replaced with new 5/8-inch gypsum wallboard. Existing electrical outlets, switches, casework, and other items will need to be reinstalled in and on the new stud shear walls. Paint and new rubber base should be installed to match adjacent wall finishes. The District might consider installation of acoustical insulation in the stud cavity to mitigate sound transfer between rooms. Floor finishes should not require replacement provided they are protected.

As existing ceilings and light fixtures will need to be removed and replaced to accomplish the strongback work in these same areas, it is recommended that this work be performed at the same time.

Roof Diaphragm Sheathing Overlay

Installation of a new plywood roof diaphragm will require removal of the existing roofing material to allow installation of new plywood sheathing. A new roof consisting of a vapor barrier, continuous rigid R-38 insulation, coverboard, and membrane roofing is recommended. It is assumed that the existing parapet flashing may be re-used and the existing gutters and downspouts may remain in place. Any mechanical equipment curbs should be raised to accommodate the thicker insulation.

Load Path to Existing Concrete Shear Walls

Access to the second-floor diaphragm and glulam beam below will be needed to install plates and anchors to secure the existing concrete shear walls to the structure above. As existing ceilings and light fixtures will need to be removed and replaced to accomplish other work in these areas, it is recommended that this work be performed at the same time.

Load Path to the Exterior Hollow Clay Tile Masonry Walls

Access to the second floor and roof diaphragms will be needed to install metal stud strongbacks. As existing ceilings and light fixtures will need to be removed and replaced to accomplish the work in these areas, it is recommended that clips or structurally bonded spray foam insulation be installed at the same time.

Ceiling in Paths of Egress

Most ceilings in this building are acoustical ceiling tile; however, it is unknown if the stair areas have suspended lath and plaster or gypsum wallboard ceilings. 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 Support

The light fixtures observed in the integrated ceiling system did not appear to have at least two wires at opposite corners independently supported to the floor or roof structure above and could potentially fall with the ACT ceiling grid during a seismic event. Maintenance and facility staff should verify that each fixture is independently supported to the floor or 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, 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.

4.4.2 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.

4.5 Opinion of Probable Conceptual Seismic Upgrades Costs

An opinion of probable project costs of the concept-level seismic upgrade recommendations provided in this report is included in Appendix C. The input of the scope of work to develop the probable costs is 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 the 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.

For this preliminary opinion of probable costs the estimate of construction costs of the preliminary scope of work is developed based on current 1st Quarter (1Q) 2021 costs. Costs are then escalated to 4Q 2022 at 6% per year of the baseline cost estimate. Costs are developed

based on the Tier 1 checklist, concept-level seismic upgrade design sketches, and project narratives.

A range of the cost estimate of -20% (low) to +50% (high) is used to develop the range of the construction cost estimate for the concept-level scope of work. The -20% to +50% range guidance is from Table 1 of the AACE International Recommended Practice 56R-08, *Cost Estimate Classification System*. This estimate is classified as a Class 5 based on the level of design of 0% to 2%. The range of a Class 5 construction cost estimate based on the AACE guidance selected for this estimate is a -20% to +50%.

The estimated total cost (construction costs plus soft costs) to mitigate the deficiencies identified in the Tier 1 checklists of the Port Townsend High School Math-Science Annex ranges between approximately $1.19M and $2.24M (-20%/+50%). The baseline estimated total cost to seismically upgrade this building is approximately $1.49M. On a per-square-foot basis, the baseline seismic upgrade cost is estimated to be approximately $113 per square foot in 4Q 2022 dollars, with a range between $90 per square foot and $170 per square foot.

4.5.1 Opinion of Probable Construction Costs

This conceptual opinion of construction cost includes labor, materials, equipment, and scope contingency, general contractor general conditions, home office 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 soft costs are described below in Section 4.5.2.

The cost is developed in 1Q 2021 costs. The costs are then escalated to 4Q 2022 using an escalation rate of 6.0% per year. If the mid-point of construction will occur at a date earlier or later than 4Q 2022, then it is appropriate to adjust the escalation to the revised mid-point of construction. Construction costs excluded from the estimate are site work, phasing of construction, additional building modifications not directly related to the seismic scope of work, off hours labor costs, accelerated schedule overtime labor costs, replacement/relocation/additional FF+E, and building code changes that occur after this report.

For project budget planning purposes, it is highly recommended that the opinion of probable project costs is determined including: the overall construction budget of the seismic upgrade and additional scope of work for the building via the services of an A/E design team to study the proposed seismic mitigation strategies to refine the concept-level seismic upgrades design approach contained in this report, determine the construction timeline to adjust the escalation costs, define the construction phasing, if any, and the project soft costs.

4.5.2 Opinion of Probable A-E Design Budgets and Owner's Additional Project Costs (Soft Costs)

Additional owner's project costs would likely include owner's project administration costs, including project management, financing/bond costs, administration/contract/accounting costs, review of plans, value engineering studies, building permits, bidding costs, equipment, fixtures,

furnishings and technology, and relocation of the school staff and students during construction. These costs are known as soft costs.

These soft costs have been included in the opinion of probable costs at 40% of the baseline probable construction cost for the seismic upgrade of this building.
The soft costs used for the projects that total to 40% are:
A+E Design - 10%
QA/QC Testing - 2%
Project Administration - 2%
Owner Contingency - 11%
Average Washington State Sales Tax - 9%
Building Permits - 6%

It is typical for soft costs to vary from owner to owner. Based upon our team members' experience on K-12 school projects in the state of Washington, it is our opinion that an allowance of 40% of the average probable construction cost is a reasonable and appropriate soft cost recommendation for planning purposes. We also recommend that each owner develop their own soft costs as part of their budgeting process and not rely solely on this recommended percentage.

4.5.3 Escalation Rate

A 6.0%/year construction cost escalation rate is used for planning purposes for the conceptual estimates. The rate is compounded annually to the projected midpoint of construction. This rate is representative of the escalation based on the previous five years of market experience of construction costs throughout the state of Washington and is projected going forward for these projects. This rate is calculated to the 4th Quarter of 2022 as an allowance for planning purposes. The actual construction schedule for the project is to be determined and we recommend the escalation cost be revised based on revised construction schedule using the 6%/year rate.

Table 4.5.3-1. 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)
Port Townsend High School, Math-Science Annex	URM	High / D	**Structural**			
			Life Safety	13,169 SF	$36 - $67 ($473K) ($887K)	$45 ($592K)
			Nonstructural			
			Life Safety	13,169 SF	$29 - $54 ($379K) ($710K)	$36 ($473K)
			Total			
				13,169 SF	$65 - $121 ($852K) ($1.60M)	$81 ($1.07M)
					Estimated Soft Costs:	$426K
					Total Estimated Project Costs:	**$1.49M**

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

This page intentionally left blank.

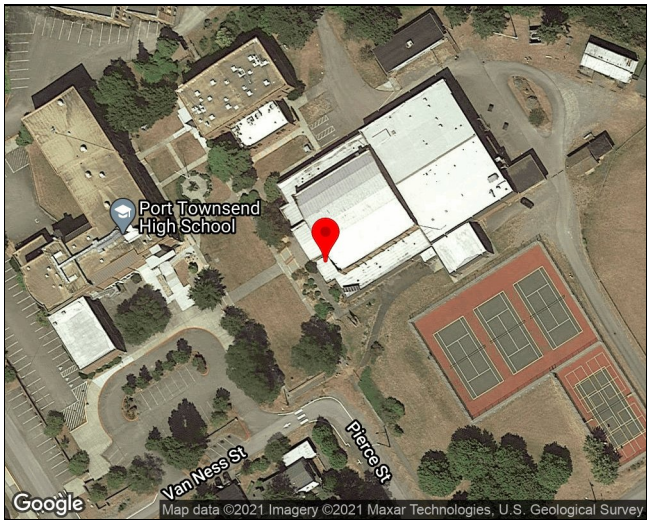
Appendix A: ASCE 41 Tier 1 Screening Report

This page intentionally left blank.

1. Port Townsend, Port Townsend High School, Math Science Annex

1.1 Building Description

Building Name:	Math Science Annex
Facility Name:	Port Townsend High School
District Name:	Port Townsend
ICOS Latitude:	48.118
ICOS Longitude:	-122.768
ICOS County/District ID:	16050
ICOS Building ID:	10330
ASCE 41 Bldg Type:	URM
Enrollment:	366
Gross Sq. Ft. :	13,169
Year Built:	1928
Number of Stories:	2
$S_{XS\ BSE\text{-}2E}$:	1.066
$S_{X1\ BSE\text{-}2E}$:	0.630
ASCE 41 Level of Seismicity:	High
Site Class:	D
V_{S30}(m/s):	355
Liquefaction Potential:	very low
Tsunami Risk:	Extremely Low
Structural Drawings Available:	Yes
Evaluating Firm:	Reid Middleton, Inc.



The Math Science Annex at Port Townsend High School, which was originally constructed in 1928, is a 2-story building with exterior unreinforced hollow clay tile masonry bearing walls and wood framed floors and roof. According to a 2007 study and survey, this building underwent a significant modernization in 1984 which include seismic upgrades such as out-pf-plane wall anchoring and addition of concrete shear walls. This building also received a single-story classroom addition in 1996 which also reconfigured the interior concrete shear walls that were added in 1984. In 2019 the building received and elevator tower addition in which it was discovered that the original exterior walls were constructed of brittle hollow clay tile with brick veneer. This elevator addition was not seismically evaluated based on design to current seismic codes.

Original construction drawings or structural drawings from the major 1984 modernization were not available to review. However, architectural and structural drawings from the 1996 modernization were available for review.

1.1.1 Building Use

The Math Science Annex consists of classrooms including science classroom spaces.

1.1.2 Structural System

Table 1.1-1. Structural System Description of Port Townsend High School

Structural System	Description
Structural Roof	It is assumed that roof framing consists of wood shiplap supported by 2x joists spanning in the north-south direction from exterior URM/HCT walls to interior corridor bearing walls. Based on a 1996 architectural wall section, and locations of rosette anchors on the exterior walls, the 2nd floor ceiling framing may be structural and may be used to support the roof framing. This should be further investigated. The roof of the 1996 addition is plywood sheathing over engineered wood I-joists supported by wood stud bearing walls.
Structural Floor(s)	The second floor likely consists of wood shiplap supported by 2x joists spanning in the north-south direction from exterior URM/HCT walls to interior corridor beams and bearing walls. The first floor framing over a crawlspace also likely consists of wood shiplap supported by 2x joists spanning in the north-south direction and supported by concrete stem walls and footings. The first floor of the 1996 addition is framed with plywood sheathing over engineered wood I-joists spanning over crawlspace to concrete foundation stem walls. The
Foundations	Foundations consist of shallow cast-in-place concrete footings and stem walls.
Gravity System	The gravity system of the original building is wood framing with unreinforced hollow clay tile masonry bearing walls at the exterior and interior girders. The gravity system of the 1996 addition is wood framing with wood stud bearing walls. The 2019 elevator addition is steel framed with 2nd floor deck and topping.
Lateral System	The lateral system of the original building consists of exterior unreinforced hollow clay tile masonry shear walls, reinforced concrete shear walls (in the east-west direction only), and flexible floor and roof diaphragms. The lateral system of the 1996 addition consists of plywood shear walls and a plywood roof diaphragm. The lateral system of the 2019 elevator addition is Sure-Board sheathed metal shear walls.

1.1.3 Structural System Visual Condition

Table 1.1-2. Structural System Condition Description of Port Townsend High School

Structural System	Description
Structural Roof	The roof structure appears to be in satisfactory condition.
Structural Floor(s)	The structural floors appear to be in satisfactory condition.
Foundations	Foundations are not visible but appear to be in satisfactory condition with no apparent issues.
Gravity System	The gravity system appears to be in satisfactory condition.
Lateral System	The lateral force resisting system appears to be in satisfactory condition.

Photos:

Figure 1-1. Math/Science Annex, Southeast Corner (2018)

Figure 1-2. Math/Science Annex, South Elevation (2018)

Figure 1-3. Math/Science Annex, South Elevation (2018)

Figure 1-4. Math/Science Annex, West Elevation (2018)

Figure 1-5. Math/Science Annex, North Entry (2018)

Figure 1-6. Math /Science Annex, Typical Ceiling System (2018)

Figure 1-7. Math/Science Annex, Typical Window/Ceiling System (2018)

Figure 1-8. Math/Science Annex, Mechanical Room (2018)

Figure 1-9. Math/Science Annex, Mechanical Room (2018)

Figure 1-10. Hollow Clay Tile Exterior Walls (2019 Elevator Tower Project)

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 Port Townsend Port Townsend High School Math Science Annex

Deficiency	Description
Shear Stress Check	Wall shear stress per quick check does not appear to be compliant. Exterior walls hollow clay tile with brick veneer. Lateral system strengthening for in-plane shear of exterior shear walls is recommended to mitigate seismic risk.
Transfer to Shear Walls	Likely non-compliant relative to original 1928 construction. Additional diaphragm to shear wall connections may be appropriate to mitigate seismic risk.
Proportions	Hollow clay tile exterior walls do not meet this requirement. Hollow clay tile is brittle and strongbacking of walls is recommended to mitigate seismic risk.
Diagonally Sheathed and Unblocked Diaphragms	It is unknown if original diaphragm is diagonally sheathed but span in east-west direction exceeds 40 feet. Also diaphragm span of 1996 wood framed addition also exceeds 40 feet. Further investigation and analysis is recommended. Additional interior shear walls to reduce diaphragm spans and demand may be appropriate to mitigate seismic risk.
Beam, Girder, and Truss Supports	Hollow Clay Tile (HCT) exterior walls are bearing walls for 2nd floor and roof joists. HCT walls are brittle and should not be used for bearing. Supplement bearing walls is recommended to mitigate seismic risk. Steel girders at second floor however, that are supporting walls, floor, and roof above bear on steel columns independent of the HCT walls.

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 Port Townsend Port Townsend High School Math Science Annex

Unknown Item	Description
Load Path	Load path is unknown for the original 1928 construction and further investigation should be performed to determine diaphragm connections to the exterior hollow clay tile walls. Additional diaphragm to shear wall connections may be appropriate to mitigate seismic risk. Load path to the concrete shear walls reconfigured in 1996 exists as does the load path for the 1996 condition.
Liquefaction	The liquefaction potential of site soils is unknown at this time given available information. Very low 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.
Surface Fault Rupture	Requires further investigation by a licensed geotechnical engineer to determine whether site is near locations of expected surface fault ruptures.
Wall Anchorage	Rosette anchors are visible on the exterior at the 2nd floor, 2nd floor ceiling framing level, and at the roof level. These were added during the 1984 modernization however no drawings were available to review the connection of these wall anchors to the floor, ceiling, and roof framing or diaphragms. Further investigation should be performed. Additional out-of-plane anchoring may be appropriate to mitigate seismic risk.
Wood Ledgers	Likely non-compliant relative to original 1928 construction. Further investigation should be performed. Additional blocking and strapping may be appropriate to mitigate seismic risk.
Cross Ties	Cross-ties to develop the out-of-plane anchors that were added in 1984 are unknown due to unavailable 1984 drawings. Further investigation should be performed to determine if rosette anchor forces is adequately transferred to the elevated diaphragms. Additional blocking, strapping and connections may be appropriate to mitigate seismic risk.
Spans	It is unknown if the original building diaphragms are straight sheathed or diagonally sheathed. Diaphragm spans for lateral loads in the east-west direction however are less than 24 feet. Diaphragm spans for lateral loads in the north-south direction however exceed 24 feet, therefore the orientation of sheathing should be further investigated.
Stiffness of Wall Anchors	No available information. Further investigation should be performed. Additional shear wall anchoring may be appropriate to mitigate seismic risk.

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 Port Townsend Port Townsend High School Math Science Annex

Deficiency	Description
LF-1 Independent Support. HR-not required; LS-MH; PR-MH.	It is unclear how much the light fixtures weigh. However, it appears that the light fixtures are not suspended independently from the ceiling by at least 2 wires at diagonally opposite corners. Adding wires for suspending the light fixtures may be appropriate to mitigate seismic risk.
M-4 Unreinforced Masonry Backup. HR-LMH; LS-LMH; PR-LMH.	The backup for the exterior brick is hollow clay tile unreinforced masonry. Strongbacking of exterior hollow clay tile walls is recommended to mitigate seismic risk.

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 Port Townsend Port Townsend High School Math Science Annex

Unknown Item	Description
LSS-1 Fire Suppression Piping. HR-not required; LS-LMH; PR-LMH.	No available record drawing information on fire suppression piping and unable to verify during site investigation. Sprinklers only occur on the first floor. Further investigation required to determine compliance with NFPA 13. Bracing for fire suppression piping may be appropriate to mitigate seismic risk.
LSS-2 Flexible Couplings. HR-not required; LS-LMH; PR-LMH.	No available record drawing information on fire suppression piping and unable to verify during site investigation. Sprinklers only occur on the first floor. Further investigation required to determine compliance with NFPA 13. Flexible coupling for fire suppression piping may be appropriate to mitigate seismic risk.
LSS-3 Emergency Power. HR-not required; LS-LMH; PR-LMH.	Use of emergency power was not verified with maintenance or facility staff. Evaluation of emergency power equipment may be appropriate to mitigate seismic risk.
LSS-5 Sprinkler Ceiling Clearance. HR-not required; LS-MH; PR-MH.	
HM-1 Hazardous Material Equipment. HR-LMH; LS-LMH; PR-LMH.	It is unknown if equipment is mounted on vibration isolators. Further investigation may be appropriate to mitigate seismic risk.
HM-2 Hazardous Material Storage. HR-LMH; LS-LMH; PR-LMH.	It is unknown if hazardous materials are stored in the science classrooms but this can be verified by facilities personnel. 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. There may be gas lines present. Further investigation of mechanical piping should be performed. Bracing and anchoring of piping may be appropriate 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. Further investigation of mechanical piping should be performed. Providing shutoff valves may be appropriate to mitigate seismic risk.
HM-5 Flexible Couplings. HR-LMH; LS-LMH; PR-LMH.	Unknown whether the building has hazardous materials. There may be gas lines present. Further investigation of mechanical piping should be performed. Flexible coupling for piping and ductwork may be appropriate to mitigate seismic risk.
C-1 Suspended Lath and Plaster. HR-H; LS-MH; PR-LMH.	Most ceilings are ACT, however it is unknown if the stair areas has a suspended lath and plaster ceiling. It is unlikely that the ceiling is braced for seismic forces. Further investigation should be performed as this is a path of egress. Bracing for ceilings may be appropriate to mitigate seismic risk.
C-2 Suspended Gypsum Board. HR-not required; LS-MH; PR-LMH.	Most ceilings are ACT, however it is unknown if the stair areas has a suspended gypsum board ceiling. It is unlikely that the ceiling is braced for seismic forces. Further investigation should be performed as this is a path of egress. Bracing for ceilings may be appropriate to mitigate seismic risk.

Unknown Item	Description
M-1 Ties. HR-not required; LS-LMH; PR-LMH.	The connection of the original brick to the hollow clay tile exterior walls is unknown. Observation from the engineers of the 2019 elevator addition noted an air gap between the brick and hollow clay tile. Research of archaic hollow clay tile wall construction literature shows brick veneer interlaced with hollow clay tile coursing, however this should be verified.
M-3 Weakened Planes. HR-not required; LS-LMH; PR-LMH.	Details of original construction are not available. Further investigation is required to evaluate this statement.
M-6 Anchorage. HR-not required; LS-MH; PR-MH.	The connection of the original brick to the hollow clay tile exterior walls is unknown. Research of archaic hollow clay tile wall construction literature shows brick veneer interlaced with hollow clay tile coursing, however this should be verified.
PCOA-1 URM Parapets or Cornices. HR-LMH; LS-LMH; PR-LMH.	The unreinforced parapet details are unknown. Further investigation should be performed. Reinforcement for the parapets may be appropriate to mitigate seismic risk.
S-1 Stair Enclosures. HR-not required; LS-LMH; PR-LMH.	The details of the stair enclosure are unclear. It is likely noncompliant. Further investigation should be performed. Additional bracing or strongbacking for the wall around stair enclosures may be appropriate to mitigate seismic risk.
S-2 Stair Details. HR-not required; LS-LMH; PR-LMH.	The details of the stair connection to the floors are unknown. Further investigation should be performed. Additional anchoring from stairs to the structure may be appropriate to mitigate seismic risk.
CF-2 Tall Narrow Contents. HR-not required; LS-H; PR-MH.	Not able to verify all tall and narrow contents during site investigation. Tall narrow contents such as shelving units and cabinets should be braced at the tops to the nearest backing wall.
CF-3 Fall-Prone Contents. HR-not required; LS-H; PR-H.	Not able to verify all conditions of fall prone contents during site investigation. Heavy items on upper shelves and cabinets should be moved\ndown to lower shelves or to the ground, or restrained by netting or cabling to\navoid becoming falling hazards.
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.

Port Townsend, Port Townsend High School, Math Science Annex

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	Load path is unknown for the original 1928 construction and further investigation should be performed to determine diaphragm connections to the exterior hollow clay tile walls. Additional diaphragm to shear wall connections may be appropriate to mitigate seismic risk. Load path to the concrete shear walls reconfigured in 1996 exists as does the load path for the 1996 condition.
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				It does not appear that there are any immediately adjacent structures.
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		There does not appear to be an interior mezzanine.

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				There does not appear to be a weak story irregularity.

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				There does not appear to be a soft story irregularity.
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				There does not appear to be any changes to the horizontal dimension of the seismic force-resisting system.
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				There does not appear to be a mass irregularity.
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				There does not appear to be a torsional irregularity.

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. Very low 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.

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				The base/height ratio exceeds 0.6 Sa
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				

17-36 Collapse Prevention Structural Checklist for Building Types URM and URMa

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 unreinforced masonry shear walls, calculated using the Quick Check procedure of Section 4.4.3.3, is less than 30 lb/in.2 (0.21 MPa) for clay units and 70 lb/in.2 (0.48 MPa) for concrete units. (Tier 2: Sec. 5.5.3.1.1; Commentary: Sec. A.3.2.5.1)		X			Wall shear stress per quick check does not appear to be compliant. Exterior walls hollow clay tile with brick veneer. Lateral system strengthening for in-plane shear of exterior shear walls is recommended to mitigate seismic risk.

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	Rosette anchors are visible on the exterior at the 2nd floor, 2nd floor ceiling framing level, and at the roof level. These were added during the 1984 modernization however no drawings were available to review the connection of these wall anchors to the floor, ceiling, and roof framing or diaphragms. Further investigation should be performed. Additional out-of-plane anchoring may be appropriate to mitigate seismic risk.

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	Likely non-compliant relative to original 1928 construction. Further investigation should be performed. Additional blocking and strapping may be appropriate to mitigate seismic risk.
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			Likely non-compliant relative to original 1928 construction. Additional diaphragm to shear wall connections may be appropriate to mitigate seismic risk.
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)

Seismic-Force-Resisting System

EVALUATION ITEM	EVALUATION STATEMENT	C	NC	N/A	U	COMMENT
Proportions	The height-to-thickness ratio of the shear walls at each story is less than the following: Top story of multi-story building – 9; First story of multi-story building – 15; All other conditions – 13. (Tier 2: Sec. 5.5.3.1.2; Commentary: Sec. A.3.2.5.2)		X			Hollow clay tile exterior walls do not meet this requirement. Hollow clay tile is brittle and strongbacking of walls is recommended to mitigate seismic risk.
Masonry Layup	Filled collar joints of multi-wythe masonry walls have negligible voids. (Tier 2: Sec. 5.5.3.4.1; Commentary: Sec. A.3.2.5.3)	X				Gap between brick veneer and hollow clay tile backing appears small based on pictures from 2019 elevator tower addition.

Diaphragms (Stiff or Flexible)

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	Cross-ties to develop the out-of-plane anchors that were added in 1984 are unknown due to unavailable 1984 drawings. Further investigation should be performed to determine if rosette anchor forces is adequately transferred to the elevated diaphragms. Additional blocking, strapping and connections may be appropriate to mitigate seismic risk.
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				It is unknown if original sheathing is diagonal or straight, however diaphragm aspect ratios in each direction are less than 2 to 1.
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	It is unknown if the original building diaphragms are straight sheathed or diagonally sheathed. Diaphragm spans for lateral loads in the east-west direction however are less than 24 feet. Diaphragm spans for lateral loads in the north-south direction however exceed 24 feet, therefore the orientation of sheathing should be further investigated.
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			It is unknown if original diaphragm is diagonally sheathed but span in east-west direction exceeds 40 feet. Also diaphragm span of 1996 wood framed addition also exceeds 40 feet. Further investigation and analysis is recommended. Additional interior shear walls to reduce diaphragm spans and demand may be appropriate to mitigate seismic risk.
Other Diaphragms	The 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. before engagement of the anchors. (Tier 2: Sec. 5.7.1.2; Commentary: Sec. A.5.1.4)				X	No available information. Further investigation should be performed. Additional shear wall anchoring may be appropriate to mitigate seismic risk.
Beam, Girder, and Truss Supports	Beams, girders, and trusses supported by unreinforced masonry walls or pilasters have independent secondary columns for support of vertical loads. (Tier 2: Sec. 5.7.4.4; Commentary: Sec. A.5.4.5)		X			Hollow Clay Tile (HCT) exterior walls are bearing walls for 2nd floor and roof joists. HCT walls are brittle and should not be used for bearing. Supplement bearing walls is recommended to mitigate seismic risk. Steel girders at second floor however, that are supporting walls, floor, and roof above bear on steel columns independent of the HCT walls.

Port Townsend, Port Townsend High School, Math Science Annex

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	No available record drawing information on fire suppression piping and unable to verify during site investigation. Sprinklers only occur on the first floor. Further investigation required to determine compliance with NFPA 13. Bracing for fire suppression piping may be appropriate to mitigate seismic risk.
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	No available record drawing information on fire suppression piping and unable to verify during site investigation. Sprinklers only occur on the first floor. Further investigation required to determine compliance with NFPA 13. Flexible coupling for fire suppression piping may be appropriate to mitigate seismic risk.
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. Evaluation of emergency power equipment may be appropriate to mitigate seismic risk.
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		

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	
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. Further investigation may be appropriate 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	It is unknown if hazardous materials are stored in the science classrooms but this can be verified by facilities personnel. 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. There may be gas lines present. Further investigation of mechanical piping should be performed. Bracing and anchoring of piping may be appropriate 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. Further investigation of mechanical piping should be performed. Providing shutoff valves may be appropriate 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. There may be gas lines present. Further investigation of mechanical piping should be performed. Flexible coupling for piping and ductwork may be appropriate to mitigate seismic risk.
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		Partitions do not appear to consist of masonry or hollow-clay tile.
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		Partitions do not appear to consist of masonry or hollow-clay tile.
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		
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		Not required for life safety performance level.
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	Most ceilings are ACT, however it is unknown if the stair areas has a suspended lath and plaster ceiling. It is unlikely that the ceiling is braced for seismic forces. Further investigation should be performed as this is a path of egress. Bracing for ceilings may be appropriate to mitigate seismic risk.
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	Most ceilings are ACT, however it is unknown if the stair areas has a suspended gypsum board ceiling. It is unlikely that the ceiling is braced for seismic forces. Further investigation should be performed as this is a path of egress. Bracing for ceilings 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		Not required for life safety performance level.
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			It is unclear how much the light fixtures weigh. However, it appears that the light fixtures are not suspended independently from the ceiling by at least 2 wires at diagonally opposite corners. Adding wires for suspending the light fixtures may be appropriate to mitigate seismic risk.
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 is not a steel or concrete moment frame building.
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 have any multi-story panels.
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 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 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 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		

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 connection of the original brick to the hollow clay tile exterior walls is unknown. Observation from the engineers of the 2019 elevator addition noted an air gap between the brick and hollow clay tile. Research of archaic hollow clay tile wall construction literature shows brick veneer interlaced with hollow clay tile coursing, however this should be verified.
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		
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	Details of original construction are not available. Further investigation is required to evaluate this statement.
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 backup for the exterior brick is hollow clay tile unreinforced masonry. Strongbacking of exterior hollow clay tile walls is recommended to mitigate seismic risk.

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		
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 connection of the original brick to the hollow clay tile exterior walls is unknown. Research of archaic hollow clay tile wall construction literature shows brick veneer interlaced with hollow clay tile coursing, however this should be verified.
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	The unreinforced parapet details are unknown. Further investigation should be performed. Reinforcement for the parapets may be appropriate to mitigate seismic risk.
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				Canopy at the 2019 Elevator tower attaches at the corner HSS columns that are further than 6 ft apart. However drawings indicate fully fixed connections to these columns.
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				The masonry parapets are likely compliant as they would be extensions of the structural wall above the elevation of the roof diaphragm.

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		There does not appear to be any masonry chimneys.
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		There does not appear to be any masonry chimneys.

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	The details of the stair enclosure are unclear. It is likely noncompliant. Further investigation should be performed. Additional bracing or strongbacking for the wall around stair enclosures may be appropriate to mitigate seismic risk.
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	The details of the stair connection to the floors are unknown. Further investigation should be performed. Additional anchoring from stairs to the structure may be appropriate to mitigate seismic risk.

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		
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	Not able to verify all tall and narrow contents during site investigation. Tall narrow contents such as shelving units and cabinets should be braced at the tops to the nearest backing wall.
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	Not able to verify all conditions of fall prone contents during site investigation. Heavy items on upper shelves and cabinets should be moved down to lower shelves or to the ground, or 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.

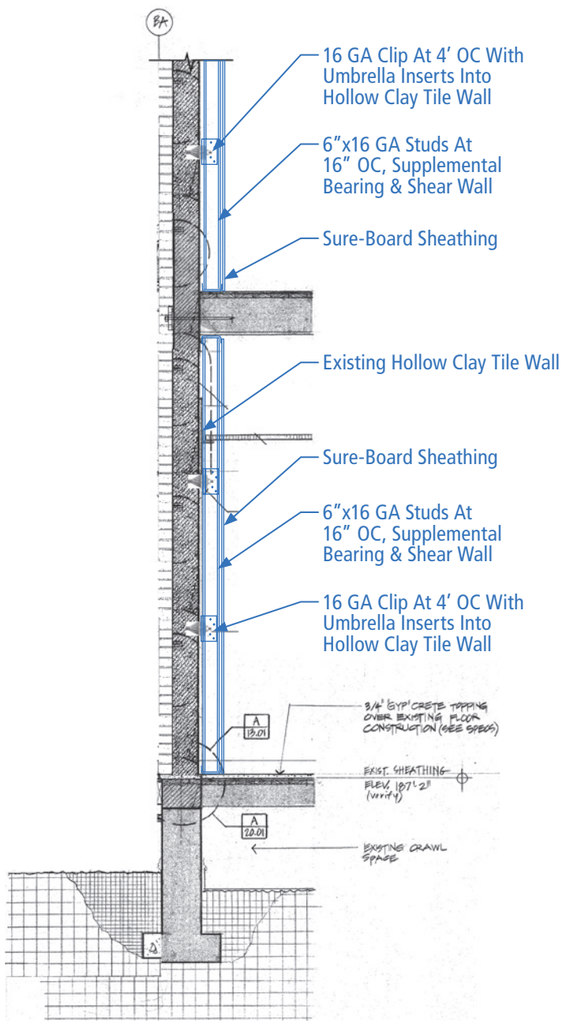
Elevators

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		Elevator appears to be a hydraulic elevator
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		Elevator appears to be a hydraulic elevator
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.

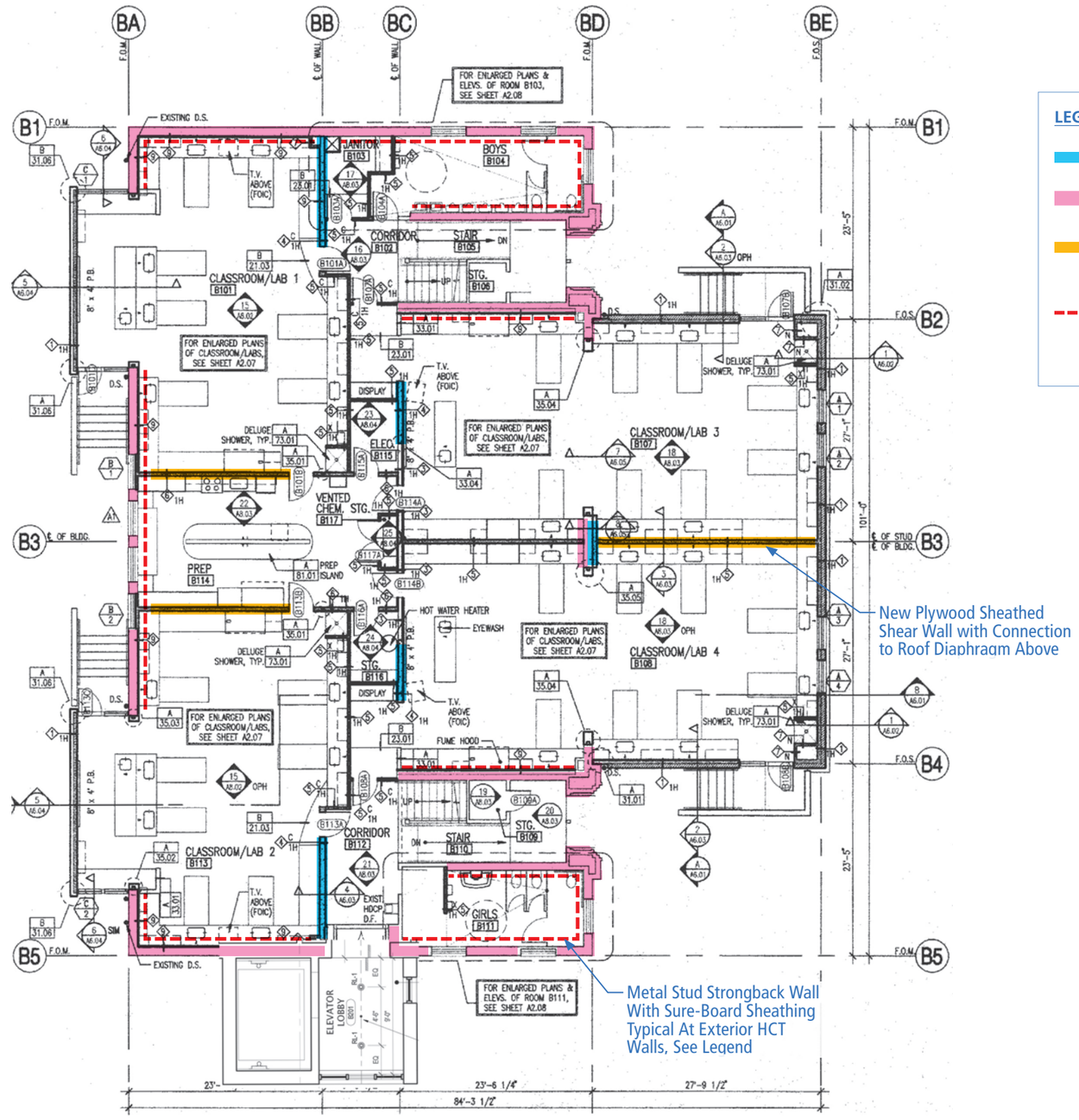
EL-4 Seismic Switch. HR-not required; LS-not required; PR-H.	Elevators capable of operating at speeds of 150 ft/min or faster are equipped with seismic switches that meet the requirements of ASME A17.1 or have trigger levels set to 20% of the acceleration of gravity at the base of the structure and 50% 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

This page intentionally left blank.



TYPICAL WALL SECTION

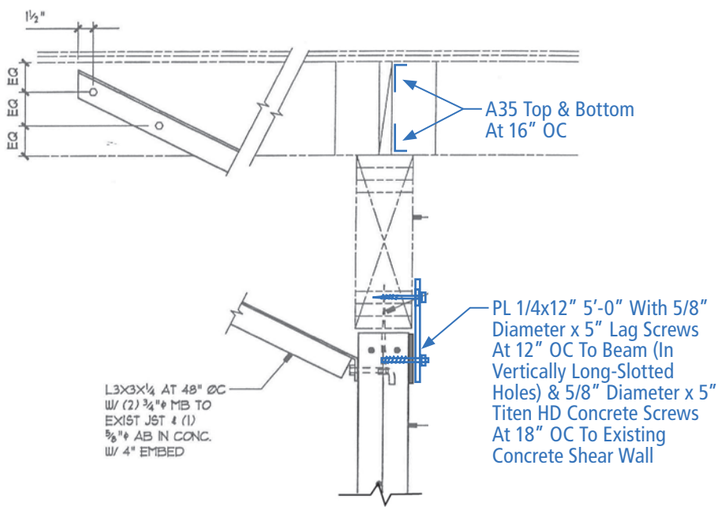


FIRST FLOOR PLAN

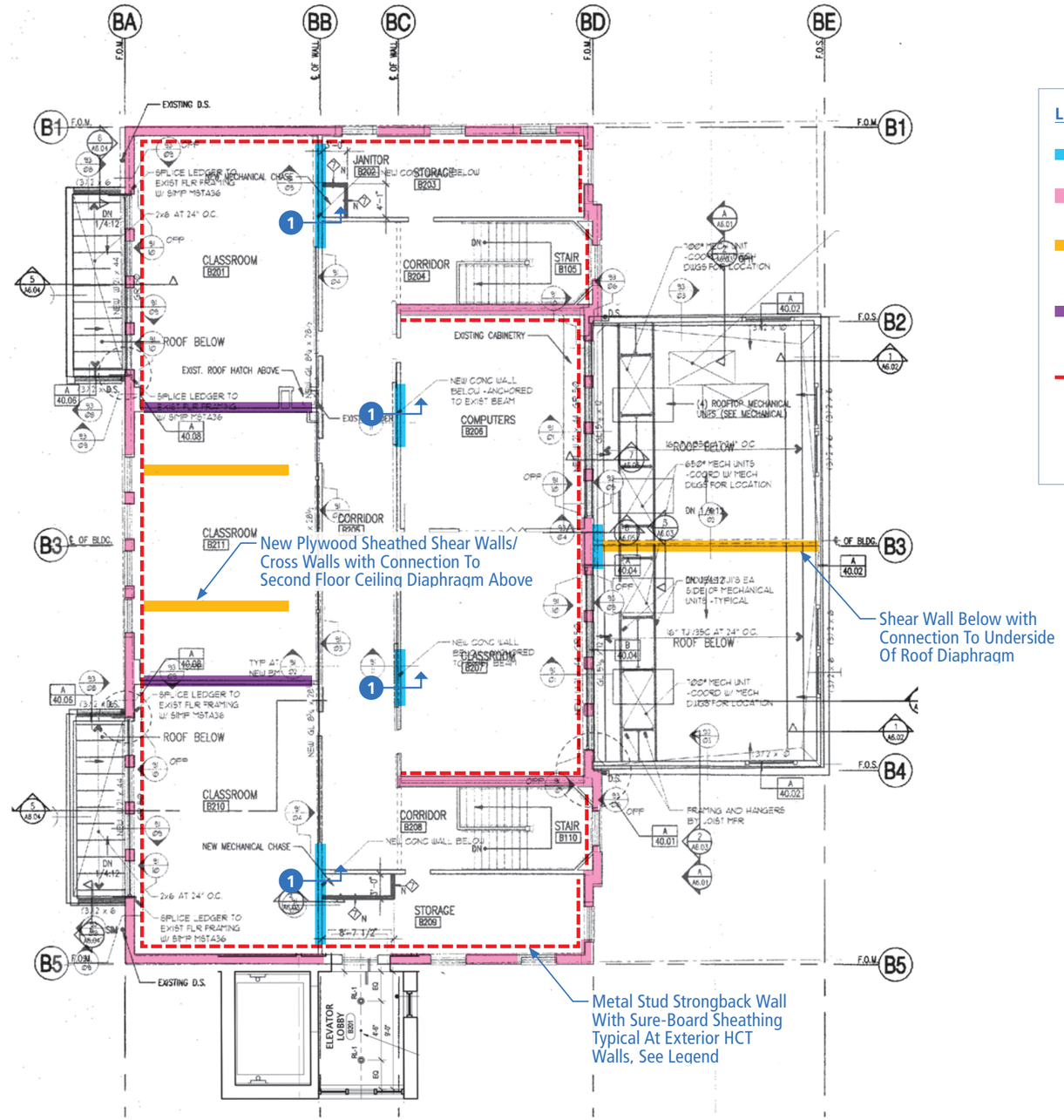
LEGEND

- Existing 6" Concrete Shear Wall (1996)
- Exterior Hollow-Clay Tile Wall With Brick Veneer
- New Plywood Sheathed Shear Walls, Cross Walls With Connection To Second Floor Diaphragm Above
- 6"X16 Gage Metal Stud Strongback Wall With Sure-Board Sheathing For Supplemental Bearing & Shear Strengthening

Figure 1 – First Floor Plan



1 CONNECTION TO CONCRETE SHEAR WALL BELOW

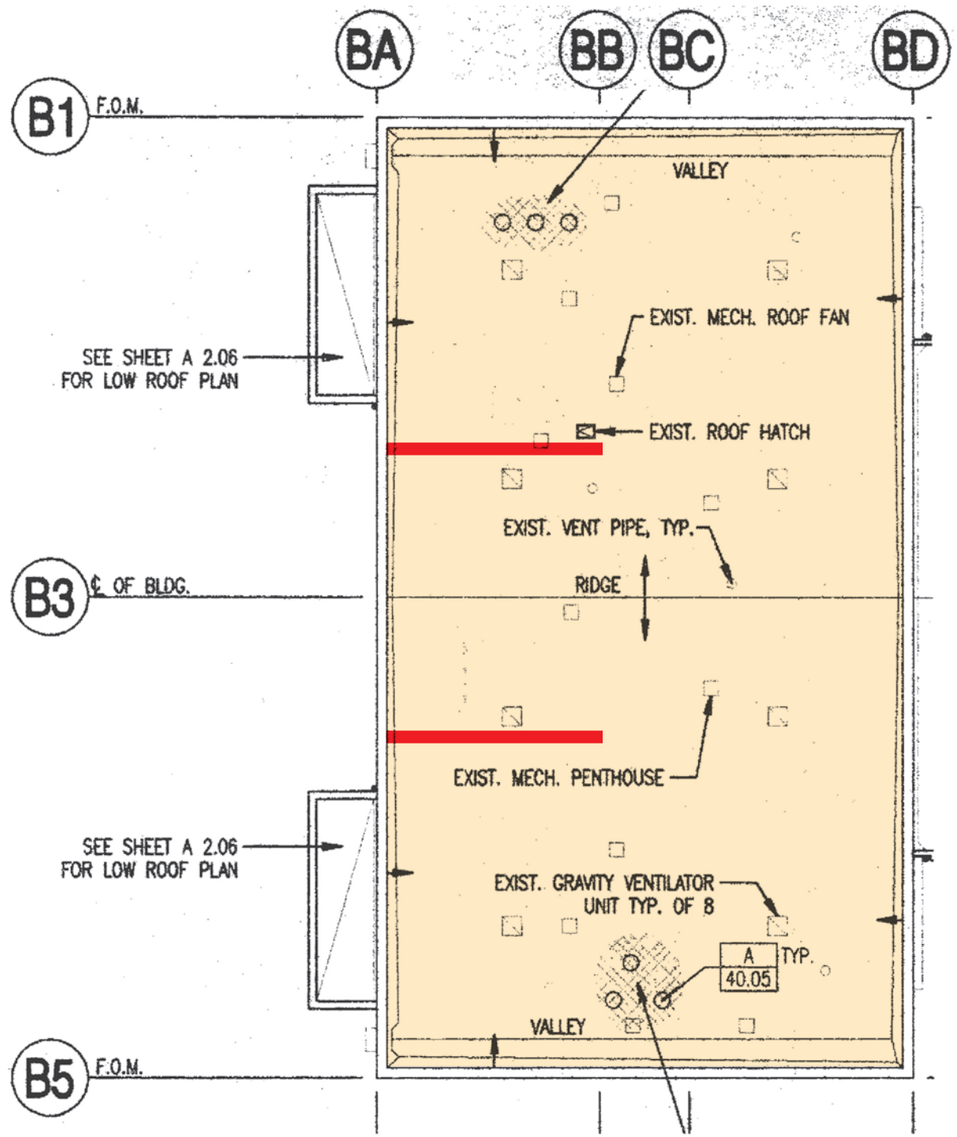


SECOND FLOOR PLAN

LEGEND

- Existing 6" Concrete Shear Wall Below (1996)
- Exterior Hollow-Clay Tile Wall With Brick Veneer
- Plywood Sheathed Shear Walls, Cross Walls Below With Connection To Underside Of Roof Diaphragm
- New Plywood Sheathed Shear Walls, Cross Walls With Connection To 2nd Floor Or Roof Diaphragm Above
- 6"x16 Gage Metal Stud Strongback Wall With Sure-Board Sheathing For Supplemental Bearing & Shear Strengthening, Metal Stud Strongback Wall With Sure-Board Sheathing, Typical At Exterior Hollow-Clay Tile Walls

Figure 2 – Second Floor Plan



LEGEND

- Remove & Replace Roofing Over New Plywood Sheathing Overlay On Existing Shiplap Sheathing
- New Plywood Sheathed Shear Walls, Cross Walls Below With Connection To 2nd Floor Ceiling Diaphragm

Figure 3 – Roof Plan

This page intentionally left blank.

Appendix C: Opinion of Probable Construction Costs

This page intentionally left blank.

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 Phase 2
Second Name:	Port Townsend High School Math-Science Annex
Location:	Port Townsend, WA
Design Phase:	ROM Cost Estimates
Date of Estimate:	March 11, 2021
Date of Revision:	April 12, 2021
Month of Cost Basis:	1Q, 2021

Port Townsend High School Math-Science Annex

Master Estimate Summary

Project Name	Construction Cost Type	Estimated Construction Cost
Port Townsend High School Math-Science Ar	Structural Costs	$591,539
Port Townsend High School Math-Science Ar	Non-Structural Costs	$473,231
TOTAL ESTIMATED CONSTRUCTION COST →		$1,064,770

Soft Costs	Soft Costs % Construction Cost	Estimated Soft Costs
Project Soft Cost Allowance	40.0%	$425,908
		Sum of the Above
TOTAL ESTIMATED PROJECT COST →		$1,490,678

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 the month of Cost Basis noted above right.

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 Allowance are: A/E design fees, QA/QC, Project Administration, Owners Project Contingency, Average Washington State Sale Tax and
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.

PRODIMS

520 Kirkland Way, Suite 301
Kirkland, WA 98033
Phone: 425-828-0500 Fax: 425-828-0700
www.prodims.com

Structural Costs

Name:	Wa State School Seismic Safety Assessment Phase 2	Areas	sqft
Second Name:	Port Townsend High School Math-Science Annex	Building Area	13,169
Location:	Port Townsend, WA		
Design Phase:	ROM Cost Estimates		
Date of Estimate:	March 11, 2021		
Date of Revision:	April 12, 2021		
Month of Cost Basis:	1Q, 2021	Total Areas	13,169

Port Townsend High School Math-Science Annex

Construction Cost Estimate

Subtotal Direct Cost From the Estimate Detail Below $ 401,884

	Percentage of Previous Subtotal		Amount		Running Subtotal
Scope Contingency	10.0%	$	40,188	$	442,072
General Conditions	10.0%	$	40,188	$	482,260
Home Office Overhead	5.0%	$	20,094	$	502,355
Profit	6.0%	$	24,113	$	526,468
Escalation Included to 4Q, 2022	12.4%	$	65,071	$	591,539
Washington State Sales Tax - Included in Soft Costs					

Total Markups Applied to the Direct Cost 47.19%
Markups are multiplied on each subtotal- They are not multiplied from the direct cost

		$/sqft
TOTAL ESTIMATED CONSTRUCTION COST--	**$ 591,539**	**$ 44.92**
-20% TOTAL ESTIMATED CONSTRUCTION COST VARIANCE --	**$ 473,231**	**$ 35.94**
+50% TOTAL ESTIMATED CONSTRUCTION COST VARIANCE --	**$ 887,309**	**$ 67.38**

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											
Superstructure											
	6"x 16 Ga Metal Stud with Sureboard Sheathing Stud Wall System	3,000	sqft	$ 4.51	$ 13,530.00	$ 3.69	$ 11,070.00	$ 0.49	$ 1,476.00	$ 8.69	$ 26,076.00
	New Shearwall with 1/2" Plywood Sheathing At Existing Wood Stud Walls - Connect Above - Remove GWB and Reinstall	720	sqft	$ 1.19	$ 853.85	$ 0.58	$ 420.55	$ 0.11	$ 76.46	$ 1.88	$ 1,350.86
Roof Systems											
	6"x 16 Ga Metal Stud with Sureboard Sheathing Stud Wall System	4,080	sqft	$ 4.51	$ 18,400.80	$ 3.69	$ 15,055.20	$ 0.49	$ 2,007.36	$ 8.69	$ 35,463.36
	New Shearwall with 1/2" Plywood Sheathing At Existing Wood Stud Walls - Connect Above - Remove GWB and Reinstall	480	sqft	$ 1.19	$ 569.23	$ 0.58	$ 280.37	$ 0.11	$ 50.98	$ 1.88	$ 900.58
	1/4" x 12" x 5'-0" Long Plate with 5/8" Dia x 5"L Wood Lags and 5/8" Titen Concrete Screws Connect Beam to Wall	2	each	$ 312.40	$ 624.80	$ 127.60	$ 255.20	$ 26.40	$ 52.80	$ 466.40	$ 932.80
	Add 1/2" Plywood Sheathing at Existing Roof	5,400	sqft	$ 0.94	$ 5,089.50	$ 0.51	$ 2,740.50	$ 0.09	$ 469.80	$ 1.54	$ 8,299.80
Roofing System											
	Remove Roofing System Down to Plywood Deck	5,400	sqft	$ 4.04	$ 21,802.50	$ 0.21	$ 1,147.50	$ 0.26	$ 1,377.00	$ 4.51	$ 24,327.00
	New Membrane Roofing System with R-38 Rigid Insulation, Flashing and Trim and Downspout Roof Drainage System	5,400	sqft	$ 8.78	$ 47,385.00	$ 10.73	$ 57,915.00	$ 1.17	$ 6,318.00	$ 20.67	$ 111,618.00
Interior Wall/Door/Casework/Specialties Systems											
	Remove and Reinstall Floor Finish Systems-Allow 80% of the Floor Area	10,535	sqft	$ 3.01	$ 31,679.35	$ 1.84	$ 19,416.37	$ 0.29	$ 3,065.74	$ 5.14	$ 54,161.46
	Remove and Reinstall Wall Finish Systems-Allow 100% of the Floor Area	13,169	sqft	$ 2.79	$ 36,741.51	$ 1.71	$ 22,518.99	$ 0.27	$ 3,555.63	$ 4.77	$ 62,816.13
	Remove Ceiling and Reinstall New ACT Ceiling Systems-Allow 80% of the Floor Area	10,535	sqft	$ 4.22	$ 44,416.40	$ 2.58	$ 27,222.96	$ 0.41	$ 4,298.36	$ 7.21	$ 75,937.72
Subtotal of the Direct Cost of Construction				**Port Townsend High School Math-Science Annex**							**$ 401,884**

PRODIMS

520 Kirkland Way, Suite 301
Kirkland, WA 98033
Phone: 425-828-0500 Fax: 425-828-0700
www.prodims.com

Non-Structural Costs

Name:	Wa State School Seismic Safety Assessment Phase 2	Areas	sqft
Second Name:	Port Townsend High School Math-Science Annex	Building Area	13,169
Location:	Port Townsend, WA		
Design Phase:	ROM Cost Estimates		
Date of Estimate:	March 11, 2021		
Date of Revision:	April 12, 2021		
Month of Cost Basis:	1Q, 2021	Total Areas	13,169

Port Townsend High School Math-Science Annex

Construction Cost Estimate

Subtotal Direct Cost From the Estimate Detail Below $ 321,507

	Percentage of Previous Subtotal	Amount	Running Subtotal
Scope Contingency	10.0%	$ 32,151	$ 353,658
General Conditions	10.0%	$ 32,151	$ 385,808
Home Office Overhead	5.0%	$ 16,075	$ 401,884
Profit	6.0%	$ 19,290	$ 421,174
Escalation Included to 4Q, 2022	12.4%	$ 52,057	$ 473,231
Washington State Sales Tax - Included in Soft Costs			

Total Markups Applied to the Direct Cost 47.19%
Markups are multiplied on each subtotal- They are not multiplied from the direct cost

		$/sqft
TOTAL ESTIMATED CONSTRUCTION COST--	**$ 473,231**	**$ 35.94**
-20% TOTAL ESTIMATED CONSTRUCTION COST VARIANCE --	**$ 378,585**	**$ 28.75**
+50% TOTAL ESTIMATED CONSTRUCTION COST VARIANCE --	**$ 709,847**	**$ 53.90**

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*											
Exteriors, Interiors and M/E/P/FP systems											
	Interior Wall/Door/Casework/Specialties Systems										
	Mechanical/Electrical/Fire Protection Systems *	13,169	sqft	$ 12.67	$ 166,819.66	$ 10.36	$ 136,488.81	$ 1.38	$ 18,198.51	$ 24.41	$ 321,506.97

*Allows 80 percent of existing nonstructural systems M/E/P/FP require upgrades/replacement.

Subtotal of the Direct Cost of Construction	**Port Townsend High School Math-Science Annex**	**$ 321,507**

This page intentionally left blank.

Appendix D: Earthquake Performance Assessment Tool (EPAT) Worksheet

This page intentionally left blank.

Washington Schools Earthquake Performance Assessment Tool (EPAT)
RESULTS SUMMARY

District Name	Port Townsend	**Existing Building Life Safety Risk & Priority for Retrofit or Replacement**
School Name	Port Townsend High School	
Building Name	Math Science Annex	Very High

Building Data

HAZUS Building Type	URM	Unreinforced Masonry Bearing Walls
Year Built	1928	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	Yes	

Seismic Data

Earthquake Ground Shaking Hazard Level	High	Frequency and severity of earthquakes at this site
Percentile S_s Among WA K-12 Campuses	82%	Earthquake ground shaking hazard is higher than 82% of WA campuses.
Site Class (Soil or Rock Type)	D	Stiff Soil
Liquefaction Potential	Very Low	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	79%	78%	Very High	Red
Life Safety Retrofit Building	20%	12%	Very Low	Green/Yellow
Current Code Building	16%	8.1%	Very Low	Green/Yellow

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:	Brian Matsumoto, Reid Middleton
User Overrides of Default Parameters:	Building Design Code Year, Latitude, Longitude, Site Class, Liquefaction, Geographic Region

This page intentionally left blank.

Appendix E: Existing Drawings

This page intentionally left blank.

Math/Science Building
Port Townsend High School
1610 Blaine Street
Port Townsend, WA 98368
Jefferson County

Site Information
Site Size: 16-1/2 acres, entire campus (approximate)

Building Information
Building Construction History
This building was originally constructed in 1928, remodeled in 1956, significantly remodeled in 1984, remodeled and expanded on the first floor level in 1996.

Original construction consisted of two story, brick masonry exterior wall construction, wood floors and roof framing with shiplap decking, and concrete spread footings,

In 1984, the building underwent a significant modernization that included a new built-up roofing and field applied granular finish over new plywood sheathing, exterior brick restoration, metal copings and flashings, exterior aluminum frame windows, roof and wall insulation, lighting, acoustical ceilings, paint and floor finishes. The project also included extensive seismic improvements including the addition of concrete shear walls, and steel rod tie-backs through the existing exterior masonry and into existing floor and roof framing. Tie-back locations are evident on the exterior surface of the building with decorative rosettes. Significant interior improvements were made to both floors including new wall and finish systems. No additional space was added to the building with this project. Project designers were Tsang-Merrit Associates of Tacoma.

In 1996, further improvements were made to the lower level including the 1,564 s.f. expansion of the south end classroom into new science laboratories and eliminating the central hallway. The two north end classrooms and prep area were consolidated into two larger science classrooms and a central science prep area. With these improvements there was a net gain of one "teaching station." Cabinetry and sinks stations were added top support a contemporary science program. Project designers were architects Reed Reinvald Johnson Willows of Tacoma.

Port Townsend High School

Phase III Modernization

Port Townsend, Washington

ABBREVIATIONS

(SEE ALSO PROJECT MANUAL VOLUME II, SECTION 04.00)

A.B.	ANCHOR BOLT
A.C.P.	ACOUSTICAL CEILING PANELS
A.C.T.	ACOUSTICAL CEILING TILE
ADJ.	ADJUSTABLE
ADMIN.	ADMINISTRATIVE
A.F.F.	ABOVE FINISH FLOOR
ALT.	ALTERNATE
ALUM.	ALUMINUM
ANOD.	ANODIZED
APPROX.	APPROXIMATELY
ARCH.	ARCHITECT(URAL)
ASSY.	ASSEMBLY
A.V.	AUDIO VISUAL
BD	BOARD
BLDG.	BUILDING
BLK	BLOCK
BLKG	BLOCKING
BM.	BEAM
BRG.	BEARING
BTM	BOTTOM
BTWN	BETWEEN
CAB.	CABINET
C.B.	CATCH BASIN
C.I.	CAST IRON
C.I.P.C.	CAST-IN-PLACE CONCRETE
CLG.	CEILING
C.M.T.	CERAMIC MOSAIC TILE
C.M.U.	CONCRETE MASONRY UNIT
C.O.	CLEAN OUT
COL.	COLUMN
COMP.	COMPOSITE/COMPOSITION
CONC.	CONCRETE
CONF.	CONFERENCE
CONST.	CONSTRUCTION
CONT.	CONTINUOUS
C.P.T.	CARPET
C.T.	CERAMIC TILE
C.V.	COVED VINYL
DBL.	DOUBLE
DEPT.	DEPARTMENT
D.F.	DRINKING FOUNTAIN
DISP.	DISPENSER
DIA.	DIAMETER
DIM.	DIMENSION
D.S.	DOWNSPOUT
DWG.	DRAWING
EA.	EACH
E.J.	EXPANSION JOINT
EL.	ELEVATION
ELEC.	ELECTRICAL
ELEV.	ELEVATION
EQ.	EQUAL
EQUIP.	EQUIPMENT
EXIST.	EXISTING
EXG.	EXISTING
EXP.	EXPOSED
EXT.	EXTERIOR
F.A.	FIRE ALARM
F.D.	FLOOR DRAIN
F.E.	FIRE EXTINGUISHER
F.E.C.	FIRE EXTINGUISHER CABINET
FIN.	FINISH
F.I.O.	FURNISHED/INSTALLED BY OWNER
FLR.	FLOOR
FLUOR.	FLUORESCENT
F.O.I.C.	FURNISHED BY OWNER AND INSTALLED BY CONTRACTOR
F.O.M.	FACE OF MASONRY
F.O.S.	FACE OF STUD
F.R.P.	FIBERGLASS REINFORCED PANEL
FT.	FEET/FOOT
FTG.	FOOTING
GA.	GAUGE
GALV.	GALVANIZED
GL.	GLASS
G.L.B.	GLULAM BEAM
GRND.	GROUND
G.W.B.	GYPSUM WALL BOARD
GYP.	GYPSUM
GRND.	GROUND
H.B.	HOSE BIBB
H.C.	HANDICAP(PED) OR HOLLOW CORE
HDCP.	HANDICAP(PED)
HDR.	HEADER
HD'W.	HARDWARE
HDWD.	HARDWOOD
H.M.	HOLLOW METAL
HORIZ.	HORIZONTAL
HR.	HOUR
HT.	HEIGHT
HVAC	HEATING/VENTILATING/AIR CONDITIONING
HWH	HOT WATER HEATER
I.D.	INSIDE DIAMETER
INCL.	INCLUDING
INS.	INSULATION
INT.	INTERIOR
INV.	INVERT
JAN.	JANITOR
JT.	JOINT
JST.	JOIST
K.D.	KILN DRIED
K.P.	KICK PLATE

LAB.	LABORATORY
LAUN.	LAUNDRY
LAV.	LAVATORY
L.B.	LAG BOLT
LBS.	POUNDS
L.F.	LINEAR FOOT
L.H.	LEFT HAND
MAN.	MANUAL
MAX.	MAXIMUM
M/E	MECHANICAL/ELECTRICAL
MAT'L.	MATERIAL
MAX.	MAXIMUM
MECH.	MECHANICAL
MFR.	MANUFACTURER
MIN.	MINIMUM
MISC.	MISCELLANEOUS
MTL.	METAL
N	NORTH
N.I.C.	NOT IN CONTRACT
NO.	NUMBER
NOM.	NOMINAL
N.T.S.	NOT TO SCALE
O.A.	OVERALL
O.C.	ON CENTER
OPH	OPPOSITE HAND
OPP	OPPOSITE
PERF.	PERFORATED
PERIM.	PERIMETER
P.L.	PROPERTY LINE
PLYWD.	PLYWOOD
P'LAM.	PLASTIC LAMINATE
PT.	POINT
P.S.F.	POUNDS PER SQUARE FOOT
P.S.I.	POUNDS PER SQUARE INCH
P.V.C.	POLYVINYL CHLORIDE
Q.T.	QUARRY TILE
QTY.	QUANTITY
R	RADIUS OR RISERS
R.A.	RETURN AIR
R.B.	RUBBER BASE
R.C.P.	REFLECTED CEILING PLAN
R.D.	ROOF DRAIN
REF.	REFERENCE
REFRIG.	REFRIGERATOR
REINF.	REINFORCED
REQ'D.	REQUIRED
R.H.	RIGHT HAND
RM.	ROOM
R.O.	ROUGH OPENING
R.O.W.	RIGHT OF WAY
S.A.T.	SUSPENDED ACOUSTICAL TILE
S.C.	SOLID CORE
SCH.	SCHEDULE
SEC.	SECTION
SIM.	SIMILAR
S.M.	SHEET METAL
SPEC'D.	SPECIFIED
SPKR.	SPEAKER
STD.	STANDRAD
STL.	STEEL
STRUCT.	STRUCTURAL
SUSP.	SUSPENDED
S.V.	SHEET VINYL
SYS.	SYSTEM
T.	TREAD OR TOP
TEL.	TELEPHONE
T&G	TONGUE AND GROOVE
T.O.B.	TOP OF BEAM
T.O.P.	TOP OF PARAPET
TRANSP.	TRANSPARENT
T.S.	TUBE STEEL
TYP.	TYPICAL
U.B.C.	UNIFORM BUILDING CODE
U.L.	UNDERWRITER'S LAB
U.N.O.	UNLESS NOTED OTHERWISE
V.C.T.	VINYL COMPOSITION TILE
V.B.	VAPOR BARRIER
VERT.	VERTICAL
VEST.	VESTIBULE
V.G.	VERTICAL GRAIN
V.P.	VENEER PLASTER
W	WEST, WIDE OR WIDTH
W/	WITH
W.C.	WATER CLOSET
W/O	WITHOUT
WD.	WOOD
W.G.	WIRE GLASS
W.P.	WATERPROOF
W.R.	WATER RESTISTANT
WSCT.	WAINSCOT
WT.	WEIGHT
WWF	WELDED WIRE FABRIC
⌀	SQUARE FOOT
∡	ANGLES
℘	PLATE
℄	CENTER LINE
#	NUMBER
ø	ROUND (DIAMETER)

SYMBOLS LEGEND

(SEE ALSO PROJECT MANUAL VOLUME II, 03.01)

- HIDDEN LINE
- CENTER LINE
- PROPERTY LINE
- EXISTING CONTOUR LINE
- NEW CONTOUR LINE
- MATCH LINE
- REFERENCE POINT
- A1 — GRID LINE REFERENCE
- INTERIOR ELEVATION REFERENCE (ELEVATION NUMBER; SHEET NO.)
- BUILDING SECTION REFERENCE (DRAWING LETTER; SHEET NO.)
- WALL SECTION REFERENCE (DRAWING NO.; SHEET NO.)
- DETAIL REFERENCE (DETAIL DESIGNATION; SHEET NO. (SEE PROJECT MANUAL, VOLUME II))
- ROOM NUMBER REFERENCE (W/ BUILDING PREFIX) (CORRIDOR — ROOM NAME; A101 — ROOM NUMBER)
- DOOR NUMBER REFERENCE (ROOM NUMBER WITH SUFFIX) (A101A)
- LOUVER REFERENCE
- WINDOW OR RELITE REFERENCE (WINDOW TYPE; WINDOW NUMBER)
- WALL TYPE REFERENCE (NOTES; FIRE RATING; WALL TYPE)
- CEILING TYPE REFERENCE (CEILING TYPE; CEILING HEIGHT; RATING (IF APPLICABLE))
- CABINET REFERENCE (CABINET NUMBER; MODIFIER (SEE SHEET A8.01); CABINET SIZE; SOURCE CATALOG (SEE SHEET A8.01))

MATERIALS LEGEND

(SEE ALSO PROJECT MANUAL VOLUME II, 03.02)

SECTION

- UNDISTURBED EARTH
- COMPACTED FILL
- SAND
- CRUSHED ROCK/GRAVEL
- CONCRETE
- BRICK
- CMU
- FINISH WOOD
- WOOD MEMBER CONTINUOUS
- WOOD MEMBER NON-CONTINUOUS
- METAL
- GLASS
- GYPSUM WALL BOARD
- ACOUSTICAL TILE CEILING
- PLYWOOD
- RIGID INSULATION
- BATT INSULATION, LOOSE FILL OR BLANKET INSULATION

PLAN

- CONCRETE
- CMU OR BRICK
- WOOD STUDS

SHEET INDEX

GENERAL

G1.01	COVER SHEET
G1.02	MAIN BUILDING CODE SHEET
G1.03	MATH/SCIENCE BUILDING CODE SHEET
G2.01	PHASING PLAN & NOTES
G3.01	SITE SURVEY

CIVIL

C1.01	CIVIL SITE PLAN

LANDSCAPE

L1.01	LANDSCAPE SITE PLAN

ARCHITECTURAL

A1.01	SITE DEMOLITION PLAN
A1.02	SITE PLAN
A1.03	ENLARGED SITE PLANS
A1.04	ENLARGED SITE PLANS
A2.01	REFERENCE FLOOR PLAN
A2.02	MAIN BUILDING LOWER LEVEL DEMOLITION/FLOOR PLAN
A2.03	MAIN BUILDING MAIN LEVEL DEMOLITION PLAN
A2.04	MAIN BUILDING MAIN LEVEL FLOOR PLAN
A2.05	MATH/SCIENCE BUILDING DEMOLITION PLANS
A2.06	MATH/SCIENCE BUILDING FLOOR PLANS
A2.07	ENLARGED SCIENCE LAB FLOOR PLANS
A2.08	ENLARGED TOILET ROOM PLANS & ELEVATIONS
A3.01	MATH/SCIENCE BUILDING ROOF PLANS
A4.01	MAIN BUILDING MAIN LEVEL REFLECTED CEILING PLAN
A4.02	MATH/SCIENCE BUILDING REFLECTED CEILING PLANS
A5.01	MATH/SCIENCE BUILDING EXTERIOR ELEVATIONS
A6.01	MATH/SCIENCE BUILDING SECTIONS
A6.02	MATH/SCIENCE BUILDING ENLARGED ELEVATIONS / WALL SECTIONS
A6.03	MATH/SCIENCE BUILDING WALL SECTIONS
A6.04	MATH/SCIENCE BUILDING WALL SECTIONS
A6.05	MATH/SCIENCE BUILDING WALL SECTIONS
A8.01	INTERIOR ELEVATIONS
A8.02	INTERIOR ELEVATIONS
A8.03	INTERIOR ELEVATIONS
A8.04	INTERIOR ELEVATIONS

STRUCTURAL

S0.01	STRUCTURAL GENERAL NOTES
S1.01	STRUCTURAL FOUNDATION AND FRAMING PLANS

MECHANICAL

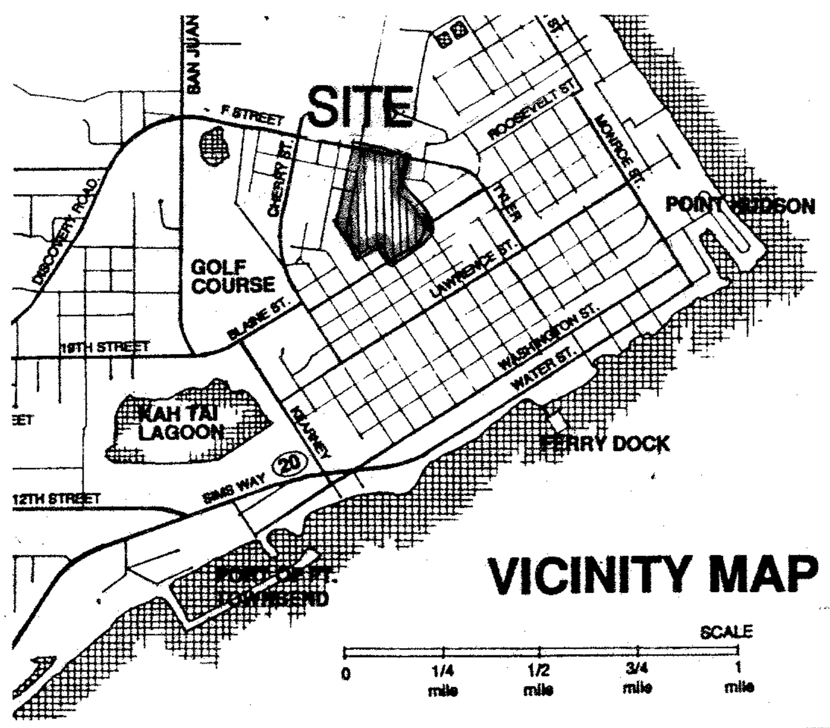
ME1.01	MECHANICAL/ELECTRICAL SITE PLAN
M2.01	MECHANICAL LEGEND & SCHEDULES AND DETAILS
M3.01	MECHANICAL MAIN BUILDING DEMOLITION PLANS
M3.02	MECHANICAL MAIN BUILDING PLUMBING PLANS
M3.03	MECHANICAL MAIN BUILDING HVAC PLANS
M4.01	MECHANICAL MATH/SCIENCE BUILDING PLUMBING DEMOLITION PLANS
M4.02	MECHANICAL MATH/SCIENCE BUILDING HVAC DEMOLITION PLAN
M4.03	MECHANICAL MATH/SCIENCE BUILDING CRAWL SPACE PLUMBING PLAN
M4.04	MECHANICAL MATH/SCIENCE BUILDING PLUMBING PLANS
M4.05	MECHANICAL MATH/SCIENCE BUILDING REFLECTED CEILING PLAN
M4.06	MECHANICAL MATH/SCIENCE BUILDING FURRED CEILING PLANS
M5.01	MECHANICAL DETAILS

ELECTRICAL

E0.01	ELECTRICAL LEGEND & SCHEDULE
E2.01	ELECTRICAL MAIN BUILDING DEMOLITION PLANS
E2.02	ELECTRICAL MAIN BUILDING POWER & SYSTEMS PLANS
E2.03	ELECTRICAL MAIN BUILDING SYSTEMS PLANS
E2.04	ELECTRICAL MAIN BUILDING LIGHTING PLANS
E3.01	ELECTRICAL MATH/SCIENCE BUILDING DEMOLITION & POWER PLANS
E3.02	ELECTRICAL MATH/SCIENCE BUILDING SYSTEMS & LIGHTING PLANS
E4.01	ELECTRICAL PANEL SCHEDULES AND DETAILS
E5.01	ELECTRICAL RISER DIAGRAMS

GENERAL NOTES

1. THESE DRAWINGS MUST BE ACCOMPANIED BY A PROJECT SPECIFICATIONS MANUAL, TITLED AND DATED IDENTICALLY TO THIS SET OF DRAWINGS. THE PROJECT SPECIFICATIONS MANUAL CONTAINS DETAILS AND SCHEDULES REFERENCED ON THE DRAWINGS HEREIN. SEE FINISH SCHEDULE 71.00 - 71.03 IN PROJECT SPECIFICATIONS MANUAL FOR ROOM FINISHES.
2. SEE STAGING PLANS, SECTION 14 OF PROJECT MANUAL.
3. ALL DIMENSIONS ARE FROM FACE OF STUD TO FACE OF STUD UNLESS OTHERWISE NOTED.
4. OPENINGS IN NON-STRUCTURAL INTERIOR PARTITIONS SHALL HAVE DOUBLE SOLID TIMBER HEADERS OF A MINIMUM NOMINAL DEPTH OF 6". SEE STRUCTURAL DRAWINGS AND NOTES FOR LOAD BEARING WALLS.
5. A DOUBLE STUD IS TYPICAL AT EACH JAMB OF OPENINGS IN NON-STRUCTURAL INTERIOR PARTITIONS.
6. ALL WOOD IN CONTACT WITH CONCRETE WILL BE TREATED WITH A PRESERVATIVE.
7. SEALS AND WEATHERPROOFING:
   A) EXTERIOR JOINTS AROUND WINDOWS AND DOOR FRAMES, OPENINGS BETWEEN WALLS AND FOUNDATION, BETWEEN WALLS, ROOFS AND WALL PANELS, OPENINGS AT PENETRATIONS OF UTILITY SERVICES THROUGH WALLS, FLOORS, AND ALL OTHER OPENINGS IN BUILDING ENVELOPE FOR ALL OCCUPANCIES, AND ALL OTHER OPENINGS BETWEEN UNITS IN R-1 OCCUPANCY SHALL BE SEALED, CAULKED, GASKETED OR WEATHERSTRIPPED TO LIMIT AIR LEAKAGE.
   B) ALL EXTERIOR DOORS SERVING AS ACCESS TO AN ENCLOSED, UNHEATED AREA SHALL BE WEATHERSTRIPPED TO LIMIT AIR LEAKAGE AROUND THEIR PERIMETER WHEN IN A CLOSED POSITION.



