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FESS/Engineering Project No. 10-8-1

Office, Technical, & Education Building

PP

Project Plan for the conventional construction to construct a new building for the Illinois Accelerator Research Center as part of the Industrial Area Upgrades Program

Submitted, Accepted, and Approved By:

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The Project Plan (PP) describes the management, control systems and procedures used by Fermi National Accelerator Laboratory (Fermilab) to meet the technical, cost, and schedule objectives of this project. The Project Plan is comprised of a Project Charter (PC), Conceptual Design Report (CDR) and Project Execution Plan (PEP). This controlling document establishes the basis for managing the project, throughout the projects life cycle including, initiating, planning, executing, monitoring/controlling and closing.

This project will be managed based on the principles provided in DOE Manual 413.3-1. This manual is not the sole source for all requirements and guidance that apply to the acquisition of capital assets. Other DOE Orders and Manuals, especially regarding design, engineering, management reserve and indirect costs have been used as guidance to determine the basis for estimating costs and establishing baselines. This identification, implementation and compliance with other relevant Orders, Manuals and requirements are the responsibility of the Integrated Project Team.

The Project Plan is to be viewed as a “living document,” and as such, will be revised when necessary. The Fermilab Project Manager is authorized to approve design refinement (CDR) and non-substantive changes to the Project Plan (e.g. name changes to the positions stated in the Project Plan), but will inform the Industrial Area Upgrades Program Management Group (IAU-PMG) via electronic mail of such changes. Change Control will be via the IAUP-PMG.

Section 1 – Project Charter (PC)

The Project Charter (PC) formally authorizes the project. The Project Charter incorporates the signed U.S. Department of Energy Work For Others FRA-2010-0002 authorization as part of this document. The Project Charter states the project justification within the framework of the Fermilab’s strategic goals. The Project Charter defines the roles and identifies the Fermilab Project Director and the Fermilab Project Manager as well as other key members of the Integrated Project Team.

Section 2 – Conceptual Design Report

The Conceptual Design Report (CDR) is intended to be a self-consistent basis for a project baseline scope, cost estimate and schedule. It is not a Title 1 report and has not answered every technical design question. The current level of contingency is believed to be consistent with the degree of technical confidence in the design at this stage. It is recognized that some basic construction concerns will be reviewed and optimized during the remaining stages of the project.

Section 3 – Project Execution Plan

The Project Execution Plan (PEP) defines the Enterprise Environmental Factors and Fermilab’s Organizational Process Assets that provides project management the methodology which defines the process.

Author of this document:

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- Fermilab Work Smart Set, Chapter 1070 of FESHM
- Multi-Organization Construction Site Safety Walkthrough Procedure
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- U.S Department of Energy Work For Others Agreement with Non-Federal Sponsors, WFO FRA-2010-0002, with transmittal letter to DOE
- Illinois Department of Commerce and Economic Opportunity Grant No. 10-203828
- Illinois Department of Commerce and Economic Opportunity Grant No. 10-203829
- State Welcome Package Grant No. 10-203828 (Reports Deliverable Schedule)
- State Welcome Package Grant No. 10-203829(Reports Deliverable Schedule)
- Illinois Historic Preservation Agency sign-off
- Illinois Department of Natural Resources sign-off

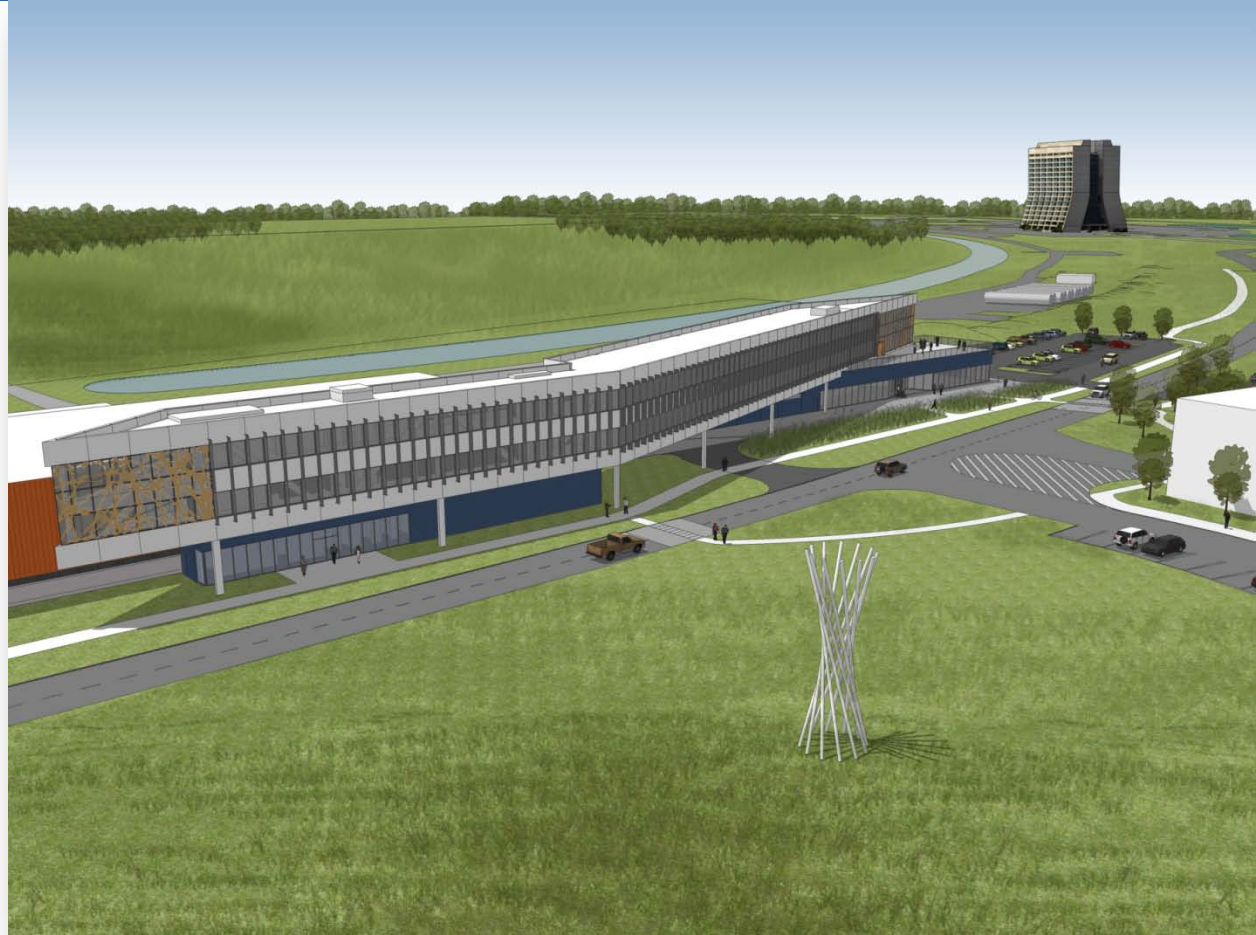
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SECTION 1: Project Charter



**Office, Technical, and Education
Building**

FESS/Engineering Project No. 10-8-1



1.1 PROJECT JUSTIFICATION

Office, Technical, and Education Building

Project Charter

The mission of the High Energy Physics (HEP) program in the DOE Office of Science is “to understand how our universe works at its most fundamental level.” Further, “HEP underpins and advances the DOE missions and objectives through this research, and by the development of key technologies and trained manpower needed to work at the cutting edge of science.”

The beams produced by today’s particle accelerators address many of the challenges confronting our nation in the 21st century: energy, the environment, good jobs and economic security, health care, national defense and the war on terror. The next-generation accelerators of tomorrow have the potential to make still greater contributions to the nation’s health, wealth and national security. The powerful new accelerator technologies created for basic science and developed by industry will produce particle accelerators with the potential to address key economic and societal issues confronting our nation.

In October 2009, the DOE’s Office of High energy Physics sponsored the “Accelerators for America’s Future” symposium and workshop. Its purpose was to elicit the views and opinions of a wide range of accelerator users on the challenges and opportunities for developing and deploying accelerators to meet the national needs. The symposium identified “A critical challenge is the translation of breakthroughs in accelerator science and technology into applications that benefit the nation’s health, wealth and security.”

As part of the Industrial Area Upgrade Program (IAUP), the Office, Technical, and Education (OTE) Building in the Illinois Accelerator Research Center (IARC) at Fermi National Accelerator Laboratory will provide a center of excellence for accelerator research, education, and industrialization and initiate/promote/support related industry. IARC will bring together scientists and engineers from Fermilab, Argonne, Illinois Universities, and private industry with the goal of encouraging development of accelerator based industry and accelerator projects. The work at IARC will serve to promote Fermilab as the leading accelerator laboratory acting as a steward of Accelerator Development within the Office of Science in the Department of Energy. In partnership with industry and local university accelerator programs, IARC will make critical contributions to the technological and economic health of Illinois and provide unique education opportunities for a new generation of engineers and scientists.

In support of the IAUP, the OTE Building will be the first phase of the physical plant of IARC.



1.2 EXECUTIVE SUMMARY

Office, Technical, and Education Building

The OTE Building will house offices, technical space and education space for use by Fermilab scientists and engineers, scientists and engineers from Argonne and other national labs, university researchers, educators, and collaborating industrial partners. The space will be used for the study, research, development and application of cutting edge accelerator technologies. Emerging new accelerator technologies will enable the construction of new large scientific instruments necessary for the advancement of fundamental research and the development of new technological applications of accelerators. The OTE Building will be utilized as incubator space for emerging accelerator technologies providing a central point for cutting-edge accelerator research and industrialization. The building and infrastructure will be optimized for the development of advanced accelerator technology.

The approximately 40,000 square foot building will provide a mixture of specialized technical space, education areas, and office space. As an incubator space, it is anticipated that private industry clients will occupy part of the building office and technical space on a rotating basis. Therefore, the OTE Building is anticipated to be a highly flexible building with a high degree of modular building components including demountable/movable partitions and a raised flooring system. In addition, state-of-the-art computing and video capabilities will be provided to facilitate international collaborations.

Project Funding

The primary funding for this project is provided through two grants from the State of Illinois Department of Commerce and Economic Opportunity (DCEO): Grant Award No. 10-203828 in an amount not to exceed \$17,000,000 and Grant Award No. 10-203829 in an amount not to exceed \$3,000,000. Funds in the total amount for both grants have been received by Fermilab, with an authorization to incur costs beginning 06/01/2010 and ending 5/31/2012.

Additional funding in the amount of \$2,000,000 is provided by DOE.

Authorization

The primary work is authorized by U.S. Department of Energy Work For Others (WFO) FRA-2010-0002. See Appendix C.

Project Costs

This project is being executed on a design-to-cost basis with a not to exceed TEC of \$22,000,000.

The TEC includes the DOE funded Construction, State-funded Construction, Architectural/Engineering contracted Engineering and Design with related construction support services, Management Reserve and Indirect Costs. All estimates are based on FY2011 dollars, escalated to 2012 per DOE Guidelines.

The Indirect Costs associated with this project are based on current laboratory rates.



1.2 EXECUTIVE SUMMARY

Office, Technical, and Education Building

The current effective MSA and G & A rate are 14.4% on A/E and subcontractor costs.

Schedule

The OTE Building project is the second component of the Industrial Area Program. It is necessary for the first component, Industrial Area Site Upgrades project to be substantially complete prior to the start of the OTE Building to avoid construction site conflicts. This schedule further assumes that a one-year time extension for good cause will be received from DCEO as identified under Risk Management, Project Execution Plan section 3.6.

Director's Review	October '10
Engineering Start	November '10
Construction Start	November '11*
Construction Complete	May '13
Engineering Complete	October '13
Project Complete	November '13

* External Milestone: IASU partial beneficial occupancy October, 2011.

A separate tracking milestones plan is identified in the Project Execution Plan



1.3 PROJECT ORGANIZATIONAL STRUCTURE

1.3.1 DOE MANAGEMENT

The U.S. Department of Energy (DOE) provides partial funding for this project to Fermilab. The Fermi Site Office (FSO) will make these funds available to Fermilab for the project based on the existing directive system.

The Manager of the FSO has been delegated the authority and responsibility for field oversight of the project. This includes line management authority, responsibility and accountability for overall project implementation and contract administration.

The FSO administers the Maintenance and Operations (M&O) contract with Fermi Research Alliance (FRA) for the operations of Fermilab and exercises oversight of Fermilab. The FSO Manager has been delegated responsibility and authority for execution of the project. The specific responsibilities of the FSO manager are:

- Supervision of DOE Federal Project Director and Fermi Site Office staff;
- Review of and concurrence with this Project Plan;
- Review documents as required by federal regulations or departmental orders or notices;
- Approval of Fermilab subcontract actions, within the authority delegated to FSO;

The Chicago Office (CO) of DOE can provide support to the FSO in the following areas as requested:

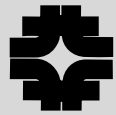
- Quality Assurance
- Implementation of ES&H
- Project Management Systems
- Design Review
- Legal

1.3.1.1 Federal Project Director

The FSO Manager has delegated authority and responsibility for management and direction of the project to the DOE Federal Project Director, Stephen Webster.

The specific responsibilities of the DOE Project Director include:

- Oversight of the Integrated Project Team;
- Participates in regularly scheduled Project Management Group meetings;
- Tailors DOE project management requirements to the project;
- Review and approval of this Project Plan and changes thereto;
- Integrates and manages the timely delivery of government reviews, approvals, services, and information;
- Manages DOE provided funds;



Office, Technical, and Education Building

1.3 PROJECT ORGANIZATIONAL STRUCTURE

- Measurement of performance against established goals including technical performance, cost levels, and schedule milestones;
- Overseeing Fermilab's management of construction activities;
- Monitoring project progress via reports prepared by the Fermilab Project Manager;
- Coordinating the approval by the FSO Manager, the construction project directives and modifications thereto.

The DOE has delegated the responsibility for design and construction of this project to Fermilab.

1.3.2 Fermi Research Alliance, LLC – M&O Contractor (FRA)

The OTE Building is part of the Industrial Area Upgrades Program which will provide leadership and oversight at the Directorate level through Project Management Group Meetings, Director's reviews, and Integrated Project Team meetings for the OTE Building.

Fermilab's Facilities Engineering Services Section (FESS) will lead the project and provide the project management and facility expertise needed to successfully complete the project. FESS will manage the design and conventional construction activities associated with this project, as well as accept line management responsibility for safety. This effort will be accomplished using the resources of the FESS Engineering Department. The FESS/Engineering department head shall assure proper attention to the coordination and timely completion of the project. This project's leadership is composed of individuals having several years of experience managing or supporting similar projects. The Federal Project Director will be supported by a project team that includes a Project Director, Project Manager, and other Fermilab support as shown on the project organization chart and as required by the project. Senior Fermilab management support includes involvement by the Chief Operating Officer, who works directly with the project team to facilitate and assist the team with best practices.

The project management team structure shown in Figure 1(below) identifies the organizational structure that will be responsible for design, procurement and construction of the Project.



1.3 PROJECT ORGANIZATIONAL STRUCTURE

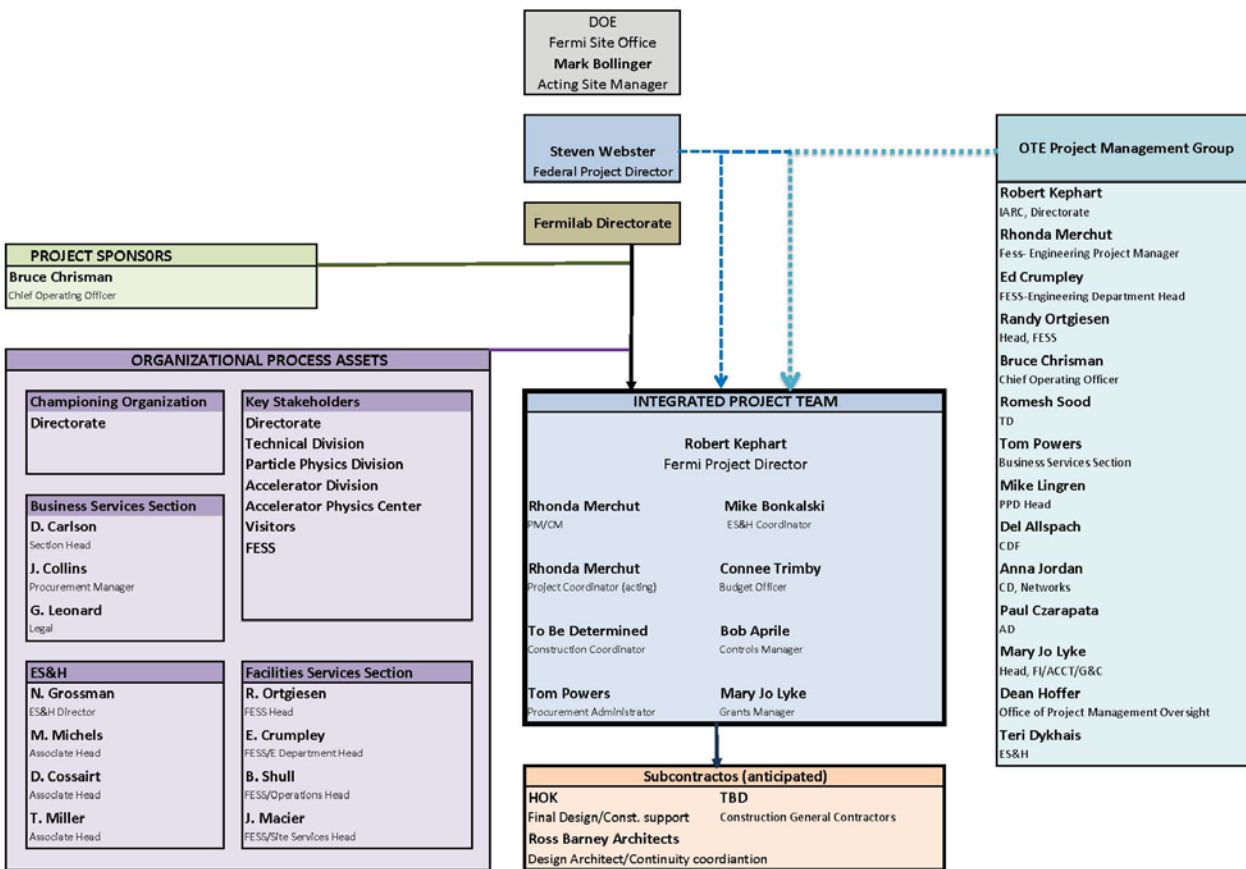


Figure 1 - OTE Project Organization Structure



1.3 PROJECT ORGANIZATIONAL STRUCTURE

1.3.2.1 Directorate

As with all activities at Fermilab, the Fermilab Directorate is at the highest level of responsibility.

1.3.2.2 Project Sponsors

The Fermilab Chief Operating Officer (COO), Bruce Chrisman and Randy Ortgiesen Head, Facilities Engineering Section are the Project Sponsors championing the project.

1.3.2.3 OTE Project Management Group (PMG)

The PMG has the responsibility of providing oversight to the OTE Building project as it relates to the Lab operations and changing accelerator research, development, and manufacturing activities.

The PMG is comprised of key stakeholders, including personnel from the Directorate, PPD, TD, AD, CD, CDF, and FESS, as indicated in Figure 1 (above). The PMG has the responsibility of insuring the OTE Building project is integrated into the long-range goals of the Industrial Area as well as coordinated with on-going GPP/IGPP projects in the Industrial Area.

The PMG approves the mission need for the OTE Building. PMG will provide oversight to insure the OTE Building Project meets the programmatic requirements, State Grant requirements, and schedule requirements. Oversight of the Project will include:

- Conducting periodic reviews of the project by way of the regularly scheduled Project Management Group meetings;
- Monitoring project progress and milestones via monthly reports;
- Monitor change control by oversight of the Change Control board;
- Proactively identify and resolves critical issues as they relate to Lab operations and safety;
- Oversee the management and mitigation of project risks;
- Ensures timely completion and quality of required project documentation



1.3 PROJECT ORGANIZATIONAL STRUCTURE

1.3.2.4 Integrated Project Team

The mission of the Integrated Project Team (IPT) with the Fermilab Project Director serving as the team leader is to provide leadership, strategic planning, coordination, and communication for the successful design and construction of the OTE Building project. The Integrated Project Team is responsible for ensuring the project's objectives are achieved on schedule, within budget, and consistent with quality, environment, safety, and health standards. The Integrated Project Team is also responsible for making sure that project management is carried out with integrity and in compliance with applicable laws.

The interface with FNAL Management and affected personnel will be necessary for coordination with activities that may impact project performance or where the project activities may have broader Lab impacts. The FNAL project manager will be the IPT point of contact for day-to-day interface with FNAL Management and other affected personnel to obtain input for coordination of project activities and planning.

The Integrated Project Team shall meet on a bi-weekly basis to accomplish the stated project goals and mission. Special meetings, when necessary, will be called to address and/or resolve specific issues

The objective of the integrated project team is to provide professional management and subject matter expertise to ensure the safe, timely, and cost-effective completion of the project.

1.3.2.4.1 Fermilab Project Director

The Fermilab Director has delegated certain responsibilities and authorities to the Fermilab Project Director who holds primary responsibility for Fermilab's management oversight of the Project. The Fermilab Director has designated Robert Kephart as the Fermilab Project Director. The Fermilab Project Director is a key stakeholder that has accepted the scope of work as described within this project's Conceptual Design Report as being appropriate and complete. The specific responsibilities of the Fermilab Project Director include:

- Leads the Integrated Project Team;
- Allocates funds;
- Reviews and approves this Project Plan and changes thereto;
- Manages the State Grant, including State Line Item Contingencies and initiates all scope changes as indicated in the Project Execution Plan.
- Secures any additional funding authority as defined by the Fermilab Project Manager.



1.3 PROJECT ORGANIZATIONAL STRUCTURE

- Organizes and serve as the leader of the Project Management Group Meetings and is main point-of-contact for the Federal Project Director.

A summary of the Fermilab Project Director's functions and responsibilities is provided in the Integrated Project Team Responsibilities Matrix included in Appendix B.

1.3.2.4.2 Fermilab Project Manager

The project manager is responsible for project implementation and evaluating and mitigating project risks. Specific responsibilities of the project manager include:

- Manages day-to-day execution of the project.
- Establishes technical and administrative controls to ensure the project is executed within the approved cost, schedule, and technical scope.
- Implements a tailored Earned Value Management System (EVMS), coordinated with the State grant requirements to track performance against the approved project baseline and in accordance with the State reporting requirements.
- Prepares DCEO Project Status Report;
- Ensures that project activities are conducted in a safe and environmentally sound manner.
- Ensures ES&H responsibilities and requirements are integrated into the project.
- Participates in IAU-PMG meetings and communicates the project status and issues.
- Identifies and manages project risks.
- Prepares and provides recommendations for baseline change control proposals.
- Ensures project deliverables as defined in the contract are on time and within budget.
- Serve as Construction Manager.
- Serves as first line of contact with the Architectural/ Engineering firm(s) and Construction Subcontractor(s).

The Fermilab Project Manager will utilize the resources of the FESS/Engineering Department as appropriate for oversight of design, construction phase support, and construction coordination. The building design will be subcontracted to an Architectural/Engineering firm(s). A summary showing the functions and responsibilities of the Fermilab Project Manager/Construction Manager is



1.3 PROJECT ORGANIZATIONAL STRUCTURE

provided in the Integrated Project Team Responsibility Matrix contained in Appendix B.

1.3.2.4.3 Fermilab Project Coordinator

The Project Coordinator assists in planning, researching, and oversight of the design, contributing in areas such as the oversight of the design review, procurement, manufacture, installation, testing, and initial operation in compliance with all applicable local, state and federal regulations, requirements and standards and all DOE orders. A summary of the Project Coordinator functions and responsibilities is provided in the Integrated Project Team Responsibility Matrix contained in Appendix B.

1.3.2.4.3.1 Design Support

In order to maintain continuity of the conceptual design documented in the CDR, the design architect, Ross Barney Architects will be retained to provide project coordination throughout the project (subject to successful proposal negotiation). Anticipated services include review and oversight of Conceptual Validation Process, provide responses to RFI's from the final design A/E including design details and drawings as needed; interface with final design A/E on key design issues; oversight and coordination of reviews; perform informal and formal reviews of final design documents and submittals for the purpose of completeness and coordination; oversight of LEED Gold documentation and HPSB Guiding Principles documentation, and review of key construction submittals.

LEED Management: Ross Barney Architects would continue as the LEED Project Manager insuring the project obtains Gold certification by providing design oversight, managing and coordinating documentation by other team members, and providing the on-line documentation as needed to achieve LEED Gold certification.

1.3.2.4.4 Fermilab Construction Coordinator

Job coordination during construction phase activities will be accomplished through the Fermilab Construction Coordinator (FCC), who shall be responsible for the oversight of daily monitoring of all work at the site, including the environment, safety and health (ES&H) program. The FCC reports to the Construction Manager for this project.



1.3 PROJECT ORGANIZATIONAL STRUCTURE

1.3.2.4.5 Fermilab Procurement Administrator

The Fermilab Procurement Administrator(s) (PA) is a member of the Business Services Section (BSS). Separate PA's may be assigned for the procurement of the architectural/engineering services (A&E) and for the construction subcontract(s). Through the head of the BSS the Fermilab Procurement Administrators will execute all subcontracts. The details of the PA's functions and responsibilities are provided in the Integrated Project Team Responsibility Matrix contained in Appendix B.

1.3.2.4.6 Fermilab ES&H Coordinator

The Fermilab ES&H Coordinator develops, integrates and implements aspects of project-related Environmental, Safety, and Health (ES&H) processes, plans, procedures, systems, methods and policies critical to the success of the project. The ES&H Coordinator ensures that technical complex requirements are properly interpreted by evaluating and applying appropriate ES&H principles and formulating scopes of work, plans, and methodologies suitable for achieving and maintaining compliance with Fermilab ES&H requirements, maintains overall responsibility for project ES&H execution, ensuring project is adhering to contract requirements, standards of quality, and to Fermilab and DOE ES&H performance expectations. The details of the ES&H coordinator's functions and responsibilities are provided in the Integrated Project Team Responsibility Matrix contained in Appendix B.

1.3.2.4.7 Fermilab Grants Manger

The Fermilab Grants Manger is responsible for insuring compliance with all requirements and conditions of the DCEO Grant, including quarterly financial reporting in accordance with the terms of the grants. The details of the Grant's Manager's functions and responsibilities are provided in the Integrated Project Team Responsibility Matrix contained in Appendix B.

1.3.2.4.8 Fermilab Budget Officer

The Fermilab Project Budget Officer manages the project budget, coordinates budget reviews and reporting with the project manager and project control account manager. The budget officer consolidates data for budget presentations, State of Illinois reporting requirements, and also maintains and reports the financial status of the project budget, submits budget reports to the project team and monitors the budget throughout the project. The details of the Budget Officer's functions and responsibilities are provided in the Integrated Project Team Responsibility Matrix contained in Appendix B.



1.3 PROJECT ORGANIZATIONAL STRUCTURE

1.3.2.4.9 Fermilab Controls Manager

The Fermilab Project Controls Manager is responsible for the project's controls systems that support the project manager in planning project cost and schedule control functions for the project. The Project Controls Manager coordinates the work, resources, and costs using project controls tools, is responsible for the coordination, preparation, consistent application, and analysis of trends, Earned Value (EV) performance reports and the project risk management plan, ensuring that the results of risk analysis are incorporated into the project baseline. The details of the Control Manager's functions and responsibilities are provided in the Integrated Project Team Responsibility Matrix contained in Appendix B.

1.3.3 FERMILAB ORGANIZATIONAL PROCESS ASSETS

Organizational process assets are those Fermilab organizations that can be used to influence the project's success and provide additional resources beyond the IPT. These assets and organizations are described below.

1.3.3.1 Championing Organization

The championing organizations provide support for the project throughout the project process by providing objectives for the eventual operational use of the project. Since the championing organization will be the primary beneficiary of the project, the input of the organization is vital to establishing the goals and objectives for the project.

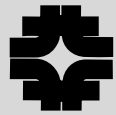
1.3.3.2 Stakeholders

All project stakeholders are considered to be organizational project assets and are considered invaluable during the planning and execution of the project. The Fermilab Project Director and Fermilab Project Manager will identify those key stakeholders and obtain the relative inputs critical to the project's success. Prospective users, landlord ES&H personnel and building managers are always key stakeholders that are included in the process.

1.3.3.3 Business Services Section

The Business Services Section (BSS) has the responsibility for subcontract administration, providing budget status and subcontract/requisition information. The details of the Fermilab Procurement Administrator's, a member of the Integrated Project Team, responsibilities have been identified and described in the Integrated Project Team Responsibility Matrix contained in Appendix B.

1.3.3.4 ES&H Management



1.3 PROJECT ORGANIZATIONAL STRUCTURE

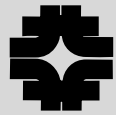
The Environment, Safety and Health (ES&H) Section has the responsibility for providing safety coordination support and oversight of safety throughout the project. As with all Fermilab projects, attention to ES&H concerns will be part of project management and safety will be incorporated into all processes. Line management for safety on this project will be the responsibility of the Facilities Engineering Services Section.

The ability to perform the construction work in a safe, environmentally acceptable manner will be designed into the project. Construction documents (drawings and specifications) will be reviewed as the documents are developed, by Fermilab engineering, construction, and safety professionals to ensure ES&H concerns are addressed. Project specific safety and health requirements for construction will be outlined in the construction documents.

The potential construction subcontractors will be qualified for bidding by submitting specific information about their safety and health program with the proposals. During construction the subcontractors will utilize Project Hazard Analyzes (PHA) to plan the work and mitigate hazards. The Fermilab Construction Coordinator will audit the subcontractor's compliance with the PHA's and with their overall Safety Plan. The Fermilab ES&H Section will augment the FCC with appropriate safety personnel during construction.

1.3.3.5 Facilities Engineering Services Section

The Facilities Engineering Services Section (FESS) has the responsibility of coordinating existing and proposed infrastructure, including water, power and communication systems. FESS will provide criteria and project reviews for systems and areas that they will maintain and service. The ability to safely maintain and service the project's deliverable will be designed into the project documents. Construction documents (drawings and specifications) will be reviewed as the documents are developed for appropriateness, ES&H concerns and life cycle value.



1.4 ALTERNATIVES ANALYSIS

The location for the OTE Building was selected based on the Illinois Accelerator Research Center programmatic requirement for a high-bay component for accelerator construction.

Multiple Sites were evaluated and presented to the Directorate fourth quarter of FY 2009. It was determined that locating the building adjacent to the CDF building would provide the most appropriate type of high bay space for the expected R&D work that will take place. Repurposing the CDF building after the Tevatron shut down for this R&D work is considered an appropriate use for the CDF high bay building. A summary of the evaluated sites is located in Appendix D.

Further studies were conducted in conjunction with possible building massing options that the available buildable area surrounding CDF would afford. Representative sketches of these massing studies are located in Appendix D.

Meetings and a design charrette were conducted and 2 design directions emerged: a tower scheme to be located in the west parking lot of CDF, and, a horizontal scheme that would be located adjacent to the north side of CDF and extend west into the CDF parking lot.

The two design directions were further developed and presented to a Functional Review Committee and distributed for review to FESS. The Functional Review Committee was comprised of high-level Fermilab personnel from throughout the lab and chaired by Steve Holmes. The group was charged with reviewing the two design directions for functionality of the design. The Committee charge and comments are located in Appendix D. The two designs were further refined in response to the Functional Review Committee and FESS comments.

On June 15, 2010, the two refined design directions were presented to the Director and the horizontal Façade Scheme was selected as the building conceptual design. Selected images presented to the Director are located in Appendix D.

SECTION 2: Conceptual Design Report



**Office, Technical, and Education
Building**

FESS/Engineering Project No. 10-8-1



2.1 DETAILED DESCRIPTION

Office, Technical, and Education Building

2.1.1 OVERVIEW

The Illinois Accelerator Research Center (IARC) program's primary goal is to establish Northern Illinois as a national center for accelerator development; and to initiate, promote, and support related industry in Illinois. Secondary goals include providing:

- Education: In association with local universities, support training of scientists and engineers in accelerator physics and related technology.
- Office Space: Provide office space plus conference/meeting rooms to facilitate laboratory collaboration with private industry, and universities.
- Outreach: Provide exhibit space for visitors, including members of the public, students and teachers and VIP visitors.

This project provides for the construction of an Office, Education and Technical (OTE) building as part of Fermilab's Industrial Area Campus to meet the primary and secondary goals stated above.

2.1.1.1 Goals and Objectives

In order to provide a standard in which to evaluate the architectural building and site design, the following list of goals and objectives were developed for the OTE building:

- Meet the functional needs of the IARC mission
- Generate a dramatic, high profile building
- Produce a building that incorporates Fermi design philosophy
- Strengthen ability to attract new physics projects
- Maximize State funding with "bricks & mortars"
- Create a symbiotic relationship to existing CDF building
- CDF truck access must be maintained
- High degree of flexibility for rotating tenants
- State-of-the-art computing and video capabilities
- Accommodate parking
- Obtain LEED Gold Certification
- Comply with HPSB Guiding Principles



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2.1.2 EXISTING CONDITIONS

2.1.2.1 Project Site

The project site is the area south of Road D, north of the Tevatron and land north and west of the Collider Detector Facility (CDF). One of goals of the project is to “create a symbiotic relationship to the existing CDF building.” After analysis of the sites surrounding the CDF, the project site was selected because the OTE building:

- Is more prominent approaching from the west and from Wilson Hall.
- Provides improved access to the west side of the CDF’s high bay space which has higher floor loading than the east side.

The project site is approximately 97,300 square feet or 2.24 acres of land west and north of the CDF.

2.1.2.1.1 West

The area west of the CDF is bordered by a retaining wall and fence to the south, D Road to the north, and an above ground pipe line to the east. The area is approximately 83,000 square feet or 1.91 acres. Another key feature is an approximately 67-foot ramp descending to an overhead door on the west elevation of the CDF that provides truck access to the building. In addition, two (2) chillers and an electrical substation are located along the south edge of the site adjacent to the retaining wall.

2.1.2.1.2 North

The area north of the CDF is bordered by D Road to the north. The area between the CDF and D Road is approximately 14,300 square feet or 0.33 acres. The distance from the northwest corner of the CDF to D Road is approximately 50-feet and the distance from the southwest corner of the CDF to D Road is approximately 60-feet,

2.1.2.2 Facilities

Significant buildings and experiments adjacent to the OTE project site are the Collider Detection Facility (CDF) and the Tevatron. The other facilities in the Industrial Area are located directly across Road D to the north.



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2.1.2.2.1 Collider Detection Facility

The CDF structure has a foot print of approximately 102'x 254' (25,900sq.ft.) and is approximately 33' tall. The CDF building consists of several primary programmatic components:

- A high bay space that spans the building from east to west along its north end
- A three story, 22' deep, band of office space along the building's south side
- A lower assembly hall level which connects to the Fermilab Tevatron south of the CDF.

The 'Grade Level Assembly Floor' (i.e. first floor level accessible from grade) of the CDF sits at approximately 3'-6" below grade. The main entrance is located on the southwest corner of the building. There are two 20' wide service ramps, one on the east and one on the west side of the CDF, which provide truck loading access from grade to the Assembly Floor level.

The CDF houses one of two detectors positioned along the four-mile Tevatron accelerator ring. Physicists use the detector to study the array of particles and forces within the atom by recording data about collisions of protons and anti-protons in the machine. The detector operation is extremely sensitive to ground vibrations.

2.1.2.2.2 Tevatron

The Tevatron is the most powerful proton-antiproton accelerator in the world. It accelerates beams of protons and antiprotons to 99.99999954 percent of the speed of light around a four-mile circumference. The two beams collide at the centers of two 5,000-ton detectors positioned around the beam pipe at two different locations. The Tevatron tunnel is buried 25 feet below grade, underneath an earthen berm.

2.1.2.2.3 Industrial Complex

The Industrial Complex is located directly across Road D from the CDF, and is composed the Industrial Center Building and four (4) high bay Industrial Building (1 through 4).

2.1.2.3 Site Features

Site features that are located on or adjacent to the project site for OTE building include Road D, parking, the bicycle/pedestrian path, the protective berm over the Tevatron tunnel, cooling ponds and other on-site equipment.



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2.1.2.3.1 Road D

Road D is part of the main east-west vehicular circulation path at Fermilab. At the west end, Road D connects to the Main Entrance Road in front of Wilson Hall and at the east end connects to Batavia Road. Road D will provide the primary vehicle access to the OTE building.

2.1.2.3.2 Parking

Parking for the CDF facility is provided at the west end of the building and on the north side of Road D.

2.1.2.3.3 Bicycle and Pedestrian Path

A bicycle and pedestrian path starts near Wilson Hall runs along the south side of Road D and passes in front of the CDF building and project site. The path's width varies along its route from 8 to 10 feet.

2.1.2.3.4 Earthen Berm

A major site feature is the earthen berm that was constructed over the 4-mile Tevatron tunnel. The berm is located south of the project site, and is roughly 15-feet above grade at its highest point.

2.1.2.3.5 Retaining Walls

Concrete retaining walls that cut into the earthen berm are located in the area south, west and east of the CDF. The west retaining wall is approximately 260 linear feet and defines the south boundary of the project site.

2.1.2.3.6 Equipment

The area immediately outside the west entrance of the CDF contains several pieces of large electrical and mechanical equipment including:

- An electrical substation with three (3) 1500 kva transformers
- Two (2) air switches serving the transformers
- Two (2) large chillers units
- Diesel generator

2.1.2.4 Utilities

Site utilities that are located on or adjacent to the project site for OTE building include domestic water, industrial cooling water, sanitary sewer, storm sewer, and medium voltage electricity. The following utility descriptions are based on completion of the Industrial Area Site Upgrade project #3-2-178.



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2.1.2.4.1 Domestic Water Service (DWS)

An 8-inch HDPE DWS line enters the project site at the west end, and turns northeast crossing Road D. The DWS line continues parallel to Road D on the north side until it turns north towards the Industrial Center Building. A 8-inch HDPE DWS line crosses Road D and enters the CDF at the northwest corner. A 6-inch HDPE DWS line crosses Road D and provides a connection point for the project along the north elevation of the CDF.

