State of Utah

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Division of Facilities Construction and Management
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Addendum No. 1

Date:	June 30, 2016
To:	Contractors
From:	Tim Parkinson – Project Manager, DFCM
Reference:	Social Science Building Renovation Weber State University DFCM Project No. 16050810
Subject:	**Addendum No. 1**

Pages	Addendum Cover Sheet	1	page
	Revised Project Schedule	1	page
	BIM Guidelines	48	pages
	Building Program	188	pages
	Hazmat Survey	137	pages
	Total	375	pages

Note: This Addendum shall be included as part of the Contract Documents. Items in this Addendum apply to all drawings and specification sections whether referenced or not involving the portion of the work added, deleted, modified, or otherwise addressed in the Addendum. Acknowledge receipt of this Addendum in the space provided on the Bid Form. Failure to do so may subject the Bidder to Disqualification.

1.1 SCHEDULE: Revised project schedule attached.

1.2 GENERAL ITEMS: Attached documents: BIM Guidelines, Building Program and Hazmat Survey.

	STATE OF UTAH - DEPARTMENT OF ADMINISTRATIVE SERVICES **Division of Facilities Construction and Management**	**DFCM**

PROJECT SCHEDULE
REVISED PER ADDENDUM NO. 1 DATED JUNE 30, 2016

PROJECT NAME: **SOCIAL SCIENCE BUILDING RENOVATION**
WEBER STATE UNIVERSITY – OGDEN, UTAH

DFCM PROJECT NO. **16050810** **CM/GC**

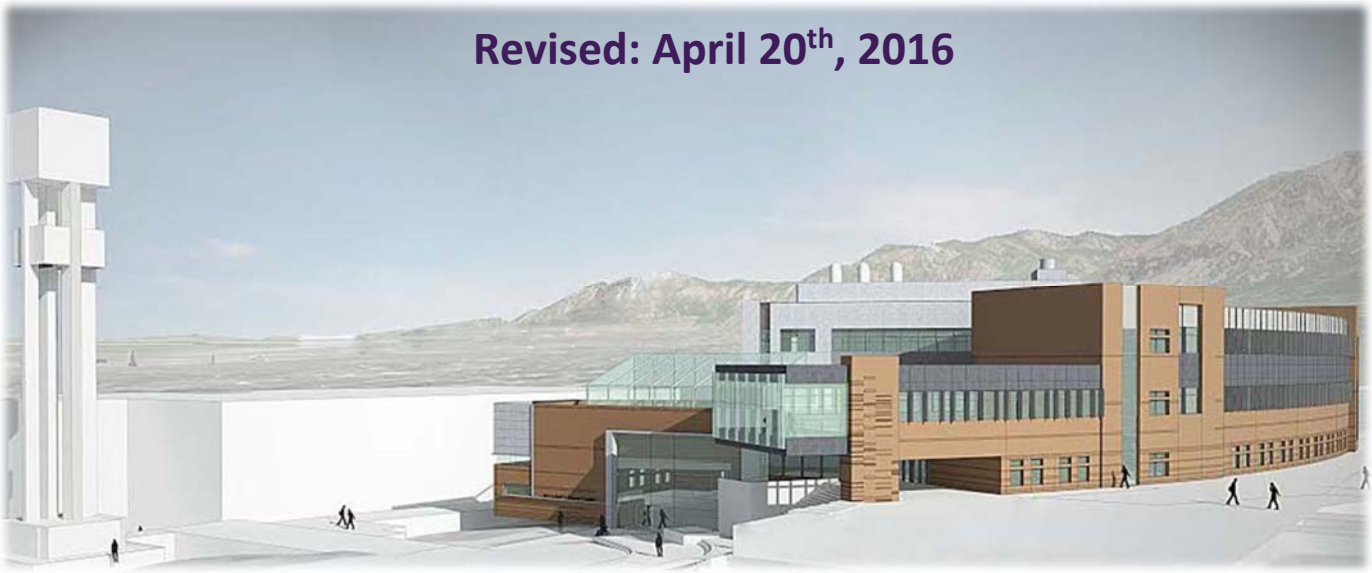
Event	Day	Date	Time	Place
Request for Proposals Available	Tuesday	June 7, 2016	3:00 PM	DFCM web site *
Mandatory Pre-Proposal Site Meeting	Monday	June 20, 2016	1:00 PM	Weber State University Campus Services Bldg- Rm 102 Ogden, Utah
Last Day to Submit Questions	Thursday	June 23, 2016	11:00 AM	Tim K Parkinson- DFCM E-mail timkparkinson@utah.gov
Addendum Deadline (exception for proposal delays)	Thursday	June 30, 2016	8:00 AM	DFCM web site *
Cost Proposals, Management Plans, References, Statements of Qualifications, and Termination/Debarment Certifications Due	Thursday	July 7, 2016	12:00 Noon	DFCM Room 4110 State Office Bldg. Capitol Hill Complex SLC, UT
Short Listing by Selection Committee, if applicable.	Tuesday	July 12, 2016	2:00 PM	TBD
Announcement of Finalists	Wednesday	July 13, 2016	2:00 PM	DFCM web site*
Interviews	Monday	July 18, 2016	10:00 AM	WSU Campus Services Bldg-Rm 102 Ogden, Utah
Announcement	Tuesday	July 19, 2016	1:00 AM	DFCM web site *
Requested Substantial Completion Date	Monday	July 2, 2018		

* **DFCM's web site address is http://dfcm.utah.gov**

BIM

Guidelines & Standards
for Architects, Engineers, and Contractors

Revised: April 20th, 2016



ACKNOWLEDGEMENTS

Weber State University is grateful to the many organizations that have helped to pave the path for Owner organizations like ourselves in the development of Building Information Modeling (BIM) Guidelines, Standards, and Execution strategies. It is their leading efforts and progress in this area that have helped to provide a framework for Weber State University (WSU). As we move forward in our development and use of BIM and IPD, we hope that we might help others as well.

Special thanks and acknowledgement goes to:

- General Services Administration (GSA) – BIM Guide Series 02 – version 0.96 – April 2007
- General Services Administration (GSA) – BIM Guide (Series 08) For Facilities Management – version 0.50 – May 2011
- National Institute of Building Sciences and building SMART Alliance National BIM Standard _ United States National Building Information Modeling Standard – version 1 – Part 1: Overview, Principles, and Methodologies – December 2007
- IMAGINiT.com
- U.S. Army Corps of Engineers Building Information Modeling (BIM) – October 2006
- Bimforum.org – Level of Development Specification – version 2015-Draft – April 2015
- Indiana U BIM Guidelines & Standards for Architects, Engineers, and Contractors – July 2012
- University of Southern California Building Information Modeling (BIM) Guidelines – April 2012
- Penn State Building Information Modeling Planning Guide for Facility Owners – version 2.0 June 2013
- Ohio State University Building Information Modeling (BIM) Project Delivery Standards – August 2014
- Georgia Tech BIM Requirements & Guidelines for Architects, Engineers and Contractors – Sept 2011
- AIA Document E203 -2013 – Building Information Modeling and Digital Data Exhibit
- AIA Document G202 -2013 – Project Building Information Modeling Protocol Form

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SECTION 1. INTRODUCTION TO WSU BIM GUIDELINES

This BIM Guideline and Standard applies to construction and remodel projects for Weber State University (WSU) as we implement the use of Building Information Model (BIM) as a tool to improve and standardize the quality of information available for day-to-day operational needs and to provide reliable data for life-cycle management and ongoing capital planning. Facility data is created throughout the design and construction process, and is then updated throughout the lifecycle of the facility, via documentation from small projects, operations & maintenance, and major renovations & alterations. These standards set the stage as we prepare for future development of integrating WSU BIM data with multiple enterprise data systems, including FM's computerized maintenance management system (CMMS), geographic information system, automation systems, building & rooms database, etc.

Vision/Goal: WSU BIMs shall be 'key' for providing:

- A unified information base
- Space management/usage reporting and analysis
- Location-aware model of equipment, fixtures, and furnishings, replete with data
- Effective support for energy, sustainability and other initiatives
- Support for emergency response and security management and scenario planning

1.1 STATEMENT OF PURPOSE

If used effectively, BIM provides opportunities for continual improvements to methods of design and construction coordination by decreasing the potential for costly change orders, providing multiple opportunities for Owner review and participation by means of 3D visualization of the project and specialty spaces, and reducing design and construction schedules. Additionally, BIM allows for the reuse of data for multiple purposes, including the operation and maintenance of WSU's facilities. To achieve these ends, the BIM must be structured in a manner to achieve university purposes. This document describes WSU's requirements for the production and use of Building Information Models (BIM) in the design, construction and maintenance of its facilities.

1.2 KEY INGREDIENTS FOR SUCCESS

There are several factors that will affect the successful outcome of a BIM-based project:

- Establishing a collaborative environment and a collaborative use of the BIMs during the design and construction process where the Designers, Contractor, subcontractors and Owner work together with a proactive approach to issue resolution.
- Leveraging the BIMs to the fullest extent possible to shorten the construction schedule and reduce construction costs. This would include reviewing the BIMs with users and WSU Facilities Management (FM) personnel to ensure that all key personnel understand what the final product will look like and that accesses and clearances meet their expectations; reducing surprises and change orders down the line.
- Ensuring that the "I" in BIM is fully represented, as far as been specified in this document. With time, the university will add/edit these guidelines as processes are set in place to accommodate more specific data that Building Information Models can provide.

1.3 DESIGN

BIMs shall be created to include all geometry, physical characteristics and product data needed to describe the design and construction work of a project. All drawings, schedules, simulations, and services required for assessment, review, bidding and construction shall be extractions from this model. (note about MEP / Navisworks BIM; Arch & Struc / Revit BIM)

In all cases, building and infrastructure systems shall be modeled to a level that allows verification of clearances, analysis of conflicts/clashes and proper coordination of work with all other aspects of the project.

All existing conditions/elements needed to explain the extent of construction work for alterations and additions will be modeled. The extent of modeling beyond the affected areas and the level information to be included will be determined based on project needs and will be discussed during the project kickoff meetings.

The Design Team shall develop their BIM using parametric links that are maintained within the models, from schematic and design throughout the construction and as-built phases, to enable automatic generation of all plans, sections, elevations, custom details and schedules as well as 3D views. All information needed to describe the "detailed design" shall be graphically or alphanumerically included in and derived from these models only, except for the Specifications.

1.4 SOFTWARE

Parametric BIM authoring software is required for WSU projects. The deliverable file format for all BIM project models is to be .RVT (Autodesk Revit). MEP projects may be delivered in .RVT and Navisworks formats.

1.5 CIVIL

Civil engineering aspects of projects shall be created to include all geometry, physical characteristics and product data needed to describe the design and construction work to within 5' of building envelope. Drawings and schedules required for assessment, review, bidding and construction shall be extractions from this model. Software used, will be capable of interfacing with Autodesk software.

1.6 GEO-REFERENCE

Site plans, utilities (found, installed, removed, abandoned) and building models shall be geo-referenced to **NAD 83 State Plane Utah North FIPS 4301 (US Feet)**.

SECTION 2. PROCESS

2.1 WSU RESPONSIBILITIES

Throughout the processes defined below, various WSU departments will review the BIMs and verify that the model content is accurate and up to date. Dependent upon the scope of the project, these departments and their involvement as it pertains to the BIMs are as follows:

- WSU FACILITIES MANAGEMENT (FM) CAMPUS PLANNING & CONSTRUCTION PROJECT MANAGER / UTAH DEPARTMENT OF FACILITIES CONSTRUCTION MANAGEMENT (DFCM)
  - -Coordinates BIM reviews with various departments.
  - -Provides initial project information in BIM Execution Plan.
  - -Insures that the BIM Project Execution Plan is adhered to for the duration of the project.
  - -Coordinates electronic access to BIM for project collaboration.
- WSU FM CAD / BIM & SPACE MANAGEMENT:
  - -Defines space-related data requirements for databases, reports, way-finding signage, etc.
- WSU FM OPERATIONS:
  - -Defines the FM model and data requirements (Appendix A and B). Reviews access and clearances to mechanical equipment and object naming conventions.
  - -Verifies that the systems and zones are defined appropriately.
- THIRD PARTY COMMISSIONING AGENT: To be identified in the bid documents.
- WSU NETWORK AND TELECOMMUNICATIONS SERVICES:
  - -Defines IT data and model requirement
- VARIOUS USER GROUPS, DEPENDENT ON PROJECT SCOPE: To be determined, as necessary.

2.2 BIM EXECUTION PLAN

As part of their respective proposals/bid submittals, the Architect and the General Contractor must submit a BIM Execution Plan (BEP) describing processes and procedures in place within their organizations, used to coordinate and deliver the BIM's and associated data according to the guidelines contained herein. See Appendix H for the BIM Execution Plan template to be used. WSU will evaluate the BEP's and provide feedback to the successful bidder at the time of contract award, after which the Contractor will have 2 weeks to make changes to the BEP and resubmit.

2.3 DELIVERABLES

The final delivery of the BIM and associated data to WSU will be in the form of:

a. Fully coordinated architectural, structural, civil and MEP 3D models in Revit at 100% CD by the Design Team.
b. All equipment schedules must be generated from the parameters embedded in the Revit model objects. No linked CAD, Excel, or other format-type data in Model.
c. "As constructed" native format MEPF and structural models provided by the General Contractor.
d. Complete "as constructed" Revit models provided by the Designers conforming to WSU FM requirements as detailed in Appendix A.
e. A narrative describing the software used to create the BIMs including the software publisher, software name and version number.

SECTION 3. Design Team: Modeling Requirements

3.1 BIM AUTHORING SOFTWARE

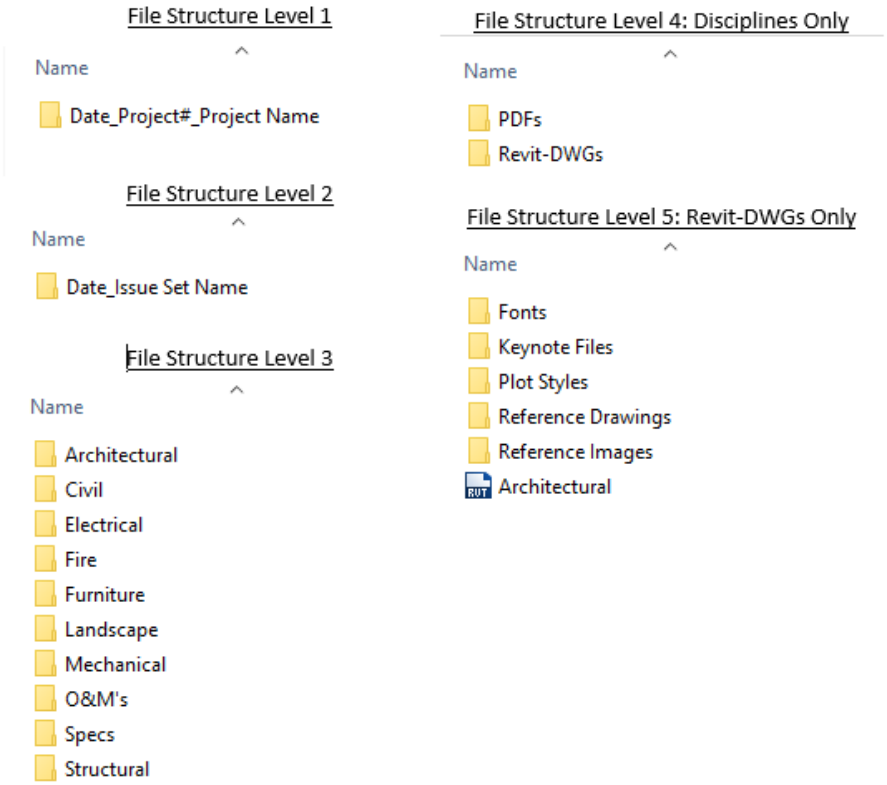
The Architectural and MEPF Designers shall model their systems in Revit. The Civil and MEPF designers may opt to use alternative software such as Civil 3D and NavisWorks Manage. The version number of any software to be used including collaboration software shall be announced and agreed upon at the start of the project and must be maintained throughout project close-out unless the team as a whole agrees to upgrade to a newer version.

3.2 GEO-REFERENCED MODEL

The Architects will set the spatial coordinates at the beginning of the project. The coordinates will be accurately geo-referenced to a permanent campus monument. This will be coordinated between the Civil Engineer, the Architects and WSU. It is the Architects responsibility to verify the accuracy of the coordinates and to provide a grid intersection at 0,0 for all other team members.

3.3 PROJECT COLLABORATION AND BIM ACCESS

The Design and Construction team will setup a project folder for all project related documentation, including all BIMs (see illustrations below). Included, will be a specific BIM folder that is strictly dedicated to 3D coordination models and files (such as Revit, Naviworks NWD's, NWC's, DWGs, etc.). Models will be accessible to all parties in both their native formats and in dwg and/or NWD/NWC/IFC formats (as requested). They will be updated on a regular basis showing any modifications that have been made.



3.4 DESIGN BIM FACILITATOR

The Design Consultant must have a dedicated full-time BIM Facilitator/BIM Engineer whose responsibilities include the following:

a. Ensuring that all members of their Design Team are delivering and updating the BIMs according to schedule (regularly).
b. Ensuring that the BIMs are uploaded to the common server/ ftp site on time and in the correct format(s).
c. Ensuring that the submitted BIMs comply with the requirements as defined in this document.
d. Assembling the submitted BIMs into a single consolidated BIM in Navisworks and reviewing the consolidated BIM for coordination and constructability feedback.
e. Providing design coordination and constructability feedback.
f. Facilitating design coordination meetings and e-mailing webcast invitations to the meetings at least 1 day prior to meeting. *
g. Having a solid working knowledge of Navisworks, Revit, and any other software tools to be used for BIM and model checking.
h. Ensuring that BIMs are used appropriately to test design requirements/ criteria.
i. Serves as POC for all internal and external BIMs with WSU and the General Contractor.
j. Ensuring that the model is geospatially located.
k. Ensuring that a common reference point is determined, distributed, and used by ALL team members.
l. Having a pro-active approach to problem solving and ensuring that everyone has what they need when they need it.

*Equipment and webcasting software used for the coordination meetings should be checked at least 15 minutes prior to the meeting.

3.5 MODEL QUALITY AND LEVEL OF DETAIL: ARCHITECTURAL AND MEPF

a. The Designers will set up the required parameters and fields in Revit to meet WSU FM requirements.
b. The Architects and MEPF Designers will review the Revit warnings periodically throughout the entire design process and correct any significant modeling issues. See Appendix E for a list of Revit model requirements and Revit warnings to correct.
c. All interior walls must be modeled to their correct heights and the corresponding **Revit families must represent the entire wall assembly accurately.**
d. Acoustic tile and hard lid ceilings may be represented as a plane with a thickness representing the total construction thickness.

3.6 AUDIO VISUAL AND OTHER SPECIALTY DESIGN DISCIPLINES

The AV system and any other specialty disciplines will be provided in a separate Revit file. All of the same rules apply as for the main design disciplines.

3.7 ENERGY REQUIREMENTS (to be developed)

3.8 EXISTING CONDITIONS

The Design Team shall model all existing conditions needed to explain the extent of the construction work for alterations and additions projects. The extent of modeling beyond the affected areas and the level of information to be included will be determined based on project needs. These requirements may be stated in the project program or discussed during the project kickoff meeting. The BIM Execution Plan should define the agreed upon scope of the modeling effort.

SECTION 4. MEPF SPECIFICATIONS

4.1 SHARED PARAMETERS

See Appendix B: MASTER ATTRIBUTES (page 28) for required fields for ALL MEPF system families.

4.2 NOMENCLATURE

Naming conventions for equipment types should be succinct, useful and descriptive. The names provided should allow for easy identification and be easily understood in order to facilitate the operation, repair and maintenance of WSU equipment. Appendix C provides nomenclature guidance.

4.3 WORKSETS

The MEPF Designers will create separate worksets in Revit and NavisWorks Manage for each MEPF trade and corresponding 3D views for each trade. The 3D views will be stored in a separate folder in the project browser designated: "3D COORDINATION". Include a folder for any 'Technician Notes' describing related paths for each category, where applicable: HVAC; mechanical; electrical; lighting; fire; etc. for guidance of future maintenance and repairs. WSU/FM considers controllers to be unique systems, separate from assets, and require them to be separated out in project. It is the responsibility of the Designers' BIM Facilitator to ensure the correct and necessary visibility of the items in the designated views. At a minimum, the following 3D MEPF views should be created without overlap of associated data:

a. Plumbing
b. HVAC Wet (i.e. HHW, CHW)
c. HVAC Dry (i.e. Ducts)
d. Mechanical Equipment
e. Electrical Power
f. Lights (**with light source disabled in the light families**)*
g. Fire Sprinkler
h. Methane (if applicable)

**The purpose for disabling the Revit family light sources is to remove the glow that appears in Navisworks as an object; which interferes with clash detection and obstructs views of other elements.*

4.4 ISOLATABLE SYSTEMS AND ZONES

MEPF systems must be defined within Revit such that each system can be isolated and viewed separately.

- **AREAS** – The Architectural model must contain areas, such as occupancy or departmental, as required by the program design.
- **ZONES** – The Mechanical model must contain MEPF zones, such as air circulation zones or others as required by the program.

4.5 BUILDING LINE

All underground utilities should be extended to within 5' of building and be taken precisely up to where they will meet the corresponding building utilities. There should be no overlapping of utilities around the building.

SECTION 5. DESIGN TEAM DELIVERABLE SCHEDULE AND MILESTONES

The submittal schedule along with the milestones for any given project is listed below:

Milestone	**Deliverable**
Contract Award	Final BIM Execution Plan
Conceptualization Phase	Architectural Massing Model
	Preliminary Energy Model Spreadsheet
Schematic Design Phase	Architectural Model
	Civil Model
	Schematic Energy Model
	Square Foot Cost Analysis (upon request)
Design Development	Architectural Model
	Civil Model
	Detailed Energy Model
	MEP Model or Models
	Structural Model
	Discipline Collision Report
	System Cost Estimate
	Program Validation
Construction Documents	Architectural Model
	Civil Model
	MEP Model or Models
	Structural Model
	Pre-Bid Collision Report
	Quantity Estimate

Additional deliverables and milestones requirements for the Design Team shown later in this document.

5.1 SCHEMATIC DESIGN PHASE

5.1.1 GENERAL

The Design Team may use any method to begin the design process but shall be using a BIM authored model(s) by completion of this phase. All information needed to describe the schematic design shall be included in and derived from these models. Deliverables are required as stated in the Deliverable and Milestones schedule.

5.1.2 CIVIL SURFACE AND UTILITIES

Detailed requirements of what is to be included in surveying deliverables is managed by WSU staff in consultation with the Design Team on a project by project basis. Surveys shall be provided in electronic format and minimally include 3d topographic information including paving and retaining walls and all civil utilities.

5.1.3 ARCHITECTURAL MODEL

The Design Team shall model all existing conditions as needed and the level of information to be included will be determined based upon project needs. The BIM Execution Plan should define the agreed upon scope of the modeling effort.

The model geometry shall include:

a. The building footprint definition and all exterior walls.
b. All interior wall definitions with all rooms modeled individually.
c. All fenestration.
d. All doors.
e. All overhangs, sun shades and roof monitors.
f. All floors, with a separate floor finish model element per room.

5.1.4 LEVEL OF DETAIL (LOD)

All elements shall be modeled to AIA standard LOD 100 by the appropriate design disciplines. Clearances and access zones should be modeled on separate layers, one layer per system.

LOD 100 Model Content Requirements: Overall building massing indicative of area, height, volume, location and orientation.

5.1.5 PROGRAM AND SPACE VALIDATION

The Design Team shall use the BIM Authoring software or other analysis tools to compare and validate the stated program requirements with the actual design solution.
The following shall be developed automatically from the Building Information Model:

a. Assignable Areas and Non-assignable areas measured to inside face of wall objects and designated boundaries of areas.
b. Gross Area measured to the outside face of wall objects.

5.1.6 COBie DESIGN DATA

The Design Team shall submit the design data to WSU in spread sheet format in compliance with the most current version of COBie. This data set shall include those COBie "designer" worksheets related to the architectural program. The following COBie Design worksheets shall be provided in the Schematic Design Set:

Contact – (all fields)
Facility – Facility(ies) referenced in the file (all fields)
Floor – Description of vertical levels (all fields)
Space – Spaces referenced in the project (all fields)
Zone (all fields)

5.1.7 INITIAL COLLISION REPORT AND CONSTRUCTABILITY

The Design Team BIM Facilitator is to assemble all of the models into a single consolidated or linked A/S/MEP model and may use automated collision detection software for this phase of the work ***in addition*** to performing a visual walk through of the model from various perspectives and cross sections to detect any constructability issues that would not necessarily be detected automatically.

All disciplines should be clashed against one another and all clearances and access zones should be verified either by clash detection or visual inspection to be clear of any unacceptable obstructions. The intention is to have as error and collision free a model as possible at each submission phase.

5.2 DESIGN DEVELOPMENT PHASE

5.2.1 GENERAL

The Design Team shall continue developing their BIMs. Parametric links shall be maintained within the models to enable automatic generation of all plans, sections, elevations, custom details and schedules as well as 3D views. Deliverables are required as stated in the Deliverables and Milestones schedule (see page #).

5.2.2 MODEL CONTENT

See appendix A for the list of minimum required model elements.

5.2.3 LEVEL OF DETAIL (LOD)

All elements shall be modeled to AIA standard minimum LOD 200 by the appropriate design disciplines. Clearances and access zones should be modeled on separate layers, one layer per system.

LOD 200 Model Content Requirements: Model Elements are modeled as generalized systems or assemblies with approximate quantities, size, shape, location and orientation.

5.2.4 COBie DESIGN DATA

The Design Team shall submit the design data in conformance with the most current version of COBie. This data set shall include those COBie "designer" worksheets related to the architectural program. The Designer shall specifically identify spatial and systems zoning to reflect the space circulation zones and building service zones that are reflected in the design drawings and specifications. The following COBie Design worksheets shall be provided in the Schematic Design Set:

- **Contact** (all fields)
- **Facility** (all fields)
- **Floor** (all fields)
- **Space** (all fields)
- **Zone** (all fields)
- **Type** (Name, CreatedBy, CreatedOn, Category, Description, AssetType, ExtSystem, ExtObject, ExtIdentifier)
- **Component** (Name, CreatedBy, CreatedOn, TypeName, Space, Description, ExtSystem, ExtObject, ExtIdentifier)
- **System** (all fields)

5.2.5 COLLISION DETECTION AND CONSTRUCTABILITY

Repeat process described in Appendix F.

5.3 CONSTRUCTION DOCUMENTS PHASE

5.3.1 GENERAL

The Design Team shall continue development of the models created in the Design Development Phase. Parametric links shall be maintained within the models to enable automatic generation of all plans, section elevation, custom details and schedules as well as 3D views. Deliverable are required as stated in the Deliverable and Milestones schedule (page #).

See Appendix A for the list of minimum required model elements.

5.3.2 MODEL CONTENT

Refinement of the model content defined in the design development phase. Whatever content was not known at that time should be accurately represented in this phase.

5.3.3 LEVEL OF DETAIL (LOD)

All elements shall be modeled to AIA standard minimum LOD 350 by the appropriate design disciplines. Clearances and access zones should be modeled on separate layers, one layer per system.

LOD 350 Model Content Requirements: Model elements are modeled as specific assemblies accurate in terms of quantity, size, shape, locate and orientation.

5.3.4 PROGRAM AND SPACE VALIDATION

The Design Team shall use the methodology described in item 5.1.5 to reconfirm the program (including Room ID #, Room Names, and SF).

5.3.5 OTHER ANALYSIS AND CHECKING TOOLS

The Design Team shall analyze the design using software that interacts with the model in order to refine load calculations, daylighting, natural ventilation, acoustics, code issues and design issues in addition to reviewing and correcting any issues arising out of the Revit warnings in both Revit Architecture and Revit MEP.

5.3.6 COBie DESIGN DATA

The Design Team shall re-submit the design data that was developed in the Design Development phase but further refined at this phase, to WSU in conformance with the most current version of COBie.

- **Contact** (all fields)
- **Facility** (all fields)
- **Floor** (all fields)
- **Space** (all fields)
- **Zone** (all fields)
- **Type** (Name, Created By, Created On, Category, Description, Asset Type, Ext System, ExtObject, ExtIdentifier)
- **Component** (Name, Space, Typename, CreatedBy, CreatedOn, Category, Description, ExtSystem, ExtObject, ExtIdentifier)
- **System** (all fields)
- **Document** (all fields, submittals and similar documents, ApprovalBy = “Information Only”, Stage = “Requirement”)
- **Attribute** (all fields, design-intent attributes, Category = “Requirement”)

5.3.7 COLLISION DETECTION AND CONSTRUCTABILITY

a. The Design Team must provide a clash free design model using the method described in item 5.1.7.
b. If there are any outstanding unresolved issues, the Design Team must submit a list of these with an explanation of why they could not be resolved.

5.4 BIDDING PHASE

5.4.1 ARCHIVING OF DESIGN BIMS

At the completion of Construction Documents, the 100% CD design BIMs will be archived in the folder and designated “As Designed”.

5.4.2 BID DELIVERABLE

The 100% CD BIMs and associated documentation will be made available to prospective General Contractor's and their subcontractors for bidding purposes. The Design Team BIM Facilitator will provide the General Contractor with access to the BIM files. It will be the responsibility of the General Contractor to distribute models as they deem necessary to bidding subcontractors**. It should be noted however, that access to the BIMs is provided for reference, clarification and design intent only and if used for estimating or any other purpose, is done so at the sole risk of the General Contractor and its subcontractors.**

5.4.3 BIM EXECUTION PLAN

The General Contractor shall submit a BIM Execution Plan describing processes and procedures in place within their organization to coordinate and deliver the BIMs and associated data according to the guidelines contained herein. See Appendix E for the BEP template to be used.

5.4.4 DESIGN MODEL UPDATES

The Design Team will continue to develop and update the design models throughout the entire construction process. For any design changes that have a direct and immediate effect on construction coordination, the Design Team must update and re-upload their design models to the project BIM folder in e-Builder within 3 work days if there is an ASI, MSI, SSI or any other question that is answered by the Design Team that requires a design change or a change order that affects coordination or that is driven by coordination (such as ceiling elevation changes or a change in the size of a shaft opening).

The MEP Engineers will not be uploading changes to the MEPF models but will be updating their MEPF design models immediately following the subcontractor sign off of a given floor on a floor by floor basis. Model mash-ups (see **item 6.5.6** below) can be used as a check to ensure that the design model mimics the fabrication models.

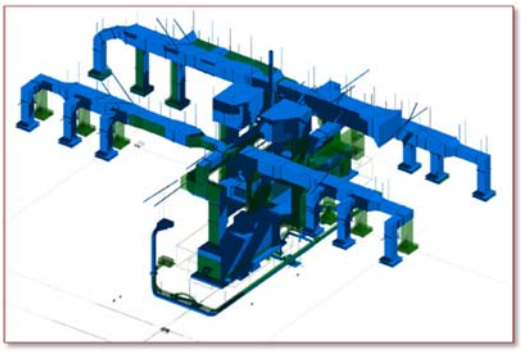
The Architects will publish a monthly bulletin summarizing all questions, resolutions and model changes/updates, and all decisions for design or for value engineering that have been made and will post the bulletins to the server as a non-editable file along with the updated models.

All of the above described bulletin items shall be recorded in the model with labeled bubbles around the affected area with reference to the bulletin item number.

The Structural Designer will be updating the design model in parallel with the steel fabricator. In some cases, the Designer's structural model may be the only model used throughout.

5.4.5 MODEL MASH-UPS IN NAVISWORKS

The mash-ups are overlays of the final as constructed fabrication models with the most up-to-date MEPF design models. This provides the Designers with a visual comparison of the design vs. fabrication model types – to assist them in making any required adjustments to their design model to match the "as constructed" condition. Model mash-ups will be created as each floor's coordination is complete and is signed off by all of the trade subcontractors.



Above: Sample mash-up of ductwork. Green duct must be adjusted to match as-built blue duct.

SECTION 6. CONSTRUCTION TEAM: BIM PROCESS AND MODELING REQUIREMENTS

6.1 BIM EXECUTION PLAN FEEDBACK AND REVISIONS

WSU will provide a marked up version of the General Contractor's BIM Execution plan with any comments or exceptions upon award of the contract. The General Contractor is required to make the appropriate revisions and re-submit for final approval one week after receipt of the marked up plan.

6.2 CONSTRUCTION BIM FACILITATOR

The General Contractor must have a dedicated full time BIM Facilitator/BIM Engineer on staff with proven at least 3 years of MEPF coordination experience and whose responsibilities include, but are not limited to:

a. Ensuring that all of the subcontractors are updating the BIMs according to schedule.
b. Ensuring that the BIM's get uploaded to the common server on time and in the correct file format(s).
c. Ensuring that the submitted BIMs comply with all of the requirements as defined in this document including COBie data requirements.
d. Assembling the submitted BIMs into a single consolidated BIM in Navisworks and reviewing the consolidated BIM for coordination and constructability issues.
e. Providing construction coordination and constructability feedback.
f. Facilitating construction coordination meetings.
g. Having a solid working knowledge of Navisworks, Revit and any other software tools to be used for BIM and model checking.
h. Serving as the POC for all internal and external BIM's with WSU and the Designers.
i. Having a pro-active approach to problem solving and ensuring that everyone has what they need when they need it. *
j. Creating a 3D Grid.

*This often entails constant reminders to responsible parties (including WSU) to make timely decisions or provide information expediently.

6.3 COBie CONSTRUCTION DATA

The General Contractor will be responsible for updating and adding additional data.

- **Contact** (all fields)
- **Facility** (all fields)
- **Floor** (all fields)
- **Space** (all fields)
- **Zone** (all fields)
- **Type** (all fields)
- **Component** (all fields)
- **System** (all fields)
- **Spare** (all fields)
- **Resource** (all fields)
- **Job** (all fields)
- **Document** (all fields, installed equipment documentation, ApprovalBy = "Owner Approval", Stage = "As Built")
- **Attribute** (all fields, manufacturer-providded attributes, Category = "As-Built")

The Quality of the COBie data will be checked against the requirements provided by the Owner and detailed herein. If the requirements are not met, the General Contractor shall resubmit the data within two weeks after WSU provides a report of inaccurate or missing data.

COBie compliant data will be used by WSU for linking associated data in the 3D models to WSU 's Facility Management and Maintenance systems and it is essential that the required fields and file naming conventions be followed accurately.

The COBie compliant data will be verified and feedback provided by WSU at a minimum, at the following construction stages:

- 75% Substantial Completion
- Commissioning Complete
- Project Close-Out

6.4 EXTRACTING INFORMATION FROM THE DESIGN MODEL

The General Contractor can extract any required 2D background, such as floor plans or reflected ceiling plans from the most current Revit files.

It is the General Contractor's responsibility to export the individual trades and systems from Revit in an appropriate file format (.dwg OR .nwc, for example) for the corresponding subcontractors if necessary.

6.5 CONSTRUCTION MODEL UPDATES

All subcontractors shall update their models regularly during construction to reflect the accurate as constructed/as installed condition. This **shall not** be left until the end of the project. The General Contractor's BIM Facilitator will be responsible for ensuring that this process is in place and for verifying compliance. Where installation differs from the coordinated model, a log of adjusted installations will be kept detailing what the change was, the reason for the change and confirming that the 3D model has been updated accordingly. See Appendix D for sample log.

6.6 TRADE COORDINATION

6.6.1 KICK-OFF MEETING

All members of the design and construction team are required to attend the initial BIM kick-off meeting in person at the designated WSU location. There must be at least one representative from each trade. The General Contractor will provide the details of the meeting date, time and place.

6.6.2 SUGGESTED COORDINATION PROCESS

The General Contractor's BIM Execution Plan will confirm the intended procedures to be implemented.

A BIM folder created for uploading the 3D models produced by the Designers and subcontractors. These models will be accessible to authorized team members for individual coordination purposes on a trade by trade basis.

The General Contractor's BIM Facilitator shall be responsible for integrating all of the 3D models into a single consolidated Navisworks NWF and NWD per floor, running clash detection and creating viewpoints of identified issues.

The MEPF detailers are required to submit models that are clash free from any structural components that are included in the structural model provided, to the best of their ability.

One integrated BIM per floor or zone shall be published in a Navisworks NWD file format and shall include numbered and labeled view sets of clashes and/or other design/constructability issues that the General Contractor uncovers during this process. The individual team members will be responsible for reviewing the saved views one by one prior to the next coordination meeting. To this end, all team members must have at their disposal one copy of Navisworks Manage.

Each party can be notified automatically when any file is uploaded if he/she so chooses.

For all e-mail communications on this project, preface the subject line with the acronym for this project: PROJECTNAMEACRONYM.
The General Contractor shall create a 3D grid for incorporation into the Navisworks file. A minimum of one copy of the 3D grid should be placed at each floor level and should be named according to the level that it is placed, e.g. 3D grid_L01. This will provide the viewer with a quick point of reference when navigating through the model.

All 3D detailers and associated foremen shall be required to attend regularly scheduled interactive coordination sessions facilitated by the General Contractor's BIM Facilitator. Designers should be available upon request and should expect to attend a number of these sessions as well. During these sessions the coordination team shall review the consolidated model and the saved viewpoints on a floor by floor basis and find solutions to identified issues. Attendance via webcast is an option.

The BIM Facilitator shall include in the BIM Execution Plan a description of the methodology to be used for tracking and ensuring the timely resolution of clashes and/or constructability issues. A Clash matrix must be provided by the General Contractor's BIM Facilitator with numbered viewpoints and with a description of the trades that are affected, matching the viewpoint numbers and labels in the associated Navisworks file. This matrix can be used by all parties to identify the agreed upon party(ies) responsible for resolving the clashes and to add personal notes. ALL matrix issues should be resolved by the designated trades responsible at least 24 hrs prior to the following coordination meeting.

The General Contractor must provide a BIM coordination room in a mutually agreed upon location for regularly scheduled 3D coordination meetings. The "BIM Room" must be equipped with the following minimum equipment and software specifications:

- 64 bit operating system on a desktop or laptop
- Navisworks Manage
- Document viewing software
- Projection system that allows for dual display

The General Contractor must be vigilant about engaging the design team on a regular basis to review, assess and provide feedback on any design related issues AS THEY ARISE.

Shear wall and slab penetration location information must be provided to the Structural Engineer as soon as a set location for said penetrations has been determined as a result of the 3D coordination effort. Initial locations of suggested penetrations can be provided by means of 3D viewpoints saved as jpegs, with dimensional information and grid references (if one or more of the 3D grid intersections can be seen in the view, that is sufficient) and/or in the form of 2D elevations with dimensions and grid references.

6.6.3 INSTALLATION

a. Field installation will use some form of optical survey or GPS instruments for hanger inserts at a minimum and for any other installation where practicable.
b. It is the General Contractor's responsibility to ensure that all field personnel involved in the installation of MEPF at any level have at least minimal familiarity with the BIM models and understand by visual means what the repercussions are for changing the location of an installed item.
c. The General Contractor must have at least one dedicated workstation in the field (or within easy access) with the most current Navisworks files and documentation loaded (updated daily) for the duration of the construction process. This workstation shall be accessible by all field personnel. The Navisworks files shall have saved viewpoints for specific areas based on the planned and scheduled subdivision of work areas.

6.6.4 REQUIREMENTS FOR 3D MODELS, FORMATS AND MODEL STRUCTURES

a. FILE FORMAT: All files should be exported to 3D DWG or Navisworks NWC or NWD format. Revit has a Navisworks plug-in for direct export to NWC.
b. 3D SOLIDS: all objects must be modeled as 3D solids, not wire frame or lines.
c. MODEL STRUCTURE: Models should be created on a floor by floor basis from top of slab to top of slab. If this is impractical for certain trades, alternate solutions can be discussed.
d. LEVEL OF DETAIL (LOD): The models should contain the same level of detail as required for fabrication and installation. See Appendix D for required LOD.
e. LIGHT SOURCES TURNED OFF: Prior to ecporting lights to Navisworks, make sure that the lights source is turned off in all of the light families. Otherwise the light source appears as a spherical object in Navisworks which id difficult to isolate globally.
f. LOCAL COORDINATES: When exporting Revit files to Navisworks, use local coordinates.
g. CLEARANCES AND ACCESS: All clearances and access to equipment, valves, etc. required by code or requested by WSU for the purposes of operations and maintenance must be modeled in 3D and kept in a separate layer and labeled correspondingly. These should be reviewed by the WSU maintenance staff at approximately 80% coordination completion of each floor to verify the adequacy and practicality of the assigned space reservations and signed off at 95% to 100% coordination of each floor. This process shall be coordinated by WSU's Project Manager.
h. TRADE COLORS: Each trade shall be identifiable by a single color within Navisworks with the exception of architectural and structural elements as follows:

There is no ne ltered when
imported into

COMMON REI n reference point
or global coor the Architects.

"CLEAN" MOD contain only
relevant 3D da

SECTION 7. PROJECT CLOSE-OUT

Milestone	Deliverable
Project Close-Out (Design Team)	As-Buildt Models (.rvt format)
	Record Document Project Drawings (.pdf format)
	Record Document Drawings (2 sets of paper)
Project Close-Out (Contractor)	Scanned Field Set Drawings – As-Built (.pdf format)
	O&M Manuals (paper / .pdf / excel format)
	Coordination Models in their native format

7.1 DESIGN TEAM AS-BUILTS

The Design Team shall update their respective models with contractor recorded changes (Record Documents). Republish record document in paper, .dwg and .pdf formats. They must also submit full Revit models with all needed objects and reference drawings, in original authored software. The Design Team is required to submit all per Weber State University professional services contract (deliverables sections) and the Weber State University As-Built Requirement document (prior to final payment).

7.2 CONTRACTOR RECORD DOCMENTS

The contractor shall submit one set of scanned field set drawings (Record Documents) in .pdf format (at substantial completion.)

7.3 O&M (OPERATIONS & MAINTENANCE) MANUALS

The contractor shall submit the following information to Weber State University – two paper copies in binders of the O&M Manuals. An electronic format of the O&M manuals shall also be submitted along with the paper copies, the format shall be color PDF and native Excel files (at substantial completion).

Appendix A

Architectural Systems Model

The model should be modeled to a level that defines the design intent and accurately represents the design solution. Building elements will be modeled using the specific element tool in the BIM-authoring application (a door is created using the door tool; a slab is created using the slab tool; etc.). If the situation arises where such tools are not available, a generic object should be created and assigned to a building element type. This enables tracking elements, linking them and/or adjoining to other elements, and managing those relationships within the model.

The model should include the following elements (if applicable):

- Architectural Site plan (also see Civil Engineering section)
- Paving, grades, sidewalks, curbs, gutters, site amenities and other elements typically included on enlarged scale site drawings in building vicinity.
- Existing conditions to the extent required.
- Demolished items to the extent required.
- New interior and exterior walls - shall have relationships to adjoining walls and to the spaces they encompass. Include all finishes within the wall type regardless of the thickness of the finish.
- Wall thickness and height – Required for routing main utilities, locating VAV boxes, identifying priority wall framing, wall penetrations, fire stopping.
- Doors, windows, openings – New Interior and exterior Doors and windows should always be inserted into a wall component (to create links/relationships) and must not extend beyond wall geometry. Associate hardware and accessories to doors and windows via properties. Storefront doors must be modeled as "contained" in a wall object and not extend outside wall area. Curtain Walls and large window assemblies must be modeled as "contained" in a wall object and not extend outside wall area.
- Interior and exterior soffits, overhangs, sun control elements
- Parapets, screening elements
- Architectural precast
- Floor, ceiling and roof systems including but not limited to:
  - Include appropriate structural items listed if not provided by the structural engineer and integrated into the architectural model for coordination and document generation.
  - Insulation
  - Roof, floor and ceiling slopes, if needed.
  - Soffits, openings, and accessories
  - Hard ceilings and soffits – Required for identifying HVAC diffuser locations, electrical fixture locations, and routing of utilities with openings for diffusers and lights.
- Elevators, stairs, and ramps (including railing systems)
- Shafts, wall chases – Required for identifying the correct locations of plumbing vents, and HVAC shafts.
- Architectural features requiring utilities – Required for utility routing.
- Architectural features in mechanical spaces – Required for utility routing.
- Casework, shelving, and other interior architectural elements
- Furnishings, fixtures, equipment, and associated manufacturers and specifications (if not provided by others and integrated into the architectural model for coordination and document generation.)
  - Furniture and Furniture Systems (Fixed and Loose)
  - Specialty equipment (food service, medical, etc.)
- Model mechanical, electrical and plumbing items that require architectural space (toilets/sinks/etc.), require color/finish selection (louvers, diffusers, etc.) or affect 3D visualization (lighting fixtures) unless provided by engineers.

- Clearance zones for access, door swings, service space requirements, gauge reading, and other operational clearance must be modeled as part of all equipment and checked for conflicts with other elements. These clearance zones should be modeled as invisible solids within the object.

Structural Systems Model

Model the following structural elements (if applicable):

- Footings
- Foundations such as:
  - Spread Foundations
  - Caisson Foundations
  - Pile Foundations
  - Mat Foundations
  - Load-bearing Wall Foundations
- Framing such as:
  - Steel Columns (with correct shape and size)
  - Steel Floor C-Joists
  - Open Web Joists
  - Joist Girders
  - Steel Beams (with correct shape and size)
  - Precast Concrete Elements (Hollow Core Plank may be modeled as a slab unless the hollow core is being used for mechanical systems and coordination with those systems needs to occur).
  - Cast-In-Place Concrete Elements
  - Floors including overall extents and openings
  - Model overall thickness of wood floor systems
  - Wood Posts/Column
  - All other Joists
  - Wood Trusses
  - Solid Wood or Laminated Beams
  - Fireproofing, if required – alternatively use a 2” clearance for clash detection
  - Braces and gusset plates
  - Supplemental steel
  - Miscellaneous supports for equipment, toilet partitions, etc.
  - External wall framing connections
  - Area of influence zones under foundations
  - Slabs and slab depressions
- Wall Types including openings
  - Load Bearing Walls – for calculations only (Masonry, Concrete, Cold-Formed Steel, and Wood)
  - Model overall thickness of Cold-Formed Steel and Wood Stud walls (individual members may be modeled at the Design Team’s option)
  - Structural Foundation Walls including brick ledges
- These items may be modeled at the Design Team’s option:
  - Steel reinforcing in concrete
  - Embeds in concrete
  - Miscellaneous Steel
  - Angles for openings, deck bearing, etc.
  - Channels for mechanical units needed for coordination reviews between structural and mechanical
  - Lintels (unless considered a major member)

- Metal decks

HVAC Systems

Model the following HVAC elements at a minimum. The detail and responsibility to fulfill these modeling requirements should be addressed fully within the BIM Execution Plan.

- Equipment
  - Fans, VAV's, compressors, chillers, cooling towers, air handlers, etc.
- Distribution
  - Supply, return, exhaust, relief and outside air ductwork modeled to outside face dimension or duct insulation (whichever is greater).
    - Duct Joints
      - Diffusers, grilles, louvers, hoods, radiant panels, perimeter units, wall units.
- Pipes sized at and over 3/4" diameter, include any insulation in model unless otherwise noted by the BIM Execution Plan.
- Clearance zones for access, door swings, service space requirements, gauge reading, and other operational clearance must be modeled as part of the HVAC equipment and checked for conflicts with other elements. These clearance zones should be modeled as invisible solids within the object.

Mechanical and Plumbing Systems Model

Model the following elements (if applicable):

- Installation of all utilities, regardless of size or diameter, shall be modeled.
- Layers shall be labeled as per the architectural drawings to identify the utilities.
- Model Clearance Requirements – Model should include code and maintenance items, such as valve handle swings and pull chain drops. Constructability clearances for a specific utility line or equipment shall be modeled in 3D and contained on one dedicated layer.
- Insulation should be included on all piping, plumbing and ductwork where required.
- Pre-Fabrication – Any pre-fabricated item shall be included in the model to ensure proper space and connections.
- All modeled objects must be custom/specific objects from the manufacturer – Generic model pieces should not be used for the 'signed off' coordination models.
- MEPF systems should contain a minimum amount of associated data for ease of identification: hot water, cold water, waste, supply, return, overall duct and pipe sizes, elevation, etc.
- HVAC&R Equipment
  - Fans, VAV's, compressors, chillers, cooling towers, air handlers etc.
- HVAC&R Distribution
  - Supply, return, exhaust, relief and outside air ductwork modeled to outside face dimension or duct insulation (whichever is greater)
  - Duct Joints
  - Diffusers, grilles, louvers, hoods, radiant panels, perimeter units, wall units
- Pipes larger than 3/4" diameter, include any insulation in model.
- Clearance zones for access, door swings, service space requirements, gauge reading, and other operational clearance must be modeled as part of the HVAC equipment and checked for conflicts with other elements. These clearance zones should be modeled as invisible solids within the object.
- Low pressure duct – Required for coordination and routing of other trades as well as pre-fabrication.

- Shaft locations – Required for coordination and routing of other trades and for locating smoke dampers, etc.
- Flanges
- Fire smoke dampers – Required in coordination, tagged with correct Equipment ID.
- Flex ducts – Required for showing how low pressure ducts connect to the diffusers.
- Diffuser locations and sizes – Required for coordination of finish utilities with the other fixtures in a room (like electrical fixtures, etc.).
- All duct and pipe insulation – Should be included where required so that the maximum sizes are represented in the model. – Required for coordination.
- Hangers and seismic bracing – Required for coordination and routing of other trades and for inserting the deck correctly before installation begins.
- HVAC piping to VAV boxes – Main lines are required for coordinating with other trades; also required if they will be pre-fabricated; connections to VAV boxes can be left for field routing.
- HVAC piping to Equipment – Main lines are required for coordinating with other trades; also required if they will be pre-fabricated; final connections to equipment need to be coordinated on model as well.
- Underground utilities - Required for underground MEP / FP coordination.
- Mechanical room

Plumbing and Fire Protection

Model the following plumbing and fire protection elements at a minimum:

- Waste and Vent Piping sized at and over 3/4" diameter, includes any insulation in model
  - Roof and floor drains, leaders, sumps, grease interceptors, tanks, water treatments and other major items.
- Supply Piping larger than 3/4" diameter, includes any insulation in model.
  - Domestic Booster Pumps
- Fixtures: sinks, toilet fixtures, water tanks, floor sinks
- Fire protection
  - Sprinkler lines larger than 3/4"diameter
  - Sprinkler heads, Fire Protection Pumps
  - Stand pipes, wall hydrants, fire department connections, risers, including valve clearances
- Clearance zones for access, service space requirements, gauge reading, valve clearances and other operational clearance must be modeled as part of the plumbing and fire protections system and checked for conflicts with other elements. These clearance zones should be modeled as invisible solids within the object.

- Plumbing fixtures – Required for coordination with other MEP trades.
- Graded cast iron pipe lines – Required for coordination with other trades and pre-fabrication.
- Underground storm and sewer pipes – Required for underground utilities coordination and for prefabrication.
- Waste and vent lines – Required for coordination with other trades and with architectural walls, shafts and for pre-fabrication.
- Cold and hot water piping – Required for coordination with other trades and for pre-fabrication. Identify valves and tag with appropriate valve number.
- Hangers and seismic bracing details – Required for coordination with other trades and for inserting before installation.
- Specialty piping – Required for coordination with other trades and for pre-fabrication.
- All equipment – Required for coordination.
- Methane

Sprinklers

- Sprinkler mains and branches – Required for coordination with other trades and for pre-fabrication.
- Sprinkler head drops – Required for coordination with finish utilities like electrical lighting, diffusers, etc.
- Sprinkler pipes – Required if hard pipe is used, useful if the newer type of flex pipe is used.
- Hangers and seismic bracing – Required for coordination with other trades and for inserting the deck correctly before installation begins.
- Underground utilities - Required for underground MEP / FP coordination.
- All equipment – Required for coordination.

Process Piping

- Process piping – All piping, valves, actuators, and fittings required for coordination with other trades.
- Hangers and seismic bracing – Required for coordination and routing of other trades and for inserting the deck correctly before installation begins.
- Process equipment – A model of each piece of equipment must be provided by the equipment manufacturer for coordination with other trades.

Controls

- Conduit and tubing – All Instrument Air, power and control wiring conduit, conduit and distribution boxes serving control tubing are required for coordinating with other trades.
- Equipment panels – Required with associated conduit and gutters in the model for space coordination with other trades as well as determining backing.
- Raceways - Required for coordination with other trades.

Electrical systems

Model the following electrical elements at a minimum:

Data, Power and Telecommunications

- Interior and exterior transformers, emergency generators, and other equipment
- Main and distribution panels and switchgear including access clearances
- Main IDF's
- Branch, Feeders and conduit larger than ¾" diameter – Required for coordination with other trades and for pre-fabrication.
- Outlets, switches, junction boxes – Required for coordination with other trades.

Lighting

- Permanently mounted lighting fixtures Lighting fixtures – Required for coordination with other trades and finish utilities like ceiling grid, sprinkler heads, HVAC diffusers and specialty lighting. Tag with Circuit number. (Moveable, plug-in fixtures need not be modeled as estimating purposes within a loose furnishings package. Should be discussed and agreed upon within the BIM Execution Plan.)
- Lighting Controls

Fire Alarm and Security Systems

- Fire Alarm and Security Systems

- Input devices
- Notification devices
- Associated equipment and access clearances
- Permanently mounted fixtures

- Building Controls
- Electrical Power-Off Buttons (EPOs)
- Clearance zones for access, door swings, service space requirements, gauge reading, valve clearances and other operational clearance must be modeled as part of the electrical equipment for collision checking. These clearance zones should be modeled as invisible solids within the object.
- All underground conduits – Required for underground MEP / FP coordination.
- All lighting supports for special lighting – Required for routing and coordination of other trades.
- Cable trays and other supports – Required for coordination with other trades.
- Hangers and seismic bracing – Required for coordination with other trades and for inserting the deck.
- Equipment Panels – Required for coordinating with wall framing to determine backing, etc. Tag with Panel number.
- Electrical rooms – Required for coordination with wall framing and other trades.
- Bundles of cable or wiring – Useful for coordination and pre-fabrication.
- Outlets and switch locations in rooms – Useful for pre-fabrication and coordination. Tag with Circuit number.
- Electrical power off buttons
- All equipment – Required for coordinating with other trades.

Specialty Consultants

Suppliers should be requested to provide equipment models to an appropriate level of detail. If that is not available, model the following specialty consultant elements to correct size and location:

- Equipment provided or specified by said consultant
- Rough-in connection points for power, data, communications, water service and waste, gas, steam, or other needed utilities.
- Extent of specialty consultant modeling shall be coordinated with the Design Team and described in the BIM Execution Plan.
- Clearance zones for access, doors swings, service space requirements, controls, gauge reading, and other operational clearance must be modeled as part of the equipment and checked for conflicts with other elements.

Civil Engineering

If a Civil BIM model is used it should include the following civil engineering elements at a minimum:

- Topography – 3D terrain of all site work as designed, including retaining walls. This model should include the site and surrounding areas that contribute to the site's drainage system or otherwise impact on the site. In most cases this will require that adjacent roadways be modeled.
- Landscaping elements: planting areas, such as raised planting beds and berms, parking islands, pools/ponds/other water features, terraces and other items not included elsewhere in the model.
- Irrigation system and equipment
- Storm water management structures, pump stations, fueling systems, manholes and other major items that impact on the overall project understanding or which may become project design constraints. All items must be geo-referenced such that all elements can be viewed as an overlay in the BIM or Indiana University's GIS system correctly positioned in the correct

Information Technology Systems

- Underground OSP System

  - Conduits size
  - Conduits number
  - Conduit locations
  - Trench line location
  - Conduit depths and details
  - MH locations
  - MH size
  - MH details/cable layout splice locations
  - Copper cable type, size
  - Copper cable splice cases
  - Fiber cables type, size
  - Fiber splice cases

- Building Inside Cable Supports Infrastructures

  - OSP conduits entering MDF room.
  - Riser system from main telecom room to other telecom rooms. Amount, size and route.
  - MDF room size location and layouts.
  - Other Telecom room size and layout.
  - Conduits, sleeves, stub up conduits, boxes, cable trays and their location and sizes.
  - Telecom Jack locations, wall mounted floor mounted.
  - Telecom outlets types, quad, duplex, single, rack mount patch panels.
  - Wi-Fi location and cable.
  - Telecom room's power outlet locations.
  - Telecom room ground Bus Bar.
  - Telecom room AC location and size.
  - All associated supports (wire and/or rods).
  - Distributed Antenna System (DAS).
  - Cable or satellite TV.
  - Security cameras.
  - Building or site emergency phones.
  - Area of refuge phone requirement.

Energy modeling

The Design Development phase energy model shall build upon the model developed in the Schematic Design phase.

This energy model shall be complete enough to use for additional submissions, such as LEED EA Credit 1 calculations, should the building apply for LEED certification. This model shall be detailed and finalized enough to use as an indicator of approximate building energy use after occupancy. This model shall also serve as a baseline for future comparisons. After building completion and occupancy of a minimum of one year, actual building performance shall be evaluated against this model. This model shall be used as a tool to facilitate post-occupancy commissioning should discrepancies between modeled and actual energy use arise. Caution is advised in this, as deviations from design in weather, occupancy, plug loads, schedules, electric and fuel costs, etc. will affect actual energy use, and these factors must be taken into account.

PROJECT AS-BUILT AND RECORD DOCUMENT DELIVERABLES

Prior to Record BIM Submittal

- Verify that all Construction BIMs represent as-built conditions, including Architectural Supplemental Instructions, Change Orders, and field changes.
- Create, for each discipline or system, a Record BIM for each floor of the building
- Verify that the Record IBMs for each floor register in X, Y and Z dimensions
- Commissioning data, as to design intent, performance criteria and operations data shall be recorded and/or linked to the REVIT model as commissioning occurs throughout the project. It is the contractor's responsibility to coordinate the information sources and integrate this information into the REVIT model

AS-BUILT BIM

As-Built record BIMs serve to document the as-constructed building and components for use in future projects and O&M activities, and as the project record archive. The as-built BIM is maintained by WSU to capture building and component updates throughout the lifecycle of the facility.

The As-Built BIM delivered, shall correspond with the realities of the facility as-constructed and provide accurate data for maintenance, life-cycle management and future projects/renovations.

The Design Team shall update their respective models with contractor recorded changes and republish in paper, Autodesk Revit (.rvt) and .pdf formats. (May also include Autodesk NavisWorks (.nwd), AutoCAD (.dwg), and/or Autodesk Civil 3D (.dwg) files/formats.

Project Close-out Deliverable include, but are not limited to:

- As-Built Models in .rvt format
  - Architectural Model
  - Structural Model
  - MEP Model
- Record Document Project Drawings in .pdf format
- Record Document Project Drawings – 1 set – full-size paper
- O&M Manuals in .pdf format (pdf template provided by WSU)

OWNERSHIP AND RIGHTS OF DATA

Weber State University has ownership of all CAD files, BIM models, and facility data developed for the project and may make use of this data following any deliverable.

Appendix B

COBie

Information Tiers

For the purpose of categorizing data that would eventually be delivered in a COBie compliant format, the following tiers have been established.

Tier #1: Master Attributes + Asset Management Attributes
It is anticipated that these will be found and maintained (throughout the project) within the design models.

Tier #2: Balance of information required of COBie
It is anticipated that these shall be found and maintained (throughout the project) within the agreed upon depository of COBie worksheets.

Tier #3: Project close-out documents
It is anticipated that these shall be found and maintained (throughout the project) within the agreed upon depository of COBie worksheets.

COBie Standard Worksheets

The following COBie standard worksheets shall be provided (at minimum) to meet the long term Facilities Management goals. The standard fields within these respective sheets shall be consistent with the current COBie 2 standards.

1. Design models:
    a. Contact
    b. Facility
    c. Floor
    d. Space should be classified using OmniClass and Net Area is provided (Gross Area is generated by Revit).
    e. Zones should have categories assigned.
    f. Types should have Name, Category (OmniClass), Description, AssetType.
    g. Components should have Name, Description, Type and Space.
    h. Systems should have Name, Category (OmniClass), Components.
    i. Document
    j. Attribute (see Tier#1 for minimum requirements)

2. Construction models
    a. Type information updated by providing manufacturer, model number, warranty information (parts and labor and duration), replacement cost.
    b. Component information updated by providing serial number, installation date, warranty start date, tag number and/or barcode. Installation date for major equipment will be the finish date of the scheduled activity.
    c. Spare parts provided for types.
    d. Attributes provided for types and components.

3. Commissioning Models
    a. Attributes corrected based on real measurements.
    b. Documents linked to COBie worksheet.

COBie Update Schedule

It is anticipated that the master COBie compliant worksheet is updated to reflect the available information at the following stages in a project.

- 100% Design Documents (validation of Tier#1 fields provided)
- Issuance of "For Construction"
- 75% Substantial Completion
- Commissioning Complete
- Project Close-Out

Appendix C (to be developed)

Appendix D

LEVEL OF DEVELOPMENT

The Level of Development (LOD) descriptions identify the specific minimum content requirements and associated Authorized Uses for each Model Element at five progressively detailed levels of completeness.

LOD 100

Model Element Content Requirements.
The Model Element may be graphically represented in the Model with a symbol or other generic representation, but does not satisfy the requirements for LOD 200. Information related to the Model Element (i.e., cost per square foot, tonnage of HVAC, etc.) can be derived from other Model Elements.

Authorized Uses
Analysis. The Model Element may be analyzed based on volume, area and orientation by application of generalized performance criteria assigned to other Model Elements.

Cost Estimating. The Model Element may be used to develop a cost estimate based on current area, volume or similar conceptual estimating techniques (e.g., square feet of floor area, condominium unit, hospital bed, etc.).

Schedule. The Model Element may be used for Project phasing and determination of overall Project duration.

LOD 200

Model Element Content Requirements.
The Model Element is graphically represented within the Model as a generic system, object, or assembly with approximate quantities, size, shape, location, and orientation. Non-graphic information may also be attached to the Model Element.

Authorized Uses
Analysis. The Model Element may be analyzed for performance of selected systems by application of generalized performance criteria assigned to the representative Model Elements.

Cost Estimating. The Model Element may be used to develop cost estimates based on the approximate data provided and quantitative estimating techniques (e.g., volume and quantity of elements or type of system selected).

Schedule. The Model Element may be used to show ordered, time-scaled appearance of major elements and systems.

Coordination. The Model Element may be used for general coordination with other Model Elements in terms of its size, location and clearance to other Model Elements.

LOD 300

Model Element Content Requirements.
The Model Element is graphically represented within the Model as a non- proprietary system, object or assembly in terms of quantity, size, shape, location, and orientation. Non-graphic information may also be attached to the Model Element.

Authorized Uses

Analysis. The Model Element may be analyzed for performance of selected systems by application of specific performance criteria assigned to the representative Model Element.

Cost Estimating. The Model Element may be used to develop cost estimates suitable for procurement based on the specific data provided.

Schedule. The Model Element may be used to show ordered, time-scaled appearance of detailed elements and systems.

Coordination. The Model Element may be used for specific coordination with other Model Elements in terms of its size, location and clearance to other Model Elements including general operation issues.

LOD 400

Model Element Content Requirements.

The Model Element is graphically represented within the Model as a specific system, object or assembly in terms of size, shape, location, quantity, and orientation with detailing, fabrication, assembly, and installation information. Non-graphic information may also be attached to the Model Element.

Authorized Uses

Analysis. The Model Element may be analyzed for performance of systems by application of actual performance criteria assigned to the Model Element.

Cost Estimating. Costs are based on the actual cost of the Model Element at buyout.

Schedule. The Model may be used to show ordered, time-scaled appearance of detailed specific elements and systems including construction means and methods.

Coordination. The Model Element may be used for coordination with other Model Elements in terms of its size, location and clearance to other Model Elements, including fabrication, installation and detailed operation issues.

LOD 500

Model Element Content Requirements.

The Model Element is a field verified representation in terms of size, shape, location, quantity, and orientation. Non-graphic information may also be attached to the Model Elements.

Appendix E

BIM Execution Plan

By signature below, this BIM Execution Plan is herewith adopted and incorporated into the Agreement, dated _____, for Professional Design Services between _____ and Indiana University.

Weber State University	Date
Architect	Date
Construction Manager	Date
Civil Engineer	Date
Structural Engineer	Date

Mechanical Engineer	Date
Electrical Engineer	Date
Plumbing Engineer	Date
Additional Party as Needed	Date
Additional Party as Needed	Date

1. Overview

The intent of this BIM Execution Plan is to provide a framework that will let the owner, architect, engineers, and construction manager deploy building information modeling (BIM) technology and best practices on this project faster and more cost-effectively. This plan delineates roles and responsibilities of each party, the detail and scope of information to be shared, relevant business processes and supporting software. *All text that is green is for illustrative purposes only and should not be construed as a formalized response to this execution plan.*

2. Project Initiation

This section defines the Core Collaboration Team, the project objectives, project phases, and overall communication plan throughout the project's phases.

A. Project Information

Project Name:	
Project Number:	
Project Address:	
Project Description:	

B. Core Collaboration Team

Contact Name	Role/Title	Company	Email	Phone

C. Project Goals and Objectives

Project Goal	Objective	Achieved if	Project Timeframe

D. Collaborative Process Mapping (Coordination Plan)

	Owner	Architect	Consulting Engineers	Construction Manager	Commissioning Agent
Conceptualization/ Program of Requirements	Provide requirements related to form, function, cost and schedule	Begin design intent model with massing concepts and site considerations	Provide feedback on initial building performance goals and requirements	Provide feedback on initial building cost, schedule, and constructability	Provide feedback on advanced commissioning requirements
Criteria Design/Schematic Design	Provide design review and to further refine design requirements	Refine Design Model with new input from Owner, Consulting Engineers, and Construction Manager. Conduct Reverse Phase Scheduling Activity	Provide schematic energy modeling and system iterations as Design Model continues to develop	Provide design review and continued feedback on cost, schedule, and constructability	Refine advanced commissioning requirements

Detailed Design/Design Development	Department design reviews. Final approval of project design and metrics	Continue to refine Design Model. Introduce consultants models and perform model coordination	Create Discipline specific Design Models. Create detailed energy model.	Create Construction Model for simulation, coordination, estimates, and schedule	Review design model for all disciplines
Implementation Documents/Construction Documents		Finalize Design Model, Construction Documents, and Specifications	Finalize Discipline specific Design Models and Final Energy Model	Enhance Construction Model and perform final estimate and final construction schedule	Review design model for all disciplines
Agency Coordination/Final Buyout	Assist with code compliance negotiations and permitting	Work with agencies on code compliances, plan acceptance and respond to construction RFI's	Work with agencies on code compliances, plan acceptance and respond to construction RFI's	Manage bid process, project buyout, and preconstruction RFI's	
Construction	Monitor construction and give input to construction changes and issues	Perform contract administration, update Design Model with changes	Assist with RFI's and update Discipline specific Design Models, field conditions, and commissioning	Manage construction with subcontractors and suppliers, inform changes to Design Model	Observe construction and perform advanced commissioning.
Facility Management	Engage Architect and Facilities Group for model turnover to staff.	Coordinate information exchange through model to Facilities Group			

E. Project Phases / Milestones

Project Phase / Milestone	Estimated Start Date	Estimated Completion Date	Project Stakeholders Involved
Conceptualization/ Program of Requirements Phase			**Owner, Architect, Consulting Engineers, CM**
Criteria Design/Schematic Design Phase			**Owner, Architect, Consulting Engineers, CM, Commission Agent**
Detailed Design/ Design Development Phase			**Owner, Architect, Consulting Engineers, CM, Commission Agent**
Implementation Documents/ Construction Documents Phase			**Owner, Architect, Consulting Engineers, CM**
Agency Coordination/Final Buyout Phase			**Owner, Architect, Consulting Engineers, CM**
Construction Phase			**Owner, Architect, Consulting Engineers, CM, Commission Agent**
Facility Management Phase			**Owner, Architect**

3. Modeling Plan

Advance planning around which models will need to be created during the different phases of the project, who will be responsible for updating models and distributing them, and predetermining the content and format of models as much as possible will help your project run more efficiently and cost-effectively during every phase.

A. Model Managers

Each party—such as the owner, architect, contractor, or sub-consultants—that is responsible for contributing modeling content should assign a model manager to the project. The model manager from each party has a number of responsibilities. They include, but are not limited to:

- Transferring modeling content from one party to another
- Validating the level of detail and controls as defined for each project phase
- Validating modeling content during each phase
- Combining or linking multiple models
- Participating in design review and model coordination sessions
- Communicating issues back to the internal and cross-company teams

- Keeping file naming accurate
- Managing version control
- Properly storing the models in the collaborative project management system

Stakeholder Company Name	Model Manager Name	Email	Phone

B. Planned Models

In the table below, outline the models that will be created for the project. List the model name, model content, project phase when the model will be delivered, the model's authoring company, and the model authoring tool that will be used. For models that will not be used or created in your project, just leave the row blank, and add rows for model types you anticipate needing that are not already listed. The first line offers an example.

Model Name	Model Content	Project Phase	Authoring Company	Authoring Tool
Architectural Model	**Architectural objects, code information**	**Conceptualization / Program of Requirements Phase**		**Autodesk Revit Architecture**
Civil Model	**Topography, site utilities to within 5 feet of perimeter, hard and soft surfaces, other site objects**	**Criteria Design / Schematic Design Phase**		**Autodesk Civil 3D**
Structural Model	**Structural steel members, bearing and shear walls, analytical structural model, lintels**	**Criteria Design / Schematic Design Phase**		**Autodesk Revit Structure**
Mechanical Model	**Mechanical systems, equipment, load information, utilities within 5 feet of building perimeter**	**Criteria Design / Schematic Design Phase**		**Autodesk Revit MEP**

Electrical Model	Electrical systems, equipment, load information, utilities within 5 feet of building perimeter	Criteria Design / Schematic Design Phase		Autodesk Revit MEP
Plumbing Model	Plumbing systems, equipment, load information, utilities within 5 feet of building perimeter	Criteria Design / Schematic Design Phase		Autodesk Revit MEP
Energy Model	Energy data, run iterations, life cycle costing, peak loads	Criteria Design / Schematic Design Phase		Autodesk Ecotect
Construction Model	Scheduling information, sequencing information	Criteria Design / Schematic Design Phase		Autodesk Navisworks
Estimate Model	Costing data, quantity takeoffs	Criteria Design / Schematic Design Phase		Autodesk Quantity Takeoff
Coordination Model	Design Intent Models and Fabrication information	Construction		Autodesk Navisworks

C. Model Components

As an aid to usability during later phases of your project, specify what the content, level of detail, and file naming structure of your models should look like.

1. File Naming Structure

Determine and list the structure for model file names. The first line offers an example.

File Names for Models Should Be Formatted as:	
DISCIPLINE-Project Number-Building Number.rvt (example: ARCH-20090001-BL001.rvt)	
Architectural Model	ARCH-
Civil Model	CIVIL-
Mechanical Model	MECH-
Electrical Model	ELECT-
Plumbing Model	PLUMB-
Food Service Model	KITCHEN-
Structural Model	STRUCT-

Energy Model	ENERGY-
Construction Model	CONST-
Estimate Model	COST-
Coordination Model	COORD-

2. Precision and Dimensioning

Models should include all appropriate dimensioning as needed for design intent, analysis, and construction. With the exception of the exclusions listed below, the model will be considered accurate and complete. In the table below, enter which items' placement will not be considered entirely accurate and should not be relied on for placement or assembly.

Items that Will Not Be Considered Accurate for Dimensioning or Placement
Architectural –
MEP –
Civil –
Construction –
Food Service –
Structural –

3. Modeling Object Properties

The level of property information in the modeling objects and assemblies depends on the types of analysis that will be performed on the model. See *Section IV-A (Analysis Models)* for the types of analysis that will be performed.

4. Modeling Level of Detail

Specify the level of detail in your models below. The level of detail can be defined by exclusions and/or by object size.

1. Exclusions: List the objects that will be excluded from the model in the table below.

Items that Will Be Excluded from the Model
Architectural –
MEP –
Civil –
Construction –
Food Service –
Structural –

2. Size: Any object smaller than [TBD] will not be included in the model.

D. Detailed Modeling Plan

For each phase of the project, the project team should create a detailed modeling plan, which should include the modeling objectives, models included, and the roles and responsibilities of model contributors. Model objectives and model manager roles and responsibilities by phase are outlined below.

1. Conceptualization / Program of Requirements Phase

1. Objectives: Provide initial design based on conceptual parameters established by the owner, ensure that code and zoning requirements meet project objectives, and establish a 3D reference point of model coordination. Provide Program of Requirements and all space considerations for reference in the model.

2. Model Roles: A model may or may not take shape during the Conceptualization / Program of Requirements phase. If a model is created, its role will be to depict the visual concept and general layout of the project along with space requirements.

3. Responsibilities: The architect's designated model manager will establish a baseline model to be used as the basis for other models. During the Conceptualization / Program of Requirement phase, the model managers from all parties will establish modeling standards and guidelines.

2. Criteria Design / Schematic Design Phase

1. Objectives: Provide spatial design based on input from the Conceptualization / Program of Requirement phase; provide initial design for building system and attributes including architectural, structural, and MEP; identify initial coordination issues between building systems; receive input from suppliers and fabricators regarding system cost, placement, fabrication and scheduling.

2. Model Roles: The Architectural model will show the general design and layout of the building structure and act as the baseline for all other subsystem designs, such as MEP and Structural models. The subsystem designs will be used to show the initial selection and layout of building components. The Architectural model and Consulting Engineers' model will be used to inform the Energy Models.

3. Responsibilities: Once the baseline conceptual structure has been created, the architect's model manager will send the model to the sub-consultants so they can develop their designs. The consulting engineers' designated model managers will audit and deliver the completed models to the architect's model manager. The architect's model manager will review the models to ensure compliance with the phase requirements. Once the models meet the requirements, the architect's model manager will link or combine cross-disciplinary models. The architect's model manager should coordinate with the consulting engineers' model managers to eliminate duplicate or redundant objects.

3. Detailed Design / Design Development Phase

1. Objectives: Provide final design of building and building systems; resolve coordination issues between building systems; provide a Construction model capable of analyzing schedule, cost, and constructability.

2. Model Roles: The Architectural model will continue to act as the baseline for all other subsystem designs. The subsystem designs will be modified accordingly to represent the enhanced design.

3. Responsibilities: The consulting engineers' model managers will use the Architectural model to revise and complete their designs. Once the models are complete, the consulting engineers' model managers will deliver their models to the architect's model manager. The architect's model manager will review the models to ensure compliance with the phase requirements. The architect's model manager will provide the construction manager's model manager with the Architectural model and the Consulting Engineers' models.

4. Implementation Documents / Construction Documents Phase

1. Objectives: Finalize design of the building and all building systems, prepare documentation for agency review, and provide construction modeling that highlights constructability, trade coordination, and fabrication.

2. Model Roles: All design models will be used to reflect the design. The models will then be used to generate the contract documents. The Construction model will be used primarily for estimating, scheduling, and constructability analysis.

3. Responsibilities: The architect's and engineers' model managers will prepare contract documents for agency review based on the Design Intent models.

5. Agency Coordination / Bidding Phase

1. Objective: Revise Design Intent models based on agency feedback on all models.

2. Model Roles: The design models will be adjusted to reflect agency feedback. The Construction model will be enhanced and further used for estimating, scheduling, construction sequencing, trade coordination, and constructability analysis.

3. Responsibilities: The architect's model manager will communicate agency comments back to the design team. The consulting engineers' model managers will revise their design models accordingly and submit them back to the architect. The architect's model manager will provide the construction manager's model manager with the Architectural model and the Consulting Engineers' models.

6. Construction

1. Objectives: Update Architectural and Consulting Engineers' models based on submittals, RFIs, or owner-directed changes; maintain the Construction model based on construction activities. The construction team will submit RFIs and submittals through the collaborative project management system.

2. Model Roles: The Architectural and Consulting Engineers' models will be revised throughout construction, based on owner directives and As Built comments. The models will always reflect the revised contract documents. The Construction model will be used for scheduling analysis, construction sequencing, and trade coordination.

3. Responsibilities: The architect's model manager will work with their consulting engineers to answer the RFIs and submittals and adjust the models accordingly. The construction manager's model manager will update the Construction model and will work with the architect to develop the Architectural and Consulting Engineers' models.

7. Facility Management

1. Objective: Use the Architectural and Consulting Engineers' models for facility management, with the possibility of use in ongoing operations.

2. Model Roles: The Architectural and Consulting Engineers' models will be used to represent the actual assembly of the building from construction.

3. Responsibilities: The architect will deliver the models at the end of the project to the owner.

3. Analysis Plan

By listing and specifying what types of analysis your project will likely require at the beginning of your project, you can ensure that your key models will include the relevant information, making the analysis easier and more efficient.

A. Analysis Models

Your project's scope of work may require performing certain kinds of analysis, such as the ones listed below, based on existing or specially created model(s). In most cases the quality of the analysis depends on the quality of the original model that the analysis is derived from. Therefore the project team member performing the analysis should clearly communicate the analysis requirements to the original model authoring team member.

1. Quantity Takeoff Analysis

The objective of quantity takeoff analysis is to use modeling property data to automate or simplify the quantity takeoff process. This information from the quantity takeoff tool can then be imported or tied to cost-estimating software. In order for the quantity takeoff process to work seamlessly, the original modeling author will need to include the relevant property information in the design and an agreement of modeled content communities to estimate.

2. Scheduling Analysis

Scheduling analysis lets the project team use the project model to analyze the timeline and sequencing for construction. This information can then be used to modify or adjust the construction schedule. Tools currently exist that allow project team members to visualize the

construction over time, but no systems exist yet that interact automatically with scheduling tools.

3. Visualization Analysis

Visualization tools let the project team view the design or construction of the project in 3D, giving them a more accurate perspective of the end product.

4. LEED Rating/Energy Analysis

LEED (leadership in energy and environmental design) Rating/Energy Analysis tools help the project team evaluate the impact of design decisions on sustainability and energy consumption. This analysis model is usually based on the main Architectural model, after which material and building system inputs can be used to evaluate the project's sustainability and energy consumption.

5. Structural Analysis

Structural analysis tools use the model to analyze the building's structural properties. Structural analysis programs typically use the finite element method (FEM) to measure the stresses on all structural elements of the design. For structural analysis to work seamlessly, the original structural modeling tool needs to be compatible with the structural analysis tool, and the original structural model property data must include information about the structural elements.

B. Detailed Analysis Plan

For each type of analysis that may be performed for your project, list the models used for the analysis, which company will perform the analysis, the file format required for the analysis, the estimated project phase, and the analysis tool that will be used. If there are other special instructions associated with the analysis, mark the Special Instructions column and list the details in the Special Instructions table in the next section.

Analysis	Analysis Tool	Model	Analyzing Company	Project Phase	File Format Required
Visualization		**Architectural Model**			**.rvt/.nwf**
Structural		**Structural Model**			**.rvt/?**
Quantity Takeoff		**All Models**			**.rvt**
Scheduling /4D		**All Models**			**.rvt/.nwf/?**
Cost Analysis /5D		**All Models**			**.rvt/.nwf**
Energy/LEED		**Architectural Model**			**.rvt/.GBXml**
Daylight/Lighting		**Architectural Model**			**.rvt/.FBX**

C. Clash Detection Process

Clash detection analysis is done to check for interferences between the designs of one or many models. To reduce change orders during construction, clash detection should be performed early and continue throughout the design process. For clash detection to work properly your project's models need to have a common reference point and they must be compatible with the clash detection tool.

5. Concurrent As-Built Modeling Plan

As-built modeling will be a collaborative effort between the Architect and consultants and the construction team. During the construction process, the design team will incorporate changes triggered by requests for information (RFIs), architect's supplemental instructions (ASIs) and change orders in into the Architectural and Consultant models. At specified dates during the construction process, the construction team will provide the design team with necessary changes due to shop drawings, coordination drawings and change orders. As required, the completed form of the construction will also be verified at these specified dates using laser scanning. The design team will then incorporate the changes reported by the construction team into the Architectural and Consultant models. At the end of construction, it will be the updated Architectural and Consultant models that are used for facility management.

A. Construction Capture Schedule

Event	Date	Parties involved
Construction Capture 1		Construction team, Design Team, [Laser Scanning]
Construction Capture 2		Construction Team, Design Team, [Laser Scanning]
Construction Capture 3		Construction Team, Design Team, [Laser Scanning]
Construction Capture 4		Construction Team, Design Team, [Laser Scanning]

6. Collaboration Plan

Creating a collaboration plan early on—including defining permissions and file structures—will help team members efficiently communicate, share, and retrieve information throughout the project. It lets you get the most out of your collaborative project management system, saving time and increasing your ROI.

A. Document Management

A Collaborative Project Management system will have to be researched and agreed upon prior to start of project. The requirements of the Collaborative Project Management system are;

- Be web-based or web-enabled—so all relevant, authorized project team members can remotely access it.
- Accommodate different permissions profiles for different project team members.
- Allow communication through either internal messaging or system-generated email.
- Include document management capability that lets the project team create a customized and permission-based folder structure which offers upload, download, and version control capabilities.
- Include a viewer that allows the project team to view .dwg, .dgn, .plt, .dwf, .pdf, .tif, .jpg, .doc, and .xls files.

• Include construction management capabilities for the tracking of requests for information (RFIs), submittals, design review, meeting minutes, daily reports, issues, correspondence, and transmittals.
• Able to interact with the file folder structure in the document management section.
• Able to automatically accept raw data from the clash detection tool.
• Include bid management capability, and this bid management solution should allow the project team to post the contract drawings and specifications for viewing in the form of a Plan Room.
• Allow for cost management controls, and this cost management capability should include budgeting, contracting, change orders processing, and payments applications tracking.
• Allow the project team to run reports based on the information in the system.
• Allow for the workflow and routing throughout the document, construction and cost management components of the solution.

B. Document Management Solution

A document management solution will be provided by the owner. The document management solution that will be used is called [TBD]. The architect will setup the site and set up all permissions for the site. The architect will lead a training session for the entire project team on how to use the site. The site will be maintained from the signing of this document until the occupation of the building.

WEBER STATE UNIVERSITY

SOCIAL SCIENCE BUILDING PROGRAM

JANUARY 22, 2016

GSBS ARCHITECTS

PAULIEN & ASSOCIATES, INC.

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APPROVALS

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1/12/16

Chad Downs Date
WSU Project Manager

EXECUTIVE SUMMARY

Designed in 1969 and occupied in 1973, Weber State University's Social Science Building has a strong physical presence on campus and is one of the University's most heavily used classroom facilities. WSU's administration, working off feasibility studies conducted in 2011, has a strong commitment to reusing the existing building. A successful renovation will require careful consideration of the existing concrete structure, adherence to contemporary building systems and energy standards, attention to current campus circulation corridors and a sensitivity to the building's existing architectural character. The project is sure to be a rewarding challenge.

The College of Social and Behavioral Sciences occupies the Social Science Building. Academic departments include:

- Criminal Justice
- Geography
- History
- Political Science & Philosophy
- Psychology
- Social Work & Gerontology
- Sociology & Anthropology

Other entities housed in the building include:

- Dean's Suite
- Military Science classroom
- Richards Institute
- Social Science Education Center
- Testing Center
- Walker Institute

Although some of the following entities function under a department, they are being tracked separately in order to clearly capture and record their requirements.

- Classrooms
- Building and Operational Support
- Neuroscience
- Student Organizations & Study
- Women & Gender Studies

Space in the building will predominately be classroom and office functions. Remaining spaces include laboratory, gathering, circulation, storage and building support functions.

MISSION STATEMENT

The major renovation of the existing WSU Social Science Building will create a like-new energy efficient building that supports contemporary teaching and learning styles and promotes the wellness of its occupants.

PROJECT OBJECTIVES

- Develop a contemporary architectural expression respectful of the building's past, its context within the campus, and its significant presence at a highly visible edge of the campus.
- Maximize the utilization of learning and other spaces.
- Create a more significant entry responding to interior organization and campus traffic patterns.
- Promote student-to-student, student-to-teacher and faculty-to-faculty interaction and collaboration.
- Improve way-finding within the building.
- Replace building envelope to improve performance and enhance quality daylighting in interior spaces.
- Replace existing mechanical, plumbing and electrical systems to meet current WSU standards and improve occupant comfort.
- Address site accessibility issues.
- Enclose the current ground floor breezeway to increase assignable space.
- Stay within the existing footprint to the greatest extent possible.

PROGRAMMING PROCESS

The programming process began in July of 2015 with the final program document published in January of 2016. The process was guided by a Steering Committee comprised of representatives from each academic department and a sub-committee of WSU administrators. The following activities (in rough chronological order) were undertaken to collect information and garner meaningful input:

VISIONING AND TRENDS SESSIONS – Workshops were held with a broad group of stakeholders to explore current trends in pedagogy and classroom design with the end goal of defining a clear vision for the project.

DATA GATHERING – Existing conditions on the project site and within the building were analyzed with a focus on American with Disabilities Act (ADA) compliance. Campus utility services were analyzed including central plant heating / cooling loops, electrical capacity and fire protection water flow. Space inventory information was received from WSU and confirmed through departmental interviews and space-by-space observation. Faculty and staff insight was gathered and their preferences prioritized through an on-line survey.

USER WORKSHOPS – Staff from individual academic departments, administrators and campus facilities representatives were engaged to understand their exact needs and desires for the new building. These workshops also served as an opportunity to refine results of the faculty and staff survey and to begin conversations about the unique aspects and requirements of individual departments and groups.

CLASSROOM UTILIZATION – A major goal of the programming process was to maximize the utilization of new classroom space. Weber State University provided data sets consisting of Fall 2014 course files, staffing records, and the facilities space inventory of the Social Science Building. This data was carefully analyzed to understand existing weekly room hours (WRH), student station occupancy (SSO), and assignable square feet per student station (ASF/Station). With this information, specific goals were established to maximize utilization and establish the number and size of classroom spaces in the new renovation.

BUILDING AND SPACE DEVELOPMENT - Room data sheets and space diagrams were developed for each unique

space type with input from facilities staff and department representatives. A code analysis was also conducted capturing required components and characteristics.

As a major renovation to an existing structure, efforts were required to test fit the space program within the existing footprint and structural bays. Space adjacencies, floor level relationships, and all building systems were analyzed to generally validate the space program. Several iterations of the space program were developed during this effort in order to create and document a viable approach.

CONCEPT DESIGN - Floor plans and exterior elevations were developed with the intention of further validating the space program. Input from the steering committee was invited at regular meetings and incorporated into the concept solutions.

CONSTRUCTABILITY REVIEW – A local contractor with significant experience in major renovations was engaged to help evaluate two separate design options. This work concluded that the existing concrete roof structure should be replaced with a lighter weight metal roof system. It also concluded that the project's new air handler should be placed on grade, in the north service area, rather than on the roof.

ESTIMATING COSTS – Several stages of cost estimating were utilized in the programming process. Immediately upon award of the project, the Project Feasibility and Tier II Structural Study estimates from 2011 were reviewed and updated to 2015 / 2016 numbers. This acted as a benchmark for the project. Following the draft program in October 2015, a program-loaded cost estimate was developed that responded more closely to real project factors. A final cost estimate was developed incorporating the further development of plans and elevations and the results of the Constructability studies.

FACULTY AND STAFF SURVEY

An online survey was provided to all college staff and faculty, including adjunct faculty. The purpose of this effort was to understand what issues these people felt were the most and least important to the development of the renovation. A clear majority of those invited took the opportunity with 57 faculty, 1 adjunct faculty and 14 staff members participating.

The survey asked for subjective evaluation of existing classroom, office, interaction, conference and research space. It also evaluated the effectiveness of elements within those spaces. Elements included lighting, utilities, aesthetics, technology and equipment / furniture.

Following is a summary of the results. Full findings can be found in the appendix.

76% of respondents felt that physical aspects of the building were limiting their effectiveness. The following elements were noted:

- CLASSROOM: Spaces were deemed to be deficient in their ability to support active learning. Department interviews suggest that this was due to furniture that is difficult to configure / reconfigure and to classrooms being either too large or too small for the group. Teaching technology was evaluated as generally meeting needs, but there was a common request for more consistency between classrooms. Better lighting / daylighting and improved thermal comfort were emphasized as needing substantial improvement.

- OFFICE: Respondents prioritized lighting/daylighting, size and adjacency as being the most important aspects of new offices. Department interviews and other guidance also suggested that common meeting space adjacent to offices was important. There was wide variance in opinions regarding student access to faculty offices and the related privacy. The current relationship with many offices having classrooms immediately across the corridor is not desired. However, faculty also do not desire "faculty-only" type environment where students are discouraged from interacting with them.

- INTERACTION SPACE: Respondents consistently reported a lack of places for students to interact or places that foster interaction. Dean Harrold echoed this need and placed it as a top priority for the renovation (see Project Objectives).

- CONFERENCE SPACE: On average, respondents reported using conference rooms 4 hours per week with some reporting usage of up to 30 hours per week. Two issues were commonly mentioned. Conference rooms function as both departmental meeting spaces and as seminar classrooms. Scheduling under this scenario is difficult, driving departments

to protect these spaces. Respondents also identified that the existing conference rooms do not foster interdisciplinary collaboration. It was concluded that this was a function of the department's desire to tightly protect the rooms, disallowing interaction with faculty from other departments.

- LAB AND RESEARCH SPACE: 92% of faculty conduct research in office type spaces, while 29% have additional task-specific space. Regardless of which space type they are using, 40% of faculty believe they will require more space in the future. Currently the size, utilities and furniture / casework in these spaces are reported as not meeting needs.

SPACE PROGRAM SUMMARY

The following summary incorporates current assumptions about fitting space within the existing footprint and structural bays. It also includes enclosing the breezeway located on the ground floor. Commentary regarding assumptions and WSU guidance is included in the body of this program. A fully detailed space program is included later in this document.

SUMMARY SPACE PROGRAM (square feet)	
ASSIGNABLE SPACE DESCRIPTION	**PROGRAM**
100 CLASSROOMS	
Classrooms	34,581
200 LABS	
Sociology/Anthropology	2,212
Criminal Justice	1,020
Geography	720
Psychology Computer	1,620
Psychology Research	1,200
Neuroscience	600
300 OFFICES	
Sociology/Anthropology	2,695
Criminal Justice	2,725
Geography	1,985
History	2,873
IT	120
Office of Dean	2,460
Poli Sci & Philosophy	2,215
Psychology	2,815
Neuroscience	150
Social Work/Gerontology	1,935
Social Science Ed. Center	160
Walker Institute	760
Woman's Studies	1,023
Physical Plant	120
400 STUDY / LOUNGE	
Student Org/Club	640
Interaction Space	1,920
Group Study	1,920
Vending/Café	500
Entry and Gathering	1,500
700 SUPPORT SPACES	
I.T.	590
Physical Plant	950
ASSIGNABLE SPACE	**76,004**
NEW BLDG. SIZE	**119,323**
Unassignable Space	43,319
EFFICIENCY (Assig. Space/New Size)	**64%**

COST ESTIMATE

The total construction cost of the project is estimated at $25,361,567. This cost includes the Contractor's general conditions, bonds, overhead and profit. It also accommodates inflation to a construction start date in early 2017 and a design contingency of 15%.

The estimated cost is 8.9% higher than reported in the 2011 feasibility report. The following factors and elements play a role in this increase:

- Increased activity in the construction industry raising costs across the board
- Replacement of the entire building envelope (limited to strengthening existing panels in 2011)
- Extent of necessary interior and exterior accessibility improvements expanded
- Fire hydrant water flow issues requiring two additional hydrants
- Additional structural upgrades identified in the constructibility studies.

Elements that helped limit the additional costs include:

- Refinement of the renovated roof design (see constructability)
- Placing the new air handler on the ground
- Maintaining existing stair shafts and mechanical chase

ESTIMATED DESIGN AND CONSTRUCTION SCHEDULE

The following design and construction durations are anticipated:

Design	8 months
Construction	18 months

Funding will dictate actual timing, but WSU would like to begin design in March of 2016. With DFCM review and bidding process, the construction process would then begin in January of 2017 and conclude around July of 2018.

SITE ANALYSIS

The Social Science Building sits on the north-west edge of Weber State University's campus, sculpting pedestrian circulation patterns and influencing visitor's first impressions of the campus.

As a renovation to an existing building, the implications of the renovation work to campus circulation patterns are relatively minor. That said, it is important to acknowledge existing patterns of use when considering potential reorganization of entrances to the building.

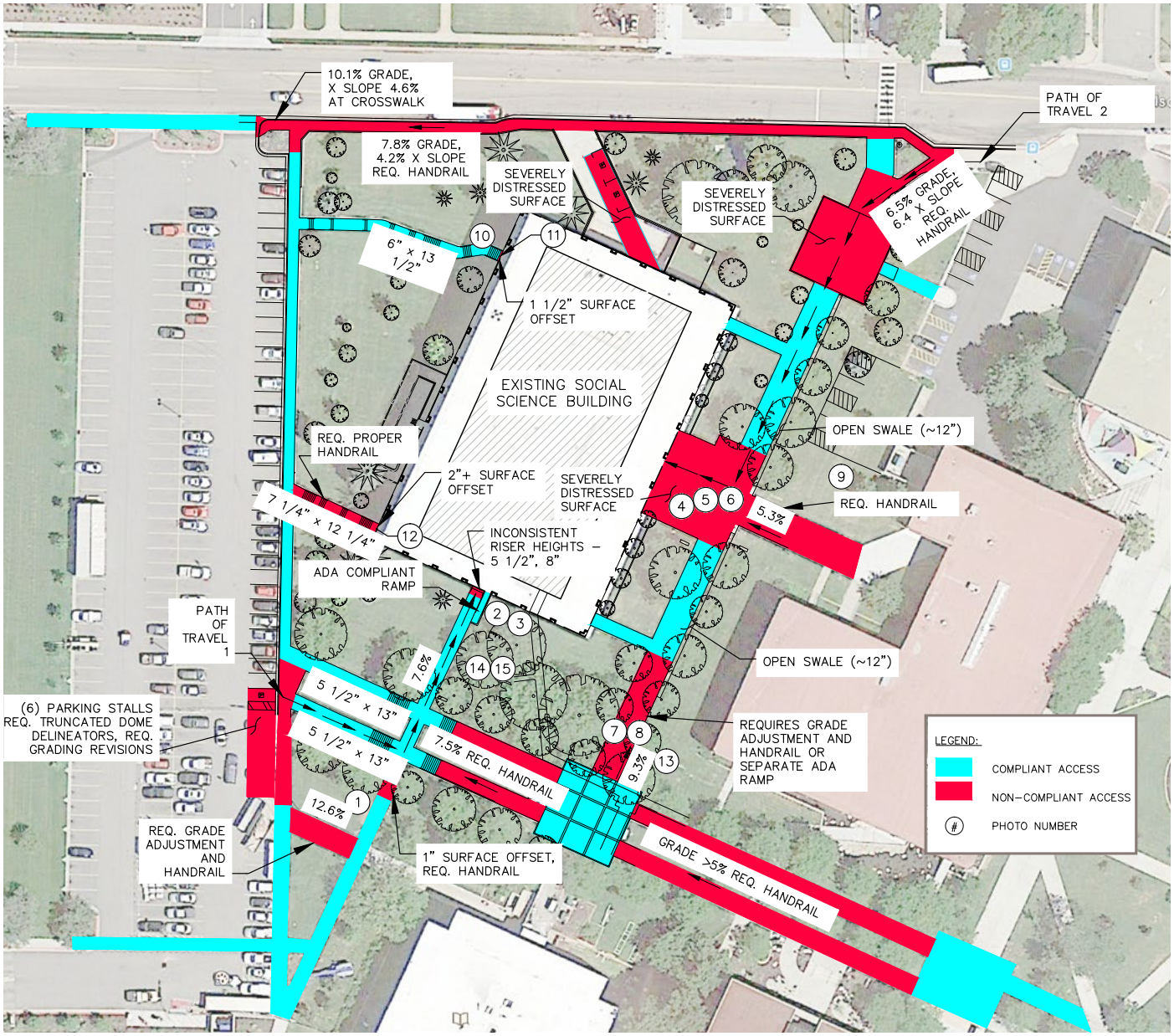
Primary circulation around the building occurs on the south and east sides of the building with doors on the west side being used by those coming from the parking lot. The primary pedestrian way on the south side ties many of WSU's largest buildings together and is utilized heavily by students and staff. The north building entrance is accessed via a sunken drive with tall retaining walls enclosing a service area. This north entrance area also functions as an accessible entrance with ADA parking stalls restricting the width of the access drive. The service and accessible entrance function of this entrance do not coincide well and there is a strong desire to move the primary accessible entrance away from this area.

WSU has expressed a preference for having the primary entrance to the renovated building in the center of the east façade. This is where the current primary entrance is and, in this location, will likely require less disruption of interior structure and exterior site elements.

The Architectural Design section discusses enclosure of the open walkway at the main level in order to capture additional programmable space. This will restrict movement around the building from the outside. Careful consideration of new paths is necessary to assure those coming from the west parking lots and from the north side of the building have a reasonable and understandable path into the building.

SITE ASSESSMENT

The WSU Social Sciences Building renovation will be required to comply with multiple regulatory agencies. For site improvements, the Americans with Disabilities Act (ADA) will govern the design of pedestrian paths of travel including the following elements: sidewalks, handrails, steps/stairs, ramps, grades and surface uniformity. In order to delineate necessary improvements, an assessment of existing surface features was conducted looking at current code compliance, functionality, and overall condition. The assessment also evaluated the utilities shown in as-built documents provided by WSU. The following delineates the findings:



OVERALL ACCESS EXHIBIT

ACCESSIBILITY

Two accessible routes shall be established to the renovated building. The first route is from the parking area southwest of the building, starting at the existing ADA parking stalls, following the southerly of two parallel sidewalks approximately 100', then turning north-east toward the building's southwest facing façade. An existing ramp in this location is ADA compliant, however extension of the building shell on the first story will necessitate a new ADA compliant ramp. Otherwise, only minor modifications are needed in order to provide a compliant path of travel along this route, including grade adjustments and hardscape improvements to achieve a uniform surface with a compliant grade.

The second accessible route is from the parking area to the northeast of the Social Sciences Building and follows the sidewalk at the public bus stop west, then southwest through the existing court yard to the proposed front on the south-east face of the building. Significant improvements are needed along this route. The existing sidewalks do not comply with regard to cross slope, running slope, surface uniformity, and number of available ADA parking stalls. The Overall Access Exhibit shows this area with new proposed parking stalls and a potential compliant path of travel to the east-side main entrance.

ASSESSMENT OF EXISTING CONDITIONS

ADA paths of travel are lacking for access to the proposed main entry on the east side of the Social Science Building. Available paths do not comply with current ADA guidance for cross slope, longitude slope, and hand rail requirements based on the following observations

- Sidewalk grades necessitate either re-work and/or addition of hand railings along paths of travel. The attached exhibit delineates areas of compliance (blue highlighting) from areas of noncompliance (red highlighting). Notes regarding sidewalk grades and other conditions appear on the plans, as well as references to relevant photo documentation.
- The ADA ramp at the south side of the building appears to be compliant (See photo 2, 3).
- Damaged concrete at east side of building (See photos 4, 5, 6).
- The walkway and stairs at the NW corner of the building exhibit signs of deep degradation; reinforcement steel is rusting due to water/oxygen contact and causing stair nosing to spall/crack. This condition will eventually result in collapses of stair nosing and make unsafe walking conditions as well as poor aesthetics (See Photo 10).
- The existing walk way (north to south) along the east side of the building consists in part of a sloped section at 9.3% grade. In addition to the steep grade a past patch job has severely degraded and settled with surface offsets of 1”-2” posing a significant tripping hazard (See Photo 7, 8, 9).
- Sidewalk/stair connections on west side of the building are uneven; surface offsets of up to 2” are noted in these locations (See Photo 11, 12).

ACCESSIBILITY RECOMMENDATIONS

- In order to provide code compliant ADA access, WSU will need to incorporate additional hand rails, re-worked concrete sidewalk, and truncated dome delineations at sidewalk/driveway interface, and possibly re-worked parking stalls and number of parking stalls. See attached exhibit noting the locations of features that require modifications.
- Re-work of existing sidewalks, stairs and the concrete drive may be needed and/or desired. This is particularly true at the north-west corner of the site to correct surface offsets and mitigate spalling/cracking concrete. The north service drive should also be replaced.
- A secondary sidewalk could be designed to create a more direct approach path from the west parking lot to the building.

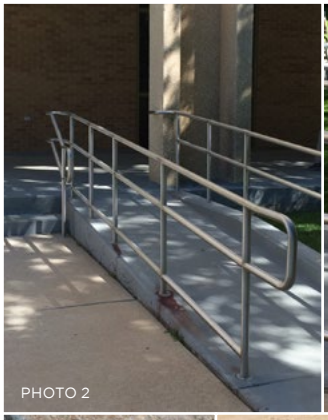


PHOTO 2

PHOTO 3

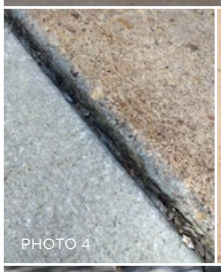


PHOTO 4

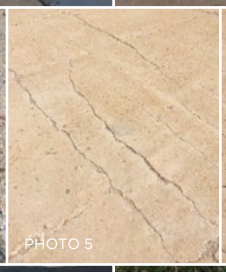


PHOTO 5

PHOTO 6

PHOTO 7

PHOTO 8

PHOTO 9

PHOTO 10

PHOTO 11

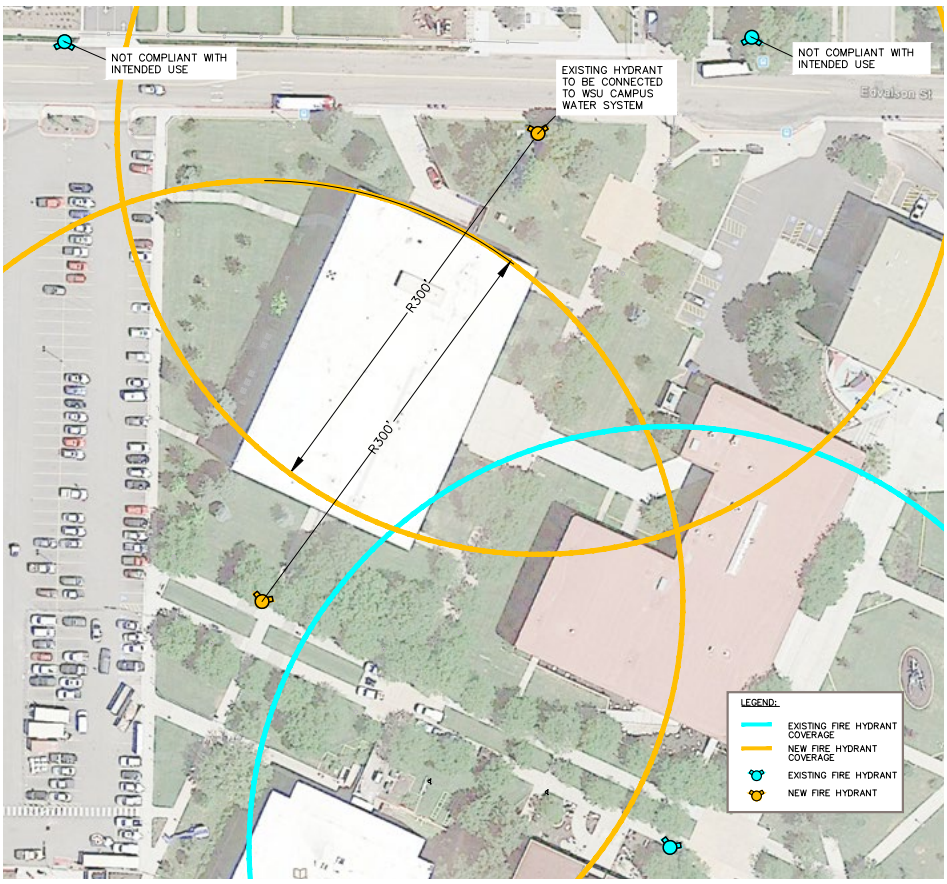
PHOTO 12

PHOTO 13

PHOTO 14

PHOTO 15

- ADA stalls in the service entrance area severely limit the maneuverability of vehicles and compromise the safety of service people and those using the stalls. These stall should be removed and incorporated into the existing lots. Eight (8) or more ADA compliant stalls should be created. Some of these stalls could be constructed as pullouts from Edvalson Street just west of the existing crosswalk.



OVERALL FIRE EXHIBIT

UTILITIES

- Storm Drain facilities appeared to be in place in relatively close proximity and should be noted, but should not significantly conflict with proposed remodeling within and immediately adjacent to the existing building footprint (See photo 13).
- Utility access facilities (tunnel) were identified on the south side of the building. The proximity of this structure should be noted and further characterized as to potential conflicts, convenience for future design, and other generic awareness (See photos 14, 15).
- Fire hydrants are located around the site as illustrated in the Overall Fire Exhibit. Coverage for the south side of this building/site appears limited. Hydrants located to the southeast are not considered a relevant use for fire protection at this site.

The utility tunnel contains both active and abandoned utilities, which need to be assessed for their current function and need. Specific elements that should be assessed include: piping, conduit, electrical and data lines, lighting, ventilation, structural conditions and water proofing. Following the tunnel assessment during design, required tunnel work will likely become a bid- alternate.

Refer to Mechanical / Plumbing and Electrical narratives for further discussion of utilities.

UTILITIES RECOMMENDATIONS

- At least two additional fire hydrants are required to adequately cover the building and site. As illustrated in the Overall Fire Exhibit, one new hydrant is required near the south west corner of the building. Fire flow testing (see Appendix) has confirmed inadequate capacity from Ogden City's hydrants across Edvalson Street. Therefore, an additional hydrant, connected to the WSU fire water system, will be required on the north side of the building.
- Based on available records and coordinated survey data, various utilities (potable water, irrigation, sewer, cable, etc.) will require only minor work should a realigned utility tunnel be desired along the eastern side of the Social Science Building. Overall, there are no observable mitigating factors preventing the realignment.
- Existing storm drain facilities are paved over or otherwise unverifiable to some extent. The project should incorporate further investigation and analysis of the system within a somewhat greater footprint context so as to confirm adequacy and functionality of storm drain system. For example, as built drawings show storm drain systems in the parking area with manholes for access, however no manholes could be located, they may have been paved over. Further, based on surveyed invert elevations data, the storm drain features (man holes) to the south of the building do appear to be connected as would be expected. A greater understanding of the storm drain design is helpful to the site improvement aspects of this project.

EXISTING SOCIAL SCIENCE BUILDING FROM THE SOUTHWEST

VIEW PAST MILLER ADMINISTRATION BUILDING

WATTIS BUSINESS BUILDING

ELIZABETH HALL – WEST FAÇADE

ELIZABETH HALL-SOUTH

TRACY HALL (CONSTRUCTION)

ARCHITECTURAL DESIGN NARRATIVE

The Social Science Building's existing space configuration, circulation patterns, finishes and MEP systems do not meet the contemporary standards or needs of Weber State University. Due to this, the renovation of the building will include demolition of all systems down to the structure. The structure itself will then undergo renovations to bring it up to current codes. New walls, building systems, and finishes will then be constructed to create a like-new building.

ARCHITECTURAL CONTEXT

The building is prominently located on the northwest corner of the campus and has a significant visual presence from Harrison Boulevard and primary campus pedestrian routes. The WSU campus steps up the east bench of Ogden creating many unique and varied vantage points of the relatively low-lying Social Science Building. In this position, the renovated project will sit within a context of more contemporary buildings, like Elizabeth Hall, and traditional campus architecture, such as the Miller Administration Building.

The design and exterior materials of neighboring buildings is varied, requiring the new renovation to rely more on current campus standards than on the context of its surroundings. Of all campus buildings, the adjacent Miller Administration Building provides the most relevant architectural context. This building recently underwent a major renovation, which maintained the brick and concrete façade and replaced all fenestration. The renovation is intended to extend that building's usefulness by decades, creating a relatively permanent contextual piece for the Social Science Building.

The Wattis Business Building sits directly above the Social Science Building and has a different character than other campus buildings. With its mirrored surfaces, it does not respond to either past or current campus standards, and WSU is not interested in replicating these materials. That said, exterior renovations to this building are not planned and the building will be part of the new project's context.

WSU has renovated and added to its building stock in recent years. These newer buildings have established a more contemporary aesthetic utilizing wide expanses of

green-tinted glass, metal panel and shading devices. Use of the campus standard brick has also been promoted in the newer buildings.

ORIENTATION AND MICRO CLIMATE FACTORS

Unlike a typical new project, this renovation does not intend to change the placement, orientation or massing of the building. With these design elements fixed, this programming report does not address design considerations that would typically inform those decisions. It should be noted, however, that rooftop solar access is good with neighboring buildings not presenting any shading concerns and mature trees to the south extending only a small distance above the parapet height.

EXTERIOR DESIGN AND MATERIALS

CHARACTER

The Social Science Building was designed in 1969 and occupied in 1973. The building has strong aesthetic features consistent with the era of its design and with other buildings on campus. In its prominent position the building will be a character-defining architectural piece of WSU's main campus. As such, WSU wants a design that respects the character of the existing structure while upgrading the façade to improve energy performance, increase views to the outside and increase daylighting of interior spaces. The new design should capitalize on the benefits of new materials and construction techniques. It should serve to reduce costs and waste by conserving materials, ultimately finding a balance between new and old to create a contemporary building grounded in its historical roots.

The existing building houses all of its air handling and other equipment in the basement. This leaves the roof as a clean horizontal plane that reinforces the building's simple, yet strong, design. This program proposes to repurpose the existing basement mechanical space requiring large equipment to be placed elsewhere. Aspects of this work are covered in the Mechanical and Plumbing narratives and specifically in the Constructability Studies section of this program. The aesthetic considerations, however, are discussed here as they relate to the character of the building.

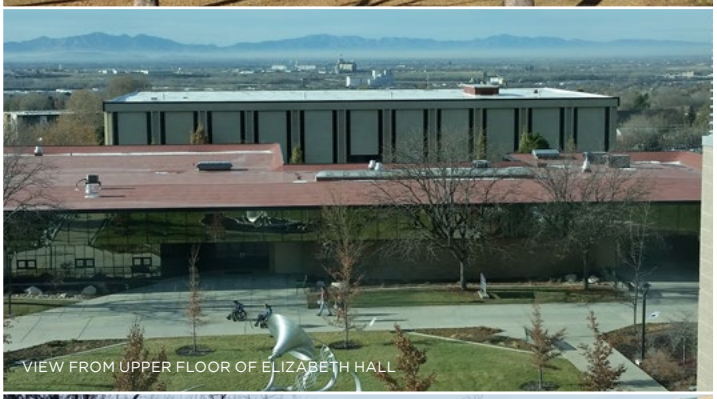
WSU's preference is to not place new equipment on the roof. This will eliminate concerns with aesthetics and remove the costs associated with providing elevator access to an additional level. An alternate location for a large mechanical air handler has been identified in the north service area (see Constructability Studies).

Should equipment be placed on the roof (other than solar PV panels), WSU requires that it be fully screened. Due to maintenance and aesthetic concerns, a full penthouse would likely be required. As illustrated in the images on this page, any large massing on the roof will create an entirely new element visible from multiple locations on campus. The design of such a significant element must carefully consider its impact on maintained historical elements and the impact on the varied views of the building.

PRIMARY ENTRANCE

The primary building entrance shall be maintained on the east side of the building. The presence of this entrance needs to be enhanced establishing it as the main entry point and offering visitors a sense of arrival to this important university building.

VIEW FROM PRIMARY PEDESTRIAN WALKWAY


VIEW FROM UPPER FLOOR OF ELIZABETH HALL

VIEW FROM PLAZA TO THE NORTH OF SHEPARD STUDENT UNION

EXTERIOR MATERIALS

New buildings on the WSU campus are articulated in varying ways, but a pallet of materials has been developed and should be used in the renovation of the Social Science Building. WSU does not require the use of all materials on a building and there are no fixed proportions. These elements of the project are to be determined during the design process. WSU constructs their major projects under DFCM guidelines which also direct the use of certain materials. These guidelines can be found at the following web address:

http://dfcm.utah.gov/downloads/design_manual/design_requirements.pdf.

WSU's current standard allows the use of the following exterior products:

- Golden buff brick
- Metal panel
- Gray concrete
- Sandstone (historical tie-back)
- Clear anodized aluminum storefront/curtainwall
- Green-tinted high performance glass
- Sunshades

There is potential for top daylighting on the upper floor of the building. Should this option be pursed, unit skylights (pre-manufactured assemblies) are not allowed. Site constructed, fully designed light monitors or skylights are preferred to minimize the potential for roof leaks.

SPACE ORGANIZATION

(Please see the Space Requirements Section for a complete list of required spaces.)

The extent of demolition of existing interior elements should allow for a complete redesign of spaces including circulation routes, classrooms and offices. It is anticipated that the current vertical circulation shafts and structural columns will be maintained placing some constraints on the new design.

Extensive efforts are made in this program to minimize the amount of required space by promoting efficient classroom utilization and by grouping academic departments so that they can share resources (see the Utilization & Space Program Narrative). The renovation design will need to be mindful of circulation space and other unprogrammed elements to promote this deliberate effort and to meet the floor plan efficiencies indicated in the Space Program Narrative. The following priorities and considerations must be emphasized in this effort.

As one passes through the primary east building entrance, there must be a clear sense of organization and wayfinding allowing students to quickly find their classrooms and other resources. Larger occupancy spaces, especially the 150-seat auditorium, shall be conveniently located near the entrance lobby. Ground-level priority shall be given to large classrooms with convenient and understandable access and egress options. Due to the existing structural grid, larger classrooms will likely need to be located in the central bays of the building. This will drive some of these larger spaces to either the bottom floor or one floor above ground. These larger spaces should not be placed on the upper floors.

Academic department groupings, as well as smaller gathering and learning spaces, shall be placed on upper floors. This will promote a more intimate setting for smaller classes and for interactions between faculty and students. It is important that easily understandable circulation routes be maintained, even at floors with small space groupings.

The lowest floor of the Social Science Building is below grade and does not offer daylighting opportunities. Due to this, WSU has identified several spaces that will not require daylight. These include:

- Laboratories
- Testing Center

The Particular Space Requirements narrative in this section includes additional discussion of space characteristics.

VERTICAL CIRCULATION

The existing stairs in the building have tread and riser inconsistencies and other code compliance problems. It is anticipated that the vertical shaft enclosures will remain, but the interior stair and railing will be replaced.

The existing elevator is too small and unreliable and a new elevator will be installed as part of the renovation. The new elevator shall be centrally located and sized to accommodate the building's occupancy, as well as stretchers. The existing elevator may be maintained if it is deemed helpful to facilities staff, and if its existing location can be accommodated in the new floor plan design.