VICINITY MAP

PROJECT DIRECTORY

OWNER:

PORT TOWNSEND SCHOOL DISTRICT #50
CONTACT: DR. RICHARD LUTZ
ASST. SUPERINTENDENT
450 FIR STREET
PORT TOWNSEND, WA 98368
PHONE: (360) 385-3614

ARCHITECT:

ARCHITECTS REED REINVALD JOHNSON WILLOWS, PLLC
PROJECT MANAGER: BOB KENWORTHY
PROJECT ARCHITECT: RON HARPEL
201 NORTH I STREET
TACOMA, WA 98403
PHONE: (206) 572-3993
FAX: (206) 572-1445

CIVIL/STRUCTURAL ENGINEERS:

AHBL
CONTACT: DOREEN GAVIN, CIVIL
CONTACT: GEOFF HODSON, STRUCTURAL
2215 N. 30th, SUITE 300
TACOMA, WA 98403
PHONE: (206) 383-2422
FAX: (206) 383-2572

MECHANICAL/ELECTRICAL ENGINEERS:

BCE ENGINEERS
CONTACT: VALERIE RAMENTO, MECHANICAL
CONTACT: MIKE COZART, ELECTRICAL
3601 20TH ST. E., SUITE 1
TACOMA, WA 98424
PHONE: (206) 922-0446
FAX: (206) 922-0896

LANDSCAPE ARCHITECT:

EDWARDS/IWASAKI, P.S.
CONTACT: DUANE EDWARDS
ONE PACIFIC BUILDING
621 PACIFIC AVENUE, SUITE 101
TACOMA, WA 98402
PHONE: (206) 272-6206
FAX: (206) 272-3508

04/15/96
C:\DATA\DRAWINGS\95050\5500

THE AMERICAN INSTITUTE OF ARCHITECTS

DRAWN: AJH
CHECKED: RH
APPROVED:
NOT:

REVISIONS:

Copyright © 199 by Architects Reed Reinvald Johnson Willows All Rights Reserved

PROJECT TITLE:
PORT TOWNSEND HIGH SCHOOL
PHASE III MODERNIZATION
PORT TOWNSEND, WA

ARCHITECTS REED REINVALD JOHNSON WILLOWS PLLC
201 North "I" Street
Tacoma, Washington 98403
Phone: (206) 572-3993
Fax: (206) 572-1445

4130 REGISTERED ARCHITECT
DEAN C. WILLOWS
STATE OF WASHINGTON

CONSULTANT:

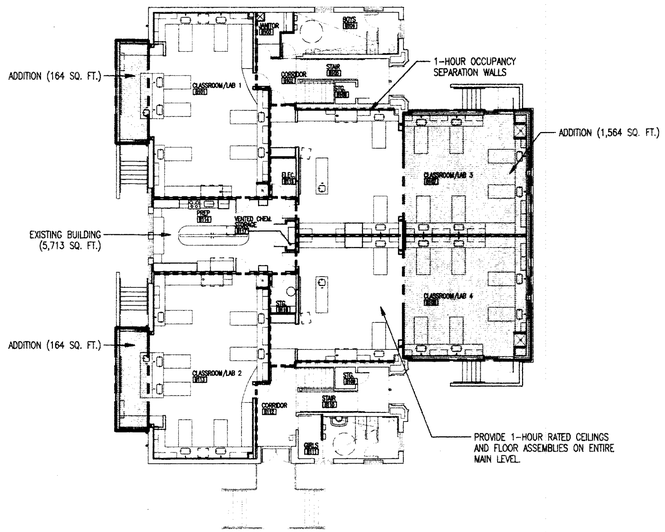
SHEET TITLE:
COVER SHEET

52

SCALE: NO SCALE
DATE: 17 APRIL 1996
PROJECT NO: 95050.01
SHEET NO:

G 1.01

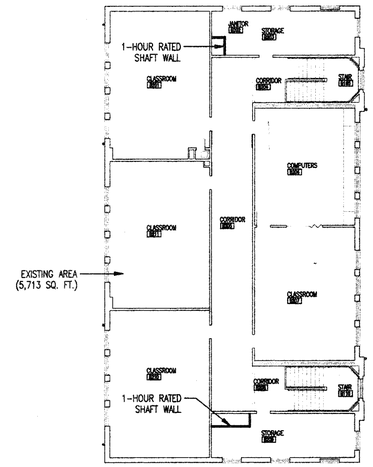
NO: OF SHEETS



TOTAL SQUARE FEET:	7,508 SQ. FT.

PLAN NORTH

MAIN LEVEL CODE DATA FLOOR PLAN



TOTAL SQUARE FEET:	5,713 SQ. FT.

PLAN NORTH

UPPER LEVEL CODE DATA FLOOR PLAN

BUILDING CODE DATA - MATH/SCIENCE BUILDING

1. FIRE SPRINKLERS: FIRE SPRINKLERS: THE BUILDING SHALL BE FULLY FIRE SPRINKLERED, AND SHALL USE QUICK RESPONSE HEADS THROUGHOUT.
2. OCCUPANCY GROUP: PRIMARY: E-1
3. TYPE OF CONSTRUCTION: TYPE V - 1-HOUR (1983 UPDATE)
4. NUMBER OF STORIES: TWO
5. BUILDING HEIGHT: 32 FEET
6. OCCUPANCY SEPARATIONS: 1-HOUR: E-1 TO E-1 SCIENCE LABORATORIES, SCIENCE PREP ROOM
   E-1 TO E-1 SCIENCE SUITE TO UPPER LEVEL CLASSROOMS
7. AREA SEPARATION: NONE
8. ALLOWABLE AREA INCREASES: 3 SIDES, 100% INCREASE
   FIRE SPRINKLERS, TRIPLE FOR 1-STORY.
   SEE AREA CALCULATIONS THIS SHEET.
9. REQUIRED TOILET FIXTURES: 13,221 SQ. FT. / 100 SQ. FT. PER STUDENT
   134 STUDENTS ASSUMED (67 MALE, 67 FEMALE)
   MALES: 2 WC, 1 LAV REQUIRED
   2 WC, 5 URINALS, 2 LAVS PROVIDED
   FEMALES: 3 WC, 2 LAVS REQUIRED
   3 WC, 3 LAVS PROVIDED
10. SPECIAL CONSIDERATIONS:
    A. PROVISIONS TO FIRE-SPRINKLE THE UPPER LEVEL AT A FUTURE DATE CAN BE ACCOMPLISHED, VIA THE INSTALLATION OF A STUB. SEE M5.01 SPRINKLER RISER DIAGRAM, VIC CAP FOR FUTURE.
    B. THE ORIGINAL DRAWINGS (1928) CALL OUT A 1" CEMENT PLASTER CAP TO THE UNDERSIDE OF THE UPPER LEVEL FLOOR JOISTS. ARRJW HAS ASSUMED THAT THIS FIRE-BREAK HAS NOT BEEN ALTERED OR DAMAGED DURING THE 1983 WORK.
    C. 3/4" FIRE RESISTIVE "GYP-CRETE" WILL BE INSTALLED IN THE SCIENCE LABS AND PREP AREA TO IMPROVE THE RATING OF THE EXISTING NON-RATED FLOOR STRUCTURE AT THE MAIN LEVEL.

MATH/SCIENCE BUILDING — TYPE V - 1 HOUR CONSTRUCTION

	TABLE 5B TYPE V - 1 HOUR BASIC ALLOWABLE AREA		SECTION 505 ALLOWABLE AREA INCREASES 3-SIDES 100%	SECTION 508 FIRE SPRINKLERS		TOTAL SQUARE FEET ALLOWED		TOTAL SQUARE FEET ACTUAL (BASEMENT)		
	ONE FLOOR	MULTI-STORY		ONE FLOOR	MULTI-STORY	ONE FLOOR	MULTI-STORY	MAIN LEVEL	UPPER LEVEL	MULTI-STORY
E-1 SPECIAL HAZARDS	9,100	15,700	X2		NOT USED	= 18,200	31,400	7,508	5,713	13,221
								OK	OK	OK

I. ARRJW questioned Rob Sears with respect to allowable areas and separation walls at additions. Mr. Sears stated that rated separation walls will not be required if the overall building areas comply with the limits set forth in table 5-A of the UBC. ARRJW will prepare a code analysis sheet for the city of Port Townsend to clearly delineate the allowable areas for the main building.

Items	*504.2*	*Building above 1-story*
	504.3	*Mixed use occupancies*
	505.1.1	*Allowable area increases via building separation(s)*
	505.1.2	
	505.1.3	

The UBC multipliers listed above will be included in the code analysis/area calculation.

2. Stuart Building - An existing floor plan was presented and reviewed. The current gross area is 16,500 s.f. and the assumed building classification is Type V-N.

   a. One of the schematic proposals has 4 science lab classrooms and the associated science support spaces clustered in the southeast portion of the Stuart Building.

   b. An occupancy separation wall will be required between the science suite and the remaining un-altered portion of the building. And, each lab space will have an occupancy separation wall between adjacent lab rooms.

      Reference: 305.2.4 "special hazards" for Group E Occupancies.

      Laboratories vocational shops and similar areas containing hazardous materials shall be separated from each other and from other portions of the building by not less than a one-hour fire-resistive occupancy separations. When the quantities of hazardous master lab in such uses do not exceed those listed in Table 3-D or 3-E, the requirements of Sections 307.5.2 and 307.8 shall apply.

   c. Bob Kenworthy stated that the current floor construction is a raised wood framed non-rated assembly. The question of how to physically separate or partition the science spaces at the floor was not resolved. Rob Sears will research this and advise the design team of possible solutions. Concrete grade beams with framed walls and rated gypsum sheathing infilled between the floor structure and grade within the crawl space was suggested. ARRJW will allow for this in the cost estimate for schematic design. Access between partitioned crawl spaces and ventilation systems will have to be considered in more detail.

3. Existing floor plan drawings of the annex were reviewed and discussed. The annex is a 2-level Type V-N structure. Bob Witheridge mentioned that the 1983 modernization was completed at the same time as the main building remodel and that the techniques for construction were similar to those 1-hour requirements.

   a. ARRJW outlined the scheme that expands the existing lower level of the annex to accommodate 4 complete science labs for 32 students in each teaching station. The architects explained the requirements for occupancy separation at science as mentioned earlier under UBC 305.2.4. A horizontal 1-hour rated floor separation between the ground floor science suite, and the upper floor classrooms will need to be provided. The proposed schematic assumes that a total lower floor demo will occur allowing an opportunity for the alterations to improve; mechanical ventilation, the number of exits at lab stations from 1 to 2 and enhanced clarity in building egress for occupants leaving the upper level.

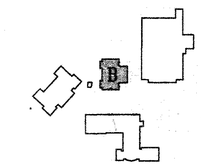
4. Site Planning/Landscaping - ARRJW explained both the existing conditions of the site and a schematic proposal for several areas of site improvements. Jan Zimmer at Public Works and Judy Surber specializing in street improvements/zoning were mentioned as contacts at the city of Port Townsend.

   a. Pervious and impervious areas on site were discussed. Rob Sears mentioned that the recent storm detention tank installed near the tennis courts may be oversized... Which leaves the potential to receive loading from run-off of new asphalt parking areas. Additionally, the small (20 car) parking lot being planned for on the east end of the Stuart Building would probably require a grease separator. The parking and landscaping plan presented by ARRJW generally reduces the amount of asphalt, paving and allows landscaped islands with extruded curbs to provide separation and clarity to the parking lots and pedestrian circulation paths. Rob Sears stated that alteration work on site could be performed without requiring additional detention vaults if the ratio of pervious to impervious area is maintained or improved.

   b. ARRJW will provide area analysis if required. Vacating or terminating Benton Street - Fir Street was discussed. Dick Lutz suggested that ARRJW research the application process and time frame for this. The architect will inform the district when further information is available.

THE AMERICAN INSTITUTE OF ARCHITECTS

DRAWN: AJH
CHECKED: RH
APPROVED:
NOTES:



KEY PLAN
PLAN NORTH
REVISIONS:

Copyright © 1996 by Architects Reed Reinvald Johnson Willows PLLC All Rights Reserved.

PROJECT TITLE:
PORT TOWNSEND HIGH SCHOOL

PHASE III MODERNIZATION

PORT TOWNSEND, WA

ARCHITECTS REED REINVALD JOHNSON WILLOWS PLLC
201 North "I" Street
Tacoma, Washington 98403
Phone: (206) 572-3993
Fax: (206) 572-1445

4130 REGISTERED ARCHITECT
DEAN C. WILLOWS
STATE OF WASHINGTON

CONSULTANT:

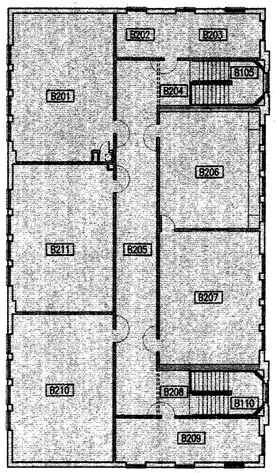
SHEET TITLE:
MATH/SCIENCE BUILDING CODE DATA

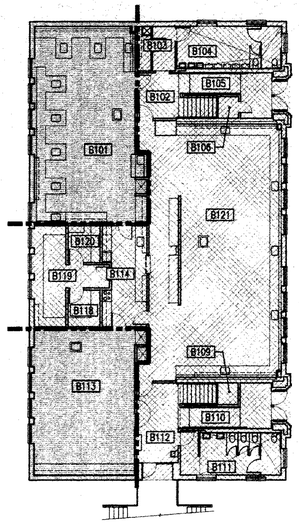
SCALE: 1/16"=1'-0"
DATE: 17 APRIL 1996
PROJECT NO: 95050.01
SHEET NO:

G 1.03

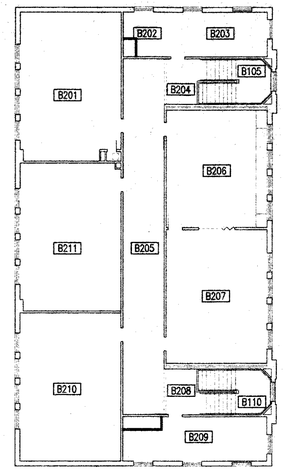
NO: OF SHEETS:

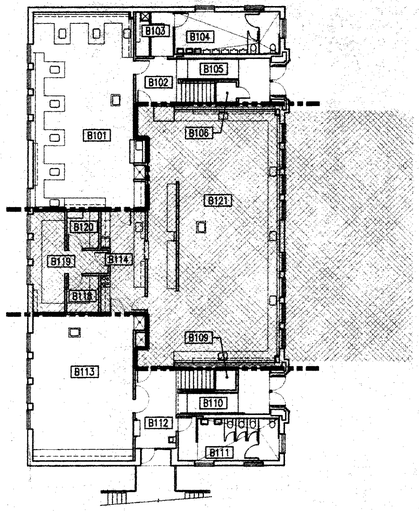
04/15/96
C:\DATA\DRAWINGS\95050\550192CD



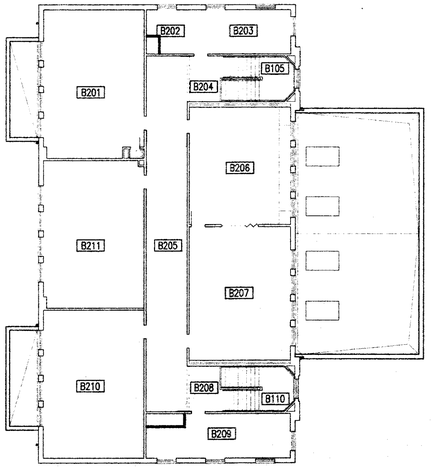


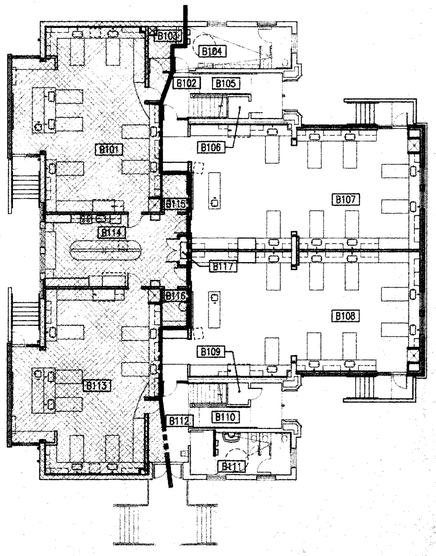
PLAN NORTH
PHASE 1A
17 JUNE 1996 TO 25 AUGUST 1996





PLAN NORTH
PHASE 1B
26 AUGUST 1996 TO 15 NOVEMBER 1996





PLAN NORTH
PHASE 2
25 NOVEMBER 1996 TO 25 JANUARY 1996

PHASING NOTES

A. OWNER OCCUPANCY SCHEDULE:

PHASE 1A: THE OWNER WILL REMOVE ALL FURNITURE AND EQUIPMENT FROM ROOMS B102 TO B104, B111, B112, B114, AND B118 TO B121 TO ALLOW CONTRACTOR'S WORK. THE OWNER WILL NOT OCCUPY ROOMS B101, B105, B106, B110, B113, AND B201 TO B211, BUT WILL NOT REMOVE FURNITURE AND EQUIPMENT. CONTRACTOR IS TO PROTECT OWNER'S FURNITURE, EQUIPMENT AND EXISTING FINISHES TO REMAIN WHILE WORKING IN THESE ROOMS.

PHASE 1B: THE OWNER WILL OCCUPY ROOMS B101, B102, B104 TO B106, B109 TO B113, AND B201 TO B211.

PHASE 2: THE OWNER WILL REMOVE ALL FURNITURE AND EQUIPMENT FROM ROOMS B101 AND B113 TO ALLOW CONTRACTOR'S WORK. THE OWNER WILL OCCUPY ROOMS B102, B104 TO B112, AND B201 TO B211.

B. CONTRACTOR IS TO MAINTAIN ALL EXISTING UTILITIES SERVING ROOMS B101, B102, B104 TO B106, B109 TO B113, AND B201 TO B211 DURING PHASE 1B. ROOMS B102, B104 TO B112, AND B201 TO B211 ARE TO BE SERVED BY NEW OR TEMPORARY UTILITIES DURING PHASE 2.

C. EXISTING ELECTRICAL PANELS, AND THE WALLS IN WHICH THEY ARE LOCATED, ARE TO REMAIN UNTIL THE BEGINNING OF PHASE 2. PROVIDE EXISTING OR TEMPORARY POWER TO AREAS OCCUPIED BY OWNER.

D. CONTRACTOR IS TO MAINTAIN EXISTING EXITING AT ALL AREAS OF OWNER OCCUPANCY THROUGHOUT PHASES 1B AND 2. CONTRACTOR TO VERIFY ACCEPTABILITY OF BARRIER LOCATIONS WITH LOCAL GOVERNING AGENCIES.

PHASING LEGEND

OCCUPANCY DIVISION LINE

OWNER OCCUPANCY

CONTRACTOR'S WORK AREA

OWNER WILL NOT VACATE THESE SPACES. CONTRACTOR MAY WORK IN THESE SPACES, BUT MUST PROTECT OWNER FURNISHINGS, EQUIPMENT, AND EXISTING FINISHES.

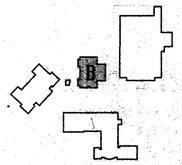
04/14/96
C:\DATA\DRAWINGS\95050\550PHASE

THE AMERICAN INSTITUTE OF ARCHITECTS

DRAWN: AJH
CHECKED: RH
APPROVED:

NOTES:

SEE SHEET A 2.02 FOR GENERAL NOTES TO FLOOR PLANS.



KEY PLAN
PLAN NORTH

REVISIONS:

Copyright © 1996 by Architects Reed Reinvald Johnson Willows PLLC
All Rights Reserved.

PROJECT TITLE:
PORT TOWNSEND HIGH SCHOOL

PHASE III MODERNIZATION

PORT TOWNSEND, WA

ARCHITECTS REED REINVALD JOHNSON WILLOWS PLLC
201 North "I" Street
Tacoma, Washington 98403
Phone: (206) 572-3993
Fax: (206) 572-1445

4130 REGISTERED ARCHITECT
DEAN C. WILLOWS
STATE OF WASHINGTON

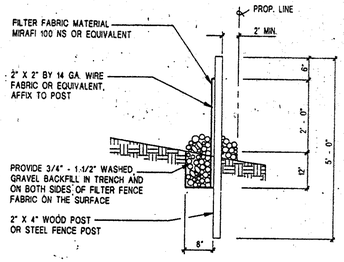
CONSULTANT:

SHEET TITLE:
MATH/SCIENCE PHASING PLANS

SCALE: 1/16"=1'-0"
DATE: 17 APRIL 1996
PROJECT NO: 95050.01
SHEET NO:

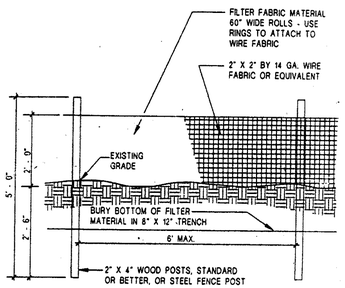
G 2.01

NO: OF SHEETS:



1 FILTER FABRIC FENCE (SIDE VIEW)

NOT TO SCALE

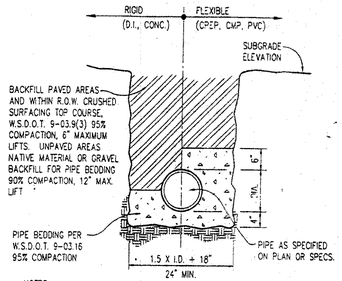


2 FILTER FABRIC FENCE (FRONT VIEW)

NOT TO SCALE

FILTER FABRIC FENCE NOTES

1. THE FILTER FABRIC SHALL BE PURCHASED IN A CONTINUOUS ROLL CUT TO THE LENGTH OF THE BARRIER TO AVOID USE OF JOINTS. WHEN JOINTS ARE NECESSARY, FILTER CLOTH SHALL BE SPLICED TOGETHER ONLY AT A SUPPORT POST, WITH A MINIMUM SIX-INCH OVERLAP, AND BOTH ENDS SECURELY FASTENED TO THE POST.
2. THE FILTER FABRIC FENCE SHALL BE INSTALLED TO FOLLOW THE CONTOURS (WHERE FEASIBLE) THE FENCE POSTS SHALL BE SPACED A MAXIMUM OF SIX FEET APART AND DRIVEN SECURELY INTO THE GROUND (MINIMUM OF 30 INCHES).
3. A TRENCH SHALL BE EXCAVATED, ROUGHLY EIGHT INCHES WIDE AND TWELVE INCHES DEEP, UPSLOPE AND ADJACENT TO THE WOOD POST TO ALLOW THE FILTER FABRIC TO BE BURIED.
4. WHEN STANDARD STRENGTH FILTER FABRIC IS USED, A WIRE MESH SUPPORT FENCE SHALL BE FASTENED SECURELY TO THE UPSLOPE SIDE OF THE POSTS USING HEAVY-DUTY WIRE STAPLES AT LEAST ONE INCH LONG, TIE WIRES, OR HOG RINGS. THE WIRE SHALL EXTEND INTO THE TRENCH A MINIMUM OF FOUR INCHES AND SHALL NOT EXTEND MORE THAN THIRTY SIX INCHES ABOVE THE ORIGINAL GROUND SURFACE.
5. THE STANDARD STRENGTH FILTER FABRIC SHALL BE STAPLED OR WIRED TO THE FENCE, AND TWENTY INCHES OF THE FABRIC SHALL BE EXTENDED INTO THE TRENCH. THE FABRIC SHALL NOT EXTEND MORE THAN THIRTY SIX INCHES ABOVE THE ORIGINAL GROUND SURFACE. FILTER FABRIC SHALL NOT BE STAPLED TO EXISTING TREES.
6. WHEN EXTRA-STRENGTH FILTER FABRIC AND CLOSER POST SPACING ARE USED, THE WIRE MESH SUPPORT FENCE MAY BE ELIMINATED. IN SUCH A CASE THE FILTER FABRIC IS STAPLED OR WIRED DIRECTLY TO THE POSTS WITH ALL OTHER PROVISIONS OF STANDARD NOTE (5) APPLYING.
7. THE TRENCH SHALL BE BACKFILL WITH 3/4 INCH MINIMUM DIAMETER WASHED GRAVEL.
8. FILTER FABRIC FENCES SHALL BE REMOVED WHEN THEY HAVE SERVED THEIR USEFUL PURPOSE, BUT NOT BEFORE THE UPSLOPE AREA HAS BEEN PERMANENTLY STABILIZED.
9. FILTER FABRIC FENCES SHALL BE INSPECTED IMMEDIATELY AFTER EACH RAINFALL AND AT LEAST DAILY DURING PROLONGED RAINFALL. ANY REQUIRED REPAIRS SHALL BE MADE IMMEDIATELY.



NOTES:

1. NATIVE BACKFILL MATERIAL AT UNPAVED AREAS SHALL NOT HAVE PARTICLE SIZE GREATER THAN 1" WITHIN 6" OF THE PIPE OR THE CONTRACTOR HAS THE OPTION TO USE GRAVEL BACKFILL PIPE BEDDING CONFORMING TO 9-02.12 (3).

3 BEDDING & BACKFILL PIPE IN TRENCHES

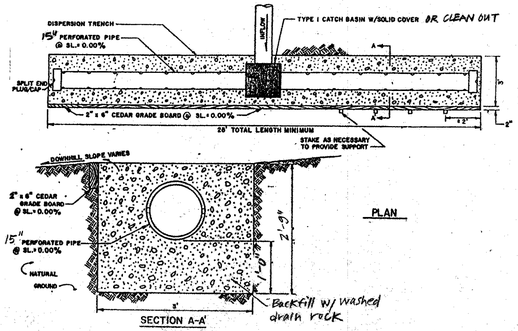
NOT TO SCALE

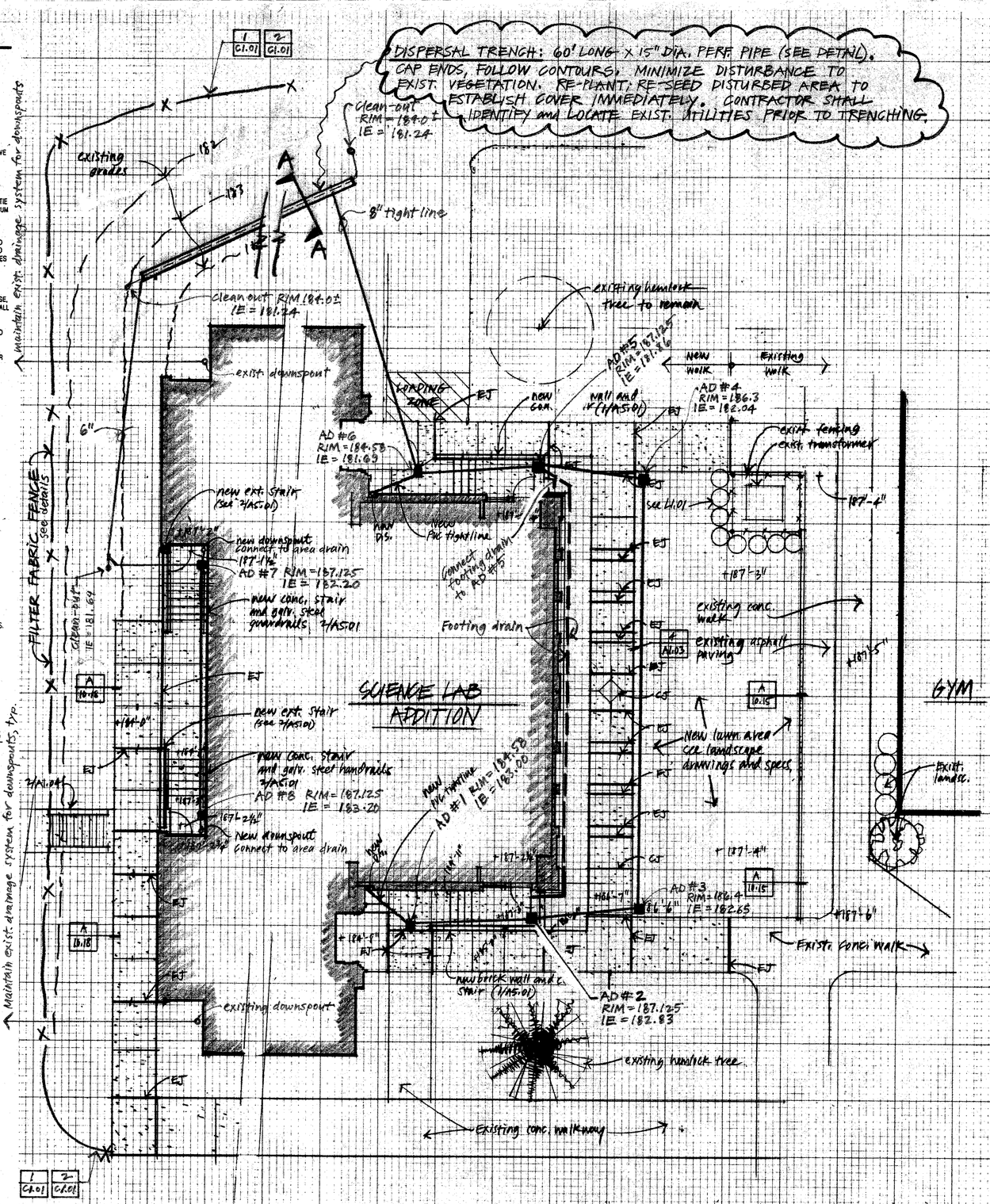
EROSION CONTROL NOTES

1. ON-SITE CONTROL MEASURES SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. ANY PROBLEMS OCCURRING BEFORE FINAL ACCEPTANCE OF THE STORM SYSTEM BY THE ENGINEER SHALL BE CORRECTED BY THE APPLICANT.
2. IN CASE EROSION OR SEDIMENTATION OCCURS TO ADJACENT PROPERTY OWNERS, ALL CONSTRUCTION WORK WITHIN THE DEVELOPMENT THAT WILL AGGRAVATE THE SITUATION IN THE FUTURE, MUST CEASE AND THE CONTRACTOR WILL IMMEDIATELY COMMENCE RESTORATION METHODS. RESTORATION ACTIVITY WILL CONTINUE UNTIL SUCH TIME AS THE AFFECTED PROPERTY OWNER IS SATISFIED.
3. ALL EROSION AND SEDIMENTATION CONTROL DEVICES SHOWN ON THIS DRAWING SHALL BE INSTALLED PRIOR TO OR AS THE FIRST STAGE OF SITE PREPARATION.
4. SHOULD THE TEMPORARY EROSION AND SEDIMENTATION CONTROL MEASURE AS SHOWN ON THIS DRAWING NOT PROVE ADEQUATE TO CONTROL EROSION AND SEDIMENTATION, THE APPLICANT/CONTRACTOR SHALL INSTALL ADDITIONAL FACILITIES AS NECESSARY TO PROTECT ADJACENT PROPERTIES, SENSITIVE AREAS, NATURAL WATER COURSES, AND/OR STORM DRAINAGE SYSTEMS.
5. IN ANY AREA WHICH HAS BEEN STRIPPED OF VEGETATION AND WHERE NO FURTHER WORK IS ANTICIPATED FOR A PERIOD OF 30 DAYS OR MORE, ALL DISTURBED AREAS MUST BE IMMEDIATELY STABILIZED WITH MULCHING, GRASS PLANTING, OR OTHER APPROVED EROSION CONTROL TREATMENT APPLICABLE TO THE TIME OF YEAR IN QUESTION. GRASS SEEDING ALONE WILL BE ACCEPTABLE ONLY DURING THE MONTHS OF APRIL THROUGH SEPTEMBER, INCLUSIVE. SEEDING MAY PROCEED, HOWEVER, WHENEVER IT IS IN THE INTEREST OF THE APPLICANT/CONTRACTOR, BUT MUST BE AUGMENTED WITH MULCHING, NETTING, OR OTHER TREATMENT.

STORM DRAINAGE NOTES

1. MATERIALS FOR THE STORM DRAINAGE SYSTEM AND THEIR INSTALLATION SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE LATEST ADOPTED EDITION OF THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION (WSDOT) STANDARD SPECIFICATIONS. TESTING OF THE STORM DRAINAGE SYSTEM MAY BE REQUIRED BY THE LOCAL JURISDICTION OR AHBL.
2. UNLESS OTHERWISE SPECIFIED ON PLANS, ALL ROOF DRAINS SHALL BE RIGID 6-INCH PVC OR LARGER CONFORMING TO ASTM D 3034, SDR 35. SUFFICIENT CLEANOUTS SHALL BE INSTALLED SO THE SYSTEM IS EASILY MAINTAINED. THE CONTRACTOR SHALL KEEP A DIMENSIONED RECORD OF ALL PIPES AND CLEANOUTS AND SUBMIT IT TO THE OWNER AND/OR AHBL UPON COMPLETION OF THE WORK.
3. ALL BUILDING ROOF DRAIN DOWNSPOUTS, UNLESS OTHERWISE SPECIFIED, SHALL BE CONNECTED DIRECTLY TO THE MAIN STORM DRAINAGE CONVEYANCE SYSTEM THROUGH AN UNDERGROUND PIPE SYSTEM. THE SYSTEM SHOWN HERE IS A RECOMMENDED SOLUTION.
4. THE MIN. PIPE SLOPE SHALL BE 1.0%





SITE IMPROVEMENTS - CIVIL DRAWINGS AND DETAILS

1/8"=1'-0"

THE AMERICAN INSTITUTE OF ARCHITECTS

DRAWN: RCH
CHECKED: RCH · BK
APPROVED: Doreen Gavin AHBL
KEYNOTES:

REVISIONS:
4/3/96 Value Engineer

Copyright © by Architects Reed Reinvald Johnson Willows. All Rights Reserved.

PROJECT TITLE:
PORT TOWNSEND HIGH SCHOOL
PHASE III MODERNIZATION
PORT TOWNSEND, WA

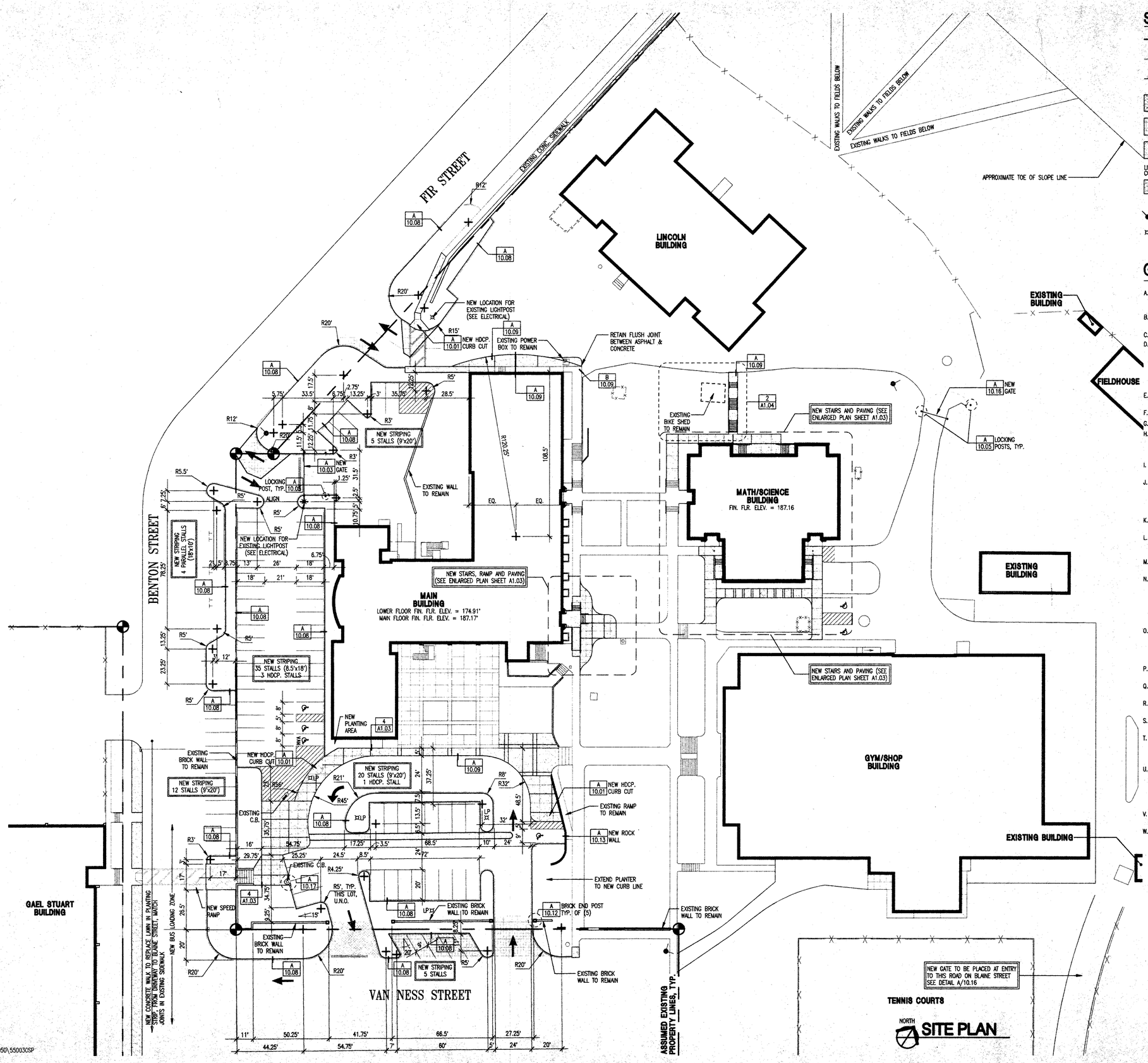
ARCHITECTS REED REINVALD JOHNSON WILLOWS
201 North "I" Street
Tacoma, Washington 98403
Phone: (206) 572-3993
Fax: (206) 572-1445

GEOFFREY BOSNOS STATE OF WASHINGTON REGISTERED PROFESSIONAL ENGINEER
EXPIRES: 4/6/97

CONSULTANT:

SHEET TITLE:

SCALE: As noted
DATE: 4/15/96
PROJECT NO: 95050
SHEET NO: C1.01
NO: OF SHEETS:



04/14/96
C:\DATA\DRAWINGS\95050\550030SP

SITE LEGEND

- EXISTING PROPERTY LINE
- NEW CURB, SEE A/10.08
- NEW CURB
- NEW CONCRETE PAVING SEE A/10.09 FOR EDGE DETAIL
- NEW ASPHALT PAVING
- REPAIR EXISTING ASPHALT PAVEMENT
- LIGHTER LINE INDICATES CONTROL JOINT, SEE A/10.02
- DARKER LINE INDICATES EXPASION JOINT, SEE B/10.02
- EXISTING FIRE HYDRANT (SEE SITE SURVEY)
- LP LIGHT POLE (SEE ELECTRICAL DRAWINGS)

GENERAL NOTES TO SITE PLANS

A. INFORMATION ON THESE SHEETS WAS OBTAINED FROM A PRELIMINARY SITE SURVEY, (EXCEPT FOR PROPERTY LINES, WHICH ARE ASSUMED) AND ALL INFORMATION SHOULD BE VERIFIED PRIOR TO COMMENCEMENT OF WORK

B. SEE LANDSCAPE, MECHANICAL, AND ELECTRICAL DRAWINGS FOR ADDITIONAL INFORMATION AND REQUIREMENTS.

C. SEE SITE SURVEY FOR EXISTING CONDITIONS.

D. SEE SPEC. SECTION 02200 FOR STRUCTURAL FILL REQUIREMENTS UNDER BUILDING AND PAVEMENT AREAS. THESE DOCUMENTS DO NOT GIVE QUANTITIES OF EXCAVATION OR FILL REQUIRED. IT IS THE CONTRACTOR'S RESPONSIBILITY TO CALCULATE QUANTITIES OF ALL EARTHWORK BASED ON ARCHITECTURAL, LANDSCAPE, CIVIL DRAWINGS AND ANY IMPACTS OF OTHER TRADES' WORK, AND INCLUDE ALL SUCH QUANTITIES AND COSTS IN THE BID, BOTH BASE BID AND IMPACTS OF ANY ALTERNATE BIDS.

E. SEE THE SOILS REPORT CONTAINED IN THE SPECIFICATIONS SECTION 02010 FOR EXISTING SOIL DATA.

F. SEE THE PROJECT MANUAL, VOLUME 1, DIVISIONS 1 & 2.

G. SEE ARCHITECTURAL FLOOR PLANS FOR DOWNSPOUT LOCATIONS.

H. CONTRACTOR SHALL ASCERTAIN AND MEET THE FIRE DEPARTMENT'S REQUIREMENTS FOR SITE AND BUILDING ACCESS FOR THE PURPOSE OF FIRE FIGHTING THROUGHOUT THE TERM OF CONSTRUCTION. SUCH REQUIREMENTS SHALL SUPERSEDE ANY CONFLICTING DIRECTION FOUND IN THESE DOCUMENTS.

I. ALL FIRE HYDRANTS SHALL BE MAINTAINED IN FULL OPERATION DURING CONSTRUCTION, AND SHALL NOT BE OBSTRUCTED BY CONSTRUCTION PROCESSES.

J. THE CONTRACTOR SHALL CONSTRUCT A TEMPORARY CONSTRUCTION FENCE AROUND ALL TREES TO BE SAVED TO PROTECT THE TREE FROM DAMAGE. THE FENCES SHALL BE LOCATED A MINIMUM OF 10'-0" BEYOND THE DRIPLINE OF THE TREE PRIOR TO ANY CLEARING OR GRADING. SEE LANDSCAPE DRAWINGS FOR ADDITIONAL INFORMATION. ALSO, COMPLY WITH ALL LOCAL REQUIREMENTS.

K. CONNECTION OF FOOTING DRAINS TO STORM SEWER SYSTEM/CATCH BASIN. CONNECT USING PVC TIGHT LINE.

L. PROVIDE CONTROL JOINTS AND EXPANSION JOINTS IN CONCRETE WALKS AT LOCATIONS SHOWN OR AS SPECIFIED. SEE A/10.02 FOR CONTROL JOINT DETAIL; B/10.02 FOR EXPANSION JOINT DETAIL.

M. DIMENSIONS ARE TYPICALLY TO THE PAVEMENT SIDE OF EXTRUDED CURBS. SEE A/10.08 FOR EXTENT OF ASPHALT PAVING BEYOND EXTRUDED CURBS.

N. THESE AND OTHER DEMOLITION DRAWINGS SHOW THE BASIC DEMOLITION REQUIREMENTS FOR THE PROJECT TO ASSIST IN CLARIFYING THE SCOPE OF WORK. THE CONTRACTOR SHALL BE FULLY RESPONSIBLE TO CAREFULLY REVIEW THE SITE AND INVESTIGATE EXISTING CONDITIONS AS NECESSARY TO DETERMINE THE SCOPE OF DEMOLITION NECESSARY (POTENTIALLY IN ADDITION TO THE WORK SHOWN HERE), TO COMPLETE THE FINISHED PRODUCT IN ACCORDANCE WITH THE CONTRACT DOCUMENTS, AND INCLUDE ALL ASSOCIATED COSTS IN THE BID.

O. THE COMPLETED WORK SHALL BE FULLY FINISHED, INCLUDING REPAIRS TO OR REPLACEMENT OF, EXISTING MATERIALS TO REMAIN, DAMAGED OR AFFECTED BY THE DEMOLITION PROCESS, RESTORING THE ITEM IMPACTED TO AN EQUIVALENT LEVEL OF QUALITY AS THE ADJACENT EXISTING MATERIAL/PRODUCT. THE ARCHITECT SHALL BE THE SOLE JUDGE AS TO THE EQUIVALENCY.

P. REMOVAL OF MATERIALS/EQUIPMENT SHALL INCLUDE ENTIRE MATERIAL AND/OR ASSEMBLY, U.N.O.

Q. SEE SPECIFICATIONS FOR ADDITIONAL INFORMATION ON ITEMS TO BE REMOVED BY THE CONTRACTOR AND TURNED OVER TO THE OWNER.

R. ALL CONCRETE SLAB AND ASPHALT PAVING REMOVAL SHALL BE SAW-CUT ALONG STRAIGHT LINES, GENERALLY PERPENDICULAR TO THE LENGTH OF THE SLAB.

S. SEE THE SPECIFICATIONS, SECTION 01010 FOR LIMITATIONS ON USE OF SITE AND SPECIAL PHASING REQUIREMENTS.

T. THE CONTRACTOR SHALL PLACE CRUSHED ROCK SURFACING AS NECESSARY FOR CONSTRUCTION PROCESSES, MATERIALS STORAGE, ETC. WITHIN THE FENCED CONSTRUCTION AREA, AND BEYOND THE FENCED AREA BUT ONLY WITH THE OWNER'S APPROVAL.

U. CONTRACTOR SHALL PROVIDE ALL TEMPORARY BARRIERS, FENCES, PERSONNEL, ETC., AS REQUIRED TO FULLY PROTECT ALL OCCUPANTS AND VISITORS TO THE EXISTING HIGH SCHOOL BUILDINGS, PLUS ALL EXISTING TREES, EQUIPMENT AND FACILITIES TO REMAIN, AND TO ALLOW THE OWNERS CONTINUED USE OF THE FACILITY. SEE SPECIFICATIONS, PHASING PLANS, LANDSCAPE, STRUCTURAL, MECHANICAL, AND ELECTRICAL DOCUMENTS FOR ADDITIONAL INFORMATION.

V. STORM DRAINAGE SDR 35 PIPE SHALL BE 6" PVC ASTM 3034 SDR 35 UNLESS NOTED OTHERWISE. MINIMUM SLOPE SHALL BE 1.0%.

W. FOOTING DRAINS SHALL BE CONNECTED TO THE STORM SYSTEM AT A CATCH BASIN OR AREA DRAIN.

THE AMERICAN INSTITUTE OF ARCHITECTS

DRAWN: AJH
CHECKED: RH
APPROVED:
NOTES:

REVISIONS:

Copyright © 1996 by Architects Reed Reinvald Johnson Willows PLLC
All Rights Reserved.

PROJECT TITLE:
PORT TOWNSEND HIGH SCHOOL

PHASE III MODERNIZATION

PORT TOWNSEND, WA

ARCHITECTS REED REINVALD JOHNSON WILLOWS PLLC
201 North "I" Street
Tacoma, Washington 98403
Phone: (206) 572-3993
Fax: (206) 572-1445

4130 REGISTERED ARCHITECT
DEAN C. WILLOWS
STATE OF WASHINGTON

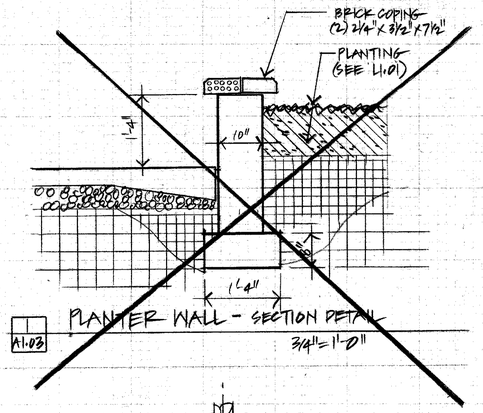
CONSULTANT:

SHEET TITLE:
SITE PLAN

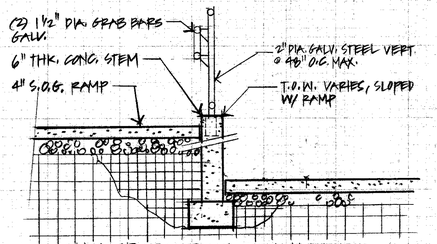
SCALE: 1"=30'-0"
DATE: 17 APRIL 1996
PROJECT NO: 95050.01
SHEET NO:

A 1.02

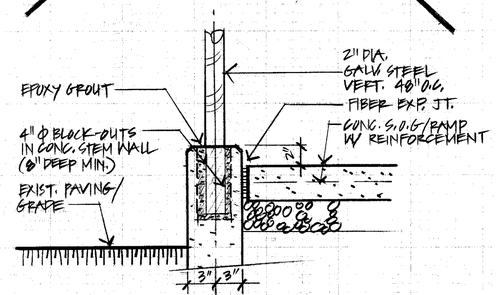
NO: OF SHEETS:



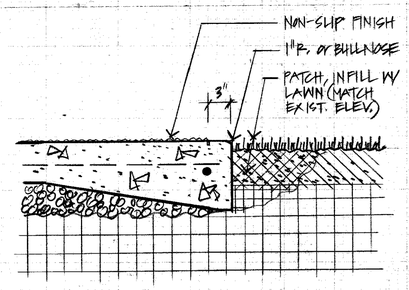
PLANTER WALL - SECTION DETAIL
A1.03 3/4"=1'-0"



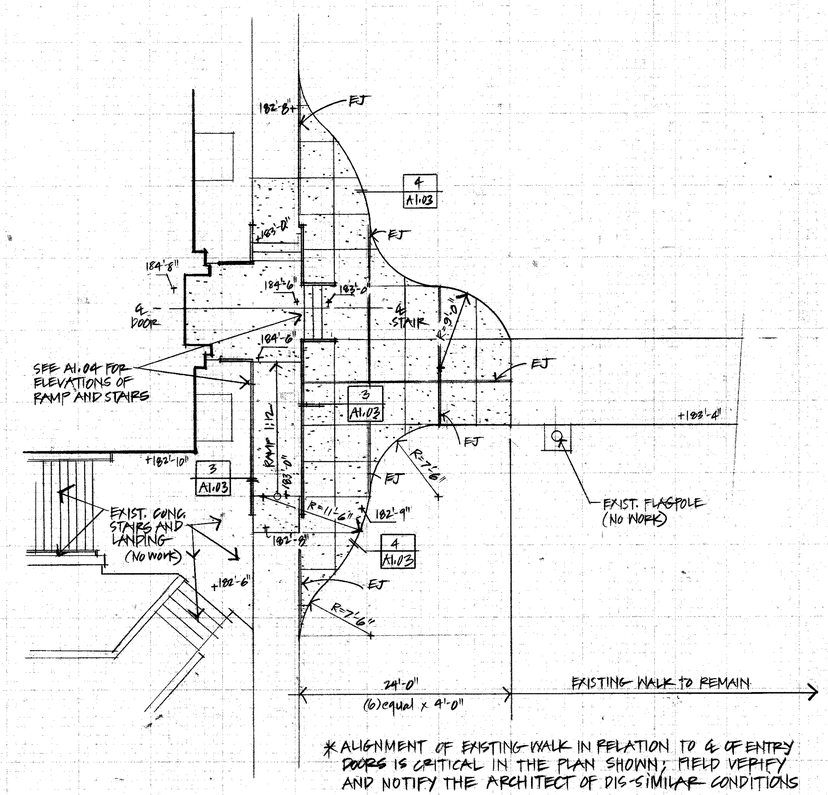
2 A1.03 HANDICP. RAMP and BENCH DETAIL
1/2"=1'-0"



3 A1.03 RAMP TRANSITION - POST ANCHOR
1½"=1'-0"

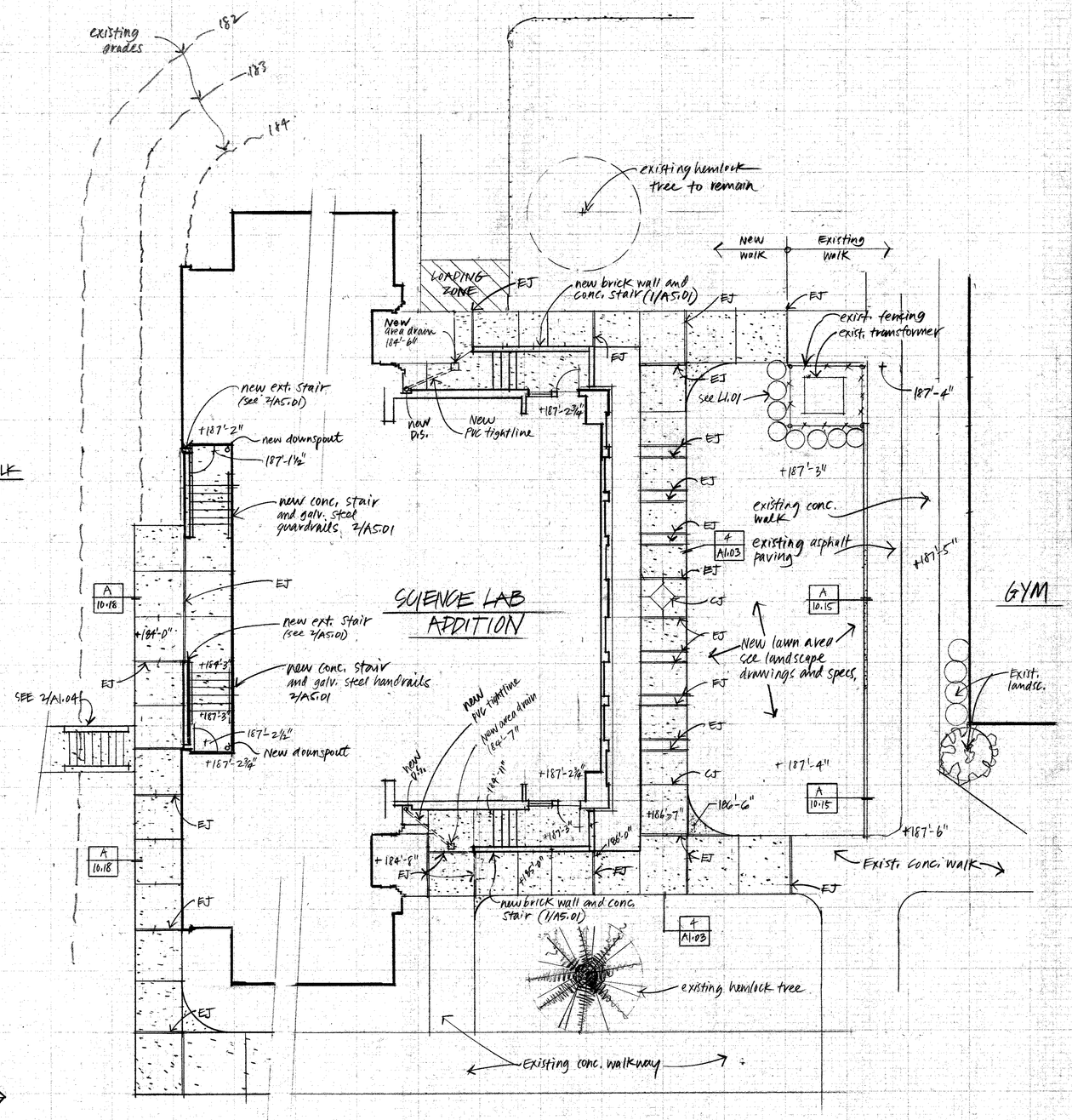


4 A1.03 TYPICAL SLAB EDGE DETAIL CONC. WALK
1½"=1'-0"



* ALIGNMENT OF EXISTING WALK IN RELATION TO ℄ OF ENTRY DOORS IS CRITICAL IN THE PLAN SHOWN; FIELD VERIFY AND NOTIFY THE ARCHITECT OF DIS-SIMILAR CONDITIONS

NEW RAMP - PAVING PLAN (main building)
1/8"=1'-0"



SITE IMPROVEMENTS - EDGE DETAILS (Math/science building)
1/8"=1'-0"

THE AMERICAN INSTITUTE OF ARCHITECTS

DRAWN: RCH
CHECKED: RCH · BK
APPROVED:
KEYNOTES:

REVISIONS:
4/9/96 Value Engineer'g

Copyright © by Architects Reed Reinvald Johnson Willows. All Rights Reserved.

PROJECT TITLE:
PORT TOWNSEND HIGH SCHOOL
PHASE III MODERNIZATION
PORT TOWNSEND, WA

ARCHITECTS
REED REINVALD JOHNSON WILLOWS
201 North "I" Street
Tacoma, Washington 98403
Phone: (206) 572-3993
Fax: (206) 572-1445

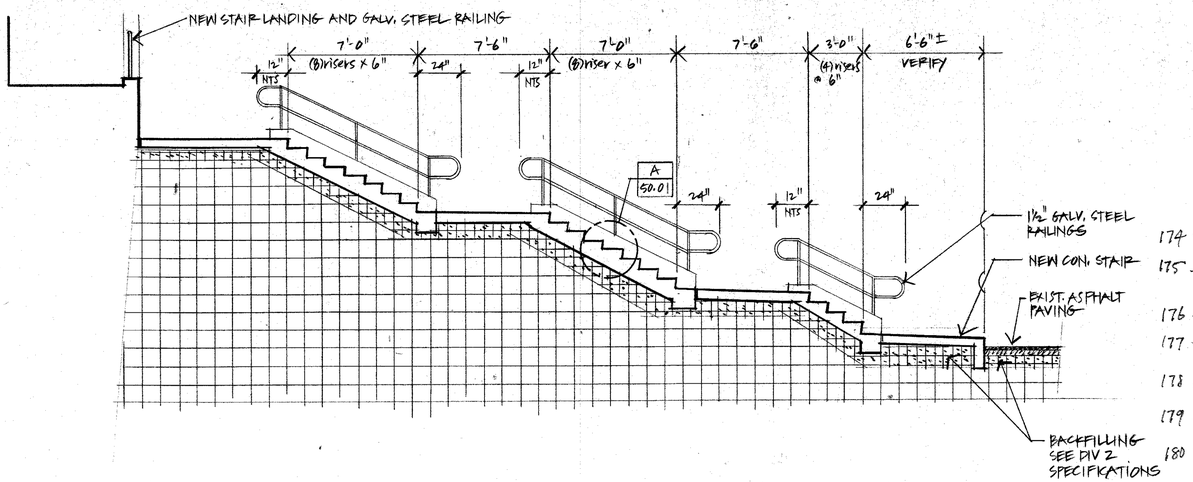
4130 REGISTERED ARCHITECT DEAN C. WILLOWS STATE OF WASHINGTON

CONSULTANT:

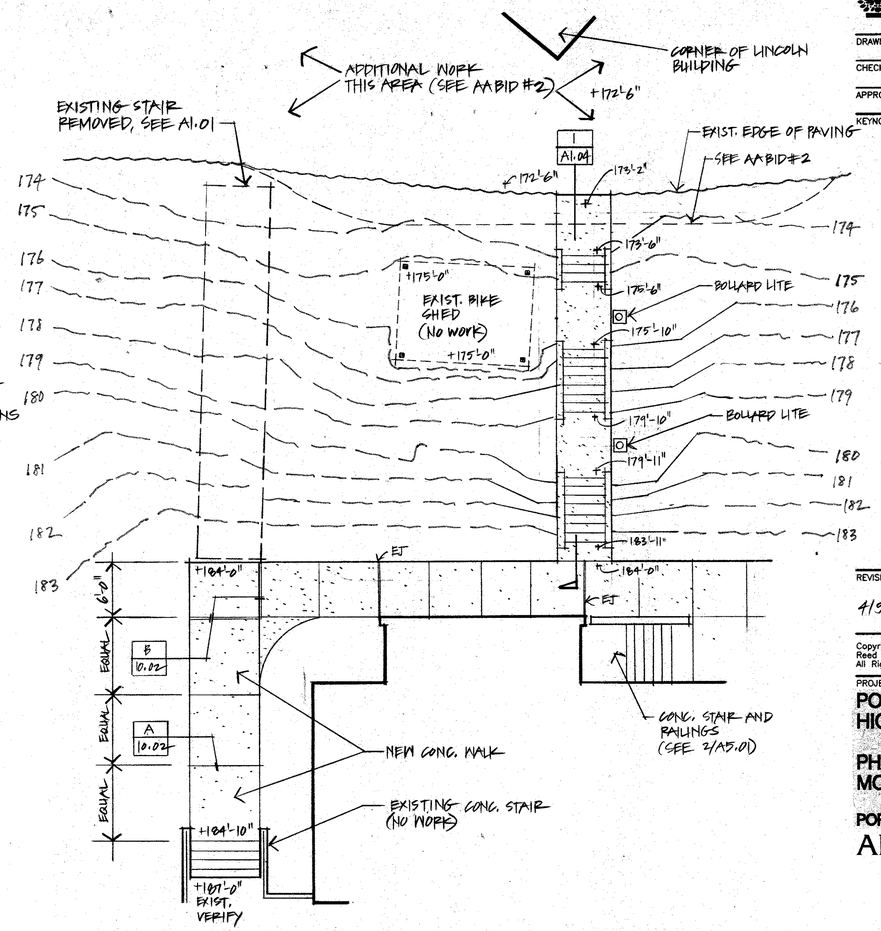
SHEET TITLE:
Enlarged Site Plans and Details

SCALE: As noted
DATE: 4/15/96
PROJECT NO: 95050
SHEET NO:
A1.03

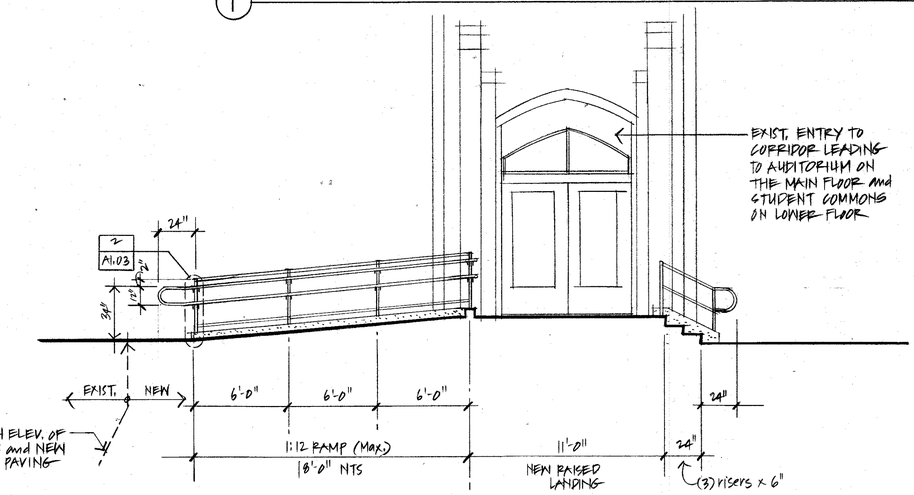
NO: OF SHEETS:



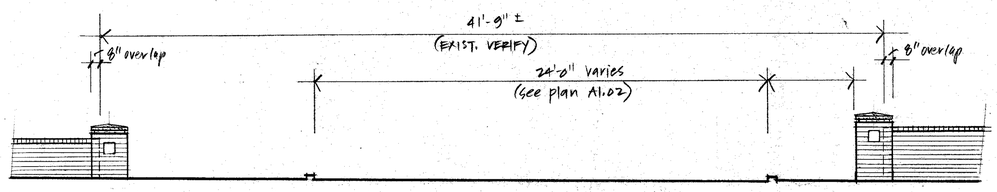
1 SECTION @ CONCRETE STAIR - PEDESTRIAN WALKWAY TO LINCOLN BLDG.
1/4" = 1'-0"



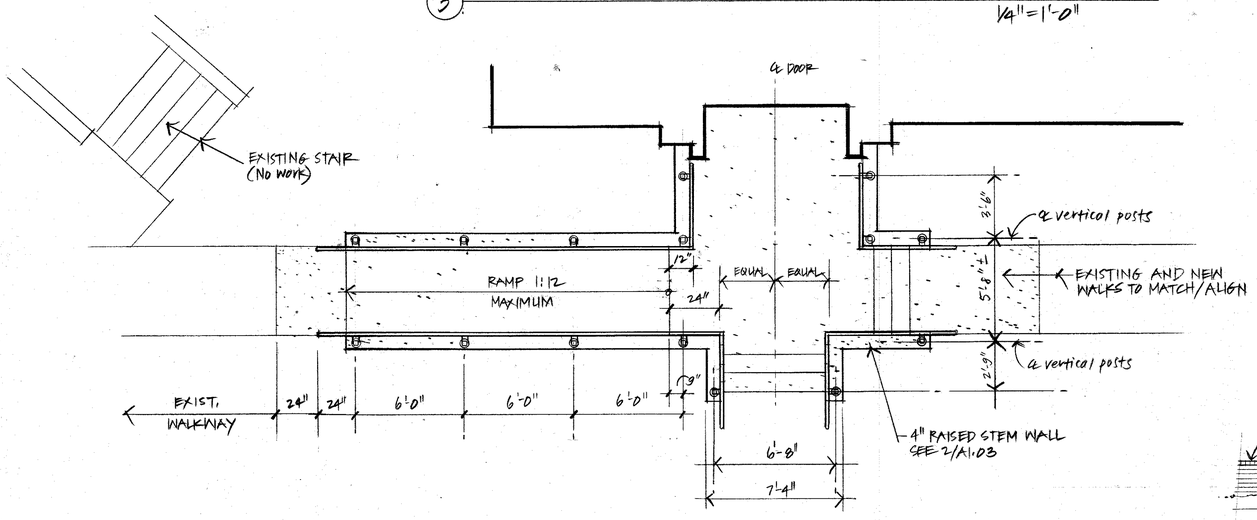
2 ENLARGED PLAN, PEDESTRIAN CONNECTION
1/8" = 1'-0"



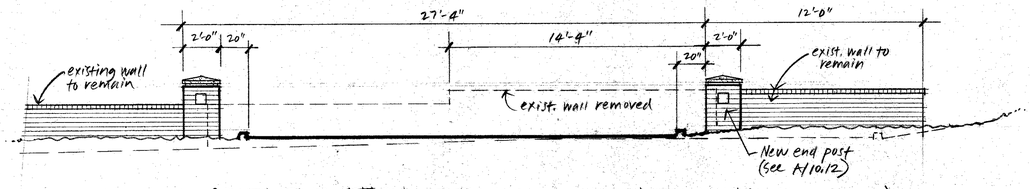
3 SECTION · ELEVATION OF NEW RAMP AT MAIN BUILDING
1/4" = 1'-0"



5 NORTH ELEVATION, SITE WALL @ MAIN PARKING AREA (AUTO EXIT)
1/4" = 1'-0"



4 DIMENSION PLAN FOR NEW RAMP AT MAIN BUILDING
1/4" = 1'-0"



6 SOUTH ELEVATION, SITE WALL @ MAIN PARKING (AUTO ENTRY)
1/4" = 1'-0"

THE AMERICAN INSTITUTE OF ARCHITECTS

DRAWN: RCH
CHECKED: RCH · BK
APPROVED:
KEYNOTES:

REVISIONS:
4/9/96 Value Engineer's

Copyright © by Architects Reed Reinvald Johnson Willows. All Rights Reserved.