2.1.2.4.2 Industrial Cooling Water (ICW)

An 14-inch HDPE ICW line enters the project site at the west end, and turns northeast crossing Road D. The ICW line continues parallel to Road D on the north side until it turns north towards the Industrial Center Building, and then branches east. A 6-inch HDPE ICW line crosses Road D serving a fire hydrant on the south side of Road D. An 8-inch HDPE ICW line crosses Road D and enters the CDF at the northwest corner. A 6-inch HDPE ICW line crosses Road D and provides a connection point for the project along the north elevation of the CDF.

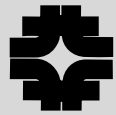
2.1.2.4.3 Natural Gas

A 4-inch natural gas line runs along the north side of D Road. A 4-inch gas line branches to the south crossing Road D and enters the project site west of the CDF. The gas line turns east and parallels the berm and provides a connection point for the project. The natural gas lines operate at 90 PSI.

2.1.2.4.4 Electrical

A medium voltage electric manhole (MH P-27) is located approximately 55-feet from the northwest corner of the CDF. Medium voltage electric lines run north, south and west from P-27. The south lines serve two (2) air switches located just south of the CDF west ramp. The air switches serve the three existing transformers and allow for one additional future transformer.

- From one air switches, two (2) 5-inch conduits serve one of the existing 3 transformers and provide a connection to a transformer pad.
- From the other air switch, two (2) 5-inch conduits serve two existing transformers.
- In addition, an electrical duct bank runs from the new transformer pad to a termination point along the north elevation of the CDF.



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Three (3) sets of power lines run from each of the transformers to the CDF. Each set consist of four (4) 5-inch PVC conduits encased in concrete. Two of the sets of power lines run northeast and enter the CDF along the west elevation. The third set of power lines runs parallel to the south side of the building and enters the CDF around midpoint in the south elevation. In addition, a 5-inch underground rigid steel conduit runs south from the substation through the berm.

2.1.2.4.5 Communications

Communication lines are used to support the telephone, computing services, lab-wide Metasys building management system and FIRUS for equipment and fire alarm monitoring.

A communications manhole (MH C-23) is located approximately 55-feet from the northwest corner of the CDF. Communications lines run west, east and north from P-27. The west line runs under the existing parking lot towards MH C-21. Three communication lines head north and go under D Road. Two lines continue to head north and one turns east and runs north of D Road. The east line consists of four (4) 4-inch PVC ducts encased in concrete, and enters the CDF at the northwest corner.

An additional communication line, with 4 – 4" PVC ducts encased in concrete, runs along the south side Road D from Wilson Hall to the CDF. Pull cords are provided in each duct. The line terminates on the north side of the CDF.

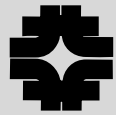
2.1.2.4.6 Sanitary Sewer

A 10-inch sanitary sewer line enters the project site at the west end, and turns northeast crossing Road D. An 8-inch sanitary line continues east and provides a connection point for the project. The 10-inch line continues parallel to Road D on the north side until it turns north towards the Industrial Center Building and south, across Road to MH-22.

Sanitary sewer manhole (MH 22) is located approximately 25-feet from the northwest corner of the CDF. A 4-inch sanitary line runs east from MH 22 and enters the CDF in northwest corner.

In addition, an 8-inch sanitary line enters the east end of site north of the CDF and provides a connection point for the project.

There are abandoned sanitary sewer lines run under the project site west and north of the CDF.



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2.1.2.4.7 Storm Sewer

The storm water system on the project site includes lines west and north of the CDF. The lines are a combination of 18-inch and 24-inch HDPE pipes. There are several manholes within the project site.

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2.1.3 BUILDING PROGRAM

The OTE building program consists of office, technical, educations and support elements.

2.1.3.1 Office Elements

The office elements are defined as upper level private offices, standard private offices, workplace cubicles and conference rooms. The OTE building program includes approximately 19,840 feet of flexible space to accommodate a mixture of 150 office elements, and provide a variety of office configurations.

The office areas will be designed as highly flexible space utilizing a manufactured demountable partitions system. A raised flooring system throughout will provide further flexibility. The systems will provide for fully integrated partition/flooring/and furniture.

2.1.3.2 Technical Element

The technical element includes light technical space for the fabrication and testing of assembly components. The space is programmed at 4,800 square feet that can be subdivided into four (4) smaller independent spaces.

The technical space will be designed to offer maximum flexibility for rotating use. Although it will be the responsibility of each end-user to outfit and equip the technical space, the following will be provided as part of the base building:

- Capability to use as one large space or isolated 4 smaller spaces, each approximately 1200 square feet.
- Ability to secure in all configurations.
- The utilities shall be provided to each of the 4 tech spaces in such a manner that when one tech space is utilizing or modifying the utility, it has minimal or no impact on the on-going utility use of another tech space or the building as a whole.
- Central utility trunk - ability to access utilities and controls without entering other tech rooms.



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In addition to the items above, the technical space is to conform to the following requirements;

- The design of the tech space exterior envelope is to take into account the possibility of several types of future exhausts and intake. These knockout panels will be incorporated into the envelope design scheme.
- Vertical shaft(s) through the roof to be incorporated into the building design scheme. Shafts will be sized to accommodate 2-14" diameter ducts for each of 4 subdivisions within the tech space.
- The floor slab in the tech space shall have a load capacity of 600lbf.
- Cable tray to be provided for all power lines.
- Fiber optics feed to the tech space to be provided.
- 2 welding outlets to be provided for each subdivision of tech space.
- 2 phone/data outlets to be provided for each subdivision of tech space.
- 75 foot-candles of light to be provided throughout the tech space
- Tech space to accommodate valves/fittings for possible future purified/filtered water system (4) from raw water supply.
- Provide dedicated hot water line from building hot water supply to each of 4 subdivisions within the tech space, with valves/fittings to facilitate future temperature controls, boosters, etc.
- Cold water supply to be provided via. Individual run to each of 4 subdivisions of tech space, valves and capped for future use.
- A minimum of one 4" in floor drain and one 4" stub (capped, not trapped, for future use) to be provided in each tech space subdivision for incidental use.
- One chemical sump basin with associated valves/connections for future equipment to be provided for each subdivision of tech space (filtering equipment by future

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tenant).

- Dedicated HVAC with humidity control
- Tech space designed to accommodate future 3 ton overhead bridge crane full length of space.
- Tech space designed to accommodate possible future clean room with raised floor.
- Epoxy floor to be provided throughout tech space.
- Space to be provided to accommodate exterior pads for future equipment - air scrubbers, dewar tanks, etc.
- Acoustical treatment to be provided between tech space, lobby, and office to reduce sound transmission.

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2.1.3.3 Education Element

The education element consists of four (4) classrooms approximately 600 square feet each totaling 2400 square feet. A key feature of the education element is providing flexibility to reconfigure the four (4) classrooms into two (2) 1200 square feet rooms, or into one (1) 2400 square foot assembly space. The purpose of the education element is to provide space for a state-of-the-art conference and teaching space that can be used by Illinois Accelerator Research Center, and by other Fermilab departments. The space will be designed to facilitate ease of future upgrades for emerging technologies.

2.1.3.4 Support Elements

The support elements consist of the building lobby large enough to be used as small exhibition area, and a lunch room for the building occupants. Other elements accommodate Leadership in Energy and Environmental Design (LEED) and High Performance and Sustainable Building Assessment and Compliance Tool for New Construction (HPSB) related criteria such as a room dedicated to recycling operations and shower/changing rooms to support bicycle riders.



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2.1.4 BUILDING DESIGN

The OTE building is a 46, 200 gross square feet and connects to the CDF along its north elevation and stretches to the west. The 3-story structure is 47-feet tall and is 540 feet long. The design has two separate program areas at the ground level at the east and west ends that make up the building's bases. The second and third floors connect to the CDF at the east end and then angles southwest to "sit" on top of the west base. The office floors bridge between the two base components and over the west truck access ramp of the CDF. The offices are framed with two triangular elements on east and west ends that contain conference rooms and the lunch room, respectively. This gives the new OTE building a unique form that creates a symbiotic relationship with the CDF and a dynamic, fresh identity for the IARC.

The design provides approximately 32,400 square feet of useable or occupiable square feet with a building efficiency of 70 percent.

2.1.4.1 Programmatic Layout

The OTE building program is organized onto three floors with the education and light tech elements located on the first floor, and the office elements housed on the second and third floors.

2.1.4.1.1 First Floor

The first floor is approximately 15215 gross square feet divided into a 2.383 square foot east base and a 12.832 square foot west base. The larger west base consists of the main entry lobby and display area, primary vertical circulation core, restrooms, classrooms, light tech space, and support and mechanical spaces. The east base is located along the north elevation of the CDF and is made up of a small entry lobby, secondary vertical circulation core, restrooms with shower/changing rooms, and mechanical space. Descriptions of the primary functional areas include:

- **Lobby/Exhibit Space:** The main entrance lobby is approximately 1,856 square feet with a 14-foot ceiling height. The space is designed to function as both an exhibit space and/or a pre-function area for the education/conference center. The primary vertical circulation and restrooms are located directly off the lobby.
- **Education/Conference Center:** The education/conference center is approximately 2,385 square feet with a 14-foot ceiling height. The center is located at the west end of the building directly adjacent to the main entrance lobby. The



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space is designed to be configured into 1, 2, 3 or 4 rooms using an operable partition system. When arranged into four (4) classrooms, each space is 520 square feet and able to accommodate 25 persons.

- Light Technical Space: The light technical space is approximately 4,822 square feet with a 16-foot ceiling height. The light tech spaces are located on the east end of west base adjacent to the CDF. The spaces are accessible from the main lobby by a corridor running along the south elevation. The space is designed to be configured into 1, 2, 3 or 4 spaces using operable partitions. When arranged into four (4) tech spaces, each room is approximately 1,200 square feet. The space is designed to accommodate a 100 square foot modular office.

2.1.4.1.2 Second Floor

The second floor is approximately 16,068 square feet and houses a 2- story lunch room with outdoor seating area, office space, a conference room, restrooms, and mechanical space. Descriptions of the primary functional areas include:

- Office Space: The second floor provides approximately 10,162 square feet of office space with a ceiling height of 9.5 feet. The office space that can be configured into a combination of private offices, workstations and conference rooms. Using Fermilab-standard office and workstation sizes, the second floor can accommodate 73 office elements.
- Conference Room: The design includes one (1) permanent conference room on the east end of the building. The conference room is approximately 262 net square feet and can accommodate 12 to 14 persons.
- Lunch Room: The west end of the second floor houses the approximately 1,102 square foot area with lunch room and café/vendor. The lunch room is a 2-story space that is 902 square feet and can accommodate approximately 46 persons.
- Outdoor Terrace: The 2,021 square foot roof over the education/conference center is designed as an outdoor terrace accessible to the building occupants. The outdoor area is immediately west of the lunch room, and can provide



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exterior seating during good weather. The occupiable part of the terrace shall be limited to less than 50 persons to meet egress requirements allowing a single exit.

2.1.4.1.3 Third Floor

The third floor is approximately 14,858 square feet and includes flexible open office space, along with two conference rooms, restrooms and vertical circulation cores. Descriptions of the primary functional areas include:

- **Office Space:** The third floor provides approximately 10,830 square feet of office space with a ceiling height of 9.5 feet. The office space that can be configured into a combination of private offices, workstations and conference rooms. Using Fermilab standard office and workstation sizes, the second floor can accommodate 78 office elements.
- **Conference Room:** The design includes one (1) permanent conference room on the east end of the building. The conference room is approximately 262 net square feet and can accommodate 12 to 14 persons.
- **Lunch Room:** The west end of the third floor includes a small lunch room that overlooks the larger lunch room seating area on the second floor. The lunch room is 282 square feet and can accommodate approximately 15 persons.

2.1.4.2 Building Efficiency

The building design provides approximately 32,894 square feet of useable or occupiable square feet with a building efficiency of 71.3 percent. The BOMA/ANSI publication, *The Standard Method for Measuring Floor Area in Office Buildings* was used as guide in determining net and gross areas.. The measurements were performed in AutoCad for maximum accuracy.

2.1.4.2.1 Gross Square Feet

The Gross Square Feet (GSF) of the building includes all floor areas, exterior walls, horizontal and vertical circulation, toilets, building structure, vertical shafts, and all mechanical, electrical, plumbing (MEP) spaces.



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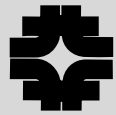
2.1.4.2.2 Net Square Feet

The Net Square Feet includes is the net usable square feet of the building, and excludes the following:

- Exterior walls
- Building structure
- Vertical circulation (stairs and elevators)
- Public corridors and circulation
- Toilets and shower rooms
- Vertical shafts
- Mechanical, Electrical and Plumbing (MEP) spaces

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Floor/Space	Net Square Feet (NSF)	Gross Square Feet (GSF)	Efficiency NSF/GSF
First Floor	9,826	15,215	64.6 / 35.4
Lobby/Exhibit	1,856		
Education/Conference	2,385		
Light Technical	4,822		
Recycling	275		
Table/Chair Storage	175		
Shower/Changing Room	144		
Coat Room	87		
Vending Area	82		
Second Floor	11,649	16,068	72.5 / 27.5
Office	10,162		
Conference	262		
AV/Storage	45		
Storage	78		
Lunch Room	902		
Café Service	200		
Third Floor	11,419	14,858	72.9 / 27.1
Office	10,830		
Conference	262		
AV/Storage	45		
Lunch Room	282		
BUILDING	32,894	46,141	71.3 / 28.7



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2.1.4.3 Building Entrances

Two (2) building entrances are provided in the OTE building. The main entrance is at the west end of the building and enters the lobby space on the ground floor. The main entrance is designed to serve the building occupants, FNAL employees, and people attending functions at the education/conference center.

The secondary entrance at the east end is primarily for FNAL employees coming from other buildings in the Industrial Area campus and parking areas at the east end of the campus.

2.1.4.4 CDF Connections

The OTE building design provides entrances into the existing CDF at the east end on the first and second floors. The east building entrance provides an access onto the CDF manufacturing floor via a short flight of stairs, and a new elevator.

In addition, the second floor of the OTE building is designed to connect to third floor of the CDF with a “bridge” along the west end of the high bay space. The OTE second floor and CDF third floor elevations are both at 766. In addition, the “bridge” will provide a vantage point to observe activity on the CDF manufacturing floor.

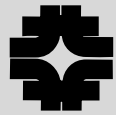
2.1.4.5 Horizontal Circulation

Horizontal circulation at the first floor of the building is provided by the main entrance lobby that connects the education/conference center to the light tech space, and provides direct access to the elevators, stair and restrooms. In addition, access to the light tech spaces is provided by a corridor located along the south side of the building.

Horizontal circulation on the second and third floors is provided through the office space that connects the two vertical circulation cores. A variety of office layouts were completed to examine possible egress and circulation paths, as well as visually break up a potentially long “corridor.”

2.1.4.5.1 Vertical Circulation

Vertical circulation for the building is provided by two (2) stair and elevator cores. The primary vertical circulation is provided at the west end of the building and is located directly off the main entrance lobby. The secondary vertical circulation is provided at the east end of the building.



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2.1.4.5.2 Stairs

Egress stairs are provided at the west and east ends of the OTE building. The west egress stair is designed with 1-hour fire resistant glazing along its north elevation to make the stair both visible and prominent from the main lobby.

2.1.4.5.3 Elevators

The west core includes two (2) ADA accessible elevators that serve the three floors of the building. The east core includes one (1) ADA accessible elevator and an egress stair. The east elevator is front and back opening and serves the three floors of the building and provides handicapped access to the manufacturing floor of the CDF.

Because the OTE building is three (3) stories, the applicable codes allow the egress stairs to provide access between floors.

2.1.4.6 Sustainable Strategies

There are numerous features of the design that shall create a building that is environmentally respectful and meets the requirements for achieving a minimum certification rating of GOLD under the LEED (Leadership in Energy and Environmental Design) green building rating system and complies with the HPSB Guiding Principles

2.1.4.6.1 Building Orientation:

With the majority of the building façade facing north and south, the building is oriented in order to maximize north/south exposure and minimize east/west.

2.1.4.6.2 Façade Shading Systems

All façade shading systems are designed in order to minimize the impact of solar gain and thus reduce cooling loads of the building. These devices must also balance the need to maintain as much day lighting to interior spaces as possible.

2.1.4.6.3 Light Shelves

Light shelves on the south elevation shall act as horizontal shading devices that are designed to shade the building from the sun as well as maximize indirect daylight to interior spaces. These fixed in place, light-reflecting overhangs are placed above eye-level and generally have a high-reflectance upper surface that redirects daylight deeper into the interior of the building



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2.1.4.6.4 Building Enclosure

The exterior envelope of the building will be designed to provide maximum views and day lighting while still providing a high performance thermal barrier to winter and summer temperature variances.

2.1.4.6.5 Roof Surfaces

All roof surfaces are designated to be either 'white'/reflective roof surfaces, or vegetated green roofs.

2.1.4.6.6 Building Systems

Environmental, energy saving building systems that deal with mechanical, plumbing, and electrical needs of the building are being extensively investigated. For information on environmental building systems, please refer to the specific section for each system within this report.

2.1.4.6.7 Site Work

Sustainable strategies such as storm water run-off control and treatment, solar shading/collection, constructed wetlands, etc. are being studied in the development of this project.

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2.1.5 SITE DESIGN

The IARC programmatic goals influenced the building massing and site design. Key features of the site design are:

- Creating a prominent presence on the Fermilab campus especially when approaching from the west on Road D.
- Maintaining truck access to the west end of the CDF
- Providing easy and convenient access from the light technical spaces in the OTE building to the CDF manufacturing floor.
- Landscaping with native and adaptive plants with minimal maintenance requirements.
- Using permeable pavements to reduce the stormwater impacts of the project.

2.1.5.1 Vehicular Access and Circulation

Vehicular access to the site is provided by Road D, the primary east-west artery on the Fermilab campus. The design provides two vehicular entrances onto the project site from Road D, one for the new on-site parking and one for truck access.

2.1.5.2 Parking Entrance/Exit:

The parking entrance is located just west of the building and provides a drop off point near the main entrance.

2.1.5.3 Truck Access and Circulation

Maintaining truck access to the west overhead door of CDF was key influence in the design of the OTE building. During program verification, Fermilab personnel indicated the frequency of truck deliveries using the west overhead door were one or two times a week. The drawings show two options for trucks entering and exiting the site.

2.1.5.3.1 Turning Radius

The minimum turning radius of a 55-foot tractor trailer is 19-foot inner radius and a 45-foot outer radius. The site design provides a 25 + foot inner radius and a 50 + foot outer radius and can accommodate a truck coming from the east or west on D Road. The truck maneuvering patterns are shown on the drawings.

2.1.5.3.2 Entering

The truck would pull into the 22-foot wide paved area, equivalent to a 2-lane road in front of the OTE light tech space, and back-up to the west overhead door of the CDF.



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2.1.5.3.3 Exiting

Option 1 was developed based on the infrequency of projected truck traffic. Under Option 1, when leaving, the truck would pull forward, heading west and exit out the parking entrance/exit. Heading east on D Road, the truck would need to make a 3-point turn. Option 1 requires a truck to pass in front of the building entrance once or twice a week but provides the following benefits:

- Increased stormwater site capacity with less pavement and more landscaping.
- De-emphasizes the truck entrance and overhead doors to the light technical spaces.

Option 2 provides a dedicated exit for trucks and removes truck traffic from in front of the main entrance, but also requires an additional curb cut and a large amount of additional pavement. In addition, the site layout draws attention away from the main entrance to the building.

2.1.5.3.4 Building Protection

Three (3) of the building columns land near the perimeter of the truck maneuvering zones. The columns can handle an impact from a truck with no adverse affects based on structural analysis of the building. In addition, the site design provides generous 22-foot driving lanes to ease maneuvering.

2.1.5.4 Light Technical Space Access

Vehicular access to the light technical spaces is provided with the 22-foot paved area along the north side of the west core. Four (4) overhead doors exit onto the paved area that allows direct access to the west overhead door of the CDF.

In addition, the truck entrance allows vehicular access to the service yard immediately east of the west section of the OTE building.

2.1.5.5 Bicycle Access

Approximately 1000 feet of the existing bicycle path located along the south side of Road D will be rebuilt at part of the project to accommodate the new parking and building. The bicycle path is located to maintain a minimum 10-foot buffer from its north edge to the south edge of Road D. In addition, the buffer zone shall be graded to accommodate stormwater runoff from the bicycle path.



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2.1.5.6 Pedestrian Circulation

Pedestrian access to the site is provided by the bicycle path and new sidewalks connecting to three (3) crosswalks along Road D. The sidewalks and crosswalks provide paths from parking and the Industrial Area buildings located on the north side of Road D.

2.1.5.7 Pedestrian Plaza

The design includes a 22-foot wide pedestrian plaza at the main entrance that is an exterior addition to the lobby/exhibit and education/conference spaces. The plaza is an extension of the pavement serving the CDF truck entrance and light technical spaces.

2.1.5.8 Bollards

Two sets of remotely controlled, pneumatic operated bollards are shown on the site plan to restrict vehicular traffic in the pedestrian plaza. The controls would reside in the CDF since the bollards would lower into the pavement to allow truck traffic to use the plaza for exiting.

2.1.5.9 Parking

The project includes a new parking lot which is located immediately west of the OTE building. The lot has 65 parking spaces including 7 accessible spaces.

2.1.5.10 Service/Equipment Yard

The positioning of the OTE building in relation to the CDF creates a protected service yard for major pieces of equipment serving both buildings. The free space in the yard is 36'-10" wide by 84'-5" long, and can accommodate a 40-foot long mobile crane with fully extended outriggers and flat bed truck simultaneously. Vehicle entry to the yard is provided by 16' clear opening.

2.1.5.11 Permeable Pavement

If technically feasible, permeable paving will be used for all new paved areas. Permeable pavements decrease stormwater runoff by allowing rainwater to seep through the pores and infiltrate into subsurface soils. Permeable paving is considered a Best Management Practice for storm water detention.

Permeable interlocking concrete pavement (PICP) will be used because of its strength, durability, ease of maintenance, and sustainable qualities. Further PICP technical information is provided at the end in the Appendix.



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2.1.5.12 Exterior Lighting

The new parking area shall include new site lighting. The new lighting will be solar powered and spaced approximately 72-foot x 108-foot based on the following:

- 18-foot mounting height
- 150 watt lamp
- Type III luminaries

The general arrangement of the poles and lighting include single luminaries around the perimeter, and double luminaries down the centerline of the lot. Hard wiring will be provided as back-up to the solar power.

2.1.5.13 Landscaping

Landscape design for the OTE Building focuses on plant materials native to the local soil and climate. A large part of the existing Fermilab property features native grasses and forbs. While the new building site should harmonize with this existing character of Fermilab, its new landscape areas will provide a visually intended clean foreground to the building when viewed from D Road as well as the Industrial Buildings on the north.

2.1.5.13.1 Native Plants

Short grasses and forbs will be mixed together within the long expansive planting beds along the north side of the building and the new parking lot. In order to compliment the proposed building materials and colors, the plants were selected that display blooms or leaves in a similar range of colors. The suggested combination of plants includes Little Bluestem, Prairie Dropseed, Blazing Star, and Foxglove Beardtongue.

2.1.5.13.2 Maintenance

Native plants have been selected for this project since they will be self-sustaining once they are established. Manual watering and weeding will be limited to an as-needed basis during the establishment period after installation. Pruning back the plants after winter will facilitate growth during the next season. The landscape design:

- Eliminates weekly mowing during spring, summer and fall
- Will not require an irrigation system
- Does not require “burning”
- Meets LEED criteria



2.1 DETAILED DESCRIPTION

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2.1.6 CODE ANALYSIS

The code analysis examines occupancy classifications, fire protection, egress and life safety requirements for the OTE building. The International Building Code (IBC) and NFPA 101, Life Safety Code are primarily used as the basis for the analysis.

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2.1.6.1 Occupancy Classification

The OTE Building is a mixed use occupancy in accordance with Section 508 of the IBC, and Section 6.1.14.2 of the NFPA 101. In addition, the provisions of “separated occupancies” of both codes shall apply. The primary occupancies in the building are:

PROGRAM	OCCUPANCY CLASSIFICATIONS	
	IBC	NFPA 101
Office Elements	Business Group B	Business
Education Element	Business Group B	Assembly < 300
Light Technical Element	Factory Industrial F-1	Industrial, Special Purpose

2.1.6.2 Occupancy Load

The maximum occupant load for each floor of the building was calculated using Table 7.3.1.2. Occupant Load Factors in NFPA 101. Support elements, such as the lobby and lunch room, were assumed to primarily support the building’s occupants and classified as “simultaneous” use spaces. The occupancy loads for individual spaces were calculated to design for life safety and fire protection provisions.



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Floor/Space	Net SF	SF per Person	Occupant Load
First Floor			293
Lobby/Exhibit	1,856	15	124
Education/Conference	2,385	20	120
Light Technical	4,822	100	49
Second Floor			164
Office	10,162	100	102
Conference	262	20	14
Lunch Room	902	20	46
Café Service	200	100	2
Third Floor			138
Office	10,830	100	109
Conference	262	20	14
Lunch Room	282	20	15

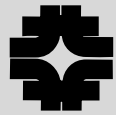
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2.1.6.3 Occupancy Separation Requirements

NFPA 101 has stricter occupancy separation requirements than IBC. Under the IBC, there is no separation requirements between Group B and F-1 occupancies. Using NFPA 101, the applicable separation requirements are:

- 1-hour fire resistive ratings between Assembly < 300 (Education Element) and Business occupancies
- 2-hour fire resistive ratings between Industrial and Business occupancies which can be reduced to 1-hour where the building is protected throughout with an approved automatic sprinkler system.
- 2-hour fire resistive ratings between Industrial and Assembly < 300 (Education Element) occupancies which can be reduced to 1-hour where the building is protected throughout with an approved automatic sprinkler system.

On the first floor, the walls and doors separating the lobby from the classrooms and from the tech space shall be designed to provide 1-hour fire separation. The floor and ceiling assembly between the first and second floors shall be designed to provide a 1-hour fire separation.



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2.1.6.4 Construction Types

Several factors were used in selecting Construction Types:

- Allowable heights
- Maximum number stories above grade
- Maximum area allowed per story
- Fire resistive ratings for building elements

Both Type I-B and Type II-B construction types were evaluated, and the OTE building shall be constructed to Type II-B standards for buildings 5 stories and under, and 65-feet above grade and less. The equivalent NFPA construction type is Type II (000).

2.1.6.5 Allowable Heights and Building Areas

Per IBC Table 503, the maximum allowable number of stories and areas per floor, without allowable increases for an automatic sprinkler system, are:

	TYPE II-B	
Occupancy Group	Stories	Area/Story
A (Assembly)	2	9,500 SF
B (Business)	4	23,000 SF
F-1 (Industrial)	2	15,500 SF

The building design meets the Type II-B requirements with the:

- A (Assembly) occupancy not exceeding 2 stories or 9,500 square feet
- B (Business) occupancy not exceeding 4 stories or 23,000 square feet per floor
- F-1 (Industrial) occupancy not exceeding 2 stories or 15,500 square feet



2.1 DETAILED DESCRIPTION

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2.1.6.6 Fire Resistive Rating Requirements

The required Fire Resistive Rating of Building Elements per IBC Table 601 and NFPA Table 8.2.1.2 are as follows:

BUILDING ELEMENT	IBC	NFPA
	II-B	II (000)
Structural Frame	0	0
Exterior Bearing Walls	0	0
Interior Bearing Walls	0	-
Multiple floors and walls	-	0
One floor or roof	-	0
Exterior Non-bearing Walls	See Table 602	0
Interior Non-bearing Walls	0	0
Floor Construction	0	0
Roof Construction	0	0

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2.1.6.7 Minimum Number of Exits

Per IBC Table 1019.1, based on the calculated occupant load, each floor of the OTE building shall have a minimum of two (2) exits. The first floor has exits to grade from the lobby, classrooms and tech space. The required second and third floors exits are provided by two (2) egress stairs at opposite ends of the building.

Occupant Load (persons per story)	Minimum Number of Exits (per story)
1 - 500	2
501 - 1000	3
More than 1000	4

In addition, egress requirements for individual spaces in the OTE building were evaluated. Per IBC Table 1015.1, spaces exceeding an occupant load of 49 persons would required more than one exit from the space. Based on the calculated occupant load for individual spaces, there are no individual rooms that require more than one (1) exit. The room with the largest occupant load is the second floor lunchroom at 46 persons.



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Floor/Room	Net SF	SF per Person	Occupant Load
First Floor			
Classrooms (each)	521	20	27
Light Tech (each)	1205	100	13
Second Floor			
Lunch Room	902	20	46
Conference Room	262	20	14
Third Floor			
Lunch Room	282	20	15
Conference Room	262	20	14

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However, both the classrooms and tech spaces can be combined into larger rooms. In these cases,

- The maximum occupant load for the classrooms exceeds 49 persons but is less than 500.
- The maximum occupant load for the tech space is 49 persons

In either case, the OTE building design provides 2 or more exits from the combined spaces.

Floor/Room	Net SF	SF per Person	Occupant Load
Classrooms (combined)	2385	20	120
Light Tech (combined)	4820	100	49

The exterior terrace located on the second floor shall be designed as a combination of occupiable and vegetative “green” areas to limit occupancy to less than 50 persons.

2.1.6.8 Egress Width

Per IBC Table 1005.1.1, the maximum number of occupants that can be served was by a 36-inch single door and a 48-inch egress stairway was calculated at 240 persons. On the first floor with a maximum possible occupant load of 307, multiple exits with 36-inch doors are provided to grade. On the second and third floors the maximum possible occupant loads are 162 and 141, respectively. These floors are served by two (2) 48-inch egress stairs that exceed 50% of the total occupant capacity per floor.



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Occupancies	With Sprinkler System (inches per occupant)	
	Stairways	Other Egress Components
A (Assembly)	0.2	0.15
B (Business)		
F-1 (Industrial)		

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2.1.6.9 Travel Distance

Per IBC Table 1016.1.1, the travel distances with an approved sprinkler system are 250 feet for A (Assembly) and F-1 (Industrial) occupancies; and 300 for B (Business) occupancy. The OTE building exit access travel distances for the:

- First floor A (Assembly) occupancy is approximately 60 feet
- First Floor F-1 (Industrial) occupancy is approximately 135 feet
- Second and Third Floor B (Business) occupancies is approximately 210 feet.

Occupancy	With Sprinkler System (feet)
A (Assembly)	250
B (Business)	300
F-1 (Industrial)	250

2.1.6.10 Stairway Enclosures

Per IBC Section 1020.1, “exit enclosures shall have a fire rating ... of not less than 1 hour where connecting less than four stories.” The stairways shall be designed as 1-hour rated enclosures. The west egress stair is designed with 1-hour fire rated glazing on the north side. In addition, both egress stairs are designed with areas of refuge.

2.1.6.11 Corridors

Per IBC Table 1017.1, for Occupancies A, B and F there is no fire-resistance rating required for corridors when the building is equipped with an automatic sprinkler system.



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2.1.7 STRUCTURAL SYSTEM

2.1.7.1 Substructure

The selection and design of the foundation system were influenced by:

- The cost of the systems
- Constructability; and
- Potential risks associated with constructing shallow foundations adjacent to the existing CDF basement walls and existing utility runs

The OTE building uses a combined foundation system consisting of shallow foundations for the west half of the building, and a deep foundation system for the east half of the building. The deep foundations are combination of straight shaft piers and belled caissons connected by grade beams at the east building, adjacent to the CDF facility.

The ground floor level will be supported on a 6" slab-on-grade with a perimeter frost beam. The light tech spaces, shall have a thicker slab-on-grade structure, currently anticipated to be 10" thick to meet the requested 600 psf in those areas.

2.1.7.2 Superstructure

The superstructure will typically consist of steel columns and beams with a composite concrete over metal deck floor system. The depths of steel beam members will be optimized based on considerations for cost, coordination with the architectural and services systems, and constructability. Currently, the beams are designed as 16"-deep wide flange sections spanning to deeper girders at the perimeter of the third floor and the roof, and spanning to deeper, upturned beams at the perimeter of the second floor which are upturned due to height considerations at the loading dock below. The concrete over metal deck will serve as a horizontal diaphragm to span between the north-south lateral systems at the east and west sides of the building.

The composite beam structure will span between two (2) 2-story steel trusses that run along each side of the second and third floors, and will be detailed with consideration for constructability of the beams relative to the steel truss members. The girders running parallel with the trusses at the 3rd level are inset from the trusses so as not to impose loading on the truss diagonals; these girders are supported at seated connections at the truss vertical member locations. The trusses span between steel columns located at approximately 70' on center typically. The building lateral



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system will consist of braced frames. The 2-story trusses serve as the lateral system in the longitudinal direction for the second and third floors, and for the roof.

The steel members in the roof system above Level 4 are sloped and/or offset in elevation in order to accommodate a slope of the roof from north to south. The longitudinal girders at the east end of the building are deeper than the typical girders in order to cantilever out to pick up the end of the roof without the provision of a vertical structural member at the corner of the building. At the west end of the building, a series of flat horizontal HSS members are provided as lateral support for the two-story façade from Level 2 to the roof.

The roof system over the first floor classroom areas at the west end of the building will consist of steel framing with composite lightweight concrete over metal deck to accommodate an exterior seating area off the lunch room at the second floor.

The roof system over the first floor light tech areas at the west end of the building will be either composite lightweight concrete over metal deck or metal roof deck alone.

2.1.8 MECHANICAL SYSTEMS

The mechanical system is anticipated to incorporate a ground source piping loop which will serve as heat sink for heating and cooling. Cooling and heating will be provided by multiple water to water heat pumps to the air handling units. The heat pumps will utilize the ground loop as heat sink. At this time it is anticipated that 20 to 25 ground wells will make up the loop field. The loop field will be located beneath the parking area. Water circulation for the loop field will be accomplished by circulating pumps located in the mechanical room. A back-up boiler will be installed for extreme conditions to supplement the well field as necessary.

2.1.8.1 Air Handling Units

Two (2) main air handling units will be utilized to accomplish control of discrete thermal zones. Air handling units will be located in mechanical rooms on the east and west ends of the first floor. The air handling units will provide constant 55°F supply air to the terminal units and air columns. AHU's will be provided with air side economizers, MERV 13 filters, hot water heating coil, chilled water cooling coil, supply fan and exhaust return fan. The air handling units will be variable air volume and the fans will be controlled by variable frequency drives. AHU's will be 2" thick double wall



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construction with stainless steel drain pans, access plenums, interior service lights and internal vibration isolation.

Water to the air handling units will be configured as a four pipe system to allow simultaneous heating and cooling to zones which have differing thermal requirements. Hot water and chilled water pumps will be provided for circulation to the air handling units.

2.1.8.2 Chilled and Hot Water

Chilled water and hot water will be supplied to the air handling units and heating devices by Multistack modular chiller heaters with Virtual Moveable Endcaps. Three 70 ton modules will be configured such that all modules can be in either heating or cooling or the modules can be mixed to provide chilled water and hot water simultaneously. The heat sink for the system is anticipated to consist of a geothermal field described below.

Chilled water and hot water piping systems will include in-line pumps located in the east mechanical room. Redundancy will be factored into the pump selections. Piping systems will be complete with air separators, strainers, control valves, etc for a complete and operational system. Pumping systems will be variable flow with VFD's for all pumps.

2.1.8.3 Geothermal Field

The anticipated geothermal well field will be located north of the east section of the OTE building and the CDF between the bicycle path and Road D. The well field will be immediately adjacent to the mechanical room on the ground floor housing the units served by the geothermal system.

The well field will consist of multiple bore holes circulating a mixture of propylene glycol and water. The well field will be sized with a minimum of one extra bore hole which can be isolated and bypassed in case of failure. Pumps for the well field will be end suction base mounted pumps located in the east mechanical room. The pumps will be provided with VFD's for balancing purposes. It is anticipated the geothermal field will consist of 20 to 25 wells of approximately 600' depth to provide 140 tons of capacity.

2.1.8.4 Zone Control Terminal Units and Air Columns

Zone control for spaces will be provided by a combination of VAV terminal units, Fan Powered VAV terminal units and Vertical "Air Column" terminal units.

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VAV terminal units will be utilized at the lunch room to provide air along the perimeter of the room. VAV terminal units will be provided with hot water re-heat coils for heating.

Fan Powered VAV terminal units (series flow) will be utilized at conference rooms and classrooms. The classroom Fan Powered units will be used to blend return air and primary air to provide air to the spaces in a displacement distribution scheme. Fan Powered units at conference rooms and lobby will be used to provide constant air flow to the rooms. All Fan Powered units will be provided with hot water re-heat coils.

Air Columns will be utilized for zone control for the general office spaces. Air columns at the perimeter exposures will be controlled as VAV with re-heat and will supply 55°F air in cooling mode and 90° F maximum in heating mode. Separate air column zones will be provided for north and south building exposures. Interior office spaces will be served via an under floor air distribution (UFAD) plenum. The air will be ducted within the plenum due to the extended length of the plenum. The air Columns will mix primary air and return air for the interior spaces to satisfy space load. Interior air columns will be controlled to maintain floor plenum pressure and will supply air at a constant 65° F.

Tech Space rooms will be conditioned by individual four pipe fan coil units. Fan coil units will be configured for economizer and make-up air mode operation for future potential process exhaust requirements. Unit selections will accommodate a minimum of 50% OA.

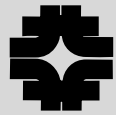
Environmental Control for the occupied space will consist of zone sensors and adjustable (UFAD) floor diffusers. Air Columns which serve perimeter zones will be controlled off of localized sensors. VAV boxes and Fan Powered VAV boxes serving individual spaces will be controlled off of localized sensors. Interior office spaces will be manually adjustable by the occupant to suit individual preference.

2.1.8.5 Miscellaneous Spaces

A computer room air conditioning unit (CRAC) will be provided for the main data closet. The CRAC will utilize the ground loop for condenser water.

Roof mounted exhaust fans will be provided for the exhaust of toilet rooms and janitor's closets and elevator machine rooms.

Mechanical and electrical rooms will be provided with hot water and electric unit heaters respectively.