ACOUSTICS

Current DFCM design requirements (Section 3.3, F. and 3.10 Q) stipulate acoustical performance providing NIC and NC ratings for generic space types. In addition, the room data sheets within this program provide criteria for those specific spaces. The design and documentation of equipment and assemblies should carefully consider acoustical performance and designers must confirm the proposed elements meet requirements.

PARTICULAR SPACE REQUIREMENTS

(Please see Space Program Highlights under the Space Requirements section for additional information about the size and use of spaces.)

Academic Department Suites

Shall maintain an open and welcoming character to promote student, faculty and staff interactions. A waiting and reception area, shared by at least two departments, shall offer a central control point and meeting area. Due to the loss of privacy for the department secretaries, huddle-rooms shall be immediately accessible from the reception area. The Huddle Rooms are intended to provide space for private, impromptu student meetings with department secretaries and faculty.

Adjunct faculty are also accommodated within the department suites. Systems-furniture arrangements are intended to be used on a first-come first-served basis with lockers in the area to secure belongings. A conference room, break room, and work room are also shared in each suite.

Visible Elements

Specific elements of the program need to have a high level of visibility to those visiting the renovated building. The Space Program and renovation concept plans suggest that the Dean's Suite, Walker Institute and Political Science Department be configured very similarly to the academic department suites, while meeting these visibility requirements. Visibility for the Walker Institute is important and someone entering from the main entry should have an immediate indication of the Institute's presence.

Due to WSU's prioritization of clear and understandable circulation and wayfinding elements, it is appropriate to again mention that these elements must be highly visible and evident.

Student Study and Gathering Space

It is important that the new design incorporate quality spaces dedicated to student interaction and learning. These programmed spaces shall be distributed throughout the floor plates with concentrations around classrooms. These spaces should promote multiple modes of learning incorporating technology and configurable furniture. The spaces are intended to be exciting and dynamic in nature motivating students to occupy them. The images on this page illustrate examples promoted by WSU.

Café Amenity

There is a strong desire by faculty to include a small café within or near the lobby. Current campus-wide concessionaire agreements may or may not support this type of amenity. It will be WSU's responsibility to determine the feasibility of this space. If directed to include the café, the design team will need to provide appropriate infrastructure and space.

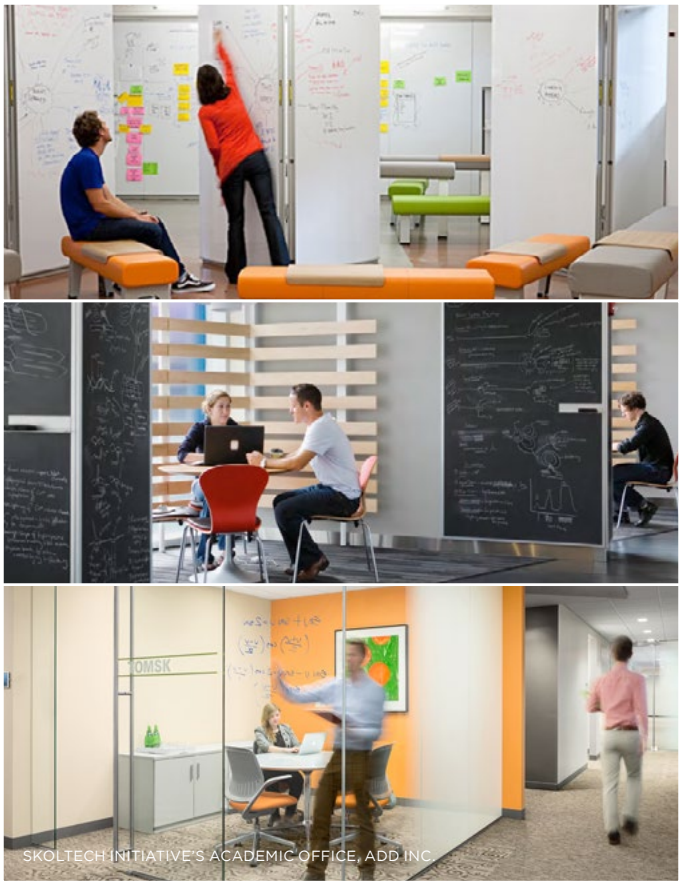
Storage

Each department has been assigned a portion of a centralized storage area in the basement. In addition to this common space, specific storage requirements have been listed within the Space Summary sheets for each department. It is expected that additional opportunities for storage will present themselves as the new program is fit into the existing footprint of the floor plate. As with all higher education projects, storage is always desirable and the final design should maximize all storage opportunities.

Custodial Needs

The space program includes a physical plant section indicating the need for janitor's closets, a custodian's office and central custodial storage. Recently, WSU has experienced problems accommodating specific pieces of equipment in the programmed custodial spaces. Due to this, the design process should place special emphasis on confirming that WSU's specific equipment can be accommodated. The current custodial equipment standard has been included in the appendix and should be confirmed once design commences.

Recycling waste continues to be a priority for WSU. The design shall accommodate waste recycling from the initial collection point (waste bin) to floor by floor collection areas, to building-wide collection at the north service area.



STUDENT GATHERING EXAMPLES

INTERIOR CONSTRUCTION AND MATERIALS

WSU publishes their Design and Construction Standards at the following web address:

http://departments.weber.edu/facilities/docs/2004_08_a_e_guide_revision.pdf

This program document does not replicate WSU's Design and Construction Standards, but the following items were noted during the programming process.

- The entrance / lobby will require upgraded materials that support an enhanced aesthetic and superior durability.
- The Utah Percent for Art Act will apply to this project. This will provide a significant source of funding for artwork that may enhance the visitor experience.
- Interior doors will typically include both a side lite and transom. Glass will be frosted or otherwise obscured at offices and other private spaces.
- Card access controls are desired on all classrooms and laboratories, and at all other locations required by WSU's standards.
- Multi-occupant restrooms shall be designed to have labyrinth style entrances where no doors are used. Careful consideration of all direct and reflected sightlines is necessary.
- Multi-occupant restrooms will utilize energy efficient hand dryers rather than paper products.
- Adhered stainless steel corner guards shall be used throughout the facility. Conference rooms and the back wall of classrooms (minimum) will require a chair rail.
- Window coverings shall be included in the architectural design. Manually-operated roller shades shall be used.

OWNER'S PROJECT REQUIREMENTS (OPR)

An OPR has been developed with input from the full programming team, including Facilities staff and leadership. The full document is included in the appendix to this program.

The OPR is intended to supplement this program and act as a living document throughout the design process and into construction. It should be used as a tool to evaluate building system options that support the project's sustainability, durability and maintainability goals.

It should be noted that the OPR plays an important role in meeting DFCM's High Performance Building Standards and should be a primary driver in the establishment of the Basis of Design (BOD) document and Commissioning processes. Please see the Mechanical / Plumbing, Electrical and Sustainability Narratives for additional OPR related information.

CODE ANALYSIS

APPLICABLE CODES, STANDARDS AND REGULATIONS

- 2012 International Building Code (IBC)
- 2012 International Fire Code (IFC)
- 2012 International Plumbing Code (IPC)
- 2012 International Mechanical Code (IMC)
- 2011 National Electrical Code (NEC)
- 2009 International Energy Conservation Code (IECC)
- 2009 ANSI/A117.1
- 2012 International Fuel Gas Code (IFGC)
- NFPA 101 (2012 edition with State of Utah Amendments)
- Laws, Rules and Regulations of the Utah State Fire Marshall
- Design Guidelines - Weber State University
- DFCM Design and Construction Standards for Architects, Engineers and Contractors
- State of Utah DFCM High Performance Building Standard
- USGBC LEED Green Building Rating System

BUILDING CODE SUMMARY

WSU's Social Science Building project is a renovation of an existing building located on the Weber State University Ogden Campus. The existing building is a 4-story concrete structure, which will be partially demolished and seismically upgraded to meet current codes. Based on current program level test fits the completed building will be approximately 119,300 gross square feet. The existing building is slightly smaller (107,000 square feet). The intent to enclose the exterior area on the second level accounts for this difference.

Level one of the current building is, and will remain, underground with a single access point for vehicles on the North Elevation. This condition requires level one to be considered a "story above the grade plane" as defined in the 2012 International Building Code. This condition means that the building is a 4 story building which limits the design. The following analysis has been completed using this more stringent condition, however, it is highly recommended that this be reviewed with the code official during design.

SITE

The existing Social Science Building is located at the base of the main campus central corridor, a prominent position at the entrance to the campus on the West end. Service/fire access to the existing building is handled via this main corridor to the South. Adjacent buildings include the Wattis Business Building to the east and the Miller Administration Building to the south. The existing building is approximately 46'-6" above ground plane on all side with the site sloping dramatically just beyond the West elevation down to the adjacent parking lot. The access on the North side of the building requires that the grade level be considered even with level one so the building height per code standards is approximately 60'-6".

Approximate existing adjacencies/distances to Social Science

- Eastern Walkway/Fire Lane (East) – 37'
- Edvalson Street (North) – 48' closest point
- Parking Lot (West) – 45' closest point
- Main Campus Pedestrian Access/Fire Lane (South) – 72'-8"

BUILDING OCCUPANCY

- The primary occupancy for the building is Business Group B. There are also portions of the building that will be classified as Assembly Group A-3 defined as spaces with occupancies greater than 49 and requiring (2) exits per DFCM standards.
- Due to the number of large classrooms, it is assumed that assembly occupancies (A-3) will make up more than 10% of each level's square footage. This condition requires either separated uses or an A-3 non-separated occupancy classification per IBC Section 504. For the purposes of this program-level code review, the allowable building area and height will be reviewed under both of these conditions.

BUILDING TYPE

The existing building structure is comprised of concrete columns, roof, and floor structure. In addition there are several interior concrete shear and bearing walls. This construction appears to be consistent with a non-combustible Type II-A or II-B designation. Again, both types of construction have been reviewed and their impacts noted in this code analysis.

SPRINKLERS

The current building is fully sprinkled and the new design will maintain and update this system as required to meet current code standards. Note that hydrant flow rates and placement on site were deficient requiring changes to be made (see the Site / Civil Narrative).

ALLOWABLE HEIGHT AND AREA

Per table 503 of the IBC the tabular allowable area for an A-3 and B building is as follows:

OCCUPANCY/CONSTRUCTION TYPE AND IMPLICATIONS

A-3/IIA – 3 Story 15,500 sf/story; 65'

B/IIA – 5 Story; 37,500 sf/story; 65'

A-3/IIB – 2 Story 9,500 sf/story; 55'

B/IIB – 3 Story 23,000 sf/story; 55'

Allowable area modifications for frontage increases and automatic sprinkler systems will increase the allowable area and height as follows:

Story Modification – 1 story

Area Modification – (At + [At X If] + [At X Is])
Is = 2
If = (F/P – 0.25)W/30

Height Modification – +20'

ALLOWABLE STORY/AREA/HEIGHT CALCULATIONS

Allowable Stories:

A-3/IIA – 4 stories

B/IIA – 6 stories

A-3/IIB – 3 stories

B/IIB – 4 stories

Actual stories of the existing building is 4.

1. If the building is a IIB construction it must have separated uses for the A-3 components.
2. It is not anticipated that the roof will be occupied. If it is occupied, it will be considered an additional story and the building must be of type IIA construction with separated uses.

Allowable Area:

A-3/IIA – 15,500+(15,500 x .75) + (15,500 x 2) = 58,125 sf

B/IIA – 37,500+(37,500 x .75) + (37,500 x 2) = 140,625 sf

A-3/IIB – 9,500+(9,500 x .75) + (9,500 x 2) = 35,625 sf

B/IIB – 23,000+(23,000 x .75) + (23,000 x 2) = 86,250 sf

Actual Area of the existing building per floor is 30,800 sf

ALLOWABLE HEIGHT:

A-3/IIA – 85'

B/IIA – 85'

A-3/IIB – 75'

B/IIB – 75'

Actual Height of the existing building is currently 60'-6"

The scenarios and results noted above could be substantially affected by the requirements of IBC section 506.5.2 (Mixed occupancy area determination) and section 508.4.2 (Allowable building area) depending on the approach taken. Section 506.5.2 requires each story of a mixed occupancy building, with more than one story above the grade plane, to individually comply with allowable area limitations. If separated uses are necessary, section 508.4.2 requires in each story, the building area shall be such that the sum of the ratios of the actual building area of each separate occupancy divided by the allowable building area of each separate occupancy not exceed 1. Early design efforts must establish accurate occupancy ratios that will indicate which of the scenarios outline here are appropriate.

Atrium

Due to the added cost and complication of atrium spaces, any floor to floor connections in the design should be limited to adjoining two stories only, eliminating any code-defined atriums.

Chemical Storage

Chemical quantities are low in the existing building and are expected to remain minimal in the new renovation. Due to this, it is expected that the entire building will act as a single chemical control area with no horizontal or vertical rated separations. Criteria should be reanalyzed during the design process to confirm this direction.

Occupant Loads

Based on the Space Program, load factors were applied to arrive at an assumed total occupant load of 1750 (1600 classroom occupants and 150 office occupants). These numbers will need to be reevaluated during design based on the final occupancy classification and space sizes.

Stairs

When the overall occupant load of 1750 is divided evenly per floor it results in a per floor occupant load of 438. This results in a required egress component width of 87.6" for stairs and 65.7" for doors in a building with sprinklers and

an emergency voice/alarm system. Dividing this between the two egress stair towers, the required stair width is 43.8" (code minimum width of 44") with access doors of 32.85" (code minimum width of 36").

PLUMBING FIXTURES

Required plumbing fixtures counts are based on the occupant load and Table 2902.1 of the IBC. Although a portion of the building will have an A occupancy, it is assumed that a B occupancy can represent the entire building due to its more stringent requirements. This seems appropriate given the use characteristics of a large university classroom building. See Table below:

Gender	Toilets/ Urinals	Lavs	Drinking Fountains	Service Sinks
Male	19	12	18	1
Female	19	12		

A single family / assisted use toilet room is required in the building. However, WSU requires that this type of room be included on each floor.

REQUIRED FIRE SEPARATIONS

Required fire separations include:

- 2 hour shafts
- Separated uses as required in the code review

STRUCTURAL DESIGN NARRATIVE

EXISTING STRUCTURAL DESCRIPTION

The Social Science Building consists of a 4-level (3 floors above grade and 1 level below) concrete structure. The construction year of the original building was 1969 and no additions or structurally significant remodels have occurred in the years since.

GRAVITY LOAD RESISTING ELEMENTS:

Roof: Un-topped pre-cast double tee joists supported on cast-in-place concrete beams.

Floors: Topped pre-cast double tee joists supported on cast-in-place concrete beams.

Columns: Interior cast-in-place concrete columns and exterior pre-cast concrete columns.

Walls: Cast-in-place concrete bearing walls.

Footings: Cast-in-place concrete piles below cast-in-place pile caps and strip footings.

LATERAL LOAD RESISTING ELEMENTS:

Diaphragms: Floor levels consisting of topped pre-cast double tee joists which act as a rigid diaphragm. The roof level consists of un-topped double tee joists with no interconnectivity and do not act as an adequate diaphragm.

Shear walls: Cast-in-place, reinforced concrete walls at the stair shafts and mechanical shaft act as shear walls.

The cast-in-place stair and shaft walls are load bearing and are also considered the lateral force resisting system for the building. If the intent of the lateral analysis is to de-couple the shear walls from the building, as was suggested in the seismic investigation, careful consideration must be given in the event that the remodel chooses to modify these walls. Significant costs will be incurred in terms of upgrading, adding to, or supplementing existing concrete walls to maintain their vertical load carrying ability. For this reason, there is a certain lack of flexibility in plan modifications.

PREVIOUS STRUCTURAL INVESTIGATIONS

An ASCE/SEI 41-06 Tier 2 seismic investigation was completed in 2011. The investigation provided schematic recommendations for a full seismic upgrade of the existing structure. This program includes many new design features that deviate significantly from the original structure and render many of those recommendations not applicable.

For example, the report includes upgrade designs for the exterior pre-cast cladding panels. However, in this program, the recommendation is made to remove the panels from the building and replace them with lighter, more ductile systems. The report also indicates that the entire roof requires a glass fiber overlay to create a structural diaphragm. While this is a viable option, it is now proposed that the roof structure be entirely replaced with a much lighter conventional steel joist and metal deck system. Finally, the report suggests new cast-in-place concrete shear walls, while this program recommends buckling restrained braced frames.

The implications of these deviations are significant and are explained in greater detail in the following section.

STRUCTURAL DESIGN CONSIDERATIONS

The largest structural design consideration, in terms of its impact on the renovation as a whole, is the idea of removing the existing concrete roof structure and replacing it with a structural steel roof. Because the existing roof does not have a concrete topping slab and virtually no interlocking exists between elements, there is no structural diaphragm. A diaphragm is necessary to transfer lateral seismic/wind forces to the intended lateral force resisting system. Because seismic forces are a linear function of the mass of the building, a heavy, non-effective roof diaphragm is a large liability.

The 2011 report includes provisions to overlay the entire roof with glass fiber composites to create a structural diaphragm, at a significant cost. By removing and replacing the concrete roof with a structural steel roof consisting of steel joists and metal deck, the mass at the highest point of the structure is significantly reduced. This reduction in mass has significant implications for the entire lateral force resisting system of the building as is shown in the table at the end of this structural narrative.

By removing and replacing the roof with a new/lighter structure, there may be increased flexibility in others areas of the design. For example, light monitors could be added to daylight the upper floor. There may also be added flexibility for air handler placement. There may also be some flexibility in the column layout. (See the Constructability Studies section)

The second most significant remodel item relative to structural performance is the removal and replacement of the existing pre-cast cladding elements. From an architectural stand point and life safety consideration, the elements are brittle, and are insufficiently attached to the building. They present a significant falling hazard during a design seismic event. Based on mass alone, they are responsible for an increase in seismic base shear.

The architectural program suggests that they be removed and replaced with a lighter, more ductile skin system that can be designed and detailed to accommodate design level building drifts. The attached table also shows how the mass of these elements and possible alternatives affect the base shear of the building.

The architectural program suggests that stairs will need to be removed and their supporting walls may be modified or eliminated in order to open up critical space. At these locations, it will be important to study the impacts to the gravity system. It may be cost effective to remove entire bays of structural framing to accommodate some improvements.

The 2011 report suggested the use of special reinforced concrete shear walls. This program suggests that buckling retrained braced frames (BRB's) is a viable alternative that should be considered. There are many benefits to be realized with the use of BRB's. For example, more daylight can be brought into the building. BRB's may be utilized at a lower overall cost when considering seismic effects on the building, as a whole. BRB's also may provide more opportunities for flexibility and open space within the floor plan.

The University would like the renovation to accommodate the future installation of solar panels on the roof. If the existing roof is replaced, new solar panels can be accounted for in the steel design with relatively minor cost implications. One option is to determine the locations of the panels during the design phase and have posts installed that extend up through the roofing to receive a future panel system. This approach has been used elsewhere on campus.

By installing the posts during the current project, the roofing need not be affected when the panels are installed at a later date.

If the concrete roof is not replaced, the design engineer will have to carefully consider the effects of the solar panel support system, including snow drifting and seismic effects on the double tee roof structure.

FOOTING AND FOUNDATION CONSIDERATIONS

Because the existing building is supported on concrete piles, modifying/retrofitting existing footings may be difficult. Generally, shallow foundations and deep foundations should not be used in the same area of the same structure to avoid differential settlement issues that may arise.

Depending on the nature of the remodel, new foundations or existing foundation upgrades may be necessary. The designer must carefully consider the configuration and intent of future and existing foundations. Consideration should be given to lighter walls and a lighter roof structure since they have significant impacts here. These lighter systems are encouraged in order to minimize needed foundation modifications.

CODES AND STANDARDS

International Building Code 2012 and all referenced standards, including, but not limited to:

- ASCE 7-10
- AISC 341-10
- AISC 360-10
- ACI 318-11
- ASCE/SEI 41-06

GENERAL DESIGN CRITERIA:

Dead Loads: As required

Floor Live Loads-

- 80 psf at offices, classrooms, corridors above first floor
- 100 psf at corridors at main levels
- 2500 pound concentrated load

Flat Roof Snow Load-

- 40 psf with special consideration for drifting where applicable

Seismic Criteria-

- 2%/50 0.2 sec period spectral acceleration: 1.405 g
- 2%/50 1.0 sec period spectral acceleration: 0.588 g
- Not vulnerable to fault rupture
- Not vulnerable to slope failure
- Not vulnerable to liquefaction
- Distance to nearest known fault: 0.33 miles

Soils Information-

- Description: Silty Clay Fill
- Site Class: D
- Soil Stability: Stable
- Reference: GSH Geotechnical Report dated 7/29/2011 (See Appendix)

BUILDING ENVELOPE OPTIONS - IMPACT ON STORY SHEAR			
	Level 2 force (Kips)	Level 3 force (Kips)	Roof force (Kips)
BASELINE - Existing building	2,492	1,686	916
Percent of baseline	100%	100%	100%
REPLACE PRECAST WALLS WITH METAL PANEL AND MAINTAIN ROOF	2,329	1,563	847
Percent of baseline	94%	93%	93%
REPLACE PRECAST WALLS WITH GFRC AND MAINTAIN ROOF	2,357	1,584	859
Percent of baseline	95%	94%	94%
REPLACE PRECAST WALLS WITH GFRC AND REPLACE ROOF	2,136	1,435	533
Percent of baseline	86%	85%	58%
REPLACE PRECAST WITH METAL PANEL AND REPLACE ROOF	2,109	1,415	521
Percent of baseline	85%	84%	57%

See Constructability Studies for more information on roof replacement details

MECHANICAL / PLUMBING DESIGN NARRATIVE

BUILDING PERFORMANCE

- Building energy cost is required to be 20% less than a code-minimum building in accordance with ASHRAE 90.1-2013
- Energy performance to be assessed through energy modeling
- The only metric to apply to building performance analysis is annual energy cost.

AVAILABLE UTILITIES

The building will connect to the central campus chilled water system. The system is being converted to a condenser water system, and the building must use the central system as the heat source and heat sink.

Although steam is available at the building, do not connect.

Connect to new domestic water extension – 2-1/2" for building and 6" for fire protection

Connect to new sanitary sewer in two locations, 6" each

Connect to new storm sewer, four locations, 6" each

SYSTEMS: GENERAL REQUIREMENTS

MECHANICAL SYSTEM

Design the building in conformance with the Campus Master Plan, which mandates that buildings will be served by a central condenser loop that will be the source for all cooling and heating demands.

The preferred method to achieve this is with a water-cooled Variable Refrigerant Flow (VRF) system.

VRF Design Expectations:

- Manufacturer to be Mitsubishi
- Units are to be capable of simultaneous heating and cooling.
- Zone the VRF systems to maximize load sharing, grouping the distribution units and condensing units so that simultaneous heating and cooling occurs on a common circuit as much as possible, in order to maximize energy savings.
- Provide zoning plan during schematic design review that indicates proposed zoning plan for review and approval by Campus Planning staff.
- Locate water cooled condensing units in basement, at north end of building. Locate the units so that units can be accessed for maintenance, with access to building exterior either direct (same grade) or by elevator.
- Use ceiling cassette fan coils wherever possible, in lieu of ducted or wall-mount fan coils
- Zone each office independently, as well as each classroom and laboratory. Controls are to be by the VRF manufacturer. Provide permanently-installed wall-mounted controls.
- Work directly with VRF manufacturer's representative to generate shop drawings as part of the design package, in order to accommodate the specific design strategies of the basis of design system.
- It is critical that the refrigerant lines are routed and installed in a clean and neat manner. Flexible lines are to be rigidly mounted to unistrut and supported without sags.
- Utilize existing standard testing and inspection specification, as well as in-house commissioning standard.
- Performance requirements of the VRF system are as follows:

MODE	ECWT(DEG F)	PERFORMANCE
Cooling	77	12.0 EER
Heating	50	3.6 COP

Tested in compliance with AHRI 1230

Air Side

- Provide ventilation air through a dedicated outdoor air system (DOAS).
- Require pressure testing of all duct systems in accordance with 2012 IMC
- Deliver ventilation air to each fan coil, and ensure required volume of ventilation air is delivered by the fan coil regardless of fan coil fan speed, wither through the use of a pressure independent control damper or VAV box.
- Route exhaust and relief air through the DOAS unit, and incorporate energy recovery into the DOAS unit, either through heat wheel, runaround coil or heat exchanger. Recover energy from relief system, and control relief system to maintain building static pressure.

- Investigate feasibility of evaporatively cooling the relief/exhaust air in order to provide indirect evaporative cooling for the outside air.
- Modulate DOAS fan speed to maintain duct static pressure set point, and reset static pressure set point from control damper position.
- Use automatic dampers on exhaust fans in lieu of barometric dampers.
- Document fan sizing calculations with zone by zone load calculations.
- Document that transport energy consumption meets the following criteria:

LOAD	MAXIMUM AIR TRANSPORT ENERGY (bhp/1,000 cfm)
Full Load	0.75
50% Load	0.30

Hydronic Systems

- Disconnect steam pipe and chilled water pipe back to Student Services. Cap steam pipe, and valve chilled water pipe.
- Alternate: Demolish steam and chilled pipe back to Student Services.
- Connect new condenser water pipe to existing chilled water pipe. Use SCH 40 steel pipe, sized at 8 fps maximum velocity. Insulate as chilled water pipe.
- Circulate VRF condenser water in building with variable speed secondary pumps.
- Provide a pressure-independent control valve at each condensing unit to ensure constant flow when condensing unit activated.
- Air separation, expansion compensation and makeup are not required.

Placement of Equipment

WSU prefers that the large air handler be placed on the ground rather than on the roof of the building. Please see the Constructability Review Section for discussion and analysis of these criteria.

Laboratory Systems

- Variable volume exhaust hoods, with quick-response air valves for hood exhaust, general exhaust and supply.
- Use automatic sash closers.
- Provide ability to de-commission hoods for extended periods of time.
- Route exhaust in welded stainless steel from hood connection to vertical riser. Use galvanized duct in riser.
- Provide redundant variable volume exhaust fans, with stack discharge at least 10 feet above any adjacent walking surface. Coordinate discharge with DOAS location.
- Consider ductless hoods.
- Provide a source of reheat in order to maintain space temperature during periods of high ventilation. Potential methods include electric resistance, a dedicated VRF unit, or VRF reheat.

PLUMBING

Domestic Water Supply

- Disconnect from existing service and connect to new service in tunnel at east side
- Install new isolation valve, 2 stage PRV station and reduced pressure principle backflow preventer.
- Install auto-isolation meter at the water service entry, and alarm through BMS and fire alarm
- Distribute throughout with Type L hard drawn copper with wrought copper fittings and lead free solder or mechanical joints
- Do not use PEX piping.
- Provide isolation valves external to each laboratory for each utility provided to that laboratory.

Hot Water

- Generate hot water using heat pump water heaters.
- Generate at 130 F and distribute at the same temperature
- Recirculate to within 3' of each fixture. Enable recirculation pump with timer, and cycle from aquastat.

Laboratory Water (Industrial Water)

Not required

Vacuum

- Provide a laboratory vacuum system to deliver vacuum at 18" Hg, using a single stage, oil-free positive displacement, non-pulsating liquid ring vacuum pump.
- Use Type L hard drawn copper with wrought copper solder fittings and lead free solder.

Natural Gas

There is no natural gas at the building.

Compressed Air

- Provide a compressed air system to deliver air at point of use at 100 psig, using a single stage, oil-free, positive displacement, non-pulsating liquid ring compressor
- Store compressed air in ASME certified tanks with automatic electronic drains, piped to floor drains.
- Distribute compressed air in Type L hard drawn copper with wrought copper solder fittings and lead free solder.
- Provide each laboratory with an accessible filter/drier.

Sanitary Sewer/Waste/Roof Drains

- Cast-iron pipe and no-hub fittings above grade, PVC below grade
- Minimum size for roof drain piping to be 3", buried piping to be 4"

Laboratory Waste

- Use acid resistant tailpiece and piping at all horizontal waste piping from laboratory sinks.
- Allowable materials include schedule 40 flame retardant polypropylene, CPVC, or tempered and annealed borosilicate glass.

Laboratory Safety Fixtures

Provide combination emergency shower/eyewash station and floor drain in Criminal Justice laboratory

Plumbing Fixtures

Water Closet: Wall-hung, vitreous china, with manual flush valve, 1.28 gpf

Urinal: Wall-hung, vitreous china, with manual flush valve, 0.125 gpf.

Lavatory:

- Wall-hung or counter-mount, with battery operated automatic sensor faucet, 0.5 gpm.
- Provide individual ASEE 1070 listed point-of-use thermostatic mixing valve at each faucet, readily accessible for maintenance

Water Cooler:

- Wall hung refrigerated water cooler with stainless steel backsplash
- Provide multiple locations with bottle fillers

General:

- Deep seal traps, not trap primers.
- Provide sediment trap at sinks in Archeology laboratory

FIRE PROTECTION

- Provide fire sprinkler protection throughout building. System to comply with NFPA, campus fire marshal building official and IBC requirements and State of Utah Fire Marshal requirements.
- Include horizontal routing of fire protection mains on the mechanical drawings. Final head location and pipe less than 2" is not required to be included.
- A fire pump is not anticipated, because the flow and pressure requirements can likely be met from the campus system. Conduct a fire flow analysis per DFCM criteria during the schematic design phase to confirm this assumption.
- Provide individual floor control assembly, including zone check assembly, at each floor.

Sprinkler Occupancy Hazard Classifications are as follows:

Office and Public Areas:	Light Hazard.
Service Areas:	Ordinary, Group 1.
Mechanical Equipment Rooms:	Ordinary, Group 1.
Building Service Areas:	Ordinary, Group 1.
Electrical Equipment Rooms:	Ordinary, Group 1.
General Storage Areas:	Ordinary, Group 1.

Minimum Density for Automatic-Sprinkler Piping Design, as follows: (Reduce Design areas with quick response heads when applicable and increase design area as required for pitched ceilings.

Light:	0.10 gpm over 1500 ft2. area.
Ordinary Group 1:	0.15 gpm over 1500 ft2. area.

Maximum Protection Area per Sprinkler: As follows (except as modified by authorities having jurisdiction)

Office Space:	225/400 ft2.
Storage Areas:	130/400 ft2.
Mechanical Equipment Rooms:	130 ft2.
Electrical Equipment Rooms:	130 ft2.

Other Areas: NFPA 13 recommendations, unless otherwise indicated.

Components and Installation: Capable of producing piping systems with 175-psig minimum working-pressure rating, unless otherwise indicated. All piping and components are to be Schedule 40 minimum, and of domestic manufacture.

CONTROLS

- Control of the VRF system, including individual zone control and operation of the water-cooled condensing units will be by the VRF manufacturer.
- All other systems will be controlled with a Direct Digital Control (DDC) system by Johnson Controls, factory office.
- Communicate from VRF to BMS through a BACnet interface, to allow remote monitoring of status and alarms, and adjustment of zone setpoint and schedule.
- Integrate the mechanical and electrical systems. Provide microprocessor to microprocessor communication between the DDC and variable frequency drives, air handler(s), electrical distribution, lighting, emergency generators, UPS system and building power.
- Additional points shall be made available for non-mechanical/electrical monitoring that may be required by the engineering department.
- Provide written sequence of operation on drawings for all systems controlled by the DDC system. Provide graphical representation of sequence of operations on the Building Automation System graphics.
- Label the areas served by air handlers and other fan systems on the BAS graphics.
- Integrate the building meters with the campus Lucid system
- Integrate Johnson BMS with Notifier and LENEL systems.

SUSTAINABILITY/ENERGY EFFICIENCY

(also see Sustainability Section)

- Provide a design narrative that includes the following:
- Basis of design, including all information required to prepare the design
- Sequence of operation of all systems, as well as their interaction with other systems.
- System description, including operating parameters and assumptions.
- A description of the methods used by the design team to achieve sustainability, including the integrated design process; and a description of the results, i.e. a description of the sustainable elements included in the design. Include in this section how the requirements of this program were met.
- Results of the energy simulation, with a design energy performance standard for the building.

Specific measures to be investigated include:

- Improved supply air fan and hydronic pump efficiencies:

SYSTEM	BASELINE	PROPOSED
Supply Air Fan	1.05 w/cfm	0.75 w/cfm
Hydronic Pump	19 w/gpm	10.9 w/gpm

- Improved EER/COP for VRF units
- Reduced air volume in laboratories below standard, and variable volume exhaust when operating.
- Heat pump water heater, with heat source from electrical room.
- Oversized duct for reduced pressure drop.
- Evaporative cooling on exhaust/relief air to provide indirect cooling of outside air.
- Adding additional ground source capability to the campus in either the lower quad west of the building or in the A2 parking lot east of the building.
- Using the duck pond as a source/sink.

COMMISSIONING

- Coordinate with the commissioning plan developed, as required by HPBS
- The Owner will self-perform commissioning services.
- Develop a specification for test and balance that is specific to the project, and is coordinated with the Owner's commissioning plan.

MEASUREMENT AND VERIFICATION

- Energy meters to provide local as well as remote readouts, using BACnet protocol
- Continuous metering equipment for the following uses (as applicable):

SYSTEM	METER
Condenser Loop, Domestic Water	Magnetic insertion flow meter similar to Onicon F-3500, with Onicon System 10 Btu meter providing the following information: fluid flow rate, supply and return temperature, instantaneous energy flow rate, totalized energy flow rate

SPACE	EXHAUST RATE CRITERIA
Toilet Rooms	100 cfm/fixture public, 75 cfm/fixture private

VENTILATION/INDOOR AIR QUALITY

- Comply with the minimum requirements of ASHRAE Standard 62.1-2010, Ventilation for Acceptable Indoor Air.
- Reset outdoor air intake flow and/or space or zone airflow as operating conditions change, in accordance with Section 6.2.7 of the Standard, for zones that require Demand Controlled Ventilation (DCV).
- Design the ventilation system for an air change effectiveness of 0.8, as determined by ASHRAE Standard 62.1-2010.
- Implement a Construction IAQ Construction Management Plan that includes the use of high efficiency filters (Minimum Efficiency Reporting Value (MERV) = 8, as determined by ASHRAE 52.2-1999), at each return air grille for systems used during construction.
- Provide MERV 8 filters at the VRF fan coils and MERV 13 filters at the central air handling equipment, without pre-filters.
- Exhaust conditioned spaces as follows:

Janitor Closets, Copy Rooms	0.5 cfm/ft2, or larger as required to maintain at negative pressure of 0.02" w.c. relative to adjoining spaces
Laboratories	6 ACH, occupied 3 ACH, unoccupied 0 ACH, de-commissioned

GENERAL REQUIREMENTS

Site Elevation 4,650 ASL

Outdoor design conditions (ASHRAE 99%, Ogden Airport)

Winter: 12.0 F

Summer: 95.1DB/61.0WB F

Dew point: 55.4 F

Indoor design conditions:

	TEMPERATURE			
	Summer		Winter	
	Occ*	Unocc	Occ*	Unocc
Circulation	75/75	85	72/69	65
Classrooms	75/78	85	72/69	65
Laboratories	72/75	85	72/69	65
Private Offices	75/78	85	72/69	65
Restrooms	75/75	85	72/69	65
Storage	80/NA	85	60/NA	55

*setup/setback temperature when space is temporarily unoccupied during occupied period, as determined by space occupancy sensor

Humidity control is not required.

CODE & STANDARDS

The mechanical systems will be designed in accordance with:

- 2012 IBC
- 2012 IMC
- 2012 IPC
- 2012 IFC
- 2012 IECC
- ANSI/ASHRAE Standard 55-2010
- ANSI/ASHRAE Standard 62.1-2010
- ASHRAE Standard 52.2-1999
- ANSI/AIHA Z9.5-2009– Laboratory Ventilation
- DFCM Design Standards, current as of completion of Design Development,

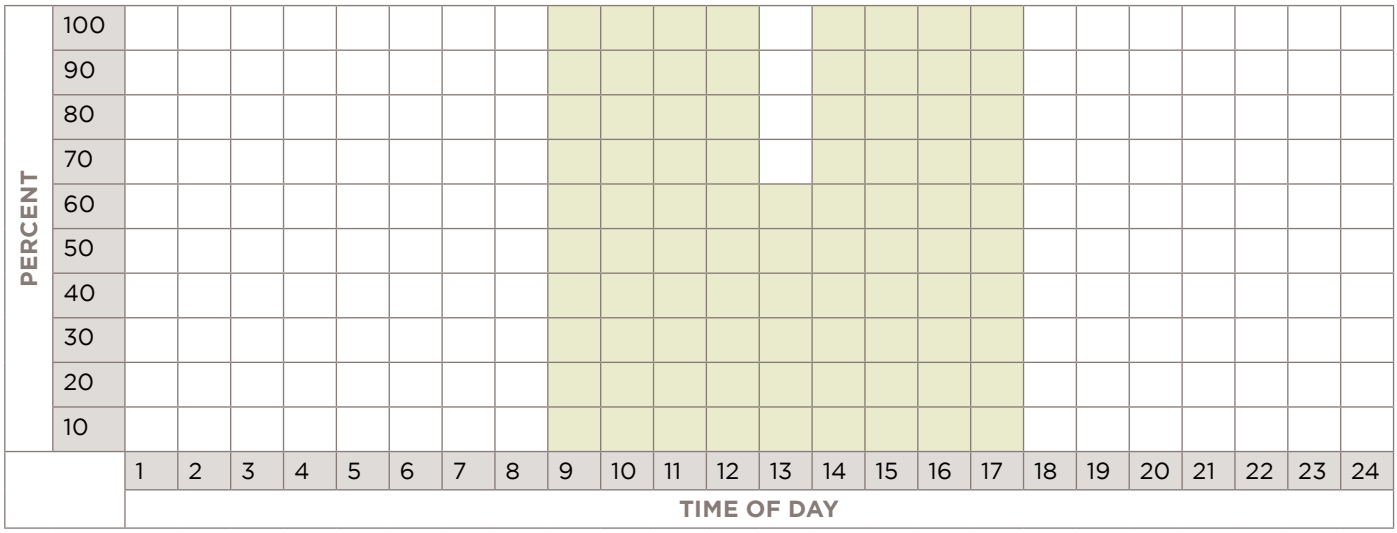
Weber State University Design and Construction Standards, October 2009, with section revisions as available

OPERATING SCHEDULES

ADMINISTRATIVE AREA

Design Peak: Reference Room Data Sheets

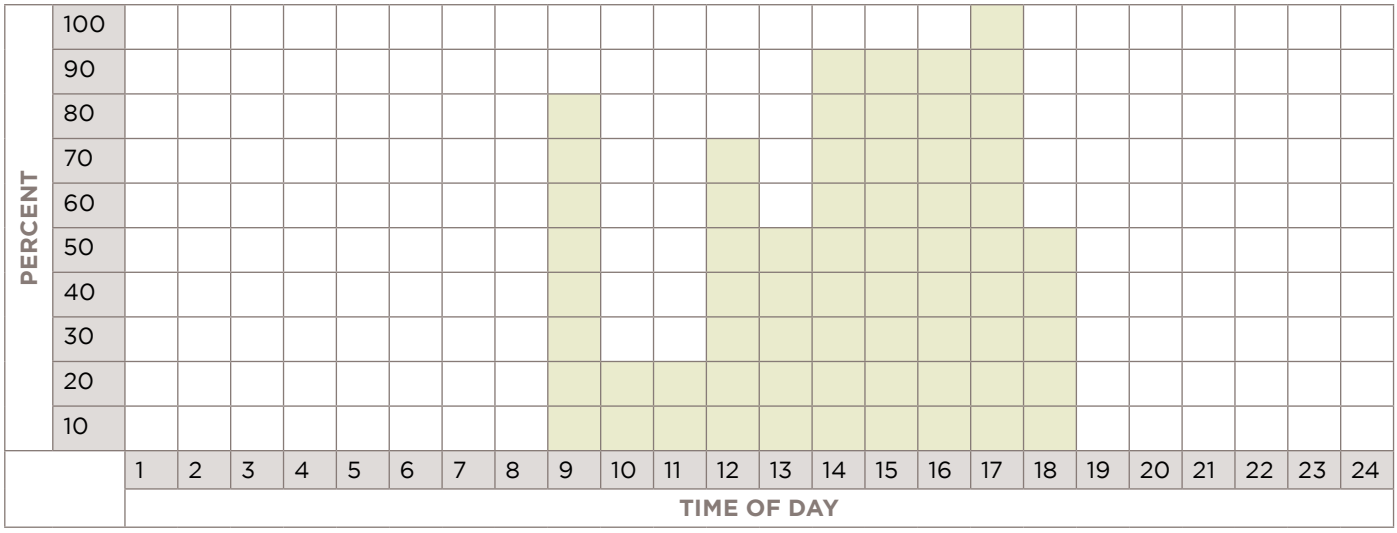
Year-round weekdays (closed weekends)



FACULTY OFFICE

Design Peak: Reference Room Data Sheets

Year-round weekdays (closed weekends)

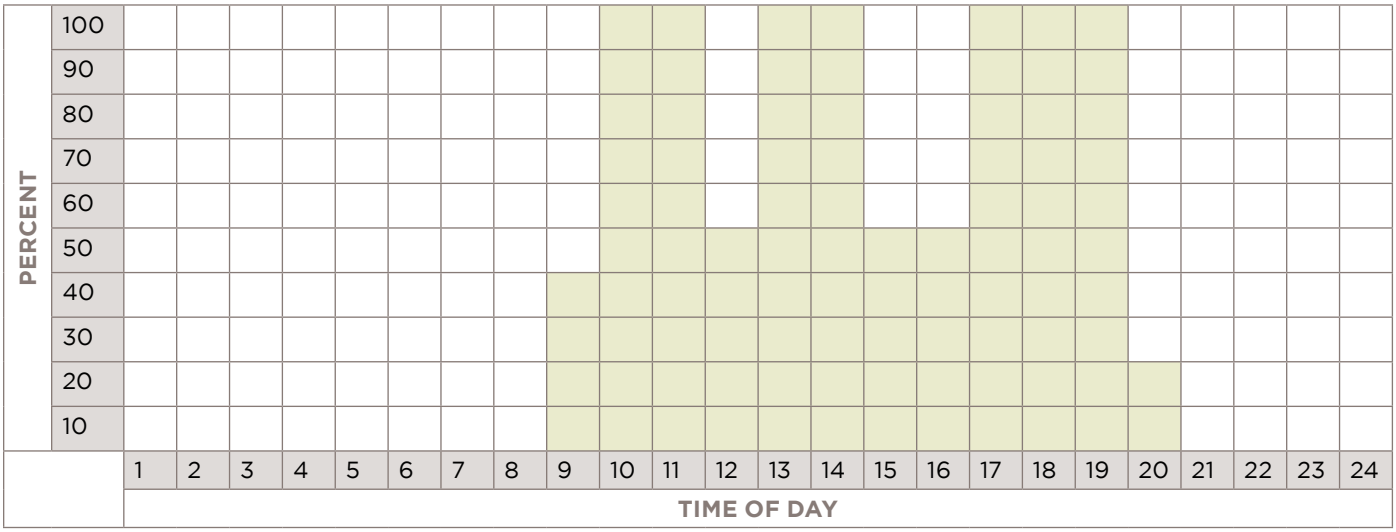


OPERATING SCHEDULES

CLASSROOMS

Design Peak: 25

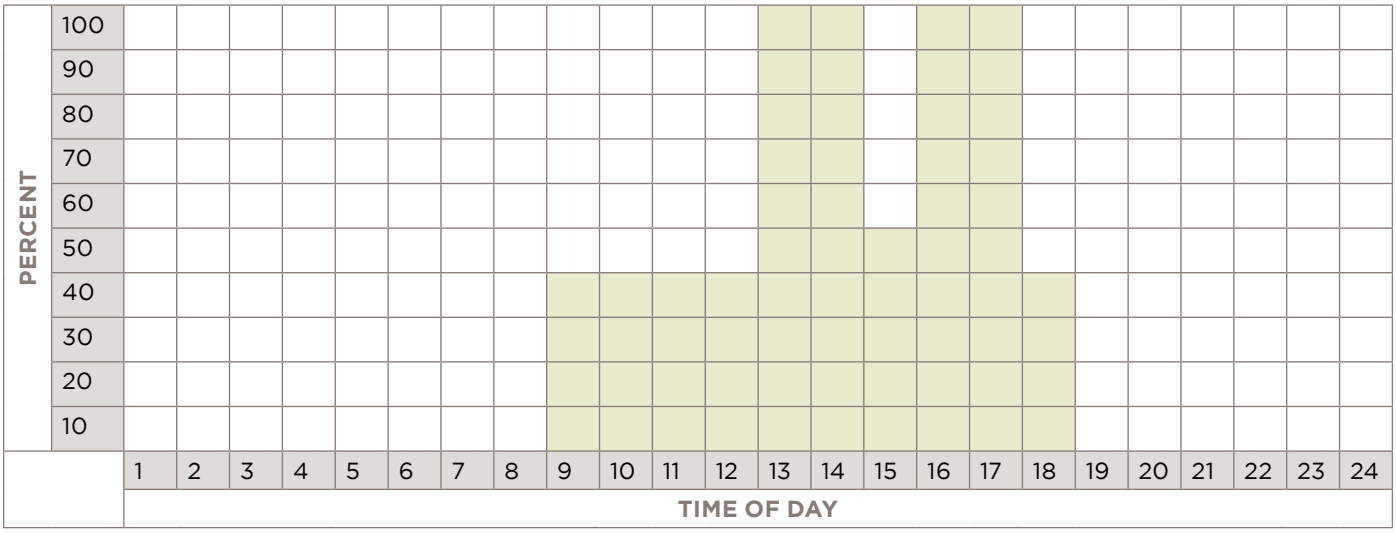
9 month calendar, weekdays (closed weekends)



LABORATORIES

Design Peak: 25

9 month calendar weekdays (closed weekends)



ELECTRICAL DESIGN NARRATIVE

The renovation of the Social Science Building will include the replacement of nearly all electrical systems including power, lighting, fire alarm and voice/data. Existing equipment, cabling and conduit will be removed.

POWER DISTRIBUTION SYSTEM

- Existing medium voltage substation that serves the entire campus electrical load has adequate capacity to support the electrical load in this building.
- Existing medium voltage transformers are located inside of the building and will be removed under this project.
- A new 277/480 volt medium voltage pad mounted transformer will be installed inside the building where the old transformer was located and will be tied to existing medium voltage switch.
- Existing 277/480 volt and 120/208 volt main distribution switchboards are old and will be replaced with new ones.
- New main electrical room will be constructed to house 277/480 volt main distribution switchboard, dry type transformer, 120/208 volt main distribution switchboard, etc.
- A pad mounted dry type transformer will be installed in the main electrical room for the new 120/208 volt, 3 phase main distribution switchboard.
- The two existing digital meters will be replaced with new meters to comply with WSU BAC net system. The new meters will monitor the entire electrical building load and mechanical equipment.
- All large mechanical equipment will be tied to 277/480 volt panelboards.
- Existing 277/480 volt and 120/208 volt branch panelboards are located in the hallways and are to be removed.
- New electrical rooms will be constructed in the center of the building on every floor to house new branch distribution panelboards.
- All lighting in the building will be tied to 277/480 volt panelboard.
- Surge protection devices will be provided for main distribution panelboards and branch panelboards which provide power to critical equipment such as computers, A/V equipment, security equipment, etc.
- Existing motor control center will be removed.
- A separate neutral conductor will be pulled with all branch circuits to meet current code.
- A ground conductor will be pulled in all the conduits to meet current code.
- New devices will be installed in the entire building.
- All poke-through devices will be removed. New campus standard poke-through devices will be installed per new furniture layout.
- All duplex outlets will be replaced with new ones.
- All electrical connection to existing mechanical equipment will be removed.
- Power will be provided to digital signs.
- Power will be provided to all A/V equipment in the classrooms, conference room, etc.
- Power will be provided to new elevator. New elevator will be tied to diesel back-up engine generator.

EMERGENCY POWER DISTRIBUTION SYSTEM

- Existing 80 KW diesel engine generator will be replaced with a new diesel engine generator. New diesel engine generator will have 125 gallon skid mounted fuel tank. New engine generator will be installed where the existing engine generator is located.
- Emergency power will be provided to all new life safety emergency lights, light fixtures in IT room, electrical rooms, mechanical rooms or any other critical spaces.
- Security and IT equipment will be backed-up with emergency power.
- Diesel engine generator will be sized to handle the new elevator load.

FUTURE SOLAR SYSTEM

- All the conduit rough-in will be provided to allow the installation of photo voltaic panels on the entire roof.
- All necessary roof penetration for solar system will be provided for all future cabling.
- Space will be provided in the electrical room for solar equipment.
- Design of future solar system will be coordinated closely with WSU.

LIGHTING

- All existing light fixtures throughout the building will be removed. New ceiling will be installed throughout building.
- New energy efficient LED fixtures will be installed throughout the building.
- Motion sensors will be installed throughout the building for automatic control and to maximize on energy saving.
- Dimmer switches with motion sensors will be provided in all private offices to allow occupants to set the light at their desired level.
- Dimmer switches with motion sensors will be provided by the entrance doors and A/V cabinets in classrooms. Lights by the projector screen will be on a separate zone than the remaining lights in the room.
- Motion sensors will be installed in all public spaces such as hallways, restrooms, janitor room, etc. to maximize on energy savings.
- 2'x4' dimmable lay-in LED light fixtures (campus standard) will be used in 2'x4' lay-in ceiling grid as possible (approximately one every 80 square feet).
- Emergency lights will be provided in path of egress to meet code and will be tied to emergency panel through automatic transfer switches in each emergency light fixture.
- Light fixtures in critical spaces such as IT rooms, mechanical rooms, electrical rooms, etc. will be tied to emergency panel.
- LED strip light fixture will be used in all electrical rooms, tunnels, mechanical rooms, etc.
- Wall mounted LED light fixtures will be used in the stairs where possible to allow ease of maintenance.
- Pendant mounted linear UP/DOWN LED light fixtures will be used in open ceiling areas.
- Edge Lite exit signs with NiCad battery back-up will be used.
- Exterior under soffit light fixtures around the building will be removed. Soffits need to be patched to match existing surfaces.
- New exterior LED light fixtures will be installed at building entrances.
- Campus Standard pole light fixtures will be installed for the sidewalks on the west side of the building.
- IES recommended illumination light level shall be as follows:

AREA TYPE	AVERAGE ILLUMINATION LIGHT LEVEL
Small Office Spaces and Open Offices	30 FC
Labs	50 FC
Corridors	15 FC
Storage Spaces	15 FC
Classrooms	30 FC
Electrical, MDF, IDF Room	30 FC
Toilet Rooms	15 FC

Color of Cat. Cable for lighting will be green.

FIRE ALARM SYSTEM

- Entire fire alarm system will be replaced with a new voice fire alarm system.
- New fire alarm control panel will be provided and installed in main electrical room.
- New fire alarm control panel will be tied to campus with a single mod fiber cable.
- Fire alarm devices will be installed throughout the building to meet DFCM, WSU and National Fire Code.
- Voice/strobe devices will be installed throughout the building.
- Smoke detectors will be installed in corridors, MDF room, IDF rooms, mechanical room, electrical rooms, etc.
- Color of Cat. Cable for fire alarm will be red.
- Emergency communication signal strength test will be performed to meet NFPA 72.

SECURITY SYSTEM

- Card access will be provided for all building entrances, IDF rooms, MDF rooms and classrooms.
- New cameras will be installed by the entrances and other areas, as directed by WSU.
- Conduit will be provided from camera locations to nearest cable tray on the same floor.
- Cable trays will be utilized for security cables as possible.

VOICE / DATA SYSTEM

- Campus communication system has adequate capacity to support the communication needs in this new renovated building.
- New MDF room will be constructed as closely as possible to existing utility tunnel to house IT racks, equipment, TTB, etc.
- Security equipment panels will be installed in MDF room.
- IDF rooms will be constructed in center of the building on every floor. IDF rooms will be stacked above each other.
- Cable tray or conduit will be installed between the MDF and nearest IDF room.
- Four (4) 4" conduit sleeves will be provided between the IDF rooms. Locations to be coordinated with WSU IT Group.
- Cable trays will be installed above the ceilings on all the floors for voice/data cabling.
- Conduit and boxes will be provided in all the walls for voice/data outlets. Conduit will run to nearest cable tray on the same floor. Conduit will be sized for Cat. 60 cables.
- An isolated ground bus bar will be installed in the MDF and IDF rooms. The ground bus bars will be tied to main ground bus bar in 277/480 Volt Main Distribution Switchboard.
- 208 volt and 120 volt power will be provided for all IT equipment. Rack mounted UPS will be provided by IT group.
- Voice/Data cabling and its installation will not be a part of the electrical contractor's responsibility.
- Color of Cat. Cable for voice/data will be blue.

AUDIO AND VIDEO SYSTEM

- Multi Media Classrooms
- Multi Media Classrooms will be equipped with ceiling mounted projector, ceiling mounted camera, ceiling mounted speakers, a two (2) section teaching consoles to house the A/V equipment such as amplifier, DVD player, computer, monitor, etc.

The following is a list of A/V equipment:

ITEM	BRAND	MODEL#
LED Projector HD	Panasonic	PT-RZ370
Projector mounting plate	Chief	RPAU
Ceiling Pole Mount	Chief	CMA-440
Extension Pole 12" length	Chief	CMS012W
Desk top camera	Elmo	TT-12
BluRay-DVD player	Panasonic	DMP-BD75
Audio Amplifier 70v	Extron	XPA 2001
Ceiling Speakers	Extron	FF 120T
Control system	Extron	IN-1606
Button panel	Extron	MLC 226 IP
Campus Standard Computer		From College Vendor
Computer Monitor HDMI input		From College Vendor

- Cabling for HDMI, Cat. 6 will be provided for a complete system.
- Color of Cat. Cable for audio and video system will be gray.

CONFERENCE ROOMS

- LED screen will be installed on the wall by WSU.
- Connection will be made from center conference table to the monitor for HDMI.
- Cat. 6 cable will run to the screen and to the conference table.

DIGITAL SIGNAGE

- Cat. 6 and power will be provided to location of all digital signage.
- Cat. 6 and power will be provided to all TV monitors in public spaces.

SUSTAINABLE DESIGN

SUSTAINABLE PRIORITIES AND GUIDELINES

Both DFCM and WSU put a high priority on the sustainable features of buildings that enhance energy efficiency and performance. Input from Social and Behavior Science faculty and staff emphasize the importance of user comfort. These priorities, coupled with required building standards, emphasize the importance of sustainable design to this project.

ENERGY EFFICIENCY GOALS

Energy efficiency of the building will be determined using ASHRAE 90.1-2010.

1. The minimum reduction in energy cost will be between 20% and 30% per WSU and DFCM requirements. This project will shoot for 30% (or above) to support its LEED certification strategy. It is believed that the mechanical, electrical and envelope systems indicated in this program support this goal.
2. The target energy use intensity (EUI) shall be 40 kBtu/ft^2
3. The roof redesign should consider the loading and structural/electrical connections required to install a solar array on the building in the future.
4. The building infiltration rate will be reduced to meet the requirements of the High Performance Building Standards.

USER COMFORT GOALS

Throughout the programming process the faculty and staff have focused on the importance of daylight, thermal comfort, and a quality building envelope.

1. Daylighting will be provided in all of the offices and as many classrooms as possible. Glare and heat gain considerations will inform a quality daylighting design.
2. Thermal comfort will be increased and user control will be required per LEED and the HPBS.
3. The building envelop infiltration rate will be limited through consideration of envelope systems and construction details.

CERTIFICATION GOALS

The project is required to meet LEED Silver certification and DFCM's High Performance Building Standards.

LEED 2009 FOR NEW CONSTRUCTION AND MAJOR RENOVATIONS

Project Checklist

WSU Social Science Renovation

Y	?	N			
17	8	1	**Sustainable Sites**	Possible Points:	26
Y			Prereq 1	Construction Activity Pollution Prevention	
1			Credit 1	Site Selection	1
5			Credit 2	Development Density and Community Connectivity	5
		1	Credit 3	Brownfield Redevelopment	1
6			Credit 4.1	Alternative Transportation—Public Transportation Access	6
	1		Credit 4.2	Alternative Transportation—Bicycle Storage and Changing Rooms	1
	3		Credit 4.3	Alternative Transportation—Low-Emitting and Fuel-Efficient Vehicles	3
2			Credit 4.4	Alternative Transportation—Parking Capacity	2
1			Credit 5.1	Site Development—Protect or Restore Habitat	1
	1		Credit 5.2	Site Development—Maximize Open Space	1
	1		Credit 6.1	Stormwater Design—Quantity Control	1
	1		Credit 6.2	Stormwater Design—Quality Control	1
	1		Credit 7.1	Heat Island Effect—Non-roof	1
1			Credit 7.2	Heat Island Effect—Roof	1
1			Credit 8	Light Pollution Reduction	1
2	6	2	**Water Efficiency**	Possible Points:	10
Y			Prereq 1	Water Use Reduction—20% Reduction	
2	2		Credit 1	Water Efficient Landscaping	2 to 4
		2	Credit 2	Innovative Wastewater Technologies	2
	4		Credit 3	Water Use Reduction	2 to 4
12	21	2	**Energy and Atmosphere**	Possible Points:	35
Y			Prereq 1	Fundamental Commissioning of Building Energy Systems	
Y			Prereq 2	Minimum Energy Performance	
Y			Prereq 3	Fundamental Refrigerant Management	
10	9		Credit 1	Optimize Energy Performance	1 to 19
	7		Credit 2	On-Site Renewable Energy	1 to 7
2			Credit 3	Enhanced Commissioning	2
		2	Credit 4	Enhanced Refrigerant Management	2
	3		Credit 5	Measurement and Verification	3
	2		Credit 6	Green Power	2
7	6		**Materials and Resources**	Possible Points:	14
Y			Prereq 1	Storage and Collection of Recyclables	
1	2		Credit 1.1	Building Reuse—Maintain Existing Walls, Floors, and Roof	1 to 3
	1		Credit 1.2	Building Reuse—Maintain 50% of Interior Non-Structural Elements	1
2			Credit 2	Construction Waste Management	1 to 2
	1		Credit 3	Materials Reuse	1 to 2
			Materials and Resources, Continued		
2			Credit 4	Recycled Content	1 to 2
1	1		Credit 5	Regional Materials	1 to 2
	1		Credit 6	Rapidly Renewable Materials	1
1			Credit 7	Certified Wood	1
12	2	1	**Indoor Environmental Quality**	Possible Points:	15
Y			Prereq 1	Minimum Indoor Air Quality Performance	
Y			Prereq 2	Environmental Tobacco Smoke (ETS) Control	
1			Credit 1	Outdoor Air Delivery Monitoring	1
		1	Credit 2	Increased Ventilation	1
1			Credit 3.1	Construction IAQ Management Plan—During Construction	1
1			Credit 3.2	Construction IAQ Management Plan—Before Occupancy	1
1			Credit 4.1	Low-Emitting Materials—Adhesives and Sealants	1
1			Credit 4.2	Low-Emitting Materials—Paints and Coatings	1
1			Credit 4.3	Low-Emitting Materials—Flooring Systems	1
1			Credit 4.4	Low-Emitting Materials—Composite Wood and Agrifiber Products	1
1			Credit 5	Indoor Chemical and Pollutant Source Control	1
1			Credit 6.1	Controllability of Systems—Lighting	1
1			Credit 6.2	Controllability of Systems—Thermal Comfort	1
1			Credit 7.1	Thermal Comfort—Design	1
1			Credit 7.2	Thermal Comfort—Verification	1
	1		Credit 8.1	Daylight and Views—Daylight	1
	1		Credit 8.2	Daylight and Views—Views	1
1	5		**Innovation and Design Process**	Possible Points:	6
	1		Credit 1.1	Innovation in Design: Specific Title	1
	1		Credit 1.2	Innovation in Design: Specific Title	1
	1		Credit 1.3	Innovation in Design: Specific Title	1
	1		Credit 1.4	Innovation in Design: Specific Title	1
	1		Credit 1.5	Innovation in Design: Specific Title	1
1			Credit 2	LEED Accredited Professional	1
2	2		**Regional Priority Credits**	Possible Points:	4
1			Credit 1.1	Regional Priority: Development Density	1
1			Credit 1.2	Regional Priority: Alternate Transportation	1
	1		Credit 1.3	Regional Priority: Specific Credit	1
	1		Credit 1.4	Regional Priority: Specific Credit	1
53	50	6	**Total**	Possible Points:	110

Certified 40 to 49 points Silver 50 to 59 points Gold 60 to 79 points Platinum 80 to 110

LEED CERTIFICATION

A LEED rating strategy has been developed for this project and is articulated in the LEED Checklist above. The strategy reflects information gathered from WSU's facilities group, a "standard" LEED checklist provided by facilities, and the experience of the programming team with both WSU and the LEED rating system. Note that this strategy is based on LEED version 3, on which WSU has based their Silver rating requirement. If the project is registered under LEED version 4, the project team will need to consider differences between the rating systems and adjust the certification strategy appropriately.

HIGH PERFORMANCE BUILDING STANDARD

DFCM's High Performance Building Standard (HPBS) has many synergies with the LEED Certification requirement on this project. It is worth noting some of the required differences including the requirement of an integrated process, the analysis of life-cycles, the inclusion of envelope commissioning, the request for an education and outreach program and the specific metering and monitoring requirements. All of these requirements must be met in the final design and construction of the project.

ENERGY ANALYSIS

This project is a major renovation of an existing building so factors such as building massing and orientation cannot be changed. These limitations, coupled with well-defined mechanical and electrical requirements, focus the energy analysis on building envelope construction and design.

MECHANICAL SYSTEMS

The following energy analysis is based on a variable refrigerant flow (VRF) mechanical system. The details of the overall system can be found in the mechanical narrative. The energy implications are the focus of this section.

ELECTRICAL SYSTEMS

WSU standards for lighting, power and AV have been honed toward an efficient outcome and these standards are reflected in the electrical narrative. The following energy analysis assumes that these criteria are met and the electrical systems are constant.

Using the EnergyPlus energy simulation tool, the following variables were set in order to study the possible envelope configurations.

- Mechanical System – VFR
- Lighting Power Density – 0.5 watts/SF
- Plug Load – 0.5 watt/SF
- Infiltration Rate – based on PNNL studies and standards
- Orientation and Massing – matching the existing building
- Occupancy schedule – based on the national standard
- Overall Building Occupancy – 1750 people

Wall system and glazing system variables were studied. A parallel coordinates chart was developed to compare the energy performance of different design options. Exhibit #1 shows the overall chart. Components of the chart are described below starting from the left side and moving right. Following this description, portions of the overall chart are enlarged and specific results discussed.

WALL SYSTEM VARIABLES:

- Wall u-factor (Wall U-factor): Two options are reviewed – typical wall assembly and improved wall assembly.
- Window to wall ratio (WWR): Three options are reviewed – 35%, 30% and 25%.
- Glare on West and East elevations (Glare West (hours)): The range of hours exceeding discomfort on the glare index is shown.
- Horizontal sunshades (Sunshade (inches)): Two options are reviewed – no sunshade and 24" sunshades.
- Glare on South elevation (Glare South (hours)): The range of hours exceeding discomfort on the glare index is shown.

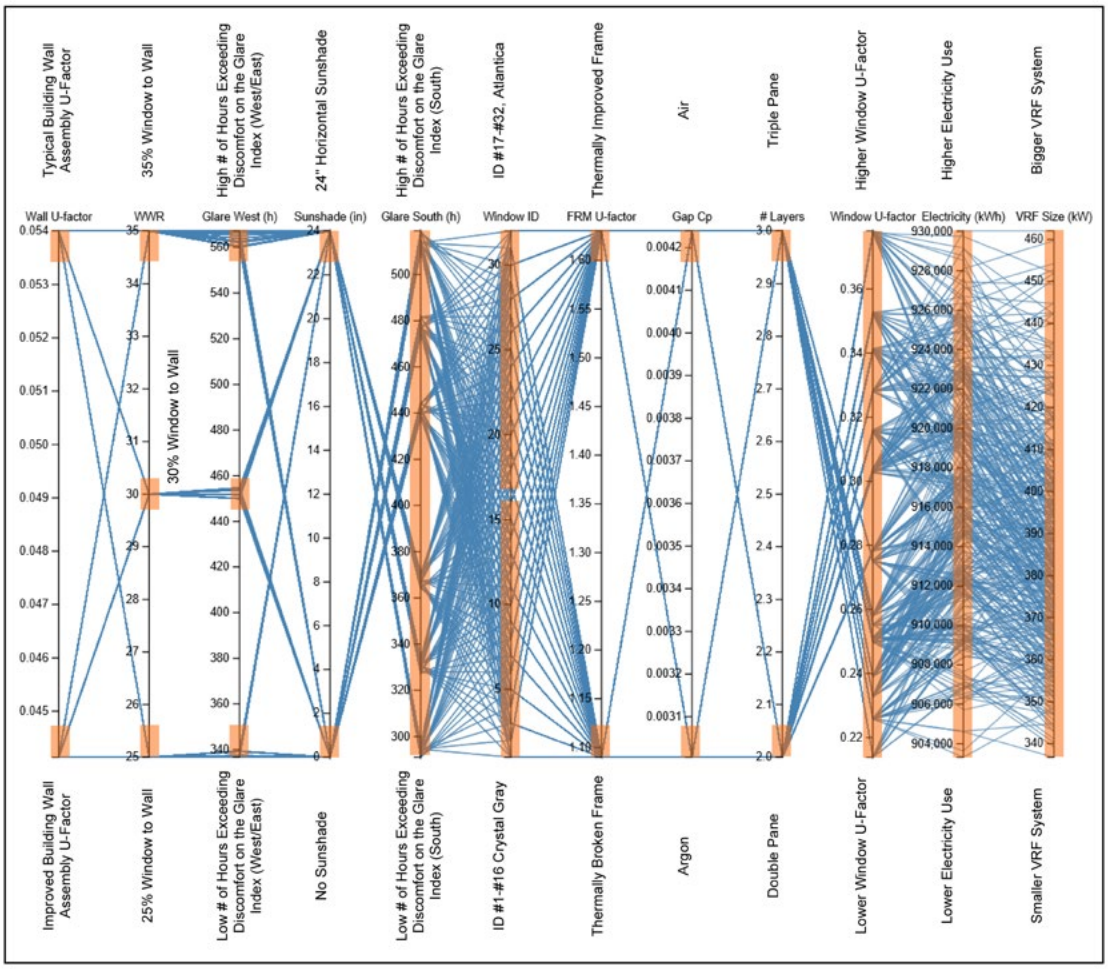


EXHIBIT #1 - PARALLEL COORDINATES CHART - WSU ANALYSIS KEY

GLAZING SYSTEM VARIABLES:

- Glazing Tint (Window ID): Two glazing options are reviewed – Crystal Gray (ID #1-#16) or WSU's Standard Atlantica (ID #17-32). See Exhibit #2 for description of each ID#.
- Frame Type (FRM U-Factor): Two options are reviewed – thermally improved and thermally broken frames.
- Airgap Medium (Gap Cp): Two options are reviewed – air and argon.
- Number of Panes (# Layers): Two options are reviewed – double pane and triple pane.
- Low E Coatings (Window U-factor): The range of possible u-factors as effected by different possible coatings is shown.

The blue lines on the chart show all the options reviewed in the EnergyPlus model, and the final two columns on the right show how these variables effect electricity use and VRF size. All possible combinations of variables are reviewed resulting in the hundreds of possible outcomes for electricity use and VRF size. In order to clarify these results, each variable has been reviewed separately to determine its impact on the overall envelope system and provide appropriate recommendations for the design team.

GLAZING SYSTEMS

EXHIBIT #2

First we will review aspects of the glazing options to determine which variables will impact the energy use and VRF system sizing the most.

WINDOW ID	GLAZING TINT	FRM U-FACTOR	GAP CP	# LAYERS	WINDOW U-FACTOR
1	Crystal Gray	Broken	Air	Double	0.353
2	Crystal Gray	Improved	Air	Double	0.378
3	Crystal Gray	Broken	Air	Double	0.303
4	Crystal Gray	Improved	Air	Double	0.328
5	Crystal Gray	Broken	Air	Triple	0.25
6	Crystal Gray	Improved	Air	Triple	0.275
7	Crystal Gray	Broken	Air	Triple	0.233
8	Crystal Gray	Improved	Air	Triple	0.258
9	Crystal Gray	Broken	Argon	Double	0.316
10	Crystal Gray	Improved	Argon	Double	0.341
11	Crystal Gray	Broken	Argon	Double	0.279
12	Crystal Gray	Improved	Argon	Double	0.304
13	Crystal Gray	Broken	Argon	Triple	0.226
14	Crystal Gray	Improved	Argon	Triple	0.251
15	Crystal Gray	Broken	Argon	Triple	0.214
16	Crystal Gray	Improved	Argon	Triple	0.239
17	Atlantica	Broken	Air	Double	0.352
18	Atlantica	Improved	Air	Double	0.377
19	Atlantica	Broken	Air	Double	0.303
20	Atlantica	Improved	Air	Double	0.328
21	Atlantica	Broken	Air	Triple	0.25
22	Atlantica	Improved	Air	Triple	0.275
23	Atlantica	Broken	Air	Triple	0.233
24	Atlantica	Improved	Air	Triple	0.258
25	Atlantica	Broken	Argon	Double	0.315
26	Atlantica	Improved	Argon	Double	0.341
27	Atlantica	Broken	Argon	Double	0.278
28	Atlantica	Improved	Argon	Double	0.304
29	Atlantica	Broken	Argon	Triple	0.226
30	Atlantica	Improved	Argon	Triple	0.251
31	Atlantica	Broken	Argon	Triple	0.255
32	Atlantica	Improved	Argon	Triple	0.239

EXHIBIT #2 - GLAZING SYSTEMS

GLAZING TINT
EXHIBIT #3

Two glazing tints are considered, Crystal Gray and the WSU standard Atlantica (green). All other things being equal, the electrical efficiencies of both tints are similar while the VRF sizing is reduced slightly using the Crystal Gray. There is no cost difference associated with glazing tint. See exhibit #4

AIRGAP
EXHIBIT #4

The airgap between insulated panels of the glazing unit can be filled with regular air, or it can be filled with argon. The analysis shows that the argon performs better than air, with a notable decrease in electricity consumption. Crystal Gray glazing and argon used together will result in better window system than Atlantica and/or air. This difference comes with less dramatic impacts to the budget but also needs to be weighed against other campus and project requirements. The impact on the electrical use and VRF size of these selections is also less dramatic than the impacts of other decisions as we will see.

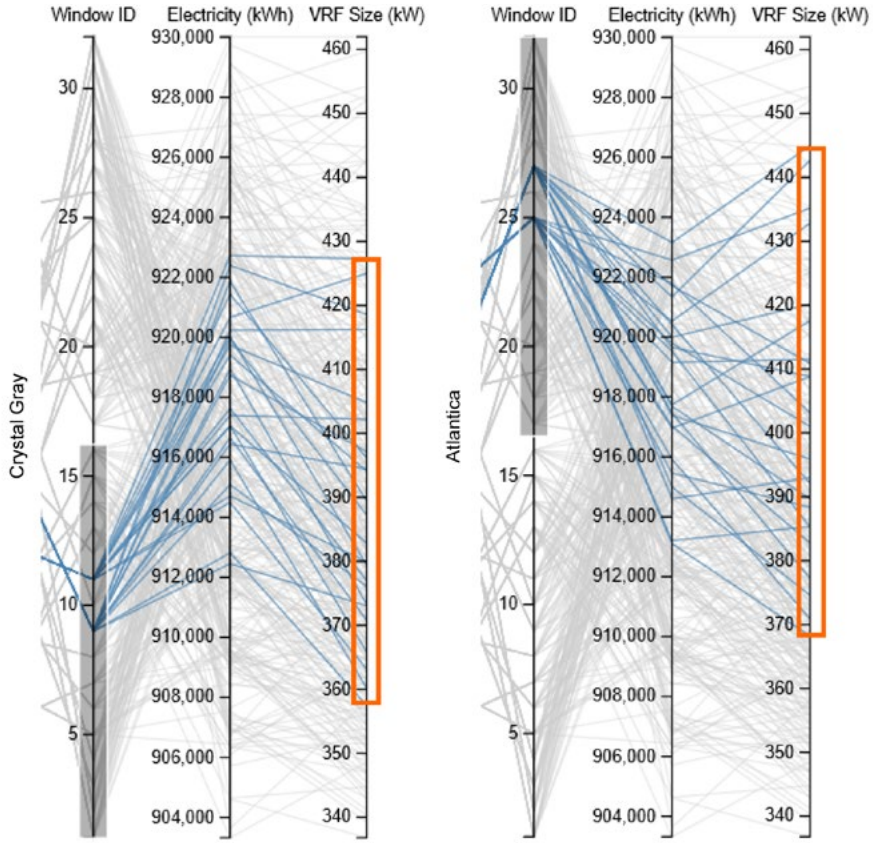


EXHIBIT #3 - GLAZING TINT COMPARISON

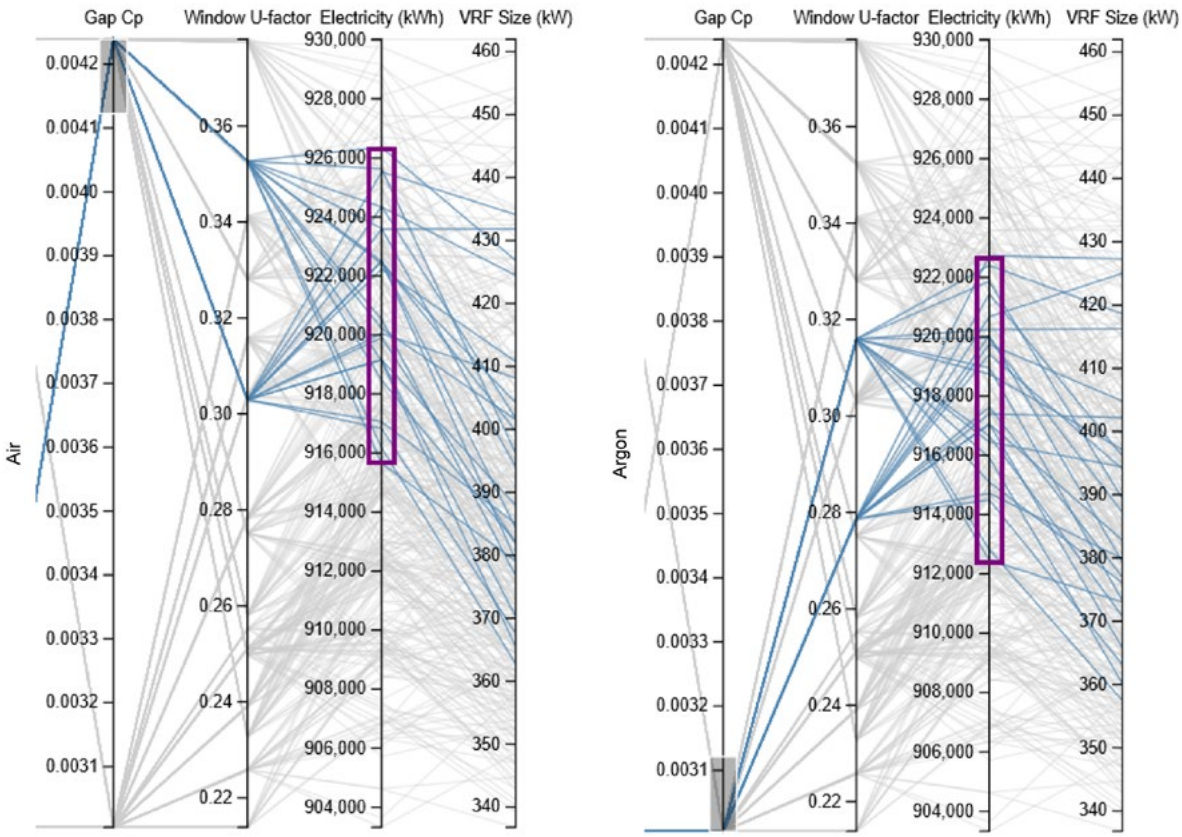


EXHIBIT #4 - GLAZING GAP MEDIUM COMPARISON

NUMBER OF PANES AND FRAME TYPE

EXHIBIT #5 & #6

Frame type (U-value) and the number of glazing panes have a pronounced impact on electricity use and VRF size. Using Crystal Gray glass with argon as the base, the impact of the frame U-value and the number of panes is compared.

The analysis shows a more dramatic impact associated with the number of panes of glass as compared to the frame type. It also shows that the impact of thermally broken frames vs. improved frames (U-value) is not impacted by the number of panes. So, these two decisions can be made independently.

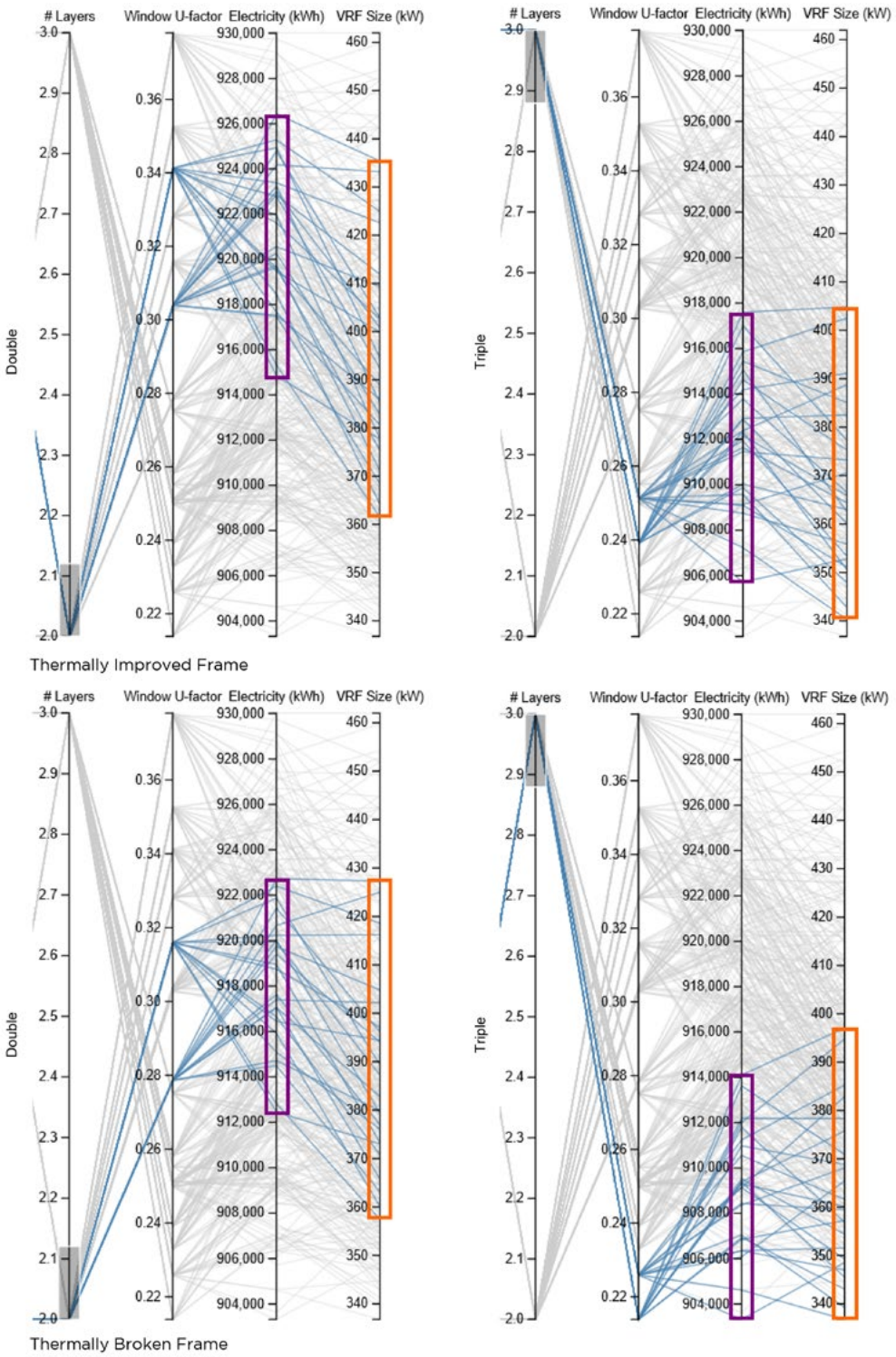


EXHIBIT #5 - NUMBER OF PANE COMPARISON

The cost difference between triple and double-pane glazing is more than the difference between thermally improved and thermally broken aluminum curtainwall. Although its impact on energy performance is more pronounced, the increased cost makes a decisive recommendation on the number of glazing panes difficult (see next section). Analysis does, however, support recommending a thermally broken frame (better U-value) as opposed to a thermally improved frame.

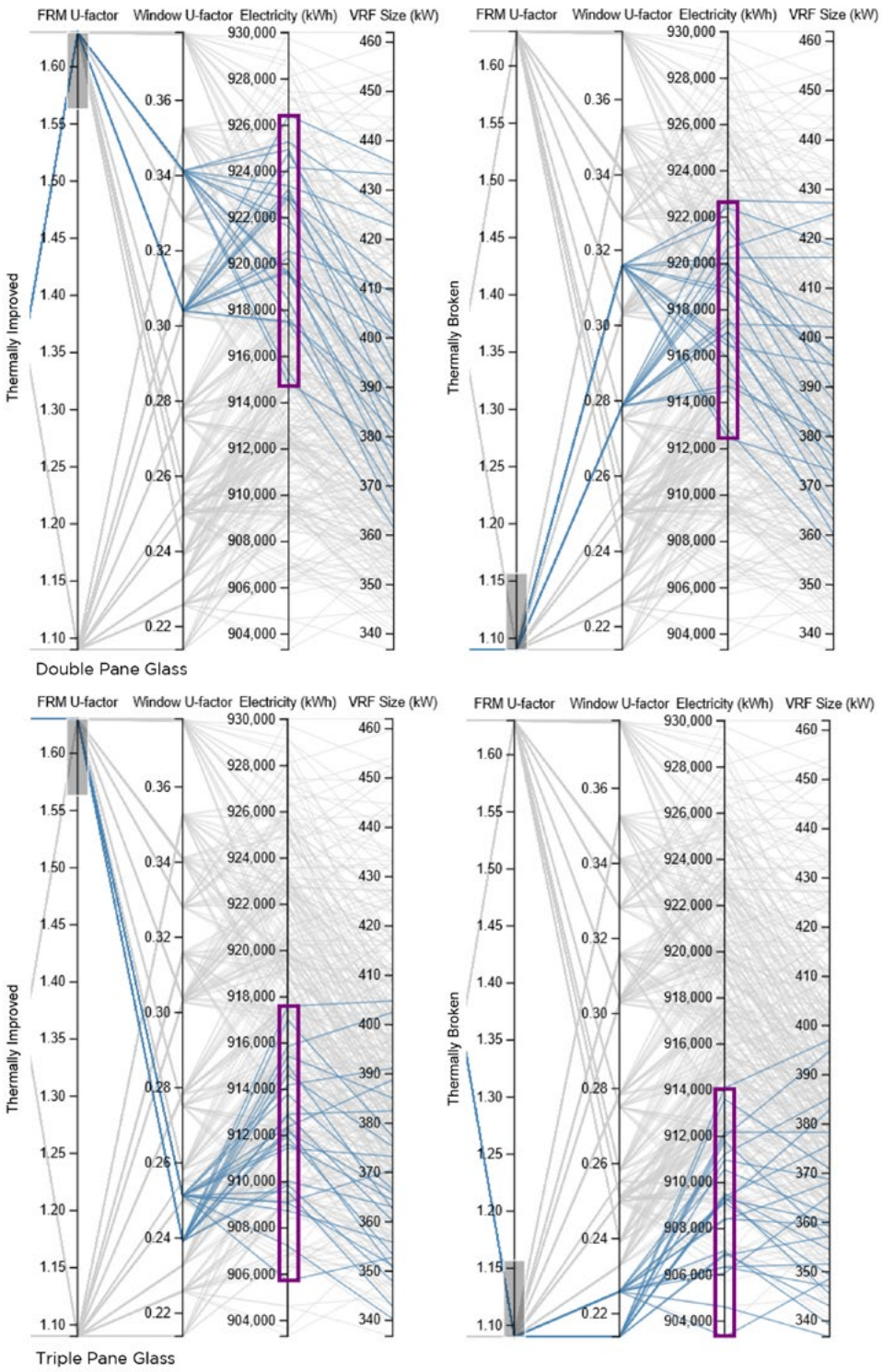


EXHIBIT #6 - FRAME U-FACTOR COMPARISON

VALUE OF TRIPLE PANE

EXHIBITS #7

Triple-pane glazing reduces the VRF size and reduces energy consumption. However, double pane glazing can provide high energy savings and a reduction in VRF size at a lower cost. For this reason double pane glazing has been included in the cost estimate and is considered the recommended strategy. It will be important for the final design decision to be based on detailed energy analysis capturing the interplay between costs, energy performance and occupant comfort.

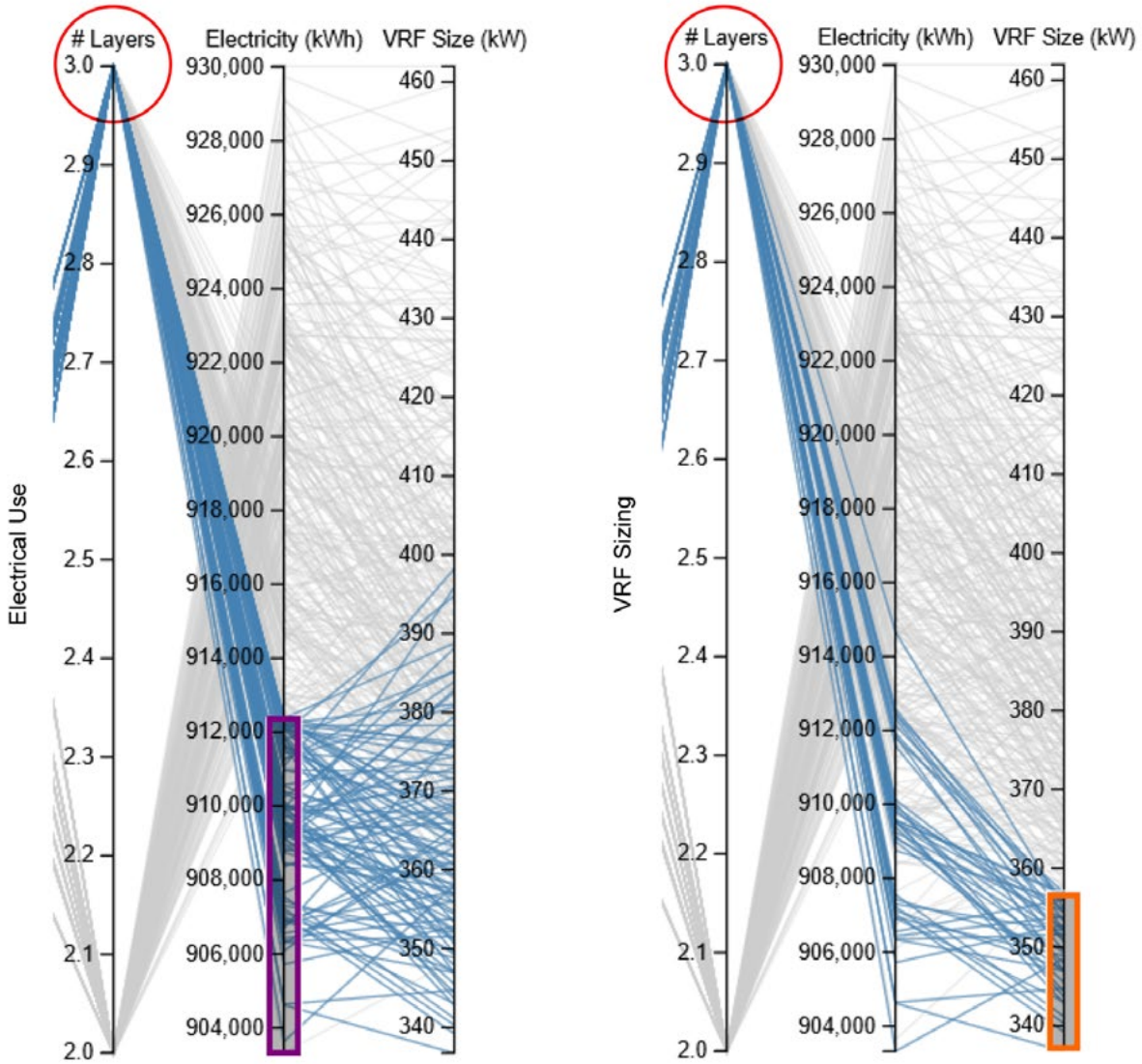


EXHIBIT #7 - TRIPLE PANE EFFECT ON ELECTRICAL USE AND VRF SIZING

GLAZING TYPE RECOMMENDATION

EXHIBITS #8 & #9

Once the glazing type is limited to double pane systems, the best glazing system in both energy use and VRF sizing is shown to be Crystal Gray tinted with a thermally broken frame, argon in the airgap and a low-e coating (Glazing ID #9). This is, however, contrary to WSU's standard Atlantica tint. If the characteristic green color of the Atlantica product is desired, the best performing assembly is the Atlantica tint with a thermally broken frame, argon in the air gap and a low-e coating (Glazing ID #25). The results of these two recommended glazing systems can be compared and considered further during design.

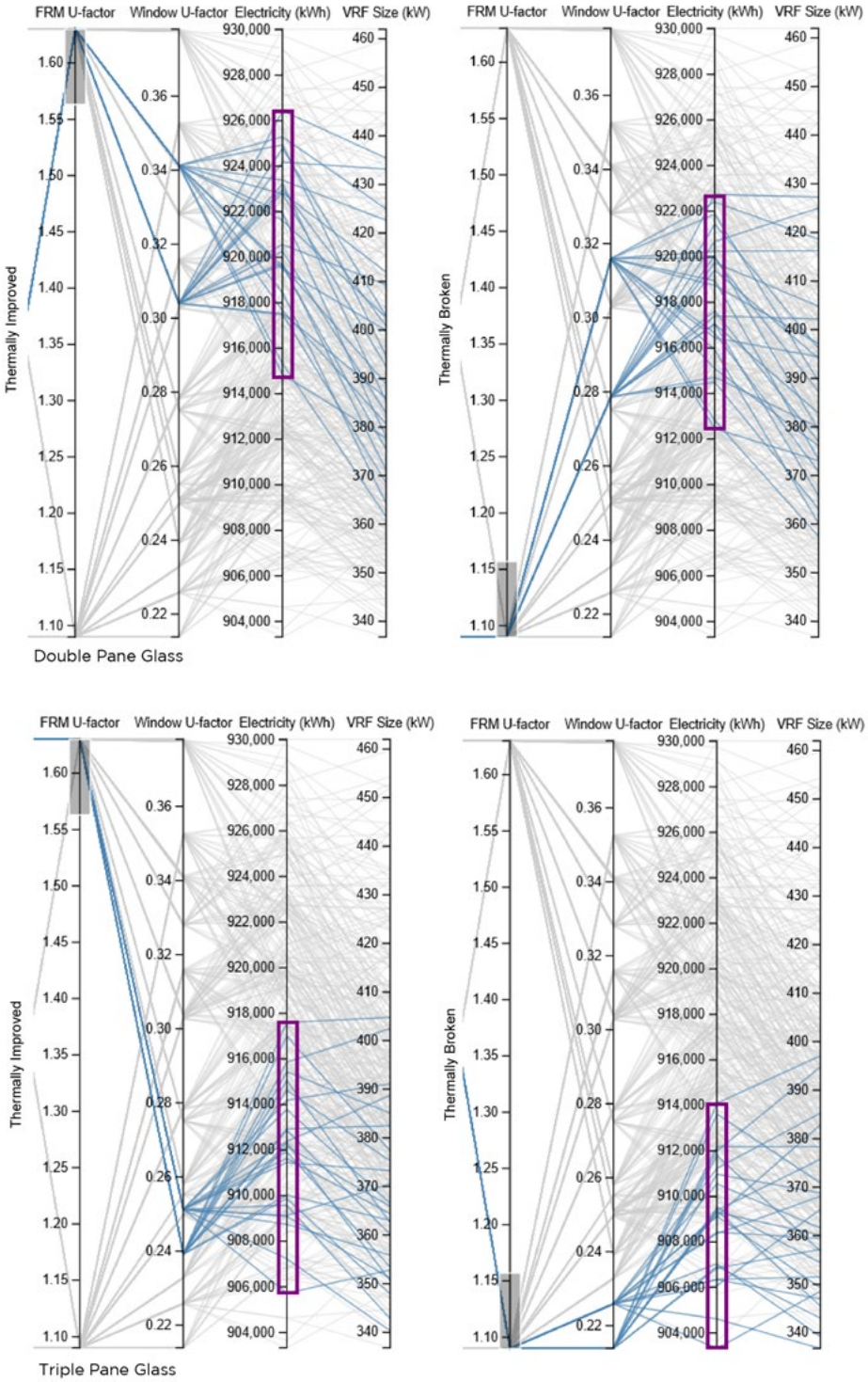


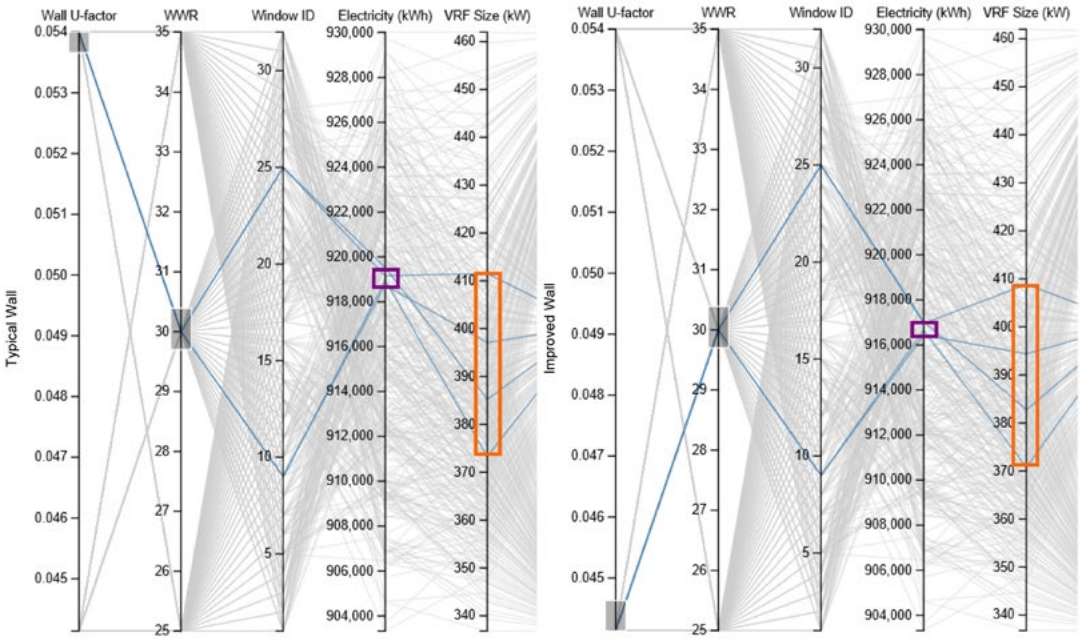
EXHIBIT #8 & 9 - FRAME U-FACTOR COMPARISON

WALL CONSTRUCTION AND WINDOW TO WALL RATIO

EXHIBITS #10 & #11

Analysis shows that the window to wall ratio has a greater effect on electricity use and VRF size than does the U value of the wall (opaque portion). However, the overall wall u-value should be considered as it is oftentimes an inexpensive and unobtrusive improvement.

Building users and WSU administration have consistently requested abundant daylight and views to the exterior. Window-to-wall ratios between 30-35% will be conducive to this goal. However, large ratios will also reduce energy performance as much, or more, than any other design decision. Based on the concept design phase illustrated in this program, ratios of 25-30% appear reasonable while maintaining light to each office and many common and classroom spaces.



Sustainability Narrative: Exhibit #10 Wall U Factor Comparison

EXHIBIT #10 - WALL U-FACTOR COMPARISON

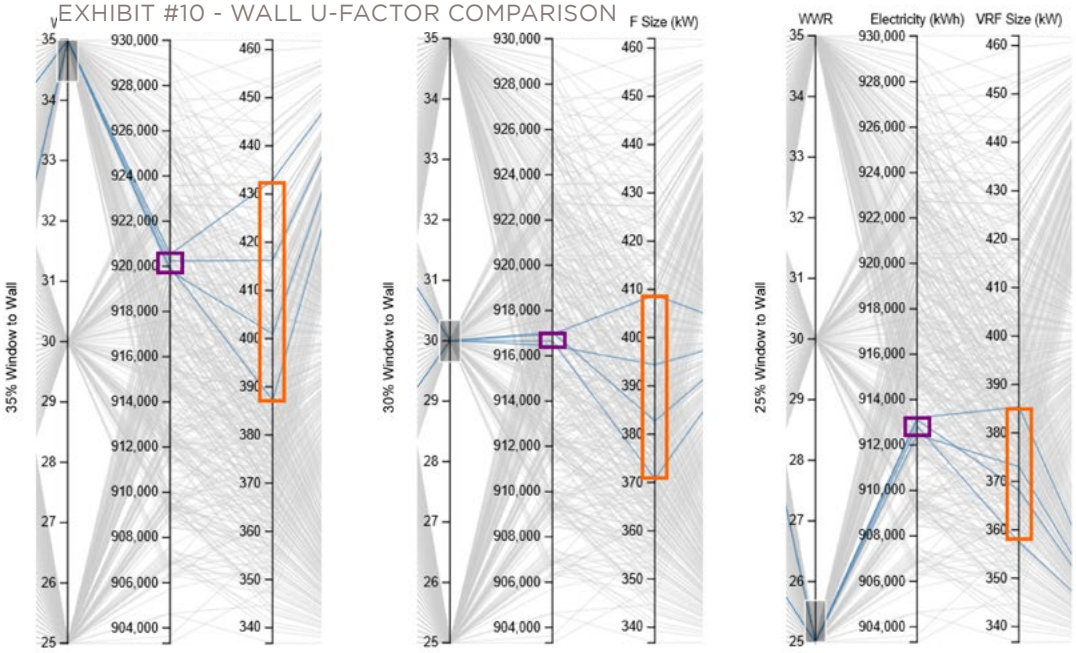


EXHIBIT #11 - WINDOW TO WALL RATIO COMPMARISON

SUNSHADES, GLARE AND WINDOW TO WALL RATIO

EXHIBIT #12 & #13

The impact of horizontal shading on each façade of the building was studied showing that they have little impact on the north, east and west sides and a significant impact on the south side. This basic finding supports the recommendation that horizontal sun shades be included only on the south elevation.

In the analysis of sun control, glare was also analyzed (Exhibit 13).

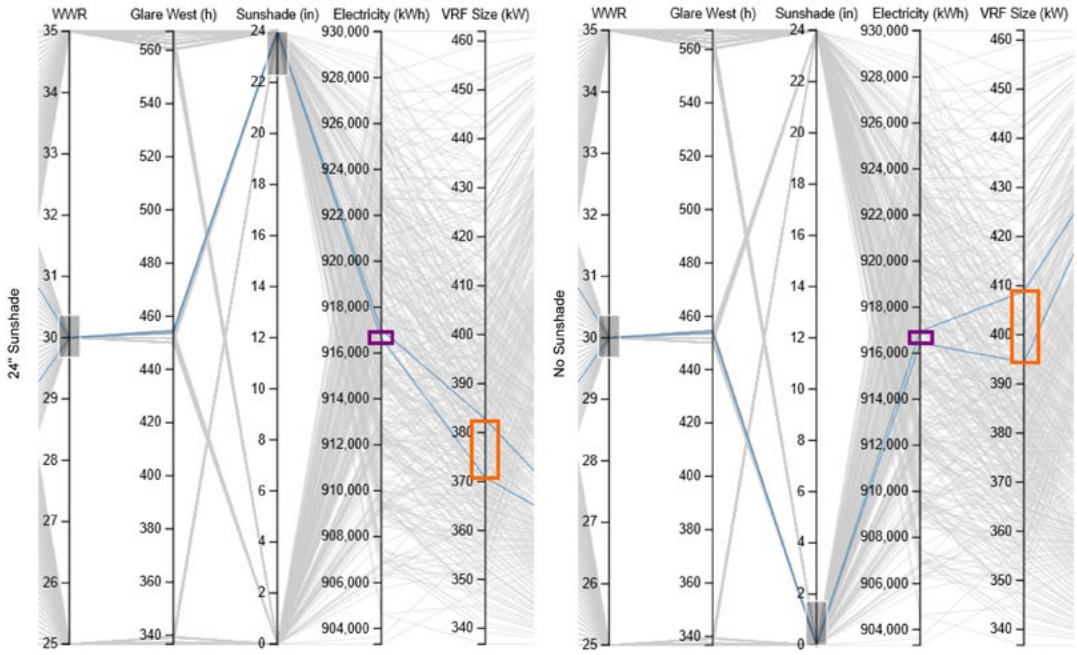


EXHIBIT #12 - SUNSHADE COMPARISON

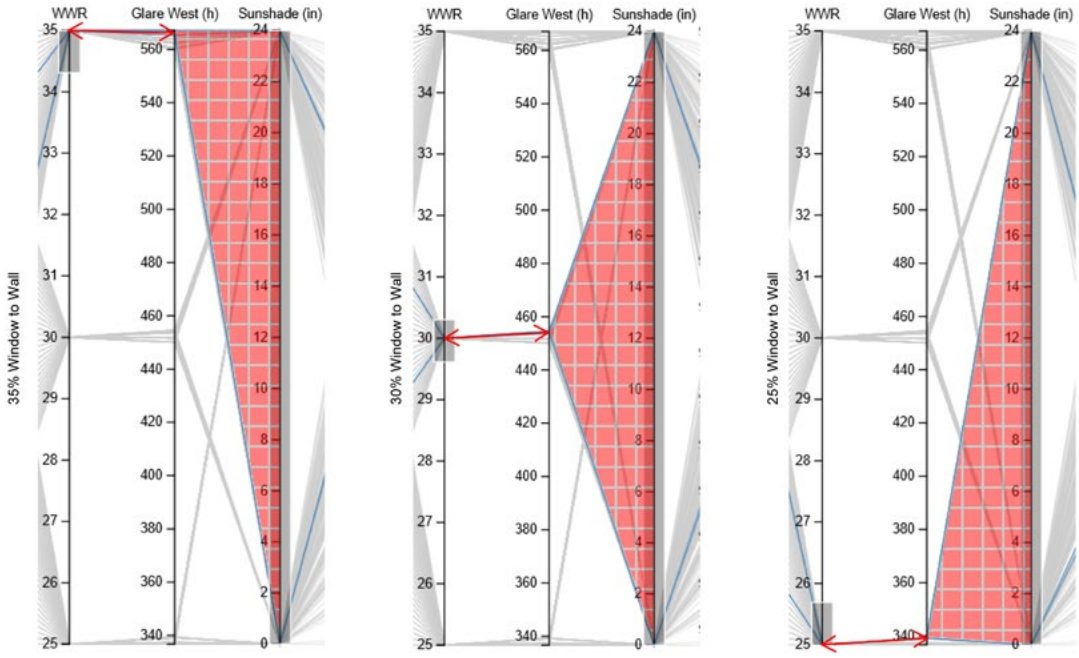
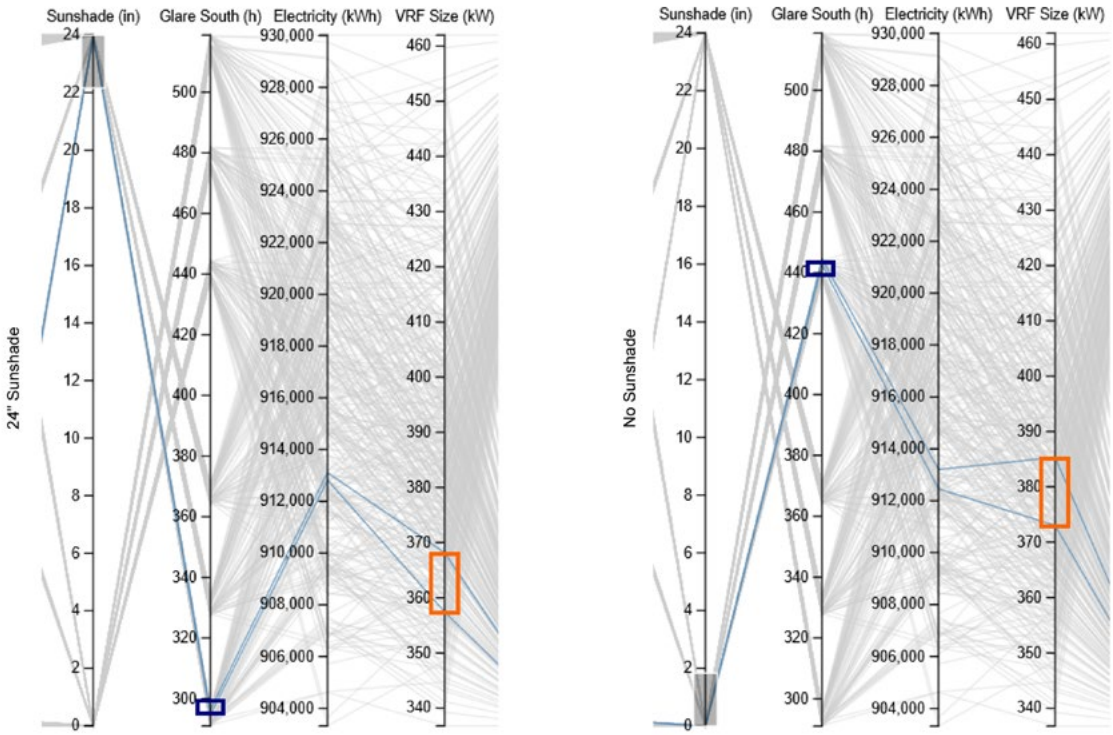


EXHIBIT #13 - CORRELATION BETWEEN WINDOWN TO WALL RATIO AND GLARE ON EAST AND WEST ELEVATIONS

EXHIBIT #14 - SOUTH ELEVATION SUNSHADES IMPACT ON GLARE AND VRF SIZE



Due to low sun angles, sun shades do not adequately control sun exposure and glare on the East and West elevations. One practical way to control the unwanted sun (glare) is to reduce the amount of glass by decreasing the window to wall ratio. Earlier discussions outline the energy advantages to this strategy. Other strategies to control the glare include glazing types with lower visible light transmittance and operable shades.

OTHER SUSTAINABLE CONSIDERATIONS

Beyond energy there are many other aspects of sustainable design to consider. Most of these are summarized and outlined well in the LEED and HPBS requirements. Some general requirements are noted below.

SITE

Overall scope of the site work is not fully determined however some elements can be addressed. The current site has access to amenities and student housing which could be used to demonstrate community connectivity. Similarly the site is directly adjacent to public transportation. Parking is a consideration. Currently no new parking is planned as a part of this renovation, but the LEED boundary will need to be determined and managed to demonstrate compliance with parking requirements. The boundary for the project will also affect how all other site credits are addressed and will require careful consideration to balance all the potential challenges and maximize the sustainable outcomes.

WATER

Water use in this build is not intense however that does not mean that water use reduction is not a consideration. Low flow fixtures will be integrated into the building design. An overall reduction in water consumption inside and on the site will result in a minimum of a 50% reduction in water use for the landscaping and a 30% reduction inside the building.

MATERIALS

The most sustainable approach to building materials is building reuse. This renovation will enable the design team to consider the implication of demolition through the aesthetic, sustainable, and functional lens. While maintaining many existing building components, the entire envelope will be replaced in order to improve energy performance and occupant comfort.

All new materials should be durable with a low environmental impact and a relationship to the material standards of the campus. Regionally sourced materials with high recycled content and low embodied energy should be used, including the campus standard Golden Buff brick and other materials that complement the existing components to remain.

USER COMFORT

User comfort is affected by air quality, temperature, lighting levels and access to the natural environment. All the materials used in the building should promote a healthy indoor environment utilizing low-emitting materials and healthy construction standards before occupancy. The design of the lighting and heating/cooling systems will provide adequate control and levels for appropriate tasks/spaces. Task lighting will supplement the otherwise highly energy efficient lighting standards while temperature controls will be available to users and easily controlled.

CONSTRUCTABILITY STUDIES

Two significant issues were studied with extra detail in order to make an informed recommendation regarding different design options. Jacobsen Construction was engaged to provide input on the constructability, schedule and cost aspects of each option. GSBS, ARW Engineers and Colvin Engineering also provided significant input.

MAINTAINING OR REPLACING THE ROOF STRUCTURE

Options: Maintain existing roof structure or replace it with a lighter-weight system?

Although earlier cost estimates and the 2011 feasibility study did not consider replacing the existing roof structure, the programming team suspected that the option might cost the same or less than improving the existing system and offer other benefits.

The existing concrete roof structure consists of un-topped precast double and single tee joists spanning to precast and cast-in-place concrete girders. The existing un-topped tees do not provide a sufficient structural diaphragm to transmit lateral wind and seismic forces to the vertical elements of the lateral force resisting system. If this system is maintained, two orthogonal layers of carbon fiber must be installed over the existing structure in order to create a proper diaphragm.

The carbon fiber overlay system, while providing a quality structural solution, offers specific challenges. The system cannot be penetrated with shot-pins or screws, or cut after installation to allow for mechanical, plumbing and electrical penetrations. Attachment of roofing, penthouse / screen walls and all penetrations must be carefully coordinated and laid out prior to placement of the fiber overlay. The fiber overlay is also expensive.

Preliminary designs were completed by ARW Engineers to more accurately depict the different roof structure options. Through this process, the following design characteristics were determined for the roof replacement (see metal deck plan):

- Removal of the double and single tee precast joists
- Maintaining the existing concrete girders
- Installing new steel joists bearing on existing girders
- Installing new corrugated metal b-deck

A major objective of the building renovation is to upgrade structural systems to better resist earthquake forces. The mass of the building and its components dictate the force experienced during an earthquake. Replacing the existing concrete structure with a metal joist and deck system reduces the roof mass by 65%. As shown in the table included in the Structural Narrative, this reduction in mass leads to a 43% reduction in shear forces at the roof. Columns, braces and foundation element sizes are all reduced based on this change in the shear force.

Regardless of the decision to replace the roof structure or to keep it, new deep foundation elements will be required to support modified footings. Helical piers are likely a good type of deep foundation to use. If the existing heavy concrete roof is maintained, 31% more helical piers will be required. More extensive footings will be required to distribute load to these added piers.

The two roof structure options have significant construction schedule impacts. Removal of the existing concrete structure will add approximately 2-3 months to the structural portion of the schedule. However, if the mechanical air handler is located on the ground, where work can be done independently, there will likely be no appreciable impact to the overall schedule. If the air handler is placed on the roof with its associated screening or penthouse, a 2 month delay should be expected.

Keeping the existing concrete structure could create a challenging interplay between the schedule and budget. If the carbon fiber overlay must be installed in the colder months between October and April, tenting and temporary heating will be required. The cost of tenting and heating is estimated between $130,000 and $200,000. If these costs are not acceptable, the project could be delayed, allowing the fiber overlay to be installed when conditions are naturally favorable.

The construction costs associated with the two options are significantly different and support the replacement of the roof structure. Jacobsen Construction estimates the total cost of maintaining the existing roof structure to be $6,050,000. Replacing the existing structure with a new

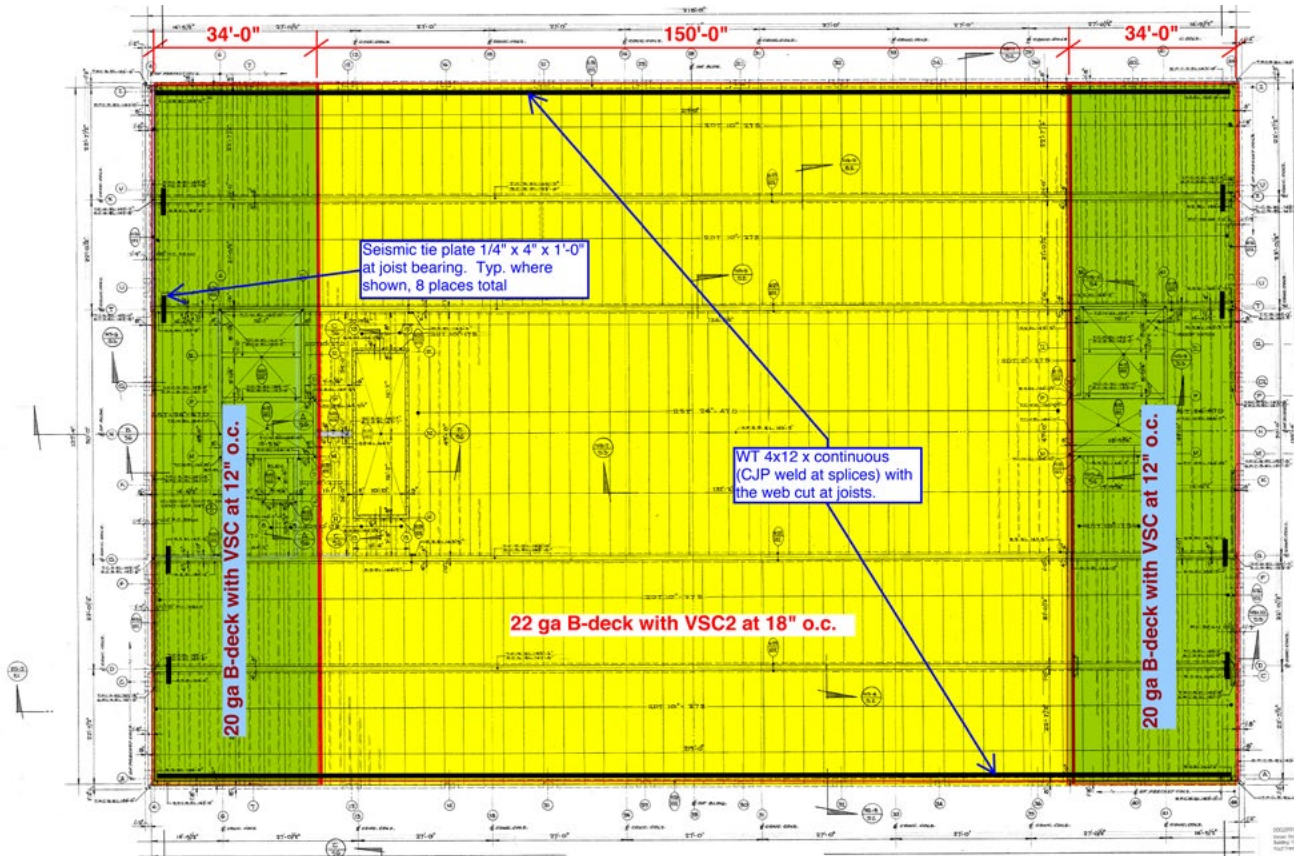


FIGURE 1 - METAL ROOF DECK PLAN

lighter-weight structure shows its advantages in structural saving with an estimated cost of $4,650,000. There is a $1,400,000 difference. (See the attached constructability cost estimate)

RECOMMENDATION

It is recommended that the existing concrete roof structure be replaced with a light-weight metal joist and deck system.