PROJECT TITLE:
PORT TOWNSEND HIGH SCHOOL

PHASE III MODERNIZATION

PORT TOWNSEND, WA

ARCHITECTS
REED REINVALD JOHNSON WILLOWS
201 North "I" Street
Tacoma, Washington 98403
Phone: (206) 572-3993
Fax: (206) 572-1445

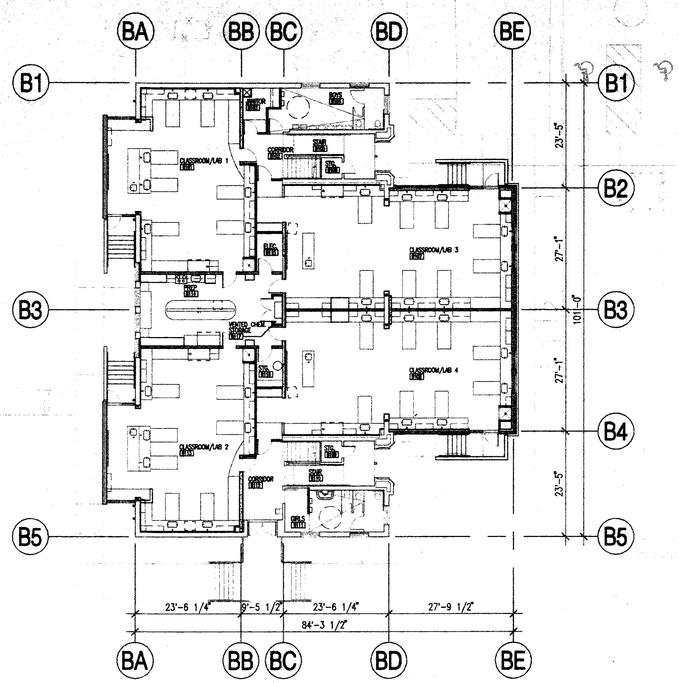
4130 REGISTERED ARCHITECT
DEAN C. WILLOWS
STATE OF WASHINGTON

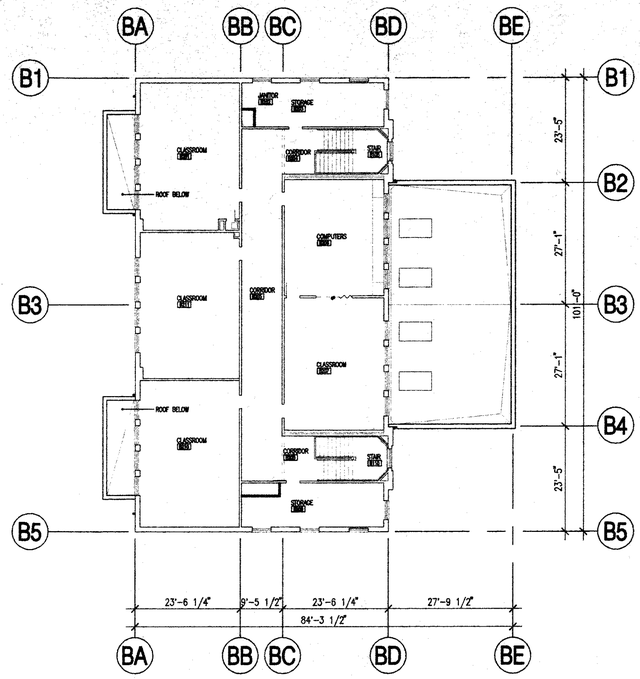
CONSULTANT:

SHEET TITLE:
Site Plans
Ramps
Stairs

SCALE: As Noted
DATE: 4/15/96
PROJECT NO: 95050
SHEET NO:
A1.04

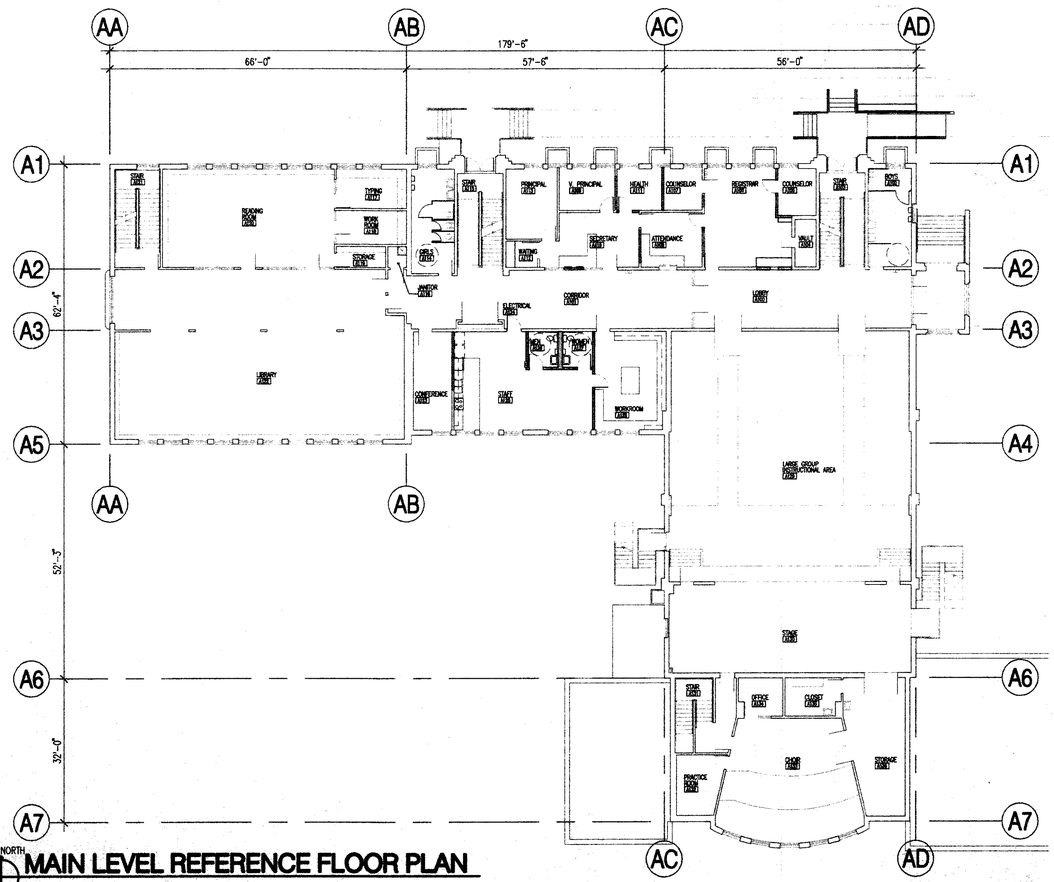
NO: OF SHEETS:





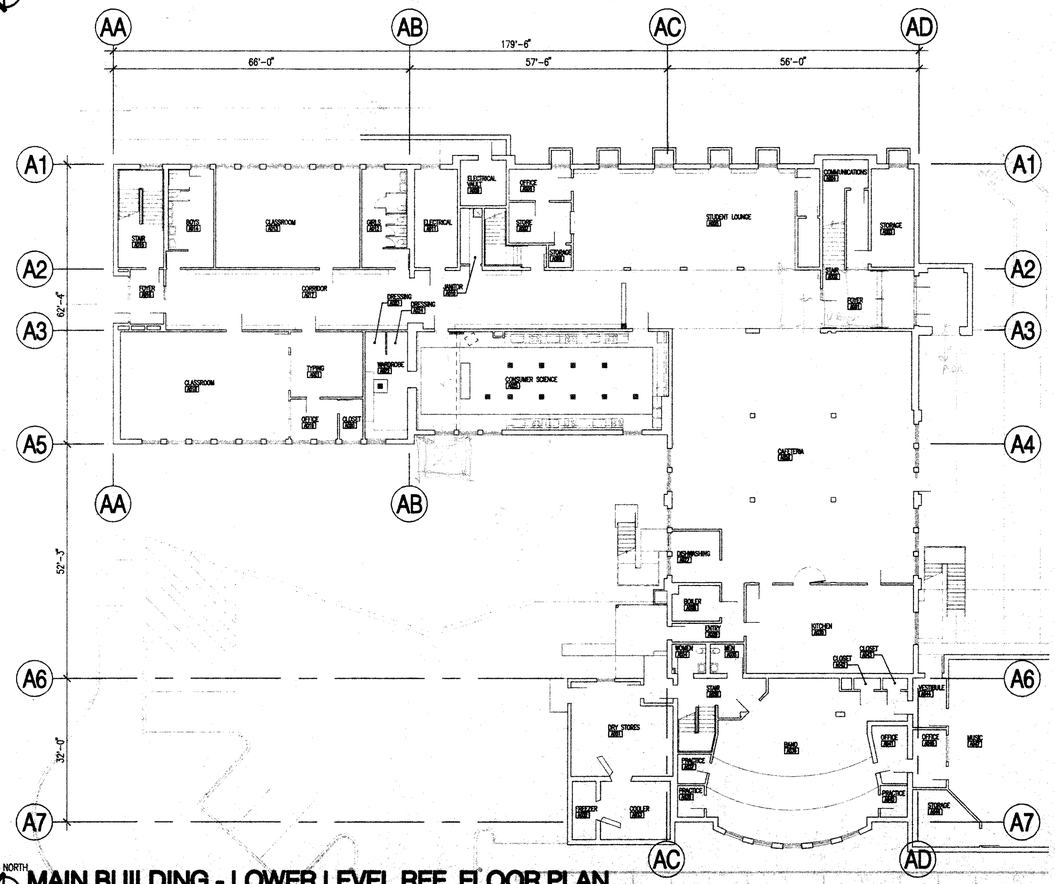
PLAN NORTH

MATH/SCIENCE BUILDING - UPPER LEVEL REFERENCE FLOOR PLAN



PLAN NORTH

MAIN LEVEL REFERENCE FLOOR PLAN



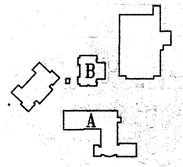
PLAN NORTH

MAIN BUILDING - LOWER LEVEL REF. FLOOR PLAN

04/14/96
C:\DATA\DRAWINGS\95050\550492FM

THE AMERICAN INSTITUTE OF ARCHITECTS

DRAWN: AJH
CHECKED: RH
APPROVED:
NOTES:



KEY PLAN

PLAN NORTH
REVISIONS:

Copyright © 1996 by Architects Reed Reinvald Johnson Willows PLLC. All Rights Reserved.

PROJECT TITLE:
PORT TOWNSEND HIGH SCHOOL

PHASE III MODERNIZATION

PORT TOWNSEND, WA

ARCHITECTS REED REINVALD JOHNSON WILLOWS PLLC

201 North "I" Street
Tacoma, Washington 98403
Phone: (206) 572-3993
Fax: (206) 572-1445

4130 REGISTERED ARCHITECT
DEAN C. WILLOWS
STATE OF WASHINGTON

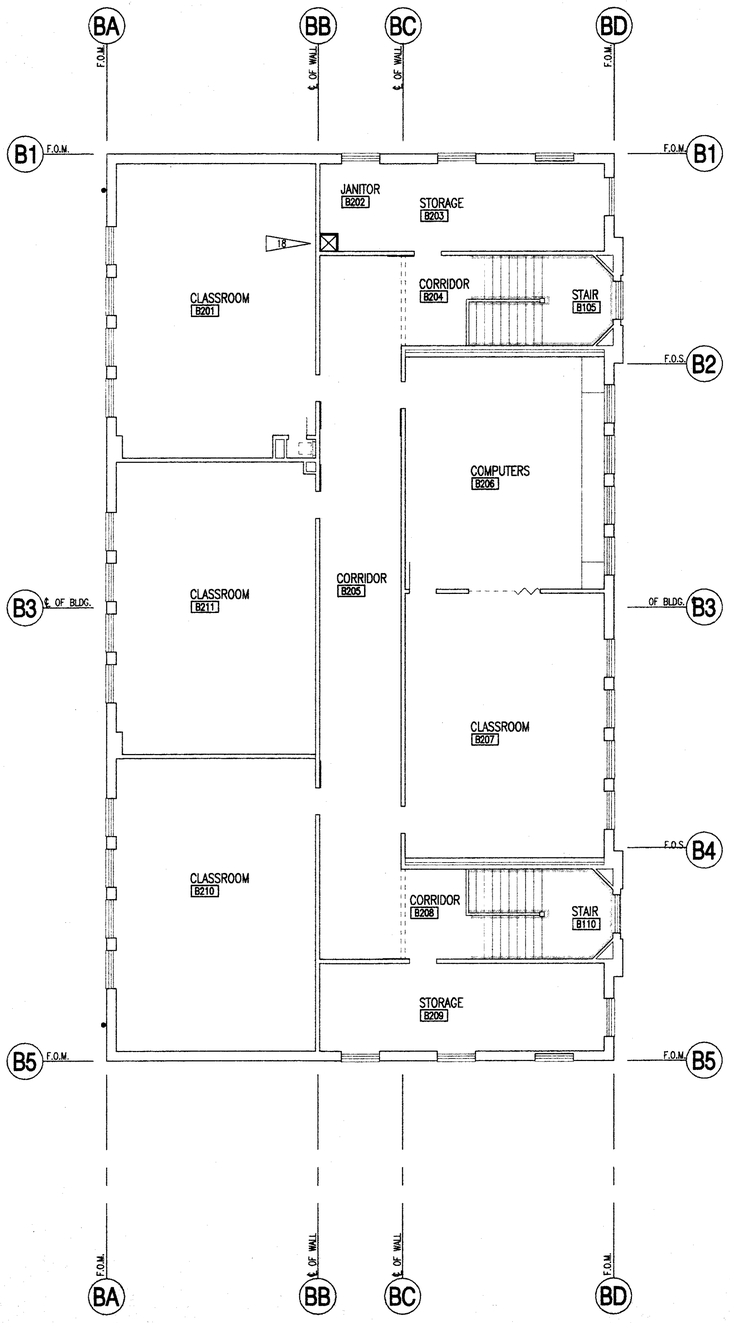
CONSULTANT:

SHEET TITLE:
REFERENCE FLOOR PLANS

SCALE: 1/16"=1'-0"
DATE: 17 APRIL 1996
PROJECT NO: 95050.01
SHEET NO:

A 2.01

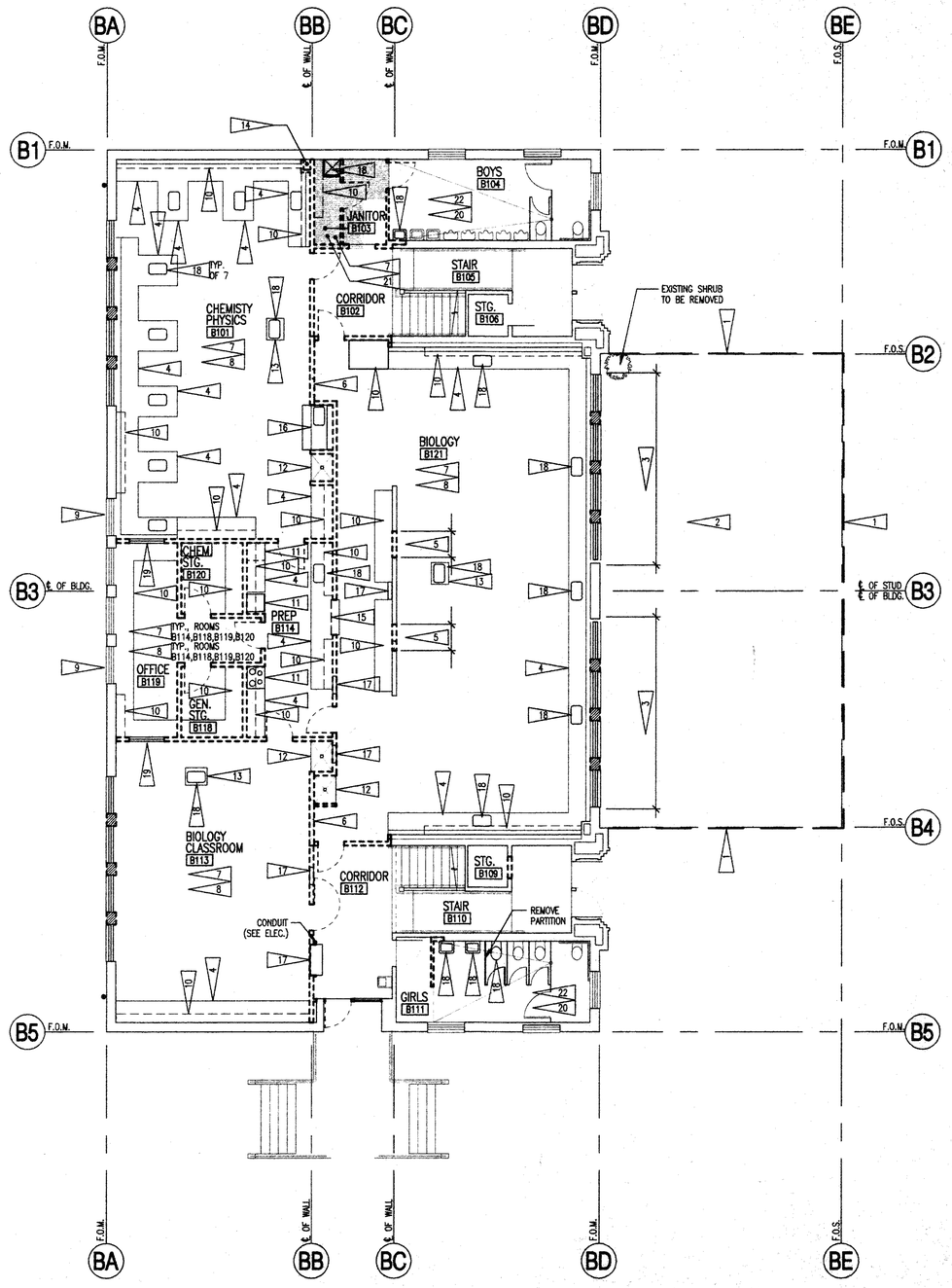
NO: OF SHEETS:



PLAN NORTH

MATH/SCIENCE BUILDING - UPPER LEVEL DEMOLITION PLAN

04/14/96
C:\DATA\DRAWINGS\95050\55095FM



PLAN NORTH

MATH/SCIENCE BUILDING - LOWER LEVEL DEMOLITION PLAN

SCIENCE BUILDING DEMOLITION NOTES

1. APPROXIMATE LIMITS OF DEMOLITION FOR PREPARATION OF UNDER FLOOR CONSTRUCTION. (REFER TO STRUCTURAL DRAWINGS AND SPECIFICATIONS FOR REMOVAL OF EXISTING TOPSOIL, BACKFILLING, AND COMPACTION REQUIREMENTS.)
2. DEMOLISH AND REMOVE EXISTING CONCRETE WALKWAY.
3. DEMOLISH AND REMOVE LOAD BEARING MASONRY WALL. (SEE STRUCTURAL DRAWINGS.)
4. CAREFULLY REMOVE AND SALVAGE RESIN-EPOXY COUNTER TOPS; TURN OVER TO OWNER. DEMOLISH AND REMOVE PLASTIC LAMINATE CLAD CASEWORK, INCLUDING HARDWARE AND ALL ASSOCIATED WALL AND FLOOR ANCHORING SYSTEMS.
5. REMOVE PORTION OF EXISTING 6" CAST-IN-PLACE CONCRETE SHEAR WALL. (SEE STRUCTURAL.)
6. DEMOLISH AND REMOVE EXISTING CAST-IN-PLACE CONCRETE SHEAR WALL ENTIRELY. (SEE STRUCTURAL.)
7. REMOVE EXISTING SUSPENDED ACOUSTIC CEILING TILE AND GRID ENTIRELY (INCLUDING LIGHT FIXTURES, AND MECHANICAL GRILLES AND LOUVERS) IN ROOMS: B101, B103, B113, B114, B118, B119, B120, B121.
8. REMOVE SHEET VINYL/RESILIENT FLOORING MATERIAL, INCLUDING ADHESIVES. PREPARE EXISTING PLYWOOD SUB-FLOORING FOR INSTALLATION OF CONCRETE TOPPING SLAB. SEE SPECIFICATIONS AND FINISH SCHEDULE FOR FURTHER INFORMATION.
9. REMOVE GLAZING FROM ALUMINUM FRAMED WINDOW.
10. REMOVE PLASTIC LAMINATE CLAD CASEWORK.
11. CAREFULLY REMOVE AND SALVAGE EXISTING APPLIANCES; TURN OVER TO OWNER. (DISHWASHER, RANGE AND REFRIGERATOR.)
12. REMOVE EMERGENCY SHOWER AND EYE WASH STATION AND SALVAGE FOR REUSE, SEE SHEETS A 2.06 & A 2.07 (SEE MECHANICAL DRAWINGS AND SPECIFICATIONS.)
13. CAREFULLY REMOVE RESIN-EPOXY COUNTER TOP SLAB @ INSTRUCTOR DEMONSTRATION ISLAND; TURN OVER TO OWNER. DEMOLISH AND REMOVE PLASTIC LAMINATE CLAD BASE CABINET INCLUDING HARDWARE AND ALL ASSOCIATED UTILITY LINES.
14. REMOVE EXISTING WOOD FRAMED CHASE INCLUDING PLUMBING AND UTILITY CONDUITS. (SEE MECHANICAL AND ELECTRICAL DRAWINGS AND SPECIFICATIONS.)
15. REMOVE OVERHEAD COILING DOOR AND FRAME.
16. CAREFULLY REMOVE AND SALVAGE EXISTING FUME HOOD W/ SINK. (SEE SHEET A 2.07 ROOM PREP/B114 FOR LOCATION. REFER TO MECHANICAL DRAWINGS AND SPECIFICATIONS FOR FURTHER DEMOLITION INSTRUCTIONS.)
17. DEMOLISH AND REMOVE EXISTING RECESSED WALL ELECTRICAL PANELS. (SEE ELECTRICAL)
18. PLUMBING FIXTURE TO BE REMOVED. (SEE MECHANICAL DRAWINGS AND SPECIFICATIONS FOR CAPPING-STUBBING AND INSTRUCTIONS FOR ABANDONING EXISTING UTILITIES.
19. REMOVE METAL FRAME RELIGHT.
20. REMOVE CERAMIC TILE FLOORING AS REQUIRED FOR NEW WORK.
21. REMOVE FLOORING MATERIAL IN SHADED AREA, INCLUDING ADHESIVES. PREPARE EXISTING PLYWOOD SUB-FLOORING FOR INSTALLATION OF CONCRETE TOPPING SLAB. SEE SPECIFICATIONS AND FINISH SCHEDULE FOR FURTHER INFORMATION.
22. REMOVE PORTION OF CEILING AS REQUIRED TO INSTALL NEW HVAC EQUIPMENT. (SEE MECHANICAL)

DEMOLITION LEGEND

REMOVE WOOD FRAMED WALL INCLUDING UTILITIES.

REMOVE DOOR AND FRAME.

GENERAL NOTE FOR DEMOLITION

THESE PLANS DELINEATE THE BASIC SCOPE OF WORK FOR THE REMOVAL OF EXISTING MATERIALS. THE DEMOLITION DRAWINGS AND NOTES ARE PROVIDED WITH THE INTENT TO GENERALLY DESCRIBE AREAS AND LIMITS OF WORK. THE CONTRACTOR SHALL BE FAMILIAR WITH THE SITE AND CONDITIONS THEREON, AND SHALL NOT SOLELY RELY ON REVIEW OF THE BIDDING DOCUMENTS IN DETERMINING EXTENT OF WORK REQUIRED.

COORDINATION OF THESE DRAWINGS WITH THE REQUIREMENTS FOR CONTRACT WORK IS THE RESPONSIBILITY OF THE CONTRACTOR. ADDITIONAL INFORMATION ON DEMOLITION IS SHOWN ON STRUCTURAL, MECHANICAL AND ELECTRICAL DRAWINGS, AND THE COORDINATION OF ALL WORK IS THE RESPONSIBILITY OF THE CONTRACTOR. DISCREPANCIES BETWEEN OR WITHIN CONTRACT DOCUMENTS SHALL BE REPORTED TO THE ARCHITECT IMMEDIATELY. THE CONTRACTOR SHALL PROVIDE CLARITY SKETCHES, DIAGRAMS, AND DIMENSIONS OF EXISTING CONDITIONS AT THE REQUEST OF THE ARCHITECT IF/WHEN CONFLICTS ARE IDENTIFIED.

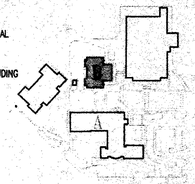
THE AMERICAN INSTITUTE OF ARCHITECTS

DRAWN: AJH
CHECKED: RH
APPROVED:

NOTES:

SEE SHEET A 2.02 FOR GENERAL NOTES TO FLOOR PLANS.

SEE ALSO SHEET G 2.01 FOR PHASING PLAN & ADDITIONAL INFORMATION.



KEY PLAN

PLAN NORTH

REVISIONS:

Copyright © 1996 by Architects Reed Reinvald Johnson Willows PLLC All Rights Reserved.

PROJECT TITLE:
PORT TOWNSEND HIGH SCHOOL

PHASE III MODERNIZATION

PORT TOWNSEND, WA

ARCHITECTS REED REINVALD JOHNSON WILLOWS PLLC

201 North "I" Street
Tacoma, Washington 98403
Phone: (206) 572-3993
Fax: (206) 572-1445

4130 REGISTERED ARCHITECT
DEAN C. WILLOWS
STATE OF WASHINGTON

CONSULTANT:

SHEET TITLE:
MATH/SCIENCE BUILDING DEMO. PLANS

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

DATE: 17 APRIL 1996

PROJECT NO: 95050.01

SHEET NO:

A 2.05

NO: OF SHEETS:

WALL TYPE ASSEMBLIES

WALL TYPE 1 — **1-HR**
2-1/4" x 3-1/2" x 7-1/2" BRICK VENEER
1-7/8"± AIR SPACE
BUILDING WRAP/AIR INFILTRATION BARRIER
5/8" TYPE 'X' GYPSUM SHEATHING
PLYWOOD SHEATHING (SEE STRUCTURAL)
BATT INSULATION (R-19)
2x6 WOOD STUDS @ 16" O.C.
VAPOR BARRIER
5/8" TYPE 'X' GWB
FIRE RATING: 1-HR, PER UL U305

WALL TYPE 2 — **1-HR**
5/8" TYPE 'X' GWB
PLYWOOD SHEATHING (SEE STRUCTURAL)
2x6 STUDS @ 16" O.C.
SOUND ATTENUATION FIRE BLANKETS
5/8" TYPE 'X' GWB
FIRE RATING: 1-HR, PER UL U305

EXISTING WALL

WALL TYPE 3 — **1-HR**
5/8" TYPE 'X' GWB
2x WOOD FURRING @ 16" O.C.
EXISTING 6" CAST-IN-PLACE CONCRETE WALL
2x WOOD FURRING @ 16" O.C.
5/8" TYPE 'X' GWB
FIRE RATING: 1-HR, PER UBC TABLE 7-B ITEM 7-1.1

WALL TYPE 4 — **1-HR**
5/8" TYPE 'X' GWB
2x WOOD FURRING @ 16" O.C.
NEW 6" CONCRETE WALL
2x WOOD FURRING @ 16" O.C.
5/8" TYPE 'X' GWB
FIRE RATING: 1-HR, PER UBC TABLE 7-B ITEM 7-1.1

WALL TYPE 5 — **1-HR**
5/8" TYPE 'X' GWB
2x4 WOOD STUDS @ 16" O.C.
SOUND ATTENUATION FIRE BLANKETS
5/8" TYPE 'X' GWB
FIRE RATING: 1-HR, PER UL U305

WALL TYPE 6 — **1-HR**
5/8" TYPE 'X' GWB
2x6 WOOD STUDS @ 16" O.C.
SOUND ATTENUATION FIRE BLANKETS
5/8" TYPE 'X' GWB
FIRE RATING: 1-HR, PER UL U305

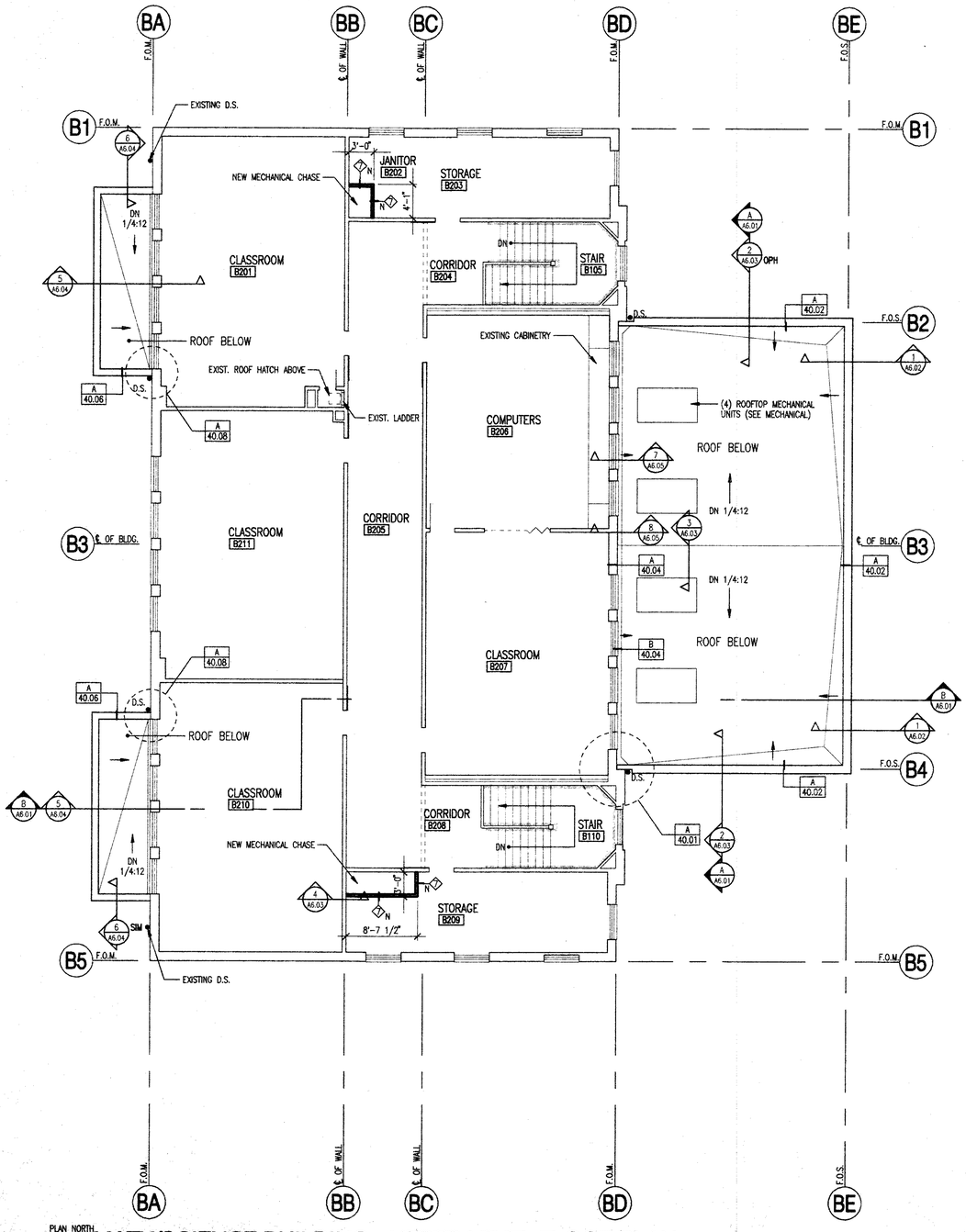
WALL TYPE 7 — **NON-RATED**
5/8" TYPE 'X' GWB
2x4 WOOD STUDS @ 16" O.C.
SOUND ATTENUATION FIRE BLANKETS
FIRE RATING: NONE

WALL TYPE 8 — **1-HR**
5/8" TYPE 'X' GWB
2x WOOD STUDS @ 16" O.C.
WIDTH TO MATCH EXISTING ADJACENT WALL
5/8" TYPE 'X' GWB
FIRE RATING: 1-HR, PER UL U305

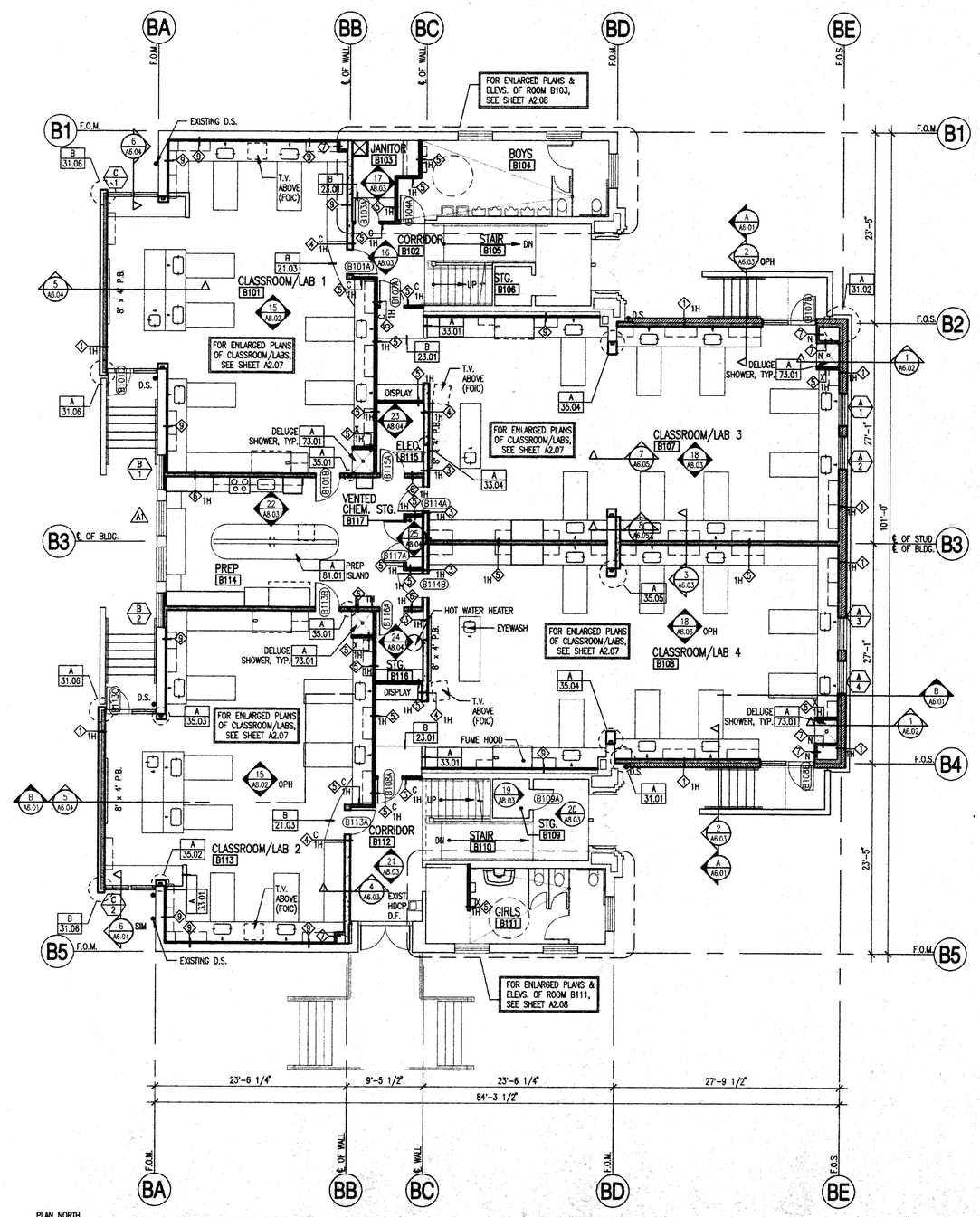
WALL TYPE 9 — **NON-RATED**
5/8" TYPE 'X' GWB
2x4 WOOD STUD FURRING @ 16" O.C.
NEW OR EXISTING WALL
FIRE RATING: NONE

WALL TYPE LEGEND

- WALL TYPE DESIGNATION (SEE WALL TYPE ASSEMBLIES)
- WALL TYPE MODIFIER
  - C – CORRIDOR WALL
  - S – SOUND RATED WALL (SEE SPECIFICATIONS)
  - X – NO SOUND INSULATION THIS WALL
- WALL TYPE FIRE-RATING (SEE WALL TYPE ASSEMBLIES)



PLAN NORTH
MATH/SCIENCE BUILDING - UPPER LEVEL FLOOR PLAN



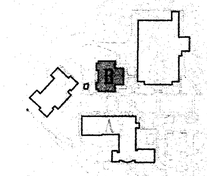
PLAN NORTH
MATH/SCIENCE BUILDING - LOWER LEVEL FLOOR PLAN

04/14/96
C:\DATA\DRAWINGS\95050\550096FM

THE AMERICAN INSTITUTE OF ARCHITECTS

DRAWN: AJH
CHECKED: RH
APPROVED:

NOTES:
SEE SHEET A 2.02 FOR GENERAL NOTES TO FLOOR PLANS.
SEE SHEET A 2.07 FOR DIMENSIONS.
SEE ALSO SHEET G 2.01 FOR PHASING PLAN & ADDITIONAL INFORMATION.



KEY PLAN
PLAN NORTH

REVISIONS:

Copyright © 1996 by Architects Reed Reinvald Johnson Willows PLLC
All Rights Reserved.

PROJECT TITLE:
PORT TOWNSEND HIGH SCHOOL

PHASE III MODERNIZATION

PORT TOWNSEND, WA

ARCHITECTS REED REINVALD JOHNSON WILLOWS PLLC
201 North "I" Street
Tacoma, Washington 98403
Phone: (206) 572-3993
Fax: (206) 572-1445

4130 REGISTERED ARCHITECT
DEAN C. WILLOWS
STATE OF WASHINGTON

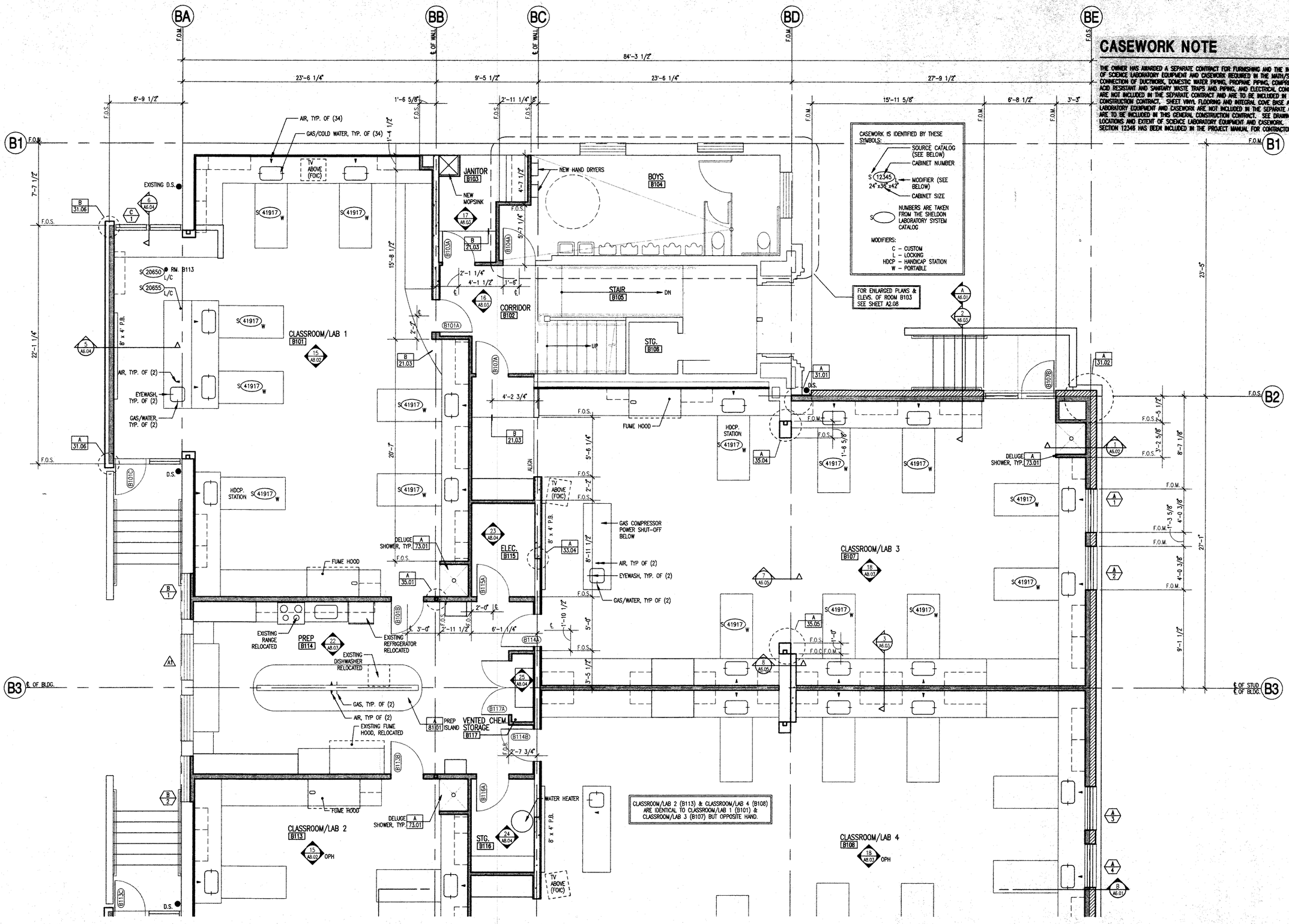
CONSULTANT:

SHEET TITLE:
MATH/SCIENCE BUILDING FLOOR PLANS

SCALE: 1/8"=1'-0"
DATE: 17 APRIL 1996
PROJECT NO: 95050.01
SHEET NO:

A 2.06

NO: OF SHEETS:



CASEWORK NOTE

THE OWNER HAS AWARDED A SEPARATE CONTRACT FOR FURNISHING AND THE INSTALLATION OF SCIENCE LABORATORY EQUIPMENT AND CASEWORK REQUIRED IN THE MATH/SCIENCE BUILDING. CONNECTION OF DUCTWORK, DOMESTIC WATER PIPING, PROPANE PIPING, COMPRESSED AIR PIPING, ACID RESISTANT AND SANITARY WASTE TRAPS AND PIPING, AND ELECTRICAL CONDUIT AND WIRING ARE NOT INCLUDED IN THE SEPARATE CONTRACT AND ARE TO BE INCLUDED IN THIS GENERAL CONSTRUCTION CONTRACT. SHEET VINYL FLOORING AND INTEGRAL COVE BASE AROUND SCIENCE LABORATORY EQUIPMENT AND CASEWORK ARE NOT INCLUDED IN THE SEPARATE CONTRACT AND ARE TO BE INCLUDED IN THIS GENERAL CONSTRUCTION CONTRACT. SEE DRAWINGS FOR LOCATIONS AND EXTENT OF SCIENCE LABORATORY EQUIPMENT AND CASEWORK. SPECIFICATION SECTION 12346 HAS BEEN INCLUDED IN THE PROJECT MANUAL FOR CONTRACTOR'S INFORMATION.

THE AMERICAN INSTITUTE OF ARCHITECTS

DRAWN: AJH
CHECKED: RH
APPROVED:

NOTES:

SEE SHEET A 2.02 FOR GENERAL NOTES TO FLOOR PLANS.

SEE SHEET A 2.06 FOR WALL TYPES.

SEE ALSO SHEET G 2.01 FOR PHASING PLAN & ADDITIONAL INFORMATION.

KEY PLAN

PLAN NORTH

REVISIONS:

Copyright © 1996 by Architects Reed Reinvald Johnson Willows PLLC All Rights Reserved.

PROJECT TITLE:
PORT TOWNSEND HIGH SCHOOL

PHASE III MODERNIZATION

PORT TOWNSEND, WA

ARCHITECTS REED REINVALD JOHNSON WILLOWS PLLC

201 North "I" Street
Tacoma, Washington 98403
Phone: (206) 572-3993
Fax: (206) 572-1445

4130 REGISTERED ARCHITECT
DEAN C. WILLOWS
STATE OF WASHINGTON

CONSULTANT:

SHEET TITLE:
ENLARGED SCIENCE LAB FLOOR PLANS

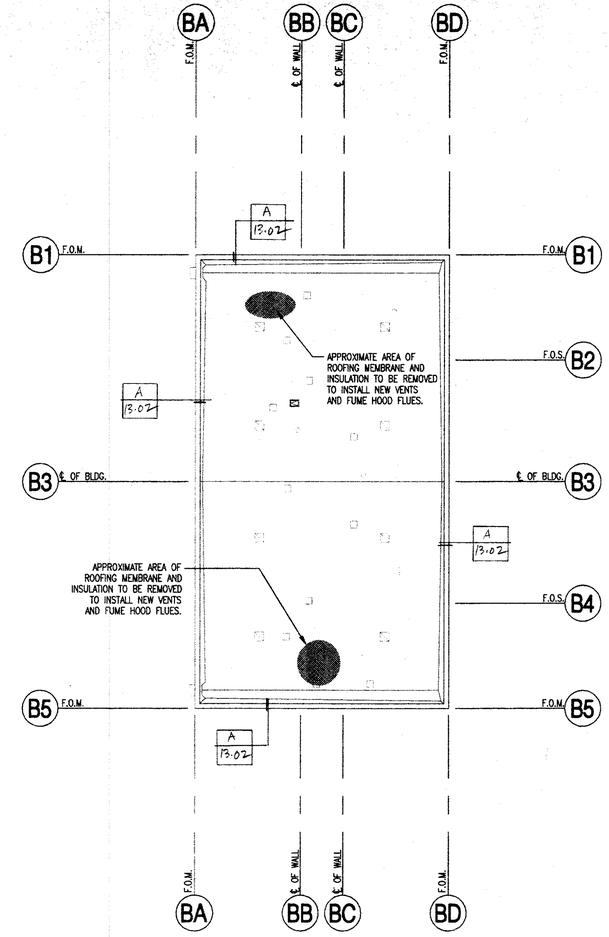
SCALE: 1/4"=1'-0"
DATE: 17 APRIL 1996
PROJECT NO: 95050.01
SHEET NO:

A 2.07

NO: OF: SHEETS:

04/14/96
C:\DATA\DRAWINGS\95050\550048FM

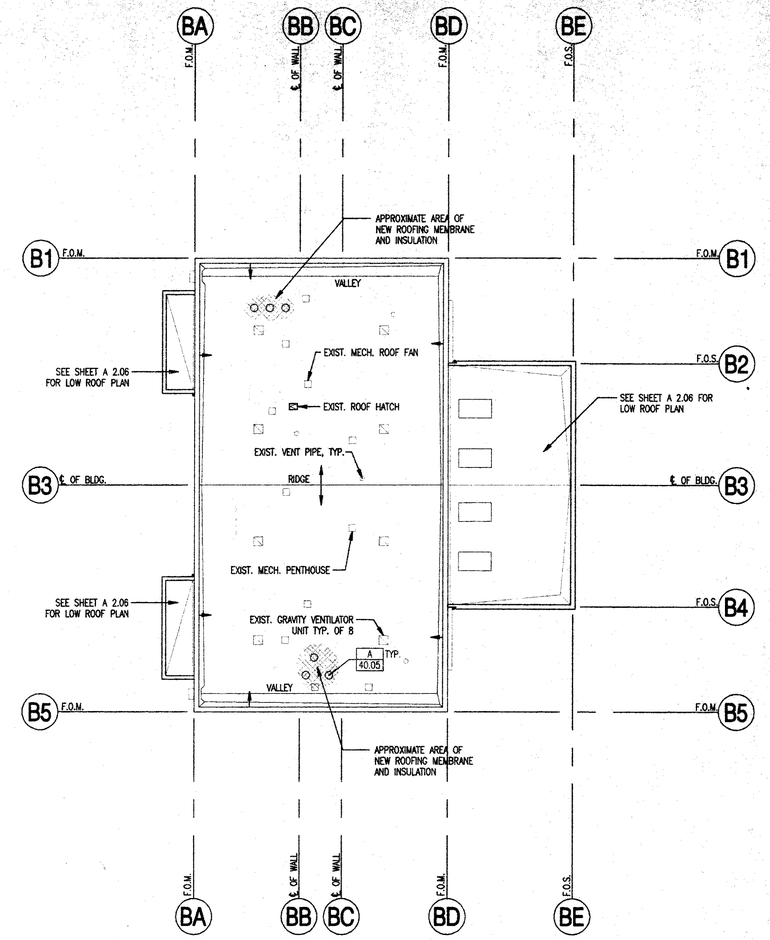
PLAN NORTH **ENLARGED SCIENCE LAB FLOOR PLANS**



PLAN NORTH

MATH/SCIENCE BUILDING - DEMOLITION ROOF PLAN

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



PLAN NORTH

MATH/SCIENCE BUILDING - ROOF PLAN

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

ROOF PLAN GENERAL NOTES

A. REFER TO MECHANICAL AND ELECTRICAL DRAWINGS AND SPECIFICATIONS FOR RESPECTIVE ROOF-MOUNTED EQUIPMENT AND ROOF PENETRATIONS.

B. ALL ROOF PENETRATIONS SHALL BE LOCATED AWAY FROM ROOF VALLEYS. ALL ROOF PENETRATIONS SHALL BE PROPERLY FLASHED TO DIRECT PRECIPITATION TO DRAINS IN CONFORMANCE WITH DETAILS AND CURRENT "SMACNA" PUBLISHED STANDARDS. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS FOR APPROVAL.

C. ALL ROOF CONSTRUCTION SHALL PROVIDE POSITIVE SLOPE TO DRAIN IN CONFORMANCE WITH N.R.C.A. PUBLISHED RECOMMENDATIONS. STANDING WATER OR PONDING AT ROOF AND/OR GUTTER AREAS SHALL NOT BE ACCEPTABLE. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS FOR APPROVAL.

D. SEE FLOOR PLANS FOR ADDITIONAL SECTION REFERENCES.

E. SEE SECTION 40 FOR ROOF DETAILS.

F. SEE FLOOR PLANS AND EXTERIOR ELEVATIONS FOR EXACT DOWNSPOUT LOCATIONS. CAREFULLY COORDINATE WITH CIVIL DRAWINGS AND SUBCONTRACTOR TO ASSURE EXACT ALIGNMENT WITH STORM SEWER LINE CONNECTION AT GRADE.

THE AMERICAN INSTITUTE OF ARCHITECTS

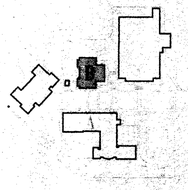
DRAWN: AJH

CHECKED: RH

APPROVED:

NOTES:

SEE ALSO SHEET G 2.01 FOR PHASING PLAN & ADDITIONAL INFORMATION.



KEY PLAN

PLAN NORTH

REVISIONS:

Copyright © 1996 by Architects Reed Reinvold Johnson Willows PLLC All Rights Reserved.

PROJECT TITLE:

PORT TOWNSEND HIGH SCHOOL

PHASE III

MODERNIZATION

PORT TOWNSEND, WA

ARCHITECTS REED REINVALD JOHNSON WILLOWS PLLC

201 North "I" Street
Tacoma, Washington 98403
Phone: (206) 572-3993
Fax: (206) 572-1445

4130 REGISTERED ARCHITECT

DEAN C. WILLOWS
STATE OF WASHINGTON

CONSULTANT:

SHEET TITLE:

MATH/SCIENCE BUILDING ROOF PLAN

SCALE: VARIES

DATE: 17 APRIL 1996

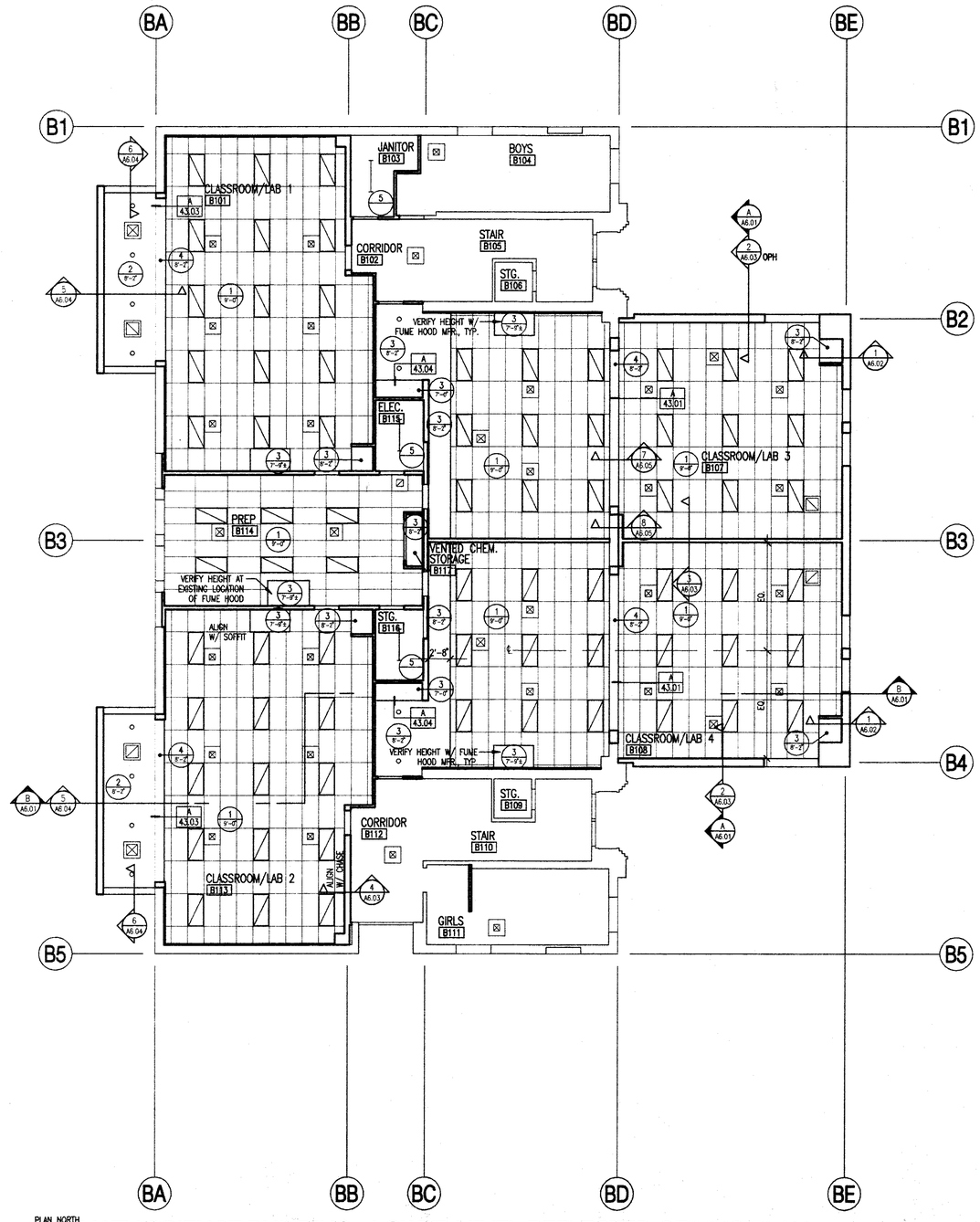
PROJECT NO: 95050.01

SHEET NO:

A 3.01

NO: OF SHEETS:

04/14/96
C:\DATA\DRAWINGS\95050\550096FM



PLAN NORTH

MATH/SCIENCE BUILDING - LOWER LEVEL REFLECTED CEILING PLAN

CEILING NOTES

1. 2x4 SUSPENDED ACOUSTICAL PANEL CEILING, STANDARD FINISH, EXPOSED GRID.
2. (1) LAYER 5/8" GWB APPLIED TO SUSPENDED METAL CHANNEL SYSTEM
3. (1) LAYER 5/8" GWB APPLIED TO 2X FRAMING
4. 1" CEMENT PLASTER OVER METAL LATHE
5. EXPOSED TO EXISTING RATED CEILING ABOVE

CEILING LEGEND

- CEILING TYPE / CEILING HEIGHT
- RECESSED FLUORESCENT LIGHT FIXTURE (SEE ELECTRICAL)
- SURFACE OR PENDANT MOUNTED FLUORESCENT LIGHT FIXTURE (SEE ELECTRICAL)
- EXPOSED FLUORESCENT LIGHT FIXTURE (SEE ELECTRICAL)
- □ OR ○ — LIGHT FIXTURE (SEE ELECTRICAL)
- MECHANICAL GRILLE - SUPPLY (SEE MECHANICAL)
- MECHANICAL GRILLE - RETURN OR EXHAUST (SEE MECHANICAL)

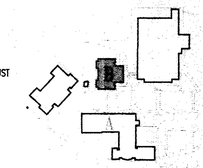
THE AMERICAN INSTITUTE OF ARCHITECTS

DRAWN: AJH
CHECKED: RH
APPROVED:

NOTES:

SEE SHEET A 4.01 FOR GENERAL NOTES TO REFLECTED CEILING PLANS.

SEE ALSO SHEET G 2.01 FOR PHASING PLAN & ADDITIONAL INFORMATION.



KEY PLAN

PLAN NORTH

REVISIONS:

Copyright © 1996 by Architects Reed Reinvald Johnson Willows PLLC
All Rights Reserved.

PROJECT TITLE:
PORT TOWNSEND HIGH SCHOOL

PHASE III MODERNIZATION

PORT TOWNSEND, WA

ARCHITECTS REED REINVALD JOHNSON WILLOWS PLLC

201 North "I" Street
Tacoma, Washington 98403
Phone: (206) 572-3993
Fax: (206) 572-1445

4130 REGISTERED ARCHITECT
DEAN C. WILLOWS
STATE OF WASHINGTON

CONSULTANT:

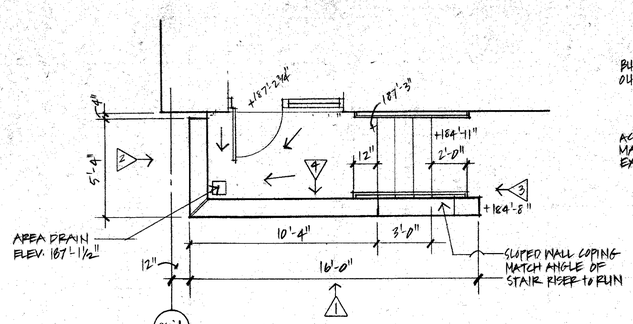
SHEET TITLE:
MATH/SCIENCE BLDG., LOWER LEVEL RCP

SCALE: 1/8"=1'-0"
DATE: 17 APRIL 1996
PROJECT NO: 95050.01
SHEET NO:

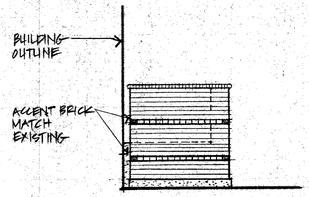
A 4.02

NO: OF SHEETS:

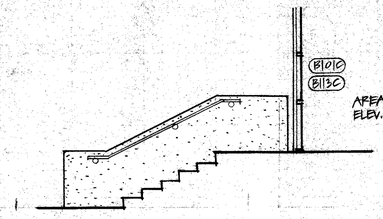
04/14/96
C:\DATA\DRAWINGS\95050\550096FM



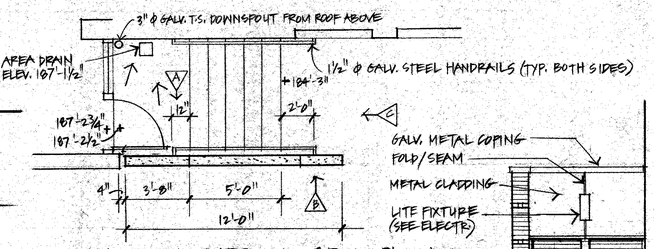
1 A5.01 ENLARGED EXTERIOR STAIR PLAN
1/4"=1'-0"



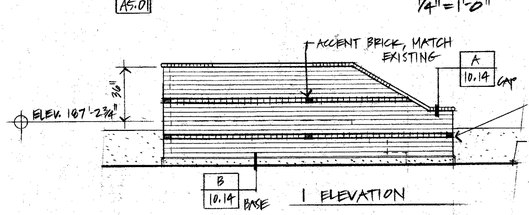
2 ELEVATION



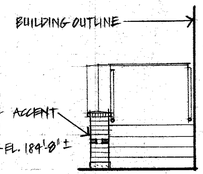
'A' ELEVATION



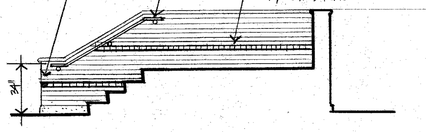
2 A5.01 ENLARGED EXTERIOR STAIR PLAN
1/4"=1'-0"



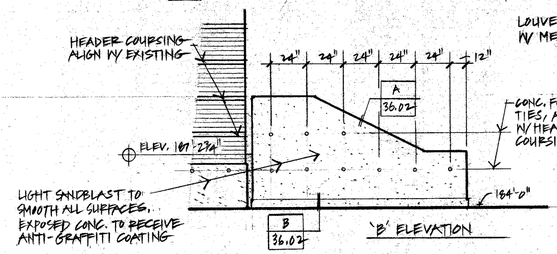
1 ELEVATION



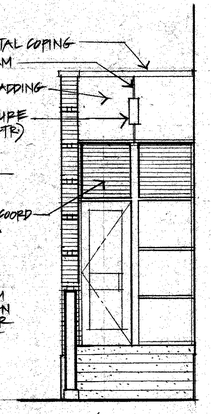
3 ELEVATION



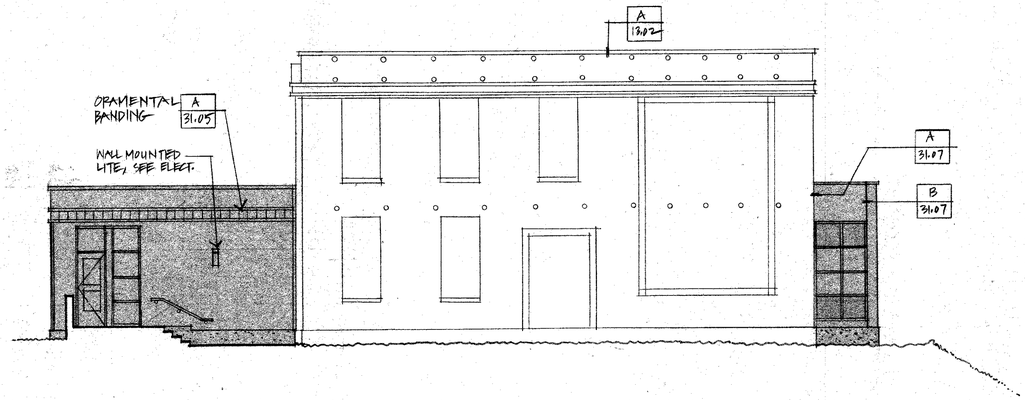
4 ELEVATION



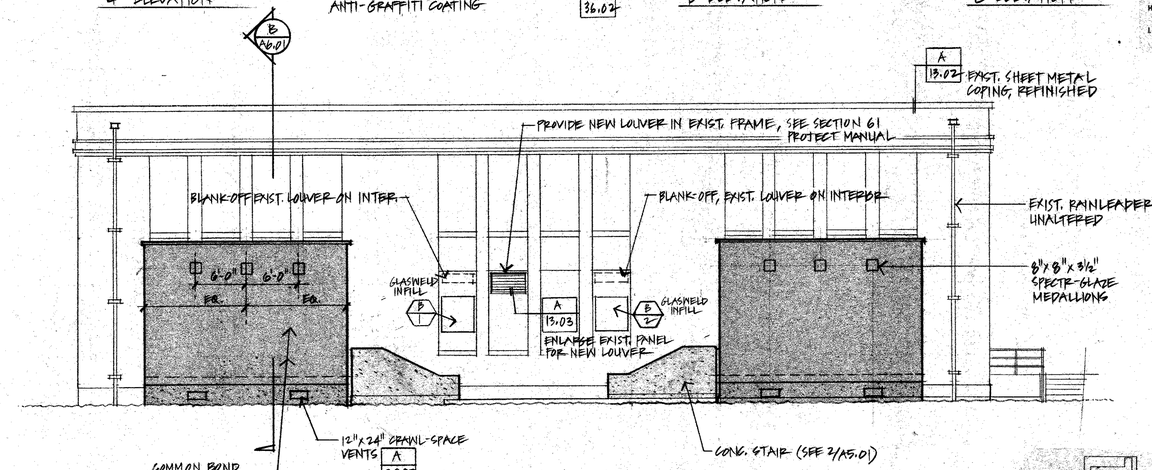
'B' ELEVATION



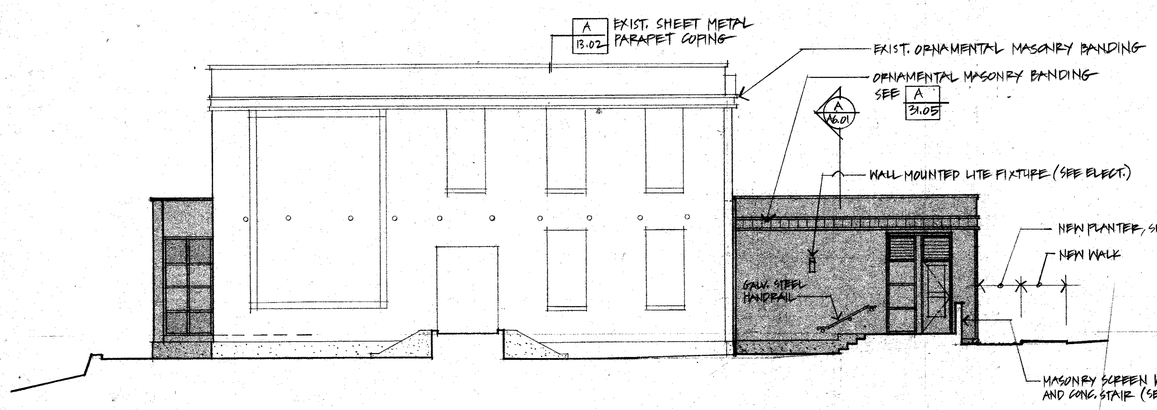
'C' ELEVATION



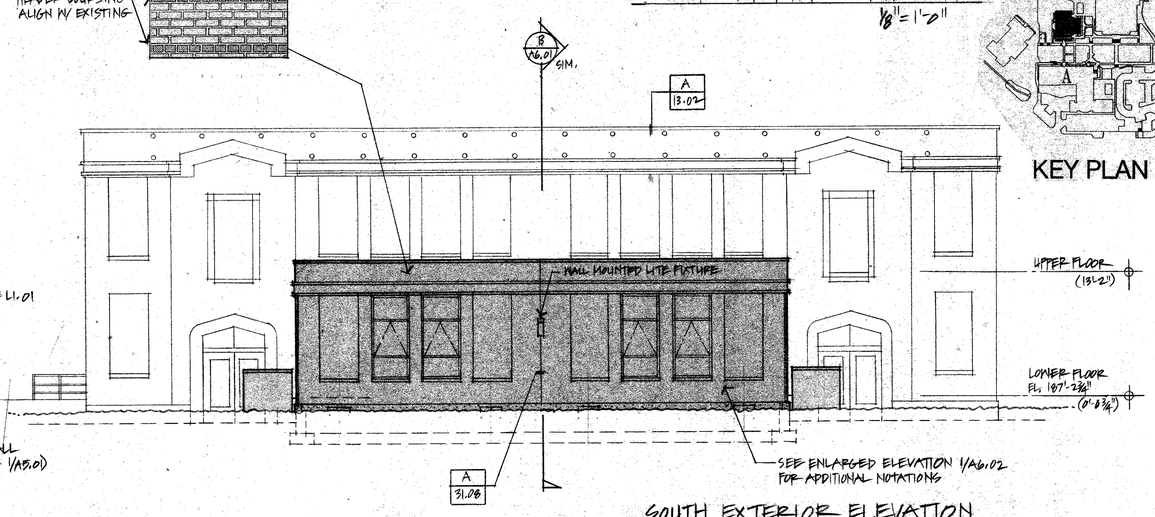
EAST EXTERIOR ELEVATION
1/8"=1'-0"



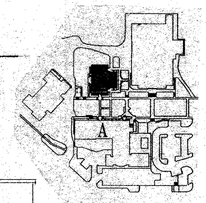
NORTH EXTERIOR ELEVATION
1/8"=1'-0"



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



SOUTH EXTERIOR ELEVATION
1/8"=1'-0"



KEY PLAN

THE AMERICAN INSTITUTE OF ARCHITECTS

DRAWN: RCH
CHECKED: RCH BK
APPROVED:
KEYNOTES:

GENERAL NOTES TO EXTERIOR ELEVATIONS

A. GENERAL CONTRACTOR SHALL COORDINATE THE WORK OF THE APPLICABLE TRADES TO PROVIDE PROPER LOCATIONS AND INSTALLATION OF ELEMENTS AND SYSTEMS ON WALLS, AS APPROVED BY THE ARCHITECT.

B. MECHANICAL AND ELECTRICAL INFORMATION SHOWN ON ARCHITECTURAL ELEVATIONS IS FOR GENERAL CONTRACTOR'S USE IN LOCATING LIGHT FIXTURES, HORNS, ETC. REFER TO MECHANICAL AND ELECTRICAL DRAWINGS AND SPECIFICATIONS FOR QUANTITIES OF DEVICES AND ALL OTHER RELATED INFORMATION.

C. E.J. INDICATES EXPANSION JOINT IN THE MASONRY VENEER FINISH. SEE DETAILS AS REFERENCED. E.J.'S IN THE INTERIOR STRUCTURAL CMU WALLS ARE ALSO NOTED. SEE ARCHITECTURAL FLOOR PLANS AND STRUCTURAL DRAWINGS.

D. D.S. INDICATES DOWN SPOUT, WHICH ARE 3" ϕ GALVANIZED STEEL TUBES, UNLESS NOTED OTHERWISE. SEE DETAILS FOR BRACKET CONSTRUCTION. SEE FLOOR PLANS FOR EXACT D.S. LOCATIONS. CAREFULLY COORDINATE WITH CIVIL DRAWINGS AND SUBCONTRACTOR TO ASSURE EXACT ALIGNMENT WITH STORM SEWER LINE CONNECTION AT GRADE.

E. CONTRACTOR SHALL SEAL AROUND ALL PENETRATION OF THE EXTERIOR BUILDING ENVELOPE FOR A WEATHER TIGHT SEAL. USE SPECIFIED SEALANTS, FLASHINGS AND OTHER APPROVED MEANS. USE APPROVED FIRE RATED MATERIALS AT AREA SEPARATION WALLS, AND OTHER LOCATIONS REQUIRING A FIRE RATED SEPARATION.

G. THERMAL INSULATION SHALL PROVIDE CONTINUOUS ENVELOPE AT THE BUILDING WALLS AND ROOF.

H. AT EXTERIOR WOOD STUD WALLS, APPLY CONTINUOUS SEALANT BEAD BENEATH STUD FLOOR TRACK, TYPICAL.

I. ALL EXPOSED EXTERIOR STEEL SHALL BE GALVANIZED AND FINISH PAINTED, UNLESS NOTED OTHERWISE.

REVISIONS:

Copyright © by Architects
Reed Reinvald Johnson Willows.
All Rights Reserved.