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2.1.9 PLUMBING SYSTEMS

2.1.9.1 Plumbing Fixtures

An estimated occupant count of 408 was used for calculating the minimum number of plumbing fixtures. This occupant counts assumes support elements, such as the lobby and lunch room, primarily support the building's occupants and are classified as "simultaneous" use spaces. The calculations assume half are men and half are women. The table shows the required number of plumbing fixtures per the Illinois Plumbing Code for Office and Public Buildings and the number of plumbing fixtures in the design .

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Minimum Plumbing Fixture Count		Persons		Min. No.	Design
Water Closets	5 for each	110	males	5	
	1 for each additional minus urinals	40	males	3	
			men	5	7
	5 for each	110	females	5	
	1 for each additional	40	females	3	
			women	8	11
Urinals	no more than 50% of water closets		Total	4	4
Lavatories	1 for each	125	males	5	
	1 for each additional	45	males	1	
			men	6	8
	1 for each	125	females	5	
	1 for each additional	45	females	1	
			women	6	8
Drinking Fountains	1 per public restroom	75	occupants	6	6
Service Sinks	1 per floor with restrooms			3	3



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2.1.9.2 Domestic Cold Water System

Metered services to the building will be extended from the 6-inch DWS main located in the vicinity of the East core of the building from a point 5 feet outside the building. Water will be distributed through mains, risers, and branches to plumbing fixtures and equipment.

An electric variable speed pumping system will be provided since the available data indicates that the pressure in the DWS main is insufficient to provide the required flow and pressure for the building.

2.1.9.3 Domestic Hot Water System

Hot water will be provided by heater(s) as described below and distributed through mains, risers and branches to plumbing fixtures and equipment.

The hot water requirements for the west part of the building include the restrooms on each floor and the tech spaces. Using gas as the heating medium, hot water will be generated in gas fired water heaters and supplied to draw-off points. The stored water in the tank will be heated via solar panels on the main roof and will serve to pre-heat the supply water to the gas heater.

The hot water requirements for the east part of the building include restrooms on each floor plus showers on the first floor. It is proposed that gas is used as the heating medium. Hot water will be generated in an instantaneous type water heater and supplied to fixtures. The heater will be located locally to the fixtures being served. To supplement this installation, a centrally located storage tank will be provided upstream of the heater. The stored water in the tank will be heated via solar panels on the main roof and will serve to pre-heat the supply water to the gas heater.

Heaters in both cores will be located close to the points of use however consideration will be given to the use of a re-circulated piping system incorporating a single in-line circulating pump to ensure satisfactory delivery time of hot water at the outlets.

At least 30% of the hot water needs of the building will be met via the solar panels.

2.1.9.4 Sanitary Waste and Vent System

Plumbing fixtures will be drained by gravity through soil, waste and vent stacks, house drains and house sewers, to and connected to site main. The East and West cores of the building have individual connections to the site main.



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2.1.9.5 Storm Drainage System

Roofs and outdoor plazas of building will be drained at low points by gravity through multiple inside leaders and connect to the storm system on site.

As an alternate, storm run-off from roof areas will be separated from grade run-off and will be routed to an underground holding tank for re-use as a 'grey water system' within the building.

Water closets and urinals would be supplied from the grey water system

If incorporated in the design, the holding tank will be provided with necessary accessories such as pre-screening inlet sump and electric booster pumps in order to provide the required flow and pressure for grey water system needs within the building.

The building will be provided with overflow scuppers in parapet walls, therefore a secondary system of overflow drainage will not be required.

2.1.9.6 Natural Gas System

Metered and regulated natural gas will be extended from the site distribution main and distributed through risers and branches to gas fired equipment.

2.1.10 FIRE PROTECTION SYSTEM

A service to East Core of the building will be extended from the 6-inch ICW line located by the at the east core and connected to the building's fire suppression system. The requirement for a meter on this service is still to be determined.

Based on available water pressure information in the ICW site main, the automatic sprinkler system will be able to operate without the need for an automatic fire pump.

A standpipe system is required since the IBC requires these systems for all buildings where the highest occupied floor is more than 30ft above grade.

Residual flow and pressure for standpipe system operation will be provided by Fire department pumper truck via the exterior fire department inlet connections.

Standpipe will be a wet pipe type with supply valve open and under water pressure at all times and cross-connected to fire department inlet. All standpipes will be interconnected.

Roof manifold with approved roof outlets and pressure gauges will be provided at the top of each standpipe as required by code.



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Sprinkler heads will be as follows:

- Office spaces, classrooms, conference rooms and public circulation areas – concealed heads
- Toilet rooms – semi-recessed heads
- Tech spaces and other areas with no suspended ceilings – exposed heads.

2.1.11 ELECTRICAL SYSTEMS

2.1.11.1 Incoming Electrical Service

The building will be served via two (2) - 3 phase 4 wire, 480/277-volt service from the site distribution network. A new ground mounted transformer will be located adjacent to the existing outdoor electrical equipment. Space will be allowed for a further future transformer should it become necessary to provide an isolated source of clean 400Hz power in the future. Conduits will be provided into the building from this location.

The service entrance location and main electrical room will be located at ground floor. This room will have a 3 hour fire rating.

Main mechanical plant will operate at 480/277 Volts. 480/277 Volt industrial power panels will be provided in the Tech area. Each of the four technical areas will have separate power supplies wired direct from the a dedicated main switchboard to minimize interference by process loads.

The remaining electrical distribution within the building will operate at 208/120 Volts, via (2) step-down transformers..

Our preliminary estimate of service capacity is in the order of 300kVA however a dedicated 1500kVA transformer will be provided to allow for future unknown process loads.

The building connected load has been determined using the following allowances:

System	Connected load (W/sf)
Lighting	1.0
Small Power	2.5
Server room power	80
HVAC	6



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2.1.11.2 Electrical Distribution

The office areas will be served from two electrical riser locations in order to reduce cable lengths. The primary electrical riser will be located towards the east end of the building and will comprise a walk-in electrical closet on each floor. A second electrical riser will comprise panelboards located within the mechanical rooms at the west end of the building. Each panelboard will be separately cabled back to the main switchgear at level 1.

2.1.11.3 Low Voltage Distribution

Electricity will be distributed throughout the building from the main electrical room to electrical distribution panels on each floor. These will be located in the core area in a landlord riser/closet. Step down transformers to provide 208/120 Volt supplies will be centrally located in the ground floor electrical room.

The distribution panels on each floor will serve lighting, convenience power, and local mechanical equipment. Sub-metering together with a data gathering system will be provided so that the building owner can monitor electrical usage area by area and system by system (e.g. lighting, mechanical power etc.) as part of his ongoing strategy to minimize energy usage.

2.1.11.4 Small Power

Small power will be distributed to office and classroom/conference areas within the raised access floor. An underfloor plug-in busbar trunking system will allow flush floor outlet boxes to be plugged in at any location to suit furniture layouts. Outlet boxes will be two-compartment power/data.

2.1.11.5 Lighting

Lighting to circulation and back of house areas will be energy efficient and will generally be controlled by local occupancy sensors. Lamps will be compact fluorescent or T5 tubular fluorescent.

Lighting to office areas will be high efficiency tubular fluorescent with recessed or suspended fixtures to suit the ceiling design. These will be occupancy sensor controlled and will be dimmable with daylight sensing and control to take maximum advantage of available daylight.

Lighting in classrooms/conference rooms will again be dimmable fluorescent. A control system will allow for multiple pre-set scenes to suit presentations, video conferencing, etc. This control system will be capable



2.1 DETAILED DESCRIPTION

Office, Technical, and Education Building

of being interfaced with an AV control system which is outside of this scope.

2.1.11.6 Daylighting

Maximizing natural daylight within the building is essential for both physiological and energy efficiency reasons. LEED recognizes the benefits of daylight within buildings with two credits; one for achieving a good level of natural illumination internally and the other for maximizing views to the outside.

This needs to be balanced however with the functional requirements of the building.

Arrangements such as light shelves, skylights and light pipes to bring daylight as deep as possible into interiors will be studied further in final design.

2.1.11.7 External Lighting

The exterior of the building and the surrounding landscaping will require night lighting both for effect and for the safety of visitors. The design of this lighting is expected to be a collaboration between architect, and landscape designer. The lighting will be highly energy efficient, using LEDs where appropriate, and will enhance surfaces with no spill light into the night sky.

2.1.11.8 Lightning Protection

A lightning protection assessment will be conducted during the design development phase. If it is determined that lightning protection is to be provided, a UL Master Labeled system will be specified in accordance with NFPA 780. The system would comprise an air termination network at roof level. The building's structural reinforcement would form the down conductors and driven earth rods would form the ground termination network. The air termination network would be connected to the structural reinforcement system via disconnectable test joints at roof level. The lightning protection system would be bonded to the service main grounding system per Code.

2.1.11.9 Emergency Power Supply

Per code, a standby generator is not required for this building Any owner equipment requested to be supplied with a standby power supply, will require a dedicated battery back-up system



2.1 DETAILED DESCRIPTION

Office, Technical, and Education Building

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2.1.11.10 Emergency Lighting

Egress lighting and exit signs will be provided in accordance with National Electrical Code. The back-up power source for the emergency lighting system will be provided from integral emergency battery ballasts within specific light fixtures .

2.1.11.11 Fire Detection and Alarm

The fire alarm system will be a fully addressable system, and will be designed in conformance with NFPA 72.

The Fire Command station, consisting of the Fire Alarm Panel, Voice Communications Control Panel and Elevator Status Control Panel will be located in the ground floor entrance lobby.

Automatic smoke or heat detectors will be provided throughout the building. Manual pull stations will be located in areas that are supervised by staff to reduce the risk of malicious use. Alarms will be given by combined sounder/strobe units.

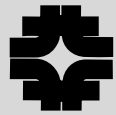
2.1.11.12 Elevators

All elevators will run on normal utility power only, , and will operate in a sequenced manner upon loss of utility power supply. Elevator recall will also be provided per Code, and will be triggered by the sprinkler flow detector of each floor zone. 4 hour battery lighting will be provided in each elevator cab, per Code.

2.1.11.13 Photovoltaics

Photovoltaic panels placed on the building or integrated into its façade can provide sustainable energy which both reduces the building's overall energy cost and contributes to the percentage of on-site renewable energy generation. Both of these factors contribute to the building's LEED rating.

PV panels will be considered for the project to contribute to LEED rating points and to offset the energy consumption of the building. Locations identified for possible location of PV panels include the roof of the existing building and as a shading canopy above the parking area.



2.2 PERFORMANCE REQUIREMENTS

Office, Technical, and Education Building

The performance requirements listed below describe the project specific requirements that exceed or are not addressed in the applicable building codes and standards requirements and referenced in Section 2.4, Quality Levels.

2.2.1 REFERENCE MATERIALS

Following are a list of project specific reference materials followed for the design of the OTE Building.

2.2.1.1 Fermilab Publications

- Designing for Maintenance Needs, FESS/Ops Standard, March 23, 2010
- A/E Consultant Handbook, FESS, April 2008
- CAD Standard Manual, FESS, April 2008
- Draft Programming Document V3, FESS, July 14, 2009
- Federal Publications
- Executive Order 13514—Federal Leadership in Environmental, Energy, and Economic Performance, October 8, 2009
- Executive Order 13423—Strengthening Federal Environmental, Energy, and Transportation Management, January 26, 2007
- Technical Support Document: 50% Energy Savings Design Technology Packages for Medium Office Buildings, Department of Energy, September 2009

2.2.1.2 Sustainable Design

- LEED 2009 for New Construction and Major Renovations Rating System, April 14, 2009
- High Performance and Sustainable Buildings Assessment and Compliance Tool for New Construction, Department of Energy



2.2 PERFORMANCE REQUIREMENTS

Office, Technical, and Education Building

2.2.2 GENERAL PROJECT REQUIREMENTS

The identified project requirements are listed below:

- 2.2.2.1 Disruption of on-going CDF and lab activities shall be kept to a minimum. Specific coordination with AD, PPD, TD and FESS-Ops is required.
- 2.2.2.2 Excessive vibration is not allowed. Specific coordination with AD, PPD, and TD is required.
- 2.2.2.3 Disruption of fire protection/life safety shall be kept to a minimum. Specific coordination with the Fire Department and building managers is required. Access to one exit on the west side of CDF shall be maintained at all times.
- 2.2.2.4 Fire Department personnel access will be maintained to the west (south) CDF entrance at all times.
- 2.2.2.5 Disruption of public traffic on Road D and the bike trail shall be kept to a minimum. Specific coordination with FESS-Services is required. Pedestrian access from the parking lot north of Road D to CDF shall be maintained.
- 2.2.2.6 Intermittent use of the west side loading ramp to CDF is required. Access shall be maintained.
- 2.2.2.7 Access for repair and maintenance to existing CDF utilities in the project area shall be maintained. This will include possible refueling of the generator.
- 2.2.2.8 LEED Gold certification will be achieved for this building and all work will be performed in compliance with the HPSB Guiding Principles.
- 2.2.2.9 All utilities shall be metered. Meters shall be programmable and capable of remote monitoring on an hourly basis and compatible with existing Johnson Controls Metasys.

2.1.1

2.1.2

2.1.3

2.1.4

2.1.5

2.1.6

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2.2 PERFORMANCE REQUIREMENTS

Office, Technical, and Education Building

2.2.3 SUSTAINABLE REQUIREMENTS

The project is designed to achieve LEED Gold certification and meet the DOE requirements in the High Performance and Sustainable Buildings Assessment and Compliance Tool for New Construction. Specific criteria for this project are as follows:

2.2.3.1 Site Design

The site design shall achieve the following objectives:

- Provide bicycle storage on site
- Provide changing rooms and showers
- Provide parking spaces for low-emitting and fuel efficient vehicles
- The parking lot capacity shall not exceed local or established ordinances
- The site shall be developed to enhance and restore local habitats with use of native and adaptive plant species
- The site design shall maximize open space
- The site design shall minimize stormwater runoff by reducing the amount of impervious surfaces and use of permeable pavements
- The design shall reduce the heat island effect by using a combination of reflective and vegetative roofs.
- The design shall reduce the heat island effect by the using a combination of reflective paving materials and shading.
- The exterior lighting design shall be minimized to provide illumination for safety, and all exterior fixtures shall have full optic cutoffs.

2.2.3.2 Water Efficiency

The project design shall achieve water use reductions of at least 30% by using:

- Dual flush, low flow water closets
- Low, metered pneumatic lavatory faucets
- Ultra low flow urinals
- Low flow shower heads
- Landscape design that eliminates irrigation



2.2 PERFORMANCE REQUIREMENTS

Office, Technical, and Education Building

2.2.3.3 Energy and Atmosphere

The project has been designed to achieve the following objectives:

- Energy savings of at least 34% according to energy modeling
- Allowances for the use of on site renewal energy sources such as photovoltaics and/or a wind turbine
- Use of solar water heating to achieve a minimum of 30% of the hot water needs of the building
- Metering of resources and building systems for measurement and verification purposes

2.2.3.4 Materials and Resources

The project design shall meet the following objectives:

- Require the contractor to develop, document and implement a Construction Waste Management plan
- Use a materials with recycled content
- Use materials that are available locally and regionally
- Use materials that are rapidly renewable
- Use wood products that meet certified harvesting and processing requirements

2.2.3.5 Indoor Environmental Quality

The project design meets or shall meet the following objectives:

- Meet minimum indoor air quality performance as defined by ASHRAE
- Provide outdoor air delivery monitoring
- Require the contractor to develop, document and implement a Indoor Air Quality Management plan
- Use low emitting adhesives and sealants
- Use low emitting paints and coatings
- Use low emitting flooring systems
- Use low emitting composite wood products
- Provide controls for lighting that include occupancy sensors and photocells
- Provide controls for the HVAC system to enhance thermal comfort
- Achieves exterior views for 90% of the occupants



2.2 PERFORMANCE REQUIREMENTS

Office, Technical, and Education Building

- Achieves daylighting for 75% of the occupied spaces

2.2.4 SITE AND UTILITIES

The identified project requirements for the Site and Utilities portion of the work are listed below:

- 2.2.4.1** No work will be performed on the beam shielding (berm). Specific coordination with AD-ES&H is required. All work will be coordinated with AD to assure properly controlled access to radiation areas and maintenance of radiation shielding.
- 2.2.4.2** The connection of the new utility lines to existing lines shall be scheduled to occur within the same narrow time frame to minimize impacts to operations in the Industrial Area.

2.2.5 STRUCTURAL

2.2.5.1 Gravity Loads

Specific concentrated loads to be determined include the following:

- Elevators
- Overhead doors at the Light Technical spaces
- 3-ton capacity crane in Light Technical spaces – either an overhead bridge crane or a mobile gantry crane, currently

2.2.5.2 Seismic Loading

2.1.7 The geotechnical reports for the project site identified specific seismic design criteria to be used are as follows:

Factor	Value	
Seismic Design Category	B	
Site Class	C	
Spectral Response Acceleration Parameters	S_S	0.22
	S_1	0.07
	S_{DS}	0.18
	S_{D1}	0.08



2.2.5.3 Truck and Impact Loading Criteria

2.1.8 Structural elements near the CDF loading dock driveways and ramp shall be designed for an impact load of 10 kips applied at a height of 2'-8" above the driving surface per the AASHTO Bridge Design Specification Chapt. 2.6 "Highway Clearances for Depressed Roadways".

2.2.5.4 Fire Resistance Rating

2.1.9 Spray-on fireproofing will be used on the primary floor structure as needed to achieve a fire resistance rating of one hour between the light tech space and the office above.

2.2.5.5 Materials

2.1.10 Based on the geotechnical reports and the project's structural design the following criteria shall be used in the building's construction.

Concrete	f'c (PSI)
Footings, grade beams,	4,000
Deep foundations	5,000
Slab on grade	4,000
Lightweight concrete slabs on metal deck	4,000
Equipment pads and curbs	2,000

Concrete Reinforcement	ASTM Designation	Fy (KSI)
Typical reinforcement	A615	60
Welded wire fabric	A185	Varies



2.2 PERFORMANCE REQUIREMENTS

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Steel	Designation	F _y (KSI)
Wide flange sections and tee sections	ASTM A992	50
Channels, angles, and plates	ASTM A36	36
Square and rectangular HSS	ASTM A500, Grade B	42
Pipes	ASTM A53, Grade B	35
Bolts	<i>TBD</i>	
Threaded rod anchor bolts	ASTM A572 Grade 50 U.O.N.	50
Welding electrodes	E70XX	
Metal deck	ASTM 653 SQ Grade 33	33

2.2.5.6 Structural Analysis

2.1.11 The following structural analysis programs were used in performing the structural design of the OTE building.

Structural Analysis Program	Usage
Microsoft Excel	General Structural Analysis
Autodesk Revit Structure	3D Modeling and Drafting of Structure
Oasys GSA	Finite Element Analysis of Building Superstructure and Substructure
RAM Structural System	Design and Analysis of select members



2.2 PERFORMANCE REQUIREMENTS

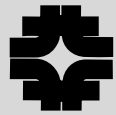
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2.2.6 MECHANICAL

2.2.6.1 Temperature/Occupancy Criteria

Interior spaces will be designed in accordance with the following criteria.

- Office Spaces
 - 2.1...1 Winter Design 72° F (±2)
 - 2.1...2 Summer Design 75° F(±2)/50% RH Maximum
 - 2.1...3 1 person/150 SF
- Tech
 - 2.1...1 Winter Design 72° F (±2)
 - 2.1...2 Summer Design 75° F(±2)/50% RH Maximum
 - 2.1...3 1 person/300 SF
- Lobbies
 - 2.1...1 Winter Design 72° F(±2)
 - 2.1...2 Summer Design 75° F(±2)/50% RH Maximum
 - 2.1...3 1 person/50 SF
- Classrooms and Conference Rooms
 - 2.1...1 Winter Design 72° F(±2)
 - 2.1...2 Summer Design 75° F(±2)/50% RH Maximum
 - 2.1...3 1 person/25 SF
- Lunch Room
 - 2.1...1 Winter Design 72° F(±2)
 - 2.1...2 Summer Design 75° F(±2)/50% RH Maximum
 - 2.1...3 1 person/25 SF
- Back of House (Mech/Elec rooms)
 - 2.1...1 Winter Design 60° F(±2)
 - 2.1...2 Summer Design – No Cooling
 - 2.1...3 Unoccupied



2.2.6.2 Building Envelope

2.1.12 The following minimum criteria shall be used for the selection of the building envelope components.

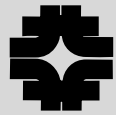
- Roof – Maximum $U=0.033$ Btu/sf*°F (R=30 or better)
- Exterior Walls – Maximum $U=0.05$ Btu/sf*°F (R=20 or better)
- Vision Glass
 - 2.1...1 Shading Coefficient – Maximum 0.32
 - 2.1...2 U-Value 0.29 Btu/sf*°F (Center of Glass)
 - 2.1...3 U-Value 0.35 Btu/sf*°F (Overall glass/frame combined)
- Spandrel Glass
 - 2.1...1 Shading Coefficient – Maximum 0.32
 - 2.1...2 U-Value 0.05 Btu/sf*°F
 - 2.1...3 U-Value 0.10 Btu/sf*°F (Overall glass/frame combined)

2.2.6.3 Building Automation System (BAS) and Control System

A full Building Automation System (BAS) will be required for the project. The system will be capable of providing the following controls:

- HVAC Central Cooling System
- HVAC Central Heating System
- HVAC Air Handling Systems
- Exhaust Systems
- Lighting Systems
- Domestic Water
- Life Safety Monitoring
- Renewable Energy Systems
- Monitor Water Re-use strategies

A full DDC Building Energy Management Control System (BMS) will be provided. Equipment and software will be specified to match Fermilab



2.2 PERFORMANCE REQUIREMENTS

Office, Technical, and Education Building

standards. The following items of equipment will be monitored and/or controlled:

- All central HVAC equipment such as air handling units, chillers, boilers, pumps and exhaust fans.
- All decentralized HVAC equipment such as variable air volume units, reheat coils, thermostats, metering, air and water temperature sensors and system pressures.
- Trending output reporting estimated peak KWHR demand and estimated BTU use of previous day and quarterly reports of energy bills, energy use of EPA lease space and shared common areas.
- Light control systems.

2.2.7 PLUMBING

- 2.2.7.1** Water closets will be vitreous china siphon jet wall hung water-conserving 1.28 gallon flushometer type, with manual operation.
- 2.2.7.2** Urinals will be vitreous china, wall hung, siphon jet water-conserving 0.125 gallon flushometer type, with manual operation.
- 2.2.7.3** Public lavatories will be provided with 0.5 gpm flow restrictors using manually operated self-closing faucets.
- 2.2.7.4** Drinking fountains will have integral chiller units.

2.2.8 ELECTRICAL

2.2.8.1 Power Criteria

Interior spaces will be designed in accordance with the following criteria.

- Office Space
 - 2.1...1** Lighting 1.0 Watts/SF
 - 2.1...2** Equipment 1 Computer/Person
 - 2.1...3** Miscellaneous Equipment – 0.5 Watts/SF
- Light Technical
 - 2.1...1** Lighting - 5.0 Watts/SF
 - 2.1...2** Computers - 1 Per Person (150 Watts)



2.2 PERFORMANCE REQUIREMENTS

Office, Technical, and Education Building

- **2.1...3** Miscellaneous Equipment – 0.5 Watts/SF
- Lobby/Exhibit
 - 2.1...1** Lighting 1.0 Watts/SF
 - 2.1...2** Miscellaneous Equipment – 0.5 Watts/SF
- Classrooms and Conference Rooms
 - 2.1...1** Lighting 1.0 Watts/SF
 - 2.1...2** Computers 1 Per Person (150 Watts)
 - 2.1...3** Miscellaneous Equipment – 1.5 Watts/SF
- Lunch Room
 - 2.1...1** Lighting – 1.4 Watts/SF
 - 2.1...2** Miscellaneous Equipment – 1.5 Watts/SF
- Back of House (Mech/Elec rooms)
 - 2.1...1** Lighting 1.0 Watts/SF

2.2.8.2 Lighting Levels

Lighting levels are based on industry standards, and are outlined below:

Occupied Space	Recommended Lighting Level (fc)
Open Office Areas	40-50
Private Offices	50
Lobbies / Reception	15
Corridors	10
Classrooms	50-60
Technology Room	50-75
Print / Copy Rooms	15

2.2.8.3 Electrical Equipment

Major pieces of exterior electrical equipment, such as air switches and transformers, shall be located 25-feet from the building.

2.2.9 FIRE PROTECTION



2.2 PERFORMANCE REQUIREMENTS

Office, Technical, and Education Building

- 2.2.9.1 Work involving the ICW shall not interrupt fire suppression systems to existing buildings subject to coordination with the Fire Department and building managers.
- 2.2.9.2 The CDF building manager shall be informed of any work on ICW or communication lines.
- 2.2.9.3 Work involving the communication lines shall not interrupt fire alarm service to existing buildings subject to coordination with the Fire Department and building managers

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2.2.10 BUILDING SYSTEMS EVALUATIONS

- 2.1.13 The mechanical systems for the building have been selected to integrate with the architecture of the building and the desire for energy efficiency. To meet the goal of designing to LEED Gold and beating ASHRAE 90.1 targets by a minimum of 30% the selected system consists of a Geothermal well field and a central Chiller/Heater which will provide both cooling and heating as needed. Although the cost of this system is anticipated to be higher than a more typical office building system of a packaged rooftop unit, the system will have a longer useful life and is expected to require lower operating and maintenance budgets.
- 2.1.14 Consideration was also given to utilizing the site's Industrial Cooling Water (ICW) in lieu of the geothermal well field. However, it was determined that utilizing the ICW will result in higher energy costs due to large fluctuations in the temperature of the ICW system (80F summer/36F winter) vs a more consistent geothermal temperature range of 55F to 65F.
- 2.1.15 To reduce the maintenance and operational expense central indoor VAV air handling units were selected to provide primary heating, cooling and ventilation requirements as opposed to distributed heat pumps with localized compressors. This also allowed the building design to utilize a lower floor to floor height and reduced envelope loads.

2.2.11 Energy Conservation Strategies

The project is designed for low energy consumption. The minimum target for energy conservation is to exceed ASHRAE Standard 90.1 by greater than 30%. To accomplish this we anticipate incorporating the following strategies.

- Geothermal well field or Industrial Cooling Water as heat sink



2.2 PERFORMANCE REQUIREMENTS

Office, Technical, and Education Building

- Exterior Building Shading to reduce solar loads
- High Efficiency Condensing Boilers
- Building oriented on the East-West axis to reduce solar loads
- High performance Glazing and building components
- Extensive use of Daylight and Daylighting Controls
- Solar Thermal domestic water heating
- Possible use of renewable energy (Photovoltaics or wind turbine)
- Variable Frequency drives on pumps and air handling units

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2.2.12 Life Cycle Cost Analysis

2.1.16 A preliminary Life Cycle Cost (LCC) analysis was performed comparing heat rejection options of the proposed Geothermal field, a conventional cooling tower/boiler system, and use of the Industrial Cooling Water (ICW) system. The baseline system of VAV rooftop units was not used for the LCC since it would not meet the requirement for 30% savings over ASHRAE 90.1. Consideration was also given to a system of distributed heat pumps in lieu of a central system but was not included in the LCC since it had both a higher energy usage and a higher installation cost.

2.1.17 Based on the LCC the design team's recommendation is to utilize the central heat pump system with a geothermal field and a back-up boiler. While the LCC shows this as having a higher life cycle cost it is the system which will meet project goals of low energy use and exceeds the minimum 30% savings over ASHRAE 90.1. However, during design development this should be re-visited since the systems are close in energy usage. If other building energy savings can be included in the project including possible use of renewable energy, then one of the lower first cost alternative can be utilized and still meet the project requirements.

2.1.18 Several assumptions were necessary in the preliminary LCC analysis. The owner should confirm the economic indices used for the analysis are appropriate. The system operation of the systems are similar with the exception of the heat rejection methodology. For the LCC increased maintenance was included for annual cooling tower maintenance and semi-annual cleaning of the ICW heat exchanger.

2.1.19 For the purpose of the LCC the following cost estimates were used:

- Geothermal Field installed cost - \$3000 per ton
- Cooling Tower Installed Cost - \$40,000 (includes strainer)



2.2 PERFORMANCE REQUIREMENTS

Office, Technical, and Education Building

- Cooling Tower Maintenance - \$1,500 Annually
- ICW Heat exchanger Installed Cost - \$25,000 Annually
- ICW maintenance \$3,000 Annually

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2.3 ADJUNCT REQUIREMENTS AND ASSESSMENTS

Office, Technical, and Education Building

2.3.1 SAFEGUARDS AND SECURITY

Direction for security issues related to the design of this project is taken from the current operating procedures of the Fermilab activities.

Access to the site areas outside any beam line excavation limits will be allowed during normal business working hours. Access to any radiological areas, areas in the area of the existing beam lines, are controlled by the Accelerator Division Radiation Safety and will require coordination of work efforts and beam line operations. GERT training will be required for all personnel that enter the berm area.

CDF is a controlled access building. Access to the controlled areas during normal working hours will be controlled by the Particle Physics Division's system of restricted identification card access. An identification badge is required for access to the building.

Access to utilities during normal working hours will be controlled by a FESS construction coordinator.

2.3.2 HEALTH AND SAFETY

All aspects of the project will be evaluated to ensure that the adequate health and safety precautions are incorporated in the design and construction of this project.

2.3.3 ENVIRONMENTAL PROTECTION

The overall environmental impact of this project will be evaluated and reviewed as required to conform to all applicable portions of the National Environmental Policy Act (NEPA). A Storm Water Pollution Prevention Plan and Notice of Intent to discharge water under the Illinois General Permit for Construction Activities will be required.

2.3.4 DECONTAMINATION AND DECOMMISSIONING

Decontamination and decommissioning procedures are an important part of Fermilab environment, safety and health policies. These policies are described in Chapter 8070 of the Fermilab Environment, Safety and Health Manual. Appropriate decontamination and decommissioning procedures will be instituted for this project.



2.3 ADJUNCT REQUIREMENTS AND ASSESSMENTS

Office, Technical, and Education Building

2.3.5 TELECOMMUNICATIONS

Telecommunication systems will be installed as part of this project.

2.3.6 COMPUTER EQUIPMENT

No computer equipment will be installed as part of this project.

2.3.7 ACCESSIBILITY PROVISIONS

The applicable requirements of the *Architectural Barriers Act (ABA)* and the *ADA and ABA Accessibility Guidelines* will be incorporated into the design of this project. The building, parking lot and routes to those areas served by the parking lot will be designed in full compliance with the existing statutes.

2.3.8 EMERGENCY SHELTER PROVISIONS

During construction, the existing emergency shelter in CDF will be utilized for this project during normal working hours

2.3.9 SPACE MANAGEMENT REQUIREMENTS

Offset space will not be required per FNAL Space Waiver(Oct2009).xls/DOE Bank 2002_2009_091112.xls.

2.3.10 COMMISSIONING

Commissioning of the facility will be required per LEED Gold requirements. A detailed commissioning plan will be developed during the design phase and incorporated into the construction documents.



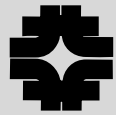
2.4 QUALITY LEVELS

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The design of this project will be in accordance with recognized architectural and engineering practice and will comply with the applicable portions of the U.S. Department of Energy and the State of Illinois codes, orders and regulations as incorporated into contract No. DE-AC02-07CH11359 between the U.S. Department of Energy and Fermi Research Alliance, LLC. A URL link to the contract is included in Appendix B of this document.

Fermilab has adopted the Necessary and Sufficient Process (NSP) for determining the Work Smart Set (WSS) of Standards which are used to determine the appropriate environment, safety and health standards used to ensure the safe and environmentally responsible operations of the Laboratory. The Work Smart Set in effect for this project is included in Appendix B of this Project Plan. Where no edition or “latest edition” is noted on the Work Smart Set, it is assumed that the edition in effect at the time of the acceptance of this Project Plan will be used.

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2.5 COST ESTIMATE

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The Baseline Project Costs includes the costs associated with Engineering, Design, Contingency and Indirect Costs.

The estimated construction costs are based on cost data taken from Means Cost Estimating Guides, historical data and recent construction history at Fermilab. While the suggested project budget can provide input for the feasibility of the project, further design refinement will affect the final cost of the project. However, it is recognized that the final cost shall not exceed the project budget.

DOE Directive G430.1-1, Chapter 11 was used as guidance in estimating the appropriate Contingency for this project for costs not governed by the State limitation as established by the State line-item DCEO Budget Amount.

Indirect Costs rates are defined by DOE Order 4700.1 that states indirect costs are "...costs incurred by an organization for common or joint objectives and which cannot be identified specifically with a particular activity or project." The multipliers used in this document are based on current Fermilab rates.

The costs contained in the estimates listed above are based on FY2011 dollars. Cost estimates have been escalated to the midpoint of construction.

DOE Guide 430.1-1X, *DOE Cost Estimating Guide for Program and Project Management* classifies cost estimates into one (1) of five (5) categories. These classifications are listed below in figure 8:



2.5 COST ESTIMATE

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Cost Estimate Classification	Primary Characteristics	
	Level of Definition (% of Complete Definition)	Cost Estimating Description (Techniques)
Class 5, Order of Magnitude	0% to 2%	Stochastic, most parametric, judgment (parametric, specific analogy, expert opinion, trend analysis)
Class 4, Intermediate	1% to 15%	Various, more parametric (parametric, specific analogy, expert opinion, trend analysis)
Class 3, Preliminary	10% to 40%	Various, including combinations (detailed, unit-cost, or activity-based; parametric; specific analogy; expert opinion; trend analysis)
Class 2, Intermediate	30% to 70%	Various, more definitive (detailed, unit-cost, or activity-based; expert opinion; learning curve)
Class 1, Definitive	50% to 100%	Deterministic, most definitive (detailed, unit-cost, or activity-based; expert opinion; learning curve)

Figure 8 - Cost Estimate Classifications

These classifications are based on the Association for the Advanced of Cost Engineering (AACE) Recommended Practice No. 18R-97. These classifications help ensure that the quality of the cost estimate is appropriately considered when applying escalation and contingency.

The classification for the cost estimates contained in this conceptual design report is considered a Class 3 (Preliminary) based on the preliminary nature and level of definition of the programmatic requirements.