Advantages

- Provide significant cost savings
- Eliminates the need to coordinate exact element placement with the carbon fiber overlay
- Requires smaller structural braces, foundation modifications and fewer deep foundation elements.

Challenges

- If the mechanical air handler is placed on the roof, construction schedule conflict may occur lengthening the overall schedule

PLACEMENT OF THE MECHANICAL AIR HANDLER

Options: Rooftop or Ground Placement?

The existing air handling equipment occupies a large area in the basement of the building. This area will be repurposed in the renovation, requiring the equipment to be housed elsewhere. There is space on the roof for the air handler and a continuous air shaft connects the roof to all floors allowing air distribution. For ground placement, an area within the existing north service yard has been identified as a suitable location. Illustrations on the next page show the location.

Connections to the existing vertical air distribution shaft can be achieved from the north service area location. As illustrated on the next page, the exiting fresh-air intake path provides a tunnel under the lowest floor level. A new sub-grade duct can enter the existing pathway through its north side wall. The size of the new ductwork will be approximately 25% of the existing pieces due to the characteristics of the proposed VRF mechanical system. This reduction in size should allow both the intake and exhaust paths to be placed in the existing tunnel.

With the air handler in the service area, placement of the fresh air intake will be critical. Air flow modeling may be required to understand contamination sources, and/or the air inlet may need to be routed to the roof to assure a quality source.

The structural impact of placing the air handler on the roof is not dramatic. The unit would likely be placed right over the existing shaft, allowing those concrete walls to support the weight. Laterally, the weight of the unit, and the required screening, does not have a large impact on new structural braces. This is especially true if the concrete roof structure is maintained (see the first part of this constructability review).

The placement of the air handler does impact construction scheduling. If placed on the roof, mechanical work would be delayed 4 to 5 months. Although this would not be reflected directly in the overall schedule, it would require the mechanical crews to be "stacked" at the end of the project. Stacking is not desirable as it increases costs and negatively impacts quality and the commissioning process.

Coordination issues related to the carbon fiber overlay could also impact the schedule if the air handler is on the roof and the existing roof structure is maintained.

The cost difference between the two options heavily favors placing the equipment in the north service area. Jacobsen Construction estimates the total cost of placing the equipment on the roof at $574,000. Placing it in the north service area is estimated at $230,000, a $344,000 difference. (See the attached constructability cost estimate)

RECOMMENDATION

It is recommended that the project's primary air handler be placed in the north service area.

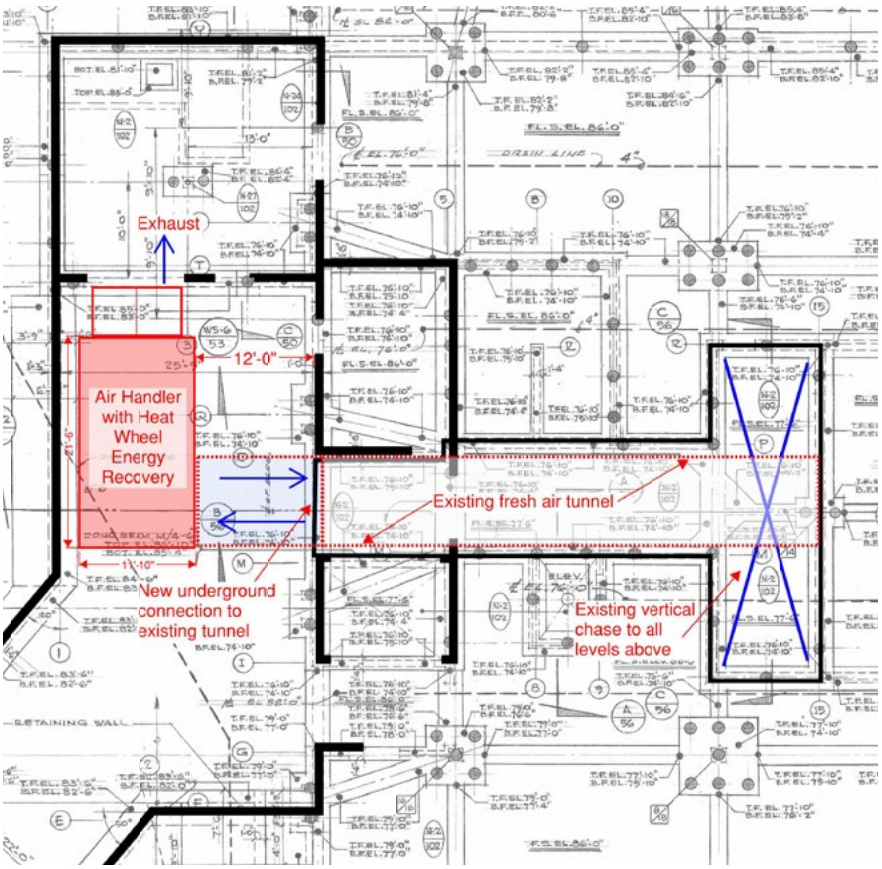
Advantages

- Provides significant cost savings
- Maintains desired architectural character
- Eliminates coordination with fiber overlay
- Eliminates need for rooftop elevator/stair access
- Improves accessibility for maintenance
- Is located appropriately on service-side of building
- Is compatible with efficient heat wheel configurations

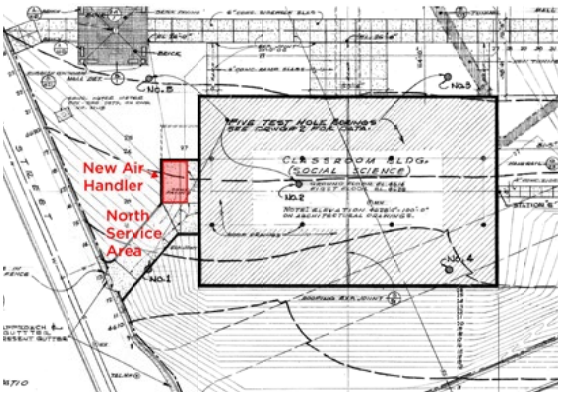
Challenges

- Assure quality fresh air supply
- Maintains access to Generator / Generator Room
- Reduces maneuverability in service area
- Assures appropriate egress through service area

DETAILED PLAN OF DUCT PATH TO VERTICAL SHAFT →



AIR HANDLER LOCATION AT GROUND LEVEL ↓



CONSTRUCTABILITY STUDY - COST ESTIMATE

The attached cost estimate reflects only the elements involved in the two constructability items discussed in this section. This work has been coordinated with the cost estimates presented for the overall project. The overall project cost estimates reflect replacing the roof structure and placing the air handler on the ground in the north service area.

The orange columns (1 & 2) show the two roof structure options. Keeping the existing structure is estimated to cost $6,049,991. Replacing the existing structure with a lighter-weight system is estimated at $4,637,741. There is a difference of $1,412,250.

The green columns (3 & 4) show the two placement options for the air handler. Placing the air handler on the roof is estimated to cost $573,972. Placing it in the north service area is estimated to cost $230,199. There is a $343,773.

The entire constructibility study cost estimate follows with detailed costs for components within each option.

WSU Social Science Building
Roof & Seismic / Mechanical Equipment Location Study Options
Based on preliminary program information provided by GSBS / ARW up thru 5 January 2016
5-Jan-16

JACOBSEN Advisory Services

Option	Floor	Scope Description	Area	Net SF	U/M	Net to Gross SF Factor 1.00 Gross SF	U/M	Cost Escalation Factor to Date 1.025 Cost / Unit	Total Cost	Roof / Seismic; Mechanical Roof or Basement Options: Remove existing precast concrete and replace with Steel Joist System Option 1	Cost /SF	Keep Existing Precast Concrete Roof System and upgrade Seismic System Option 2	Cost /SF	Mechanical Air Handler located at Basement Level Option 3	Cost /SF	Mechanical Penthouse located on Roof Level Option 4	Cost /SF
										Recommended Option				Recommended Option			
		Substructure / Demo															
		Total Substructure / Demo							$ 3,326,657	$ 1,627,643	$ 14.94	$ 1,575,911	$ 14.46	$ 119,003	$ 1.09	$ 4,100	$ 0.04
		Superstructure															
		Total Superstructure							$ 4,767,402	$ 1,779,265	$ 16.33	$ 2,899,064	$ 26.61	$ -	$ -	$ 89,073	$ 0.82
		Exterior Closure															
		Total Exterior Closure							$ 215,865	$ -	$ -	$ -	$ -	$ -	$ -	$ 215,865	$ 1.98
		Roofing															
		Total Roofing							$ 20,500	$ -	$ -	$ -	$ -	$ -	$ -	$ 20,500	$ 0.19
		Conveying															
		Total Conveying							$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
		Interior Finishes															
		Total Interior Finishes							$ 92,250	$ -	$ -	$ -	$ -	$ 51,250	$ 0.47	$ 41,000	$ 0.38
		Mechanical															
		Total Mechanical							$ 41,000	$ -	$ -	$ -	$ -	$ -	$ -	$ 41,000	$ 0.38
		Fire Sprinklers															
		Total Fire Sprinklers							$ 9,994	$ -	$ -	$ -	$ -	$ 3,844	$ 0.04	$ 6,150	$ 0.06
		Electrical															
		Total Electrical							$ 16,400	$ -	$ -	$ -	$ -	$ -	$ -	$ 16,400	$ 0.15
		Special Systems															
		Total Special Systems							$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
		Site work															
		Total Site work							$ 201,105	$ 100,553	$ 0.92	$ 100,553	$ 0.92	$ -	$ -	$ -	$ -
		Subtotal							$ 8,691,172	$ 3,507,461		$ 4,575,527		$ 174,096		$ 434,088	
		GC's, Fees, Insurances, Contingency, Etc.						29%	$ 2,520,440	$ 1,017,164		$ 1,326,903		$ 50,488		$ 125,885	
		Escalation to 3rd Quarter 2016						2.5%	$ 280,290	$ 113,116		$ 147,561		$ 5,615		$ 13,999	
		Total Cost							$ 11,491,903	$ 4,637,741		$ 6,049,991		$ 230,199		$ 573,972	
									$ 11,491,903								
		Total Affected Gross SF							108,953	108,953		108,953		108,953		108,953	
		Total Cost / Affected Gross SF								$ 42.57		$ 55.53		$ 2.11		$ 5.27	
										Recommended Option				Recommended Option			

WSU Social Science Building
Roof & Seismic / Mechanical Equipment Location Study Options
Based on preliminary program information provided by GSBS / ARW up thru 5 January 2016
5-Jan-16

JACOBSEN Advisory Services

Option	Floor	Scope Description	Area	Net SF	U/M	Net to Gross SF Factor 1.00 Gross SF	U/M	Cost Escalation Factor to Date 1.025 Cost / Unit	Total Cost	Roof / Seismic; Mechanical Roof or Basement Options: Remove existing precast concrete and replace with Steel Joist System Option 1 Recommended Option	Cost /SF	Keep Existing Precast Concrete Roof System and upgrade Seismic System Option 2	Cost /SF	Mechanical Air Handler located at Basement Level Option 3 Recommended Option	Cost /SF	Mechanical Penthouse located on Roof Level Option 4	Cost /SF
		Substructure / Demo															
1	0	Demo	Ground Floor - Interior Demolition	30,210	SF	30,210	SF	$ 3.61	$ 108,998	$ 108,998		$ -		$ -		$ -	
2	0	Demo	Ground Floor - Interior Demolition	30,210	SF	30,210	SF	$ 3.61	$ 108,998	$ -		$ 108,998		$ -		$ -	
1	1	Demo	1st Floor - Interior Demolition	18,323	SF	18,323	SF	$ 3.61	$ 66,109	$ 66,109		$ -		$ -		$ -	
2	1	Demo	1st Floor - Interior Demolition	18,324	SF	18,324	SF	$ 3.61	$ 66,113	$ -		$ 66,113		$ -		$ -	
1	2	Demo	2nd Floor - Interior Demolition	30,210	SF	30,210	SF	$ 3.61	$ 108,998	$ 108,998		$ -		$ -		$ -	
2	2	Demo	2nd Floor - Interior Demolition	30,210	SF	30,210	SF	$ 3.61	$ 108,998	$ -		$ 108,998		$ -		$ -	
1	3	Demo	3rd Floor - Interior Demolition	30,210	SF	30,210	SF	$ 3.61	$ 108,998	$ 108,998		$ -		$ -		$ -	
2	3	Demo	3rd Floor - Interior Demolition	30,210	SF	30,210	SF	$ 3.61	$ 108,998	$ -		$ 108,998		$ -		$ -	
1	R	Demo	Roofing Membrane Demolition	30,210	SF	30,210	SF	$ 1.54	$ 46,448	$ 46,448		$ -		$ -		$ -	
2	R	Demo	Roofing Membrane Demolition	30,210	SF	30,210	SF	$ 1.54	$ 46,448	$ -		$ 46,448		$ -		$ -	
1	R	Demo	Wood Roof Substructure Demolition	30,211	SF	30,211	SF	$ 2.05	$ 61,933	$ 61,933		$ -		$ -		$ -	
2	R	Demo	Wood Roof Substructure Demolition	30,212	SF	30,212	SF	$ 2.05	$ 61,935	$ -		$ 61,935		$ -		$ -	
1	R	Demo	Roof Structure- Precast Panel Demolition	30,210	SF	30,210	SF	$ 2.82	$ 85,154	$ 85,154		$ -		$ -		$ -	
1	2 thru R	Demo	Remove Precast Concrete Wall Panels	108	Ea	108	Ea	$ 768.75	$ 83,025	$ 83,025		$ -		$ -		$ -	
2	2 thru R	Demo	Remove Precast Concrete Wall Panels	108	Ea	108	Ea	$ 768.75	$ 83,025	$ -		$ 83,025		$ -		$ -	
1	R	Demo	Crane & Truck Access for Demo Work	16,350	SF	16,350	SF	$ 1.54	$ 25,138	$ 25,138		$ -		$ -		$ -	
2	R	Demo	Crane & Truck Access for Demo Work	16,351	SF	16,351	SF	$ 1.54	$ 25,140	$ -		$ 25,140		$ -		$ -	
1	R	Demo	Crane for Demo of Precast Concrete Roof / Walls Panels	4	Mo	4	Mo	$ 29,417.50	$ 117,670	$ 117,670		$ -		$ -		$ -	
2	R	Demo	Crane for Demo of Precast Concrete Walls Panels	2	Mo	2	Mo	$ 29,417.50	$ 58,835	$ -		$ 58,835		$ -		$ -	
3	0	Demo	Demo Slab for Access to Fresh Air Tunnel	300	SF	300	SF	$ 25.63	$ 7,688	$ -		$ -		$ 7,688		$ -	
3	0	Substructure	Vertical Shoring - Tunnel Walls	720	SF	720	SF	$ 66.63	$ 47,970	$ -		$ -		$ 47,970		$ -	
3	0	Substructure	Construct Fresh Air Tunnel Extension -Earthwork / Ftg / Wall / S Slab	300	SF	300	SF	$ 205.00	$ 61,500	$ -		$ -		$ 61,500		$ -	
3	0	Substructure	Mechanical Equipment Pads	200	SF	200	SF	$ 9.23	$ 1,845	$ -		$ -		$ 1,845		$ -	
4	R	Substructure	Mechanical Equipment Pads & Vibration Isolation Pads	200	SF	200	SF	$ 20.50	$ 4,100	$ -		$ -		$ -		$ 4,100	
1	0	Demo	Removal of SOG to access new pile caps / helical piers locations	2,432	SF	2,432	SF	$ 8.46	$ 20,566	$ 20,566		$ -		$ -		$ -	
2	0	Demo	Removal of SOG to access new pile caps / helical piers locations	2,432	SF	2,432	SF	$ 8.46	$ 20,566	$ -		$ 20,566		$ -		$ -	
1	0	Substructure	Vertical Shoring - Shear Walls / Pilaster Modifications	5,200	SF	5,200	SF	$ 66.63	$ 346,450	$ 346,450		$ -		$ -		$ -	
2	0	Substructure	Vertical Shoring - Shear Walls / Pilaster Modifications	5,200	SF	5,200	SF	$ 66.63	$ 346,450	$ -		$ 346,450		$ -		$ -	
1	0	Substructure	Earthwork - Grade Beams / Footings	2,072	cy	2,072	cy	$ 15.38	$ 31,852	$ 31,852		$ -		$ -		$ -	
2	0	Substructure	Earthwork - Grade Beams / Footings	2,072	cy	2,072	cy	$ 15.38	$ 31,852	$ -		$ 31,852		$ -		$ -	
1	0	Substructure	Earthwork - Grade Beams / Footings - Export	2,072	cy	2,072	cy	$ 10.25	$ 21,235	$ 21,235		$ -		$ -		$ -	
2	0	Substructure	Earthwork - Grade Beams / Footings - Export	2,072	cy	2,072	cy	$ 10.25	$ 21,235	$ -		$ 21,235		$ -		$ -	
1	0	Substructure	Earthwork - Grade Beams / Footings - Import	2,072	cy	2,072	cy	$ 12.30	$ 25,482	$ 25,482		$ -		$ -		$ -	
2	0	Substructure	Earthwork - Grade Beams / Footings - Import	2,072	cy	2,072	cy	$ 12.30	$ 25,482	$ -		$ 25,482		$ -		$ -	
1	0	Substructure	Earthwork - Grade Beams / Footings - Install & Compact	2,072	cy	2,072	cy	$ 8.20	$ 16,988	$ 16,988		$ -		$ -		$ -	
2	0	Substructure	Earthwork - Grade Beams / Footings - Install & Compact	2,072	cy	2,072	cy	$ 8.20	$ 16,988	$ -		$ 16,988		$ -		$ -	
1	0	Substructure	Concrete - Grade Beams / Footings - Install w rebar	160	cy	160	cy	$ 358.75	$ 57,400	$ 57,400		$ -		$ -		$ -	
2	0	Substructure	Concrete - Grade Beams / Footings - Install w rebar	160	cy	160	cy	$ 358.75	$ 57,400	$ -		$ 57,400		$ -		$ -	
1	0	Substructure	Helical Piers - Option 1 - 192 each	5,760	vlf	5,760	vlf	$ 51.25	$ 295,200	$ 295,200		$ -		$ -		$ -	
2	0	Substructure	Helical Piers - Option 2 - 252 each	7,560	vlf	7,560	vlf	$ 51.25	$ 387,450	$ -		$ 387,450		$ -		$ -	
0	0	Substructure				-		$ -	$ -	$ -		$ -		$ -		$ -	
0	0	Substructure				-		$ -	$ -	$ -		$ -		$ -		$ -	
		Total Substructure / Demo							**$ 3,326,657**	**$ 1,627,643**	**$ 14.94**	**$ 1,575,911**	**$ 14.46**	**$ 119,003**	**$ 1.09**	**$ 4,100**	**$ 0.04**
		Superstructure															
1	R	Steel Joists / Girders	Roof Area @ 2.5 #/sf	30,210	SF	30,210	SF	$ 5.99	$ 180,837	$ 180,837		$ -		$ -		$ -	
1	R	Metal Roof Deck	Roof Area - 20 gauge deck	30,210	SF	30,210	SF	$ 2.85	$ 86,083	$ 86,083		$ -		$ -		$ -	
1	R	Superstructure	Bearing Seats / Misc. Steel for joists & girders @ 3#/sf	45.3	Ton	45.3	Ton	$ 4,305.00	$ 195,081	$ 195,081		$ -		$ -		$ -	
1	R	Superstructure	Roof Area - WT 4 x 12 @East / West Perimeter	2.6	Ton	2.6	Ton	$ 4,305.00	$ 11,193	$ 11,193		$ -		$ -		$ -	
1	R	Superstructure	Roof Area - Drag Struts & other misc steel	15.1	Ton	15.1	Ton	$ 4,305.00	$ 65,027	$ 65,027		$ -		$ -		$ -	
1	R	Superstructure	Seismic Tie Plates - 1/4" x 4" x 1'	8	EA	8	EA	$ 2,562.50	$ 20,500	$ 20,500		$ -		$ -		$ -	
1	1 thru R	Superstructure	Crane Access for Steel Work	16,350	SF	16,350	SF	$ 1.79	$ 29,328	$ 29,328		$ -		$ -		$ -	
1	1 thru R	Superstructure	Crane for Steel Braced Frame / Roof Steel / Deck Erection	4	Mo	4	Mo	$ 29,417.50	$ 117,670	$ 117,670		$ -		$ -		$ -	
1	1 thru R	Superstructure	New BRB Bracing - Small	16	EA	16	Ea	$ 3,843.75	$ 61,500	$ 61,500		$ -		$ -		$ -	
1	1 thru R	Superstructure	New BRB Bracing - Med	32	EA	32	Ea	$ 5,125.00	$ 164,000	$ 164,000		$ -		$ -		$ -	
1	1 thru R	Superstructure	New BRB Bracing - Large	-	EA	-	Ea	$ 8,712.50	$ -	$ -		$ -		$ -		$ -	
1	0 to 1	Superstructure	New Shear Walls/Pilaster upgrade - w rebar	1,920	SF	1,920	SF	$ 43.05	$ 82,656	$ 82,656		$ -		$ -		$ -	
2	0 to 1	Superstructure	New Shear Walls/Pilaster upgrade - w rebar	1,920	SF	1,920	SF	$ 43.05	$ 82,656	$ -		$ 82,656		$ -		$ -	
1	0 to 1	Superstructure	New Shear Walls/Pilaster upgrade - Epoxy Connections	1,280	EA	1,280	EA	$ 17.94	$ 22,960	$ 22,960		$ -		$ -		$ -	
2	0 to 1	Superstructure	New Shear Walls/Pilaster upgrade - Epoxy Connections	1,280	EA	1,280	EA	$ 17.94	$ 22,960	$ -		$ 22,960		$ -		$ -	
2	1 thru R	Superstructure	New BRB Bracing - Small plus	16	EA	16	Ea	$ 4,804.69	$ 76,875	$ -		$ 76,875		$ -		$ -	

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5-Jan-16

JACOBSEN Advisory Services

Option	Floor	Scope Description	Area	Net SF	U/M	Net to Gross SF Factor 1.00 Gross SF	U/M	Cost Escalation Factor to Date 1.025 Cost / Unit	Total Cost	Roof / Seismic; Mechanical Roof or Basement Options: Remove existing precast concrete and replace with Steel Joist System Option 1	Cost /SF	Keep Existing Precast Concrete Roof System and upgrade Seismic System Option 2	Cost /SF	Mechanical Air Handler located at Basement Level Option 3	Cost /SF	Mechanical Penthouse located on Roof Level Option 4	Cost /SF
										Recommended				Recommended			
2	1 thru R	Superstructure	New BRB Bracing - Med plus	32	EA	32	Ea	$ 6,150.00	$ 196,800	$ -		$ 196,800		$ -		$ -	
2	1 thru R	Superstructure	New BRB Bracing - Large plus	-	EA	-	Ea	$ 10,455.00	$ -	$ -		$ -		$ -		$ -	
1	2 thru R	Superstructure	New Brace Frame Beam - W14 x 68	36	Ton	36	Ton	$ 3,280.00	$ 116,962	$ 116,962		$ -		$ -		$ -	
2	3 thru R	Superstructure	New Brace Frame Beam - W14 x 69	36	Ton	36	Ton	$ 3,280.00	$ 116,962	$ -		$ 116,962		$ -		$ -	
1	1 thru R	Superstructure	New Braced Frame Steel Columns	70	Ton	70	Ton	$ 3,280.00	$ 230,846	$ 230,846		$ -		$ -		$ -	
2	1 thru R	Superstructure	New Braced Frame Steel Columns	88	Ton	88	Ton	$ 3,280.00	$ 289,237	$ -		$ 289,237		$ -		$ -	
4	R	Superstructure	Penthouse Structure / Mechanical Screen @ 12 # / sf plus decking plus concrete SMD	2,000	SF	2,000	SF	$ 29.42	$ 58,835	$ -		$ -		$ -		$ 58,835	
4	1 - R	Superstructure	Additional / upsizing of BRB Bracing - 10%	48	EA	48	EA	$ 512.50	$ 24,600	$ -		$ -		$ -		$ 24,600	
2	R	Superstructure	Two-layers of Carbon Fiber on existing precast concrete roof deck	30,210	SF	30,210	SF	$ 47.15	$ 1,424,402	$ -		$ 1,424,402		$ -		$ -	
2	R	Superstructure	Roof Insulation & Membrane substructure / embeds over / within Carbon Fiber overlay	30,211	SF	30,211	SF	$ 4.36	$ 131,607	$ -		$ 131,607		$ -		$ -	
2	1 thru 3	Superstructure	Single layer of Carbon Fiber on existing precast concrete floor beams	8,298	SF	8,298	SF	$ 27.62	$ 229,222	$ -		$ 229,222		$ -		$ -	
2	1 thru 3	Superstructure	Floor / Wall installation embed over / within carbon fiber overlay	8,298	SF	8,298	SF	$ 2.31	$ 19,137	$ -		$ 19,137		$ -		$ -	
1	1 thru 3	Superstructure	Single layer of Carbon Fiber on existing precast concrete floor beams	8,298	SF	8,298	SF	$ 27.62	$ 229,222	$ 229,222		$ -		$ -		$ -	
1	1 thru 3	Superstructure	Floor / Wall installation embed over / within carbon fiber overlay	8,298	SF	8,298	SF	$ 2.31	$ 19,137	$ 19,137		$ -		$ -		$ -	
2	R	Superstructure	Roof Area - Drag Struts & other misc steel - 1.15#/sf	17.4	Ton	17.4	Ton	$ 4,305.00	$ 74,781	$ -		$ 74,781		$ -		$ -	
2	1 thru 3	Superstructure	Floor Area - Drag Struts & other misc steel - 0.75#/sf	34.0	Ton	34.0	Ton	$ 4,305.00	$ 146,262	$ -		$ 146,262		$ -		$ -	
1	1 thru 3	Superstructure	Floor Area - Drag Struts & other misc steel - 0.75#/sf	34.0	Ton	34.0	Ton	$ 4,305.00	$ 146,262	$ 146,262		$ -		$ -		$ -	
2	1 thru R	Superstructure	Crane Access for Steel Braced Frame Work	16,350	SF	16,350	SF	$ 1.79	$ 29,328	$ -		$ 29,328		$ -		$ -	
2	1 thru R	Superstructure	Crane for Steel Braced Frame Erection	2	Mo	2	Mo	$ 29,417.50	$ 58,835	$ -		$ 58,835		$ -		$ -	
4	3 to R	Superstructure	Stair Access to Penthouse	1	lot	1	Lot	$ 5,637.50	$ 5,638	$ -		$ -		$ -		$ 5,638	
0	0	Superstructure				-		$ -	$ -	$ -		$ -		$ -		$ -	
0	0	Superstructure				-		$ -	$ -	$ -		$ -		$ -		$ -	
		Total Superstructure							**$ 4,767,402**	**$ 1,779,265**	**$ 16.33**	**$ 2,899,064**	**$ 26.61**	**$ -**	**$ -**	**$ 89,073**	**$ 0.82**
		Exterior Closure															
4	R	Exterior Closure	Penthouse Structure / Mechanical Screen	3,240	sf	3,240	sf	$ 66.63	$ 215,865	$ -		$ -		$ -		$ 215,865	
3	0	Exterior Closure	Mechanical Screen for Equipment located in Basement Area - Exisitng Area	-	sf	-	sf	$ -	$ -	$ -		$ -		$ -		$ -	
0	0	Exterior Closure				-		$ -	$ Page 3 of 5	$ -		$ -		$ -		$ -	
0	0	Exterior Closure				-		$ -	$ -	$ -		$ -		$ -		$ -	
0	0	Exterior Closure				-		$ -	$ -	$ -		$ -		$ -		$ -	
		Total Exterior Closure							**$ 215,865**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ 215,865**	**$ 1.98**
		Roofing															
4	R	Roofing	Penthouse Roofing	2,000	sf	2,000	sf	$ 10.25	$ 20,500	$ -		$ -		$ -		$ 20,500	
3	0	Roofing	Basement Area - Mechanical - Existing	-	sf	-	sf	$ -	$ -	$ -		$ -		$ -		$ -	
0	0	Roofing				-		$ -	$ -	$ -		$ -		$ -		$ -	
0	0	Roofing				-		$ -	$ -	$ -		$ -		$ -		$ -	
		Total Roofing							**$ 20,500**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ 20,500**	**$ 0.19**
		Conveying															
0	0	Conveying						$ -	$ -	$ -		$ -		$ -		$ -	
0	0	Conveying						$ -	$ -	$ -		$ -		$ -		$ -	
		Total Conveying							**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
		Interior Finishes															
4	R	Interior Finishes	Penthouse Structure / Mechanical Screen	2,000		2,000		$ 20.50	$ 41,000	$ -		$ -		$ -		$ 41,000	
3	0	Interior Finishes	Mechanical Area - affected basement area	2,500		2,500		$ 20.50	$ 51,250	$ -		$ -		$ 51,250		$ -	
0	0	Interior Finishes				-		$ -	$ -	$ -		$ -		$ -		$ -	
0	0	Interior Finishes				-		$ -	$ -	$ -		$ -		$ -		$ -	
		Total Interior Finishes							**$ 92,250**	**$ -**	**$ -**	**$ -**	**$ -**	**$ 51,250**	**$ 0.47**	**$ 41,000**	**$ 0.38**
		Mechanical															
4	R	Mechanical	Mechanical HVAC in Penthouse area	2,000	SF	2,000	SF	$ 20.50	$ 41,000	$ -		$ -		$ -		$ 41,000	
3	0	Mechanical	Mechanical HVAC in Basement Area - Existing	-	SF	-	SF	$ -	$ -	$ -		$ -		$ -		$ -	
0	0	Mechanical				-		$ -	$ -	$ -		$ -		$ -		$ -	
0	0	Mechanical				-		$ -	$ -	$ -		$ -		$ -		$ -	
		Total Mechanical							**$ 41,000**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ 41,000**	**$ 0.38**
		Fire Sprinklers															
4	R	Fire Sprinklers	Penthouse Area	2,000	SF	2,000	SF	$ 3.08	$ 6,150	$ -		$ -		$ -		$ 6,150	
3	0	Fire Sprinklers	Adjust FP in Basement Area affected by Mechanical Equipment	2,500	SF	2,500	SF	$ 1.54	$ 3,844	$ -		$ -		$ 3,844		$ -	
0	0	Fire Sprinklers				-		$ -	$ -	$ -		$ -		$ -		$ -	
0	0	Fire Sprinklers				-		$ -	$ -	$ -		$ -		$ -		$ -	
		Total Fire Sprinklers							**$ 9,994**	**$ -**	**$ -**	**$ -**	**$ -**	**$ 3,844**	**$ 0.04**	**$ 6,150**	**$ 0.06**

WSU Social Science Building
Roof & Seismic / Mechanical Equipment Location Study Options
Based on preliminary program information provided by GSBS / ARW up thru 5 January 2016
5-Jan-16

JACOBSEN Advisory Services

Option	Floor	Scope Description	Area	Net SF	U/M	Net to Gross SF Factor 1.00 Gross SF	U/M	Cost Escalation Factor to Date 1.025 Cost / Unit	Total Cost	Remove existing precast concrete and replace with Steel Joist System Option 1 (Roof / Seismic; Mechanical Roof or Basement Options) Recommended	Cost /SF	Keep Existing Precast Concrete Roof System and upgrade Seismic System Option 2	Cost /SF	Mechanical Air Handler located at Basement Level Option 3 Recommended	Cost /SF	Mechanical Penthouse located on Roof Level Option 4	Cost /SF
		Electrical															
4	R	Electrical	Lighting and Power in Mechanical Penthouse	2,000	SF	2,000	SF	$ 8.20	$ 16,400	$ -		$ -		$ -		$ 16,400	
3	0	Electrical	Lighting and Power in Mechanical Basement Area - Exisiting	-	SF	-	SF	$ -	$ -	$ -		$ -		$ -		$ -	
0	0	Electrical				-		$ -	$ -	$ -		$ -		$ -		$ -	
0	4	Electrical				-		$ -	$ -	$ -		$ -		$ -		$ -	
		Total Electrical							**$ 16,400**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ 16,400**	**$ 0.15**
		Special Systems															
0	0	Special Systems				-		$ -	$ -	$ -		$ -		$ -		$ -	
0	0	Special Systems				-		$ -	$ -	$ -		$ -		$ -		$ -	
0	4	Special Systems				-		$ -	$ -	$ -		$ -		$ -		$ -	
		Total Special Systems							**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
		Site work															
1	0	Site work	Site work - Refurbish Disturbed Crane Access Area	16,350	SF	16,350	SF	$ 6.15	$ 100,553	$ 100,553		$ -		$ -		$ -	
2	0	Site work	Site work - Refurbish Disturbed Crane Access Area	16,350	SF	16,350	SF	$ 6.15	$ 100,553	$ -		$ 100,553		$ -		$ -	
0	0	Site work	Site work NIC			-		$ -	$ -	$ -		$ -		$ -		-	
0	0	Site work	Site work NIC			-		$ -	$ -	$ -		$ -		$ -		-	
0	0	Site work	Site work			-		$ -	$ -	$ -		$ -		$ -		$ -	
		Total Site work							**$ 201,105**	**$ 100,553**	**$ 0.92**	**$ 100,553**	**$ 0.92**	**$ -**	**$ -**	**$ -**	**$ -**
		Subtotal							**$ 8,691,172**	**$ 3,507,461**		**$ 4,575,527**		**$ 174,096**		**$ 434,088**	
		GC's, Fees, Insurances, Contingency, Etc.						**29%**	**$ 2,520,440**	**$ 1,017,164**		**$ 1,326,903**		**$ 50,488**		**$ 125,885**	
		Escalation to 3rd Quarter 2016						**2.5%**	**$ 280,290**	**$ 113,116**		**$ 147,561**		**$ 5,615**		**$ 13,999**	
		Total Cost							**$ 11,491,903**	**$ 4,637,741**		**$ 6,049,991**		**$ 230,199**		**$ 573,972**	
									$ 11,491,903								
		Total Affected Gross SF							**108,953**	**108,953**		**108,953**		**108,953**		**108,953**	
		Total Cost / Affected Gross SF								**$ 42.57**		**$ 55.53**		**$ 2.11**		**$ 5.27**	
										Recommended Option				**Recommended Option**			

UTILIZATION AND SPACE PROGRAM

Current management of the Social Science Building has individual departments scheduling and controlling their own learning spaces. Although some classrooms and other resources are shared, spaces are predominately used by only one or two departments. This operational model often requires classes to be held in inappropriately sized rooms, creates "turf-wars" between departments and leads to less-efficient utilization of space. The College has committed to centrally scheduling spaces in the newly renovated building with the understanding that there will be a boost in utilization efficiency.

The space program presented in this document is the result of a robust analysis of how the building is currently utilized and how its utilization can be maximized. The classroom sizes and quantities are "right-sized" to respond to both current and future needs. Utilization targets were fine-tuned with input from administration, faculty and students. Classroom use modeling was applied to help assure that the final utilization goals, spaces quantities and sizes combine to create a reasonable and achievable goal.

The Classroom Program, presented within the Space Program, provides proposed assignable square feet per student station (ASF/SS). These values have been maximized in order to promote the use of desk and seating types that are flexible and encourage active learning environments. These values also respond to test fit efforts where classrooms were laid out within the existing structural column grids. Each ASF/SS will need to be evaluated during design to understand if compromises are necessary to meet the reality of existing building elements.

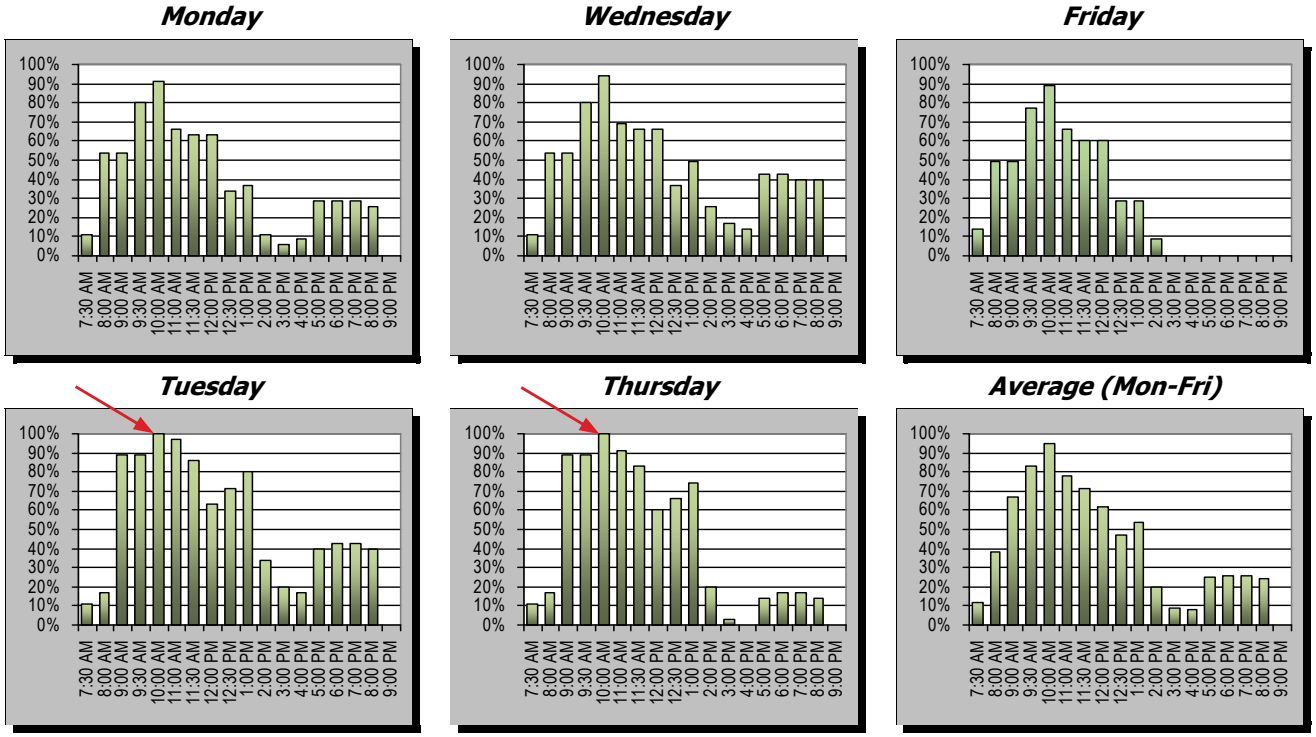
BACKGROUND

For the analysis of the existing facility, Weber State University (WSU) provided data sets consisting of Fall 2014 course files, staffing records, and the facilities space inventory of the Social Science Building. The space inventory listed a total of 99,284 assignable square feet (ASF), of which 31,726 ASF were unassigned (e.g., corridor space, custodial closets, mechanical space, etc.).

The classroom utilization analysis determined that existing classrooms were scheduled on average for 22 weekly room hours (WRH) at a 54% student station occupancy (SSO) with an average of 17 ASF per student station. In programming the renovation, goals were set at 28 WRH in consideration of the student demographics, 50% SSO and a higher ASF/station.

CLASSROOM UTILIZATION ANALYSIS

A classroom utilization analysis was completed using Fall 2014 data for courses that were taught in the Social Science Building. The utilization analysis provided detailed



PERCENT OF CLASSROOMS IN USE

information on when classrooms were schedule by time of day and day of week. Metrics such as average weekly room hours and student station occupancy were calculated and assisted in the programming of new classroom space. Finally, a capacity analysis was completed that aided in appropriately sizing new classrooms to match future course section enrollments.

For Fall 2014, classrooms were heavily used from 9:00 AM until 11:30 AM Monday through Friday. On Tuesday and Thursday, 100% of the 35 classrooms were in use at 10:00 AM. Classroom use declined dramatically between 2:00 PM and 4:00 PM. During the evening hours of 5:00 PM to 8:00 PM, an average of 25% of the classrooms was in use. (See graph on previous page)

The 35 rooms designated as classrooms generated an average of 22 WRH at 54% SSO for credit instruction. Classroom utilization findings varied by department, with a high of 28 WRH for Social Work. Two departments used their classrooms less than 14 hours per week. Classrooms averaged 17 ASF/station, a number that is low compared to today's classroom standards. The utilization information for the 35 classrooms, organized by department, is shown in the table.

CLASSROOM PLANNING CRITERIA

The classroom utilization expectation goals used for programming were set as 28 weekly room hours (vs existing average of 22 WRH) and 60% student station occupancy (vs existing average of 54%). This was determined to be reasonable, given the characteristics of the student body, most of who commute and hold jobs or have other commitments. Therefore, scheduling parameters were established such that no Tuesday / Thursday (TR) classes were to be scheduled with a start time before 8:30am or after 1:30pm, and no Monday / Wednesday / Friday (MWF) classes scheduled with a start time before 8:00am or after 2:00pm.

The ASF/station varied depending on the type of classroom space programmed, but were sized for more active learning environments which could accommodate moveable tablet arm chairs, as well as group tables and chairs, especially at the smaller sizes.

An enrollment increase of 10% was forecast in determining future section size. As campus enrollments increase at Weber State University, it is expected that weekly room hours and student station occupancy in the Social Science Building will increase to accommodate growth.

The planning criteria can be summarized as follows:

General Criteria

- No TR classes scheduled with start time before 8:30am or after 1:30pm
- No MWF classes scheduled with a start time before 8:00am or after 2:00pm
- 10% enrollment growth
- 28 weekly room hours (22 existing)
- 60% student station occupancy (54% existing)

New Classroom Sizes Proposed

- 15 seat seminar rooms
- 150 seat tiered auditorium to accommodate larger class sizes as well as special, College-related events and symposia

Scheduling

- Centrally scheduled
- Upper division courses, which currently have 10 or fewer enrolled will be scheduled in seminar rooms
- Otherwise, sizing of classrooms is made using current capacities listed in course offering file
- ESL (English as Second Language) not included in classroom mix; assumed to be scheduled on an as-available basis in classrooms

Department	No. of Rooms	Average Room Size	Average ASF per Station	Average Section Size	Weekly Seat Hours	Average Weekly Room Hours	Hours in Use Student Station Occupancy %
Criminal Justice	5	702	17	25	14.4	24	58%
Geography	3	1,243	18	42	8.5	12	60%
History	6	854	15	30	12.0	23	53%
Military Science	1	820	23	17	6.1	13	45%
Political Science/Philosophy Shared Space	5	695	15	26	11.4	21	52%
Psychology	6	1,051	19	33	13.8	22	56%
Social Work	4	706	17	18	13.8	28	46%
Sociology/Anthropology Shared Space	5	794	15	31	15.4	24	58%
Total No. of Rooms = 35 **AVERAGE**		**850**	**17**	**28**	**12.7**	**22**	**54%**

EXISTING CLASSROOM UTILIZATION ANALYSIS BY DEPARTMENT SUMMARY

REDUCED CLASSROOM SIZE STRATEGY

Initial space programming efforts documented a floor plate efficiency (assignable square feet / gross square feet) of 67%. Team members agreed that this value was too aggressive and efforts were made to reduce the assignable square footage to reach an efficiency of 64%. This efficiency is achieved in the current space program. WSU has indicated that small reductions in classroom sizes, while not desirable, may be possible if the 64% efficiency is not practical.

The current program documents an average ASF/Station of 23.5. Classrooms that achieve this amount of space per student station can typically support active learning environments, and this value is significantly better than the 17 ASF/Station average of the existing building. If a reduction strategy is required, WSU can accept an average ASF/Station of around 22.

Reductions shall not be applied evenly across all classrooms. Designs that accommodate actual existing building elements (such as columns) will help inform the decision on where to cut space. A mix between active learning and traditional learning spaces will be necessary with certain classrooms coming in above and below the average. Regardless of the final results, WSU needs to be fully informed of their options and final decisions communicated clearly so the impact of those decisions are understood.

OFFICE PLANNING CRITERIA

In the faculty survey, adjacency to colleagues was rated as one of the highest and best attributes of the existing offices. During interviews and work sessions, a strong desire was expressed to foster interdisciplinary interaction. To study this request we explored the option of co-locating two departments. It was found that sharing space and resources at the departmental level offered the benefits of greater space efficiency and improved coverage of reception functions.

With the provision of dedicated seminar rooms for teaching, the scheduling load and space needs for departmental conference rooms were reduced. In order to promote interaction across traditional departmental boundaries, shared work rooms and break rooms were introduced. The program also includes small “huddle rooms” which can be used for impromptu group interactions or for administrative staff to interact with students on confidential or personal matters with greater privacy.

It was noted that instructional load is carried by adjunct faculty, but they generally lack space to meet with students and colleagues. Therefore, a shared “hoteling” office space for adjuncts was included for each departmental area. This will also help to better integrate these instructors into their home departments.

The office planning assumptions are summarized below.

- Future Growth in Departments @ +1 Faculty + Adjunct
- Faculty Offices @ 120 ASF as per state and campus space standards
- Adjunct Offices @ 60 ASF each @ 50% Diversity + Locker storage
- Two Departments Share Administrative Area:
    - Shared Reception (2 receptionists @ 80 ASF ea)
    - Shared Waiting (2 @ 60 ASF ea)
    - Shared Office Storage (1 @ ASF)
    - Shared Basement Storage (60 ASF per Dept)
    - Shared Conference Room (1 @ 325 ASF)
    - Shared Work/Project Room (1 @ 250 ASF)
    - Shared Break Room (1 @ 275 ASF)
    - Shared “Huddle” Rooms (2 @ 70 ASF)

As noted in the faculty survey, the College prides itself in having close faculty and student interactions, so it was a high College priority to have offices easily accessible to students. This favors an approach whereby the departmental receptionist areas are visible and welcoming but do not act as a gatekeeper for entering a private suite of faculty offices.

SPACE PROGRAM HIGHLIGHTS

Space programs were developed for each area after user interviews and review sessions with the executive and steering committees. The general approach to growth projections and office requirements are discussed elsewhere in this planning document. The purpose of this section is to highlight unique features of each program and the associated planning assumptions. Notes on the program sheets also provide further detail.

ANTHROPOLOGY/SOCIOLOGY

This department includes the existing archeology lab and storage area located in the basement of the Social Science Building. The archeology program has responsibility for storing and maintaining state artifacts, from which they derive revenue. Trailer storage, currently housed in the basement lab space, will be accommodated by WSU outside the bounds of this project. The staffing includes an additional faculty member for Biological Anthropology and a dedicated lab for this purpose replaces the general

classroom, which is currently adjacent to the basement lab area. The existing reception area adjacent to the basement office has been eliminated, since that function no longer exists.

CRIMINAL JUSTICE

The teaching lab was planned with adjacencies to a storage area, a gun test facility, and an equipment room, which is to be shared with Neuroscience and their Histology Lab. The gun test facility is based upon the purchase of a new bullet recovery chamber. This space has been removed from the program, but should be considered if space and budget allow. The existing darkroom is eliminated with inclusion of room darkening black-out shades in the main lab area.

Criteria for the lab included a fume hood with ventilated chemical storage and flexible tables that can be moved to the side in order to create a 10'x10' floor space for demonstrations. Use of the space for combined lab and lecture is preferred, so layout and audio/visual requirements will need to be considered.

GEOGRAPHY

A computer lab has been programmed to help support GIS coursework taught in the department. This may become available for use by other departments or as an open lab when not scheduled for GIS. It was assumed that the Geography classrooms could become generally scheduled with certain conditions. For example, use of maps and rocks in class requires tables instead of tablet arm chairs. Therefore, this should be considered in the layout and furnishings of the corresponding classrooms.

The Geography classes that require additional material handling will typically occur in the 80 seat classrooms. These spaces should be designed with extra storage and consideration for the special needs of the Geography classes

HISTORY

The distinctive feature of the History program is the inclusion of a dedicated departmental conference room, which can accommodate storage and display of discipline specific books.

POLITICAL SCIENCE

There are not any unique program-specific requirements for this department.

PSYCHOLOGY

Two computer teaching labs were included to replace the two existing labs located in Rooms 325 and 337. The research space was assumed to be relatively equivalent in size, but it is currently dispersed throughout the floor, so some efficiencies may be gained by consolidated multiple spaces.

NEUROSCIENCE

The existing histology lab serves a dual purpose for teaching and research, and the new lab space will similarly serve that dual purpose. As previously indicated, the lab should be co-located with Criminal Justice to share the equipment room. It is desired that the space have capability for both lab and lecture, so layout and audio/visual technology should be considered accordingly.

SOCIAL SCIENCE EDUCATION CENTER

This area was programmed for a single full-time equivalent (FTE) serving as the director. If needed, this director could share administrative support and conferencing area with another group or the Dean's office.

SOCIAL WORK AND GERONTOLOGY

The only special request made concerned the inclusion of an observation room, potentially adjacent to the conference room or other space.

TESTING CENTER

This area was programmed with input on the desirable aspects of similar spaces in the library and the new science building. The overflow computer area, used for peak periods during mid-term and final examinations, is intended to be used for coursework or open lab use when available.

WALKER CENTER

The plan accommodates staffing growth to three FTE's and student interns. A reception area is sized for up to six guests, and meeting space will be shared with the dean's office, so proximity is important.

WOMEN AND GENDER STUDIES

One additional FTE was identified for future growth. A shared conference room arrangement was programmed at the 50% allocation for use between two departments. Since there were an odd number of groups receiving a 50% allocation of a conference room, this will need to be revisited with regard to potential layout and proximity with other meeting facilities and departments.

STUDENT STUDY

In the faculty survey, the existing building received the lowest score for students having sufficient places for interaction and developing a sense of community. Therefore, a modest amount of additional student study space was allowed in the space program. Each floor received two allocations of

240 ASF, which equates to four faculty office modules of space. If located along the external wall, access to direct daylighting and views will serve both a way-finding and place-making role.

The program allocated two office modules of space to informal gathering and two for more formal group study work on each floor without prescription of location or combination of these spaces. These were intended as place-holders for design, but it responded to a perceived need for both types of spaces.

Space for student organizations was consolidated into a single, larger shared space with storage for each group. A small café space was identified for possible inclusion adjacent to building entry and lobby space, to help reinforce sense of entry, arrival, and place-making.

DEAN'S OFFICE

The existing space inventory assigned multiple faculty offices, located throughout the building, to the Dean's area. These offices functioned as placeholders for future growth across all departments. Departmental growth is now allocated within each department and these offices have been removed from the Dean's space list. Specific growth in the Dean's office includes the addition of an Associate Dean and one FTE to implement and maintain the centralized scheduling of all College classrooms in the building. Office support facilities were maintained as they currently exist. A Dean's conference room was sized for departmental meetings, but may also be made available for other use, for example by the Walker Institute or other entities in the building that may need meeting space larger than typical departmental conference rooms.

One extra office for an advisor/career counselor was added, and it was assumed that this could be shared with the development (fund-raising) representative assigned to the College to give that position a visible presence in the building and easy access to the dean. The program also contains a place-holder for a possible institute position. A visible first floor location proximate to the Walker Institute could work well. The information technology function reports to the Dean but was given its separate area.

INFORMATION TECHNOLOGY

IT currently occupies a single office in the building, but it lacks support space to receive, store, and work on equipment. Therefore, storage and a work room have been added. Due to their critical nature, the space program includes Data closets on every floor .

PHYSICAL PLANT

The existing facilities inventory listed circulation, custodial and storage space as unassigned, and it is assumed that all of this space is transferred directly to the new program. This section identifies space needed in addition to that which is existing.

DETAILED SPACE PROGRAM

SUMMARY OF SPACE PROGRAM

			Program	Comments
100	**CLASSROOMS**			
	Gen	Class Rooms	34,581	Includes 1 Classroom for Military Science
		TOTAL:	**34,581**	
200	**LABS**			
	Class	Archeology	2,212	Includes Bio-Anthro Class Lab
	Class	Crim Justice	1,020	
	Class	Geography	720	Added GIS Lab; Others in GEN Classrooms
	Class	Psychology	1,620	Includes 2 Computer Class Labs
	Resrch	Psychology	1,200	
	Resrch	Neuroscience	600	
	Test	Testing Lab	3,996	Includes all categories and 1 generally scheduled computer classroom
		TOTAL:	**11,368**	
300	**OFFICES**			
	Office	Soc/Anthro	2,695	
	Office	Crim Justice	2,725	
	Office	Geography	1,985	
	Office	History	2,873	
	Office	IT	120	
	Office	Ofc of Dean	2,460	
	Office	Pol Sci	2,215	
	Office	Psychology	2,815	
	Office	Neuroscience	150	
	Office	Soc Work/Ger	1,935	
	Office	Soc Sci Ed Ctr	160	
	Office	Walker Inst	760	
	Office	Woman's Studies	1,023	
	Office	Physical Plant	120	
		TOTAL:	**22,035**	
400	**STUDY/LOUNGE**			
	Study	Student Org/Club	640	
	Lounge	Interaction Space	1,920	
	Study	Group Study	1,920	
	Lounge	Vending/Café	500	
	Lobby	Entry/Gathering	1,500	
		TOTAL:	**6,480**	
700	**SUPPORT FACILITIES**			
	Comp	I.T.	590	
	Shp/Sto	Physical Plant	950	Includes 600 ASF Shared Dept Storage in Basement
		TOTAL:	**1,540**	
		GRAND TOTAL:	**76,004**	

CLASSROOM PROGRAM

New Classroom Sizes	No. of Rooms Needed	Stations per Room	ASF/Station	ASF per Room	TOTAL ASF
15 seats Seminar	4	15	26.60	400.0	1,600
30 seats	5	30	24.25	727.5	3,638
36 seats	6	36	24.25	873.0	5,238
48 seats	6	48	21.20	1,017.6	6,106
60 seats	2	60	21.00	1,260.0	2,520
80 seats	7	80	20.50	1,640.0	11,480
150 seat Auditorium	1	150	26.60	3,990.0	4,000
TOTAL:	**31**				**34,581**

NOTES

1. See Architectrual narrative for discussion on classroom size reduction strategy
2. Maintaining the listed ASF/SS values is a priority, but may not be possible due to existing physical constraints
3. Abbreviations: WRH = Weekly Room Hours; ASF = Assignable Square Feet
4. 80 seat classrooms used for Geography will need to accommodate large format map storage
5. Military Science classroom included as a 30 seat classroom

SOCIOLOGY & ANTHROPOLOGY

Use Code	Functional Area	Existing Staffing	Future Staffing	No. of Occupants	ASF per Occupant	ASF per Space	No. of Spaces	Total ASF	TOTAL AREA
210	**Lab**								**1,312**
	Archeology Lab					800	1	800.0	
	Bio Anthro Cls Lab			16	32	512	1	512.0	
215	**Lab Support[1]**								**900**
	Archeology Work Room					900	1	900.0	
310	**Offices**	24	26						**2,060**
	Dept Chair	1	1			180	1	180.0	
	Faculty	11	12			120	12	1,440.0	
	Adjunct[2]	11	12	12	60			360.0	
	Reception	1	1			80	1	80.0	
315	**Office Support**								**403**
	Waiting					60	1	60.0	
	Storage[3]					60	1	60.0	
	Shared Break Rm					275	1	137.5	
	Shared Work Rm					250	1	125.0	
	Adjunct Lockers					20	1	20.0	
350	**Conference**								**233**
	"Huddle" Room					70	1	70.0	
	Shared Conf Rm					325	1	162.5	
								TOTAL UNIT'S ASF	**4,907**

NOTES

1. 600 sf required outside of this project for trailer storage
2. 60 ASF per adjunct discounted with diversity factor of 50% occupancy
3. Additional shared storage in basement listed under Physical Plant

CRIMINAL JUSTICE LAB

Use Code	Functional Area	Existing Staffing	Future Staffing	No. of Occupants	ASF per Occupant	ASF per Space	No. of Spaces	Total ASF	TOTAL AREA
210	**Lab**								**720**
	Criminal Justice Lab			12	60	720	1	720.0	
215	**Lab Support**								**300**
	Equipment Rm (Shared w/Histology Lab)					180	1	180.0	
	Storage					120	1	120.0	
310	**Offices**	25	27						**2,090**
	Dept Chair	1	1			180	1	180.0	
	Faculty	11	12			120	12	1,440.0	
	Adjunct[1]	12	13	13	60			390.0	
	Reception	1	1			80	1	80.0	
315	**Office Support**								**403**
	Waiting					60	1.0	60.0	
	Storage[2]					60	1.0	60.0	
	Shared Break Rm					275	0.5	137.5	
	Shared Work Rm					250	0.5	125.0	
	Adjunct Lockers					20	1.0	20.0	
350	**Conference**								**233**
	"Huddle" Room					70	1.0	70.0	
	Shared Conf Rm					325	0.5	162.5	
								TOTAL UNIT'S ASF	**3,745**

Notes

1. 60 ASF per adjunct discounted with diversity factor of 50% occupancy
2. Additional shared storage in basement listed under Physical Plant
3. A 270 SF Gun Test/Bullet Recovery space is desired but not required, adjacent to the Criminal Justice Lab.

DEAN'S OFFICE

Use Code	Functional Area	Existing Staffing	Future Staffing	No. of Occupants	ASF per Occupant	ASF per Space	No. of Spaces	Total ASF	TOTAL AREA
210	**Class Lab**								**0**
310	**Offices**								**940**
	Dean	1	1			180	1	180.0	
	Assoc Dean/Dir		1			160	1	160.0	
	Faculty Office	7							
	Scheduling		1			120	1	120.0	
	Advising/Counseling		2			120	2	240.0	
	Development[2]		1				0	0.0	
	Richardson Inst		1			120	1	120.0	
	Reception	1	1			120	1	120.0	
315	**Office Support**								**920**
	Waiting					120	1	120.0	
	Storage[1]					180	1	180.0	
	Work Rm 136 (Copier)					250	1	250.0	
	Work Rm 268								
	Central Mail Rm 144					120	1	120.0	
	1st Floor Break Rm					250	1	250.0	
350	**Conference**								**600**
	Rm 272								
	Rm 115								
	New Conf (shared)					600	1	600	
								TOTAL UNIT'S ASF	**2,460**

NOTES

1. Additional shared storage in basement listed under Physical Plant
2. Development office shared with career counseling

GEOGRAPHY

Use Code	Functional Area	Existing Staffing	Future Staffing	No. of Occupants	ASF per Occupant	ASF per Space	No. of Spaces	Total ASF	TOTAL AREA
210	**Lab**								**720**
	GIS Lab			24	30	720	1	720.0	
215	**Lab Support**								
310	**Offices**	12	14						**1,250**
	Dept Chair	1	1			180	1	180.0	
	Faculty Office	5	6			120	6	720.0	
	Faculty Office	1	1			120	1	120.0	
	Adjunct Office[1]	4	5	5	60			150.0	
	Reception	1	1			80	1	80.0	
315	**Office Support**								**503**
	Waiting					60	1.0	60.0	
	Storage[2]					60	1.0	60.0	
	Storage-Field Equip					100	1.0	100.0	
	Shared Break Rm					275	0.5	137.5	
	Shared Work Rm					250	0.5	125.0	
	Adjunct Lockers					20	1.0	20.0	
350	**Conference**								**233**
	"Huddle" Room					70	1.0	70.0	
	Shared Conf Rm					325	0.5	162.5	
								TOTAL UNIT'S ASF	**2,705**

NOTES

1. 60 ASF per adjunct discounted with diversity factor of 50% occupancy
2. Additional shared storage in basement listed under Physical Plant

HISTORY

Use Code	Functional Area	Existing Staffing	Future Staffing	No. of Occupants	ASF per Occupant	ASF per Space	No. of Spaces	Total ASF	TOTAL AREA
210	**Lab**								**0**
215	**Lab Support**								**0**
310	**Offices**	22	24						**2,000**
	Dept Chair	1	1			180	1	180.0	
	Faculty	11	12			120	12	1,440.0	
	Adjunct[1]	9	10	10	60			300.0	
	Reception	1	1			80	1	80.0	
315	**Office Support[3]**								**403**
	Waiting					60	1.0	60.0	
	Storage[2]					60	1.0	60.0	
	Shared Break Rm					275	0.5	137.5	
	Shared Work Rm					250	0.5	125.0	
	Adjunct Lockers					20	1.0	20.0	
350	**Conference[3]**								**470**
	"Huddle" Room					70	1.0	70.0	
	Dedicated Conf Rm						1.0	400.0	
								TOTAL UNIT'S ASF	**2,873**

NOTES

1. 60 ASF per adjunct discounted with diversity factor of 50% occupancy
2. Additional shared storage in basement listed under Physical Plant
3. Office support and conference spaces shared with Social Science Education Center

SOCIAL SCIENCE EDUCATION CENTER

Use Code	Functional Area	Existing Staffing	Future Staffing	No. of Occupants	ASF per Occupant	ASF per Space	No. of Spaces	Total ASF	TOTAL AREA
310	**Offices**	0							**160**
	Director	1	1	1	160		1	160.0	
315	**Office Support[1]**								**0**
	Storage (To be shared)								
350	**Conference[1]**								**0**
	Conference Room (To be shared)								
								TOTAL UNIT'S ASF	**160**

NOTES

1. Office support and conference spaces shared with History

NEUROSCIENCE

Use Code	Functional Area	Existing Staffing	Future Staffing	No. of Occupants	ASF per Occupant	ASF per Space	No. of Spaces	Total ASF	TOTAL AREA
210	**Class Lab**								**0**
	See 250 Research Lab below								
215	**Lab Support**								**0**
	Equipment Rm shared w/CJ (reported in Criminal Justice Dept)								
250	**Research[3]**								**600**
	Histology Lab			20	30	600	1	600.0	
310	**Offices**	2	3						**150**
	Faculty	0	1			120	1	120.0	
	Adjunct	1	1	1	60			30.0	
315	**Office Support[2]**								**0**
350	**Conference[2]**								**0**
	Huddle Room							0.0	
	Conference Room							0.0	
								TOTAL UNIT'S ASF	**750**

NOTES

1. Additional shared storage in basement listed under Physical Plant
2. Neuroscience shares office support and conference spaces with the Psychology Department
3. Neuroscience research space included in Research Lab - Data Entry under Psychology

POLITICAL SCIENCE AND PHILOSOPHY

Use Code	Functional Area	Existing Staffing	Future Staffing	No. of Occupants	ASF per Occupant	ASF per Space	No. of Spaces	Total ASF	TOTAL AREA
210	**Lab**								**0**
215	**Lab Support**								**0**
310	**Offices**	17	19						**1,580**
	Dept Chair	1	1			180	1	180.0	
	Faculty	8	9			120	9	1,080.0	
	Adjunct[1]	7	8	8	60			240.0	
	Reception	1	1			80	1	80.0	
315	**Office Support**								**403**
	Waiting					60	1.0	60.0	
	Storage[2]					60	1.0	60.0	
	Shared Break Rm					275	0.5	137.5	
	Shared Work Rm					250	0.5	125.0	
	Adjunct Lockers					20	1.0	20.0	
350	**Conference**								**233**
	"Huddle" Room					70	1.0	70.0	
	Conference Room					325	0.5	162.5	
								TOTAL UNIT'S ASF	**2,215**

NOTES

1 60 ASF per adjunct discounted with diversity factor of 50% occupancy

2 Additional shared storage in basement listed under Physical Plant

PSYCHOLOGY

Use Code	Functional Area	Existing Staffing	Future Staffing	No. of Occupants	ASF per Occupant	ASF per Space	No. of Spaces	Total ASF	TOTAL AREA
210	**Class Lab**								**1,620**
	Computer Lab (Rm 337)			30	30	900	1	900.0	
	Computer Lab (Rm 325)			24	30	720	1	720.0	
215	**Lab Support**								**0**
250	**Research Lab - Data Entry[3]**							**1,200.0**	**1,200**
310	**Offices**	25	27						**2,180**
	Dept Chair	1	1	1		180	1	180.0	
	Faculty	12	13	13		120	13	1,560.0	
	Adjunct Office	11	12	12	60			360.0	
	Reception	1	1	1		80	1	80.0	
315	**Office Support[2]**								**403**
	Waiting					60	1.0	60.0	
	Storage[1]					60	1.0	60.0	
	Shared Break Rm					275	0.5	137.5	
	Shared Work Rm					250	0.5	125.0	
	Adjunct Lockers					20	1.0	20.0	
350	**Conference[2]**								**233**
	"Huddle" Room					70	1.0	70.0	
	Shared Conf Rm					325	0.5	162.5	
								TOTAL UNIT'S ASF	**5,635**

NOTES

1. Additional shared storage in basement listed under Physical Plant
2. Neuroscience shares office support and conference spaces with the Psychology Department
3. Neuroscience research space included in Research Lab - Data Entry under Psychology

SOCIAL WORK AND GERONTOLOGY

Use Code	Functional Area	Existing Staffing	Future Staffing	No. of Occupants	ASF per Occupant	ASF per Space	No. of Spaces	Total ASF	TOTAL AREA
210	**Lab**								**0**
215	**Lab Support**								**0**
310	**Offices**	14	16						**1,300**
	Dept Chair	1	1			180	1	180.0	
	Faculty	5	6			120	6	720.0	
	Adjunct	7	8	8		60		240.0	
	Reception	1	1			80	1	80.0	
	Observation Room					80	1	80.0	
315	**Office Support**								**403**
	Waiting					60	1.0	60.0	
	Storage[1]					60	1.0	60.0	
	Shared Break Rm					275	0.5	137.5	
	Shared Work Rm					250	0.5	125.0	
	Adjunct Lockers					20	1.0	20.0	
350	**Conference**								**233**
	"Huddle" Room					70	1.0	70.0	
	Shared Conf Rm					325	0.5	162.5	
								TOTAL UNIT'S ASF	**1,935**

NOTES

1 Additional shared storage in basement listed under Physical Plant

STUDENT ORG AND STUDY

Use Code	Functional Area	Existing Staffing	Future Staffing	No. of Occupants	ASF per Occupant	ASF per Space	No. of Spaces	Total ASF	TOTAL AREA
	Student Org	0	0						**640**
	Amnesty, Psi Chi								
	SW and Anthro Clubs								
	Shared space			15	40	600	1	600.0	
	Storage					40	1	40.0	
	Study					10% of Classroom Space		3,458.1	**3,840**
	2 pods informal mtg per floor					240	8.0	1,920.0	
	2 group study per floor					240	8.0	1,920.0	
	Vending/Café								**500**
	Café							300.0	
	Seating							200.0	
								TOTAL UNIT'S ASF	**4,980**

NOTES

(none)

TESTING

Use Code	Functional Area	Existing Staffing	Future Staffing	No. of Occupants/ Stations	ASF per Occupant	ASF per Space	No. of Spaces	Total ASF	TOTAL AREA
310	**Office**								**670**
	Testing Coordinator	1	1	1	120		1	120.0	
	Testing Supervisors (Reception/Check-in)	3	3	3	550		1	550.0	
315	**Office Service**								**140**
	Storage/Breakroom					120	1	120.0	
	Test/Exam Holding File					20	1	20.0	
210	**Teaching Laboratories**								**700**
	Computer Laboratory (Test Overflow & Schedule Use)			28	25		1	700.0	
220	**Open Laboratories**								**2,325**
	Testing Center (Computer and Open Stations)[1]			48	25		1	1,200.0	
	Distraction Free Testing Room			1	50		2	100.0	
	Proctor Station			1	35		1	35.0	
	Peer Tutoring			4		80	3	240.0	
	Open Laboratory								
	Fixed Computer Stations			30	25		1	750.0	
225	**Open Laboratory Service**								**161**
	Student Lockers (During Testing)			54	1.5		1	81.0	
	Laboratory Storage					80	1	80.0	
410	**Study Room**								**0**
	Student Study Area (See Collaborative Learning)								
								TOTAL UNIT'S ASF	**3,996**

NOTES

1 Desire to increase Testing Center station count to 54 as space permits

WALKER INSTITUTE

Use Code	Functional Area	Existing Staffing	Future Staffing	No. of Occupants	ASF per Occupant	ASF per Space	No. of Spaces	Total ASF	TOTAL AREA
310	**Offices**								**560**
	Director	1	1	1	160		1	160.0	
	Assistant Director		1	1	120		1	120.0	
	Administrative Assistant	0.5	1	1	120		1	120.0	
	Student Assistants (Interns)	3	4	4	40		1	160.0	
315	**Office Support**								**200**
	Reception			6	20			120.0	
	File Storage					80	1	80.0	
	Work Room (To be shared with Dean's Office)								
	Break Room								
350	**Conference**								**0**
	Conference/Board Room (To be Shared with Dean's Office)			0	0		0	0.0	
								TOTAL UNIT'S ASF	**760**

NOTES

(none)

WOMEN AND GENDER STUDIES

Use Code	Functional Area	Existing Staffing	Future Staffing	No. of Occupants	ASF per Occupant	ASF per Space	No. of Spaces	Total ASF	TOTAL AREA
310	**Offices**	10	13						**680**
	Dept Chair	1	1	1	180		1	180.0	
	Faculty	0	1	1	120		1	120.0	
	Administrative Assistant	1	1	1	80		1	80.0	
	Adjunct	8	10	10	60			300.0	
315	**Office Support**								**180**
	Reception			5	20		1	100.0	
	Storage[1]					80	1	80.0	
350	**Conference**								**163**
	Conference Room - Shared					325	0.5	162.5	
								TOTAL UNIT'S ASF	**1,023**

NOTES

1 Additional shared storage in basement listed under Physical Plant

INFORMATION TECHNOLOGY

Use Code	Functional Area	Existing Staffing	Future Staffing	No. of Occupants	ASF per Occupant	ASF per Space	No. of Spaces	Total ASF	TOTAL AREA
310	**Offices**								**120**
	I.T. Technician	1	1	1	120		1	120.0	
710	**Central Computer**								**320**
	I.T. Data Closet (1 per floor)			0	0	80	4	320.0	
715	**Central Computer**								**270**
	I.T. Workroom with Bench			1		120	1	120.0	
	I.T. Storage (up to 70 computers)					150	1	150.0	
								TOTAL UNIT'S ASF	**710**

ASF = Assignable Square Feet

NOTES

(none)

PHYSICAL PLANT

Use Code	Functional Area	Existing Staffing	Future Staffing	No. of Occupants	ASF per Occupant	ASF per Space	No. of Spaces	Total ASF	TOTAL AREA
310	**Offices**								**120**
	Custodian	1	1	1	120		1	120.0	
730	**Central Storage**								**350**
	Facility Storage/Attic Stock					350	1	350.0	
780	**Dept Storage**			10	60	600	1	600.0	**600**
	In basement								
XXX	**Building Services**								**0**
	Custodial Equipment (non-assignable)								
	Janitorial Supply (non-assignable)								
	Janitorial Closet with Sink - 1 per floor (non-assignable)								
								TOTAL UNIT'S ASF	**1,070**

NOTES

(none)

SPACE DATA SHEETS & DIAGRAMS

AUDITORIUM

Floor Area (sf)	3,990	# Occupants	151
Adjacencies	Lobby / Entrance	Occupant Type	Public/Faculty/Student
Activities	Learning, Guest Lecture	Alt. Pedagogy	No

ARCHITECTURAL

Floor Finish	Carpet	Wall Finish	Special	Ceiling Finish	Special		
Door Size	(3) 36"	Door Material	Wood	Door Function	Elec. Access		
Door Sidelight	Yes	Door Transom	No	Roller Shades	Yes		
Millwork Faces		Millwork Top					
Equip./Furnish.		Desk		Office Chair		Guest Chair	X	Chair Rail (At Back)
	X	Table		Side Table	x	Writing Sur.		Shelving
		Millwork		Bookcase		Couch		Printer
		Podium	X	Teach Station		Tall File		Copier
		Lat. File		Coat Hooks		Poster Rail	x	Computer

Equipment /Millwork Notes: Fixed tables with movable seating allowing collaboration between rows. Wall and ceiling treatments must consider acoustical quality. Double doors with removable mullion for equipment movement.

ELECTRICAL / DATA

Foot Candle Level	30	Dimmable	Yes		
Task Lighting	No	Phone / Data	Yes	Floor Box	Yes

Electrical Notes: Motorized projector screen. Power / USB outlets in every other row at every other seat. Lighting must accommodate deskwork, projected presentations and special event lectures.

AUDIO / VISUAL

Projector&Screen	Yes	Flat Panel	No

AV Notes:

MECHANICAL

Room Temp	68-74	Dedic. Zone	Yes

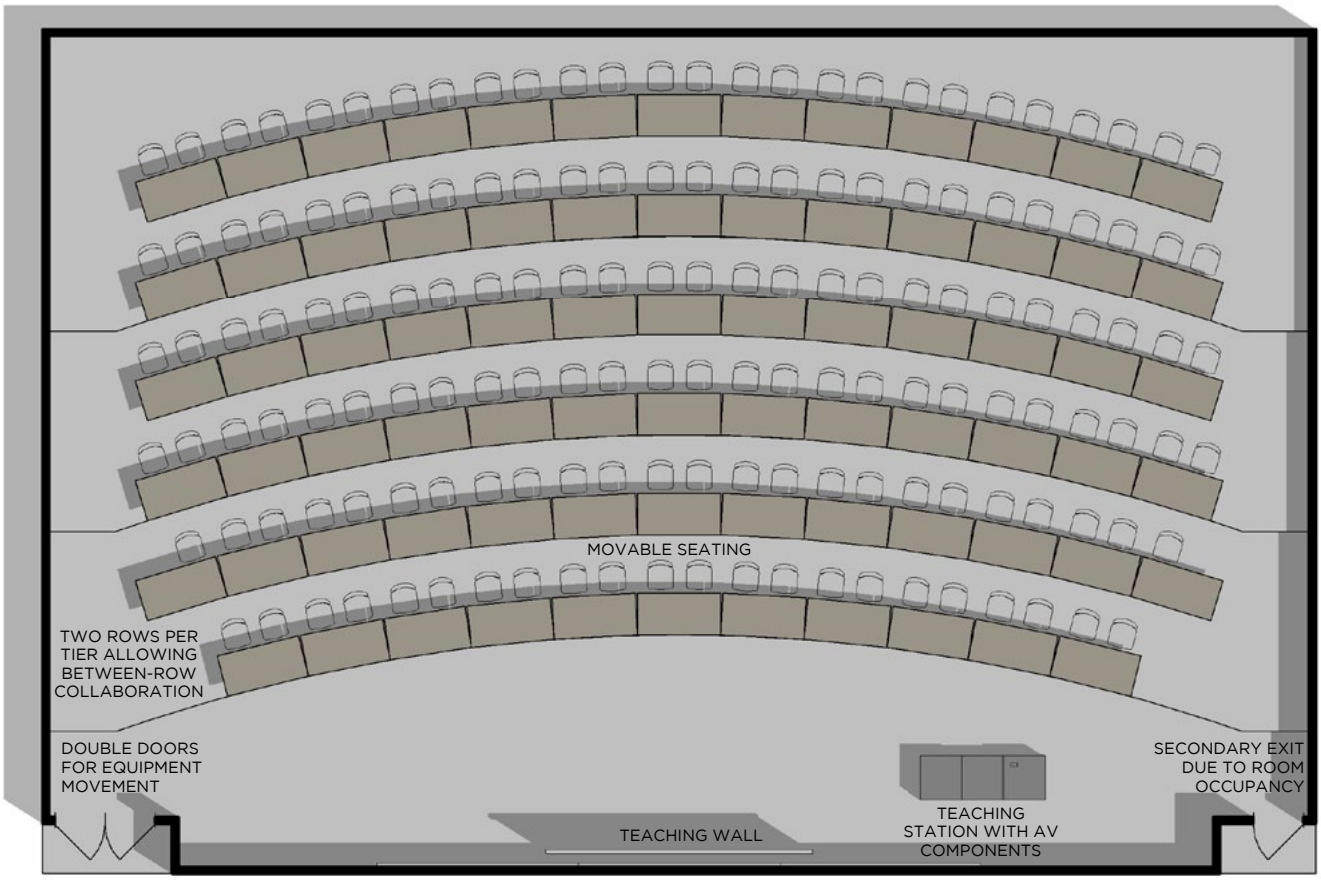
Mechanical Notes:

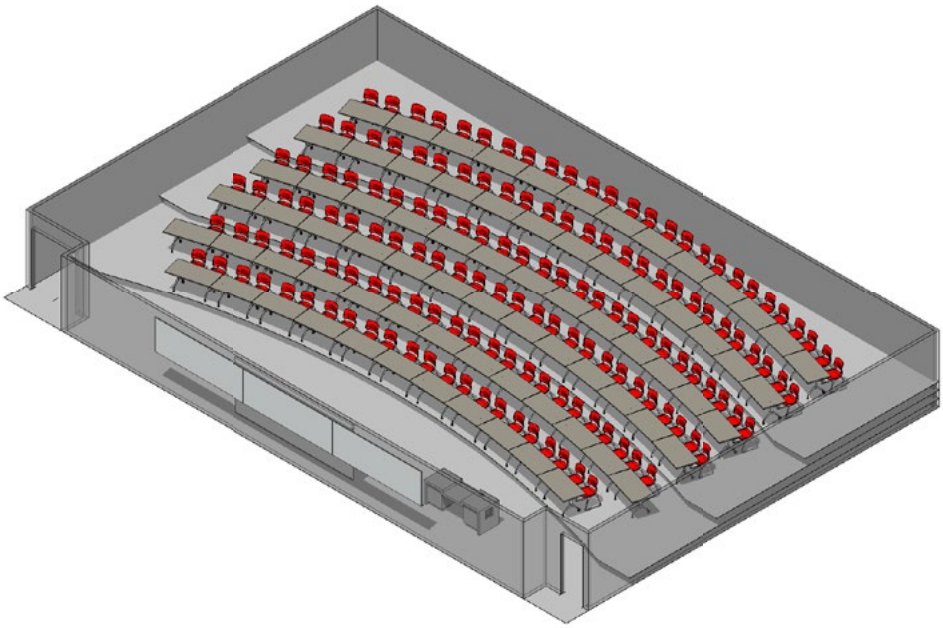
PLUMBING

		Kitchen Sink		Utility Sink		Hose Bib
		Drinking Fountain		Floor Drain		
		Shower		Toilet		

SPECIAL REQUIREMENTS

STC of 55 at walls, NC level of 30


MOVABLE SEATING
TWO ROWS PER TIER ALLOWING BETWEEN-ROW COLLABORATION
DOUBLE DOORS FOR EQUIPMENT MOVEMENT
SECONDARY EXIT DUE TO ROOM OCCUPANCY
TEACHING STATION WITH AV COMPONENTS
TEACHING WALL



CLASSROOMS 30-80 SEAT

Floor Area (sf)	750	30 Seat	**# Occupants**	Varies
	875	36 Seat	**Occupant Type**	Public/Faculty/**Student**
	1,015	48 Seat	**Alt. Pedagogy**	Supported
	1,260	60 Seat		
	1,640	80 Seat		

ARCHITECTURAL

Floor Finish	Carpet	**Wall Finish**	Paint	**Ceiling Finish**	Acoust. Tile		
Door Size	36"	**Door Material**	Wood	**Door Function**	Elec. Access		
Door Sidelight	Yes	**Door Transom**	Yes	**Roller Shades**	Yes		
Millwork Faces	P. Lam.	**Millwork Top**	P. Lam.				
Equip./Furnish.	x Desk	x Office Chair	Guest Chair	x Chair Rail			
	x Table	Side Table	x Writing Sur.	Shelving			
	Millwork	Bookcase	Couch	Printer			
	Podium	x Teach Station	Tall File	Copier			
	Lat. File	Coat Hooks	x Poster Rail	x Computer			

Equipment /Millwork Notes

ELECTRICAL / DATA

Foot Candle Level	30	**Dimmable**	Yes		
Task Lighting	No	**Phone / Data**	Yes	**Floor Box**	No

Electrical Notes

Lighting control at entrance. No control from media controller.

AUDIO / VISUAL

Projector&Screen	Yes	**Flat Panel**	No

AV Notes

See Electrical discussion for standard classroom AV equipment requirements.

MECHANICAL

Room Temp	68-74	**Dedic. Zone**	Yes

Mechanical Notes

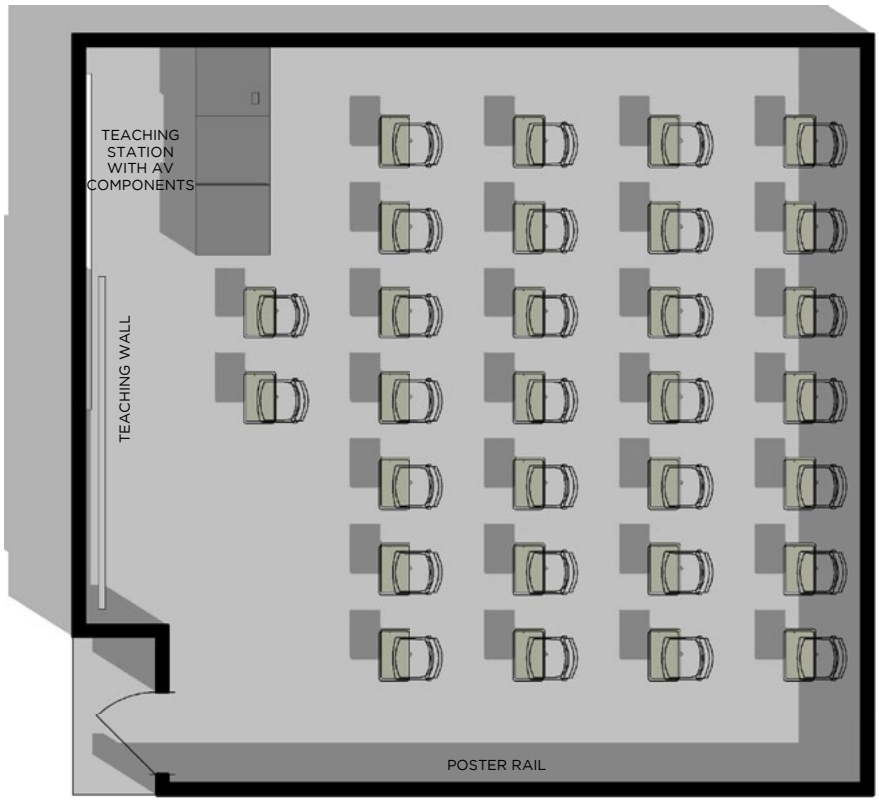
PLUMBING

Kitchen Sink	Utility Sink	Hose Bib
Drinking Fountain	Floor Drain	
Shower	Toilet	

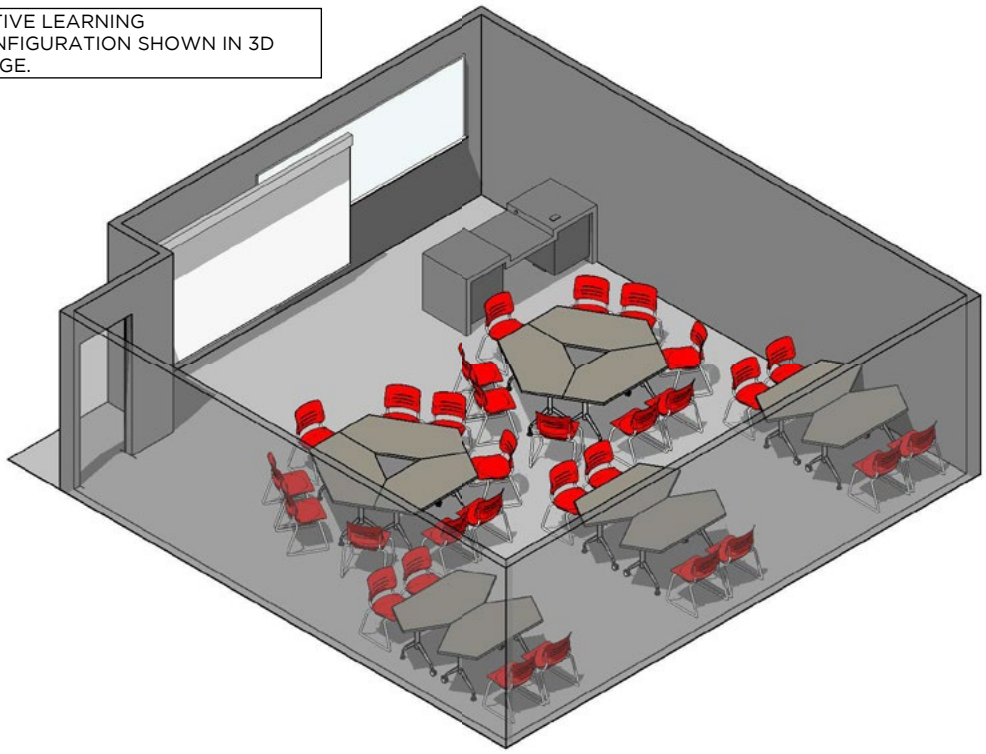
SPECIAL REQUIREMENTS

STC of 55 at walls, NC level of 35, NRC of .60 at ceiling

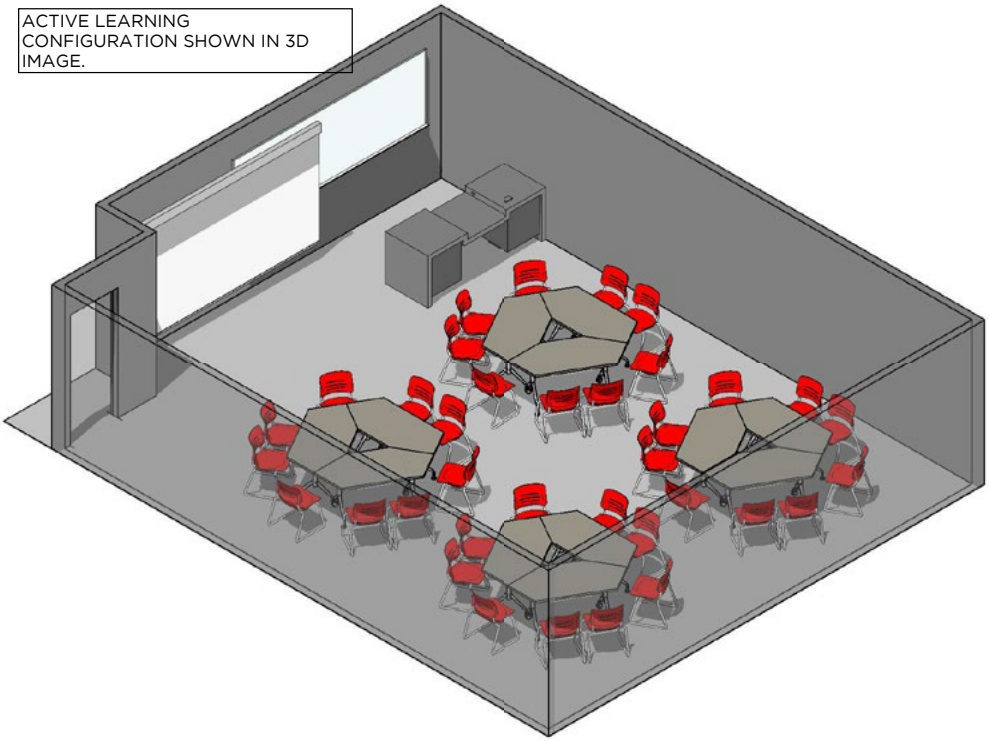
CLASSROOMS 30 SEAT



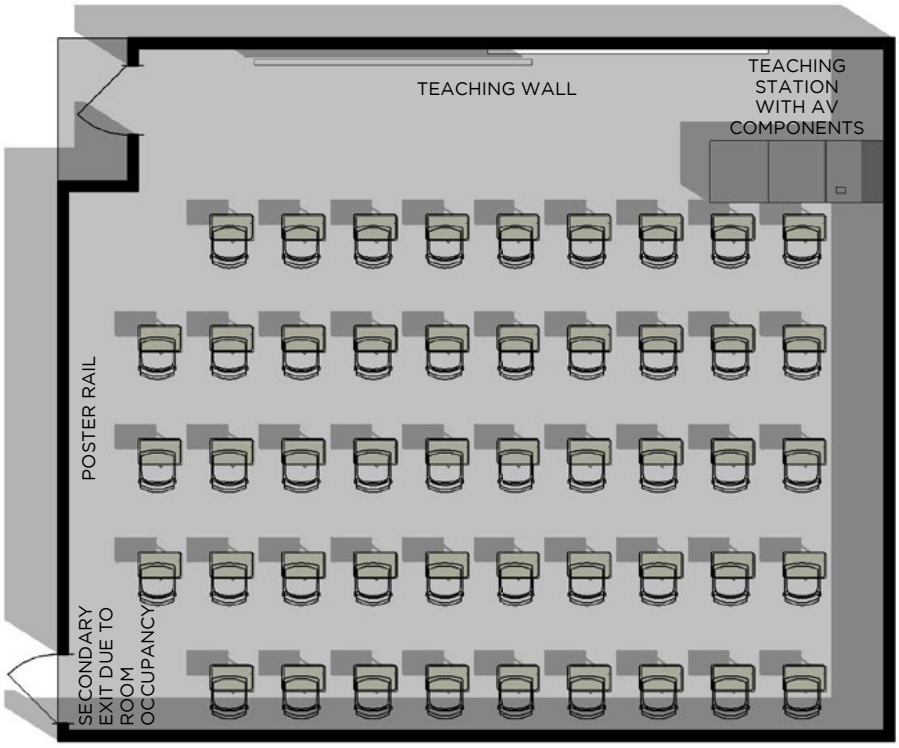
ACTIVE LEARNING CONFIGURATION SHOWN IN 3D IMAGE.



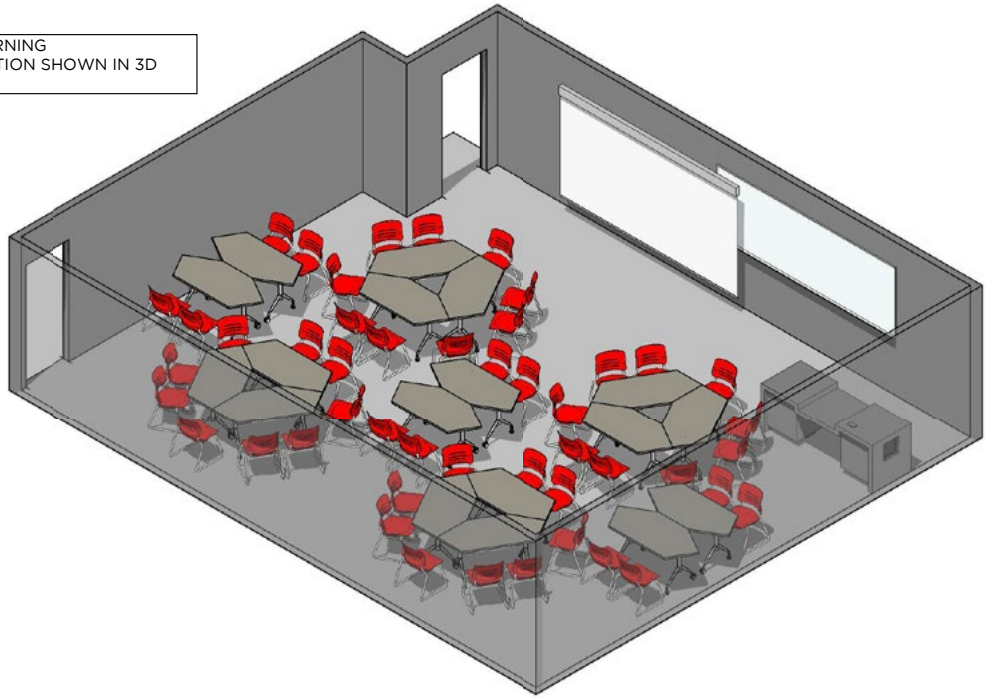
CLASSROOMS 36 SEAT



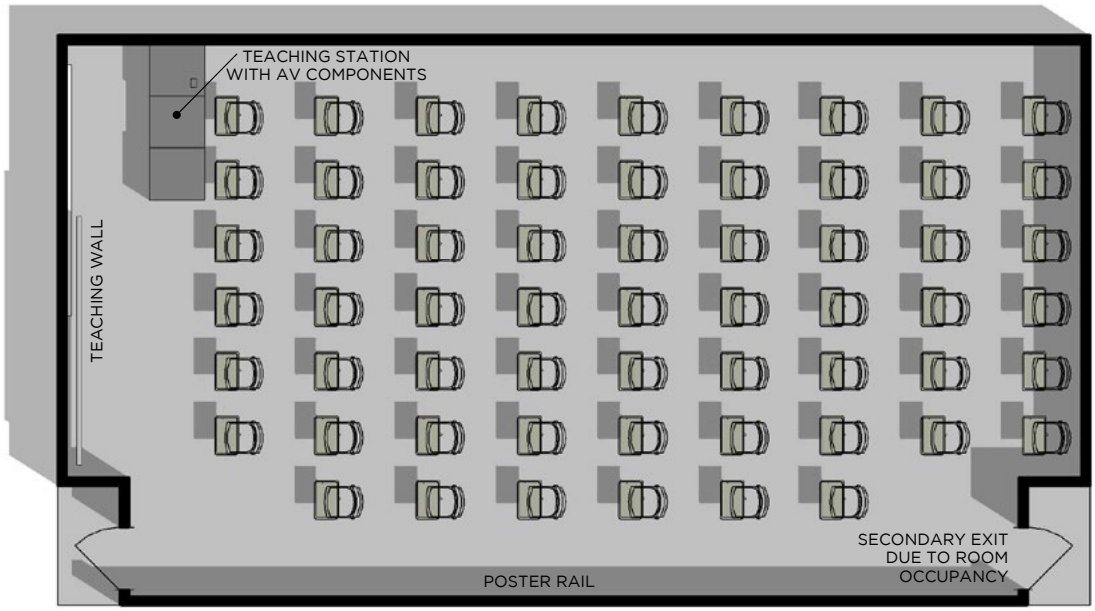
CLASSROOMS 48 SEAT

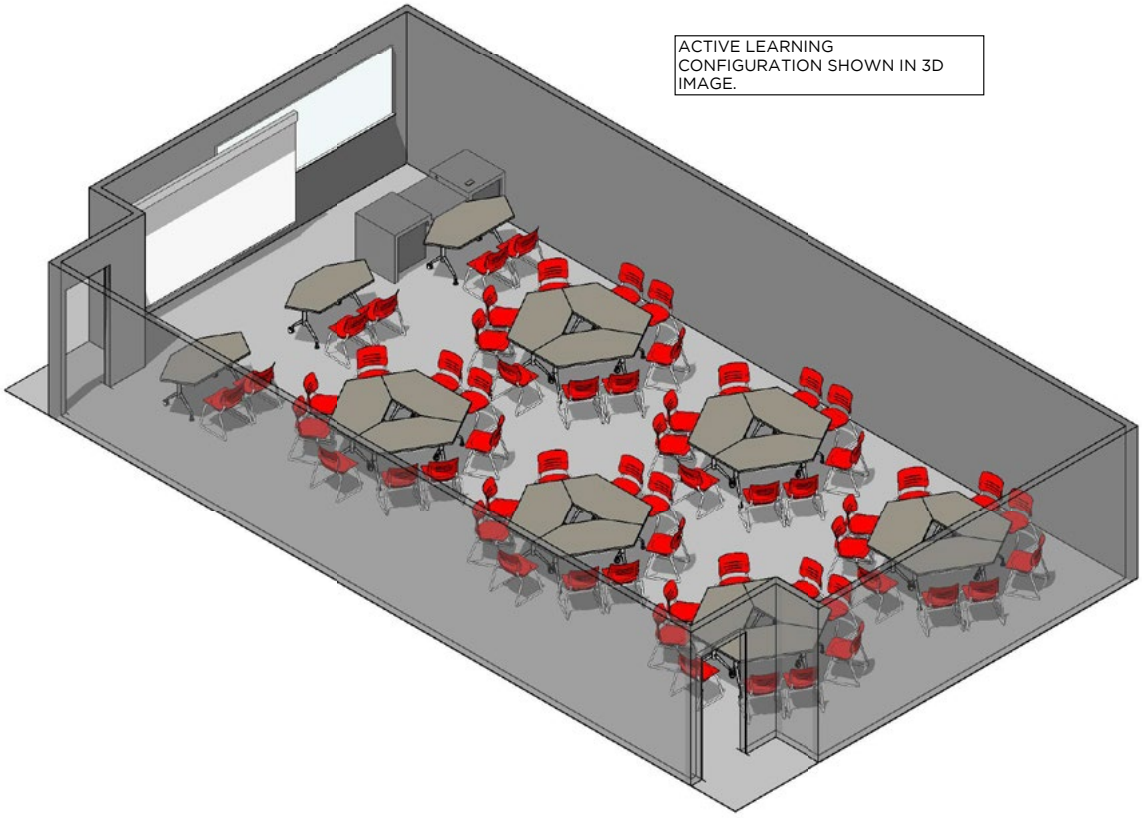


ACTIVE LEARNING CONFIGURATION SHOWN IN 3D IMAGE.

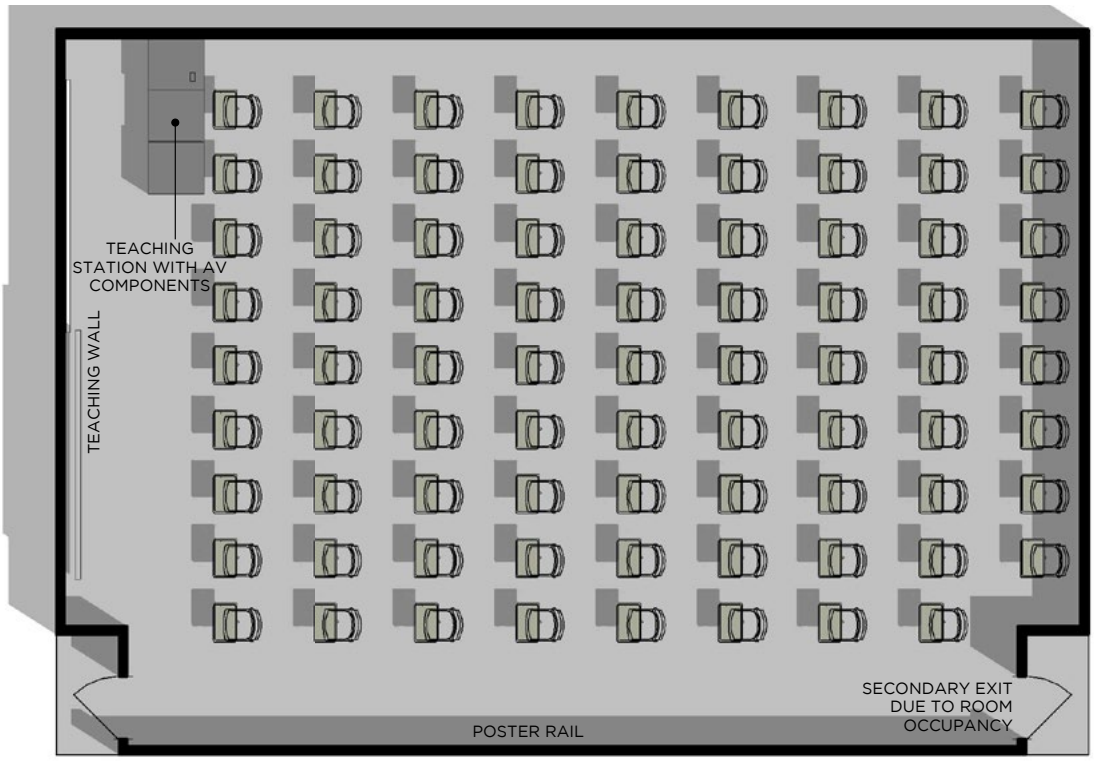


CLASSROOMS 60 SEAT

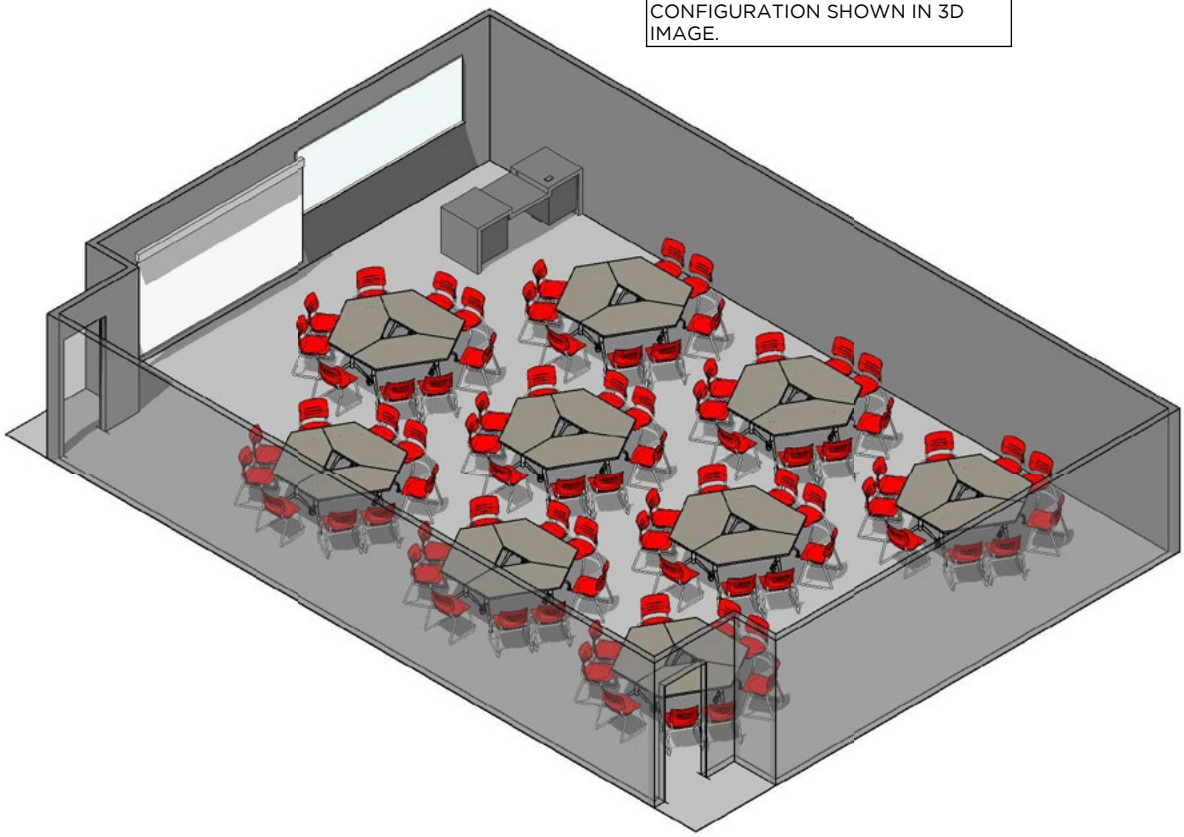




CLASSROOMS 80 SEAT



ACTIVE LEARNING CONFIGURATION SHOWN IN 3D IMAGE.



SEMINAR CLASSROOM 15 SEAT

# Occupants	15		
Floor Area (sf)	400	**Occupant Type**	Public/Faculty/**Student**
Adjacencies	Classrooms	**Alt. Pedagogy**	Supported
Activities	Learning, Small Group Meeting		

ARCHITECTURAL

Floor Finish	Carpet	**Wall Finish**	Paint	**Ceiling Finish**	Acoust. Tile
Door Size	36"	**Door Material**	Wood	**Door Function**	Elec. Access
Door Sidelight	Yes	**Door Transom**	Yes	**Roller Shades**	Yes
Millwork Faces		**Millwork Top**			

Equip./Furnish.

	Desk	x	Office Chair		Guest Chair	x	Chair Rail
x	Table		Side Table	x	Writing Sur.		Shelving
x	Millwork		Bookcase		Couch		Printer
	Podium		Teach Station		Tall File		Copier
	Lat. File		Coat Hooks	x	Poster Rail	x	Computer

Equipment /Millwork Notes: To be determined if AV cabinet is project millwork or owner provided.

ELECTRICAL / DATA

Foot Candle Level	30	**Dimmable**	Yes		
Task Lighting	No	**Phone / Data**	Yes	**Floor Box**	Yes

Electrical Notes: Lighting control at entrance. No control from media controller.

AUDIO / VISUAL

Projector&Screen	No	**Flat Panel**	Yes

AV Notes: Flat panel size to be based on actual room dimensions. AV cabinet at front, AV connections required at table.

MECHANICAL

Room Temp	68-74	**Dedic. Zone**	Yes

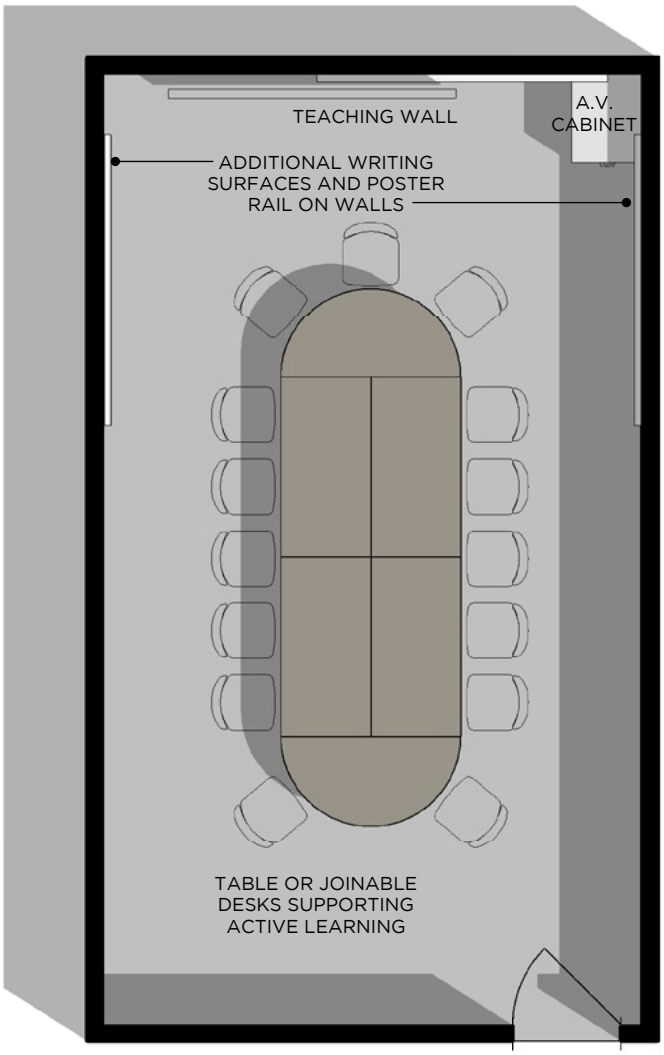
Mechanical Notes:

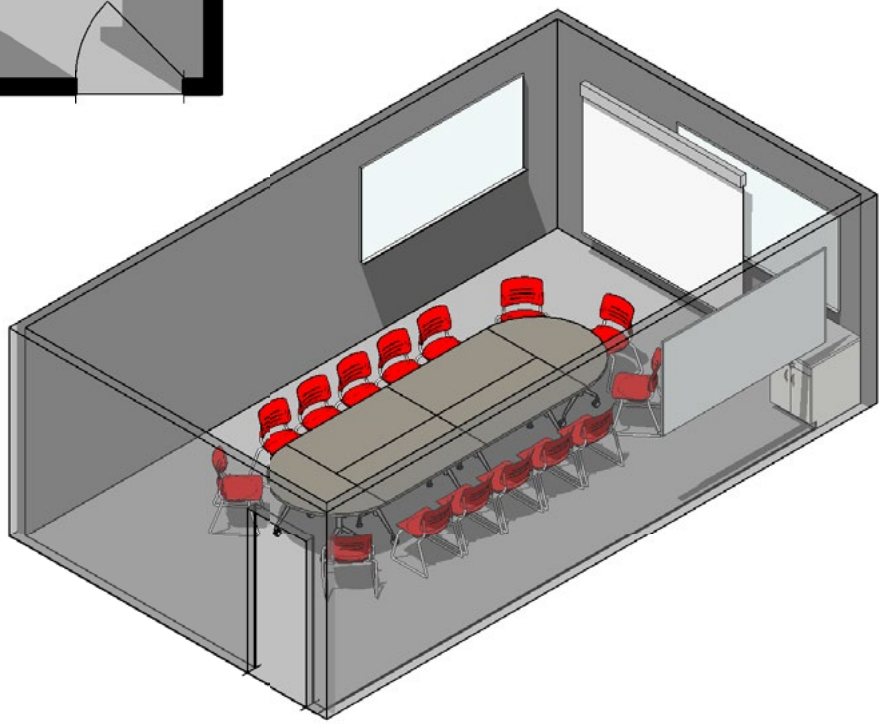
PLUMBING

	Kitchen Sink		**Utility Sink**		**Hose Bib**
	Drinking Fountain		**Floor Drain**		
	Shower		**Toilet**		

SPECIAL REQUIREMENTS

STC of 55 at walls, NC level of 35, NRC of .60 at ceiling


TEACHING WALL
A.V. CABINET
ADDITIONAL WRITING SURFACES AND POSTER RAIL ON WALLS
TABLE OR JOINABLE DESKS SUPPORTING ACTIVE LEARNING



ARCHEOLOGY LAB

Floor Area (sf)	1,700 (including workroom)	# Occupants	12-15
Adjacencies	C.J. Fume Hood	Occupant Type	Public/Faculty/Student
Activities	Learning, Lab /Research, Artifact Storage	Alt. Pedagogy	Teaching Lab

ARCHITECTURAL

Floor Finish		Concrete	Wall Finish		Paint	Ceiling Finish		Acoust. Tile
Door Size		42"	Door Material		Wood	Door Function		Elec. Access
Door Sidelight		Yes	Door Transom		Yes	Roller Shades		Yes
Millwork Faces		P. Lam	Millwork Top		Epoxy Resin			
Equip./Furnish.		Desk		x	Office Chair		Guest Chair		Chair Rail	x	Stool
	x	Table			Side Table	x	Writing Sur.	x	Shelving	x	Refrigerator
	x	Casework			Bookcase		Couch		Printer	x	Freezer
		Podium		x	Teach Station		Tall File		Copier	x	Oven
		Lat. File			Coat Hooks	x	Poster Rail	x	Computer		

Equipment /Millwork Notes: 15 Backpack cubbies req'd. Glass and Solid front casework. Photography space/table in work room. 24" deep racks. Extent of high-density storage to be determined. Residential type Ref/Frez.

ELECTRICAL / DATA

Foot Candle Level	50	Dimmable	No		
Task Lighting	Yes	Phone / Data	Yes	Floor Box	No

Electrical Notes: High density of electrical outlets including electrical drops at island tables in workroom

AUDIO / VISUAL

Projector&Screen	Yes	Flat Panel	No

AV Notes:

MECHANICAL

Room Temp	68-74	Dedic. Zone	Yes

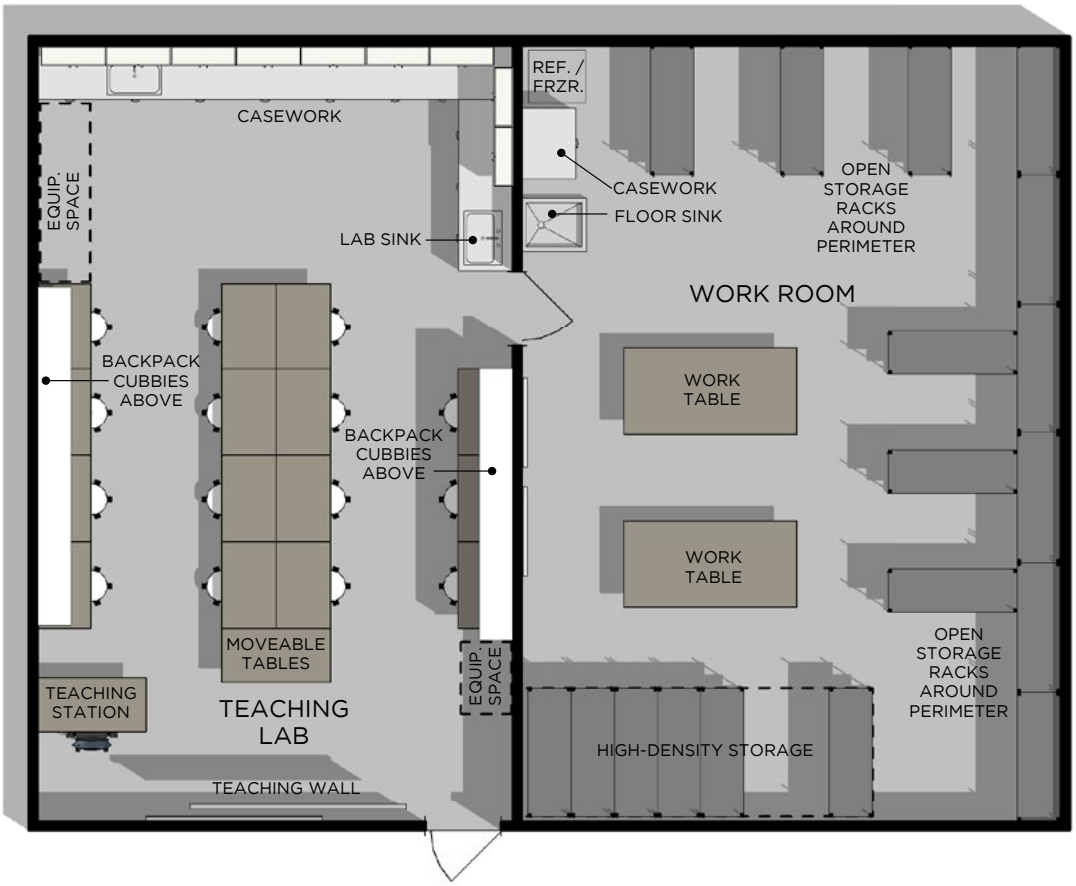
PLUMBING

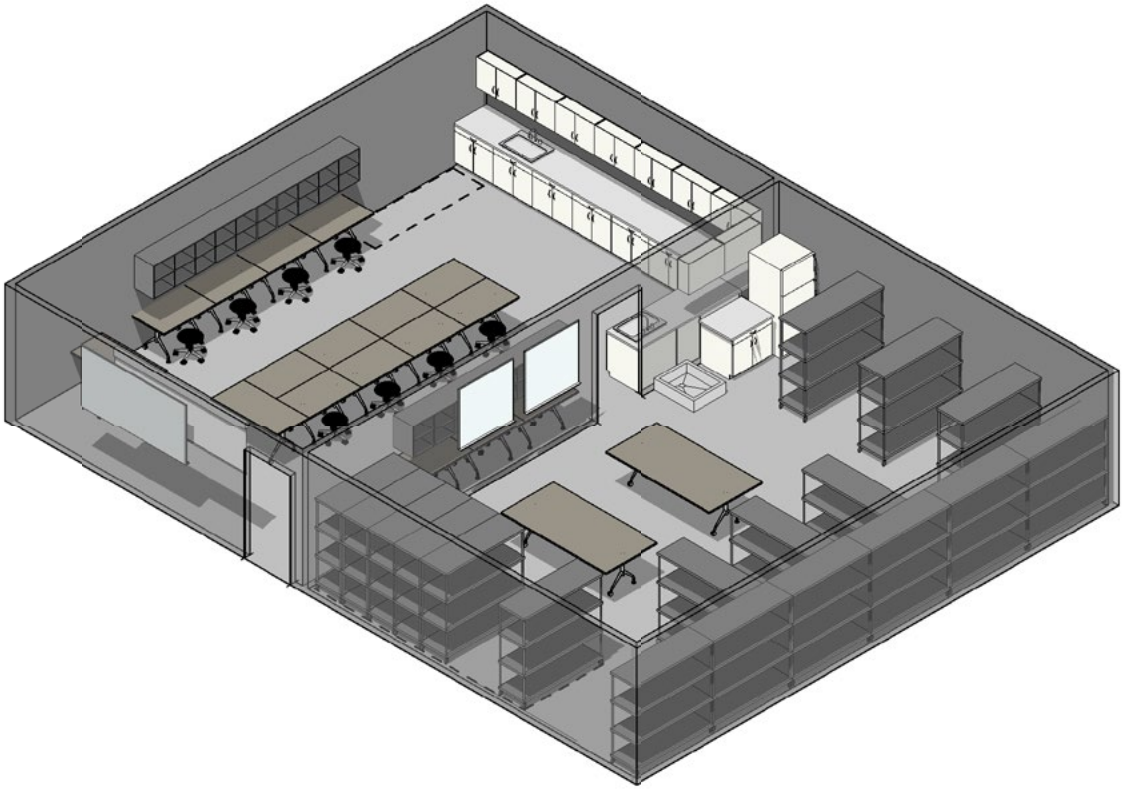
	x	Steel Lab Sink	x	Utility Sink	Compressed Air
		Safety Shower		Floor Drain	Natural Gas
		Eye Wash		Hose Bib	Purified Water

Mech/Plumbing Notes: No special air exchange rates or humidiry control. Sediment traps at all sinks. Sample drying cabinets may add heat load.