PROJECT TITLE:

PORT TOWNSEND HIGH SCHOOL

PHASE III MODERNIZATION

PORT TOWNSEND, WA

ARCHITECTS
REED
REINVALD
JOHNSON
WILLOWS

201 North "I" Street
Tacoma, Washington 98403
Phone: (206) 572-3993
Fax: (206) 572-1445

4130 REGISTERED ARCHITECT
DEAN C. WILLOWS
STATE OF WASHINGTON

CONSULTANT:

SHEET TITLE:

EXTERIOR ELEVATIONS

SCALE:

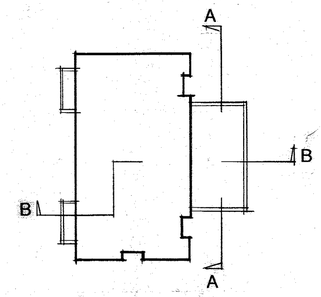
DATE: 4.15.96

PROJECT NO: 95050

SHEET NO:

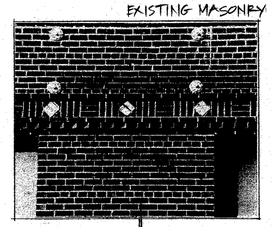
A5.01

NO: OF SHEETS:

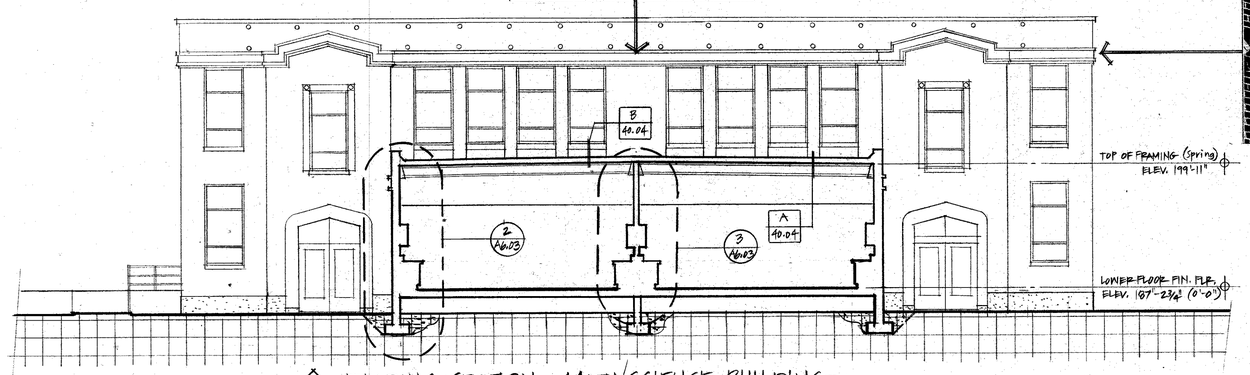


KEY PLAN

EXISTING MASONRY PATTERNS

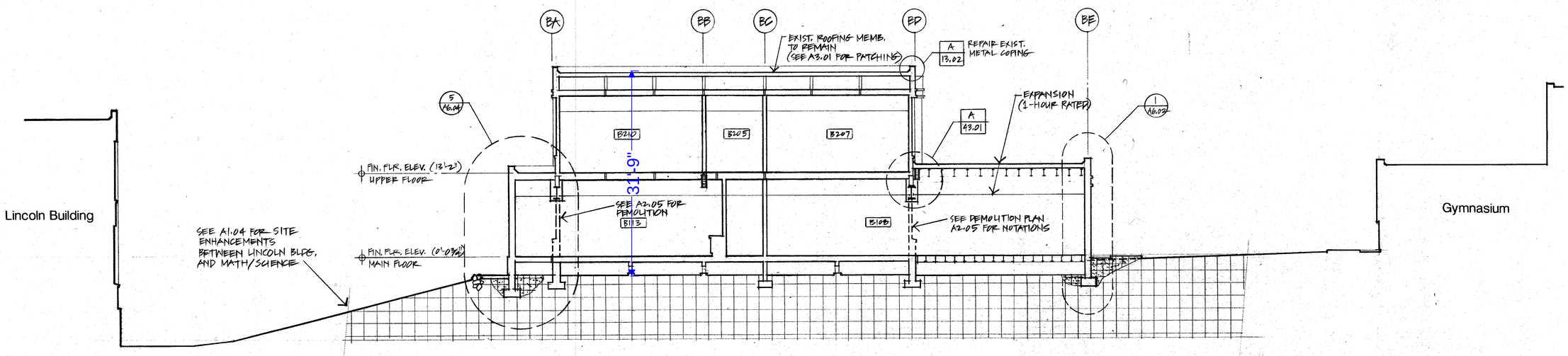


EXISTING BAND COURSING AT ROOF PARAPET



A BUILDING SECTION - MATH/SCIENCE BUILDING

1/8" = 1'-0"



B BUILDING SECTION - MATH/SCIENCE BUILDING

1/8" = 1'-0"

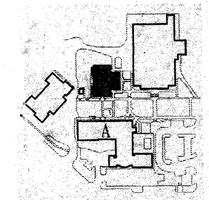
THE AMERICAN INSTITUTE OF ARCHITECTS

DRAWN: RCH

CHECKED: BK

APPROVED:

KEYNOTES:



KEY PLAN

PLAN NORTH

REVISIONS:

Copyright © by Architects Reed Reinvald Johnson Willows. All Rights Reserved.

PROJECT TITLE:

PORT TOWNSEND HIGH SCHOOL

PHASE III MODERNIZATION

PORT TOWNSEND, WA

ARCHITECTS
REED REINVALD JOHNSON WILLOWS

201 North "I" Street
Tacoma, Washington 98403
Phone: (206) 572-3993
Fax: (206) 572-1445

4130 REGISTERED ARCHITECT
DEAN C. WILLOWS
STATE OF WASHINGTON

CONSULTANT:

SHEET TITLE:

BUILDING SECTIONS

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

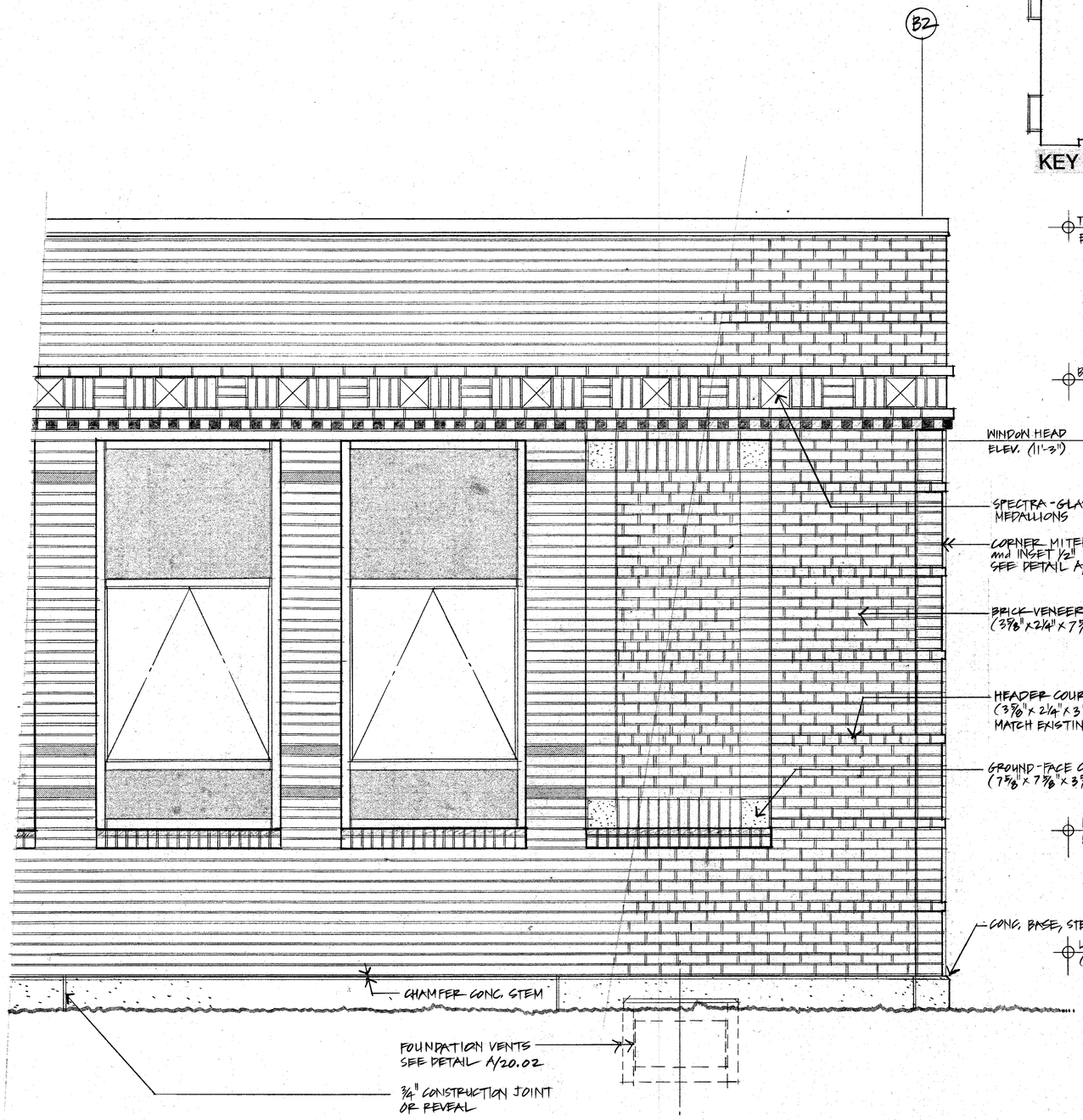
DATE: 4.15.96

PROJECT NO: 95050

SHEET NO:

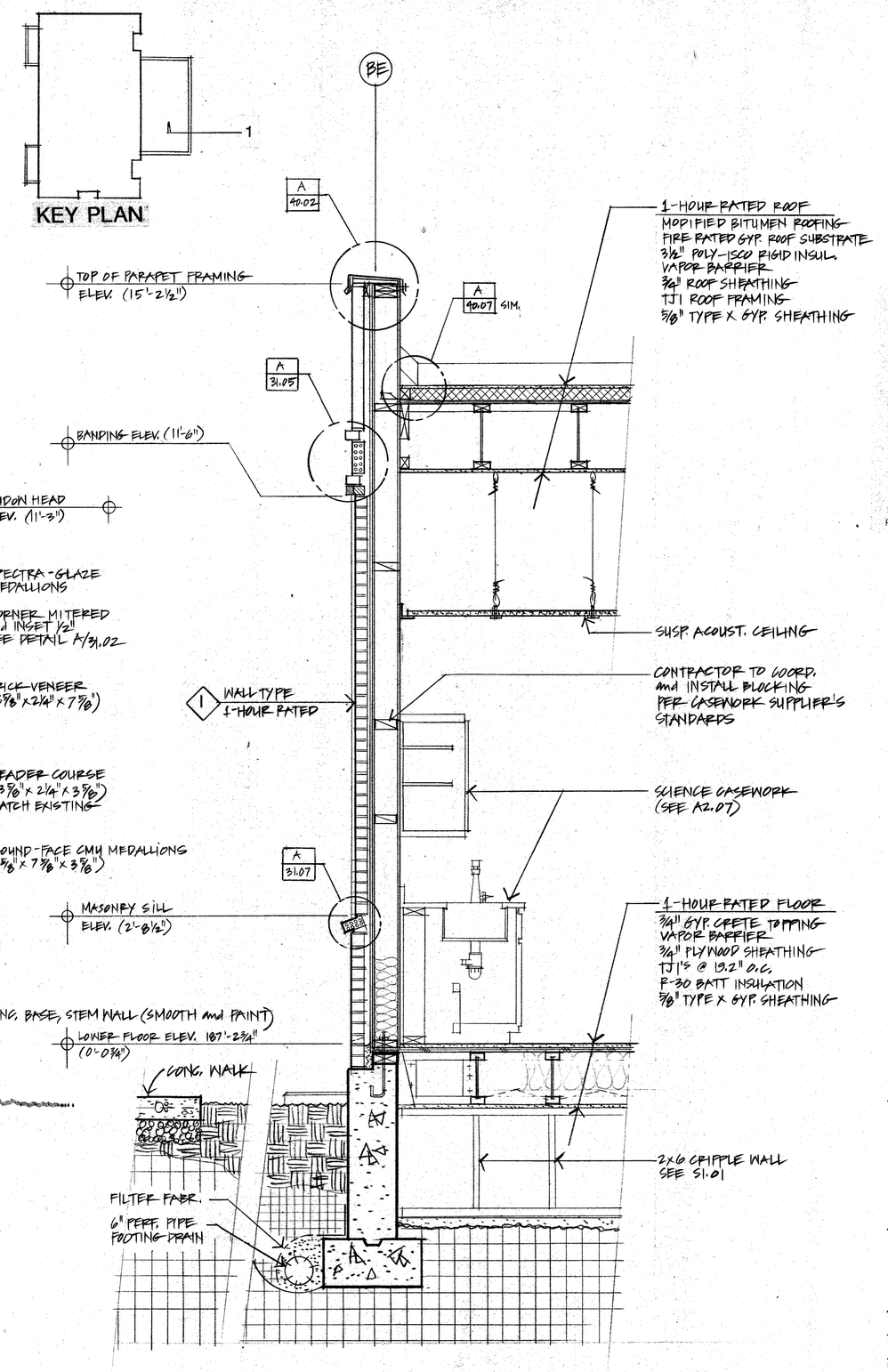
A6.01

NO: OF SHEETS:



A ENLARGED ELEVATION - MASONRY PATTERNS

3/4"=1'-0"



1 TYPICAL WALL SECTION @ SCIENCE LAB ADDITION

3/4"=1'-0"

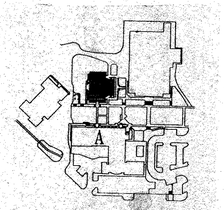
THE AMERICAN INSTITUTE OF ARCHITECTS

DRAWN: RCH

CHECKED: BK

APPROVED:

KEYNOTES:



KEY PLAN

PLAN NORTH

REVISIONS:

Copyright © by Architects
Reed Reinvald Johnson Willows.
All Rights Reserved.

PROJECT TITLE:

ARCHITECTS
REED
REINVALD
JOHNSON
WILLOWS

201 North "I" Street
Tacoma, Washington 98403
Phone: (206) 572-3993
Fax: (206) 572-1445

4130 REGISTERED ARCHITECT
DEAN C. WILLOWS
STATE OF WASHINGTON

CONSULTANT:

SHEET TITLE:

WALL SECTION
MASONRY PATTERNS

SCALE: 3/4"=1'-0"

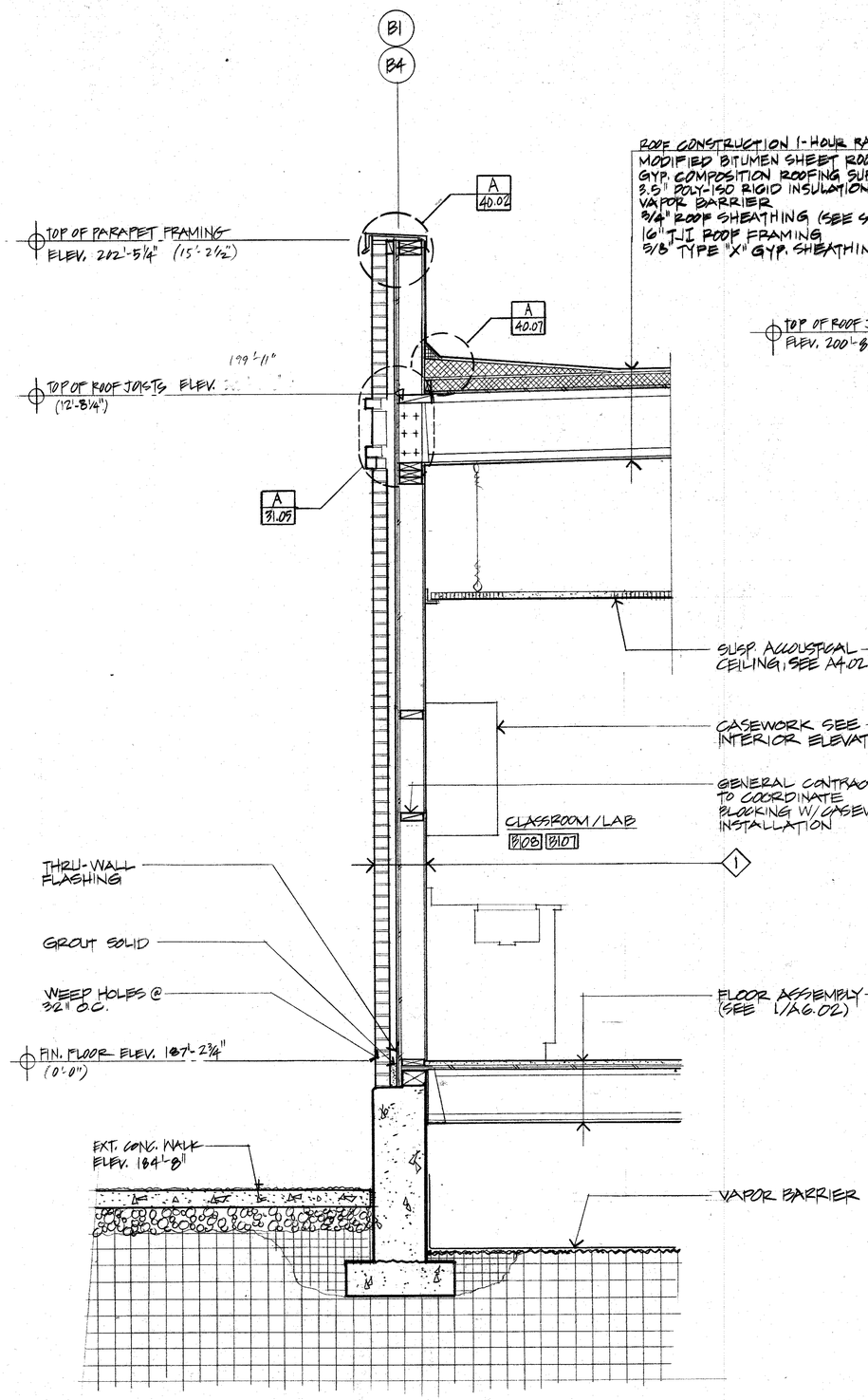
DATE: 4.15.96

PROJECT NO: 95050

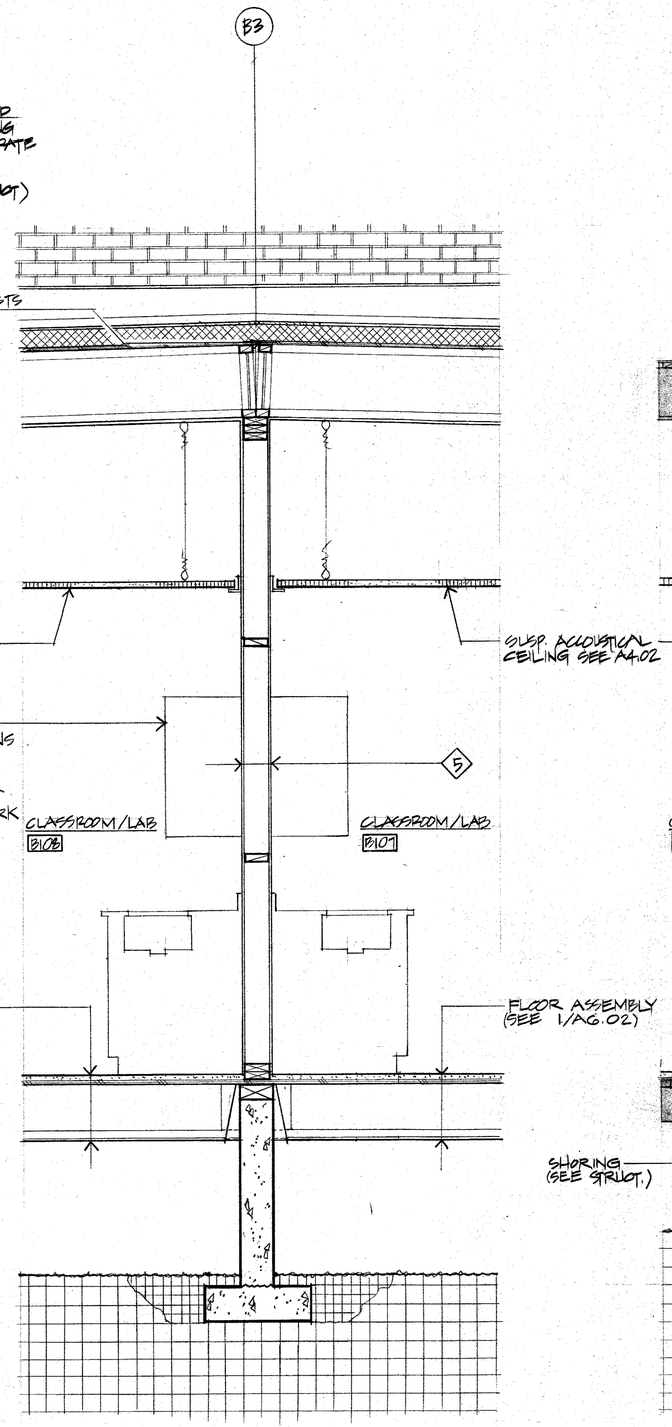
SHEET NO:

A6.02

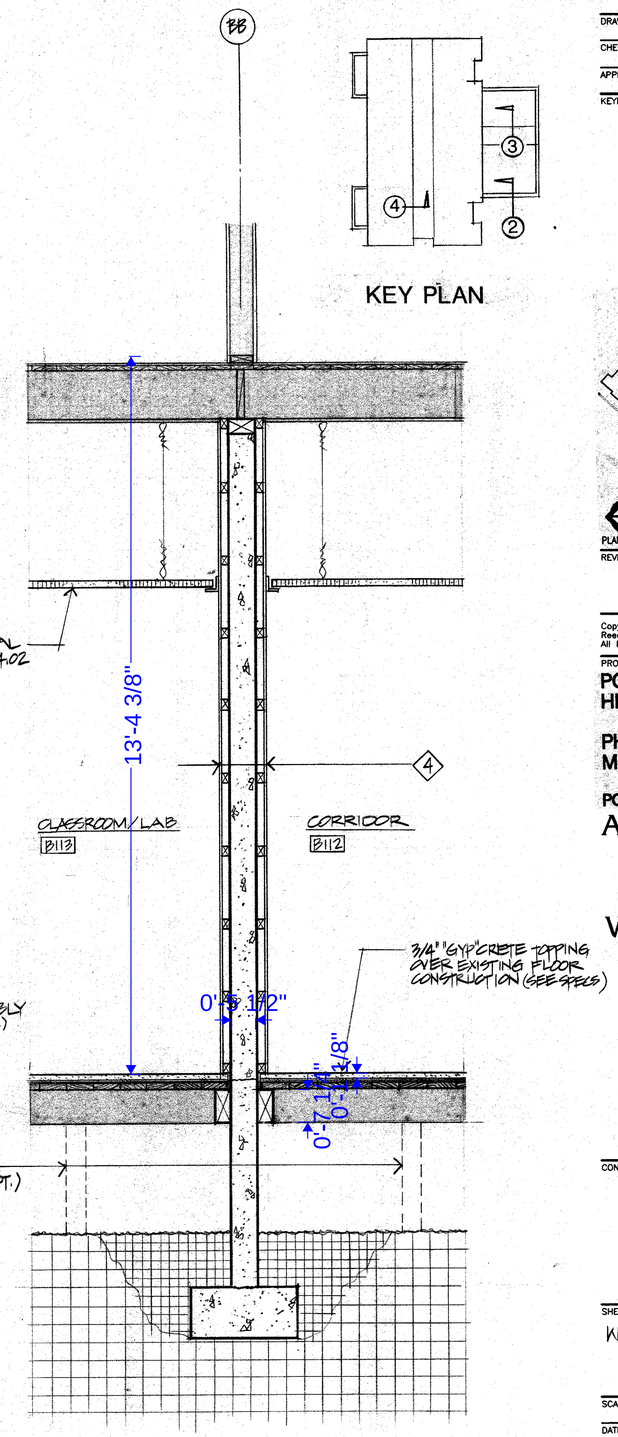
NO: OF SHEETS:



2 WALL SECTION (MATH/SCI BUILDING ADDITION)
3/4" = 1'-0"

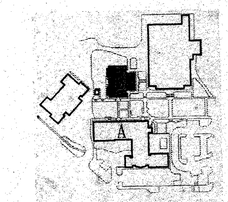


3 WALL SECTION (MATH/SCI BUILDING ADDITION)
3/4" = 1'-0"



4 WALL SECTION (MATH/SCI BUILDING ADDITION)
3/4" = 1'-0"

KEY PLAN



KEY PLAN
PLAN NORTH

REVISIONS:

Copyright © by Architects Reed Reinvald Johnson Willows. All Rights Reserved.

PROJECT TITLE:
PORT TOWNSEND HIGH SCHOOL

PHASE III MODERNIZATION

PORT TOWNSEND, WA

THE AMERICAN INSTITUTE OF ARCHITECTS

ARCHITECTS
REED REINVALD JOHNSON WILLOWS
201 North "I" Street
Tacoma, Washington 98403
Phone: (206) 572-3993
Fax: (206) 572-1445

4130 REGISTERED ARCHITECT
DEAN C. WILLOWS
STATE OF WASHINGTON

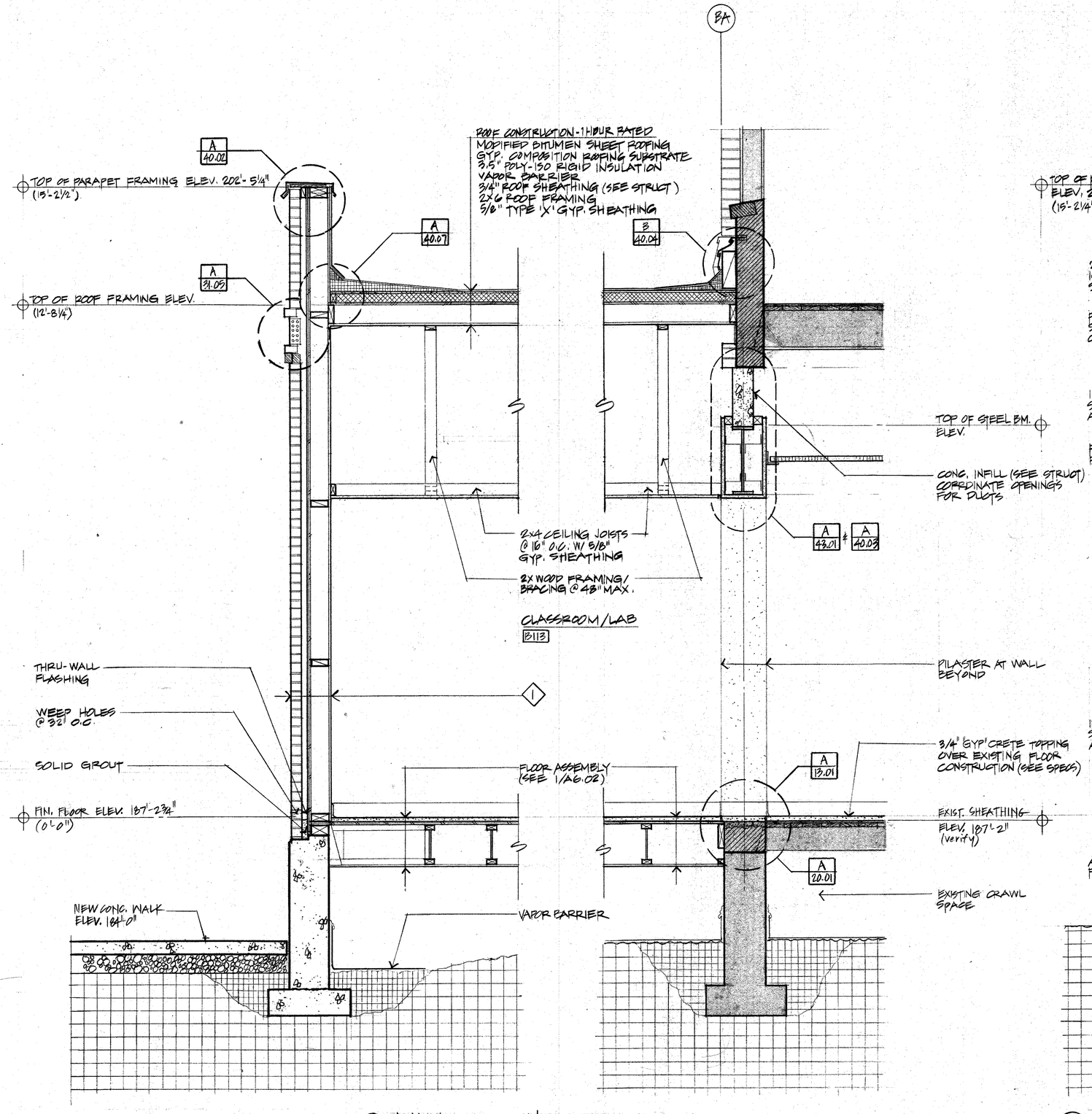
DRAWN: RCH, RN
CHECKED: BK
APPROVED:
KEYNOTES:

CONSULTANT:

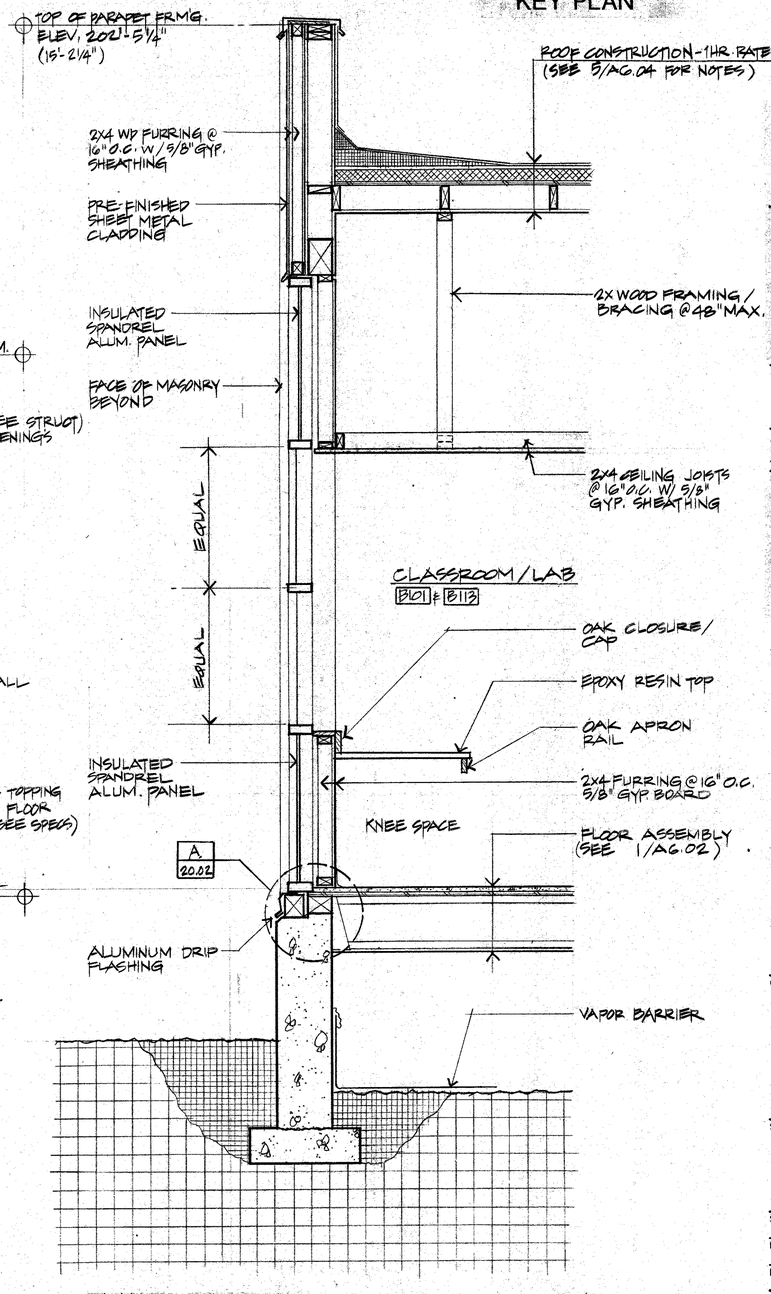
SHEET TITLE:
WALL SECTIONS

SCALE: 3/4" = 1'-0"
DATE: 4.15.96
PROJECT NO: 95050
SHEET NO:
A6.03

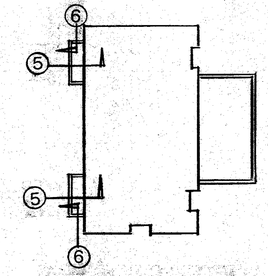
NO: OF SHEETS:



5 WALL SECTION (MATH/SCI BUILDING ADDITION)
3/4" = 1'-0"



6 WALL SECTION (MATH/SCI BUILDING ADDITION)
3/4" = 1'-0"



KEY PLAN

THE AMERICAN INSTITUTE OF ARCHITECTS

DRAWN: RCH, RN
CHECKED: BK
APPROVED:
KEYNOTES:

REVISIONS:

Copyright © by Architects Reed Reinvald Johnson Willows. All Rights Reserved.

PROJECT TITLE:
PORT TOWNSEND HIGH SCHOOL

PHASE III MODERNIZATION

PORT TOWNSEND, WA

ARCHITECTS
REED REINVALD JOHNSON WILLOWS
201 North "I" Street
Tacoma, Washington 98403
Phone: (206) 572-3993
Fax: (206) 572-1445

4130 REGISTERED ARCHITECT
DEAN C. WILLOWS
STATE OF WASHINGTON

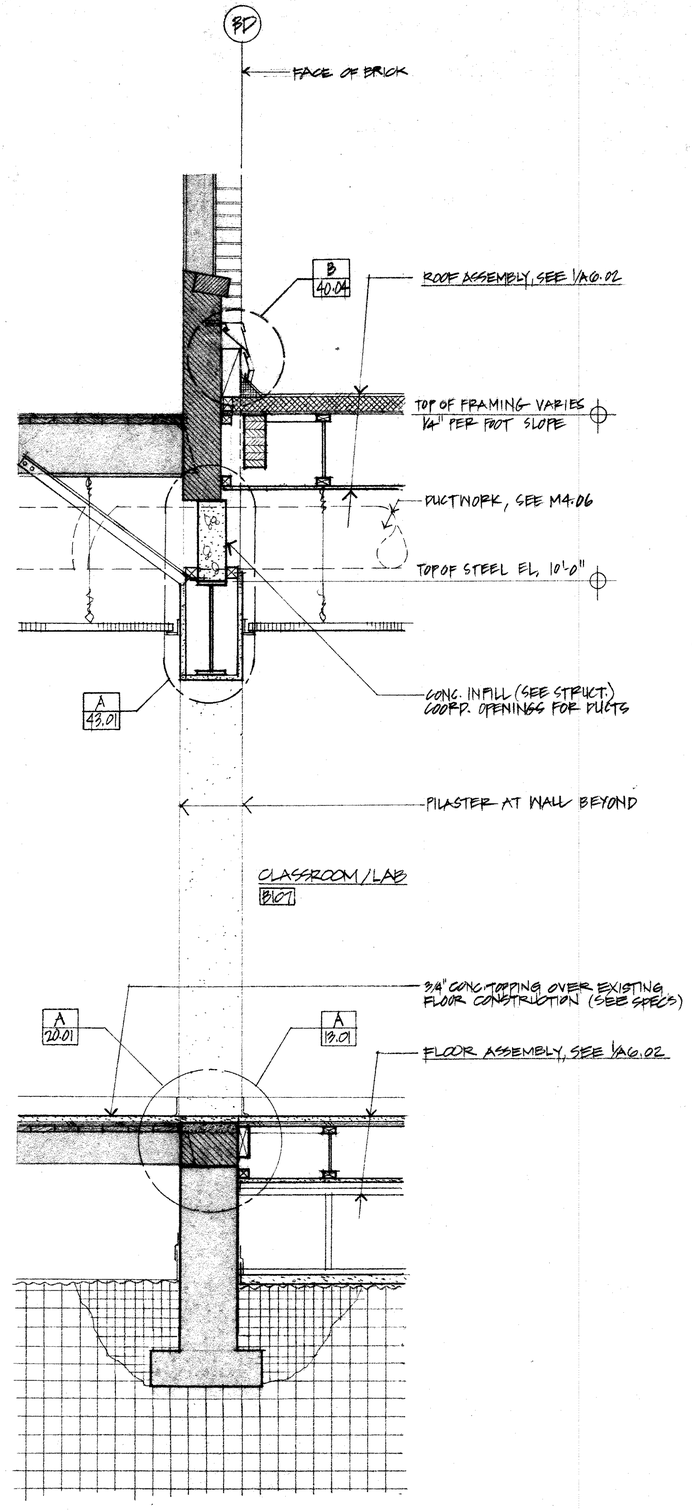
CONSULTANT:

SHEET TITLE:
WALL SECTIONS

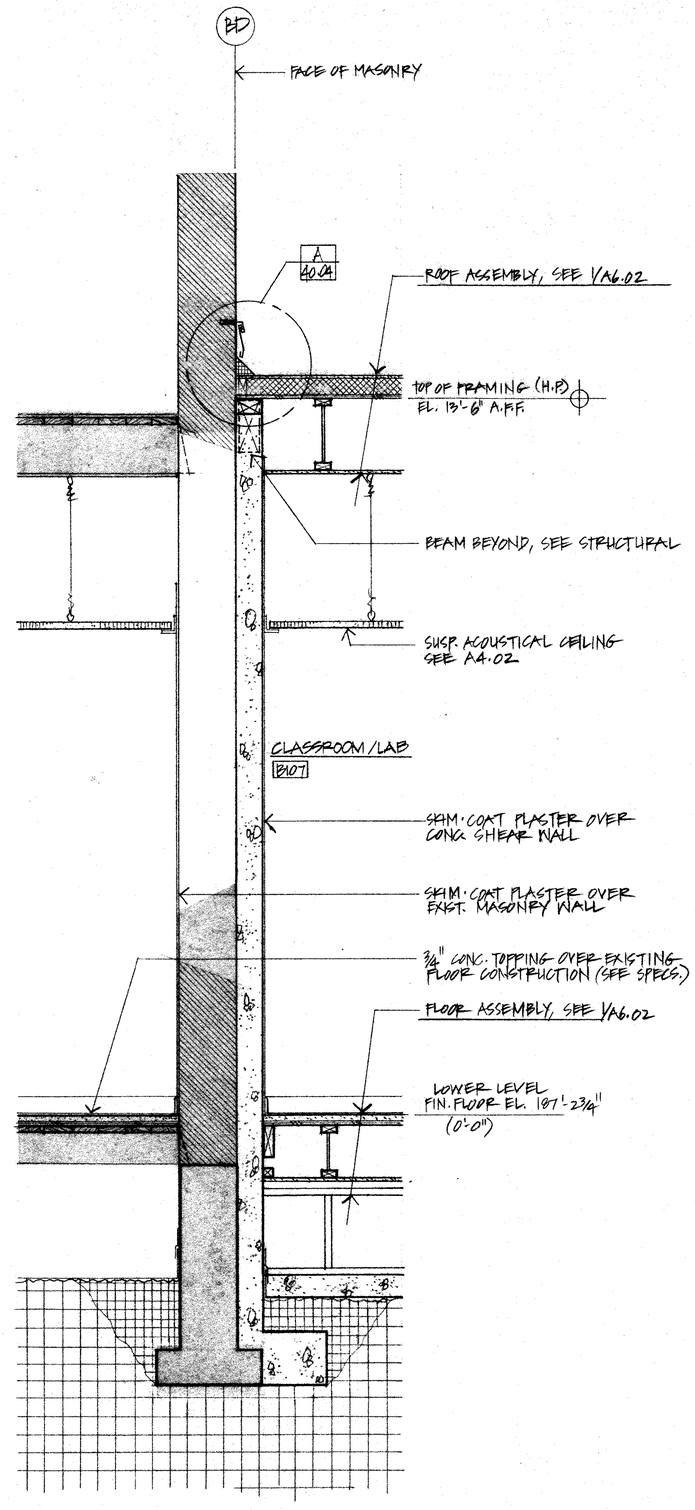
SCALE: 3/4" = 1'-0"
DATE: 4.15.96
PROJECT NO: 95050
SHEET NO:

A6.04

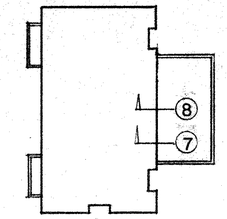
NO: OF SHEETS:



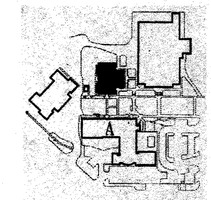
7 WALL SECTION (MATH/SCI BUILDING ADDITION)
3/4" = 1'-0"



8 WALL SECTION (MATH/SCI BUILDING ADDITION)
3/4" = 1'-0"



KEY PLAN



KEY PLAN
PLAN NORTH

REVISIONS:

Copyright © by Architects
Reed Reinvald Johnson Willows.
All Rights Reserved.

PROJECT TITLE:

PORT TOWNSEND HIGH SCHOOL

PHASE III MODERNIZATION

PORT TOWNSEND, WA

ARCHITECTS
REED
REINVALD
JOHNSON
WILLOWS

201 North "I" Street
Tacoma, Washington 98403
Phone: (206) 572-3993
Fax: (206) 572-1445

4130 REGISTERED ARCHITECT
DEAN C. WILLOWS
STATE OF WASHINGTON

CONSULTANT:

SHEET TITLE:
WALL SECTIONS

SCALE: 3/4" = 1'-0"
DATE: 4.15.96
PROJECT NO: 95050
SHEET NO:

A6.05

NO: OF SHEETS:

THE AMERICAN INSTITUTE OF ARCHITECTS

DRAWN: RCH, RN
CHECKED: EK
APPROVED:
KEYNOTES:

1.0 STRUCTURAL NOTES

ANY DISCREPANCY FOUND AMONG THE DRAWINGS, SPECIFICATIONS, THESE NOTES, AND THE SITE CONDITIONS SHALL BE REPORTED TO THE ARCHITECT, WHO SHALL CORRECT SUCH DISCREPANCY IN WRITING. ANY WORK DONE BY THE CONTRACTOR AFTER DISCOVERY OF SUCH DISCREPANCY SHALL BE DONE AT THE CONTRACTOR'S RISK. THE CONTRACTOR SHALL VERIFY AND COORDINATE THE DIMENSIONS AMONG ALL DRAWINGS PRIOR TO PROCEEDING WITH ANY WORK OR FABRICATION. THE CONTRACTOR IS RESPONSIBLE FOR ALL ERECTION BRACING, FORMWORK AND TEMPORARY CONSTRUCTION SHORING.

1.1 BIDDERS WARRANTY

BY THE ACT OF SUBMITTING A BID FOR THE PROPOSED CONTRACT, THE CONTRACTOR WARRANTS THAT:

1.1.1 THE CONTRACTOR AND ALL SUBCONTRACTORS HE INTENDS TO USE HAVE CAREFULLY AND THOROUGHLY REVIEWED THE DRAWINGS AND STRUCTURAL NOTES AND HAVE FOUND THEM COMPLETE AND FREE FROM AMBIGUITIES AND SUFFICIENT FOR THE PURPOSE INTENDED; FURTHER THAT,

1.1.2 THE CONTRACTOR HAS CAREFULLY EXAMINED THE SITE OF THE WORK AND THAT FROM HIS OWN INVESTIGATIONS, HE HAS SATISFIED HIMSELF AS TO THE NATURE AND LOCATION OF THE WORK, AS TO THE CHARACTER, QUALITY, QUANTITIES OF MATERIAL AND DIFFICULTIES TO BE ENCOUNTERED, AS TO THE EXTENT OF EQUIPMENT AND OTHER FACILITIES NEEDED FOR THE PERFORMANCE OF THE WORK AND AS TO THE GENERAL AND LOCAL CONDITIONS, AND OTHER ITEMS WHICH MAY IN ANY WAY AFFECT THE WORK OR ITS PERFORMANCE, FURTHER THAT,

1.1.3 THE CONTRACTOR AND ALL WORKMEN HE INTENDS TO USE ARE SKILLED AND EXPERIENCED IN THE TYPE OF CONSTRUCTION REPRESENTED BY THE DRAWINGS AND DOCUMENTS BID UPON; FURTHER THAT,

1.1.4 NEITHER THE CONTRACTOR NOR ANY OF HIS EMPLOYEES, AGENTS, INTENDED SUPPLIERS, OR SUBCONTRACTORS HAVE RELIED UPON ANY VERBAL REPRESENTATIONS ALLEGEDLY AUTHORIZED OR UNAUTHORIZED FROM THE OWNER OR HIS EMPLOYEES OR AGENTS, INCLUDING THE ARCHITECT OR ENGINEERS, IN ASSEMBLING THE BID FIGURES; FURTHER THAT,

1.1.5 THE CONTRACTOR AND ALL SUBCONTRACTORS HE INTENDS TO USE (INCLUDING AGENTS AND SUPPLIERS) ARE AWARE OF AND ACKNOWLEDGE THAT CLOSE COORDINATION AMONG ARCHITECTURAL, MECHANICAL/ELECTRICAL AND STRUCTURAL DRAWINGS ARE REQUIRED FOR THE FOLLOWING:

DETERMINATION OF ALL COLUMN LOCATIONS AND SIZES.

DETERMINATION OF TOP OF FLOOR, TOP OF STEEL, WALL PLATE, AND TOP OF BEAM ELEVATIONS.

VERIFICATION OF ALL DIMENSIONS.

THE CONTRACTOR AND ALL SUB CONTRACTORS HE INTENDS TO USE (INCLUDING HIS AGENTS AND SUPPLIERS) SHALL MAKE CONSIDERATION FOR AND INCLUDE MONIES FOR THE ABOVE IN THE PREPARATION OF THEIR BIDS. THIS REQUIREMENT SHALL SUPERSEDE ANY CONTAINED IN THE AISC "MANUAL OF STEEL CONSTRUCTION;" FURTHER THAT,

1.1.6 NEITHER THE CONTRACTOR NOR ANY OF HIS EMPLOYEES, AGENTS, INTENDED SUPPLIERS, OR SUBCONTRACTORS HAVE SCALED THESE DRAWINGS TO OBTAIN REQUIRED DIMENSIONS; FURTHER THAT,

1.1.7 THE BID FIGURE IS BASED SOLELY UPON THE CONSTRUCTION CONTRACT DOCUMENTS AND PROPERLY ISSUED WRITTEN OR VERBAL REPRESENTATIONS.

1.2 CODES

1.2.1 ALL METHODS, MATERIALS AND WORKMANSHIP SHALL CONFORM TO THE 1994 UNIFORM BUILDING CODE (UBC) AS AMENDED AND ADOPTED BY THE LOCAL BUILDING AUTHORITY.

1.2.2 ALL REFERENCE TO OTHER CODES, STANDARDS AND SPECIFICATIONS, (ACI, ASTM, ETC.), SHALL BE FOR THE LATEST OR MOST CURRENT EDITION AVAILABLE.

1.3 DESIGN CRITERIA

1.3.1 UNIFORM LOADS:

LOCATION	LIVE LOAD	DEAD LOAD
ROOF	25 PSF	ACTUAL
CLASSROOM	40 PSF	ACTUAL

1.3.2 CONCENTRATED LOADS:

ALL MANUFACTURERS OF PRE-ENGINEERED COMPONENTS OR SYSTEMS SHALL LOCATE, COORDINATE, VERIFY WEIGHTS, ETC. OF MECHANICAL UNITS OR OTHER CONCENTRATED LOADS AND DESIGN THEIR SYSTEM FOR THESE LOADS.

1.3.3 LATERAL LOADS:

WIND: PER UBC SECTION 1613-1623

BASIC WIND SPEED: 80 mph

EXPOSURE: B

IMPORTANCE FACTOR: 1.0

1.3.4 SEISMIC: PER UBC SECTION 1624-1633

ZONE: 3

IMPORTANCE FACTOR: 1.0

DUCTILITY FACTOR (Rw): 6

FOR PIPES, CONDUITS, DUCTS AND MECHANICAL EQUIPMENT SUPPORTED OR BRACED FROM STRUCTURE: CONFORM TO SHEET METAL AND AIR CONDITIONING CONTRACTORS NATIONAL ASSOCIATION, INC., PUBLICATION "APPENDIX E: SEISMIC RESTRAINT MANUAL GUIDELINES FOR MECHANICAL SYSTEMS." ALL BRACING AND SUPPORTS SHALL BE DESIGNED FOR SEISMIC HAZARD LEVEL (SHL) B. SPRINKLER LINE ATTACHMENTS SHALL CONFORM TO NFPA PAMPHLET 13.

1.4 SOIL DATA

ALLOWABLE SOIL PRESSURE 3000 PSF. ALLOW 33-1/3% INCREASE FOR LOADS FROM WIND OR SEISMIC ORIGIN. SEE GEOTECHNICAL DESIGN REPORT BY MYERS BIODYNAMICS .

1.5 INSPECTION/TESTING REQUIREMENTS

SEE DRAWINGS, SPECIFICATIONS AND UBC SECTIONS 108 AND 1701, AND AS OUTLINED BELOW.

1.5.1 FOUNDATION INSPECTION BY BUILDING OFFICIAL TO BE MADE AFTER EXCAVATIONS ARE COMPLETE AND FORMWORK AND REINFORCEMENT ARE IN PLACE.

1.5.2 CONCRETE SLAB OR UNDER FLOOR INSPECTION BY BUILDING OFFICIAL TO BE MADE AFTER ALL UNDER SLAB ACCESSORIES (INCLUDING REINFORCEMENT) ARE PLACED AND PRIOR TO CONCRETE SLAB POUR.

1.5.3 FRAME INSPECTIONS BY BUILDING OFFICIAL TO BE MADE AFTER ALL FRAMING IS COMPLETE AND ALL PIPES, DUCTS, ELECTRICAL, PLUMBING, ETC. ARE INSTALLED AND PRIOR TO COVER.

1.5.4 THE FOLLOWING ITEMS SHALL BE TESTED AND VERIFIED BY A TESTING AGENCY EMPLOYED BY THE BUILDING OWNER IN ACCORDANCE WITH THE UNIFORM BUILDING CODE.

1.5.4.1 CONCRETE STRENGTHS

1.5.4.2 ALL STRUCTURAL WELDING

1.5.4.3 REINFORCING PLACEMENT

1.6 SHOP DRAWINGS

SUBMIT SHOP DRAWINGS TO ARCHITECT/ENGINEER FOR THE FOLLOWING:

1.6.1 REINFORCING STEEL
1.6.2 STRUCTURAL AND MISCELLANEOUS STEEL INCLUDING WELD INSERTS AND ANCHORS
1.6.3 GLUED-LAMINATED MEMBERS
1.6.4 PRE-ENGINEERED WOOD I JOISTS

1.7 MISCELLANEOUS

1.7.1 VERIFY ALL DIMENSIONS AND CONDITIONS IN THE FIELD.

1.7.2 VERIFY SIZE AND LOCATION OF ALL OPENINGS IN THE FLOORS, ROOF AND WALLS WITH ARCHITECTURAL, MECHANICAL AND ELECTRICAL DRAWINGS.

1.7.3 CONSTRUCTION DETAILS NOT SPECIFICALLY SHOWN ON THE DRAWINGS SHALL FOLLOW SIMILAR DETAILS OF SECTIONS OF THIS PROJECT AS APPROVED BY THE ARCHITECT/ENGINEER.

1.7.4 SEE ARCHITECTURAL, MECHANICAL AND ELECTRICAL DRAWINGS FOR DIMENSIONS AND LOCATIONS OF OPENINGS NOT DIMENSIONED OR SHOWN ON STRUCTURAL PLANS.

1.7.5 THE STRUCTURE HAS BEEN DESIGNED TO RESIST CODE REQUIRED VERTICAL AND LATERAL FORCES AFTER THE CONSTRUCTION OF ALL STRUCTURAL ELEMENTS HAS BEEN COMPLETED. STABILITY OF THE STRUCTURE PRIOR TO COMPLETION IS THE SOLE RESPONSIBILITY OF THE GENERAL CONTRACTOR. THIS RESPONSIBILITY INCLUDES BUT IS NOT LIMITED TO JOB SITE SAFETY; ERECTION MEANS, METHODS, AND SEQUENCES; TEMPORARY SHORING, FORMWORK, AND BRACING; USE OF EQUIPMENT AND CONSTRUCTION PROCEDURES.

2.0 SITE WORK

2.1 EXCAVATION

EXCAVATE TO DEPTH SHOWN AND TO FIRM UNDISTURBED MATERIAL. OVER-EXCAVATIONS SHALL BE BACKFILLED WITH LEAN CONCRETE (f'c=2,000 PSI) AT THE CONTRACTOR'S EXPENSE. EXERCISE EXTREME CARE DURING EXCAVATION TO AVOID DAMAGE TO BURIED LINES, TANKS, AND OTHER CONCEALED ITEMS. UPON DISCOVERY, DO NOT PROCEED WITH WORK UNTIL RECEIVING WRITTEN INSTRUCTIONS FROM ARCHITECT. A COMPETENT REPRESENTATIVE OF THE OWNER SHALL INSPECT ALL FOOTING EXCAVATIONS FOR SUITABILITY OF BEARING SURFACES PRIOR TO PLACEMENT OF REINFORCING STEEL. PROVIDE DRAINAGE AS NECESSARY TO AVOID WATER-SOFTENED SUBGRADE.

2.2 FILL, BACKFILL AND COMPACTION

BACKFILL AGAINST WALLS SHALL NOT BE PLACED UNTIL AFTER THE REMOVAL OF ALL MATERIAL SUBJECT TO ROT OR CORROSION. ALL FILL PLACED AGAINST RETAINING WALLS OR BASEMENT WALLS SHALL BE FREE DRAINING GRANULAR MATERIAL. STRUCTURAL FILL OTHER THAN PEA GRAVEL SHALL BE GRANULAR, PLACED IN 6 INCH LIFTS AND COMPACTED TO AT LEAST 95% OF ITS MAXIMUM DRY DENSITY AS DETERMINED BY ASTM D-1557 (MOD PROCTOR) AND ASTM D-698 (STANDARD PROCTOR). PEA GRAVEL FILL SHALL HAVE A MAXIMUM PARTICLE SIZE OF 3/8" DIAMETER.

3.0 STRUCTURAL CONCRETE

3.1 GENERAL

ALL CONCRETE SHALL BE HARD ROCK CONCRETE MEETING REQUIREMENTS OF ACI-301, "SPECIFICATIONS FOR STRUCTURAL CONCRETE FOR BUILDINGS." PROPORTIONING OF INGREDIENTS FOR EACH CONCRETE MIX SHALL BE BY METHOD 2 OR THE ALTERNATE PROCEDURE GIVEN IN ACI-301. PLACE CONCRETE PER ACI-304 AND CONFORM TO ACI-604 (306) FOR WINTER CONCRETING AND ACI-605 (305) FOR HOT WEATHER CONCRETING. USE INTERIOR MECHANICAL VIBRATORS WITH 7,000 RPM MINIMUM FREQUENCY. DO NOT OVER-VIBRATE. CONCRETE SHALL BE PLACED MONOLITHICALLY BETWEEN CONSTRUCTION OR CONTROL JOINTS. PROTECT ALL CONCRETE FROM PREMATURE DRYING, EXCESSIVE HOT OR COLD TEMPERATURE FOR SEVEN DAYS AFTER PLACING.

3.2 STRENGTH

TWENTY-EIGHT DAY COMPRESSIVE STRENGTHS SHALL BE:

	PSI
BEAMS, COLUMNS, VERTICALLY FORMED WALLS	4000
FOOTINGS	3000

THE WATER/CEMENT RATIO FOR CONCRETE SHALL BE LESS THAN THE MAXIMUM SHOWN IN THE TABLE BELOW.

MAXIMUM ABSOLUTE WATER-CEMENT RATIO BY WEIGHT		
SPECIFIED COMPRESSIVE STRENGTH PSI	NON-AIR ENTRAINED CONCRETE	AIR-ENTRAINED CONCRETE
3000	0.58	0.46
3000	0.58	0.46

THESE MAXIMUMS MAY BE EXCEEDED IF TEST RECORDS PER SECTION 5.3 OF ACI 318 (BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE) ARE SUBMITTED TO AND APPROVED BY THE ENGINEER.

3.3 MATERIALS

3.3.1 CEMENT: ASTM C150, TYPE I OR TYPE II. ENGINEER'S APPROVAL IS NEEDED FOR USE OF TYPE III CEMENT.

3.3.2 COARSE AND FINE AGGREGATE: ASTM C33.

3.3.3 WATER SHALL BE CLEAN AND POTABLE.

3.4 WATER REDUCING ADMIXTURES

3.4.1 WATER REDUCING ADMIXTURE: ASTM C494. ADMIXTURES SHALL BE USED IN EXACT ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.

3.4.2 SYNERGIZED PERFORMANCE SYSTEMS: CONCRETE USING ADMIXTURES TO PRODUCE FLOWABLE CONCRETE MAY BE USED SUBJECT TO ENGINEER'S APPROVAL.

3.4.3 AIR ENTRAINMENT: ASTM C260 AND ASTM C494, ENTRAIN 4% PLUS/MINUS 1% BY VOLUME IN ALL EXPOSED CONCRETE.

3.4.4 NO OTHER ADMIXTURES PERMITTED UNLESS APPROVED BY THE ENGINEER.

3.5 FORMWORK AND SHORING

3.5.1 FOLLOW RECOMMENDED PRACTICE FOR CONCRETE FORMWORK (ACI-347).

3.5.2 RESHORING FOR EARLY REMOVAL OF ORIGINAL SUPPORTS WILL NOT BE PERMITTED.

3.5.3 WHILE RESHORING OPERATIONS ARE UNDERWAY, NO CONSTRUCTION LOADS WILL BE PERMITTED ON THE NEW CONSTRUCTION.

3.5.4 ALL SHORING SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. FORMWORK SUPPORTS AND SHORING SHALL BE DESIGNED TO PROVIDE FINISHED CONCRETE SURFACES AT ALL FACES LEVEL, PLUMB, AND TRUE TO THE DIMENSIONS AND ELEVATIONS SHOWN. TOLERANCES AND VARIATIONS SHALL BE AS SPECIFIED.

3.6 REINFORCING STEEL

DETAIL, FABRICATE, AND PLACE PER ACI-315 AND ACI-318. SUPPORT REINFORCEMENT WITH APPROVED CHAIRS, SPACERS, OR TIES.

3.6.1 DEFORMED BAR REINFORCEMENT: ASTM A-615-GR 60

3.6.2 WELDED DEFORMED BAR REINFORCEMENT: ASTM A706 GR 60

3.6.3 WELDED WIRE FABRIC: ASTM A-185 & ASTM A-82 Fy=65 KSI

3.6.4 DEFORMED BAR ANCHORS: ASTM A-496

3.6.5 ALL REINFORCING SHALL BE LAP-SPLICED A MINIMUM LAP OF 48 X (THE BAR DIAMETER) EXCEPT AS NOTED SPECIFICALLY ON THE STRUCTURAL DRAWINGS. NO MORE THAN 50% OF HORIZONTAL OR VERTICAL BARS SHALL BE SPLICED AT ONE LOCATION.

3.6.6 PROVIDE ELBOW BARS TO LAP HORIZONTAL STEEL (A MINIMUM DISTANCE OF 48X THE BAR DIAMETER) AT CORNERS AND INTERSECTIONS IN FOOTINGS AND WALLS.

3.6.7 LAP WELDED FABRIC 12" OR ONE SPACING PLUS 2", WHICHEVER IS MORE.

3.7 CONCRETE COVER ON REINFORCING (UNLESS SHOWN OTHERWISE)

3.7.1	BOTTOM OF FOOTINGS	3"
3.7.2	FORMED EARTH FACE AND SLAB ON GRADE	2"
3.7.3	WALLS, WEATHER FACE	1-1/2"
3.7.4	WALLS, INSIDE FACE	1"

3.8 CONSTRUCTION JOINTS

3.8.1 CONSTRUCTION JOINT SPACING IN WALLS SHALL NOT EXCEED 50' ON CENTER EXCEPT AS DIRECTED BY THE ARCHITECT/ENGINEER.

3.8.2 UNLESS NOTED OTHERWISE, LOCATION OF THE CONSTRUCTION OR CONTROL JOINTS IN SLAB ON GRADE SHALL BE ON COLUMN GRIDS OR UNDER PERMANENT PARTITIONS AND SHALL NOT EXCEED 15'-0" C/C EACH WAY.

3.8.3 NO JOISTS, BEAMS OR GIRDERS SHALL BE SLEEVED FOR PIPING OR CONDUIT EXCEPT AS NOTED ON THE STRUCTURAL DRAWINGS OR AS APPROVED BY THE ARCHITECT/ENGINEER.

3.8.4 ELECTRICAL CONDUIT SHALL NOT BE PLACED WITHIN A SLAB ON GRADE, BUT PLACED BELOW THE SLAB IN THE SUB-BASE.

3.9 GROUT FOR BEARING PLATE

GROUT FOR BEARING PLATES AND EQUIPMENT UP TO 25 HP:

THE GROUT SHALL BE MASTERFLOW 928 BY MASTER BUILDERS TECHNOLOGIES, OR EQUIVALENT, AND A PREPACKAGED NATURAL AGGREGATE GROUT, MIXED, PLACED, AND CURED AS RECOMMENDED BY THE MANUFACTURER. THE MANUFACTURER'S WARRANTY SHALL NOT CONTAIN A DISCLAIMER OR LIMIT THE RESPONSIBILITY TO ONLY REPLACEMENT OF PRODUCT OR PURCHASE PRICE. GROUT SHALL CONFORM TO CRD-C621-89 AND ASTM 1107-89A GRADE B WHEN TESTED AT A FLUID CONSISTENCY (20 TO 30 SECONDS) PER CRD-C611-85 FOR 30 MINUTES, AT 45 F, 70 F AND 90 F. GROUT MANUFACTURER SHALL CERTIFY WITH INDEPENDENT TEST DATA THAT THE EXPANSION AT 3 OR 14 DAYS DOES NOT EXCEED THE 28 DAY EXPANSION AND THAT ITS NON SHRINK PROPERTY IS NOT BASED ON GAS EXPANSION. FLUID GROUT SHALL PASS THROUGH THE FLOW CONE 1 HOUR AFTER BATCHING AT A 60 SECOND FLOW MAXIMUM, AND HAVE A MINIMUM STRENGTH OF 2,500 PSI AT 1 DAY, 4,500 PSI AT 3 DAYS AND 7,000 PSI AT 28 DAYS. THE CONTRACTOR SHALL PAY AN INDEPENDENT TESTING LABORATORY TO RUN A 24 HOUR EVALUATION OF ANY GROUT SUBMITTED FOR APPROVAL. THE CONTRACTOR SHALL RECEIVE APPROVAL FROM THE ENGINEER BEFORE USING THE GROUT.

3.10 SHOTCRETE

3.10.1 GENERAL. SHOTCRETE SHALL BE DEFINED AS MORTAR OR CONCRETE PNEUMATICALLY PROJECTED AT HIGH VELOCITY ONTO A SURFACE. EXCEPT AS SPECIFIED IN THIS SECTION, SHOTCRETE SHALL CONFORM TO THE REGULATIONS OF THIS CHAPTER FOR PLAIN CONCRETE OR REINFORCED CONCRETE.

3.10.2 PROPORTIONS AND MATERIALS. SHOTCRETE PROPORTIONS SHALL BE SELECTED THAT ALLOW SUITABLE PLACEMENT PROCEDURES USING THE DELIVERY EQUIPMENT SELECTED AND SHALL RESULT IN FINISHED IN-PLACE HARDENED SHOTCRETE MEETING THE STRENGTH REQUIREMENTS OF THIS CODE.

3.10.3 AGGREGATE. COARSE AGGREGATE, IF USED, SHALL NOT EXCEED 3/4 INCH (19 MM).

3.10.4 REINFORCEMENT. LAP SPLICES IN REINFORCING BARS SHALL BE BY THE NON-CONTACT LAP SPLICE METHOD WITH AT LEAST 2 INCHES (51 MM) CLEARANCE BETWEEN BARS BUT NO GREATER THAN 1/5 THE LAP LENGTH OR 6 INCHES. THE BUILDING OFFICIAL MAY PERMIT THE USE OF CONTACT LAP SPLICES WHEN NECESSARY FOR THE SUPPORT OF THE REINFORCING PROVIDED IT CAN BE DEMONSTRATED BY MEANS OF PRE-CONSTRUCTION TESTING, THAT ADEQUATE ENCASEMENT OF THE BARS AT THE SPLICE CAN BE ACHIEVED, AND PROVIDED THAT THE SPLICES ARE PLACED SO THAT A LINE THROUGH THE CENTER OF THE TWO SPLICED BARS IS PERPENDICULAR TO THE SURFACE OF THE SHOTCRETE WORK.

3.10.5 PRE-CONSTRUCTION TESTS. WHEN REQUIRED BY THE BUILDING OFFICIAL A TEST PANEL SHALL BE SHOT, CURED, CORED OR SAWN, EXAMINED AND TESTED PRIOR TO COMMENCEMENT OF THE PROJECT. THE SAMPLE PANEL SHALL BE REPRESENTATIVE OF THE PROJECT AND SIMULATE JOB CONDITIONS AS CLOSELY AS POSSIBLE. THE PANEL THICKNESS AND REINFORCING SHALL REPRODUCE THE THICKEST AND MOST CONGESTED AREA SPECIFIED IN THE STRUCTURAL DESIGN. IT SHALL BE SHOT AT THE SAME ANGLE, USING THE SAME NOZZLEMAN AND WITH THE SAME CONCRETE MIX DESIGN THAT WILL BE USED ON THE PROJECT.

3.10.6 REBOUND. ANY REBOUND OR ACCUMULATED LOOSE AGGREGATE SHALL BE REMOVED FROM THE SURFACES TO BE COVERED PRIOR TO PLACING THE INITIAL OR ANY SUCCEEDING LAYERS OF SHOTCRETE. REBOUND SHALL NOT BE RE-USED AS AGGREGATE.

3.10.7 JOINTS. EXCEPT WHERE PERMITTED HEREIN, UNFINISHED WORK SHALL NOT BE ALLOWED TO STAND FOR MORE THAN 30 MINUTES UNLESS ALL EDGES ARE SLOPED TO A THIN EDGE. BEFORE PLACING ADDITIONAL MATERIAL ADJACENT TO PREVIOUSLY APPLIED WORK, SLOPING AND SQUARE EDGES SHALL BE CLEANED AND WETTED.

3.10.8 DAMAGE. IN-PLACE SHOTCRETE WHICH EXHIBITS SAGS OR SLOUGHS, SEGREGATION, HONEYCOMBING, SAND POCKETS OR OTHER OBVIOUS DEFECTS SHALL BE REMOVED AND REPLACED. SHOTCRETE ABOVE SAGS AND SLOUGHS SHALL BE REMOVED AND REPLACED WHILE STILL PLASTIC.

3.10.9 CURING. DURING THE CURING PERIODS SPECIFIED HEREIN, SHOTCRETE SHALL BE MAINTAINED ABOVE 40 DEGREES F (4.4 DEGREES C) AND IN MOIST CONDITION. IN INITIAL CURING, SHOTCRETE SHALL BE KEPT CONTINUOUSLY MOIST FOR 24 HOURS AFTER PLACEMENT IS COMPLETE. FINAL CURING SHALL CONTINUE FOR SEVEN DAYS AFTER SHOTCRETING, FOR THREE DAYS IF HIGH-EARLY-STRENGTH CEMENT IS USED, OR UNTIL THE SPECIFIED STRENGTH IS OBTAINED. FINAL CURING SHALL CONSIST OF A FOG SPRAY OR AN APPROVED MOISTURE-RETAINING COVER OR MEMBRANE. IN SECTIONS OF A DEPTH IN EXCESS OF 12 INCHES (305 MM), FINAL CURING SHALL BE THE SAME AS THAT FOR INITIAL CURING.

3.10.10 STRENGTH TEST. STRENGTH TEST FOR SHOTCRETE SHALL BE MADE BY AN APPROVED AGENCY ON SPECIMENS WHICH ARE REPRESENTATIVE OF WORK AND WHICH HAVE BEEN WATER SOAKED FOR AT LEAST 24 HOURS PRIOR TO TESTING. WHEN THE MAXIMUM SIZE AGGREGATE IS LARGER THAN 3/8 INCH (9.5 MM), SPECIMENS SHALL CONSIST OF NOT LESS THAN THREE 3-INCH-DIAMETER (76 MM) CORES OR 3-INCH (76 MM) CUBES. WHEN THE MAXIMUM SIZE AGGREGATE IS 3/8 INCH (9.5 MM) OR SMALLER, SPECIMENS SHALL CONSIST OF NOT LESS THAN THREE 2-INCH-DIAMETER (51 MM) CORES OF 2-INCH (51 MM) CUBES. SPECIMENS SHALL BE TAKEN IN ACCORDANCE WITH ONE OF THE FOLLOWING:

3.10.10.1 FROM THE IN-PLACE WORK: TAKEN AT LEAST ONCE EACH SHIFT OR LESS THAN ONE FOR EACH 50 CUBIC YARDS (38.2 m3) OF SHOTCRETE; OR

3.10.10.2 FROM TEST PANELS: MADE NOT LESS THAN ONCE EACH SHIFT OR NOT LESS THAN ONE FOR EACH 50 CUBIC YARDS (38.2 m3) OF SHOTCRETE PLACED. WHEN THE MAXIMUM SIZE AGGREGATE IS LARGER THAN 3/8 INCH (9.5 MM), THE TEST PANELS SHALL HAVE A MINIMUM DIMENSION OF 18 INCHES BY 18 INCHES (457 MM BY 457 MM). WHEN THE MAXIMUM SIZE AGGREGATE IS 3/8 INCH OR SMALLER, THE TEST PANELS SHALL HAVE A MINIMUM DIMENSION OF 12 INCHES BY 12 INCHES (305 MM BY 305 MM). PANELS SHALL BE GUNNED IN THE SAME POSITION AS THE WORK, DURING THE COURSE OF THE WORK AND BY NOZZLEMEN DOING THE WORK. THE CONDITION UNDER WHICH THE PANELS ARE CURED SHALL BE THE SAME AS THE WORK.

THE AVERAGE OF THREE CORES FROM A SINGLE PANEL SHALL BE EQUAL TO OR EXCEED 0.85 f'c WITH NO SINGLE CORE LESS THAN 0.75 f'c. THE AVERAGE OF THREE CUBES TAKEN FROM A SINGLE PANEL MUST EQUAL OR EXCEED f'c WITH NO INDIVIDUAL CUBE LESS THAN 0.88 f'c. TO CHECK TESTING ACCURACY, LOCATIONS REPRESENTED BY ERRATIC CORE STRENGTHS MAY BE RE-TESTED.