2.5 COST ESTIMATE

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FERMILAB - FESS/E CONSTRUCTION COST ESTIMATE					
ESTIMATED SUBCONTRACT AWARD AMOUNT					\$14,056,123
Subcontractor Overhead and Profit				18%	\$ 2,055,095
Escalation				5.4%	\$ 583,834
Difficult Conditions				5.6%	\$ 605,457
Subcontract Base Amount					\$10,811,737
Project Title: Office, Technical and Education (OTE) Building		Project No:	Status:	Date:	Revision Date:
Funding: State + DOE		10-8-01	CDR	July 24, 2010	4-Oct-10
ITEM NO.	DESCRIPTION OF WORK:	QUANTITY	UNITS	UNIT COST	AMOUNT
A	SUBSTRUCTURE	\$382,294			
A1010	Foundations				
	Foundation underdrain, outside only, porous concrete, 6" diameter	1,000	L.F.	\$15.85	\$15,850.00
	Foundation dampproofing, asphalt coated board and mastic, 1/4" thick, 4' high	1,000	L.F.	\$10.26	\$10,260.00
	Frost beam, 12" wide	600	L.F.	\$45.50	\$27,300.00
	Spread footings, 3000 PSI concrete, load 300K, soil bearing capacity 3 KSF, 10' - 6" square x 25" deep	13	Ea.	\$2,825.00	\$36,725.00
	Spread footings, 3000 PSI concrete, load 1200K, soil bearing capacity 6 KSF, 15' - 0" square x 48" deep	6	Ea.	\$9,400.00	\$56,400.00
	Spread footings, 3000 PSI concrete, load 900K, soil bearing capacity 3 KSF, 19' - 0" square x 40" deep	1	Ea.	\$13,275.00	\$13,275.00
A1020	Special Foundations				
	Caisson, wet ground, 3000 PSI concrete, 10 KSF bearing, 800K load, 3' - 0" x 70' - 0"	8	Ea.	\$10,150.00	\$81,200.00
	Grade beam, 40' span, 40" deep, 12" wide, 2 KLF load	200	L.F.	\$127.50	\$25,500.00
A1030	Slab-on-grade				
	Slab on grade, 6" thick, non industrial, reinforced	9,745	S.F.	\$5.94	\$57,885.30
	Slab on grade, 12" thick, heavy industrial, reinforced	5,665	S.F.	\$9.35	\$52,967.75
A2010	Excavation				
	Excavate and fill, 10,000 SF, 4' deep, sand gravel, or	15,410	S.F.	\$0.32	\$4,931.20
B	SHELL	\$3,911,104			
B1010	Floor & Roof Construction				
	Structural Steel	570	ton	\$2,400.00	\$1,368,000.00
	Floor, metal deck, 18 ga, 3" deep, concrete slab, 11' span, 5" deep, 125 PSF superimposed load, 169 PSF total load	52,500	S.F.	\$8.52	\$447,300.00
B2010	Exterior Walls				
	Metal stud partition, non-load bearing, galvanized, 12"high, 6" wide, 20 gauge, 16" O.C., includes top & bottom track	23,000	S.F.	\$2.77	\$63,710.00
	Blanket insulation, for walls or ceilings, foil faced fiberglass, 6" thick, R19, 15" wide	23,000	S.F.	\$1.35	\$31,050.00
	Sheathing, plywood, CDX, 1/2" thick	23,000	S.F.	\$1.37	\$31,510.00
	Vapor Retarders, building paper, polyethylene vapor barrier, standard, .010" thick	230	Sq.	\$25.00	\$5,750.00
	Metal siding, steel, corrugated or ribbed, 20 ga, .0359" thick, colored	11,000	S.F.	\$9.14	\$100,540.00
	Metal siding, steel, sandwich panels, factory fabricated, 2" polystyrene, steel core, 22 ga, baked enamel	12,200	S.F.	\$19.45	\$237,290.00
	Metal siding, steel, sandwich panels, factory fabricated, 2" polystyrene, steel core, 22 ga, baked enamel	7,800	S.F.	\$19.45	\$151,710.00
B2020	Exterior Windows				
	Aluminum flush tube frame, thermo-break frame, 2.25" x 4.5", 5' x 20' opening, 3 intermediate horizontals	8,600	S.F.	\$28.25	\$242,950.00
	Glazing panel, insulating, 1" thick units, 2 lites, light and heat reflective glass, tinted	8,600	S.F.	\$46.80	\$402,480.00
	Windows, aluminum, sliding, insulated glass, 8' x 4'	305	Ea.	\$870.00	\$265,350.00
	Windows, aluminum, picture unit, insulated glass, 2'-8" x 6'-	15	Ea.	\$885.00	\$13,275.00
	Screens, vertical shading devices	165	Ea.	\$619.29	\$102,182.85



2.5 COST ESTIMATE

Office, Technical, and Education Building

**Conceptual
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FERMILAB - FESS/E CONSTRUCTION COST ESTIMATE					
ESTIMATED SUBCONTRACT AWARD AMOUNT					\$14,056,123
Subcontractor Overhead and Profit				18%	\$ 2,055,095
Escalation				5.4%	\$ 583,834
Difficult Conditions				5.6%	\$ 605,457
Subcontract Base Amount					\$10,811,737
Project Title: Office, Technical and Education (OTE) Building		Project No.:	Status:	Date:	Revision Date:
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ITEM NO.	DESCRIPTION OF WORK:	QUANTITY	UNITS	UNIT COST	AMOUNT
	Screens, horizontal shading devices	550	L.F.	\$88.47	\$48,658.50
	Window film, graphic	4,900	S.F.	\$10.00	\$49,000.00
B2030	Exterior Doors				
	Door, aluminum & glass, revolving, stock design, maximum, 6'-10" x 7'-0" opening	1	Opng.	\$49,600.00	\$49,600.00
	Door, aluminum & glass, without transom, full vision, hardware, 3'-0" x 7'-0" opening	4	Opng.	\$4,175.00	\$16,700.00
	Door, aluminum & glass, without transom, full vision, double door, hardware, 6'-0" x 7'-0" opening	2	Opng.	\$5,900.00	\$11,800.00
	Door, steel 18 gauge, hollow metal, 1 door with frame, no label, 3'-0" x 7'-0" opening	8	Opng.	\$1,640.00	\$13,120.00
	Door, steel 18 gauge, hollow metal, 1 door with frame, "A" label, 3'-0" x 7'-0" opening	2	Opng.	\$1,975.00	\$3,950.00
	Door, steel, overhead, rolling, electric operator, 12'-0" x 12'-0" opening	4	Opng.	\$4,900.00	\$19,600.00
B3010	Roof Covering				
	Roofing, single ply membrane, reinforced, PVC, 60 mils, fully adhered, adhesive	22,400	S.F.	\$2.89	\$64,736.00
	Insulation, rigid, roof deck, extruded polystyrene, 60 PSI compressive strength, 4" thick, R20	22,400	S.F.	\$3.15	\$70,560.00
	Outdoor seating, Wood deck, 4" thick, cedar	3,575	S.F.	\$2.69	\$9,616.75
	Green roof systems, hoist and spread soil mixture 6 inch depth up to five stories tall roof	3,575	S.F.	\$2.48	\$8,866.00
	Green roof systems, planting sedum mat, per SF, includes planting only, 4000 SF minimum	3,575	S.F.	\$7.35	\$26,276.25
	Base flashing, aluminum, .050" thick, mill finish, .025" aluminum reglet, .032" counter flashing	1,400	L.F.	\$30.75	\$43,050.00
	Roof edges, aluminum, mill finish, .050" thick, 8" face	400	L.F.	\$27.80	\$11,120.00
	Roof hatch, with curb, 1" fiberglass insulation, 2'-6" x 3'-0", aluminum	1	Opng.	\$1,353.00	\$1,353.00
03	INTERIORS	\$1,876,852			
C1010	Partitions				
	Metal partition, 5/8" fire rated gypsum board face, 3-5/8" @ 24", 3.5" fiberglass insulation	22,000	S.F.	\$6.79	\$149,380.00
	Gypsum wallboard, on walls, standard, w/compound skim coat (level 5 finish), 1/2" thick	23,000	S.F.	\$1.95	\$44,850.00
	Storefront Systems, aluminum frame, monumental grade, clear 3/8" plate glass, 3' x 7' door with hardware, 400 SF	730	S.F.	\$48.00	\$35,040.00
	Fire Glass	730	S.F.	\$64.00	\$46,720.00
	Classrooms, Acoustic partitions, operable, with track, 3"	1,910	S.F.	\$101.75	\$194,342.50
	Tech space, Acoustic partitions, operable, with track, 3"	1,770	S.F.	\$101.75	\$180,097.50
C1020	Interior Doors				
	Labeled metal door/metal frame, hollow, 3 hr, 18 ga full panel, 2'-8" x 7'-0", KD frame, 5-3/4"	1	Ea.	\$1,085.00	\$1,085.00
	Labeled metal door/metal frame, hollow, 3 hr, 18 ga full panel, 6'-0" x 7'-0", KD frame, 5-3/4"	1	Ea.	\$1,830.00	\$1,830.00
	Wood fire door, metal frame, 1hr, 3 ply core, 1-3/4" thick, birch face, 3/0 x 7/0 (wxh)	7	Ea.	\$850.00	\$5,950.00



2.5 COST ESTIMATE

Office, Technical, and Education Building

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Escalation				5.4%	\$ 583,834
Difficult Conditions				5.6%	\$ 605,457
Subcontract Base Amount					\$10,811,737
Project Title: Office, Technical and Education (OTE) Building		Project No.	Status:	Date:	Revision Date:
Funding: State + DOE		10-8-01	CDR	July 24, 2010	4-Oct-10
ITEM NO.	DESCRIPTION OF WORK:	QUANTITY	UNITS	UNIT COST	AMOUNT
	Wood fire door, metal frame, 1.5 hr, 3 ply core, 1-3/4" thick, birch face, 3/0 x 7/0 (wxh)	1	Ea.	\$845.00	\$845.00
	Wood door/wood frame, solid core/flush type, birch face, 2'-8" x 6'-8", pine frame, 3-5/8"	42	Ea.	\$601.00	\$25,242.00
	Hinges, full mortise, high frequency, steel base, 5" x 5" USP	52	Ea.	\$29.00	\$1,508.00
	Locksets, heavy duty cylindrical, non-keyed, privacy	40	Ea.	\$118.50	\$4,740.00
	Closers, rack & pinion, adjustable backcheck, 4 way mount, hold open arm	52	Ea.	\$335.00	\$17,420.00
	Push, pull handle, push bar, aluminum	12	Ea.	\$193.00	\$2,316.00
	Panic devices, narrow stile, bar and concealed rod, exit only	14	Ea.	\$1,008.00	\$14,112.00
C1030	Fittings				
	Toilet partitions, cubicles, ceiling hung, stainless steel	9	Unit	\$2,220.00	\$19,980.00
	Toilet partitions, cubicles, ceiling hung, handicap addition	6	Unit	\$420.00	\$2,520.00
	Urinal screens, floor mounted, 24" wide, stainless steel	3	Unit	\$760.00	\$2,280.00
	Shower stall, single wall, fiberglass, 2'-8" x 2'-8"	2	Ea.	\$1,085.00	\$2,170.00
	Lockers, two tier, maximum	20	Ea.	\$146.50	\$2,930.00
	Signs, interior electric exit sign, wall mounted, 6"	15	Ea.	\$204.00	\$3,060.00
	Directory boards, outdoor, black plastic, 36" x 24"	1	Ea.	\$1,430.00	\$1,430.00
	Chalkboards, sliding board, 1 board with back panel	600	S.F.	\$46.72	\$28,032.00
	Bathroom accessories, stainless steel, curtain rod, 5' long,	2	Ea.	\$88.00	\$176.00
	Bathroom accessories, stainless steel, towel dispenser,	12	Ea.	\$489.00	\$5,868.00
	Bathroom accessories, stainless steel, grab bar, 1-1/2"	96	L.F.	\$78.50	\$7,536.00
	Bathroom accessories, stainless steel, mirror, framed, with shelf, 72" x 24"	12	Ea.	\$511.00	\$6,132.00
	Bathroom accessories, stainless steel, toilet tissue dispenser, surface mounted, double roll	18	Ea.	\$52.00	\$936.00
	Bathroom accessories, stainless steel, towel bar, 30" long	2	Ea.	\$138.50	\$277.00
C2010	Stair Construction				
	Stairs, steel, cement filled metal pan & picket rail, 24 risers,	4	Flight	\$22,400.00	\$89,600.00
	Stairs, steel, cement filled metal pan & picket rail, 12 risers, w/o landing	2	Flight	\$9,550.00	\$19,100.00
C3010	Wall Finishes				
	Painting, interior on plaster and drywall, brushwork, primer & 3 coats	67,000	S.F.	\$1.60	\$107,200.00
	Ceramic tile, thin set, 4-1/4" x 4-1/4"	4,000	S.F.	\$8.07	\$32,280.00
C3020	Floor Finishes				
	Access floors, office application, steel panels, no covering, to 8" high, over 6,000 sf	29,000	S.F.	\$10.23	\$296,670.00
	Carpet tile, nylon, fusion bonded, 18" x 18" or 24" x 24", 42 oz	27,300	S.F.	\$6.20	\$169,260.00
	Polyurethane, thermoset, maximum	4820	S.F.	\$17.45	\$84,109.00
	Tile, porcelain type, maximum	1,200	S.F.	\$13.60	\$16,320.00
	Vinyl sheet goods, maximum	2,800	S.F.	\$9.22	\$25,816.00
	Composition flooring, epoxy terrazzo, maximum	2,100	S.F.	\$17.50	\$36,750.00
	Integral topping and finish, 1:1:2 mix, 1/2" thick	8,000	S.F.	\$3.44	\$27,520.00



2.5 COST ESTIMATE

Office, Technical, and Education Building

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Project Title: Office, Technical and Education (OTE) Building		Project No:	Status:	Date:	Revision Date:
Funding: State + DOE		10-8-01	CDR	July 24, 2010	4-Oct-10
ITEM NO.	DESCRIPTION OF WORK:	QUANTITY	UNITS	UNIT COST	AMOUNT
C3030	Ceiling Finishes				
	Acoustic ceilings, 3/4" fiberglass board, 24" x 24" tile, tee grid, suspended support	27,300	S.F.	\$5.01	\$136,773.00
	Gypsum board ceilings, 1/2" fire rated gypsum board, painted finish, 1-5/8" metal stud furring, 24" OC support	6,300	S.F.	\$4.23	\$26,649.00
D	BUILDING SYSTEMS				\$3,316,745
D1010	Conveying				
	Hydraulic, passenger elevator, 3500 lb, 5 floors, 100 FPM	3	Ea.	\$143,900.00	\$431,700.00
D2020	Plumbing Fixtures				
	Water closets, battery mount, wall hung, side by side, first closet	5	Ea.	\$2,140.00	\$10,700.00
	Water closets, battery mount, wall hung, side by side, each additional water closet, add	12	Ea.	\$1,990.00	\$23,880.00
	Urinal, vitreous china, wall hung	3	Ea.	\$1,365.00	\$4,095.00
	Lavatory w/trim, wall hung, PE on CI, 19" x 17"	14	Ea.	\$1,620.00	\$22,680.00
	Service sink w/trim, PE on CI, corner floor, 28" x 28", w/rim guard	3	Ea.	\$2,550.00	\$7,650.00
	Shower, stall, baked enamel, terrazzo receptor, 36" square	2	Ea.	\$2,450.00	\$4,900.00
	Drinking fountain, 1 bubbler, wall mounted, full recessed, stainless steel	6	Ea.	\$1,655.00	\$9,930.00
	Supporting Piping	1	LS	\$50,830.00	\$50,830.00
D2020	Domestic Water Distribution				
	Solar, draindown, 3/4" tubing, 3 each 3' x 7' flat collectors, 120 gal tank	1	Ea.	\$11,700.00	\$11,700.00
	Gas fired water heater, commercial, 100< F rise, 75.5 MBH input, 63 GPH	1	Ea.	\$4,875.00	\$4,875.00
D2020	Additional Utilities				
	Water distribution piping, copper tubing, type K, 1-1/2" diameter, excludes excavation and backfill	280	L.F.	\$23.54	\$6,591.20
	Pump, pressure booster system, 5 HP pump, includes diaphragm tank, control and pressure switch	3	Ea.	\$8,400.00	\$25,200.00
	Drainage and sewage piping, 4" diameter, PVC SDR-35, excavation and backfill excluded	140	L.F.	\$5.02	\$702.80
	Gas service piping, 1" diameter, steel, Sch 40, plain ends, excavation and backfill excluded	140	L.F.	\$15.15	\$2,121.00
D2040	Rain Water Discharge				
	Roof drain, steel galv sch 40 grooved, 5" diam piping, 10' high	7	Ea.	\$2,825.00	\$19,775.00
	Roof drain, steel galv sch 40 threaded, 5" diam piping, for each additional foot add	200	Ea.	\$73.00	\$14,600.00
D3020	HVAC System				
	AHUS, Heat Pumps, Ventilation	43,600	S.F.	\$29.00	\$1,264,400.00
D4010	Fire Suppression				
	Wet pipe sprinkler systems, steel, ordinary hazard, 1 floor, 10,000 SF	14,600	S.F.	\$4.12	\$60,152.00
	Wet pipe sprinkler systems, steel, ordinary hazard, each additional floor, 10,000 SF	29,000	S.F.	\$3.47	\$100,630.00
D4020	Standpipes				



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ITEM NO.	DESCRIPTION OF WORK:	QUANTITY	UNITS	UNIT COST	AMOUNT
	Wet standpipe risers, class III, steel, black, sch 40, 4" diam pipe, 1 floor	1	Floor	\$7,250.00	\$7,250.00
	Wet standpipe risers, class III, steel, black, sch 40, 4" diam pipe, additional floors	2	Floor	\$1,650.00	\$3,300.00
D5010	Electrical Service/Distribution				
	Service installation, includes breakers, metering, 20' conduit & wire, 3 phase, 4 wire, 120/208 V, 600 A	5	Ea.	\$12,975.00	\$64,875.00
	Feeder installation 600 V, including RGS conduit and XHHW wire, 1000 A	150	L.F.	\$324.00	\$48,600.00
	Switchgear installation, incl switchboard, panels & circuit breaker, 1600 A	1	Ea.	\$44,400.00	\$44,400.00
D5020	Lighting and Branch Wiring				
	Receptacle systems, conduit system with floor boxes, high	43,600	S.F.	\$4.45	\$194,020.00
	Wall switches, 5.0 per 1000 SF	43,600	S.F.	\$1.35	\$58,860.00
	Miscellaneous power, to .5 watts	38,800	S.F.	\$0.16	\$6,208.00
	Miscellaneous power, 3 watts	4,800	S.F.	\$0.84	\$4,032.00
	Central air conditioning power, 1 watt	43,600	S.F.	\$0.36	\$15,696.00
	Fluorescent fixtures, type D, 34 fixtures per 2000 SF	43,600	S.F.	\$10.40	\$453,440.00
D5030	Communications and Security				
	Telephone wiring for offices & laboratories, 8 jacks/MSF	43,600	S.F.	\$3.52	\$153,472.00
	Communication and alarm systems, fire detection,	1	Ea.	\$38,600.00	\$38,600.00
	Fire alarm control panel, 8 zone	1	Ea.	\$2,085.00	\$2,085.00
	Fire alarm command center, addressable without voice	1	Ea.	\$3,700.00	\$3,700.00
	Internet wiring, 8 data/voice outlets per 1000 S.F.	44	M.S.F.	\$2,820.00	\$124,080.00
D5090	Other Electrical Systems				
	Uninterruptible power supply, charger, inverter, and alarm 1 phase, 120 V, 15 kVA, incl 10 minutes battery	1	Ea.	\$17,015.00	\$17,015.00
E	EQUIPMENT AND FURNISHING				\$147,199
E2010	Fixed Furnishings				
	Furnishings, shades, mylar, wood roller, single layer, non-reflective	18,300	S.F.	\$7.57	\$138,531.00
	Furnishings, floor mats, link-including nosings, steel-galvanized, 3/8" thick	400	S.F.	\$21.67	\$8,668.00
F	SITE WORK				\$1,177,542
F2010	Site Improvements				
	Demo, bike path	844	SY	\$8.05	\$6,797.71
	Relocate chiller	1	Ea.	\$13,500.00	\$13,500.00
	Micellaneous equipment pads, structural concrete, in place, equipment pad, 3' x 3' x 6", includes forms, reinforcing steel, concrete, and finishing	6	EA	\$2,135.00	\$12,810.00
	Site grading	9,753.98	SY	\$2.42	\$23,604.63
	Sidewalk, 6" thick concrete, 6" gravel base, 6' wide	100	LF	\$41.03	\$4,102.50
	Bike Path, 6" thick concrete, 6" gravel base, 8' wide	1,000	LF	\$54.70	\$54,700.00
	Parking and other pavement, 6" permeable paving system	35,954	SF	\$12.53	\$450,501.64
	Site lighting, solar, 72 W	5	EA	\$8,350.00	\$41,750.00
	Light pole, aluminum, 20' high, 1 arm bracket	2	EA	\$2,035.00	\$4,070.00
	Light pole, aluminum, 20' high, 2 arm brackets	3	EA	\$2,135.00	\$6,405.00



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ITEM NO.	DESCRIPTION OF WORK:	QUANTITY	UNITS	UNIT COST	AMOUNT
	Painted pavement markings, acrylic waterborne, white or yellow, 4" wide	1,300	LF	\$0.45	\$585.00
	Specialties, flagpole, aluminum, tapered, 70' high	3	EA	\$2,135.00	\$6,405.00
F2010	Landscaping				
	Planting beds preparation, excavate planting pit, heavy soil or clay	700	CY	\$11.00	\$7,700.00
	Deciduous trees, maple, red, B & B, 8' - 10', 1-1/2" caliper, in prepared beds	5	EA	\$515.00	\$2,575.00
	Shrubs and trees, evergreen, in prepared beds	5	EA	\$340.00	\$1,700.00
	Shrubs, holly, B & B, 15"-18", planted in prepared beds	20	EA	\$167.50	\$3,350.00
	Shrubs, euonymus, B & B, 15" to 18", planted in prepared beds	10	EA	\$202.50	\$2,025.00
	Ground cover and vines, english ivy, potted, 2 year, includes planting only, excludes preparation of beds	10	C	\$243.00	\$2,430.00
	Prarie plants	10	C	\$200.00	\$2,000.00
F3010	Site Utilities				
	Geothermal system closed loop	120	TON	\$3,000.00	\$360,000.00
	6-inch ICW service connection and meter	1	EA	\$9,000.00	\$9,000.00
	6-inch DWS service connection and meter	1	EA	\$9,000.00	\$9,000.00
	4-inch gas connection, reducing sration and meter	1	EA	\$5,000.00	\$5,000.00
	Electric Service				
	High voltage cable	200	LF	\$36.30	\$7,260.00
	Pad mounted transformer	1	EA	\$20,800.00	\$20,800.00
	Connect transformers	1	EA	\$5,250.00	\$5,250.00
	New data service				
	Trenching, common earth excavator, 1/2 :1 slope, 2' wide, 6' deep, 3/8 CY BK	525	LF	\$71.45	\$37,511.25
	Underground duct banks, PVC, 1 @ 2" diameter	525	LF	\$2.15	\$1,128.75
	Low voltage cable	5	CLF	\$428.00	\$2,140.00
	Manhole/catch basin, concrete, cast-in-place, 4' ID riser, 8' deep	1	EA	\$6,025.00	\$6,025.00
	Sanitary sewer connection	2	EA	\$3,000.00	\$6,000.00
	New storm sewer connection				
	Trenching, common earth excavator, 1/2 :1 slope, 4' wide, 6' deep, 1/2 CY BK	600	LF	\$19.45	\$11,670.00
	Pipe bedding, side slope 1/2:1, 3' wide, pipe size 18" diameter	600	LF	8.27	\$4,962.00
	Drainage and sewage piping, 18" diameter, excavation and backfill excluded	600	LF	31.75	\$19,050.00
	Cleanout, extra heavy duty, 8" pipe size	2	EA	\$817.00	\$1,634.00
	Manhole/catch basin, concrete, cast-in-place, 4' ID riser, 8' deep	4	EA	\$6,025.00	\$24,100.00



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FERMILAB - FESS/E CONSTRUCTION COST ESTIMATE ALLOWANCES					
ESTIMATED SUBCONTRACT AWARD AMOUNT					\$2,707,807
Subcontractor Overhead and Profit				18%	\$ 395,899
Escalation				5.4%	\$ 112,471
Difficult Conditions				5.6%	\$ 116,637
Subcontract Base Amount					\$2,082,800
Project Title: Office, Technical and Education (OTE) Building		Project No.	Status:	Date:	Revision Date:
Funding: State + DOE		10-8-01	CDR	25-Aug-10	4-Oct-10
ITEM NO.	DESCRIPTION OF WORK:	QUANTITY	UNITS	UNIT COST	AMOUNT
01	Interior CDF Bridge	1	LS	\$500,000.00	\$500,000.00
02	Demountable Partitions	1,500	L.F.	\$350.00	\$525,000.00
03	Light Tech Crane	1	Ea.	\$100,000.00	\$100,000.00
04	AV Equipment				\$67,800.00
	Projection Screens, motorized	6	Ea.	\$2,500.00	\$15,000.00
	Projectors and mounts	6	Ea.	\$2,500.00	\$15,000.00
	LCD Displays	6	Ea.	\$2,000.00	\$12,000.00
	Video Conferencing, cameras	6	Ea.	\$500.00	\$3,000.00
	Interactive Whiteboard	6	Ea.	\$1,400.00	\$8,400.00
	CPUs	6	Ea.	\$1,200.00	\$7,200.00
	Sound System, classroom, wireless	6	Ea.	\$1,200.00	\$7,200.00
05	Acoustical Treatment				\$40,000.00
	Wall Construction	1,000	S.F.	\$10.00	\$10,000.00
	Ceiling Construction	1,200	S.F.	\$25.00	\$30,000.00
06	154kW photovoltaic system	1	LS	\$850,000.00	\$850,000.00



2.5 COST ESTIMATE

Office, Technical, and Education Building

Conceptual
Design
Report

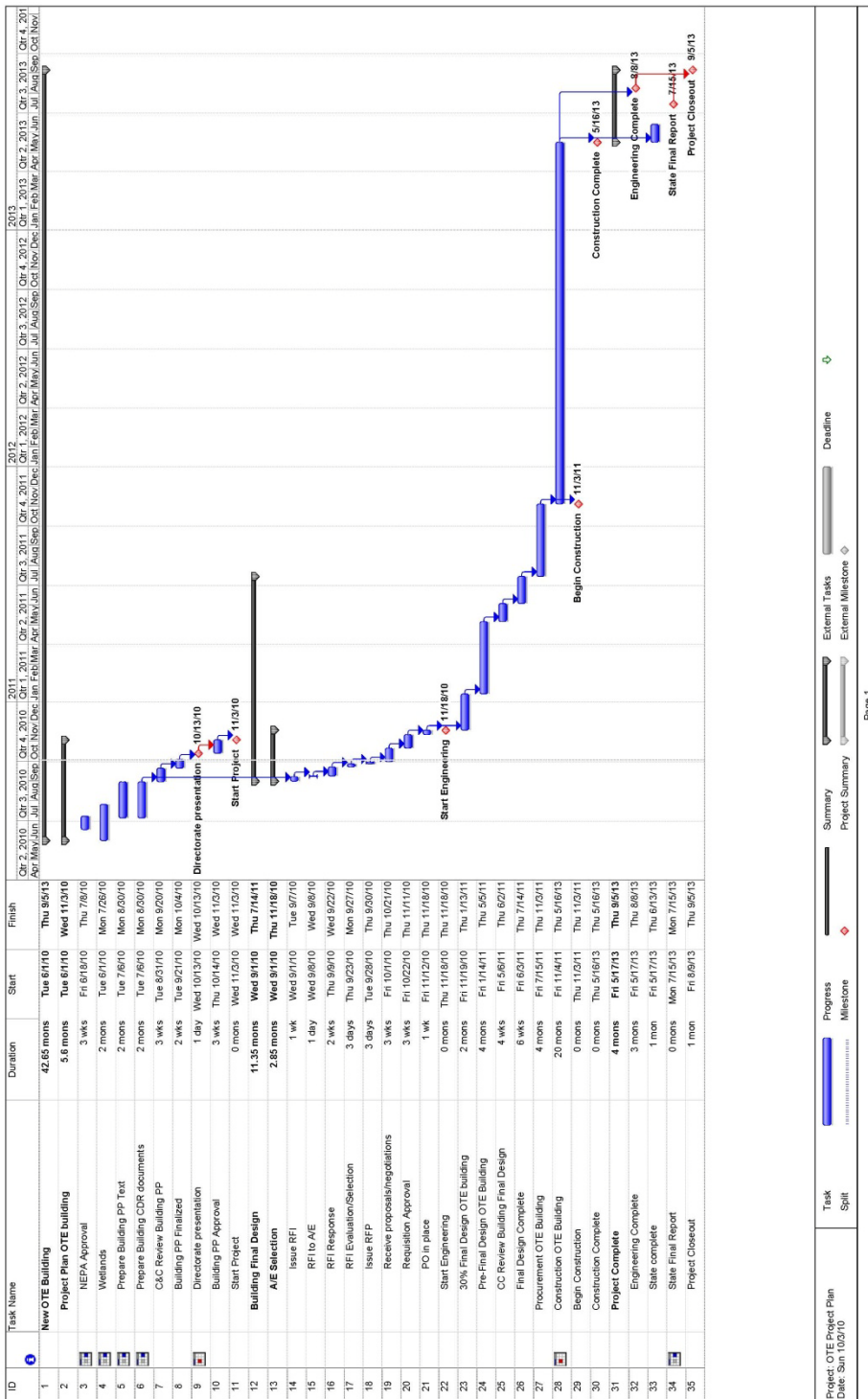
FERMILAB - FESS/E CONSTRUCTION COST ESTIMATE					
ALTERNATE DEDUCTS					
ESTIMATED SUBCONTRACT AWARD AMOUNT					\$1,597,932
Subcontractor Overhead and Profit				18%	\$ 233,628
Escalation				5.4%	\$ 66,372
Difficult Conditions				5.6%	\$ 68,830
Subcontract Base Amount					\$1,229,103
Project Title: Office, Technical and Education (OTE) Building		Project No.	Status:	Date:	Revision Date:
Funding: State + DOE		10-8-01	CDR	25-Aug-10	4-Oct-10
ITEM NO.	DESCRIPTION OF WORK:	QUANTITY	UNITS	UNIT COST	AMOUNT
01	North side, screens, vertical shading devices	165	Ea.	\$619.29	\$102,182.85
02	South, screens, horizontal shading devices	550	L.F.	\$88.47	\$48,658.50
03	Window film, graphic	4,900	S.F.	\$10.00	\$49,000.00
04	Outdoor seating, Wood deck, 4" thick, cedar	3,575	S.F.	\$2.69	\$9,616.75
05	Green Roof over Tech Space				\$35,142.25
	Green roof systems, hoist and spread soil mixture 6 inch depth up to five stories tall roof	3,575	S.F.	\$2.48	\$8,866.00
	Green roof systems, planting sedum mat, per SF, includes planting only, 4000 SF minimum	3,575	S.F.	\$7.35	\$26,276.25
05	West Stair, rated glazing				\$76,803.30
	Storefront Systems, aluminum frame, monumental grade, clear 3/8" plate glass, 3' x 7' door with hardware, 400 SF max	730	S.F.	\$48.00	\$35,040.00
	Fire Glass	730	S.F.	\$64.00	\$46,720.00
	Metal partition, 5/8" fire rated gypsum board face, 3-5/8" @ 24", 3.5" fiberglass insulation	(730)	S.F.	\$6.79	(\$4,956.70)
06	Classrooms, Acoustic partitions, operable, with track, 3"	1,910	S.F.	\$101.75	\$194,342.50
07	Tech space, Acoustic partitions, operable, with track, 3"	1,770	S.F.	\$101.75	\$180,097.50
08	Tech space, change flooring				\$67,528.20
	Polyurethane, thermoset, maximum	4,820	S.F.	\$17.45	\$84,109.00
	Integral topping and finish, 1:1:2 mix, 1/2" thick	(4,820)	S.F.	\$3.44	(\$16,580.80)
09	Lobby, change flooring				\$29,526.00
	Composition flooring, epoxy terrazzo, maximum	2,100	S.F.	\$17.50	\$36,750.00
	Integral topping and finish, 1:1:2 mix, 1/2" thick	(2,100)	S.F.	\$3.44	(\$7,224.00)
10	Hydraulic, passenger elevator, 3500 lb, 5 floors, 100 FPM	1	Ea.	\$143,900.00	\$143,900.00
11	Change paving system				\$292,304.73
	Parking and other pavement, 6" permeable paving system	35,954	SF	\$12.53	\$450,501.64
	Parking and other pavement, Asphaltic concrete	(35,954)	SF	\$4.40	(\$158,196.90)



2.6 SCHEDULE

Office, Technical, and Education Building

Conceptual Design Report



SECTION 3: Project Execution Plan



**Office, Technical, and Education
Building**

FESS/Engineering Project No. 10-8-1



3.1 RESOURCE REQUIREMENTS

Office, Technical, and Education Building

The following resource requirements have been identified for this project.

3.1.1 FUNDING

This project is primarily funded by two grants from the State of Illinois Department of Commerce and Economic Opportunity: Grant Award No. 10-203828 in an amount not to exceed \$17,000,000 and Grant Award No. 10-203829 in an amount not to exceed \$3,000,000. In addition, DOE will provide an additional TEC not to exceed \$2,000,000 to be part of this project. The Total Estimated Cost (TEC) of the project shall not exceed \$22,000,000.

3.1.2 HUMAN RESOURCES

Divisions/Sections/Research Centers (D/S/C) are responsible for assigning the responsibilities of individuals within the Integrated Project Team (IPT) as indicated in Figure 1 of the Project Charter. In addition, D/S/C will provide additional resources for specialized or unique elements of the project, or as necessary to support the IPT.

Design reviews will occur at varying levels through Final Design. All Divisions/Sections/Research Centers are aware of the design review process and will assign appropriate personnel to complete the reviews for conformance and compliance with D/S/C requirements.

Divisions/Sections/Research Centers will provide required personnel to coordinate construction phase activities that directly affect their operations. For example, the Facilities Engineering Services Section (FESS) will provide personnel to coordinate related activities with the Fermilab Construction Coordinator.

FESS/Engineering will provide licensed professional architects, professional engineers and structural engineers for the oversight of the design and coordination of the project. FESS/Engineering will retain the professional services of an architectural/engineer firm for final design and construction support.

The FESS/Engineering department will provide the oversight of the construction management for the project, overseeing the subcontractor's construction subcontract. Field inspection, environment, safety and health, and quality control of construction activity will be the responsibility of the subcontractor. FESS/Engineering will provide quality and safety assurance oversight during construction phase activities.



3.2 PROJECT BASELINE

Office, Technical, and Education Building

The Project Baseline identifies the basis for evaluating project performance. The components are the Work Breakdown Structure, which identifies each component of the project, the Baseline Costs, Escalation Rates, and Baseline Schedule and Milestones.

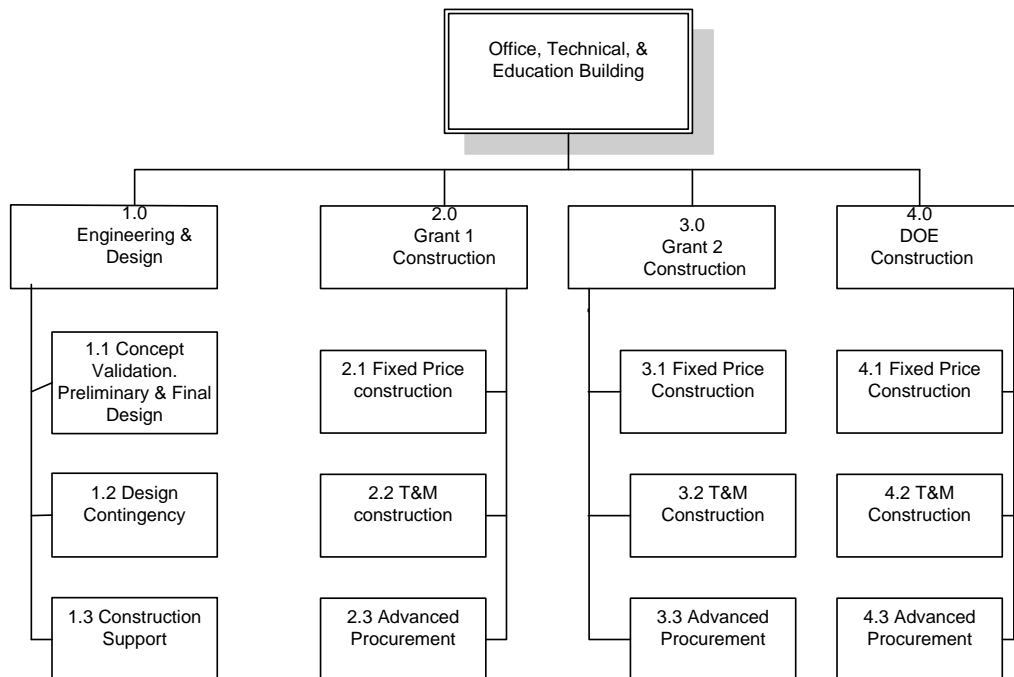
3.2.1 Scope Baseline

The work outlined in the Conceptual Design Report (CDR) forms the basis for the preliminary baseline scope. Project Completion will be accomplished when the design and construction of the building meeting the goals and objectives described in the CDR is complete and ready for Beneficial Occupancy.

3.2.2 WORK BREAKDOWN STRUCTURE (WBS)

In order to provide DCEO the required verifiable costing, the WBS will be broken down by funding sources. Listed below is the planned WBS for this project.

/





3.2 PROJECT BASELINE

Office, Technical, and Education Building

Listed below is further breakdown of the WBS for this project. Breakdown of the listed structure is as required for accounting purposes in order to provide DCEO financial tracking.

1.0 State Grant #1 and #2: Engineering and Design (ED)

This WBS will cover A/E subcontractor services needed to prepare all building design documents, including preliminary and final design, LEED documentation, commissioning documentation, project costs and schedules, and to provide construction support activities. The descriptions are based on DOE Directive G430.1-1, Chapter 6. In addition, DOE Directive G430.1-1, Chapter 25 was used as guidance in estimating the ED cost for this project. This DOE Directive can be found at the DOE website. Appendix B of this document contains the URL link to this chapter.

- 1.1 This WBS item will be used for State Grant 1 Preliminary and Final Design - 1205
- 1.2 This WBS item will be used for State Grant 1 Design Contingency - 1235
- 1.3 This WBS item will be used for State Grant 2 Construction Support - 1221

2.0 State Grant 1 Construction: Grant No. 10-203829

- 2.1 This WBS item will be used for the fixed-price State funded construction portion of the project;
 - 2.1.1 Equipment/Material/Labor - 1217
 - 2.1.2 Contingency - 1235
- 2.2 This WBS item will be used for the Time and Materials construction orders for this project;
 - 2.2.1 Equipment/Material/Labor - 1217
 - 2.2.2 Contingency - 1235
- 2.3 This WBS item will be used for advanced procured materials.
 - 2.3.1 Equipment/Material/Labor - 1217
 - 2.3.2 Contingency - 1235

3.0 State Grant 2 Construction: Grant No. 10-203828

- 3.1 This WBS item will be used for the fixed-price State funded construction portion of the project;



3.2 PROJECT BASELINE

Office, Technical, and Education Building

- 3.1.1 Wiring/Electrical - 1215
- 3.1.2 Equipment/Material/Labor -1217
- 3.1.3 Paving/Concrete/Masonry - 1219
- 3.1.4 Mechanical systems - 1223
- 3.1.5 Excavation/Site Prep/Demo - 1225
- 3.1.6 Plumbing -1229
- 3.1.7 Other Construction Expenses - 1233
- 3.1.8 Contingency -1235

- 3.2 This WBS item will be used for the Time and Materials construction orders for this project;

- 3.2.1 Wiring/Electrical - 1215
- 3.2.2 Equipment/Material/Labor -1217
- 3.2.3 Paving/Concrete/Masonry - 1219
- 3.2.4 Mechanical systems - 1223
- 3.2.5 Excavation/Site Prep/Demo - 1225
- 3.2.6 Plumbing -1229
- 3.2.7 Other Construction Expenses - 1233
- 3.2.8 Contingency -1235

- 3.3 This WBS item will be used for advanced procured materials.

- 3.3.1 Wiring/Electrical - 1215
- 3.3.2 Equipment/Material/Labor -1217
- 3.3.3 Paving/Concrete/Masonry - 1219
- 3.3.4 Mechanical systems - 1223
- 3.3.5 Excavation/Site Prep/Demo - 1225
- 3.3.6 Plumbing -1229
- 3.3.7 Other Construction Expenses - 1233
- 3.3.8 Contingency -1235

4.0 DOE Construction

This WBS will be used for the DOE funded construction costs.

- 4.1 This is fixed-price construction portion of the project;
- 4.2 This is Time and Materials construction orders for this project;
- 4.3 This WBS item will be used for advanced procured materials.

State Budget Definitions

The following definitions are for types or costs associated with the individual WBS for State expenditures:

- X.X.1 Wiring/Electrical – purchase of materials necessary for completion of the



3.2 PROJECT BASELINE

Office, Technical, and Education Building

project scope such as: electrical wiring; conduit; switches; etc. including associated labor/installation costs.

X.X.2 Equipment/Material/Labor – purchase of materials and/or purchase/lease of equipment, to use or install for the project, such as steel; drywall; lumber; wiring; doors; windows; roofing; rock; etc. including labor/installation costs.

X.X.3 Paving/Concrete/Masonry – purchase of materials necessary for completion of the project scope such as bituminous pavement; concrete; rock; bricks; blocks; mortar; tuckpointing; etc. including labor/installation costs.

X.X.4 Mechanical systems – purchase of materials necessary for completion of the project scope such as: HVAC, elevators; fire alarm, sprinkler, or ventilation systems; etc. including labor/installation costs.