SPECIAL REQUIREMENTS

STC of 50 at walls, NC level of 40, NRC of .60 at ceiling


CASEWORK
EQUIP. SPACE
REF. / FRZR.
CASEWORK
FLOOR SINK
LAB SINK
OPEN STORAGE RACKS AROUND PERIMETER
WORK ROOM
BACKPACK CUBBIES ABOVE
WORK TABLE
BACKPACK CUBBIES ABOVE
WORK TABLE
MOVEABLE TABLES
EQUIP. SPACE
OPEN STORAGE RACKS AROUND PERIMETER
TEACHING STATION
TEACHING LAB
HIGH-DENSITY STORAGE
TEACHING WALL



CRIMINAL JUSTICE LAB

Floor Area (sf)	1,290 (including support)	# Occupants	13 Lab, 21 Lecture
Adjacencies	Hist. / Arch. Labs	Occupant Type	Public/Faculty/Student
Activities	Learning, Lab /Research	Alt. Pedagogy	Teaching Lab

ARCHITECTURAL

Floor Finish		Concrete	Wall Finish		Paint	Ceiling Finish		Acoust. Tile
Door Size		42"	Door Material		Wood	Door Function		Elec. Access
Door Sidelight		No	Door Transom		No	Roller Shades		Blackout
Millwork Faces		P. Lam	Millwork Top		Epoxy Resin			
Equip./Furnish.		Desk		Office Chair		Guest Chair		Chair Rail	x	Stool
	x	Table		Side Table	x	Writing Sur.	x	Shelving	x	Refrigerator
	x	Casework		Bookcase		Couch		Printer	x	Freezer
		Podium		Teach Station		Tall File		Copier	x	Cor. Storage
		Lat. File	x	Coat Hooks	x	Poster Rail		Computer	x	Flamable St.

Equipment /Millwork Notes: All lockabe casework, Movable tables, Dark conditions required but not complete blackout, Gunpowder/ amunition storage required. Steel armored walls desired in case of accidental firearm discharge.

ELECTRICAL / DATA

Foot Candle Level	50	Dimmable	Yes		
Task Lighting	Yes	Phone / Data	Yes	Floor Box	No

Electrical Notes: High density of electrical outlets including electrical drops at desks, All lights dimmable

AUDIO / VISUAL

Projector&Screen	Yes	Flat Panel	No

AV Notes: Smart board will be used. Infrastructure for projector and screen required. AV connection plate for AV control. No teaching station.

MECHANICAL

Room Temp	68-74	Dedic. Zone	Yes

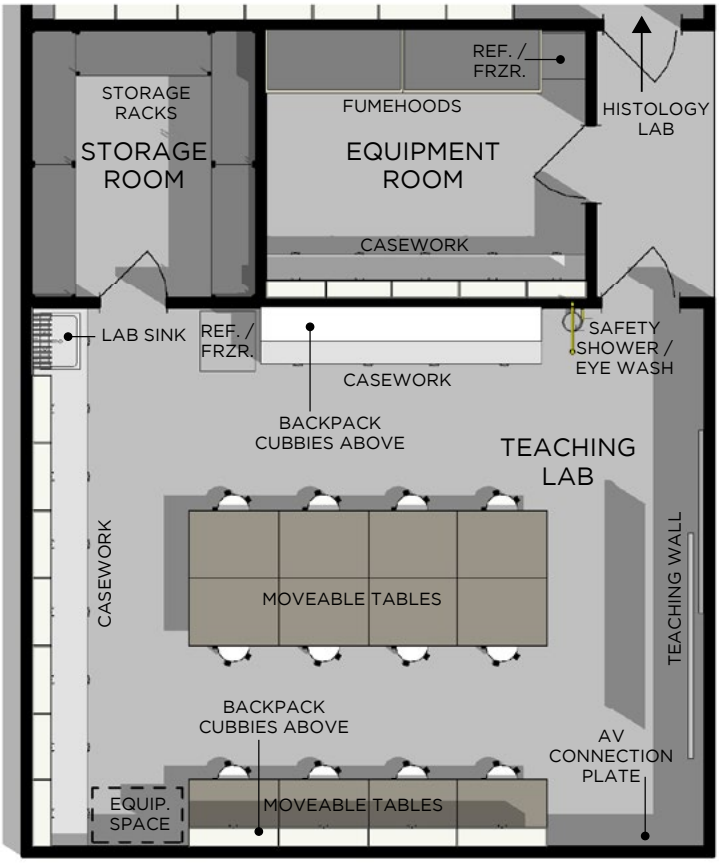
Mechanical Notes: No special exhaust criteria requested. Neighboring Equipment Room shared with Histollogy and will have (2) fume hoods. Ventless hoods shall be investigated for appropriate application.

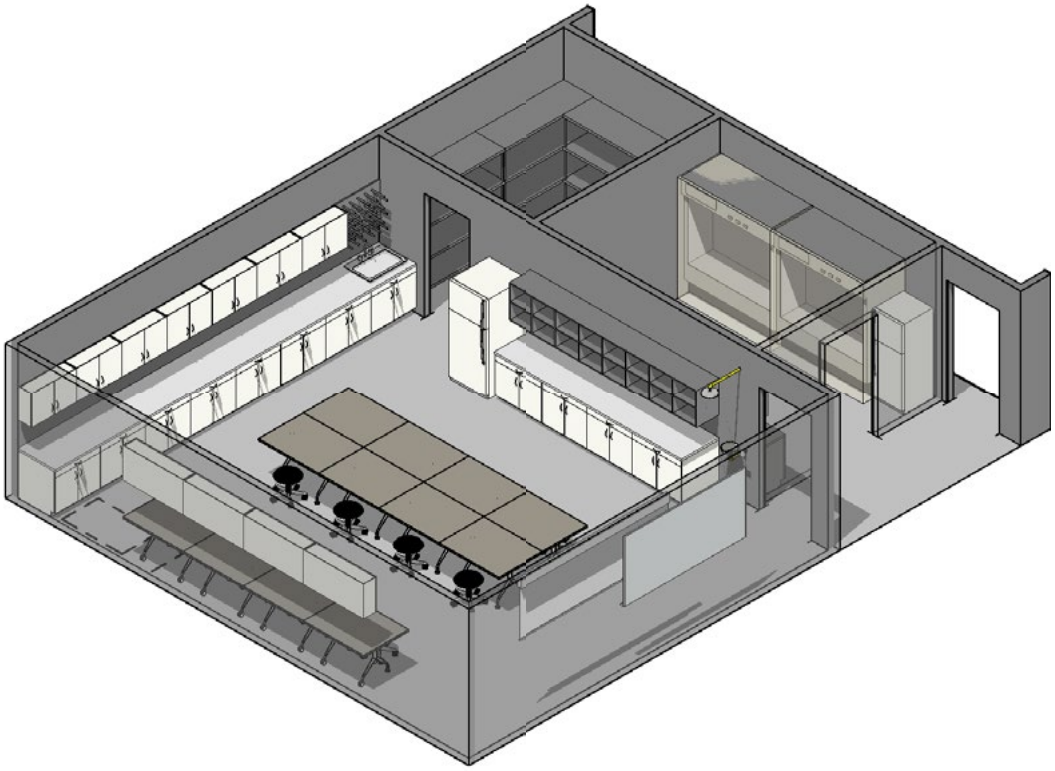
PLUMBING

x	Steel Lab Sink		Utility Sink		Compressed Air
x	Safety Shower		Floor Drain	x	Natural Gas (hoods)
x	Eye Wash		Hose Bib		Purified Water

SPECIAL REQUIREMENTS

STC of 50 at walls, NC level of 40, NRC of .60 at ceiling


STORAGE RACKS
STORAGE ROOM
REF. / FRZR.
FUMEHOODS
EQUIPMENT ROOM
HISTOLOGY LAB
CASEWORK
LAB SINK
REF. / FRZR.
CASEWORK
SAFETY SHOWER / EYE WASH
BACKPACK CUBBIES ABOVE
TEACHING LAB
CASEWORK
MOVEABLE TABLES
TEACHING WALL
BACKPACK CUBBIES ABOVE
AV CONNECTION PLATE
EQUIP. SPACE
MOVEABLE TABLES



HISTOLOGY LAB

Floor Area (sf)	600 (teaching lab only)	# Occupants	21
Adjacencies	C.J. Equip. Room	Occupant Type	Public/Faculty/Student
Activities	Learning, Lab / Research	Alt. Pedagogy	Teaching Lab

ARCHITECTURAL

Floor Finish		Concrete	Wall Finish		Paint	Ceiling Finish		Acoust. Tile
Door Size		42"	Door Material		Wood	Door Function		Elec. Access
Door Sidelight		Yes	Door Transom		Yes	Roller Shades		Yes
Millwork Faces		P. Lam	Millwork Top		Epoxy Resin			
Equip./Furnish.		Desk			Guest Chair		Chair Rail	x Stool
	x	Table			Writing Sur.		Shelving	x Refrigerator
	x	Casework			Couch		Printer	x Freezer
		Podium			Tall File		Copier	
		Lat. File	x Coat Hooks	x	Poster Rail	x	Computer	

Equipment /Millwork Notes	Backpack cubbies at front. Combination of glass and solid fronts on casework. Drying racks at all sinks. Teaching technology at front millwork, no dedicated station.

ELECTRICAL / DATA

Foot Candle Level	50	Dimmable	No		
Task Lighting	Yes	Phone / Data	Yes	Floor Box	No

Electrical Notes	High density of electrical outlets including electrical drops at islands. Laptop computers at each student station.

AUDIO / VISUAL

Projector&Screen	Yes	Flat Panel	No

AV Notes	AV Connection panel at millwork. No central teaching station.

MECHANICAL

Room Temp	68-74	Dedic. Zone	Yes

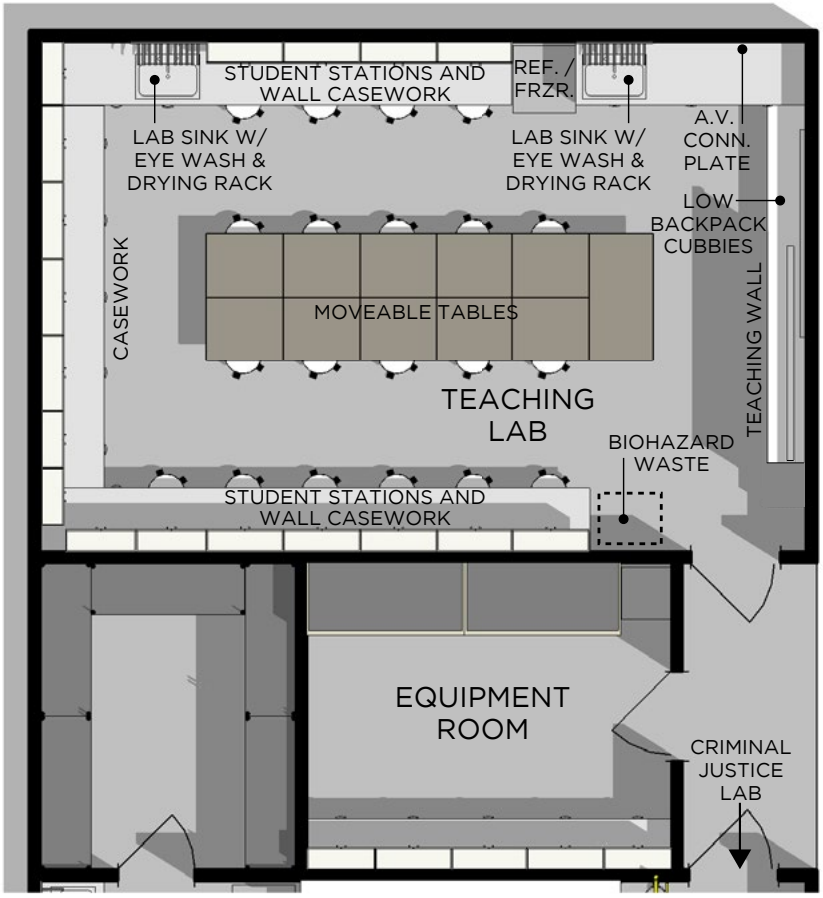
Mechanical Notes	Disections require enhnaced ventilation rates. Elevated rates not desired all of the time.

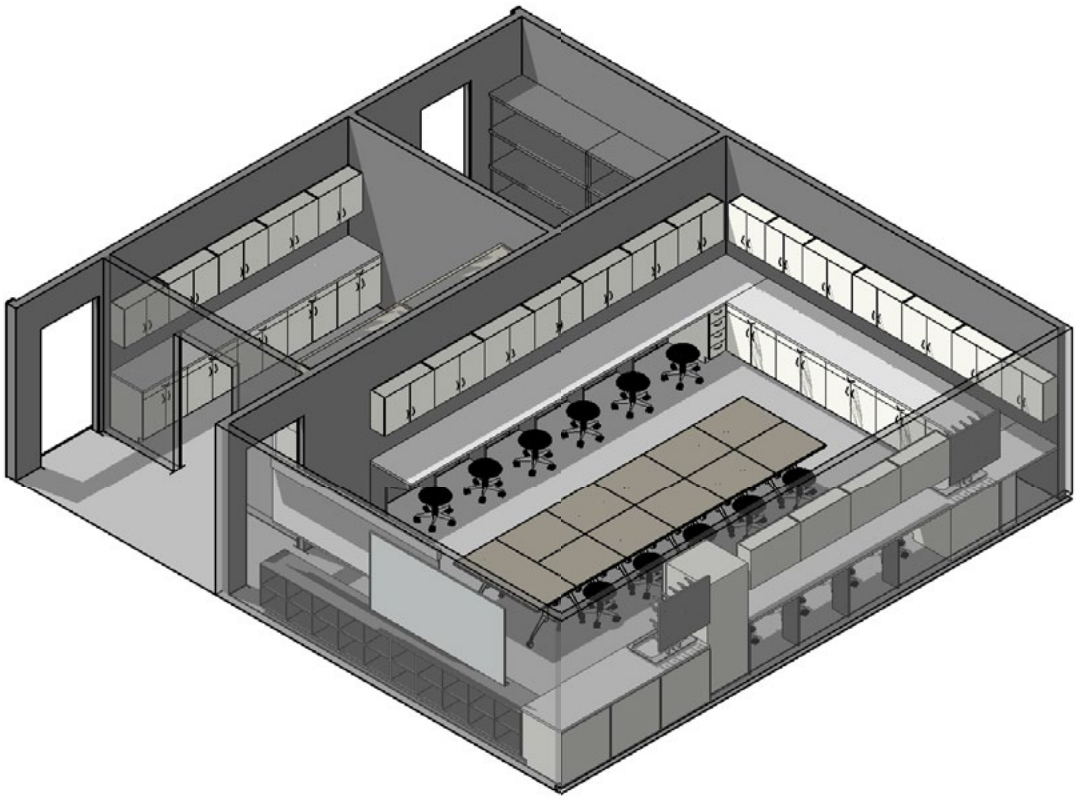
PLUMBING

x	Steel Lab Sink	Utility Sink	Compressed Air
	Safety Shower	Floor Drain	Natural Gas
x	Eye Wash (@ sink)	Hose Bib	Purified Water

SPECIAL REQUIREMENTS

STC of 50 at walls, NC level of 40, NRC of .60 at ceiling


STUDENT STATIONS AND
WALL CASEWORK
REF. /
FRZR.
LAB SINK W/
EYE WASH &
DRYING RACK
LAB SINK W/
EYE WASH &
DRYING RACK
A.V.
CONN.
PLATE
LOW
BACKPACK
CUBBIES
CASEWORK
MOVEABLE TABLES
TEACHING WALL
TEACHING
LAB
BIOHAZARD
WASTE
STUDENT STATIONS AND
WALL CASEWORK
EQUIPMENT
ROOM
CRIMINAL
JUSTICE
LAB



TESTING CENTER

Floor Area (sf)	3,996 (see space program)	# Occupants	116 (all spaces)
Adjacencies	Study/ Student Gathering	Occupant Type	Public/**Faculty**/Student
Activities	Testing / Study / Teaching		

ARCHITECTURAL

Floor Finish		Carpet	Wall Finish	Paint	Ceiling Finish	Acoust. Tile	
Door Size		36"	Door Material	Wood	Door Function	Elec. Access	
Door Sidelight		Yes	Door Transom	Yes	Roller Shades	Yes	
Millwork Faces		P. Lam	Millwork Top	P. Lam			
Equip./Furnish.	x	Desk	x	Office Chair		Guest Chair		Chair Rail
	x	Table		Side Table	x	Writing Sur.		Shelving
	x	Millwork	x	Bookcase		Couch	x	Printer
		Podium		Teach Station		Tall File	x	Copier
	x	Lat. File	x	Coat Hooks	x	Poster Rail	x	Computer

Equipment /Millwork Notes	Refer to the Detailed Space Program for individual space sizes and occupancy. Visibility into testing spaces is important.

ELECTRICAL / DATA

Foot Candle Level	30	Dimmable	No		
Task Lighting	No	Phone / Data	Yes	Floor Box	Yes

Electrical Notes	Power and data fed through cable management in tables with progination at floor boxes.

AUDIO / VISUAL

Projector&Screen	Yes	Flat Panel	No

AV Notes	AV ready at computer laboratories (2 spaces). No AV in 48 seat testing room.

MECHANICAL

Room Temp	68-74	Dedic. Zone	Yes

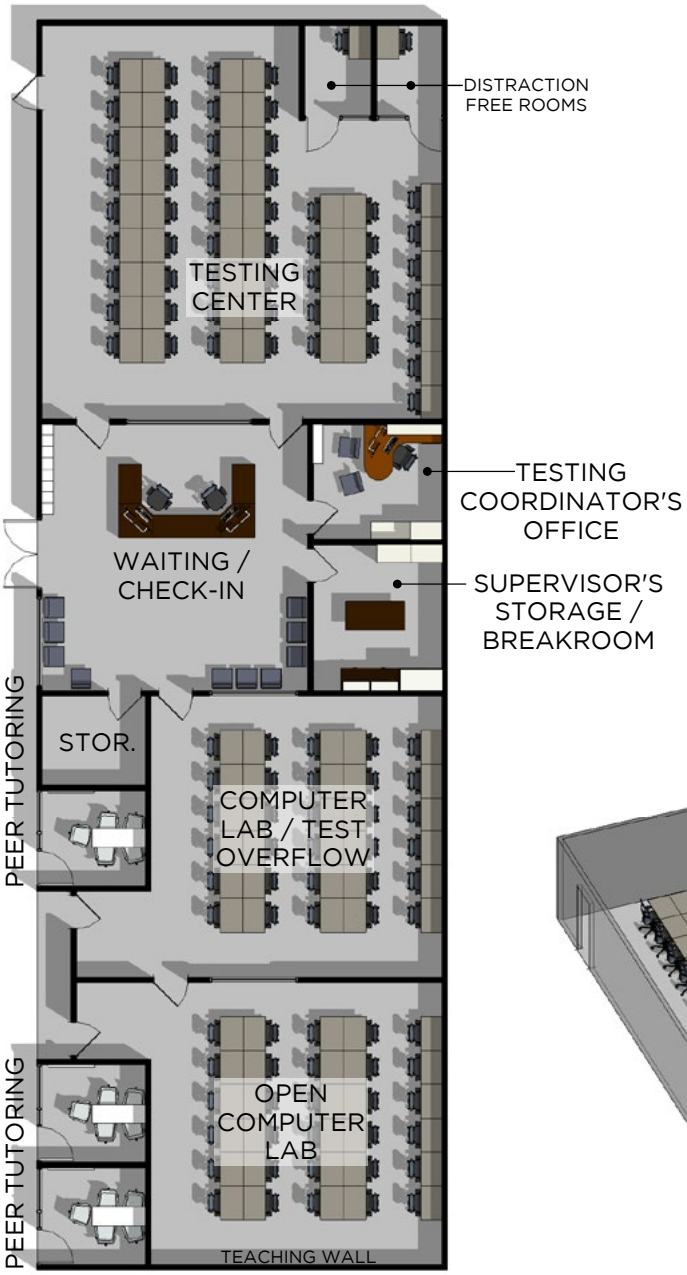
Mechanical Notes	

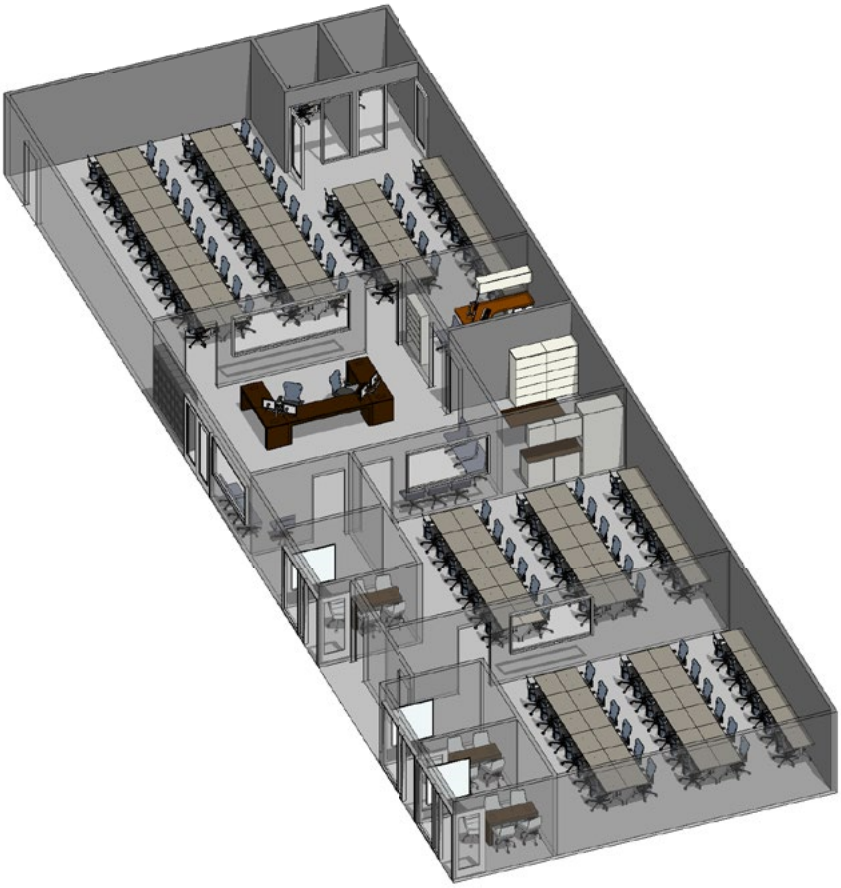
PLUMBING

		Kitchen Sink		Utility Sink		Hose Bib
		Drinking Fountain		Floor Drain		
		Shower		Toilet		

SPECIAL REQUIREMENTS

STC of 50, NC level of 35, NRC of .60 at ceiling


DISTRACTION FREE ROOMS
TESTING CENTER
TESTING COORDINATOR'S OFFICE
WAITING / CHECK-IN
SUPERVISOR'S STORAGE / BREAKROOM
PEER TUTORING
STOR.
COMPUTER LAB / TEST OVERFLOW
PEER TUTORING
OPEN COMPUTER LAB
TEACHING WALL



COMPUTER CLASSROOM

Floor Area (sf)	900	# Occupants	31
Adjacencies		Occupant Type	Public/**Faculty**/Student
Activities	Scheduled Teaching and Open Lab	Alt. Pedagogy	No

ARCHITECTURAL

Floor Finish	Carpet		Wall Finish	Paint		Ceiling Finish	Acoust. Tile
Door Size	36"		Door Material	Wood		Door Function	Elec. Access
Door Sidelight	Yes		Door Transom	Yes		Roller Shades	Yes
Millwork Faces	P. Lam		Millwork Top	P. Lam			
Equip./Furnish.		Desk	x Office Chair		Guest Chair	x Chair Rail	
	x	Table		Side Table	x Writing Sur.		Shelving
	x	Millwork		Bookcase		Couch	x Printer
		Podium	x Teach Station		Tall File		Copier
		Lat. File	x Coat Hooks		x Poster Rail	x Computer	

Equipment /Millwork Notes: Standard teaching station. 30" linear per student at tables.

ELECTRICAL / DATA

Foot Candle Level	30	Dimmable	Yes		
Task Lighting	No	Phone / Data	Yes	Floor Box	No

Electrical Notes: Power and data fed through cable management in tables. Multi circuit outlets at wall to support multiple stations in single table line.

AUDIO / VISUAL

Projector&Screen	Yes	Flat Panel	No

AV Notes:

MECHANICAL

Room Temp	68-74	Dedic. Zone	Yes

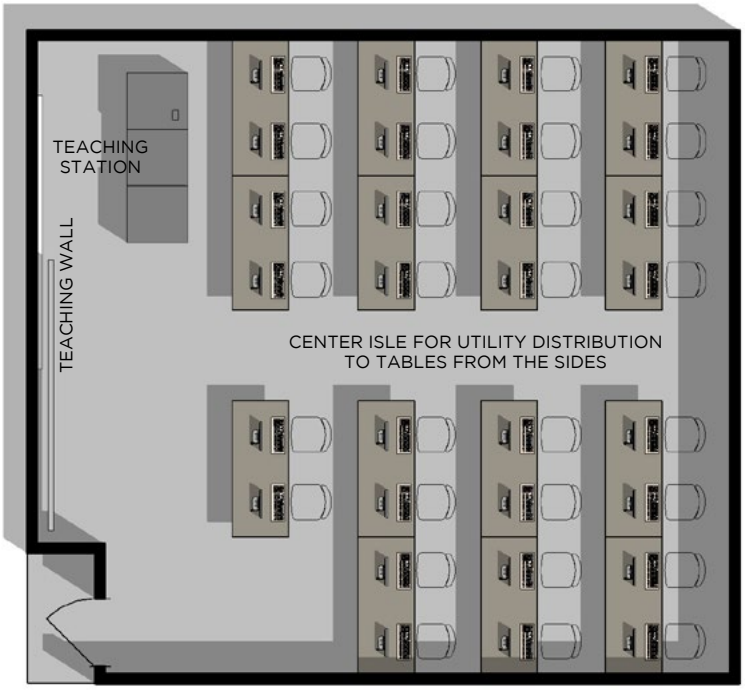
Mechanical Notes:

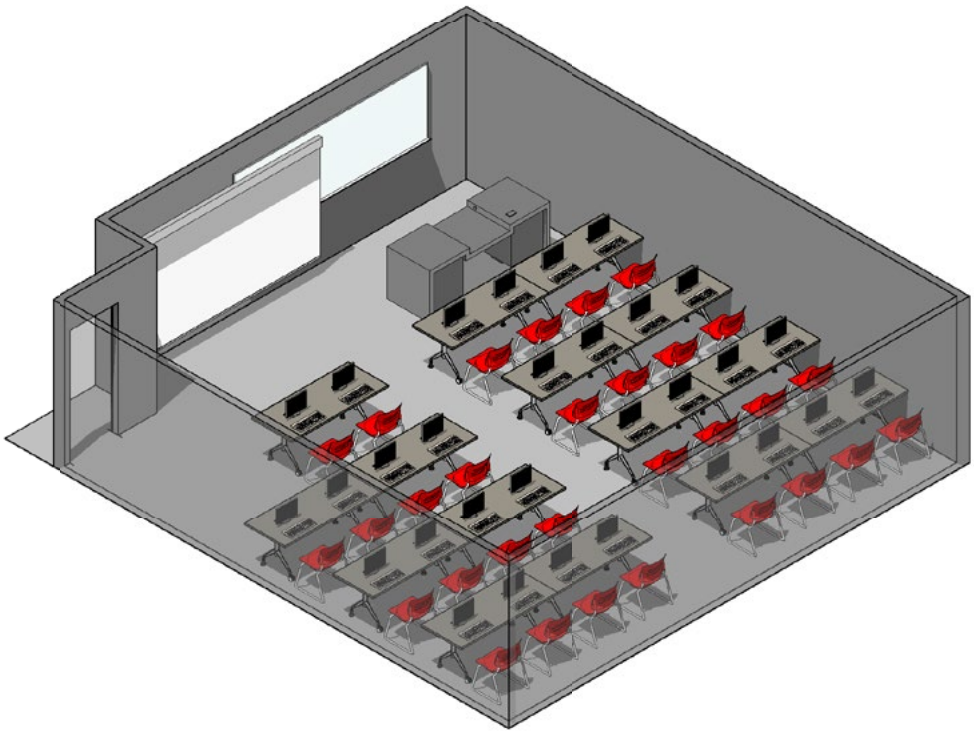
PLUMBING

	Kitchen Sink	Utility Sink	Hose Bib
	Drinking Fountain	Floor Drain	
	Shower	Toilet	

SPECIAL REQUIREMENTS

STC of 50, NC level of 35, NRC of .60 at ceiling


TEACHING STATION
TEACHING WALL
CENTER ISLE FOR UTILITY DISTRIBUTION TO TABLES FROM THE SIDES



OFFICE - STANDARD

Floor Area (sf)	120	# Occupants	1
Adjacencies	Dept. common facilities	Occupant Type	Public/**Faculty**/Student
Activities	Private	Alt. Pedagogy	

ARCHITECTURAL

Floor Finish	Carpet	Wall Finish	Paint	Ceiling Finish	Acoust. Tile
Door Size	36"	Door Material	Wood	Door Function	Office
Door Sidelight	Yes	Door Transom	Yes	Roller Shades	Yes
Millwork Faces		Millwork Top			

Equip./Furnish.	x Desk	x Office Chair	x Guest Chair	Chair Rail (At Table)
	Table	Side Table	x Writing Sur.	x Shelving
	Millwork	x Bookcase	Couch	x Printer
	Podium	Teach Station	Tall File	Copier
	x Lat. File	x Coat Hooks	Poster Rail	x Computer

Equipment /Millwork Notes	Monitor arms desired to free up work surface. Manual roller shades for sun / glare control

ELECTRICAL / DATA

Foot Candle Level	30	Dimmable	Yes		
Task Lighting	Yes	Phone / Data	Yes	Floor Box	No

Electrical Notes	

AUDIO / VISUAL

Projector&Screen	No	Flat Panel	No

AV Notes	

MECHANICAL

Room Temp	68-74	Dedic. Zone	Yes

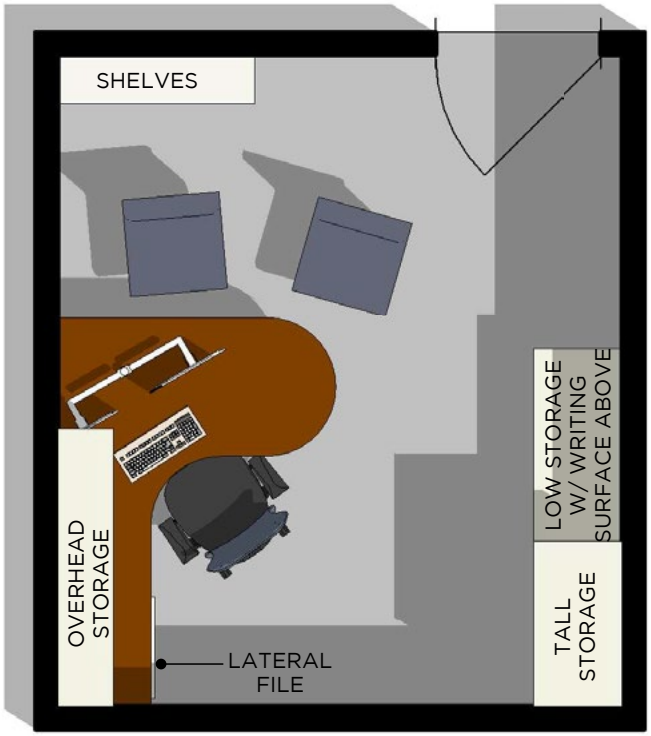
Mechanical Notes	

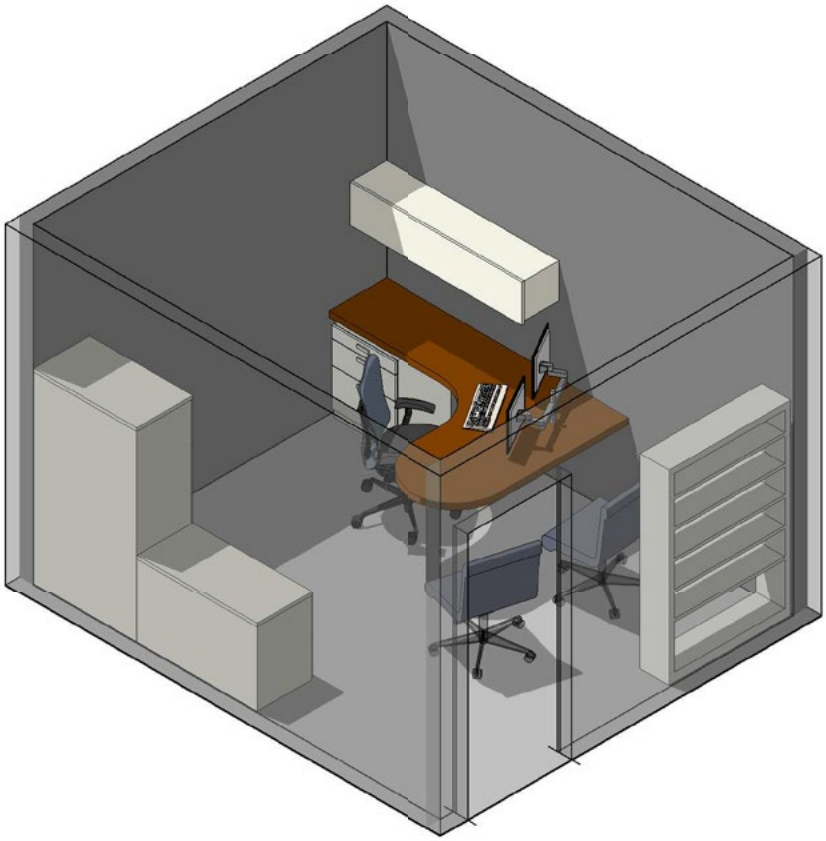
PLUMBING

Kitchen Sink	Utility Sink	Hose Bib
Drinking Fountain	Floor Drain	
Shower	Toilet	

SPECIAL REQUIREMENTS

STC of 50 at walls, NC level of 40, NRC of .60 at ceiling


OVERHEAD STORAGE
SHELVES
LATERAL FILE
LOW STORAGE W/ WRITING SURFACE ABOVE
TALL STORAGE



OFFICE - EXECUTIVE

Floor Area (sf)	180	# Occupants	1
Adjacencies	Offices	Occupant Type	Public/**Faculty**/Student
Activities	Private, Small Group	Alt. Pedagogy	

ARCHITECTURAL

Floor Finish	Carpet	Wall Finish	Paint	Ceiling Finish	Acoust. Tile		
Door Size	36"	Door Material	Wood	Door Function	Office		
Door Sidelight	Yes	Door Transom	Yes	Roller Shades	Yes		
Millwork Faces		Millwork Top					
Equip./Furnish.	x Desk	x Office Chair	x Guest Chair	x Chair Rail (At Table)			
	x Table	Side Table	x Writing Sur.	x Shelving			
	Millwork	x Bookcase	Couch	x Printer			
	Podium	Teach Station	Tall File	Copier			
	x Lat. File	x Coat Hooks	Poster Rail	x Computer			

Equipment /Millwork Notes: Monitor arms desired to free up work surface. Manual roller shades for sun / glare control

ELECTRICAL / DATA

Foot Candle Level	30	Dimmable	Yes	Scenes	No
Task Lighting	Yes	Phone / Data	Yes	Floor Box	No

Electrical Notes:

AUDIO / VISUAL

Projector&Screen	No	Flat Panel	TBD

AV Notes: Flat panel may be desired at conference table

MECHANICAL

Room Temp	68-74	Dedic. Zone	Yes

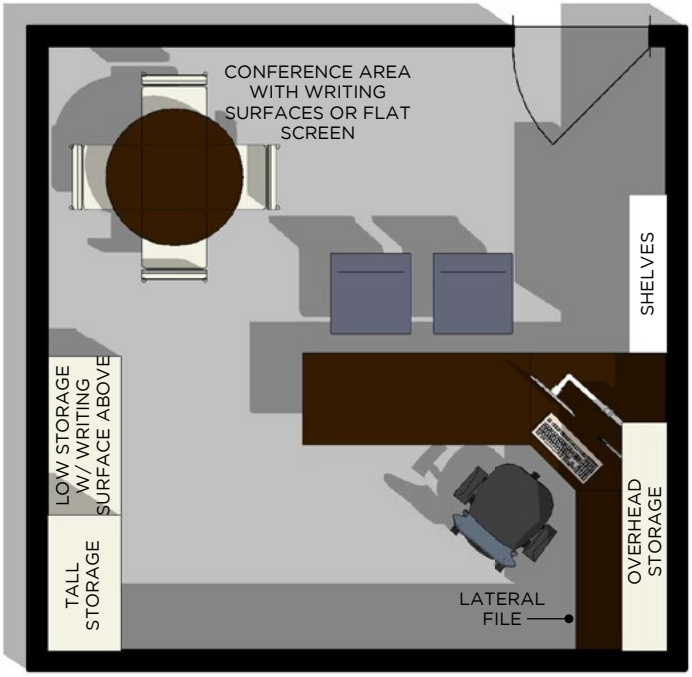
Mechanical Notes:

PLUMBING

	Kitchen Sink	Utility Sink	Hose Bib
	Drinking Fountain	Floor Drain	
	Shower	Toilet	

SPECIAL REQUIREMENTS

STC of 50 at walls, NC level of 40, NRC of .60 at ceiling


TALL STORAGE
LOW STORAGE W/ WRITING SURFACE ABOVE
CONFERENCE AREA WITH WRITING SURFACES OR FLAT SCREEN
LATERAL FILE
OVERHEAD STORAGE
SHELVES

RECEPTION / WAITING

		# Occupants	2 (Shared)
Floor Area (sf)	280	Occupant Type	Public/Faculty/Student
Adjacencies	Huddle Rooms, Dept. Shared Resources		
Activities	Waiting area for department visitors. Work space for 2 Department Secretaries		

ARCHITECTURAL

Floor Finish	Carpet	Wall Finish	Paint	Ceiling Finish	Acoust. Tile		
Door Size	Dlb Doors	Door Material	Glass	Door Function	TBD		
Door Sidelight	Yes	Door Transom	Yes	Roller Shades			
Millwork Faces		Millwork Top					
Equip./Furnish.	x	Desk	x	Office Chair	x	Guest Chair	Chair Rail
		Table	x	Side Table		Writing Sur.	Shelving
		Millwork		Bookcase	x	Couch	x Printer
		Podium		Teach Station	x	Tall File	Copier
	x	Lat. File	x	Coat Hooks		Poster Rail	x Computer
Equipment /Millwork Notes	Space to be inviting to students						

ELECTRICAL / DATA

Foot Candle Level	30	Dimmable	No		
Task Lighting	Yes	Phone / Data	Yes	Floor Box	No
Electrical Notes	USB charging ports at Interaction and Waiting spaces.				

AUDIO / VISUAL

Projector&Screen	No	Flat Panel	No
AV Notes			

MECHANICAL

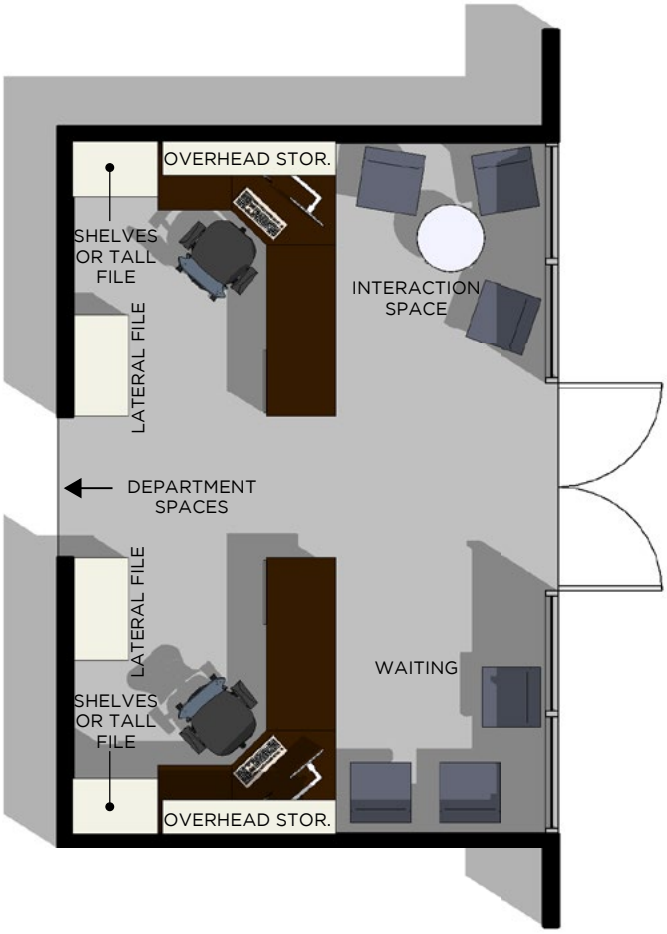
Room Temp	68-74	Dedic. Zone	TBD
Mechanical Notes			

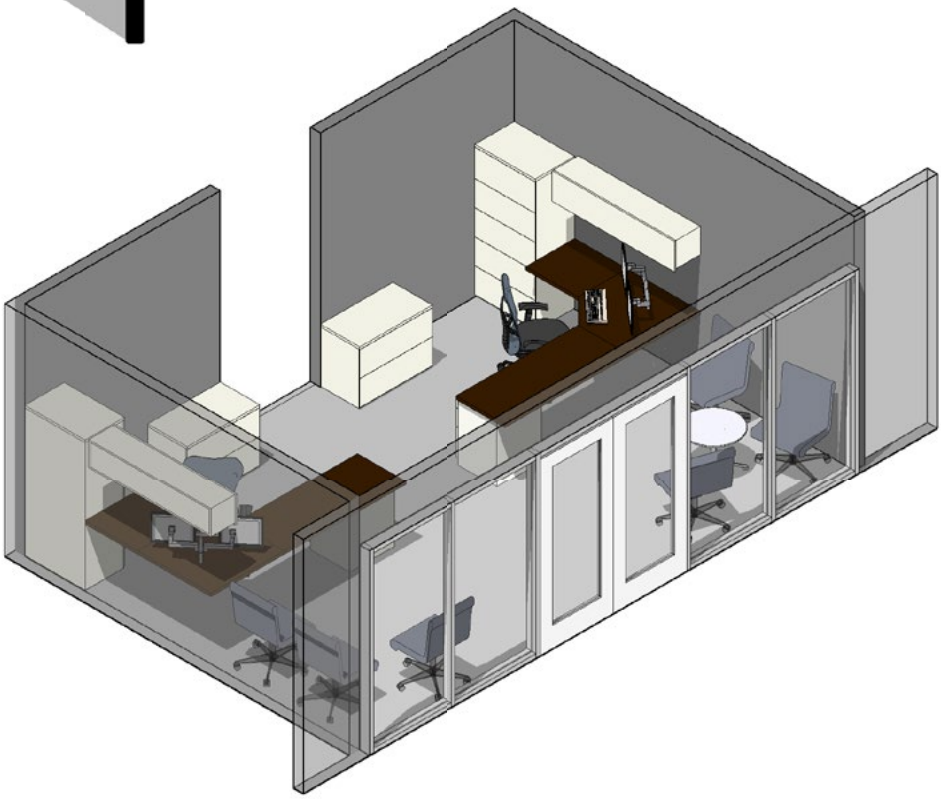
PLUMBING

	Kitchen Sink	Utility Sink	Hose Bib
	Drinking Fountain	Floor Drain	
	Shower	Toilet	

SPECIAL REQUIREMENTS

NC level of 40, NRC of .60 at ceiling


OVERHEAD STOR.
SHELVES OR TALL FILE
LATERAL FILE
INTERACTION SPACE
DEPARTMENT SPACES
LATERAL FILE
WAITING
SHELVES OR TALL FILE
OVERHEAD STOR.



CONFERENCE ROOM

# Occupants	15		
Floor Area (sf)	325	**Occupant Type**	Public/**Faculty**/Student
Adjacencies	Dept. Shared, Offices	**Alt. Pedagogy**	
Activities	Informal and formal meetings		

ARCHITECTURAL

Floor Finish	Carpet	**Wall Finish**	Paint	**Ceiling Finish**	Acoust. Tile		
Door Size	36"	**Door Material**	Wood	**Door Function**	Classroom		
Door Sidelight	Yes	**Door Transom**	Yes	**Roller Shades**	Yes		
Millwork Faces	P. Lam	**Millwork Top**	P. Lam				
Equip./Furnish.	_ Desk	x Office Chair	x Guest Chair	x Chair Rail			
	x Table	_ Side Table	x Writing Sur.	x Shelving			
	x Millwork	_ Bookcase	_ Couch	_ Printer			
	_ Podium	_ Teach Station	_ Tall File	_ Copier			
	_ Lat. File	_ Coat Hooks	x Poster Rail	_ Computer			

Equipment /Millwork Notes: Millwork base cabinet to contain AV components and have space for storage.

ELECTRICAL / DATA

Foot Candle Level	30	**Dimmable**	Yes		
Task Lighting	No	**Phone / Data**	Yes	**Floor Box**	Yes

Electrical Notes: Lighting control at entrance. No control from media controller.

AUDIO / VISUAL

Projector&Screen	Yes	**Flat Panel**	Yes

AV Notes: Flat panel acceptability and size to be established based on final room dimensions.

MECHANICAL

Room Temp	68-74	**Dedic. Zone**	Yes

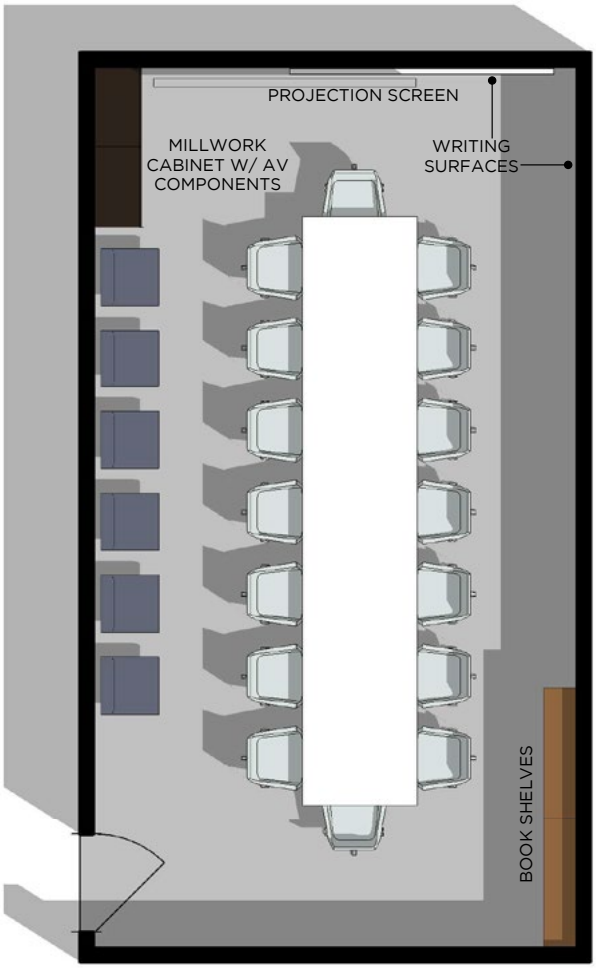
Mechanical Notes:

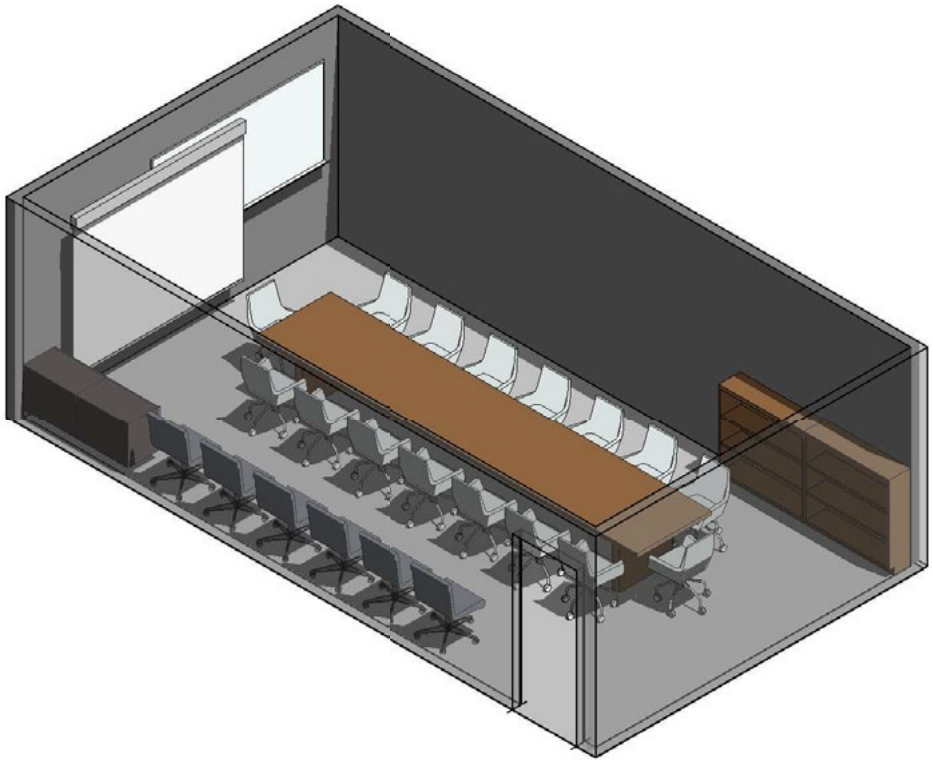
PLUMBING

_ **Kitchen Sink**	_ **Utility Sink**	_ **Hose Bib**	
_ **Drinking Fountain**	_ **Floor Drain**	_	
_ **Shower**	_ **Toilet**	_	

SPECIAL REQUIREMENTS

STC of 55 at walls, NC level of 30, NRC of .60 at ceiling


PROJECTION SCREEN
MILLWORK CABINET W/ AV COMPONENTS
WRITING SURFACES
BOOK SHELVES



BREAK ROOM

		# Occupants	20
Floor Area (sf)	340	**Occupant Type**	Public/**Faculty**/Student
Adjacencies	Offices, Shared Space		
Activities	Break, dining, interaction		
	Desire to consolidate break rooms to greatest extent.		

ARCHITECTURAL

Floor Finish	VCT	**Wall Finish**	Paint	**Ceiling Finish**	Acoust. Tile				
Door Size	36"	**Door Material**	Wood	**Door Function**	Passage				
Door Sidelight	Yes	**Door Transom**	Yes	**Roller Shades**	Yes				
Millwork Faces	P. Lam.	**Millwork Top**	P. Lam.						
Equip./Furnish.		Desk		Office Chair	x	Guest Chair	x	Chair Rail	x Microwave
	x	Table		Side Table		Writing Sur.		Shelving	x Refrig/Frz.
	x	Millwork		Bookcase		Couch		Printer	x Dishwasher
		Podium		Teach Station		Tall File		Copier	
		Lat. File		Coat Hooks		Poster Rail		Computer	

Equipment /Millwork Notes: Refrigerator(s) and microwave(s) required.

ELECTRICAL / DATA

Foot Candle Level	30	**Dimmable**	Yes		
Task Lighting	No	**Phone / Data**	Yes	**Floor Box**	No

Electrical Notes: Accommodate a vending machine if break is shared between more than 2 departments. Dedicated power and data outlet for vending machine.

AUDIO / VISUAL

Projector&Screen	No	**Flat Panel**	No

AV Notes:

MECHANICAL

Room Temp	68-74	**Dedic. Zone**	TBD

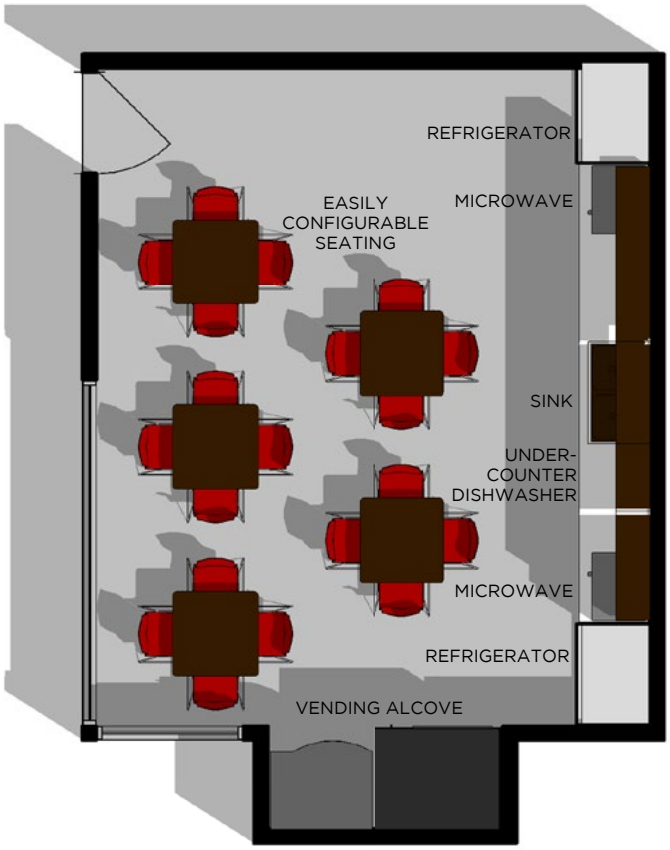
Mechanical Notes: No garbage disposal at sink.

PLUMBING

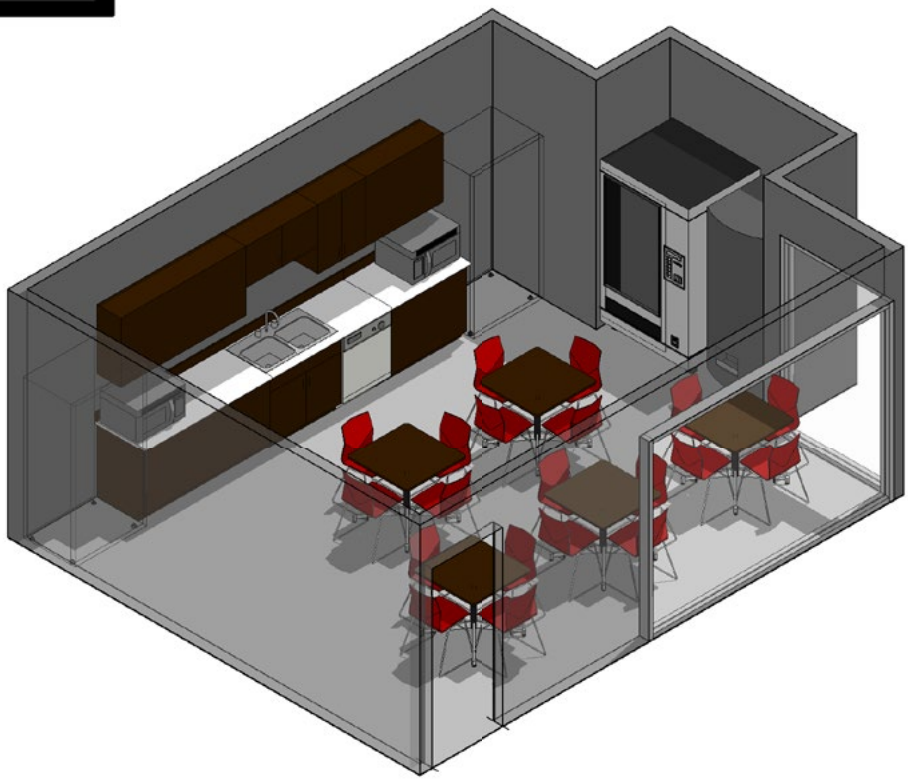
	x	**Kitchen Sink**		**Utility Sink**		**Hose Bib**
	x	**Drinking Fountain**		**Floor Drain**		
		Shower		**Toilet**		

SPECIAL REQUIREMENTS

NC level of 40, NRC of .60 at ceiling



LARGE,
MULTI-DEPARTMENT
VERSION SHOWN



WORK ROOM

		# Occupants	0
Floor Area (sf)	300	Occupant Type	Public/**Faculty**/Student
Adjacencies	Dept. Shared Spaces		
Activities	Printing, Copying, Layout, Mailboxes		

ARCHITECTURAL

Floor Finish	Carpet	Wall Finish	Paint	Ceiling Finish	Acoust. Tile
Door Size	42"	Door Material	Wood	Door Function	Passage
Door Sidelight	Yes	Door Transom	Yes	Roller Shades	
Millwork Faces	P. Lam	Millwork Top	P. Lam		
Equip./Furnish.	Desk	Office Chair	Guest Chair	Chair Rail	
	x Table	Side Table	Writing Sur.	x Shelving	
	x Millwork	Bookcase	Couch	x Printer	
	Podium	Teach Station	Tall File	x Copier	
	Lat. File	Coat Hooks	Poster Rail	Computer	

Equipment /Millwork Notes	Base and wall cabinets, millwork mailboxes to accommodate all faculty and staff associated with space.

ELECTRICAL / DATA

Foot Candle Level	30	Dimmable	No		
Task Lighting	Yes	Phone / Data	Yes	Floor Box	No

Electrical Notes	Confirm electrical requirements for large volume printer/copier.

AUDIO / VISUAL

Projector&Screen	No	Flat Panel	No

AV Notes	

MECHANICAL

Room Temp	68-74	Dedic. Zone	Yes

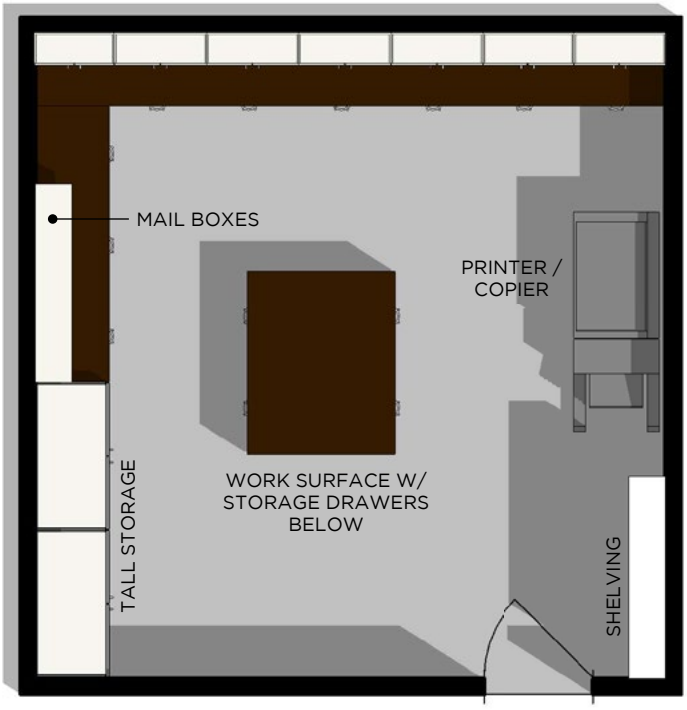
Mechanical Notes	

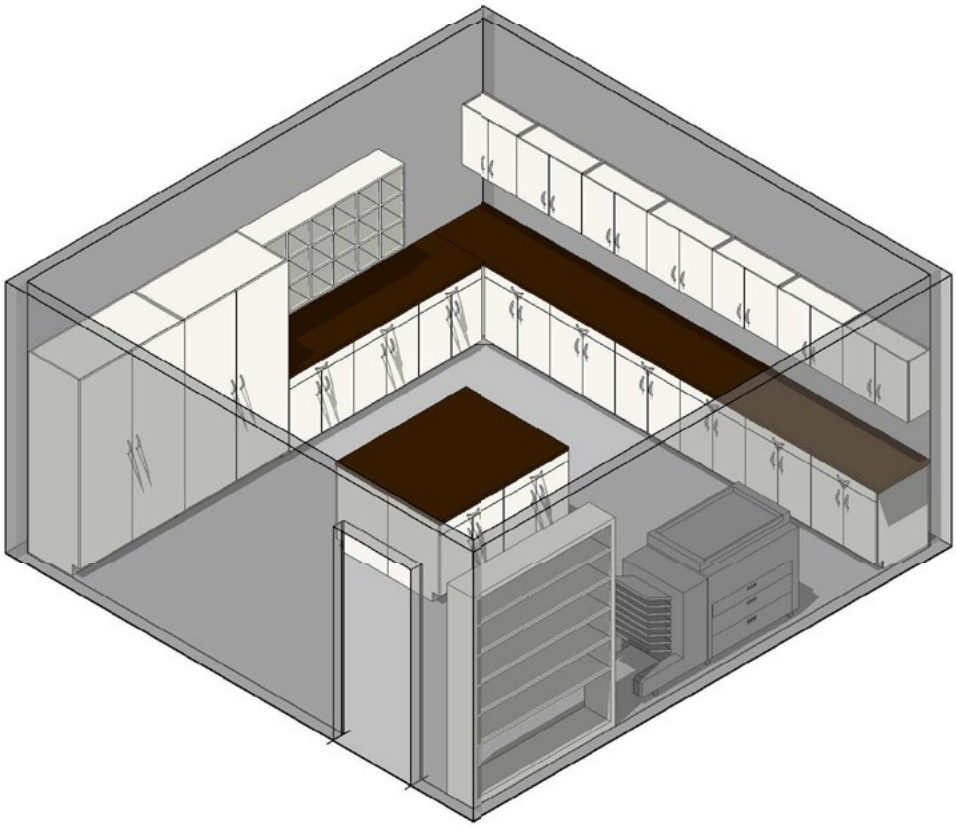
PLUMBING

	Kitchen Sink	Utility Sink	Hose Bib
	Drinking Fountain	Floor Drain	
	Shower	Toilet	

SPECIAL REQUIREMENTS

NC level of 40, NRC of .60 at ceiling


MAIL BOXES
PRINTER / COPIER
WORK SURFACE W/ STORAGE DRAWERS BELOW
TALL STORAGE
SHELVING



HUDDLE ROOM

Floor Area (sf)	70	# Occupants	4-5
Adjacencies	Reception, Offices	Occupant Type	Public/Faculty/Student
Activities	Small group meetings, ad-hoc meeting space	Alt. Pedagogy	

ARCHITECTURAL

Floor Finish	Carpet	Wall Finish	Paint	Ceiling Finish	Acoust. Tile		
Door Size	36"	Door Material	Wood	Door Function	Passage		
Door Sidelight	Yes	Door Transom	Yes	Roller Shades			
Millwork Faces		Millwork Top					
Equip./Furnish.		Desk		Office Chair	x	Guest Chair	x Chair Rail
	x	Table		Side Table	x	Writing Sur.	Shelving
		Millwork		Bookcase		Couch	Printer
		Podium		Teach Station		Tall File	Copier
		Lat. File	x	Coat Hooks	x	Poster Rail	Computer

Equipment /Millwork Notes

ELECTRICAL / DATA

Foot Candle Level	30	Dimmable	Yes		
Task Lighting	No	Phone / Data	Yes	Floor Box	No

Electrical Notes

AUDIO / VISUAL

Projector&Screen	No	Flat Panel	Yes

AV Notes: AV connector plate at table.

MECHANICAL

Room Temp	68-74	Dedic. Zone	Yes

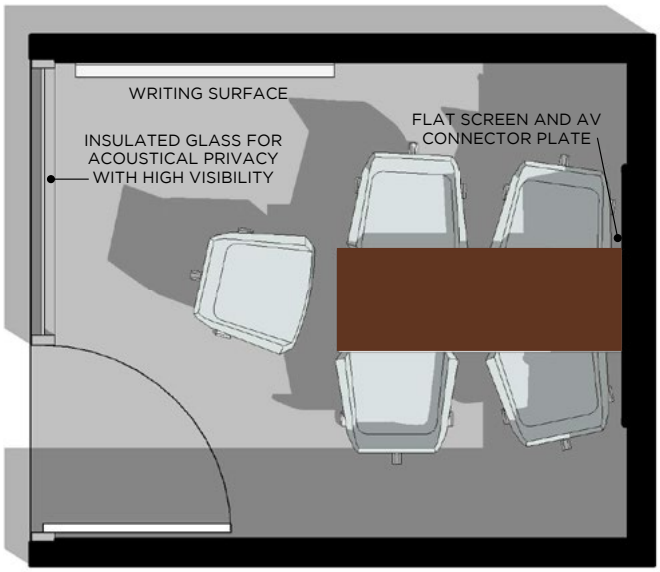
Mechanical Notes

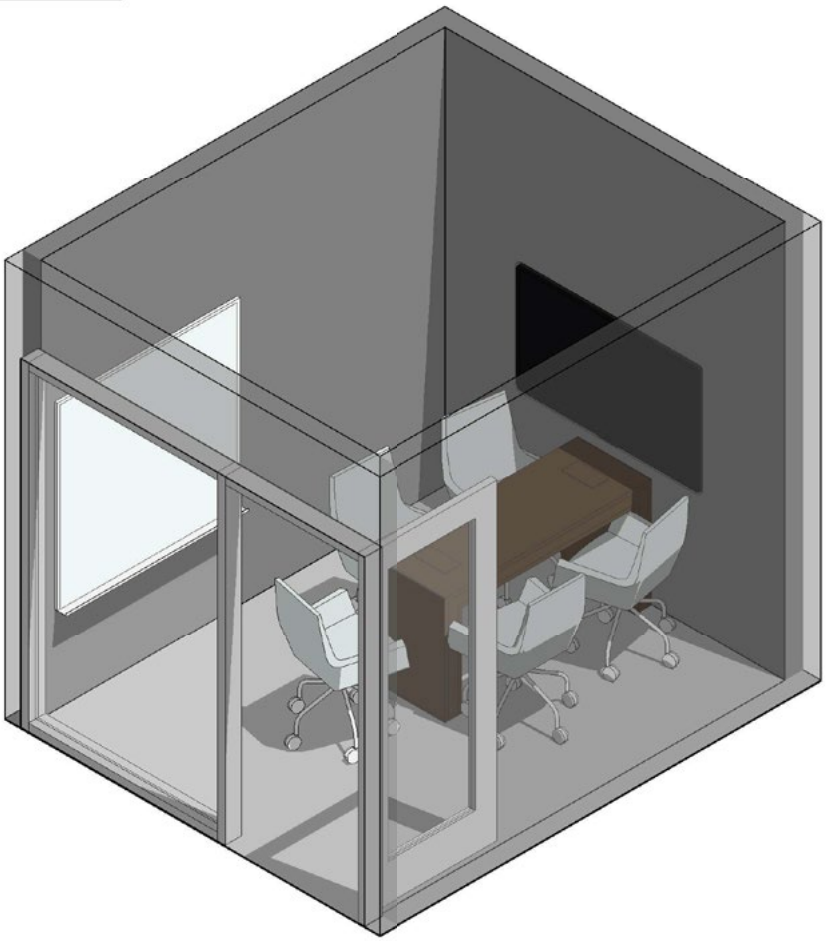
PLUMBING

	Kitchen Sink	Utility Sink	Hose Bib
	Drinking Fountain	Floor Drain	
	Shower	Toilet	

SPECIAL REQUIREMENTS

STC of 55 at walls, NC level of 30, NRC of .60 at ceiling


WRITING SURFACE
INSULATED GLASS FOR ACOUSTICAL PRIVACY WITH HIGH VISIBILITY
FLAT SCREEN AND AV CONNECTOR PLATE



STUDENT ORGANIZATION

Floor Area (sf)	640	# Occupants	8-12
Adjacencies		Occupant Type	Public/Faculty/**Student**
Activities	Student Organization meetings, work room for projects.	Alt. Pedagogy	

ARCHITECTURAL

Floor Finish	Carpet		Wall Finish	Paint		Ceiling Finish	Acoust. Tile	
Door Size	36"		Door Material	Wood		Door Function	Office	
Door Sidelight	Yes		Door Transom	Yes		Roller Shades	Yes	
Millwork Faces	P. Lam		Millwork Top	P. Lam				
Equip./Furnish.		Desk	x	Office Chair	x	Guest Chair	x	Chair Rail
	x	Table		Side Table	x	Writing Sur.		Shelving
	x	Millwork		Bookcase		Couch		Printer
		Podium		Teach Station		Tall File		Copier
		Lat. File	x	Coat Hooks	x	Poster Rail		Computer

Equipment /Millwork Notes	Tall lockage cabinets for each group. 6 feet of base and wall cabinet for common material storage. Work tabes and small meeting / conference area.

ELECTRICAL / DATA

Foot Candle Level	30	Dimmable	Yes		
Task Lighting	No	Phone / Data	Yes	Floor Box	No

Electrical Notes	

AUDIO / VISUAL

Projector&Screen	No	Flat Panel	Yes

AV Notes	Connection plate for student laptops / devices

MECHANICAL

Room Temp	68-74	Dedic. Zone	Yes

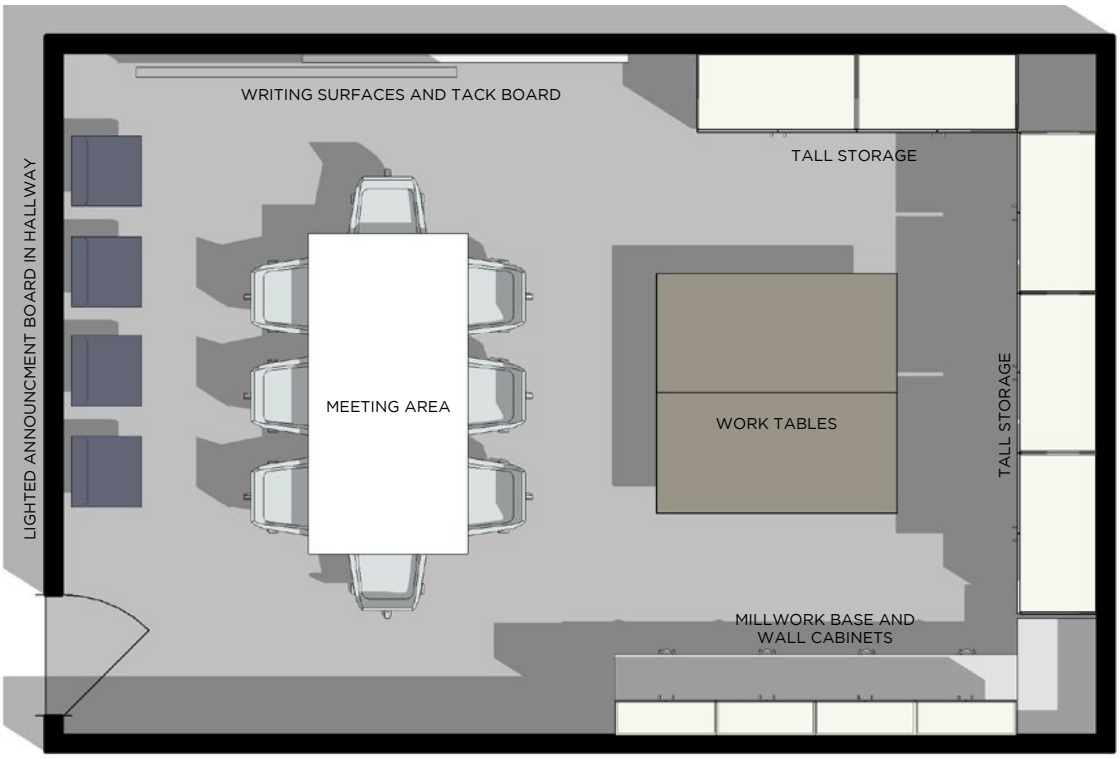
Mechanical Notes	

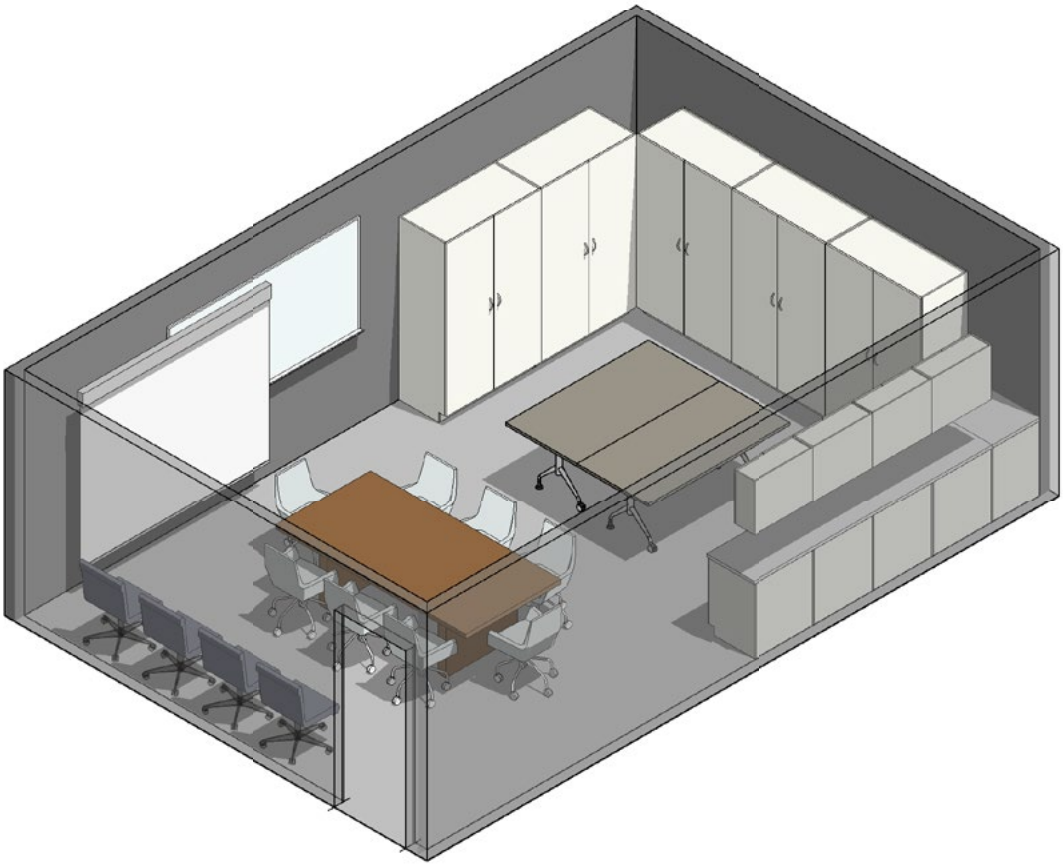
PLUMBING

		Kitchen Sink		Utility Sink		Hose Bib
		Drinking Fountain		Floor Drain		
		Shower		Toilet		

SPECIAL REQUIREMENTS

STC of 50 at walls, NC level of 35, NRC of .60 at ceiling


WRITING SURFACES AND TACK BOARD
TALL STORAGE
LIGHTED ANNOUNCMENT BOARD IN HALLWAY
MEETING AREA
WORK TABLES
TALL STORAGE
MILLWORK BASE AND
WALL CABINETS



RENOVATION CONCEPTS

A building envelope concept design and floor plan test fit were completed as part of the programming effort. Unlike the design of a new building, existing structural columns, an established footprint and prominent aesthetic elements of the exterior facade provided strong direction as to the ultimate solution. The following narrative describes these, and other considerations and how they were implemented into a programming-level design concept. Iterations of the design were refined through meetings with WSU's steering and executive committees resulting in a product that, at a minimum, expresses their fundamental desires.

FLOOR PLAN TEST FIT

LOWER LEVEL

WSU supports the removal of the mechanical equipment from the basement in order to open up needed program space. This newly created area has long structural spans and larger classrooms are a necessary fit for this space. Daylight is not critical to the function of select labs, the Testing Center, physical plant spaces and storage so this sub-grade level is also used to accommodate, these spaces.

LEVELS 1, 2 & 3

The core of the upper 3 floors has wider column spacing (50') reducing the potential for conflicts with sightlines and seating arrangements. The concept design takes advantage of these large structural bays using the space for additional large classrooms.

CIRCULATION

In order to achieve the project's floor-plate efficiency goals, circulation was carefully considered. Corridor width and layout is crucial to efficiency, and a relatively narrow 8' corridor wraps the building's core utilizing door alcoves to eliminate interference between travel paths and door swings. The race-track type configuration reduces conflicts with existing columns in the large center-bay classrooms placing them in the more broken up spaces of the academic department suites, smaller classrooms and student gathering areas.

MAIN ENTRY

The main entry to the building is located on the ground floor on the east side. The entry reaches through the perimeter spaces creating a welcoming and open connection to circulation elements. This entrance element contains an open stair that physically and visually connects the second floor circulation to the entry. The existing mechanical shaft is near the entry, and placing a new elevator in this location minimizes the structural impact and reduces the cost of this new element.

STACKING

The major traffic generating functions (auditorium, large classrooms) are located on lower floors. The perimeter of the building (35') is reserved for the academic department office suites, student spaces and smaller classrooms. The departments are grouped together to allow them to share common spaces (breakrooms, workrooms and conference rooms). These departments are located on the north end of the building with the student spaces located on the south end. Existing stair shafts are left in place to minimize demolition disturbance, construction duration and costs. IT and electrical closets, janitors closets and restrooms are stacked from floor to floor.

ENVELOPE CONCEPT

The exterior envelope design is guided by three criteria.

1. Maximize quality daylighting of the interior spaces while promoting energy efficiency through a low window-to-wall ratio (30% maximum).
2. Integrate the building into the campus with materials of a similar pallet.
3. Create a contemporary aesthetic that respects, and even celebrates, the bold vertical columns and the strong horizontal roof plane.

As discussed in the Sustainable Design section, energy simulations were used to determine window types and the extent of glazing. The concept rendering represents a 26% window-to-wall ratio. Energy modeling also supports the use of sunshades on the south façade.

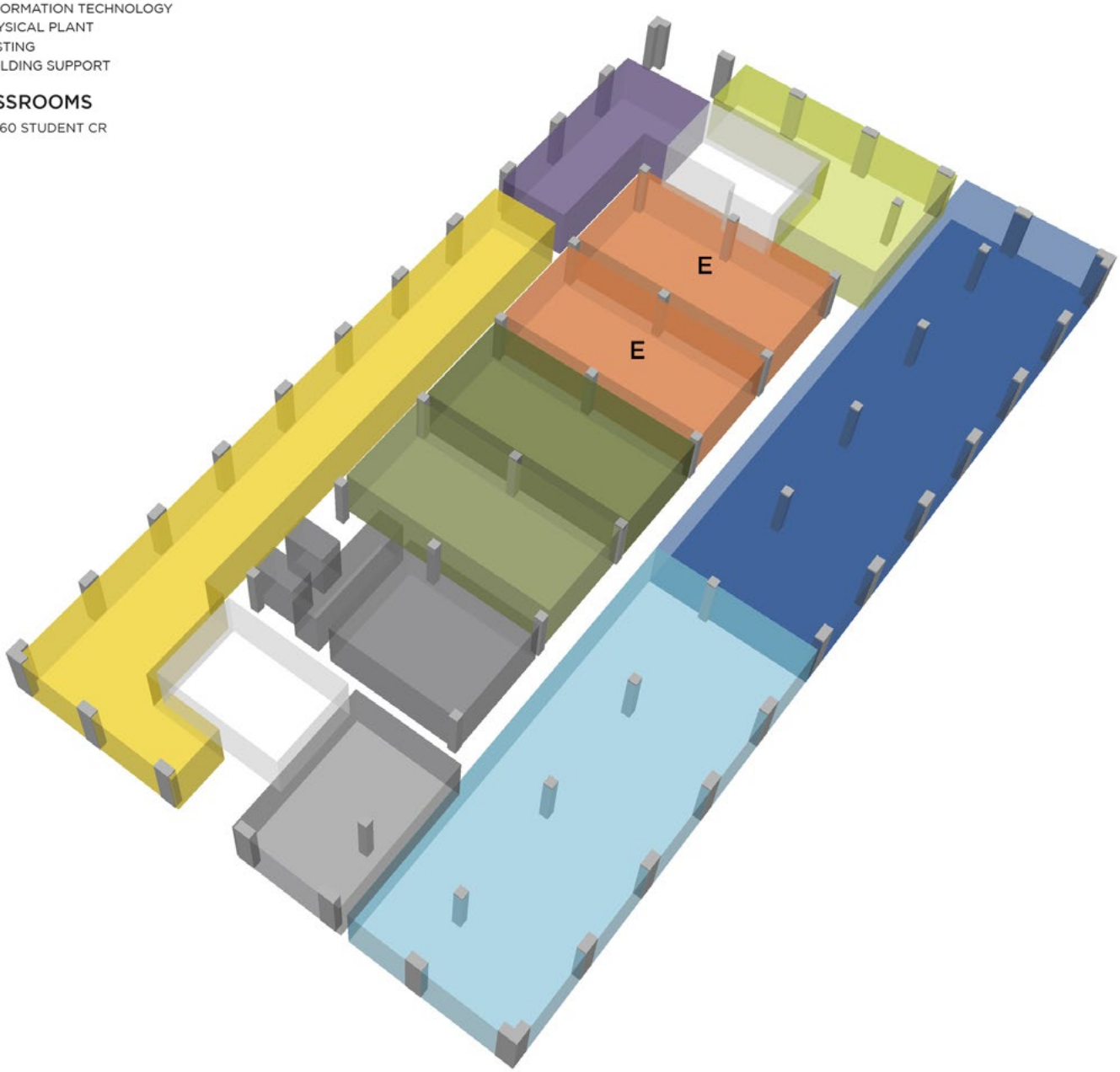
LOWER LEVEL

DEPARTMENTS

- ARCHEOLOGY LAB
- CRIMINAL JUSTICE LAB
- HISTOLOGY LAB
- STUDENT GATHERING
- INFORMATION TECHNOLOGY
- PHYSICAL PLANT
- TESTING
- BUILDING SUPPORT

CLASSROOMS

- E - 60 STUDENT CR



LEVEL ONE

DEPARTMENTS

- DEAN
- STUDENT ORG & STUDY
- WALKER INSTITUTE
- POLI SCI & PHILOSOPHY
  - a - DEPARTMENT CHAIR
  - b - OFFICE
  - c - ADJUNCT
- SHARED DEPARTMENT SPACE
  - d - CONF.
  - e - BREAK
  - f - WORKROOM
- BUILDING SUPPORT

CLASSROOMS

- A - 15 STUDENT CR
- B - 30 STUDENT CR
- C - 36 STUDENT CR
- D - 48 STUDENT CR
- F - 80 STUDENT CR
- G - 150 STUDENT CR

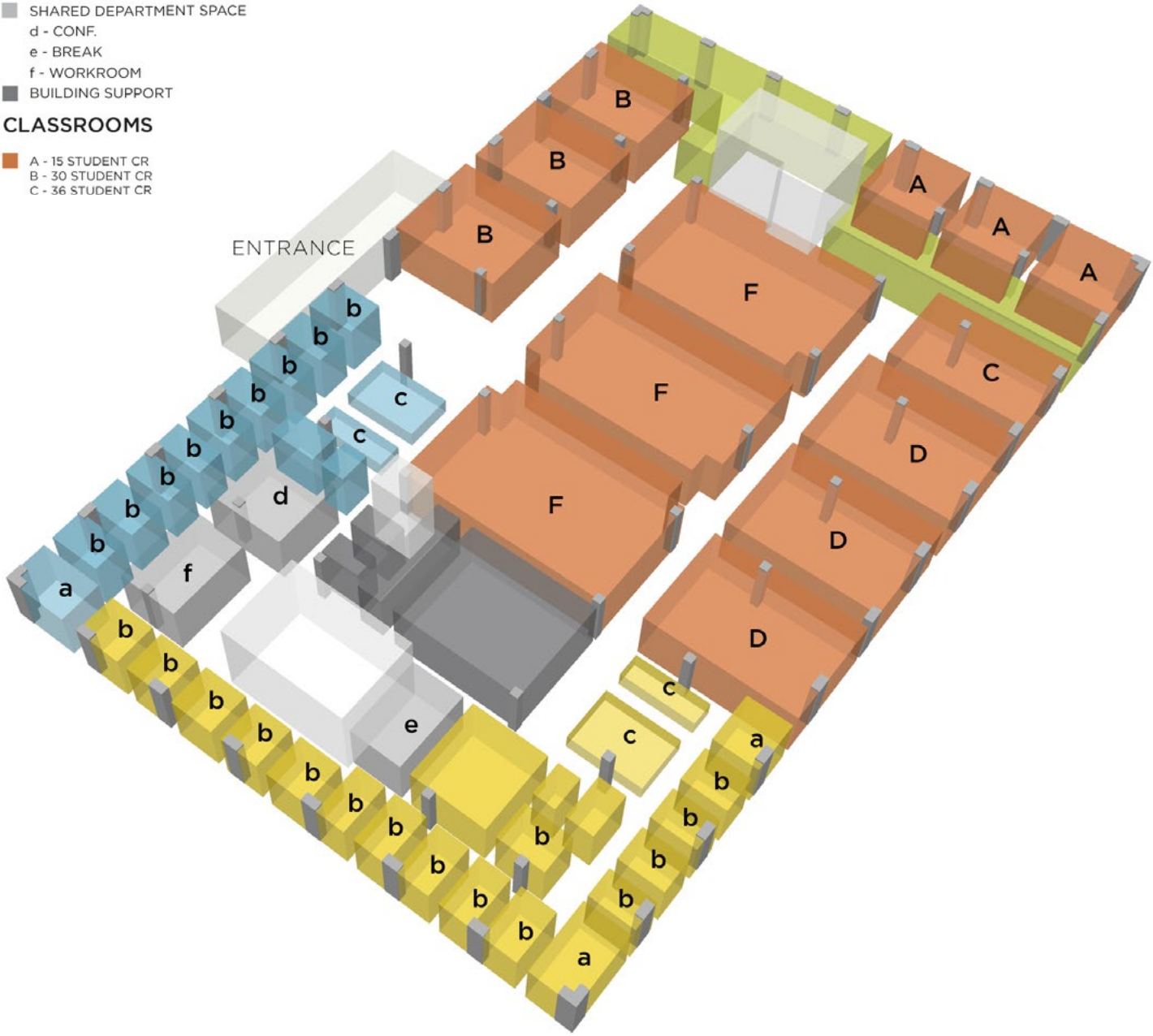
LEVEL TWO

DEPARTMENTS

- SOCIOLOGY & ANTHROPOLOGY
- STUDENT ORG & STUDY
- HISTORY/SOCIAL SCIENCE EDUCAT
  - a - DEPARTMENT CHAIR
  - b - OFFICE
  - c - ADJUNC
- SHARED DEPARTMENT SPACE
  - d - CONF.
  - e - BREAK
  - f - WORKROOM
- BUILDING SUPPORT

CLASSROOMS

- A - 15 STUDENT CR
- B - 30 STUDENT CR
- C - 36 STUDENT CR



LEVEL THREE

DEPARTMENTS

- GEOGRAPHY
- NEUROSCIENCE
- CRIMINAL JUSTICE
- SOCIAL WORK & GERONTOLOGY
- PSYCHOLOGY
  - a - DEPARTMENT CHAIR
  - b - OFFICE
  - c - ADJUNCT
- WOMEN & GENDER STUDIES
- SHARED DEPARTMENT SPACE
  - d - CONF.
  - e - BREAK
  - f - WORKROOM
- BUILDING SUPPORT

CLASSROOMS

- C - 36 STUDENT CR
- F - 80 STUDENT CR

CONCEPT RENDERING

COSTS

The following cost estimate report indicates the expected construction cost to be $25,361,567. This estimate includes all Contractor costs including overhead and profit. It also provides for inflation up to an assumed construction start date in early 2017. Finally, it includes a design contingency allowance of 15% that can be reduced as the project details are further developed.

The reported cost estimate does not include soft-costs or FF&E, and it is based on program-level information with the following exceptions:

- The building envelope was developed to a level supporting discussions about aesthetics. Therefore, general curtainwall vs opaque wall quantities were used.
- Energy analysis of envelope options informed the cost of sun shades (south elevation only), thermally broken aluminum curtain wall systems and double pane insulated glazing units.
- The constructability studies created concept / schematic design level information regarding placement of the air handler in the north service area and replacing the existing roof structure with a lighter-weight metal system. The cost information associated with these elements is also more developed. See the Constructability Studies section for more information.

The constructability study of the roof structure indicates that tenting / heating of the roof area may be required based on timing of construction and other variables. The cost of this activity is estimated between $130,000 and $200,000 and has not been included in the construction cost estimate.

Although the programming team was not engaged to develop a moving plan for existing college staff and classes, a limited amount of work was done in 2011 as part of the feasibility study. The 2011 report estimated that four 60' x 96' portable classroom spaces would be required. The cost for these elements was estimated at $2,430,075. This value is not included in the construction cost estimate.

BUDGET VS. COST ESTIMATE

Based on earlier work, the project budget was established at $24,214,960. This is $1,146,607 lower than the current estimate. At 4.7%, this over-run is not a major source of concern as the estimating accuracy is assumed to be +/- 5% and the current cost estimate has maintained a reasonable 15% design contingency. The project team will be expected to closely track costs as the design progresses to assure that the design and costs are aligned.

OGDEN, UTAH

WEBER STATE UNIVERSITY
SOCIAL SCIENCES BUILDING

BUILDING RENOVATION
S U M M A R Y

Conceptual Construction Cost Estimate
January 14, 2016

SECTION				COST/SF	CONCEPTUAL COST
02 SITEWORK				15.88	$1,895,276
03 CONCRETE				10.32	$1,231,597
04 MASONRY				3.70	$441,853
05 METALS				16.49	$1,967,410
06 WOOD AND PLASTICS				2.83	$338,153
07 THERMAL AND MOISTURE PROTECTION				2.43	$290,139
08 DOORS AND WINDOWS				14.82	$1,767,845
09 FINISHES				19.94	$2,378,707
10 SPECIALTIES				2.26	$269,670
11 EQUIPMENT				2.83	$337,684
12 FURNISHINGS				0.52	$62,254
13 SPECIAL CONSTRUCTION				0.45	$54,240
14 CONVEYING SYSTEM				0.85	$101,700
15 MECHANICAL				36.77	$4,387,948
16 ELECTRICAL				27.34	$3,261,871
SUB-TOTAL		119,323	GSF	157.44	$18,786,346
GENERAL CONDITIONS, BOND, OH & P	14.0%			22.04	$2,630,088
INFLATION TO CONST START, ALLOW	6.0%			9.45	$1,127,181
DESIGN CONTINGENCY, ALLOW	15.0%			23.62	$2,817,952
TOTAL (Construction)		119,323	GSF	212.55	$25,361,567

NOTES: Costs are for Construction only.
Costs are Based on a Traditional Open Competitive Bid Basis.
Costs are Based on a Construction Start of January 2017.
* Denotes Pricing by Jacobsen Construction Report Dated 01-05-16.

Parametrix, Inc. (801) 733-5900

OGDEN, UTAH

WEBER STATE UNIVERSITY
SOCIAL SCIENCES BUILDING

BUILDING RENOVATION

Conceptual Construction Cost Estimate
January 14, 2016

SECTION	QUANTITY	UNIT	UNIT COST	COST
02 SITEWORK				
Site Improvements:				
Clear & Grade, Site	15,000	SF	0.96	$14,400
Paving, Remove & Replace	6,000	SF	9.04	$54,240
Landscaping & Irrigation	9,000	SF	3.96	$35,640
Railings, Remove & Replace	300	LF	209.05	$62,715
Water Line & Fire Hydrants (2)	300	LF	113.00	$33,900
Site Lighting	10	EA	2,825	$28,250
Site Utilities, Misc	1	LS	30,000	$30,000
Site Refurbishment (Crane Distruption)*	1	LS	100,553	$100,553
Earthwork, Building Related:				
Excavate & Backfill Earth				See Below
Demolition, Building Related:				
Earthwork / Remove Foundations & Superstructure*	1	LS	439,551	$439,551
Remove HVAC Air Handler, Etc*	1	LS	119,003	$119,003
Selective Building Demolition	119,323	SF	7.35	$877,024
Temporary Heating	1	LS	100,000	$100,000
Hazardous Material Abatement, Allowance			Carried Under Separate Budget	
			15.88	**$1,895,276**
03 CONCRETE				
Concrete Exterior / Interior Walls, Reinf	1,750	SF	24.86	$43,505
Earthwork / Foundations*	1	LS	1,188,092	$1,188,092
			10.32	**$1,231,597**

OGDEN, UTAH

WEBER STATE UNIVERSITY
SOCIAL SCIENCES BUILDING

BUILDING RENOVATION

Conceptual Construction Cost Estimate
January 14, 2016

SECTION	QUANTITY	UNIT	UNIT COST	COST
04 MASONRY				
Brick Veneer, Exterior Wall	18,620	SF	23.73	$441,853
			3.70	**$441,853**
05 METALS				
Steel Stairs & Railings	9	FLT	20,905	$188,145
Steel Superstructure*	1	LS	1,779,265	$1,779,265
			16.49	**$1,967,410**
06 WOOD AND PLASTICS				
Cabinets / Millwork	950	LF	355.95	$338,153
			2.83	**$338,153**

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SOCIAL SCIENCES BUILDING

BUILDING RENOVATION

Conceptual Construction Cost Estimate
January 14, 2016

SECTION	QUANTITY	UNIT	UNIT COST	COST
07 THERMAL AND MOISTURE PROTECTION				
Waterproofing / Rigid Insulation, Foundation	1,250	SF	5.93	$7,413
Membrane Roofing w/ Rigid Insulation & Flashings	27,800	SF	10.17	$282,726
			2.43	**$290,139**
08 DOORS AND WINDOWS				
Exterior Curtain Wall Frame w/ Insulated Glazing	10,620	SF	67.80	$720,036
Exterior Curtain Wall Frame w/ Insulated Spandrel	4,835	SF	66.67	$322,349
Exterior Window Frame w/ Insulated Glazing	5,300	SF	47.46	$251,538
Exterior Door w/ Frame, Per Leaf	16	LEAF	2,430	$38,872
Interior Door w/ Frame, Per Leaf	275	LEAF	1,582	$435,050
			14.82	**$1,767,845**
09 FINISHES				
Metal Stud Wall, Insulation, Sheathing & Gypsum Board, Exterior	26,245	SF	10.74	$281,871
Metal Stud Wall, Insul & Gypsum Board, Interior	55,300	SF	10.17	$562,401
Floor, Wall & Ceiling Finishes	119,323	SF	12.43	$1,483,185
Floor, Wall & Ceiling Finishes - HVAC Related*	1	LS	51,250	$51,250
			19.94	**$2,378,707**

OGDEN, UTAH

WEBER STATE UNIVERSITY
SOCIAL SCIENCES BUILDING

BUILDING RENOVATION

Conceptual Construction Cost Estimate
January 14, 2016

SECTION	QUANTITY	UNIT	UNIT COST	COST
10 SPECIALTIES				
Building Specialties / Accessories, Etc.	119,323	SF	2.26	$269,670
			2.26	**$269,670**
11 EQUIPMENT				
Building Equipment (Minimal Lab, Dock, Etc)	119,323	GSF	2.83	$337,684
			2.83	**$337,684**
12 FURNISHINGS				
Window Coverings	7,601	SF	8.19	$62,254
			0.52	**$62,254**
13 SPECIAL CONSTRUCTION				
Styrofoam Floor Infill - 4'	3,200	SF	16.95	$54,240
			0.45	**$54,240**

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SOCIAL SCIENCES BUILDING

BUILDING RENOVATION

Conceptual Construction Cost Estimate
January 14, 2016

SECTION	QUANTITY	UNIT	UNIT COST	COST
14 CONVEYING SYSTEM				
Elevator, Hydraulic - 4 Stop	1	EA	101,700	$101,700
			0.85	**$101,700**
15 MECHANICAL				
Fire Sprinkler System:				
Remove Fire Sprinkler System	119,323	SF	0.28	$33,410
Fire Sprinkler System	119,323	SF	3.67	$437,915
Fire Sprinkler System - HVAC Related*	1	LS	3,844	$3,844
Plumbing:				
Remove Plumbing System	119,323	SF	0.57	$68,014
Plumbing Fixtures w/ Piping	80	EA	3,108	$248,600
Plumbing Equipment & Specialties	119,323	SF	0.85	$101,425
HVAC:				
Remove HVAC System	119,323	SF	1.13	$134,835
Ductwork & Devices	113,350	LBS	7.63	$864,861
HVAC Equipment (AHU's & VAVs)	119,323	SF	12.43	$1,483,185
HVAC Piping & Specialties	119,323	SF	4.52	$539,340
HVAC Control System	119,323	SF	3.96	$472,519
			36.77	**$4,387,948**

OGDEN, UTAH

WEBER STATE UNIVERSITY
SOCIAL SCIENCES BUILDING

BUILDING RENOVATION

Conceptual Construction Cost Estimate
January 14, 2016

SECTION	QUANTITY	UNIT	UNIT COST	COST
16 ELECTRICAL				
Remove Electrical System	119,323	SF	1.13	$134,835
Light Fixtures, Exterior	25	EA	491.55	$12,289
Light Fixtures, Interior	1,500	EA	378.55	$567,825
Power Outlets / Switches	2,025	EA	158.20	$320,355
Electrical Service & Distribution	119,323	SF	2.83	$337,684
Feeder & Branch Wiring	119,323	SF	5.37	$640,765
Fire Alarm System	119,323	SF	1.98	$236,260
Special Systems (Lighting Controls, Telecomm/Data Security, Basic A/V, Etc)	119,323	SF	8.48	$1,011,859
			27.34	**$3,261,871**

SUB-TOTAL		**119,323**	**GSF**	**157.44**	**$18,786,346**
GENERAL CONDITIONS, BOND, OH & P	**14.0%**			**22.04**	**$2,630,088**
INFLATION TO CONST START, ALLOW	**6.0%**			**9.45**	**$1,127,181**
DESIGN CONTINGENCY, ALLOW	**15.0%**			**23.62**	**$2,817,952**
TOTAL (Construction)		**119,323**	**GSF**	**212.55**	**$25,361,567**

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* Denotes Pricing by Jacobsen Construction Report Dated 01-05-16.

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APPENDIX

WEBER STATE UNIVERSITY

PROGRAMMING – SOCIAL SCIENCE BUILDING REMODEL

GSBS ARCHITECTS

PAULIEN & ASSOCIATES, INC.

WEBER STATE UNIVERSITY

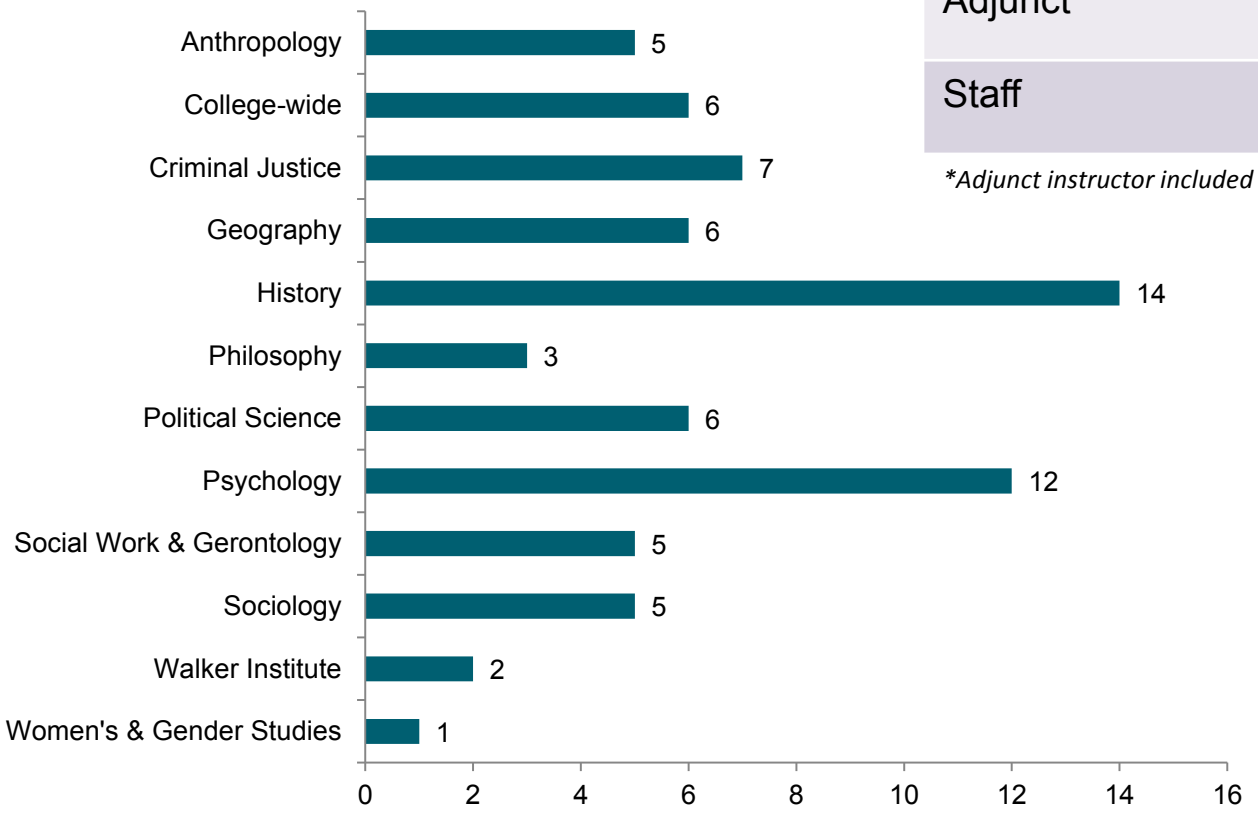
GSBS ARCHITECTS
PAULIEN & ASSOCIATES, INC.

SURVEY RESPONDENTS

Respondents (72)	
Faculty	57
Adjunct	1
Staff	14

**Adjunct instructor included in faculty response analysis*

By Department



GSBS ARCHITECTS
PAULIEN & ASSOCIATES, INC.

FACULTY USE OF TIME

	Percent of Faculty Who Spend Time:	Percent of Time Faculty Spends On:
Teaching	100%	54.2%
Research	96.55%	18.4%
Service	93.10%	17.6%
Advising	87.93%	10.3%
Other	34.48%	20%

EXISTING CLASSROOM RATINGS

GSBS ARCHITECTS
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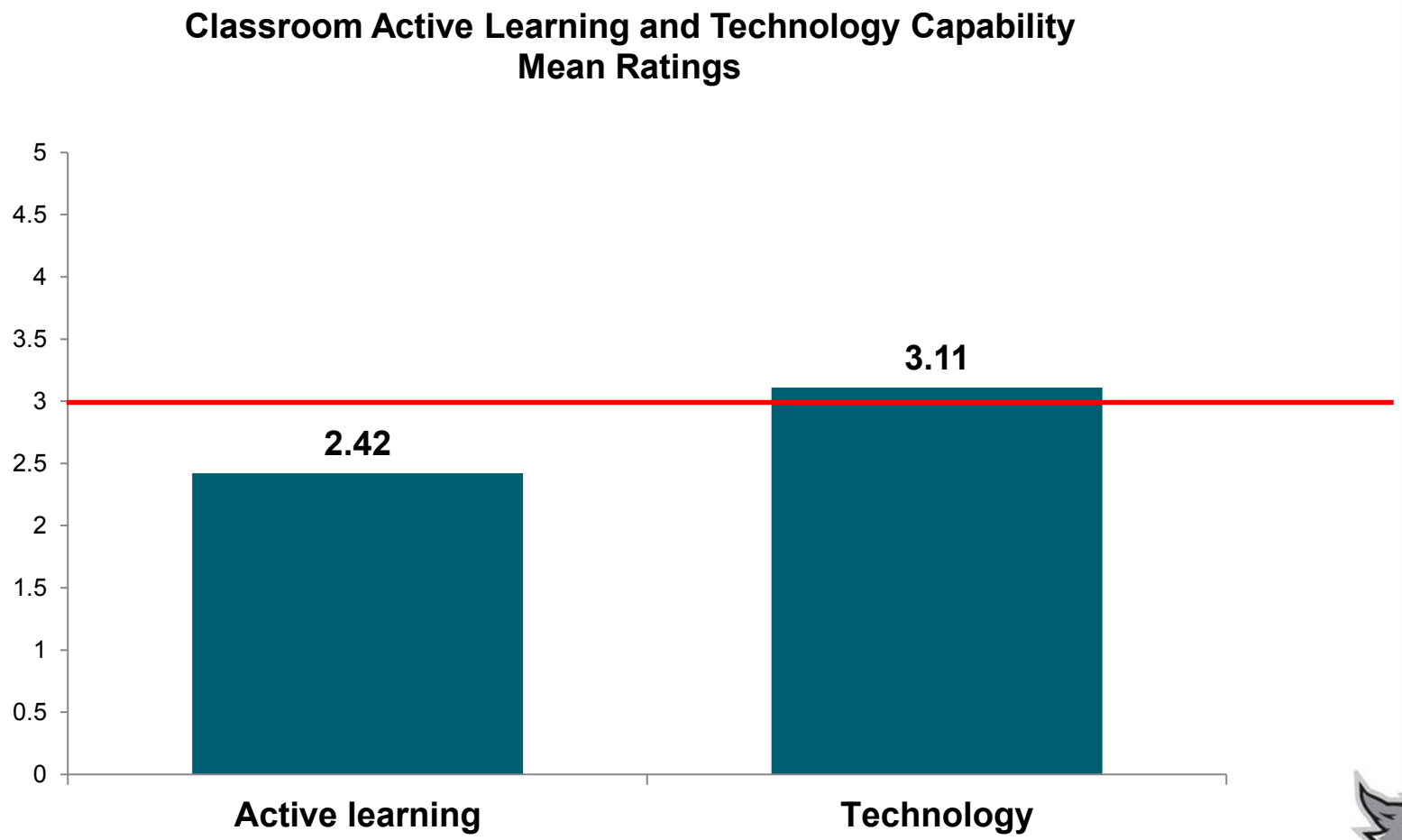
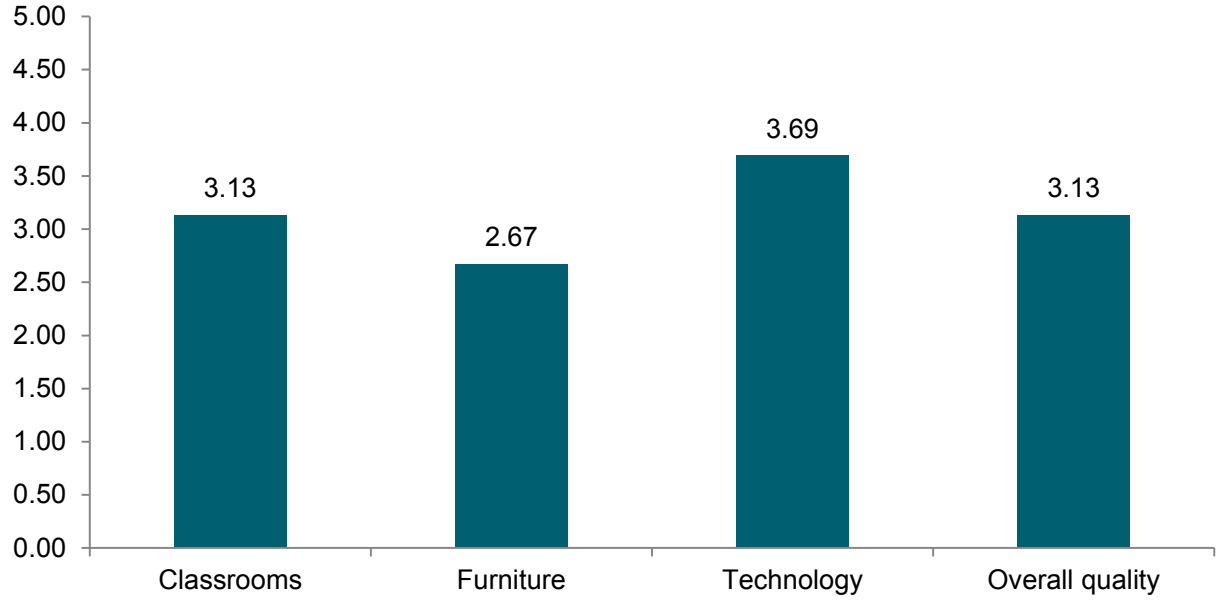


Scale: 1=Least collaborative, 5=Most collaborative
Scale: 1=Minimal technology; 5=Most technology

EXISTING CLASSROOM RATINGS

GSBS ARCHITECTS
PAULIEN & ASSOCIATES, INC.

Attributes for Effective Teaching/Learning

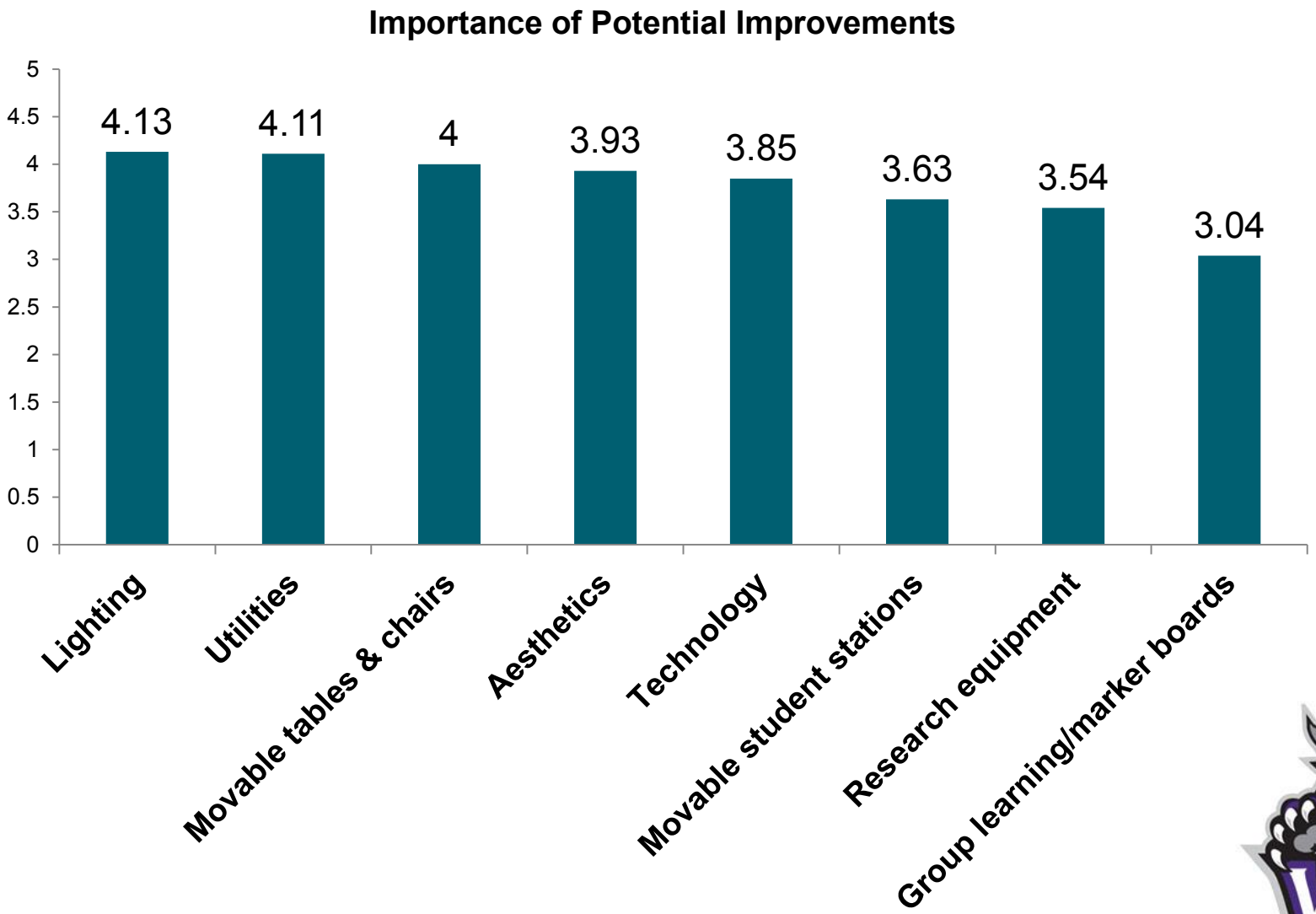


These attributes promote effective teaching and student learning.