3.10.11 INSPECTIONS

3.10.11.1 DURING PLACEMENT. WHEN SHOTCRETE IS USED FOR STRUCTURAL MEMBERS, A SPECIAL INSPECTOR IS REQUIRED BY SECTION 1701.5, ITEM 12. THE SPECIAL INSPECTOR SHALL PROVIDE CONTINUOUS INSPECTION OF THE PLACEMENT OF THE REINFORCEMENT AND SHOTCRETING AND SHALL SUBMIT A STATEMENT INDICATING COMPLIANCE WITH THE PLANS AND SPECIFICATIONS.

3.10.11.2 VISUAL EXAMINATION FOR STRUCTURAL SOUNDNESS OF IN-PLACE SHOTCRETE. COMPLETED SHOTCRETE WORK SHALL BE CHECKED VISUALLY FOR REINFORCING BAR EMBEDMENT, VOIDS, ROCK POCKETS, SAND STREAKS AND SIMILAR DEFICIENCIES BY EXAMINING A MINIMUM OF THREE, 3-INCH (76 MM) CORES TAKEN FROM THREE AREAS CHOSEN BY THE DESIGN ENGINEER WHICH REPRESENT THE WORST CONGESTION OF REINFORCING BARS OCCURRING IN THE PROJECT. EXTRA REINFORCING BARS MAY BE ADDED TO NON-CONGESTED AREAS AND CORES MAY BE TAKEN FROM THESE AREAS. THE CORES SHALL BE EXAMINED BY THE SPECIAL INSPECTOR AND A REPORT SUBMITTED TO THE BUILDING OFFICIAL PRIOR TO FINAL APPROVAL OF THE SHOTCRETE.

3.10.11.3 EQUIPMENT. THE EQUIPMENT USED IN PRE-CONSTRUCTION TESTING SHALL BE THE SAME EQUIPMENT USED IN THE WORK REQUIRING SUCH TESTING, UNLESS SUBSTITUTE EQUIPMENT IS APPROVED BY THE BUILDING OFFICIAL.

4.0 MASONRY

4.1 MORTAR AND GROUT

MORTAR: ASTM C-270, TYPE S, f'c - 1800 PSI AT 28 DAYS

GROUT: ASTM C-476 f'c - 2500 PSI AT 28 DAYS
5-1/2 SACK MIX, MINIMUM, 3/8" SIZE AGGREGATE
SLUMP 5" - 8"

4.2 REINFORCEMENT - SEE 3.6.1.

4.3 BRICK VENEER (MASONRY OR STONE UNITS)

4.3.1 MATERIALS: SEE ARCHITECTURAL.

4.3.2 INSTALLATION: INSTALL PER UBC SECTION 3006. ANCHOR TIES FOR ANCHORED MASONRY AND STONE UNITS (5 INCHES MAXIMUM IN THICKNESS AND 2-1/2 INCHES MINIMUM IN THICKNESS) SHALL BE GALVANIZED CORRUGATED METAL, A MINIMUM SIZE OF NUMBER 22 GAUGE BY 1-INCH MINIMUM WIDTH OR 9 GAUGE MINIMUM WIRE.

TIES SHALL BE SPACED SO AS TO SUPPORT NO MORE THAN TWO SQUARE FEET OF WALL BUT NOT MORE THAN 24" O.C. HORIZONTAL OR 18" O.C. VERTICALLY. ANCHORS (OR WIRE) SHALL BE HOOKED AROUND THE HORIZONTAL JOINT REINFORCEMENT WHICH CONSISTS OF NO. 9 GAGE WIRE OR EQUIVALENT. THE JOINT REINFORCEMENT SHALL BE CONTINUOUS WITH BUTT SPLICES BETWEEN TIES PERMITTED.

ATTACHMENT TO WOOD STUD SHALL BE BY GALVANIZED 8-PENNY COMMON NAILS AT THE ANGLE POINT IN THE TIE IN DOUGLAS FIR, 10-PENNY GALVANIZED COMMON IN HEM-FIR. STUD SPACING SHALL NOT EXCEED 16 INCHES ON CENTER.

ATTACHMENT TO EXISTING CONCRETE SHALL BE WITH 9-GAUGE X 1-1/2" DIAMOND POINT, QUENCH HARDENED, FLUTED SHANKED CONCRETE NAIL. ATTACHMENT SHALL BE MADE IN MANNER SUCH THAT DAMAGE TO EXISTING CONCRETE IS PREVENTED. IF CONCRETE NAIL CANNOT BE INSTALLED, USE 1/4" DIAMETER HILTI KWIK BOLT II EXPANSION BOLTS EMBEDDED 2" MINIMUM IN EXISTING CONCRETE.

ATTACH TO EXISTING MASONRY IN THE SAME MANNER EXCEPT EXPANSION BOLTS SHALL BE IMBEDDED 3" MINIMUM.

5.0 METALS

5.1 WELDING

5.1.1 ALL WELDING SHALL BE IN ACCORDANCE WITH THE "STRUCTURAL WELDING CODE," ANSI/AWS D1.1.

5.1.2 ALL WELDING SHALL BE BY CERTIFIED WELDERS; USE E70 XX ELECTRODES, EXCEPT WHERE NOTED IN SECTION 5.1.3.

5.1.3 NO WELDING OF REINFORCING STEEL SHALL BE ALLOWED EXCEPT WHERE SHOWN. ALL WELDING OF REINFORCEMENT SHALL BE PER ANSI/AWS D1.4. THE FOLLOWING ELECTRODES SHALL BE USED WHEN WELDING REINFORCEMENT:
FOR WELDING OF ASTM A615 GR 40 REBAR, USE E70 XX ELECTRODE.
FOR WELDING OF ASTM A706 GR 60 REBAR, USE E80 XX ELECTRODE.
FOR WELDING OF ASTM A615 GR 60 REBAR, USE E90 XX ELECTRODE.

5.1.4 ALL FULL PENETRATION FIELD AND SHOP WELDS SHALL BE INSPECTED BY ULTRASONIC NON-DESTRUCTIVE TESTING PROCEDURES. RESULTS OF TESTS SHALL BE SUBMITTED FOR REVIEW BY THE STRUCTURAL ENGINEER.

5.2 STRUCTURAL STEEL

5.2.1 ALL DETAILING, FABRICATION, AND ERECTION SHALL CONFORM TO THE AISC, "MANUAL OF STEEL CONSTRUCTION," LATEST EDITION EXCEPT AS AMENDED BY SECTION 1.1.5 OF THESE STRUCTURAL NOTES.

5.2.2 STEEL SHAPES AND PLATES SHALL BE ASTM A-36. STEEL SHAPES SHALL BE ASTM A-572 GRADE 50 WHERE NOTED.

5.2.3 TUBE COLUMNS SHALL BE PER ASTM A500, GRADE B (Fy = 46 KSI).

5.2.4 MACHINE BOLTS AND ANCHOR BOLTS SHALL BE ASTM A-307 EXCEPT AS NOTED.

5.2.5 THRU-WALL AND DRILLED-IN BUILDING RODS SHALL BE ALL-THREAD. (Fy=36 KSI)

5.2.6 EXPANSION ANCHORS SHALL BE HILTI KWIK BOLT II CONCRETE ANCHORS AS MANUFACTURED BY HILTI CORPORATION (OR APPROVED EQUIVALENT).

5.2.7 METAL PROTECTION: ALL STEEL EXPOSED TO WEATHER, MOISTURE, SOIL, OR AS NOTED SHALL BE GALVANIZED PER ASTM A-123 OR A153 AS APPLICABLE. ALL OTHER STEEL SURFACES SHALL BE SHOP PRIMED AFTER FABRICATION. LINTEL ANGLES SHALL HAVE A MINIMUM OF 1.5 OZ OF ZINC SPELTER PER SQUARE FOOT OF SURFACE AREA.

REPAIR ALL DAMAGED AREAS OF GALVANIZED PARTS SUCH AS FIELD WELDS, ETC PER ASTM A780. APPLY COATING THICKNESS GREATER THAN OR EQUAL TO ORIGINAL ZINC COATING THICKNESS.

6.0 CARPENTRY

FRAMING LUMBER SHALL BE HEM FIR #2. SAWN LUMBER BEAMS AND HEADERS SHALL BE DOUGLAS FIR #2 OR AS SHOWN ON THE DRAWINGS. ALL 2" NOMINAL LUMBER SHALL BE KILN DRIED (KD). EACH PIECE OF LUMBER SHALL BEAR STAMP OF WEST COAST LUMBER INSPECTION BUREAU (WCLIB) AND/OR WESTERN WOOD PRODUCTS ASSOCIATION (WWPA) SHOWING GRADE MARK. PROVIDE CUT WASHERS OR M.I.W. WHERE BOLT HEADS, NUTS AND LAG SCREW BEAR ON WOOD. TREAT ALL WOOD IN CONTACT WITH CONCRETE, MORTAR, GROUT, MASONRY, AND WITHIN 12" OF EARTH; ALL WOOD OVER WATER; AND ALL WOOD IN CONTACT WITH EARTH; IN ACCORDANCE WITH AWPA SPECIFICATIONS FOR THE PRESSURE TREATMENT OF WESTERN WOODS, LATEST EDITION. WHERE POSSIBLE, PRE-CUT MATERIAL BEFORE TREATMENT. ALL FIELD CUTS AND DRILLED HOLES SHALL BE FIELD TREATED IN ACCORDANCE WITH AWPA M-4.

6.1 CARPENTRY HARDWARE

6.1.1 BOLTS SHALL BE ASTM A-307.

6.1.2 WASHERS SHALL BE MALLEABLE IRON WASHERS (MIW) OR HEAVY PLATE CUT WASHERS.

6.1.3 NAILS SHALL BE COMMON, AMERICAN OR CANADIAN MANUFACTURER ONLY.

6.1.4 LAG SCREWS, SHEAR PLATES-SEE NATIONAL DESIGN SPECIFICATION.

6.1.5 ANCHORS AND CONNECTIONS SHALL BE SIMPSON, TECO, LUMBERLOK OR ICBO APPROVED. ALL FASTENERS SHALL BE INSTALLED PER MANUFACTURERS RECOMMENDATIONS UNLESS OTHERWISE SHOWN.

6.1.6 HARDWARE EXPOSED TO WEATHER OR IN UNHEATED PORTIONS OF BUILDING SHALL BE GALVANIZED PER SECTION 5.2.7.

6.2 MINIMUM NAILING - PER UBC TABLE 23-I-Q - NAILING SCHEDULE.

6.3 SHEATHING (PLYWOOD)

EACH SHEET SHALL BEAR THE TRADEMARK OF THE AMERICAN PLYWOOD ASSOCIATION; ALL GRADING SHALL CONFORM TO PS 1-83 & REPORT NO. NER-108. THICKNESS, NUMBER OF PLIES, AND LAYUP AS SHOWN. ALL PLYWOOD SHALL BE C-D INTERIOR WITH EXTERIOR GLUE OR AS NOTED ON THE DRAWINGS AND SHALL BE GROUP I OR II SPECIES. EXCEPT AS OTHERWISE SHOWN, PROVIDE THE FOLLOWING MINIMUM NAILING; PANEL EDGES 10D AT 6" ON CENTER, INTERMEDIATE SUPPORT 10D AT 12" ON CENTER.

6.4 GLUED-LAMINATED TIMBER

MATERIALS, MANUFACTURE AND QUALITY CONTROL PER ANSI/AITC A190 "STRUCTURAL GLUED LAMINATED TIMBER". CAMBER 1-1/2 TIMES DEAD LOAD DEFLECTION WHERE NOT INDICATED ON DRAWINGS. ALL MEMBERS SHALL BE COMBINATION 24F-V4 FOR SIMPLE SPANS AND 24F-V8 FOR CONTINUOUS OR CANTILEVERED SPANS AND HAVE EXTERIOR GLUE. ALL MEMBERS SHALL BE INDUSTRIAL APPEARANCE UNLESS NOTED ON THE DRAWINGS.

6.4.1 ADHESIVES SHALL MEET THE REQUIREMENTS FOR WET CONDITIONS OF SERVICE.

6.4.2 MEMBERS SHALL BE MARKED INDICATING CONFORMANCE WITH ANSI/A190.1 AND IN ADDITION, A CERTIFICATE OF SUCH CONFORMANCE SHALL BE PROVIDED TO THE BUYER.

6.5 PRE-ENGINEERED WOOD I-JOISTS.

6.5.1 GEOMETRY & SPACING SHALL BE AS SHOWN. THE MANUFACTURER SHALL PROVIDE ADDITIONAL FRAMING MEMBERS AS SHOWN OR AS NECESSARY TO SUPPORT MECHANICAL EQUIPMENT, WALLS AND/OR PARTITIONS, SNOW DRIFT LOADS, ETC. TRUSSES WITH SPANS GREATER THAN 35' SHALL HAVE THE HEEL PLATES DESIGNED CONSIDERING THE EFFECT OF ECCENTRIC LOADING. WHERE NOTED, PRECUT BLOCKING, BRIDGING, BRACING AND/OR FILLER PIECES SHALL BE FURNISHED BY THE MANUFACTURER. WHERE APPLICABLE, WIND UPLIFT BRACING SHALL BE PROVIDED BY MANUFACTURER.

6.5.2 DESIGN LOADS SHALL BE AS STATED IN SECTION 1.3 PLUS ANY SPECIAL LOADS INDICATED ON THE DRAWINGS. UNLESS OTHERWISE NOTED, MINIMUM DESIGN LOADS SHALL INCLUDE:

6.5.2.1 TOTAL DEAD LOAD OF 12 PSF PLUS TRUSS/JOIST SYSTEM DEAD LOADS.

6.5.2.2 BOTTOM CHORD SUPERIMPOSED DEAD LOAD OF 5 PSF (INCLUDED IN 6.5.2.1).

6.5.2.3 AT MASONRY AND/OR CONCRETE WALLS; 200 PLF ACTING NORMAL TO WALL, IN COMBINATION WITH VERTICAL DEAD PLUS 1/2 LIVE LOADS, UNLESS OTHERWISE NOTED.

6.5.2.4 MINIMUM NET UPLIFT LOAD OF 5 PSF.

6.5.3 PROPRIETARY COMPONENTS SHALL HAVE COUNCIL OF AMERICAN BUILDING OFFICIALS (CABO) APPROVAL VIA EVALUATION SERVICE COMMITTEE REPORT AND/OR ICBO (INTERNATIONAL CONFERENCE OF BUILDING OFFICIALS) APPROVAL.

6.5.4 SHOP DRAWINGS SHALL INDICATE ALL REQUIRED PERMANENT BRACING (INCLUDING BOTTOM CHORD AND WEB BRACING SYSTEM TO RESIST WIND UPLIFT FORCES). SHOP CALCULATIONS SHALL INDICATE MEMBER STRESSES, SPECIES/GRADES AND APPLICABLE CABO/ICBO APPROVALS. SHOP DRAWINGS AND CALCULATIONS SHALL BE SEALED BY A PROFESSIONAL STRUCTURAL ENGINEER REGISTERED IN THE STATE OF THE PROJECT SITE.

6.5.5 UNLESS NOTED OTHERWISE, THE TRUSS/JOIST MANUFACTURER SHALL SPECIFY AND FURNISH CONNECTION HARDWARE NECESSARY FOR INSTALLATION OF THEIR SYSTEM.

6.5.6 LONG SPAN I JOISTS (>30'-0) SHALL BE CAMBERED.

6.5.7 WOOD I JOISTS SHALL BE BY TRUS-JOIST OR APPROVED EQUAL.

6.6 WOOD ADHESIVE

ALL WOOD ADHESIVES SHALL BE ELASTOMERIC AND SHALL BE EQUIVALENT TO 3M SCOTCH GRIP WOOD ADHESIVE 5230. ALL ADHESIVES SHALL BE APPLIED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.

THE AMERICAN INSTITUTE OF ARCHITECTS

DRAWN: LAW
CHECKED: TRH
APPROVED:
NOTES:

REUSE OF DOCUMENTS
THIS DOCUMENT, AND THE IDEAS AND DESIGNS INCORPORATED HEREIN, AS AN INSTRUMENT OF PROFESSIONAL SERVICE, IS THE PROPERTY OF AHBL AND IS NOT TO BE USED, IN WHOLE OR OR IN PART, FOR ANY OTHER PROJECT WITHOUT THE WRITTEN AUTHORIZATION OF AHBL.

REVISIONS:

Copyright ©1996 by Architects Reed Reinvald Johnson Willows PLLC
All Rights Reserved.

PROJECT TITLE:
PORT TOWNSEND HIGH SCHOOL

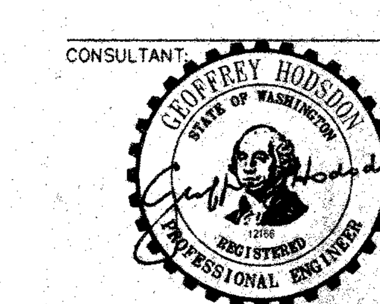
PHASE III MODERNIZATION

PORT TOWNSEND, WA

ARCHITECTS REED REINVALD JOHNSON WILLOWS PLLC

201 North "I" Street
Tacoma, Washington 98403
Phone: (206) 572-3993
Fax: (206) 572-1445

CONSULTANT:



EXPIRES 4 / 6 / 97

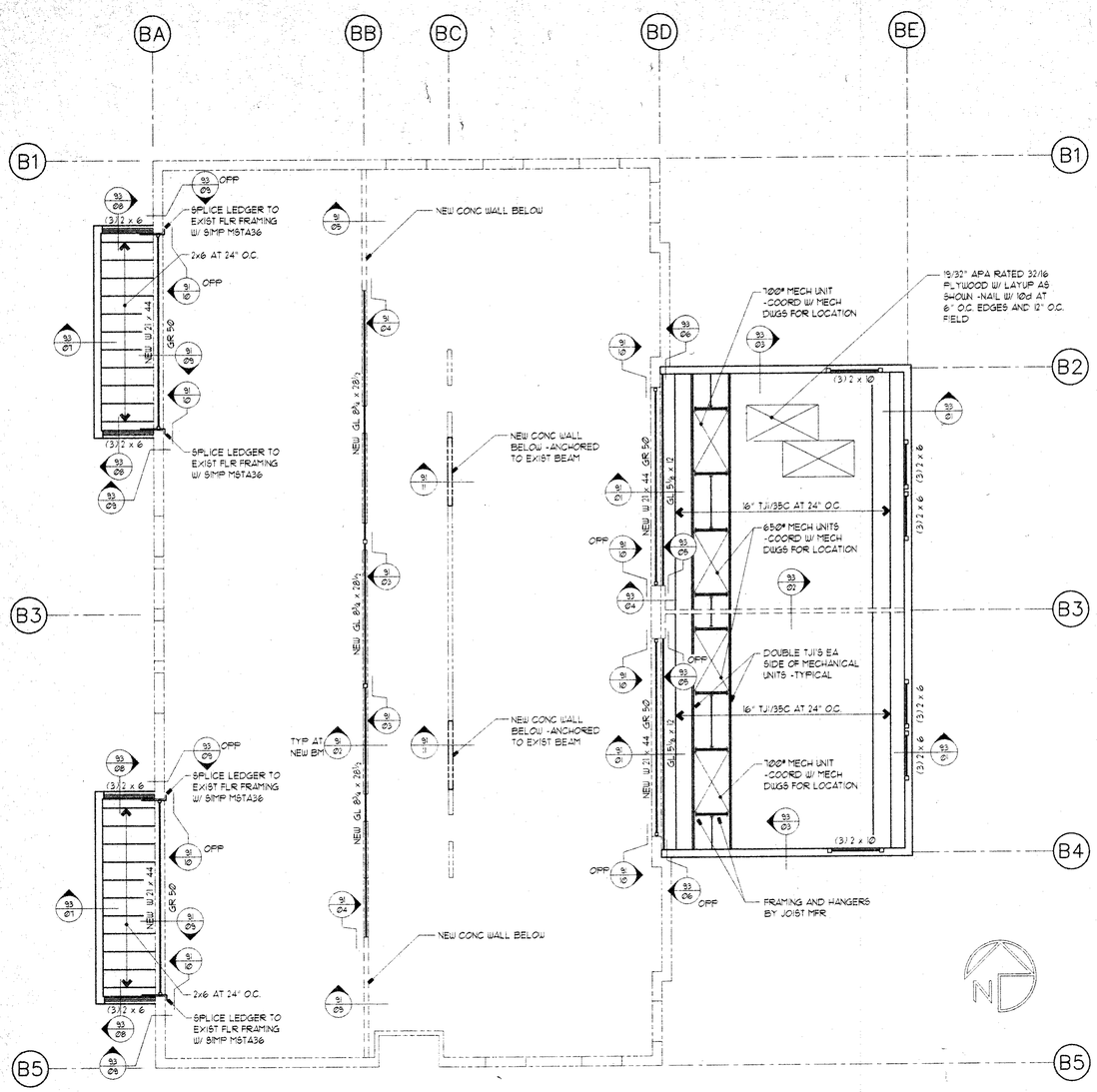
SHEET TITLE:
GENERAL NOTES

SCALE: 1/8"=1'-0"
DATE: 4/15/96
PROJECT NO: 95050.01
SHEET NO:

S 0.01

NO: OF SHEETS:

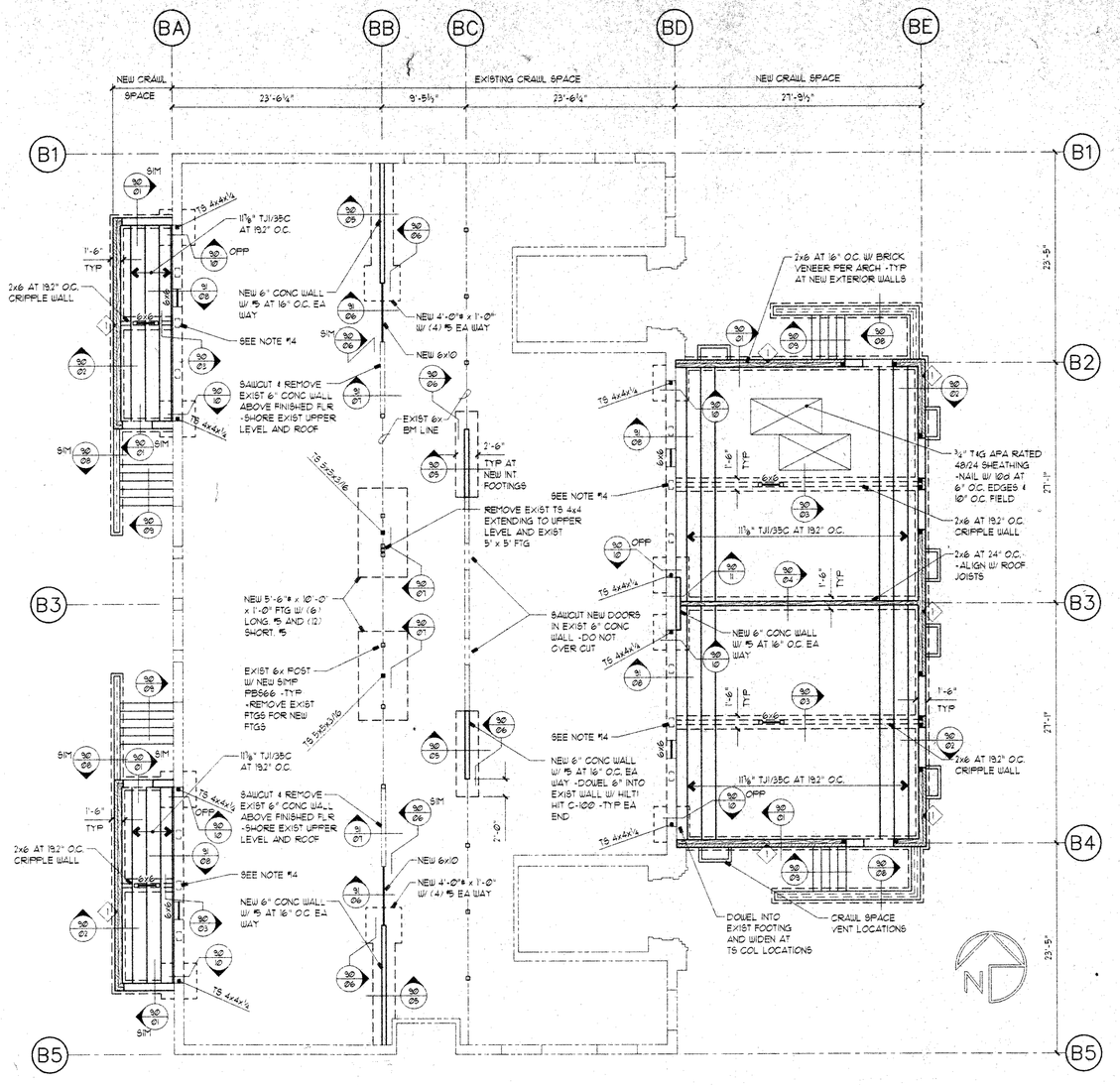
FILENAME: K:\S\96002\96002S01.DWG
CREATED: DEC 05 1994 11:13:01
UPDATED: APR 13 1996 10:31:27
PLOTTED: APR 13 1996 10:40:03



UPPER LEVEL & LOW ROOF FRAMING PLAN

2

1/8" = 1'-0"



FOUNDATION PLAN

1

1/8" = 1'-0"

THE AMERICAN INSTITUTE OF ARCHITECTS

DRAWN: PDC
CHECKED: TRH
APPROVED: GH
NOTES:

REUSE OF DOCUMENTS
THIS DOCUMENT, AND THE IDEAS AND DESIGNS INCORPORATED HEREIN, AS AN INSTRUMENT OF PROFESSIONAL SERVICE, IS THE PROPERTY OF ARRL AND IS NOT TO BE USED IN WHOLE OR IN PART FOR ANY OTHER PROJECT WITHOUT THE WRITTEN AUTHORIZATION OF ARRL.

REVISIONS:

Copyright ©1996 by Architects Reed Reinvald Johnson Willows PLLC
All Rights Reserved.

PROJECT TITLE:
PORT TOWNSEND HIGH SCHOOL

PHASE III MODERNIZATION

PORT TOWNSEND, WA

ARCHITECTS REED REINVALD JOHNSON WILLOWS PLLC
201 North "I" Street
Tacoma, Washington 98403
Phone: (206) 572-3993
Fax: (206) 572-1445

UPPER LEVEL AND LOW ROOF FRAMING NOTES:

1. ALL GLULAM BEAMS SHALL HAVE 0" CAMBER UNLESS NOTED OTHERWISE.
2. ALIGN JOISTS WITH STUDS BELOW WHERE SPACINGS ARE EQUAL.
3. VERIFY ALL TOP OF BEAM AND TOP OF WALL ELEVATIONS WITH ARCHITECTURAL DRAWINGS.
4. VERIFY ALL DOOR AND WINDOW WIDTHS AND HEIGHTS WITH ARCHITECTURAL DRAWINGS.
5. VERIFY SIZE AND LOCATION OF ALL MECHANICAL PENETRATIONS WITH ARCHITECTURAL AND MECHANICAL DRAWINGS.
6. ALL JOIST SPACINGS SHALL BE 2'-0" EXCEPT AS SHOWN OR NOTED.
7. JOIST TYPES AND NUMBER SHOWN ARE SCHEMATIC ONLY. JOIST MFR SHALL SUBMIT SHOP DRAWINGS AND CALCULATIONS. ALL DRAWINGS AND CALCULATIONS SHALL BE STAMPED BY A STRUCTURAL ENGINEER LICENSED IN THE STATE OF THE PROJECT. JOIST MFR SHALL SUPPLY ALL ENGINEERING AND CONNECTION DETAILS. ALL ENGINEERING DETAILS SHALL BE STAMPED BY A STRUCTURAL ENGINEER LICENSED IN THE STATE OF THE PROJECT.
8. ALL SAWN HEADERS SHOWN SHALL BE HF# UNLESS NOTED OTHERWISE.
9. MINIMUM SHEATHING DIMENSION SHALL BE 24" AT BOUNDARIES AND CHANGES IN FRAMING UNLESS ALL EDGES ARE BLOCKED.

SHEAR WALL SCHEDULE

3

MARK (6)	SHEATHING (2)(5)	NAILING		BLKG (4)	A.B. SIZE (3) AND SPACING	REMARKS
		SIZE (1)	SPACING (7)			
1	19/32" APA RATED SHTG	10d COMMON OR 0.148" DIA x 3¼"	6" O.C. EDGES 12" O.C. FIELD	YES	¾"ø AT 48"O.C.	

1. NAILS SHALL BE COMMON FROM AN AMERICAN OR CANADIAN MFR ONLY. NAIL PENETRATION INTO WOOD FRAMING SHALL BE 1 5/8" FOR 10d NAILS AND 1 1/2" FOR 8d NAILS. NAIL DIAMETERS SHALL BE 0.148" FOR 10d NAILS AND 0.131" FOR 8d NAILS.
2. SHEATHING MATERIAL MAY BE EITHER PLYWOOD OR ORIENTED STRAND BOARD.
3. ANCHOR BOLTS SHALL HAVE 6" MIN. EMBED. PROVIDE A MINIMUM OF (2) ANCHOR BOLTS PER PIECE.
4. PANEL BLOCKING SHALL BE A 2X4 PLACED FLAT CENTERED ON THE JOINT WHERE REQUIRED.
5. SHEARWALLS SHALL RUN CONTINUOUS THROUGH BREAKS CAUSED BY INTERSECTING WALLS.
6. UNLESS NOTED OTHERWISE, THE SHEARWALL DESIGNATION APPLIES TO FULL EXTENT OF WALL BETWEEN CORNERS OF WALLS.
7. NAIL SPACING APPLIES TO ALL STUDS, TOP AND BOTTOM PLATES AND BLOCKING.
8. MINIMUM SHEATHING DIMENSION SHALL BE 24" AT BOUNDARIES AND CHANGES IN FRAMING UNLESS ALL EDGES ARE BLOCKED.

FOUNDATION NOTES:

1. NEW CONCRETE WALLS MAY BE PUMPED OR SHOTCRETE AT CONTRACTORS OPTION.
2. SEE ARCHITECTURAL DRAWINGS FOR DIMENSIONS, ELEVATIONS, AND WALLS NOT SHOWN.
3. SEE ARCHITECTURAL DRAWINGS FOR STUD SIZE, SPACING, AND CALLOUTS AT NON-LOAD BEARING WALLS.
4. SEE SHEET "S0.01" FOR STRUCTURAL NOTES AND DETAIL SECTION 92 FOR TYPICAL DETAILS.
5. WALLS INDICATED AS ◇ ARE SHEARWALLS. SEE THE SHEARWALL SCHEDULE FOR SHEATHING, NAILING AND ANCHOR BOLT REQUIREMENTS. EXTENT OF THE SHEARWALL REQUIREMENTS INCLUDE THE TOTAL LENGTH OF THE WALL INCLUDING ABOVE AND BELOW WINDOWS AND DOORS UNLESS NOTED OTHERWISE.
6. ALL LOAD BEARING WALL STUDS SHALL BE COVERED WITH A MIN. OF 1/2" SHEATHING (EITHER GWB, PW, OR OSB AS APPLICABLE) (1) SIDE OF STUDS. SEE ARCHITECTURAL DRAWINGS FOR ADDITIONAL WALL COVERING REQUIREMENTS. SEE SHEARWALL SCHEDULE FOR SHEATHING, NAILING AND ANCHOR BOLT REQUIREMENTS AT SHEARWALLS.
7. ALL 2X STUDS SHALL BE CONTINUOUS BETWEEN DETAIL CUTS. POSITION BUILT-UP STUDS TO ALIGN WITH THE TRUSSES ABOVE.
8. COLUMNS DESIGNATED ■ ARE (3) 2X BUILT-UP COLUMNS UNLESS NOTED OTHERWISE.
9. COLUMNS NOT SPECIFICALLY LOCATED BY DIMENSIONS SHALL BE LOCATED ADJACENT TO OPENINGS AS DIMENSIONED BY THE ARCHITECT. SEE ARCHITECTURAL DRAWINGS FOR DETAILS AT ALL WINDOW AND DOOR JAMBS.
10. SEE SOILS REPORT FOR ALL FOUNDATION SUPPORT REQUIREMENTS. THIS IS TO INCLUDE ALL EXCAVATION, FILL AND FILL PLACEMENT REQUIREMENTS.
11. LOCATIONS OF TUBE STEEL COLUMNS LOCATED IN WALLS ARE SHOWN SCHEMATICALLY ON STRUCTURAL DRAWINGS. THE CONTRACTOR IS TO COORDINATE LOCATION OF TUBE STEEL COLUMNS WITH ARCHITECTURAL DRAWINGS.
12. VERIFY ALL WINDOW AND DOOR WIDTH AND HEIGHTS WITH ARCHITECTURAL DRAWINGS.
13. THE CONTRACTOR SHALL INSTALL TEMPORARY SHORING ALONG GRID "BB" TO SUPPORT THE MAIN FLOOR, UPPER FLOOR AND ROOF DURING CONSTRUCTION. SHORING SHALL ALSO BE PROVIDED ALONG GRID "BC" TO SUPPORT THE MAIN FLOOR DURING CONSTRUCTION OF THE NEW CONCRETE WALL.
14. THE CONTRACTOR SHALL PROVIDE SHORING ADJACENT TO THE EXISTING MASONRY PIERS TO SUPPORT THE MASONRY WALL, UPPER FLOOR AND ROOF PRIOR TO DEMOLISHING THE EXISTING PIERS.
15. THESE PLANS DENOTE THE BASIC SCOPE OF WORK FOR THE REMOVAL OF EXISTING MATERIALS. THE DEMOLITION DRAWINGS AND NOTES ARE PROVIDED WITH THE INTENT TO GENERALLY DESCRIBE AREAS AND LIMITS OF WORK. THE CONTRACTOR SHALL BE FAMILIAR WITH THE SITE AND CONDITIONS THEREON, AND SHALL NOT RELY SOLELY ON THE REVIEW OF THE BIDDING DOCUMENTS IN DETERMINING THE EXTENT OF WORK REQUIRED. COORDINATION OF THESE DRAWINGS WITH REQUIREMENTS FOR CONTRACT WORK IS THE RESPONSIBILITY OF THE CONTRACTOR. DISCREPANCIES BETWEEN OR WITHIN THE CONTRACT DOCUMENTS SHALL BE REPORTED TO THE ARCHITECT IMMEDIATELY. THE CONTRACTOR SHALL PROVIDE CLARIFYING SKETCHES, DIAGRAMS, AND FIELD DIMENSIONS OF EXISTING CONDITIONS AT THE REQUEST OF THE ARCHITECT IF/WHEN CONFLICTS ARE IDENTIFIED.

CONSULTANT:
GEOFFREY HODGDON
STATE OF WASHINGTON
REGISTERED PROFESSIONAL ENGINEER
EXPIRES 4/6/97

SHEET TITLE:
FOUNDATION AND FRM'G PLANS

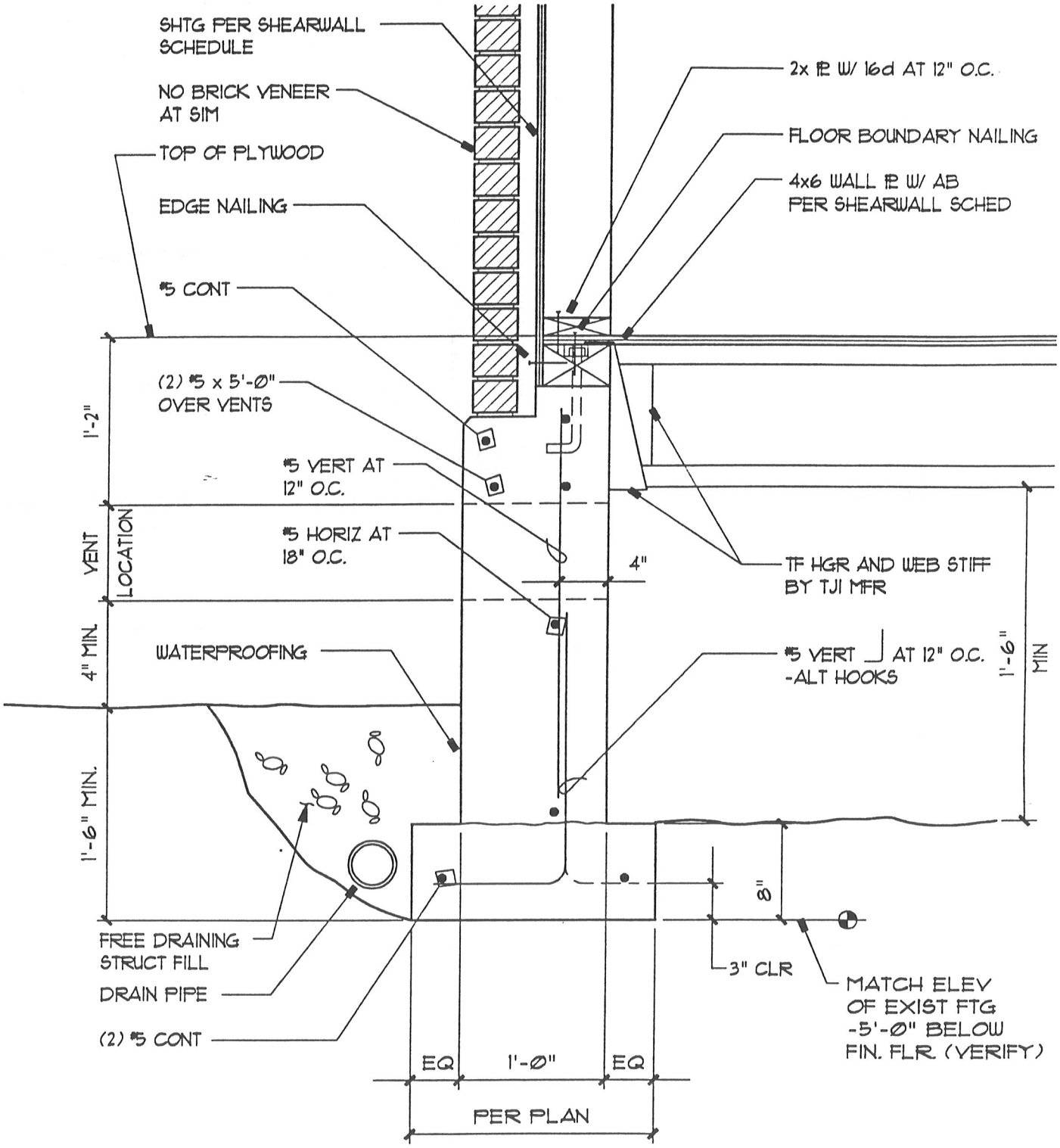
SCALE: 1/8"=1'-0"
DATE: 4/15/96
PROJECT NO: 95050.01
SHEET NO:

S1.01

NO: OF SHEETS:

FILENAME: K:\S\96002\96002S10.DWG UPDATED: APR 13 1996 12:16:55
CREATED: DEC 05 1994 11:13:01 PLOTTED: APR 15 1996 08:07:24

D01



ARCHITECTS
REED
REINVALD
JOHNSON
WILLOWS

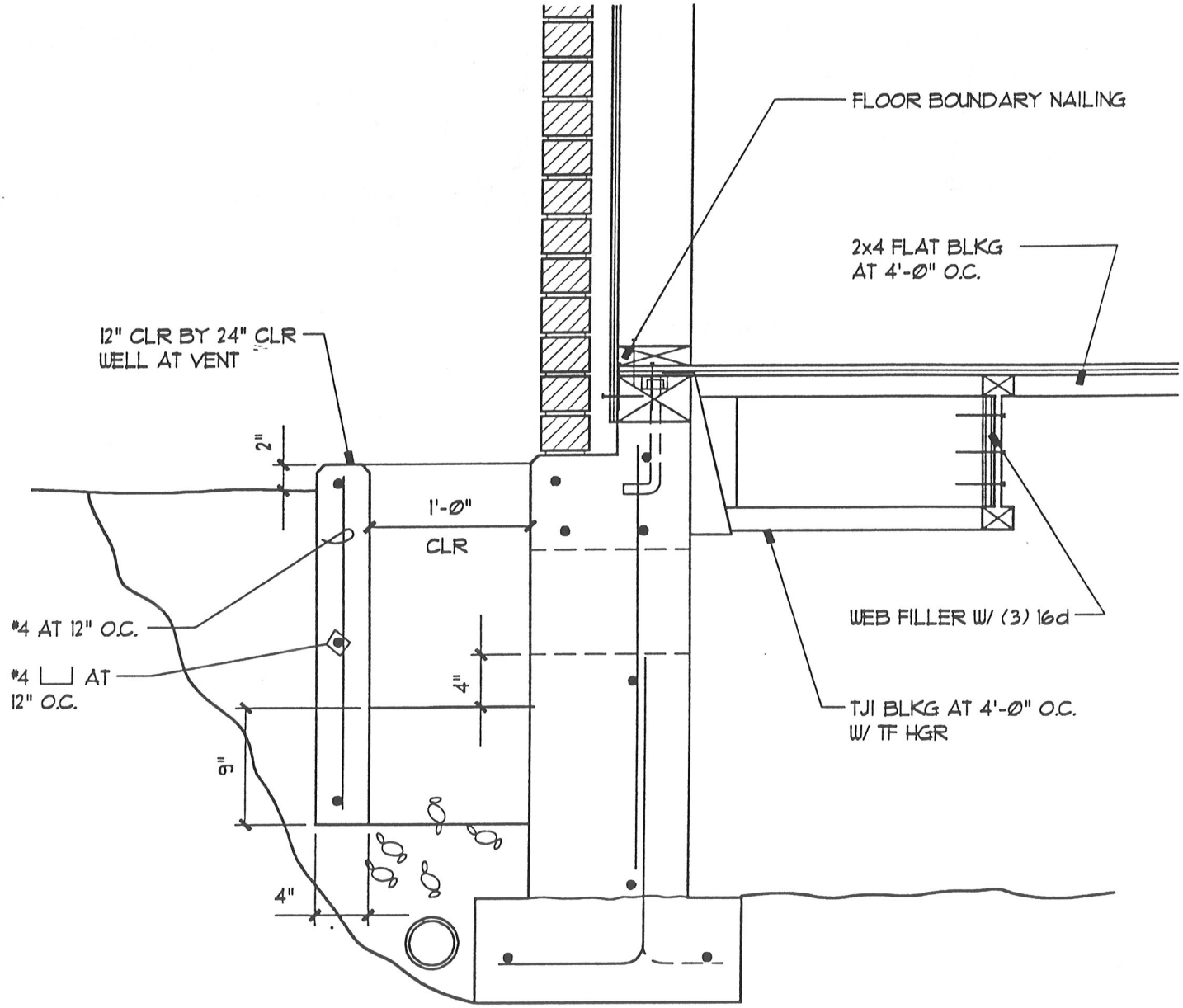
201 North "I" Street
Tacoma, Washington 98403
Phone: (206) 572-3993
Fax: (206) 572-1445

PORT TOWNSEND HIGH SCHOOL
PHASE 3 MODERNIZATION
Port Townsend, Washington

PROJECT #: 95050.01
DATE: 15 APR 96
BY:
REVISIONS:

Drawing No.
90.01

D01



SEE 90/01 FOR CALLOUTS IN COMMON

ARCHITECTS
REED
REINVALD
JOHNSON
WILLOWS

201 North "I" Street
Tacoma, Washington 98403
Phone: (206) 572-3993
Fax: (206) 572-1445

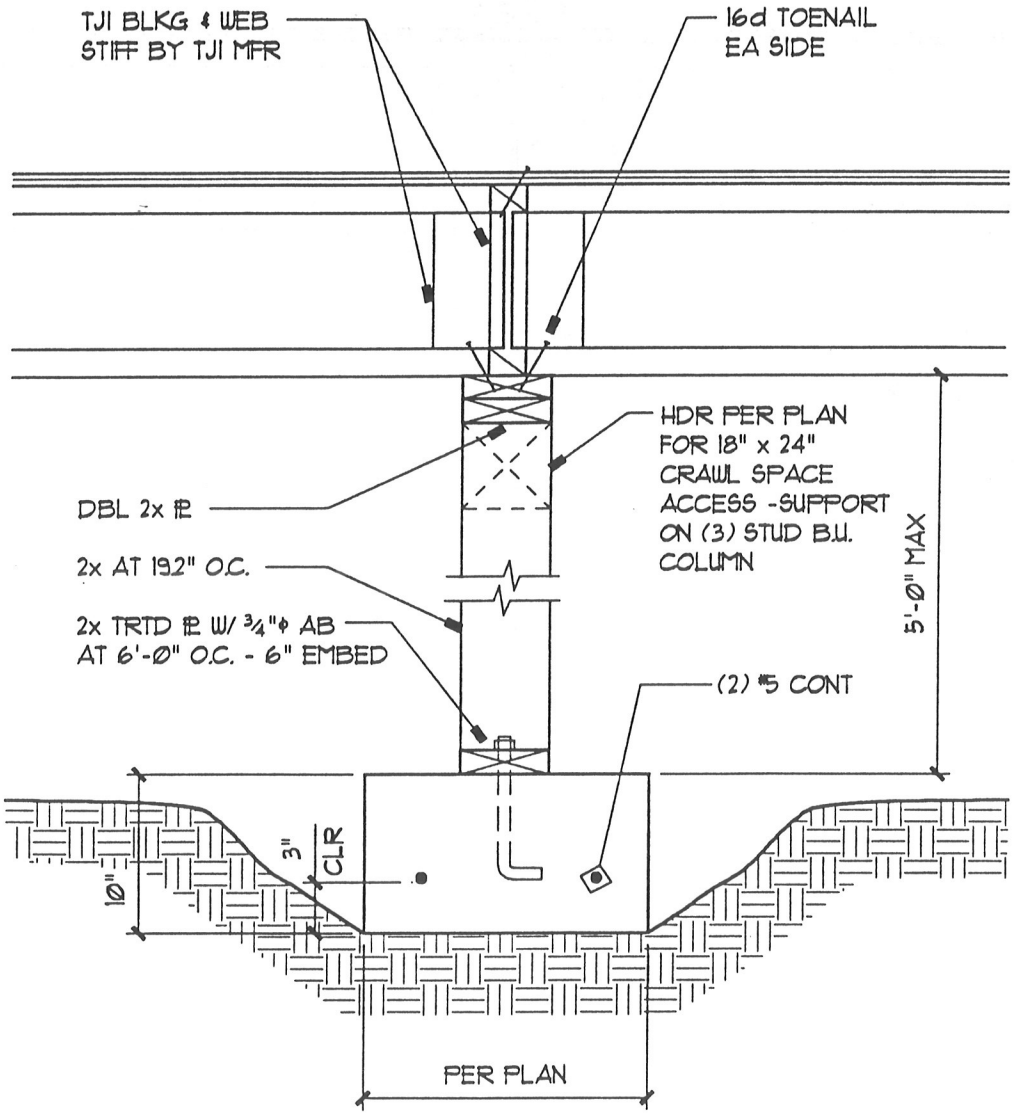
PORT TOWNSEND HIGH SCHOOL
PHASE 3 MODERNIZATION

Port Townsend, Washington

PROJECT #: 95050.01
DATE: 15 APR 96
BY:
REVISIONS:

Drawing No.
90.02

D01



ARCHITECTS
REED
REINVALD
JOHNSON
WILLOWS

201 North "I" Street
Tacoma, Washington 98403
Phone: (206) 572-3993
Fax: (206) 572-1445

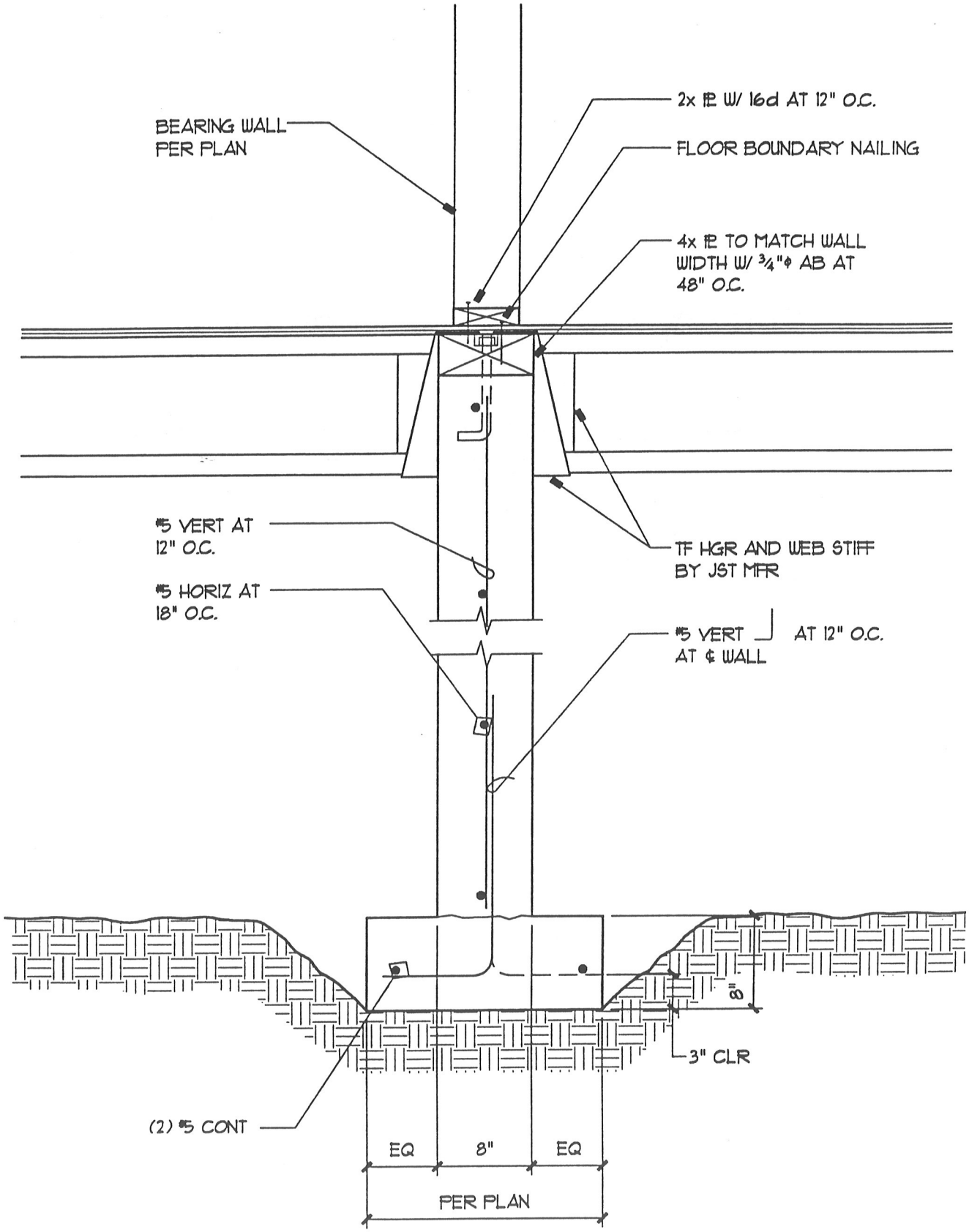
PORT TOWNSEND HIGH SCHOOL
PHASE 3 MODERNIZATION

Port Townsend, Washington

PROJECT #: 95050.01
DATE: 15 APR 96
BY:
REVISIONS:

Drawing No.
90.03

D01



ARCHITECTS
REED
REINVALD
JOHNSON
WILLOWS

201 North "I" Street
Tacoma, Washington 98403
Phone: (206) 572-3993
Fax: (206) 572-1445

PORT TOWNSEND HIGH SCHOOL
PHASE 3 MODERNIZATION

Port Townsend, Washington

PROJECT #: 95050.01

DATE: 15 APR 96

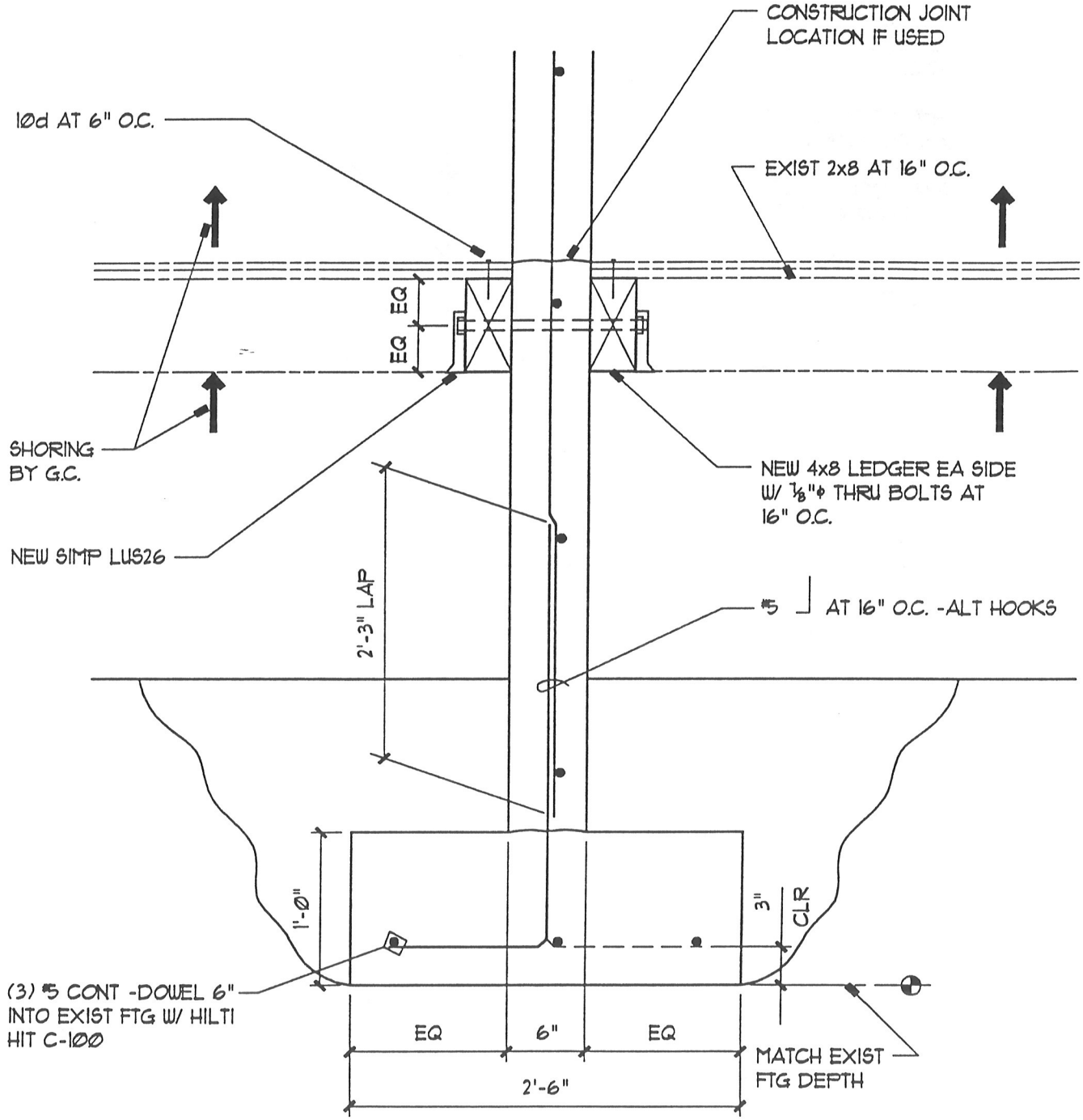
BY:

REVISIONS:

Drawing No.

90.04

D03



ARCHITECTS
REED
REINVALD
JOHNSON
WILLOWS

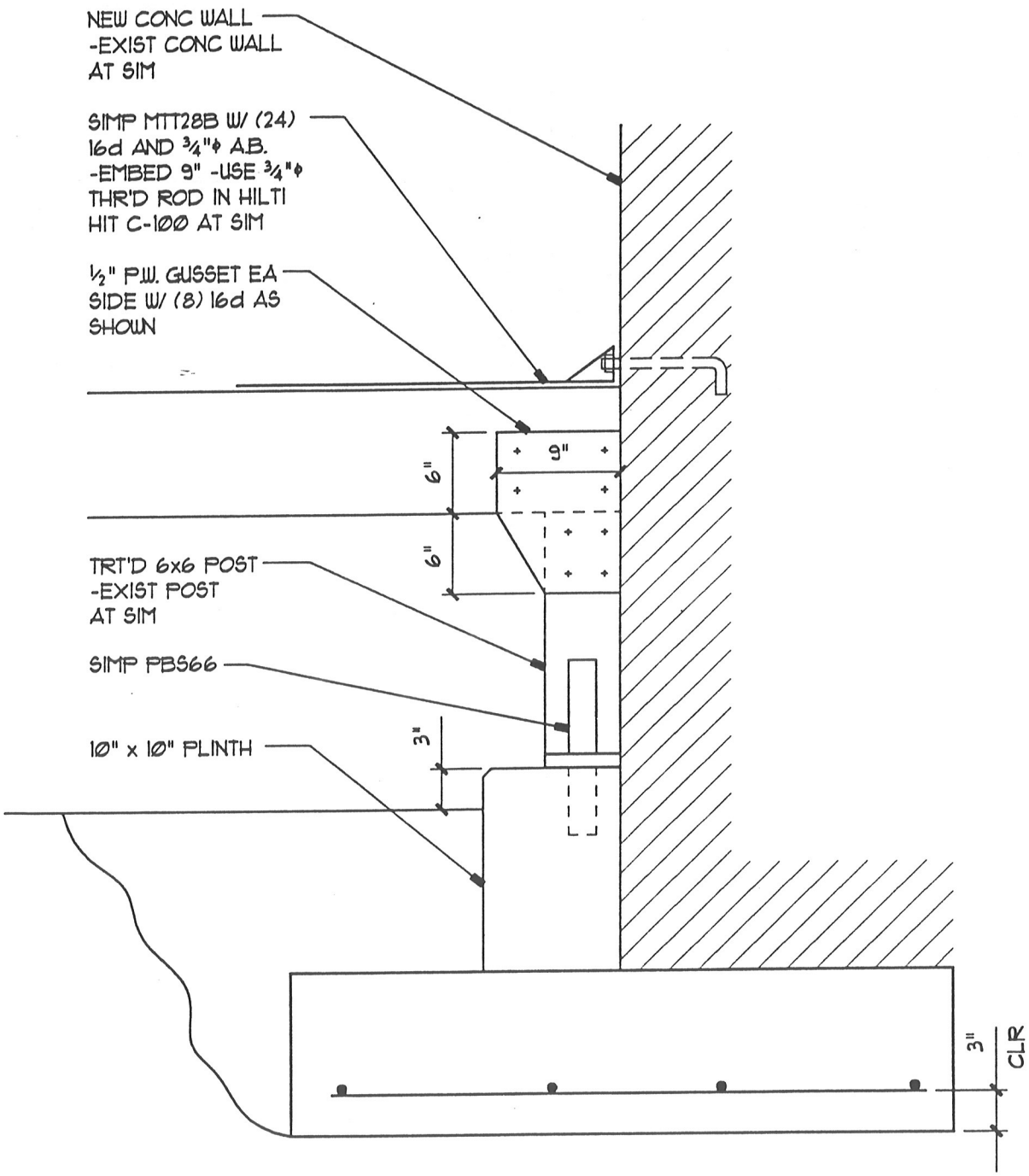
201 North "I" Street
Tacoma, Washington 98403
Phone: (206) 572-3993
Fax: (206) 572-1445

PORT TOWNSEND HIGH SCHOOL
PHASE 3 MODERNIZATION
Port Townsend, Washington

PROJECT #: 95050.01
DATE: 15 APR 96
BY:
REVISIONS:

Drawing No.
90.05

D03



ARCHITECTS
REED
REINVALD
JOHNSON
WILLOWS

201 North "I" Street
Tacoma, Washington 98403
Phone: (206) 572-3993
Fax: (206) 572-1445

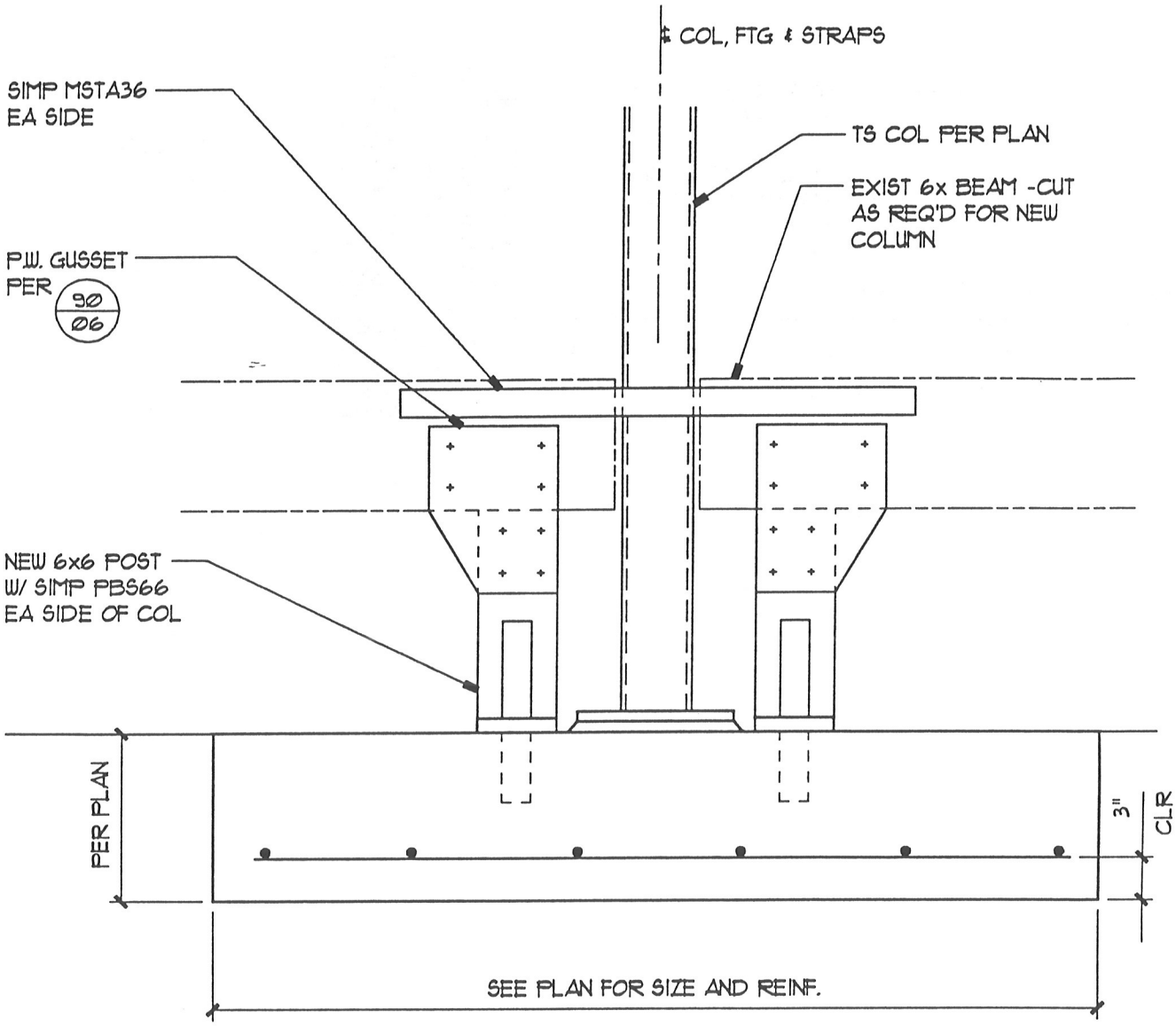
PORT TOWNSEND HIGH SCHOOL
PHASE 3 MODERNIZATION

Port Townsend, Washington

PROJECT #: 95050.01
DATE: 15 APR 96
BY:
REVISIONS:

Drawing No.
90.06

D03



ARCHITECTS
REED
REINVALD
JOHNSON
WILLOWS

201 North "I" Street
Tacoma, Washington 98403
Phone: (206) 572-3993
Fax: (206) 572-1445

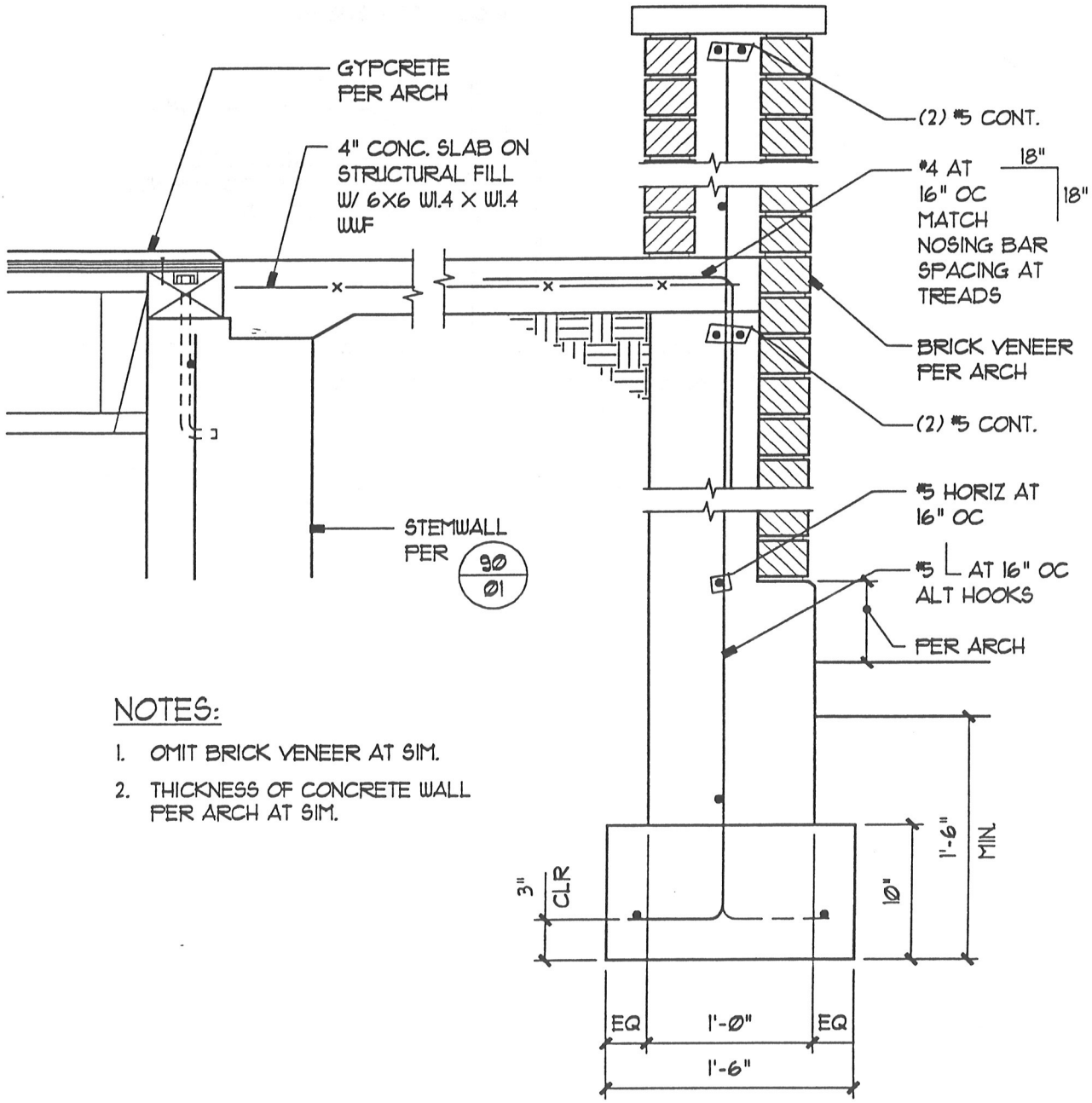
PORT TOWNSEND HIGH SCHOOL
PHASE 3 MODERNIZATION

Port Townsend, Washington

PROJECT #: 95050.01
DATE: 15 APR 96
BY:
REVISIONS:

Drawing No.
90.07

D07



NOTES:

1. OMIT BRICK VENEER AT SIM.
2. THICKNESS OF CONCRETE WALL PER ARCH AT SIM.

ARCHITECTS
REED
REINVALD
JOHNSON
WILLOWS

201 North "I" Street
Tacoma, Washington 98403
Phone: (206) 572-3993
Fax: (206) 572-1445

PORT TOWNSEND HIGH SCHOOL
PHASE 3 MODERNIZATION

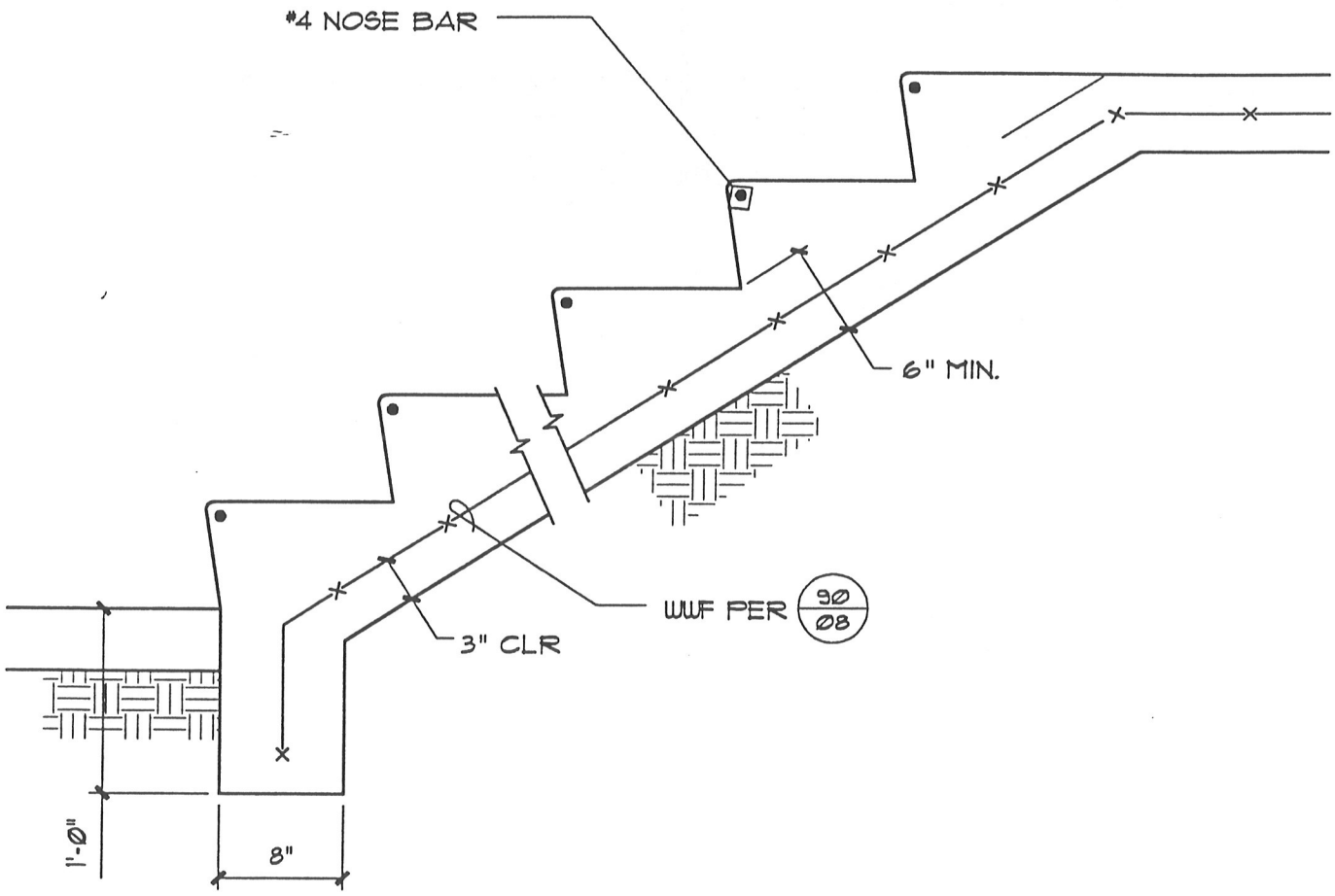
Port Townsend, Washington

PROJECT #: 95030.01
DATE: 15 APR 96
BY:
REVISIONS:

Drawing No.