X.X.5 Excavation/Site Prep/Demo – costs associated with demolition of existing structures on the project site and/or preparation of the project site including excavation, etc., ahead of actual new construction activities.

X.X.6 Plumbing – purchase of materials necessary for completion of the project scope such as: internal or external pipes for water, gas, and/or sewage; fixtures; etc. including associated labor/installation costs.

X.X.7 Other Construction Expenses – costs that can't be easily broken out to or covered by other individual/specific budgetary line items such as: landscaping; hauling; equipment rental; insurance; environmental fees.

X.X.8 Contingency – coverage of potential cost overruns in any of the other Budget line items.

Final cost estimates and construction breakdown costs will be in accordance with these definitions.

For accounting purposes, the above listed State funded WBS items will be separated WBS items.

For accounting purposes, the management reserve of the above listed DOE WBS items will be included in the WBS costs. DOE Directive G430.1-1, Chapter 11 was used as guidance in estimating the appropriate management reserve for this project. This DOE Directive can be found at the DOE website. Appendix B of this document contains the URL link to this chapter.

For accounting purposes, the indirect costs of the above listed WBS items will be included in all WBS items. For reference purposes, Indirect Costs rates are defined by DOE Order 4700.1 that states indirect costs are "...costs incurred by an organization for common or joint objectives and which cannot be identified specifically with a



3.2 PROJECT BASELINE

Office, Technical, and Education Building

particular activity or project.” The multipliers used in this document are based on current Fermilab rates with maximum cap threshold taken into consideration. Appendix B of this document contains the URL link to the Fermilab Indirect Cost rates. While Indirect Costs have been estimated and included in the Total Project Cost, the Finance Section will confirm that the allocated funds are adequate. The Indirect Costs are not considered as part of the managed baseline.

3.2.3 BASELINE PROJECT COSTS

Listed on the following page are the baseline project costs for this project. The indicated State project costs are identified in the Grants as Budget Line Items. Variance greater than 10% for any Budget Line Item requires DCEO approval; however, in no case shall the total of the Budget Line Items exceed the total Grant award amount.

**Project
Execution
Plan**



3.2 PROJECT BASELINE

Office, Technical, and Education Building

Project Execution Plan

	DCEO Budget Cost Category	Base Cost	Management Reserve	Indirect Costs	Subtotal
1.0	Engineering Design & Inspection	\$ 2,579,100	\$ 128,050	\$ 244,000	\$ 2,951,150
1.1	State Grant #1 Design/Engineering 10-203829	1205 \$ 1,252,050		150,000	1,402,050
1.2	State Grant #1 Design Contingency	1235	128,050	19,000	147,050
1.3	State Grant #2: Construction Support 10-203828	1221 1,327,050		75,000	1,402,050
2.0	State Grant #1: 10-203829 Construction	\$ 1,208,150	\$ 151,100	\$ 91,650	\$ 1,450,900
2.1	State Fixed Price Construction 10-203829	1,108,000	139,000	75,000	1,322,000
2.1.1	State Equipment/Material/Labor 10-203829	1217 1,108,000		75,000	1,183,000
2.1.2	State Contingency 10-203829	1235	139,000		139,000
2.2	State T & M Construction 10-203829	25,150	3,100	4,300	32,550
2.2.1	State T&M Equipment /Material/Labor 10-203829	1217 25,150		3,800	28,950
2.2.2	State T&M Contingency 10-203829	1235	3,100	500	3,600
2.3	State Pre-procurement 10-203829	75,000	9,000	12,350	96,350
2.3.1	State Pre Pro Equipment /Material/Labor 10-203829	1217 75,000		11,000	86,000
2.3.2	State Contingency 10-203829	1235	9,000	1,350	10,350
3.0	State Grant #2: 10-203828 Construction	\$ 13,792,402	\$ 1,695,185	\$ 110,363	\$ 15,597,950
3.1	State funded Fixed priced construction 10-203828	13,588,748	1,663,085	75,000	15,326,833
3.1.1	Wiring/Electrical 10-203828	1215 1,751,881			1,751,881
3.1.2	Equipment/Material/Labor 10-203828	1217 6,071,946		75,000	6,146,946
3.1.3	Paving/Concrete/Masonry 10-203828	1219 1,435,847			1,435,847
3.1.4	Mechanical systems 10-203828	1223 2,957,778			2,957,778
3.1.5	Excavation/Site Prep/Demo 10-203828	1225 143,429			143,429
3.1.6	Plumbing 10-203828	1229 430,754			430,754
3.1.7	Other Construction Expenses 10-203828	1233 797,112			797,112
3.1.8	Contingency 10-203828	1235	1,663,085		1,663,085
3.2	State funded T&M construction 10-203828	13,654	1,700	2,303	17,657
3.2.1	Wiring/Electrical T&M 10-203828	1215 1,625		244	1,869
3.2.2	Equipment/Material/Labor T&M 10-203828	1217 6,177		927	7,104
3.2.3	Paving/Concrete/Masonry T&M 10-203828	1219 1,438		216	1,653
3.2.4	Mechanical systems T&M 10-203828	1223 3,019		453	3,472
3.2.5	Excavation/Site Prep/Demo T&M 10-203828	1225 144		22	165
3.2.6	Plumbing T&M 10-203828	1229 431		65	496
3.2.7	Other Construction Expenses T&M 10-203828	1233 821		123	944
3.2.8	Contingency T&M 10-203828	1235	1,700	255	1,955
3.3	State funded Pre-procurement construction 10-203828	190,000	30,400	33,060	253,460
3.3.1	Wiring/Electrical Pre Pro 10-203828	1215 100,000		15,000	115,000
3.3.2	Equipment/Material/Labor Pre Pro 10-203828	1217 20,000		3,000	23,000
3.3.3	Paving/Concrete/Masonry Pre Pro 10-203828	1219		0	0
3.3.4	Mechanical systems Pre Pro 10-203828	1223 50,000		7,500	57,500
3.3.5	Excavation/Site Prep/Demo Pre Pro 10-203828	1225		0	0
3.3.6	Plumbing Pre Pro 10-203828	1229		0	0
3.3.7	Other Construction Expenses Pre Pro 10-203828	1233 20,000		3,000	23,000
3.3.8	Contingency Pre Pro 10-203828	1235	30,400	4,560	34,960
4.0	DOE Funding	1,650,000	259,000	91,000	2,000,000
4.1	DOE Fixed Price Construction	1,550,000	248,000	75,000	1,873,000
4.2	DOE T & M Construction	30,000	5,000	5,000	40,000
4.3	DOE Pre-procurement	70,000	6,000	11,000	87,000
PROJECT TOTAL		\$ 19,229,652	\$ 2,233,335	\$ 537,013	\$ 22,000,000



3.2 PROJECT BASELINE

Office, Technical, and Education Building

3.2.4 MANAGEMENT RESERVE

Management Reserve, identified as “contingency” in the State Grant is a line-item cost category for the State reporting documents. The Grant specifically limits contingency to 10% of the total Grant Amounts. The total contingency for the State Grant is \$2,000,000, which is approximately 12% of the estimated construction costs.

Normally at the CDR stage of the project, a 20% management reserve is applied to cover the cost that may result due the early design stage or uncertainties associated with project execution such as unknown future market conditions.

In order to execute and manage the design-to-cost budget several items of scope management reserve have been identified. This list will continue to be refined during the final design stage. These scope-deduct items will be identified on the final construction documents as “alternate deducts” during the competitive procurement activities. During the source evaluation process, the project team will review the alternate deducts and determine which ones should be excluded from the scope of work, if necessary, while still providing a fully-functional building at project completion.

The Request for Proposal (RFP) will ask for a base-bid price incorporating the full scope as defined by the subcontract documents. In addition to a base-bid price, the RFP will ask for alternate deducts based on the following scope deduct items (or alternative scope deducts developed during the final design stage), as well as separate contract option prices:

Scope Deducts	North side, screens, vertical shading devices	\$133,000
	South, screens, horizontal shading devices	\$63,000
	Window film, graphic	\$64,000
	Outdoor seating, Wood deck, 4” thick, cedar	\$12,500
	Green Roof over Tech Space	\$46,000
	West Stair, rated glazing	\$100,000
	Classrooms, Acoustic partitions, operable, with track, 3” thick, deluxe,	\$253,000
	Tech space, Acoustic partitions, operable, with track, 3” thick, deluxe	\$234,000
	Tech space, change flooring	\$88,000
	Lobby, change flooring	\$38,000
	Hydraulic, passenger elevator, 3500 lb, 100 FPM	\$187,000
	Change paving system	\$380,000
	Interior CDF Bridge	\$650,000
	Movable Partition System	\$680,000
	Light Crane – Tech Area	\$130,000
	Education and Conference A/V Equipment	\$90,000
	Tech Area Acoustical Upgrades	\$52,000
	TOTAL	\$3,200,500.00

**Project
Execution
Plan**



3.2 PROJECT BASELINE

Office, Technical, and Education Building

In the event that proposals are favorable, additional interior furnishings and equipment, sustainability elements, landscaping, and other fit-up features will be added and enhanced.

**Project
Execution
Plan**



3.2 PROJECT BASELINE

Office, Technical, and Education Building

3.2.5 ESCALATION

The baseline project and associated cost estimate assumes that the midpoint of construction will be the 1st quarter of fiscal year 2013 (FY13). DOE Directive G430.1-1 was used as guidance in estimating the appropriate escalation for this project. This directive can be found at the DOE website. Escalation rates are based on “*Escalation Rate Assumptions for DOE Projects*” (November 27, 2009, reviewed June 2010). These rates are considered conservative with respect to recent decline in construction price indices as well as slow economic recovery expectations. Escalation rates will be closely monitored during the design process.

**Project
Execution
Plan**

YEAR	Start Date Design	Mid-point Construction	DOE Rate	Effective Rate
2010	06/15/10		2.3%	0.0115
2011			2.2%	0.0220
2012		10/12	2.4%	0.0200

Calculation of Construction Escalation Rate:

	1.0115
X	1.0220
X	1.0200
	<hr/> <hr/>
	1.0544

Construction Escalation Rate= 5.4%



3.2 PROJECT BASELINE

Office, Technical, and Education Building

3.2.6 BASELINE PROJECT SCHEDULE AND MILESTONES

The baseline schedule listed below sets forth the major activities and milestones essential for the completion of the project within the constraints of Lab operations.

The Grants require the Grant Scope of Work to be completed within the grant term, 06/01/2010 - 05/31/2012. Grant Section 4.2 allows for extensions of the grant term for good cause. This schedule is based on obtaining a one-year Grant Extension from DCEO. The milestones are defined as:

MILESTONE	DEFINITION	BASELINE
Start Project	Director sign-off	Month 0
Start Engineering	Engineering work for the project starts when a task is entered into the Task Database	Month 1
Begin Construction	Notice To Proceed/Purchase Order Issued	Month 13
Construction Complete	Final acceptance of all work	Month 31
Engineering Complete	Completion of Close-out Documents	Month 33
Project Complete	Project Closed	Month 34



3.3 ACQUISITION EXECUTION PLAN

Office, Technical, and Education Building

3.3.1 DESIGN

The development of construction documents and bid packages will be accomplished by use of an Architectural-Engineering (A/E) firm. The selection of the A/E firm will be from the 2009 Large A/E Selection master list for General A/E's of firms that have been prequalified and that are under a master contract.

3.3.1.1 Source Selection Process

The selection of the A/E firm will be in accordance with the FESS-Engineering procedures established for Selecting and Tasking New Large A/E Contracts. These procedures consist of:

- Identification and department head approval of appropriate A/E category;
- Establishment of Selection Committee(SC) consisting of FESS Project Manager, FESS 2009 Large A/E Evaluation Team, Fess-Engineering Department Head, Fermi Project Director, and the Procurement Officer;
- Development of project specific Requests for Information (RFI) and scoring criteria with approval by the SC.
- RFI distributed to all A/E's in the appropriate A/E category;
- On-site presentation to the SC of each A/E's response to the RFI;
- SC ranks A/E's based on scoring criteria, with final selection based on highest technical ability. (Fees are not part of the RFI or scoring criteria.)

3.3.2 CONSTRUCTION

In order to manage costs and schedules, it is anticipated that this project may be accomplished by at least two (2) separate construction packages: Underground Work and Above Ground Work. The Conventional Construction packages will be a competitively bid, lump sum contract. Time and Materials (T&M) tasks may be used for work that is specialized and difficult to include in the competitive procurement process. Advanced procurement may be used for items with long-lead procurement timeframes.

3.3.2.1 Possible Sources for the Conventional Construction Subcontractors

Fermilab has access to several Subcontractors that have sufficient qualifications to execute this Subcontract. Subcontractors are selected in response to a Request for Proposal and must meet specific safety and quality requirements. When applicable, there will be a close-out meeting to formally assess the performance of subcontractors in accordance with FESHM Chapter 7010.

**Project
Execution
Plan**



3.3 ACQUISITION EXECUTION PLAN

Office, Technical, and Education Building

3.3.2.2 Performance Based Incentive Process

The subcontractor will be paid only for work completed. In addition, retention may be reduced from 10% to as little as 2% during the subcontract if the subcontractor maintains a safe environment and meets subcontract milestones.

3.3.2.3 Methods of Completion

The Request for Proposal (RFP) process will be used to solicit proposals from area Subcontractors with the appropriate safety records and experience to accomplish this work.

3.3.2.4 Source Selection Process

A Source Evaluation Team (SET) will be established to evaluate the proposal offers, which will include the Fermi Project Director, Fermi Project Manager, Fermi Project Coordinator, and Fermi Procurement Officer to evaluate and select a Subcontractor for the Conventional Construction Package. Evaluation criteria will be included in the Request for Proposal (RFP) documents as a basis for the SET evaluation of proposals.

3.3.2.5 Justification for Non-competitive Acquisitions

Anticipated non-competitive acquisitions may include Time and Material (T&M) tasks and advanced-procured items requiring longer than tolerable fabrication or delivery time. These items will be identified during the Final Design phase.

3.3.2.6 Milestones for Acquisition

Construction milestones will be established for inclusion into the subcontract documents.



3.4 MONITORING AND CONTROLS

Office, Technical, and Education Building

3.4.1 COST CONTROL

A separate cost account will be maintained for the following elements listed in the project Work Breakdown Schedule (WBS):

- 1.0 Engineering Design & Inspection**
 - 1.1 State Design/Engineering ED&I Grant 10-203829
 - 1.2 State Design Contingency ED&I Grant 10-203829
 - 1.3 State Construct. Support ED&I Grant 10-203828
- 2.0 State Grant 10-203829 Construction**
 - 2.1 State Fixed Price Construction**
 - 2.1.1 State Equipment/Material/Labor
 - 2.1.2 State Contingency
 - 2.2 State T & M Construction 10-203829**
 - 2.2.1 State Equipment/Material/Labor
 - 2.2.2 State Contingency
 - 2.3 State Pre-procurement 10-203829**
 - 2.3.1 State Equipment/Material/Labor
 - 2.3.2 State Contingency
- 3.0 State Grant 10-203828 Construction**
 - 3.1 State Fixed priced construction**
 - 3.1.1 Wiring/Electrical
 - 3.1.2 Equipment/Material/Labor
 - 3.1.3 Paving/Concrete/Masonry
 - 3.1.4 Mechanical systems
 - 3.1.5 Excavation/Site Prep/Demo
 - 3.1.6 Plumbing
 - 3.1.7 Other Construction Expenses
 - 3.1.8 Contingency
 - 3.2 State T&M construction 10-203828**
 - 3.2.1 Wiring/Electrical
 - 3.2.2 Equipment/Material/Labor
 - 3.2.3 Paving/Concrete/Masonry
 - 3.2.4 Mechanical systems
 - 3.2.5 Excavation/Site Prep/Demo
 - 3.2.6 Plumbing
 - 3.2.7 Other Construction Expenses
 - 3.2.8 Contingency
 - 3.3 State Pre-procurement construction 10-203828**
 - 3.3.1 Wiring/Electrical
 - 3.3.2 Equipment/Material/Labor
 - 3.3.3 Paving/Concrete/Masonry

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- 3.3.4 Mechanical systems
- 3.3.5 Excavation/Site Prep/Demo
- 3.3.6 Plumbing
- 3.3.7 Other Construction Expenses
- 3.3.8 Contingency
- 4.0 **DOE**
- 4.1 DOE Fixed Price Construction
- 4.2 DOE T & M Construction
- 4.3 DOE Pre-procurement

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The baseline budget for each element will be shown on all reports. Costs charged to these accounts will be reported monthly on a report available on the Business Services Section (BSS) website. In addition, costs in these accounts will be reported quarterly to the State in the format required by the Grant. The Fermilab Project Manager will review the report as needed and verify the validity of all cost charges during the reporting period; that commitments are correct; and that projections of costs can be covered by the baseline budget for each work element.

The Fermilab Project Manager has the responsibility for the use and commitment of project funds. Any costs or commitments that are made without the project manager's signed approval or that of higher Laboratory management may be rejected. Progress payments to the Architect/Engineer, suppliers, and subcontractors will be made upon receipt and approval of acceptable invoices, nominally on a monthly basis.

The Fermilab Project Manager, within authorized limits, will be responsible for the administration of the project's management reserve funds.

The Fermilab Project Manager is responsible for updating, as needed, the project Estimate at Completion (EAC) for each work element to reflect changes in design and construction, and for overall project fiscal management.

3.4.2 SCHEDULE CONTROL

The Baseline Schedule, shown in Section 3.2.5 of this project plan, depicts the milestones. As the project develops, the schedule may be further refined. The Fermilab Project Manager shall have the responsibility to monitor and control these tasks within the baseline. The baseline may be revised with the change control board and PMG concurrence.

The Project manager/construction manager will review work progress with the subcontractor at regular intervals. Any identified difficulties will require the subcontractor to provide a plan for their resolution. Significant schedule slippage will



3.4 MONITORING AND CONTROLS

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be cause for expediting actions by BSS at the request of the Fermilab Project Manager.

The following Preliminary Tracking Milestones will be used as a basis for schedule control:

Tracking Milestone	Definition	Date
CDR Complete	RBA delivers CDR document	Oct 6, 2010
Director's Review	Review by FNAL mgmt of Proj Plan	Oct 13, 2010
Engineering Start	Proj Plan approved, directorate sign-off	Nov 3, 2010
A/E start	Proposal negotiations complete	Nov 18, 2010
Eng Drawings complete	CCR comments incorporated	July 14, 2011
Award Construction Contract	Source Evaluation Team evaluation complete, BSS complete, establish initial project scope, retain 10% contingency	Nov 3, 2011
Substructure	Details based on construction contract	TBD
Shell	Details based on construction contract	TBD
Interiors	Details based on construction contract	TBD
Building Systems	Details based on construction contract. Reduce contingency	TBD
Equipment and Furnishings	Details based on construction contract	TBD
Site Work	Details based on construction contract	TBD
Construction 100% complete	Final acceptance of all construction work	May 16, 2013
Engineering complete	Completion of close-out documents	Aug 8, 2013
Project complete	Final reports to DCEO, DOE, project closed	Sept 5, 2013

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3.4 MONITORING AND CONTROLS

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3.4.3 CHANGE CONTROL PROCEDURES AND AUTHORITIES

Changes to the project’s internal baseline can occur to the scope, cost, or schedule aspects of the project. Changes at WBS Level 1 and below will be made with the approval of the Fermilab Project Manager for cost changes up to \$75,000 and schedule changes up to 3 months. Cost and schedule changes above these amounts and changes to the scope of the project as outlined in the CDR will require the approvals outlined below. Any change to the Total Project Cost will require the approval of the Change Control Board, the IAU-PMG, and DOE. Project change control will be accomplished in accordance with practices listed below.

Change Control Procedures		
Change	Approval Required	Change Request Form
Normal Field Changes no added cost or time	Fermilab Project Manager	None
In scope ≤\$75k or ≤3 mos. schedule change	Fermilab Project Manager	None
In scope >\$75k or >3 mos. schedule change	Control Board	Required
Total Project Cost	Control Board DOE FSO	Required
Non-Emergency Required for ES&H regulations	Fermilab Project Manager	Required
Change to Project Scope or Project Schedule (milestones)	Control Board DOE FSO	Required

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The Change Control Board (Control Board) will be comprised of the following named individuals or the designees:

DOE Fermi Area Office
Sponsor - Chief Operating Officer
Stakeholder – FESS Head
Fermilab Business Service Section
Fermilab Project Director
Fermilab Project Manager

S. Webster (non-voting)
B. Chrisman
R. Ortgiesen
D. Carlson
R. Kephart
R. Merchut (Chair)



3.4 MONITORING AND CONTROLS

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The Fermilab Project Manager will act as Chair to the Control Board. The Control Board will consider the change requests promptly and, in cases not requiring additional information or discussion, will respond within two (2) weeks. The project manager will report the actions of the change control board to the PMG.



3.5 ORGANIZATIONAL PROCESS ASSETS

3.5.1 INTEGRATED SAFETY MANAGEMENT (ISM)

Fermilab subscribes to the philosophy of Integrated Safety Management (ISM), in accordance with Department of Energy Order 413.3 “Program and Project Management for the Acquisition of Capital Assets.” Appendix B of this document contains a URL link to the DOE order. Fermilab requires its subcontractors and sub-tier subcontractors to do the same. ISM is a system for performing work safely and in an environmentally responsible manner. The term “integrated” is used to indicate that the Environment, Safety & Health (ES&H) management systems are normal and natural elements of doing work. The intent is to integrate the management of ES&H with the management of the other primary elements of design and construction: quality, cost, and schedule.

The final design documents shall be based on comprehensive life safety and code analysis. Preliminary safety and hazard plans shall be developed during design. Radiation safety plans to be part of final design documents.

The construction subcontractor(s) shall submit proof of an effective integrated safety management program. The program must be described in the terms listed below.

- Line Management Responsibility for Safety;
- Clear Roles and Responsibilities;
- Competence Commensurate with Responsibility;
- Balanced Priorities;
- Identification of Safety Standards and Requirements;
- Hazard Controls Tailored to Work Being Performed;
- Operations Authorization.

3.5.2 QUALITY ASSURANCE

All aspects of this project will be periodically reviewed with regard to Quality Assurance issues from Conceptual Design through Close-out. This review process will be completed in accordance with the Engineering Manual and applicable portions of the Fermilab Director’s Policy Manual, Section 10. Appendix B of this document contains a URL link to the Fermilab Director’s Policies. The following elements will be included in the design and construction effort:

- An identification of staff assigned to this project with clear definition of responsibility levels and limit of authority as well as delineated lines of communication for exchange of information;
- Requirement for comprehensive quality control program from design A/E.



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3.5 ORGANIZATIONAL PROCESS ASSETS

- Requirements for design criteria as identified in the Project Plan
- Standards and codes as identified in the Project Plan;
- Periodic review of design process, drawings and specification to insure compliance with accepted design criteria in bid document preparation;
- Identification of underground utilities and facility interface points prior to the commencement of any construction in affected areas;
- Conformance to procedures regarding project updating and compliance with the approved construction schedule;
- Conformance to procedures regarding the review and approval of shop drawings, samples test results and other required submittals;
- Conformance to procedures for site inspection by Fermilab personnel to record construction progress and adherence to the approved contract documents;
- Verification of project completion, satisfactory system start-up and final project acceptance.

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3.5.3 HIGH PERFORMANCE BUILDING DESIGN

Following DOE Order 430.2B, new construction and major renovation projects over \$5 million will be designed to achieve LEED-NC Gold certification.

This project is a new building; therefore the adherence to HPSB Guiding Principles and LEED Gold certification are required.

Fermilab incorporates sustainable design principals into the planning, design and construction of projects. This direction is taken from the Fermilab Director's Policy 3. Appendix B of this document contains a URL link to the Fermilab Director's Policies

Sustainability is broadly defined as the design and implementation of projects to simultaneously minimize their adverse environmental impacts, maximize occupants' health and well-being, and improve bottom line, life cycle, economic performance. The concept of sustainability is a desirable approach to development that recognizes that resources are limited, and that there is a responsibility of the present generation to preserve resources for future ones.

The United States Green Building Council (USGBC) has developed the Leadership in Energy and Environmental Design (LEED) standard to provide guidance for builders



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3.5 ORGANIZATIONAL PROCESS ASSETS

who wish to incorporate sustainable elements into their projects. LEED for new construction (and remodeling) is a set of specific and quantifiable measures, each of which confers a credit towards certification of a project as a “LEED-certified” building.

The project processes and each project element are evaluated to reduce their impact on natural resources without sacrificing program objectives. Fermilab designs will incorporate maintainability, aesthetics, environmental justice and program requirements to deliver a well-balanced project. If appropriate, internal and external reviews of design and construction provide a check and balance system for environmental, aesthetic and maintenance issues.

See Appendix B of this Project Plan for LEED 2009 Checklist.

3.5.4 RELIABILITY AND MAINTAINABILITY

Both reliability and future maintenance are considered in the design of all components of Fermilab site. Materials and construction techniques are selected during the design process to provide adequate design life, accessibility, and minimal maintenance.

When completed, this project will become the formal combined responsibility of the Fermilab FESS Section and a landlord to be determined. Formal MOU’s will be developed regarding operation and maintenance responsibilities. The completed project, and the utilities and systems that support it, will be added to the overall laboratory maintenance and building inspection program of the Facilities Engineering Services Section. The Facilities Engineering Services Section will coordinate the preventative maintenance, normal service and emergency repairs for the building equipment.

The Building Research Board National Research Council states that if a property receives an adequate level of maintenance and repair funding, a steady-state situation should exist wherein the inventory would remain in a service condition that would neither decline nor improve and a maintenance and repair backlog would not develop. Maintenance is defined as the day-to-day work necessary to sustain property in order to realize the originally anticipated useful life of a fixed asset. Maintenance includes periodic inspection, adjustment, lubrication, and cleaning (non janitorial) of equipment, replacement of parts etc. to assure continuing service and to prevent breakdown. Repair is defined as the work required to restore damaged or worn-out property to a normal operating condition. In general, repairs are curative and maintenance is preventive.



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Operations are the activities related to a building's normal performance of the function for which it is used. The cost of utilities, janitorial services, window cleaning, rodent control and waste management are generally included within the scope of operations and are not maintenance.

The following preliminary maintenance and repair costs forecast is based on information contained in the Whitestone Building and Repair Cost Reference 2002 escalated to FY2009 and indexed for the Chicago, Illinois area. The Building M&R Cost Profile is based on the Community Center model. While not an exact match, the functions and basic material selections are considered similar in nature to provide a preliminary forecast of maintenance and repair costs for this project.

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<i>Cost (FY2010)</i>	Annual Cost Per Square Foot	Annual Cost as % of Replac. Cost
PM and Minor Repair	\$1.00	1.04%
Unscheduled Maintenance	\$1.15	1.18%
Renewal and Replacement	\$3.02	3.12%
Total M&R Costs	\$5.16	5.34%

If requested, a detailed maintenance and repair forecast for this project will be developed after the completion of construction. A copy of the referenced Whitestone Building and Repair Cost Reference data is included in the Appendix B of this project plan.

3.5.5 VALUE MANAGEMENT

It is not anticipated that a separate value management exercise will be required for this project. However, internal reviews of designs at various levels of completion will be performed by the most experienced individuals at Fermilab with the goal to identify cost effective design solutions. These internal reviews will focus on understanding the impact of the technical requirements on the overall project including optimization to reduce the life cycle costs.



3.5 ORGANIZATIONAL PROCESS ASSETS

3.5.7 DESIGN REVIEWS

Design reviews have been on-going since the pre-conceptual stage and have included reviews of site location, massing and blocking, functional reviews, and conceptual design reviews.

Design reviews are accomplished in accordance with FESS/Engineering Standard Operating Procedure 8.3.5.1, “Document Reviews.”

Designs are reviewed for conformance to project requirements and for appropriateness of the proposed systems, impacts on existing systems and operations, specific technical requirements to be incorporated into the design and compliance with best and required practices of authority having jurisdiction.

A Comment and Compliance Review (CCR) will be undertaken during the Final Design Phase. Other reviews may be undertaken for specific elements of the project.



3.6 RISK MANAGEMENT

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An important part of the project planning will be to ensure the risks associated with the project have been identified, analyzed, and determined to be either avoidable or manageable.

Ten (10) risks have been identified. Of the ten risks, 2 have been identified as having a moderate risk level and 8 are believed to be low. The assessment has been made based on past Fermilab experience and consultation with Argonne National Laboratory on previous DCEO work. Each of the identified risks will be monitored on an on-going basis to assure they have been satisfactorily addressed, eliminated, or managed.

No.	Potential Risk	Risk Level
1	Ongoing Operational Constraints	Moderate
2	Site access delays	Moderate
3	A/E design team changes/loss of key member	Low
4	Design Changes/change in occupancy	Low
5	Delay in the Bidding/Procurement Approval Process	Low
6	State approval of budget variances	Low
7	State approval of schedule variances	Low
8	Unknown Existing Conditions	Low
9	Change in market conditions	Low
10	Field Permit Delays – wetland	Low

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Risk No. 1: A significant risk management item on this project involves the coordinated activities affecting ongoing Fermilab operations. Sufficient float in the Schedule is currently projected for the activities related to constructing the project to accommodate potential disruptions. Coordination meetings with affected users will occur frequently throughout the design period to identify impact on ongoing Fermilab operations and identify strategies to reduce risk.

Risk No. 2: Project Start delay due to delays in other Fermilab construction projects, including, the Industrial Area Site Upgrades project and the Sanitary Sewer Pipe Burst project also presents a moderate risk. Sufficient float in the Schedule is currently projected to accommodate delays in site access and to fully mitigate this risk.



3.6 RISK MANAGEMENT

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DCEO Grant Risks:

Risk No. 6: State approval of budget variances in excess of 10% of the State line-item budget is required by Grant Section 5.7. The individual line item budgets were developed at a pre-conceptual stage and are expected to change based on the final design. Approval of line item budget variances is considered a low risk, because as a design-to cost-project, the total Grant amounts will not be exceeded therefore, reducing the risk of not receiving line item budget variations. Cost estimates will be closely evaluated at multiple stages of design.

Risk No. 7: In order to accommodate Risks #1 and #2, ongoing Lab operations and site availability, the current schedule indicates the project completion to be 12 months after the grant terms of 24-month. This will require a Grant extension under the provisions of Grant section 4.2, with the possibility of DCEO requiring a grant refund. (Section 4.14, Grant Recovery Act has been deleted from the Grants, section 4.3(A) Expenditure of Funds: Right to Refund has not.) Nearly all state funds will be obligated prior to the end of the Grant term. Based on consultation with Argonne National Laboratory, term extensions for good cause are easily obtainable from DCEO. On-going Lab operations and site availability are believed to be good cause. Fermilab legal office was consulted. As a result of this consultation, approval of a term extension is considered a low risk.

Risk No. 10: The parking lot adjacent to the building encroaches upon a small wetland, which requires a jurisdictional determination by the Army Corps of Engineers and possibly a wetlands permit in compliance with the Clean Water Act (CWA). As part of an existing maintained drainage system, this wetland is not expected to require a permit. However, because of the length of time involved with the permit determination process it is considered a low risk until the process is complete.

Risk No. 3, 4, 5, 8, and 9: The remainder of the risks are considered low, with sufficient schedule and budget controls and monitoring to mitigate impact on schedule or budget.

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The objective of the reporting and review activity is to provide the collection and integration of essential technical, cost, schedule and performance data into reports for the monitoring and management of the project.

3.7.1 REPORTING

Quarterly Work for Others Status Reports -- The Fermilab Project Manager will provide to the Project Management Group (PMG) and DOE management Quarterly General Plant Project (GPP) type reports covering status of cost and schedule, progress towards meeting established milestones, issues and problems with proposed corrective actions.

Quarterly State Reporting -- The Fermilab Project Manager will provide to the Fermilab Manager of Grants and Contracts Quarterly Project Status progress reports, including end-of-Grant reports, in accordance with the DCEO Reports Deliverable Schedule, dated June 28, 2010, contained in Appendix C. Project Status Reports will be approved by the Fermilab Project Director.

In accordance with the DCEO Reports Deliverable Schedule, the Fermilab Manager of Grants and Contracts will develop Quarterly Financial Status progress reports from the Fermilab Accounting system based on paid invoices. All costs incurred, whether funded by DCEO or DOE must be accounted for within the Lab's Oracle-based accounting system. All financial reports to be prepared and submitted must be based on and reconciled to the Oracle Record of accounts.

The Fermilab Manager of Grants and Contracts will electronically submit to the DCEO quarterly Project Status and Financial Status Reports

Monthly Progress Reports – The Fermilab Project Manager will provide reports on a regular basis to the PMG. The reporting will include cost, schedule and performance data. Problems or issues will be addressed.

The Budget Officer and the Controls Manager will submit monthly written narrative reports to the Project Manager detailing specific progress on the pertinent subsystems. The reports summarize the activities of the previous month, including progress, problems, budget and schedule status, including comparison of projected status versus actual status.

The Design and Construction Subcontractors will submit a monthly invoice, schedule update, EVMS reporting, and narrative description of project progress.



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Weekly – The Design and Construction Subcontractors will submit a summary report that details the activities performed, progress on completion of major activities and milestones, hours worked the previous week, and quality control activities for the previous week. These reports will include a “look ahead” schedule that details the expected progress in the coming weeks.

Daily – If appropriate, construction logs may be prepared by the Fermilab Construction Coordinator that document the ongoing construction progress, quality assurance, safety and change issues. When required, the Subcontractor prepares daily quality control reports documenting their efforts on field activities. The Fermilab Project Manager and Fermilab Construction Manager are provided these reports on the following workday.

3.7.2 REVIEWS

Bi-Weekly IPT meetings – General project meetings will take place on a bi-weekly basis and provide the opportunity for update and review for project participants at every level.

The Fermilab Project Manager as well as the IPT will review design and construction progress, changes, subcontractor payouts and general project progress.

Technical, cost, and schedule performance will be monitored, evaluated, and reported.

Directorate Level Review – If appropriate and requested, the project team will meet with the Directorate to review the project related cost data, schedule status and performance progress.

Various meetings between the Directorate, PMG, and the Integrated Project Team will be held at appropriate intervals to ensure management of the overall project and provide opportunity for review.

Multi-Organization Construction Site Safety Walkthrough – These walkthroughs will occur periodically as determined by the Fermilab Project Manager. The walkthroughs will be completed in accordance with Section 7010 of the Fermilab Environment Safety and Health Manual (FESHM). A copy of the procedure is included in Appendix B of this Project Plan.

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APPENDIX D



Design

- Basis of Design
- Conceptual Drawings

CDR - 1	Site Plan	CDR - 21	Structural Caisson Plan
CDR - 2	Landscape Plan	CDR - 22	1 st Floor Structural Plan
CDR - 3	1 st Floor Plan	CDR - 23	2 nd Floor Framing Plan
CDR - 4	2 nd & 3 rd Floor Plan	CDR - 24	3 rd Floor Framing Plan
CDR - 5	Elevations	CDR - 25	Roof Framing Plan
CDR - 6	Sections	CDR - 26	3-D Rendering - Structural
CDR - 7	Sections		
CDR - 8	Enlarged Plans	CDR - 27	1st Floor Mechanical
CDR - 9	Enlarged Elevations	CDR - 28	2nd Floor Mechanical
CDR - 10	Wall Sections	CDR - 29	3rd Floor Mechanical
CDR - 11	Wall Sections	CDR - 30	Roof Plan
CDR - 12	Wall Sections	CDR - 31	Mechanical Riser Diagrams
CDR - 13	Wall Sections		
CDR - 14	Details	CDR - 32	1st Floor Electrical Plan
CDR - 15	Details	CDR - 33	2nd Floor Electrical Plan
CDR - 16	Lunchroom Perspectives	CDR - 34	3rd Floor Electrical Plan
CDR - 17	Office Layout – Option A	CDR - 35	Electrical Riser Diagrams
CDR - 18	Office Layout – Option B		
CDR - 19	Office Layout – Option C	CDR - 36	1st Floor Plumbing Plan
CDR - 20	Office Layout – Option D	CDR - 37	2nd Floor Plumbing Plan
		CDR - 38	3rd Floor Plumbing Plan
		CDR - 39	Roof Plumbing Plan
		CDR - 40	Plumbing Riser Diagrams
		CDR - 41	Radiation Safety Plan
		CDR - 42	Radiation Safety Sections
		CDR - 43	Radiation Safety Sections

- Soil Borings Report

The following data was compiled as a Basis of Design for design of the building systems.

A.1 REFERENCE MATERIALS

Following are a list of applicable codes and standards followed for the design of the OTE Building.

A.1.1 Applicable Codes

- Illinois Accessibility Code, State of Illinois, Capital Development Board, April 24, 1997
- Illinois Plumbing Code
- NFPA 101, Life Safety Code
- (ICC) International Building Code 2009
- (ICC) International Plumbing Code 2009
- (ICC) International Mechanical Code 2009
- (ICC) International Fuel Gas Code 2009
- (ICC) International Fire Code 2009
- (NEC) National Electrical Code 2005
- (ICC) International Energy Conservation Code 2009
- 2005 National Electrical Code NFPA 70
- 2007 National Fire Alarm Code NFPA 72

A.1.2 Applicable Standards

- NFPA 13 – Standard for the Installation of Sprinkler Systems
- NFPA 14 – Standard for Standpipe Systems
- NFPA 20 – Standard for the Installation of Centrifugal Fire Pumps
- American Society of Civil Engineers – SEI/ASCE 7-05 Minimum Design Loads for Buildings and Other Structures
- American Concrete Institute 318-08/318R-08: Building Code Requirements for Structural Concrete and Commentary
- American Institute of Steel Construction – Manual of Steel Construction 13th Edition – Load and Resistance Factor Design
- American Institute of Steel Construction – Steel Design Guide Series, Design Guide 11: Floor Vibrations Due To Human Activity
- ASHRAE Standard 90.1 – 2007 Energy Standard for Buildings Except Low-Rise Residential Buildings
- ASHRAE Standard 62.1 – 2007 Ventilation for Acceptable Indoor Air Quality
- ASHRAE 55 – 2004. Thermal Environmental Conditions for Human

Occupancy

A.2 STRUCTURAL

A.2.1 Loads

A.2.1.1 Gravity Loading

Superimposed dead loads and live loads are general and pertain to both beam and column design. Some structural elements have specific loading demands in addition to the loads specified here. Live load reduction factors will be used for the design of columns and foundations for all occupiable floor loads less than 100 pounds per square foot. Specific concentrated loads to be determined include the following:

- Elevators
- Overhead doors at Tech spaces
- 3-ton capacity crane in Light Tech spaces – either an overhead bridge crane or a mobile gantry crane, currently identified as an alternate scope addition in this report
- Additional loading TBD

A.2.1.2 Dead Loading

All dead loads are to be calculated as the self weight of the structure.