	Strongly Disagree/ Disagree	Strongly Agree/ Agree	Mean
Classrooms	25.46%	34.54%	3.13
Furniture	52.73%	27.28%	2.67
Technology	12.73%	70.91%	3.69
Overall quality	32.72%	41.82%	3.13

GSBS ARCHITECTS
PAULIEN & ASSOCIATES, INC.

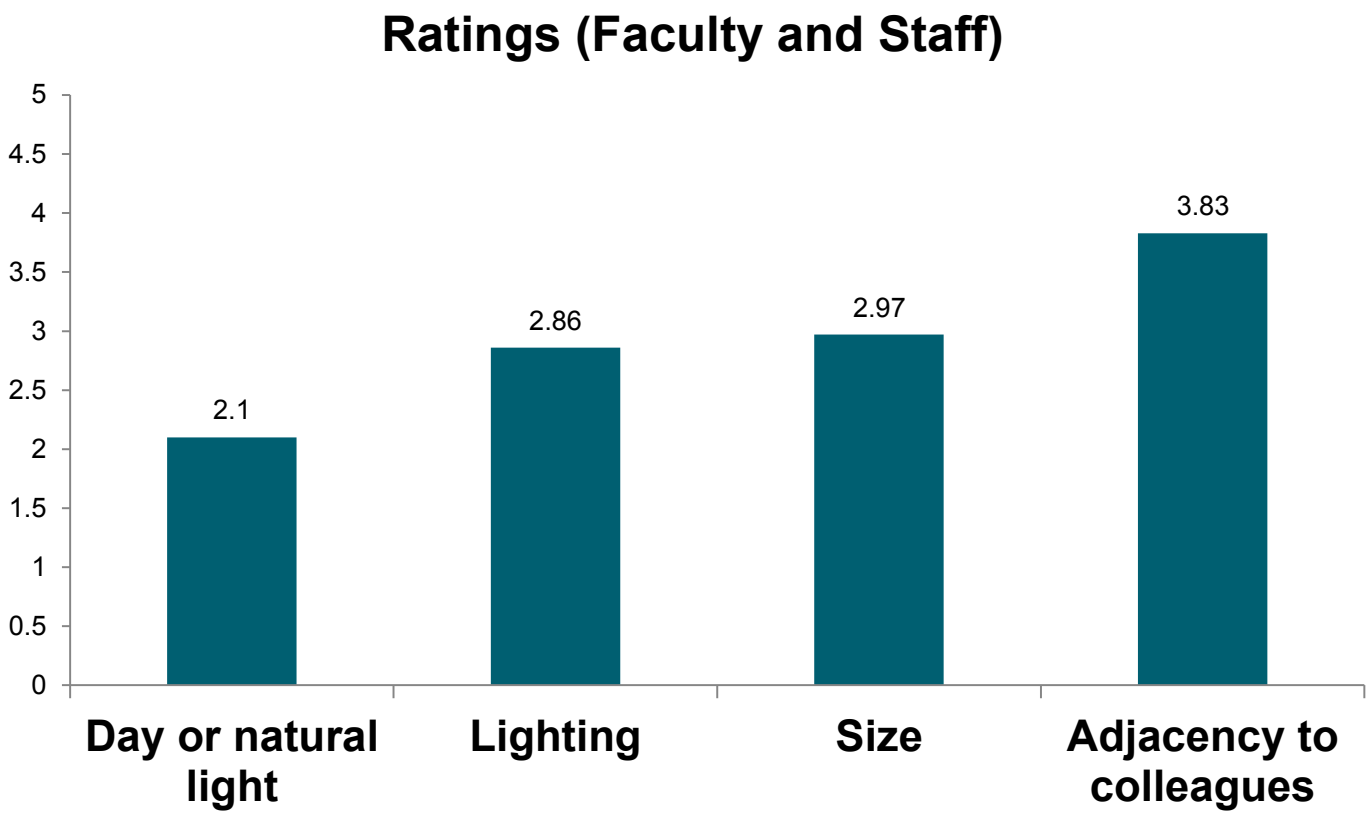
CLASSROOM IMPROVEMENTS



Scale: 1=least important, 5=most important

EXISTING OFFICES

GSBS ARCHITECTS
PAULIEN & ASSOCIATES, INC.

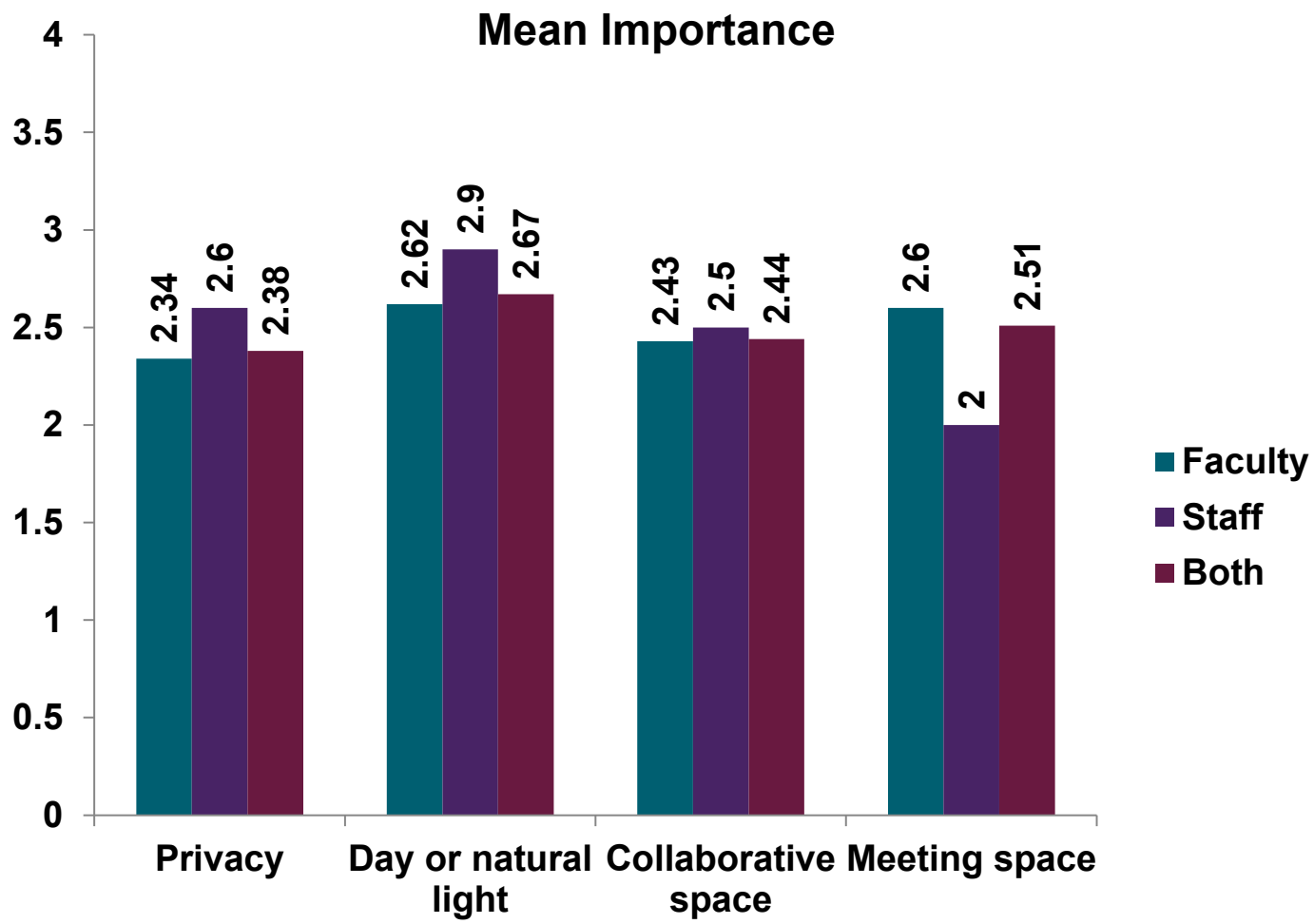


Ranking: 1=least important, 4=most important

Faculty Office Usage	Hours Per Week		
	Min	*Max*	*Average*
Scholarly/instructor work	2	50	22
Meeting with students	1	28	8

GSBS ARCHITECTS
PAULIEN & ASSOCIATES, INC.

ASPECTS OF OFFICE SPACE



Ranking: 1=least important, 4=most important

GSBS ARCHITECTS
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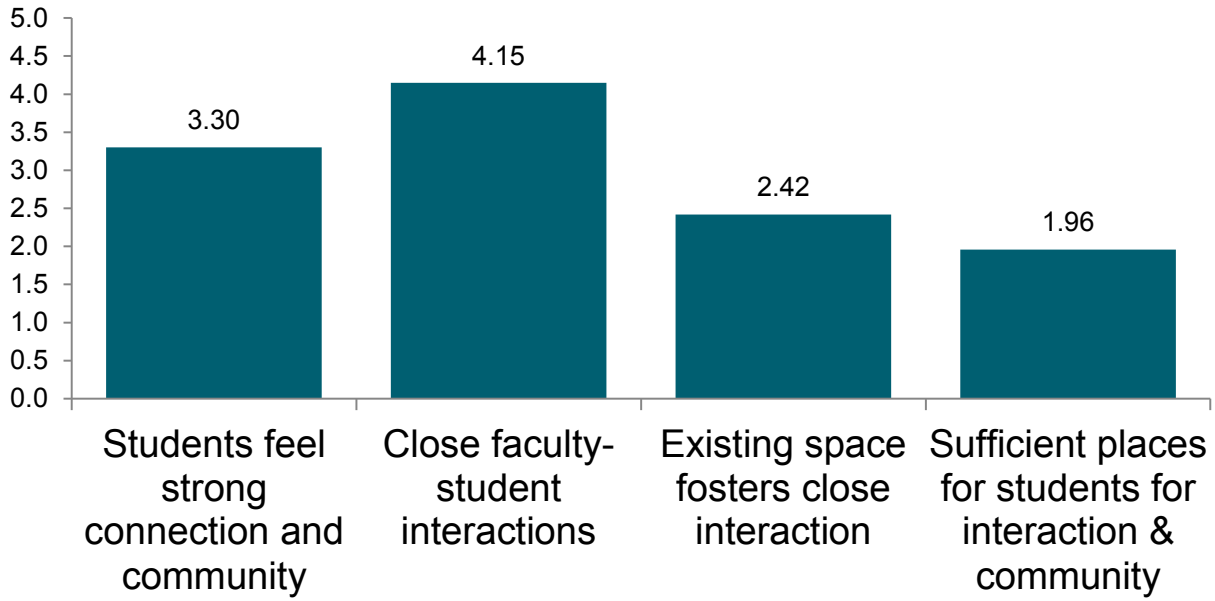
INTERACTION SPACES

Mean Agreement



Attributes of Interaction Spaces *Scale: 1=strongly disagree, 5=strongly agree*	Strongly Disagree/ Disagree	Strongly Agree/ Agree	Mean
Students feel strong connection and community	27%	57%	3.30
Close faculty-student interactions	2%	83%	4.15
Existing space fosters close interaction	57%	17%	2.42
Sufficient places for students for interaction and community	79%	8%	1.96

GSBS ARCHITECTS
PAULIEN & ASSOCIATES, INC.

CONFERENCE AND DEPARTMENT SPACE

On a scale of 1 to 5, the existing space's ability to foster interdisciplinary collaboration is a mean of 2.62. 21% rated this ability as the worst and 6.5% rated it as the best.

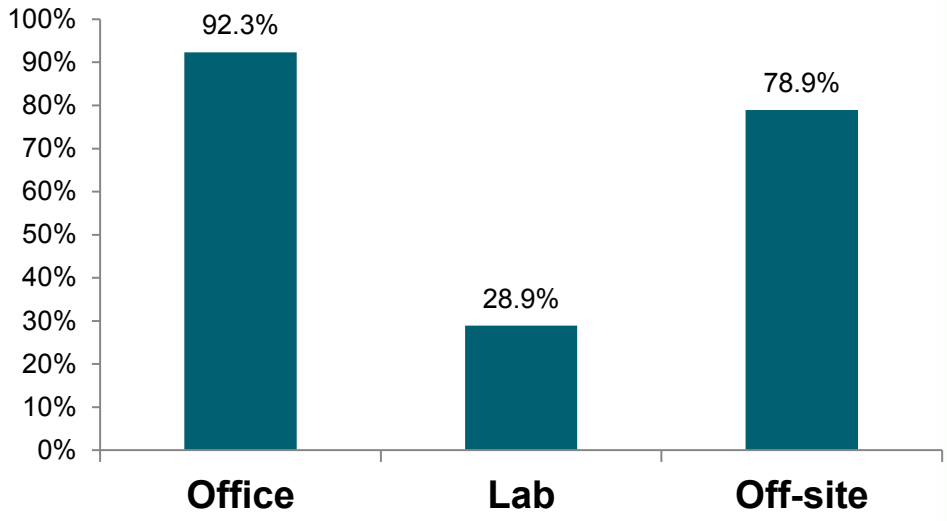
Conference Room Usage	Hours Per Week		
	Min	*Max*	*Average*
Faculty	0.25	30	3.5
Staff	1	19	7
All	0.25	30	4

GSBS ARCHITECTS
PAULIEN & ASSOCIATES, INC.

RESEARCH AND LAB SPACE

The need for research activities that require a physical location would **remain the same** for **60%** of faculty and **increase** for **40%.**

Where is research conducted?



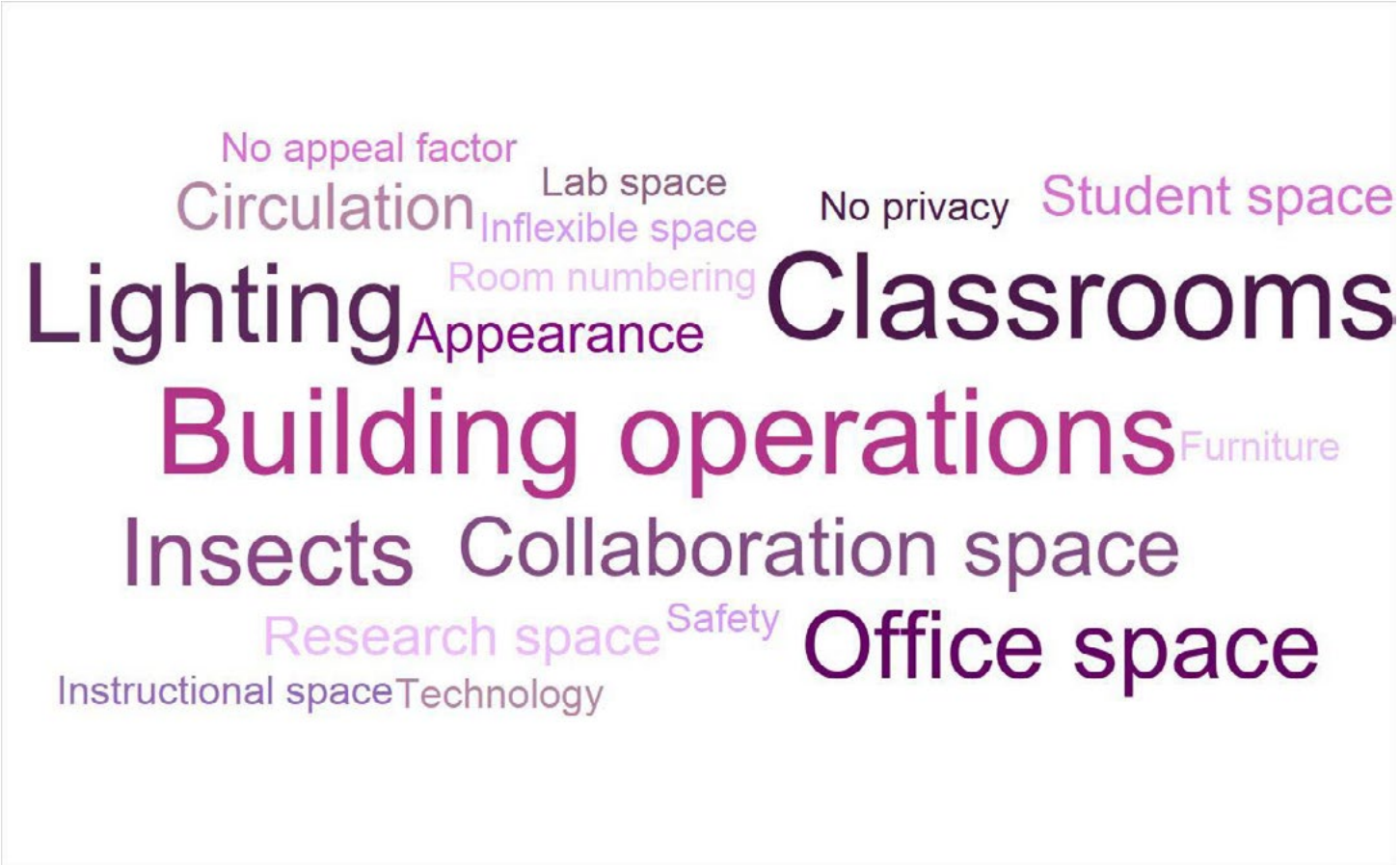
Existing Lab Space Ratings

Scale: 1=worst, 5=best	Mean	% Rated Best	% Rated Worst
Size and adequacy	2.54	7.69%	25%
Utilities	2.58	2%	13%
Casework/furniture	2.38	2%	21%

GSBS ARCHITECTS
PAULIEN & ASSOCIATES, INC.

SPACE IMPACT ON EFFECTIVENESS

76% of faculty respondents felt that physical aspects of the building were limiting their effectiveness.



WEBER STATE UNIVERSITY

SOCIAL SCIENCE BUILDING RENOVATION

OWNER'S PROJECT REQUIREMENTS (OPR)

01/22/2016

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OWNER AND USER REQUIREMENTS

Brief Description of Project: Complete renovation of the existing 106,322 SF Social Science Building on the main campus of Weber State University. The project will enclose the roughly 13,000 SF exterior breezeway surrounding the building, but otherwise the existing structural footprint will remain.

Brief Description of Sustainability and Design Goals: Our goal is to target a minimum of a LEED Silver rating as well as to adhere to the State of Utah High Performance Building Standard. This renovated building should also play a part in our ongoing WSU commitment to being carbon neutral by 2050. The design goal would be to create a much more modern, functional and engaging classroom building for the College of Social & Behavioral Sciences, with much better public collaboration spaces and better access to daylighting throughout, at this highly important location on our campus.

GENERAL PROJECT INFORMATION

Construction site

1299 Edvalson St., Ogden, UT 84408

Number of Floors: 4

Project delivery method: CMGC

Contact information

Chad Downs

WSU Project Manager

chaddowns@weber.edu

(801) 626-6642

Code occupancy schedules

Business -Type B

Assembly – Type A3

Codes and standards

As of Programming:

- 2012 International Building Code (IBC)
- 2012 International Fire Code (IFC)
- 2012 International Plumbing Code (IPC)
- 2012 International Mechanical Code (IMC)
- 2011 National Electrical Code (NEC)
- 2009 International Energy Conservation Code (IECC)
- 2009 ANSI/A117.1
- 2012 International Fuel Gas Code (IFGC)
- NFPA 101 (2012 edition with State of Utah Amendments)
- Laws, Rules and Regulations of the Utah State Fire Marshall
- Design Guidelines - Weber State University
- DFCM Design and Construction Standards for Architects, Engineers and Contractors
- State of Utah DFCM High Performance Building Standard
- USGBC LEED Green Building Rating System

Building envelope area types

	Building Type	Area Description	Area [ft2]	Space Conditioning
1	School / University		119,322	Nonresidential

Construction budget ($)

Construction Budget: $34,114,279 total budget ($25,361,567 construction & $8,752,712 soft costs)

Strategies for Cost Control: Provide regular cost input for the benefit of the design team and WSU. If the project is over budget, fully inform WSU of cost modifying options, including the quality, durability and maintenance information necessary to make informed decisions.

Design and Construction Schedule

Stage	Target
Programming	1/22/16
Design	8 month duration
Construction	18 month duration
Substantial Completion	TBD

PROJECT PURPOSE, VISION AND STATEMENT

The renovation is intended to create a like-new energy efficient building that supports contemporary teaching and learning styles. Both student and faculty experiences must be improved through better way-finding, increased daylight, right-sizing of classrooms and careful consideration of student-to-student, student-to-teacher and faculty-to-faculty collaboration space.

The entire façade of the building is expected to be replaced, allowing for substantially improved envelope performance. Expansion outside the existing footprint of the building is not desirable. However, a new two-story entry will be developed and will likely be one element allowed to break this guideline.

PROJECT PERFORMANCE AND SUSTAINABILITY GOALS

Standards

LEED certification: Silver minimum (WSU Requirement). Weber State University may re-evaluate requirements under LEEDv4, but as of publication of this program, LEEDv3 Silver certification is required.

DFCM High Performance Standard: Yes

Envelope

Opaque Envelope Components: Existing exterior concrete/cast stone columns (the remainder to still be re-designed, but likely there will be some elements of the campus standard 'golden buff' brick).

Vertical Fenestrations: Fenestration to be replaced/increased.

Window Design Guidelines for Thermal Conditions: Overall U-max = 0.32

Window Design Guidelines for Daylighting: Not greater than 30% glazing upon building façade, but a strong project emphasis on directing daylight into the building.

Envelope Commissioning: Yes, we would expect to include the envelope commissioning as required by the DFCM High Performance Standard.

Lighting

- The target lighting power density shall be .5 w/ft2.
- Interior lighting guidelines for day light harvesting: day light harvest sensors shall not be used. Utilize dimmer switches in all the offices, classrooms, labs, etc.
- Utilize Campus Standard 2'x4' lay-in light fixtures as much as possible.
- Classroom, provide lighting control at the main entrance and by the A/V cabinet. Classroom lights are to be on two (2) different zones.
- Install the light fixtures in the stairs on the wall as much as possible for ease of maintenance.
- In Criminal Justice Lab, do not provide emergency lights.
- Use Campus Standard light poles for walkway on the west side of the building.
- IES recommended illumination light level shall be as follows:

AREA TYPE	AVERAGE ILLUMINATION LIGHT LEVEL
Small Office Spaces and Open Offices	30 FC
Labs	50 FC
Corridors	15 FC
Storage Spaces	15 FC
Classrooms	30 FC
Electrical, MDF, IDF Room	30 FC
Toilet Rooms	15 FC

Plug Loads

Targeted Plug Load Density

	Building Type	Targeted Plug Load Density (W/ft2)
1	School / University	TBD

Plug Load Controls: Motion sensor power strips

Service Water Heating

Use low-flow fixtures throughout

Provide point-of-use water heater or integral electric heater at ware-washing machine in order to minimize central hot water demand.

Use air source heat pump storage-type water heater. Heat source to be mechanical room or electrical room

HVAC Systems and Equipment

HVAC System Types:

Design the building in conformance with the Campus Master Plan, which mandates that buildings will be served by a central condenser loop that will be the source for all cooling and heating demands. The preferred method to achieve this is with a water-cooled Variable Refrigerant Flow (VRF) system.

Specific VRF design expectations include:

- Manufacturer to be Mitsubishi
- Units are to be capable of simultaneous heating and cooling
- Zone the VRF systems to maximize load sharing, grouping the distribution units and condensing units so that simultaneous heating and cooling occurs on a common circuit as much as possible, in order to maximize energy savings
- Locate water cooled condensing units in basement, at north end of building. Locate the units so that units can be accessed for maintenance, with access to building exterior either direct (same grade) or by elevator
- Use ceiling cassette fan coils wherever possible, in lieu of ducted or wall-mount fan coils
- Zone each office independently, as well as each classroom and laboratory. Controls are to be by the VRF manufacturer. Provide permanently-installed wall-mounted controls.
- Work directly with VRF manufacturer's representative to generate shop drawings as part of the design package, in order to accommodate the specific design strategies of the basis of design system.
- It is critical that the refrigerant lines are routed and installed in a clean and neat manner. Flexible lines are to be rigidly mounted to unistrut and supported without sags.
- Utilize existing standard testing and inspection specification, as well as in-house commissioning standard.
- Coordinate Test and Balance section of Specification with Campus commissioning standard

Dedicated Outdoor Air System

- Provide ventilation air through a dedicated outdoor air system (DOAS).
- Duct ventilation air to each fan coil, and ensure required volume of ventilation air is delivered by the fan coil regardless of fan coil fan speed, wither through the use of a pressure independent control damper or VAV box.
- Route exhaust and relief air through the DOAS unit, and incorporate energy recovery into the DOAS unit, either through heat wheel, runaround coil or heat exchanger. Recover energy from relief system, and control relief system to maintain building static pressure
- Investigate feasibility of evaporatively cooling the relief/exhaust air in order to provide indirect evaporative cooling for the outside air
- Modulate DOAS fan speed to maintain duct static pressure set point, and reset static pressure set point from control damper position

Hydronic Systems

- Demolish steam pipe and chilled water pipe back to Student Services. Cap steam pipe, and valve chilled water pipe
- Connect new condenser water pipe to existing chilled water pipe. Use SCH 40 steel pipe, sized at 8 fps maximum velocity. Insulate as chilled water pipe.
- Directly supply water-cooled VRF units with condenser water. Campus system pressure will be adequate to generate flow. Use pressure-independent control valve to ensure constant flow when condensing unit activated
- Air separation, expansion compensation and makeup are not required.
- Provide magnetic insertion meter, Onicon F-3500, and integrate with BMS.

Laboratory Systems

- Recirculating fume hoods are preferred, but chemical / fume compatibility must be confirmed.
- Variable volume exhaust hoods (if recirculating not appropriate), with quick-response air valves for hood exhaust, general exhaust and supply.
- Use automatic sash closers
- Provide ability to de-commission hoods for extended periods of time
- Redundant variable volume exhaust fans, with stack discharge at least 10 feet above any adjacent walking surface. Coordinate discharge with DOAS location.
- Use electric reheat in order to maintain space temperature during periods of high ventilation.
- Route exhaust in welded stainless steel from hood connection and all horizontal offsets to vertical riser. Galvanized duct is acceptable after a minimum of 3 hoods have been connected to a common duct, and the duct is vertical.

Fire Protection

- Include fire protection layout on drawings.

Horizontal pipe smaller than 2", and final head location is not required to be shown.

Renewable Energy

Renewable Energy Types:

We would like to include an alternate option for adding a ground-source loop as part of this project – to either be installed in the current 'lower quad' area just west of the building or in the 'A2' parking lot located east of this building. It might also be worth looking at using the WSU duck pond as a location for heat rejection. But at minimum, this building's HVAC system will connect to the central campus condenser loop.

Solar PV will likely be installed upon the Social Science Building roof at some point in the near future, so we would like to have the roof structure designed to support such a system and have the conduit run for this.

Financing Mechanism: This solar installation and/or the ground-source loop, if not funded by the current project funds, would likely be funded by the campus revolving fund for energy and sustainability projects.

Renewable Energy Certificate: WSU would prefer to obtain any REC's created through this project, in our efforts for carbon neutrality by 2050.

BUILDING OCCUPANY AND O&M PERSONNEL EXPECTATIONS

Periodic HVAC maintenance performed by: WSU Facilities Management

Lighting system maintenance will be performed by: WSU Facilities Management

Training required for operating and maintenance staff: Yes, training required for any new equipment or controls in the renovated building, provided to our WSU Facilities (Operations Group) staff.

SPACES PROGRAM

The space list with quantity and sizes is published in the Program Document.

Architectural criteria

WSU would like to gain approximately 13,000 SF by enclosing the current exterior breezeway on level one. They would also like to have a greater sense of entry to the building by possibly opening up two stories to a single larger lobby-type gathering space (without officially creating an atrium by code). Daylighting shall be greatly enhanced in the new building, perhaps by adding strategic lightwells, and by increasing the amount and quality of exterior glazing. Common study and collaboration space throughout is also a strong goal of the project. A larger lecture hall type space (that the building does not currently contain) has also been requested by the building's occupants. There is a desire to keep the architectural look of the existing cast stone columns and some degree of the campus standard 'golden buff' brick, but the other façade elements between the stone columns could be a mix of more modern materials, such as glazing (including glazed spandrel panels), metal panels and/or shading devices.

Electrical criteria per space program

- Remove the existing medium voltage transformers out of the building. Provide a pad mounted medium voltage transformer (277/480 Volt, 3 Phase).
- All electrical switchboard, panelboards, etc. shall be new. All existing gears are to be removed.
- Provide a dry-type step-down transformer to power 120/208 V building load.
- Utilize existing power meters to monitor the building electrical load and mechanical loads.
- Mechanical equipment shall be on its own electrical distribution system.
- Provide surge protective devices for main electrical switchboard and all branch panelboard, which provides power to critical load.
- Existing diesel engine generator is to be replaced with a new one. New engine generator to be sized to handle life safety equipment and one of the elevators.
- WSU will verify that IT equipment does not need to be on emergency engine generators.
- Fire alarm system to be replaced completely with a new addressable speaker type system. Provide Campus Standard notifier system.
- Electrical rooms are to be stacked and located in a central location in the building.
- MDF/IDF rooms are to be stacked and located in a central location in the building.

Mechanical criteria per space program

See earlier Mech./HVAC discussion for some of these items related to the desired VRF system.

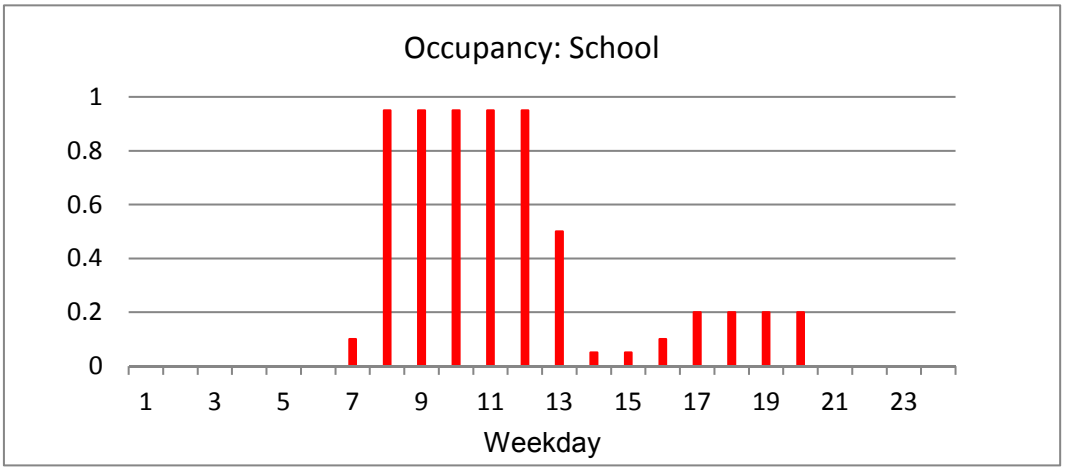
Re: metering, WSU prefers to use the insertion magnetic type meter, such as the Onicon F-3500 meter.

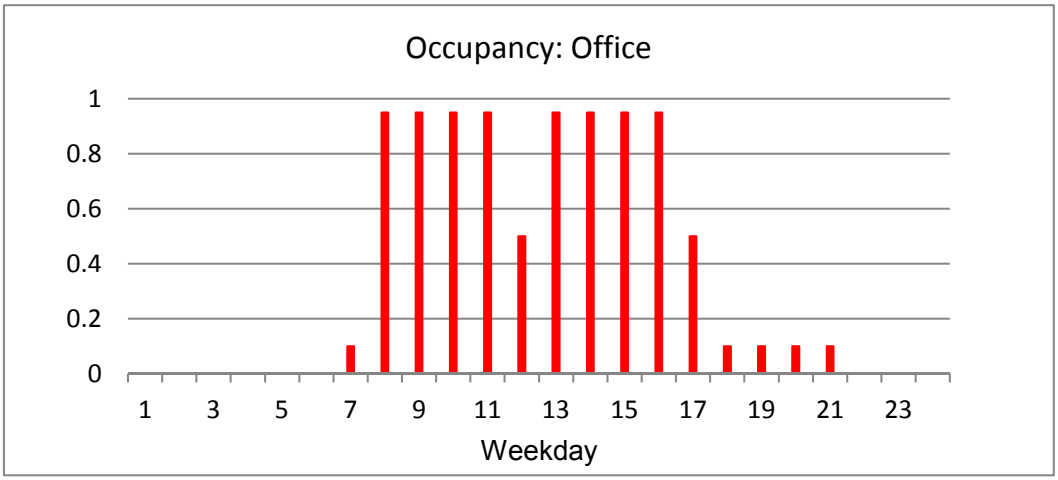
We would like to see auto-isolation meters on the domestic water and also the gas line, wired to the fire alarm if possible.

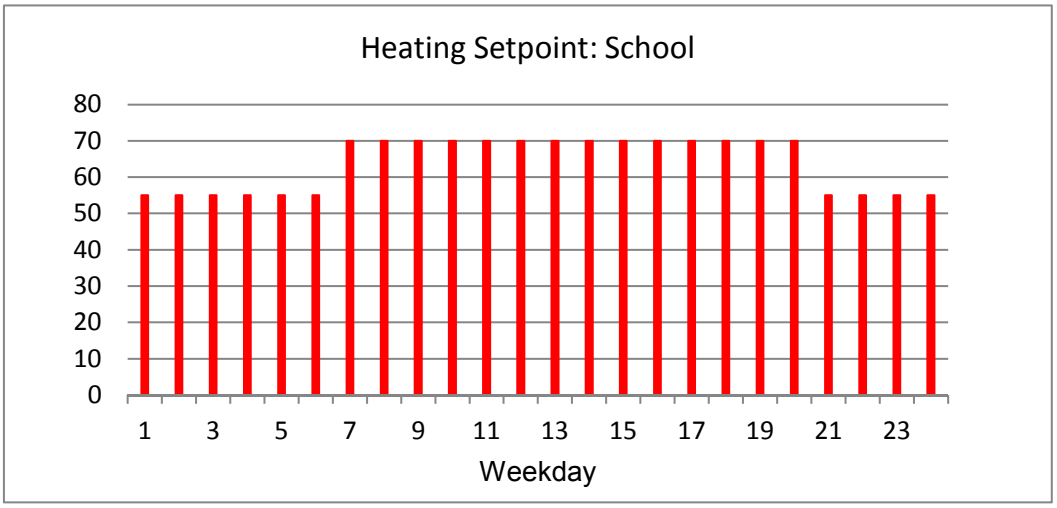
We would prefer the sprinkler system design to be incorporated into the project design by the Mechanical Engineer, so as to avoid deferred submittals (and the inevitable lack of coordination) for this system design.

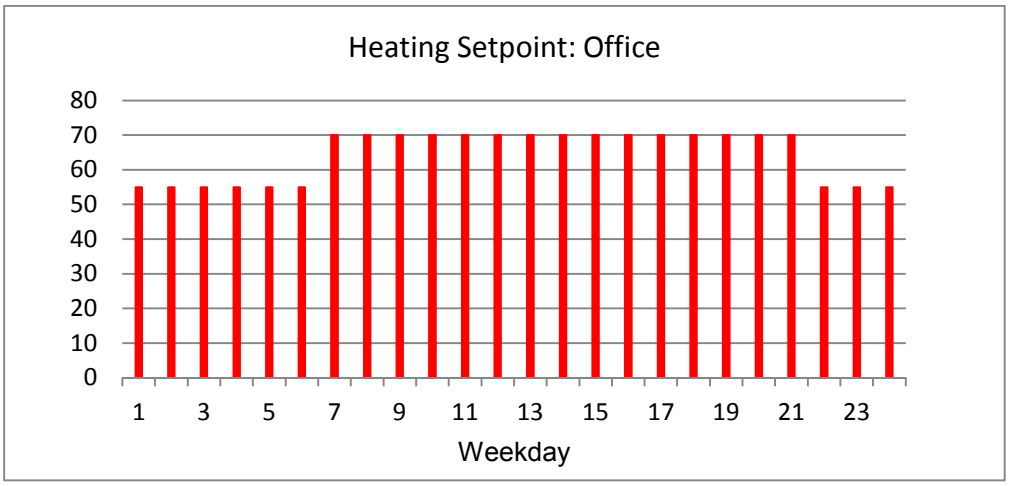
Recirculating hoods should be investigated in the few locations where hoods are required.

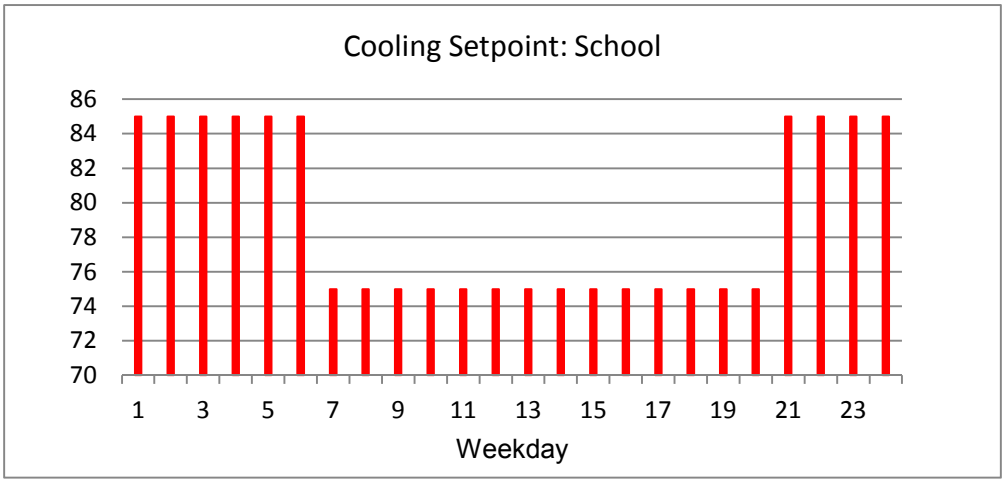
For heating and cooling design, the following occupancy schedules and set-points shall be used:

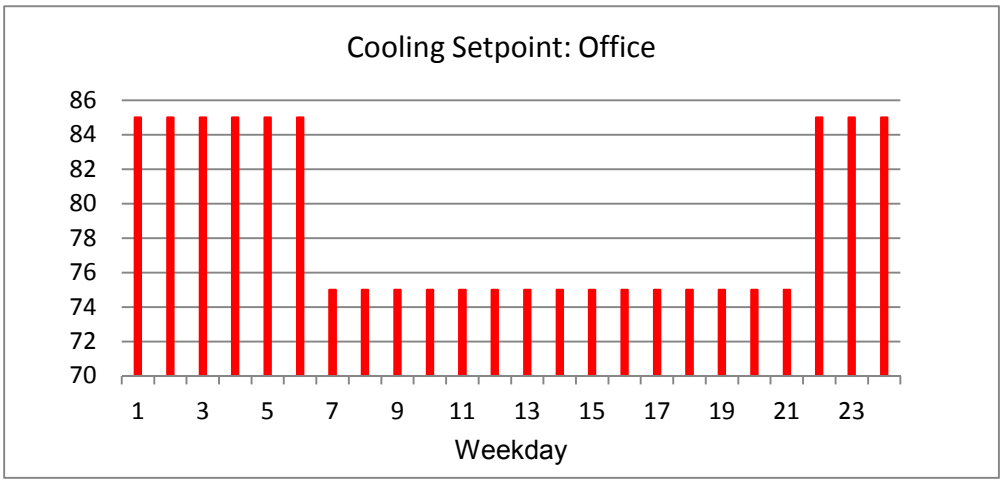







Heating Setpoint: Office
80
70
60
50
40
30
20
10
0
1 3 5 7 9 11 13 15 17 19 21 23
Weekday


Cooling Setpoint: School
86
84
82
80
78
76
74
72
70
1 3 5 7 9 11 13 15 17 19 21 23
Weekday


Cooling Setpoint: Office
86
84
82
80
78
76
74
72
70
1 3 5 7 9 11 13 15 17 19 21 23
Weekday

BAS/BMS requirements per space program

Integrate the building with the campus JCI (Johnson Controls) Metasys BAS system, and communicate via BACnet.

Integrate the new building meters with the campus Lucid dashboard system.

Investigate integrating the JCI system with the Notifier (fire alarm) and LENEL (access control) systems,

Security requirements per space program

The building is on our central campus electronic access system, with the exterior doors having this ability and integration with our central system at minimum. The classroom level would be the next level of electronic access that may be implemented in the renovation should the budget allow.

Locations for interior security cameras at the entry/exit points at minimum should also be roughed-in. Our campus standard security cameras are currently powered-over-ethernet (POE).

The new fire alarm system to be the campus standard Notifier system.

Audio visual requirements per space program

Refer to equipment list, supplied by Bob King of WSU, included in the Program Document.

We would like to use a teaching console like the one designed by GSBS for the recent projects at our Davis Campus.

The new clocks will not be part of a centralized campus system. WSU Facilities will provide these.

Acoustical criteria per space program

Room Data Sheets included in the Program Document indicate required Noise Criteria (NC), Sound Transmission Class (STC) and Noise Reduction Coefficients per space type. DFCM standards also include acoustical design criteria.

Campus infrastructure system

See earlier Mech./HVAC discussion for some of these items related to the campus infrastructure system integration

Peak condenser water flow is anticipated to be 600 gpm. Water temperature will range from 53 deg F in the winter to 75 deg F in the summer

Existing steam system is to be abandoned and piping and accessories demolished and removed back to connection at Student Services Building.

Connect to new domestic water supply in tunnel to east, and provide auto-isolation meter that is wired to the BMS and the fire alarm.

Existing campus electrical system will not be effected by this project.

Existing fire hydrants are not adequate. Two additional hydrants will be required. See the Site/Civil narrative within the Program Document.

OTHER DESIGN CONSIDERATIONS

Utility Information

	Meter Type	Meter Number	Rate Schedule
1	Hawkeye digital meter for main electrical	<Enter meter number>	<Enter rate schedule>
2	Hawkeye digital meter for mechanical load		

Site design

To preserve the existing open space and landscape surrounding the building would be a goal of this project, as well as reducing storm water runoff, the heat island effect and light pollution. We would like to create a stronger sense of entry to the building from the heart of campus (likely from the east and/or possibly the southeast side(s) of the building). We also need to make the building meet accessibility requirements.

Energy performance

We are not targeting a specific EUI, but we would like to lower this as much as we can. We would like to be more specific about the desired equipment in the building rather than a specific EUI. The project is also driven by our larger campus goal of achieving carbon neutrality by the year 2050.

Targeted energy cost reduction according to 90.1-2010, Appendix G: 20% is WSU's minimum. This project intends to reach at least 30%.

New construction vs. major renovation: The project totally removes the building envelope, lighting/electrical system, and mechanical/plumbing system. Only the structure remains. We believe it is classified as a major renovation for LEED purposes.

Energy modeling vs. qualitative energy engineering: This project requires qualitative energy engineering in accordance with ASHRAE 90.1-2010, Appendix G

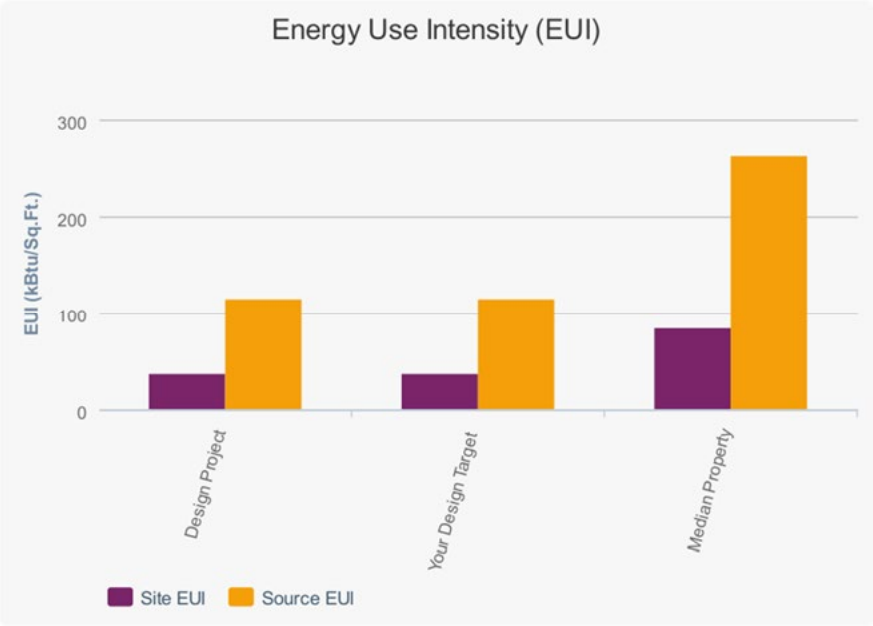
Life cycle cost analysis is required.

Anticipated energy costs from ENERGY STAR Portfolio Manager:

Assumptions:

- 100% Electric Building
- 120,000 Gross Floor Area
- 35 Weekly Operating Hours
- 1622 Enrollment
- 216 Full Time Equivalent (FTE) Workers
- 216 Number of Computers

Metrics Comparison for Your Design and/or Target



Metric	Design Project	Design Target	Median Property*
Source EUI (kBtu/ft²)	115.5	115.5	262.6
Site EUI (kBtu/ft²)	36.8	36.8	83.6
Source Energy Use (kBtu)	13,863,191.20	13,864,751.90	31,510,799.70
Site Energy Use (kBtu)	4,415,029.00	4,415,525.60	10,035,285.40
Energy Cost ($)	103,002.64	103,014.22	234,123.24
Total GHG Emissions (Metric Tons CO2e)	497.1	497.1	1,129.80

Life cycle cost analysis: Required

Equipment performance of major mechanical equipment (i.e. boilers, chillers, fans:

VRF Minimum performance requirement, when tested in accordance with AHRI 1230:

Cooling, @ 77 ewt, 12.0 EER

Heating, @ 50 ewt, 3.6 COP

Supply Air Fan Efficiency: 0.746 w/cfm

Hydronic Pump equivalent efficiency: 10.9 w/gpm

Non-standard control strategies: None.

Type of economizers:

VRF system provides inherent economizer function by sharing laod between zones.

Zone the VRF system to maximize load sharing

Narrative on premium efficiency motors:

Utilize EC motors where possible, or premium efficiency otherwise.

Integrated drives are acceptable

Materials and resources

It would be nice to incorporate recycling stations throughout the building, as well as to incorporate adequate space on the exterior for both the regular trash dumpster and the second dumpster for recyclables. The project should meet the LEED standards for Materials & Resources where possible.

Indoor environmental quality

The building should strive to meet the LEED standards for Indoor Environmental Quality wherever possible.

Views:

Views to the exterior should be carefully considered and are desirable. Due to the broad floorplate of the building, it is not expected that each occupant will have access to quality exterior views, but strategies should maximize opportunities.

Filtration:

Ventilate all spaces per the requirements of ASHRAE Standard 62.1-2013. Specifically calculate outside air requirements for each space, accounting for area and anticipated occupant density, and incorporating ventilation effectiveness factor (0.80) as appropriate for a VRF system that has no specific heating air temperature control. Additionally, provide demand controlled ventilation in accordance with the provisions of Standard 62.1

Provide MERV 13 rigid pleated filters at the DOAS

Specify ceiling cassettes with MERV 10 filters at the return grille

Evaluate post-construction outside air flush, although may not be feasible due to the minimal outside air capacity of the DOAS system

Ventilate laboratory spaces at 6 air changes per hour (ACH) during occupied periods, and 3 ACH during unoccupied times. Provide means to de-commission and disable exhaust hood during extended periods of non-use.

Building Flush:

Our campus standard is to use zero VOC paints, and zero or low VOC products wherever else it is reasonable. This strategy is emphasized.

Incentives and Rebates

The anticipated incentives and rebates, if needed.

Rocky Mountain Power provides the following rebates that are anticipated

- Interior lighting: $0.08/kWh annual energy savings
- LED exterior lighting: Varies on fixture type
- CEE Tier 1, multisplit system with heat recovery, VRF water cooled heat pumps: $75/ton
- Energy Star Cool Roof: $0.10/ft2
- Roof insulation, R-5 insulation above code: $0.10/ft2

- Wall insulation, R-3.7 insulation above code: $0.07/ft2

Windows, site-built, U-Factor <= 0.30 and SHGC <= 0.33 center-of-glass: $0.35/ft2

General systems to be commissioned

The building envelope should be commissioned by an outside entity, as should the elevator, but WSU plans to conduct the HVAC and other building commissioning items through an in-house commissioning process.

Mechanical Systems to be Commissioned Include:

VRF Condensing Unit

VRF Refrigerant

VRF Dry Side

DOAS

Condenser Water Piping, including pumps and meters

Domestic Hot Water

Laboratory Systems

Electrical Systems Include:

Lighting

Post-occupancy and warranty

We would like to conduct a one-year warranty walk with the occupant, the architect, the general contractor, the DFCM project manager and the WSU project manager – as is typical with all of our development-level WSU projects.

Operations and maintenance

Owner-training required for any new equipment or controls in the renovated building, provided to our WSU Facilities (Operations Group) staff.

We like to receive a digital version of the O&M manual, organized and populated in a digital file folder 'tree' that has been created for the project using the specific spec sections in the project manual.

Building occupant expectations

Re: programming workshops held w/the building occupants and various departments inhabiting the building.

Possible behavioral implications

Consider opportunities to create feedback loops based on occupant action.

Specific building typology requirements

This is primarily a classroom building, with a few labs housed within, as well as a campus computer lab and testing center.

WSU CUSTODIAL EQUIPMENT STANDARD

Carpet Care	Spec/Basis	Space Minumum (Sqft)	Space Maximum (Sqft)	Space Served	Notes
Ride-on Carpet Extractor	Windsor Chariot 3 iExtract 26 or equivalent	40,000	n/a	Very Unobstructed Carpet	
Battery Walk Behind Carpet Extractor	Windsor Commodore 20 or equivalent	5,000	80,000	Unobstructed Carpet	
Pull/wand Carpet Extractor	Windsor Clipper 12 or equivalent	5,000	60,000	Obstructed Carpet	
Upright Vaccum	Windsor Versamatic Plus 14 inch	All buildings get 1	n/a	Entrances	
Backpack Vacuum	Windsor Vac Pac	3,000	30,000	Carpet	
Canister Vaccum (pig)	NSS M1 Pig Vacuum	All buildings over 40,000 sqft get 1		All surface	
Large Area Upright Vacuum	Windsor NuWave 26 inch	40,000	n/a	Unobstructed Carpet	Replaces 2 Vac Pacs
Carpet Spot Cleaner	Windsor Presto 3	5,000	40,000	Carpet and furniture	

Water Cleanup Equipment

Wet/Dry Vacuum	Windsor Recover 18	5,000	50,000	Hard surface	
Floor Fan	Windsor Air Mover 3	All buildings with an extractor get 1 fan.	60,000	All surface (additional only for carpet surface)	

Bathroom/Lockerroom Cleaning Equipment

All Purpose Touchless Cleaning System	Windsor Compass 2	1,200	n/a	Bathroom/Lockerroom	

Hard Surface (Vinyl, Tile, Cement, Terrazzo, Wood)

Stand-on Floor Scrubber	Windsor Chariot 3 iScrub 26	30,000	n/a	Unobstructed Hard Surface	
Walk-behind Floor Scrubber	Windsor Saber Cutter 26	5,000	n/a	Unobstructed Hard Surface	
Small Walk-behind Floor Scrubber	Windsor Saber Micro 16	5,000	n/a	Obstructed Hard Surface	Replaces standard walk behind based
Low-speed Buffer	Windsor Bolt 20"	5,000	n/a	Obstructed Hard Surface	
High Speed Burnisher	Windsor Lightning 2000	5,000	n/a	Unobstructed Hard Surface	
Hand-operated Square Scrubber	Windsor Pivot	5,000	n/a	Obstructed Hard Surface	

Craig Blue, P.E. Inc.
Fire Suppression
Engineering & Testing

1971 West 3300 South, #A
West Valley City, UT 84119
801-886-3473
Craig@CBluePE.com

Fire Flow Report

CBPE # 750-45
Date:12/2/15

This report contains the assessment of the water supply available for fire protection at the following site/address:

WSU- Social Science Bldg
Edvalson Streeet.
Ogden, UT

Report was prepared at the direction of:

Garth Shaw
GSBS Architects, Inc.
375 West 200 South, Suite 100
Salt Lake City, UT
GSHAW@gsbsarchitects.com
801.521.8600

Prepared by:

Craig Blue, P.E.

Background Information:

The purpose of this report is to determine the amount of water supply available at the site noted above. The report shall assist authorities having jurisdiction, in determining fire suppression requirements & issuing of building permits. Comments included in report, that reference 2012 International Building/Fire code are based on minimum recommended standards only. The authorities having jurisdiction may require more or less than the reference appendix.

Existing building has an fire area estimated at 119,323 sq.ft. Existing fire sprinkler system and north hydrants are supplied from Ogden Water System routed along north side of building (edvalson st.). Static pressures off city system is low and provides insufficient fire flow performance. The city flow test (1/30/14) data is included in report for reference.

A second (campus) water system routed on south side of building is also serving hydrants near bldg. Campus Plumbing Rep Doug Hall indicated that there has been discussion about providing new service to building for fire sprinkler system supply.

Water & Hydrants to south of site are supplied from Campus water system. Water system uses PRV supply with a looped main along south side of building. Pressures and flows are considered stable and reliable throughout season. Hydrants selected were nearest to site.

Flow Test:

The flow test was performed by Craig Blue P.E. & Doug Hall- Campus Water Dept. Water flow and pressures available at hydrants nearest to site are as follows:

WSU- Campus Water

Static Pressure:	135psi
Residual Pressure:	60psi
Flowing 2.469" 2 outlets (25 psi-pitot):	1636 gpm

See flow data sheet for site plan, and hydrants reference.

Fire flow calculated for performance	2061 gpm at 20 psi,

Proposed building shall use III-A structure with an overall fire area estimated at 25,400 sq.ft. Approx. The proposed structure shall be provided with fire sprinklers allowing for a fire flow reduction.

In accordance with Appendix table B105.1 . The Table allows for an unlimited fire area vs structure when fire sprinklers are provided, and using a 75% fire flow reduction for a 2000 gpm fire flow requirement.

Summary & Recommendations:

As noted above, it is our opinion, that fire flow performance near site is sufficient for structures noted previously. For the purpose of fire sprinkler design, the area is an established area which is considered reliable.

We recommend that the fire sprinkler design use a minimum 15% reduction to water pressures. Reduced pressures shall be as noted.

Static Pressure:	115psi
Residual Pressure:	51psi
Flowing	1636 gpm

See flow data sheet for site plan, and hydrants reference elevations.

If there are further questions, please contact me

Craig Blue,P.E.

Attached:

Flow Data Sheet & Chart
Referenced IFC code sections.

CC: Pat Killion Murray Fire
Steve Davis Murray Water

FLOW TEST DATA SHEET

Craig Blue, P.E. Inc.
Fire Suppression
Consulting & Engineering

1971 West 3300 South, #A
West Valley City, UT 84119

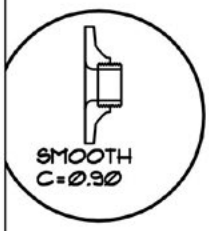
801-886-3473
Craig@CBluePE.com

CBPE: 750-43

WATER SYSTEM: WSU Campus Water
NAME OF PROPERTY: Social Sciences Bldg
ADDRESS: Weber State University
Ogden Utah
DATE: x TIME: x TEMPERATURE: +70°F
TYPE OF CITY SYSTEM: PRV supplied from City Water
TEST CONDUCTED BY: Craig Blue PE
WITNESSED BY: x
NOTES:

OUTLET TYPES:

PLAY PIPE
C=0.97



SMOOTH
C=0.90

SQUARE
C=0.80

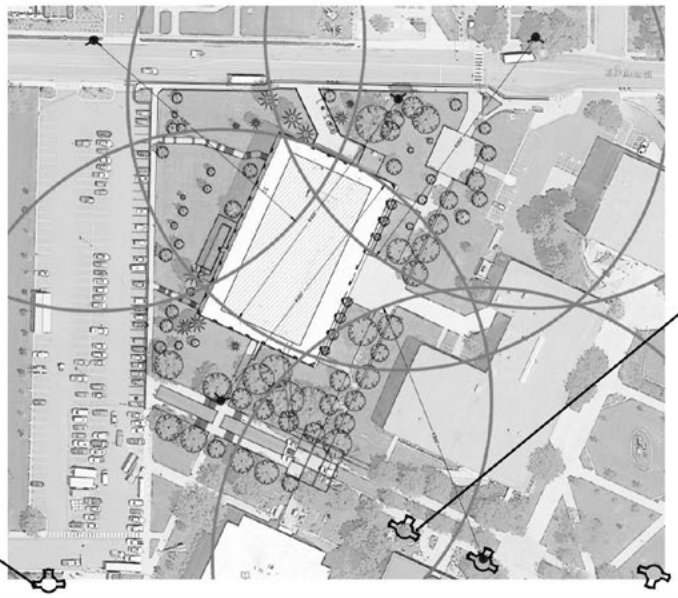
PROJECTED
C=0.70

FORMULA: $Q = 29.83\ CD^2\sqrt{P}$

WHERE Q IS GALLONS PER MINUTE
C IS THE COEFFICIENT OF DISCHARGE
D IS I.D. IN INCHES OF OUTLET (2.469" typ.)
P IS PITOT GAUGE READING (PSI)

	SIZE (IN)	PITOT (PSI)	FLOW (GPM)
OUTLET 1	2.469	25	818
OUTLET 2	2.469	25	818
OUTLET 3			
OUTLET 4			
FIRE FLOW: 2061 @ 20psi		TOTAL FLOW: 1636 gpm	

STATIC: 135 PSI RESIDUAL: 60 PSI ELEVATION: varies



Campus Water
HYDRANT:
135 psi Static
60 psi Residual

Campus Water
HYDRANT:
flowing 1610 gpm

FLOW TEST DATA CHART

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Fire Suppression
Engineering & Testing

1971 West 3300 South, #A
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801-886-3473
Craig@CBluePE.com

CBPE: 700-6

WATER SYSTEM: Ogden City Water System
NAME OF PROPERTY: WSU Campus-Public Safety Bldg
ADDRESS: Edvalson & Dixon Drive
Ogden, UT

SUPPLY: 65 PSI (STATIC) 30 PSI (RESIDUAL) 384 GPM (FLOWING) 4561 FT ELEV.

DATE OF TEST: 1/30/14

FIRE FLOW DATA ADJUSTED FOR ELEVATION AND FRICTION LOSS IN 6" DEAD END LINE-CALCULATED FLOW AT SITE-STATIC 82 PSI, 20 PSI FLOWING 545 GPM

AT A MINIMUM 20% REDUCTION FOR PRESSURES AND SEASONAL VARIATIONS THE FIRE SPRINKLER SYSTEM SHOULD BE DESIGNED AT 65 PSI STATIC, 16 PSI RESIDUAL FLOWING 545 GPM. (4590 ft. elev. approx.)

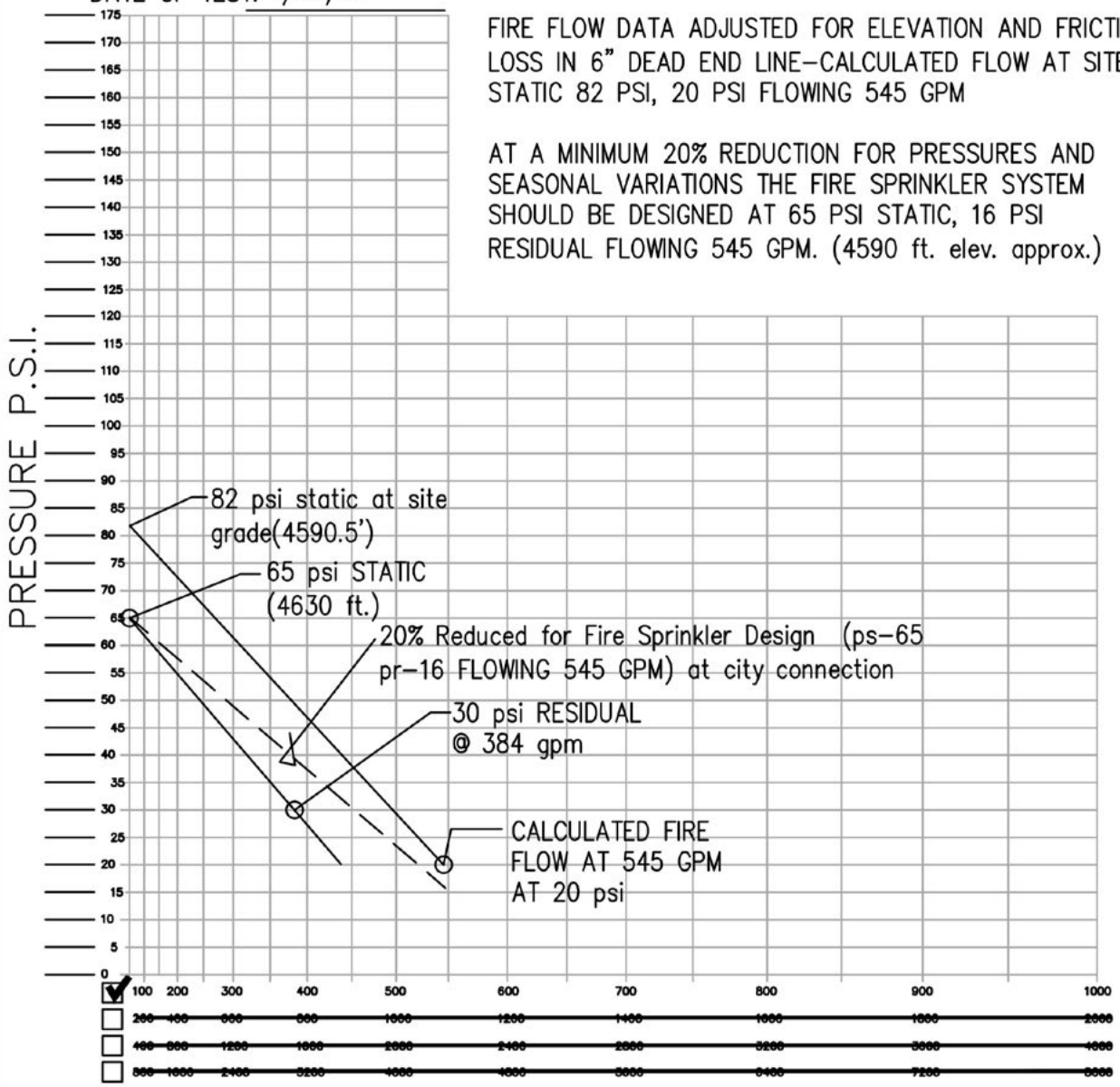


CHART #1

FLOW TEST DATA SHEET

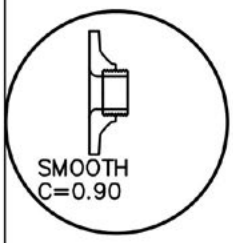
Craig Blue, P.E. Inc.
Fire Suppression
Engineering & Testing

1971 West 3300 South, #A
West Valley City, UT 84119
801-886-3473
Craig@CBluePE.com

CBPE: 700-6

OUTLET TYPES:

PLAY PIPE
C=0.97



SMOOTH
C=0.90

SQUARE
C=0.80

PROJECTED
C=0.70

WATER SYSTEM: Ogden City Water System
NAME OF PROPERTY: WSU Campus-Public Safety Bldg
ADDRESS: Edvalson & Dixon Drive
Ogden, UT
DATE: 1/30/14 TIME: 11 am TEMPERATURE: 40°F
TYPE OF CITY SYSTEM: 6" Dead end line
TEST CONDUCTED BY: Craig Blue
WITNESSED BY: Waylon Blue
NOTES:

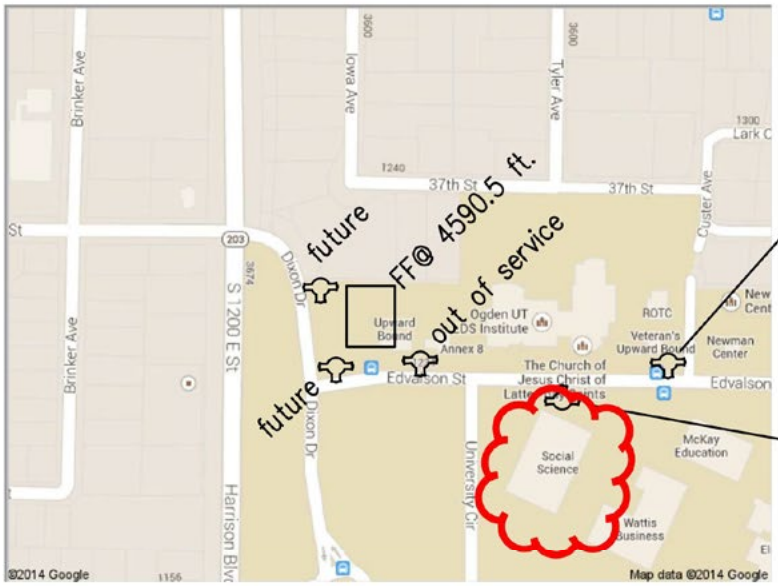
FORMULA: $Q = 29.83\ CD^2\sqrt{P}$

WHERE Q IS GALLONS PER MINUTE
C IS THE COEFFICIENT OF DISCHARGE
D IS I.D. IN INCHES OF OUTLET (2.469" typ.)
P IS PITOT GAUGE READING (PSI)

	SIZE (IN)	PITOT (PSI)	FLOW (GPM)
OUTLET 1	2.469	5.5	384
OUTLET 2			
OUTLET 3			
OUTLET 4			
FIRE FLOW: 440 @ 20psi		TOTAL FLOW: 384 gpm	

STATIC: 65 PSI RESIDUAL: 30 PSI ELEVATION: 4630' ELEV.
4590 AT SITE

SKETCH AREA MAP BELOW:



FLOW TEST DATA CHART

Craig Blue, P.E. Inc.
Fire Suppression
Engineering & Testing

1971 West 3300 South, #A
West Valley City, UT 84119
801-886-3473
Craig@CBluePE.com

CBPE: 700-6

WATER SYSTEM: Ogden City Water System
NAME OF PROPERTY: WSU Campus-Public Safety Bldg
ADDRESS: Edvalson & Dixon Drive
Ogden, UT

SUPPLY: 65 PSI (STATIC) 30 PSI (RESIDUAL) 384 GPM (FLOWING) 4561 FT ELEV.

DATE OF TEST: 1/30/14

FIRE FLOW DATA ADJUSTED FOR ELEVATION AND FRICTION LOSS IN 6" DEAD END LINE-CALCULATED FLOW AT SITE-STATIC 82 PSI, 20 PSI FLOWING 545 GPM

AT A MINIMUM 20% REDUCTION FOR PRESSURES AND SEASONAL VARIATIONS THE FIRE SPRINKLER SYSTEM SHOULD BE DESIGNED AT 65 PSI STATIC, 16 PSI RESIDUAL FLOWING 545 GPM. (4590 ft. elev. approx.)

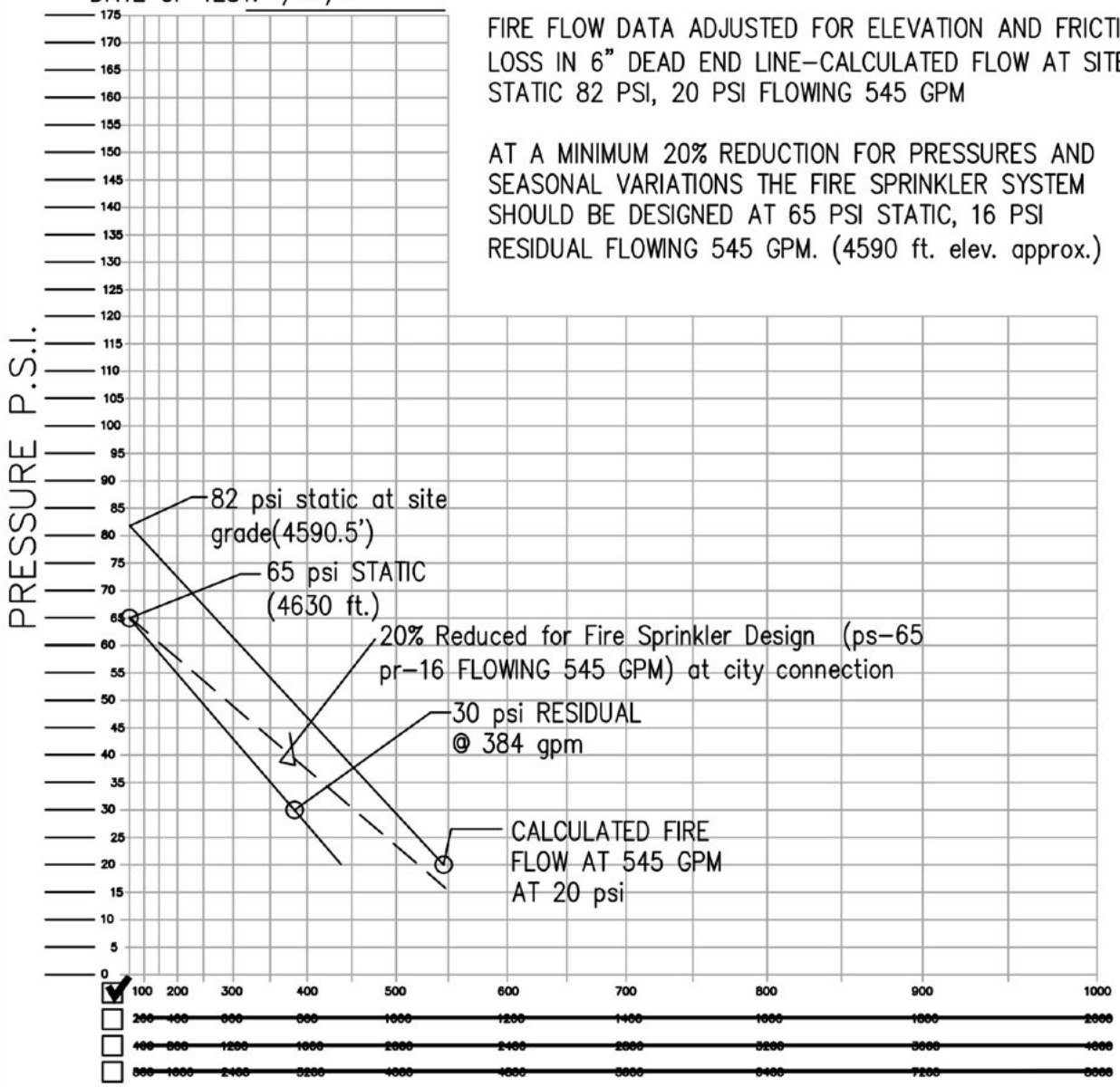


CHART #1

used to identify the structure. Address numbers shall be maintained.

505.2 Street or road signs. Streets and roads shall be identified with *approved* signs. Temporary signs shall be installed at each street intersection when construction of new roadways allows passage by vehicles. Signs shall be of an *approved* size, weather resistant and be maintained until replaced by permanent signs.

SECTION 506
KEY BOXES

506.1 Where required. Where access to or within a structure or an area is restricted because of secured openings or where immediate access is necessary for life-saving or fire-fighting purposes, the *fire code official* is authorized to require a key box to be installed in an *approved* location. The key box shall be of an *approved* type listed in accordance with UL 1037, and shall contain keys to gain necessary access as required by the *fire code official*.

506.1.1 Locks. An *approved* lock shall be installed on gates or similar barriers when required by the *fire code official*.

506.1.2 Key boxes for nonstandardized fire service elevator keys. Key boxes provided for nonstandardized fire service elevator keys shall comply with Section 506.1 and all of the following:

1. The key box shall be compatible with an existing rapid entry key box system in use in the jurisdiction and *approved* by the *fire code official*.
2. The front cover shall be permanently labeled with the words "Fire Department Use Only—Elevator Keys."
3. The key box shall be mounted at each elevator bank at the lobby nearest to the lowest level of fire department access.
4. The key box shall be mounted 5 feet 6 inches (1676 mm) above the finished floor to the right side of the elevator bank.
5. Contents of the key box are limited to fire service elevator keys. Additional elevator access tools, keys and information pertinent to emergency planning or elevator access shall be permitted when authorized by the *fire code official*.
6. In buildings with two or more elevator banks, a single key box shall be permitted to be used when such elevator banks are separated by not more than 30 feet (9144 mm). Additional key boxes shall be provided for each individual elevator or elevator bank separated by more than 30 feet (9144 mm).

Exception: A single key box shall be permitted to be located adjacent to a *fire command center* or the nonstandard fire service elevator key shall be permitted to be secured in a key box used for other purposes and located in accordance with Section 506.1.

506.2 Key box maintenance. The operator of the building shall immediately notify the *fire code official* and provide the new key when a lock is changed or rekeyed. The key to such lock shall be secured in the key box.

SECTION 507
FIRE PROTECTION WATER SUPPLIES

507.1 Required water supply. An *approved* water supply capable of supplying the required fire flow for fire protection shall be provided to premises upon which facilities, buildings or portions of buildings are hereafter constructed or moved into or within the jurisdiction.

507.2 Type of water supply. A water supply shall consist of reservoirs, pressure tanks, elevated tanks, water mains or other fixed systems capable of providing the required fire flow.

507.2.1 Private fire service mains. Private fire service mains and appurtenances shall be installed in accordance with NFPA 24.

507.2.2 Water tanks. Water tanks for private fire protection shall be installed in accordance with NFPA 22.

507.3 Fire flow. Fire flow requirements for buildings or portions of buildings and facilities shall be determined by an *approved* method.

507.4 Water supply test. The *fire code official* shall be notified prior to the water supply test. Water supply tests shall be witnessed by the *fire code official* or *approved* documentation of the test shall be provided to the *fire code official* prior to final approval of the water supply system.

507.5 Fire hydrant systems. Fire hydrant systems shall comply with Sections 507.5.1 through 507.5.6.

507.5.1 Where required. Where a portion of the facility or building hereafter constructed or moved into or within the jurisdiction is more than 400 feet (122 m) from a hydrant on a fire apparatus access road, as measured by an *approved* route around the exterior of the facility or building, on-site fire hydrants and mains shall be provided where required by the *fire code official*.

Exceptions:

1. For Group R-3 and Group U occupancies, the distance requirement shall be 600 feet (183 m).
2. For buildings equipped throughout with an *approved automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2, the distance requirement shall be 600 feet (183 m).

507.5.1.1 Hydrant for standpipe systems. Buildings equipped with a standpipe system installed in accordance with Section 905 shall have a fire hydrant within 100 feet (30 m) of the fire department connections.

Exception: The distance shall be permitted to exceed 100 feet (30 m) where approved by the *fire code official*.

APPENDIX B

FIRE-FLOW REQUIREMENTS FOR BUILDINGS

The provisions contained in this appendix are not mandatory unless specifically referenced in the adopting ordinance.

SECTION B101
GENERAL

B101.1 Scope. The procedure for determining fire-flow requirements for buildings or portions of buildings hereafter constructed shall be in accordance with this appendix. This appendix does not apply to structures other than buildings.

SECTION B102
DEFINITIONS

B102.1 Definitions. For the purpose of this appendix, certain terms are defined as follows:

FIRE-FLOW. The flow rate of a water supply, measured at 20 pounds per square inch (psi) (138 kPa) residual pressure, that is available for fire fighting.

FIRE-FLOW CALCULATION AREA. The floor area, in square feet (m^2), used to determine the required fire flow.

SECTION B103
MODIFICATIONS

B103.1 Decreases. The fire chief is authorized to reduce the fire-flow requirements for isolated buildings or a group of buildings in rural areas or small communities where the development of full fire-flow requirements is impractical.

B103.2 Increases. The fire chief is authorized to increase the fire-flow requirements where conditions indicate an unusual susceptibility to group fires or conflagrations. An increase shall not be more than twice that required for the building under consideration.

B103.3 Areas without water supply systems. For information regarding water supplies for fire-fighting purposes in rural and suburban areas in which adequate and reliable water supply systems do not exist, the *fire code official* is authorized to utilize NFPA 1142 or the *International Wildland-Urban Interface Code.*

SECTION B104
FIRE-FLOW CALCULATION AREA

B104.1 General. The fire-flow calculation area shall be the total floor area of all floor levels within the *exterior walls*, and under the horizontal projections of the roof of a building, except as modified in Section B104.3.

B104.2 Area separation. Portions of buildings which are separated by *fire walls* without openings, constructed in accordance with the *International Building Code,* are allowed to be considered as separate fire-flow calculation areas.

B104.3 Type IA and Type IB construction. The fire-flow calculation area of buildings constructed of Type IA and Type IB construction shall be the area of the three largest successive floors.

Exception: Fire-flow calculation area for open parking garages shall be determined by the area of the largest floor.

SECTION B105
FIRE-FLOW REQUIREMENTS FOR BUILDINGS

B105.1 One- and two-family dwellings. The minimum fire-flow and flow duration requirements for one- and two-family *dwellings* having a fire-flow calculation area that does not exceed 3,600 square feet (344.5 m^2) shall be 1,000 gallons per minute (3785.4 L/min) for 1 hour. Fire-flow and flow duration for *dwellings* having a fire-flow calculation area in excess of 3,600 square feet (344.5m^2) shall not be less than that specified in Table B105.1.

Exception: A reduction in required fire-flow of 50 percent, as *approved*, is allowed when the building is equipped with an *approved automatic sprinkler system.*

B105.2 Buildings other than one- and two-family dwellings. The minimum fire-flow and flow duration for buildings other than one- and two-family *dwellings* shall be as specified in Table B105.1.

Exception: A reduction in required fire-flow of up to 75 percent, as *approved*, is allowed when the building is provided with an *approved automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2. The resulting fire-flow shall not be less than 1,500 gallons per minute (5678 L/min) for the prescribed duration as specified in Table B105.1.

SECTION B106
REFERENCED STANDARDS

ICC	IBC—12	International Building Code	B104.2, Table B105.1
ICC	IWUIC—12	International Wildland-Urban Interface Code	B103.3
NFPA	1142—12	Standard on Water Supplies for Suburban and Rural Fire Fighting	B103.3

TABLE B105.1
MINIMUM REQUIRED FIRE-FLOW AND FLOW DURATION FOR BUILDINGS

FIRE-FLOW CALCULATION AREA (square feet)					FIRE-FLOW (gallons per minute)[b]	FLOW DURATION (hours)
Type IA and IB[a]	Type IIA and IIIA[a]	Type IV and V-A[a]	Type IIB and IIIB[a]	Type V-B[a]		
0-22,700	0-12,700	0-8,200	0-5,900	0-3,600	1,500	2
22,701-30,200	12,701-17,000	8,201-10,900	5,901-7,900	3,601-4,800	1,750	
30,201-38,700	17,001-21,800	10,901-12,900	7,901-9,800	4,801-6,200	2,000	
38,701-48,300	21,801-24,200	12,901-17,400	9,801-12,600	6,201-7,700	2,250	
48,301-59,000	24,201-33,200	17,401-21,300	12,601-15,400	7,701-9,400	2,500	
59,001-70,900	33,201-39,700	21,301-25,500	15,401-18,400	9,401-11,300	2,750	
70,901-83,700	39,701-47,100	25,501-30,100	18,401-21,800	11,301-13,400	3,000	3
83,701-97,700	47,101-54,900	30,101-35,200	21,801-25,900	13,401-15,600	3,250	
97,701-112,700	54,901-63,400	35,201-40,600	25,901-29,300	15,601-18,000	3,500	
112,701-128,700	63,401-72,400	40,601-46,400	29,301-33,500	18,001-20,600	3,750	
128,701-145,900	72,401-82,100	46,401-52,500	33,501-37,900	20,601-23,300	4,000	4
145,901-164,200	82,101-92,400	52,501-59,100	37,901-42,700	23,301-26,300	4,250	
164,201-183,400	92,401-103,100	59,101-66,000	42,701-47,700	26,301-29,300	4,500	
183,401-203,700	103,101-114,600	66,001-73,300	47,701-53,000	29,301-32,600	4,750	
203,701-225,200	114,601-126,700	73,301-81,100	53,001-58,600	32,601-36,000	5,000	
225,201-247,700	126,701-139,400	81,101-89,200	58,601-65,400	36,001-39,600	5,250	
247,701-271,200	139,401-152,600	89,201-97,700	65,401-70,600	39,601-43,400	5,500	
271,201-295,900	152,601-166,500	97,701-106,500	70,601-77,000	43,401-47,400	5,750	
295,901-Greater	166,501-Greater	106,501-115,800	77,001-83,700	47,401-51,500	6,000	
—	—	115,801-125,500	83,701-90,600	51,501-55,700	6,250	
—	—	125,501-135,500	90,601-97,900	55,701-60,200	6,500	
—	—	135,501-145,800	97,901-106,800	60,201-64,800	6,750	
—	—	145,801-156,700	106,801-113,200	64,801-69,600	7,000	
—	—	156,701-167,900	113,201-121,300	69,601-74,600	7,250	
—	—	167,901-179,400	121,301-129,600	74,601-79,800	7,500	
—	—	179,401-191,400	129,601-138,300	79,801-85,100	7,750	
—	—	191,401-Greater	138,301-Greater	85,101-Greater	8,000	

For SI: 1 square foot = 0.0929 m2, 1 gallon per minute = 3.785 L/m, 1 pound per square inch = 6.895 kPa.

a. Types of construction are based on the *International Building Code*.

b. Measured at 20 psi residual pressure.

per exception 105.2 exception. Building will be fully fire sprinklered allowing for a 75% reduction. (8000 x 25%) = 2000 gpm. Fire flow data exceeds minimum requirements.

APPENDIX C

FIRE HYDRANT LOCATIONS AND DISTRIBUTION

The provisions contained in this appendix are not mandatory unless specifically referenced in the adopting ordinance.

SECTION C101
GENERAL

C101.1 Scope. Fire hydrants shall be provided in accordance with this appendix for the protection of buildings, or portions of buildings, hereafter constructed.

SECTION C102
LOCATION

C102.1 Fire hydrant locations. Fire hydrants shall be provided along required fire apparatus access roads and adjacent public streets.

SECTION C103
NUMBER OF FIRE HYDRANTS

C103.1 Fire hydrants available. The minimum number of fire hydrants available to a building shall not be less than that listed in Table C105.1. The number of fire hydrants available to a complex or subdivision shall not be less than that determined by spacing requirements listed in Table C105.1 when applied to fire apparatus access roads and perimeter public streets from which fire operations could be conducted.

SECTION C104
CONSIDERATION OF EXISTING FIRE HYDRANTS

C104.1 Existing fire hydrants. Existing fire hydrants on public streets are allowed to be considered as available. Existing fire hydrants on adjacent properties shall not be considered available unless fire apparatus access roads extend between properties and easements are established to prevent obstruction of such roads.

SECTION C105
DISTRIBUTION OF FIRE HYDRANTS

C105.1 Hydrant spacing. The average spacing between fire hydrants shall not exceed that listed in Table C105.1.

Exception: The fire chief is authorized to accept a deficiency of up to 10 percent where existing fire hydrants provide all or a portion of the required fire hydrant service.

Regardless of the average spacing, fire hydrants shall be located such that all points on streets and access roads adjacent to a building are within the distances listed in Table C105.1.

TABLE C105.1
NUMBER AND DISTRIBUTION OF FIRE HYDRANTS

FIRE-FLOW REQUIREMENT (gpm)	MINIMUM NUMBER OF HYDRANTS	AVERAGE SPACING BETWEEN HYDRANTS[a, b, c] (feet)	MAXIMUM DISTANCE FROM ANY POINT ON STREET OR ROAD FRONTAGE TO A HYDRANT[d]
1,750 or less	1	500	250
2,000-2,250	2	450	225
2,500	3	450	225
3,000	3	400	225
3,500-4,000	4	350	210
4,500-5,000	5	300	180
5,500	6	300	180
6,000	6	250	150
6,500-7,000	7	250	150
7,500 or more	8 or more[e]	200	120

For SI: 1 foot = 304.8 mm, 1 gallon per minute = 3.785 L/m.

a. Reduce by 100 feet for dead-end streets or roads.

b. Where streets are provided with median dividers which cannot be crossed by fire fighters pulling hose lines, or where arterial streets are provided with four or more traffic lanes and have a traffic count of more than 30,000 vehicles per day, hydrant spacing shall average 500 feet on each side of the street and be arranged on an alternating basis up to a fire-flow requirement of 7,000 gallons per minute and 400 feet for higher fire-flow requirements.

c. Where new water mains are extended along streets where hydrants are not needed for protection of structures or similar fire problems, fire hydrants shall be provided at spacing not to exceed 1,000 feet to provide for transportation hazards.

d. Reduce by 50 feet for dead-end streets or roads.

e. One hydrant for each 1,000 gallons per minute or fraction thereof.

GSH
Gordon Spilker Huber
Geotechnical Consultants, Inc.

REPORT
GEOTECHNICAL INVESTIGATION
SOCIAL SCIENCE BUILDING SEISMIC UPGRADE
SOUTHEAST CORNER OF TYLER AVENUE
AND EDVALSON STREET
OGDEN, UTAH

Submitted To:

Weber State University
Facilities Management
2601 University Circle
Ogden, Utah 84408-2601

Submitted By:

Gordon Spilker Huber Geotechnical Consultants, Inc.
473 West 4800 South
Salt Lake City, Utah 84123

July 29, 2011

Job No. 1153-001-11

GSH
Gordon Spilker Huber
Geotechnical Consultants, Inc.

July 29, 2011
Job No. 1153-001-11

Weber State University
Facilities Management
2601 University Circle
Ogden, Utah 84408-2601

Attention: Mr. Chad Downs

Gentlemen:

Re: Report
Geotechnical Investigation
Social Science Building Seismic Upgrade
Southeast Corner of Tyler Avenue
and Edvalson Street
Ogden, Utah

1. INTRODUCTION

1.1 GENERAL

This report presents the results of our geotechnical investigation performed for the Weber State University (WSU) Social Science Building seismic upgrade located at the southeast corner of Tyler Avenue and Edvalson Street in Ogden, Utah. The general location of the site with respect to major topographic features and existing facilities, as of 1998, is presented on Figure 1, Vicinity Map. A more detailed layout of the site showing the proposed building and existing facilities is presented on an aerial based map, Figure 2, Site Plan. The locations of the borings drilled in conjunction with this study are also presented on Figure 2.

During the course of this study, many of the conclusions and recommendations were presented to the project structural engineer, Mr. Jeremy Achter of ARW Engineers, and Mr. Chad Downs of WSU.

1.2 OBJECTIVES AND SCOPE

The objectives and scope of our study were planned in discussions among Mr. Downs, Mr. Achter, and Mr. Bryan Roberts of Gordon Spilker Huber Geotechnical Consultants, Inc. (GSH).

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www.gshgeotech.com

In general, the objectives of this study were to:

1. Define and evaluate the subsurface soil and groundwater conditions across the site.

2. Provide appropriate foundation and geoseismic recommendations/information to be utilized in the seismic upgrade design and construction for the existing structure.

In accomplishing these objectives, our scope has included the following:

1. A field program consisting of the drilling, logging, and sampling of 2 borings to depths of 41.5 feet.

2. A laboratory testing program.

3. An office program consisting of the correlation of available data, engineering analyses, and the preparation of this summary report.

1.3 AUTHORIZATION

Authorization was provided through Purchase Order No. P0036482 from the WSU Purchasing Department dated July 6, 2011 for GSH Professional Services Agreement No. 11-0704 dated July 5, 2011.

1.4 PROFESSIONAL STATEMENTS

Supporting data upon which our recommendations are based are presented in subsequent sections of this report. Recommendations presented herein are governed by the physical properties of the soils encountered in the exploration borings, projected groundwater conditions, and the layout and design data discussed in Section 2., Proposed Construction, of this report. If subsurface conditions other than those described in this report are encountered and/or if design and layout changes are implemented, GSH must be informed so that our recommendations can be reviewed and amended, if necessary.

Our professional services have been performed, our findings developed, and our recommendations prepared in accordance with generally accepted engineering principles and practices in this area at this time.

2. BUILDING CONSTRUCTION

2.1 CURRENT

The Social Science Building is rectangular in shape with a footprint on the order of 30,520 square feet. The building is constructed with one level below grade and three levels above grade and of steel and concrete wall/panel framing. The main level above grade is 14 to 20 feet narrower than the below-grade level and the upper two levels on all four sides. The perimeter of the upper two levels is supported on concrete columns. Based on an original plan drawing labeled "Footing & Piling Plan" (Plan Sheet No. 100, dated September 8, 1969) provided by WSU Facilities Management, the building is founded on steel pipe piles extending to depths of approximately 50 to 63 feet below the sublevel floor (approximately 65 to 80 feet below grade).

2.2 PROPOSED

Proposed construction will consist of upgrading the building with respect to updated seismic codes and loading. At this time, specific construction information necessary to complete the upgrade is unavailable. When upgrade information becomes available, GSH should be informed in order to provide geotechnical-related recommendations as necessary.

3. INVESTIGATIONS

3.1 FIELD PROGRAM

In order to define and evaluate the subsurface soil and groundwater conditions at the site, 2 borings were explored to depths of 41.5 feet below existing grade. The borings were drilled using and all-terrain drill rig equipped with hollow-stem augers. Locations of the borings are presented on Figure 2.

The field portion of our study was under the direct control and continual supervision of an experienced member of our geotechnical staff. During the course of the drilling operations, a continuous log of the subsurface conditions encountered was maintained. In addition, samples of the typical soils encountered were obtained for subsequent laboratory testing and examination. The soils were classified in the field based upon visual and textural examination. These classifications have been supplemented by subsequent inspection and testing in our laboratory. Detailed graphical representation of the subsurface conditions encountered is presented on Figures 3A and 3B, Log of Borings. Soils were classified in accordance with the nomenclature described on Figure 4, Unified Soil Classification System.

A 3.25-inch outside diameter, 2.42-inch inside diameter drive sampler (Dames & Moore) was utilized in the majority of the subsurface sampling at the site. Additionally, a 2.0-inch outside diameter, 1.38-inch inside diameter drive sampler (SPT) was utilized at select locations and

depths. The blow counts recorded on the boring logs were those required to drive the sampler 12 inches with a 140-pound hammer dropping 30 inches.
Following completion of drilling operations, one and one-quarter-inch diameter slotted PVC pipe was installed in each boring in order to provide a means of monitoring the groundwater fluctuations.

3.2 PREVIOUS GEOTECHNCIAL STUDY

The original geotechnical report for the Social Science Building is unavailable. However, five boring logs are shown on the original building plan drawing labeled "Footing & Piling Plan", (Plan Sheet No. 100, dated September 8, 1969). The plan sheet also indicates that each of these borings was located within the building footprint and extends to depths of 52 to 82 feet below original ground surface.

3.3 LABORATORY TESTING

3.3.1 General

In order to provide data necessary for our engineering analyses, a laboratory testing program was performed. The program included moisture and density, laboratory vane shear, consolidation, and chemical tests. The following paragraphs describe the tests and summarize the test data.

3.3.2 Moisture and Density Tests

To aid in classifying the soils and to help correlate other test data, moisture and density tests were performed on selected samples. The results of these tests are presented on the boring logs, Figures 3A and 3B.

3.3.3 Laboratory Vane Shear Tests

To determine the undrained shear strength of the soils encountered at the site, laboratory vane shear tests were performed. The results of the tests are tabulated in the table below:

Boring No.	Depth (feet)	Soil Type	In-Situ Moisture Content (percent)	Dry Density (pcf)	Ultimate Shear Strength (psf)
B-1	20.5	CL	26.6	96	3,500
B-2	25.0	CL	29.3	93	1,850
B-2	30.5	CL	31.5	90	1,600
B-1	35.5	CL	33.5	87	1,600

3.3.4 Consolidation Test

To provide data necessary for our settlement analyses, a consolidation test was performed upon each of two representative samples of the fine-grained clay soils encountered in the exploration borings at depths of 15.5 and 25.5 feet. The results indicate that the finer-grained soils are generally moderately to moderately highly over-consolidated and will exhibit moderate compressibility characteristics when loaded below the over-consolidation pressure. Detailed results of the test are maintained within our files and can be transmitted to you, upon your request.

3.3.5 Chemical Tests

To determine if the site soils will react detrimentally with concrete, chemical tests were performed on a representative sample of the silty clay soils encountered in Boring B-1 at a depth of 15.5 feet below existing grade. The results of the chemical tests are tabulated below:

Boring No.	Depth (feet)	Soil Classification	pH	Total Water Soluble Sulfate (mg/kg-dry)
B-1	15.5	CL	8.79	17.0

4. SITE CONDITIONS

4.1 SURFACE

The existing building is located at the southeast corner of Tyler Avenue and Edvalson Street on the WSU campus. The building is immediately surrounded with grass-covered landscape, some trees, and sidewalk followed by Edvalson Street and the LDS Institute to the north; The McKay Education and Wattis Business Buildings to the east; the Miller Administration Building to the south; and Tyler Avenue and a parking lot to the west. The site is relatively level but begins to slope off toward the south and west down to the west parking area.

4.2 SUBSURFACE SOIL AND GROUNDWATER

The soil conditions encountered in each of the borings, to the depths penetrated, were relatively similar. Additionally, the subsurface conditions correspond well with the original project borings shown on Plan Sheet No. 100 of the existing building drawings.

At each boring, the surface is blanketed with grass landscaping with roots and topsoil on the order of four to five inches thick. Below the topsoil to a depth of approximately seven and one-half feet in Boring B-2, a layer of silty clay fill exists. The fill is stiff, moist, and brown in color. Whether or not this fill was placed and compacted as engineered fill is unknown.

Below the fill in Boring B-2 and from below the topsoil in Boring B-1, natural soils consist of silty clay with some fine sand and occasional to numerous silty fine sand/fine sandy silt seams and layers up to two inches thick to the full depth penetrated, 41.5 feet. The natural clays are predominately stiff to very stiff, moist grading saturated with depth, and brown and grayish-brown in color.

Static groundwater was measured seven days following drilling at depths of 15.3 feet and 21.6 feet in Borings B-1 and B-2, respectively. The general area is known to have "perched" and confined (artesian) groundwater within layers of sands and silts interbedded in the clay soils.

Groundwater conditions will be affected seasonally, with the highest seasonal levels generally occurring during the late spring and early summer months.

5. DISCUSSIONS AND RECOMMENDATIONS

5.1 SUMMARY OF FINDINGS

The results of our study show that should additional foundations be required in conjunction with the seismic upgrade, these foundations may be supported upon conventional spread and continuous wall foundations established upon suitable natural soils and/or structural fill extending to suitable natural soils. In many cases with upgraded structures, micro piles, helical piers, or other deep foundations may be required in areas of limited space. Once additional information is available, including proposed foundation loads, GSH must be contacted to provide additional recommendations.

Static groundwater was encountered in Boring B-1 as shallow as 15.3 feet and as deep as 21.6 feet in Boring B-2. The area is known to have "perched" groundwater within layers of sands and silts interbedded in the clay soils. If exterior walls are to be exposed during construction and if a perimeter foundation drain is not already present, a foundation subdrain should be installed prior to backfilling. Foundation subdrain recommendations may be provided, upon request.

A layer of fill was encountered at the surface in Boring B-2 extending to seven and one-half feet below surrounding grade. If this fill was placed, compacted, and tested as structural fill is unknown at this point. Therefore, it must be considered as non-engineered unless proven otherwise.

In the following sections, detailed discussions pertaining to earthwork, foundations, lateral resistance and pressure, floor slabs, and the geoseismic setting of the site are provided.

5.2 EARTHWORK

5.2.1 Site Preparation

Prior to the placement of structural fill, floor slabs, or footings, all loose and or otherwise unsuitable soils, debris, and deleterious materials must be removed down to suitable natural soils. The exposed natural subgrade should be proofrolled by running moderate-weight rubber tire-mounted construction equipment or compaction equipment uniformly over the surface at least two times. If excessively soft or otherwise unsuitable soils are encountered beneath footings, they must be completely removed. If required removal depth is greater than two feet, GSH must be notified to provide further recommendations. In floor slab and outside flatwork areas, unsuitable natural soils should be removed to a maximum depth of two feet and replaced with compacted granular structural fill.

5.2.2 Excavations

For general considerations, temporary construction excavations in cohesive soil, not exceeding four feet in depth and above or below the groundwater table, may be constructed with near-vertical sideslopes. Temporary excavations up to eight feet deep in fine-grained cohesive soils, above or below the water table, may be constructed with sideslopes no steeper than one-half horizontal to one vertical. Temporary excavations up to 15 feet deep in fine-grained cohesive soils, above or below the water table, may be constructed with sideslopes no steeper than three-quarters horizontal to one vertical. Excavations deeper than 15 feet are not anticipated at the site.

For granular (cohesionless) soils, construction excavations above the water table, not exceeding four feet, should be no steeper than one-half horizontal to one vertical. For excavations up to 15 feet in granular soils and above the water table, the slopes should be no steeper than one horizontal to one vertical. Excavations encountering saturated cohesionless soils will be very difficult and will require very flat sideslopes and/or shoring, bracing, and dewatering.

All excavations must be inspected periodically by qualified personnel. If any signs of instability or excessive sloughing are noted, immediate remedial action must be initiated.

5.2.3 Structural Fill

Structural fill is defined as all fill which will ultimately be subjected to structural loadings, such as imposed by footings, floor slabs, pavements, etc. Structural fill may be required as backfill over foundations and utilities, as site grading fill, and as replacement fill below footings. All structural fill must be free of sod, rubbish, topsoil, frozen soil, and other deleterious materials.

Structural site grading fill is defined as fill placed over relatively large open areas to raise the overall grade. For structural site grading fill, the maximum particle size should generally not exceed four inches; although, occasional larger particles not exceeding eight inches in diameter

may be incorporated if placed randomly in a manner such that "honeycombing" does not occur and the desired degree of compaction can be achieved.

The on-site fine-grained soils may be utilized as structural site grading fill provided they meet the requirements stated herein. However, it should be noted that unless moisture control is maintained near optimum and the subgrade is stable, utilization of these natural on-site silty clay soils as structural site grading fill will be very difficult, if not impossible, during wet and cold periods of the year. Additionally, these on-site fine-grained soils are presently above optimum moisture content and would require drying prior to recompacting.

Only granular soils are recommended as structural fill in confined areas, such as around foundations and within utility trenches, and as replacement fill below footings. The maximum particle size within structural fill placed within confined areas should generally be restricted to two inches.

Imported structural fill should consist of a fairly well-graded mixture of sand and gravel with less than 20 percent fines.

To stabilize soft subgrade conditions, a mixture of coarse gravels and cobbles (stabilizing fill) should be utilized.

Non-structural site grading fill is defined as all fill material not designated as structural fill and may consist of any cohesive or granular soils not containing excessive amounts of degradable material.

5.2.4 Fill Placement and Compaction

Coarse gravel and cobble mixtures (stabilizing fill), if utilized, shall be end-dumped, spread to a maximum loose lift thickness of 15 inches, and compacted by dropping a backhoe bucket onto the surface continuously at least twice. As an alternative, the fill may be compacted by passing moderately heavy construction equipment or large self-propelled compaction equipment at least twice. Subsequent fill material placed over the coarse gravels and cobbles shall be adequately compacted so that the "fines" are "worked into" the voids in the underlying coarser gravels and cobbles.

All other structural fill shall be placed in lifts not exceeding eight inches in loose thickness. Structural fills shall be compacted in accordance with the percent of the maximum dry density as determined by the AASHTO[1] T-180 (ASTM[2] D-1557) compaction criteria to the requirements outlined in the table on the following page.

---

1 American Association of State Highway and Transportation Officials
2 American Society for Testing and Materials

Location	Total Fill Thickness (feet)	Minimum Percentage of Maximum Dry Density
Beneath an area extending at least 5 feet beyond the perimeter of the structure	0 to 10	95
Beneath an area extending at least 5 feet beyond the perimeter of the structure	10 to 15	97*
Outside area defined above	0 to 5	90
Outside area defined above	5 to 10	95

* Moisture 0 to 3 percent over optimum.

Structural fills greater than 15 feet thick are not anticipated at the site.

Non-structural fill may be placed in lifts not exceeding 12 inches in loose thickness and compacted by passing construction, spreading, or hauling equipment over the surface at least twice.

5.2.5 Utility Trenches

All utility trench backfill material below structurally loaded facilities (flatwork, floor slabs, roads, etc.) should be placed at the same density requirements established for structural fill. If the surface of the backfill becomes disturbed during the course of construction, the backfill should be proofrolled and/or properly compacted prior to the construction of any exterior flatwork over a backfilled trench. Proofrolling may be performed by passing moderately loaded rubber tire-mounted construction equipment uniformly over the surface at least twice. If excessively loose or soft areas are encountered during proofrolling, they should be removed to a maximum depth of two feet below design finish grade and replaced with structural fill.

Most utility companies and City-County governments are now requiring that Type A-1 or A-1a (AASHTO Designation – basically granular soils with limited fines) soils be used as backfill over utilities. These organizations are also requiring that in public roadways the backfill over major utilities be compacted over the full depth of fill to at least 96 percent of the maximum dry density as determined by the AASHTO T-180 (ASTM D-1557) method of compaction. We recommend that as the major utilities continue onto the site that these compaction specifications are followed.

The natural fine-grained cohesive soils are not recommended for use as trench backfill.

5.3 SPREAD AND CONTINUOUS WALL FOUNDATIONS

5.3.1 Design Data

The results of our study show that should additional foundations be required in conjunction with the seismic upgrade, these foundations may be supported upon conventional spread and continuous wall foundations established upon suitable natural soils and/or structural fill extending to suitable natural soils. As previously mentioned, if space is limited and deep foundations such as helical piers or micro piles are needed, GSH must be contacted to provide further recommendations. For design, the following parameters are provided:

Minimum Recommended Depth of Embedment for Frost Protection	- 30 inches
Minimum Recommended Depth of Embedment for Non-frost Conditions	- 15 inches
Recommended Minimum Width for Continuous Wall Footings	- 18 inches
Minimum Recommended Width for Isolated Spread Footings	- 24 inches
Recommended Net Bearing Pressure for Real Load Conditions	- 2,000 pounds per square foot*
Bearing Pressure Increase for Seismic Loading	- 50 percent

* Heavily loaded footing will require a minimum of 12 inches of structural replacement fill to control settlements. See Section 5.3.3, "Settlements" below.

The term "net bearing pressure" refers to the pressure imposed by the portion of the structure located above lowest adjacent final grade. Therefore, the weight of the footing and backfill to lowest adjacent final grade need not be considered. Real loads are defined as the total of all dead plus frequently applied live loads. Total load includes all dead and live loads, including seismic and wind.

5.3.2 Installation

Under no circumstances shall the footings be established upon soft, loose or disturbed soils, non-engineered fills, deleterious materials, debris, or within ponded water. If the natural soils upon which the footings are to be established become loose or disturbed, they must be removed and

replaced with granular structural fill. If granular structural fill upon which the footings are to be established become disturbed, they should be recompacted to the requirements for structural fill.

The width of replacement structural fill below footings should be equal to the width of the footing plus one additional foot for each foot of fill thickness placed. For example, if the width of the footing is two feet and the thickness of the structural fill beneath the footing is one foot, the width of the structural fill at the base of the footing excavation would be a total of three feet. We recommend that footing excavations be completed with smooth-lip bucket equipment to reduce disturbance of the bearing subgrade soils.

5.3.3 Settlements

Settlements of foundations will be dependent upon the loads imposed and the thickness of replacement granular structural fill beneath the footings. For multiple loading conditions, the projected settlements are tabulated below:

Footing Type	Load	Minimum Thickness of Structural Granular Fill (feet)	Projected Settlement (inches)
Spread	Up to 60 kips	0.0	¼ to ⅝
	60 to 100 kips	1.0	½ to ⅝
Wall	Up to 6 kips per lineal foot	0.0	¼ to ⅝
	6 to 8 kips per lineal foot	1.0	½ to ⅝

Approximately 60 percent of the quoted settlement should occur rapidly during construction loading.

5.4 LATERAL RESISTANCE

Lateral loads imposed upon foundations due to wind or seismic forces may be resisted by the development of passive earth pressures and friction between the base of the footings and the supporting soils. In determining frictional resistance, a coefficient of 0.40 should be utilized. Passive resistance provided by properly placed and compacted granular structural fill above the water table may be considered equivalent to a fluid with a density of 300 pounds per cubic foot. Below the water table, this granular soil should be considered equivalent to a fluid with a density of 150 pounds per cubic foot.

A combination of passive earth resistance and friction may be utilized provided that the friction component of the total is divided by 1.5.

5.5 LATERAL PRESSURES

The lateral pressure parameters, as presented within this section, are based on the backfill consisting of a drained granular soil placed and compacted in accordance with the recommendations presented herein. The lateral pressures imposed upon subgrade facilities will, therefore, be basically dependent upon the relative rigidity and movement of the backfilled structure. For active walls, such as retaining walls which can move outward (away from the backfill), granular backfill may be considered equivalent to a fluid with a density of 35 pounds per cubic foot in computing lateral pressures. For more rigid below-grade walls granular backfill may be considered equivalent to a fluid with a density of 45 pounds per cubic foot.

For seismic loading, the following uniform pressures in pounds per square foot should be added with respect to the wall depths and rigidity:

Wall Height (feet)	Pressure (active) (pound/square foot)	Pressure (moderately yielding) (pounds/square foot)
5	40	75
10	75	155
15	115	230

5.6 FLOOR SLABS

Floor slabs may be established upon properly prepared, suitable undisturbed natural soils, and/or upon structural fill extending to suitable natural soils. To provide a capillary break, it is recommended that floor slabs be directly underlain by at least four inches of "free-draining" fill, such as "pea" gravel or three-quarter- to one-inch minus clean gap-graded gravel. Settlements of lightly to moderately loaded floor slabs are anticipated to be minor.

The tops of all floor slabs in habitable areas must be established at least two feet above the highest anticipated normal water level or one and one-half feet above the maximum groundwater level controlled by subdrains.

5.7 CEMENT TYPES

The laboratory tests indicate that the site soils contain negligible amounts of water soluble sulfates. Therefore, all concrete which will be in contact with the site soils may be prepared using Type I cement.

5.8 GEOSEISMIC SETTING

5.8.1 General

Utah municipalities adopted the International Building Code (IBC) 2009 in 2010. The IBC 2009 code determines the seismic hazard for a site based upon 2002 mapping of bedrock accelerations prepared by the United States Geologic Survey (USGS) and the soil site class. The USGS values are presented on maps incorporated into the IBC code and are also available based on latitude and longitude coordinates (grid points).

The structural upgrades must be designed in accordance with the procedure presented in Section 1613, Earthquake Loads, of the IBC 2009 edition.

5.8.2 Faulting

The site is located outside fault investigation zones identified by Weber County. The nearest active fault is the Ogden portion of the Wasatch Fault, approximately one-third mile east of the site. The Wasatch Fault zone is considered capable of generating earthquakes as large as magnitude 7.3[3].

5.8.3 Soil Class

For dynamic structural analysis, the Site Class D - Stiff Soil Profile as defined in Table 1613.5.2, Site Class Definitions, of the IBC 2009 can be utilized.

5.8.4 Ground Motions

The IBC 2009 code is based on 2002 USGS mapping, which provides values of short and long period accelerations for the Site Class B-C boundary for the Maximum Considered Earthquake (MCE). This Site Class B-C boundary represents a hypothetical bedrock surface and must be corrected for local soil conditions. The following table summarizes the peak ground and short and long period accelerations for a MCE event and incorporates a soil amplification factor for a Site Class D soil profile in the second column. Based on the site latitude and longitude (41.1943 degrees north and 111.9459 degrees west, respectively), the values for this site are tabulated on the following page.

---

3 Arabasz, W.J., Pechmann, J.C., and Brown, E.D., 1992, Observational seismology and the evaluation of earthquake hazards and risk in the Wasatch Front area, Utah, in Gori, P.L., and Hays, W.W., eds., Assessment of regional earthquake hazards and risk along the Wasatch Front, Utah: U.S. Geological Survey Professional Paper 1500-D, 36 p.

Spectral Acceleration Value, T Seconds	Site Class B-C Boundary [mapped values] (% g)	Site Class D [adjusted for site class effects] (% g)
Peak Ground Acceleration	55.9	55.9
0.2 Seconds, (Short Period Acceleration)	$S_S = 139.8$	$S_{MS} = 139.8$
1.0 Seconds (Long Period Acceleration)	$S_1 = 58.3$	$S_{M1} = 87.5$

The IBC 2009 code design accelerations (S_{DS} and S_{D1}) are based on multiplying the above accelerations (adjusted for site class effects) for the MCE event by two-thirds (⅔).

5.8.5 Liquefaction

The site is located in an area that has been identified by Weber County as having a "moderate" liquefaction potential. Liquefaction is defined as the condition when saturated, loose, finer-grained sand-type soils lose their support capabilities because of excessive pore water pressure which develops during a seismic event.

According to the USGS map "Surface Geologic Map of the Weber Segment, Wasatch Fault Zone, Weber And Davis Counties, Utah" by Alan R. Nelson and Stephen F. Personius, 1993, Weber State University, including this site, is located within an area of Bonneville Lake cycle and younger lacustrine, marsh, and alluvial deposits, which have been re-deposited by lateral spread caused by liquefaction during a passed seismic event. After re-deposition, these soils are now less susceptible to liquefaction during a design seismic event. In fact, based on soil type and conditions encountered, the potential for liquefaction at this site would be considered low. Additionally, it is believed and/or understood that the site has been subjected to subsequent seismic events similar to the one creating the lateral spread since the time of the original lateral spread event.

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We appreciate the opportunity of providing this service for you. If you have any questions or require additional information, please do not hesitate to contact us.

Respectfully submitted,

GSH Geotechnical Consultants, Inc.

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BNR/MSH:jlh

Encl. Figure 1, Vicinity Map
Figure 2, Site Plan
Figures 3A and 3B, Log of Borings
Figure 4, Unified Soil Classification System

Addressee (3 + email)

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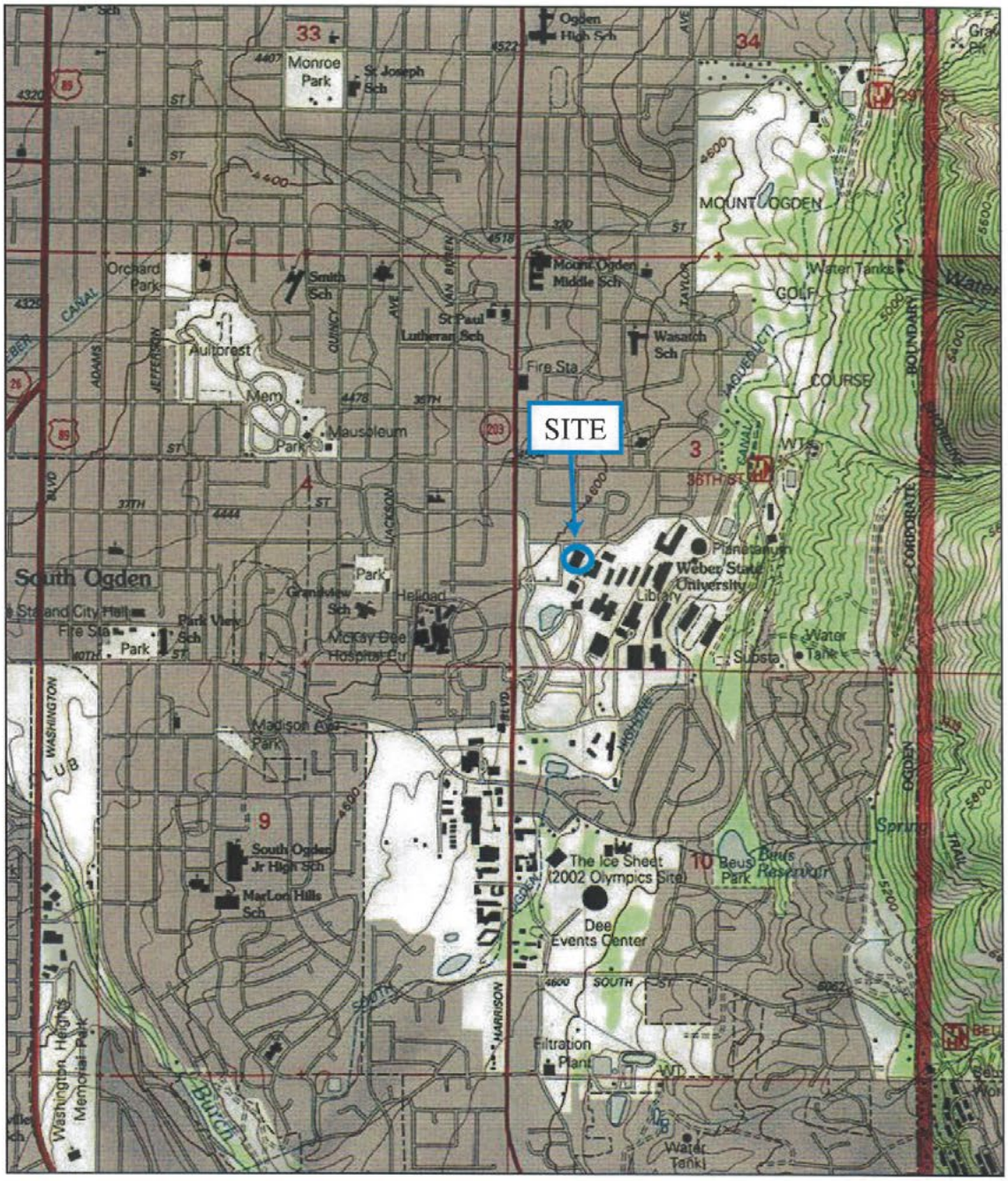
BRYAN N. ROBERTS
STATE OF UTAH

WEBER STATE UNIVERSITY
JOB NO. 1153-001-11



SCALE IN FEET
1000 0 1000 2000

FIGURE 1
VICINITY MAP

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REFERENCE:
USGS 7.5 MINUTE TOPOGRAPHIC QUADRANGLE MAP
TITLED "OGDEN, UTAH" DATED 1998

WEBER STATE UNIVERSITY
JOB NO. 1153-001-11

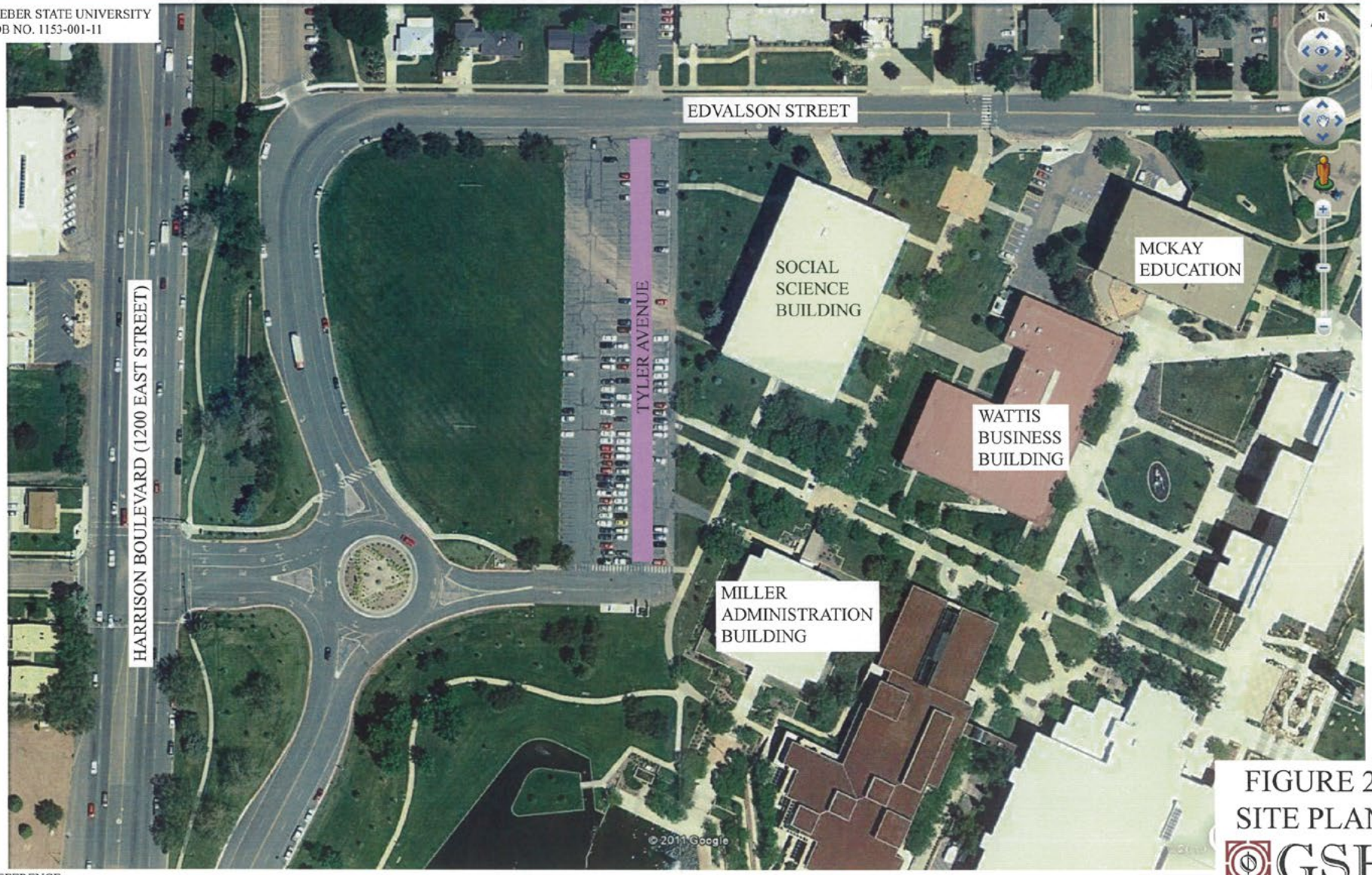

FIGURE 2
SITE PLAN

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REFERENCE:
ADAPTED FROM AERIAL PHOTOGRAPH
DOWNLOADED FROM 2010 GOOGLE EARTH
IMAGERY DATE JUNE 17, 2010

APPROXIMATE SCALE: 1" = 105'

Gordon Spilker Huber Geotechnical Consultants, Inc.
Salt Lake City, Utah 84123

BOREHOLE B-1

Project Name: Social Science Building Seismic Upgrade
Project No.: 1153-001-11
Location: SE Cnr Tyler Avenue/Edvalson Street, Ogden, UT
Client: Weber State University
Drilling Method: 3-3/4" ID Hollow-Stem Auger
Date Drilled: 07-13-11
GSH Field Rep.: RJG
Elevation: ---
Water Level: 15.0' (07-13-11) 15.3' (07-20-11)
Remarks:

Graphical Log	Water Level	DESCRIPTION	DEPTH FT.	BLOWS/FT	SAMPLE SYMBOL	MOISTURE (%)	% PASSING 200	DRY DENSITY (PCF)	Liquid Limit (%)	Plastic Limit (%)	REMARKS
		Ground Surface	0								
		SILTY CLAY with some fine sand; major roots (topsoil) to 4"; brown (CL)									loose to 8" moist
				39							very stiff
		grades slightly blocky structure	5	27		20.9		106			
		grades with occasional layers up to 1/2" thick of silty fine sand with oxidation mottling	10	31							very moist
		grades with occasional to numerous fine sandy silt partitions	15	27		23.7		99			saturated
		grades with occasional layers up to 1/2" thick of silty fine sand	20	19		26.6		96			stiff
			25								

The discussion in the text under the section titled, SUBSURFACE CONDITIONS, is necessary for a proper understanding of the nature of the subsurface material.