90.08

D09



ARCHITECTS
REED
REINVALD
JOHNSON
WILLOWS

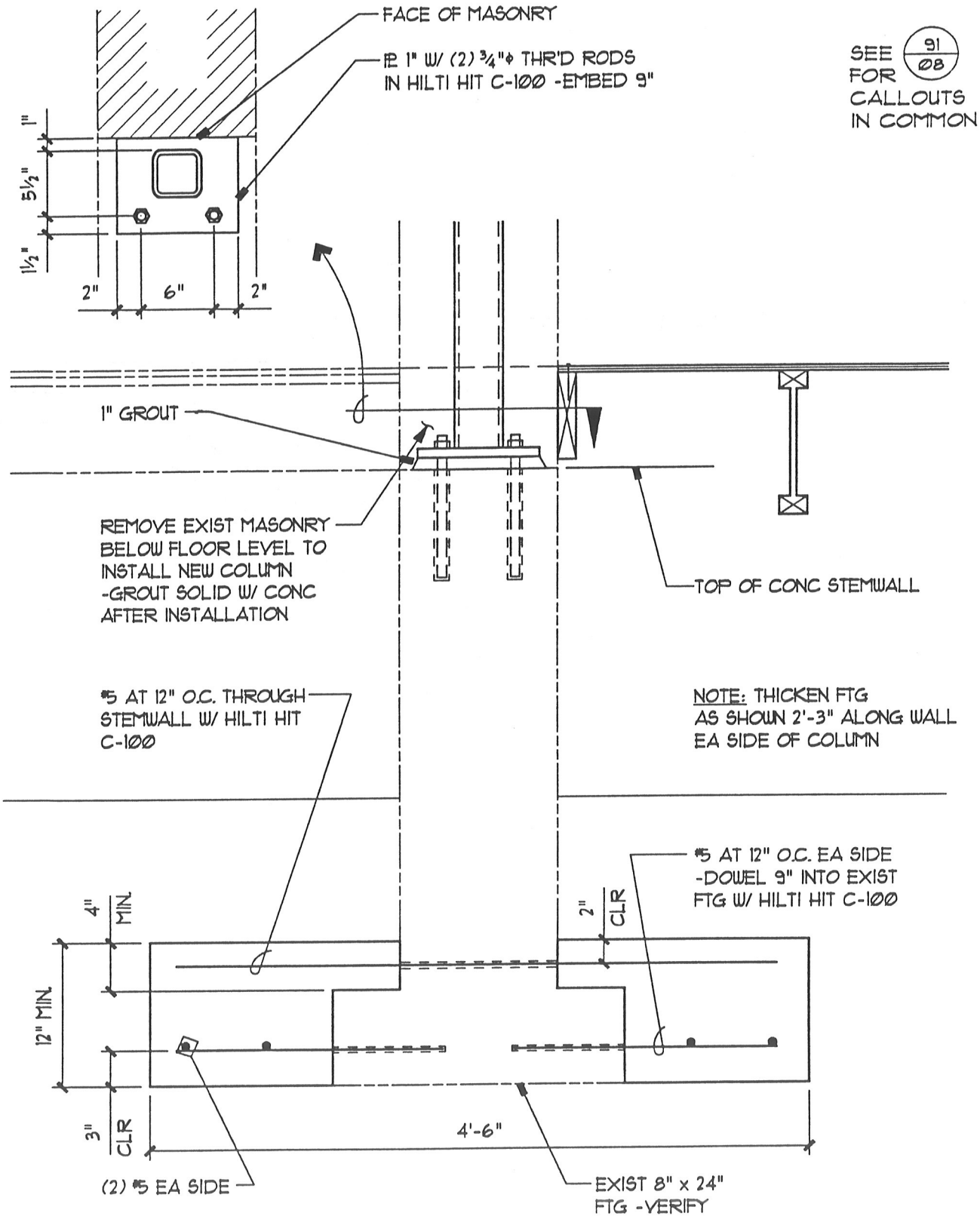
201 North "I" Street
Tacoma, Washington 98403
Phone: (206) 572-1993
Fax: (206) 572-1445

PORT TOWNSEND HIGH SCHOOL
PHASE 3 MODERNIZATION
Port Townsend, Washington

PROJECT #: 95050.01
DATE: 15 APR 96
BY:
REVISIONS:

Drawing No.
90.09

D07



ARCHITECTS
REED
REINVALD
JOHNSON
WILLOWS

201 North "I" Street
Tacoma, Washington 98403
Phone: (206) 572-3933
Fax: (206) 572-1445

PORT TOWNSEND HIGH SCHOOL
PHASE 3 MODERNIZATION

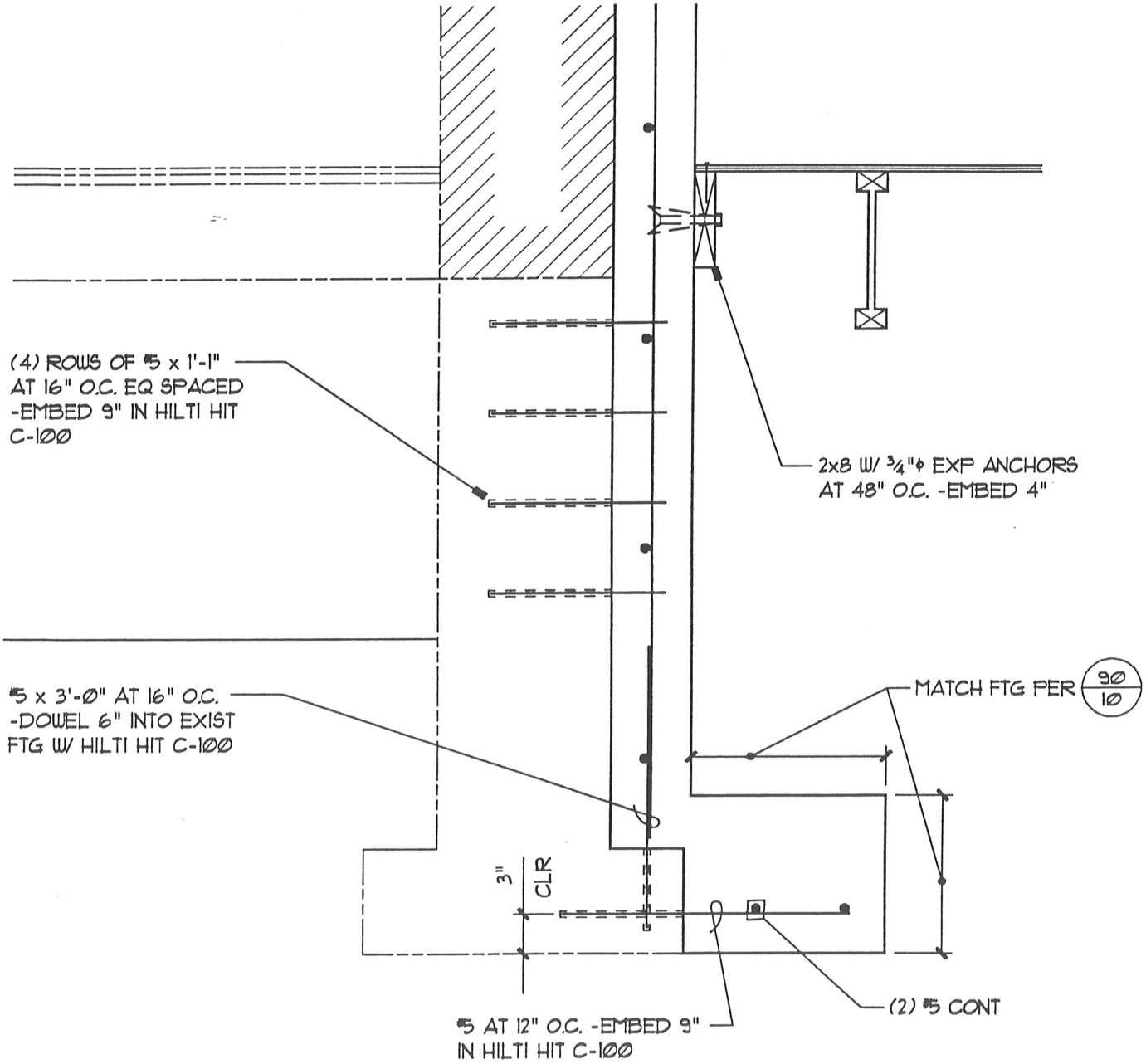
Port Townsend, Washington

PROJECT #: 95050.01
DATE: 15 APR 96
BY:
REVISIONS:

Drawing No.
90.10

D07

SEE 90/10 FOR CALLOUTS IN COMMON



ARCHITECTS
REED
REINVALD
JOHNSON
WILLOWS

201 North "I" Street
Tacoma, Washington 98403
Phone: (206) 572-4993
Fax: (206) 572-1445

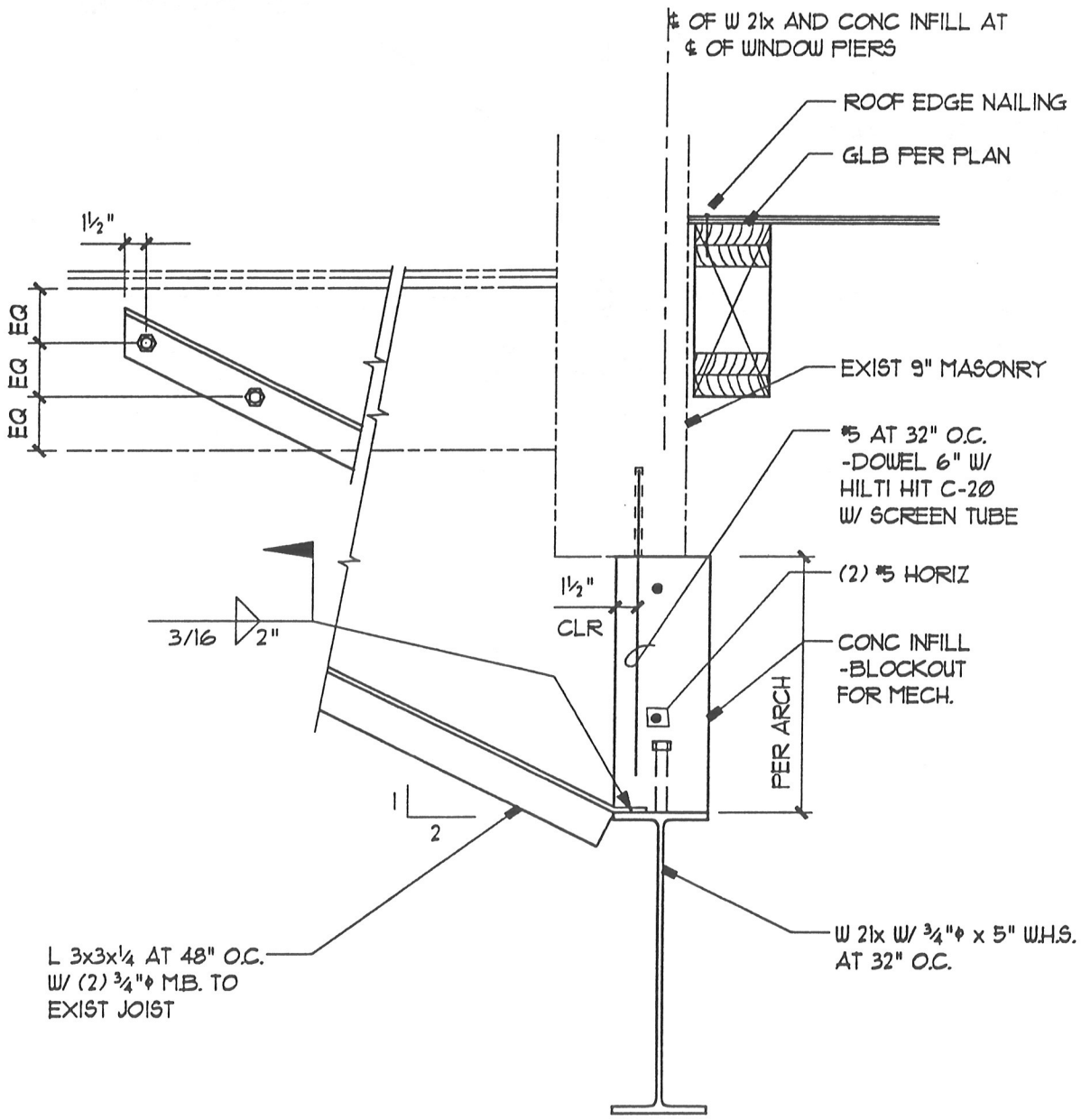
PORT TOWNSEND HIGH SCHOOL
PHASE 3 MODERNIZATION

Port Townsend, Washington

PROJECT #: 95050.01
DATE: 15 APR 96
BY:
REVISIONS:

Drawing No.
90.11

D02



ARCHITECTS
REED
REINVALD
JOHNSON
WILLOWS

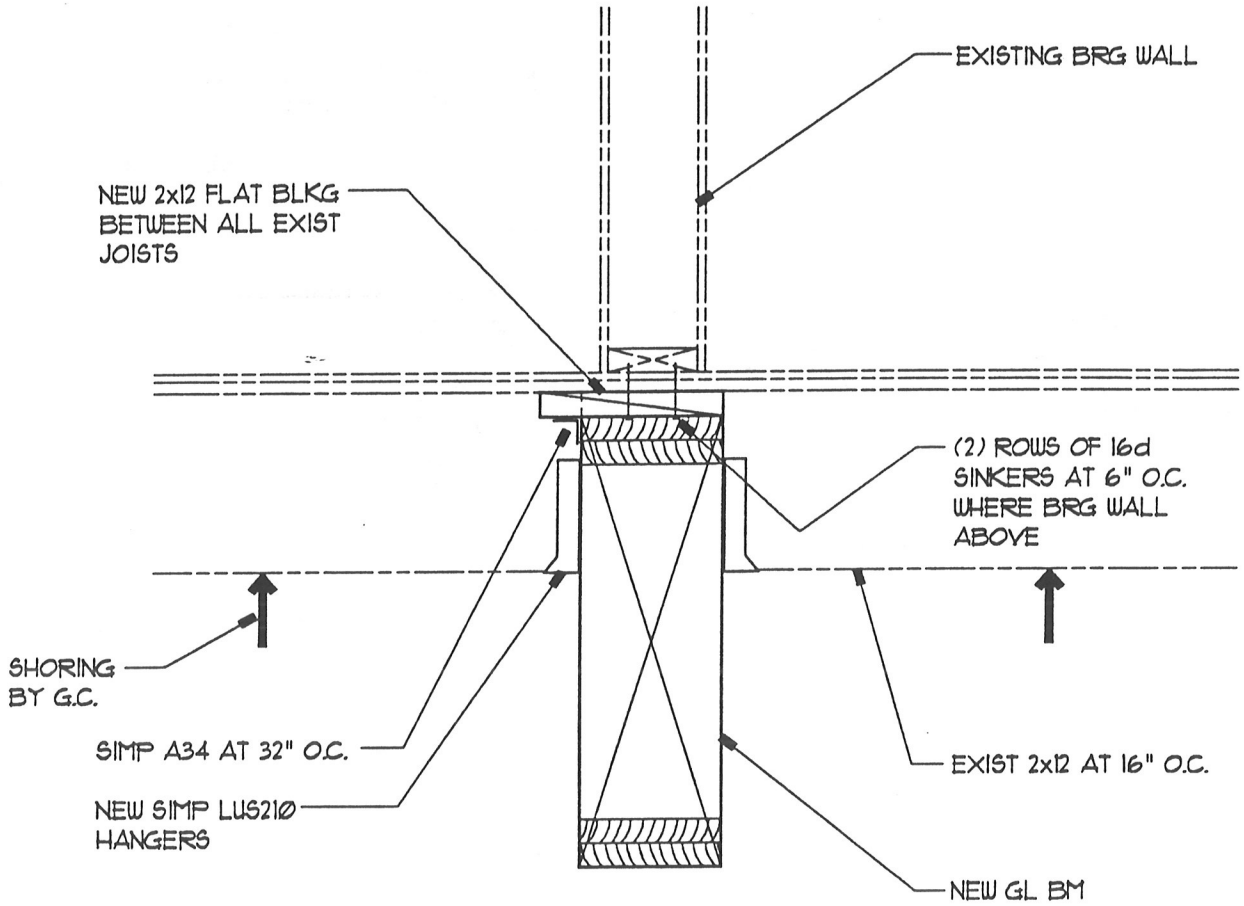
201 North "I" Street
Tacoma, Washington 98403
Phone: (206) 572-3993
Fax: (206) 572-1445

PORT TOWNSEND HIGH SCHOOL
PHASE 3 MODERNIZATION
Port Townsend, Washington

PROJECT #: 9503.01
DATE: 15 APR 96
BY:
REVISIONS:

Drawing No.
91.01

D03



NOTE: CUT EXIST LAPPED JOISTS FOR NEW BEAM INSTALLATION

ARCHITECTS
REED
REINVALD
JOHNSON
WILLOWS

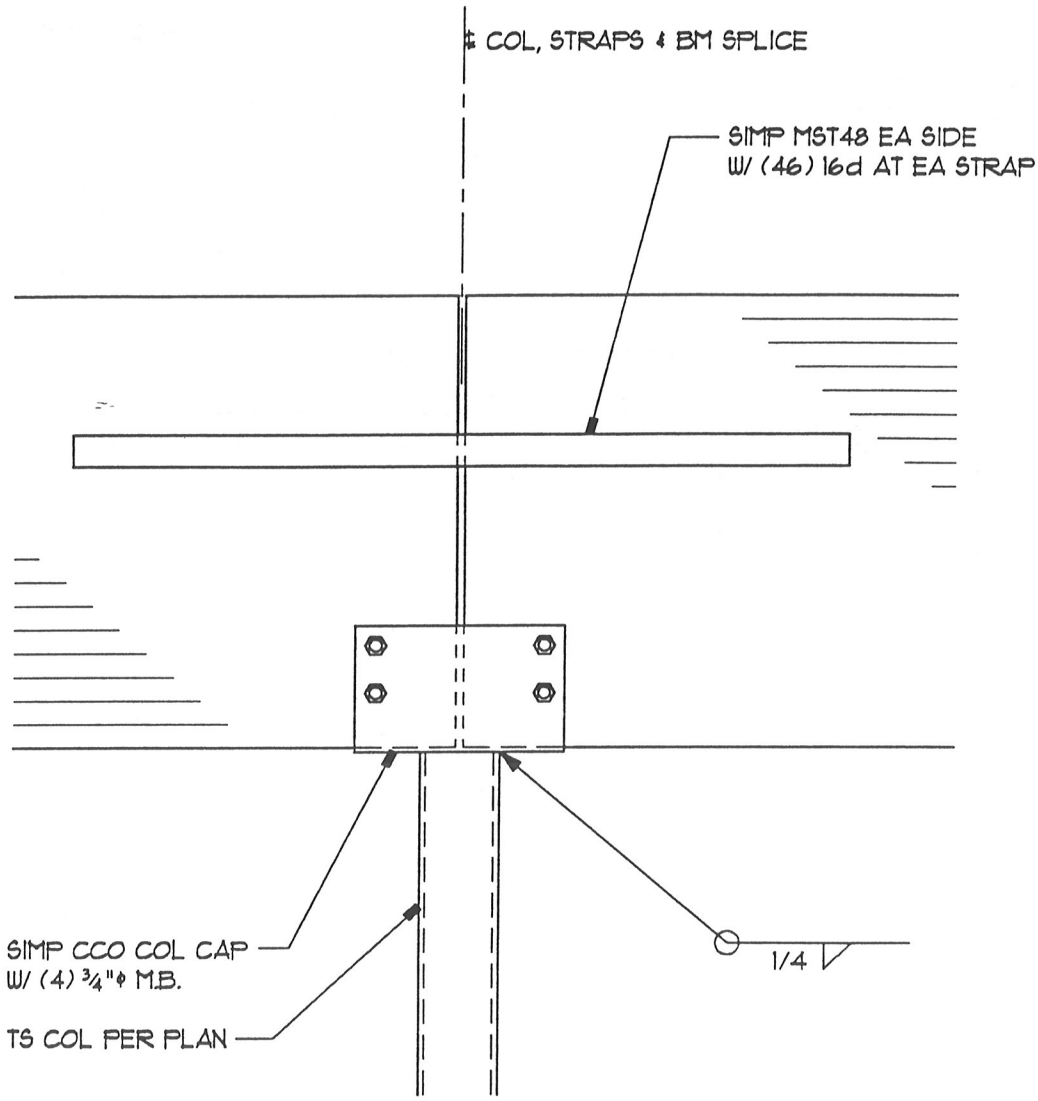
201 North "I" Street
Tacoma, Washington 98403
Phone: (206) 572-3993
Fax: (206) 572-1445

PORT TOWNSEND HIGH SCHOOL
PHASE 3 MODERNIZATION
Port Townsend, Washington

PROJECT #: 95050.01
DATE: 15 APR 96
BY:
REVISIONS:

Drawing No.
91.02

D04



ARCHITECTS
REED
REINVALD
JOHNSON
WILLOWS

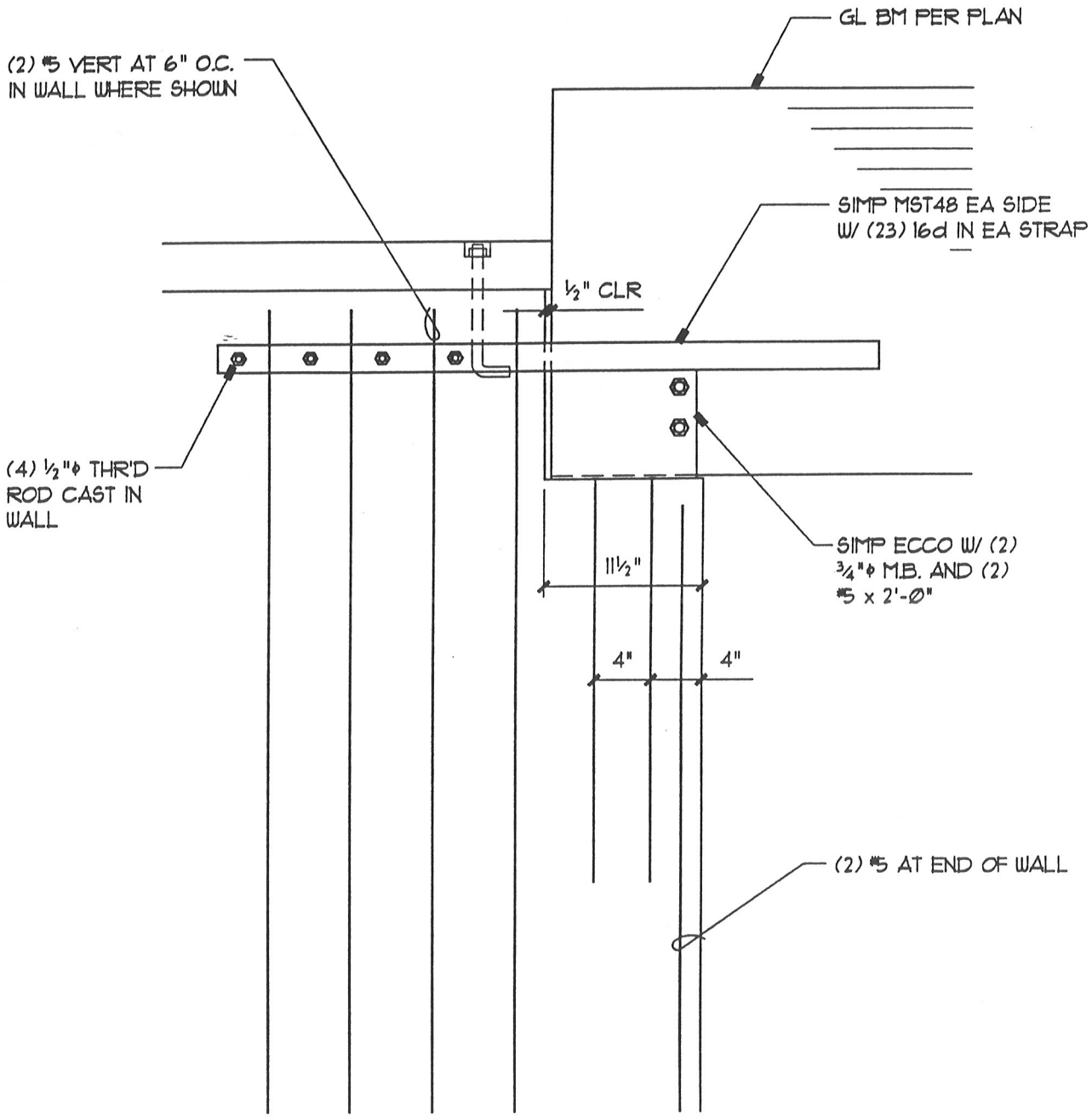
201 North "I" Street
Tacoma, Washington 98403
Phone: (206) 572-3993
Fax: (206) 572-1445

PORT TOWNSEND HIGH SCHOOL
PHASE 3 MODERNIZATION
Port Townsend, Washington

PROJECT #: 95050.01
DATE: 15 APR 96
BY:
REVISIONS:

Drawing No.
91.03

D04



ARCHITECTS
REED
REINVALD
JOHNSON
WILLOWS

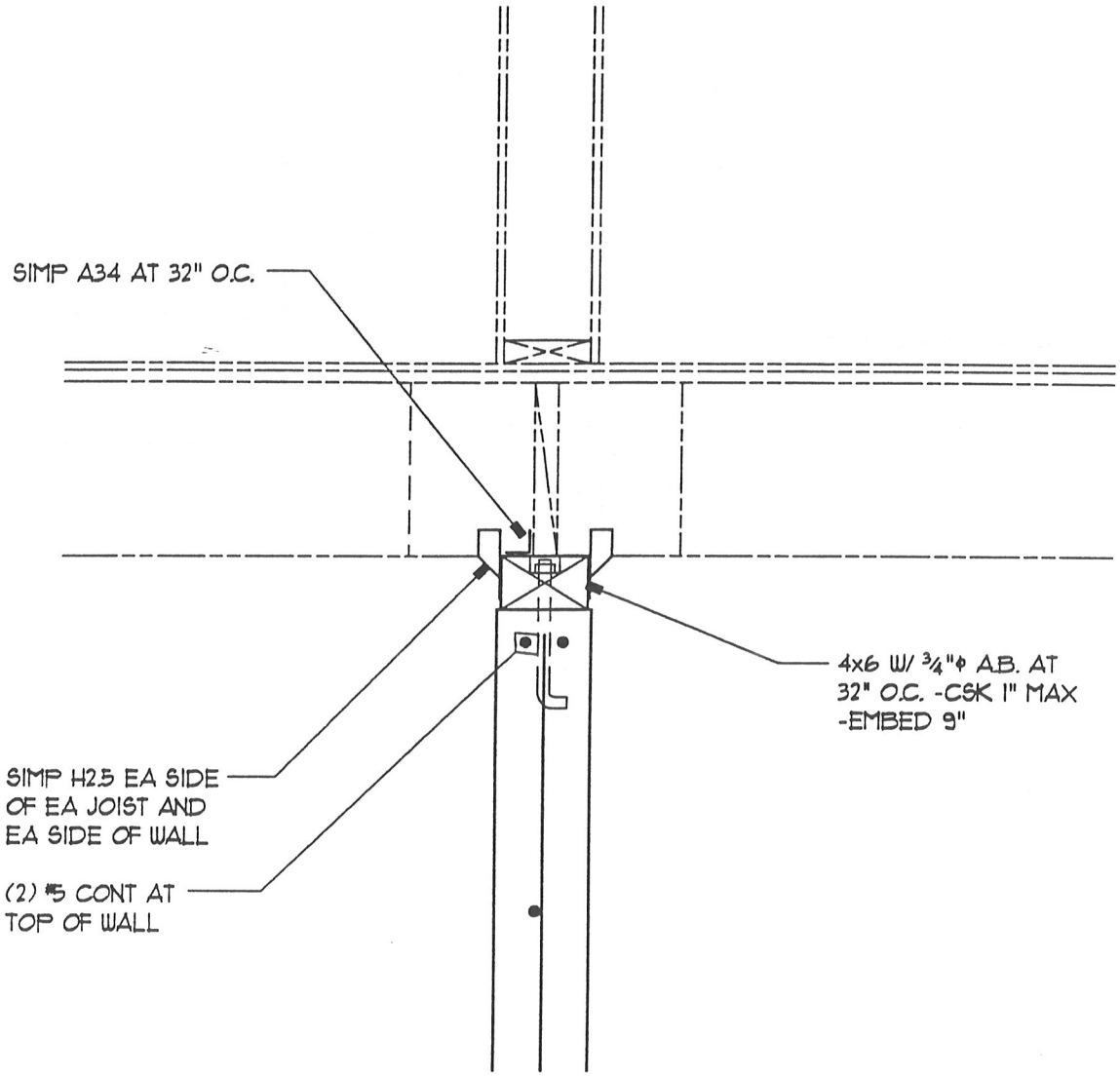
201 North "I" Street
Tacoma, Washington 98403
Phone: (206) 572-3993
Fax: (206) 572-1445

PORT TOWNSEND HIGH SCHOOL
PHASE 3 MODERNIZATION
Port Townsend, Washington

PROJECT #: 95050.01
DATE: 15 APR 96
BY:
REVISIONS:

Drawing No.
91.04

D04



ARCHITECTS
REED
REINVALD
JOHNSON
WILLOWS

201 North "I" Street
Tacoma, Washington 98403
Phone: (206) 572-3993
Fax: (206) 572-1445

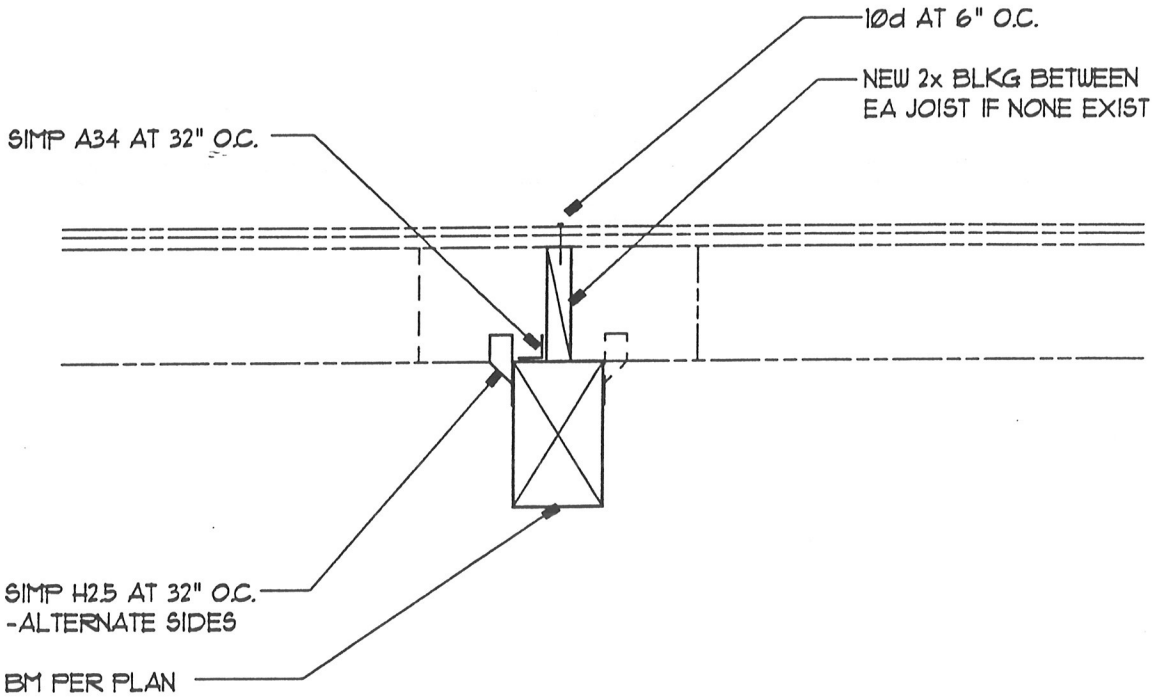
PORT TOWNSEND HIGH SCHOOL
PHASE 3 MODERNIZATION

Port Townsend, Washington

PROJECT #: 95050.01
DATE: 15 APR 96
BY:
REVISIONS:

Drawing No.
91.05

D04



ARCHITECTS
REED
REINVALD
JOHNSON
WILLOWS

201 North "I" Street
Tacoma, Washington 98403
Phone: (206) 572-3893
Fax: (206) 572-1443

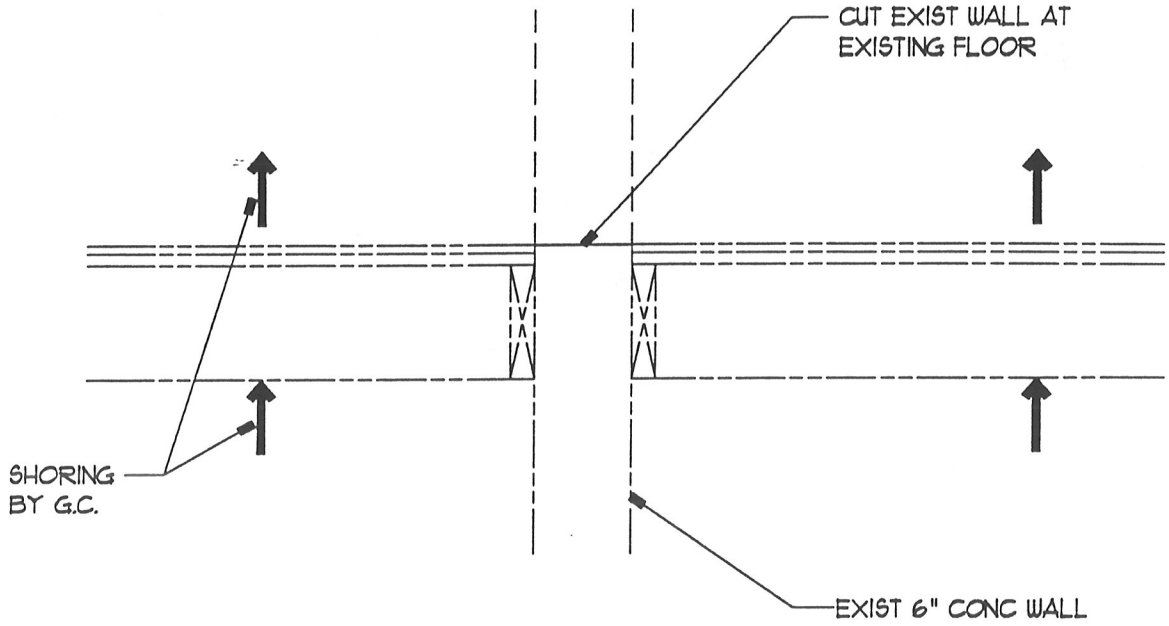
PORT TOWNSEND HIGH SCHOOL
PHASE 3 MODERNIZATION

Port Townsend, Washington

PROJECT #: 95050.01
DATE: 15 APR 96
BY:
REVISIONS:

Drawing No.
91.06

D05



ARCHITECTS
REED
REINVALD
JOHNSON
WILLOWS

201 North "I" Street
Tacoma, Washington 98403
Phone: (206) 572-3993
Fax: (206) 572-1443

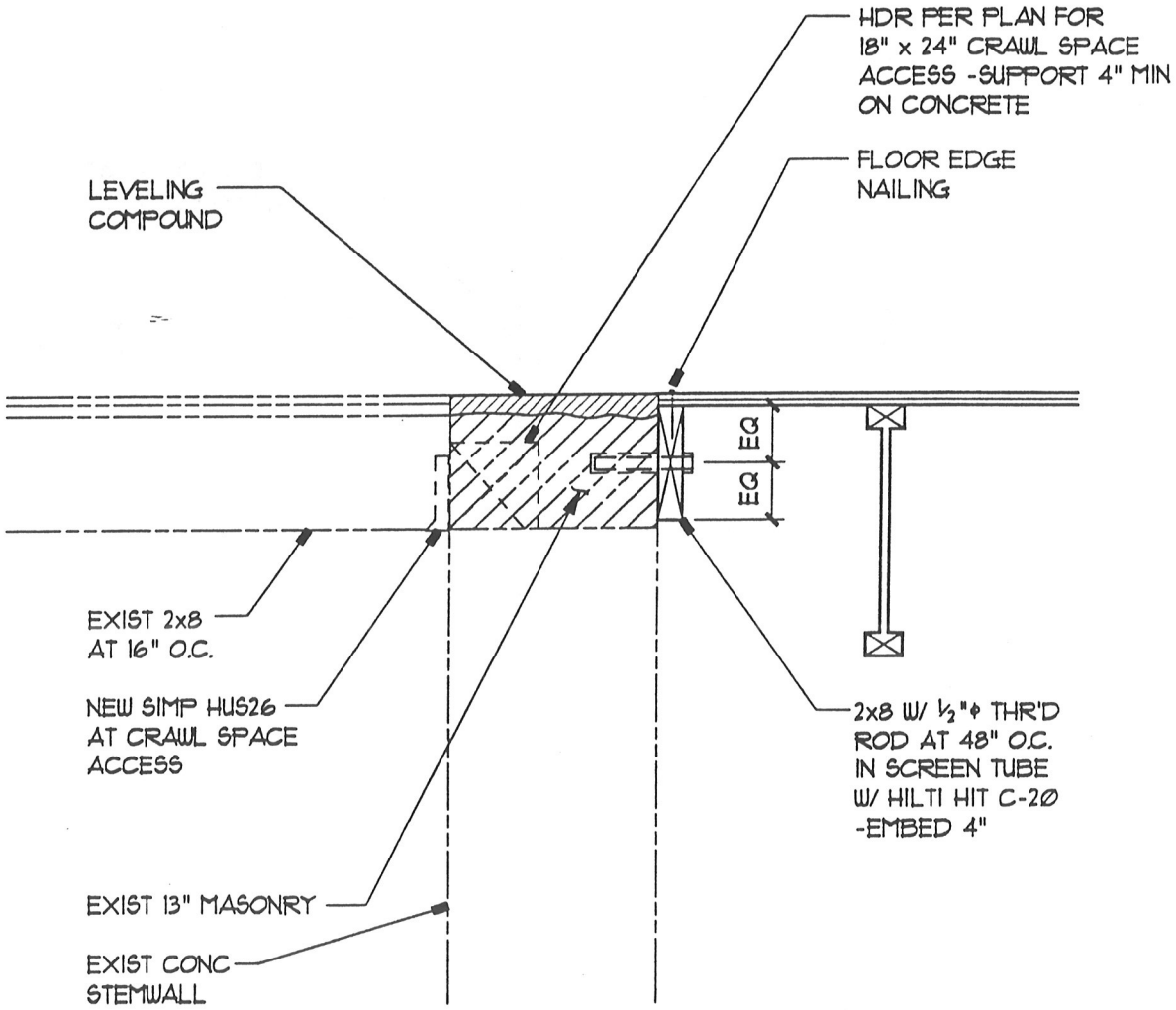
PORT TOWNSEND HIGH SCHOOL
PHASE 3 MODERNIZATION

Port Townsend, Washington

PROJECT #: 95050.01
DATE: 15 APR 96
BY:
REVISIONS:

Drawing No.
91.07

D05



ARCHITECTS
REED
REINVALD
JOHNSON
WILLOWS

201 North "I" Street
Tacoma, Washington 98403
Phone: (206) 572-3993
Fax: (206) 572-1445

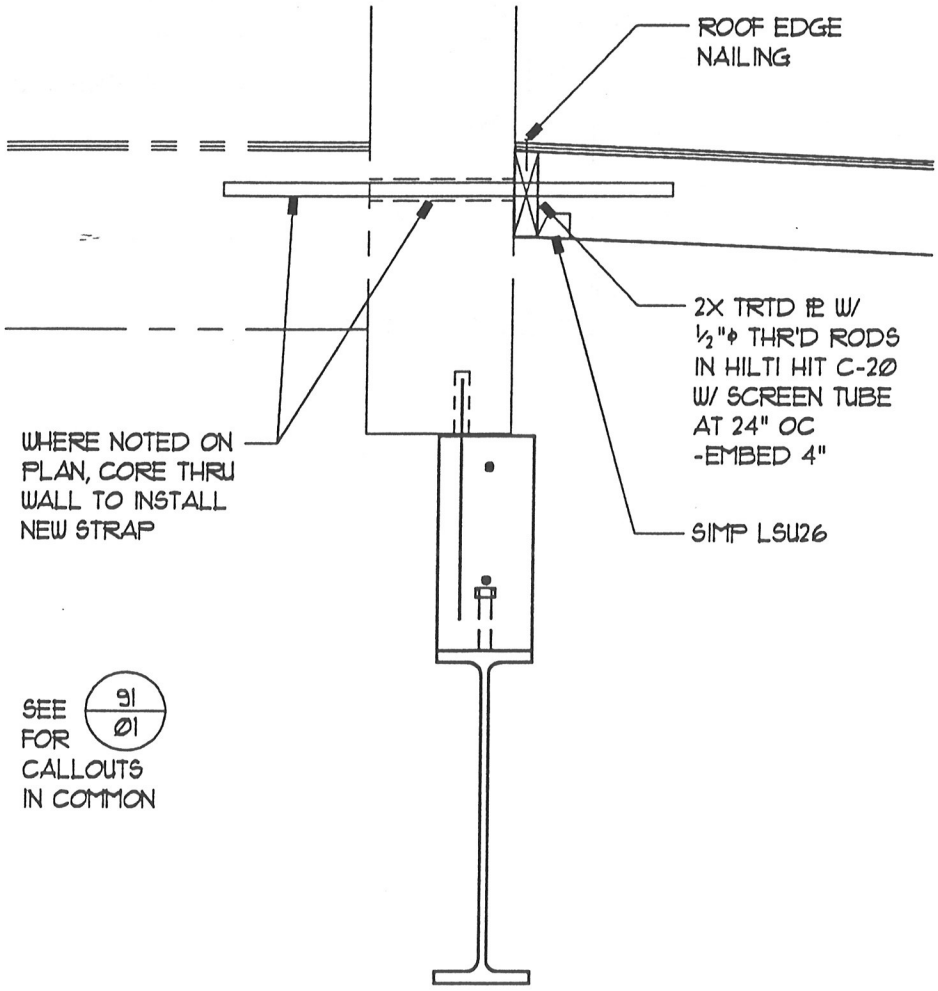
PORT TOWNSEND HIGH SCHOOL
PHASE 3 MODERNIZATION

Port Townsend, Washington

PROJECT #: 95050.01
DATE: 15 APR 96
BY:
REVISIONS:

Drawing No.
91.08

DØ8



ARCHITECTS
REED
REINVALD
JOHNSON
WILLOWS

201 North "I" Street
Tacoma, Washington 98403
Phone: (206) 572-3993
Fax: (206) 572-1445

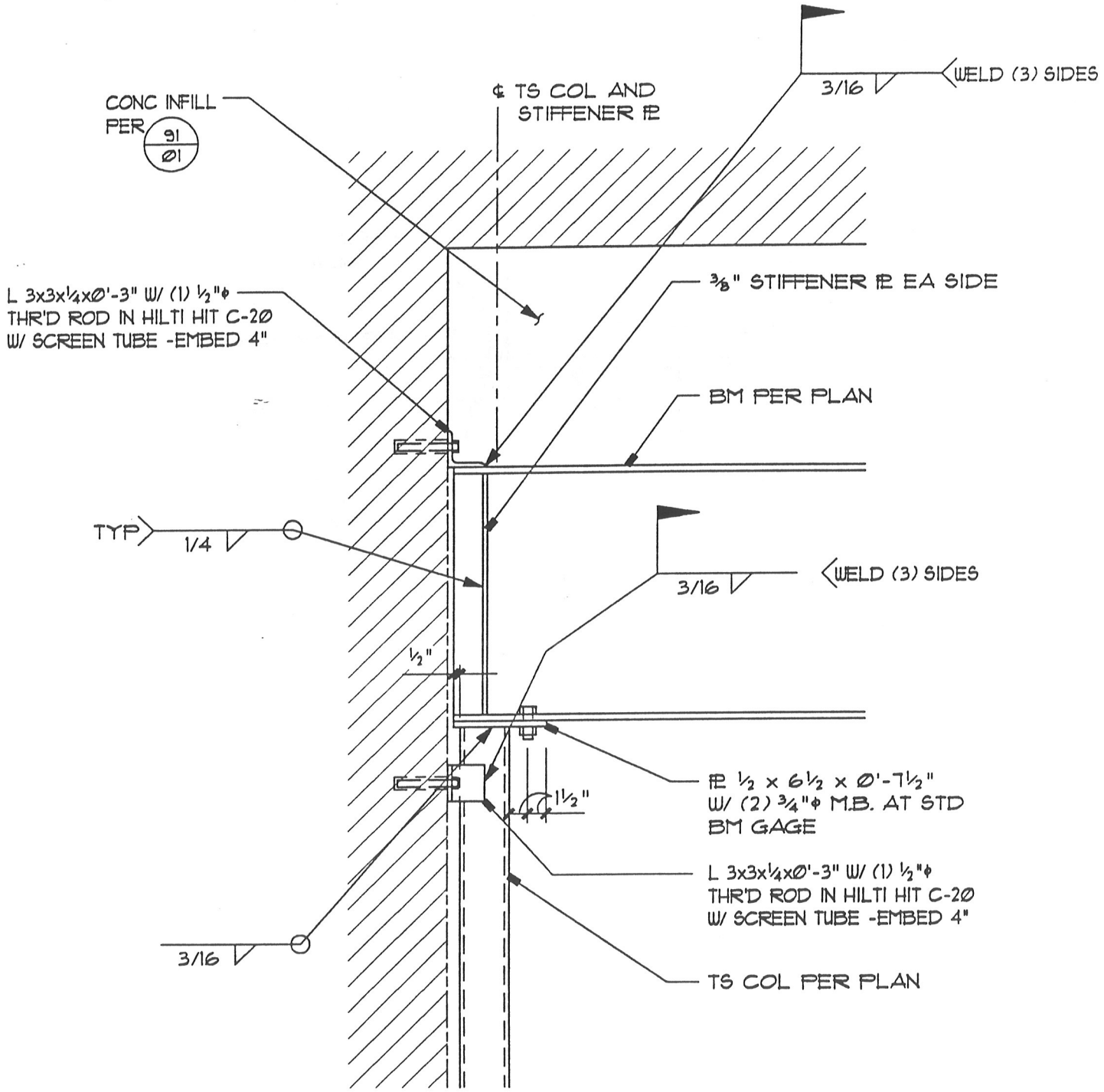
PORT TOWNSEND HIGH SCHOOL
PHASE 3 MODERNIZATION

Port Townsend, Washington

PROJECT #: 95050.01
DATE: 15 APR 96
BY:
REVISIONS:

Drawing No.
91Ø9

D08



ARCHITECTS
REED
REINVALD
JOHNSON
WILLOWS

201 North "I" Street
Tacoma, Washington 98403
Phone: (206) 572-3993
Fax: (206) 572-1445

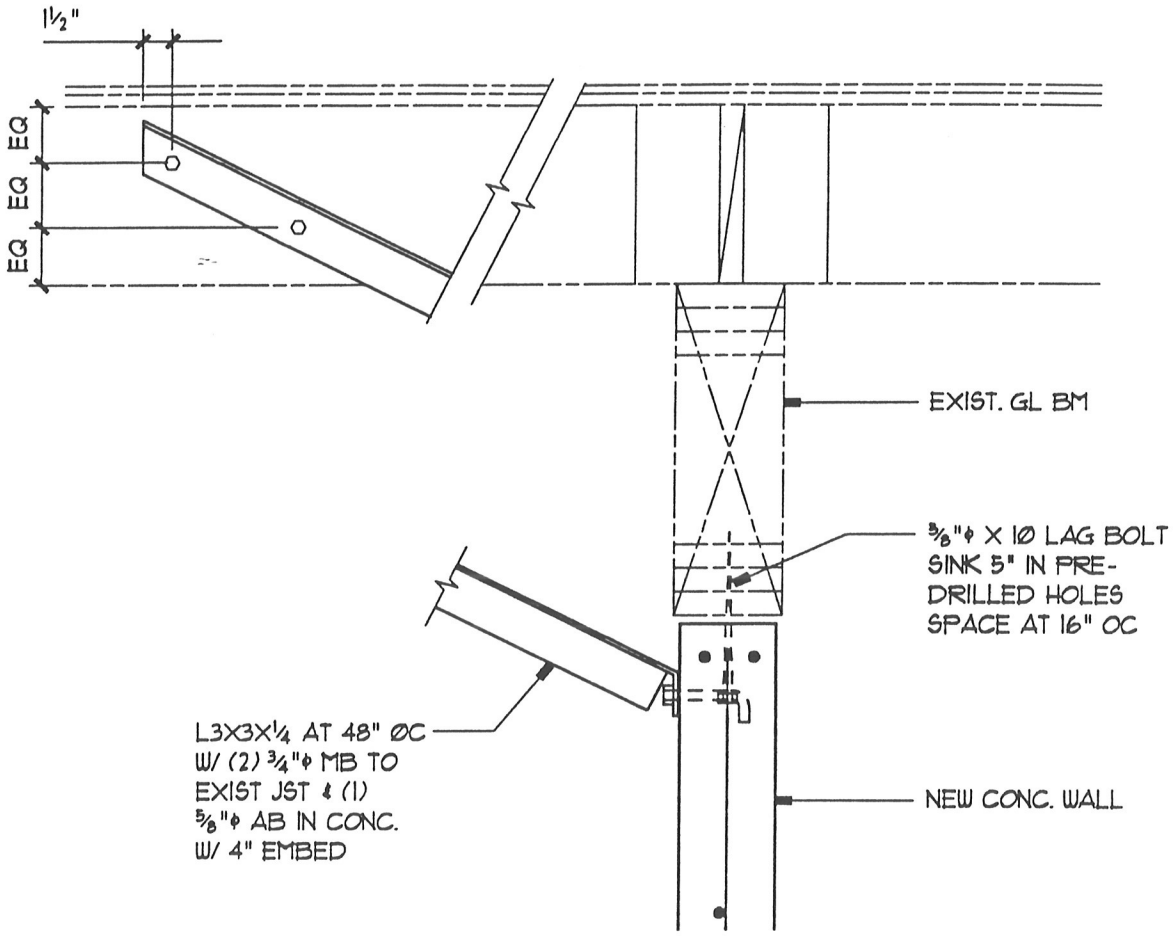
PORT TOWNSEND HIGH SCHOOL
PHASE 3 MODERNIZATION

Port Townsend, Washington

PROJECT #: 95050.01
DATE: 15 APR 96
BY:
REVISIONS:

Drawing No.
91.10

D08



ARCHITECTS
REED
REINVALD
JOHNSON
WILLOWS

201 North "I" Street
Tacoma, Washington 98403
Phone: (206) 572-3893
Fax: (206) 572-1445

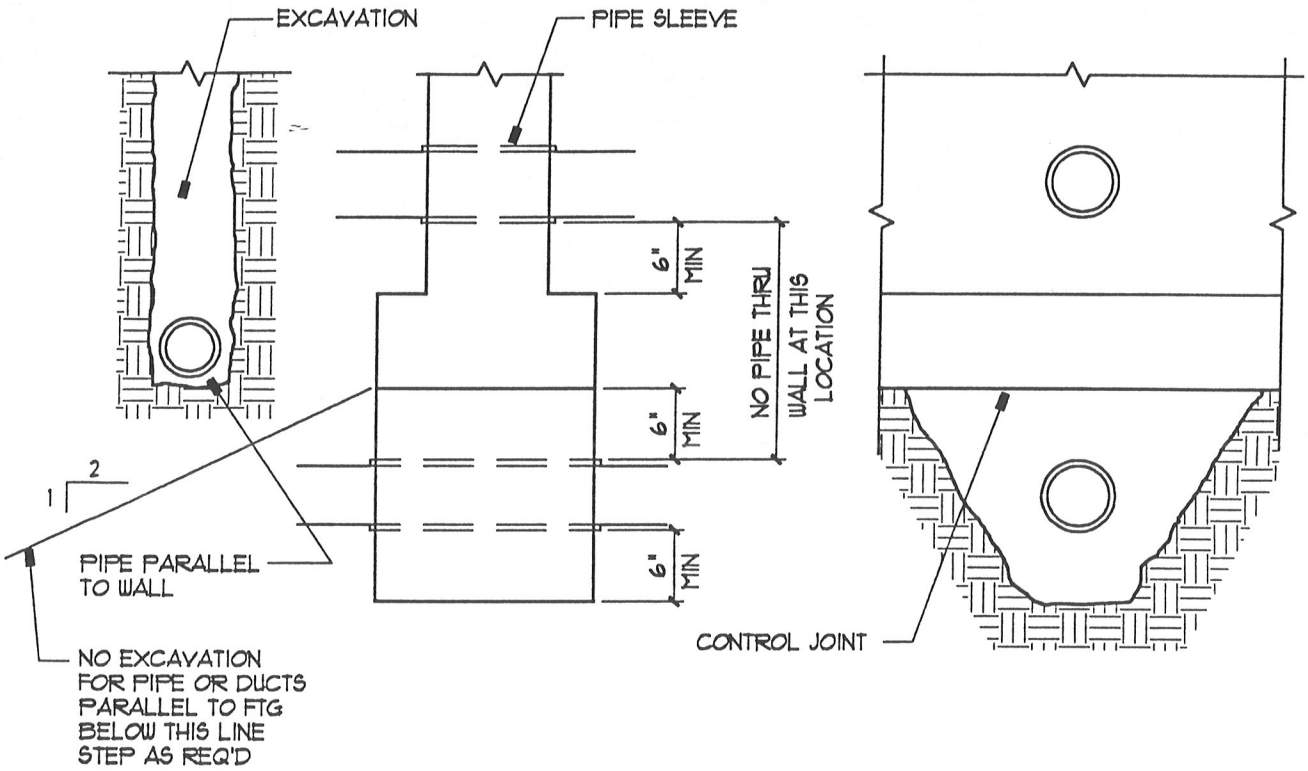
PORT TOWNSEND HIGH SCHOOL
PHASE 3 MODERNIZATION

Port Townsend, Washington

PROJECT #: 95050.01
DATE: 15 APR 96
BY:
REVISIONS:

Drawing No.
91.11

D06



TYP DETAIL OF PIPE AT CONCRETE FTG

NO SCALE

ARCHITECTS
REED
REINVALD
JOHNSON
WILLOWS

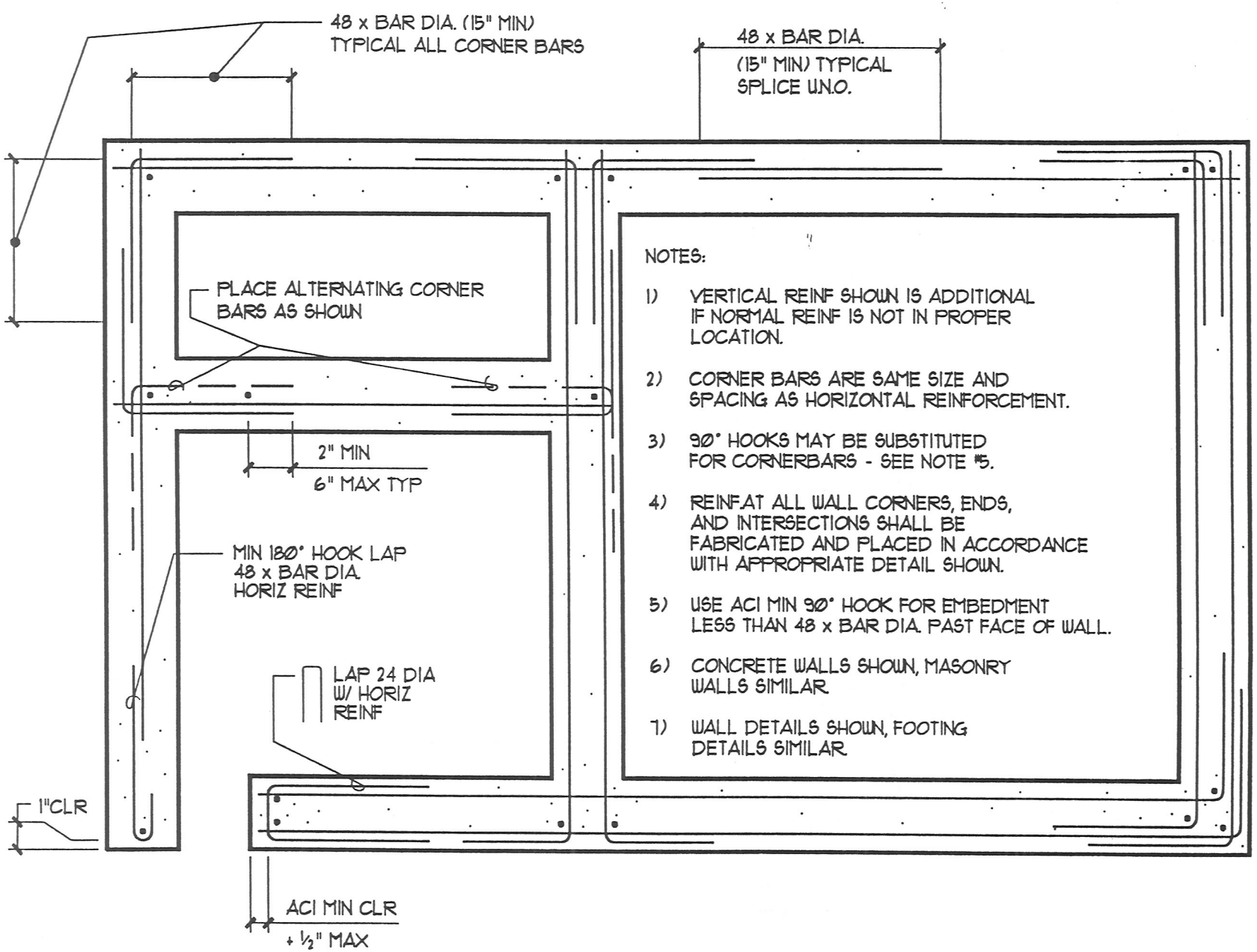
201 North "I" Street
Tacoma, Washington 98403
Phone: (206) 572-3993
Fax: (206) 572-1445

PORT TOWNSEND HIGH SCHOOL
PHASE 3 MODERNIZATION
Port Townsend, Washington

PROJECT #: 9505.01
DATE: 15 APR 96
BY:
REVISIONS:

Drawing No.
92.01

D06



NOTES:

1) VERTICAL REINF SHOWN IS ADDITIONAL IF NORMAL REINF IS NOT IN PROPER LOCATION.

2) CORNER BARS ARE SAME SIZE AND SPACING AS HORIZONTAL REINFORCEMENT.

3) 90° HOOKS MAY BE SUBSTITUTED FOR CORNERBARS - SEE NOTE #5.

4) REINF.AT ALL WALL CORNERS, ENDS, AND INTERSECTIONS SHALL BE FABRICATED AND PLACED IN ACCORDANCE WITH APPROPRIATE DETAIL SHOWN.

5) USE ACI MIN 90° HOOK FOR EMBEDMENT LESS THAN 48 x BAR DIA. PAST FACE OF WALL.

6) CONCRETE WALLS SHOWN, MASONRY WALLS SIMILAR.

7) WALL DETAILS SHOWN, FOOTING DETAILS SIMILAR.

TYPICAL REINFORCEMENT PLACING DETAIL

NO SCALE

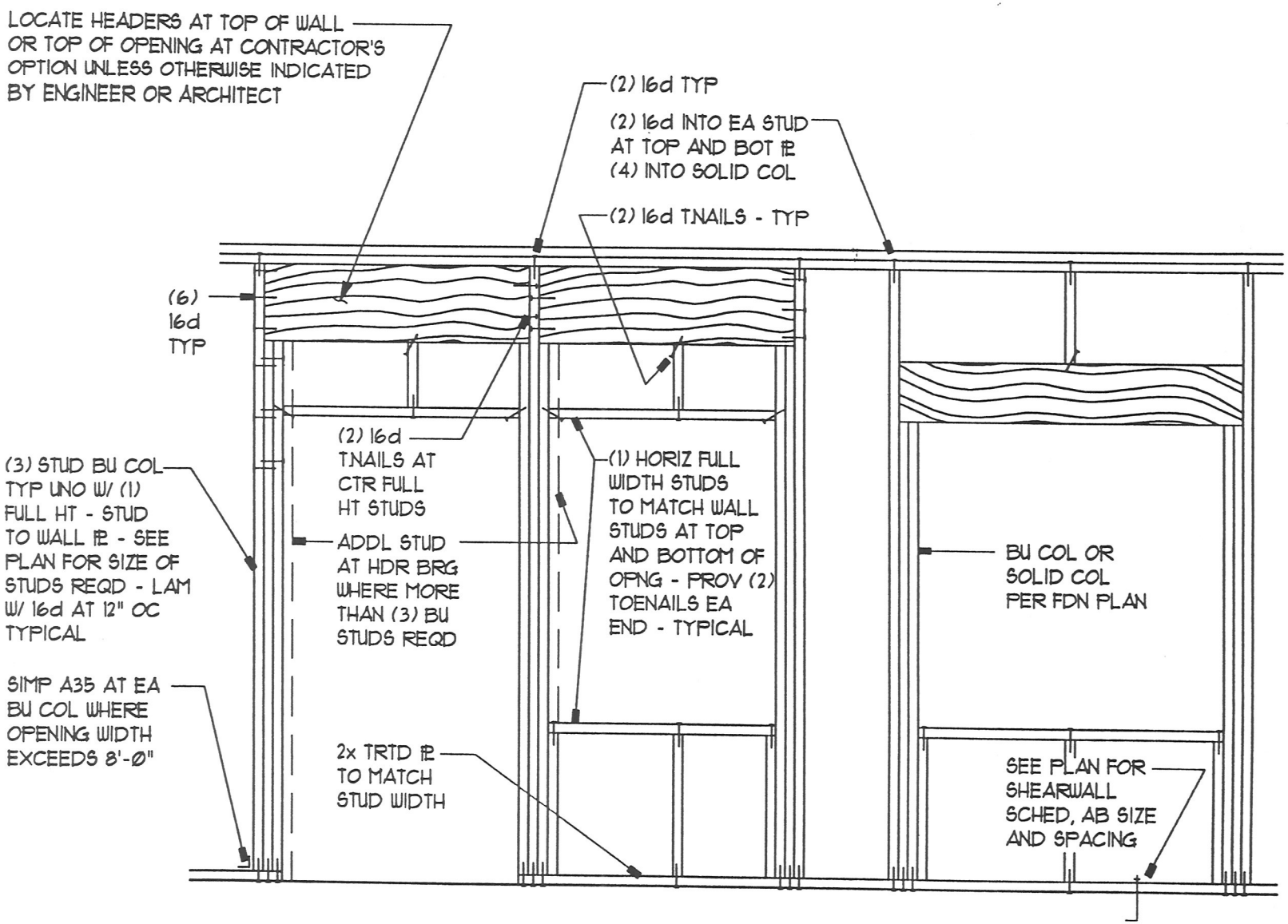
ARCHITECTS
REED
REINVALD
JOHNSON
WILLOWS
201 North "T" Street
Tacoma, Washington 98403
Phone: (206) 572-7133
Fax: (206) 572-7143

PORT TOWNSEND HIGH SCHOOL
PHASE 3 MODERNIZATION
Port Townsend, Washington

PROJECT #: 9509.01
DATE: 15 APR 96
BY:
REVISIONS:

Drawing No. 92.02

D06



TYP. BEARING WALL ELEV.