A.2.1.3 Superimposed Dead Loading

Superimposed dead loads will be determined from the architectural design and the design of other building systems. Preliminary values for typical superimposed dead loading are indicated in the table below.

Loading Type	Loading Value (PSF)
Floor finishes	15
Ceiling and services, typical	10
Partitions	20
Equipment pads	TBD
Green roof assembly	TBD
Cladding (measured on a vertical face)	15
Others TBD	

A.2.1.4 Floor Live Loading

Occupancy/Use	Loading Value (PSF)
Public spaces	100

Egress corridors and stairs	100
Offices	
General (reducible)	50
Partitions	20
Mechanical equipment rooms – specific loading from heavy equipment will be accommodated in design	150
Light Tech spaces	
General (reducible)	600
Moveable partitions	20
Light storage rooms	125
Heavy storage rooms	250
Roof, with the exception of snow drift loading – see following section	30
Accessible roof gardens	100

A.2.1.5 Snow Loading

Snow loads will be in accordance with Section 7 of ASCE 7. Values to be used in snow load calculation per Chapter 7 of ASCE 7 are indicated in the table below. Special drift areas shall be marked on the plans.

Factor	Symbol	Value
Ground snow load	P_g	25 psf
Exposure factor	C_e	0.9
Thermal factor	C_t	1.0
Importance factor	I	1.1

A.2.1.6 Wind Loading

Wind loads for the preliminary design of the façade support structures as well as the lateral stability system of the building will be in accordance with IBC 2006 and Section 6 of ASCE 7. Values to be used in wind load calculation per Chapter 6 of ASCE 7 are indicated in the table below.

Factor	Symbol	Value
Basic Wind Speed	V	90 mph
Importance Factor	I	1.00
Building Category		II
Exposure		C
Gust Factor	G	0.85
Enclosure		Enclosed
Directionality Factor	K_d	0.85

A.2.1.7 Seismic Loading

Seismic loads for the design of the Fermilab IARC facility will be in accordance with IBC 2006 and ASCE 7.

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A.2.1.8 Deflection

Vertical deflection of typical composite floor beams shall be limited as follows:

$$\text{Live load deflection} < L / 360$$

$$\text{Total deflection} < L / 240$$

Where L = beam span (for cantilevers, L = 2x the cantilever length)

Vertical deflection of composite floor beams vertically supporting façade members shall be limited as follows:

$$\text{Post composite deflection} < L / 360 \text{ or } \frac{3}{4}''$$

Vertical deflection of roof structures shall be limited as follows:

$$\text{Total deflection} < L / 180$$

$$\text{Live load deflection} < L / 240$$

Lateral deflection of structures shall be limited as follows:

$$\text{Lateral wind deflection} < H / 500 \text{ (over full building height)}$$

$$\text{Lateral wind deflection} < H / 400 \text{ (inter-story drift)}$$

$$\text{Lateral seismic deflection} < H / 50, \text{ and compatible with building finishes}$$

A.2.2 Floor Vibration Criteria

The susceptibility of the floors to excessive vibrations due to walking excitation shall be assessed according to the provisions set forth by AISC Steel Design Guide, "Floor Vibrations Due to Human Activity," (Murray, Allen, Ungar, 1997). The vibration acceptance criteria shall be based on an "Office" occupancy per Table 4.1 of that publication.

A.3 MECHANICAL

A.3.1 Design Criteria

A.2.1.1 Temperature/Occupancy

Interior spaces will be designed in accordance with the following criteria

- Office Spaces
 - Winter Design 72° F (±2)
 - Summer Design 75° F(±2)/50% RH Maximum
 - 1 person/150 SF
- Tech
 - Winter Design 72° F (±2)
 - Summer Design 75° F(±2)/50% RH Maximum
 - 1 person/300 SF
- Lobbies
 - Winter Design 72° F(±2)
 - Summer Design 75° F(±2)/50% RH Maximum
 - 1 person/50 SF
- Classrooms and Conference Rooms
 - Winter Design 72° F(±2)
 - Summer Design 75° F(±2)/50% RH Maximum
 - 1 person/25 SF
- Lunch Room
 - Winter Design 72° F(±2)
 - Summer Design 75° F(±2)/50% RH Maximum
 - 1 person/25 SF
- Back of House (Mech/Elec rooms)
 - Winter Design 60° F(±2)
 - Summer Design – No Cooling
 - Unoccupied

A.2.1.2 Ventilation

Outside air ventilation will be based on the requirements as set out in ASHRAE 62.1-2004. When outside air is supplied to an interior, it has to be cooled or heated for large parts of the year and strategies to minimize the quantity of outside air, whilst maintaining internal air quality standards, can save significant amounts of energy. Demand Control Ventilation will be implemented to make sure that minimum ventilation air is provided to each zone at all times.

Occupancy values shall be based on those suggested by ASHRAE 62.1-2007 or based on actual where specific occupancy can be determined.

A.2.1.3 Building Envelope

The following criteria for the selection of the building envelope components are targeted.

- Roof – Maximum $U=0.033$ Btu/sf*°F (R=30 or better)
- Exterior Walls – Maximum $U=0.05$ Btu/sf*°F (R=20 or better)
- Vision Glass
 - Shading Coefficient – Maximum 0.32
 - U-Value 0.29 Btu/sf*°F (Center of Glass)
 - U-Value 0.35 Btu/sf*°F (Overall glass/frame combined)
- Spandrel Glass
 - Shading Coefficient – Maximum 0.32
 - U-Value 0.05 Btu/sf*°F
 - U-Value 0.10 Btu/sf*°F (Overall glass/frame combined)
 -

A.2.1.4 Lighting/Equipment

- Office Space
 - Lighting 1.0 Watts/SF
 - Equipment 1 Computer/Person
 - Miscellaneous Equipment – 0.5 Watts/SF
- Lite-Tech
 - Lighting - 5.0 Watts/SF
 - Computers - 1 Per Person (150 Watts)
 - Miscellaneous Equipment – 0.5 Watts/SF
- Lobbies
 - Lighting 1.0 Watts/SF
 - Miscellaneous Equipment – 0.5 Watts/SF
- Classrooms and Conference Rooms
 - Lighting 1.0 Watts/SF

- Computers 1 Per Person (150 Watts)
- Miscellaneous Equipment – 1.5 Watts/SF
- Lunch Room
 - Lighting – 1.4 Watts/SF
 - Miscellaneous Equipment – 1.5 Watts/SF
- Back of House (Mech/Elec rooms)
 - Lighting 1.0 Watts/SF

A.2.1.5 Duct and Pipe Sizing Criteria

The maximum duct velocities in ductwork are the following:

Service	Maximum Velocity	Pressure Class	Seal Class
Medium pressure ductwork from AHU discharge to terminal unit	1,800 FPM	4"	A
Main ducts from air handling units in mechanical rooms and in shafts:	1,500 FPM	2"	B
Main branch ducts on each floor:	1,000 FPM	2"	B
Secondary branch ducts:	750 FPM	2"	B
Branch ducts to and from diffuser and grilles, etc.:	500 FPM	2"	B
Exhaust	1500	2" (Negative)	B

Hydronic piping systems (chilled water, heating hot water, condensate drain) shall be Type L copper for sizes 2 ½" and smaller and Schedule 40 steel for sizes 3" and larger. All chemical treatment piping shall be PVC.

On chilled water piping, all insulation shall be a closed cell elastomeric or cellular glass type with vapor barrier and PVC jacket. If piping is run in an exterior space or in equipment rooms, an aluminum jacket shall be provided. On all condensate drain piping, provide elastomeric insulation with vapor barrier and PVC jacket.

In hydronic systems, provide manual air vents at all high points, manual drain valves at all low points, and automatic air vents at the high points of all risers.

The following design criteria have been used in pipe sizing:

Pipe Size (inches)	Velocity (m/s)	Friction (ft H ₂ O/100 ft)	Max. Flow (GPM)
3/4"	2	2.81	3
1	2.35	2.73	6
1-1/4"	2.82	2.91	11
1-1/2"	3.44	3.35	19
2"	3.97	3.08	38
2-1/2"	4.52	2.98	67
3"	4.99	3.11	115
4"	5.85	3.0	232
6"	8.26	3.51	744
8"	8.98	2.05	1400

A.4 PLUMBING

A.4.1 Domestic Water System

The building's domestic cold and hot water system will be sized based on Section 604 of the 2009 International Plumbing Code.

Domestic cold and hot water system pipe sizing will be based on a maximum velocity of 6 feet per second and a maximum allowable pressure loss of 2 psi per 100 feet.

System will be designed to prevent water hammer conditions by providing shock arrestors for batteries of flush valve fixtures, and for quick closing valves.

Wall hydrants will be provided at intervals around the building perimeter and also in mechanical rooms. External wall hydrants will be supplied from the ICW service.

Isolation valves will be provided at all pieces of equipment, the base of all main risers, at branches to each floor and at main bathroom areas and groups of plumbing fixtures.

Valved and capped connections will be provided at each floor to allow the future installation of plumbing fixtures that may be outside the core areas.

Tech areas will be provided with capped cold and hot water connections and floor drains.

Backflow devices will be located on all connections to HVAC equipment.

A.4.2 Sanitary Waste and Vent System

The building sanitary waste and vent system will be sized based on the International Plumbing Code, Chapter 7, Table 709.1, Table 710.1.1 and Table 710.1.2.

Horizontal drainage piping installation will be installed with uniform slopes. The minimum slope shall be based on Table 704.1 of the International Plumbing Code.

Capped connections will be provided to allow the future installation of plumbing fixtures that may be outside the core areas.

A.4.3 Storm Drainage System

Roof drainage system shall be sized based on Section 1106 of the 2009 Edition of the International Plumbing Code, Table 1106.2 and Table 1106.3.

A roof drainage system will be provided for the roof of the building Parapet scuppers are provided to handle overflow drainage requirements.

A.4.4 Plumbing Fixtures

Fixtures will be provided with chromium-plated brass trim and individual stop valves.

Appropriate 'barrier free' fixtures will be provided in accordance with the disabled access codes.

A.4.5 Insulation

All hot water piping system will be insulated.

All storm drain piping below roof will also be insulated up to connection with risers.

All piping, components, and equipment subject to sweating or heat loss will be insulated in accordance with the local energy code with appropriate thickness of insulation.

Additional insulation will be provided to ensure that noise transmission from any overhead and / or in wall plumbing systems are mitigated.

A.4.6 Miscellaneous

New Fire Hydrants shall be Waterous 5 1/4 with 1 - 4.5" steamer port with NH Threads, and 2- 2.5" hose connections with NH Threads.

All underground bolts shall be stainless steel.

Post Indicators Valves (PIV's) shall be American Flow Control Mode IP. 71

Gate Valves shall be American Flow Series 2500 Resilient Wedge Gate Valve

Mechanical joint fittings attached to HDPE Water Main or PVC Water Main shall be restrained joints by Megalug, with a internal stainless steel stiffener for HDPE Pipe.

A.5 ELECTRICAL

All new equipment and pads shall be placed to maximize the central clearance area for future equipment maintenance and replacement.

A.6 FIRE PROTECTION

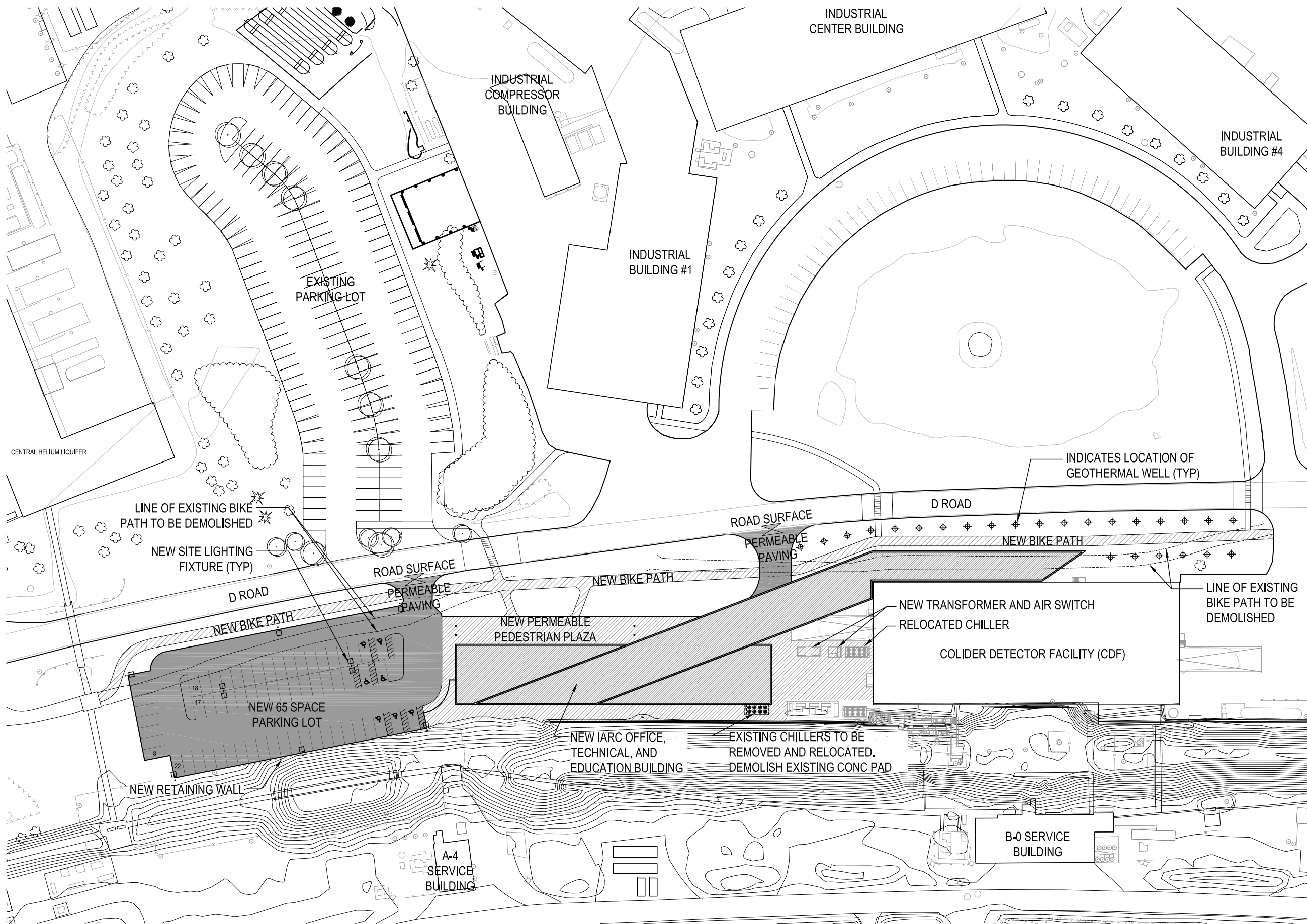
Sprinkler design densities will be provided per NFPA 13 provisions

All areas of the building will be provided with sprinkler protection unless not required by code.

Sprinkler system will be provided with automatic sprinklers, control valves, drain valves, water flow switches, tamper switches and alarm panel.

Each floor or level will be annunciated as a separate zone at the main fire alarm panel.

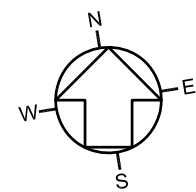
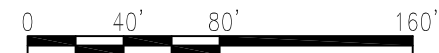
Dry sprinkler systems will be provided for unheated areas

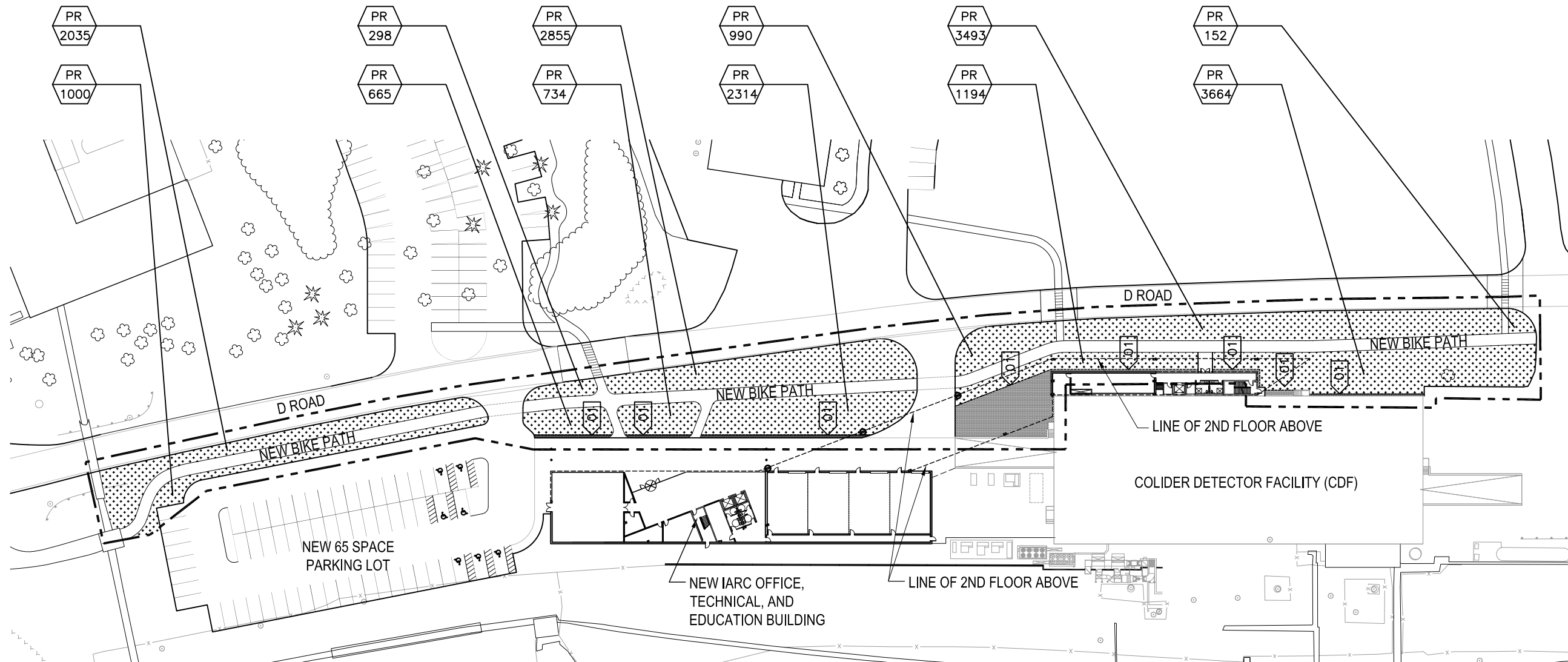


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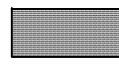



SITE PLAN

SCALE: 1"=80'





LEGEND

-  - NATIVE PLANTS
-  - LANDSCAPE ROCK (DARK GRAY, 12" D, SIZE RANGE 3"-4")
-  - PLANT KEY
- PLANT QUANTITY
-  - STEEL EDGING (3/16" W X 4" D, BLACK)
-  - LIMIT OF WORK (THIS SHEET SHOWS EXTENT OF NEW PLANTING WORK ONLY. SEE SITE PLAN FOR OTHER SITE WORK LIMIT UNDER THIS PROJECT.)

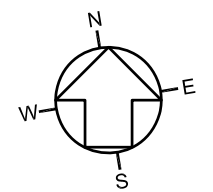
NOTES

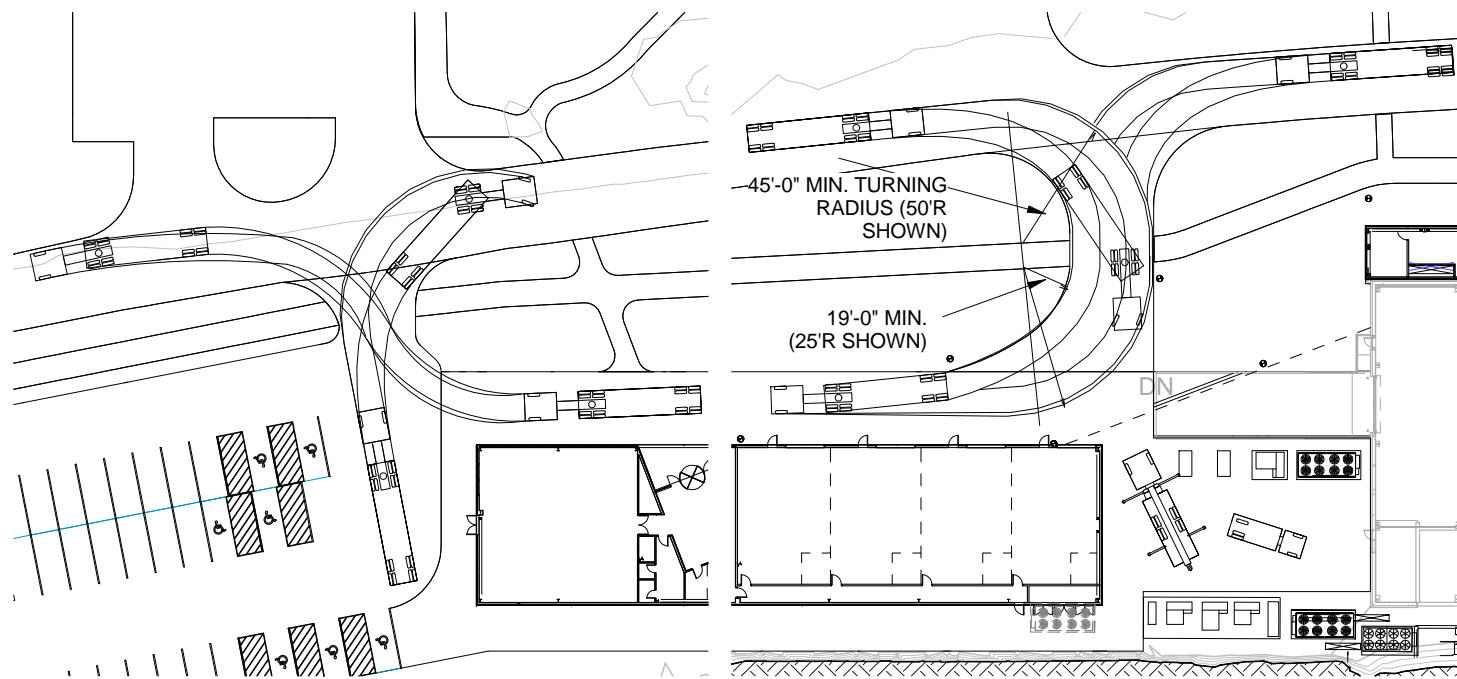
1. RESTORE ALL AREAS DISTURBED BY CONSTRUCTION UNLESS NOTED OTHERWISE. RESTORATION SHOULD INCLUDE 8 FEET MINIMUM BEYOND CONSTRUCTION FENCE.
2. ALL NEW PLANTING BEDS SHALL HAVE FINELY SHREDDED HARDWOOD BARK MULCH, 3" DEPTH. DO NOT COVER GEO-THERMAL WELLS WITH MULCH.
3. SEE SURVEY DRAWING FOR EXISTING CONDITIONS. SEE SITE PLAN FOR INFORMATION ON SITE DEMOLITION WORK.
4. IF A DISCREPANCY EXISTS BETWEEN THE NUMBER OF PLANTS SHOWN IN THE PLANT MATERIALS SCHEDULE AND THE PLANS, THE PLANS SHALL GOVERN.
5. MATCH FINISHED TOP ELEVATION OF MULCH AND LANDSCAPE ROCK WITH FINISHED ELEVATION OF ADJACENT SIDEWALK AND PLAZA.

PLANT MATERIALS SCHEDULE

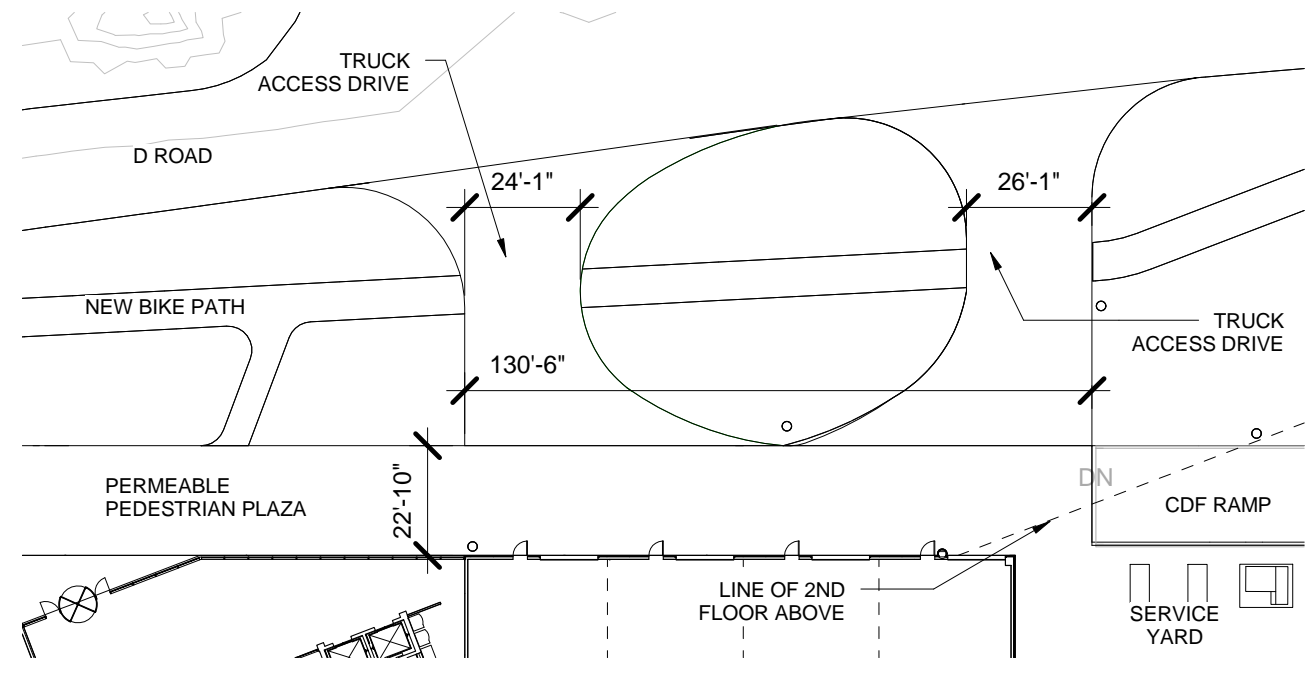
KEY	COMMON NAME / BOTANICAL NAME	QTY	ROOT	SIZE	REMARKS
NATIVE PLANTS					
PR	LITTLE BLUESTEM <i>Schizachyrium scoparium</i>	19,394	CONT.	#1	MIX THESE PLANTS EVENLY IN EACH AREA SHOWN. PLANT AT 15" O.C., TYP. QTY. SHOWN IN EACH AREA INDICATES TOTAL NUMBER OF PLANTS COMBINED.
	PRAIRIE DROPSEED <i>Sporobolus heterolepis</i>				
	PRAIRIE BLAZING STAR <i>Liatris pycnostachya</i>				
	HUSKER RED FOXGLOVE BEARDTONGUE <i>Penstemon digitalis</i> 'Husker Red'				

1 LANDSCAPE PLAN
SCALE: 1"=80'

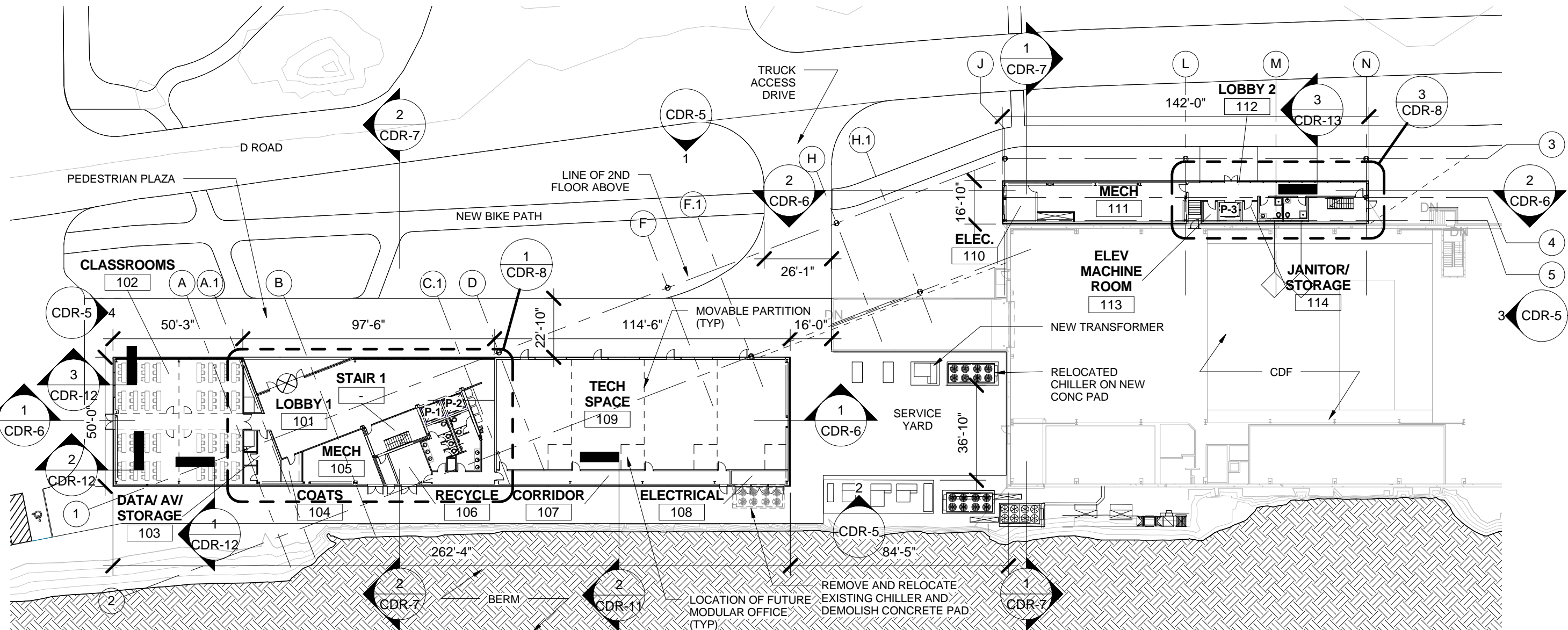




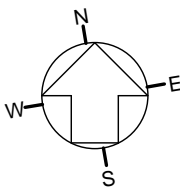
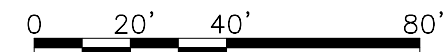
2 TRUCK ACCESS DIAGRAM
SCALE: NTS



3 SERVICE DRIVE ALT. PLAN
SCALE: 1" = 40'-0"



1 1st FLOOR PLAN
SCALE: 1" = 40'-0"



IARC
OFFICE, TECHNICAL, AND EDUCATION BUILDING
1ST FLOOR PLAN

Fermilab

U.S. DEPARTMENT OF ENERGY

DATE

10.06.2010

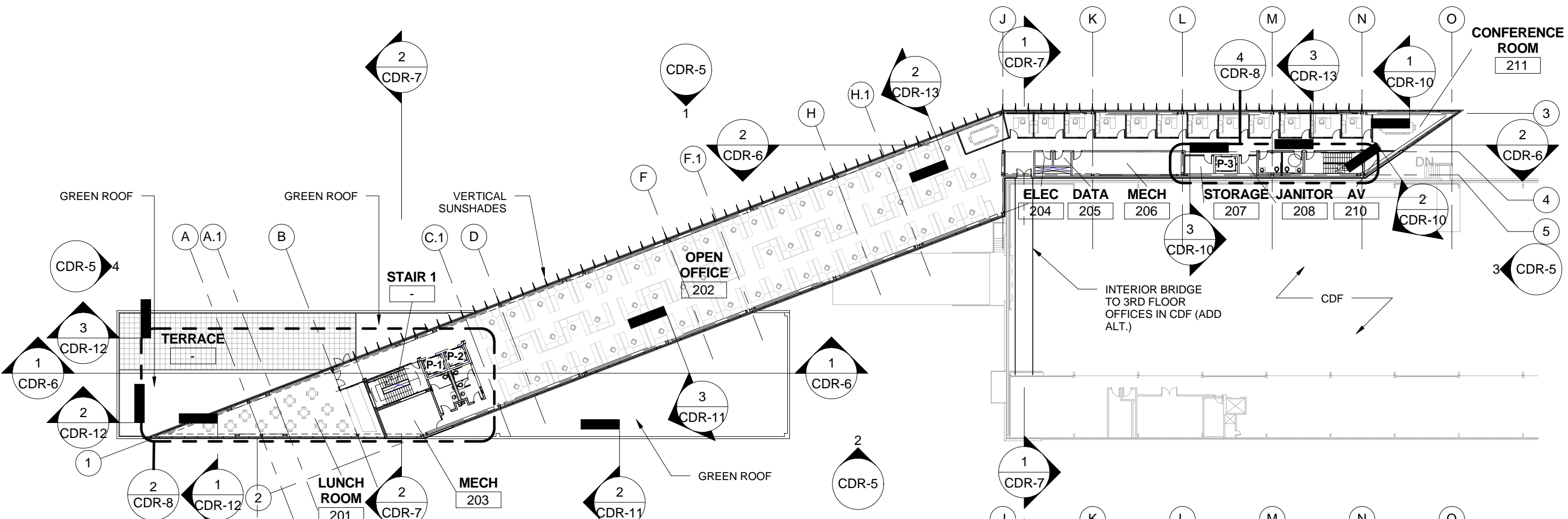
PROJECT NO.