FIGURE 3A

Gordon Spilker Huber Geotechnical Consultants, Inc.
Salt Lake City, Utah 84123

BOREHOLE B-1

Project Name: Social Science Building Seismic Upgrade
Project No.: 1153-001-11
Location: SE Cnr Tyler Avenue/Edvalson Street, Ogden, UT
Client: Weber State University
Drilling Method: 3-3/4" ID Hollow-Stem Auger
Date Drilled: 07-13-11
GSH Field Rep.: RJG
Elevation: ---
Water Level: 15.0' (07-13-11) 15.3' (07-20-11)
Remarks:

Graphical Log	Water Level	DESCRIPTION	DEPTH FT.	BLOWS/FT	SAMPLE SYMBOL	MOISTURE (%)	% PASSING 200	DRY DENSITY (PCF)	Liquid Limit (%)	Plastic Limit (%)	REMARKS
		grades with occasional to numerous layers up to 1/2" thick of silty fine sand grades grayish-brown		19							
		grades with occasional to numerous layers up to 2" thick of silty fine sand; brown/grayish-brown	30	22							very stiff
			35	13		33.5		87			stiff
			40	11							
		Stopped drilling at 40.0'. Stopped sampling at 41.5'. Installed 1-1/4" diameter slotted PVC pipe to 35.0'.	45								
			50								

The discussion in the text under the section titled, SUBSURFACE CONDITIONS, is necessary for a proper understanding of the nature of the subsurface material.

FIGURE 3A
(con't)

Gordon Spilker Huber Geotechnical Consultants, Inc.
Salt Lake City, Utah 84123

BOREHOLE B-2

Project Name: Social Science Building Seismic Upgrade
Project No.: 1153-001-11
Location: SE Cnr Tyler Avenue/Edvalson Street, Ogden, UT
Client: Weber State University
Drilling Method: 3-3/4" ID Hollow-Stem Auger
Date Drilled: 07-13-11
GSH Field Rep.: RJG
Elevation: ---
Water Level: 20.0' (07-13-11) 21.6' (07-20-11)
Remarks:

Graphical Log	Water Level	DESCRIPTION	DEPTH FT.	BLOWS/FT	SAMPLE SYMBOL	MOISTURE (%)	% PASSING 200	DRY DENSITY (PCF)	Liquid Limit (%)	Plastic Limit (%)	REMARKS
		Ground Surface									
		SILTY CLAY, FILL with some fine sand; major roots (topsoil) to 5"; brown (CL-FILL)	0								loose to 8" moist
											stiff
				17							
		grades with occasional coarse sand and fine gravel	5								
				17							
		SILTY CLAY with some fine sand and occasional silt and coarse sand partitions; mottling									
			10								
				18							
		grades with occasional to numerous silty fine sand/fine sandy silt partitions	15								medium stiff
				5							
		no recovery with D&M, pushed SPT	20								saturated
				1							very soft
			25								

The discussion in the text under the section titled, SUBSURFACE CONDITIONS, is necessary for a proper understanding of the nature of the subsurface material.

FIGURE 3B

Gordon Spilker Huber Geotechnical Consultants, Inc.
Salt Lake City, Utah 84123

BOREHOLE B-2

Project Name: Social Science Building Seismic Upgrade
Project No.: 1153-001-11
Location: SE Cnr Tyler Avenue/Edvalson Street, Ogden, UT
Client: Weber State University
Drilling Method: 3-3/4" ID Hollow-Stem Auger
Date Drilled: 07-13-11
GSH Field Rep.: RJG
Elevation: ---
Water Level: 20.0' (07-13-11) 21.6' (07-20-11)
Remarks:

Graphical Log	Water Level	DESCRIPTION	DEPTH FT.	BLOWS/FT	SAMPLE SYMBOL	MOISTURE (%)	% PASSING 200	DRY DENSITY (PCF)	Liquid Limit (%)	Plastic Limit (%)	REMARKS
		grades with occasional to numerous layers up to 1" thick of silty fine sand; near-vertical bedding plane		13		29.3		93			stiff
		grades with occasional to numerous layers up to 2" thick of silty fine sand; horizontal bedding; brown/grayish-brown	30	22		31.5		90			very stiff
		grades with numerous to alternating layers up to 2" thick of silty fine sand; slightly dipping bedding	35	17							stiff
		grades with numerous layers up to 1" thick of silty fine sand	40	11							
		Stopped drilling at 40.0'. Stopped sampling at 41.5'. Installed 1-1/4" diameter slotted PVC pipe to 35.0'.	45 50								

The discussion in the text under the section titled, SUBSURFACE CONDITIONS, is necessary for a proper understanding of the nature of the subsurface material.

FIGURE 3B
(con't)

UNIFIED SOIL CLASSIFICATION SYSTEM

FIELD IDENTIFICATION PROCEDURES				GRAPH SYMBOL	LETTER SYMBOL [1]	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS More than half of material is larger than No. 200 sieve size. [2] (The No. 200 sieve size is about the smallest particle visible to the naked eye)	GRAVELS More than half of coarse fraction is larger than No. 4 sieve size. (For visual classifications, the 1/4" size may be used as equivalent to the No. 4 sieve size.)	CLEAN GRAVELS (Little or no fines)	Wide range in grain size and substantial amounts of all intermediate particle sizes.		GW	Well graded gravels, gravel-sand mixtures, little or no fines.
			Predominantly one size or a range of sizes with some intermediate sizes missing.		GP	Poorly graded gravels, gravel-sand mixtures, little or no fines.
		GRAVELS WITH FINES (Appreciable amount of fines)	Non-plastic fines (for identification procedures see ML below).		GM	Silty gravels, poorly graded gravel-sand-silt mixtures.
			Plastic fines (for identification procedures see CL below).		GC	Clayey gravels, poorly graded gravel-sand-clay mixtures.
	SANDS More than half of coarse fraction is smaller than No. 4 sieve size. (For visual classifications, the 1/4" size may be used as equivalent to the No. 4 sieve size.)	CLEAN SANDS (Little or no fines)	Wide range in grain sizes and substantial amounts of all intermediate particle sizes.		SW	Well graded sands, gravelly sands, little or no fines.
			Predominantly one size or a range of sizes with some intermediate sizes missing.		SP	Poorly graded sands, gravelly sands, little or no fines.
		SANDS WITH FINES (Appreciable amount of fines)	Non-plastic fines (for identification procedures see ML below).		SM	Silty sands, poorly graded sand-silt mixtures.
			Plastic fines (for identification procedures see CL below).		SC	Clayey sands, poorly graded sand-clay mixtures.

IDENTIFICATION PROCEDURES ON FRACTION SMALLER THAN No. 40 SIEVE SIZE		DRY STRENGTH (CRUSHING CHARACTERISTICS)	DILATANCY (REACTION TO SHAKING)	TOUGHNESS (CONSISTENCY NEAR PLASTIC LIMIT)	GRAPH SYMBOL	LETTER SYMBOL [1]	TYPICAL DESCRIPTIONS
FINE GRAINED SOILS More than half of material is smaller than No. 200 sieve size. (The No. 200 sieve size is about the smallest particle visible to the naked eye)	SILTS AND CLAYS Liquid limit less than 50	None to slight	Quick to slow	None		ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sand with slight plasticity.
		Medium to high	None to very slow	Medium		CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.
		Slight to medium	Slow	Slight		OL	Organic silts and organic silt-clays of low plasticity.
	SILTS AND CLAYS Liquid limit greater than 50	Slight to medium	Slow to none	Slight to medium		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts.
		High to very high	None	High		CH	Inorganic clays of high plasticity, fat clays.
		Medium to high	None to very slow	Slight to medium		OH	Organic clays of medium to high plasticity.
HIGHLY ORGANIC SOILS		Readily identified by color, odor, spongy feel and frequently by fibrous texture.				Pt	Peat and other highly organic soils.

[1] Boundary classifications: Soils possessing characteristics of two groups are designated by combinations of group symbols. For example GW-GC, well graded gravel-sand mixture with clay binder.
[2] All sieve sizes on this chart are U.S. standard.

GSH

GENERAL NOTES

1. In general, Unified Soil Classification Designations presented on the logs were evaluated by visual methods only. There rore, actual designations (based on laboratory testing) may differ.

2. Lines seperating strata on the logs represent approximate boundaries only Actual transitions may be gradual.

3. Logs represent general soil conditions observed at teh point of exploration onthe date indicated.

4. No warranty is provided as to the continuity of soil conditions between individual sample locations.

FINE - GRAINED SOIL

CONSISTENCY	SPT (blows/ft)	TORVANE UNDRAINED SHEAR STRENGTH (tsf)	POCKET PENETROMETER UNCONFINED COMPRESSIVE STRENGTH (tsf)	FIELD TEST
Very Soft	<2	<0.125	<0.25	Easily penetrated several inches by Thumb. Squeezes through fingers.
Soft	2 - 4	0.125 - 0.25	0.25 - 0.5	Easily penetrated 1 " by Thumb . Molded by light finger pressure.
Medium Stiff	4 - 8	0.25 - 0.5	0.5 - 1.0	Penetrated over 1/2 " by Thumb with moerate effort. Molded by strong finger pressure.
Stiff	8 - 15	0.5 - 1.0	1.0 - 2.0	Indented about 1/2 " by Thumb but penetrated only with great effort
Very Stiff	15 - 30	1.0 - 2.0	2.0 - 4.0	Readily indented by Thumbnail
Hard	>30	>2.0	>4.0	Indented with difficulty by Thumbnail

LOG KEY SYMBOLS

- Bulk / Bag Sample
- Thin Wall
- Standard Penetration Split Spoon Sampler
- No Recovery
- Rock Core
- 3-3/4" ID D&M Sampler
- 3" ID D&M Sampler
- Water Level
- California Sampler

COARSE -GRAINDE SOIL

APPERENT DENSITY	SPT (blows/ft)	RELATIVE DENSITY (%)	FIELD TEST
Very Loose	<4	0 - 15	Easily penetrated with 1/2 " reinforcing rod pushed by hand
Loose	4 - 10	15 - 35	Difficult to penetrated with 1/2 " reinforcing rod pushed by hand
Medium Dense	10 - 30	35 - 65	Easily penetrated a foot with 1/2 " reinforcing rod driven with 5-lb hammer
Dense	30 - 50	65 - 85	Difficult to penetrated a foot with 1/2 " reinforcing rod driven with 5-lb hammer
Very Dense	>50	85 - 100	Penetrated only a few inches with 1/2 " reinforcing rod driven with 5-lb hammer

STRATIFICATION

DESCRIPTION	THICKNESS
SEAM	1/16 - 1/2 "
LAYER	1/2 - 12 "

DESCRIPTION	THICKNESS
Occasional	One or less per foot of thickness
Frequent	More than on per foot of thichness

CEMENTATION

DESCRIPTION	DESCRIPTION
Weakely	Crumbles or breaks with handling of slight finger pressure
Moderately	Crumbles or breaks with considerable finger pressure
Strongly	Will not crumbles or breaks with finger pressure

MODIFIERS

DESCRIPTION	%
Trace	<5
Some	5 - 12
With	>12

MOISTURE CONTENT

DESCRIPTION	FIELD TEST
Dry	Absence of moisture, dusty, dry to the touch
Moist	Damp but no visible water
Wet	Visible water, usually soil below Water Table

FIGURE 4

GSH
Gordon Spilker Huber
Geotechnical Consultants, Inc.

ASBESTOS, LEAD AND HAZARDOUS MATERIALS
INSPECTION, SURVEY AND ASSESSMENT
FOR

SOCIAL SCIENCE BUILDING

WEBER STATE UNIVERSITY
OGDEN, UTAH 84403

WEBER STATE
UNIVERSITY

ASBESTOS SURVEY AND ASSESSMENT
FOR

SOCIAL SCIENCE BUILDING

WEBER STATE UNIVERSITY
OGDEN, UTAH 84403

April 8, 2016

Prepared for:

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ASBESTOS SURVEY AND ASSESSMENT
SOCIAL SCIENCE BUILDING
WEBER STATE UNIVERSITY

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1.0 EXECUTIVE SUMMARY

Asbestos Survey and Assessment
Social Science Building
Weber State University
Ogden, Utah 84403

An asbestos survey was conducted at the subject facility during January and February 2016. The building was visually inspected to identify building materials that might contain asbestos. Bulk samples were collected from suspect materials and analyzed to determine if they contained asbestos. All asbestos-containing materials (ACM) were assessed for damage and the potential for exposure. This survey was requested and approved by Mr. Chad Downs, Project Manager, Weber State University.

Asbestos-Containing Materials by Homogeneous Area
Social Science Building
Weber State University

Homogeneous Area Number	Material Description	Asbestos Content	Quantity	Cost Estimate
M001	9” Vinyl Floor Tile	3% Chrysotile	1,987 ft^2	$5,961
M002	9” Vinyl Floor Tile	5% Chrysotile	3,711 ft^2	$11,133
M003	12” Vinyl Floor Tile	3% Chrysotile	1,569 ft^2	$4,707
M006	Black Flooring Mastic	15% Chrysotile	7,357 ft^2	$20,231.75
M015	Black Tar Sealant	10% Chrysotile	14 ft^2	$168
M018	Insulation Anchor Adhesive	30% Chrysotile	9,375 ft^2	$37,500
M023	Fume Hood (transite)	17% Chrysotile	60 ft^2	$360
M024	Warming Cabinet (transite)	17% Chrysotile	256 ft^2	$1,536
M025	Cloth Hot Mitt	80% Chrysotile	2 each	$96
M028	Garbage Shute Door Insulation	35% Amosite	5 each	$250
M029	Composite Window Panel	25% Chrysotile	418 panels (2’x6’)	$250,800
M030	Insulation Sealant	5% Chrysotile	95 lf	$1,140
M032	Fire Door (and Frame) Insulation	3% Amosite 3%Chrysotile	52 each	$24,960
M034	CMU Block Filler	5% Chrysotile	2,160 ft^2	N/A
M036	Roofing	Assumed	30,800 ft^2	N/A
T001	TSI – Plaster Fitting	Trace Chrysotile[3]	101 ft^2	$4,848
M027	Vault Door Insulation	Trace Tremolite[3] Trace Actinolite	24 ft^2	$384
M035	Wall System[2]	Overall <1% Chrysotile[3]	~ 83,578 ft^2	$334,312

Notes:

1. Homogeneous Area Number (Not related to building room numbers.)
2. Wall System material contains <1% Chrysotile Asbestos in the joint compound with an overall asbestos content of less than 1%. According to the Federal Register page 542, Wednesday, January 5, 1994, 40 CFR Part 61, "Asbestos NESHAP Clarification Regarding Analysis of Multi-Layered Systems", when joint compound is applied to wallboard, it becomes an integral part of it, forming a wall system. Composite analysis of the wall system is to be conducted. In this case, the wall system contains less than 1% asbestos and is therefore not subject to the NESHAP. Removal of this material is a Class II Operation under OSHA, which requires 40-hour trained supervisors, trained workers and specific work practices (wet methods, prompt clean-up of debris, HEPA vacuums, etc.)
3. Asbestos content determined by Point Count

Asbestos Survey and Assessment
Social Science Building
Weber State University

2.0 INTRODUCTION

During January and February 2016, R & R Environmental, Inc., conducted an asbestos survey of the Social Science Building located at Weber State University, Ogden, Utah. The purpose of this survey was to identify the existence, extent, and condition of both friable and non-friable asbestos-containing materials (ACM) within the facility. Bulk samples were collected from suspect materials and analyzed for asbestos content. Each occurrence of ACM was assessed for damage and friability.

The following accredited and certified inspectors performed the inspection, collected the samples and made assessment:

April 8, 2016

Steve Smith
State of Utah, Division of Air Quality Inspector
Certification Number: ASB-3274
State of Utah Company Certification #ASBC-237

Date

This report was reviewed by:

April 8, 2016

David C. Roskelley, MSPH, CIH, CSP
State of Utah, Division of Air Quality Inspector
Certification Number: ASB-1370
AHERA Inspector #5 PSI 65451 I
Certified Safety Professional #15774
Certified Industrial Hygienist #8529
State of Utah Company Certification #ASBC-237

Date

3.0 BUILDING DESCRIPTION

Building Identification

Building Name..... Social Science Building
Building Address ..... 1014 University Circle, Ogden, Utah 84408

Building Construction

Building Construction Date.....1972
Building Type.....Classrooms, Labs, Offices
Building Total Sq. Ft ..... 124,000 ft^2
Structural System..... Concrete
Exterior Wall Construction .....Concrete, Masonry
Floor Deck Construction..... Concrete
Roof Construction.....Flat, Membrane
Floors Above Grade..... 3
Floors Below Grade..... 1

Interior Finishes

Floors ..... Carpet, Ceramic, Vinyl Flooring
Walls .....Plaster, Demountable System, Wallboard, Ceramic Tile
Attic .....None
Crawlspace .....None

Building Mechanical

Heating Plant .....Campus, Hot Water
Main Heating Distribution .....Forced Air
Cooling Plant.....Campus, Chilled Water
Main A / C Distribution .....Forced Air

4.0 SURVEY PROCEDURES

4.1 Building Survey

All accessible areas of the facility were visually inspected to identify suspect asbestos containing materials (ACM.) All accessible surfaces, structures, and mechanical systems within these areas were examined and all suspected ACM was touched to determine friability.

Suspect ACM was identified and assessed in homogeneous areas. A homogeneous area is defined as a single material, uniform in texture and appearance, installed at one time, and unlikely to consist of more than one type, or formulation, of material. In cases where joint compound and / or tape has been applied to wallboard (gypsum board) and cannot be visually distinguished from the wallboard, it is considered an integral part of the wallboard and in effect becomes one material forming a wall or ceiling "system."

Each homogeneous area was given a unique material identification number. Each ID number begins with a letter: "S" for surfacing materials, "T" for thermal system insulation, or "M" for miscellaneous materials. This letter is followed by a three-digit number, assigned in consecutive order. This number is used to identify the homogeneous area throughout the inspection report.

4.2 Bulk Sample Collection

Bulk samples were collected from all accessible homogeneous areas of suspect ACM for subsequent laboratory analysis to determine actual asbestos content. Sampling was conducted in a manner that minimized damage to the building, did not leave any unsightly marks, and did not create a health hazard for the inspectors.

The number of samples collected from each homogeneous area generally followed the EPA AHERA regulations (40 CFR 763.86). Friable surfacing materials were sampled using the random sampling scheme given in the EPA publication 560 / 5-85-30a, titled "Asbestos in buildings: Simplified Sampling Scheme for Friable Surfacing Materials."" Between three and seven samples were collected from friable surfacing materials, depending on the size of the homogeneous area.

4.3 Bulk Sample Analysis

Bulk samples were analyzed using polarized light microscopy (PLM) and visual estimation in accordance with the EPA Interim Method for the Determination of Asbestos in Bulk Insulation Samples, EPA-600 / M4-82-020. Samples were analyzed by Reservoirs Environmental, Inc., 5801 Logan Street, Suite 100, Denver, Colorado, 80216. The laboratory is accredited under the National Institute of Standards and Technology – National voluntary Laboratory Accreditation Program (NIST-NVLAP) for bulk-asbestos sample analysis and is also accredited by the American Industrial Hygiene Association (AIHA).

Federal EPA's NESHAP and AHERA regulations define ACM as material containing greater than 1% asbestos by weight; materials containing less than 1% asbestos are not considered regulated ACM.

Further, the NESHAP regulations state that any sample found to contain less than 10% asbestos but greater than "none detected," by visual estimation, must be assumed to contain greater than 1% asbestos unless confirmed to be less than 1.0% asbestos by point counting analysis. Any samples found to contain asbestos in this concentration range were assumed to contain greater than 1.0% asbestos and are listed in Section 5.8 of this report. All samples that have been point counted are identified as such in the sample result tables.

The laboratories reports can be found in Appendix D of this report.

5.0 SURVEY RESULTS

5.1 Asbestos-Containing Materials

Homogeneous areas of suspect ACM are identified as being ACM if the laboratory analysis shows the material to contain any detectable asbestos, unless subsequent TEM analysis resulted in less than 0.1% asbestos being detected. Table 1 of the Executive Summary and in Appendix A lists all homogeneous areas that were found to be ACM. Each material is described by type of material, friability and visual appearance.

Friability is defined in accordance with EPA's NESHAP regulations.

> "Friable ACM" is any material containing more than 1% asbestos (as determined by PLM) that, when dry, may be crumbled, pulverized, or reduced to powder by hand pressure and also includes non-friable ACM that may become friable during building demolition.
>
> "Non-friable ACM" is any material containing more than 1% asbestos (as determined by PLM) that, when dry, cannot be crumbled, pulverized, or reduced to powder by hand pressure.
>
> "Category I non-friable ACM" are asbestos-containing resilient floor coverings (commonly known as vinyl asbestos tile (VAT), asphalt roofing products, packings, and gaskets.
>
> "Category II non-friable ACM" encompasses all other non-friable ACM.
>
> "Non-friable RACM" is used to denote thermal system insulation that is in good condition but would become friable during renovation or demolition and therefore is "regulated asbestos containing material" (RACM).

SOCIAL SCIENCE BUILDING
WEBER STATE UNIVERSITY
DATE OF SURVEY: FEBRUARY 2016
NESHAP - REGULATED
ASBESTOS-CONTAINING MATERIALS (R-ACM)

1. Friable asbestos material (>1% asbestos and can be crumbled, pulverized or reduced to powder by hand pressure)
   ____Thermal system insulation (TSI)*
   ____Textured ceiling material (TCM)*
   ____Spray-on insulation or fireproofing*
   ____Blown-in insulation*
   ____Ceiling tiles/panels*
   ____Plaster, gypsum board, gypsum board joint compound*
   _X_Cloth materials* (Cloth Hot Mitt)
   ____Paper materials*
   ____Electrical wiring insulation*
   ____Sink undercoating (loose)*
   _X_Other*(Garbage Shute Door, Composite Door Materials)

2. Category I ACM which has become friable
   ____Packings
   ____Gaskets
   ____Resilient floor coverings (floor tile and sheet vinyl)
   ____Asphalt roofing products

3. Category I ACM that will be or has been subjected to sanding, grinding, cutting or abrading
   ____Packings
   ____Gaskets
   ____Resilient floor coverings (floor tile and sheet vinyl)
   ____Asphalt roofing products

4. Category II ACM that has a high probability of becoming or has become friable in the course of demolition or renovation operations
   ____Asbestos cement materials*
   ____Asphalt, tar and rubber-base ACM products other than roofing products*
   ____Non-asphalt and non-paper roofing products*
   ____Paint*
   ____Fire brick and/or mortar*
   ____Stainless steel sink undercoating (solid)*
   ____Encapsulated TCM*
   ____Encapsulated TSI*
   ____Mastic for floor tile, ceiling tile, cove molding, etc.*
   _X_Other* (Fire Door Insulation)

SOCIAL SCIENCE BUILDING
WEBER STATE UNIVERSITY
DATE OF SURVEY: FEBRUARY 2016
NESHAP NON-REGULATED
ASBESTOS-CONTAINING MATERIAL (N-R-ACM)

1. ≥ 1% asbestos

2. Category I Non-friable (cannot be crumbled, pulverized, or reduced to powder by hand pressure) ACM with >1% asbestos by new PLM procedure
   ____Packings
   ____Gaskets
   _X_Resilient floor coverings (floor tile)
   _X_Asphalt roofing products

3. Category II Non-friable ACM with >1% asbestos by new PLM procedure (Category includes items meeting Category I definition but not specifically listed in that category)
   _X_Asbestos cement materials (transite)*
   _X_Asphalt, tar and rubber-base ACM products other than roofing products*
   ____Non-asphalt and non-paper roofing products*
   ____Paint*
   ____Fire brick and/or mortar*
   ____Sink undercoating (solid)*
   _X_Mastic for floor tile, ceiling tile, cove molding, etc.*
   _X_Other* (CMU Block Filler Material)

Notes:

1. (*) denotes R & R's interpretation of materials included in this category.
2. New PLM procedure is outlined in Appendix A, Subpart F, 40 CFR, Part 783, Section 1, Polarized Light Microscopy.
3. The Environmental Protection Agency (EPA) National Emission Standard for Hazardous Air Pollutants (NESHAP) asbestos revision as outlined in 40 CFR, Part 61, became effective November 20, 1990. The asbestos classification system outlined in the revision and included in this section is dynamic in nature. Asbestos materials classified as "NON-REGULATED" at the time of the survey may become "REGULATED" due to ongoing or planned maintenance, renovation, or demolition actions, which can transform a material containing greater than 1% asbestos from a "non-friable" and NON-REGULATED to a friable and REGULATED condition. Classification of ACM in this section and in the executive summary of this report is, therefore, based on the observations of the surveyor at the time of the survey and may or may not be appropriate at later dates.
4. Maintenance, renovation, demolition, weathering, normal wear, water or other damage can alter the "NON-REGULATED" status of materials, and necessitate precautions required for handling them as "REGULATED" asbestos-materials.

5.2 Non-Asbestos-Containing Materials

Homogeneous areas of suspect ACM are identified as non-ACM if the laboratory analysis shows the material to contain no detectable asbestos. Table 2, located in Appendix A of this report, lists all homogeneous areas that were found to be non-ACM.

5.3 Bulk Sample Analytical Results

Table 3, located in Appendix A of this report, lists all of the bulk samples in order by sample number, that were collected from homogeneous areas of suspect ACM, along with the laboratory analytical results. Each sample was given a unique sample number. There may be more than one sample number for the same homogeneous area of suspect ACM. The homogeneous areas of suspect ACM are identified on this table by their material identification numbers. The sample location listed on this table provides a brief, but specific, description of the location where the sample was collected. This is different than the homogeneous area location provided on Tables 1 and 2. Table 4 is the same as Table 3 except the entries has been sorted by homogeneous area number.

5.4 Damage and Hazard Assessment

Each homogeneous area of ACM has been assessed for existing damage, accessibility, and potential for future damage, and this information is presented in Table 5, located in Appendix A of this report. This table also lists the substrate present beneath each homogeneous area of ACM.

Each homogeneous area of friable ACM and asbestos-containing building material (ACBM) was classified into one of the following seven categories, as specified in EPA's AHERA regulations (40 CFR 763.88):

(1) Damaged or significantly damaged thermal system insulation ACM.
(2) Damaged friable surfacing ACM.
(3) Significantly damaged friable surfacing ACM.
(4) Damaged or significantly damaged friable miscellaneous ACM.
(5) ACBM with potential for damage.
(6) ACBM with potential for damage.
(7) Any remaining friable ACBM or friable suspected ACBM.

The damage categories are defined as follows:

> "Undamaged" means the material had no visible damage, or extremely minor damage or surface marring (i.e., a room full of floor tile with only two or three small corners chipped off on the tile).
>
> "Damaged" means the material had visible damage evenly distributed over less than 10% of its surface, or localized over less than 25% of its surface.

"Significantly Damaged" means the material had visible damage that is evenly distributed over 10% or more of its surface, or localized over 25% or more if its surface.

Each homogeneous area of ACM was evaluated for accessibility to the building occupants and the general public, assuming the building was fully occupied, using the following assessment categories.

"Inaccessible" means the material was located in an area that people had no reason to enter and could not access without special measures. One example would be above a solid ceiling.

"Rarely Accessed" identifies a material that was in a location that could be accessed but wasn't unless there was a specific need. An example would be a pipe tunnel. Another example would be a high ceiling that is out of reach and not subject to any specific disturbance.

"Periodic Access" identifies a material that was in a location that was accessible, was not occupied full time, but was accessed on a routine basis. An example would be a mechanical room or boiler room.

"Continuous Access" identifies a material that was in a location that was occupied full time and was within reach of the occupants, or was frequently subject to direct disturbance. Examples would be exposed floor tile or a normal height ceiling.

5.5 Hazard Ranking

A hazard ranking has been determined for every ACM, in each functional space (room), and is listed in Table 7, Appendix A. The Hazard Rank is derived from the material's current condition and potential for future disturbance.

The DFCM required hazard assessment process used here produces seven hazard Ranks. The rankings of potential hazard range from 7, most hazardous, to 1, least hazardous, and are used to determine abatement priority. The highest ranking is reserved for ACM that is "significantly damaged". Hazard rankings 6 to 4 reflect ACM that is "damaged" (slight damage is the term used in Table 7), with a ranking of 6 indicating a "potential for significant damage", and a ranking of 5 indicating a "potential for damage." Hazard rankings of 3 to 1 are reserved for materials currently in good condition, but with a range of moderate to low in the likelihood for future disturbance.

Note that these seven rankings are different from, and should not be confused with, the seven AHERA categories of damage and potential damage described in Section 5.4, above, and listed in Table 5. This hazard assessment scheme is also completely reversed

from the current EPA Management Planner hazard assessment scheme where a hazard rank of 1 is the most hazardous.

5.6 Homogeneous Areas with Special Considerations

None

5.7 Suspect Materials Presumed to be Asbestos-Containing Materials without Laboratory Analysis

Roofing materials.

5.8 Inaccessible Areas

Masonry walls and roof covering.

5.9 Material(s) assumed to contain >1.0% asbestos without subsequent TEM or Point Count Analysis

None

6.0 RESPONSE ACTION COMMENTS

6.1 EPA Requirements

Asbestos is regulated as a hazardous air pollutant by the Environmental Protection Agency (EPA) under the authority of the Clean Air Act. The asbestos regulations are included in the National Emissions Standards for Hazardous Air Pollutants (NESHAP) and referenced as 40 CFR 61, Subpart M. ACMs identified in this report are subject to those regulations. Those regulations, and state and local regulations, should be carefully examined prior to renovation, demolition, cleanup, or any other activity which could disturb the ACMs, to ensure that all activities are in compliance with applicable requirements.

ACM is defined by the EPA, as any material containing greater than one percent of asbestos. ACMs are categorized as being either friable or non-friable. Friable ACMs are those materials that can be easily crumbled, pulverized, or otherwise broken up using hand or finger pressure when dry, and are materials considered more likely to produce airborne asbestos fibers. Non-friable ACMs are materials that do not meet the above test, and are considered less likely to produce airborne asbestos fibers. Not all ACMs are regulated under NESHAP. Regulated ACM (RACM) means (a) Friable asbestos material, (b) Category I non-friable ACM that has become friable, (c) Category I non-friable ACM that will be or has been subjected to sanding, grinding, cutting, or abrading, or (d) Category II non-friable that has a high probability of becoming or has become crumbled, pulverized, or reduced to powder by the forces expected to act on the material in the course of regulated demolition or renovation operations. Regulated demolition and renovation operations are those where the quantity of ACM affected is 260 linear feet or more on pipes, 160 square feet or more on other components, or 35 cubic feet or more in volume. There are certain notification requirements for demolition projects involving less than the above quantities.

Briefly, EPA requires that RACM be removed from facilities scheduled for demolition or renovation before any activity begins that would break up, dislodge, or similarly disturb the materials or preclude access to the materials for subsequent removal. Category I non-friable ACM that is not in poor condition and is not friable does not have to be removed prior to demolition of a facility. **However, these materials are exempt from mandatory removal only during demolition, not renovation. Removal is mandated when renovation activities are expected to disturb these ACMs and render them friable.** Category II non-friable ACM also does not have to be removed prior to demolition if the probability is low that the material will become crumbled, pulverized, or reduced to powder (made friable) during demolition. However, state regulations may require the removal of these materials. Additionally, Category I non-friable ACM that has not become crumbled, pulverized, or reduced to powder during demolition activities may be disposed of as ordinary construction waste.

In any situation where ACM remains in a building, it should be managed under a comprehensive operations and maintenance program (O&M). The procedures and

guidelines described in an O&M program should be followed whenever building maintenance activities may disturb any ACMs present in the building.

6.2 Renovation Options

NESHAP regulations require the removal of non-friable ACMs before they are **disturbed and made friable** during renovation activities. Therefore, we recommend that all of these materials be removed and properly disposed of by a licensed asbestos abatement contractor before renovation activities begin **which have the potential of disturbing and making these materials friable.** The removal project must follow the requirements of the OSHA regulation outlined in 29 CFR 1926.1101. While these materials remain in place, a comprehensive asbestos O&M program should be implemented when the building is occupied to reduce human exposure to airborne asbestos fibers.

7.0 COST ESTIMATES

A breakdown of the estimated removal costs by homogeneous area can be found in the Table 6, Appendix A. These cost estimates are provided for use in long-term budgeting and planning only, and do not have a level of accuracy sufficient to be used as a construction design cost estimate. The actual cost of asbestos removal is highly dependent on a number of factors such as the size of the project, the required time frame for removal, the time of year the job is conducted, the regulatory climate at the time, etc., therefore, actual abatement costs could vary significantly from these estimates. Replacement costs have not been included in these figures.

The cost for abatement design and management services is <u>not</u> included in these figures. These additional fees can range from 15% of the estimated abatement costs for large projects to greater than 50% for very small projects. The design and management fees cover the cost of preparing plans and specifications, conducting the bidding process as well as third-party oversight during abatement.

8.0 LIMITATIONS AND EXCLUSIONS OF WARRANTY

This asbestos survey and assessment was performed using procedures and a level of diligence typically exercised by professional consultants performing similar services. However, asbestos-containing material (ACM) can be present in a structure, but not identified using ordinary investigative procedures.

No asbestos survey can completely eliminate uncertainty regarding the presence of ACM. R & R Environmental, Inc. level of diligence and investigative procedures are intended to reduce, but not eliminate, potential uncertainty regarding the presence of ACM. The procedures used for this survey attempt to establish a balance between the competing goals of limiting investigative costs, time, and building damage, and reducing the uncertainty about unknown conditions. Therefore, the determinations in this report should not be construed as a guarantee that all ACM present in the subject property has been included in this report.

This report presents R & R Environmental, Inc.'s professional determinations, which are dependent upon information obtained during performance of consulting services. R &R Environmental, Inc. assumes no responsibility for omissions or errors resulting from inaccurate information provided by sources outside of R & R Environmental, Inc.

No warranty or guarantee, expressed or implied, is made regarding the findings, conclusions, or recommendations contained in this report. The limitations presented above supersede the requirements or provisions of all other contracts or scopes of work, implied or otherwise, except those stated or acknowledged herein.

Appendix A

Data Tables

Table 1

Asbestos-containing Materials by Homogeneous Area
Social Science Building
Weber State University

Homogeneous Area Number	Material Description / Location	Friability	Asbestos Content	Quantity
M001	**Vinyl Floor Tile** 9” Gray colored limestone tile / Rooms 114B, 140B, 209, 204, 211, 223, 225, 230B, 278A, 276A	Non-friable	3% Chrysotile	1,987 ft^2
M002	**Vinyl Floor Tile** 9” off-white colored limestone tile / Rooms 024, 024A, 105, 111, 230, 230A, 230B, 230E, 230D	Non-friable	5% Chrysotile	3,711 ft^2
M003	**Vinyl Floor Tile** 12” off-white plastic and limestone tile / Rooms 001, 001B, 008, 030, 034B, 306, 319, 320, 321, 322, 329, 331, 379, 379A, 379B	Non-friable	3% Chrysotile	1,569 ft^2
M006	**Black Flooring Mastic** Black tar mastic / Rooms 114B, 140B, 209, 204, 211, 223, 225, 230B, 278A, 276A, 024, 024A, 105, 111, 230, 230A, 230B, 230E, 230D, 001, 001B, 008, 030, 034B, 306, 319, 320, 321, 322, 329, 331, 379, 379A, 379B, 327	Non-friable	15% Chrysotile	7,357 ft^2
M015	**Black Tar Sealant** Black sealant / Room 042A	Non-friable	10% Chrysotile	14 ft^2
M018	**Insulation Anchor Adhesive** Tan adhesive / 003A, 003B, Air Boxes, Insulated Ducting	Non-friable	30% Chrysotile	9,375 ft^2
M023	**Fume Hood** Fiber cement board / Room 232	Non-friable	17% Chrysotile	60 ft^2
M024	**Warming Cabinets** Fiber cement board / Room 024	Non-friable	17% Chrysotile	256 ft^2
M025	**Cloth Hot Mitt** White oven mitt / Room 232	Friable	80% Chrysotile	2 each

Homogeneous Area Number	Material Description / Location	Friability	Asbestos Content	Quantity
M027	**Vault Door Insulation** Plaster / Room 034B	Non-friable	Trace Tremolite / Trace Actinolite (By Point Count)	24 ft^2
M028	**Garbage Shute Door Insulation** Off white insulation / Rooms 020, 110, 228, 326	Friable	35% Amosite	5 each
M029	**Composite Window Panel** Light gray fibrous material / Exterior Windows	Friable	25% Chrysotile	418 Panels (panel = 2'x6')
M030	**Insulation Sealant** White fibrous resinous material / Room 323A	Non-friable	5% Chrysotile	95 ft^2
M032	**Fire Door(and Frame) Insulation** White Sealant / Mechanical Areas, Stairways	Friable	3% Amosite 3% Chrysotile	52 each
M034	**CMU Block Filler** Gray fibrous plaster / Room 003	Non-friable	5% Chrysotile	2,160 ft^2
M035	**Wall System** Joint Compound / Scattered Ceilings and Walls	Non-friable	Overall <1% Chrysotile (By Point Count)	≈ 83,578 ft^2
M036	**Roofing Material** Built Up Roof / Roof	Non-friable	Assumed	30,800 ft^2
T001	**TSI – Plaster Fitting** Fibrous plaster / Room 003	Friable	Trace Chrysotile (By Point Count)	101 ft^2

Table 2

Homogeneous Areas That Do Not Contain Asbestos
Social Science Building
Weber State University

Homogeneous Area Number	Material Description	Material Location / Quantity
M004	**Vinyl Cove Base & Mastic** Black Colored cove base with beige mastic	Throughout / 6,340 lf
M005	**Vinyl Cove Base & Mastic** Green Colored cove base with beige mastic	Room 112 / 72 lf
M007	**Ceiling Tile #1** 12" Light gray / white ceiling tile, brown adhesive	Hallways, Stairs / 28,540 ft^2
M008	**Ceiling Tile #2** 12" Tan / white ceiling tile	Classrooms / 35,882 ft^2
M009	**Ceiling Tile #3** 12" Metal clad light brown fibrous perlitic material with white pain	Rooms 24, 332 / 2,646 ft^2
M010	**2' x 4' Ceiling Panel** Light gray/white ceiling panel	Offices Throughout / 18,487 ft^2
M011	**2' x 2' Ceiling Panel** Light gray/white ceiling panel	Room 100A / 334 ft^2
M012	**Ceiling Tile Adhesive** Brown Adhesive	Throughout / 82,500 ft^2
M013	**HVAC Vibration Isolator** Dark gray fibrous woven material	Mechanical Areas / 680 lf
M014	**Red Duct Sealant (fire caulk)** Red sealant	Mechanical Areas / 260 lf
M016	**Exterior Caulk** Black resinous material with white fibrous woven material	Windows and Doors / >11,580 lf
M017	**Duct Sealant** White sealant	Ducting Throughout / 1,250 ft^2
M019	**TSI – End Sealant** Yellow fibrous material, white sealant	Pipe Insulation Throughout / 1,850 ft^2

Homogeneous Area Number	Material Description	Material Location / Quantity
M020	**Lab Sink/Counter Material** Black resinous material	Rooms 232, 230B / 7 each
M021	**Demountable Wall Material-Faux Wood Finish** Brown wall covering, white/tan drywall	Scattered Throughout / >5,000 ft^2
M022	**Demountable Wall Material** White wall covering, white/tan drywall	Throughout / >5,000 ft^2
M026	**Sound Room Insulation** Tan fibrous material	Room 323A / 342 ft^2
M031	**Exterior Caulk** Gray resinous material	Exterior Soffits / 2,216 lf
M033	**Air Handler Insulation** Black fibrous material	Air Handlers, Ducts / 9,375 ft^2
S001	**Plaster Surfacing** White paint, white granular plaster, off white plaster	Walls Throughout / >5,000 ft^2
S002	**Plaster Soffit Material** White granular plaster, gray granular material	Exterior Circulation Area / 8,650 ft^2
S003	**Plaster Surfacing** Gray granular micaceous plaster	Room 003A / 2,800 ft^2
T001	**TSI – Plaster Fittings** Gray fibrous plaster	Throughout Building / 2,922 ft^2

Table 3

Bulk Sample Analytical Results by Sample Number
Social Science Building
Weber State University

Sample Number	Homogeneous Area Number	Material Samples	Sample Location	Analytical Results
SSB-01	M001	Vinyl Floor Tile & Mastic	211	3% Chrysotile (tile) 15% Chrysotile (mastic)
SSB-02	M002	Vinyl Floor Tile & Mastic	230	5% Chrysotile (tile) 15% Chrysotile (mastic)
SSB-03	M003	Vinyl Floor Tile & Mastic	306	3% Chrysotile (tile) 15% Chrysotile (mastic)
SSB-04	M004	Vinyl Cove Base & Mastic	300	None Detected
SSB-05	M005	Vinyl Cove Base & Mastic	112	None Detected
SSB-06	M006	Black Flooring Mastic	327	15% Chrysotile
SSB-07	M007	12” Ceiling Tile	100	None Detected
SSB-08	M007	12” Ceiling Tile	200	None Detected
SSB-09	M007	12” Ceiling Tile	300	None Detected
SSB-10	M008	12” Ceiling Tile	119	None Detected
SSB-11	M008	12” Ceiling Tile	235	None Detected
SSB-12	M008	12” Ceiling Tile	337	None Detected
SSB-13	M009	12” Ceiling Tile	24	None Detected
SSB-14	M009	12” Ceiling Tile	332	None Detected
SSB-15	M010	2’ x 4’ Ceiling Panel	138	None Detected
SSB-16	M011	2’ x 2’ Ceiling Panel	100A	None Detected
SSB-17	M012	Ceiling Tile Adhesive	337	None Detected
SSB-18	M012	Ceiling Tile Adhesive	324	None Detected
SSB-19	M012	Ceiling Tile Adhesive	105	None Detected
SSB-20	M013	HVAC Vibration Isolator	3CB	None Detected
SSB-21	M014	Red Duct Sealant	3CB	None Detected
SSB-22	M015	Black Tar Sealant	042A	10% Chrysotile
SSB-23	M016	Caulking	South Exterior Window	None Detected
SSB-24	M017	Duct Sealant	003A	None Detected
SSB-25	M018	Insulation Anchor Adhesive	003A	30% Chrysotile
SSB-26	M018	Insulation Anchor Adhesive	003A	30% Chrysotile
SSB-27	M018	Insulation Anchor Adhesive	003	None Detected
SSB-28	M019	TSI – End Sealant	003	None Detected
SSB-29	M019	TSI – End Sealant	003	None Detected
SSB-30	M019	TSI – End Sealant	003	None Detected
SSB-31	M020	Lab Sink	232	None Detected
SSB-32	M020	Lab Sink	230B	None Detected
SSB-33	M020	Lab Sink	024	None Detected
SSB-34	M021	Faux Wood Demountable Wall	235	None Detected
SSB-35	M022	White Demountable Wall	325	None Detected
SSB-36	M022	White Demountable Wall	100	None Detected
SSB-37	S001	Plaster Surfacing	1CA	None Detected
SSB-38	S001	Plaster Surfacing	102	None Detected
SSB-39	S001	Plaster Surfacing	002	None Detected
SSB-40	S001	Plaster Surfacing	205	None Detected
SSB-41	S001	Plaster Surfacing	230B	None Detected
SSB-42	S001	Plaster Surfacing	319	None Detected

Sample Number	Homogeneous Area Number	Material Samples	Sample Location	Analytical Results
SSB-43	S001	Plaster Surfacing	319	None Detected
SSB-44	S002	Plaster Soffit	Exterior	None Detected
SSB-45	S002	Plaster Soffit	Exterior	None Detected
SSB-46	S002	Plaster Soffit	Exterior	None Detected
SSB-47	S002	Plaster Soffit	Exterior	None Detected
SSB-48	S002	Plaster Soffit	Exterior	None Detected
SSB-49	S002	Plaster Soffit	Exterior	None Detected
SSB-50	S002	Plaster Soffit	Exterior	None Detected
SSB-51	M023	Fume Hood	232	17% Chrysotile
SSB-52	M024	Warming Cabinet	024	17% Chrysotile
SSB-53	M025	Cloth Hot Mitt	232	80% Chrysotile
SSB-54	T001	TSI – Plaster Fitting	3CB	None Detected
SSB-55	T001	TSI – Plaster Fitting	3CA	None Detected
SSB-56	T001	TSI – Plaster Fitting	2CA	None Detected
SSB-57	T001	TSI – Plaster Fitting	2CB	None Detected
SSB-58	T001	TSI – Plaster Fitting	1CA	None Detected
SSB-59	T001	TSI – Plaster Fitting	1CB	None Detected
SSB-60	T001	TSI – Plaster Fitting	003	None Detected
SSB-61	T001	TSI – Plaster Fitting	003	None Detected
SSB-62	T001	TSI – Plaster Fitting	003	Trace Chrysotile
SSB-63	M026	Sound Room Insulation	323A	None Detected
SSB-64	M027	Vault Door Insulation	034B	Trace Tremolite / Actinolite
SSB-65	M028	Garbage Shute Door Insulation	020	35% Amosite
SSB-66	M029	Composite Window Panel	230B	25% Chrysotile
SSB-67	M030	Insulation Sealant	323A	5% Chrysotile
SSB-68	M031	Exterior Caulk	Exterior Soffit	None Detected
SSB-69	M032	Fire Door Insulation	001E	3% Amosite 3% Chrysotile
SSB-70	M033	Black Insulation	003A	None Detected
SSB-71	M034	CMU Wall Coating	003	None Detected
SSB-72	M034	CMU Wall Coating	003	None Detected
SSB-73	M034	CMU Wall Coating	003	5% Chrysotile
SSB-74	S003	Plaster Surfacing	003A	None Detected
SSB-75	S003	Plaster Surfacing	003A	None Detected
SSB-76	S003	Plaster Surfacing	003A	None Detected
SSB-77	S003	Plaster Surfacing	003B	None Detected
SSB-78	S003	Plaster Surfacing	003B	None Detected
SSB-79	M035	Wall System	042	None Detected
SSB-80	M035	Wall System	040A (Ceiling)	3% Chrysotile
SSB-81	M035	Wall System	138A	None Detected
SSB-82	M035	Wall System	138	None Detected
SSB-83	M035	Wall System	105 (Ceiling)	None Detected
SSB-84	M035	Wall System	209 (Ceiling)	3% Chrysotile
SSB-85	M035	Wall System	300A	None Detected
SSB-86	T001	TSI – Plaster Fitting	003	None Detected
SSB-87	T001	TSI – Plaster Fitting	003	None Detected
SSB-88	T001	TSI – Plaster Fitting	003	None Detected
SSB-89	T001	TSI – Plaster Fitting	008	None Detected
SSB-90	T001	TSI – Plaster Fitting	008	None Detected
SSB-91	T001	TSI – Plaster Fitting	1CA	None Detected

Sample Number	Homogeneous Area Number	Material Samples	Sample Location	Analytical Results
SSB-92	T001	TSI – Plaster Fitting	2CB	None Detected
SSB-93	T001	TSI – Plaster Fitting	2CB	None Detected
SSB-94	T001	TSI – Plaster Fitting	3CB	None Detected

Notes:

Table 4

Bulk Sample Analytical Results by Homogeneous Area Number
Social Science Building
Weber State University

Sample Number	Homogeneous Area Number	Material Samples	Sample Location	Analytical Results
SSB-01	M001	Vinyl Floor Tile & Mastic	211	3% Chrysotile (tile) 15% Chrysotile (mastic)
SSB-02	M002	Vinyl Floor Tile & Mastic	230	5% Chrysotile (tile) 15% Chrysotile (mastic)
SSB-03	M003	Vinyl Floor Tile & Mastic	306	3% Chrysotile (tile) 15% Chrysotile (mastic)
SSB-04	M004	Vinyl Cove Base & Mastic	300	None Detected
SSB-05	M005	Vinyl Cove Base & Mastic	112	None Detected
SSB-06	M006	Black Flooring Mastic	327	15% Chrysotile
SSB-07	M007	12” Ceiling Tile	100	None Detected
SSB-08	M007	12” Ceiling Tile	200	None Detected
SSB-09	M007	12” Ceiling Tile	300	None Detected
SSB-10	M008	12” Ceiling Tile	119	None Detected
SSB-11	M008	12” Ceiling Tile	235	None Detected
SSB-12	M008	12” Ceiling Tile	337	None Detected
SSB-13	M009	12” Ceiling Tile	24	None Detected
SSB-14	M009	12” Ceiling Tile	332	None Detected
SSB-15	M010	2’ x 4’ Ceiling Panel	138	None Detected
SSB-16	M011	2’ x 2’ Ceiling Panel	100A	None Detected
SSB-17	M012	Ceiling Tile Adhesive	337	None Detected
SSB-18	M012	Ceiling Tile Adhesive	324	None Detected
SSB-19	M012	Ceiling Tile Adhesive	105	None Detected
SSB-20	M013	HVAC Vibration Isolator	3CB	None Detected
SSB-21	M014	Red Duct Sealant	3CB	None Detected
SSB-22	M015	Black Tar Sealant	042A	10% Chrysotile
SSB-23	M016	Caulking	South Exterior Window	None Detected
SSB-24	M017	Duct Sealant	003A	None Detected
SSB-25	M018	Insulation Anchor Adhesive	003A	30% Chrysotile
SSB-26	M018	Insulation Anchor Adhesive	003A	30% Chrysotile
SSB-27	M018	Insulation Anchor Adhesive	003	None Detected
SSB-28	M019	TSI – End Sealant	003	None Detected
SSB-29	M019	TSI – End Sealant	003	None Detected
SSB-30	M019	TSI – End Sealant	003	None Detected
SSB-31	M020	Lab Sink	232	None Detected
SSB-32	M020	Lab Sink	230B	None Detected
SSB-33	M020	Lab Sink	024	None Detected
SSB-34	M021	Faux Wood Demountable Wall	235	None Detected
SSB-35	M022	White Demountable Wall	325	None Detected
SSB-36	M022	White Demountable Wall	100	None Detected
SSB-51	M023	Fume Hood	232	17% Chrysotile
SSB-52	M024	Warming Cabinet	024	17% Chrysotile
SSB-53	M025	Cloth Hot Mitt	232	80% Chrysotile

Sample Number	Homogeneous Area Number	Material Samples	Sample Location	Analytical Results
SSB-63	M026	Sound Room Insulation	323A	None Detected
SSB-64	M027	Vault Door Insulation	034B	Trace Tremolite / Actinolite
SSB-65	M028	Garage Shute Door Insulation	020	35% Amosite
SSB-66	M029	Composite Window Panel	230B	25% Chrysotile
SSB-67	M030	Insulation Sealant	323A	5% Chrysotile
SSB-68	M031	Exterior Caulk	Exterior Soffit	None Detected
SSB-69	M032	Fire Door Insulation	001E	3% Amosite 3% Chrysotile
SSB-70	M033	Black Insulation	003A	None Detected
SSB-71	M034	CMU Wall Coating	003	None Detected
SSB-72	M034	CMU Wall Coating	003	None Detected
SSB-73	M034	CMU Wall Coating	003	5% Chrysotile
SSB-79	M035	Wall System	042	None Detected
SSB-80	M035	Wall System	040A (Ceiling)	3% Chrysotile
SSB-81	M035	Wall System	138A	None Detected
SSB-82	M035	Wall System	138	None Detected
SSB-83	M035	Wall System	105 (Ceiling)	None Detected
SSB-84	M035	Wall System	209 (Ceiling)	3% Chrysotile
SSB-85	M035	Wall System	300A	None Detected
SSB-37	S001	Plaster Surfacing	1CA	None Detected
SSB-38	S001	Plaster Surfacing	102	None Detected
SSB-39	S001	Plaster Surfacing	002	None Detected
SSB-40	S001	Plaster Surfacing	205	None Detected
SSB-41	S001	Plaster Surfacing	230B	None Detected
SSB-42	S001	Plaster Surfacing	319	None Detected
SSB-43	S001	Plaster Surfacing	319	None Detected
SSB-44	S002	Plaster Soffit	Exterior	None Detected
SSB-45	S002	Plaster Soffit	Exterior	None Detected
SSB-46	S002	Plaster Soffit	Exterior	None Detected
SSB-47	S002	Plaster Soffit	Exterior	None Detected
SSB-48	S002	Plaster Soffit	Exterior	None Detected
SSB-49	S002	Plaster Soffit	Exterior	None Detected
SSB-50	S002	Plaster Soffit	Exterior	None Detected
SSB-74	S003	Plaster Surfacing	003A	None Detected
SSB-75	S003	Plaster Surfacing	003A	None Detected
SSB-76	S003	Plaster Surfacing	003A	None Detected
SSB-77	S003	Plaster Surfacing	003B	None Detected
SSB-78	S003	Plaster Surfacing	003B	None Detected
SSB-54	T001	TSI – Plaster Fitting	3CB	None Detected
SSB-55	T001	TSI – Plaster Fitting	3CA	None Detected
SSB-56	T001	TSI – Plaster Fitting	2CA	None Detected
SSB-57	T001	TSI – Plaster Fitting	2CB	None Detected
SSB-58	T001	TSI – Plaster Fitting	1CA	None Detected
SSB-59	T001	TSI – Plaster Fitting	1CB	None Detected
SSB-60	T001	TSI – Plaster Fitting	003	None Detected
SSB-61	T001	TSI – Plaster Fitting	003	None Detected
SSB-62	T001	TSI – Plaster Fitting	003	Trace Chrysotile
SSB-86	T001	TSI – Plaster Fitting	003	None Detected
SSB-87	T001	TSI – Plaster Fitting	003	None Detected
SSB-88	T001	TSI – Plaster Fitting	003	None Detected
SSB-89	T001	TSI – Plaster Fitting	008	None Detected
SSB-90	T001	TSI – Plaster Fitting	008	None Detected

Sample Number	Homogeneous Area Number	Material Samples	Sample Location	Analytical Results
SSB-91	T001	TSI – Plaster Fitting	1CA	None Detected
SSB-92	T001	TSI – Plaster Fitting	2CB	None Detected
SSB-93	T001	TSI – Plaster Fitting	2CB	None Detected
SSB-94	T001	TSI – Plaster Fitting	3CB	None Detected

Notes:

Table 5

Damage and Hazard Assessment by Homogeneous Area
Social Science Building
Weber State University

Area Number	Material Type	Substrate	Assessment Category	Damage	Accessibility	Disturbance Potential
M001	Vinyl Floor Tile	Concrete	5	No Damage	Easily Accessed	Low
M002	Vinyl Floor Tile	Concrete	5	No Damage	Easily Accessed	Low
M003	Vinyl Floor Tile	Concrete	5	No Damage	Easily Accessed	Low
M006	Black Floor Mastic	Concrete	X	No Damage	Rarely Accessed	Low
M015	Black Tar Sealant	Concrete	X	No Damage	Rarely Accessed	Low
M018	Insulation Anchor Adhesive	Metal, Concrete	5	No Damage	Rarely Accessed	Low
M023	Fume Hood	Metal	5	No Damage	Rarely Accessed	Low
M024	Warming Cabinets	Wood	5	No Damage	Rarely Accessed	Low
M025	Cloth Hot Mitt	Cloth	5	No Damage	Easily Accessed	Low
M027	Vault Door Insulation	Metal	X	No Damage	Rarely Accessed	Low
M028	Garbage Shute Door Insulation	Metal	5	No Damage	Rarely Accessed	Low
M029	Composite Window Panel	Metal	5	No Damage	Rarely Accessed	Low
M030	Insulation Sealant	Fiberglass	5	No Damage	Rarely Accessed	Low
M032	Fire Door Insulation	Metal, Wood	5	No Damage	Rarely Accessed	Low

Area Number	Material Type	Substrate	Assessment Category	Damage	Accessibility	Disturbance Potential
M034	CMU Block Filler	Metal	5	No Damage	Easily Accessed	Low
M035	Wall System	Ceiling Tile	X	No Damage	Rarely Accessed	Low
M036	Roofing Material	Concrete	5	No Damage	Rarely Accessed	Low
T001	TSI – Plaster Fitting	Metal	X	Damaged	Rarely Accessed	Low

Note: Assessment Categories:

1-Damaged or significantly damaged thermal system insulation ACM
2-Damaged friable surfacing ACM
3-Significantly damaged friable surfacing ACM
4-Damaged or significantly damaged friable miscellaneous ACM
5-ACM with potential for damage
6-ACM with potential for significant damage
7-Any remaining friable ACM or friable suspect ACM
X-Not applicable (material is non-friable surfacing or miscellaneous material)

Table 6

Estimated Abatement Costs by Homogeneous Area
Social Science Building
Weber State University

Homogeneous Area Number	Material	Quantity	Average Unit Cost	Abatement Cost
M001	Vinyl Floor Tile	1,987 ft^2	$3.00	$5,961
M002	Vinyl Floor Tile	3,711 ft^2	$3.00	$11,133
M003	Vinyl Floor Tile	1,569 ft^2	$3.00	$4,707
M006	Black Flooring Mastic	7,357 ft^2	$2.75	$20,231.75
M015	Black Tar Sealant	14 ft^2	$12.00	$168
M018	Insulation Anchor Adhesive	≈ 9,375 ft^2	$4.00	$37,500
M023	Fume Hood	60 ft^2	$6.00	$360
M024	Warming Cabinets	256 ft^2	$6.00	$1,536
M025	Cloth Hot Mitt	2 each	$48.00	$96
M027	Vault Door Insulation	24 ft^2	$16.00	$384
M028	Garbage Shute Door Insulation	5 each	$50.00	$250
M029	Composite Window Panel	418 Panels (panel = 2'x6')	$6.00	$250,800
M030	Insulation Sealant	95 ft^2	$12.00	$1,140
M032	Fire Door/Frame Insulation	52 each	$480.00	$24,960
M034	CMU Block Filler	2,160 ft^2	N/A	N/A
M035	Wall System	~ 83,578 ft^2	$4.00	$334,312
M036	Roofing Materials	30,800 ft^2	N/A	N/A
T001	TSI – Plaster Fittings	101 ft^2	$48.00	$4,848.00
TOTAL ESTIMATED ABATEMENT COST				**$698,386.75**

Notes:
1. Estimated abatement costs do not include replacement costs or costs for a consultant to manage the abatement (see section 7.0).

Appendix B

Building Floor Plans

= SAMPLE NUMBER AND LOCATION

= ASBESTOS CONTAINING FLOOR TILE & MASTIC

= ASBESTOS CONTAINING WARMING CABINET

= ASBESTOS CONTAINING BLACK TAR SEALANT

R & R
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47 West 9000 South, Suite #2 Sandy, Utah 84070
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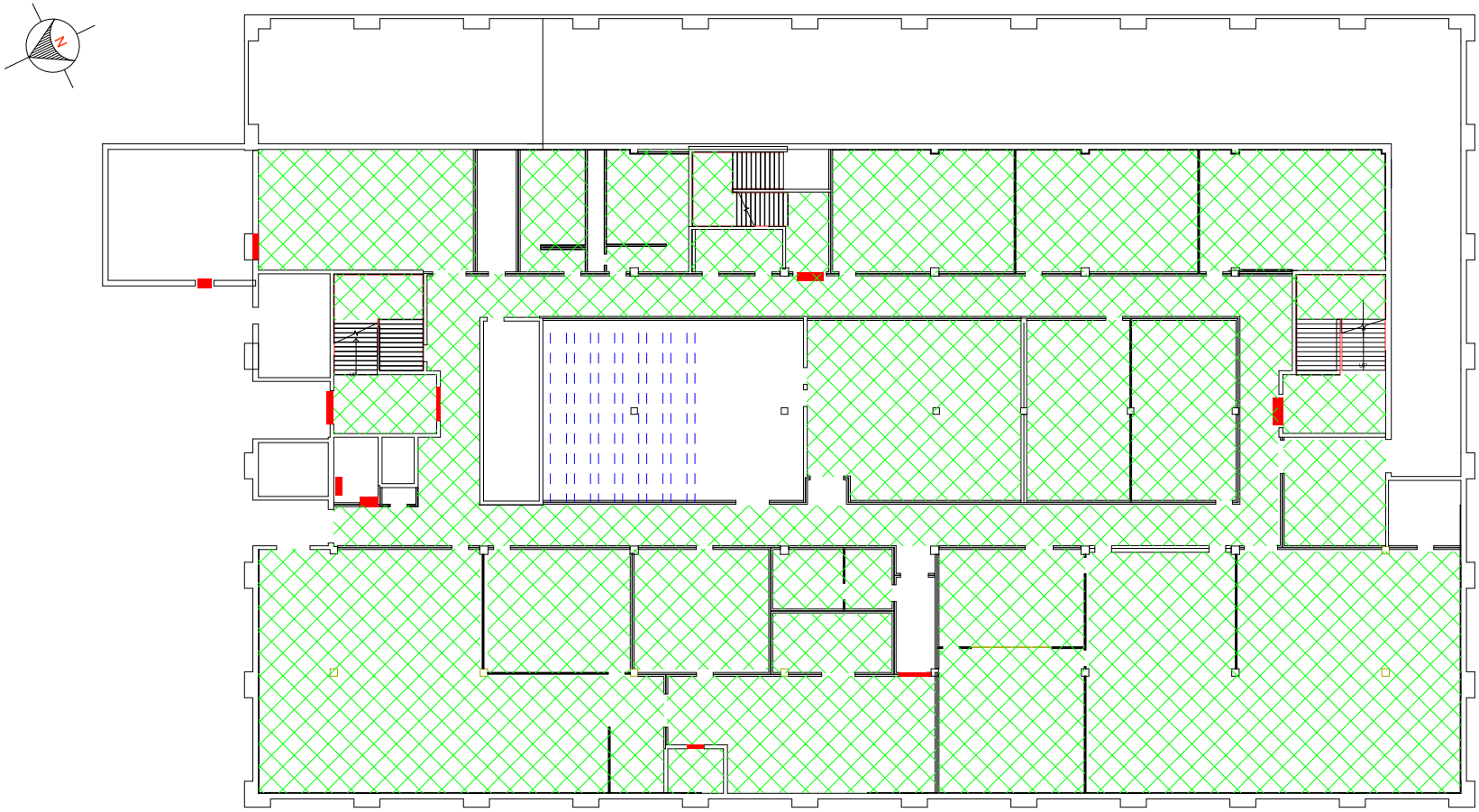
SOCIAL SCIENCE BUILDING

GROUND FLOOR PLAN

FLOORS

WEBER STATE UNIVERSITY
SOCIAL SCIENCE BUILDING
OGDEN, UTAH

FEBRUARY 2016



= ASBESTOS CONTAINING WALL SYSTEM

= ASBESTOS CONTAINING FIRE DOOR

= ASBESTOS CONTAINING WALL INSULATION ANCHOR ADHESIVE

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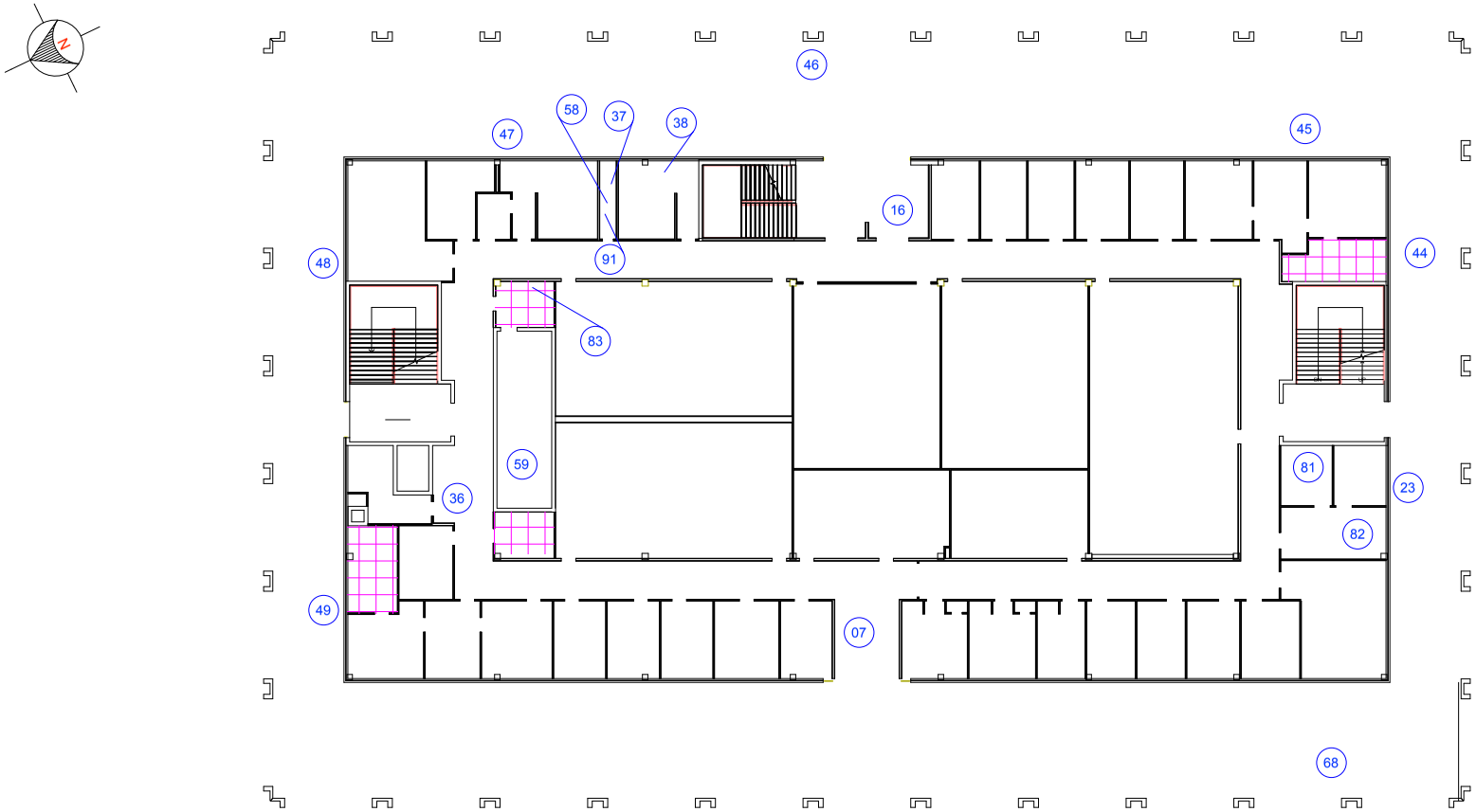
GROUND FLOOR PLAN
CEILINGS

WEBER STATE UNIVERSITY
SOCIAL SCIENCE BUILDING
OGDEN, UTAH

FEBRUARY 2016



= SAMPLE NUMBER AND LOCATION

= ASBESTOS CONTAINING FLOOR TILE & MASTIC

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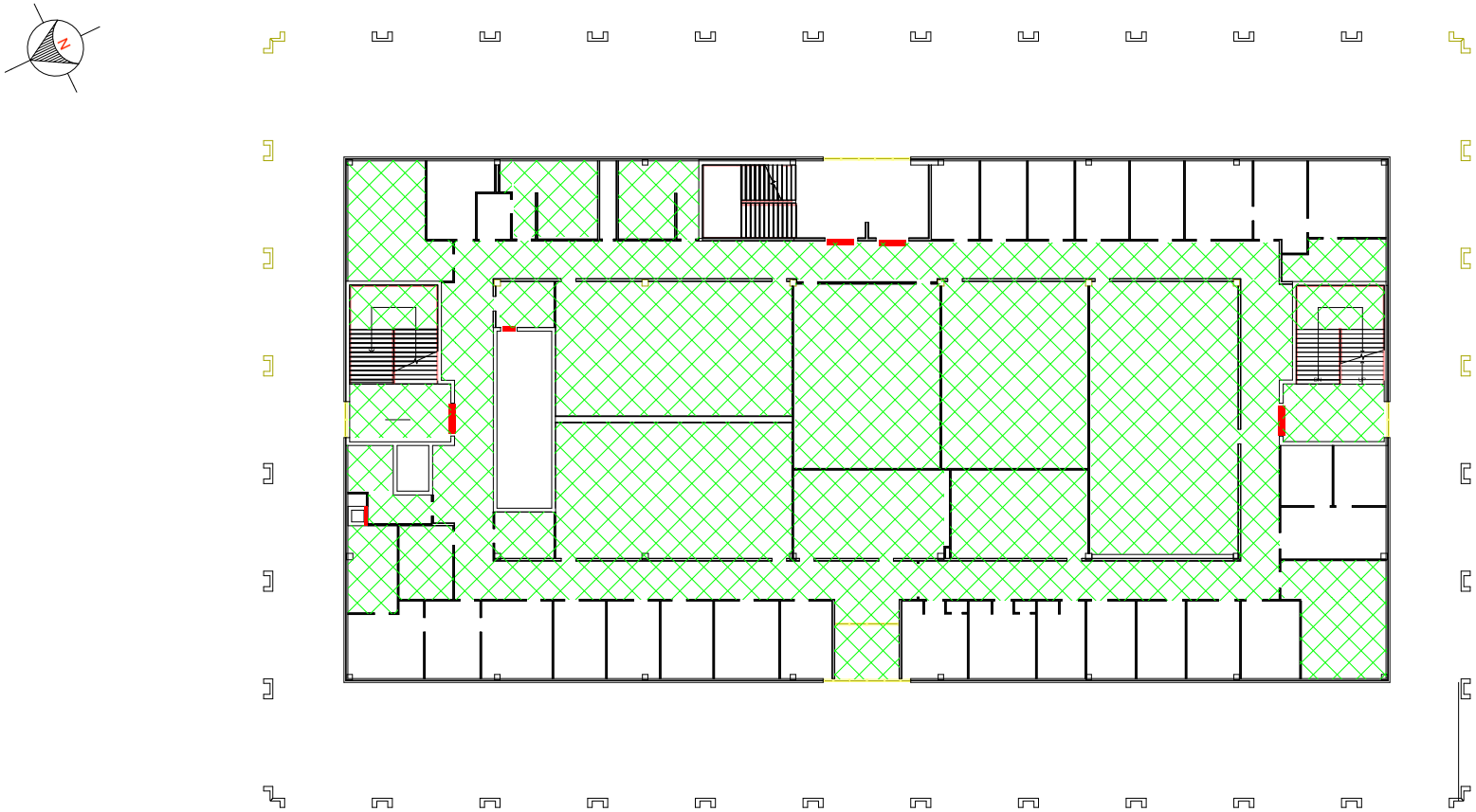
SOCIAL SCIENCE BUILDING

FIRST FLOOR PLAN

FLOORS

WEBER STATE UNIVERSITY
SOCIAL SCIENCE BUILDING
OGDEN, UTAH

FEBRUARY 2016



= ASBESTOS CONTAINING WALL SYSTEM

= ASBESTOS CONTAINING FIRE DOOR

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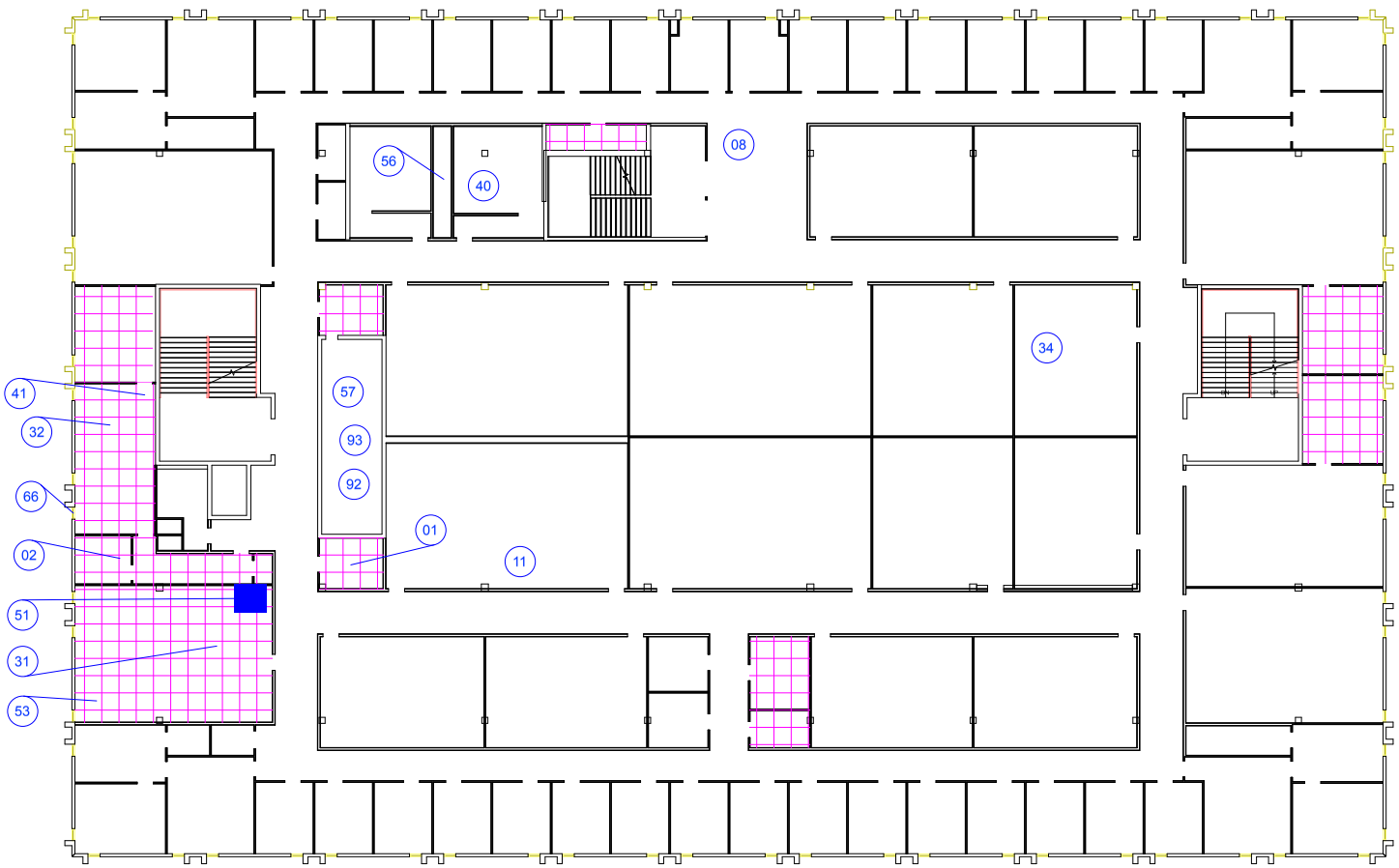
SOCIAL SCIENCE BUILDING

FIRST FLOOR PLAN
CEILINGS

WEBER STATE UNIVERSITY
SOCIAL SCIENCE BUILDING
OGDEN, UTAH

FEBRUARY 2016



= SAMPLE NUMBER AND LOCATION

= ASBESTOS CONTAINING FLOOR TILE & MASTIC

= ASBESTOS CONTAINING FUME HOOD

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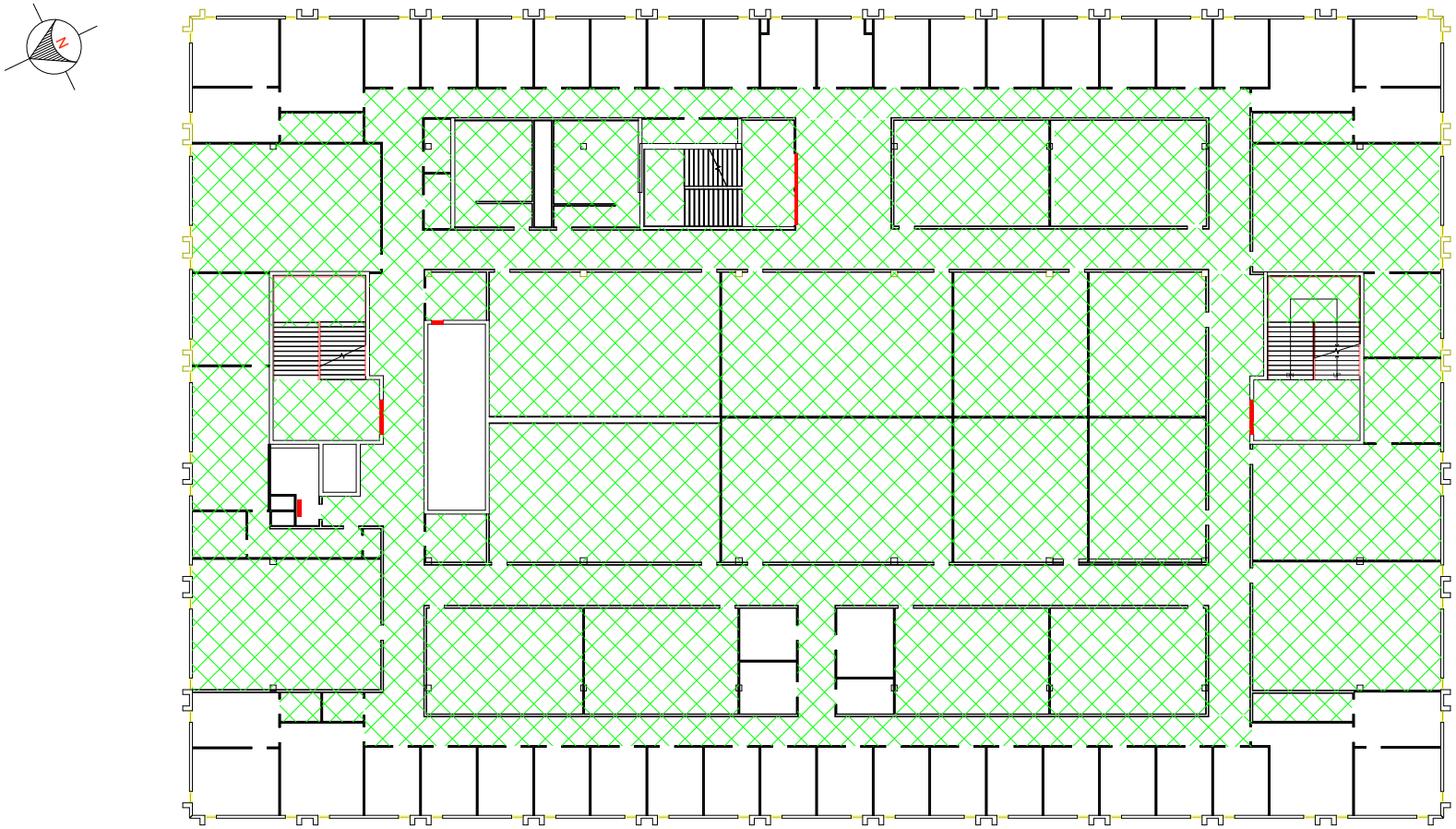
SOCIAL SCIENCE BUILDING

SECOND FLOOR PLAN

FLOORS

WEBER STATE UNIVERSITY
SOCIAL SCIENCE BUILDING
OGDEN, UTAH

FEBRUARY 2016



= ASBESTOS CONTAINING WALL SYSTEM

= ASBESTOS CONTAINING FIRE DOOR

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SOCIAL SCIENCE BUILDING

SECOND FLOOR PLAN

CEILINGS

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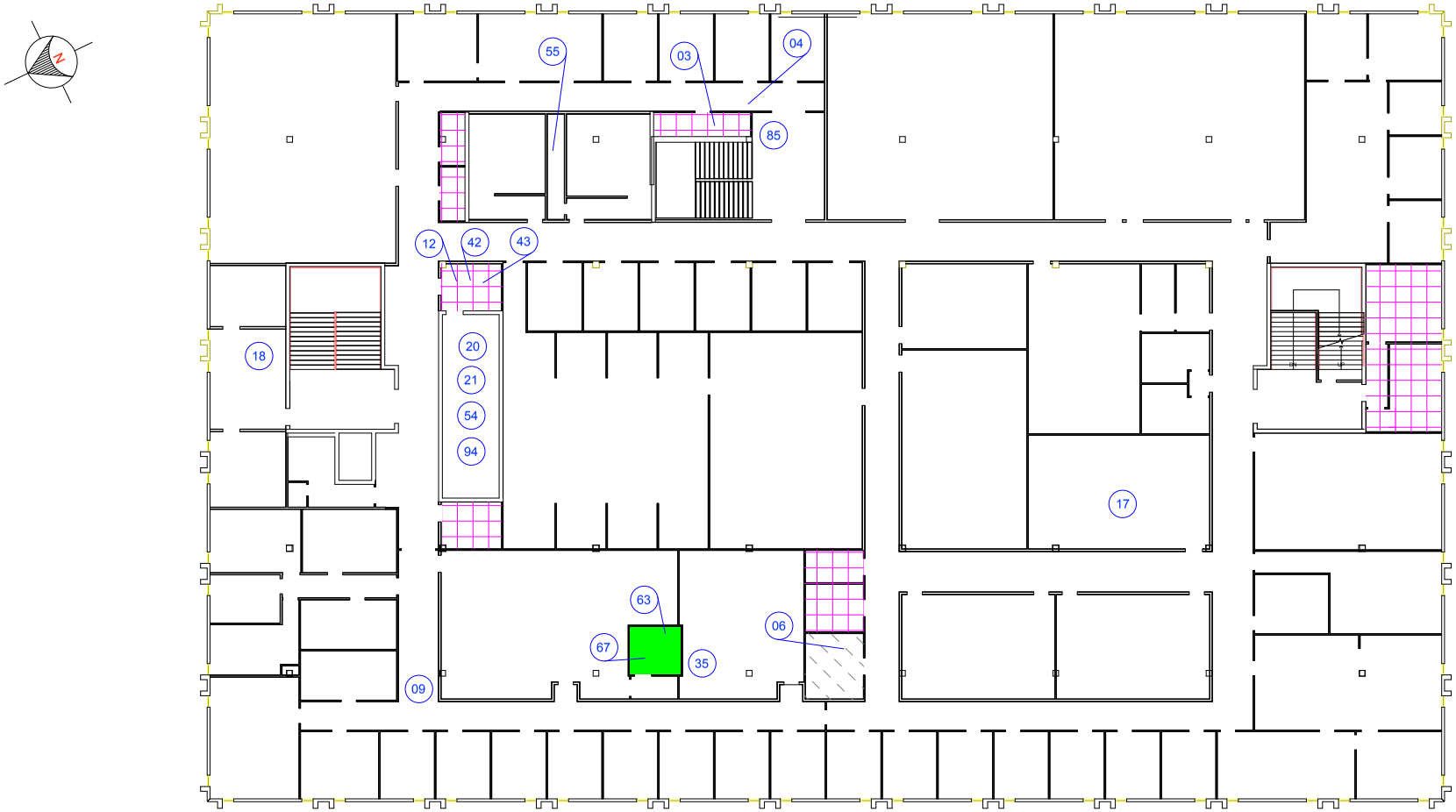
OGDEN, UTAH

FEBRUARY 2016



= SAMPLE NUMBER AND LOCATION

= ASBESTOS CONTAINING FLOOR TILE & MASTIC

= ASBESTOS CONTAINING FLOOR MASTIC

= ASBESTOS CONTAINING INSULATION SEALANT

R & R
ENVIRONMENTAL, INC.
ASBESTOS • LEAD • INDUSTRIAL HYGIENE
47 West 9000 South, Suite #2 Sandy, Utah 84070
(801) 352-2380 : Office (801) 352-2381: Fax

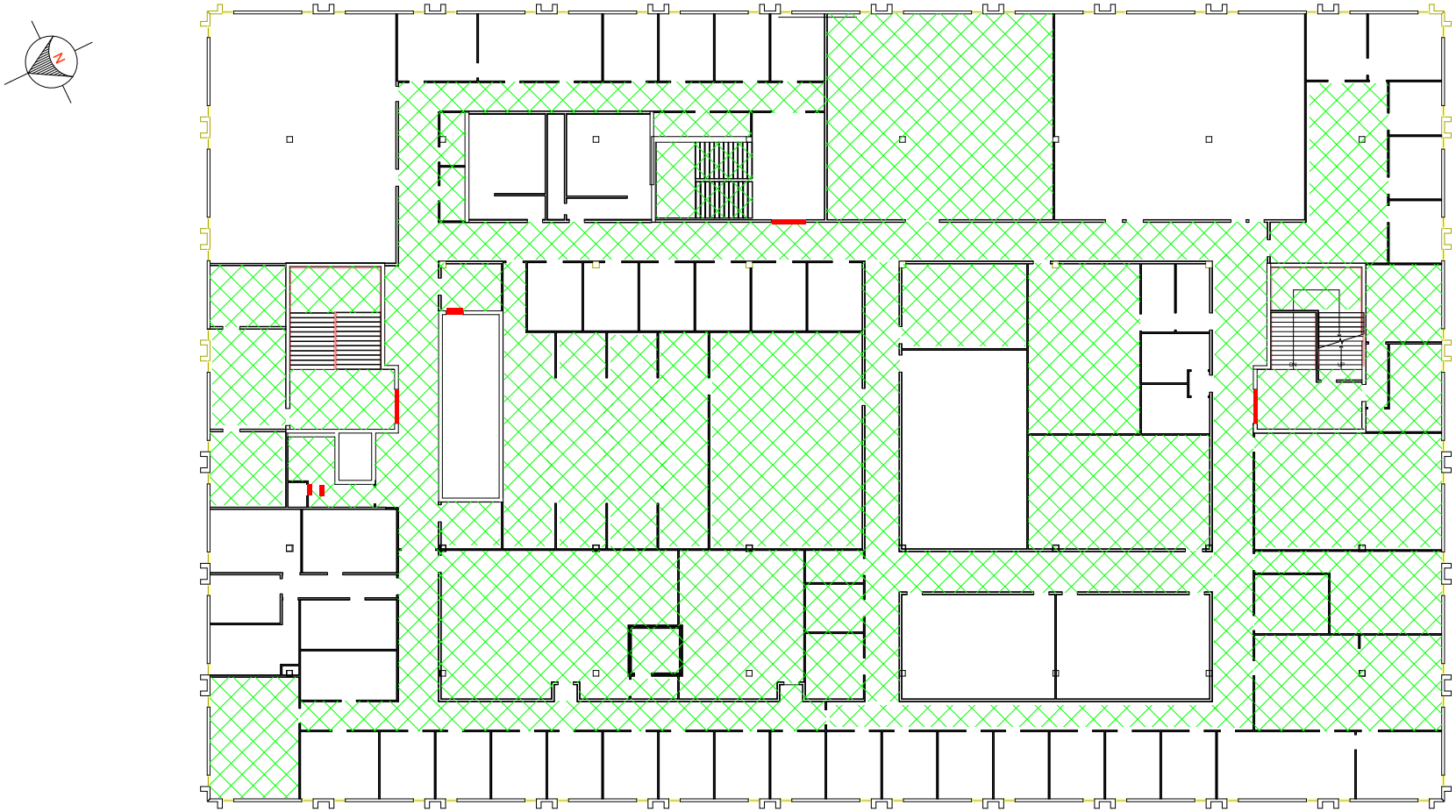
SOCIAL SCIENCE BUILDING

THIRD FLOOR PLAN

FLOORS

WEBER STATE UNIVERSITY
SOCIAL SCIENCE BUILDING
OGDEN, UTAH

FEBRUARY 2016



= ASBESTOS CONTAINING WALL SYSTEM

= ASBESTOS CONTAINING FIRE DOOR

R & R
ENVIRONMENTAL, INC.
ASBESTOS • LEAD • INDUSTRIAL HYGIENE
47 West 9000 South, Suite #2 Sandy, Utah 84070
(801) 352-2380 : Office (801) 352-2381: Fax

SOCIAL SCIENCE BUILDING

THIRD FLOOR PLAN

CEILINGS

WEBER STATE UNIVERSITY
SOCIAL SCIENCE BUILDING
OGDEN, UTAH

FEBRUARY 2016

Appendix C

Photograph Log

Photograph Log

Social Science Building
Weber State University

1. Social Science Building view from East
2. Vinyl Floor Tile (Homogenous Area M001)
3. Vinyl Floor Tile (Homogenous Area M002)
4. Vinyl Floor Tile (Homogenous Area M003)
5. Black Flooring Mastic (Homogenous Area M006)
6. Black Tar Sealant (Homogenous Area M015)
7. Insulation Anchor Adhesive (Homogenous Area M018)
8. Fume Hood (Homogenous Area M023)
9. Cloth Hot Mitt (Homogenous Area M025)
10. Vault Door Insulation (Homogenous Area M027)
11. Garbage Shute Door Insulation (Homogenous Area M028)
12. Composite Window Panel (Homogenous Area M029)
13. Insulation Sealant (Homogenous Area M030)
14. CMU Block Filler (Homogenous Area M034)
15. Wall System (Homogenous Area M035)
16. Roofing Material (Homogenous Area M036)
17. TSI – Plaster Fitting (Homogenous Area T001)

PHOTO 1

PHOTO 2

PHOTO 3

PHOTO 4

R & R Environmental, Inc.

47 West 9000 South, Suite #2, Sandy, Utah 84070
(801) 352-2380 • Fax: (801) 352-2381

PROJECT NO:		
DESIGNED BY:	SCALE:	REVIEWED BY:
DRAWN BY:	DATE:	FILE:

SITE PHOTOGRAPHS

ASBESTOS SURVEY AND ASSESSMENT

SOCIAL SCIENCE BUILDING
WEBER STATE UNIVERSITY
OGDEN, UTAH 84403

PHOTO 5

PHOTO 6

PHOTO 7

PHOTO 8

R & R Environmental, Inc.
47 West 9000 South, Suite #2, Sandy, Utah 84070
(801) 352-2380 • Fax: (801) 352-2381

PROJECT NO:		
DESIGNED BY:	SCALE:	REVIEWED BY:
DRAWN BY:	DATE:	FILE:

SITE PHOTOGRAPHS

ASBESTOS SURVEY AND ASSESSMENT

SOCIAL SCIENCE BUILDING
WEBER STATE UNIVERSITY
OGDEN, UTAH 84403

PHOTO 9

PHOTO 10

PHOTO 11

PHOTO 12

R & R Environmental, Inc.
47 West 9000 South, Suite #2, Sandy, Utah 84070
(801) 352-2380 • Fax: (801) 352-2381

PROJECT NO:		
DESIGNED BY:	SCALE:	REVIEWED BY:
DRAWN BY:	DATE:	FILE:

SITE PHOTOGRAPHS

ASBESTOS SURVEY AND ASSESSMENT

SOCIAL SCIENCE BUILDING
WEBER STATE UNIVERSITY
OGDEN, UTAH 84403

PHOTO 13

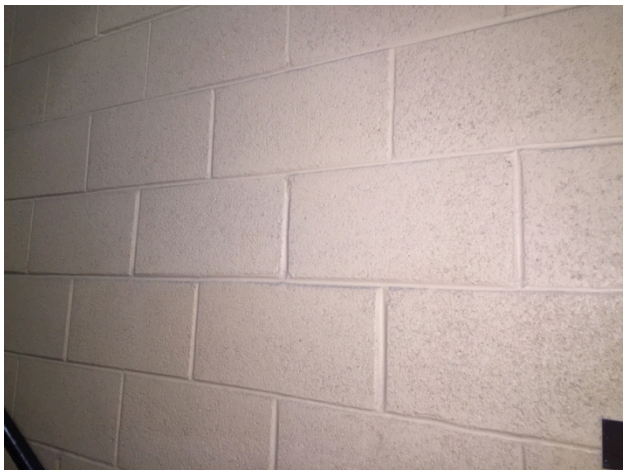


PHOTO 14

PHOTO 15

PHOTO 16

R & R Environmental, Inc.
47 West 9000 South, Suite #2, Sandy, Utah 84070
(801) 352-2380 • Fax: (801) 352-2381

PROJECT NO:		
DESIGNED BY:	SCALE:	REVIEWED BY:
DRAWN BY:	DATE:	FILE:

SITE PHOTOGRAPHS

ASBESTOS SURVEY AND ASSESSMENT

SOCIAL SCIENCE BUILDING
WEBER STATE UNIVERSITY
OGDEN, UTAH 84403

PHOTO 17

R & R Environmental, Inc.
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PROJECT NO:		
DESIGNED BY:	SCALE:	REVIEWED BY:
DRAWN BY:	DATE:	FILE:

SITE PHOTOGRAPHS

ASBESTOS SURVEY AND ASSESSMENT

SOCIAL SCIENCE BUILDING
WEBER STATE UNIVERSITY
OGDEN, UTAH 84403

Appendix D

Laboratory Analytical Reports

REI LAB **Reservoirs Environmental, Inc.**

March 5, 2016

Subcontract Number:	**NA**
Laboratory Report:	**RES 344256-1**
Project # / P.O. #	**None Given**
Project Description:	**WSU Social Science Bldg.**

Dave Roskelley
R & R Environmental
47 West 9000 South #2
Sandy UT 84070

Dear Customer,

Reservoirs Environmental, Inc. is an analytical laboratory accredited for the analysis of Industrial Hygiene and Environmental matrices by the National Voluntary Laboratory Accreditation Program (NVLAP), Lab Code 101896-0 for Transmission Electron Microscopy (TEM) and Polarized Light Microscopy (PLM) analysis and the American Industrial Hygiene Association (AIHA), Lab ID 101533 - Accreditation Certificate #480 for Phase Contrast Microscopy (PCM) analysis. This laboratory is currently proficient in both Proficiency Testing and PAT programs respectively.

Reservoirs Environmental, Inc. has analyzed the following samples for asbestos content as per your request. The analysis has been completed in general accordance with the appropriate methodology as stated in the attached analysis table. The results have been submitted to your office.

RES 344256-1 is the job number assigned to this study. This report is considered highly confidential and the sole property of the customer. Reservoirs Environmental, Inc. will not discuss any part of this study with personnel other than those of the client. The results described in this report only apply to the samples analyzed. This report must not be used to claim endorsement of products or analytical results by NVLAP or any agency of the U.S. Government. This report shall not be reproduced except in full, without written approval from Reservoirs Environmental, Inc. Samples will be disposed of after sixty days unless longer storage is requested. If you have any questions about this report, please feel free to call 303-964-1986.

Sincerely,

Tesa Harback
Tesa Harback for

Jeanne Spencer
President

RESERVOIRS ENVIRONMENTAL INC.

NVLAP Lab Code 101896-0

TABLE: PLM BULK ANALYSIS, PERCENTAGE COMPOSITION BY VOLUME

RES Job Number: **RES 344256-1**
Client: **R & R Environmental**
Client Project Number / P.O.: **None Given**
Client Project Description: **WSU Social Science Bldg.**
Date Samples Received: **March 04, 2016**
Method: **EPA 600/R-93/116 - Short Report, Bulk**
Turnaround: **24 Hour**
Date Samples Analyzed: **March 04, 2016**

ND=None Detected
TR=Trace, <1% Visual Estimate
Trem/Act=Tremolite/Actinolite

Client Sample Number	Lab ID Number	LAYER	Physical Description	Sub Part (%)	Asbestos Content: Mineral	Asbestos Content: Visual Estimate (%)	Non Asbestos Fibrous Components (%)	Non-Fibrous Components (%)
SSB-86	EM 1583093	A	White fibrous woven wrap w/ tan paint	5		**ND**	65	35
		B	Light gray fibrous plaster	95		**ND**	20	80
SSB-87	EM 1583094	A	White fibrous woven wrap w/ tan paint	4		**ND**	55	45
		B	Grayish white fibrous plaster	96		**ND**	15	85
SSB-88	EM 1583095	A	White fibrous woven wrap w/ tan paint	5		**ND**	55	45
		B	Yellow fibrous material	40		**ND**	90	10
		C	Light gray fibrous plaster	55		**ND**	15	85
SSB-89	EM 1583096	A	White fibrous woven wrap w/ tan paint	3		**ND**	60	40
		B	White fibrous plaster	97		**ND**	15	85
SSB-90	EM 1583097	A	Tan paint w/ white granular material	1		**ND**	0	100
		B	White fibrous woven wrap w/ tan paint	3		**ND**	65	35
		C	Grayish white fibrous plaster	96		**ND**	15	85
SSB-91	EM 1583098	A	White fibrous woven wrap w/ tan paint	2		**ND**	70	30
		B	White fibrous plaster	98		**ND**	20	80

TEM Analysis recommended for organically bound material (i.e. floor tile) if PLM results are <1%.

RESERVOIRS ENVIRONMENTAL INC.

NVLAP Lab Code 101896-0

TABLE: PLM BULK ANALYSIS, PERCENTAGE COMPOSITION BY VOLUME

RES Job Number: **RES 344256-1**
Client: **R & R Environmental**
Client Project Number / P.O.: **None Given**
Client Project Description: **WSU Social Science Bldg.**
Date Samples Received: **March 04, 2016**
Method: **EPA 600/R-93/116 - Short Report, Bulk**
Turnaround: **24 Hour**
Date Samples Analyzed: **March 04, 2016**

ND=None Detected
TR=Trace, <1% Visual Estimate
Trem/Act=Tremolite/Actinolite

Client Sample Number	Lab ID Number	LAYER	Physical Description	Sub Part (%)	Asbestos Content: Mineral	Asbestos Content: Visual Estimate (%)	Non Asbestos Fibrous Components (%)	Non-Fibrous Components (%)
SSB-92	EM 1583099	A	White fibrous woven wrap	2		**ND**	90	10
		B	Grayish white fibrous plaster	98		**ND**	15	85
SSB-93	EM 1583100	A	White fibrous woven wrap	3		**ND**	90	10
		B	Grayish white fibrous plaster	97		**ND**	20	80
SSB-94	EM 1583101	A	White fibrous woven wrap	2		**ND**	90	10
		B	Grayish white fibrous plaster	98		**ND**	15	85

TEM Analysis recommended for organically bound material (i.e. floor tile) if PLM results are <1%.

Michael Scales
Analyst / Data QA

Due Date: 3-7-16
Due Time: 10:15am

Reservoirs Environmental, Inc.

5801 Logan St. Denver, CO 80216 • Ph: 303 964-1986 • Fax 303-477-4275 • Toll Free :866 RESI-ENV
Pager : 303-509-2098

RES 344256

INVOICE TO: (IF DIFFERENT)

Company: R&R Environmental
Address: 47 W. 9000 S. #2
Sandy UT 84070

Company:
Address:

CONTACT INFORMATION:

Contact: [redacted]
Phone: Dave Raskelley
Fax:
Cell/pager: 801 541-1035

Contact: Justin Kurgis
Phone:
Fax:
Cell/pager: 801 828-5219

Project Number and/or P.O. #:
Project Description/Location: WSU Social Science Bldg

Final Data Deliverable Email Address: dave@menviro.com

ASBESTOS LABORATORY HOURS: Weekdays: 7am - 7pm

PLM / PCM / TEM ____ RUSH (Same Day) X PRIORITY (Next Day) ___STANDARD
(Rush PCM = 2hr, TEM = 6hr.)

CHEMISTRY LABORATORY HOURS: Weekdays: 8am - 5pm

Metal(s) / Dust ___ RUSH ___ 24 hr. ___3-5 Day
RCRA 8 / Metals & Welding Fume Scan / TCLP ___ RUSH ___ 5 day ___10 day
Organics ___ 24 hr. ___ 3 day ___5 Day
Prior notification is required for RUSH turnarounds.

MICROBIOLOGY LABORATORY HOURS: Weekdays: 9am - 6pm

E.coli O157:H7, Coliforms, S.aureus ___ 24 hr. ___2 Day ___3-5 Day
Salmonella, Listeria, E.coli, APC, Y & M ___ 48 Hr. ___3-5 Day
Mold ___ RUSH ___24 Hr ___48 Hr ___3 Day ___5 Day

Turnaround times establish a laboratory priority, subject to laboratory volume and are not guaranteed. Additional fees apply for afterhours, weekends and holidays.

Special Instructions:

VALID MATRIX CODES

Air = A	Bulk = B
Dust = D	Paint = P
Soil = S	Wipe = W
Swab = SW	F = Food
Drinking Water = DW	Waste Water = WW
O = Other	

ASTM E1792 approved wipe media only

REQUESTED ANALYSIS

#	Client sample ID number (Sample ID's must be unique)	PLM - Short report, Long report, Point Count	TEM - AHERA, Level II, 7402, ISO, +/-, Quant, Semi-quant, Micro-vac, ISO-Indirect Preps	PCM - 7400A, 7400B, OSHA	DUST - Total, Respirable	METALS - Analyte(s) RCRA 8, TCLP, Welding Fume, Metals Scan	ORGANICS - METH	MICROBIOLOGY: Salmonella: +/-	E.coli O157:H7: +/-	Listeria: +/-	Aerobic Plate Count: +/- or Quantification	E.coli: +/- or Quantification	Coliforms: +/- or Quantification	S.aureus: +/- or Quantification	Y & M: +/- or Quantification	Mold: +/-, Identification, Quantification	SAMPLER'S INITIALS OR OTHER NOTES	Sample Volume (L) / Area	Matrix Code	# Containers	Date Collected mm/dd/yy	Time Collected hh/mm a/p	EM Number (Laboratory Use Only)
1	SSB - 86 Plaster Fitting	X																	B		3/2/16		1563093
2	-87																						4
3	-88																						5
4	-89																						6
5	-90																						7
6	-91																						8
7	-92																						9
8	-93																						100
9	-94																						1
10																							

Number of samples received: 9 (Additional samples shall be listed on attached long form.)

NOTE: REI will analyze incoming samples based upon information received and will not be responsible for errors or omissions in calculations resulting from the inaccuracy of original data. By signing client/company representative agrees that submission of the following samples for requested analysis as indicated on this Chain of Custody shall constitute an analytical services agreement with payment terms of NET 30 days, failure to comply with payment terms may result in a 1.5% monthly interest surcharge.

Relinquished By: [signature] Date/Time: 3/3/16

Laboratory Use Only
Received By: [signature] Date/Time: 3/4/16 1015am Carrier: Fedex

Sample Condition: On Ice Yes / No Sealed Yes / No Intact Yes / No
Temp. (F°) _____

Results:	Contact	Phone	Email	Fax	Date	Time	Initials	Contact	Phone	Email	Fax	Date	Time	Initials
	Contact	Phone	Email	Fax	Date	Time	Initials	Contact	Phone	Email	Fax	Date	Time	Initials

ORIGIN ID:BTFA (801) 541-1035
DAVID ROSKELLEY
R & R ENVIRONMENTAL
565 EAST RIDGE DRIVE
ALPINE UT 84004
UNITED STATES US

SHIP DATE: 03MAR16
ACTWGT: 1.00 LB
CAD: 5586981/INET3730

BILL RECIPIENT

TO **SAMPLE LOG-IN**
RESERVOIRS ENVIRONMENTAL
5801 LOGAN ST

DENVER CO 80216
(303) 964-1986 REF
INV
PO DEPT

FedEx Express

J161016020501uv

540J1/CF34/727F

FRI - 04 MAR 10:30A
PRIORITY OVERNIGHT

TRK# 0201 **7757 9446 2146**

XH DENA

80216
CO-US **DEN**

After printing this label:
1. Use the 'Print' button on this page to print your label to your laser or inkjet printer.
2. Fold the printed page along the horizontal line.
3. Place label in shipping pouch and affix it to your shipment so that the barcode portion of the label can be read and scanned.

Warning: Use only the printed original label for shipping. Using a photocopy of this label for shipping purposes is fraudulent and could result in additional billing charges, along with the cancellation of your FedEx account number.
Use of this system constitutes your agreement to the service conditions in the current FedEx Service Guide, available on fedex.com.FedEx will not be responsible for any claim in excess of $100 per package, whether the result of loss, damage, delay, non-delivery,misdelivery,or misinformation, unless you declare a higher value, pay an additional charge, document your actual loss and file a timely claim.Limitations found in the current FedEx Service Guide apply. Your right to recover from FedEx for any loss, including intrinsic value of the package, loss of sales, income interest, profit, attorney's fees, costs, and other forms of damage whether direct, incidental,consequential, or special is limited to the greater of $100 or the authorized declared value. Recovery cannot exceed actual documented loss.Maximum for items of extraordinary value is $1,000, e.g. jewelry, precious metals, negotiable instruments and other items listed in our ServiceGuide. Written claims must be filed within strict time limits, see current FedEx Service Guide.

34956

REI LAB **Reservoirs Environmental, Inc.**

March 2, 2016

Subcontract Number:	**NA**
Laboratory Report:	**RES 343736-3**
Project # / P.O. #	**P0056827**
Project Description:	**Weber State University - Social Science Building**

Dave Roskelley
R & R Environmental
47 West 9000 South #2
Sandy UT 84070

Dear Customer,

Reservoirs Environmental, Inc. is an analytical laboratory accredited for the analysis of Industrial Hygiene and Environmental matrices by the National Voluntary Laboratory Accreditation Program (NVLAP), Lab Code 101896-0 for Transmission Electron Microscopy (TEM) and Polarized Light Microscopy (PLM) analysis and the American Industrial Hygiene Association (AIHA), Lab ID 101533 - Accreditation Certificate #480 for Phase Contrast Microscopy (PCM) analysis. This laboratory is currently proficient in both Proficiency Testing and PAT programs respectively.

Reservoirs Environmental, Inc. has analyzed the following samples for asbestos content as per your request. The analysis has been completed in general accordance with the appropriate methodology as stated in the attached analysis table. The results have been submitted to your office.

RES 343736-3 is the job number assigned to this study. This report is considered highly confidential and the sole property of the customer. Reservoirs Environmental, Inc. will not discuss any part of this study with personnel other than those of the client. The results described in this report only apply to the samples analyzed. This report must not be used to claim endorsement of products or analytical results by NVLAP or any agency of the U.S. Government. This report shall not be reproduced except in full, without written approval from Reservoirs Environmental, Inc. Samples will be disposed of after sixty days unless longer storage is requested. If you have any questions about this report, please feel free to call 303-964-1986.

Sincerely,

Elisa Mari
Elisa Mari for

Jeanne Spencer
President

RESERVOIRS ENVIRONMENTAL INC.

NVLAP Lab Code 101896-0

TABLE: PLM BULK ANALYSIS, PERCENTAGE COMPOSITION BY VOLUME

RES Job Number: **RES 343736-3**
Client: **R & R Environmental**
Client Project Number / P.O.: **P0056827**
Client Project Description: **Weber State University - Social Science Building**
Date Samples Received: **February 26, 2016**
Method: **EPA 600/R-93/116 - Point Count, Bulk**
Turnaround: **24 Hour**
Date Samples Analyzed: **March 02, 2016**

ND=None Detected
TR=Trace, <1% Visual Estimate
Trem/Act=Tremolite/Actinolite

Client Sample Number	Lab ID Number	LAYER	Physical Description	Sub Part (%)	Asbestos Content: Mineral	Asbestos Content: Visual Estimate (%)	Non Asbestos Fibrous Components (%)	Non-Fibrous Components (%)
SSB-01	EM 1579267	A	Black mastic	2	**Chrysotile**	**15**	0	85
		B	Gray tile	98	**Chrysotile**	**3**	0	97
SSB-02	EM 1579268	A	Black mastic	5	**Chrysotile**	**15**	0	85
		B	Off white tile	95	**Chrysotile**	**5**	0	95
SSB-03	EM 1579269	A	Black mastic	1	**Chrysotile**	**15**	0	85
		B	Off white tile	99	**Chrysotile**	**3**	0	97
SSB-04	EM 1579270	A	Brown mastic	1		**ND**	3	97
		B	White mastic	4		**ND**	0	100
		C	Black cove base	95		**ND**	0	100
SSB-05	EM 1579271	A	White paint w/ light gray paper	3		**ND**	40	60
		B	Off white/light tan mastic	7		**ND**	0	100
		C	Light green cove base	90		**ND**	0	100
SSB-06	EM 1579272	A	Black mastic	100	**Chrysotile**	**15**	0	85

TEM Analysis recommended for organically bound material (i.e. floor tile) if PLM results are <1%.

RESERVOIRS ENVIRONMENTAL INC.

NVLAP Lab Code 101896-0

TABLE: PLM BULK ANALYSIS, PERCENTAGE COMPOSITION BY VOLUME

RES Job Number: **RES 343736-3**
Client: **R & R Environmental**
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Turnaround: **24 Hour**
Date Samples Analyzed: **March 02, 2016**

ND=None Detected
TR=Trace, <1% Visual Estimate
Trem/Act=Tremolite/Actinolite

Client Sample Number	Lab ID Number	LAYER	Physical Description	Sub Part (%)	Asbestos Content: Mineral	Asbestos Content: Visual Estimate (%)	Non Asbestos Fibrous Components (%)	Non-Fibrous Components (%)
SSB-07	EM 1579273	A	Brown mastic	3		**ND**	2	98
		B	White mastic	4		**ND**	0	100
		C	Light gray/white ceiling tile	93		**ND**	55	45
SSB-08	EM 1579274	A	Light gray/white ceiling tile	100		**ND**	65	35
SSB-09	EM 1579275	A	Light gray/white ceiling tile	100		**ND**	70	30
SSB-10	EM 1579276	A	Tan/white ceiling tile	100		**ND**	85	15
SSB-11	EM 1579277	A	White/gray drywall	10		**ND**	20	80
		B	Tan/white ceiling tile	90		**ND**	85	15
SSB-12	EM 1579278	A	Light gray/white ceiling tile	100		**ND**	60	40
SSB-13	EM 1579279	A	Light brown fibrous perlitic material w/ white painted	100		**ND**	60	40
SSB-14	EM 1579280	A	Light brown fibrous perlitic material w/ white painted	100		**ND**	60	40

TEM Analysis recommended for organically bound material (i.e. floor tile) if PLM results are <1%.

RESERVOIRS ENVIRONMENTAL INC.