NO SCALE

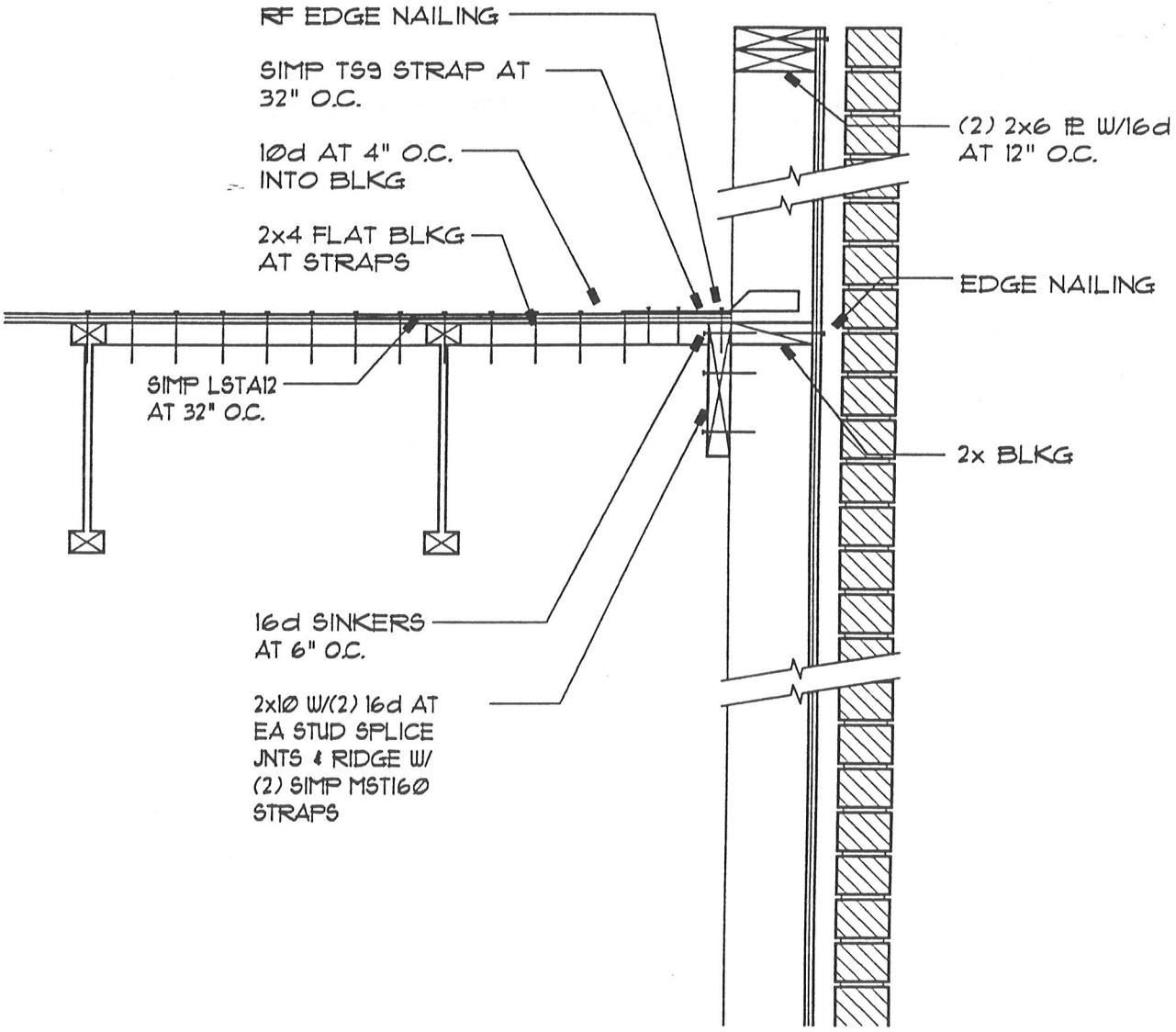
ARCHITECTS
REED REINVALD JOHNSON WILLOWS
201 North "I" Street
Tacoma, Washington 98403
Phone: (206) 572-3933
Fax: (206) 572-1413

PORT TOWNSEND HIGH SCHOOL
PHASE 3 MODERNIZATION
Port Townsend, Washington

PROJECT #: 9509.01
DATE: 15 APR 96
BY:
REVISIONS:

Drawing No. 92.03

D02



ARCHITECTS
REED
REINVALD
JOHNSON
WILLOWS

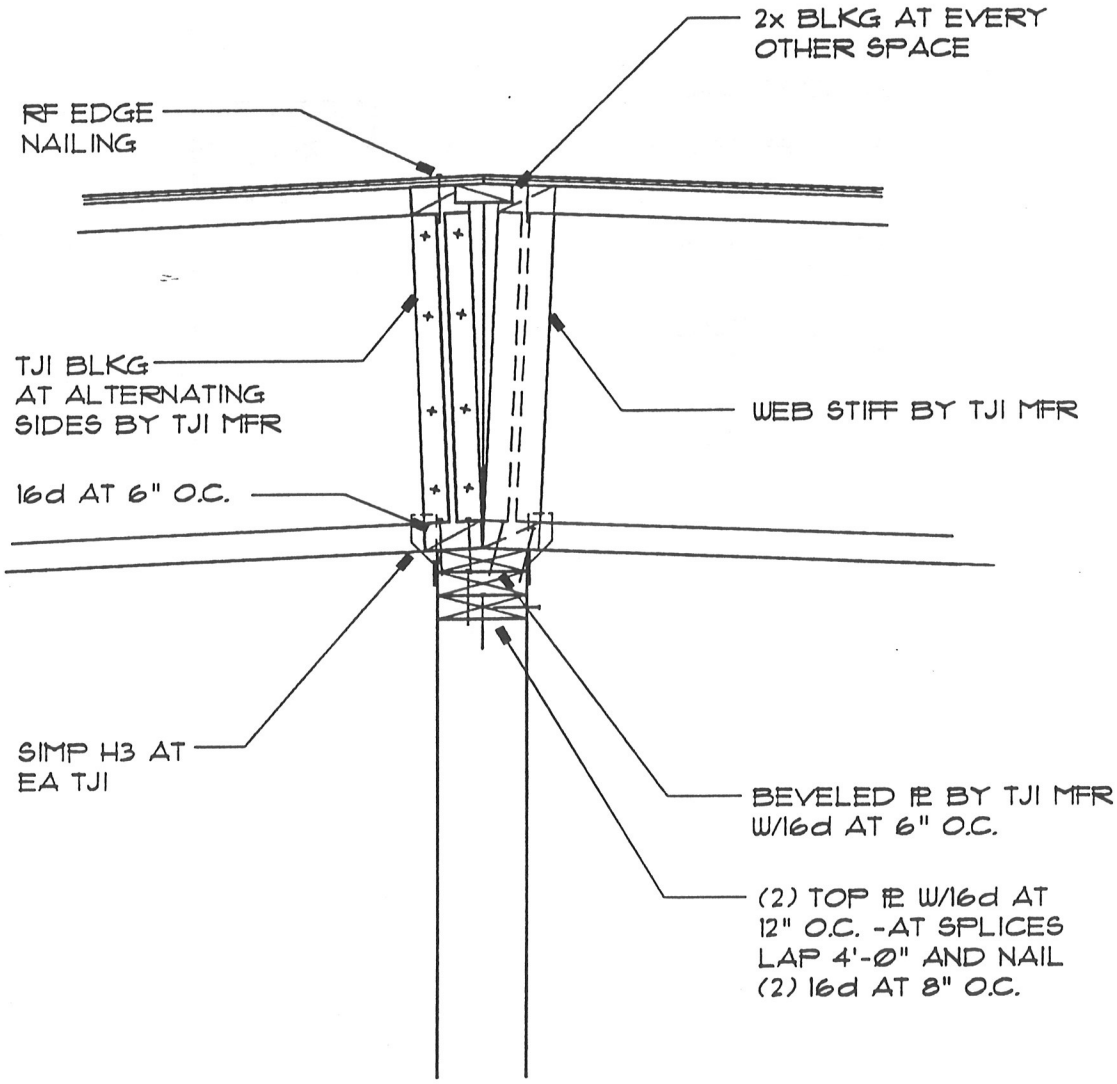
201 North "I" Street
Tacoma, Washington 98403
Phone: (206) 572-3393
Fax: (206) 572-1445

PORT TOWNSEND HIGH SCHOOL
PHASE 3 MODERNIZATION
Port Townsend, Washington

PROJECT #: 95050.01
DATE: 15 APR 96
BY:
REVISIONS:

Drawing No.
93.01

D02



ARCHITECTS
REED
REINVALD
JOHNSON
WILLOWS

201 North "I" Street
Tacoma, Washington 98403
Phone: (206) 572-3993
Fax: (206) 572-1445

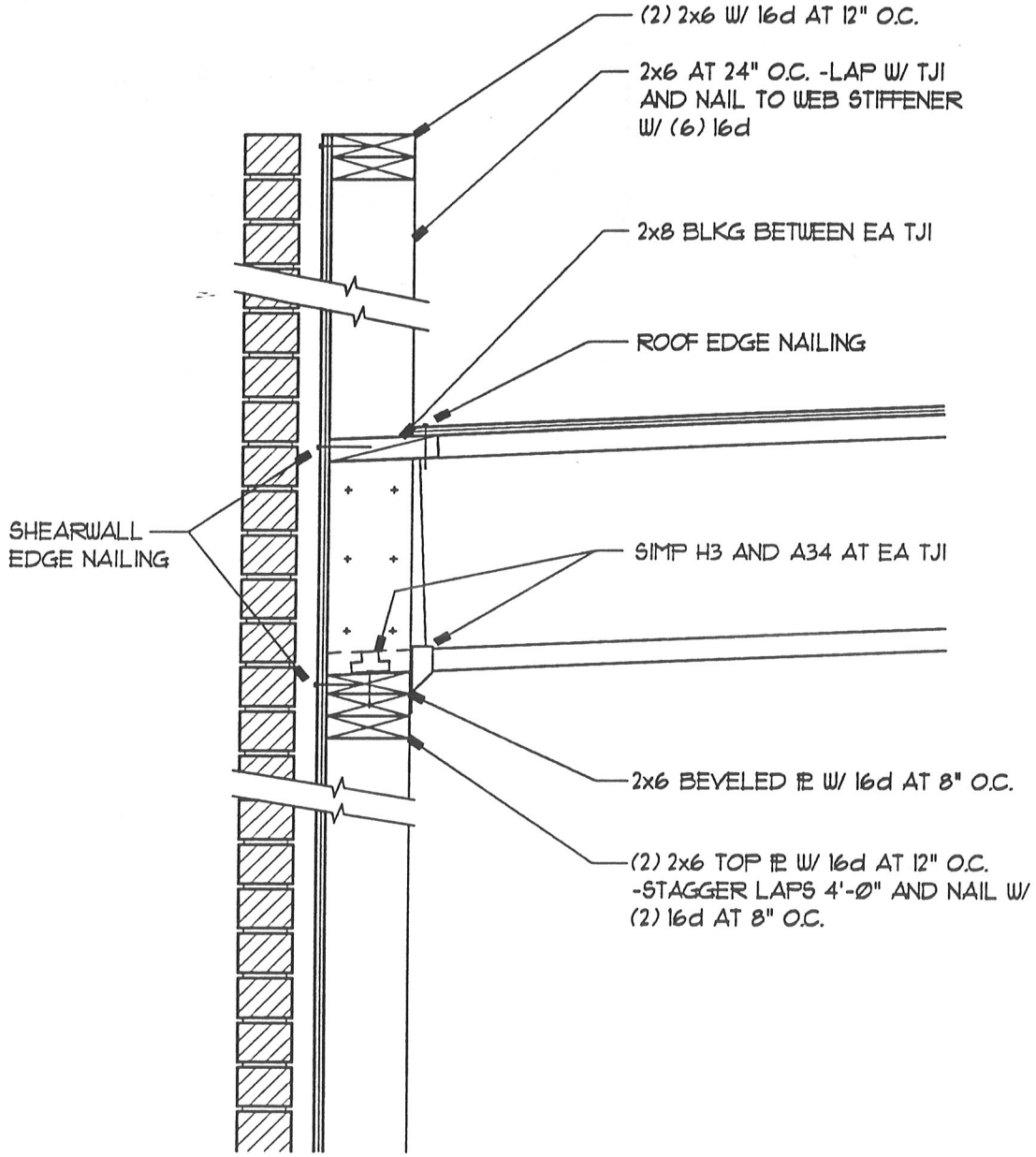
PORT TOWNSEND HIGH SCHOOL
PHASE 3 MODERNIZATION

Port Townsend, Washington

PROJECT #: 95050.01
DATE: 15 APR 96
BY:
REVISIONS:

Drawing No.
93.02

D02



ARCHITECTS
REED
REINVALD
JOHNSON
WILLOWS

201 North "I" Street
Tacoma, Washington 98403
Phone: (206) 572-3993
Fax: (206) 572-1445

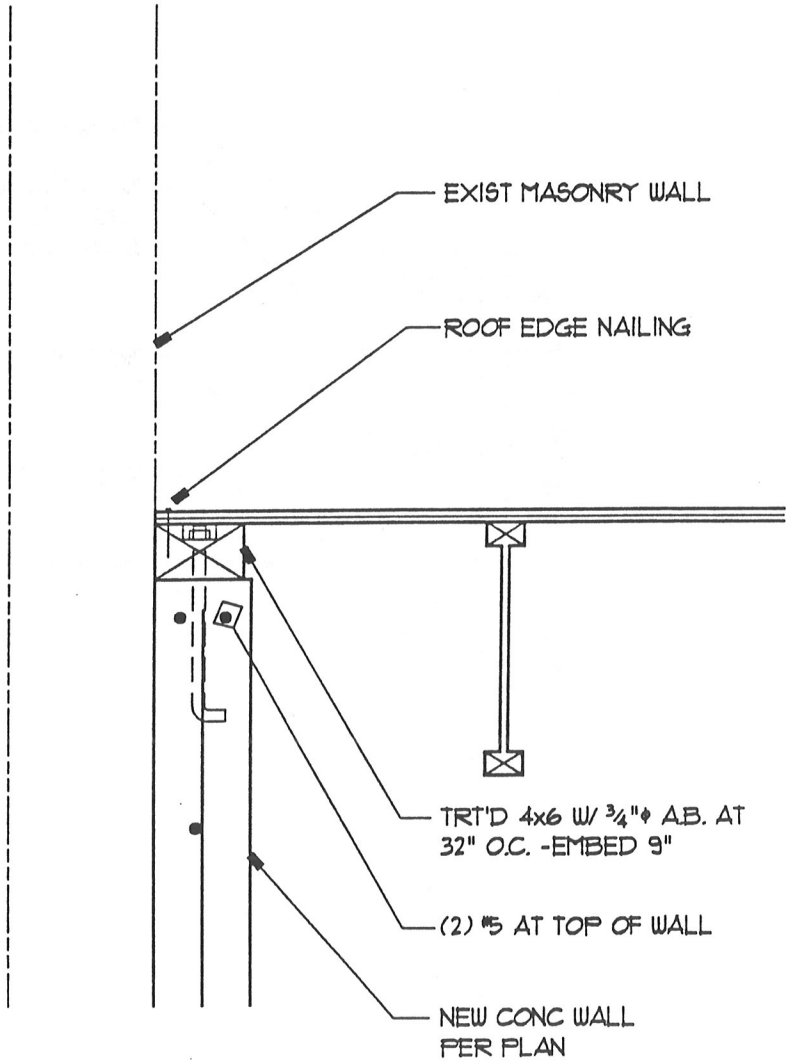
PORT TOWNSEND HIGH SCHOOL
PHASE 3 MODERNIZATION

Port Townsend, Washington

PROJECT #: 95050.01
DATE: 15 APR 96
BY:
REVISIONS:

Drawing No.
93.03

D05



ARCHITECTS
REED
REINVALD
JOHNSON
WILLOWS

201 North "I" Street
Tacoma, Washington 98403
Phone: (206) 572-3293
Fax: (206) 572-1445

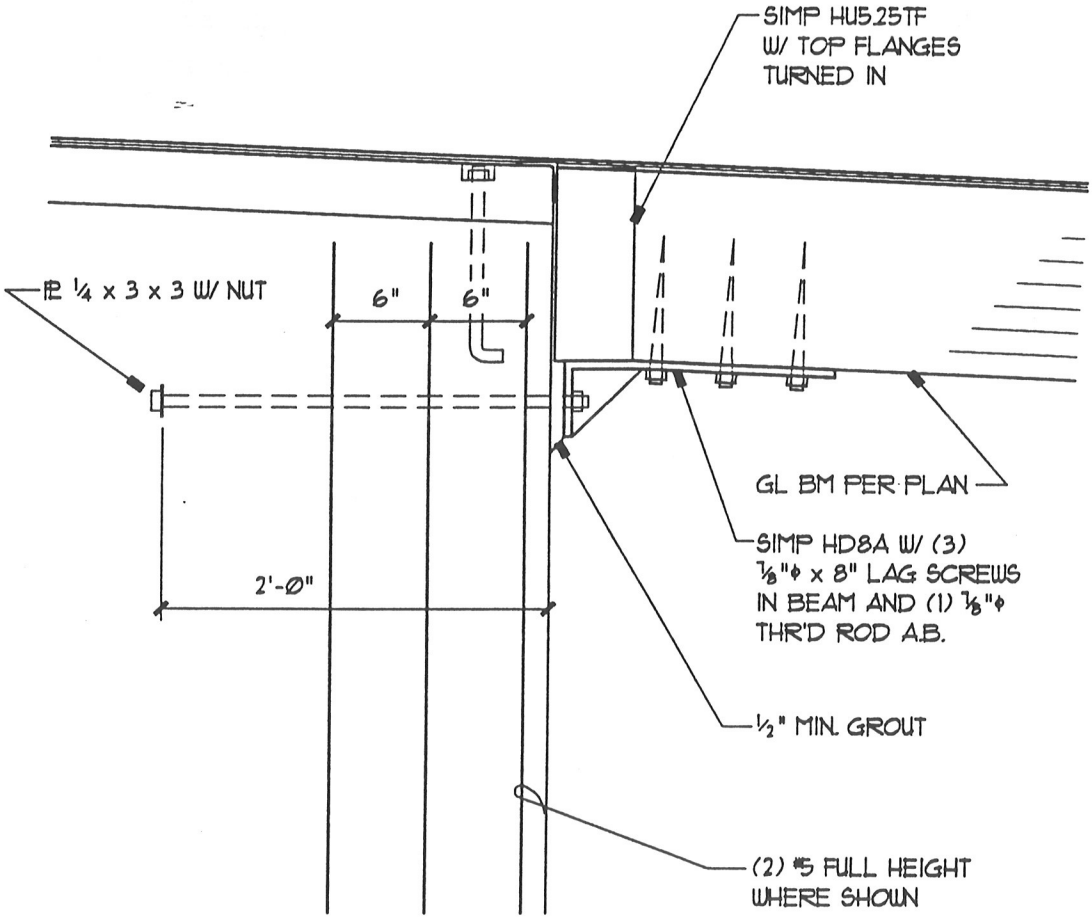
PORT TOWNSEND HIGH SCHOOL
PHASE 3 MODERNIZATION

Port Townsend, Washington

PROJECT #: 95050.01
DATE: 15 APR 96
BY:
REVISIONS:

Drawing No.
93.04

D05



ARCHITECTS
REED
REINVALD
JOHNSON
WILLOWS

201 North "I" Street
Tacoma, Washington 98403
Phone: (206) 572-3933
Fax: (206) 572-1445

PORT TOWNSEND HIGH SCHOOL
PHASE 3 MODERNIZATION

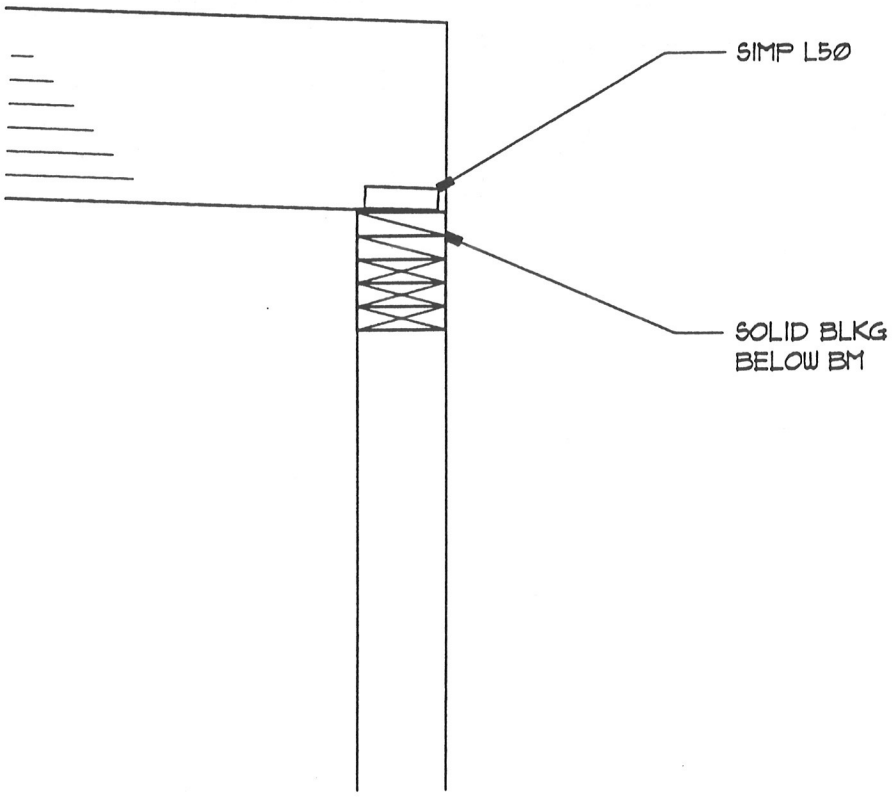
Port Townsend, Washington

PROJECT #: 93050.01
DATE: 15 APR 96
BY:
REVISIONS:

Drawing No.
93.05

D06

SEE 93/03 FOR CALLOUTS IN COMMON



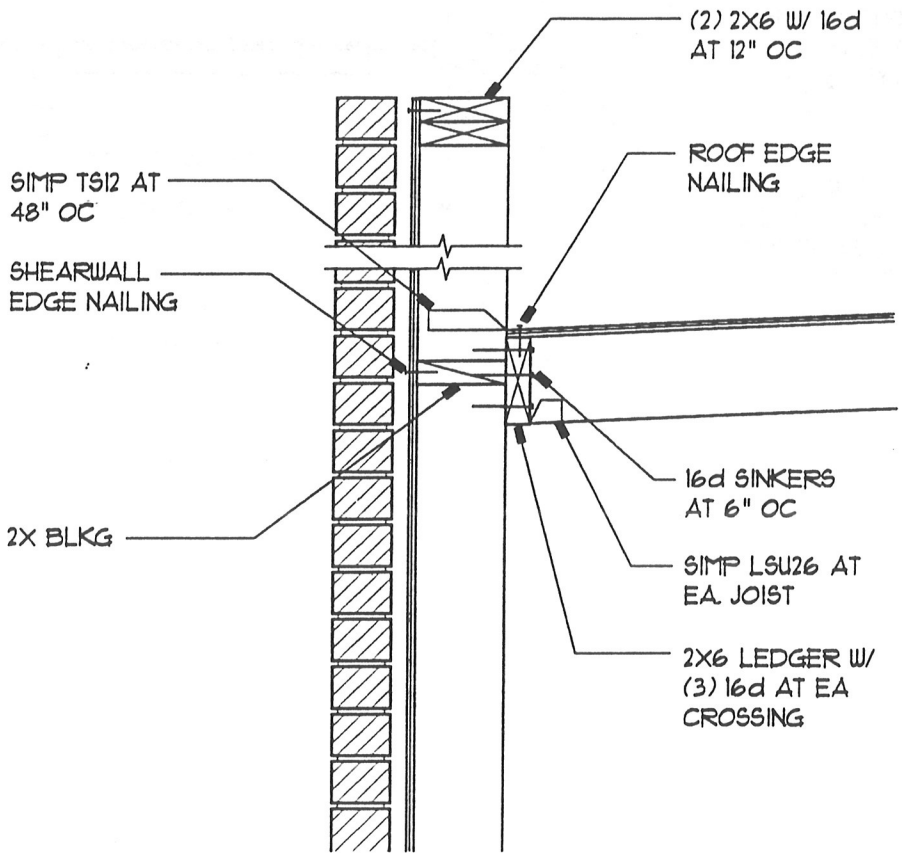
ARCHITECTS
REED REINVALD JOHNSON WILLOWS
201 North "I" Street
Tacoma, Washington 98403
Phone: (206) 572-3993
Fax: (206) 572-1445

PORT TOWNSEND HIGH SCHOOL
PHASE 3 MODERNIZATION
Port Townsend, Washington

PROJECT #: 93030.01
DATE: 15 APR 96
BY:
REVISIONS:

Drawing No. 93.06

D09



ARCHITECTS
REED
REINVALD
JOHNSON
WILLOWS

201 North "I" Street
Tacoma, Washington 98403
Phone: (206) 572-3993
Fax: (206) 572-1445

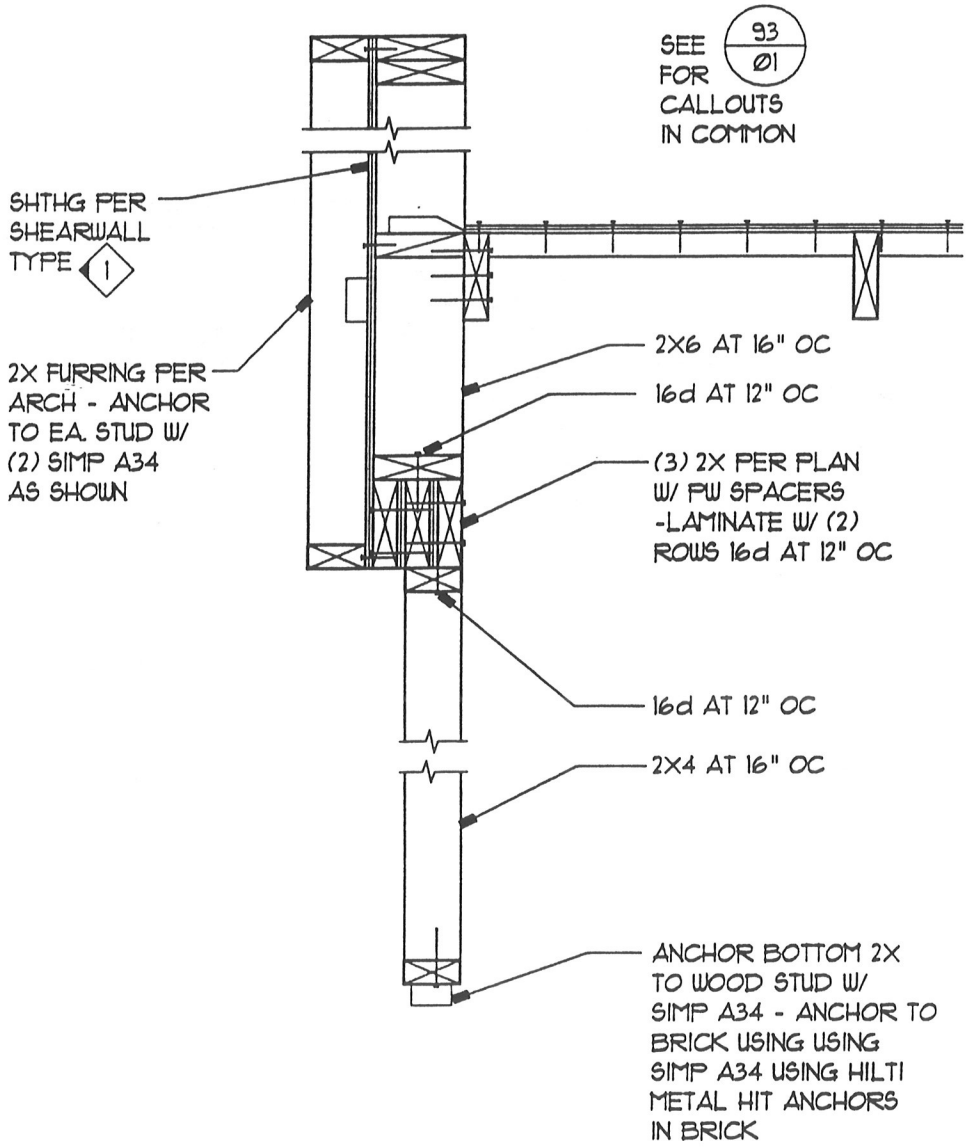
PORT TOWNSEND HIGH SCHOOL
PHASE 3 MODERNIZATION

Port Townsend, Washington

PROJECT #: 9505D.01
DATE: 15 APR 96
BY:
REVISIONS:

Drawing No.
93.07

DØ7



ARCHITECTS
REED
REINVALD
JOHNSON
WILLOWS

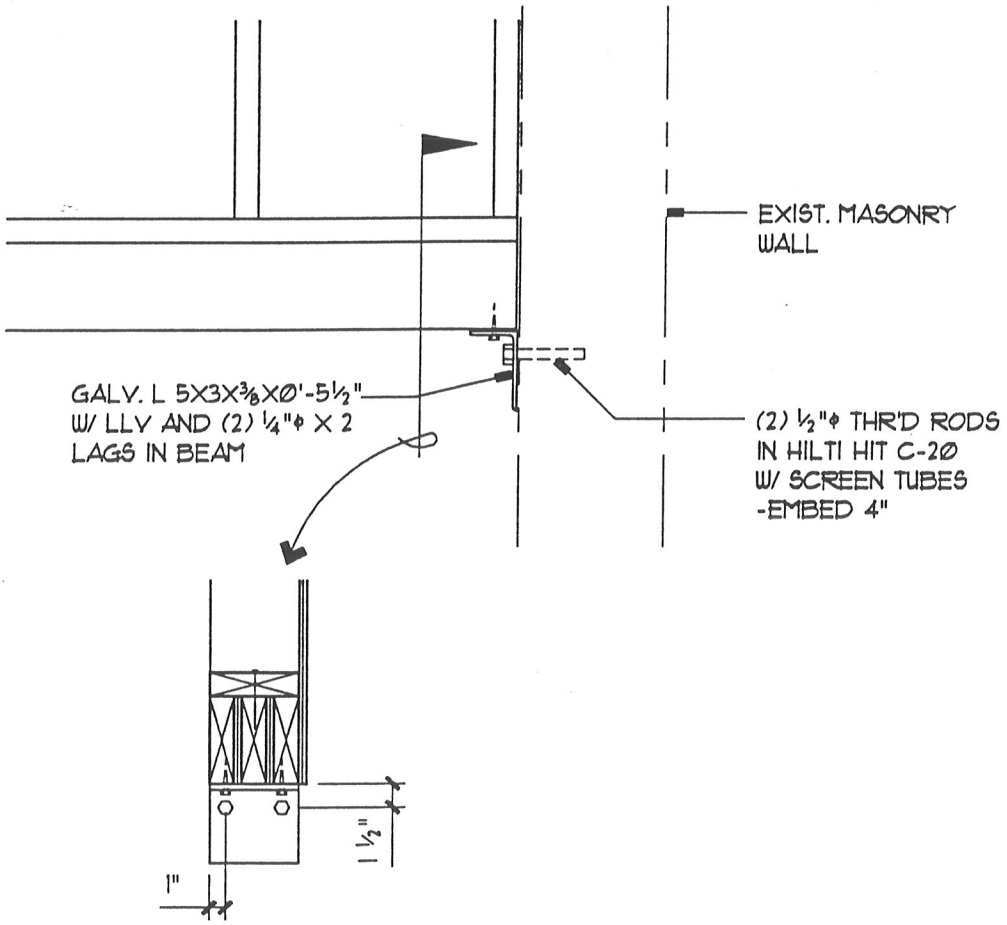
201 North "I" Street
Tacoma, Washington 98403
Phone: (206) 572-1993
Fax: (206) 572-1445

PORT TOWNSEND HIGH SCHOOL
PHASE 3 MODERNIZATION
Port Townsend, Washington

PROJECT #: 95050.01
DATE: 15 APR 96
BY:
REVISIONS:

Drawing No.
93.08

D08



ARCHITECTS
REED
REINVALD
JOHNSON
WILLOWS

201 North "I" Street
Tacoma, Washington 98403
Phone: (206) 572-3993
Fax: (206) 572-1443

PORT TOWNSEND HIGH SCHOOL
PHASE 3 MODERNIZATION

Port Townsend, Washington

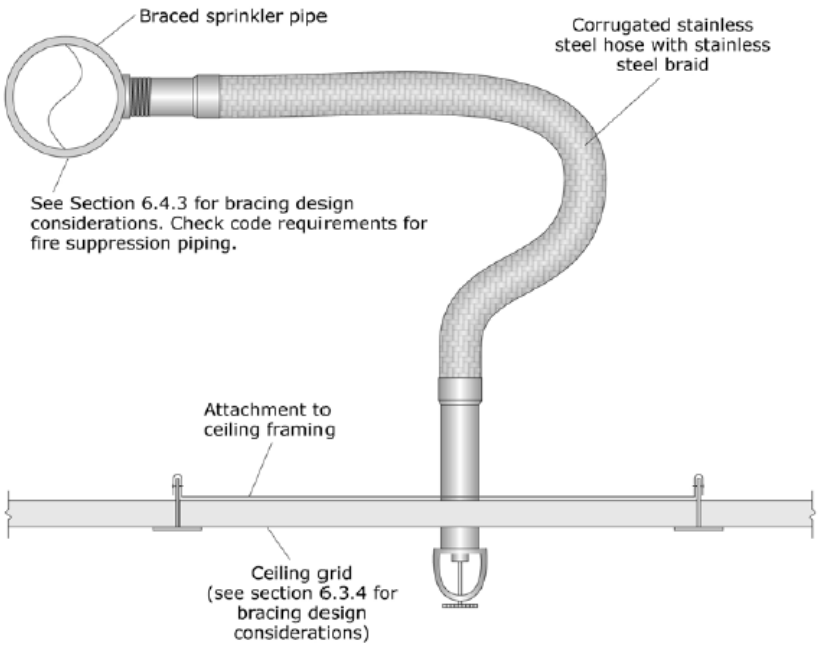
PROJECT #: 95050.01
DATE: 15 APR 96
BY:
REVISIONS:

Drawing No.
93.09

This page intentionally left blank.

Appendix F: FEMA E-74 Nonstructural Seismic Bracing Excerpts

This page intentionally left blank.



Note: for seismic design category D, E & F, the flexible sprinkler hose fitting must accommodate at least 1" of ceiling movement without use of an oversized opening. Alternatively, the sprinkler head must have a 2" oversize ring or adapter that allows 1" movement in all directions.

Figure G-1. Flexible Sprinkler Drop.

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

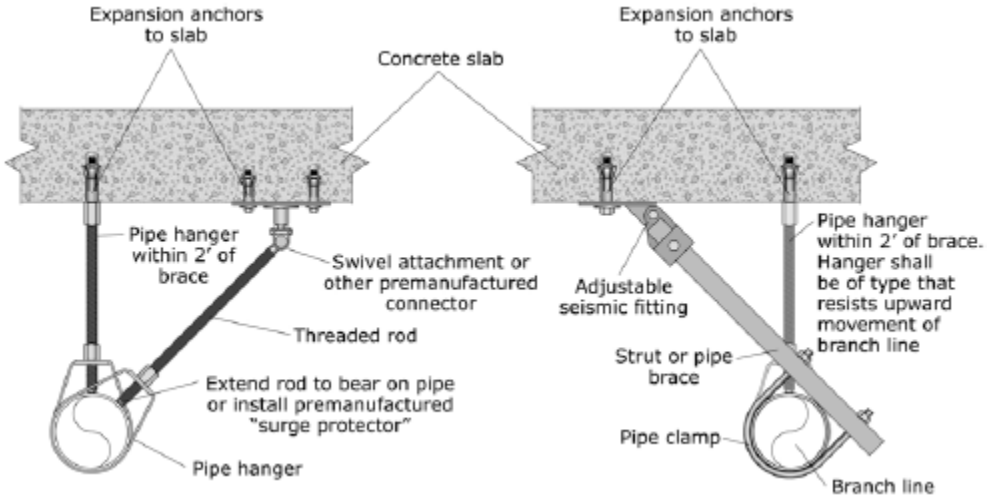


Figure G-2. End of Line Restraint.

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

Partitions

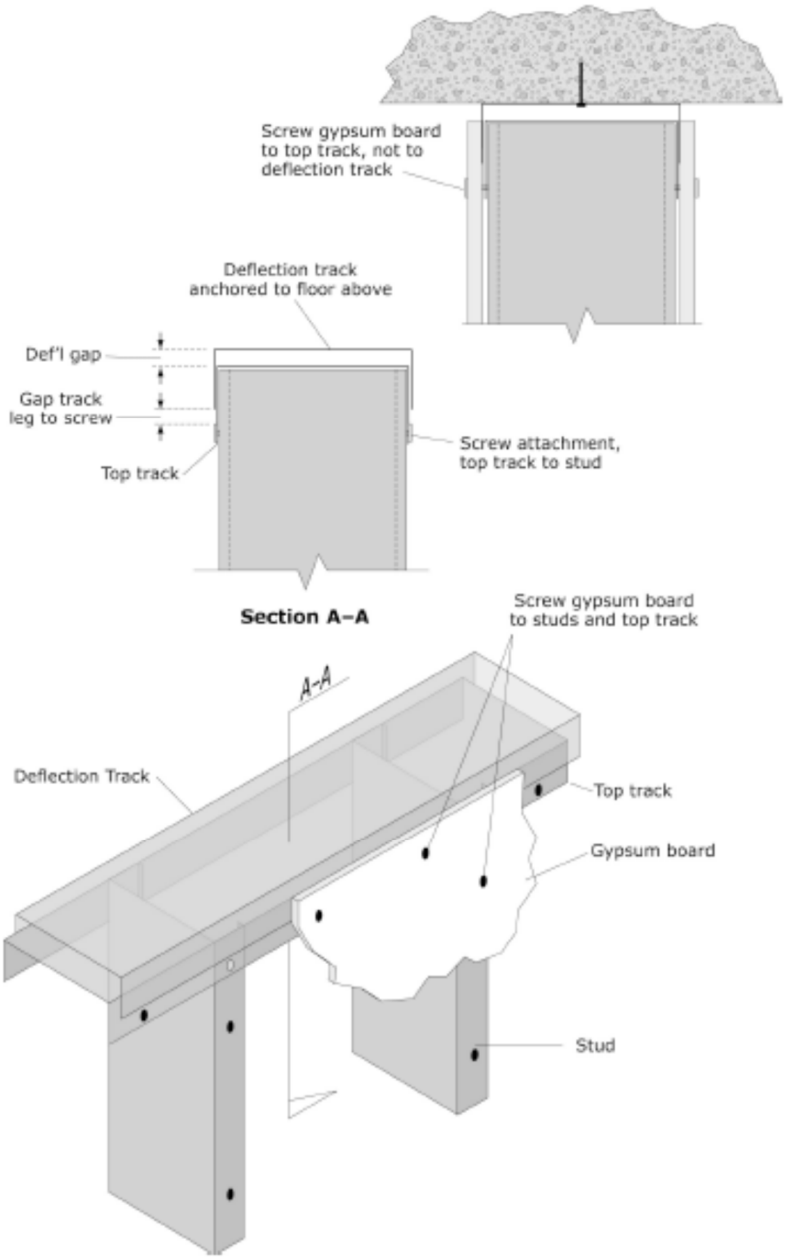


Figure G-3. Mitigation Schemes for Bracing the Tops of Metal Stud Partitions Walls.

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

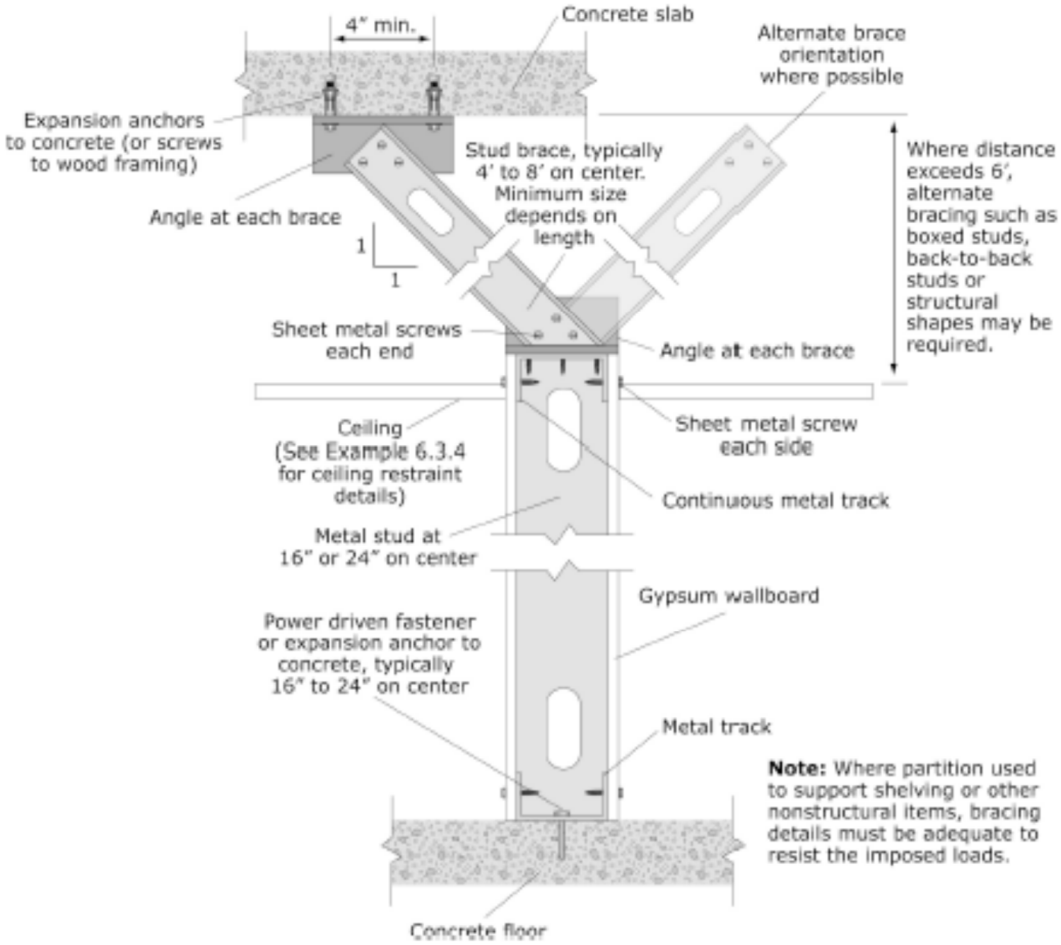
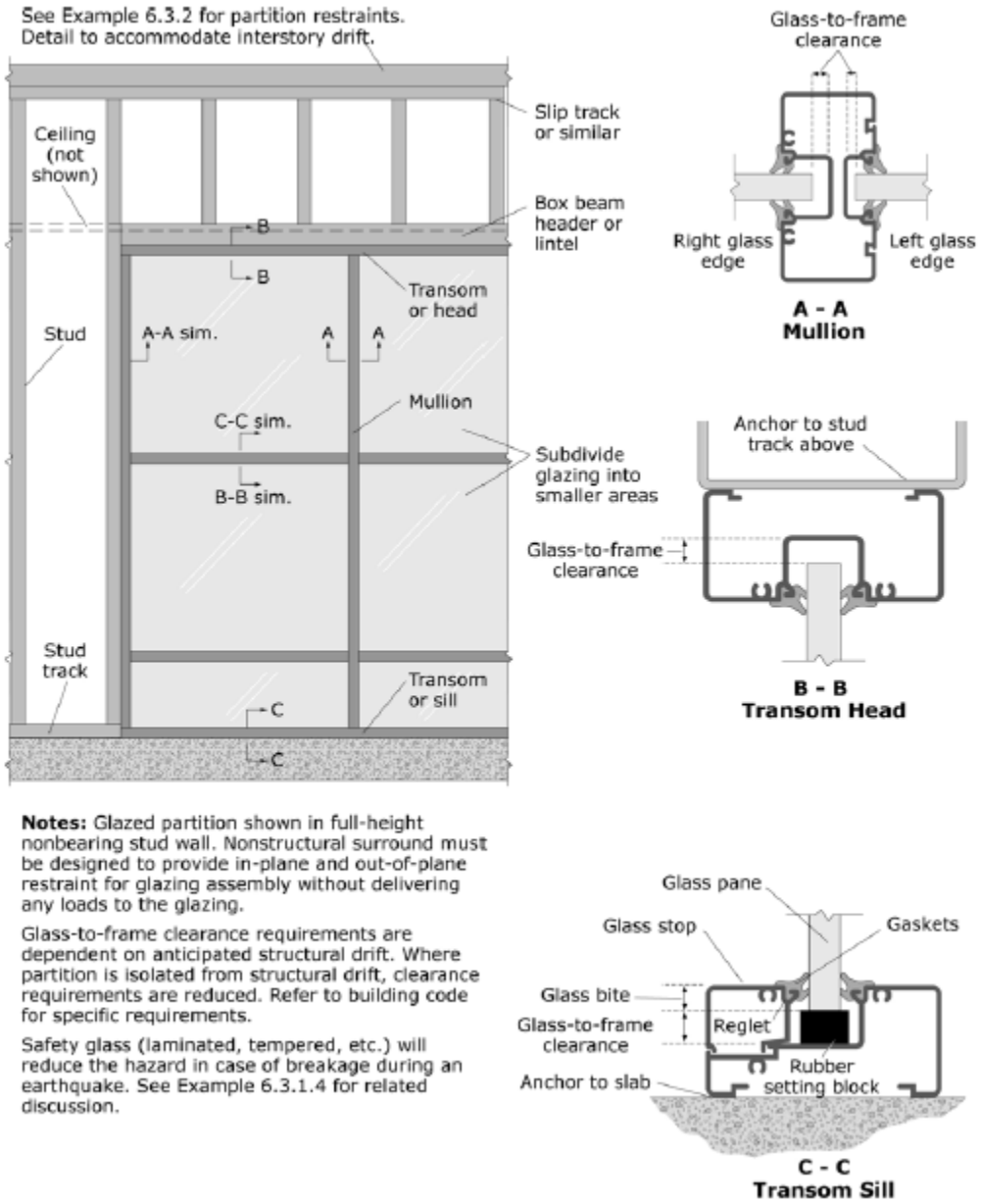


Figure G-4. Mitigation Schemes for Bracing the Tops of Metal Stud Partitions Walls.

(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)

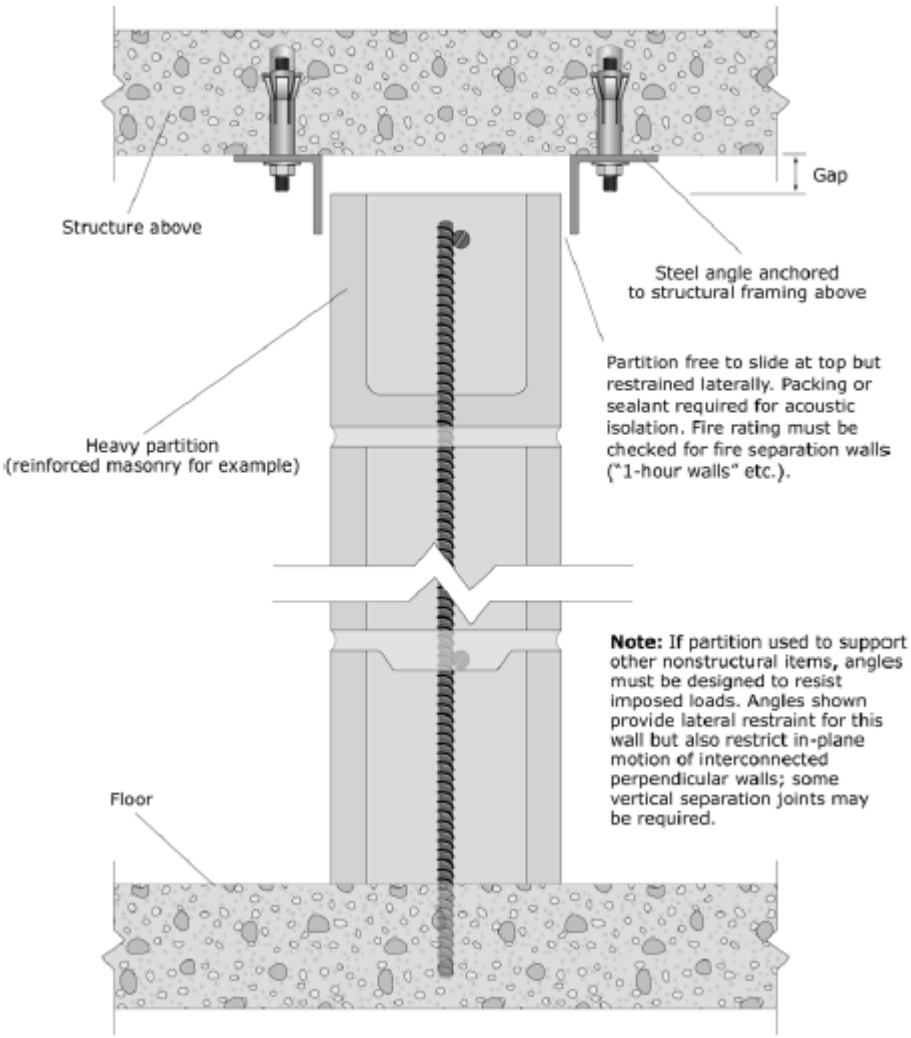


Figure G-6. Full-height Heavy Partition.

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

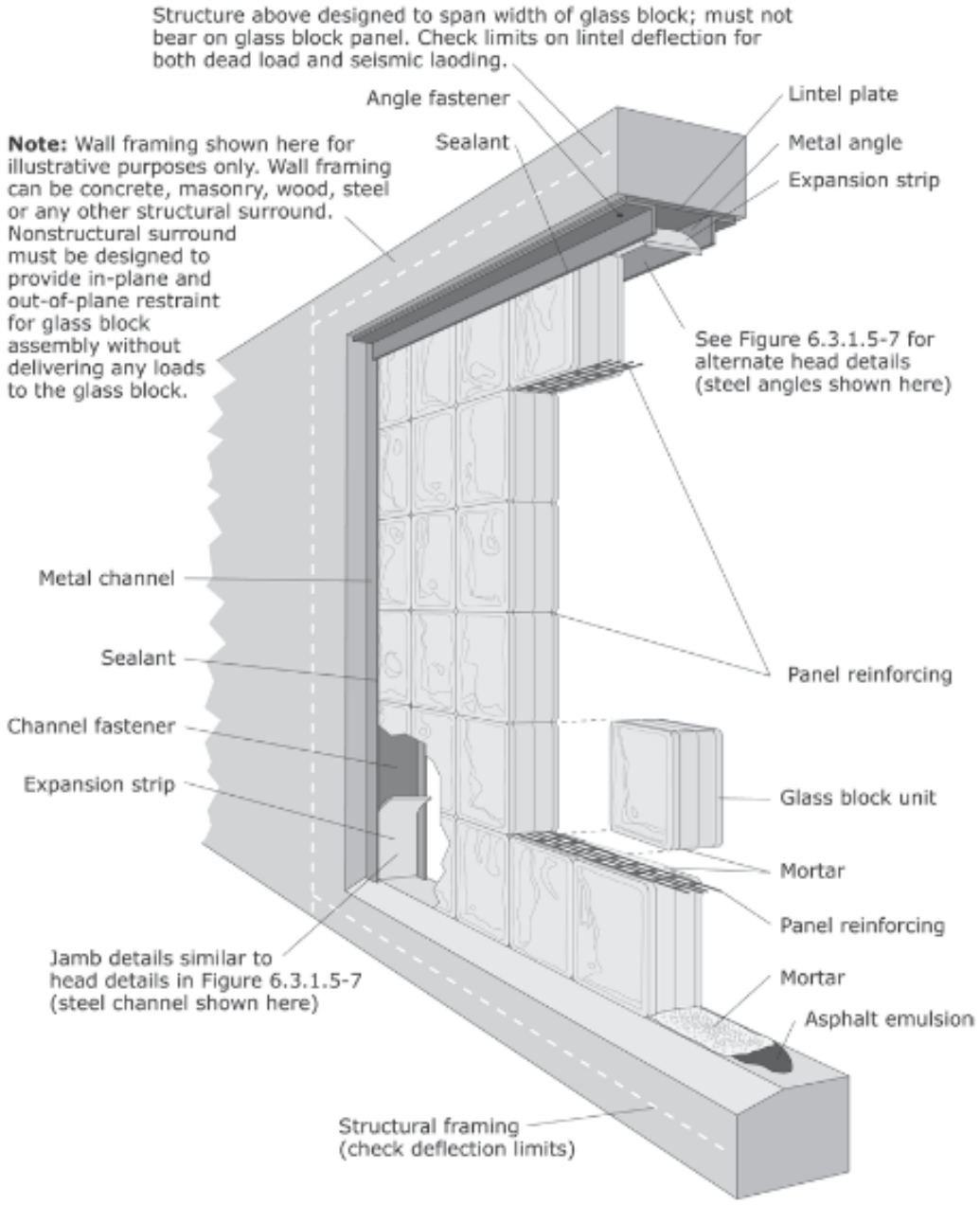


Figure G-7. Typical Glass Block Panel Details.

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

Ceilings

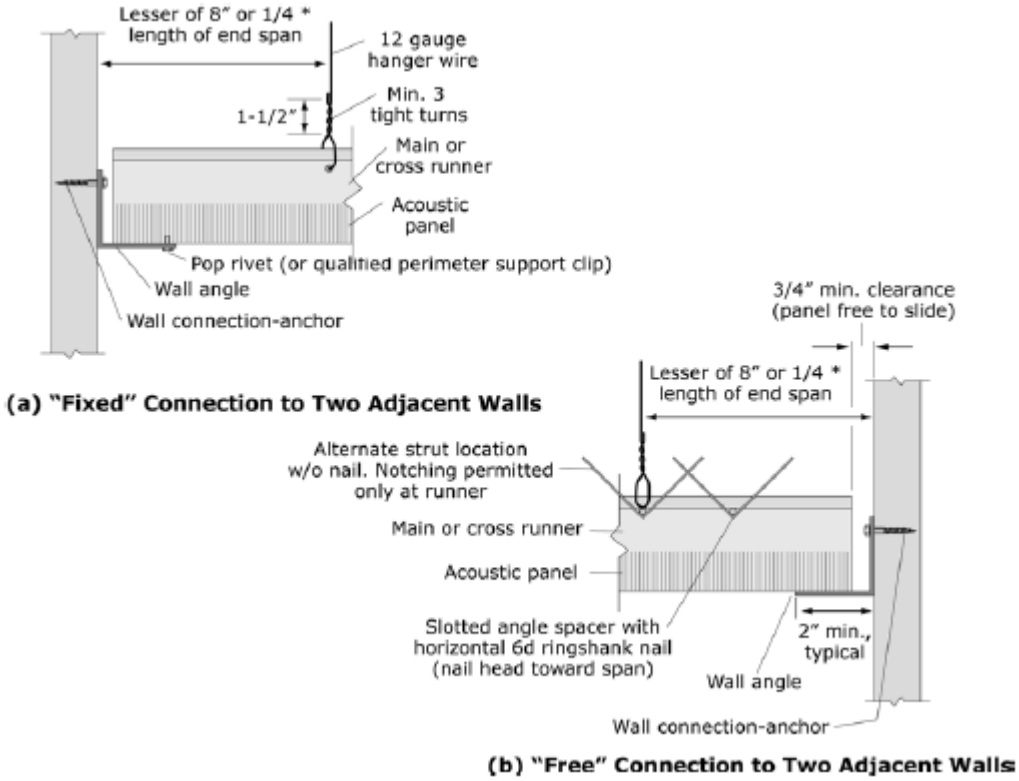
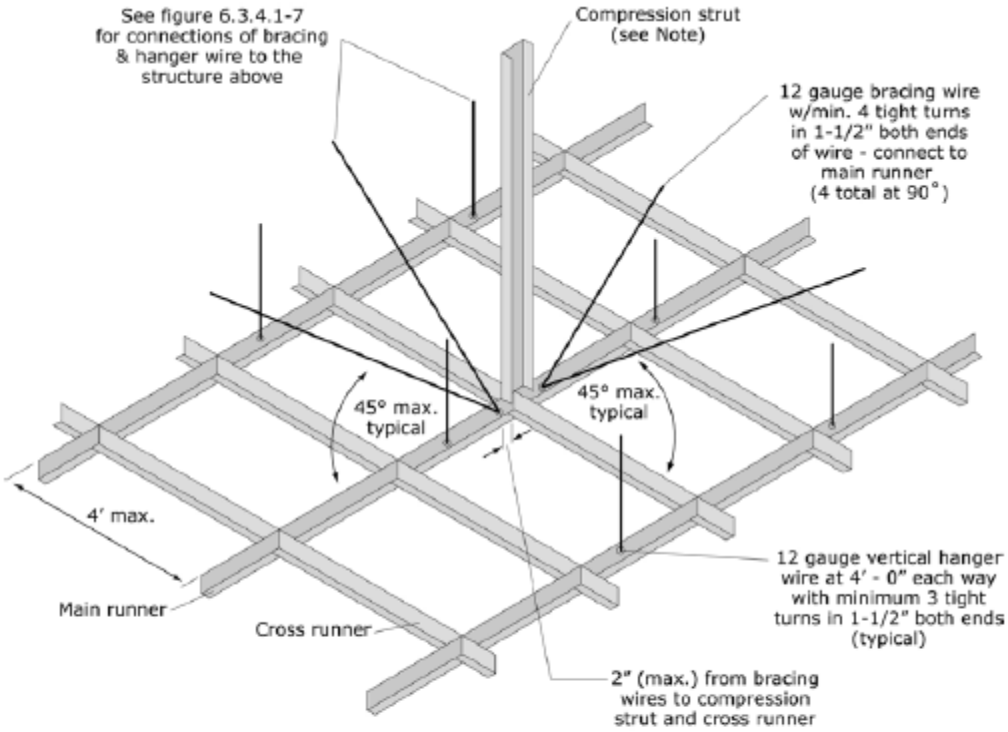


Figure G-8. Suspension System for Acoustic Lay-in Panel Ceilings – Edge Conditions.

(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)

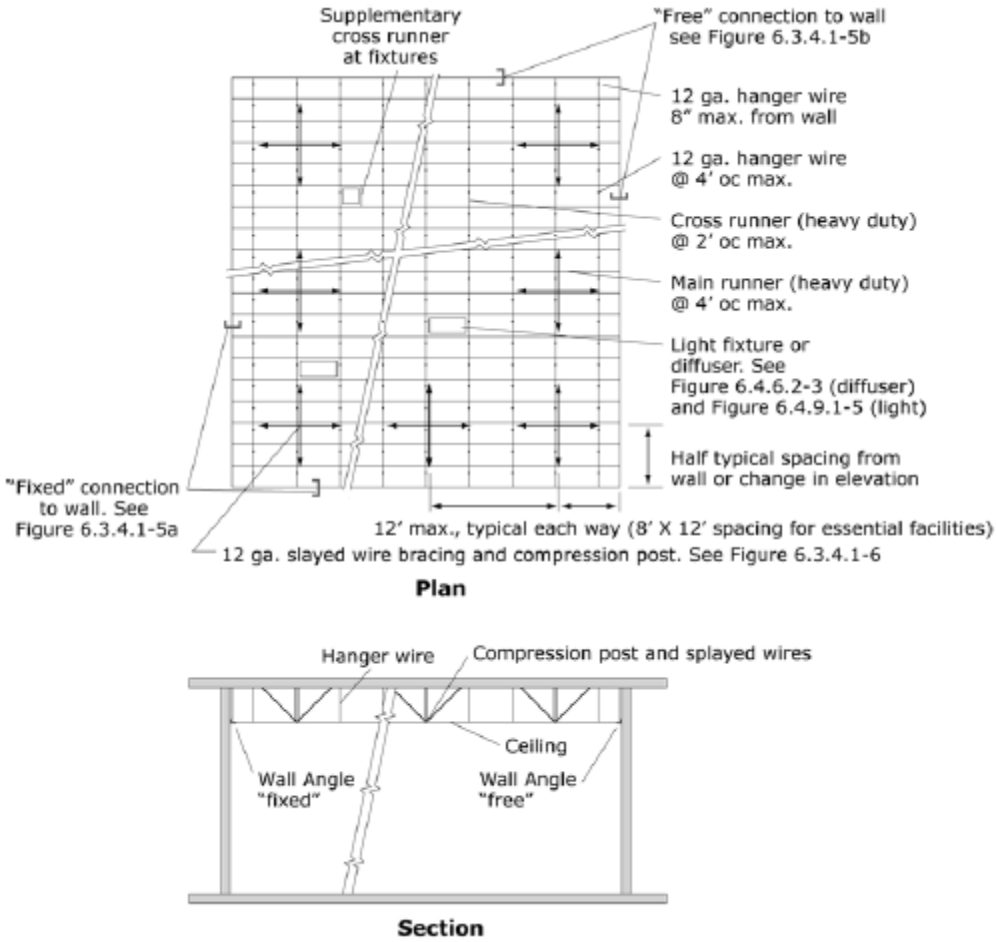


Figure G-10. Suspension System for Acoustic Lay-in Panel Ceilings – General Bracing Layout.
(FEMA E-74, 2012, Reducing the Risks of Nonstructural Earthquake Damage)

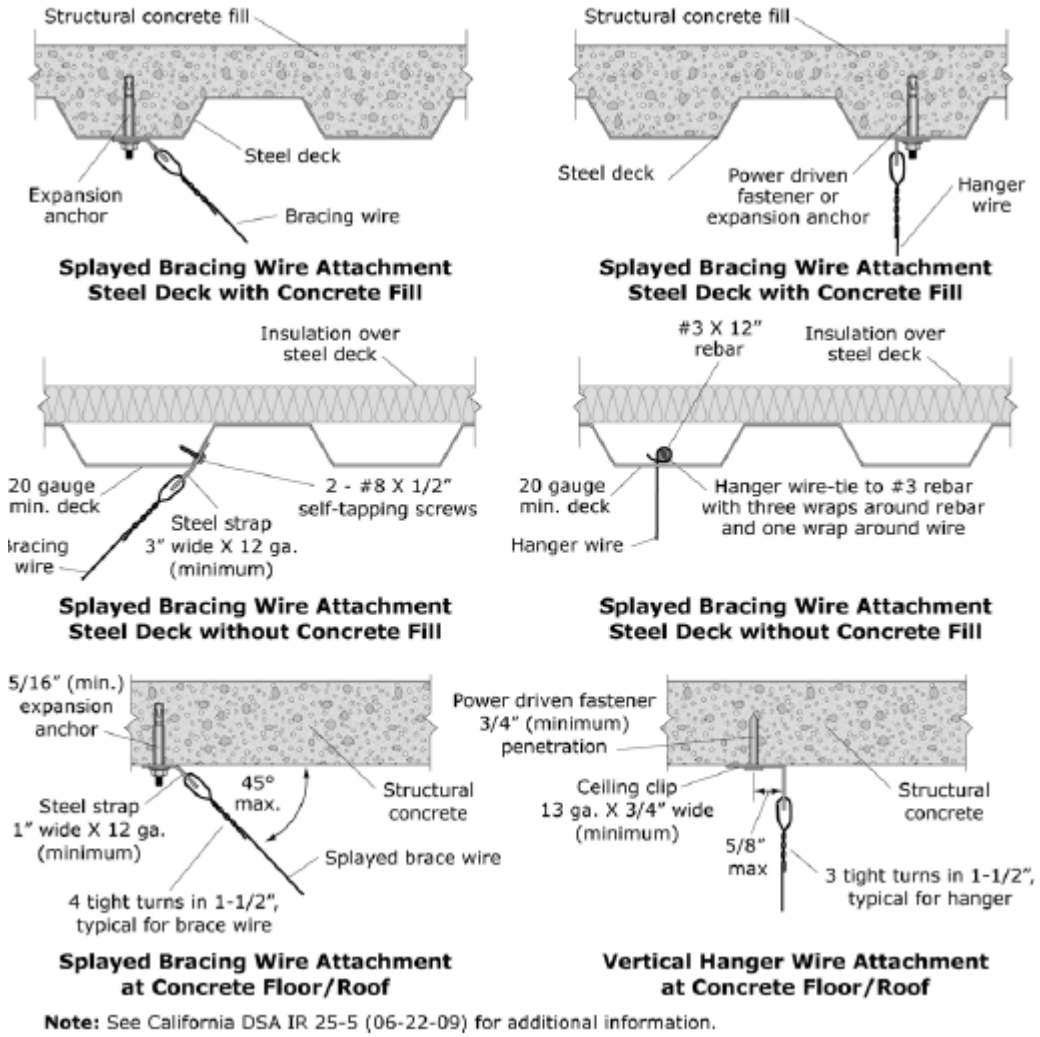
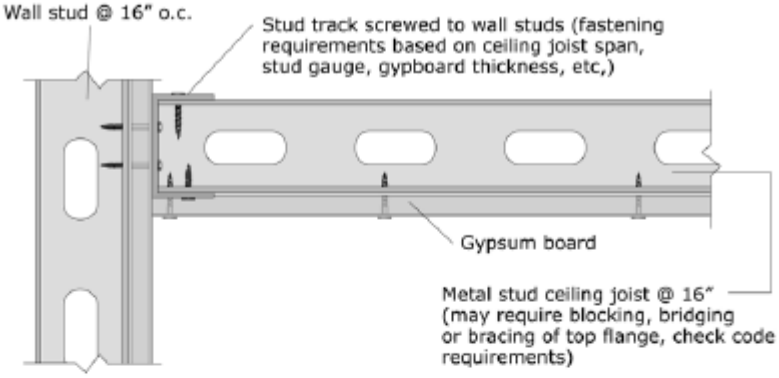
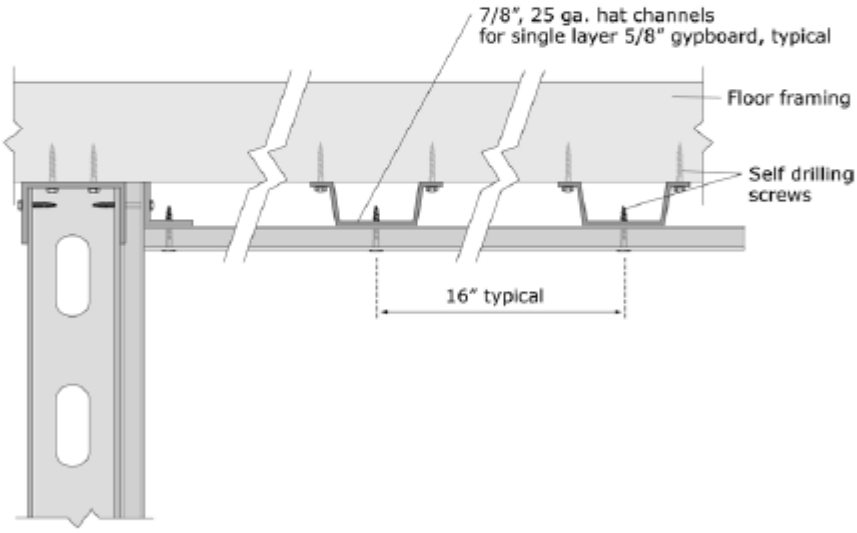


Figure G-11. Suspension System for Acoustic Lay-in Panel Ceilings – Overhead Attachment Details.

(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)

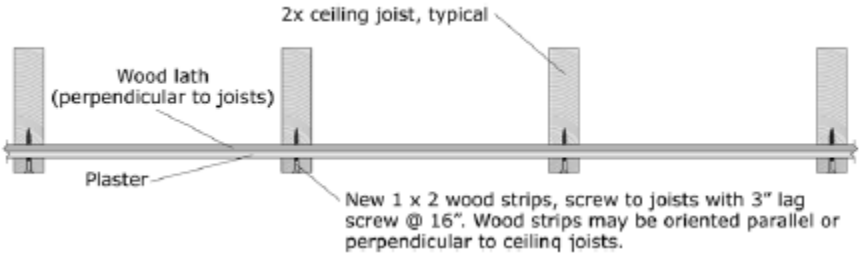


Figure G-13. Retrofit Detail for Existing Lath and Plaster.

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

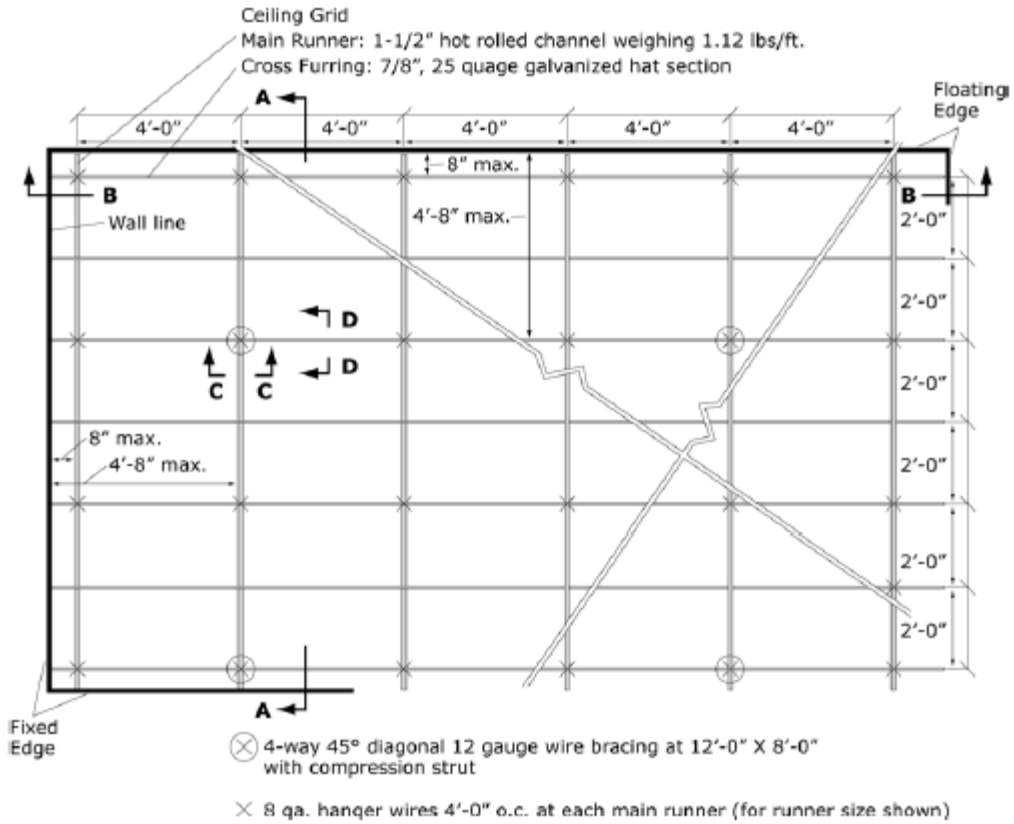


Figure G-14. Diagrammatic View of Suspended Heavy Ceiling Grid and Lateral Bracing.

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

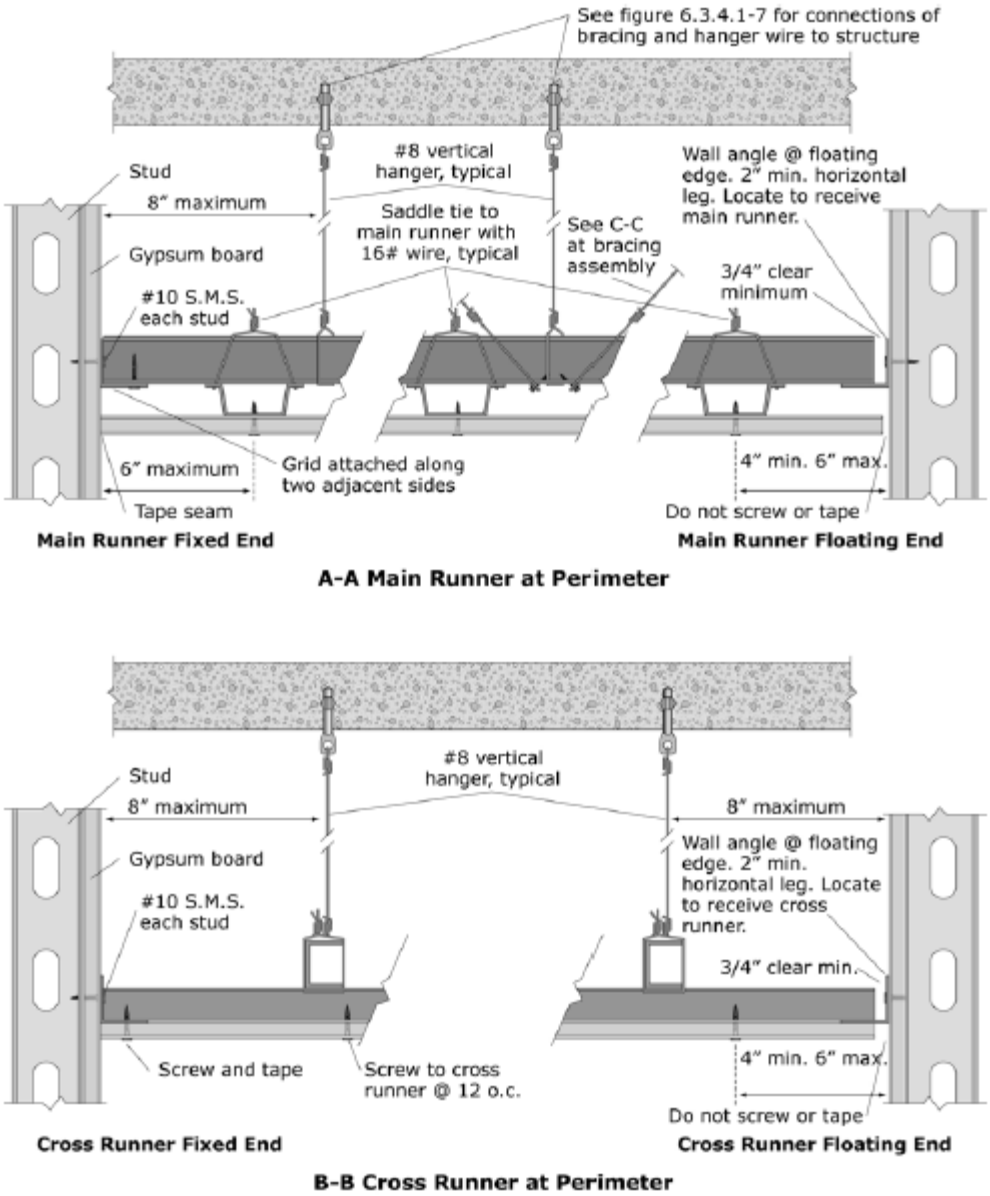
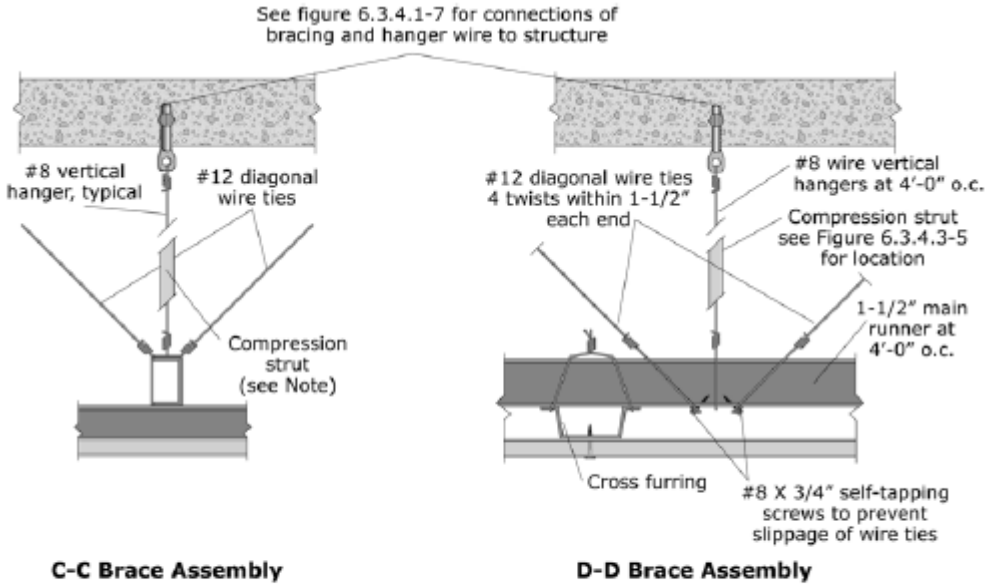


Figure G-15. Perimeter Details for Suspended Gypsum Board Ceiling.