10-8-1

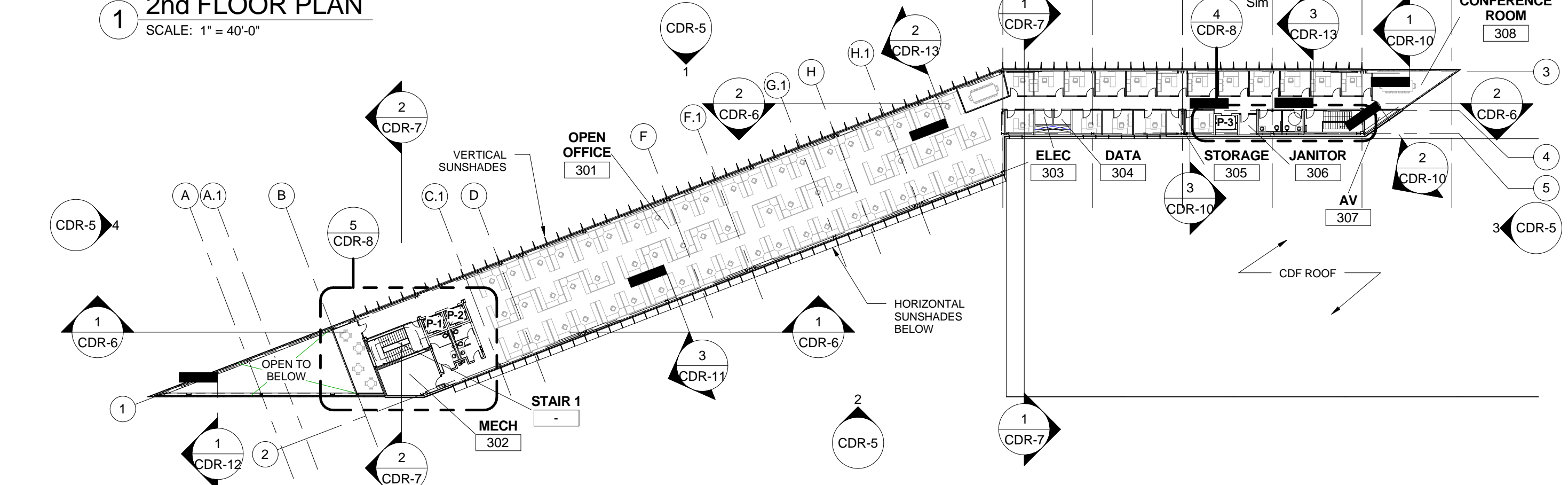
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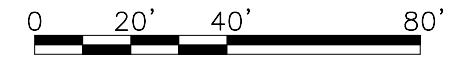
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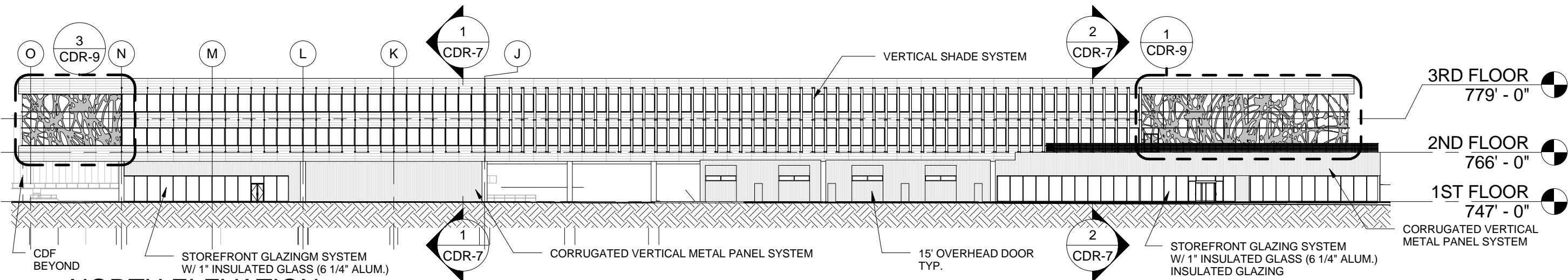


1 2nd FLOOR PLAN
SCALE: 1" = 40'-0"

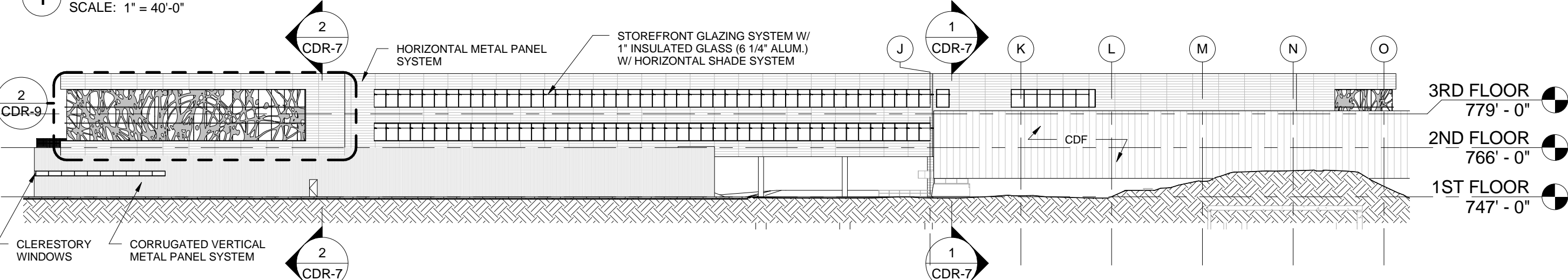


2 3rd FLOOR PLAN
SCALE: 1" = 40'-0"

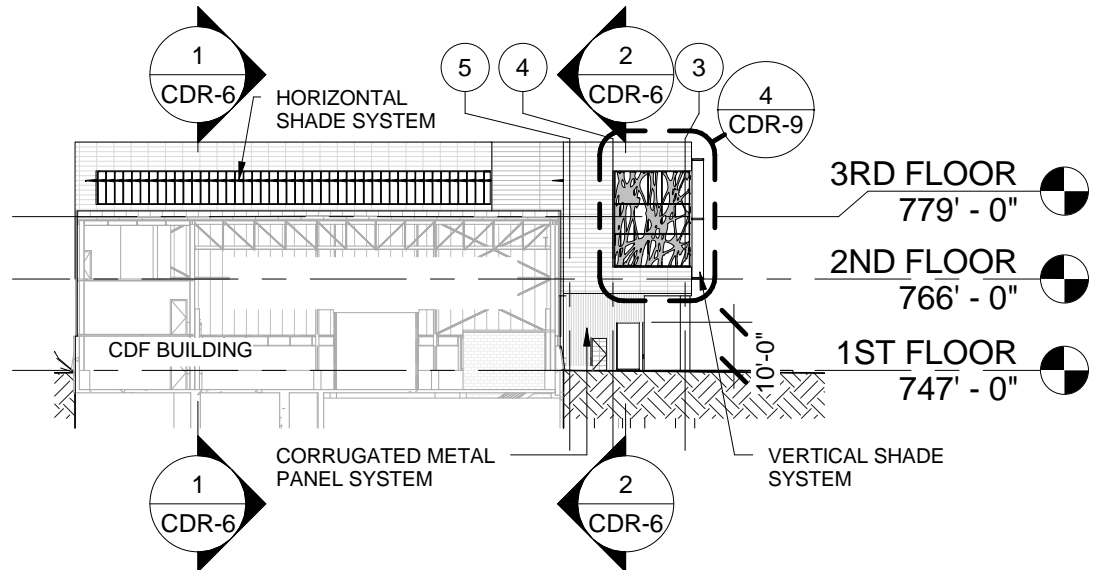




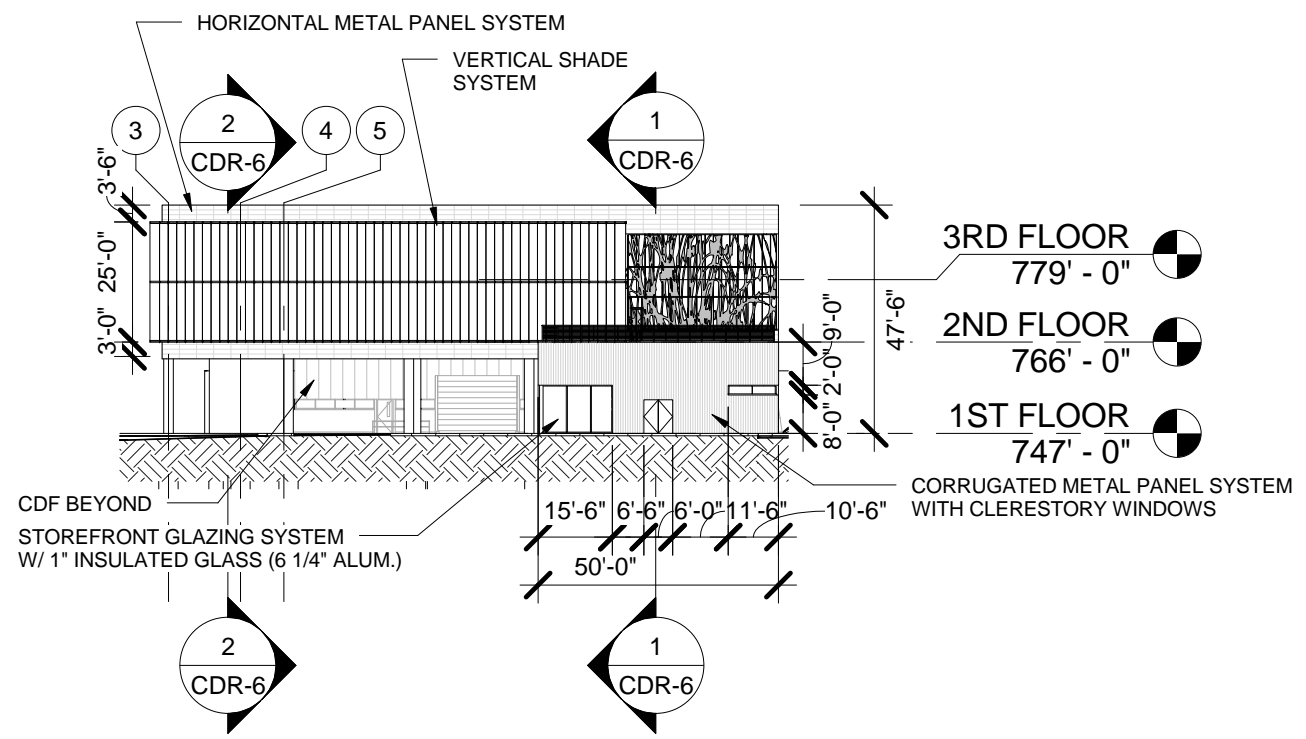
1 NORTH ELEVATION
SCALE: 1" = 40'-0"



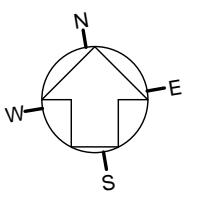
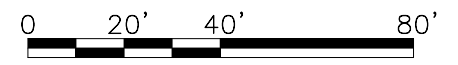
2 SOUTH ELEVATION
SCALE: 1" = 40'-0"

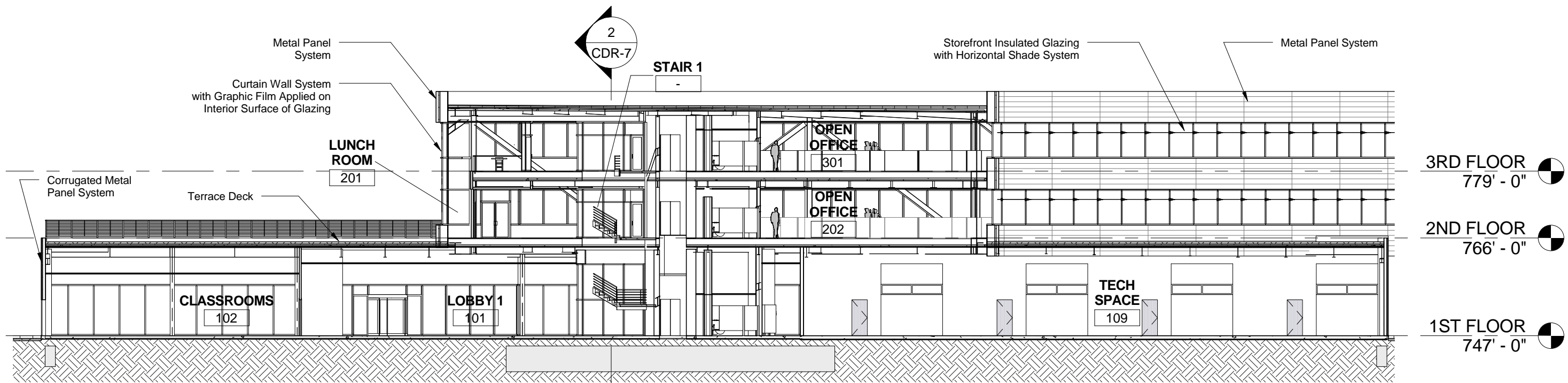


3 EAST ELEVATION
SCALE: 1" = 40'-0"



4 WEST ELEVATION
SCALE: 1" = 40'-0"



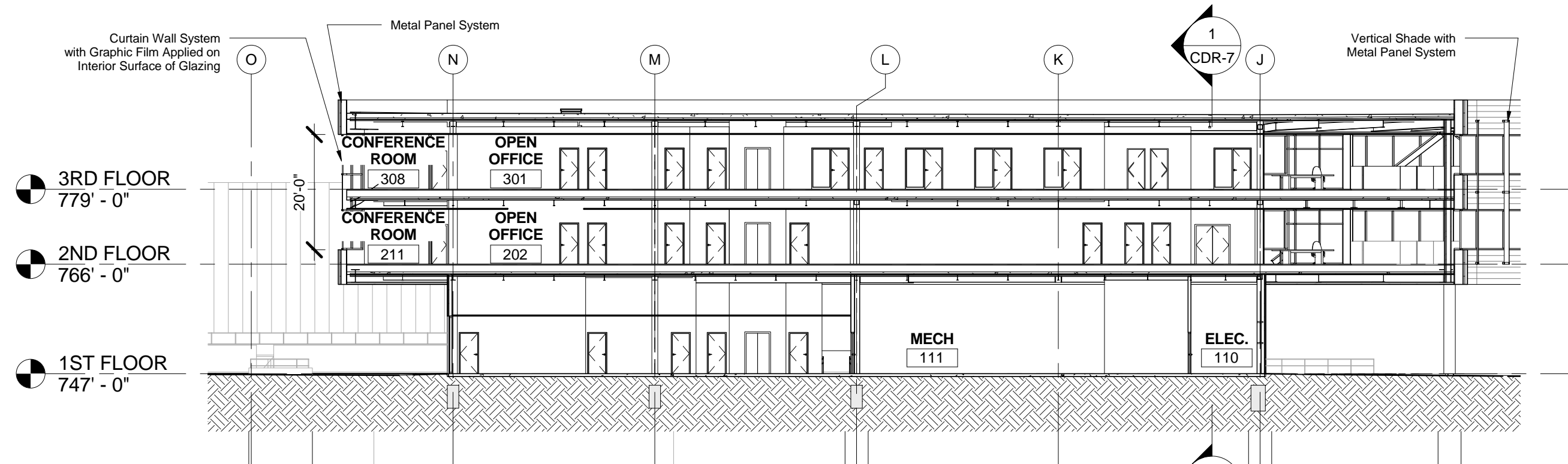


3RD FLOOR
779' - 0"

2ND FLOOR
766' - 0"

1ST FLOOR
747' - 0"

1 BUILDING SECTION - E/W 1
SCALE: 1" = 20'-0"

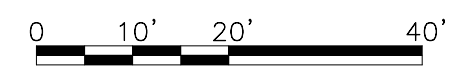


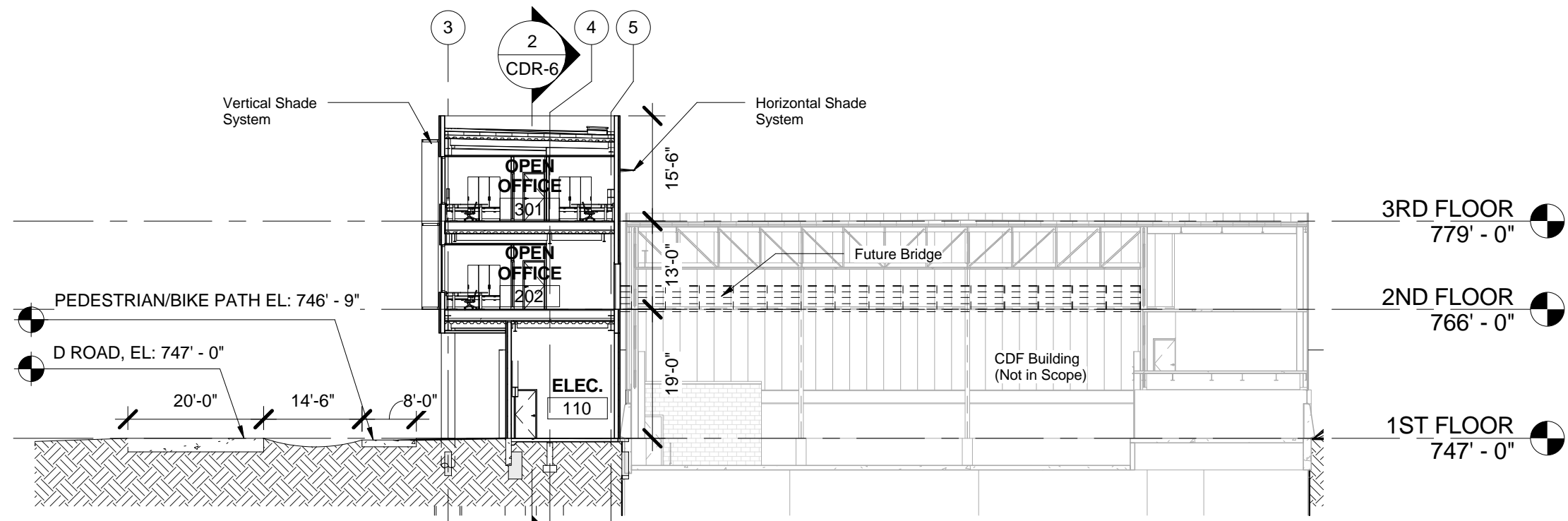
3RD FLOOR
779' - 0"

2ND FLOOR
766' - 0"

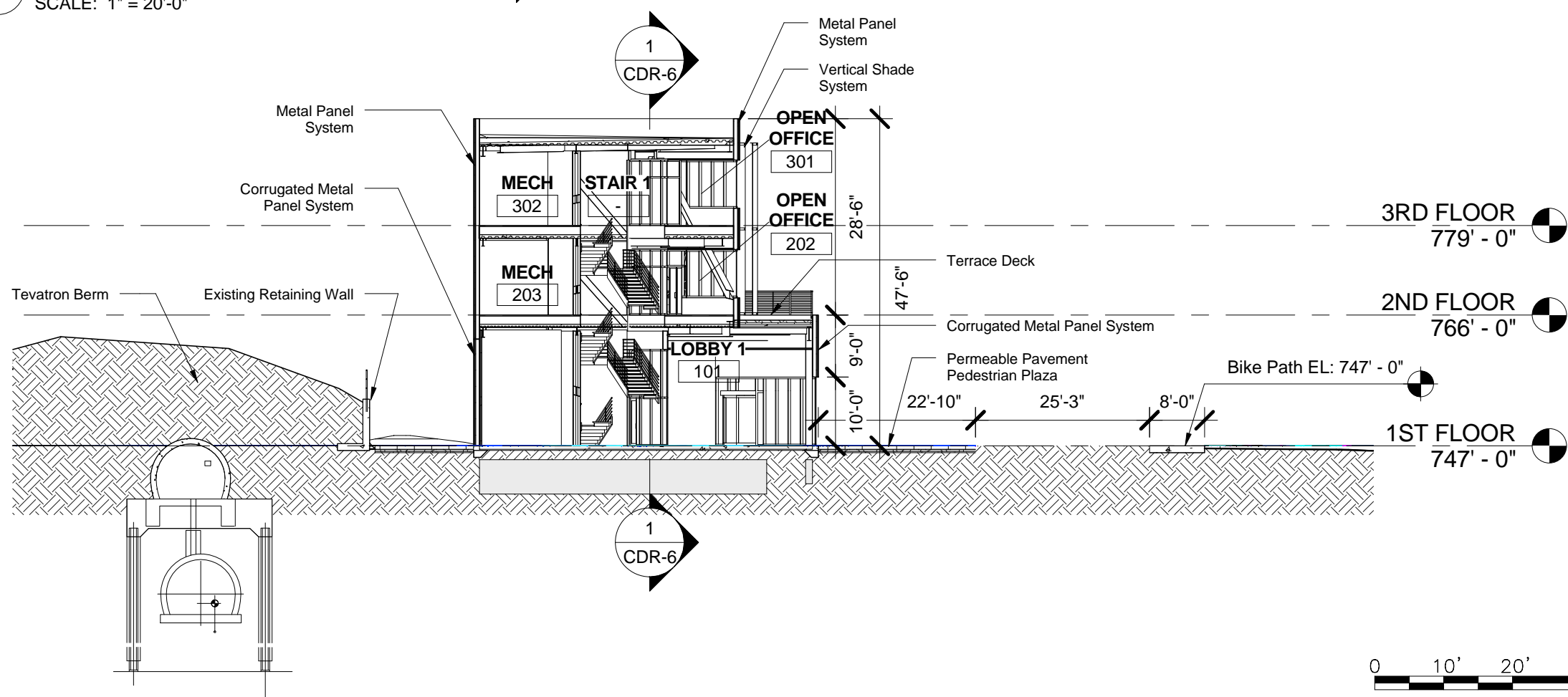
1ST FLOOR
747' - 0"

2 BUILDING SECTION - E/W 2
SCALE: 1" = 20'-0"

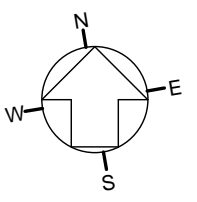
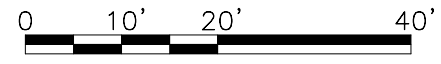


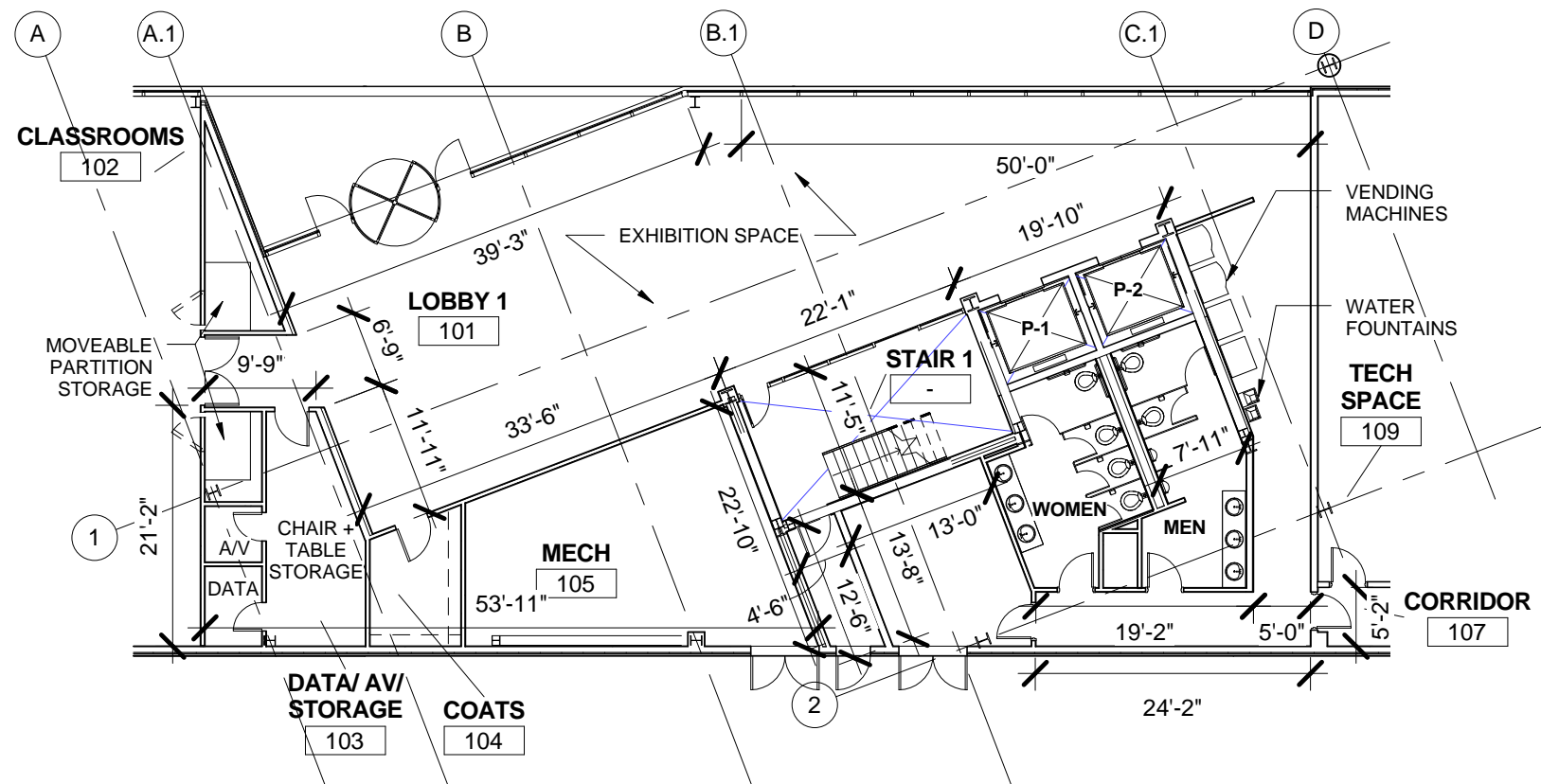


1 BUILDING SECTION - N/S 1
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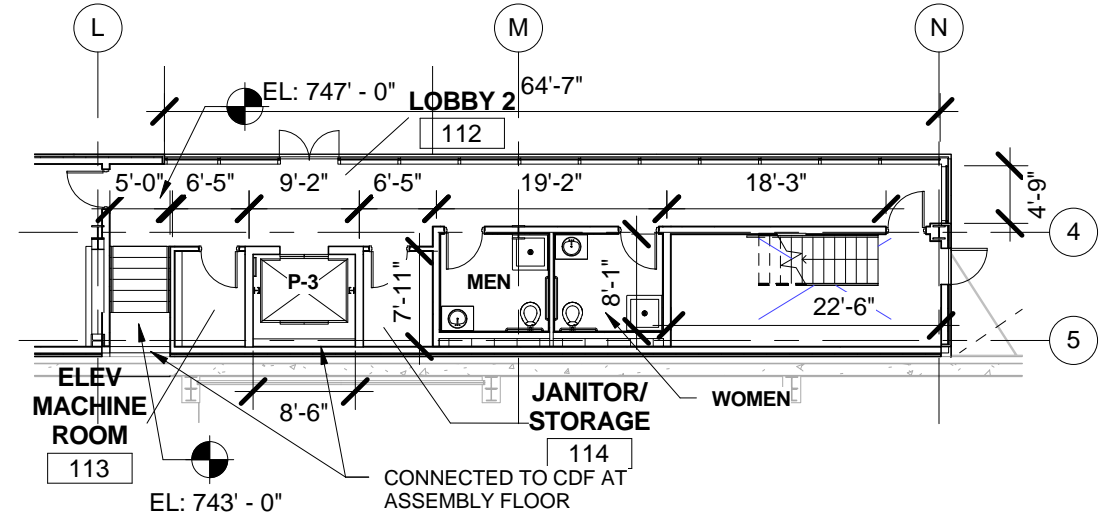
2 BUILDING SECTION - N/S 2
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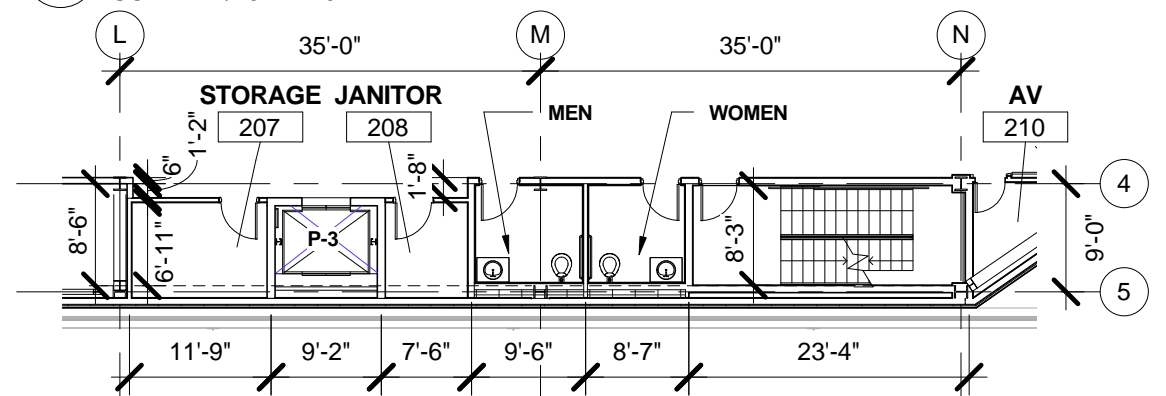
ENLARGED PLAN - WEST LOBBY

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



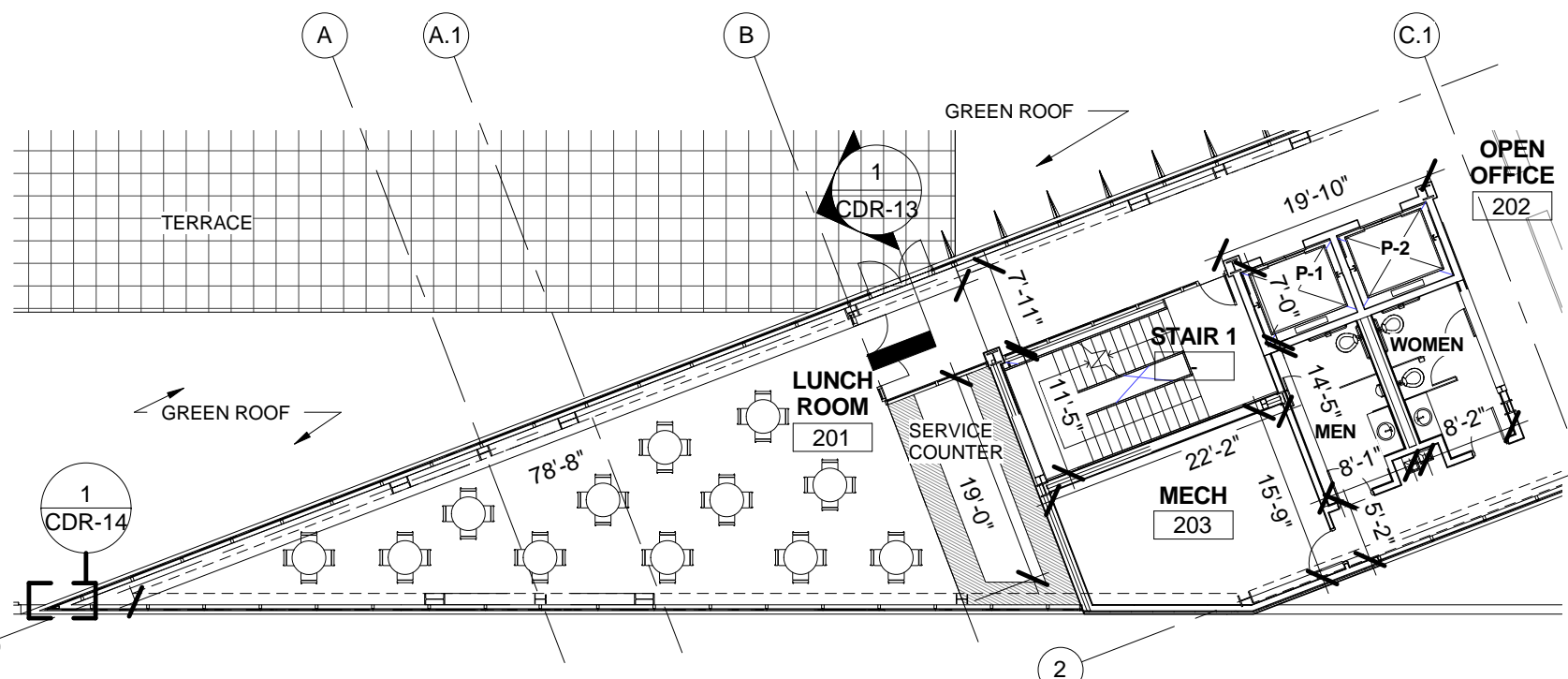
ENLARGED PLAN - EAST LOBBY

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



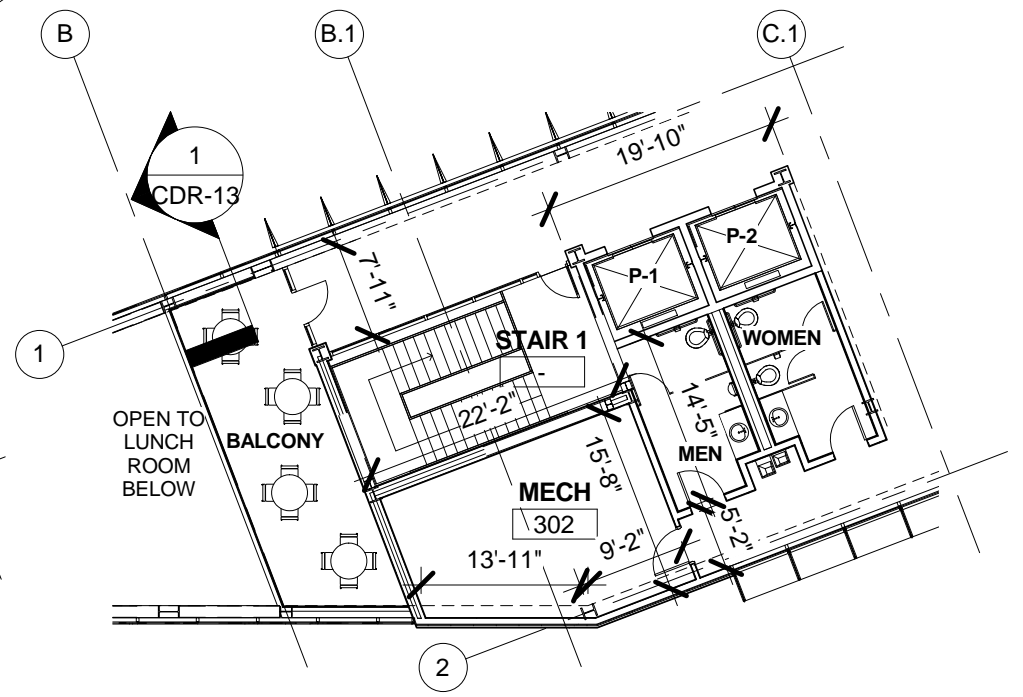
ENLARGED PLAN - 2ND+3RD FLR, EAST CORE

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



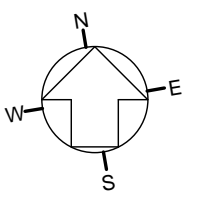
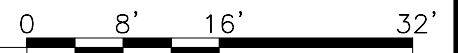
ENLARGED PLAN - 2ND FLR CORE AND LUNCHROOM

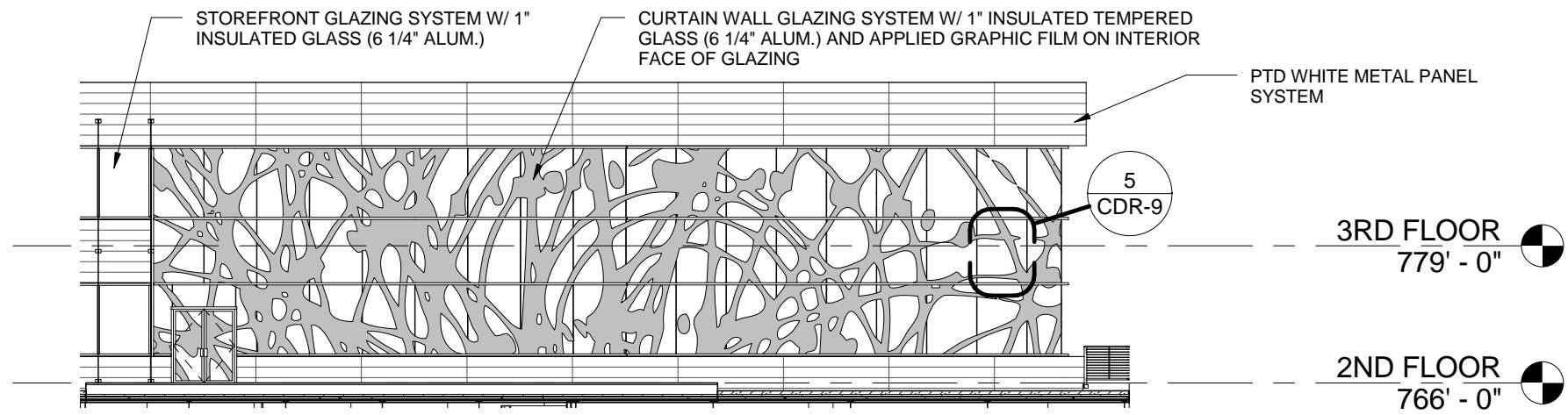
2 SCALE: 1/16" = 1'-0"



ENLARGED PLAN - 3RD FLR CORE AND LUNCHROOM

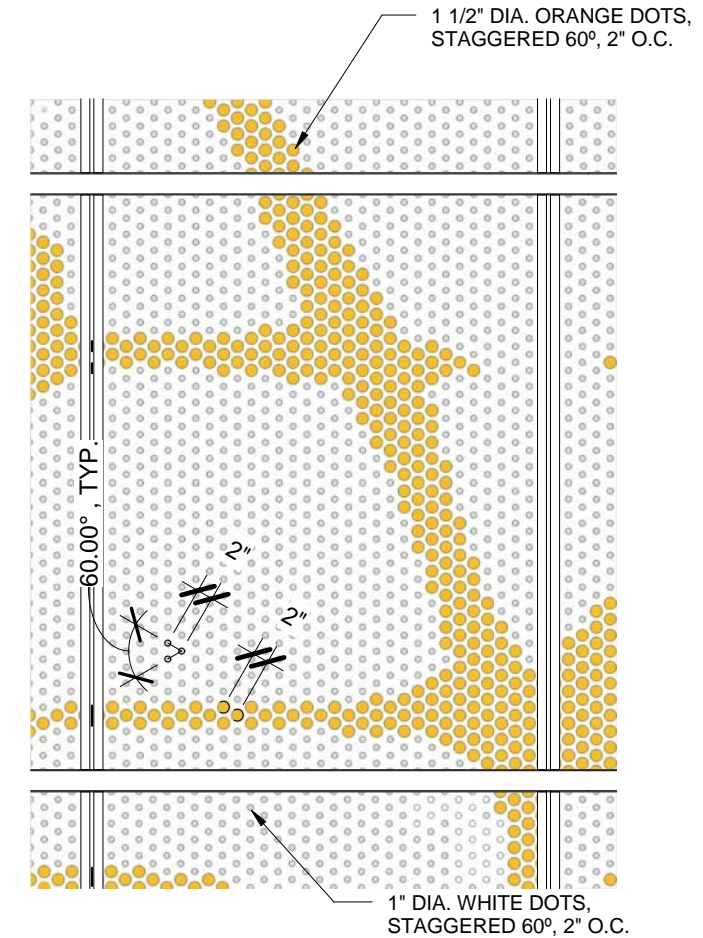
5 SCALE: 1/16" = 1'-0"





ENLARGED NORTH ELEVATION - LUNCH ROOM

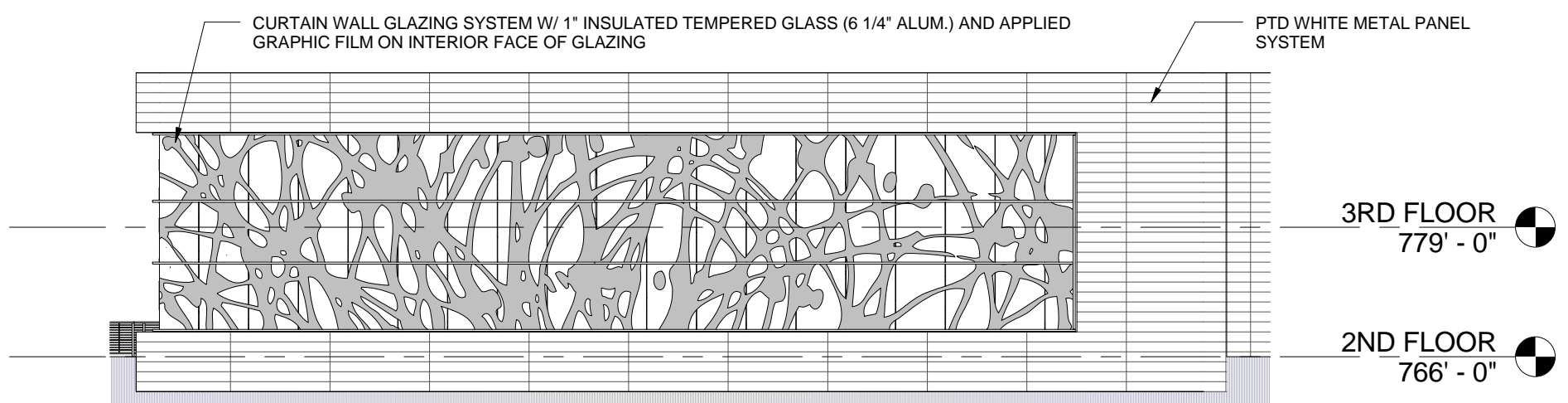
1 SCALE: 1/16" = 1'-0"



* GENERAL NOTE: TRANSPARENT GRAPHIC FILM WITH OPAQUE PRINT AS SHOWN TO BE INSTALLED AT INTERIOR FACE OF GLAZING. MOCK-UP TO BE PROVIDED AND APPROVED BY OWNER REPRESENTATIVE BEFORE INSTALLATION.