NVLAP Lab Code 101896-0

TABLE: PLM BULK ANALYSIS, PERCENTAGE COMPOSITION BY VOLUME

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Method: **EPA 600/R-93/116 - Point Count, Bulk**
Turnaround: **24 Hour**
Date Samples Analyzed: **March 02, 2016**

ND=None Detected
TR=Trace, <1% Visual Estimate
Trem/Act=Tremolite/Actinolite

Client Sample Number	Lab ID Number	LAYER	Physical Description	Sub Part (%)	Asbestos Content: Mineral	Asbestos Content: Visual Estimate (%)	Non Asbestos Fibrous Components (%)	Non-Fibrous Components (%)
SSB-15	EM 1579281	A	Light gray/white ceiling tile	100		**ND**	55	45
SSB-16	EM 1579282	A	Light gray/white ceiling tile	100		**ND**	55	45
SSB-17	EM 1579283	A	Light tan fibrous material	20		**ND**	80	20
		B	Brown adhesive	80		**ND**	2	98
SSB-18	EM 1579284	A	Brown adhesive	100		**ND**	3	97
SSB-19	EM 1579285	A	Tan fibrous material	30		**ND**	80	20
		B	Brown adhesive	70		**ND**	3	97
SSB-20	EM 1579286	A	Dark gray fibrous woven material	100		**ND**	90	10
SSB-21	EM 1579287	A	Red sealant	100		**ND**	0	100
SSB-22	EM 1579288	A	Black tar sealant	100	**Chrysotile**	**10**	0	90
SSB-23	EM 1579289	A	Black sealant	100		**ND**	0	100
SSB-24	EM 1579290	A	White sealant	100		**ND**	0	100
SSB-25	EM 1579291	A	Off white granular plaster	45		**ND**	0	100
		B	Tan resinous material on metal	55	**Chrysotile**	**30**	0	70

TEM Analysis recommended for organically bound material (i.e. floor tile) if PLM results are <1%.

RESERVOIRS ENVIRONMENTAL INC.

NVLAP Lab Code 101896-0

TABLE: PLM BULK ANALYSIS, PERCENTAGE COMPOSITION BY VOLUME

RES Job Number: **RES 343736-3**
Client: **R & R Environmental**
Client Project Number / P.O.: **P0056827**
Client Project Description: **Weber State University - Social Science Building**
Date Samples Received: **February 26, 2016**
Method: **EPA 600/R-93/116 - Point Count, Bulk**
Turnaround: **24 Hour**
Date Samples Analyzed: **March 02, 2016**

ND=None Detected
TR=Trace, <1% Visual Estimate
Trem/Act=Tremolite/Actinolite

Client Sample Number	Lab ID Number	LAYER	Physical Description	Sub Part (%)	Asbestos Content: Mineral	Asbestos Content: Visual Estimate (%)	Non Asbestos Fibrous Components (%)	Non-Fibrous Components (%)
SSB-26	EM 1579292	A	Tan resinous material	35	**Chrysotile**	**30**	0	70
		B	Off white granular plaster	65		**ND**	0	100
SSB-27	EM 1579293	A	Gray resinous fibrous material	45		**ND**	35	65
		B	Gray fibrous material	55		**ND**	70	30
SSB-28	EM 1579294	A	White paper/silver foil material	2		**ND**	35	65
		B	Yellow fibrous material	38		**ND**	85	15
		C	White sealant	60		**ND**	5	95
SSB-29	EM 1579295	A	Yellow fibrous material	34		**ND**	85	15
		B	White sealant	66		**ND**	0	100
SSB-30	EM 1579296	A	Light tan sealant w/ white fibrous woven material	100		**ND**	40	60
SSB-31	EM 1579297	A	Black material	100		**ND**	0	100
SSB-32	EM 1579298	A	Black resinous material	100		**ND**	0	100
SSB-33	EM 1579299	A	Colorless resinous material	2		**ND**	0	100
		B	Black material	98		**ND**	0	100

TEM Analysis recommended for organically bound material (i.e. floor tile) if PLM results are <1%.

RESERVOIRS ENVIRONMENTAL INC.

NVLAP Lab Code 101896-0

TABLE: PLM BULK ANALYSIS, PERCENTAGE COMPOSITION BY VOLUME

RES Job Number: **RES 343736-3**
Client: **R & R Environmental**
Client Project Number / P.O.: **P0056827**
Client Project Description: **Weber State University - Social Science Building**
Date Samples Received: **February 26, 2016**
Method: **EPA 600/R-93/116 - Point Count, Bulk**
Turnaround: **24 Hour**
Date Samples Analyzed: **March 02, 2016**

ND=None Detected
TR=Trace, <1% Visual Estimate
Trem/Act=Tremolite/Actinolite

Client Sample Number	Lab ID Number	LAYER	Physical Description	Sub Part (%)	Asbestos Content: Mineral	Asbestos Content: Visual Estimate (%)	Non Asbestos Fibrous Components (%)	Non-Fibrous Components (%)
SSB-34	EM 1579300	A	Brown wall covering	15		**ND**	20	80
		B	White/tan drywall	85		**ND**	40	60
SSB-35	EM 1579301	A	White/beige wall covering	20		**ND**	20	80
		B	White/tan drywall	80		**ND**	30	70
SSB-36	EM 1579302	A	Brown wall covering w/ off white paint	25		**ND**	15	85
		B	White/tan drywall	75		**ND**	45	55
SSB-37	EM 1579303	A	White granular plaster w/ brown paint	50		**ND**	0	100
		B	Off white granular plaster	50		**ND**	0	100
SSB-38	EM 1579304	A	Off white granular plaster	40		**ND**	0	100
		B	White plaster w/ off white/brown paint	60		**ND**	0	100
SSB-39	EM 1579305	A	Off white granular plaster	40		**ND**	0	100
		B	White plaster w/ off white/multi-layered paint	60		**ND**	0	100
SSB-40	EM 1579306	A	Off white granular plaster	45		**ND**	0	100
		B	White plaster w/ off white paint	55		**ND**	0	100

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RESERVOIRS ENVIRONMENTAL INC.

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Date Samples Analyzed: **March 02, 2016**

ND=None Detected
TR=Trace, <1% Visual Estimate
Trem/Act=Tremolite/Actinolite

Client Sample Number	Lab ID Number	LAYER	Physical Description	Sub Part (%)	Asbestos Content: Mineral	Asbestos Content: Visual Estimate (%)	Non Asbestos Fibrous Components (%)	Non-Fibrous Components (%)
SSB-41	EM 1579307	A	White plaster w/ off white/multi-layered paint	45		**ND**	0	100
		B	Off white granular plaster	55		**ND**	0	100
SSB-42	EM 1579308	A	White plaster w/ tan paint	45		**ND**	0	100
		B	Off white granular plaster	55		**ND**	0	100
SSB-43	EM 1579309	A	Off white granular plaster	45		**ND**	0	100
		B	White plaster w/ tan paint	55		**ND**	0	100
SSB-44	EM 1579310	A	White granular plaster	45		**ND**	0	100
		B	Light gray granular plaster	55		**ND**	0	100
SSB-45	EM 1579311	A	White granular material	6		**ND**	0	100
		B	Gray granular plaster	94		**ND**	0	100
SSB-46	EM 1579312	A	White granular material	4		**ND**	0	100
		B	Gray granular plaster	96		**ND**	0	100
SSB-47	EM 1579313	A	White granular material	3		**ND**	0	100
		B	Gray granular plaster	97		**ND**	0	100

TEM Analysis recommended for organically bound material (i.e. floor tile) if PLM results are <1%.

RESERVOIRS ENVIRONMENTAL INC.

NVLAP Lab Code 101896-0

TABLE: PLM BULK ANALYSIS, PERCENTAGE COMPOSITION BY VOLUME

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Client Project Description: **Weber State University - Social Science Building**
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Method: **EPA 600/R-93/116 - Point Count, Bulk**
Turnaround: **24 Hour**
Date Samples Analyzed: **March 02, 2016**

ND=None Detected
TR=Trace, <1% Visual Estimate
Trem/Act=Tremolite/Actinolite

Client Sample Number	Lab ID Number	LAYER	Physical Description	Sub Part (%)	Asbestos Content: Mineral	Asbestos Content: Visual Estimate (%)	Non Asbestos Fibrous Components (%)	Non-Fibrous Components (%)
SSB-48	EM 1579314	A	White granular material	5		**ND**	0	100
		B	Gray granular plaster	95		**ND**	0	100
SSB-49	EM 1579315	A	White granular material	3		**ND**	0	100
		B	Gray granular plaster	97		**ND**	0	100
SSB-50	EM 1579316	A	White granular material	3		**ND**	0	100
		B	Gray granular plaster	97		**ND**	0	100
SSB-51	EM 1579317	A	Green/gray fibrous cementitious material	100	**Chrysotile**	**17**	0	83
SSB-52	EM 1579318	A	Brown/gray fibrous cementitious material	100	**Chrysotile**	**17**	0	83
SSB-53	EM 1579319	A	Gray & tan fibrous material	100	**Chrysotile**	**80**	15	5
SSB-54	EM 1579320	A	Tan paper	2		**ND**	95	5
		B	Brown woven wrap	5		**ND**	90	10
		C	Gray fibrous plaster	93		**ND**	35	65
SSB-55	EM 1579321	A	White fibrous material	1		**ND**	95	5
		B	Gray fibrous plaster	99		**ND**	35	65

TEM Analysis recommended for organically bound material (i.e. floor tile) if PLM results are <1%.

RESERVOIRS ENVIRONMENTAL INC.

NVLAP Lab Code 101896-0

TABLE: PLM BULK ANALYSIS, PERCENTAGE COMPOSITION BY VOLUME

RES Job Number: **RES 343736-3**
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Date Samples Analyzed: **March 02, 2016**

ND=None Detected
TR=Trace, <1% Visual Estimate
Trem/Act=Tremolite/Actinolite

Client Sample Number	Lab ID Number	LAYER	Physical Description	Sub Part (%)	Asbestos Content: Mineral	Asbestos Content: Visual Estimate (%)	Non Asbestos Fibrous Components (%)	Non-Fibrous Components (%)
SSB-56	EM 1579322	A	White woven tape w/ brown paint	10		**ND**	80	20
		B	Gray fibrous plaster	90		**ND**	35	65
SSB-57	EM 1579323	A	White woven tape	5		**ND**	95	5
		B	Gray fibrous plaster	95		**ND**	35	65
SSB-58	EM 1579324	A	White woven tape w/ brown paint	5		**ND**	90	10
		B	Gray fibrous plaster	95		**ND**	35	65
SSB-59	EM 1579325	A	White woven tape	3		**ND**	95	5
		B	Gray fibrous plaster	97		**ND**	35	65
SSB-60	EM 1579326	A	Gray fibrous plaster	100		**ND**	35	65
SSB-61	EM 1579327	A	Gray fibrous plaster	100		**ND**	35	65
SSB-62	EM 1579328	A	White fibrous woven material w/ tan paint	10		**ND**	65	35
		B	Gray fibrous plaster	90	**Chrysotile**	**TR**	15	85
					Point Count	**<0.25**		
SSB-63	EM 1579329	A	Tan fibrous material	100		**ND**	95	5

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RESERVOIRS ENVIRONMENTAL INC.

NVLAP Lab Code 101896-0

TABLE: PLM BULK ANALYSIS, PERCENTAGE COMPOSITION BY VOLUME

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Turnaround: **24 Hour**
Date Samples Analyzed: **March 02, 2016**

ND=None Detected
TR=Trace, <1% Visual Estimate
Trem/Act=Tremolite/Actinolite

Client Sample Number	Lab ID Number	LAYER	Physical Description	Sub Part (%)	Asbestos Content: Mineral	Asbestos Content: Visual Estimate (%)	Non Asbestos Fibrous Components (%)	Non-Fibrous Components (%)
SSB-64	EM 1579330	A	Black/gray charred granular micaceous plaster	100	**Trem/Act**	**TR**	0	100
SSB-65	EM 1579331	A	Off white insulation	100	**Amosite**	**35**	0	65
SSB-66	EM 1579332	A	Brown fibrous perlitic material	50		**ND**	65	35
		B	Light gray fibrous material	50	**Chrysotile**	**25**	0	75
SSB-67	EM 1579333	A	White/off white fibrous resinous material	100	**Chrysotile**	**5**	0	95
SSB-68	EM 1579334	A	Gray resinous material	100		**ND**	0	100
SSB-69	EM 1579335	A	White plaster	100	**Chrysotile**	**3**	0	94
					Amosite	**3**		
SSB-70	EM 1579336	A	Black fibrous material	100		**ND**	60	40
SSB-71	EM 1579337	A	Gray granular material w/ tan paint	100		**ND**	0	100
SSB-72	EM 1579338	A	Gray granular material w/ tan paint	100		**ND**	0	100
SSB-73	EM 1579339	A	Tan paint	10		**ND**	0	100
		B	Gray fibrous plaster	20	**Chrysotile**	**5**	10	85
		C	Gray granular material w/ tan paint	70		**ND**	0	100

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RESERVOIRS ENVIRONMENTAL INC.

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TABLE: PLM BULK ANALYSIS, PERCENTAGE COMPOSITION BY VOLUME

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Trem/Act=Tremolite/Actinolite

Client Sample Number	Lab ID Number	LAYER	Physical Description	Sub Part (%)	Asbestos Content: Mineral	Asbestos Content: Visual Estimate (%)	Non Asbestos Fibrous Components (%)	Non-Fibrous Components (%)
SSB-74	EM 1579340	A	Gray granular micaceous plaster	100		**ND**	0	100
SSB-75	EM 1579341	A	Gray granular micaceous plaster	100		**ND**	TR	100
SSB-76	EM 1579342	A	Gray granular micaceous plaster	100		**ND**	0	100
SSB-77	EM 1579343	A	Gray granular micaceous plaster	100		**ND**	TR	100
SSB-78	EM 1579344	A	Gray granular micaceous plaster	100		**ND**	TR	100
SSB-79	EM 1579345	A	White tape	3		**ND**	95	5
		B	White joint compound	7		**ND**	0	100
		C	White compound w/ off white paint	10		**ND**	0	100
		D	White/tan drywall	80		**ND**	15	85
SSB-80	EM 1579346	A	White tape	5		**ND**	95	5
		B	White joint compound	5	**Chrysotile**	**3**	0	97
					Point Count	**0.75**		
		C	White/tan drywall	90		**ND**	15	85

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Client Sample Number	Lab ID Number	LAYER	Physical Description	Sub Part (%)	Asbestos Content: Mineral	Asbestos Content: Visual Estimate (%)	Non Asbestos Fibrous Components (%)	Non-Fibrous Components (%)
SSB-81	EM 1579347	A	White tape	3		**ND**	95	5
		B	White joint compound	5		**ND**	0	100
		C	White compound w/ off white paint	7		**ND**	0	100
		D	White/tan drywall	85		**ND**	15	85
SSB-82	EM 1579348	A	White compound w/ white paint	15		**ND**	0	100
		B	White/tan drywall	85		**ND**	15	85
SSB-83	EM 1579349	A	White compound	10		**ND**	0	100
		B	White/tan drywall	90		**ND**	15	85

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ND=None Detected
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Client Sample Number	Lab ID Number	LAYER	Physical Description	Sub Part (%)	Asbestos Content: Mineral	Asbestos Content: Visual Estimate (%)	Non Asbestos Fibrous Components (%)	Non-Fibrous Components (%)
SSB-84	EM 1579350	A	White compound	2	**Chrysotile**	**3**	0	97
					Point Count	**1.75**		
		B	White tape	3		**ND**	95	5
		C	White joint compound	5	**Chrysotile**	**3**	0	97
					Point Count	**0.50**		
		D	White/tan drywall	90		**ND**	15	85
SSB-85	EM 1579351	A	White compound w/ white paint	5		**ND**	0	100
		B	White multi-layered tape	5		**ND**	95	5
		C	White multi-layered joint compound	5		**ND**	0	100
		D	White/tan drywall	85		**ND**	15	85

TEM Analysis recommended for organically bound material (i.e. floor tile) if PLM results are <1%.

Anita Grigg	Jillian A. Doherty	Michael Scales	Que Pham
Analyst	Analyst	Analyst	Analyst / Data QA

Due Date: 2-29-16
Due Time: 10:00a

RES 343736

Reservoirs Environmental, Inc.

REI LAB

5801 Logan St. Denver, CO 80216 • Ph: 303 964-1986 • Fax 303-477-4275 • Toll Free :866 RESI-ENV

After Hours Cell Phone: 720-339-9228

SUBMITTED BY:	INVOICE TO: (IF DIFFERENT)	CONTACT INFORMATION:	
Company: R & R Environmental, Inc.	Company:	Contact: Dave Roskelley	Contact: Steve Smith
Address: 47 W. 9000 S. #2	Address:	Phone:	Phone:
Sandy UT 84070		Fax:	Fax:
		Cell/pager: 801-541-1035	Cell/pager: 801-318-5658
Project Number and/or P.O. #: P0056827		Final Data Deliverable Email Address:	
Project Description/Location: Weber State University - Social Science Building		dave@rrenviro.com & steve@rrenviro.com	

ASBESTOS LABORATORY HOURS: Weekdays: 7am - 7pm & Sat. 8am - 5pm

PLM / PCM / TEM ____ RUSH (Same Day) _X_ PRIORITY (Next Day) __STANDARD (3-5 Day)
(Rush PCM = 2hr, TEM = 6hr.)

CHEMISTRY LABORATORY HOURS: Weekdays: 8am - 5pm

Metal(s) / Dust** ___ RUSH ___ 24 hr. ___3-5 Day
RCRA 8 / Metals & Welding Fume Scan / TCLP** __RUSH (3 Day)__5 Day __10 Day
Organics ___ 24 hr. ___ 3 day ___5 Day
Prior notification is required for RUSH turnarounds.

MICROBIOLOGY LABORATORY HOURS: Weekdays: 9am - 6pm

E.coli and/or Coliforms* ___ 24-48 Hour Other: _____
Pathogens* ___ 24-48 Hour
Microbial Growth* ___ 5-10 Day
Legionella ___ 10 Day
Mold ___ RUSH ___24 Hr ___48 Hr ___3 Day ___5 Day
TAT dependent on speed of microbial growth.

Turnaround times establish a laboratory priority, subject to laboratory volume and are not guaranteed. Additional fees apply for afterhours, weekends and holidays.

Special Instructions:

VALID MATRIX CODES

Air = A	Bulk = B
Dust = D	Paint = P
Soil = S	Wipe = W
Swab = SW	F = Food
Drinking Water = DW	Waste Water = WW
O = Other	

ASTM E1792 approved wipe media only

LAB NOTES: #2 Bags

REQUESTED ANALYSIS

	Client sample ID number (Sample ID's must be unique)	PLM - Short report, Point Count, Long report, Qualitative	TEM - AHERA, Level II, 7402, ISO, +/- (Air, Bulk or Dust), Quant, Semi-Quant, Micro-vac, ISO-Indirect Preps	PCM - 7400A, 7400B, OSHA	DUST - Total, Respirable	METALS - Analyte(s) RCRA 8, TCLP, Welding Fume, Metals Scan, pH	ORGANICS - METH, TSS	MICROBIOLOGY: Pathogens: Aerobic Plate Count, Salmonella, E.coli O157:H7, Listeria, S.aureus, Camphlobacter: +/- or Quantification	MICROBIOLOGY: E.coli and/or Coliforms: +/- or Quantification	MICROBIOLOGY: Microbial Growth: Aerobic Plate Count ID, Bacteria or Y & M: +/- or Quantification	MICROBIOLOGY: Legionella: +/- or Quantification	MICROBIOLOGY: Other: Bioburden, LAL or Environmental	MICROBIOLOGY: Mold: Spore Trap or Bulk: +/-, Identification, Quantification	SAMPLER'S INITIALS OR OTHER NOTES:	Sample Volume (L) / Area	Matrix Code	# Containers	Date Collected mm/dd/yy	Time Collected hh/mm a/p	EM Number (Laboratory Use Only)
1	SSB-01	X														B		2/24/16		1579267
2	SSB-02	X														B				8
3	SSB-03	X														B				79
4	SSB-04	X														B				1
5	SSB-05	X														B				2
6	SSB-06	X														B				3
7	SSB-07	X														B				4
8	SSB-08	X														B				5
9	SSB-09	X														B				6
10	SSB-10	X														B				

Number of samples received: 85 (Additional samples shall be listed on attached long form.)

NOTE: REI will analyze incoming samples based upon information received and will not be responsible for errors or omissions in calculations resulting from the inaccuracy of original data. By signing client/company representative agrees that submission of the following samples for requested analysis as indicated on this Chain of Custody shall constitute an analytical services agreement with payment terms of NET 30 days, failure to comply with payment terms may result in a 1.5% monthly interest surcharge.

Relinquished By: [signature] Date/Time: 2-24-16 1955

Hand / FedEx / UPS / USPS / Drop Box / Courier

Sample Condition: On Ice Yes / No; Sealed Yes / No; Intact Yes / No; Temp. (F°) _____

Laboratory Use Only
Received By: [signature] Date/Time: 2/26/16 10:00a Carrier:

Data Entry QA:	Contact	Phone Email Fax	Date	Time	Initials	Contact	Phone Email Fax	Date	Time	Initials
	Contact	Phone Email Fax	Date	Time	Initials	Contact	Phone Email Fax	Date	Time	Initials

Reservoirs Environmental, Inc.
5801 Logan St. Denver, CO 80216 • Ph: 303 964-1986 • Fax 303-477-4275 • Toll Free :866 RESI-ENV

RES Job # 24576

Submitted by: R & R Environmental, Inc.

REQUESTED ANALYSIS

VALID MATRIX CODES: Air = A; Bulk = B; Dust = D; Paint = P; Soil = S; Wipe = W; Swab = SW; F = Food; Drinking Water = DW; Waste Water = WW; O = Other; **ASTM E1792 approved wipe media only**

LAB NOTES:

	Client sample ID number (Sample ID's must be unique)	PLM - Short report, Long report, Point Count	TEM - AHERA, Level II, 7402, ISO, +/-, Quant, Semi-quant, Micro-vac, ISO-Indirect Preps	PCM - 7400A, 7400B, OSHA	DUST - Total, Respirable	METALS - Analyte(s) RCRA 8, TCLP, Welding Fume, Metals Scan	ORGANICS - METH	MICROBIOLOGY: Pathogens: Aerobic Plate Count, Salmonella, E.coli O157:H7, Listeria, S.aureus, Camphlobacter: +/- or Quantification	MICROBIOLOGY: E.coli and/or Coliforms: +/- or Quantificatino	MICROBIOLOGY: Microbial Growth: Aerobic Plate Count ID, Bacteria or Y & M: +/- or Quantification	MICROBIOLOGY: Legionella: +/- or Quantification	MICROBIOLOGY: Other: Bioburden, LAL or Environmental	MICROBIOLOGY: Mold: Spore Trap or Bulk: +/- or Quantification	SAMPLER'S INITIALS OR OTHER NOTES:	Sample Volume (L) / Area	Matrix Code	# Containers	Date Collected mm/dd/yy	Time Collected hh/mm a/p	EM Number (Laboratory Use Only)
11	SSB-11	X														B				1579277
12	SSB-12	X														B				80
13	SSB-13	X														B				1-2
14	SSB-14	X														B				1579267
15	SSB-15	X														B				80
16	SSB-16	X														B				1-2
17	SSB-17	X														B				1579257
18	SSB-18	X														B				80
19	SSB-19	X														B				1-2
20	SSB-20	X														B				1579247
21	SSB-21	X														B				80
22	SSB-22	X														B				1-2
23	SSB-23	X														B				1579237
24	SSB-24	X														B				80
25	SSB-25	X														B				1-2
26	SSB-26	X														B				1579227
27	SSB-27	X														B				80
28	SSB-28	X														B				1-2
29	SSB-29	X														B				1579217
30	SSB-30	X														B				80
31	SSB-31	X														B				1-2
32	SSB-32	X														B				1579207
33	SSB-33	X														B				80
34	SSB-34	X														B				1-2
35	SSB-35	X														B				1579197
36	SSB-36	X														B				80
37	SSB-37	X														B				1-2
38	SSB-38	X														B				1579187
39	SSB-39	X														B				80
40	SSB-40	X														B				1-2
41	SSB-41	X														B				1579177

REI LAB **Reservoirs Environmental, Inc.**
5801 Logan St. Denver, CO 80216 • Ph: 303 964-1986 • Fax 303-477-4275 • Toll Free :866 RESI-ENV

RES Job # 341746

Submitted by: R & R Environmental, Inc.

REQUESTED ANALYSIS

VALID MATRIX CODES: Air = A; Bulk = B; Dust = D; Paint = P; Soil = S; Wipe = W; Swab = SW; F = Food; Drinking Water = DW; Waste Water = WW; O = Other; **ASTM E1792 approved wipe media only**

Client sample ID number (Sample ID's must be unique)	PLM - Short report, Long report, Point Count	TEM - AHERA, Level II, 7402, ISO, +/-, Quant, Semi-quant, Micro-vac, ISO-Indirect Preps	PCM - 7400A, 7400B, OSHA	DUST - Total, Respirable	METALS - Analyte(s) RCRA 8, TCLP, Welding Fume, Metals Scan	ORGANICS - METH	MICROBIOLOGY: Pathogens: Aerobic Plate Count, Salmonella, E.coli O157:H7, Listeria, S.aureus, Camphlobacter: +/- or Quantification	MICROBIOLOGY: E.coli and/or Coliforms: +/- or Quantificatino	MICROBIOLOGY: Microbial Growth: Aerobic Plate Count ID, Bacteria or Y & M: +/- or Quantification	MICROBIOLOGY: Legionella: +/- or Quantification	MICROBIOLOGY: Other: Bioburden, LAL or Environmental	MICROBIOLOGY: Mold: Spore Trap or Bulk: +/- or Quantification	SAMPLER'S INITIALS OR OTHER NOTES:	Sample Volume (L) / Area	Matrix Code	# Containers	Date Collected mm/dd/yy	Time Collected hh/mm a/p	EM Number (Laboratory Use Only)
42 SSB-42	X														B				1579308
43 SSB-43	X														B				10-17-2014
44 SSB-44	X														B				1579309
45 SSB-45	X														B				10-17-2014
46 SSB-46	X														B				1579310
47 SSB-47	X														B				10-17-2014
48 SSB-48	X														B				1579311
49 SSB-49	X														B				10-17-2014
50 SSB-50	X														B				1579312
51 SSB-51	X														B				10-17-2014
52 SSB-52	X														B				1579313
53 SSB-53	X														B				10-17-2014
54 SSB-54	X														B				1579314
55 SSB-55	X														B				10-17-2014
56 SSB-56	X														B				1579315
57 SSB-57	X														B				10-17-2014
58 SSB-58	X														B				1579316
59 SSB-59	X														B				10-17-2014
60 SSB-60	X														B				1579317
61 SSB-61	X														B				10-17-2014
62 SSB-62	X														B				1579318
63 SSB-63	X														B				10-17-2014
64 SSB-64	X														B				1579319
65 SSB-65	X														B				10-17-2014
66 SSB-66	X														B				1579320
67 SSB-67	X														B				10-17-2014
68 SSB-68	X														B				1579321
69 SSB-69	X														B				10-17-2014
70 SSB-70	X														B				1579322
71 SSB-71	X														B				10-17-2014
72 SSB-72	X														B				1579323

LAB NOTES:

Reservoirs Environmental, Inc.
5801 Logan St. Denver, CO 80216 • Ph: 303 964-1986 • Fax 303-477-4275 • Toll Free :866 RESI-ENV

RES Job # 340746

Page 4 of 4

Submitted by: R & R Environmental, Inc.

REQUESTED ANALYSIS

VALID MATRIX CODES: Air = A; Bulk = B; Dust = D; Paint = P; Soil = S; Wipe = W; Swab = SW; F = Food; Drinking Water = DW; Waste Water = WW; O = Other; **ASTM E1792 approved wipe media only**

LAB NOTES:

	Client sample ID number (Sample ID's must be unique)	PLM - Short report, Long report, Point Count	TEM - AHERA, Level II, 7402, ISO, +/-, Quant, Semi-quant, Micro-vac, ISO-Indirect Preps	PCM - 7400A, 7400B, OSHA	DUST - Total, Respirable	METALS - Analyte(s) RCRA 8, TCLP, Welding Fume, Metals Scan	ORGANICS - METH	MICROBIOLOGY: Pathogens: Aerobic Plate Count, Salmonella, E coli O157:H7, Listeria, S.aureus, Camphlobacter: +/- or Quantification	MICROBIOLOGY: E.coli and/or Coliforms: +/- or Quantificatino	MICROBIOLOGY: Microbial Growth: Aerobic Plate Count ID, Bacteria or Y & M: +/- or Quantification	MICROBIOLOGY: Legionella: +/- or Quantification	MICROBIOLOGY: Other: Bioburden, LAL or Environmental	MICROBIOLOGY: Mold: Spore Trap or Bulk: +/- or Quantification	SAMPLER'S INITIALS OR OTHER NOTES:	Sample Volume (L) / Area	Matrix Code	# Containers	Date Collected mm/dd/yy	Time Collected hh/mm a/p	EM Number (Laboratory Use Only)
73	SSB-73	X														B				1579339
74	SSB-74	X														B				40
75	SSB-75	X														B				2
76	SSB-76	X														B				3
77	SSB-77	X														B				4
78	SSB-78	X														B				5
79	SSB-79	X														B				6
80	SSB-80	X														B				7
81	SSB-81	X														B				8
82	SSB-82	X														B				9
83	SSB-83	X														B				50
84	SSB-84	X														B				1
85	SSB-85	X														B				
86																				
87																				
88																				
89																				
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101																				
102																				
103																				

REI LAB **Reservoirs Environmental, Inc.**

February 27, 2016

Subcontract Number:	**NA**
Laboratory Report:	**RES 343736-1**
Project # / P.O. #	**P0056827**
Project Description:	**Weber State University - Social Science Building**

Dave Roskelley
R & R Environmental
47 West 9000 South #2
Sandy UT 84070

Dear Customer,

Reservoirs Environmental, Inc. is an analytical laboratory accredited for the analysis of Industrial Hygiene and Environmental matrices by the National Voluntary Laboratory Accreditation Program (NVLAP), Lab Code 101896-0 for Transmission Electron Microscopy (TEM) and Polarized Light Microscopy (PLM) analysis and the American Industrial Hygiene Association (AIHA), Lab ID 101533 - Accreditation Certificate #480 for Phase Contrast Microscopy (PCM) analysis. This laboratory is currently proficient in both Proficiency Testing and PAT programs respectively.

Reservoirs Environmental, Inc. has analyzed the following samples for asbestos content as per your request. The analysis has been completed in general accordance with the appropriate methodology as stated in the attached analysis table. The results have been submitted to your office.

RES 343736-1 is the job number assigned to this study. This report is considered highly confidential and the sole property of the customer. Reservoirs Environmental, Inc. will not discuss any part of this study with personnel other than those of the client. The results described in this report only apply to the samples analyzed. This report must not be used to claim endorsement of products or analytical results by NVLAP or any agency of the U.S. Government. This report shall not be reproduced except in full, without written approval from Reservoirs Environmental, Inc. Samples will be disposed of after sixty days unless longer storage is requested. If you have any questions about this report, please feel free to call 303-964-1986.

Sincerely,

Tesa Harback
Tesa Harback for

Jeanne Spencer
President

RESERVOIRS ENVIRONMENTAL INC.

NVLAP Lab Code 101896-0

TABLE: PLM BULK ANALYSIS, PERCENTAGE COMPOSITION BY VOLUME

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Turnaround: **24 Hour**
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ND=None Detected
TR=Trace, <1% Visual Estimate
Trem/Act=Tremolite/Actinolite

Client Sample Number	Lab ID Number	LAYER	Physical Description	Sub Part (%)	Asbestos Content: Mineral	Asbestos Content: Visual Estimate (%)	Non Asbestos Fibrous Components (%)	Non-Fibrous Components (%)
SSB-01	EM 1579267	A	Black mastic	2	**Chrysotile**	**15**	0	85
		B	Gray tile	98	**Chrysotile**	**3**	0	97
SSB-02	EM 1579268	A	Black mastic	5	**Chrysotile**	**15**	0	85
		B	Off white tile	95	**Chrysotile**	**5**	0	95
SSB-03	EM 1579269	A	Black mastic	1	**Chrysotile**	**15**	0	85
		B	Off white tile	99	**Chrysotile**	**3**	0	97
SSB-04	EM 1579270	A	Brown mastic	1		**ND**	3	97
		B	White mastic	4		**ND**	0	100
		C	Black cove base	95		**ND**	0	100
SSB-05	EM 1579271	A	White paint w/ light gray paper	3		**ND**	40	60
		B	Off white/light tan mastic	7		**ND**	0	100
		C	Light green cove base	90		**ND**	0	100
SSB-06	EM 1579272	A	Black mastic	100	**Chrysotile**	**15**	0	85

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Client Sample Number	Lab ID Number	LAYER	Physical Description	Sub Part (%)	Asbestos Content: Mineral	Asbestos Content: Visual Estimate (%)	Non Asbestos Fibrous Components (%)	Non-Fibrous Components (%)
SSB-07	EM 1579273	A	Brown mastic	3		**ND**	2	98
		B	White mastic	4		**ND**	0	100
		C	Light gray/white ceiling tile	93		**ND**	55	45
SSB-08	EM 1579274	A	Light gray/white ceiling tile	100		**ND**	65	35
SSB-09	EM 1579275	A	Light gray/white ceiling tile	100		**ND**	70	30
SSB-10	EM 1579276	A	Tan/white ceiling tile	100		**ND**	85	15
SSB-11	EM 1579277	A	White/gray drywall	10		**ND**	20	80
		B	Tan/white ceiling tile	90		**ND**	85	15
SSB-12	EM 1579278	A	Light gray/white ceiling tile	100		**ND**	60	40
SSB-13	EM 1579279	A	Light brown fibrous perlitic material w/ white painted	100		**ND**	60	40
SSB-14	EM 1579280	A	Light brown fibrous perlitic material w/ white painted	100		**ND**	60	40

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SSB-15	EM 1579281	A	Light gray/white ceiling tile	100		**ND**	55	45
SSB-16	EM 1579282	A	Light gray/white ceiling tile	100		**ND**	55	45
SSB-17	EM 1579283	A	Light tan fibrous material	20		**ND**	80	20
		B	Brown adhesive	80		**ND**	2	98
SSB-18	EM 1579284	A	Brown adhesive	100		**ND**	3	97
SSB-19	EM 1579285	A	Tan fibrous material	30		**ND**	80	20
		B	Brown adhesive	70		**ND**	3	97
SSB-20	EM 1579286	A	Dark gray fibrous woven material	100		**ND**	90	10
SSB-21	EM 1579287	A	Red sealant	100		**ND**	0	100
SSB-22	EM 1579288	A	Black tar sealant	100	**Chrysotile**	**10**	0	90
SSB-23	EM 1579289	A	Black sealant	100		**ND**	0	100
SSB-24	EM 1579290	A	White sealant	100		**ND**	0	100
SSB-25	EM 1579291	A	Off white granular plaster	45		**ND**	0	100
		B	Tan resinous material on metal	55	**Chrysotile**	**30**	0	70

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Client Sample Number	Lab ID Number	LAYER	Physical Description	Sub Part (%)	Asbestos Content: Mineral	Asbestos Content: Visual Estimate (%)	Non Asbestos Fibrous Components (%)	Non-Fibrous Components (%)
SSB-26	EM 1579292	A	Tan resinous material	35	**Chrysotile**	**30**	0	70
		B	Off white granular plaster	65		**ND**	0	100
SSB-27	EM 1579293	A	Gray resinous fibrous material	45		**ND**	35	65
		B	Gray fibrous material	55		**ND**	70	30
SSB-28	EM 1579294	A	White paper/silver foil material	2		**ND**	35	65
		B	Yellow fibrous material	38		**ND**	85	15
		C	White sealant	60		**ND**	5	95
SSB-29	EM 1579295	A	Yellow fibrous material	34		**ND**	85	15
		B	White sealant	66		**ND**	0	100
SSB-30	EM 1579296	A	Light tan sealant w/ white fibrous woven material	100		**ND**	40	60
SSB-31	EM 1579297	A	Black material	100		**ND**	0	100
SSB-32	EM 1579298	A	Black resinous material	100		**ND**	0	100
SSB-33	EM 1579299	A	Colorless resinous material	2		**ND**	0	100
		B	Black material	98		**ND**	0	100

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Client Sample Number	Lab ID Number	LAYER	Physical Description	Sub Part (%)	Asbestos Content: Mineral	Asbestos Content: Visual Estimate (%)	Non Asbestos Fibrous Components (%)	Non-Fibrous Components (%)
SSB-34	EM 1579300	A	Brown wall covering	15		**ND**	20	80
		B	White/tan drywall	85		**ND**	40	60
SSB-35	EM 1579301	A	White/beige wall covering	20		**ND**	20	80
		B	White/tan drywall	80		**ND**	30	70
SSB-36	EM 1579302	A	Brown wall covering w/ off white paint	25		**ND**	15	85
		B	White/tan drywall	75		**ND**	45	55
SSB-37	EM 1579303	A	White granular plaster w/ brown paint	50		**ND**	0	100
		B	Off white granular plaster	50		**ND**	0	100
SSB-38	EM 1579304	A	Off white granular plaster	40		**ND**	0	100
		B	White plaster w/ off white/brown paint	60		**ND**	0	100
SSB-39	EM 1579305	A	Off white granular plaster	40		**ND**	0	100
		B	White plaster w/ off white/multi-layered paint	60		**ND**	0	100
SSB-40	EM 1579306	A	Off white granular plaster	45		**ND**	0	100
		B	White plaster w/ off white paint	55		**ND**	0	100

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Client Sample Number	Lab ID Number	LAYER	Physical Description	Sub Part (%)	Asbestos Content: Mineral	Asbestos Content: Visual Estimate (%)	Non Asbestos Fibrous Components (%)	Non-Fibrous Components (%)
SSB-41	EM 1579307	A	White plaster w/ off white/multi-layered paint	45		**ND**	0	100
		B	Off white granular plaster	55		**ND**	0	100
SSB-42	EM 1579308	A	White plaster w/ tan paint	45		**ND**	0	100
		B	Off white granular plaster	55		**ND**	0	100
SSB-43	EM 1579309	A	Off white granular plaster	45		**ND**	0	100
		B	White plaster w/ tan paint	55		**ND**	0	100
SSB-44	EM 1579310	A	White granular plaster	45		**ND**	0	100
		B	Light gray granular plaster	55		**ND**	0	100
SSB-45	EM 1579311	A	White granular material	6		**ND**	0	100
		B	Gray granular plaster	94		**ND**	0	100
SSB-46	EM 1579312	A	White granular material	4		**ND**	0	100
		B	Gray granular plaster	96		**ND**	0	100
SSB-47	EM 1579313	A	White granular material	3		**ND**	0	100
		B	Gray granular plaster	97		**ND**	0	100

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Client Sample Number	Lab ID Number	LAYER	Physical Description	Sub Part (%)	Asbestos Content: Mineral	Asbestos Content: Visual Estimate (%)	Non Asbestos Fibrous Components (%)	Non-Fibrous Components (%)
SSB-48	EM 1579314	A	White granular material	5		**ND**	0	100
		B	Gray granular plaster	95		**ND**	0	100
SSB-49	EM 1579315	A	White granular material	3		**ND**	0	100
		B	Gray granular plaster	97		**ND**	0	100
SSB-50	EM 1579316	A	White granular material	3		**ND**	0	100
		B	Gray granular plaster	97		**ND**	0	100
SSB-51	EM 1579317	A	Green/gray fibrous cementitious material	100	**Chrysotile**	**17**	0	83
SSB-52	EM 1579318	A	Brown/gray fibrous cementitious material	100	**Chrysotile**	**17**	0	83
SSB-53	EM 1579319	A	Gray & tan fibrous material	100	**Chrysotile**	**80**	15	5
SSB-54	EM 1579320	A	Tan paper	2		**ND**	95	5
		B	Brown woven wrap	5		**ND**	90	10
		C	Gray fibrous plaster	93		**ND**	35	65
SSB-55	EM 1579321	A	White fibrous material	1		**ND**	95	5
		B	Gray fibrous plaster	99		**ND**	35	65

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Client Sample Number	Lab ID Number	LAYER	Physical Description	Sub Part (%)	Asbestos Content: Mineral	Asbestos Content: Visual Estimate (%)	Non Asbestos Fibrous Components (%)	Non-Fibrous Components (%)
SSB-56	EM 1579322	A	White woven tape w/ brown paint	10		**ND**	80	20
		B	Gray fibrous plaster	90		**ND**	35	65
SSB-57	EM 1579323	A	White woven tape	5		**ND**	95	5
		B	Gray fibrous plaster	95		**ND**	35	65
SSB-58	EM 1579324	A	White woven tape w/ brown paint	5		**ND**	90	10
		B	Gray fibrous plaster	95		**ND**	35	65
SSB-59	EM 1579325	A	White woven tape	3		**ND**	95	5
		B	Gray fibrous plaster	97		**ND**	35	65
SSB-60	EM 1579326	A	Gray fibrous plaster	100		**ND**	35	65
SSB-61	EM 1579327	A	Gray fibrous plaster	100		**ND**	35	65
SSB-62	EM 1579328	A	White fibrous woven material w/ tan paint	10		**ND**	65	35
		B	Gray fibrous plaster	90	**Chrysotile**	**TR**	15	85
SSB-63	EM 1579329	A	Tan fibrous material	100		**ND**	95	5
SSB-64	EM 1579330	A	Black/gray charred granular micaceous plaster	100	**Trem/Act**	**TR**	0	100

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Client Sample Number	Lab ID Number	LAYER	Physical Description	Sub Part (%)	Asbestos Content: Mineral	Asbestos Content: Visual Estimate (%)	Non Asbestos Fibrous Components (%)	Non-Fibrous Components (%)
SSB-65	EM 1579331	A	Off white insulation	100	**Amosite**	**35**	0	65
SSB-66	EM 1579332	A	Brown fibrous perlitic material	50		**ND**	65	35
		B	Light gray fibrous material	50	**Chrysotile**	**25**	0	75
SSB-67	EM 1579333	A	White/off white fibrous resinous material	100	**Chrysotile**	**5**	0	95
SSB-68	EM 1579334	A	Gray resinous material	100		**ND**	0	100
SSB-69	EM 1579335	A	White plaster	100	**Chrysotile**	**3**	0	94
					Amosite	**3**		
SSB-70	EM 1579336	A	Black fibrous material	100		**ND**	60	40
SSB-71	EM 1579337	A	Gray granular material w/ tan paint	100		**ND**	0	100
SSB-72	EM 1579338	A	Gray granular material w/ tan paint	100		**ND**	0	100
SSB-73	EM 1579339	A	Tan paint	10		**ND**	0	100
		B	Gray fibrous plaster	20	**Chrysotile**	**5**	10	85
		C	Gray granular material w/ tan paint	70		**ND**	0	100
SSB-74	EM 1579340	A	Gray granular micaceous plaster	100		**ND**	0	100

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Client Sample Number	Lab ID Number	LAYER	Physical Description	Sub Part (%)	Asbestos Content: Mineral	Asbestos Content: Visual Estimate (%)	Non Asbestos Fibrous Components (%)	Non-Fibrous Components (%)
SSB-75	EM 1579341	A	Gray granular micaceous plaster	100		**ND**	TR	100
SSB-76	EM 1579342	A	Gray granular micaceous plaster	100		**ND**	0	100
SSB-77	EM 1579343	A	Gray granular micaceous plaster	100		**ND**	TR	100
SSB-78	EM 1579344	A	Gray granular micaceous plaster	100		**ND**	TR	100
SSB-79	EM 1579345	A	White tape	3		**ND**	95	5
		B	White joint compound	7		**ND**	0	100
		C	White compound w/ off white paint	10		**ND**	0	100
		D	White/tan drywall	80		**ND**	15	85
SSB-80	EM 1579346	A	White tape	5		**ND**	95	5
		B	White joint compound	5	**Chrysotile**	**3**	0	97
		C	White/tan drywall	90		**ND**	15	85

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TR=Trace, <1% Visual Estimate
Trem/Act=Tremolite/Actinolite

Client Sample Number	Lab ID Number	LAYER	Physical Description	Sub Part (%)	Asbestos Content: Mineral	Asbestos Content: Visual Estimate (%)	Non Asbestos Fibrous Components (%)	Non-Fibrous Components (%)
SSB-81	EM 1579347	A	White tape	3		**ND**	95	5
		B	White joint compound	5		**ND**	0	100
		C	White compound w/ off white paint	7		**ND**	0	100
		D	White/tan drywall	85		**ND**	15	85
SSB-82	EM 1579348	A	White compound w/ white paint	15		**ND**	0	100
		B	White/tan drywall	85		**ND**	15	85
SSB-83	EM 1579349	A	White compound	10		**ND**	0	100
		B	White/tan drywall	90		**ND**	15	85
SSB-84	EM 1579350	A	White compound	2	**Chrysotile**	**3**	0	97
		B	White tape	3		**ND**	95	5
		C	White joint compound	5	**Chrysotile**	**3**	0	97
		D	White/tan drywall	90		**ND**	15	85

TEM Analysis recommended for organically bound material (i.e. floor tile) if PLM results are <1%.

RESERVOIRS ENVIRONMENTAL INC.

NVLAP Lab Code 101896-0

TABLE: PLM BULK ANALYSIS, PERCENTAGE COMPOSITION BY VOLUME

RES Job Number: **RES 343736-1**
Client: **R & R Environmental**
Client Project Number / P.O.: **P0056827**
Client Project Description: **Weber State University - Social Science Building**
Date Samples Received: **February 26, 2016**
Method: **EPA 600/R-93/116 - Short Report, Bulk**
Turnaround: **24 Hour**
Date Samples Analyzed: **February 27, 2016**

ND=None Detected
TR=Trace, <1% Visual Estimate
Trem/Act=Tremolite/Actinolite

Client Sample Number	Lab ID Number	LAYER	Physical Description	Sub Part (%)	Asbestos Content: Mineral	Asbestos Content: Visual Estimate (%)	Non Asbestos Fibrous Components (%)	Non-Fibrous Components (%)
SSB-85	EM 1579351	A	White compound w/ white paint	5		**ND**	0	100
		B	White multi-layered tape	5		**ND**	95	5
		C	White multi-layered joint compound	5		**ND**	0	100
		D	White/tan drywall	85		**ND**	15	85

TEM Analysis recommended for organically bound material (i.e. floor tile) if PLM results are <1%.

Anita Grigg — Analyst
Jillian A. Doherty — Analyst
Michael Scales — Analyst
Que Pham — Analyst / Data QA

Due Date: 2-29-16
Due Time: 10:00a

RES 343736

Reservoirs Environmental, Inc.

REI LAB

5801 Logan St. Denver, CO 80216 • Ph: 303 964-1986 • Fax 303-477-4275 • Toll Free :866 RESI-ENV

After Hours Cell Phone: 720-339-9228

SUBMITTED BY:	INVOICE TO: (IF DIFFERENT)	CONTACT INFORMATION:	
Company: R & R Environmental, Inc.	Company:	Contact: Dave Roskelley	Contact: Steve Smith
Address: 47 W. 9000 S. #2	Address:	Phone:	Phone:
Sandy UT 84070		Fax:	Fax:
		Cell/pager: 801-541-1035	Cell/pager: 801-318-5658
Project Number and/or P.O. #: P0056827		Final Data Deliverable Email Address:	
Project Description/Location: Weber State University - Social Science Building		dave@rrenviro.com & steve@rrenviro.com	

ASBESTOS LABORATORY HOURS: Weekdays: 7am - 7pm & Sat. 8am - 5pm

PLM / PCM / TEM ____ RUSH (Same Day) _X_ PRIORITY (Next Day) __STANDARD (3-5 Day)
(Rush PCM = 2hr, TEM = 6hr.)

CHEMISTRY LABORATORY HOURS: Weekdays: 8am - 5pm

Metal(s) / Dust** ___ RUSH ___ 24 hr. ___3-5 Day
RCRA 8 / Metals & Welding Fume Scan / TCLP** __RUSH (3 Day)__5 Day __10 Day
Organics ___ 24 hr. ___ 3 day ___5 Day
Prior notification is required for RUSH turnarounds.

MICROBIOLOGY LABORATORY HOURS: Weekdays: 9am - 6pm

E.coli and/or Coliforms* ___ 24-48 Hour Other: _____
Pathogens* ___ 24-48 Hour
Microbial Growth* ___ 5-10 Day
Legionella ___ 10 Day
Mold ___ RUSH ___24 Hr ___48 Hr ___3 Day ___5 Day
TAT dependent on speed of microbial growth.

Turnaround times establish a laboratory priority, subject to laboratory volume and are not guaranteed. Additional fees apply for afterhours, weekends and holidays.

Special Instructions:

VALID MATRIX CODES

Air = A	Bulk = B
Dust = D	Paint = P
Soil = S	Wipe = W
Swab = SW	F = Food
Drinking Water = DW	Waste Water = WW
O = Other	

ASTM E1792 approved wipe media only

LAB NOTES: #2 Bags

REQUESTED ANALYSIS

	Client sample ID number (Sample ID's must be unique)	PLM - Short report, Point Count, Long report, Qualitative	TEM - AHERA, Level II, 7402, ISO, +/- (Air, Bulk or Dust), Quant, Semi-Quant, Micro-vac, ISO-Indirect Preps	PCM - 7400A, 7400B, OSHA	DUST - Total, Respirable	METALS - Analyte(s) RCRA 8, TCLP, Welding Fume, Metals Scan, pH	ORGANICS - METH, TSS	MICROBIOLOGY: Pathogens: Aerobic Plate Count, Salmonella, E.coli O157:H7, Listeria, S.aureus, Camphlobacter: +/- or Quantification	MICROBIOLOGY: E.coli and/or Coliforms: +/- or Quantification	MICROBIOLOGY: Microbial Growth: Aerobic Plate Count ID, Bacteria or Y & M: +/- or Quantification	MICROBIOLOGY: Legionella: +/- or Quantification	MICROBIOLOGY: Other: Bioburden, LAL or Environmental	MICROBIOLOGY: Mold: Spore Trap or Bulk: +/-, Identification, Quantification	SAMPLER'S INITIALS OR OTHER NOTES:	Sample Volume (L) / Area	Matrix Code	# Containers	Date Collected mm/dd/yy	Time Collected hh/mm a/p	EM Number (Laboratory Use Only)
1	SSB-01	X														B		2/24/16		1579267
2	SSB-02	X														B				8
3	SSB-03	X														B				79
4	SSB-04	X														B				1
5	SSB-05	X														B				2
6	SSB-06	X														B				3
7	SSB-07	X														B				4
8	SSB-08	X														B				5
9	SSB-09	X														B				6
10	SSB-10	X														B				

Number of samples received: 85 (Additional samples shall be listed on attached long form.)

NOTE: REI will analyze incoming samples based upon information received and will not be responsible for errors or omissions in calculations resulting from the inaccuracy of original data. By signing client/company representative agrees that submission of the following samples for requested analysis as indicated on this Chain of Custody shall constitute an analytical services agreement with payment terms of NET 30 days, failure to comply with payment terms may result in a 1.5% monthly interest surcharge.

Relinquished By: [signature] Date/Time: 2-24-16 1955

Hand / FedEx / UPS / USPS / Drop Box / Courier

Sample Condition: On Ice Yes / No; Sealed Yes / No; Intact Yes / No; Temp. (F°) _____

Laboratory Use Only
Received By: [signature] Date/Time: 2/26/16 10:00a Carrier:

Data Entry QA:	Contact	Phone Email Fax	Date	Time	Initials	Contact	Phone Email Fax	Date	Time	Initials
	Contact	Phone Email Fax	Date	Time	Initials	Contact	Phone Email Fax	Date	Time	Initials

Reservoirs Environmental, Inc.
5801 Logan St. Denver, CO 80216 • Ph: 303 964-1986 • Fax 303-477-4275 • Toll Free :866 RESI-ENV

RES Job # 24576

Submitted by: R & R Environmental, Inc.

REQUESTED ANALYSIS

VALID MATRIX CODES: Air = A; Bulk = B; Dust = D; Paint = P; Soil = S; Wipe = W; Swab = SW; F = Food; Drinking Water = DW; Waste Water = WW; O = Other; **ASTM E1792 approved wipe media only**

LAB NOTES:

	Client sample ID number (Sample ID's must be unique)	PLM - Short report, Long report, Point Count	TEM - AHERA, Level II, 7402, ISO, +/-, Quant, Semi-quant, Micro-vac, ISO-Indirect Preps	PCM - 7400A, 7400B, OSHA	DUST - Total, Respirable	METALS - Analyte(s) RCRA 8, TCLP, Welding Fume, Metals Scan	ORGANICS - METH	MICROBIOLOGY: Pathogens: Aerobic Plate Count, Salmonella, E.coli O157:H7, Listeria, S.aureus, Camphlobacter: +/- or Quantification	MICROBIOLOGY: E.coli and/or Coliforms: +/- or Quantificatino	MICROBIOLOGY: Microbial Growth: Aerobic Plate Count ID, Bacteria or Y & M: +/- or Quantification	MICROBIOLOGY: Legionella: +/- or Quantification	MICROBIOLOGY: Other: Bioburden, LAL or Environmental	MICROBIOLOGY: Mold: Spore Trap or Bulk: +/- or Quantification	SAMPLER'S INITIALS OR OTHER NOTES:	Sample Volume (L) / Area	Matrix Code	# Containers	Date Collected mm/dd/yy	Time Collected hh/mm a/p	EM Number (Laboratory Use Only)
11	SSB-11	X														B				1579277
12	SSB-12	X														B				80
13	SSB-13	X														B				1-2
14	SSB-14	X														B				1579267
15	SSB-15	X														B				80
16	SSB-16	X														B				1-2
17	SSB-17	X														B				1579257
18	SSB-18	X														B				80
19	SSB-19	X														B				1-2
20	SSB-20	X														B				1579247
21	SSB-21	X														B				80
22	SSB-22	X														B				1-2
23	SSB-23	X														B				1579237
24	SSB-24	X														B				80
25	SSB-25	X														B				1-2
26	SSB-26	X														B				1579227
27	SSB-27	X														B				80
28	SSB-28	X														B				1-2
29	SSB-29	X														B				1579217
30	SSB-30	X														B				80
31	SSB-31	X														B				1-2
32	SSB-32	X														B				1579207
33	SSB-33	X														B				80
34	SSB-34	X														B				1-2
35	SSB-35	X														B				1579197
36	SSB-36	X														B				80
37	SSB-37	X														B				1-2
38	SSB-38	X														B				1579187
39	SSB-39	X														B				80
40	SSB-40	X														B				1-2
41	SSB-41	X														B				1579177

REI LAB **Reservoirs Environmental, Inc.**
5801 Logan St. Denver, CO 80216 • Ph: 303 964-1986 • Fax 303-477-4275 • Toll Free :866 RESI-ENV

RES Job # 341746

Submitted by: R & R Environmental, Inc.

REQUESTED ANALYSIS

VALID MATRIX CODES: Air = A; Bulk = B; Dust = D; Paint = P; Soil = S; Wipe = W; Swab = SW; F = Food; Drinking Water = DW; Waste Water = WW; O = Other; **ASTM E1792 approved wipe media only**

Client sample ID number (Sample ID's must be unique)	PLM - Short report, Long report, Point Count	TEM - AHERA, Level II, 7402, ISO, +/-, Quant, Semi-quant, Micro-vac, ISO-Indirect Preps	PCM - 7400A, 7400B, OSHA	DUST - Total, Respirable	METALS - Analyte(s) RCRA 8, TCLP, Welding Fume, Metals Scan	ORGANICS - METH	MICROBIOLOGY: Pathogens: Aerobic Plate Count, Salmonella, E.coli O157:H7, Listeria, S.aureus, Camphlobacter: +/- or Quantification	MICROBIOLOGY: E.coli and/or Coliforms: +/- or Quantificatino	MICROBIOLOGY: Microbial Growth: Aerobic Plate Count ID, Bacteria or Y & M: +/- or Quantification	MICROBIOLOGY: Legionella: +/- or Quantification	MICROBIOLOGY: Other: Bioburden, LAL or Environmental	MICROBIOLOGY: Mold: Spore Trap or Bulk: +/- or Quantification	SAMPLER'S INITIALS OR OTHER NOTES:	Sample Volume (L) / Area	Matrix Code	# Containers	Date Collected mm/dd/yy	Time Collected hh/mm a/p	EM Number (Laboratory Use Only)
42 SSB-42	X														B				1579308
43 SSB-43	X														B				10-17-2014
44 SSB-44	X														B				1579309
45 SSB-45	X														B				10-17-2014
46 SSB-46	X														B				1579310
47 SSB-47	X														B				10-17-2014
48 SSB-48	X														B				1579311
49 SSB-49	X														B				10-17-2014
50 SSB-50	X														B				1579312
51 SSB-51	X														B				10-17-2014
52 SSB-52	X														B				1579313
53 SSB-53	X														B				10-17-2014
54 SSB-54	X														B				1579314
55 SSB-55	X														B				10-17-2014
56 SSB-56	X														B				1579315
57 SSB-57	X														B				10-17-2014
58 SSB-58	X														B				1579316
59 SSB-59	X														B				10-17-2014
60 SSB-60	X														B				1579317
61 SSB-61	X														B				10-17-2014
62 SSB-62	X														B				1579318
63 SSB-63	X														B				10-17-2014
64 SSB-64	X														B				1579319
65 SSB-65	X														B				10-17-2014
66 SSB-66	X														B				1579320
67 SSB-67	X														B				10-17-2014
68 SSB-68	X														B				1579321
69 SSB-69	X														B				10-17-2014
70 SSB-70	X														B				1579322
71 SSB-71	X														B				10-17-2014
72 SSB-72	X														B				1579323

LAB NOTES:

Reservoirs Environmental, Inc.
5801 Logan St. Denver, CO 80216 • Ph: 303 964-1986 • Fax 303-477-4275 • Toll Free :866 RESI-ENV

RES Job # 340746

Page 4 of 4

Submitted by: R & R Environmental, Inc.

REQUESTED ANALYSIS

VALID MATRIX CODES: Air = A; Bulk = B; Dust = D; Paint = P; Soil = S; Wipe = W; Swab = SW; F = Food; Drinking Water = DW; Waste Water = WW; O = Other; **ASTM E1792 approved wipe media only**

LAB NOTES:

	Client sample ID number (Sample ID's must be unique)	PLM - Short report, Long report, Point Count	TEM - AHERA, Level II, 7402, ISO, +/-, Quant, Semi-quant, Micro-vac, ISO-Indirect Preps	PCM - 7400A, 7400B, OSHA	DUST - Total, Respirable	METALS - Analyte(s) RCRA 8, TCLP, Welding Fume, Metals Scan	ORGANICS - METH	MICROBIOLOGY: Pathogens: Aerobic Plate Count, Salmonella, E coli O157:H7, Listeria, S.aureus, Camphlobacter: +/- or Quantification	MICROBIOLOGY: E.coli and/or Coliforms: +/- or Quantificatino	MICROBIOLOGY: Microbial Growth: Aerobic Plate Count ID, Bacteria or Y & M: +/- or Quantification	MICROBIOLOGY: Legionella: +/- or Quantification	MICROBIOLOGY: Other: Bioburden, LAL or Environmental	MICROBIOLOGY: Mold: Spore Trap or Bulk: +/- or Quantification	SAMPLER'S INITIALS OR OTHER NOTES:	Sample Volume (L) / Area	Matrix Code	# Containers	Date Collected mm/dd/yy	Time Collected hh/mm a/p	EM Number (Laboratory Use Only)
73	SSB-73	X														B				1579339
74	SSB-74	X														B				40
75	SSB-75	X														B				2
76	SSB-76	X														B				3
77	SSB-77	X														B				4
78	SSB-78	X														B				5
79	SSB-79	X														B				6
80	SSB-80	X														B				7
81	SSB-81	X														B				8
82	SSB-82	X														B				9
83	SSB-83	X														B				50
84	SSB-84	X														B				1
85	SSB-85	X														B				
86																				
87																				
88																				
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103																				

ORIGIN ID:BTFA (801) 541-1035
DAVID ROSKELLEY
R & R ENVIRONMENTAL
565 EAST RIDGE DRIVE

ALPINE, UT 84004
UNITED STATES US

SHIP DATE: 24FEB16
ACTWGT: 1.00 LB
CAD: 5586981/INET3730

BILL RECIPIENT

TO **SAMPLE LOG-IN**
RESERVOIRS ENVIRONMENTAL
5801 LOGAN ST

DENVER CO 80216
(303) 964-1986 REF: 343746
INV:
PO: DEPT:

540J1/97D7/727F

FedEx Express

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LEAD-BASED PAINT INSPECTION
FOR THE

WEBER STATE UNIVERSITY SOCIAL SCIENCE BUILDING

April 8, 2016

Prepared for:

Mr. Chad Downs
Project Manager
Weber State University
Campus Planning and Construction
1410 Edvalson Street
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LEAD-BASED PAINT INSPECTION
WEBER STATE UNIVERSITY
SOCIAL SCIENCE BUILDING

TABLE OF CONTENTS

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7.0 Limitations and Exclusion of Warranty 5

Appendices

A. Data Tables
- Table 1 – Building Component with Lead Levels at 0.3 mg/cm^2 and above
- Table 2 – Building Component with Lead Levels below 0.3 mg/cm^2

B. Photograph Log

C. Floor Plans

Lead-Based Paint Inspection

Weber State University
Social Science Building

1.0 INTRODUCTION

During February and March, 2016 a lead-based paint (LBP) survey was conducted for the Weber State University Social Science Building in Ogden, Utah. The purpose of the survey was to identify lead in paint on interior and exterior surfaces of the building. Measurements for lead in paint were made using a Niton XLp 300 X-ray Fluorescence (XRF) Spectrum Analyzer. No chip sampling or laboratory analysis was performed for confirmation of XRF measurements.

The survey work was overseen by David Roskelley with R & R Environmental, Inc. in Sandy, Utah. David Roskelley has completed Lead Inspector Training through the University of Utah, Rocky Mountain Center for Occupational and Environmental Health (RMCOEH), an EPA-sponsored Regional Lead Training Center, and is certified by the State of Utah, Division of Environmental Quality, as a Lead Inspector.

The U.S. Department of housing and Urban Development (HUD) *Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in housing* (HUD Guidelines), Chapter7: Lead-Based Paint Inspection, 1997 Revision, was generally followed for this survey, with modifications appropriate for a non-residential building.

The following accredited and certified inspector oversaw the inspection, collection of samples and made assessment:

March 26, 2016
Date

David C. Roskelley
Lead-Based Paint Inspector
State of Utah, Division of Air Quality
Certification Number: PB-1041
Certified Safety Professional #15774
Certified Industrial Hygienist #8529

This report was reviewed by:

March 26, 2016
Date

David C. Roskelley, MSPH, CIH, CSP
Lead-Based Paint Inspector
State of Utah, Division of Air Quality
Certification Number: PB-1041
Certified Safety Professional #15774
Certified Industrial Hygienist #8529

BUILDING DESCRIPTION

Building Identification

Building Name..... Social Science Building
Building Address ..... 1014 University Circle, Ogden, Utah 84408

Building Construction

Building Construction Date.....1972
Building Type.....Classrooms, Labs, Offices
Building Total Sq. Ft ..... 124,000 ft^2
Structural System..... Concrete
Exterior Wall Construction .....Concrete, Masonry
Floor Deck Construction..... Concrete
Roof Construction.....Flat, Membrane
Floors Above Grade..... 3
Floors Below Grade..... 1

Interior Finishes

Floors ..... Carpet, Ceramic, Vinyl Flooring
Walls .....Plaster, Demountable System, Wallboard, Ceramic Tile
Attic .....None
Crawlspace .....None

Building Mechanical

Heating Plant .....Campus, Hot Water
Main Heating Distribution .....Forced Air
Cooling Plant.....Campus, Chilled Water
Main A / C Distribution .....Forced Air

3.0LEAD-BASED PAINT DEFINITIONS

HUD defines "lead-based paint" as any coating that has a lead concentration of 1.0 milligram of lead per square centimeter (1.0 mg/cm^2) or greater, or if the lead concentration is greater than 0.5% by weight. The Consumer Product Safety Commission (CPSC) currently considers paint to be lead-containing if the concentration of lead exceeds 600 ppm (0.06% by weight). In 1978, the CPSC banned the sale of lead-based paint to consumers, and banned its application in areas where consumers have direct access to painted surfaces. Both the CPSC and HUD definitions of lead-containing paint are aimed at protecting the general population from exposure to lead in the residential setting.

By contrast, the mission of the Occupational Safety and Health Administration (OSHA) with respect to lead-containing paint, is to protect workers during construction activities that may generate elevated airborne lead concentrations. OSHA states that construction work (including renovation, maintenance, and demolition) carried-out on structures coated with paint have lead concentrations lower than the HUD or CPSC can still result in airborne lead concentrations in excess of regulatory limits. For this reason, OSHA has not defined lead-containing paint, but states that paint having any measurable level of lead may pose a substantial exposure hazard during construction work, depending upon the work performed.

2.0 PROCEDURES

2.1 Paint Sampling Methodologies

Direct measurements of lead in paint were made using a Niton 300 XLp Series X-ray Fluorescence (XRF) Spectrum Analyzer. The Niton 300 XLp Lead Paint Analyzer non-destructively measures lead concentrations of painted surfaces, regardless of the number of layers present. These instruments were developed specifically for addressing lead-based paint issues in housing and their use in identifying potential exposure hazards for renovation or construction work must be augmented by selective collection and analysis of physical paint chip samples.

The newer XRF instruments are capable of identifying lead in paint at concentrations of about 0.3 milligram per square centimeter (mg/cm^2) or greater. When lead concentrations are lower than this, the instruments are not capable of making accurate, reliable measurements, and the reported lead concentration may underestimate or overestimate the actual lead concentration in the paint. Therefore, an XRF readings of 0.4 mg/cm^2 or greater may be considered lead-containing from an OSHA perspective, and any readings of 0.3 mg/cm^2 or less should be confirmed by the collection and laboratory analysis of paint chip samples, or assumed to be positive for lead.

Where paint chip samples are necessary, samples are collected according to the protocol specified in the HUD Guidelines. The samples are then submitted to a laboratory recognized under the EPA's National Lead Laboratory Accreditation Program (NLLAP)

for analysis by flame atomic absorption spectrophotometry according to American Society of Testing and Materials (ASTM) method ASTM E 1645.

2.2 XRF Calibration

Before beginning the testing and after the testing was completed, the internal calibration of the Niton XLp 300 was checked by taking three consecutive measurements on a National Institute for Standards and Technology (NIST) standard with a known concentration of lead. These calibration checks are reported within the XRF data tables found in Appendix A of this report and are maintained in a file at R & R Environmental, Inc. to detect changes in instrument performance over time.

2.3 Lead Paint Inspection Data Tables

The XRF instrument generates a unique set of data tables for each inspection and can be exported into Microsoft Excel Spreadsheet format .xls. The Sequential Report lists the measurements made throughout the property in sequential order, from the first measurement to the last. The Data table is maintained in a file at R & R Environmental, Inc.

3.0 FINDINGS

The XRF instrument indicated that lead is present on interior surfaces that were tested. Lead is not present on exterior surfaces. These surfaces are listed in Table 1 "positive" building components (Measurements of 0.3 mg/cm^2 and above) in Appendix A of this report:

Interior

- Plaster walls
- Concrete columns, walls
- Demountable Walls (panels)
- Ceramic Tiled Walls
- Bulletin Boards
- Metal Door Frames
- Mop Sinks, Porcelain Sinks

Since lead has been detected in some of the building's painted surfaces, the OSHA Lead in Construction Standard (29 CFR 1926.62) would apply to any construction work (including renovation and demolition) that may disturb those surfaces. The standard requires, among other things, the following:

- Initial training on the hazards of lead exposure, proper work practices, respiratory protection, and other topics;

- An initial exposure assessment, by air monitoring, to determine the lead exposure assessment, until sample analysis indicates exposures below the Permissible Exposure Limit;

- Hand washing facilities, designated clean change areas, and designated eating areas.

In addition to the above considerations, the presence of lead in demolition debris has the potential to impose limitations on where and how the debris may be disposed. The Resource Conservation and Recovery Act (RCRA), Subtitles C and D, require that the waste must be analyzed to determine the amount of leachable lead present. The type of test to be performed on the waste is the Toxicity Characteristic Leaching Procedure (TCLP) for lead, and the results of this test will determine whether the material must be handled and disposed of as hazardous waste. For structures containing large amounts of lead-containing paint, significant potential for failing the TCLP exists.

4.0 RESULTS AND RECOMMENDATIONS

Lead-based paint was found on exterior and interior components of the building. The lead-based paint on these components is intact.

5.0 LIMITATIONS AND EXCLUSIONS OF WARRANTY

This lead inspection was performed using procedures and a level of diligence typically exercised by professional consultants performing similar services. However, lead-based paint (LBP) can be present in a surface, but not identified using ordinary investigative procedures.

No lead inspection can completely eliminate uncertainty regarding the presence of LBP. R & R Environmental, Inc. level of diligence and investigative procedures are intended to reduce, but not eliminate, potential uncertainty regarding the presence of LBP. The procedures used for this survey attempt to establish a balance between the competing goals of limiting investigative costs, time, and building damage, and reducing the uncertainty about unknown conditions. Therefore, the determinations in this report should not be construed as a guarantee that all LBP present in the subject property has been included in this report.

This report presents R & R Environmental, Inc.'s professional determinations, which are dependent upon information obtained during performance of consulting services. R &R Environmental, Inc. assumes no responsibility for omissions or errors resulting from inaccurate information provided by sources outside of R & R Environmental, Inc.

No warranty or guarantee, expressed or implied, is made regarding the findings, conclusions, or recommendations contained in this report. The limitations presented above supersede the requirements or provisions of all other contracts or scopes of work, implied or otherwise, except those stated or acknowledged herein.

Appendix A

Lead Paint Inspection Data Tables

Table 1

Building Components with Lead Levels at or above 0.3 mg/cm^2
Weber State University
Social Science Building

Room	Floor	Sample Number	Lead Level (mg/cm^2)	Component	Side (1)	Substrate	Color	Condition
CALIBRATE		1	1.55					
CALIBRATE		2	0.9	CALIBRATE				
CALIBRATE		3	0.8	CALIBRATE				
CALIBRATE		4	0.9	CALIBRATE				
CALIBRATE		5	1.1	CALIBRATE				
CALIBRATE		6	1.69					
300g	THIRD	10	0.3	WALL	D	CONCRETE	WHITE	INTACT
300g	THIRD	11	0.5	WALL	C	CONCRETE	WHITE	INTACT
300g	THIRD	12	0.5	WALL	B	CONCRETE	WHITE	INTACT
399c	THIRD	28	0.5	WALL	A	CONCRETE	WHITE	INTACT
399c	THIRD	29	0.6	WALL	A	CONCRETE	WHITE	INTACT
399c	THIRD	30	0.5	WALL	C	CONCRETE	WHITE	INTACT
379	THIRD	33	0.6	WALL	A	CONCRETE	WHITE	INTACT
379	THIRD	35	0.8	WALL	A	CONCRETE	WHITE	INTACT
379b	THIRD	41	0.7	WALL	A	CONCRETE	BROWN	INTACT
379b	THIRD	45	0.7	WALL	A	CONCRETE	BROWN	INTACT
300c	THIRD	46	0.7	WALL	A	DRYWALL	BROWN	INTACT
300c	THIRD	47	0.6	WALL	A	DRYWALL	BROWN	INTACT
300c	THIRD	48	0.7	WALL	A	DRYWALL	BROWN	INTACT
300c	THIRD	49	0.8	WALL	C	DRYWALL	BROWN	INTACT
300c	THIRD	50	0.7	WALL	C	DRYWALL	BROWN	INTACT
380	THIRD	73	0.5	WALL	A	PLASTER	WHITE	INTACT
380	THIRD	74	0.7	WALL	A	PLASTER	WHITE	INTACT
380	THIRD	79	1.3	WALL	D	PLASTER	WHITE	INTACT
380	THIRD	80	1.3	MAP	D	PLASTER	multicolored	INTACT
380a	THIRD	93	2	WALL	B	CONCRETE	WHITE	INTACT
380a	THIRD	94	1.3	WALL	B	CONCRETE	WHITE	INTACT
380b	THIRD	102	1.2	WALL	C	CONCRETE	WHITE	INTACT
380b	THIRD	103	1.5	WALL	B	CONCRETE	multicolored	INTACT
380c	THIRD	104	1.2	WALL	C	CONCRETE	WHITE	INTACT
380c	THIRD	105	1.3	WALL	C	CONCRETE	WHITE	INTACT
380c	THIRD	106	0.5	WALL	C	CONCRETE	WHITE	INTACT
380d	THIRD	115	1	WALL	C	CONCRETE	WHITE	INTACT
380d	THIRD	116	1.1	WALL	C	CONCRETE	WHITE	INTACT
380d	THIRD	117	1	WALL	C	CONCRETE	WHITE	INTACT
380d	THIRD	118	1.2	WALL	C	CONCRETE	WHITE	INTACT
380e	THIRD	122	0.9	WALL	C	CONCRETE	WHITE	INTACT
380e	THIRD	123	1.2	WALL	C	CONCRETE	WHITE	INTACT
380e	THIRD	124	0.6	WALL	D	WOOD	STAIN	INTACT
380e	THIRD	125	0.6	WALL	D	WOOD	STAIN	INTACT
390	THIRD	130	1.2	WALL	B	CONCRETE	WHITE	INTACT
390	THIRD	131	1.4	WALL	B	CONCRETE	WHITE	INTACT
394	THIRD	136	0.8	WALL	D	PLASTER	WHITE	INTACT
394	THIRD	137	0.6	WALL	D	PLASTER	WHITE	INTACT
394	THIRD	140	1.6	WALL	B	CONCRETE	WHITE	INTACT
394	THIRD	141	0.6	WALL	A	DRYWALL	WHITE	INTACT
394	THIRD	143	0.5	DOOR FRAME	D	METAL	GREY	INTACT
300a	THIRD	148	0.9	WALL	A	CONCRETE	BEIGE	INTACT
300a	THIRD	149	1	WALL	A	CONCRETE	BEIGE	INTACT
300a	THIRD	151	0.6	WALL	A	CONCRETE	BEIGE	INTACT
300a	THIRD	152	0.8	WALL	A	CONCRETE	BEIGE	INTACT
306	THIRD	155	0.8	WALL	B	DRYWALL	BEIGE	INTACT
306	THIRD	156	0.7	WALL	B	DRYWALL	BEIGE	INTACT
302	THIRD	158	0.7	WALL	D	DRYWALL	WHITE	INTACT
302	THIRD	159	1.6	WALL	D	DRYWALL	WHITE	INTACT
302	THIRD	160	1.5	WALL	B	CONCRETE	WHITE	INTACT
304	THIRD	161	1.9	WALL	B	CONCRETE	WHITE	INTACT
308	THIRD	165	0.7	WALL	D	DRYWALL	WHITE	INTACT
308	THIRD	167	1.7	WALL	B	CONCRETE	WHITE	INTACT

Room	Floor	Sample Number	Lead Level (mg/cm^2)	Component	Side (1)	Substrate	Color	Condition
310	THIRD	170	1.4	WALL	A	CONCRETE	WHITE	INTACT
314	THIRD	171	1.5	WALL	B	CONCRETE	WHITE	INTACT
310	THIRD	172	1.4	WALL	B	CONCRETE	WHITE	INTACT
314	THIRD	175	0.6	WALL	B	DRYWALL	WHITE	INTACT
316	THIRD	177	0.9	WALL	D	DRYWALL	WHITE	INTACT
316	THIRD	178	0.4	WALL	D	DRYWALL	WHITE	INTACT
316	THIRD	180	2.4	WALL	B	CONCRETE	WHITE	INTACT
300h1	THIRD	189	0.6	WALL	D	DRYWALL	BEIGE	INTACT
318	THIRD	196	0.5	WALL	B	CONCRETE	BEIGE	INTACT
320	THIRD	204	0.6	WALL	A	WOOD	STAIN	INTACT
320	THIRD	209	0.6	WALL	A	WOOD	STAIN	INTACT
311	THIRD	213	3.1	WALL	D	TILE	BEIGE	INTACT
311	THIRD	214	2.5	WALL	C	TILE	BEIGE	INTACT
CALIBRATE		230	1.42					
CALIBRATE		231	1					
CALIBRATE		232	0.7					
CALIBRATE		233	1.1					
CALIBRATE		234	1					
CALIBRATE		235	1					
378	THIRD	239	1.4	WALL	B	PLASTER	WHITE	INTACT
378	THIRD	240	1.6	WALL	C	CONCRETE	WHITE	INTACT
377	THIRD	244	1.3	WALL	C	CONCRETE	WHITE	INTACT
374	THIRD	255	1.6	WALL	C	CONCRETE	WHITE	INTACT
374	THIRD	256	0.6	WALL	D	DRYWALL	WHITE	INTACT
370	THIRD	257	0.7	WALL	B	DRYWALL	WHITE	INTACT
370	THIRD	259	1.5	WALL	D	CONCRETE	WHITE	INTACT
370a	THIRD	260	1.4	WALL	C	CONCRETE	BLUE	INTACT
370a	THIRD	261	1.6	WALL	D	CONCRETE	BEIGE	INTACT
370a	THIRD	262	0.4	WALL	A	DRYWALL	BEIGE	INTACT
368	THIRD	264	1.5	WALL	D	CONCRETE	BEIGE	INTACT
366	THIRD	265	1.4	WALL	D	CONCRETE	BEIGE	INTACT
366	THIRD	267	0.6	WALL	B	DRYWALL	BEIGE	INTACT
362	THIRD	268	0.3	WALL	B	DRYWALL	WHITE	INTACT
362	THIRD	270	1.5	WALL	D	CONCRETE	WHITE	INTACT
360	THIRD	273	0.6	WALL	B	DRYWALL	WHITE	INTACT
360	THIRD	276	1.3	WALL	D	CONCRETE	WHITE	INTACT
356	THIRD	277	1.5	WALL	D	CONCRETE	WHITE	INTACT
356	THIRD	278	1.8	WALL	D	CONCRETE	WHITE	INTACT
356	THIRD	279	1.3	WALL	D	CONCRETE	BEIGE	INTACT
354	THIRD	284	1.4	WALL	D	CONCRETE	GREEN	INTACT
352	THIRD	285	1.5	WALL	D	CONCRETE	WHITE	INTACT
352	THIRD	288	0.4	WALL	B	DRYWALL	WHITE	INTACT
350	THIRD	289	0.5	WALL	B	WOOD	STAIN	INTACT
350	THIRD	292	1.5	WALL	D	CONCRETE	WHITE	INTACT
348	THIRD	293	1.2	WALL	D	CONCRETE	BLUE	INTACT
346	THIRD	297	0.7	WALL	D	DRYWALL	BLUE	INTACT
346	THIRD	298	0.7	WALL	B	DRYWALL	BLUE	INTACT
346	THIRD	299	1.3	WALL	D	CONCRETE	BLUE	INTACT
344	THIRD	300	2	WALL	D	CONCRETE	BLUE	INTACT
344	THIRD	301	0.7	WALL	A	WOOD	BLUE	INTACT
344	THIRD	302	0.6	WALL	B	WOOD	BLUE	INTACT
342	THIRD	305	2.1	WALL	D	CONCRETE	WHITE	INTACT
340	THIRD	306	1.4	WALL	D	CONCRETE	WHITE	INTACT
340	THIRD	308	0.6	WALL	B	WOOD	STAIN	INTACT
338	THIRD	311	1.4	WALL	D	CONCRETE	WHITE	INTACT
338	THIRD	312	0.7	WALL	B	DRYWALL	WHITE	INTACT
336	THIRD	316	1.8	WALL	D	CONCRETE	WHITE	INTACT
336	THIRD	317	0.8	WALL	B	WOOD	STAIN	INTACT
334	THIRD	318	0.5	WALL	B	WOOD	STAIN	INTACT
334	THIRD	319	1.4	WALL	D	CONCRETE	WHITE	INTACT
334	THIRD	320	1	WALL	D	CONCRETE	WHITE	INTACT
334	THIRD	321	1.2	WALL	D	CONCRETE	WHITE	INTACT
332	THIRD	325	0.6	WALL	A	STUCCO	BROWN	INTACT
332	THIRD	326	0.5	WALL	D	STUCCO	BROWN	INTACT
332	THIRD	327	0.4	WALL	B	STUCCO	BROWN	INTACT

Room	Floor	Sample Number	Lead Level (mg/cm^2)	Component	Side (1)	Substrate	Color	Condition
300c1	THIRD	328	0.8	WALL	B	PLASTER	BEIGE	INTACT
300c1	THIRD	329	0.7	WALL	B	PLASTER	BEIGE	INTACT
300c1	THIRD	330	0.7	WALL	D	PLASTER	BEIGE	INTACT
300c1	THIRD	331	0.7	WALL	D	PLASTER	BEIGE	INTACT
300c1	THIRD	332	0.8	WALL	D	PLASTER	BEIGE	INTACT
300d1	THIRD	347	0.7	WALL	B	PLASTER	BEIGE	INTACT
300d1	THIRD	348	0.7	WALL	B	PLASTER	BEIGE	INTACT
300d1	THIRD	349	0.5	WALL	D	PLASTER	BEIGE	INTACT
300d1	THIRD	350	0.7	WALL	D	PLASTER	BEIGE	INTACT
300d1	THIRD	351	0.7	WALL	A	PLASTER	BEIGE	INTACT
300d1	THIRD	352	0.7	WALL	A	PLASTER	BEIGE	INTACT
300d1	THIRD	353	0.6	WALL	C	PLASTER	BEIGE	INTACT
300d1	THIRD	354	0.6	WALL	C	PLASTER	BEIGE	INTACT
300b1	THIRD	401	0.7	WALL	B	DRYWALL	BEIGE	INTACT
300b1	THIRD	402	0.8	WALL	B	DRYWALL	BEIGE	INTACT
300b1	THIRD	403	0.8	WALL	D	DRYWALL	BEIGE	INTACT
300b1	THIRD	404	0.7	WALL	D	DRYWALL	BEIGE	INTACT
300b1	THIRD	414	0.4	DOOR FRAME	D	METAL	GREEN	INTACT
326	THIRD	437	1.6	SINK	B	TILE	BROWN	INTACT
326	THIRD	438	8	SINK	B	CERAMIC	WHITE	INTACT
326	THIRD	439	8.8	SINK	B	CERAMIC	WHITE	INTACT
300aa1	THIRD	494	0.8	WALL	C	DRYWALL	WHITE	INTACT
300aa1	THIRD	495	0.8	WALL	C	DRYWALL	WHITE	INTACT
300aa1	THIRD	502	0.5	DOOR FRAME	C	METAL	RED	INTACT
300e	THIRD	509	0.5	WALL	A	CONCRETE	WHITE	INTACT
300e	THIRD	510	0.6	WALL	D	CONCRETE	WHITE	INTACT
399b	THIRD	515	0.5	WALL	B	CONCRETE	WHITE	INTACT
399b	THIRD	516	0.3	WALL	C	CONCRETE	WHITE	INTACT
399b	THIRD	517	0.6	WALL	A	CONCRETE	WHITE	INTACT
328	THIRD	541	0.4	WALL	D	DRYWALL	WHITE	INTACT
328	THIRD	542	0.5	WALL	B	DRYWALL	WHITE	INTACT
328e	THIRD	563	0.4	WALL	B	PLASTER	WHITE	INTACT
CALIBRATE		582	1					
CALIBRATE		583	1					
CALIBRATE		584	1					
CALIBRATE		585	1.67					
CALIBRATE		586	1					
CALIBRATE		587	1					
CALIBRATE		588	1.1					
299c	SECOND	589	0.4	WALL	D	CONCRETE	WHITE	INTACT
299c	SECOND	590	0.4	WALL	A	CONCRETE	WHITE	INTACT
299c	SECOND	591	0.5	WALL	C	CONCRETE	WHITE	INTACT
200g	SECOND	596	0.5	WALL	A	CONCRETE	WHITE	INTACT
200g	SECOND	597	0.6	WALL	B	CONCRETE	WHITE	INTACT
200c1	SECOND	601	0.8	WALL	C	DRYWALL	WHITE	INTACT
200c1	SECOND	602	0.8	WALL	A	DRYWALL	WHITE	INTACT
200c1	SECOND	603	0.7	WALL	A	DRYWALL	WHITE	INTACT
276	SECOND	614	1.8	WALL	B	CONCRETE	WHITE	INTACT
276	SECOND	615	1.2	WALL	C	CONCRETE	WHITE	INTACT
274	SECOND	620	0.5	WALL	C	CONCRETE	WHITE	INTACT
270	SECOND	627	0.7	WALL	B	DRYWALL	WHITE	INTACT
270	SECOND	628	0.6	WALL	B	DRYWALL	WHITE	INTACT
270	SECOND	629	1.7	WALL	D	CONCRETE	WHITE	INTACT
272	SECOND	630	0.9	WALL	C	CONCRETE	WHITE	INTACT
272b	SECOND	634	0.7	WALL	B	WOOD	STAIN	INTACT
272b	SECOND	635	0.8	WALL	D	WOOD	STAIN	INTACT
272a	SECOND	638	1	WALL	C	CONCRETE	WHITE	INTACT
272a	SECOND	639	1.7	WALL	B	CONCRETE	WHITE	INTACT
272a	SECOND	640	0.5	WALL	A	DRYWALL	WHITE	INTACT
278	SECOND	641	1	WALL	C	DRYWALL	WHITE	INTACT
278	SECOND	642	1.4	WALL	C	DRYWALL	WHITE	INTACT
278	SECOND	644	1.3	COLUMN	D	CONCRETE	WHITE	INTACT
278a	SECOND	647	0.5	WALL	C	CONCRETE	BROWN	INTACT
205	SECOND	650	1.5	WALL	A	TILE	BEIGE	INTACT
205	SECOND	651	1.5	WALL	B	TILE	BEIGE	INTACT

Room	Floor	Sample Number	Lead Level (mg/cm^2)	Component	Side (1)	Substrate	Color	Condition
200b	SECOND	657	0.6	WALL	C	DRYWALL	WHITE	INTACT
200b1	SECOND	666	0.8	WALL	B	DRYWALL	WHITE	INTACT
200b1	SECOND	667	0.7	WALL	B	DRYWALL	WHITE	INTACT
200b1	SECOND	668	0.7	WALL	D	DRYWALL	WHITE	INTACT
200b1	SECOND	669	0.7	WALL	D	DRYWALL	WHITE	INTACT
282	SECOND	690	0.7	WALL	B	WOOD	STAIN	INTACT
282	SECOND	691	0.6	WALL	D	WOOD	STAIN	INTACT
282	SECOND	693	0.8	WALL	B	CONCRETE	WHITE	INTACT
282	SECOND	694	0.8	WALL	B	CONCRETE	WHITE	INTACT
280	SECOND	695	1.5	WALL	C	CONCRETE	WHITE	INTACT
280b	SECOND	698	0.8	WALL	B	WOOD	STAIN	INTACT
280b	SECOND	699	0.6	WALL	D	WOOD	STAIN	INTACT
280b	SECOND	700	0.8	WALL	C	WOOD	STAIN	INTACT
280b	SECOND	701	0.6	WALL	C	WOOD	STAIN	INTACT
280a	SECOND	702	1.2	WALL	B	CONCRETE	WHITE	INTACT
280a	SECOND	703	1	WALL	C	CONCRETE	WHITE	INTACT
280a	SECOND	704	0.5	WALL	A	DRYWALL	WHITE	INTACT
284	SECOND	705	0.6	WALL	D	DRYWALL	WHITE	INTACT
284	SECOND	707	0.9	WALL	B	CONCRETE	WHITE	INTACT
286	SECOND	708	1.2	WALL	B	CONCRETE	WHITE	INTACT
286	SECOND	709	0.6	WALL	D	WOOD	STAIN	INTACT
288	SECOND	710	0.7	WALL	D	DRYWALL	WHITE	INTACT
288	SECOND	711	0.7	WALL	C	DRYWALL	WHITE	INTACT
288	SECOND	712	1.2	WALL	B	CONCRETE	WHITE	INTACT
290	SECOND	713	1	WALL	B	CONCRETE	WHITE	INTACT
290	SECOND	714	0.9	WALL	B	CONCRETE	WHITE	INTACT
290	SECOND	715	0.9	WALL	B	CONCRETE	WHITE	INTACT
290	SECOND	716	0.9	WALL	B	CONCRETE	WHITE	INTACT
290	SECOND	717	1.2	WALL	B	CONCRETE	WHITE	INTACT
290	SECOND	718	1.5	WALL	B	CONCRETE	WHITE	INTACT
290	SECOND	719	0.7	WALL	D	DRYWALL	WHITE	INTACT
290	SECOND	720	0.6	WALL	A	DRYWALL	WHITE	INTACT
292	SECOND	721	0.5	WALL	A	DRYWALL	WHITE	INTACT
292	SECOND	722	0.7	WALL	D	DRYWALL	WHITE	INTACT
292	SECOND	723	0.6	WALL	D	DRYWALL	WHITE	INTACT
292	SECOND	724	0.9	WALL	B	CONCRETE	WHITE	INTACT
294	SECOND	725	0.6	WALL	D	DRYWALL	WHITE	INTACT
296	SECOND	728	0.6	WALL	D	DRYWALL	WHITE	INTACT
202	SECOND	739	0.8	WALL	D	DRYWALL	WHITE	INTACT
206	SECOND	744	0.7	WALL	D	DRYWALL	WHITE	INTACT
208	SECOND	748	0.7	WALL	D	DRYWALL	WHITE	INTACT
210	SECOND	751	0.6	WALL	D	DRYWALL	WHITE	INTACT
212	SECOND	753	0.7	WALL	D	DRYWALL	WHITE	INTACT
214	SECOND	756	0.8	WALL	D	DRYWALL	WHITE	INTACT
214	SECOND	757	0.5	WALL	D	DRYWALL	WHITE	INTACT
216	SECOND	760	0.6	WALL	D	DRYWALL	WHITE	INTACT
218	SECOND	762	0.5	WALL	D	DRYWALL	WHITE	INTACT
218	SECOND	763	0.7	WALL	B	CONCRETE	WHITE	INTACT
220	SECOND	765	0.6	WALL	C	DRYWALL	WHITE	INTACT
220	SECOND	766	0.8	WALL	A	CONCRETE	WHITE	INTACT
220a	SECOND	770	0.8	WALL	B	CONCRETE	WHITE	INTACT
220a	SECOND	771	0.5	WALL	C	DRYWALL	WHITE	INTACT
220b	SECOND	772	0.6	WALL	B	WOOD	STAIN	INTACT
220b	SECOND	773	0.7	WALL	B	WOOD	STAIN	INTACT
220b	SECOND	774	0.7	WALL	D	WOOD	STAIN	INTACT
226	SECOND	785	1	WALL	A	CONCRETE	WHITE	INTACT
200b2	SECOND	788	0.7	WALL	D	DRYWALL	WHITE	INTACT
200b2	SECOND	789	0.6	WALL	D	DRYWALL	WHITE	INTACT
CALIBRATE		798	1					
CALIBRATE		799	1					
CALIBRATE		800	1					
CALIBRATE		801	1					
CALIBRATE		802	1					
CALIBRATE		803	1.61					
CALIBRATE		804	0.9					

Room	Floor	Sample Number	Lead Level (mg/cm^2)	Component	Side (1)	Substrate	Color	Condition
235	SECOND	807	0.6	WALL	A	WOOD	STAIN	INTACT
200e	SECOND	832	0.8	WALL	D	CONCRETE	WHITE	INTACT
200e	SECOND	833	0.4	WALL	A	CONCRETE	WHITE	INTACT
299b	SECOND	834	0.5	WALL	C	CONCRETE	WHITE	INTACT
299b	SECOND	835	0.4	WALL	B	CONCRETE	WHITE	INTACT
200a1	SECOND	838	0.6	WALL	C	DRYWALL	WHITE	INTACT
200a1	SECOND	839	0.7	WALL	A	DRYWALL	WHITE	INTACT
230b	SECOND	852	0.3	WALL	A	CONCRETE	WHITE	INTACT
228	SECOND	863	2.3	SINK	B	TILE	WHITE	INTACT
228	SECOND	864	12.6	SINK	B	TILE	WHITE	INTACT
233	SECOND	904	0.8	WALL	D	CONCRETE	BEIGE	INTACT
233	SECOND	905	0.8	WALL	A	WOOD	STAIN	INTACT
CALIBRATE		906	1					
CALIBRATE		907	1					
CALIBRATE		908	1.1					
CALIBRATE		909	1.53					
CALIBRATE		910	1					
CALIBRATE		911	1.1					
CALIBRATE		912	1					
268	SECOND	913	0.6	WALL	B	DRYWALL	WHITE	INTACT
268	SECOND	918	1.6	WALL	D	CONCRETE	WHITE	INTACT
266	SECOND	919	1.9	WALL	D	CONCRETE	WHITE	INTACT
266	SECOND	920	0.6	WALL	B	DRYWALL	WHITE	INTACT
262	SECOND	921	0.5	WALL	B	DRYWALL	PURPLE	INTACT
200d1	SECOND	923	0.6	WALL	B	DRYWALL	WHITE	INTACT
200d1	SECOND	924	0.7	WALL	B	DRYWALL	WHITE	INTACT
200d1	SECOND	925	0.7	WALL	D	DRYWALL	WHITE	INTACT
200d1	SECOND	926	0.6	WALL	D	DRYWALL	WHITE	INTACT
234	SECOND	942	1.4	WALL	A	CONCRETE	WHITE	INTACT
234a	SECOND	943	0.8	WALL	A	CONCRETE	WHITE	INTACT
234a	SECOND	944	1.7	WALL	D	CONCRETE	WHITE	INTACT
234b	SECOND	945	0.6	WALL	B	WOOD	STAIN	INTACT
236	SECOND	948	0.7	WALL	B	DRYWALL	WHITE	INTACT
200j	SECOND	949	0.6	WALL	B	WOOD	STAIN	INTACT
200j	SECOND	950	0.6	WALL	B	WOOD	STAIN	INTACT
200j	SECOND	951	0.6	WALL	D	WOOD	STAIN	INTACT
238	SECOND	952	1.2	WALL	D	CONCRETE	WHITE	INTACT
238	SECOND	953	0.6	WALL	B	WOOD	STAIN	INTACT
240	SECOND	954	0.6	WALL	B	DRYWALL	WHITE	INTACT
242	SECOND	957	0.6	WALL	B	DRYWALL	WHITE	INTACT
244	SECOND	958	0.6	WALL	B	DRYWALL	WHITE	INTACT
246	SECOND	959	0.5	WALL	B	DRYWALL	WHITE	INTACT
246	SECOND	960	1.5	WALL	D	CONCRETE	WHITE	INTACT
248	SECOND	961	1.6	WALL	D	CONCRETE	WHITE	INTACT
248	SECOND	962	0.7	WALL	B	TILE	STAIN	INTACT
248	SECOND	963	0.4	WALL	B	TILE	STAIN	INTACT
250	SECOND	964	0.7	WALL	B	WOOD	STAIN	INTACT
250	SECOND	965	1.6	WALL	D	CONCRETE	WHITE	INTACT
252	SECOND	966	1.2	WALL	D	CONCRETE	WHITE	INTACT
252	SECOND	967	0.4	WALL	B	DRYWALL	WHITE	INTACT
252	SECOND	968	0.6	WALL	B	DRYWALL	WHITE	INTACT
254	SECOND	970	0.6	WALL	B	DRYWALL	WHITE	INTACT
256	SECOND	972	1.3	WALL	D	CONCRETE	WHITE	INTACT
256	SECOND	973	0.7	WALL	B	WOOD	STAIN	INTACT
258	SECOND	974	0.6	WALL	B	DRYWALL	WHITE	INTACT
260	SECOND	976	1.4	WALL	D	CONCRETE	WHITE	INTACT
199c	FIRST	977	0.4	WALL	B	CONCRETE	WHITE	INTACT
199c	FIRST	978	0.6	WALL	C	CONCRETE	WHITE	INTACT
100g	FIRST	979	0.5	WALL	D	CONCRETE	WHITE	INTACT
100g	FIRST	980	0.5	WALL	D	CONCRETE	WHITE	INTACT
100c1	FIRST	987	0.6	WALL	C	DRYWALL	WHITE	INTACT
100c1	FIRST	988	0.6	WALL	D	DRYWALL	WHITE	INTACT
100b1	FIRST	989	0.8	WALL	A	DRYWALL	WHITE	INTACT
100b1	FIRST	990	0.8	WALL	C	DRYWALL	WHITE	INTACT
100b1	FIRST	991	0.7	WALL	B	DRYWALL	WHITE	INTACT

Room	Floor	Sample Number	Lead Level (mg/cm^2)	Component	Side (1)	Substrate	Color	Condition
100b1	FIRST	992	0.6	WALL	D	DRYWALL	WHITE	INTACT
100d1	FIRST	1008	0.5	DOOR FRAME	D	METAL	GREY	INTACT
100d1	FIRST	1009	0.5	DOOR FRAME	D	METAL	GREY	INTACT
100d1	FIRST	1012	0.7	WALL	B	DRYWALL	WHITE	INTACT
100d1	FIRST	1013	0.8	WALL	B	DRYWALL	WHITE	INTACT
100d1	FIRST	1014	0.8	WALL	B	DRYWALL	WHITE	INTACT
100d1	FIRST	1015	0.7	WALL	D	DRYWALL	WHITE	INTACT
100d1	FIRST	1016	0.6	WALL	D	DRYWALL	WHITE	INTACT
100d1	FIRST	1017	0.7	WALL	D	DRYWALL	WHITE	INTACT
135	FIRST	1035	0.5	WALL	B	DRYWALL	WHITE	INTACT
133	FIRST	1036	0.6	WALL	B	DRYWALL	WHITE	INTACT
132	FIRST	1038	0.7	WALL	C	DRYWALL	WHITE	INTACT
130	FIRST	1040	0.5	WALL	A	WOOD	STAIN	INTACT
128	FIRST	1041	0.7	WALL	A	DRYWALL	WHITE	INTACT
128	FIRST	1043	0.7	WALL	B	WOOD	STAIN	INTACT
128	FIRST	1044	0.6	WALL	D	WOOD	STAIN	INTACT
128	FIRST	1045	0.7	WALL	C	WOOD	STAIN	INTACT
115	FIRST	1046	0.7	WALL	C	WOOD	STAIN	INTACT
115	FIRST	1047	0.7	WALL	B	WOOD	STAIN	INTACT
113	FIRST	1048	0.7	WALL	C	WOOD	STAIN	INTACT
113	FIRST	1049	0.7	WALL	C	WOOD	STAIN	INTACT
113	FIRST	1050	0.7	WALL	A	WOOD	STAIN	INTACT
113	FIRST	1051	0.5	WALL	D	WOOD	STAIN	INTACT
113	FIRST	1052	0.7	WALL	D	WOOD	STAIN	INTACT
100f	FIRST	1053	0.8	WALL	C	DRYWALL	WHITE	INTACT
100f	FIRST	1054	0.8	WALL	A	DRYWALL	WHITE	INTACT
126	FIRST	1056	0.8	WALL	B	WOOD	STAIN	INTACT
124	FIRST	1060	0.5	WALL	B	WOOD	STAIN	INTACT
122	FIRST	1061	0.7	WALL	B	DRYWALL	WHITE	INTACT
118	FIRST	1065	0.6	WALL	B	DRYWALL	WHITE	INTACT
116	FIRST	1068	0.7	WALL	B	DRYWALL	WHITE	INTACT
114	FIRST	1069	0.7	WALL	B	DRYWALL	WHITE	INTACT
114a	FIRST	1071	0.6	WALL	B	WOOD	STAIN	INTACT
100a1	FIRST	1081	0.8	WALL	C	DRYWALL	WHITE	INTACT
100a1	FIRST	1085	0.6	WALL	A	DRYWALL	WHITE	INTACT
100a1	FIRST	1093	0.4	DOOR FRAME	A	METAL	GREY	INTACT
102	FIRST	1094	1.8	WALL	A	TILE	BEIGE	INTACT
102	FIRST	1095	1.6	WALL	B	TILE	BEIGE	INTACT
102	FIRST	1096	1.8	WALL	C	TILE	BEIGE	INTACT
102	FIRST	1097	1.6	WALL	D	TILE	BEIGE	INTACT
CALIBRATE		1099	0.9					
CALIBRATE		1100	1					
CALIBRATE		1101	1					
CALIBRATE		1102	1					
CALIBRATE		1103	1.1					
CALIBRATE		1104	1.58					
CALIBRATE		1105	1					
CALIBRATE		1106	1					
CALIBRATE		1107	1.1					
119	FIRST	1113	0.6	WALL	A	WOOD	STAIN	INTACT
142	FIRST	1125	0.7	WALL	C	WOOD	STAIN	INTACT
142	FIRST	1126	0.6	WALL	D	WOOD	STAIN	INTACT
146	FIRST	1130	0.6	WALL	D	WOOD	STAIN	INTACT
148	FIRST	1134	0.7	WALL	A	DRYWALL	WHITE	INTACT
148	FIRST	1135	0.7	WALL	D	DRYWALL	WHITE	INTACT
150	FIRST	1138	0.5	WALL	D	WOOD	STAIN	INTACT
152	FIRST	1146	0.6	WALL	D	DRYWALL	GREEN	INTACT
121	FIRST	1151	0.6	WALL	C	WOOD	STAIN	INTACT
101	FIRST	1157	0.7	WALL	A	WOOD	STAIN	INTACT
103	FIRST	1173	0.5	WALL	A	CONCRETE	WHITE	INTACT
108	FIRST	1187	0.7	WALL	C	WOOD	STAIN	INTACT
100e	FIRST	1194	0.7	WALL	D	CONCRETE	WHITE	INTACT
100e	FIRST	1195	0.3	WALL	A	CONCRETE	WHITE	INTACT
100e	FIRST	1196	0.4	WALL	C	CONCRETE	WHITE	INTACT
199b	FIRST	1203	0.5	WALL	B	CONCRETE	WHITE	INTACT

Room	Floor	Sample Number	Lead Level (mg/cm^2)	Component	Side (1)	Substrate	Color	Condition
199b	FIRST	1205	0.5	WALL	A	CONCRETE	WHITE	INTACT
110	FIRST	1212	8.6	SINK	A	LAMINATE	WHITE	INTACT
110	FIRST	1213	1.8	SINK	B	TILE	WHITE	INTACT
CALIBRATE		1218	1.61					
CALIBRATE		1219	1					
CALIBRATE		1220	1					
CALIBRATE		1221	1.1					
CALIBRATE		1222	1.56					
CALIBRATE		1223	1.1					
CALIBRATE		1224	1					
CALIBRATE		1225	1					
SOUTH STAIRS	FIRST	1229	0.3	WALL	A	CONCRETE	WHITE	INTACT
SOUTH STAIRS	FIRST	1230	0.4	WALL	B	CONCRETE	WHITE	INTACT
SOUTH STAIRS	FIRST	1231	0.5	WALL	C	CONCRETE	WHITE	INTACT
SOUTH STAIRS	FIRST	1232	0.4	WALL	C	CONCRETE	WHITE	INTACT
SOUTH STAIRS	FIRST	1233	0.5	WALL	D	CONCRETE	WHITE	INTACT
NORTH ENTRY	FIRST	1249	0.7	WALL	A	CONCRETE	WHITE	INTACT
NORTH ENTRY	FIRST	1250	0.7	WALL	B	CONCRETE	WHITE	INTACT
NORTH ENTRY	FIRST	1251	0.7	WALL	C	CONCRETE	WHITE	INTACT
NORTH ENTRY	FIRST	1252	0.4	WALL	D	CONCRETE	WHITE	INTACT
S CORRIDOR	FIRST	1256	0.7	WALL	A	DRYWALL	WHITE	INTACT
S CORRIDOR	FIRST	1257	0.9	WALL	C	DRYWALL	WHITE	INTACT
E CORRIDOR	FIRST	1262	0.8	WALL	B	DRYWALL	WHITE	INTACT
E CORRIDOR	FIRST	1264	0.7	WALL	B	DRYWALL	WHITE	INTACT
E CORRIDOR	FIRST	1265	0.9	WALL	D	DRYWALL	WHITE	INTACT
E CORRIDOR	FIRST	1266	0.6	WALL	D	DRYWALL	WHITE	INTACT
N CORRIDOR	FIRST	1271	0.8	WALL	A	DRYWALL	WHITE	INTACT
W CORRIDOR	FIRST	1279	0.8	WALL PANEL	B	DRYWALL	WHITE	INTACT
W CORRIDOR	FIRST	1280	0.8	WALL PANEL	B	DRYWALL	WHITE	INTACT
W CORRIDOR	FIRST	1281	0.8	WALL PANEL	C	DRYWALL	WHITE	INTACT
W CORRIDOR	FIRST	1282	1	WALL PANEL	D	DRYWALL	WHITE	INTACT
W CORRIDOR	FIRST	1283	0.8	WALL PANEL	D	DRYWALL	WHITE	INTACT
W CORRIDOR	FIRST	1284	0.8	BULLETIN BOARD	B	WOOD	BROWN	INTACT
W CORRIDOR	FIRST	1285	0.8	BULLETIN BOARD	B	WOOD	BROWN	INTACT
135	FIRST	1312	0.6	WALL	A	DRYWALL	WHITE	INTACT
134	FIRST	1318	0.7	WALL	B	DRYWALL	WHITE	INTACT
133	FIRST	1322	0.5	WALL	B	DRYWALL	WHITE	INTACT
CALIBRATE		1325	1					
CALIBRATE		1326	1					
CALIBRATE		1327	1					
CALIBRATE		1328	1.75					
CALIBRATE		1329	1					
CALIBRATE		1330	1.1					
CALIBRATE		1331	1					
132	FIRST	1334	0.8	WALL PANEL	A	DRYWALL	WHITE	INTACT
130	FIRST	1338	0.7	WALL	A	WOOD	BROWN	INTACT
128	FIRST	1342	0.5	WALL PANEL	A	DRYWALL	WHITE	INTACT
126	FIRST	1348	0.7	WALL PANEL	B	WOOD	BROWN	INTACT
124	FIRST	1353	0.6	WALL PANEL	B	WOOD	BROWN	INTACT
122	FIRST	1357	0.7	WALL PANEL	B	DRYWALL	WHITE	INTACT
118	FIRST	1362	0.7	WALL PANEL	B	DRYWALL	WHITE	INTACT
114	FIRST	1366	0.6	WALL PANEL	B	DRYWALL	WHITE	INTACT
114A	FIRST	1369	0.6	WALL PANEL	B	WOOD	BROWN	INTACT
114B	FIRST	1377	8.7	SINK	B	METAL	WHITE	INTACT
110	FIRST	1390	7.1	SINK	B	METAL	WHITE	INTACT
110	FIRST	1391	1.7	SINK	B	TILE	TAN	INTACT
108	FIRST	1393	0.7	WALL PANEL	C	WOOD	BROWN	INTACT
108	FIRST	1394	0.3	WALL	D	DRYWALL	WHITE	INTACT
CALIBRATE		1397	1.76					
106 WOMEN	FIRST	1399	0.3	WINDOW PANEL	B	METAL	TAN	INTACT
106 WOMEN	FIRST	1400	0.3	WINDOW PANEL	B	METAL	TAN	INTACT
106 WOMEN	FIRST	1401	1.7	WALL	A	TILE	TAN	INTACT
106 WOMEN	FIRST	1402	1.7	WALL	B	TILE	TAN	INTACT
106 WOMEN	FIRST	1403	1.7	WALL	C	TILE	TAN	INTACT
106 WOMEN	FIRST	1404	1.6	WALL	D	TILE	TAN	INTACT

Room	Floor	Sample Number	Lead Level (mg/cm^2)	Component	Side (1)	Substrate	Color	Condition
106 WOMEN	FIRST	1405	0.6	WALL	A	DRYWALL	WHITE	INTACT
106 WOMEN	FIRST	1406	0.6	WALL	B	DRYWALL	WHITE	INTACT
106 WOMEN	FIRST	1408	0.4	WALL	D	DRYWALL	WHITE	INTACT
102 MEN	FIRST	1414	0.4	WALL	A	DRYWALL	WHITE	INTACT
102 MEN	FIRST	1415	0.5	WALL	B	DRYWALL	WHITE	INTACT
102 MEN	FIRST	1416	0.5	WALL	C	DRYWALL	WHITE	INTACT
102 MEN	FIRST	1417	0.4	WALL	D	DRYWALL	WHITE	INTACT
102 MEN	FIRST	1418	1.8	WALL	A	TILE	TAN	INTACT
102 MEN	FIRST	1419	1.5	WALL	B	TILE	TAN	INTACT
102 MEN	FIRST	1420	1.7	WALL	C	TILE	TAN	INTACT
102 MEN	FIRST	1421	1.4	WALL	D	TILE	TAN	INTACT
102 MEN	FIRST	1422	0.4	SINK	C	CERAMIC	WHITE	INTACT
152	FIRST	1426	0.7	WALL PANEL	B	DRYWALL	GREEN	INTACT
150	FIRST	1433	0.5	WALL PANEL	D	WOOD	BROWN	INTACT
146	FIRST	1436	0.7	WALL PANEL	D	WOOD	BROWN	INTACT
142	FIRST	1442	0.6	WALL PANEL	C	WOOD	BROWN	INTACT
142	FIRST	1443	0.6	WALL PANEL	D	WOOD	BROWN	INTACT
140B	FIRST	1449	34.9	SINK	D	METAL	WHITE	INTACT
CALIBRATE		1451	1					
CALIBRATE		1452	1					
CALIBRATE		1453	1					
CALIBRATE		1454	1.59					
CALIBRATE		1455	1					
CALIBRATE		1456	1.1					
CALIBRATE		1457	1					
CALIBRATE		1458	1.54					
119	FIRST	1461	0.7	WALL	A	WOOD	BROWN	INTACT
119	FIRST	1465	1.6	BULLETIN BOARD	B	WOOD	TAN	INTACT
121	FIRST	1470	0.6	WALL PANEL	C	VINYL	BROWN	INTACT
121	FIRST	1471	1.6	BULLETIN BOARD	A	WOOD	TAN	INTACT
101	FIRST	1475	0.6	WALL PANEL	A	VINYL	BROWN	INTACT
101	FIRST	1478	1.6	BULLETIN BOARD	C	WOOD	TAN	INTACT
103	FIRST	1482	0.6	WALL	A	CONCRETE	WHITE	INTACT
103	FIRST	1486	1.9	BULLETIN BOARD	B	WOOD	TAN	INTACT
109	FIRST	1495	0.5	WALL PANEL	A	CONCRETE	WHITE	INTACT
109	FIRST	1498	1.8	BULLETIN BOARD	D	WOOD	TAN	INTACT
113	FIRST	1502	0.5	WALL PANEL	A	VINYL	BROWN	INTACT
113	FIRST	1505	0.6	WALL PANEL	C	VINYL	MIX	INTACT
113	FIRST	1506	0.7	WALL PANEL	D	VINYL	MIX	INTACT
115	FIRST	1510	0.5	WALL PANEL	B	VINYL	BROWN	INTACT
115	FIRST	1511	0.6	WALL PANEL	C	VINYL	BROWN	INTACT
115	FIRST	1512	0.7	WALL PANEL	D	VINYL	BROWN	INTACT
CALIBRATE		1515	1.66					
42	BASEMENT	1519	1.6	BULLETIN BOARD	D	WOOD	TAN	INTACT
38-40	BASEMENT	1524	1.7	WALL	B	CONCRETE	WHITE	INTACT
38-40	BASEMENT	1526	1.5	WALL	D	DRYWALL	WHITE	INTACT
38-40	BASEMENT	1527	0.8	WALL PANEL	CENTER	VINYL	BROWN	INTACT
38-40	BASEMENT	1529	2.3	COLUMN	B	CONCRETE	WHITE	INTACT
38-40	BASEMENT	1531	1.8	BULLETIN BOARD	B	WOOD	TAN	INTACT
36A	BASEMENT	1538	1.3	WALL	D	DRYWALL	WHITE	INTACT
36A	BASEMENT	1539	1.3	COLUMN	A	CONCRETE	WHITE	INTACT
36A	BASEMENT	1540	1.8	COLUMN	C	CONCRETE	WHITE	INTACT
CALIBRATE		1541	1					
CALIBRATE		1542	1					
CALIBRATE		1543	1.1					
CALIBRATE		1544	1.74					
CALIBRATE		1545	1					
CALIBRATE		1546	1					
CALIBRATE		1547	1.1					
CALIBRATE		1548	1.1					
34	BASEMENT	1553	0.8	WALL	D	DRYWALL	MUSTARD	INTACT
34	BASEMENT	1554	1	WALL	A	CONCRETE	MUSTARD	INTACT
34	BASEMENT	1555	0.8	COLUMN	B	CONCRETE	MUSTARD	INTACT
24	BASEMENT	1560	1.1	WALL	A	DRYWALL	MUSTARD	INTACT
24	BASEMENT	1561	1.1	WALL	B	DRYWALL	MUSTARD	INTACT

Room	Floor	Sample Number	Lead Level (mg/cm^2)	Component	Side (1)	Substrate	Color	Condition
24	BASEMENT	1562	0.8	WALL	B	VINYL	BROWN	INTACT
24	BASEMENT	1565	1.2	WALL	D	DRYWALL	MUSTARD	INTACT
24	BASEMENT	1566	1.6	COLUMN	CENTER	CONCRETE	MUSTARD	INTACT
24	BASEMENT	1567	0.7	COLUMN	CENTER	CONCRETE	WHITE	INTACT
26	BASEMENT	1577	1.4	COLUMN	A	CONCRETE	WHITE	INTACT
26	BASEMENT	1578	1.3	COLUMN	C	CONCRETE	WHITE	INTACT
26	BASEMENT	1579	1.1	COLUMN	D	CONCRETE	WHITE	INTACT
26	BASEMENT	1580	1.5	BULLETIN BOARD	B	WOOD	TAN	INTACT
20	BASEMENT	1585	0.6	WALL	A	PLASTER	MUSTARD	INTACT
20	BASEMENT	1586	0.7	WALL	B	PLASTER	MUSTARD	INTACT
20	BASEMENT	1587	0.8	WALL	C	PLASTER	MUSTARD	INTACT
20	BASEMENT	1588	1.7	WALL	D	PLASTER	MUSTARD	INTACT
10	BASEMENT	1596	0.5	WALL	C	CONCRETE	GREY	INTACT
10	BASEMENT	1597	0.5	WALL	D	CONCRETE	GREY	INTACT
04 MEN	BASEMENT	1610	0.6	WALL	A	DRYWALL	CREAM	INTACT
04 MEN	BASEMENT	1611	0.7	WALL	B	CONCRETE	CREAM	INTACT
04 MEN	BASEMENT	1612	0.6	WALL	B	CONCRETE	CREAM	INTACT
04 MEN	BASEMENT	1613	0.6	WALL	C	CONCRETE	CREAM	INTACT
04 MEN	BASEMENT	1614	0.5	WALL	D	CONCRETE	CREAM	INTACT
02 CUSTODIAL	BASEMENT	1622	6.9	SINK	B	METAL	WHITE	INTACT
02 CUSTODIAL	BASEMENT	1623	1.9	SINK	B	TILE	TAN	INTACT
48	BASEMENT	1625	0.8	WALL	A	VINYL	BROWN	INTACT
48	BASEMENT	1629	1.7	BULLETIN BOARD	B	WOOD	TAN	INTACT
46	BASEMENT	1637	1.8	BULLETIN BOARD	D	WOOD	TAN	INTACT
44	BASEMENT	1639	0.8	WALL PANEL	A	WOOD	BROWN	INTACT
44	BASEMENT	1644	1.6	BULLETIN BOARD	D	WOOD	TAN	INTACT
7	BASEMENT	1647	0.7	WALL PANEL	C	VINYL	BROWN	INTACT
7	BASEMENT	1648	2.1	BULLETIN BOARD	B	WOOD	TAN	INTACT
CALIBRATE		1668	1					
CALIBRATE		1669	1					
CALIBRATE		1670	1					