(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 ≤ 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

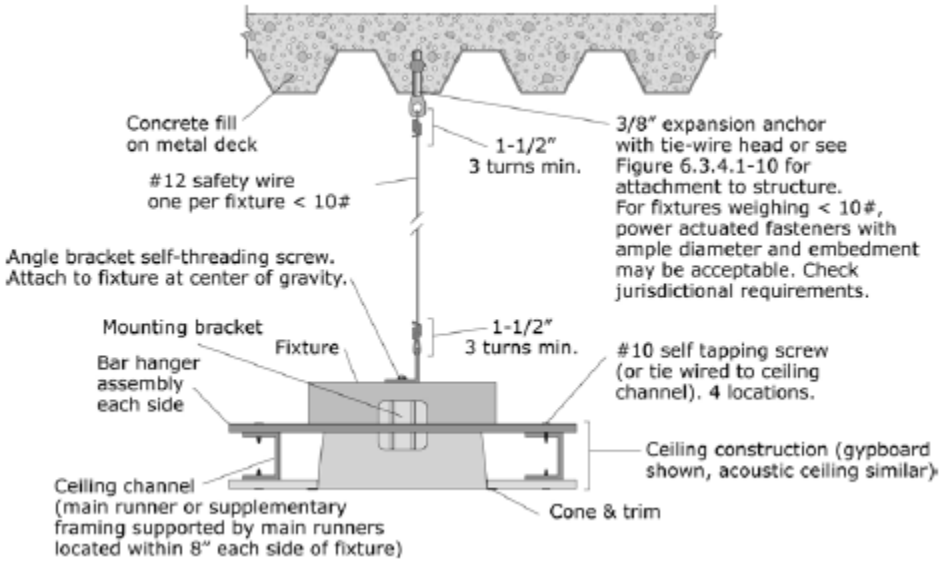


Figure G-17. Recessed Light Fixture in suspended Ceiling (Fixture Weight < 10 pounds).

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

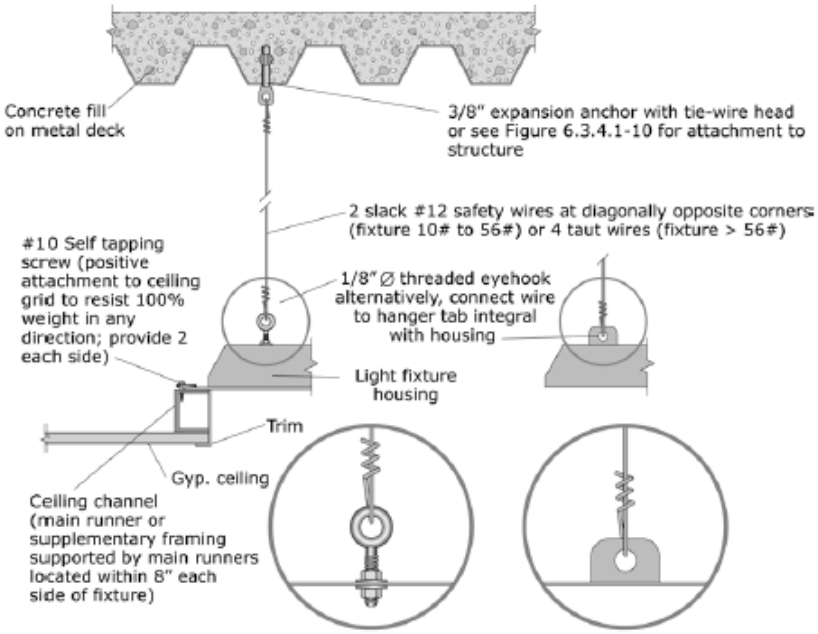


Figure G-18. Recessed Light Fixture in suspended Ceiling (Fixture Weight 10 to 56 pounds).

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

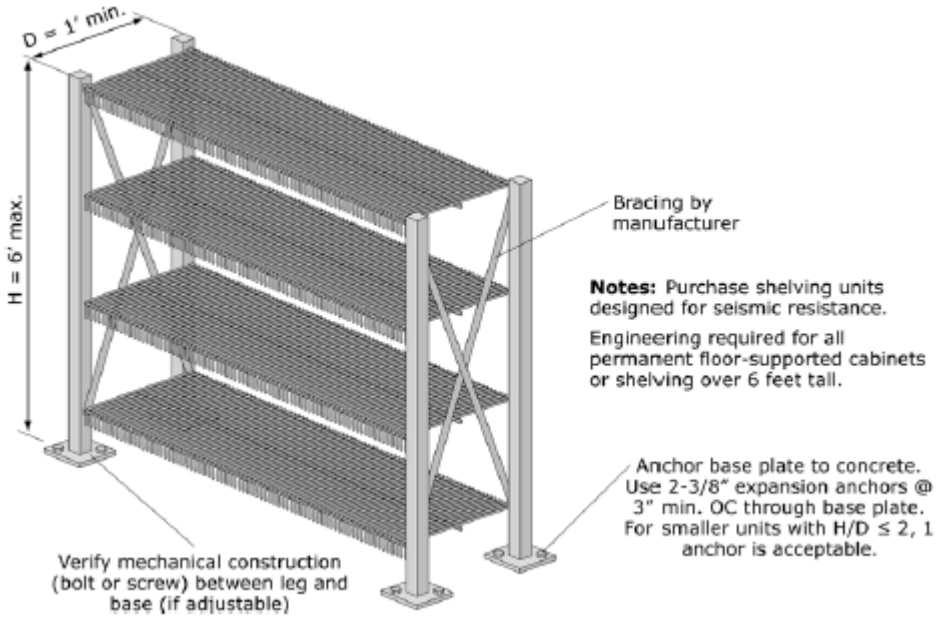
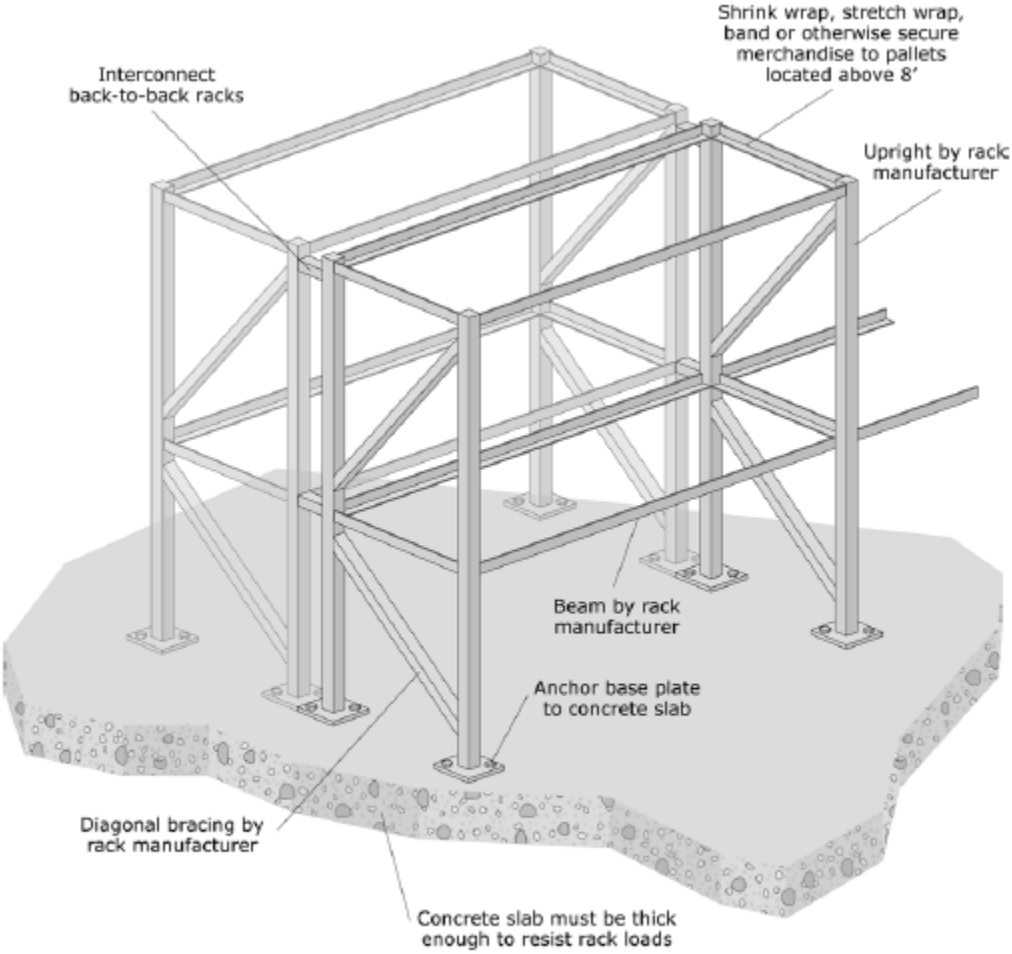


Figure G-19. Light Storage Racks.

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



Note: Purchase storage racks designed for seismic resistance. Storage racks may be classified as either nonstructural elements or nonbuilding structures depending upon their size and support conditions. Check the applicable code to see which provisions apply.

Figure G-20. Industrial Storage Racks.

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

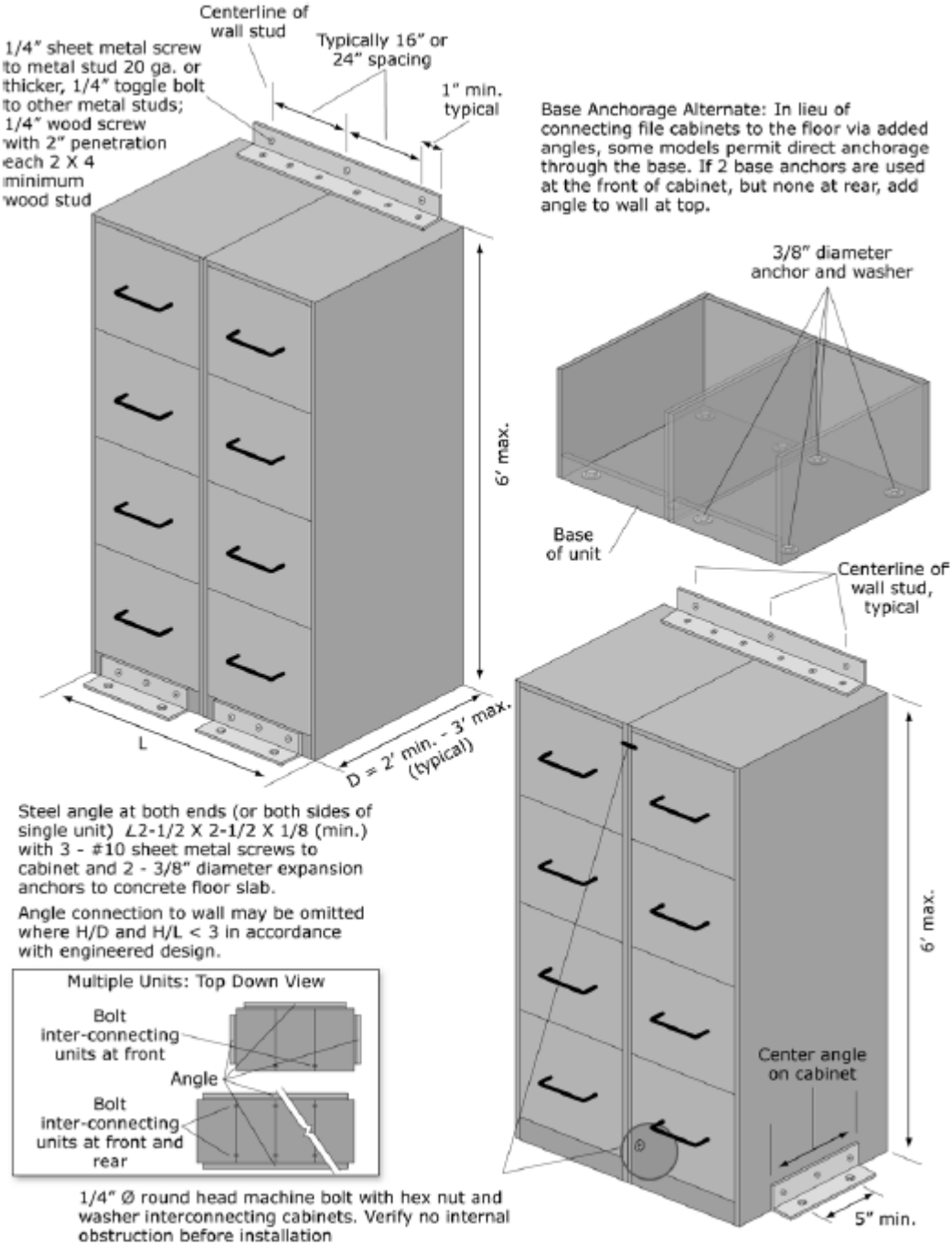


Figure G-21. Wall-mounted File Cabinets.

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

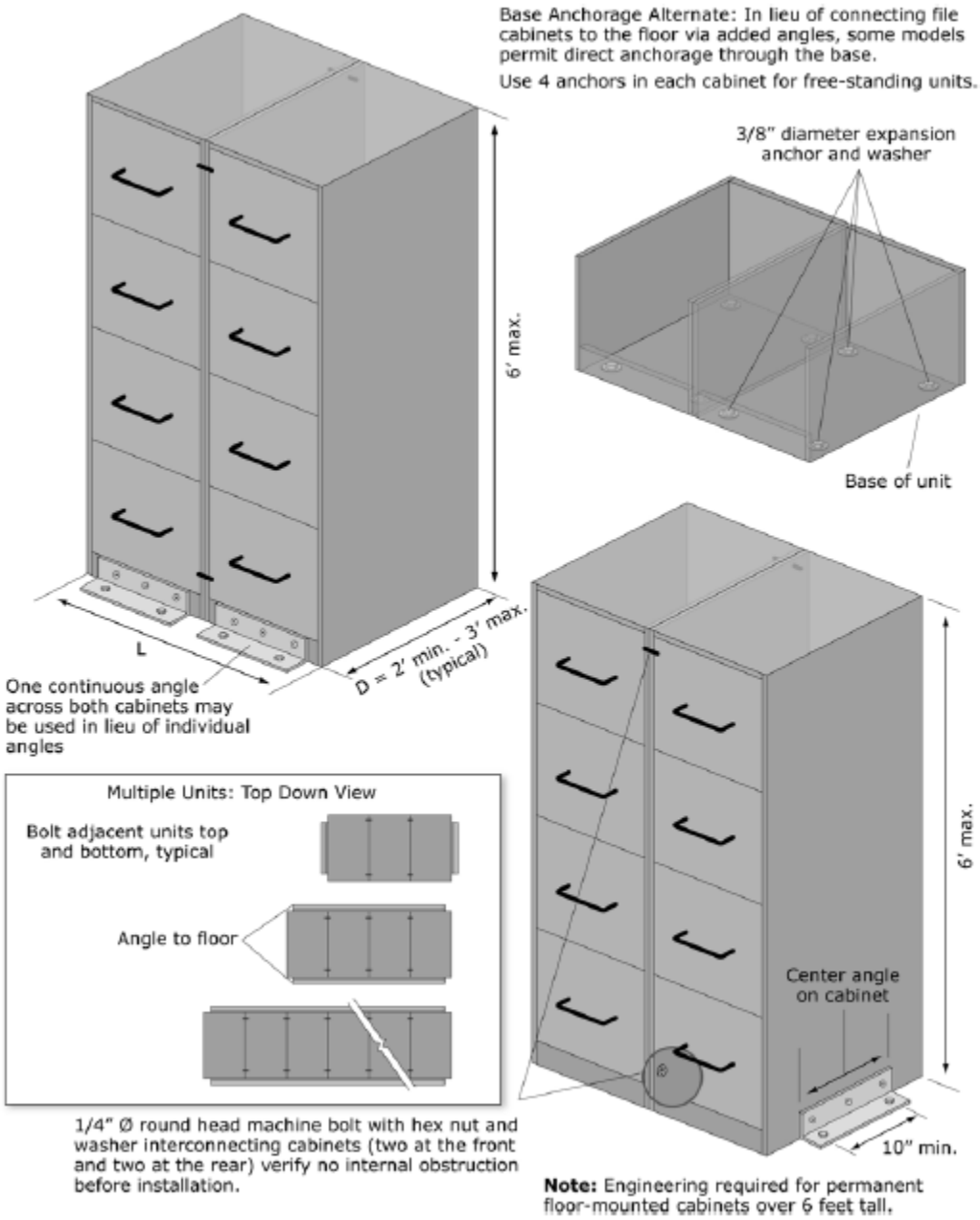


Figure G-22. Base Anchored File Cabinets.

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

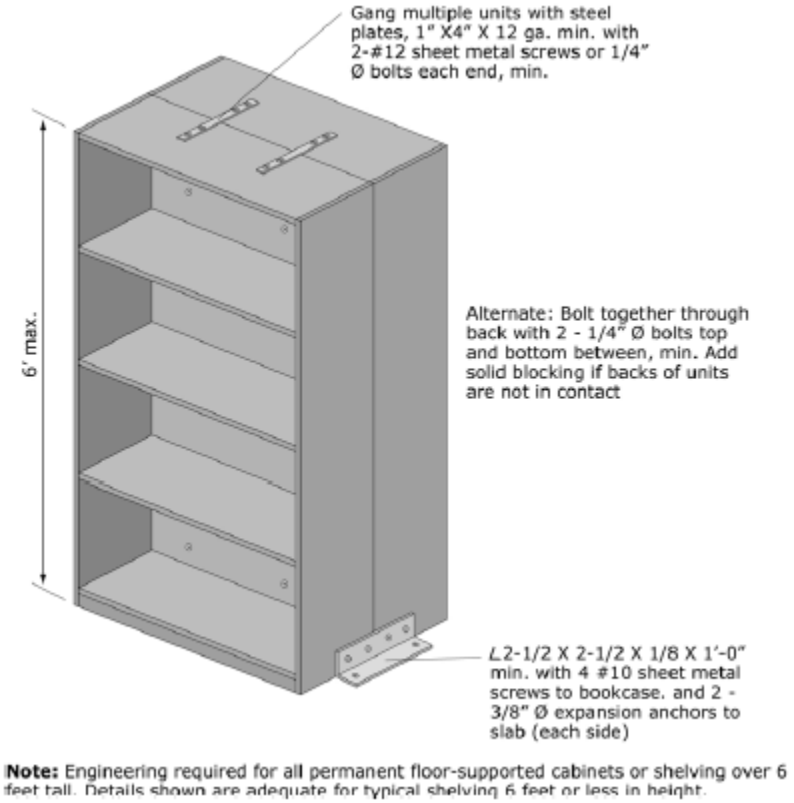


Figure G-23. Anchorage of Freestanding Book Cases Arranged Back to Back.

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

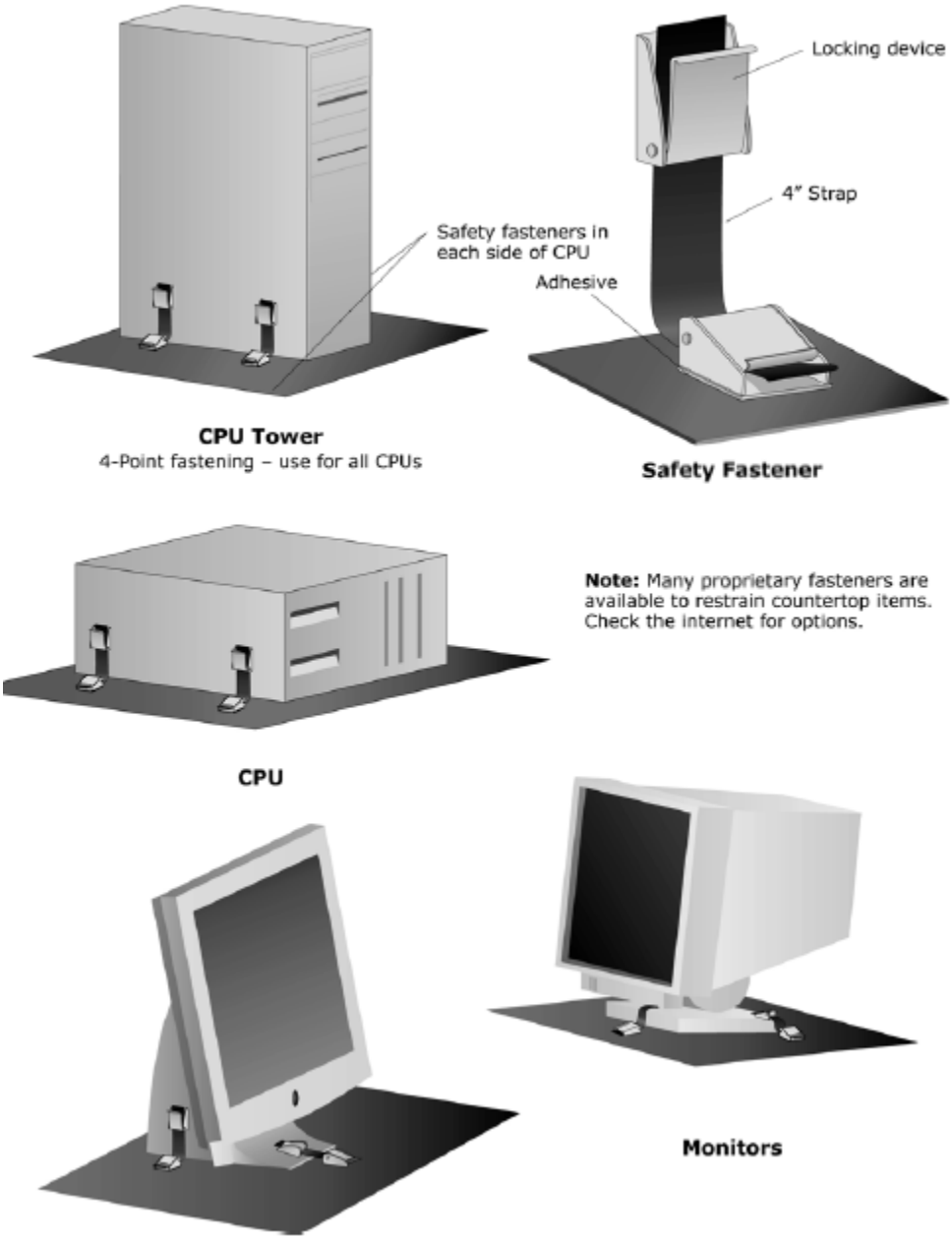
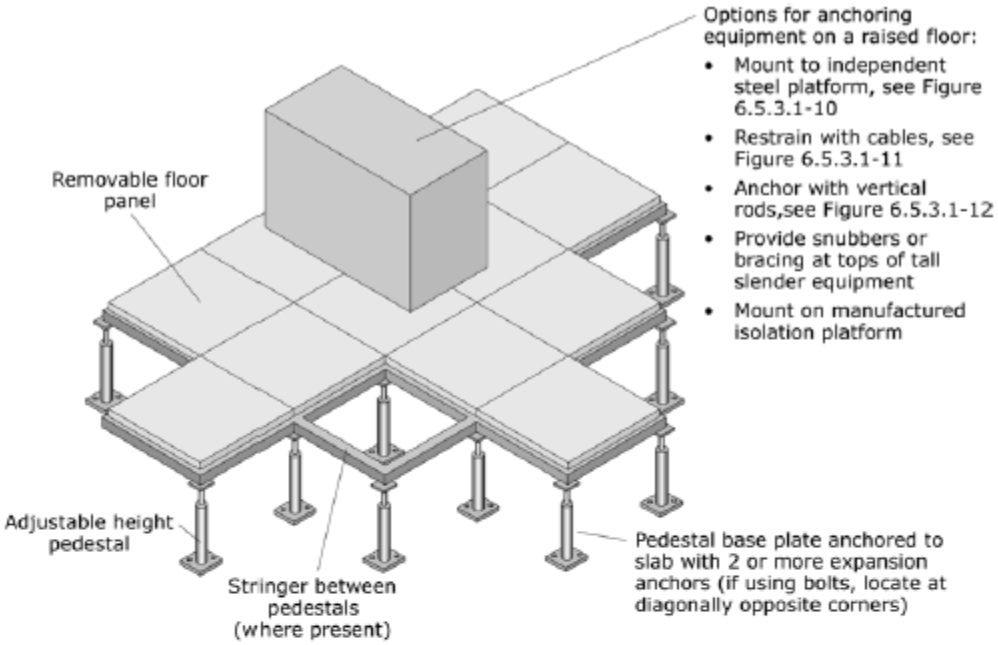
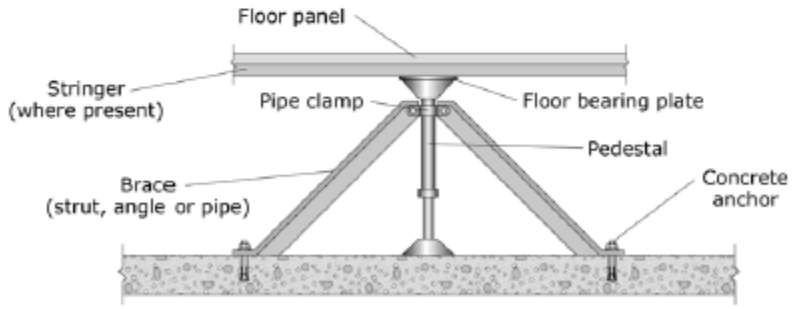


Figure G-24. Desktop Computers and Accessories.

(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)

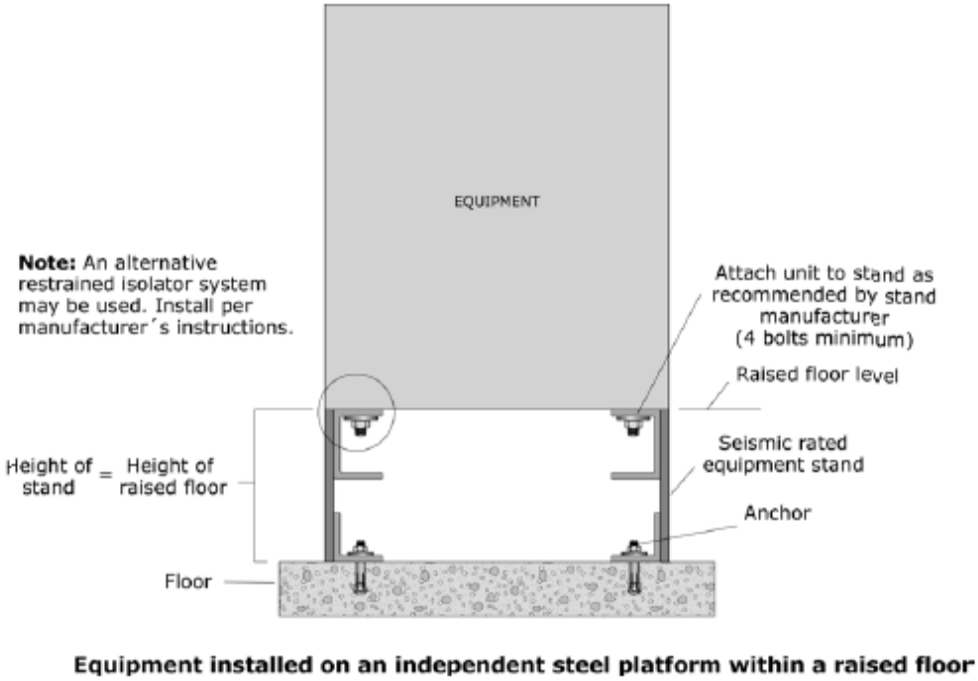


Figure G-26. Equipment Mounted on Access Floor – Independent Base.

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

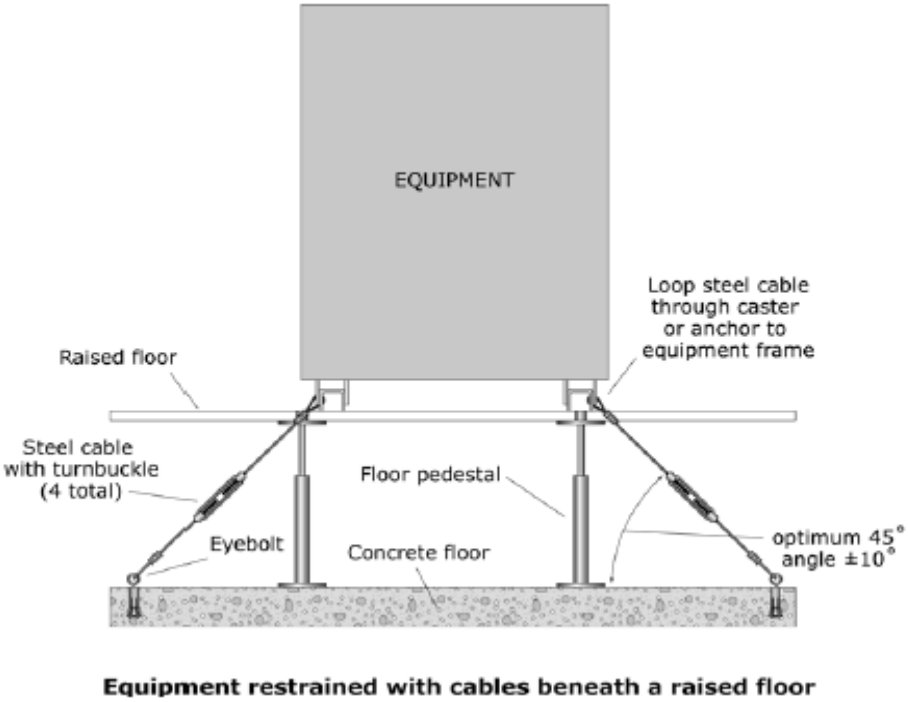


Figure G-27. Equipment Mounted on Access Floor – Cable Braced.

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

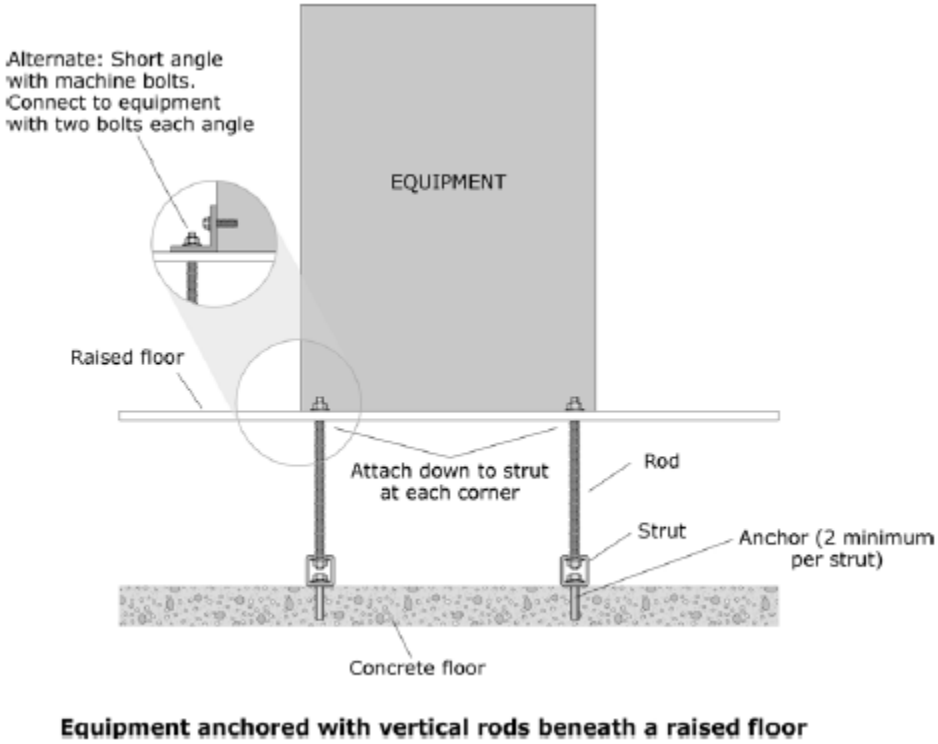
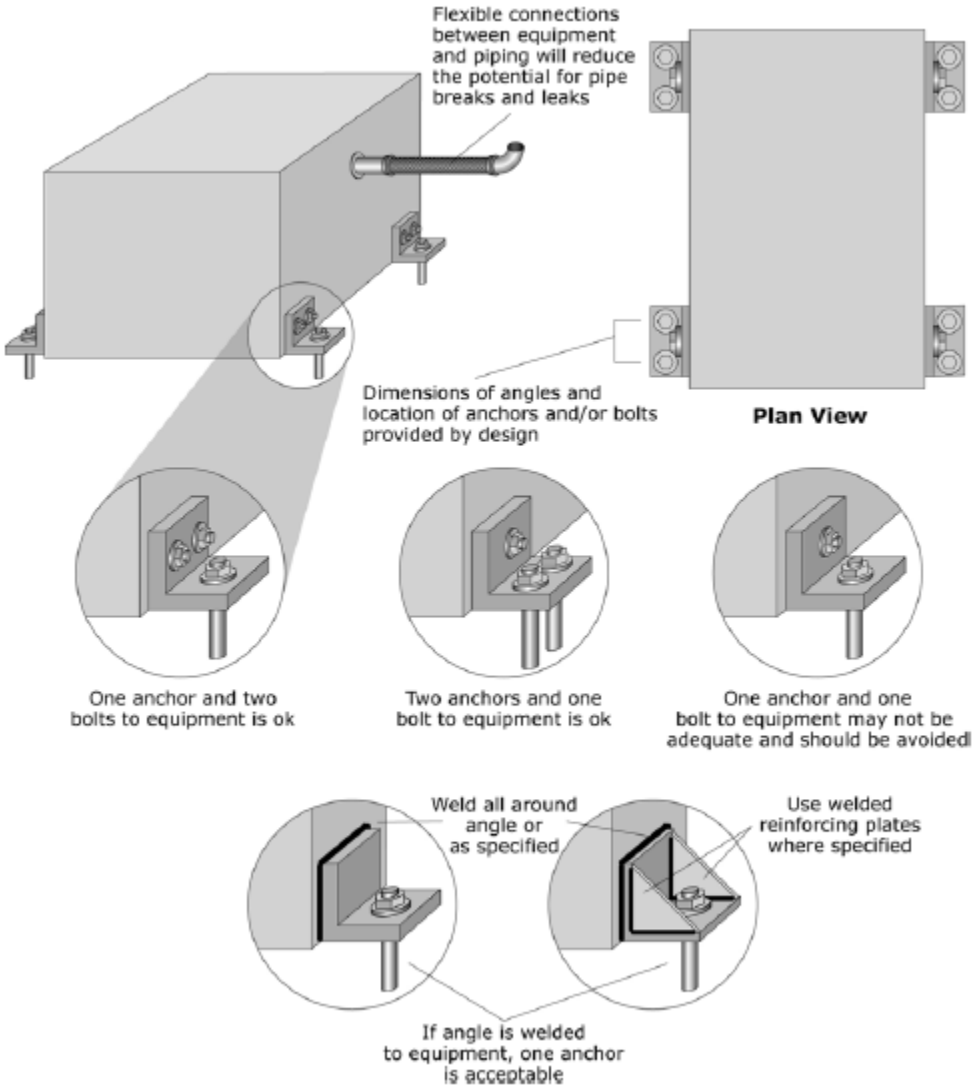


Figure G-28. Equipment Mounted on Access Floor – Tie-down Rods.

(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)

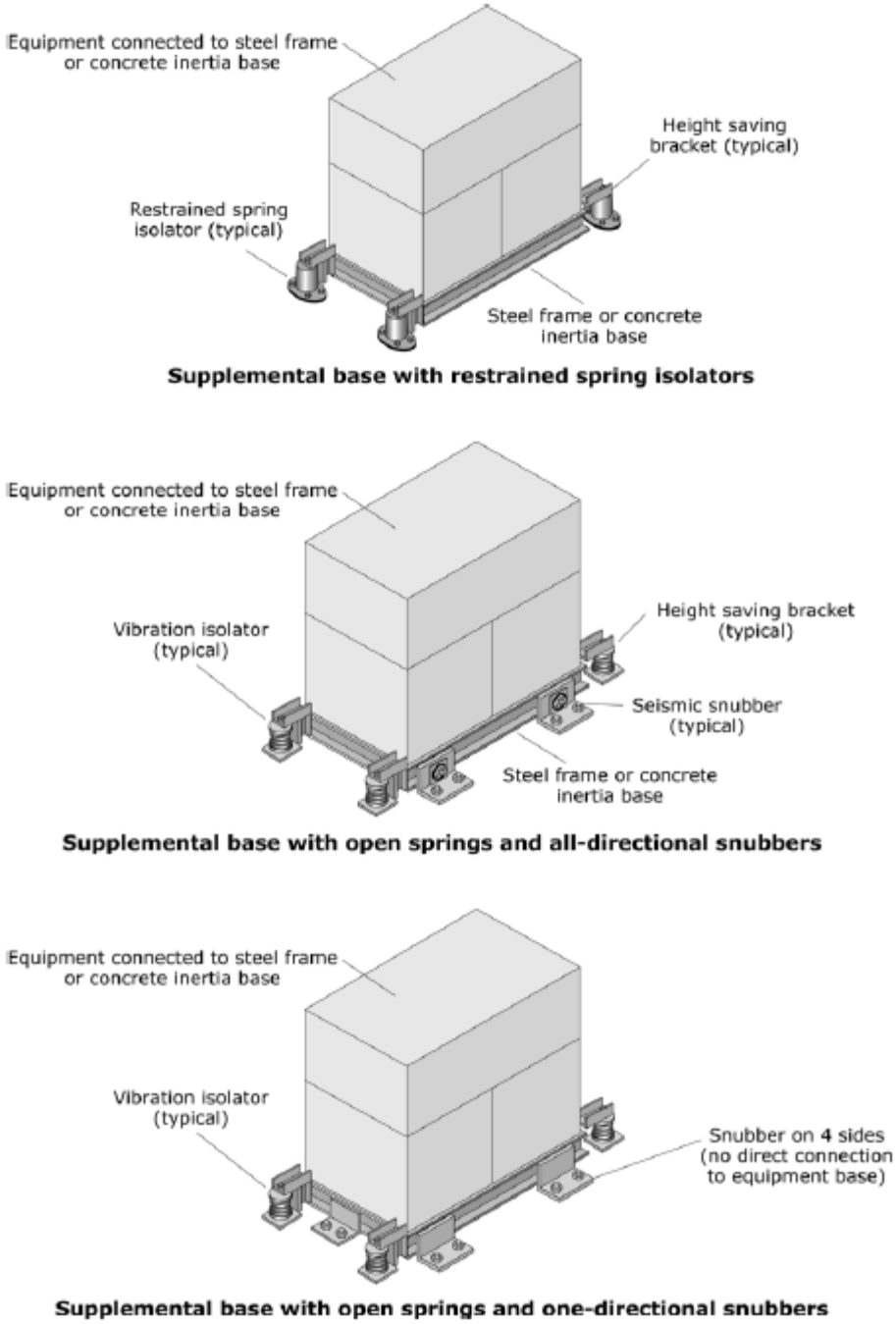


Figure G-30. HVAC Equipment with Vibration Isolation.

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

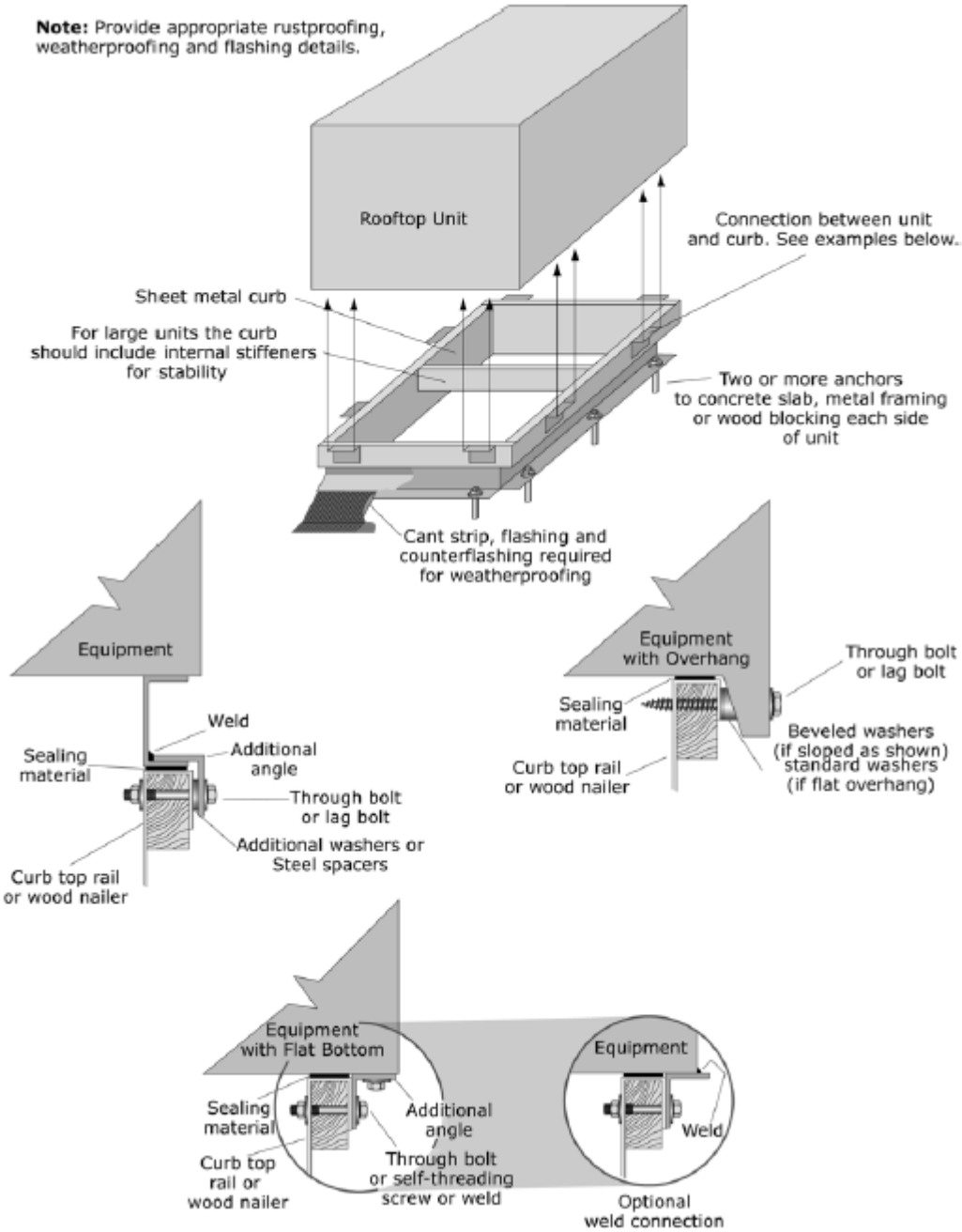


Figure G-31. Rooftop HVAC Equipment.

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

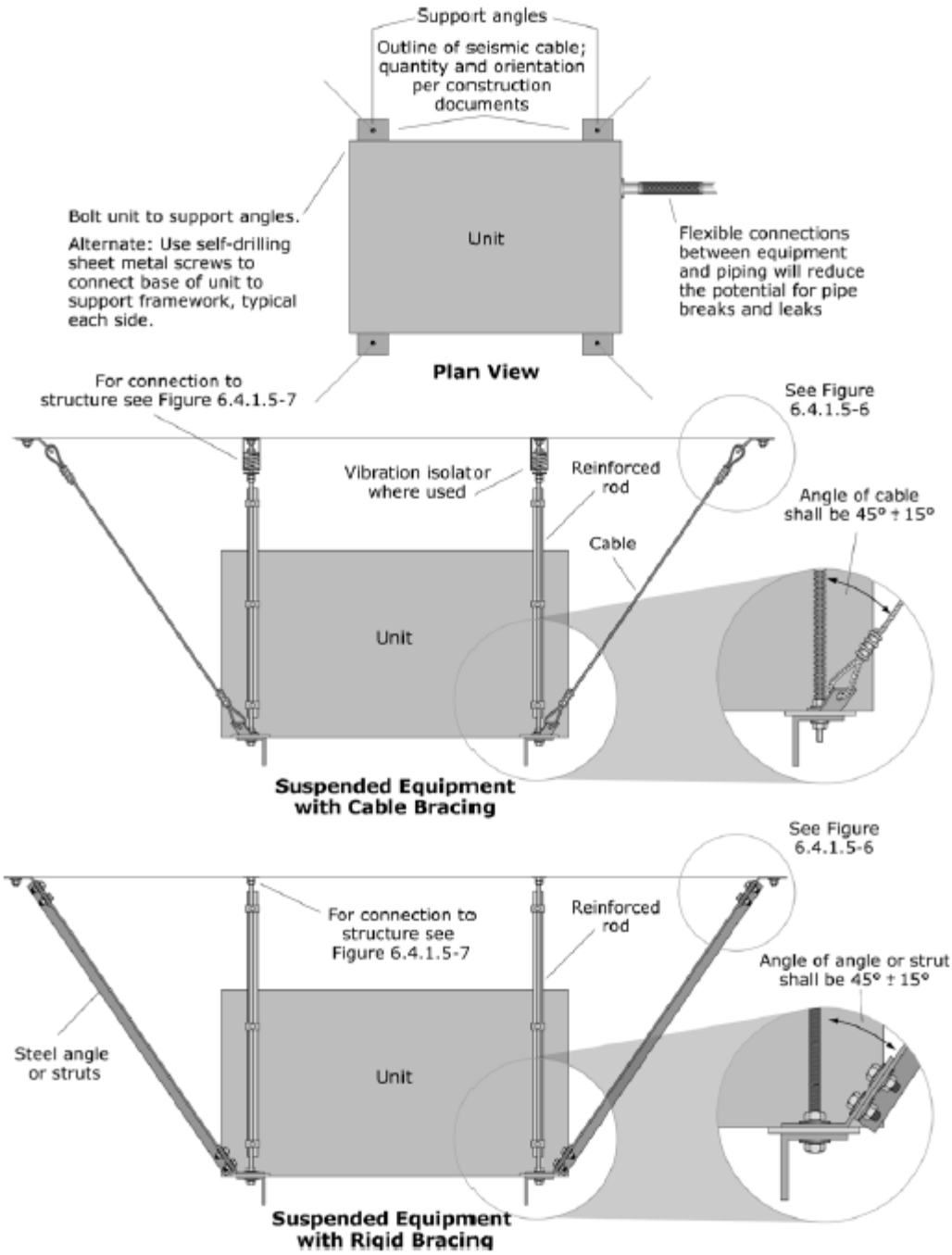


Figure G-32. Suspended Equipment.

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

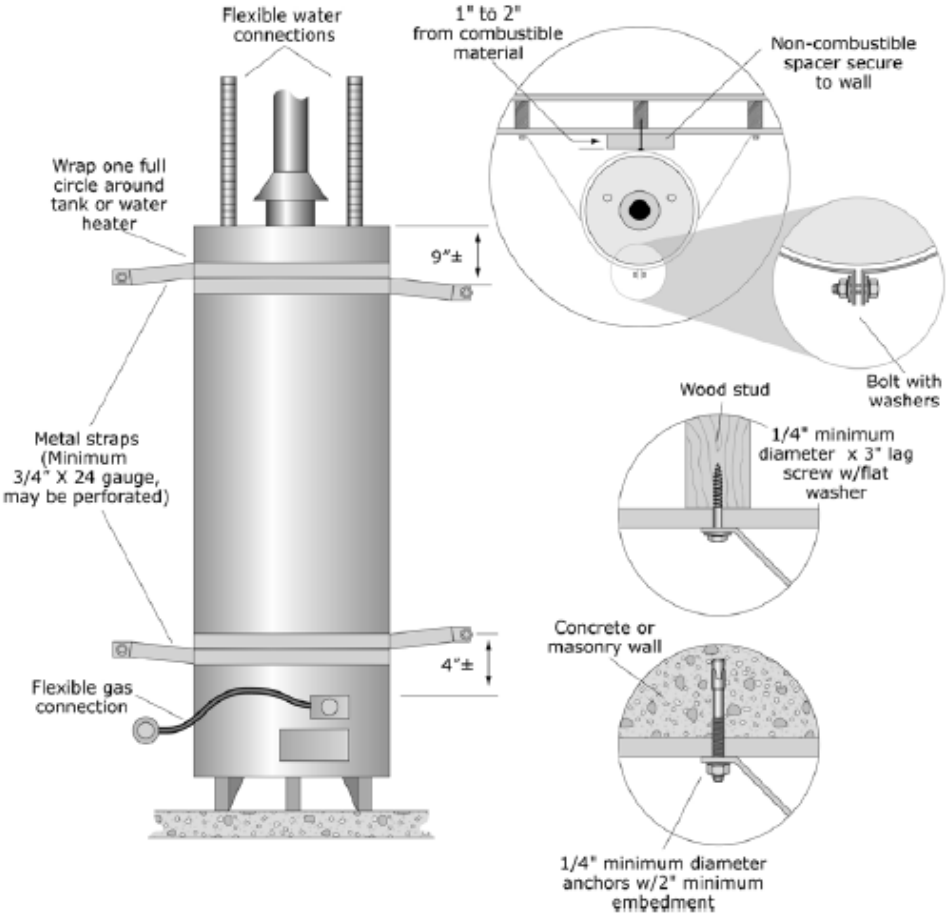


Figure G-33. Water Heater Strapping to Backing Wall.

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

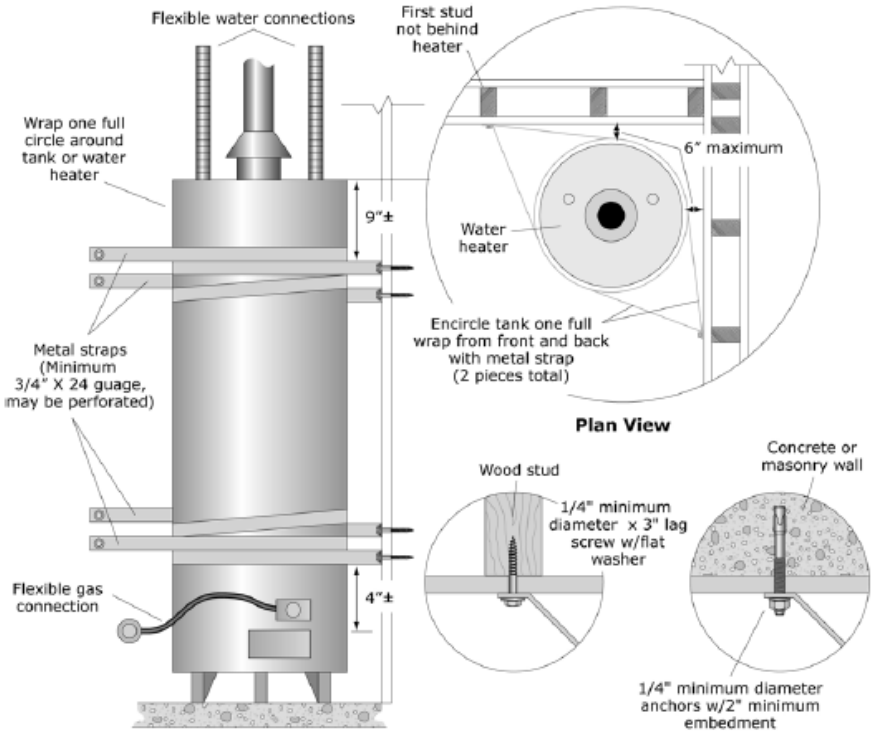


Figure G-34. Water Heater – Strapping at Corner Installation.

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

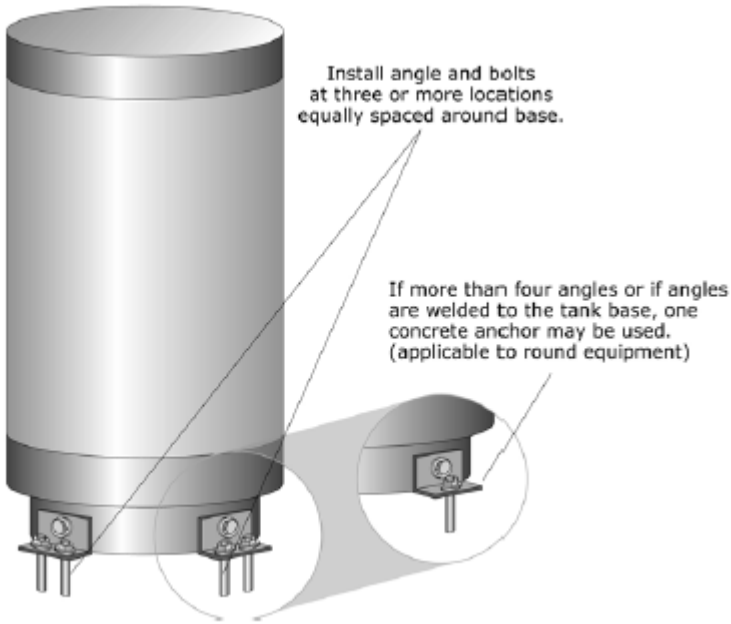


Figure G-35. Water Heater – Base Mounted.

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

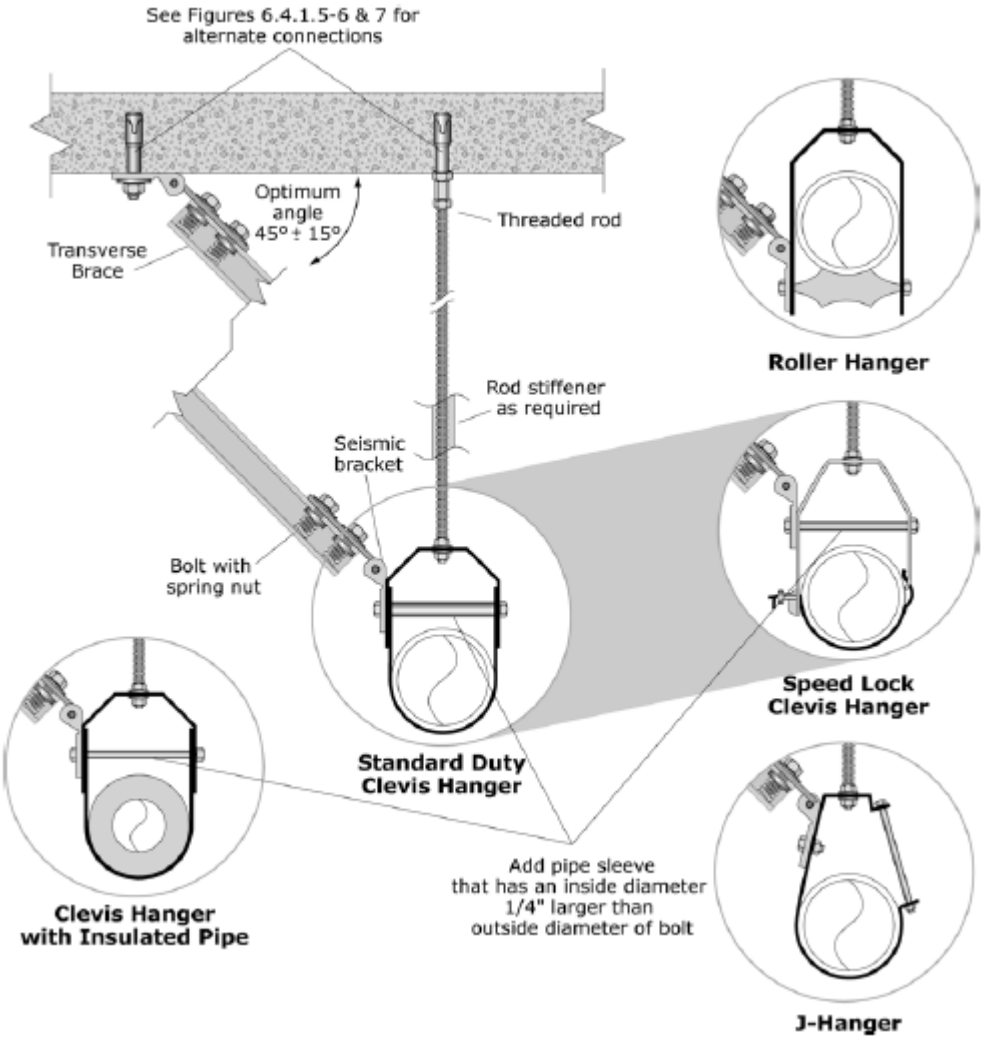


Figure G-36. Rigid Bracing – Single Pipe Transverse.

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

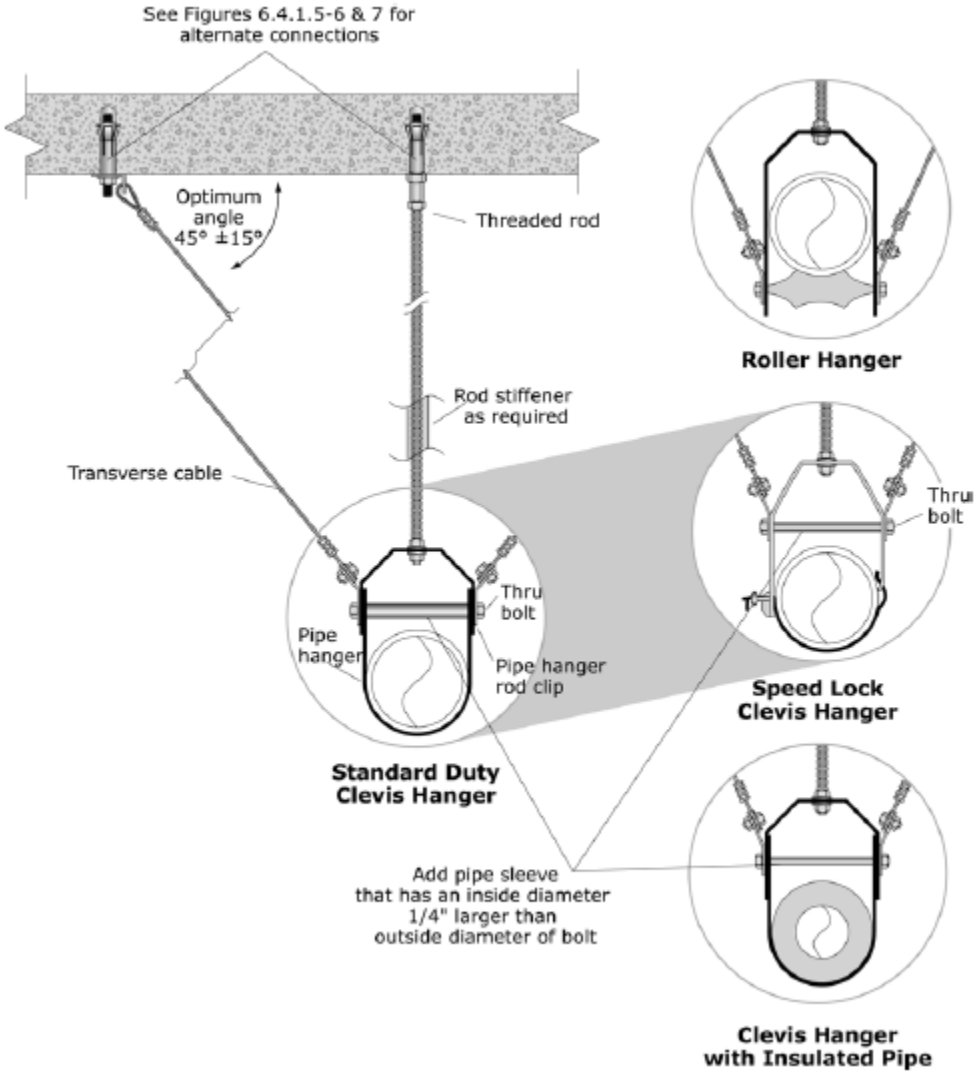


Figure G-37. Cable Bracing – Single Pipe Transverse.

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

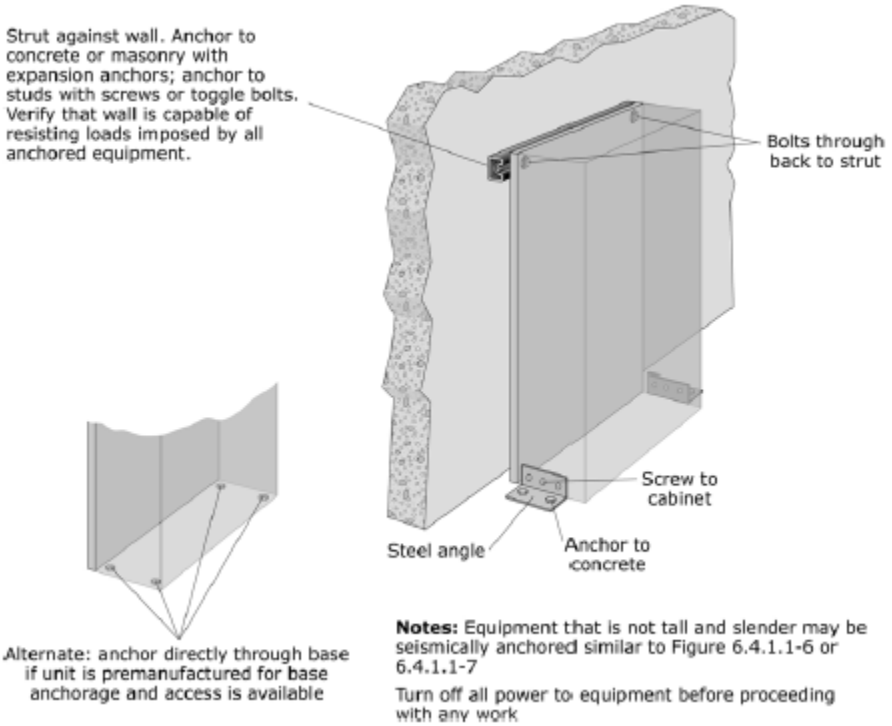


Figure G-38. Electrical Control Panels, Motor Controls Centers, or Switchgear.

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

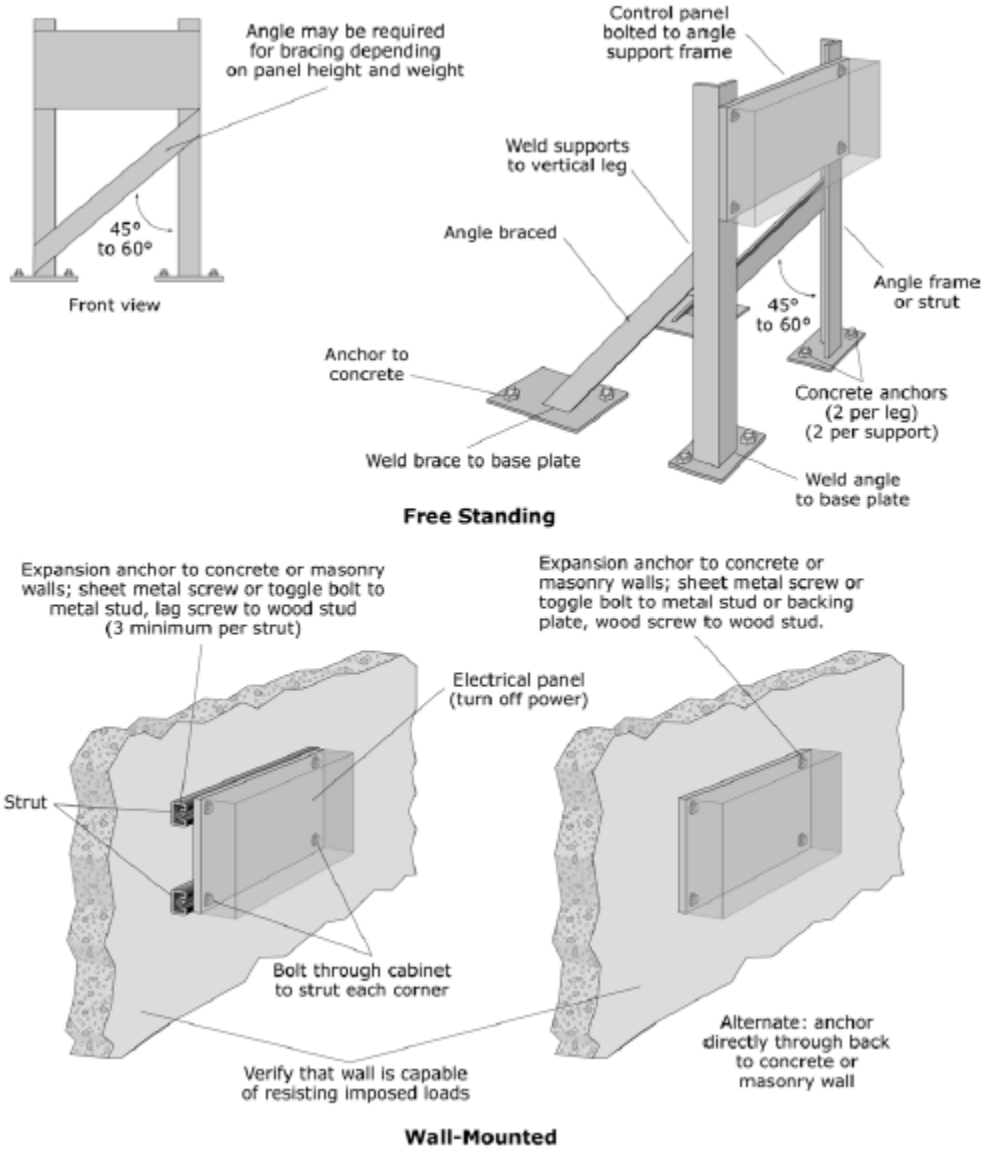


Figure G-39. Freestanding and Wall-mounted Electrical Control Panels, Motor Controls Centers, or Switchgear.

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

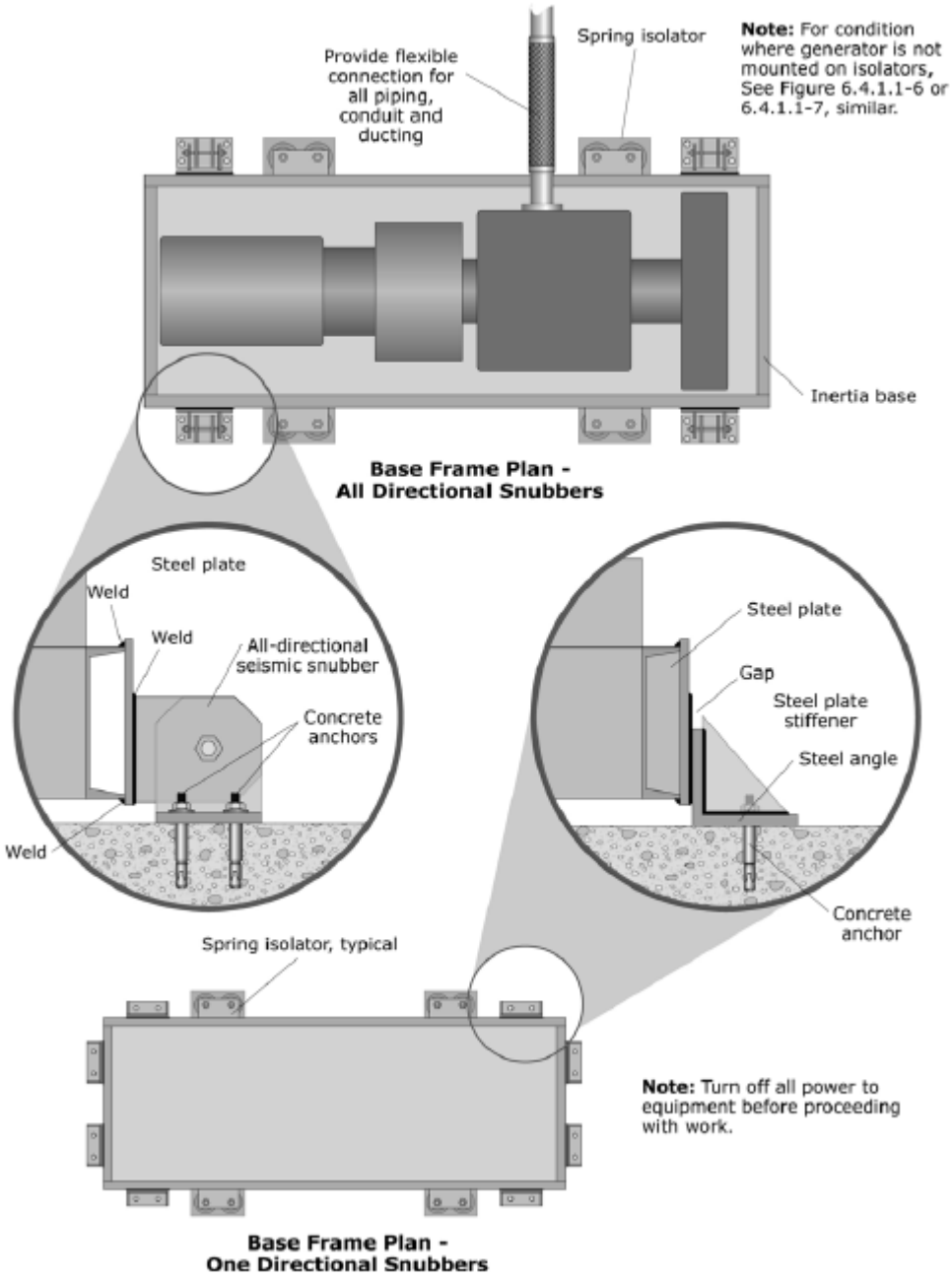


Figure G-40. Emergency Generator.
(FEMA E-74, 2012, Reducing the Risks of Nonstructural Earthquake Damage)