Note 1: A=North, B=East, C=South, D=West

Table 2

Building Components with Lead Levels below 0.3 mg/cm^2
Weber State University
Social Science Building

Room	Floor	Sample Number	Lead Level (mg/cm^2)	Component	Side (1)	Substrate	Color	Condition
300g	THIRD	7	0	WALL	C	STONE	BROWN	INTACT
300g	THIRD	8	0	WALL	D	STONE	BROWN	INTACT
300g	THIRD	9	0	WALL	B	STONE	BROWN	INTACT
300g	THIRD	13	0	DOOR	B	WOOD	STAIN	INTACT
300g	THIRD	14	0	DOOR	A	WOOD	STAIN	INTACT
300g	THIRD	15	0	DOOR	A	WOOD	STAIN	INTACT
300g	THIRD	16	0.04	DOOR FRAME	A	METAL	BEIGE	INTACT
300g	THIRD	17	0.06	DOOR FRAME	A	METAL	BEIGE	INTACT
300g	THIRD	18	0.02	DOOR FRAME	A	METAL	BLACK	INTACT
300g	THIRD	19	0	DOOR FRAME	C	METAL	BLACK	INTACT
300g	THIRD	20	0.03	DOOR FRAME	B	METAL	BLACK	INTACT
300g	THIRD	21	0	HAND RAIL	B	METAL	GREY	INTACT
300g	THIRD	22	0	HAND RAIL	B	METAL	GREY	INTACT
399c	THIRD	23	-0.38	HAND RAIL	D	METAL	GREY	INTACT
399c	THIRD	24	0	HAND RAIL	D	METAL	GREY	INTACT
399c	THIRD	25	0	WALL	C	STONE	BROWN	INTACT
399c	THIRD	26	0	WALL	B	STONE	BROWN	INTACT
399c	THIRD	27	0	WALL	A	STONE	BROWN	INTACT
379	THIRD	31	0	WALL	C	CONCRETE	WHITE	INTACT
379	THIRD	32	0	WALL	B	CONCRETE	WHITE	INTACT
379	THIRD	34	0	WALL	C	CONCRETE	WHITE	INTACT
379	THIRD	36	0	DOOR FRAME	A	METAL	BLACK	INTACT
379	THIRD	37	0	DOOR FRAME	A	METAL	BLACK	INTACT
379	THIRD	38	0	DOOR FRAME	D	METAL	GREY	INTACT
379	THIRD	39	0	DOOR FRAME	D	METAL	GREY	INTACT
379	THIRD	40	0	DOOR	D	WOOD	STAIN	INTACT
379b	THIRD	42	0	WALL	B	DRYWALL	BROWN	INTACT
379b	THIRD	43	0.01	WALL	B	DRYWALL	BROWN	INTACT
379b	THIRD	44	0.02	WALL	D	DRYWALL	BROWN	INTACT
300c	THIRD	51	0.05	WALL	C	CONCRETE	BROWN	INTACT
300c	THIRD	52	0.09	WALL	C	CONCRETE	BROWN	INTACT
300c	THIRD	53	0.1	WALL	C	PLASTER	BEIGE	INTACT
300c	THIRD	54	0.13	WALL	C	PLASTER	BEIGE	INTACT
300c	THIRD	55	0.09	WALL	C	PLASTER	BEIGE	INTACT
300c	THIRD	56	0	WALL	C	METAL	BEIGE	INTACT
300c	THIRD	57	0	WALL	C	METAL	BEIGE	INTACT
300c	THIRD	58	0.02	WALL	C	TILE	BEIGE	INTACT
300c	THIRD	59	0	WALL	C	TILE	BEIGE	INTACT
300c	THIRD	60	0	DOOR	A	WOOD	STAIN	INTACT
300c	THIRD	61	0	DOOR	A	WOOD	STAIN	INTACT
300c	THIRD	62	0	DOOR	A	WOOD	STAIN	INTACT
300c	THIRD	63	0.02	FIRE EXTINGUISHER	A	METAL	GREY	INTACT
300c	THIRD	64	0	FIRE EXTINGUISHER	A	METAL	GREY	INTACT
300c	THIRD	65	0	ELECTRIC BOX	A	METAL	GREY	INTACT
300c	THIRD	66	0	ELECTRIC BOX	A	METAL	GREY	INTACT
300c	THIRD	67	0	DOOR FRAME	A	METAL	GREY	INTACT
300c	THIRD	68	0	DOOR FRAME	A	METAL	GREY	INTACT
300c	THIRD	69	0.22	DOOR FRAME	C	METAL	GREY	INTACT
300c	THIRD	70	0	DOOR FRAME	C	METAL	GREY	INTACT
380	THIRD	71	0	DOOR FRAME	A	METAL	GREY	INTACT
380	THIRD	72	0.25	DOOR FRAME	A	METAL	GREY	INTACT
380	THIRD	75	0	WALL	B	PLASTER	WHITE	INTACT
380	THIRD	76	0	WALL	B	PLASTER	WHITE	INTACT
380	THIRD	77	0	WALL	A	DRYWALL	WHITE	INTACT

Room	Floor	Sample Number	Lead Level (mg/cm^2)	Component	Side (1)	Substrate	Color	Condition
380	THIRD	78	0	WALL	A	DRYWALL	WHITE	INTACT
380	THIRD	81	0	MAP	C	DRYWALL	PINK	INTACT
380	THIRD	82	0	MAP	C	DRYWALL	PINK	INTACT
380	THIRD	83	0	MAP	B	DRYWALL	PINK	INTACT
380	THIRD	84	0	WALL	B	DRYWALL	PINK	INTACT
380	THIRD	85	0	WALL	C	DRYWALL	PINK	INTACT
380	THIRD	86	0	DOOR	B	WOOD	STAIN	INTACT
380	THIRD	87	0	DOOR	C	WOOD	STAIN	INTACT
380	THIRD	88	0	DOOR FRAME	C	METAL	GREY	INTACT
380a	THIRD	89	0	DOOR FRAME	D	METAL	GREY	INTACT
380a	THIRD	90	0	DOOR FRAME	C	METAL	GREY	INTACT
380a	THIRD	91	0	WALL	A	VINYL	BEIGE	INTACT
380a	THIRD	92	0	WALL	C	VINYL	BEIGE	INTACT
380a	THIRD	95	0	WINDOW FRAME	B	METAL	BROWN	INTACT
380a	THIRD	96	0	WINDOW FRAME	B	METAL	BROWN	INTACT
380a	THIRD	97	0.01	RADIATOR	B	METAL	GREEN	INTACT
380a	THIRD	98	0.04	RADIATOR	B	METAL	GREEN	INTACT
380b	THIRD	99	0	RADIATOR	B	METAL	GREEN	INTACT
380b	THIRD	100	0	WALL	A	VINYL	WHITE	INTACT
380b	THIRD	101	0	WALL	A	VINYL	WHITE	INTACT
380c	THIRD	107	0	WALL	D	VINYL	WHITE	INTACT
380c	THIRD	108	0	WALL	A	VINYL	WHITE	INTACT
380c	THIRD	109	0.01	RADIATOR	C	METAL	GREEN	INTACT
380c	THIRD	110	0	RADIATOR	C	METAL	GREEN	INTACT
380c	THIRD	111	0	DOOR	A	WOOD	STAIN	INTACT
380d	THIRD	112	0	DOOR	A	WOOD	STAIN	INTACT
380d	THIRD	113	0	WALL	A	VINYL	WHITE	INTACT
380d	THIRD	114	0	WALL	B	VINYL	WHITE	INTACT
380d	THIRD	119	0.01	RADIATOR	C	METAL	WHITE	INTACT
380d	THIRD	120	0	RADIATOR	C	METAL	WHITE	INTACT
380e	THIRD	121	0.01	RADIATOR	C	METAL	BROWN	INTACT
380e	THIRD	126	0	WINDOW FRAME	C	METAL	BROWN	INTACT
390	THIRD	127	0	WINDOW FRAME	B	METAL	BROWN	INTACT
390	THIRD	128	0	WINDOW FRAME	B	METAL	BROWN	INTACT
390	THIRD	129	0.01	RADIATOR	B	METAL	GREEN	INTACT
390	THIRD	132	0	WALL	A	PLASTER	WHITE	INTACT
390	THIRD	133	0	WALL	A	PLASTER	WHITE	INTACT
390	THIRD	134	0	WALL	C	PLASTER	WHITE	INTACT
390	THIRD	135	0	WALL	C	PLASTER	WHITE	INTACT
394	THIRD	138	0	WALL	C	PLASTER	WHITE	INTACT
394	THIRD	139	0	WALL	C	PLASTER	WHITE	INTACT
394	THIRD	142	0	DOOR	D	WOOD	STAIN	INTACT
300a	THIRD	144	0	DOOR FRAME	D	METAL	BROWN	INTACT
300a	THIRD	145	0	DOOR FRAME	B	METAL	BROWN	INTACT
300a	THIRD	146	0	WALL	C	DRYWALL	BEIGE	INTACT
300a	THIRD	147	0	WALL	C	DRYWALL	BEIGE	INTACT
300a	THIRD	150	0	WALL	A	CONCRETE	BEIGE	INTACT
300a	THIRD	153	0	WALL	A	CONCRETE	BEIGE	INTACT
300a	THIRD	154	0	WALL	D	PLASTER	BEIGE	INTACT
306	THIRD	157	0	WALL	D	DRYWALL	BEIGE	INTACT
304	THIRD	162	0	DOOR	D	WOOD	STAIN	INTACT
304	THIRD	163	0	DOOR FRAME	D	METAL	GREY	INTACT
308	THIRD	164	0	DOOR FRAME	D	METAL	GREY	INTACT
308	THIRD	166	0.02	WALL	C	DRYWALL	WHITE	INTACT
308	THIRD	168	0	WINDOW FRAME	B	METAL	BROWN	INTACT
310	THIRD	169	0	WALL	A	DRYWALL	WHITE	INTACT
314	THIRD	173	0	WALL	C	DRYWALL	WHITE	INTACT
314	THIRD	174	0	WALL	C	DRYWALL	WHITE	INTACT
314	THIRD	176	0	WALL	A	DRYWALL	WHITE	INTACT
316	THIRD	179	0	WALL	A	DRYWALL	WHITE	INTACT
316	THIRD	181	0	DOOR	D	WOOD	STAIN	INTACT
316	THIRD	182	0	DOOR FRAME	D	METAL	GREY	INTACT
300h1	THIRD	183	0	DOOR	C	WOOD	STAIN	INTACT
300h1	THIRD	184	0	DOOR	B	WOOD	STAIN	INTACT
300h1	THIRD	185	0	DOOR	B	WOOD	STAIN	INTACT

Room	Floor	Sample Number	Lead Level (mg/cm^2)	Component	Side (1)	Substrate	Color	Condition
300h1	THIRD	186	0	DOOR	A	WOOD	STAIN	INTACT
300h1	THIRD	187	0	DOOR FRAME	A	METAL	GREY	INTACT
300h1	THIRD	188	0	DOOR FRAME	A	METAL	BEIGE	INTACT
300h1	THIRD	190	0	WALL	B	DRYWALL	BEIGE	INTACT
300h1	THIRD	191	0	WALL	B	DRYWALL	BEIGE	INTACT
300h1	THIRD	192	0	WALL	B	DRYWALL	BEIGE	INTACT
300h1	THIRD	193	0	WALL	B	DRYWALL	BEIGE	INTACT
300h1	THIRD	194	0	WALL	B	DRYWALL	BEIGE	INTACT
318	THIRD	195	0	WALL	C	DRYWALL	BEIGE	INTACT
318	THIRD	197	0	WALL	A	CONCRETE	BEIGE	INTACT
318	THIRD	198	0	WALL	A	CONCRETE	BEIGE	INTACT
318	THIRD	199	0	WINDOW FRAME	A	METAL	BROWN	INTACT
318	THIRD	200	0	WINDOW FRAME	A	METAL	BROWN	INTACT
318	THIRD	201	0.01	RADIATOR	A	METAL	BROWN	INTACT
318	THIRD	202	0	WALL	D	CONCRETE	WHITE	INTACT
320	THIRD	203	0	WALL	A	WOOD	STAIN	INTACT
320	THIRD	205	0	FLOOR	FLOOR	TILE	BEIGE	INTACT
320	THIRD	206	0	COLUMN	A	CONCRETE	BEIGE	INTACT
320	THIRD	207	0	COLUMN	A	CONCRETE	BEIGE	INTACT
320	THIRD	208	0	WALL	A	WOOD	STAIN	INTACT
3ca	THIRD	210	0	WALL	A	PLASTER	BROWN	INTACT
3ca	THIRD	211	0	WALL	B	PLASTER	BROWN	INTACT
3ca	THIRD	212	0	WALL	A	WOOD	BROWN	INTACT
311	THIRD	215	0	RADIATOR	C	METAL	PINK	INTACT
311	THIRD	216	0	FLOOR	FLOOR	TILE	BEIGE	INTACT
311	THIRD	217	0	FLOOR	FLOOR	TILE	BEIGE	INTACT
311	THIRD	218	0	STALL	B	PLASTIC	WHITE	INTACT
311	THIRD	219	0	WALL	A	DRYWALL	PINK	INTACT
311	THIRD	220	0	WALL	A	DRYWALL	PINK	INTACT
311	THIRD	221	0	WALL	A	DRYWALL	PINK	INTACT
311	THIRD	222	0	DOOR	A	WOOD	STAIN	INTACT
399a	THIRD	223	0	WALL	A	CONCRETE	WHITE	INTACT
399a	THIRD	224	0	WALL	D	CONCRETE	WHITE	INTACT
399a	THIRD	225	0	WALL	C	stone	BROWN	INTACT
378	THIRD	236	0	DOOR	A	WOOD	STAIN	INTACT
378	THIRD	237	0	DOOR FRAME	A	METAL	GREY	INTACT
378	THIRD	238	0.01	WALL	A	PLASTER	BEIGE	INTACT
378	THIRD	241	0	WINDOW FRAME	D	WOOD	STAIN	INTACT
378	THIRD	242	0.14	COLUMN	D	CONCRETE	WHITE	INTACT
377	THIRD	243	0.06	COLUMN	B	CONCRETE	WHITE	INTACT
377	THIRD	245	0	WINDOW FRAME	C	METAL	BROWN	INTACT
377	THIRD	246	0	WALL	A	DRYWALL	WHITE	INTACT
376	THIRD	247	0	WALL	A	DRYWALL	WHITE	INTACT
376	THIRD	248	0	WALL	D	DRYWALL	WHITE	INTACT
376	THIRD	249	0	WALL	C	DRYWALL	WHITE	INTACT
376	THIRD	250	0	DOOR	A	WOOD	STAIN	INTACT
374	THIRD	251	0	DOOR	A	WOOD	STAIN	INTACT
374	THIRD	252	0.02	DOOR	A	PLASTER	STAIN	INTACT
374	THIRD	253	0.01	WALL	B	VINYL	WHITE	INTACT
374	THIRD	254	0.04	COLUMN	B	CONCRETE	WHITE	INTACT
370	THIRD	258	0	WALL	C	DRYWALL	WHITE	INTACT
368	THIRD	263	0	WALL	C	DRYWALL	BEIGE	INTACT
366	THIRD	266	0	WALL	A	DRYWALL	BEIGE	INTACT
362	THIRD	269	0.01	WALL	A	DRYWALL	WHITE	INTACT
362	THIRD	271	0	WINDOW FRAME	D	METAL	BROWN	INTACT
362	THIRD	272	0	DOOR	B	WOOD	STAIN	INTACT
360	THIRD	274	0	WALL	C	DRYWALL	WHITE	INTACT
360	THIRD	275	0	WALL	A	DRYWALL	WHITE	INTACT
356	THIRD	280	0	WALL	A	PLASTER	RED	INTACT
356	THIRD	281	0	WALL	A	PLASTER	WHITE	INTACT
354	THIRD	282	0	WALL	A	PLASTER	WHITE	INTACT
354	THIRD	283	0	WALL	C	DRYWALL	WHITE	INTACT
352	THIRD	286	0.01	WALL	C	DRYWALL	WHITE	INTACT
352	THIRD	287	0	WALL	A	DRYWALL	WHITE	INTACT
350	THIRD	290	0	WALL	A	VINYL	WHITE	INTACT

Room	Floor	Sample Number	Lead Level (mg/cm^2)	Component	Side (1)	Substrate	Color	Condition
350	THIRD	291	0	WALL	C	VINYL	WHITE	INTACT
348	THIRD	294	0	WALL	C	DRYWALL	BLUE	INTACT
348	THIRD	295	0	WALL	B	DRYWALL	BLUE	INTACT
348	THIRD	296	0	WALL	A	DRYWALL	BLUE	INTACT
344	THIRD	303	0	WALL	C	WOOD	BLUE	INTACT
342	THIRD	304	0.01	WALL	C	DRYWALL	WHITE	INTACT
340	THIRD	307	0	WALL	C	DRYWALL	WHITE	INTACT
340	THIRD	309	0	WALL	A	VINYL	BEIGE	INTACT
340	THIRD	310	0.01	RADIATOR	D	METAL	BROWN	INTACT
338	THIRD	313	0	WALL	C	DRYWALL	WHITE	INTACT
338	THIRD	314	0	WALL	A	DRYWALL	WHITE	INTACT
336	THIRD	315	0.01	WALL	A	DRYWALL	WHITE	INTACT
334	THIRD	322	0.03	WALL	C	DRYWALL	WHITE	INTACT
334	THIRD	323	0	WALL	A	DRYWALL	WHITE	INTACT
332	THIRD	324	0	WALL	C	VINYL	WHITE	INTACT
300c1	THIRD	333	0	DOOR	D	WOOD	STAIN	INTACT
300c1	THIRD	334	0	DOOR	D	WOOD	STAIN	INTACT
300c1	THIRD	335	0	DOOR	D	WOOD	STAIN	INTACT
300c1	THIRD	336	0	DOOR	D	WOOD	STAIN	INTACT
300c1	THIRD	337	0.01	DOOR	B	WOOD	STAIN	INTACT
300c1	THIRD	338	0	DOOR	B	WOOD	STAIN	INTACT
300c1	THIRD	339	0	DOOR	B	WOOD	STAIN	INTACT
300c1	THIRD	340	0.01	DOOR	B	WOOD	STAIN	INTACT
300c1	THIRD	341	0	DOOR	B	WOOD	STAIN	INTACT
300c1	THIRD	342	0	DOOR FRAME	B	METAL	GREY	INTACT
300c1	THIRD	343	0.15	DOOR FRAME	B	METAL	GREY	INTACT
300c1	THIRD	344	0	DOOR FRAME	D	METAL	GREY	INTACT
300c1	THIRD	345	0	DOOR FRAME	D	METAL	GREY	INTACT
300d1	THIRD	346	0	EXTINGUISHER	C	METAL	GREY	INTACT
300d1	THIRD	355	0	DOOR	B	WOOD	STAIN	INTACT
300d1	THIRD	356	0	DOOR	B	WOOD	STAIN	INTACT
300d1	THIRD	357	0.01	DOOR	D	WOOD	STAIN	INTACT
300d1	THIRD	358	0	DOOR FRAME	D	METAL	GREY	INTACT
300d1	THIRD	359	0	DOOR FRAME	B	METAL	GREY	INTACT
335	THIRD	360	0	WALL	B	VINYL	BEIGE	INTACT
335	THIRD	361	0	WALL	A	VINYL	BEIGE	INTACT
335	THIRD	362	0	WALL	A	VINYL	BEIGE	INTACT
335	THIRD	363	0.05	COLUMN	C	CONCRETE	BROWN	INTACT
335	THIRD	364	0.07	COLUMN	C	CONCRETE	BROWN	INTACT
333	THIRD	365	0.14	COLUMN	C	CONCRETE	BROWN	INTACT
333	THIRD	366	0.06	COLUMN	A	CONCRETE	BROWN	INTACT
333	THIRD	367	0	WALL	C	VINYL	BEIGE	INTACT
333	THIRD	368	0.03	WALL	B	VINYL	BEIGE	INTACT
337	THIRD	369	0.04	WALL	B	VINYL	BEIGE	INTACT
337	THIRD	370	0	WALL	C	VINYL	BEIGE	INTACT
337	THIRD	371	0.01	WALL	D	VINYL	BEIGE	INTACT
337	THIRD	372	0.04	COLUMN	D	CONCRETE	BROWN	INTACT
339	THIRD	373	0	WALL	A	VINYL	BEIGE	INTACT
339b	THIRD	374	0.02	WALL	A	VINYL	BEIGE	INTACT
339b	THIRD	375	0	WALL	B	VINYL	BEIGE	INTACT
339a	THIRD	376	0.01	WALL	B	VINYL	BEIGE	INTACT
339a	THIRD	377	0	WINDOW FRAME	A	WOOD	STAIN	INTACT
341	THIRD	378	0.01	WINDOW FRAME	A	WOOD	STAIN	INTACT
341	THIRD	379	0.01	WALL	A	VINYL	BEIGE	INTACT
341	THIRD	380	0.01	WALL	B	VINYL	BEIGE	INTACT
341a	THIRD	381	0	WALL	B	VINYL	BEIGE	INTACT
343	THIRD	382	0	WALL	D	DRYWALL	WHITE	INTACT
343	THIRD	383	0	WALL	A	DRYWALL	WHITE	INTACT
343	THIRD	384	0	WALL	A	DRYWALL	WHITE	INTACT
343	THIRD	385	0	WALL	C	DRYWALL	WHITE	INTACT
343	THIRD	386	0.04	COLUMN	C	CONCRETE	BROWN	INTACT
343	THIRD	387	0.09	COLUMN	B	CONCRETE	BROWN	INTACT
343	THIRD	388	0.01	WALL	B	VINYL	BEIGE	INTACT
343	THIRD	389	0	WALL	D	VINYL	BEIGE	INTACT
345	THIRD	390	0.01	WALL	D	VINYL	BEIGE	INTACT

Room	Floor	Sample Number	Lead Level (mg/cm^2)	Component	Side (1)	Substrate	Color	Condition
345	THIRD	391	0	WALL	B	VINYL	BEIGE	INTACT
347	THIRD	392	0.01	WALL	B	DRYWALL	WHITE	INTACT
347	THIRD	393	0	WALL	A	DRYWALL	WHITE	INTACT
347	THIRD	394	0	WALL	C	DRYWALL	WHITE	INTACT
347	THIRD	395	0	WALL	D	DRYWALL	WHITE	INTACT
347	THIRD	396	0	TRIM	D	WOOD	WHITE	INTACT
349	THIRD	397	0	WALL	B	VINYL	BEIGE	INTACT
349	THIRD	398	0.01	WALL	C	VINYL	BEIGE	INTACT
349	THIRD	399	0.02	WALL	D	VINYL	BEIGE	INTACT
349	THIRD	400	0	WALL	B	DRYWALL	BEIGE	INTACT
300b1	THIRD	405	0	DOOR	D	WOOD	STAIN	INTACT
300b1	THIRD	406	0	DOOR	D	WOOD	STAIN	INTACT
300b1	THIRD	407	0	DOOR	D	WOOD	STAIN	INTACT
300b1	THIRD	408	0	DOOR	B	WOOD	STAIN	INTACT
300b1	THIRD	409	0	DOOR	B	WOOD	STAIN	INTACT
300b1	THIRD	410	0	DOOR	B	WOOD	STAIN	INTACT
300b1	THIRD	411	0	DOOR FRAME	B	METAL	GREEN	INTACT
300b1	THIRD	412	0	DOOR FRAME	B	METAL	GREEN	INTACT
300b1	THIRD	413	0	DOOR FRAME	B	METAL	GREEN	INTACT
300b1	THIRD	415	0	DOOR FRAME	D	METAL	GREEN	INTACT
319	THIRD	416	0.04	DOOR FRAME	D	METAL	GREEN	INTACT
319	THIRD	417	0.03	DOOR FRAME	D	METAL	GREEN	INTACT
319	THIRD	418	0.01	WALL	D	DRYWALL	YELLOW	INTACT
319	THIRD	419	0.05	WALL	B	DRYWALL	YELLOW	INTACT
319	THIRD	420	0.03	WALL	A	DRYWALL	YELLOW	INTACT
319	THIRD	421	0	FLOOR	A	TILE	BEIGE	INTACT
319	THIRD	422	0	FLOOR	A	TILE	BEIGE	INTACT
3cb	THIRD	423	0	HANDRAIL	C	METAL	BLACK	INTACT
3cb	THIRD	424	0	HANDRAIL	C	METAL	BLACK	INTACT
3cb	THIRD	425	0	LADDER	C	METAL	RED	INTACT
3cb	THIRD	426	0	LADDER	C	METAL	RED	INTACT
321	THIRD	427	0	FLOOR	C	TILE	BEIGE	INTACT
321	THIRD	428	0.01	WALL	C	DRYWALL	WHITE	INTACT
321	THIRD	429	0.02	WALL	A	DRYWALL	WHITE	INTACT
321	THIRD	430	0.04	ELECTRIC BOX	C	METAL	WHITE	INTACT
321	THIRD	431	0	ELECTRIC BOX	C	METAL	GREY	INTACT
321	THIRD	432	0.01	ELECTRIC BOX	C	METAL	GREY	INTACT
326	THIRD	433	0.04	WALL	C	CONCRETE	WHITE	INTACT
326	THIRD	434	0.06	WALL	A	CONCRETE	WHITE	INTACT
326	THIRD	435	0	WALL	B	STONE	BROWN	INTACT
326	THIRD	436	0	WALL	D	STONE	BROWN	INTACT
323	THIRD	440	0	WALL	B	VINYL	BEIGE	INTACT
323	THIRD	441	0	WALL	A	VINYL	BEIGE	INTACT
323	THIRD	442	0	WALL	C	DRYWALL	BEIGE	INTACT
323	THIRD	443	0.15	WALL	C	METAL	BROWN	INTACT
323	THIRD	444	0.28	WALL	C	METAL	BROWN	INTACT
323	THIRD	445	0.26	WALL	C	METAL	BROWN	INTACT
323	THIRD	446	0.06	WALL	C	PLASTIC	GREY	INTACT
323	THIRD	447	0.15	WALL	C	PLASTIC	GREY	INTACT
323	THIRD	448	0.2	VAULT DOOR	C	METAL	GREY	INTACT
323	THIRD	449	0.24	VAULT DOOR	C	METAL	GREY	INTACT
323	THIRD	450	0.05	VAULT DOOR	C	METAL	GREY	INTACT
317	THIRD	451	0.15	WALL	A	CONCRETE	WHITE	INTACT
317	THIRD	452	0.1	WALL	A	CONCRETE	WHITE	INTACT
317	THIRD	453	0.07	COLUMN	D	CONCRETE	WHITE	INTACT
317	THIRD	454	0	WALL	D	VINYL	BEIGE	INTACT
317	THIRD	455	0	WALL	C	VINYL	BEIGE	INTACT
317	THIRD	456	0	WALL	B	VINYL	BEIGE	INTACT
323	THIRD	457	0	WALL	B	CONCRETE	BROWN	INTACT
301	THIRD	458	0	WALL	B	DRYWALL	WHITE	INTACT
301	THIRD	459	0.01	WALL	D	DRYWALL	WHITE	INTACT
301	THIRD	460	0.01	WALL	C	DRYWALL	WHITE	INTACT
301	THIRD	461	0	WALL	A	DRYWALL	WHITE	INTACT
303	THIRD	462	0	WALL	A	DRYWALL	WHITE	INTACT
303	THIRD	463	0	WALL	B	DRYWALL	WHITE	INTACT

Room	Floor	Sample Number	Lead Level (mg/cm^2)	Component	Side (1)	Substrate	Color	Condition
303	THIRD	464	0.01	WALL	C	DRYWALL	WHITE	INTACT
303	THIRD	465	0	WALL	D	DRYWALL	WHITE	INTACT
305	THIRD	466	0	WALL	D	VINYL	BEIGE	INTACT
305	THIRD	467	0.01	WALL	B	VINYL	BEIGE	INTACT
305	THIRD	468	0	WALL	C	VINYL	BEIGE	INTACT
305	THIRD	469	0.19	COLUMN	B	CONCRETE	BROWN	INTACT
305	THIRD	470	0.13	COLUMN	B	CONCRETE	BROWN	INTACT
307	THIRD	471	0	DOOR	B	METAL	BLACK	INTACT
307	THIRD	472	0	WALL	D	DRYWALL	BLUE	INTACT
307	THIRD	473	0	WALL	B	DRYWALL	WHITE	INTACT
307	THIRD	474	0	WINDOW FRAME	C	WOOD	BLACK	INTACT
307	THIRD	475	0	WINDOW FRAME	A	WOOD	BLACK	INTACT
309	THIRD	476	0	WINDOW FRAME	C	WOOD	STAIN	INTACT
309	THIRD	477	0.01	WALL	C	VINYL	BEIGE	INTACT
309	THIRD	478	0	WALL	A	VINYL	BEIGE	INTACT
309	THIRD	479	0.02	WALL	D	VINYL	BEIGE	INTACT
313	THIRD	480	0	WALL	D	DRYWALL	BEIGE	INTACT
313	THIRD	481	0	WALL	A	DRYWALL	BEIGE	INTACT
313	THIRD	482	0.01	WALL	C	DRYWALL	BEIGE	INTACT
313	THIRD	483	0.01	WALL	B	DRYWALL	BEIGE	INTACT
300aa1	THIRD	492	0	WALL	A	DRYWALL	WHITE	INTACT
300aa1	THIRD	493	0	WALL	A	DRYWALL	WHITE	INTACT
300aa1	THIRD	496	0.06	WALL	C	CONCRETE	WHITE	INTACT
300aa1	THIRD	497	0	DOOR	A	WOOD	STAIN	INTACT
300aa1	THIRD	498	0.01	DOOR	A	WOOD	STAIN	INTACT
300aa1	THIRD	499	0.01	DOOR	A	WOOD	STAIN	INTACT
300aa1	THIRD	500	0	DOOR	C	WOOD	STAIN	INTACT
300aa1	THIRD	501	0	DOOR	C	WOOD	STAIN	INTACT
300aa1	THIRD	503	0	DOOR FRAME	A	METAL	GREY	INTACT
300aa1	THIRD	504	0	DOOR FRAME	A	METAL	WHITE	INTACT
300aa1	THIRD	505	0	DOOR FRAME	A	METAL	WHITE	INTACT
300e	THIRD	506	0	DOOR FRAME	A	METAL	BLACK	INTACT
300e	THIRD	507	0.01	DOOR	A	WOOD	STAIN	INTACT
300e	THIRD	508	0	DOOR	C	WOOD	STAIN	INTACT
300e	THIRD	511	0	WALL	D	STONE	BROWN	INTACT
300e	THIRD	512	0	WALL	A	STONE	BROWN	INTACT
300e	THIRD	513	0	HANDRAIL	B	METAL	GREY	INTACT
399b	THIRD	514	0	HANDRAIL	B	METAL	GREY	INTACT
399b	THIRD	518	0	WALL	A	STONE	BROWN	INTACT
399b	THIRD	519	0	WALL	B	STONE	BROWN	INTACT
324a	THIRD	520	0	WALL	A	CONCRETE	WHITE	INTACT
324a	THIRD	521	0	WALL	A	CONCRETE	WHITE	INTACT
324a	THIRD	522	0	WALL	D	DRYWALL	WHITE	INTACT
324a	THIRD	523	0	WALL	C	CONCRETE	WHITE	INTACT
324a	THIRD	524	0	WALL	B	DRYWALL	WHITE	INTACT
324a	THIRD	525	0.01	DOOR	B	WOOD	BLACK	INTACT
324a	THIRD	526	0	DOOR	B	WOOD	BLACK	INTACT
324a	THIRD	527	0.01	DOOR FRAME	B	METAL	BLACK	INTACT
324	THIRD	528	0	DOOR FRAME	C	METAL	BLACK	INTACT
324	THIRD	529	0.01	WALL	D	DRYWALL	WHITE	INTACT
324	THIRD	530	0	WALL	C	CONCRETE	WHITE	INTACT
324	THIRD	531	0	WALL	A	CONCRETE	WHITE	INTACT
324	THIRD	532	0	WALL	B	DRYWALL	WHITE	INTACT
324	THIRD	533	0	WINDOW FRAME	A	METAL	BROWN	INTACT
324b	THIRD	534	0	WALL	D	DRYWALL	WHITE	INTACT
324b	THIRD	535	0.01	WALL	D	CONCRETE	WHITE	INTACT
324b	THIRD	536	0	WALL	B	CONCRETE	WHITE	INTACT
324b	THIRD	537	0	WALL	B	CONCRETE	WHITE	INTACT
324b	THIRD	538	0	WALL	A	CONCRETE	WHITE	INTACT
328	THIRD	539	0	WALL	B	PLASTER	WHITE	INTACT
328	THIRD	540	0	WALL	D	PLASTER	WHITE	INTACT
328	THIRD	543	0.04	DOOR	B	METAL	BLACK	INTACT
328	THIRD	544	0.07	DOOR	B	METAL	BLACK	INTACT
328	THIRD	545	0.03	DOOR	D	METAL	BLACK	INTACT
328	THIRD	546	0.03	DOOR	D	METAL	BLACK	INTACT

Room	Floor	Sample Number	Lead Level (mg/cm^2)	Component	Side (1)	Substrate	Color	Condition
328c	THIRD	547	0	WALL	B	PLASTER	WHITE	INTACT
328c	THIRD	548	0	WALL	A	CONCRETE	WHITE	INTACT
328c	THIRD	549	0	WALL	D	DRYWALL	WHITE	INTACT
328d	THIRD	550	0	WALL	D	CONCRETE	WHITE	INTACT
328d	THIRD	551	0	WALL	D	CONCRETE	WHITE	INTACT
328d	THIRD	552	0	WALL	A	CONCRETE	WHITE	INTACT
328b	THIRD	553	0	WALL	D	PLASTER	WHITE	INTACT
328b	THIRD	554	0	WALL	A	CONCRETE	BROWN	INTACT
328b	THIRD	555	0	WALL	C	CONCRETE	BROWN	INTACT
328b	THIRD	556	0	WALL	C	DRYWALL	BROWN	INTACT
328a	THIRD	557	0	WALL	D	PLASTER	BROWN	INTACT
328a	THIRD	558	0	WALL	B	PLASTER	BROWN	INTACT
328a	THIRD	559	0	WALL	A	DRYWALL	BROWN	INTACT
328a	THIRD	560	0.01	WALL	A	DRYWALL	GREEN	INTACT
328a	THIRD	561	0	WALL	B	PLASTER	GREEN	INTACT
328e	THIRD	562	0.18	WALL	B	PLASTER	WHITE	INTACT
328e	THIRD	564	0.22	WALL	C	PLASTER	WHITE	INTACT
328e	THIRD	565	0	WALL	D	PLASTER	WHITE	INTACT
330	THIRD	566	0	WALL	B	DRYWALL	WHITE	INTACT
330	THIRD	567	0	WALL	A	DRYWALL	WHITE	INTACT
330	THIRD	568	0	WALL	C	DRYWALL	WHITE	INTACT
325	THIRD	569	0	WALL	C	VINYL	BEIGE	INTACT
325	THIRD	570	0.02	WALL	B	VINYL	BEIGE	INTACT
325	THIRD	571	0.01	WALL	A	VINYL	BEIGE	INTACT
327	THIRD	572	0.02	WALL	A	DRYWALL	WHITE	INTACT
327	THIRD	573	0.08	WALL	B	DRYWALL	WHITE	INTACT
327	THIRD	574	0.04	WALL	C	DRYWALL	WHITE	INTACT
329	THIRD	575	0.04	WALL	C	DRYWALL	WHITE	INTACT
329	THIRD	576	0.02	WALL	A	DRYWALL	WHITE	INTACT
329	THIRD	577	0.03	WALL	B	DRYWALL	WHITE	INTACT
331	THIRD	578	0.01	WALL	B	DRYWALL	BROWN	INTACT
331	THIRD	579	0.01	WALL	B	DRYWALL	BROWN	INTACT
331	THIRD	580	0.01	WALL	A	DRYWALL	BROWN	INTACT
331	THIRD	581	0.04	WALL	C	DRYWALL	BROWN	INTACT
299c	SECOND	592	0	WALL	C	STONE	BROWN	INTACT
299c	SECOND	593	0	WALL	A	STONE	BROWN	INTACT
200g	SECOND	594	0	WALL	A	STONE	BROWN	INTACT
200g	SECOND	595	0	WALL	B	STONE	BROWN	INTACT
200g	SECOND	598	0	HANDRAIL	A	METAL	GREY	INTACT
200c1	SECOND	599	0.11	WALL	C	CONCRETE	WHITE	INTACT
200c1	SECOND	600	0.07	WALL	C	CONCRETE	WHITE	INTACT
200c1	SECOND	604	0	DOOR	A	WOOD	STAIN	INTACT
200c1	SECOND	605	0	DOOR	A	WOOD	STAIN	INTACT
200c1	SECOND	606	0	DOOR	A	WOOD	STAIN	INTACT
200c1	SECOND	607	0	DOOR	C	WOOD	STAIN	INTACT
200c1	SECOND	608	0	DOOR	C	WOOD	STAIN	INTACT
200c1	SECOND	609	0	DOOR FRAME	C	METAL	GREY	INTACT
200c1	SECOND	610	0	DOOR FRAME	C	METAL	GREY	INTACT
200c1	SECOND	611	0	DOOR FRAME	A	METAL	GREY	INTACT
200c1	SECOND	612	0	DOOR FRAME	A	METAL	GREY	INTACT
276	SECOND	613	0	DOOR FRAME	A	METAL	GREY	INTACT
276	SECOND	616	0.01	WALL	B	VINYL	BEIGE	INTACT
276	SECOND	617	0	WALL	D	VINYL	BEIGE	INTACT
276	SECOND	618	0	WINDOW FRAME	C	METAL	BROWN	INTACT
274	SECOND	619	0	WINDOW FRAME	C	METAL	BROWN	INTACT
274	SECOND	621	0.04	COLUMN	B	CONCRETE	WHITE	INTACT
274	SECOND	622	0.05	COLUMN	D	CONCRETE	WHITE	INTACT
274	SECOND	623	0	WALL	A	VINYL	BEIGE	INTACT
274	SECOND	624	0	WALL	B	VINYL	BEIGE	INTACT
274	SECOND	625	0	WALL	D	VINYL	BEIGE	INTACT
270	SECOND	626	0.01	WALL	D	DRYWALL	WHITE	INTACT
272	SECOND	631	0	WALL	D	DRYWALL	WHITE	INTACT
272	SECOND	632	0	WALL	B	DRYWALL	WHITE	INTACT
272	SECOND	633	0.03	RADIATOR	C	METAL	GREEN	INTACT
272b	SECOND	636	0	WALL	A	DRYWALL	WHITE	INTACT

Room	Floor	Sample Number	Lead Level (mg/cm^2)	Component	Side (1)	Substrate	Color	Condition
272a	SECOND	637	0	WALL	B	DRYWALL	WHITE	INTACT
278	SECOND	643	0.22	COLUMN	B	CONCRETE	WHITE	INTACT
278a	SECOND	645	0	WALL	B	VINYL	BEIGE	INTACT
278a	SECOND	646	0	WALL	D	VINYL	BEIGE	INTACT
278a	SECOND	648	0	FLOOR	C	TILE	BROWN	INTACT
205	SECOND	649	0.01	FLOOR	C	TILE	BEIGE	INTACT
205	SECOND	652	0.07	WALL	B	DRYWALL	BEIGE	INTACT
205	SECOND	653	0.09	WALL	B	DRYWALL	BEIGE	INTACT
2ca	SECOND	654	0	WALL	D	WOOD	BROWN	INTACT
2ca	SECOND	655	0	WALL	A	PLASTER	BROWN	INTACT
200b	SECOND	656	0	WALL	A	CONCRETE	WHITE	INTACT
200b	SECOND	658	0	DOOR	A	WOOD	STAIN	INTACT
200b	SECOND	659	0	DOOR	A	WOOD	STAIN	INTACT
200b	SECOND	660	0	DOOR FRAME	A	METAL	BROWN	INTACT
299a	SECOND	661	0	DOOR FRAME	C	METAL	BROWN	INTACT
299a	SECOND	662	0	WALL	D	CONCRETE	WHITE	INTACT
299a	SECOND	663	0	WALL	B	CONCRETE	WHITE	INTACT
299a	SECOND	664	0	WALL	A	CONCRETE	WHITE	INTACT
299a	SECOND	665	0	WALL	A	STONE	BROWN	INTACT
200b1	SECOND	670	0	DOOR	D	WOOD	STAIN	INTACT
200b1	SECOND	671	0	DOOR	B	WOOD	STAIN	INTACT
200b1	SECOND	672	0	DOOR	B	WOOD	STAIN	INTACT
200b1	SECOND	673	0	DOOR	B	WOOD	STAIN	INTACT
200b1	SECOND	674	0	DOOR	B	WOOD	STAIN	INTACT
200b1	SECOND	675	0	DOOR FRAME	B	METAL	BROWN	INTACT
200b1	SECOND	676	0	DOOR FRAME	B	METAL	GREY	INTACT
200b1	SECOND	677	0	DOOR FRAME	B	METAL	GREY	INTACT
241	SECOND	678	0	DOOR FRAME	D	METAL	GREY	INTACT
241	SECOND	679	0	WALL	D	VINYL	BEIGE	INTACT
241	SECOND	680	0.03	WALL	B	VINYL	BEIGE	INTACT
241	SECOND	681	0	WALL	A	VINYL	BEIGE	INTACT
241	SECOND	682	0	WINDOW FRAME	C	WOOD	STAIN	INTACT
241	SECOND	683	0.06	COLUMN	C	CONCRETE	BROWN	INTACT
241	SECOND	684	0.07	COLUMN	A	CONCRETE	BROWN	INTACT
237	SECOND	685	0.11	COLUMN	A	CONCRETE	WHITE	INTACT
237	SECOND	686	0.05	COLUMN	C	CONCRETE	WHITE	INTACT
237	SECOND	687	0.01	WALL	A	DRYWALL	WHITE	INTACT
237	SECOND	688	0	WALL	B	DRYWALL	WHITE	INTACT
237	SECOND	689	0	WALL	D	DRYWALL	WHITE	INTACT
282	SECOND	692	0	WALL	C	DRYWALL	STAIN	INTACT
280	SECOND	696	0.01	WALL	D	DRYWALL	WHITE	INTACT
280	SECOND	697	0	WALL	B	DRYWALL	WHITE	INTACT
284	SECOND	706	0.01	WALL	C	DRYWALL	WHITE	INTACT
294	SECOND	726	0	WALL	C	DRYWALL	WHITE	INTACT
294	SECOND	727	0.01	WALL	A	DRYWALL	WHITE	INTACT
296	SECOND	729	0	WALL	C	DRYWALL	WHITE	INTACT
296	SECOND	730	0	WALL	A	DRYWALL	WHITE	INTACT
297	SECOND	731	0	WALL	A	DRYWALL	WHITE	INTACT
297	SECOND	732	0	WALL	A	DRYWALL	WHITE	INTACT
297	SECOND	733	0	WALL	C	DRYWALL	WHITE	INTACT
297	SECOND	734	0	WALL	D	DRYWALL	WHITE	INTACT
298	SECOND	735	0	WALL	D	DRYWALL	WHITE	INTACT
298	SECOND	736	0	WALL	D	DRYWALL	WHITE	INTACT
298	SECOND	737	0	WALL	C	DRYWALL	WHITE	INTACT
298	SECOND	738	0	WALL	A	DRYWALL	WHITE	INTACT
202	SECOND	740	0	WALL	A	DRYWALL	WHITE	INTACT
202	SECOND	741	0	WALL	C	DRYWALL	WHITE	INTACT
202	SECOND	742	0	WALL	C	DRYWALL	WHITE	INTACT
206	SECOND	743	0	WALL	C	DRYWALL	WHITE	INTACT
206	SECOND	745	0	WALL	A	DRYWALL	WHITE	INTACT
206	SECOND	746	0	WALL	A	DRYWALL	WHITE	INTACT
208	SECOND	747	0	WALL	A	DRYWALL	WHITE	INTACT
208	SECOND	749	0	WALL	C	DRYWALL	WHITE	INTACT
210	SECOND	750	0	WALL	C	DRYWALL	WHITE	INTACT
212	SECOND	752	0.02	WALL	A	DRYWALL	WHITE	INTACT

Room	Floor	Sample Number	Lead Level (mg/cm^2)	Component	Side (1)	Substrate	Color	Condition
212	SECOND	754	0	WALL	C	DRYWALL	WHITE	INTACT
214	SECOND	755	0	WALL	C	DRYWALL	WHITE	INTACT
214	SECOND	758	0.01	WALL	A	DRYWALL	WHITE	INTACT
216	SECOND	759	0	WALL	A	DRYWALL	WHITE	INTACT
216	SECOND	761	0	WALL	C	DRYWALL	WHITE	INTACT
218	SECOND	764	0	WALL	C	DRYWALL	WHITE	INTACT
220	SECOND	767	0	WALL	B	DRYWALL	WHITE	INTACT
220	SECOND	768	0	WALL	D	DRYWALL	WHITE	INTACT
220a	SECOND	769	0.01	WALL	D	DRYWALL	WHITE	INTACT
220b	SECOND	775	0	WALL	C	DRYWALL	WHITE	INTACT
222	SECOND	776	0.04	WALL	A	DRYWALL	BROWN	INTACT
222	SECOND	777	0.12	WALL	D	DRYWALL	BROWN	INTACT
222	SECOND	778	0.11	COLUMN	A	CONCRETE	BROWN	INTACT
224	SECOND	779	0.06	WALL	A	DRYWALL	BROWN	INTACT
224	SECOND	780	0.05	WALL	B	DRYWALL	BROWN	INTACT
224	SECOND	781	0.04	WALL	C	DRYWALL	BROWN	INTACT
226	SECOND	782	0	WALL	C	VINYL	BEIGE	INTACT
226	SECOND	783	0	WALL	B	VINYL	BEIGE	INTACT
226	SECOND	784	0	WALL	D	VINYL	BEIGE	INTACT
200b2	SECOND	786	0	WALL	B	DRYWALL	WHITE	INTACT
200b2	SECOND	787	0	WALL	B	DRYWALL	WHITE	INTACT
200b2	SECOND	790	0.12	DOOR	D	WOOD	STAIN	INTACT
200b2	SECOND	791	0	DOOR	D	WOOD	STAIN	INTACT
200b2	SECOND	792	0	DOOR	B	WOOD	STAIN	INTACT
200b2	SECOND	793	0	DOOR	B	WOOD	STAIN	INTACT
200b2	SECOND	794	0	DOOR FRAME	B	METAL	GREY	INTACT
200b2	SECOND	795	0	DOOR FRAME	B	METAL	GREY	INTACT
200b2	SECOND	796	0	DOOR FRAME	D	METAL	GREY	INTACT
200b2	SECOND	797	0	DOOR FRAME	D	METAL	GREY	INTACT
235	SECOND	808	0	WALL	D	VINYL	BEIGE	INTACT
235	SECOND	809	0	WALL	C	VINYL	BEIGE	INTACT
235	SECOND	810	0	WALL	B	VINYL	BEIGE	INTACT
235	SECOND	811	0.08	COLUMN	C	CONCRETE	BROWN	INTACT
239	SECOND	812	0.1	COLUMN	B	CONCRETE	BROWN	INTACT
239	SECOND	813	0	WALL	B	VINYL	BEIGE	INTACT
239	SECOND	814	0	WALL	C	VINYL	BEIGE	INTACT
239	SECOND	815	0	WALL	A	VINYL	BEIGE	INTACT
201	SECOND	816	0	WALL	A	VINYL	BEIGE	INTACT
201	SECOND	817	0	WALL	B	VINYL	BEIGE	INTACT
201	SECOND	818	0.04	WALL	C	VINYL	BEIGE	INTACT
201	SECOND	819	0	WALL	D	VINYL	BEIGE	INTACT
201	SECOND	820	0.18	COLUMN	B	CONCRETE	BROWN	INTACT
201	SECOND	821	0.19	COLUMN	B	CONCRETE	BROWN	INTACT
203	SECOND	822	0.07	COLUMN	B	CONCRETE	WHITE	INTACT
203	SECOND	823	0.28	WALL	A	CONCRETE	WHITE	INTACT
203	SECOND	824	0.02	WALL	D	VINYL	GREEN	INTACT
203	SECOND	825	0.03	WALL	D	VINYL	GREEN	INTACT
209	SECOND	826	0.04	WALL	D	DRYWALL	BROWN	INTACT
209	SECOND	827	0.04	WALL	C	DRYWALL	BROWN	INTACT
209	SECOND	828	0.09	WALL	A	DRYWALL	BROWN	INTACT
209	SECOND	829	0	FLOOR	A	PLASTER	BROWN	INTACT
200e	SECOND	830	0	WALL	A	STONE	BROWN	INTACT
200e	SECOND	831	0	WALL	D	STONE	BROWN	INTACT
200a1	SECOND	836	0.17	WALL	A	CONCRETE	WHITE	INTACT
200a1	SECOND	837	0.02	WALL	C	CONCRETE	WHITE	INTACT
200a1	SECOND	840	0	DOOR	A	WOOD	STAIN	INTACT
200a1	SECOND	841	0	DOOR FRAME	A	METAL	GREY	INTACT
230	SECOND	842	0	DOOR FRAME	D	METAL	GREY	INTACT
230	SECOND	843	0.01	DOOR	C	METAL	WHITE	INTACT
230	SECOND	844	0	WALL	B	DRYWALL	WHITE	INTACT
230	SECOND	845	0	WALL	D	DRYWALL	WHITE	INTACT
230	SECOND	846	0.01	WALL	B	DRYWALL	WHITE	INTACT
230	SECOND	847	0.05	FLOOR	B	TILE	WHITE	INTACT
230a	SECOND	848	-0.02	FLOOR	B	TILE	WHITE	INTACT
230a	SECOND	849	0.18	WALL	B	DRYWALL	WHITE	INTACT

Room	Floor	Sample Number	Lead Level (mg/cm^2)	Component	Side (1)	Substrate	Color	Condition
230a	SECOND	850	0.09	WALL	D	DRYWALL	WHITE	INTACT
230a	SECOND	851	0.19	WALL	A	CONCRETE	WHITE	INTACT
230b	SECOND	853	0.1	WALL	B	DRYWALL	WHITE	INTACT
230b	SECOND	854	0.2	WALL	C	CONCRETE	WHITE	INTACT
230d	SECOND	855	0.08	WALL	C	CONCRETE	WHITE	INTACT
230d	SECOND	856	0	WALL	B	DRYWALL	WHITE	INTACT
230d	SECOND	857	0.11	WALL	A	CONCRETE	WHITE	INTACT
232	SECOND	858	0.15	WALL	A	CONCRETE	WHITE	INTACT
232	SECOND	859	0.07	WALL	D	DRYWALL	WHITE	INTACT
232	SECOND	860	0.03	FLOOR	D	TILE	WHITE	INTACT
228	SECOND	861	0	WALL	D	STONE	BROWN	INTACT
228	SECOND	862	0.19	WALL	A	CONCRETE	WHITE	INTACT
211	SECOND	865	0	FLOOR	B	TILE	BROWN	INTACT
211	SECOND	866	0.02	WALL	B	CONCRETE	BROWN	INTACT
211	SECOND	867	0.08	WALL	A	DRYWALL	BROWN	INTACT
213	SECOND	868	0	WALL	C	DRYWALL	WHITE	INTACT
213	SECOND	869	0	WALL	C	DRYWALL	WHITE	INTACT
213	SECOND	870	0	WALL	A	DRYWALL	WHITE	INTACT
213	SECOND	871	0	WALL	D	DRYWALL	WHITE	INTACT
215	SECOND	872	0	WALL	D	VINYL	BEIGE	INTACT
215	SECOND	873	0.02	WALL	A	VINYL	BEIGE	INTACT
215	SECOND	874	0.01	WALL	C	VINYL	BEIGE	INTACT
217	SECOND	875	0	WALL	C	VINYL	BEIGE	INTACT
217	SECOND	876	0	WALL	B	VINYL	BEIGE	INTACT
217	SECOND	877	0	WALL	A	VINYL	BEIGE	INTACT
219	SECOND	878	0	WALL	A	VINYL	BEIGE	INTACT
219	SECOND	879	0.01	WALL	B	VINYL	BEIGE	INTACT
219	SECOND	880	0	WALL	C	VINYL	BEIGE	INTACT
253	SECOND	881	0.04	WALL	A	DRYWALL	WHITE	INTACT
253	SECOND	882	0.05	WALL	C	DRYWALL	WHITE	INTACT
253	SECOND	883	0.06	WALL	C	DRYWALL	WHITE	INTACT
253	SECOND	884	0	WALL	B	DRYWALL	WHITE	INTACT
251	SECOND	885	0	WALL	B	DRYWALL	WHITE	INTACT
251	SECOND	886	0	WALL	C	DRYWALL	WHITE	INTACT
251	SECOND	887	0	WALL	C	DRYWALL	WHITE	INTACT
251	SECOND	888	0	WALL	C	DRYWALL	WHITE	INTACT
223	SECOND	889	0	WALL	C	DRYWALL	WHITE	INTACT
223	SECOND	890	0.02	WALL	B	DRYWALL	WHITE	INTACT
225	SECOND	891	0.03	WALL	B	DRYWALL	WHITE	INTACT
225	SECOND	892	0.05	WALL	C	DRYWALL	WHITE	INTACT
225	SECOND	893	0.04	WALL	D	DRYWALL	WHITE	INTACT
227	SECOND	894	0.01	WALL	D	VINYL	BEIGE	INTACT
227	SECOND	895	0.01	WALL	B	VINYL	BEIGE	INTACT
227	SECOND	896	0	WALL	C	VINYL	BEIGE	INTACT
229	SECOND	897	0.11	WALL	C	VINYL	BEIGE	INTACT
229	SECOND	898	0.01	WALL	C	VINYL	BEIGE	INTACT
229	SECOND	899	0	WALL	A	VINYL	BEIGE	INTACT
231	SECOND	900	0	WALL	A	VINYL	BEIGE	INTACT
231	SECOND	901	0	WALL	B	VINYL	BEIGE	INTACT
233	SECOND	902	0	WALL	B	VINYL	BEIGE	INTACT
233	SECOND	903	0	WALL	C	VINYL	BEIGE	INTACT
268	SECOND	914	0.01	WALL	C	DRYWALL	WHITE	INTACT
268	SECOND	915	0	WALL	C	DRYWALL	WHITE	INTACT
268	SECOND	916	0	WALL	A	DRYWALL	WHITE	INTACT
268	SECOND	917	0.01	WALL	A	DRYWALL	WHITE	INTACT
262	SECOND	922	0	WALL	A	DRYWALL	WHITE	INTACT
200d1	SECOND	927	0	DOOR	D	WOOD	STAIN	INTACT
200d1	SECOND	928	0	DOOR	D	WOOD	STAIN	INTACT
200d1	SECOND	929	0.01	DOOR	D	WOOD	STAIN	INTACT
200d1	SECOND	930	0	DOOR	D	WOOD	STAIN	INTACT
200d1	SECOND	931	0	DOOR	B	WOOD	STAIN	INTACT
200d1	SECOND	932	0	DOOR	B	WOOD	STAIN	INTACT
200d1	SECOND	933	0	DOOR	B	WOOD	STAIN	INTACT
200d1	SECOND	934	0.01	DOOR	B	WOOD	STAIN	INTACT
200d1	SECOND	935	0	DOOR FRAME	B	METAL	GREY	INTACT

Room	Floor	Sample Number	Lead Level (mg/cm^2)	Component	Side (1)	Substrate	Color	Condition
200d1	SECOND	936	0	DOOR FRAME	B	METAL	GREY	INTACT
200d1	SECOND	937	0	DOOR FRAME	B	METAL	GREY	INTACT
200d1	SECOND	938	0	DOOR FRAME	D	METAL	GREY	INTACT
200d1	SECOND	939	0	DOOR FRAME	D	METAL	GREY	INTACT
234	SECOND	940	0.01	WALL	D	DRYWALL	WHITE	INTACT
234	SECOND	941	0	WALL	C	DRYWALL	WHITE	INTACT
234b	SECOND	946	0	WALL	C	DRYWALL	WHITE	INTACT
236	SECOND	947	0	WALL	A	DRYWALL	WHITE	INTACT
240	SECOND	955	0	WALL	A	DRYWALL	WHITE	INTACT
242	SECOND	956	0	WALL	A	DRYWALL	WHITE	INTACT
252	SECOND	969	0	WALL	C	DRYWALL	WHITE	INTACT
256	SECOND	971	0	WALL	C	DRYWALL	WHITE	INTACT
258	SECOND	975	0	WALL	A	DRYWALL	WHITE	INTACT
100g	FIRST	981	0.08	DOOR	A	METAL	BLACK	INTACT
100g	FIRST	982	0	DOOR	D	STONE	BROWN	INTACT
100g	FIRST	983	0	DOOR	C	STONE	BROWN	INTACT
100g	FIRST	984	0	DOOR	D	STONE	BROWN	INTACT
100c1	FIRST	985	0	DOOR	A	WOOD	STAIN	INTACT
100c1	FIRST	986	0	DOOR	C	WOOD	STAIN	INTACT
100b1	FIRST	993	0	DOOR	D	WOOD	STAIN	INTACT
100b1	FIRST	994	0	DOOR	D	WOOD	STAIN	INTACT
100b1	FIRST	995	0	DOOR	D	WOOD	STAIN	INTACT
100b1	FIRST	996	0	DOOR	B	WOOD	STAIN	INTACT
100b1	FIRST	997	0	DOOR	B	WOOD	STAIN	INTACT
100b1	FIRST	998	0	DOOR	B	WOOD	STAIN	INTACT
100b1	FIRST	999	0	DOOR	B	WOOD	STAIN	INTACT
100d1	FIRST	1000	0	DOOR	B	WOOD	STAIN	INTACT
100d1	FIRST	1001	0	DOOR	B	WOOD	STAIN	INTACT
100d1	FIRST	1002	0	DOOR	D	WOOD	STAIN	INTACT
100d1	FIRST	1003	0.01	DOOR	D	WOOD	STAIN	INTACT
100d1	FIRST	1004	0.01	DOOR	D	WOOD	STAIN	INTACT
100d1	FIRST	1005	0	DOOR	D	WOOD	STAIN	INTACT
100d1	FIRST	1006	0	DOOR	D	WOOD	STAIN	INTACT
100d1	FIRST	1007	0	DOOR FRAME	D	METAL	GREY	INTACT
100d1	FIRST	1010	0	DOOR FRAME	B	METAL	GREY	INTACT
100d1	FIRST	1011	0	DOOR FRAME	B	METAL	GREY	INTACT
137	FIRST	1018	0.01	WALL	C	BRICK	BROWN	INTACT
137	FIRST	1019	0	WALL	D	BRICK	BROWN	INTACT
137	FIRST	1020	0	WALL	A	DRYWALL	PINK	INTACT
137	FIRST	1021	0.01	WALL	B	DRYWALL	PINK	INTACT
137	FIRST	1022	0.01	WALL	B	DRYWALL	PINK	INTACT
138	FIRST	1023	0	WALL	B	DRYWALL	WHITE	INTACT
138	FIRST	1024	0.01	WALL	A	DRYWALL	WHITE	INTACT
138a	FIRST	1025	0	WALL	A	DRYWALL	WHITE	INTACT
138a	FIRST	1026	0	WALL	C	DRYWALL	WHITE	INTACT
138a	FIRST	1027	0.16	WALL	B	CONCRETE	WHITE	INTACT
138b	FIRST	1028	0.07	WALL	B	CONCRETE	WHITE	INTACT
136	FIRST	1029	0	WALL	B	DRYWALL	WHITE	INTACT
136	FIRST	1030	0	WALL	C	DRYWALL	WHITE	INTACT
135	FIRST	1031	0.01	WALL	C	DRYWALL	WHITE	INTACT
135	FIRST	1032	0	WALL	B	DRYWALL	WHITE	INTACT
135	FIRST	1033	0.01	WALL	D	BRICK	BROWN	INTACT
135	FIRST	1034	0	WALL	D	BRICK	BROWN	INTACT
133	FIRST	1037	0	WALL	C	DRYWALL	WHITE	INTACT
132	FIRST	1039	0	WALL	B	DRYWALL	WHITE	INTACT
128	FIRST	1042	0	WALL	B	DRYWALL	WHITE	INTACT
100f	FIRST	1055	0.02	FLOOR	A	TILE	BROWN	INTACT
126	FIRST	1057	0.01	WALL	C	VINYL	BROWN	INTACT
124	FIRST	1058	0.01	WALL	C	VINYL	BROWN	INTACT
124	FIRST	1059	0	WALL	A	VINYL	BROWN	INTACT
122	FIRST	1062	0.03	WALL	A	DRYWALL	WHITE	INTACT
120	FIRST	1063	0	WALL	D	BRICK	BROWN	INTACT
118	FIRST	1064	0.01	WALL	D	BRICK	BROWN	INTACT
118	FIRST	1066	0	WALL	C	DRYWALL	WHITE	INTACT
116	FIRST	1067	0.01	WALL	C	DRYWALL	WHITE	INTACT

Room	Floor	Sample Number	Lead Level (mg/cm^2)	Component	Side (1)	Substrate	Color	Condition
114	FIRST	1070	0	WALL	A	DRYWALL	WHITE	INTACT
114b	FIRST	1072	0.04	WALL	B	DRYWALL	YELLOW	INTACT
114b	FIRST	1073	0.03	WALL	C	DRYWALL	YELLOW	INTACT
114b	FIRST	1074	0	FLOOR	C	TILE	BROWN	INTACT
112	FIRST	1075	0	WALL	B	DRYWALL	BLUE	INTACT
112	FIRST	1076	0	WALL	C	DRYWALL	BLUE	INTACT
109	FIRST	1077	0.01	WALL	A	DRYWALL	WHITE	INTACT
109	FIRST	1078	0	WALL	D	VINYL	BEIGE	INTACT
109	FIRST	1079	0	WALL	C	VINYL	BEIGE	INTACT
109	FIRST	1080	0	WALL	B	VINYL	BEIGE	INTACT
100a1	FIRST	1082	0	WALL	C	CONCRETE	WHITE	INTACT
100a1	FIRST	1083	0.01	WALL	C	CONCRETE	WHITE	INTACT
100a1	FIRST	1084	0.07	WALL	A	CONCRETE	WHITE	INTACT
100a1	FIRST	1086	0	DOOR	A	WOOD	STAIN	INTACT
100a1	FIRST	1087	0	DOOR	A	WOOD	STAIN	INTACT
100a1	FIRST	1088	0	DOOR	C	WOOD	STAIN	INTACT
100a1	FIRST	1089	0	DOOR	C	WOOD	STAIN	INTACT
100a1	FIRST	1090	0	DOOR	C	WOOD	STAIN	INTACT
100a1	FIRST	1091	0	DOOR FRAME	C	METAL	GREY	INTACT
100a1	FIRST	1092	0	DOOR FRAME	C	METAL	GREY	INTACT
102	FIRST	1098	0	FLOOR	D	TILE	BEIGE	INTACT
119	FIRST	1108	0.02	WALL	C	VINYL	BEIGE	INTACT
119	FIRST	1109	0.04	WALL	B	VINYL	BEIGE	INTACT
119	FIRST	1110	0.07	WALL	B	VINYL	BEIGE	INTACT
119	FIRST	1111	0.11	WALL	D	CONCRETE	BEIGE	INTACT
119	FIRST	1112	0.16	COLUMN	B	CONCRETE	BEIGE	INTACT
140	FIRST	1114	0	WALL	C	DRYWALL	WHITE	INTACT
140	FIRST	1115	0.01	WALL	D	DRYWALL	WHITE	INTACT
140a	FIRST	1116	0.01	WALL	C	BRICK	BROWN	INTACT
140a	FIRST	1117	0	WALL	B	BRICK	BROWN	INTACT
140a	FIRST	1118	0.01	WALL	A	VINYL	BEIGE	INTACT
140a	FIRST	1119	0	WALL	D	VINYL	BEIGE	INTACT
140b	FIRST	1120	0.01	WALL	B	DRYWALL	BEIGE	INTACT
140b	FIRST	1121	0.11	WALL	D	CONCRETE	BEIGE	INTACT
140b	FIRST	1122	0.01	WALL	A	CONCRETE	BEIGE	INTACT
140b	FIRST	1123	0.01	WALL	C	BRICK	BLUE	INTACT
140b	FIRST	1124	0	FLOOR	C	TILE	BROWN	INTACT
142	FIRST	1127	0.01	WALL	B	BRICK	BROWN	INTACT
142	FIRST	1128	0	WALL	A	VINYL	BEIGE	INTACT
146	FIRST	1129	0.01	WALL	A	VINYL	BEIGE	INTACT
146	FIRST	1131	0.01	WALL	C	DRYWALL	GREEN	INTACT
146	FIRST	1132	0	WALL	B	BRICK	BROWN	INTACT
148	FIRST	1133	0	WALL	B	BRICK	BROWN	INTACT
148	FIRST	1136	0	WALL	C	DRYWALL	WHITE	INTACT
148	FIRST	1137	0	WALL	C	DRYWALL	WHITE	INTACT
150	FIRST	1139	0	WALL	C	VINYL	BEIGE	INTACT
150	FIRST	1140	0	WALL	A	VINYL	BEIGE	INTACT
150	FIRST	1141	0	WALL	B	BRICK	BROWN	INTACT
152	FIRST	1142	0	WALL	B	BRICK	RED	INTACT
152	FIRST	1143	0.21	COLUMN	B	CONCRETE	RED	INTACT
152	FIRST	1144	0.1	COLUMN	B	CONCRETE	RED	INTACT
152	FIRST	1145	0	WALL	A	DRYWALL	GREEN	INTACT
152	FIRST	1147	0.03	WALL	C	DRYWALL	GREEN	INTACT
121	FIRST	1148	0.01	WALL	B	VINYL	BEIGE	INTACT
121	FIRST	1149	0.01	WALL	A	VINYL	BEIGE	INTACT
121	FIRST	1150	0.01	WALL	D	VINYL	BEIGE	INTACT
121	FIRST	1152	0.06	COLUMN	C	CONCRETE	BROWN	INTACT
121	FIRST	1153	0.12	COLUMN	A	CONCRETE	BROWN	INTACT
101	FIRST	1154	0.01	WALL	C	VINYL	BEIGE	INTACT
101	FIRST	1155	0	WALL	B	VINYL	BEIGE	INTACT
101	FIRST	1156	0	WALL	D	VINYL	BEIGE	INTACT
100a	FIRST	1158	0	WALL	C	DRYWALL	WHITE	INTACT
100a	FIRST	1159	0	WALL	D	DRYWALL	WHITE	INTACT
100a	FIRST	1160	0	DOOR FRAME	B	METAL	BROWN	INTACT
199a	FIRST	1161	0	DOOR FRAME	A	CONCRETE	WHITE	INTACT

Room	Floor	Sample Number	Lead Level (mg/cm^2)	Component	Side (1)	Substrate	Color	Condition
199a	FIRST	1162	0	DOOR FRAME	B	CONCRETE	WHITE	INTACT
199a	FIRST	1163	0	DOOR FRAME	D	CONCRETE	WHITE	INTACT
199a	FIRST	1164	0	WALL	D	STONE	BROWN	INTACT
199a	FIRST	1165	0.28	WALL	A	STONE	BROWN	INTACT
199a	FIRST	1166	0	WALL	D	STONE	BROWN	INTACT
199a	FIRST	1167	0	HANDRAIL	B	METAL	GREY	INTACT
103	FIRST	1168	0.04	WALL	B	VINYL	BEIGE	INTACT
103	FIRST	1169	0.02	WALL	C	VINYL	BEIGE	INTACT
103	FIRST	1170	0.02	WALL	D	VINYL	GREEN	INTACT
103	FIRST	1171	0.03	WALL	D	VINYL	GREEN	INTACT
103	FIRST	1172	0.01	WALL	D	VINYL	GREEN	INTACT
103	FIRST	1174	0	WALL	A	DRYWALL	WHITE	INTACT
103	FIRST	1175	0.05	COLUMN	B	CONCRETE	WHITE	INTACT
106a	FIRST	1176	0	WALL	A	DRYWALL	WHITE	INTACT
106a	FIRST	1177	0	WALL	B	DRYWALL	WHITE	INTACT
106a	FIRST	1178	0	WALL	C	VINYL	WHITE	INTACT
106a	FIRST	1179	0	WALL	D	VINYL	WHITE	INTACT
107	FIRST	1180	0.01	WALL	D	VINYL	WHITE	INTACT
107	FIRST	1181	0.01	WALL	A	VINYL	WHITE	INTACT
107	FIRST	1182	0	WALL	C	VINYL	WHITE	INTACT
107	FIRST	1183	0.01	WALL	B	BRICK	BROWN	INTACT
108	FIRST	1184	0	WALL	B	BRICK	BROWN	INTACT
108	FIRST	1185	0.03	WALL	A	BRICK	BROWN	INTACT
108	FIRST	1186	0.15	COLUMN	B	CONCRETE	BROWN	INTACT
108	FIRST	1188	0.26	WALL	D	CONCRETE	WHITE	INTACT
105	FIRST	1189	0.05	WALL	D	DRYWALL	YELLOW	INTACT
105	FIRST	1190	0.07	WALL	B	DRYWALL	YELLOW	INTACT
105	FIRST	1191	0.03	WALL	A	DRYWALL	YELLOW	INTACT
105	FIRST	1192	0.13	WALL	C	DRYWALL	YELLOW	INTACT
105	FIRST	1193	0	FLOOR	C	TILE	BROWN	INTACT
100e	FIRST	1197	0	WALL	C	STONE	BROWN	INTACT
100e	FIRST	1198	0	WALL	D	STONE	BROWN	INTACT
199b	FIRST	1199	0	WALL	B	STONE	BROWN	INTACT
199b	FIRST	1200	0	WALL	B	STONE	BROWN	INTACT
199b	FIRST	1201	0	WALL	C	STONE	BROWN	INTACT
199b	FIRST	1202	0	WALL	A	STONE	BROWN	INTACT
199b	FIRST	1204	0.28	WALL	C	CONCRETE	WHITE	INTACT
199b	FIRST	1206	0	HANDRAIL	A	METAL	GREY	INTACT
110	FIRST	1207	0.04	WALL	A	CONCRETE	WHITE	INTACT
110	FIRST	1208	0.01	WALL	D	CONCRETE	WHITE	INTACT
110	FIRST	1209	0.15	WALL	B	CONCRETE	WHITE	INTACT
110	FIRST	1210	0.02	WALL	C	CONCRETE	WHITE	INTACT
110	FIRST	1211	0.13	WALL	A	BRICK	WHITE	INTACT
110	FIRST	1214	0	WALL	B	STONE	BROWN	INTACT
110	FIRST	1215	0	WALL	A	STONE	BROWN	INTACT
110	FIRST	1216	0	WALL	C	STONE	BROWN	INTACT
110	FIRST	1217	0	WALL	D	STONE	BROWN	INTACT
SOUTH STAIRS	FIRST	1226	0.05	DOOR	A	METAL	BLACK	INTACT
SOUTH STAIRS	FIRST	1227	0.04	DOOR FRAME	A	METAL	BLACK	INTACT
SOUTH STAIRS	FIRST	1228	0	HEATER	D	METAL	BEIGE	INTACT
SOUTH STAIRS	FIRST	1234	0	WALL	A	STONE	SAND	INTACT
SOUTH STAIRS	FIRST	1235	0	WALL	C	STONE	SAND	INTACT
SOUTH STAIRS	FIRST	1236	0	WALL	D	STONE	SAND	INTACT
EAST ENTRY	FIRST	1237	0.01	DOOR	D	WOOD	BROWN	INTACT
EAST ENTRY	FIRST	1238	0	DOOR	D	WOOD	BROWN	INTACT
EAST ENTRY	FIRST	1239	0.02	DOOR FRAME	D	METAL	BROWN	INTACT
EAST ENTRY	FIRST	1240	0	DOOR FRAME	D	METAL	BROWN	INTACT
EAST ENTRY	FIRST	1241	0.05	ACCESS DOOR	B	METAL	TAN	INTACT
EAST ENTRY	FIRST	1242	0.01	WALL	A	CONCRETE	WHITE	INTACT
EAST ENTRY	FIRST	1243	0	WALL	B	CONCRETE	WHITE	INTACT
EAST ENTRY	FIRST	1244	0	WALL	C	CONCRETE	WHITE	INTACT
EAST ENTRY	FIRST	1245	0	WALL	D	DRYWALL	WHITE	INTACT
EAST ENTRY	FIRST	1246	0	FLOOR	CENTER	STONE	BROWN	INTACT
NORTH ENTRY	FIRST	1247	0.04	DOOR	C	METAL	BLACK	INTACT
NORTH ENTRY	FIRST	1248	0.03	DOOR FRAME	C	METAL	BLACK	INTACT

Room	Floor	Sample Number	Lead Level (mg/cm^2)	Component	Side (1)	Substrate	Color	Condition
NORTH ENTRY	FIRST	1253	0	WALL	D	STONE	SAND	INTACT
NORTH ENTRY	FIRST	1254	0.04	HEATER	D	METAL	GREY	INTACT
NORTH ENTRY	FIRST	1255	0	FLOOR	CENTER	STONE	BROWN	INTACT
S CORRIDOR	FIRST	1258	0.27	BULLETIN BOARD	C	WOOD	TAN	INTACT
S CORRIDOR	FIRST	1259	0	CABINET	C	METAL	WHITE	INTACT
S CORRIDOR	FIRST	1260	0.01	CABINET	C	METAL	WHITE	INTACT
S CORRIDOR	FIRST	1261	0	PANEL-BREAKER	A	METAL	GREY	INTACT
E CORRIDOR	FIRST	1263	0	WALL	B	DRYWALL	WHITE	INTACT
E CORRIDOR	FIRST	1267	0.01	WALL	D	WOOD	WHITE	INTACT
E CORRIDOR	FIRST	1268	0.16	BULLETIN BOARD	B	WOOD	TAN	INTACT
E CORRIDOR	FIRST	1269	0.15	BULLETIN BOARD	D	WOOD	TAN	INTACT
N CORRIDOR	FIRST	1270	0.08	WALL	A	CONCRETE	WHITE	INTACT
N CORRIDOR	FIRST	1272	0.07	WALL	A	CONCRETE	WHITE	INTACT
N CORRIDOR	FIRST	1273	0	WALL	C	CONCRETE	WHITE	INTACT
N CORRIDOR	FIRST	1274	0.04	WALL	C	CONCRETE	WHITE	INTACT
N CORRIDOR	FIRST	1275	0	CABINET	A	METAL	WHITE	INTACT
N CORRIDOR	FIRST	1276	0.02	CABINET	A	METAL	WHITE	INTACT
N CORRIDOR	FIRST	1277	0	BULLETIN BOARD	A	WOOD	TAN	INTACT
N CORRIDOR	FIRST	1278	0.13	BULLETIN BOARD	A	WOOD	TAN	INTACT
138 SUITE	FIRST	1286	0	DOOR	A	WOOD	BROWN	INTACT
138 SUITE	FIRST	1287	0	DOOR	CENTER	WOOD	BROWN	INTACT
138 SUITE	FIRST	1288	0	DOOR FRAME	CENTER	METAL	BLACK	INTACT
138 SUITE	FIRST	1289	0	DOOR FRAME	CENTER	METAL	BLACK	INTACT
138 SUITE	FIRST	1290	0.04	WALL PANEL	A	DRYWALL	WHITE	INTACT
138 SUITE	FIRST	1291	0	WALL	B	DRYWALL	WHITE	INTACT
138 SUITE	FIRST	1292	0	WALL	C	DRYWALL	WHITE	INTACT
138 SUITE	FIRST	1293	0	WALL	C	DRYWALL	WHITE	INTACT
138 SUITE	FIRST	1294	0	WALL	C	DRYWALL	WHITE	INTACT
138 SUITE	FIRST	1295	0	WALL	D	DRYWALL	WHITE	INTACT
138 SUITE	FIRST	1296	0	BULLETIN BOARD	A	WOOD	TAN	INTACT
138 SUITE	FIRST	1297	0	BULLETIN BOARD	B	WOOD	TAN	INTACT
138 SUITE	FIRST	1298	0	BULLETIN BOARD	B	WOOD	BROWN	INTACT
137	FIRST	1299	0	DOOR	A	WOOD	BROWN	INTACT
137	FIRST	1300	0	WALL BOARD	A	DRYWALL	ORANGE	INTACT
137	FIRST	1301	0	WALL	B	DRYWALL	ORANGE	INTACT
137	FIRST	1302	0	WALL	B	BRICK	TAN	INTACT
137	FIRST	1303	0.13	COLUMN	C	CONCRETE	PINK	INTACT
137	FIRST	1304	0	CHALKBOARD	A	METAL	GREEN	INTACT
137	FIRST	1305	0.03	CHALKBOARD	B	METAL	GREEN	INTACT
136	FIRST	1306	0	DOOR	B	WOOD	BROWN	INTACT
136	FIRST	1307	0.02	WINDOW PANEL	D	METAL	BROWN	INTACT
136	FIRST	1308	0.01	WALL	A	DRYWALL	WHITE	INTACT
136	FIRST	1309	0	WALL	B	DRYWALL	WHITE	INTACT
136	FIRST	1310	0	WALL	C	DRYWALL	WHITE	INTACT
135	FIRST	1311	0	DOOR	B	WOOD	BROWN	INTACT
135	FIRST	1313	0	WALL	B	DRYWALL	WHITE	INTACT
135	FIRST	1314	0	WALL	B	DRYWALL	WHITE	INTACT
134	FIRST	1315	0	DOOR	B	WOOD	BROWN	INTACT
134	FIRST	1316	0.02	WINDOW PANEL	D	WOOD	BROWN	INTACT
134	FIRST	1317	0	WALL	A	DRYWALL	WHITE	INTACT
134	FIRST	1319	0	WALL	C	DRYWALL	WHITE	INTACT
133	FIRST	1320	0	DOOR	B	WOOD	BROWN	INTACT
133	FIRST	1321	0	WALL	A	DRYWALL	WHITE	INTACT
133	FIRST	1323	0	WALL	C	DRYWALL	WHITE	INTACT
133	FIRST	1324	0.15	COLUMN	D	CONCRETE	WHITE	INTACT
132	FIRST	1332	0	DOOR	B	WOOD	BROWN	INTACT
132	FIRST	1333	0.02	WINDOW PANEL	D	METAL	BROWN	INTACT
132	FIRST	1335	0	WALL PANEL	B	DRYWALL	WHITE	INTACT

Room	Floor	Sample Number	Lead Level (mg/cm^2)	Component	Side (1)	Substrate	Color	Condition
132	FIRST	1336	0	WALL	C	DRYWALL	WHITE	INTACT
130	FIRST	1337	0	DOOR	B	WOOD	BROWN	INTACT
130	FIRST	1339	0.03	WALL	B	VINYL	MIX	INTACT
128	FIRST	1340	0	DOOR	B	WOOD	BROWN	INTACT
128	FIRST	1341	0	WINDOW PANEL	B	METAL	BLACK	INTACT
128	FIRST	1343	0	WALL PANEL	B	DRYWALL	WHITE	INTACT
128	FIRST	1344	0	WALL PANEL	C	DRYWALL	WHITE	INTACT
126	FIRST	1345	0	DOOR	B	WOOD	BROWN	INTACT
126	FIRST	1346	0	WALL PANEL	A	VINYL	MIX	INTACT
126	FIRST	1347	0.01	WALL PANEL	C	VINYL	MIX	INTACT
126	FIRST	1349	0.1	COLUMN	D	CONCRETE	BROWN	INTACT
124	FIRST	1350	0	DOOR	B	WOOD	BROWN	INTACT
124	FIRST	1351	0.02	WINDOW PANEL	D	METAL	BROWN	INTACT
124	FIRST	1352	0.01	WALL PANEL	A	METAL	MIX	INTACT
124	FIRST	1354	0.01	BULLETIN BOARD	A	WOOD	TAN	INTACT
122	FIRST	1355	0	DOOR	B	WOOD	BROWN	INTACT
122	FIRST	1356	0.01	WALL PANEL	A	DRYWALL	WHITE	INTACT
122	FIRST	1358	0	WALL PANEL	C	DRYWALL	WHITE	INTACT
118	FIRST	1359	0	DOOR	B	WOOD	BROWN	INTACT
118	FIRST	1360	0.02	WINDOW PANEL	B	METAL	BROWN	INTACT
118	FIRST	1361	0	WALL PANEL	A	METAL	WHITE	INTACT
118	FIRST	1363	0.01	WALL PANEL	C	DRYWALL	WHITE	INTACT
114	FIRST	1364	0	DOOR	B	WOOD	BROWN	INTACT
114	FIRST	1365	0	WALL PANEL	A	DRYWALL	WHITE	INTACT
114	FIRST	1367	0	WALL PANEL	C	DRYWALL	WHITE	INTACT
114A	FIRST	1368	0	WALL PANEL	B	VINYL	MIX	INTACT
114A	FIRST	1370	0.2	COLUMN	D	CONCRETE	BROWN	INTACT
114B	FIRST	1371	0	DOOR	D	WOOD	BROWN	INTACT
114B	FIRST	1372	0.02	WALL PANEL	B	DRYWALL	YELLOW	INTACT
114B	FIRST	1373	0.02	WALL PANEL	C	DRYWALL	YELLOW	INTACT
114B	FIRST	1374	0.02	WALL PANEL	D	DRYWALL	YELLOW	INTACT
114B	FIRST	1375	0.06	COLUMN	A	CONCRETE	YELLOW	INTACT
114B	FIRST	1376	0	CABINET	B	WOOD	BROWN	INTACT
112	FIRST	1378	-0.22	DOOR	C	WOOD	BROWN	INTACT
112	FIRST	1379	0	WALL	A	DRYWALL	LIGHT BLUE	INTACT
112	FIRST	1380	0	WALL	B	DRYWALL	LIGHT BLUE	INTACT
112	FIRST	1381	0	WALL	C	DRYWALL	LIGHT BLUE	INTACT
112	FIRST	1382	0	WALL	D	DRYWALL	LIGHT BLUE	INTACT
112	FIRST	1383	0	BULLETIN BOARD	D	WOOD	TAN	INTACT
110	FIRST	1384	0	DOOR	C	WOOD	BROWN	INTACT
110	FIRST	1385	0.13	WALL	A	BRICK	WHITE	INTACT
110	FIRST	1386	0.1	WALL	B	PLASTER	WHITE	INTACT
110	FIRST	1387	0.04	WALL	C	CONCRETE	WHITE	INTACT
110	FIRST	1388	0.01	WALL	C	DRYWALL	WHITE	INTACT
110	FIRST	1389	0.01	WALL	D	DRYWALL	WHITE	INTACT
108	FIRST	1392	0	DOOR	C	WOOD	BROWN	INTACT
108	FIRST	1395	0.05	CHALKBOARD	B	METAL	BROWN	INTACT
108	FIRST	1396	0.09	COLUMN	A	CONCRETE	BROWN	INTACT
106 WOMEN	FIRST	1398	0	DOOR	D	WOOD	BROWN	INTACT
106 WOMEN	FIRST	1407	0.27	WALL	C	DRYWALL	WHITE	INTACT
106 WOMEN	FIRST	1409	0	FLOOR	D	TILE	TAN	INTACT
106 WOMEN	FIRST	1410	0.01	SINK	CENTER	CERAMIC	WHITE	INTACT
106 WOMEN	FIRST	1411	0.01	HEATER	B	METAL	GREEN	INTACT
102 MEN	FIRST	1412	0	DOOR	A	WOOD	BROWN	INTACT
102 MEN	FIRST	1413	0.02	WINDOW PANEL	B	METAL	TAN	INTACT
152	FIRST	1423	0	DOOR	B	WOOD	BROWN	INTACT
152	FIRST	1424	0	WINDOW PANEL	D	METAL	BROWN	INTACT
152	FIRST	1425	0.02	WALL PANEL	A	DRYWALL	GREEN	INTACT
152	FIRST	1427	0	WALL PANEL	C	DRYWALL	GREEN	INTACT
152	FIRST	1428	0.02	WALL PANEL	D	BRICK	RED	INTACT
150	FIRST	1429	0	DOOR	D	WOOD	BROWN	INTACT
150	FIRST	1430	0.01	WINDOW PANEL	B	METAL	BROWN	INTACT
150	FIRST	1431	0	WALL PANEL	A	VINYL	MIX	INTACT

Room	Floor	Sample Number	Lead Level (mg/cm^2)	Component	Side (1)	Substrate	Color	Condition
146	FIRST	1434	0	WALL PANEL	A	VINYL	MIX	INTACT
146	FIRST	1435	0	WALL PANEL	C	VINYL	GREEN	INTACT
146	FIRST	1437	0.08	COLUMN	B	CONCRETE	BROWN	INTACT
142	FIRST	1438	0	DOOR	C	WOOD	BROWN	INTACT
142	FIRST	1439	0	DOOR	D	WOOD	BROWN	INTACT
142	FIRST	1440	0.01	WINDOW PANEL	B	METAL	BROWN	INTACT
142	FIRST	1441	0	WALL PANEL	A	VINYL	MIX	INTACT
142	FIRST	1444	0.11	COLUMN	B	CONCRETE	BROWN	INTACT
140B	FIRST	1445	0	DOOR	B	WOOD	BROWN	INTACT
140B	FIRST	1446	0	WALL PANEL	A	DRYWALL	WHITE	INTACT
140B	FIRST	1447	0.01	WALL PANEL	B	DRYWALL	WHITE	INTACT
140B	FIRST	1448	0.09	WALL PANEL	D	DRYWALL	WHITE	INTACT
140B	FIRST	1450	0	CABINET	D	WOOD	BROWN	INTACT
119	FIRST	1459	0	DOOR	B	WOOD	BROWN	INTACT
119	FIRST	1460	0.01	DOOR	C	WOOD	BROWN	INTACT
119	FIRST	1462	0	WALL PANEL	B	VINYL	MIX	INTACT
119	FIRST	1463	0	WALL PANEL	C	VINYL	MIX	INTACT
119	FIRST	1464	0.15	WALL	D	CONCRETE	WHITE	INTACT
119	FIRST	1466	0.02	CHALKBOARD	A	METAL	BROWN	INTACT
121	FIRST	1467	0	DOOR	B	WOOD	BROWN	INTACT
121	FIRST	1468	0.01	WALL PANEL	A	VINYL	MIX	INTACT
121	FIRST	1469	0	WALL PANEL	B	VINYL	MIX	INTACT
121	FIRST	1472	0.24	CHALKBOARD	D	METAL	BROWN	INTACT
121	FIRST	1473	0.06	COLUMN	C	CONCRETE	BROWN	INTACT
101	FIRST	1474	0	DOOR	B	WOOD	BROWN	INTACT
101	FIRST	1476	0	WALL PANEL	B	VINYL	MIX	INTACT
101	FIRST	1477	0.01	WALL PANEL	C	VINYL	MIX	INTACT
103	FIRST	1479	0	DOOR	B	WOOD	BROWN	INTACT
103	FIRST	1480	0	DOOR	B	WOOD	BROWN	INTACT
103	FIRST	1481	0	WALL PANEL	A	DRYWALL	WHITE	INTACT
103	FIRST	1483	0.01	WALL PANEL	B	VINYL	MIX	INTACT
103	FIRST	1484	0.02	WALL PANEL	C	VINYL	MIX	INTACT
103	FIRST	1485	0.12	COLUMN	A	CONCRETE	WHITE	INTACT
ELECTRICAL	FIRST	1487	0	DOOR	A	WOOD	BLUE	INTACT
ELECTRICAL	FIRST	1488	0.04	WALL	A	DRYWALL	YELLOW	INTACT
ELECTRICAL	FIRST	1489	0.03	WALL	B	DRYWALL	YELLOW	INTACT
ELECTRICAL	FIRST	1490	0.11	WALL	C	DRYWALL	YELLOW	INTACT
ELECTRICAL	FIRST	1491	0.04	WALL	D	CONCRETE	YELLOW	INTACT
ELECTRICAL	FIRST	1492	0	PANEL-BREAKER	C	METAL	GREY	INTACT
109	FIRST	1493	0	DOOR	D	WOOD	BROWN	INTACT
109	FIRST	1494	0	WALL PANEL	A	DRYWALL	BROWN	INTACT
109	FIRST	1496	0	WALL PANEL	B	CONCRETE	MIX	INTACT
109	FIRST	1497	0	WALL PANEL	D	CONCRETE	MIX	INTACT
109	FIRST	1499	0.13	COLUMN	D	CONCRETE	WHITE	INTACT
109	FIRST	1500	0.12	COLUMN	D	CONCRETE	WHITE	INTACT
113	FIRST	1501	0	DOOR	D	WOOD	BROWN	INTACT
113	FIRST	1503	0	WALL PANEL	A	VINYL	MIX	INTACT
113	FIRST	1504	0.01	WALL PANEL	B	VINYL	MIX	INTACT
113	FIRST	1507	0.06	COLUMN	D	CONCRETE	BROWN	INTACT
115	FIRST	1508	0	DOOR	D	WOOD	BROWN	INTACT
115	FIRST	1509	0	WALL PANEL	A	VINYL	MIX	INTACT
115	FIRST	1513	0.13	COLUMN	C	CONCRETE	BROWN	INTACT
42	BASEMENT	1514	0	DOOR	A	WOOD	BROWN	INTACT
42	BASEMENT	1516	0	DOOR	C	WOOD	BROWN	INTACT
42	BASEMENT	1517	0.01	DOOR FRAME	C	METAL	BLACK	INTACT
42	BASEMENT	1518	0	WALL	B	DRYWALL	WHITE	INTACT
38-40	BASEMENT	1520	0	DOOR	B	WOOD	BROWN	INTACT
38-40	BASEMENT	1521	0	DOOR	B	WOOD	BROWN	INTACT
38-40	BASEMENT	1522	0	DOOR	B	WOOD	BROWN	INTACT
38-40	BASEMENT	1523	0	WALL PANEL	A	VINYL	MIX	INTACT
38-40	BASEMENT	1525	0	WALL	C	DRYWALL	WHITE	INTACT
38-40	BASEMENT	1528	0.01	COLUMN	B	CONCRETE	BLACK	INTACT
38-40	BASEMENT	1530	0	COLUMN	CENTER	CONCRETE	BLACK	INTACT
36A	BASEMENT	1532	0	DOOR	B	WOOD	BROWN	INTACT
36A	BASEMENT	1533	0.01	DOOR	C	WOOD	BROWN	INTACT

Room	Floor	Sample Number	Lead Level (mg/cm^2)	Component	Side (1)	Substrate	Color	Condition
36A	BASEMENT	1534	0	WINDOW FRAME	C	WOOD	BROWN	INTACT
36A	BASEMENT	1535	0	WINDOW FRAME	C	WOOD	BROWN	INTACT
36A	BASEMENT	1536	0.02	WALL PANEL	B	VINYL	GREY	INTACT
36A	BASEMENT	1537	0.01	WALL PANEL	C	VINYL	MIX	INTACT
34	BASEMENT	1549	0.03	DOOR	A	METAL	BLACK	INTACT
34	BASEMENT	1550	0.09	DOOR FRAME	A	METAL	BLACK	INTACT
34	BASEMENT	1551	0.02	DOOR FRAME	B	METAL	BLACK	INTACT
34	BASEMENT	1552	0.05	DOOR	B	METAL	BLACK	INTACT
34	BASEMENT	1554	1	WALL	A	CONCRETE	MUSTARD	INTACT
34	BASEMENT	1556	0	CEILING	CENTER	DRYWALL	WHITE	INTACT
24	BASEMENT	1557	0.06	DOOR	B	METAL	BLACK	INTACT
24	BASEMENT	1558	0.03	DOOR FRAME	B	METAL	BLACK	INTACT
24	BASEMENT	1559	0	DOOR	B	WOOD	BROWN	INTACT
24	BASEMENT	1563	0.04	WALL	C	CONCRETE	GREEN	INTACT
24	BASEMENT	1564	0.03	WALL	D	DRYWALL	GREEN	INTACT
24	BASEMENT	1568	0	COUNTERTOP	A	PLASTIC	ORANGE	INTACT
24	BASEMENT	1569	0	CABINET	A	WOOD	BROWN	INTACT
24	BASEMENT	1570	0	CABINET	B	WOOD	BROWN	INTACT
24	BASEMENT	1571	0	CABINET	D	WOOD	BROWN	INTACT
24	BASEMENT	1572	0	COUNTERTOP	D	WOOD	TAN	INTACT
26	BASEMENT	1573	0	DOOR	B	WOOD	BROWN	INTACT
26	BASEMENT	1574	0	DOOR	D	WOOD	BROWN	INTACT
26	BASEMENT	1575	0	WALL PANEL	A	DRYWALL	WHITE	INTACT
26	BASEMENT	1576	0.04	WALL PANEL	D	DRYWALL	WHITE	INTACT
26	BASEMENT	1581	0.23	CHALKBOARD	C	METAL	BROWN	INTACT
26	BASEMENT	1582	0.01	CHALKBOARD	C	METAL	GREEN	INTACT
20	BASEMENT	1583	0	DOOR	D	WOOD	BROWN	INTACT
20	BASEMENT	1584	0.02	DOOR FRAME	D	METAL	BLACK	INTACT
12	BASEMENT	1589	0	DOOR	C	WOOD	BROWN	INTACT
12	BASEMENT	1590	0.11	WALL	A	CONCRETE	MUSTARD	INTACT
12	BASEMENT	1591	0.16	WALL	B	CONCRETE	MUSTARD	INTACT
12	BASEMENT	1592	0.08	WALL	C	CONCRETE	MUSTARD	INTACT
10	BASEMENT	1593	0	DOOR	D	WOOD	BROWN	INTACT
10	BASEMENT	1594	0	WALL	A	DRYWALL	GREY	INTACT
10	BASEMENT	1595	0	WALL	B	DRYWALL	GREY	INTACT
10	BASEMENT	1598	0	WALL	D	DRYWALL	PURPLE	INTACT
06 WOMEN	BASEMENT	1599	0	DOOR	D	WOOD	BROWN	INTACT
06 WOMEN	BASEMENT	1600	0.03	DOOR FRAME	D	METAL	BLACK	INTACT
06 WOMEN	BASEMENT	1601	0.04	WALL	A	CONCRETE	WHITE	INTACT
06 WOMEN	BASEMENT	1602	0.02	WALL	B	CONCRETE	CREAM	INTACT
06 WOMEN	BASEMENT	1603	0.03	WALL	B	DRYWALL	CREAM	INTACT
06 WOMEN	BASEMENT	1604	0.07	WALL	D	DRYWALL	CREAM	INTACT
06 WOMEN	BASEMENT	1605	0	STALL PANEL	CENTER	PLASTIC	GREY	INTACT
06 WOMEN	BASEMENT	1606	0.02	SINK	C	CERAMIC	WHITE	INTACT
06 WOMEN	BASEMENT	1607	0.01	HEATER	A	METAL	GREEN	INTACT
04 MEN	BASEMENT	1608	0	DOOR	D	WOOD	BROWN	INTACT
04 MEN	BASEMENT	1609	0.03	DOOR FRAME	D	METAL	BLACK	INTACT
04 MEN	BASEMENT	1615	0	HEATER	C	METAL	GREEN	INTACT
04 MEN	BASEMENT	1616	0.06	SINK	A	CERAMIC	WHITE	INTACT
02 CUSTODIAL	BASEMENT	1617	0	DOOR	D	WOOD	BROWN	INTACT
02 CUSTODIAL	BASEMENT	1618	0.02	WALL	A	DRYWALL	CREAM	INTACT
02 CUSTODIAL	BASEMENT	1619	0.05	WALL	B	CONCRETE	CREAM	INTACT
02 CUSTODIAL	BASEMENT	1620	0.02	WALL	C	CONCRETE	CREAM	INTACT
02 CUSTODIAL	BASEMENT	1621	0.02	WALL	D	CONCRETE	CREAM	INTACT
48	BASEMENT	1624	0	DOOR	B	WOOD	BROWN	INTACT
48	BASEMENT	1626	0.03	WALL	D	DRYWALL	WHITE	INTACT
48	BASEMENT	1627	0.1	COLUMN	B	CONCRETE	WHITE	INTACT
48	BASEMENT	1628	0.03	COLUMN	D	CONCRETE	WHITE	INTACT
46	BASEMENT	1630	0	DOOR	B	WOOD	BROWN	INTACT
46	BASEMENT	1631	0	WALL PANEL	A	VINYL	MIX	INTACT
46	BASEMENT	1632	0	WALL PANEL	C	VINYL	MIX	INTACT
46	BASEMENT	1633	0.07	WALL	D	DRYWALL	MIX	INTACT
46	BASEMENT	1634	0.06	COLUMN	D	DRYWALL	WHITE	INTACT
46	BASEMENT	1635	0.1	COLUMN	B	DRYWALL	WHITE	INTACT
46	BASEMENT	1636	0.08	CHALKBOARD	C	METAL	BROWN	INTACT

Room	Floor	Sample Number	Lead Level (mg/cm^2)	Component	Side (1)	Substrate	Color	Condition
44	BASEMENT	1638	0.01	DOOR	D	WOOD	BROWN	INTACT
44	BASEMENT	1640	0.01	WALL	B	DRYWALL	WHITE	INTACT
44	BASEMENT	1641	0.09	WALL	C	CONCRETE	WHITE	INTACT
44	BASEMENT	1642	0.01	WALL	D	CONCRETE	WHITE	INTACT
44	BASEMENT	1643	0.02	COLUMN	D	CONCRETE	WHITE	INTACT
7	BASEMENT	1645	0	DOOR	B	WOOD	BROWN	INTACT
7	BASEMENT	1646	0.05	WALL	A	CONCRETE	CREAM	INTACT
7	BASEMENT	1649	0.01	COLUMN	C	CONCRETE	CREAM	INTACT
3 MECHANICAL	BASEMENT	1650	0.07	DOOR	D	METAL	BLACK	INTACT
3 MECHANICAL	BASEMENT	1651	0.06	DOOR FRAME	D	METAL	BLACK	INTACT
3 MECHANICAL	BASEMENT	1652	0.18	WALL	A	CINDERBLOCK	TAN	INTACT
3 MECHANICAL	BASEMENT	1653	0.24	WALL	B	CINDERBLOCK	TAN	INTACT
3 MECHANICAL	BASEMENT	1654	0.13	WALL	C	CINDERBLOCK	TAN	INTACT
3 MECHANICAL	BASEMENT	1655	0.14	WALL	D	CINDERBLOCK	TAN	INTACT
3 MECHANICAL	BASEMENT	1656	0.22	WALL	D	CONCRETE	TAN	INTACT
3 MECHANICAL	BASEMENT	1657	0	FLOOR	CENTER	CONCRETE	YELLOW	INTACT
3 MECHANICAL	BASEMENT	1658	0.07	TANK	CENTER	METAL	TAN	INTACT
3 MECHANICAL	BASEMENT	1659	0.13	COLUMN	CENTER	CONCRETE	TAN	INTACT
3 MECHANICAL	BASEMENT	1660	0	RELAY BOX	D	METAL	GREY	INTACT
EXTERIOR	FIRST	1661	0.09	WINDOW PANEL	B	METAL	BLACK	INTACT
EXTERIOR	FIRST	1662	0.11	WINDOW PANEL	B	METAL	BLACK	INTACT
EXTERIOR	FIRST	1663	0.11	WINDOW PANEL	B	METAL	BLACK	INTACT
EXTERIOR	FIRST	1664	0	WINDOW PANEL	C	METAL	BLACK	INTACT
EXTERIOR	FIRST	1665	0	WINDOW PANEL	C	METAL	BLACK	INTACT
EXTERIOR	FIRST	1666	0.14	WINDOW PANEL	D	METAL	BLACK	INTACT
EXTERIOR	FIRST	1667	0.11	WINDOW PANEL	D	METAL	BLACK	INTACT

Note 1: A=North, B=East, C=South, D=West

Appendix B

Photograph log

PHOTO 1

PHOTO 2

PHOTO 3

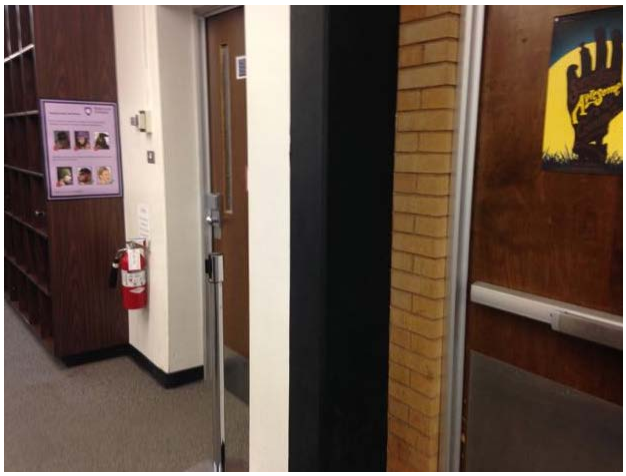

PHOTO 4

R & R Environmental, Inc.

47 West 9000 South, Suite #2, Sandy, Utah 84070
(801) 352-2380 • Fax: (801) 352-2381

PROJECT NO:		
DESIGNED BY:	SCALE:	REVIEWED BY:
DRAWN BY:	DATE:	FILE:

SITE PHOTOGRAPHS

LEAD BASED PAINT SURVEY AND ASSESSMENT

SOCIAL SCIENCE BUILDING
WEBER STATE UNIVERSITY
OGDEN, UTAH 84403

PHOTO 5

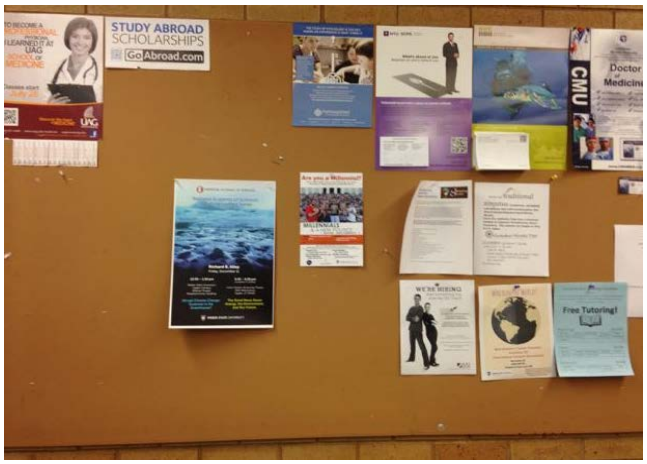

PHOTO 6

PHOTO 7

PHOTO 8

R & R Environmental, Inc.
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PROJECT NO:		
DESIGNED BY:	SCALE:	REVIEWED BY:
DRAWN BY:	DATE:	FILE:

SITE PHOTOGRAPHS

LEAD BASED PAINT SURVEY AND ASSESSMENT

SOCIAL SCIENCE BUILDING
WEBER STATE UNIVERSITY
OGDEN, UTAH 84403

PHOTO 5

PHOTO 6

PHOTO 7

PHOTO 8

R & R Environmental, Inc.

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PROJECT NO:		
DESIGNED BY:	SCALE:	REVIEWED BY:
DRAWN BY:	DATE:	FILE:

SITE PHOTOGRAPHS

LEAD BASED PAINT SURVEY AND ASSESSMENT

SOCIAL SCIENCE BUILDING
WEBER STATE UNIVERSITY
OGDEN, UTAH 84403

Appendix C

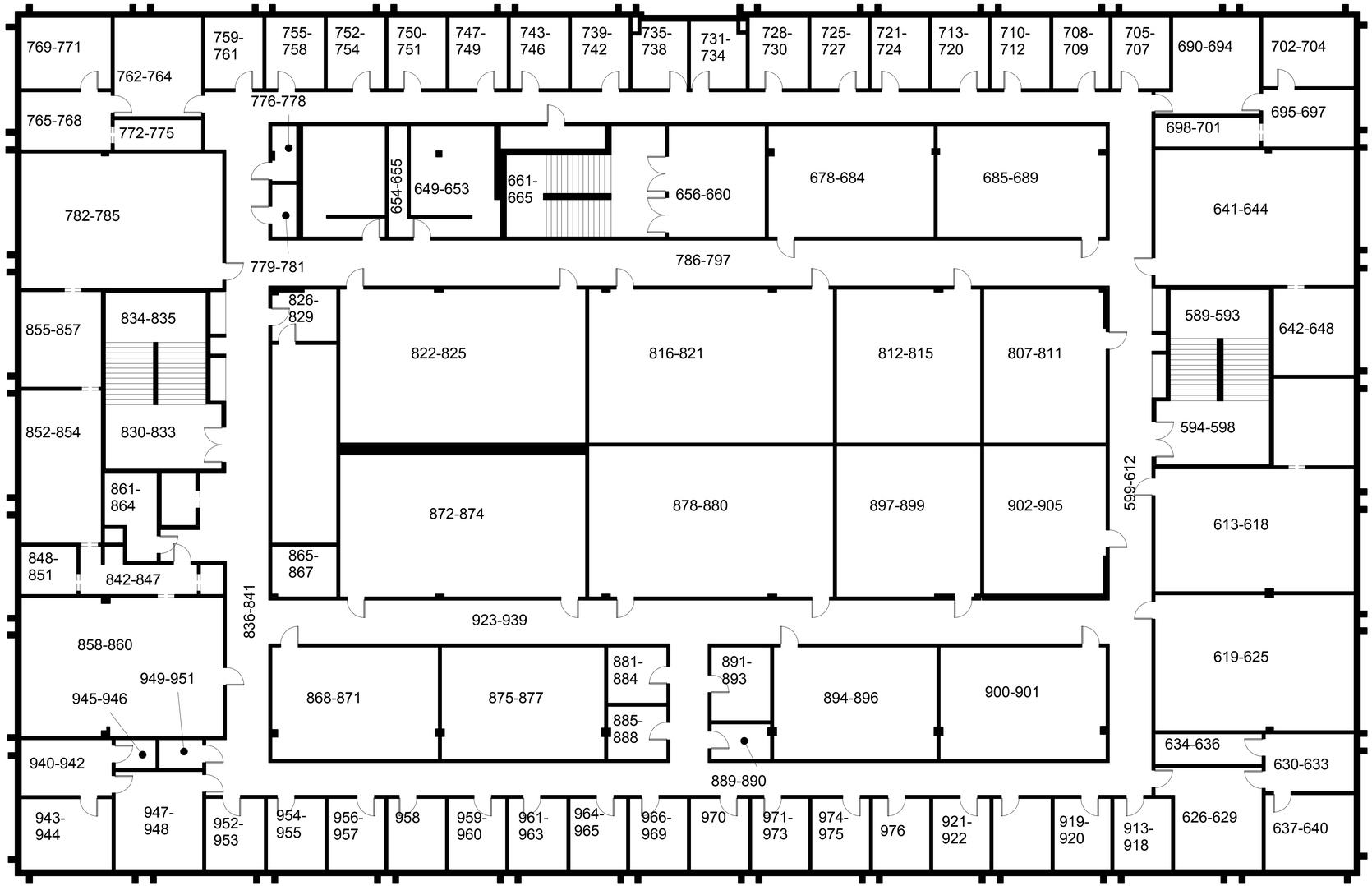
Building Floor Plans

SAMPLE LOCATIONS

R & R
ENVIRONMENTAL, INC.
ASBESTOS • LEAD • INDUSTRIAL HYGIENE
47 West 9000 South, Suite #2 Sandy, Utah 84070
(801) 352-2380 : Office (801) 352-2381: Fax

WSU SOCIAL SCIENCE BUILDING
THIRD FLOOR PLAN
LEAD BASED PAINT SURVEY

04/03/16



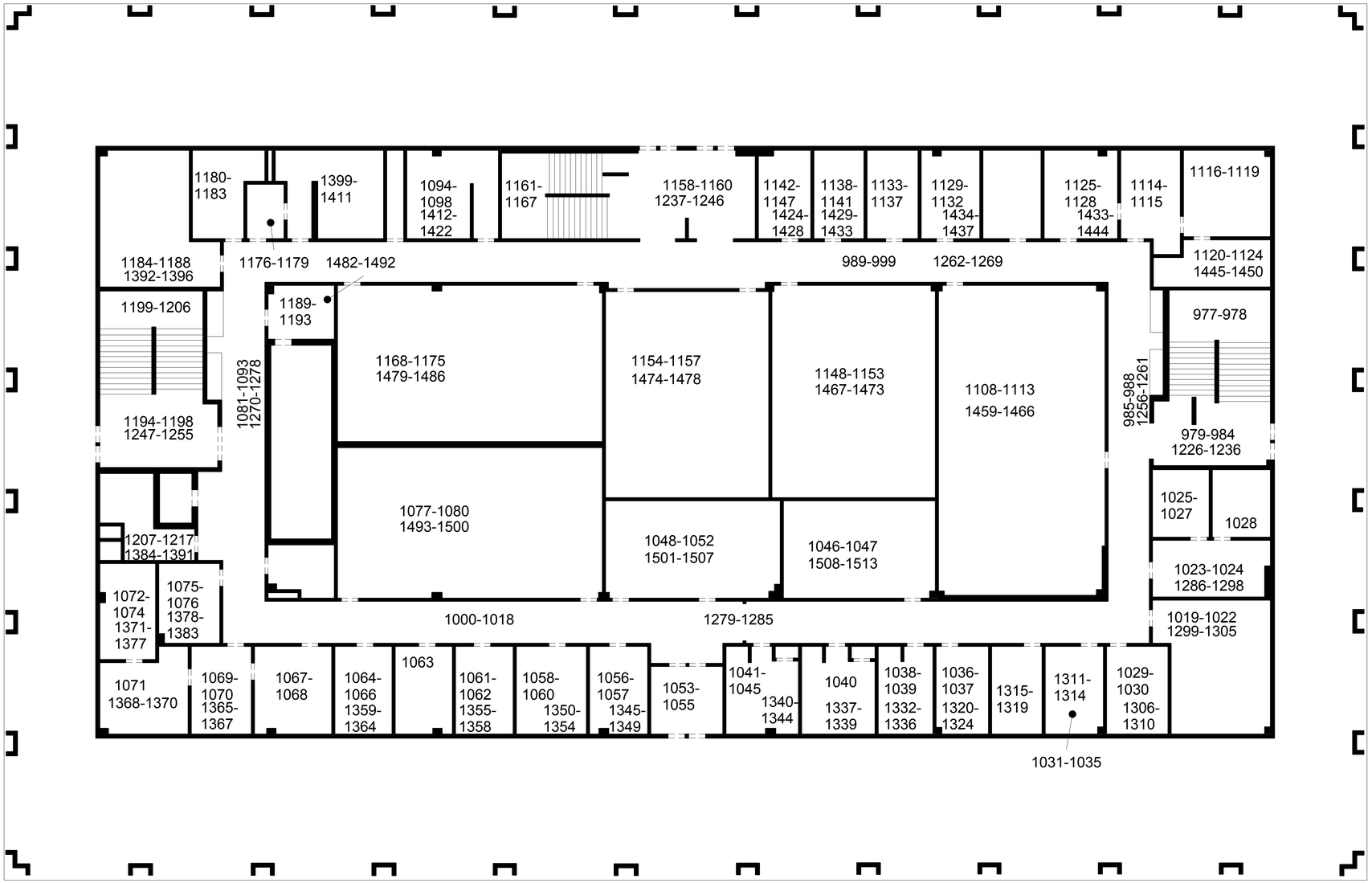
SAMPLE LOCATIONS

R & R
ENVIRONMENTAL, INC.
ASBESTOS • LEAD • INDUSTRIAL HYGIENE
47 West 9000 South, Suite #2 Sandy, Utah 84070
(801) 352-2380 : Office (801) 352-2381: Fax

WSU SOCIAL SCIENCE BUILDING

SECOND FLOOR PLAN
LEAD BASED PAINT SURVEY

04/03/16



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WSU SOCIAL SCIENCE BUILDING

FIRST FLOOR PLAN
LEAD BASED PAINT SURVEY

04/03/16

SAMPLE LOCATIONS

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WSU SOCIAL SCIENCE BUILDING

GROUND FLOOR PLAN
LEAD BASED PAINT SURVEY

04/03/16

HAZARDOUS MATERIALS INSPECTION
FOR THE

SOCIAL SCIENCE BUILDING

WEBER STATE UNIVERSITY
OGDEN, UTAH 84403

April 8, 2016

Prepared for:

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Hazardous Materials Inspection

Social Science Building
Weber State University
Ogden, Utah

During October 2015, Steve Smith of R & R Environmental, Inc., conducted a hazardous materials inspection of the Social Science Building located at Weber State University, Ogden, Utah. The purpose of this survey was to identify the existence, extent, and condition of hazardous materials. The inspection was conducted based on a agreement with Mr. Robert J. Anderson, State of Utah Division of Facility Construction and Management (DFCM), Hazardous Material Manager.

Hazardous materials requiring proper removal and disposal was identified at the Social Science Building, Weber State University, Ogden, Utah as follows:

Material	Location	Quantity	Unit Cost
PCB Ballast	Throughout	1,691 units	$2.00 / lbs. (avg. 5 lbs. / unit)
PCB Containing Transformers	Electrical Vault	3 Units	$4,500 / unit
Fluorescent Light	Throughout	3,656 tubes	$0.50 / linear foot
Refrigeration Units	Drinking Fountains	8 Units	$200.00 / unit
Freon	Rooftop AC	1 unit	$1,500.00 / unit

The State of Utah's DFCM policy requires the items above to be removed and disposed of at a facility approved to accept such waste prior to demolition. This may or may not be applied to the city of Ogden, Weber County, but R & R Environmental, Inc. recommends removal and proper disposal of these components prior to any demolition activities.

The cost estimate to remove and dispose of these hazardous materials is estimated at approximately **$40,832.00**. This cost estimate does not include transportation, removal, design, or management fees associated with dismantling and packaging the materials.