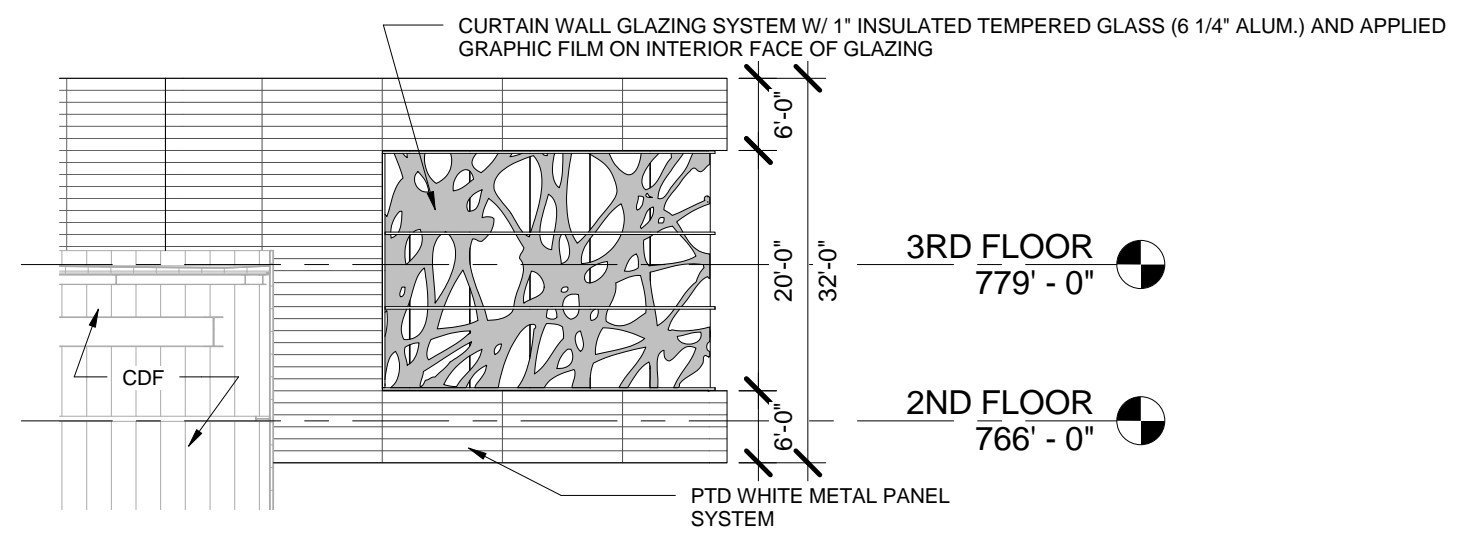
DETAIL - APPLIED GRAPHIC FILM

5 SCALE: 1/2" = 1'-0"



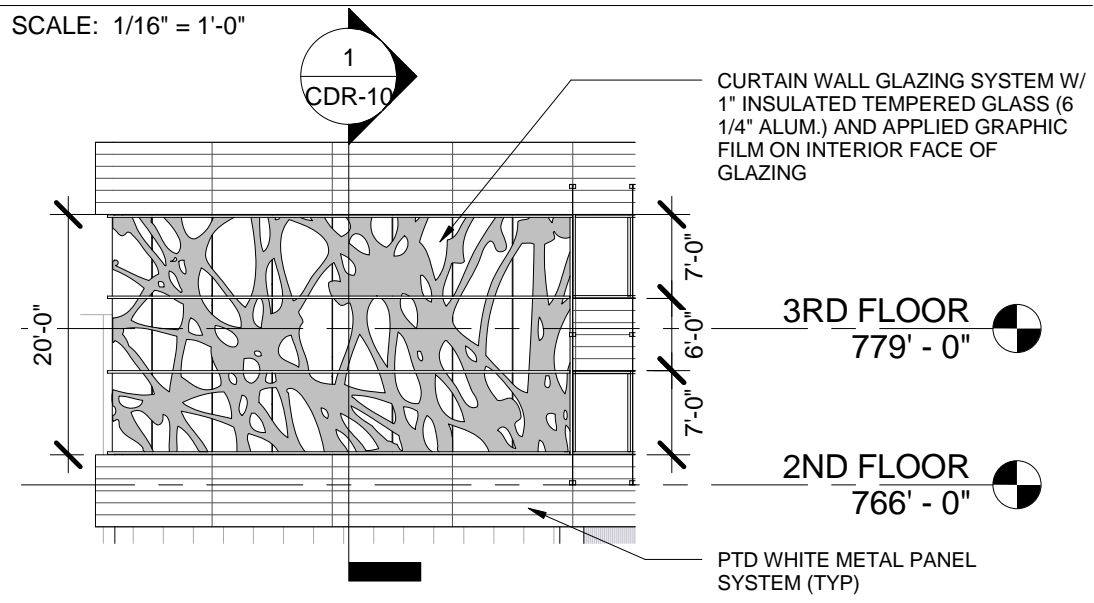
ENLARGED SOUTH ELEVATION - LUNCH ROOM

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



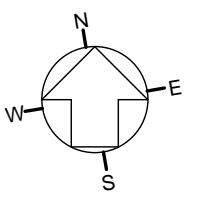
ENLARGED SOUTH ELEVATION - CONFERENCE ROOM

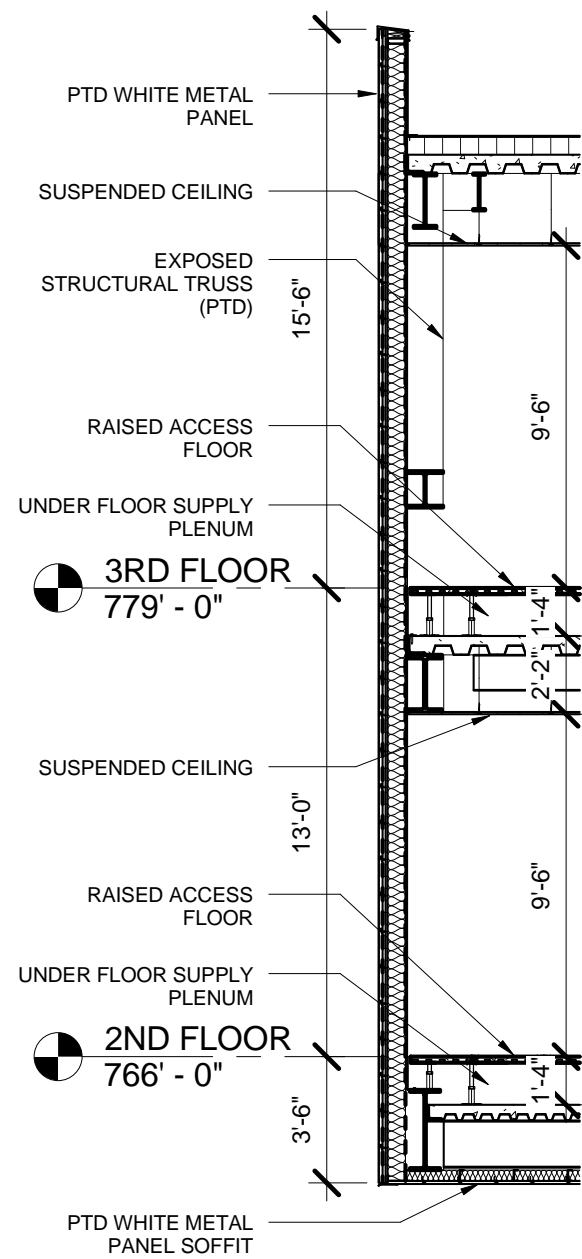
4 SCALE: 1/16" = 1'-0"



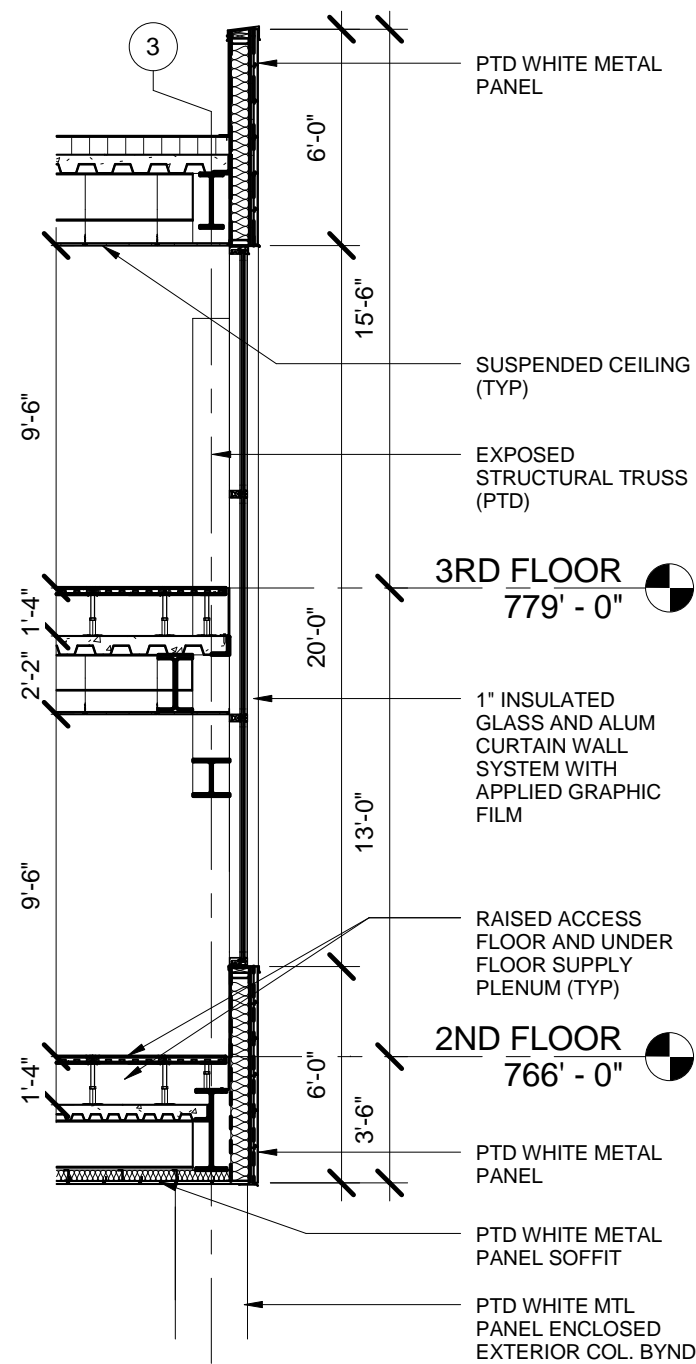
ENLARGED NORTH ELEVATION - CONFERENCE ROOM

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

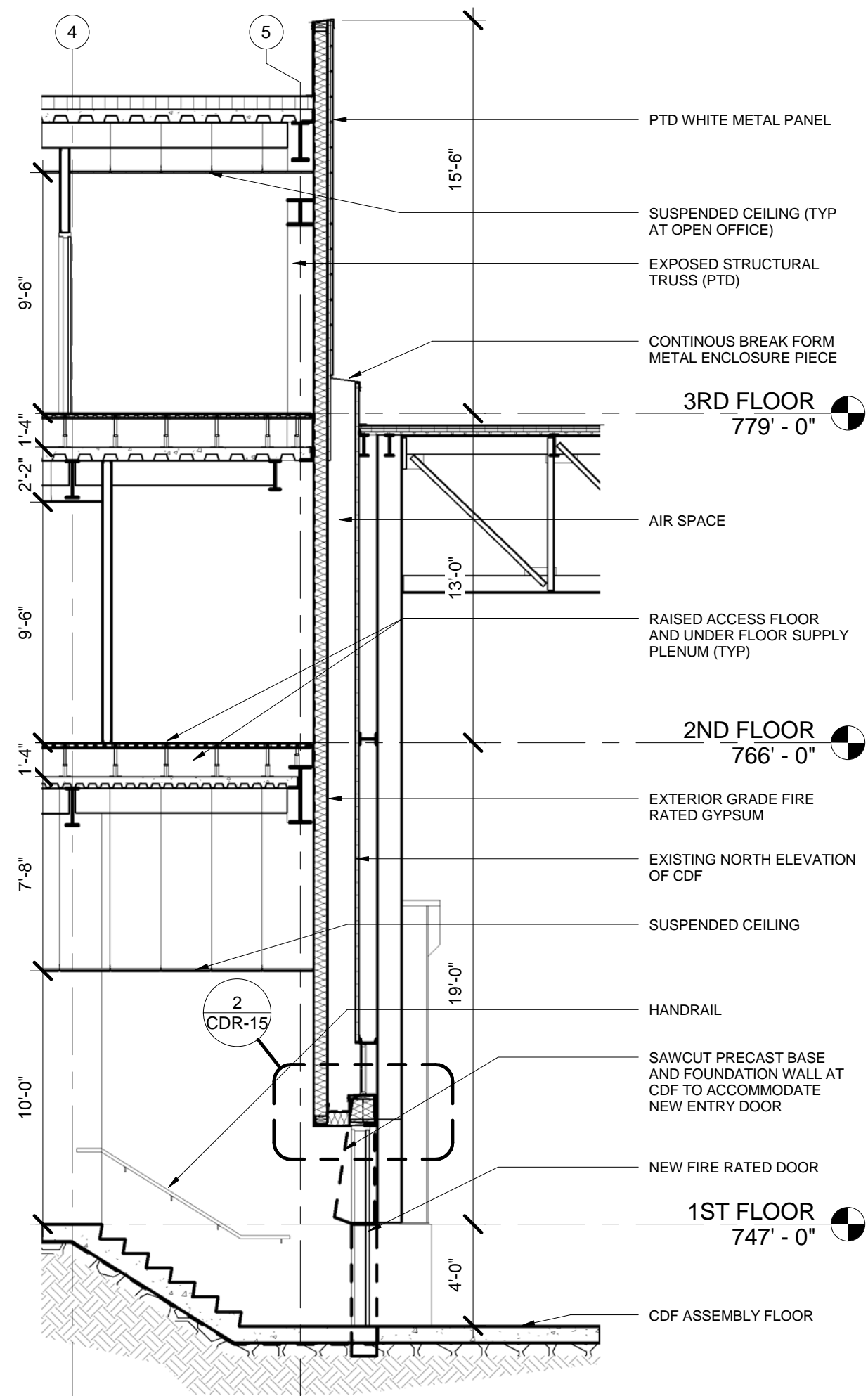




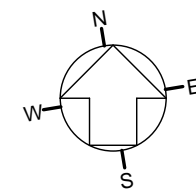
2 Wall Section 01
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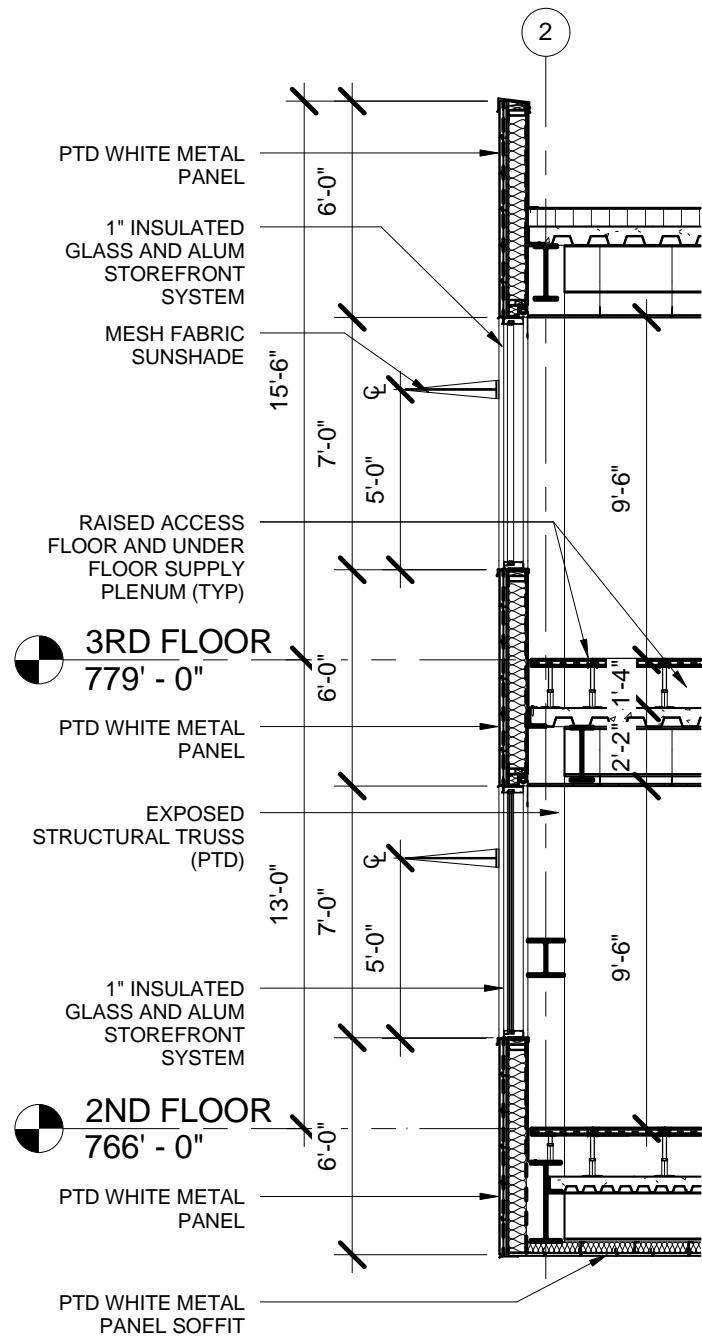


1 Wall Section 02
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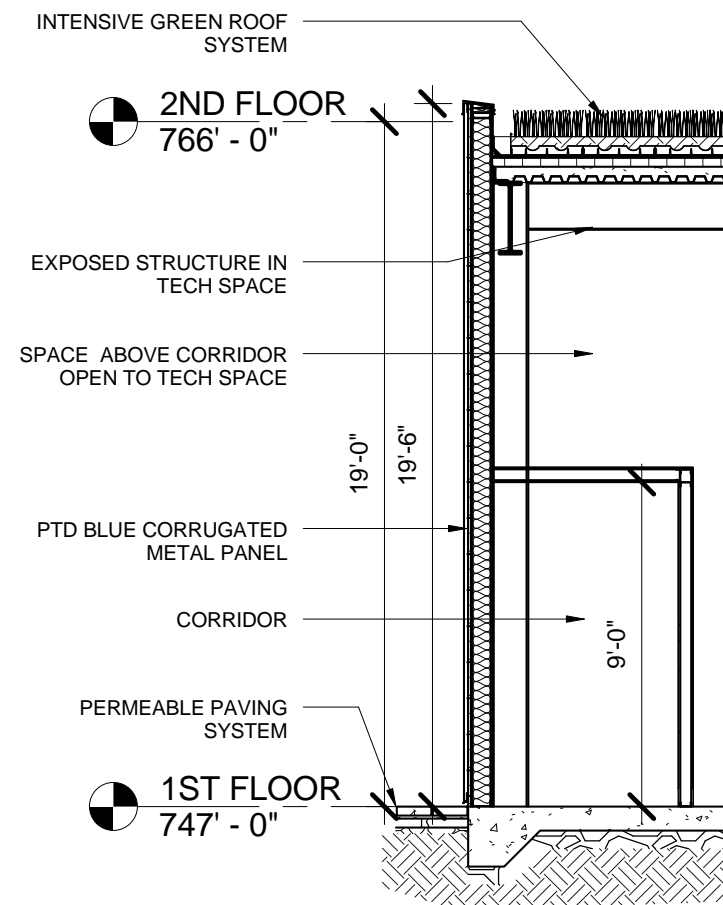


3 Wall Section 03
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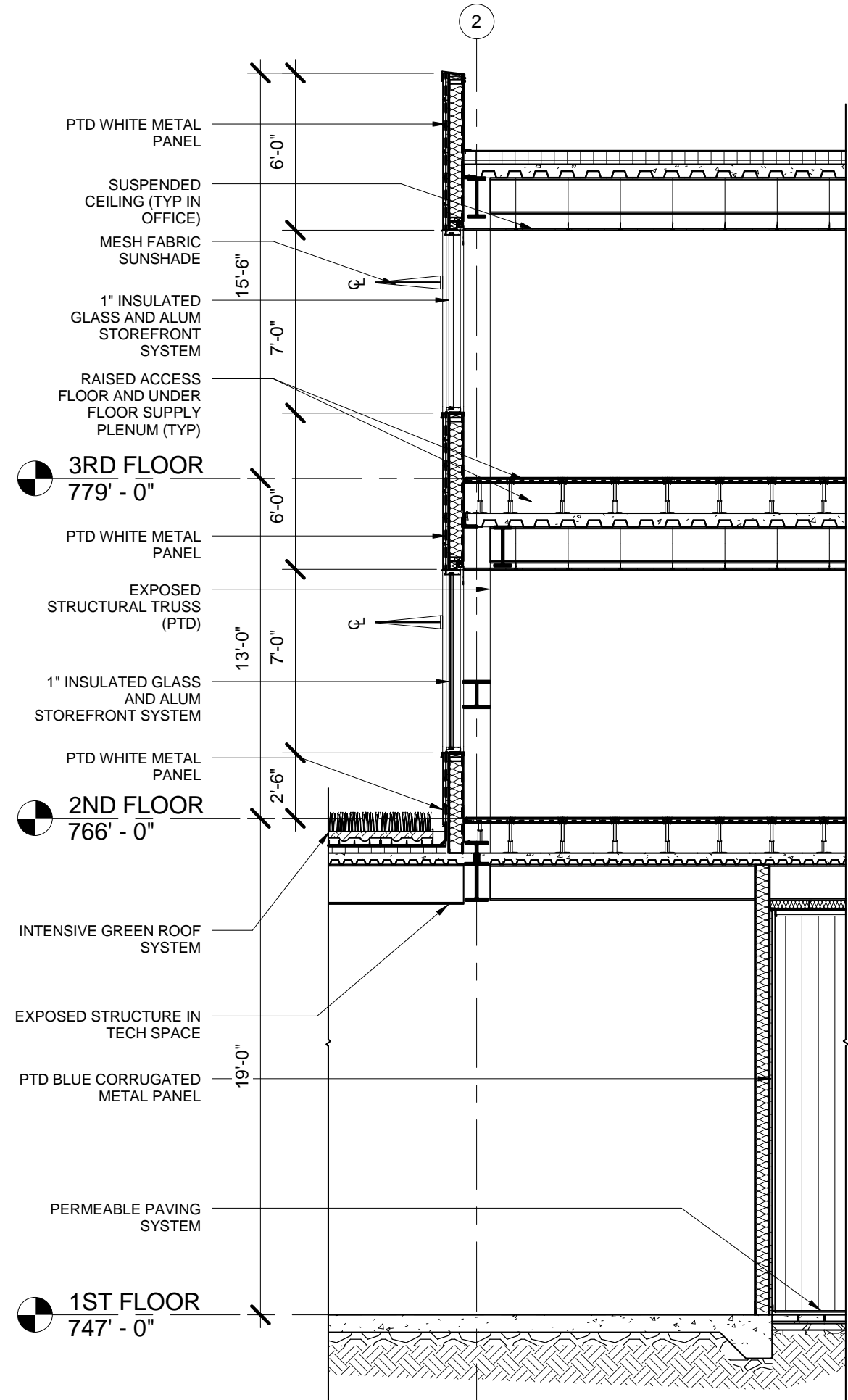




1 Wall Section 04
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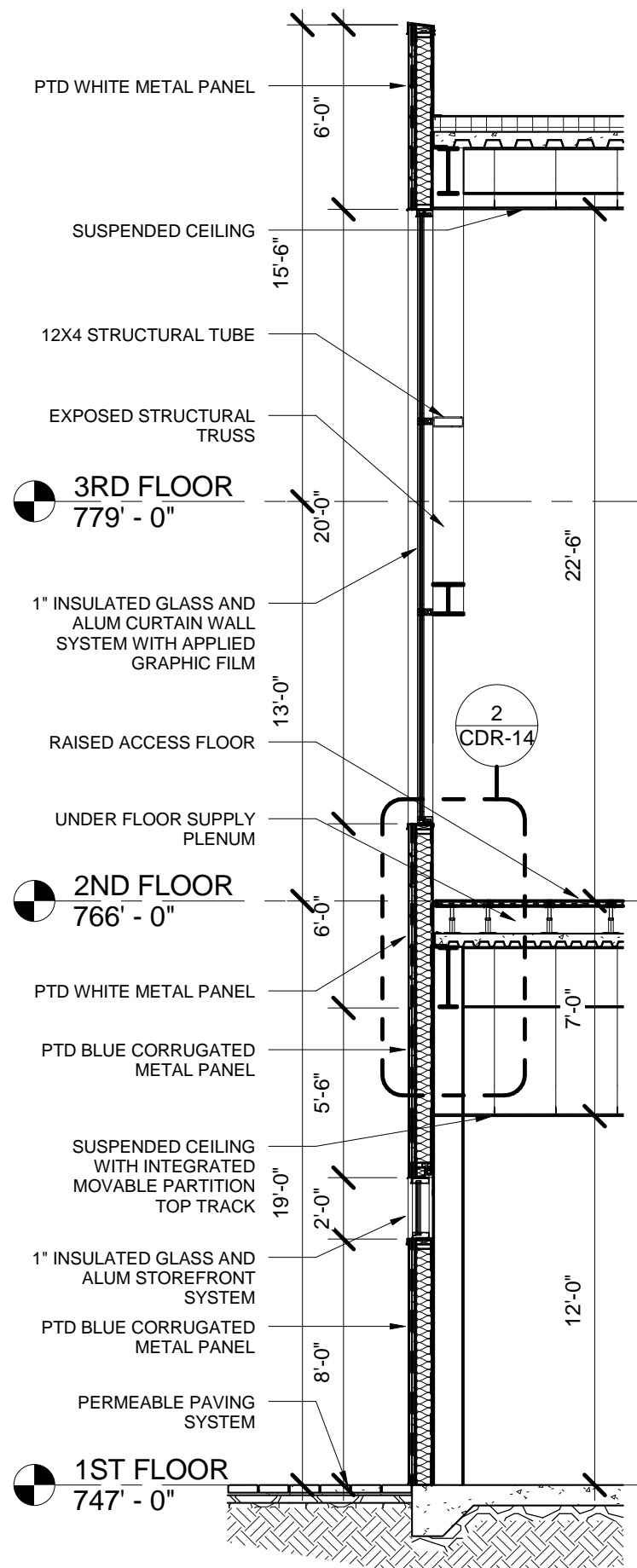


2 Wall Section 05
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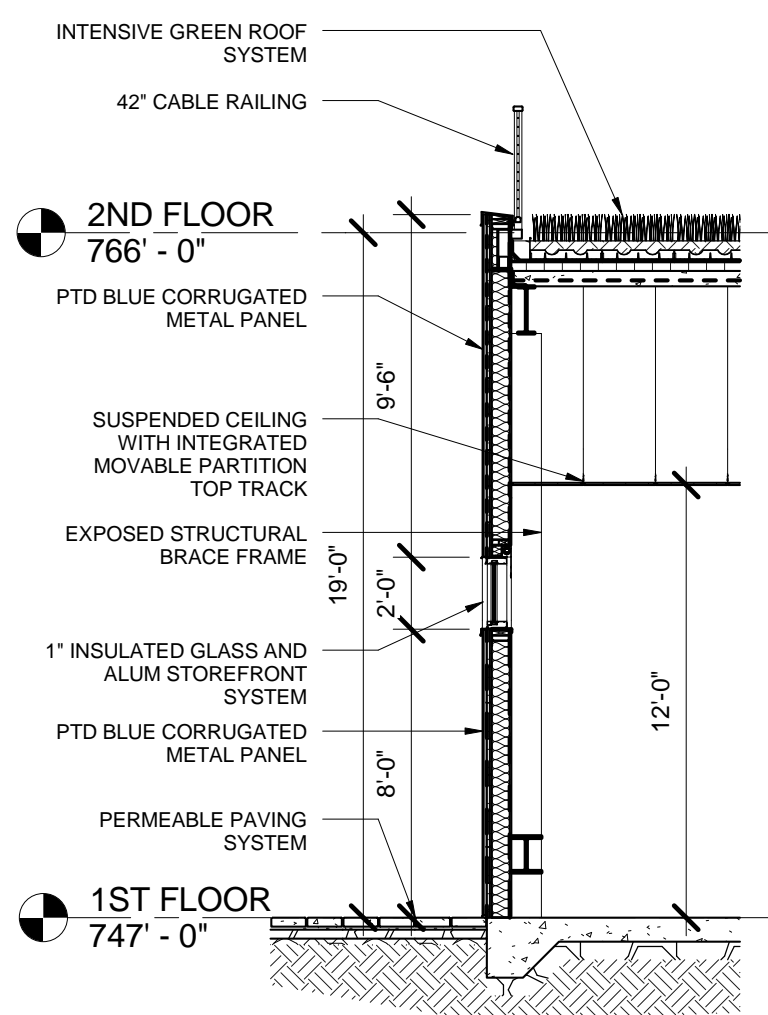


3 Wall Section 06
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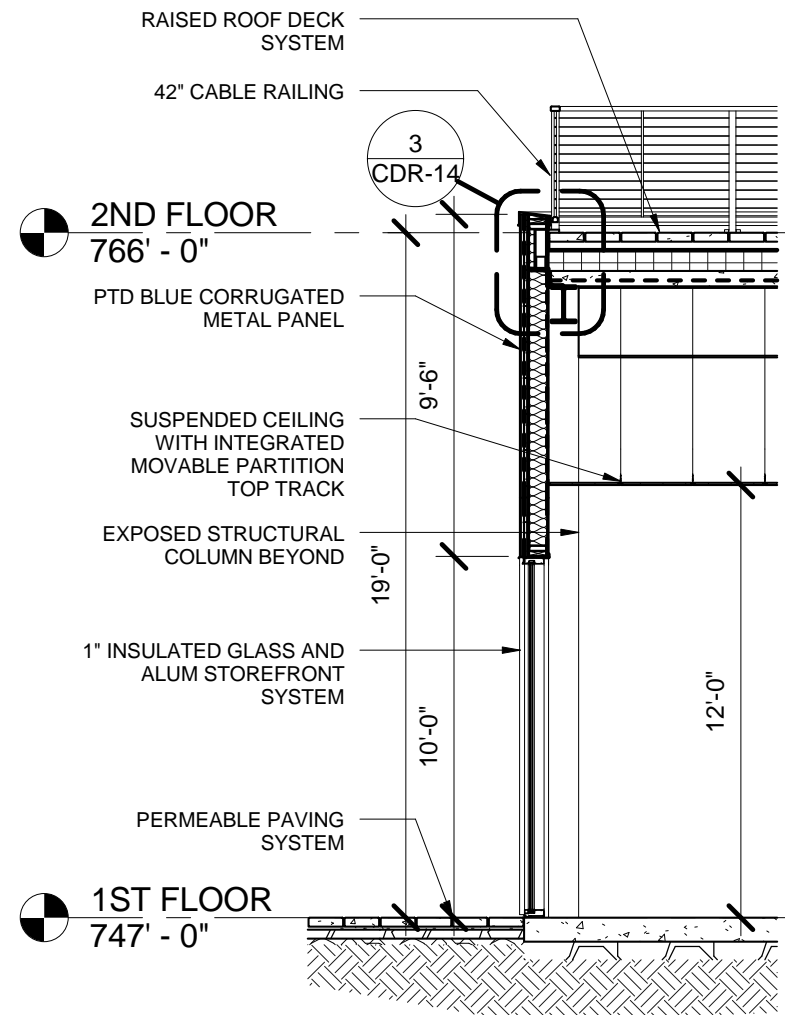




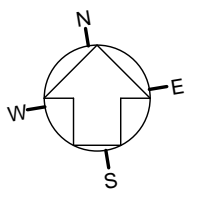
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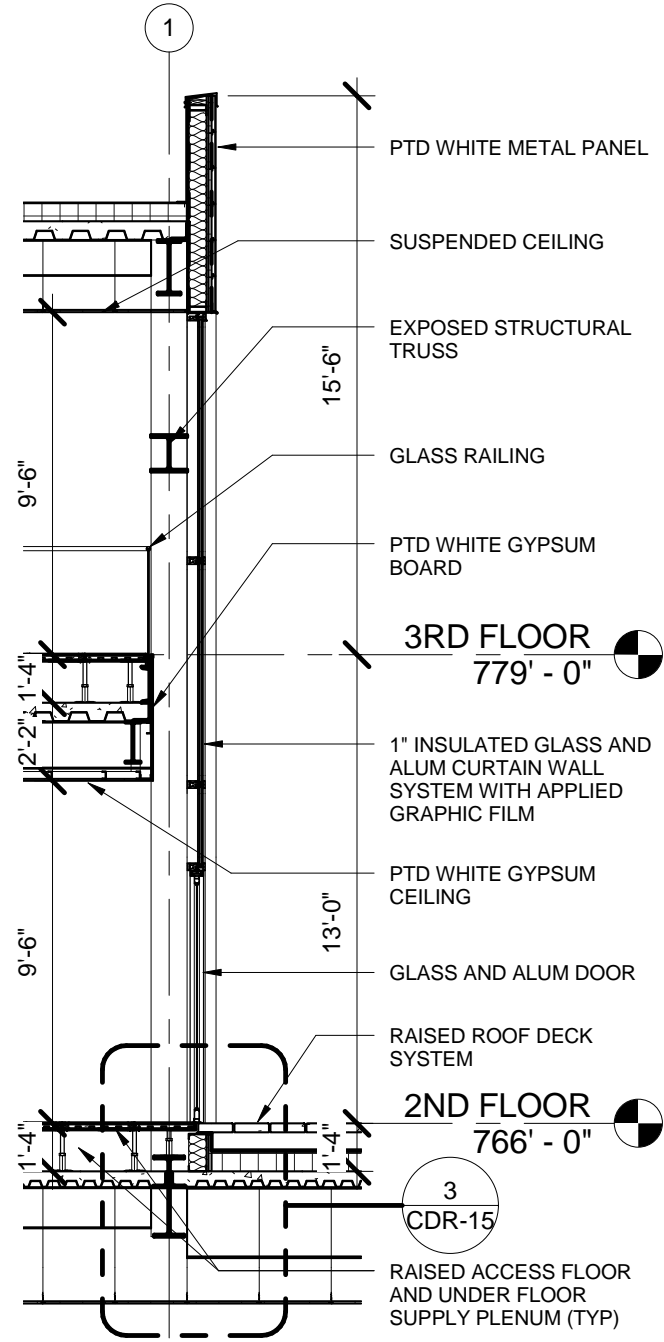


2 Wall Section 08
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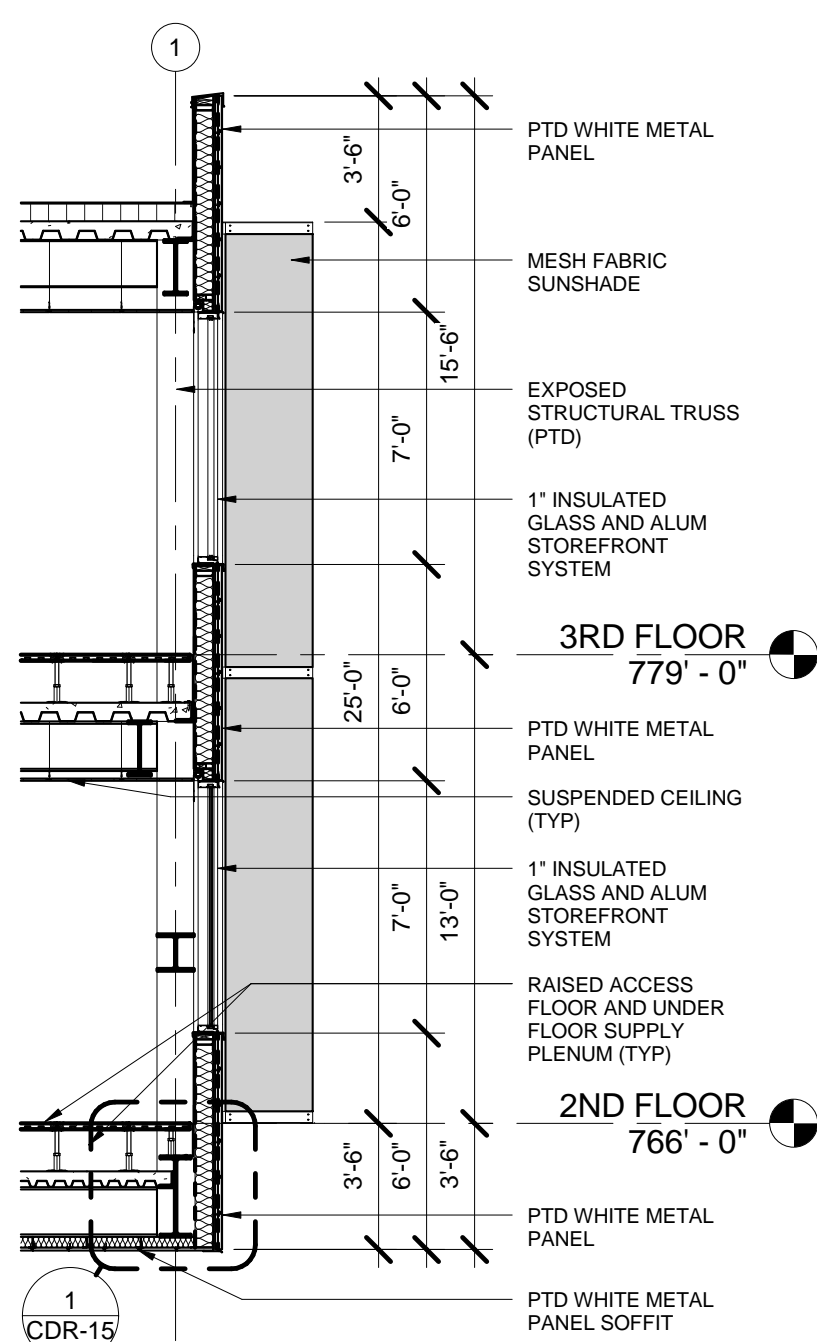


3 Wall Section 09
SCALE: 3/16" = 1'-0"

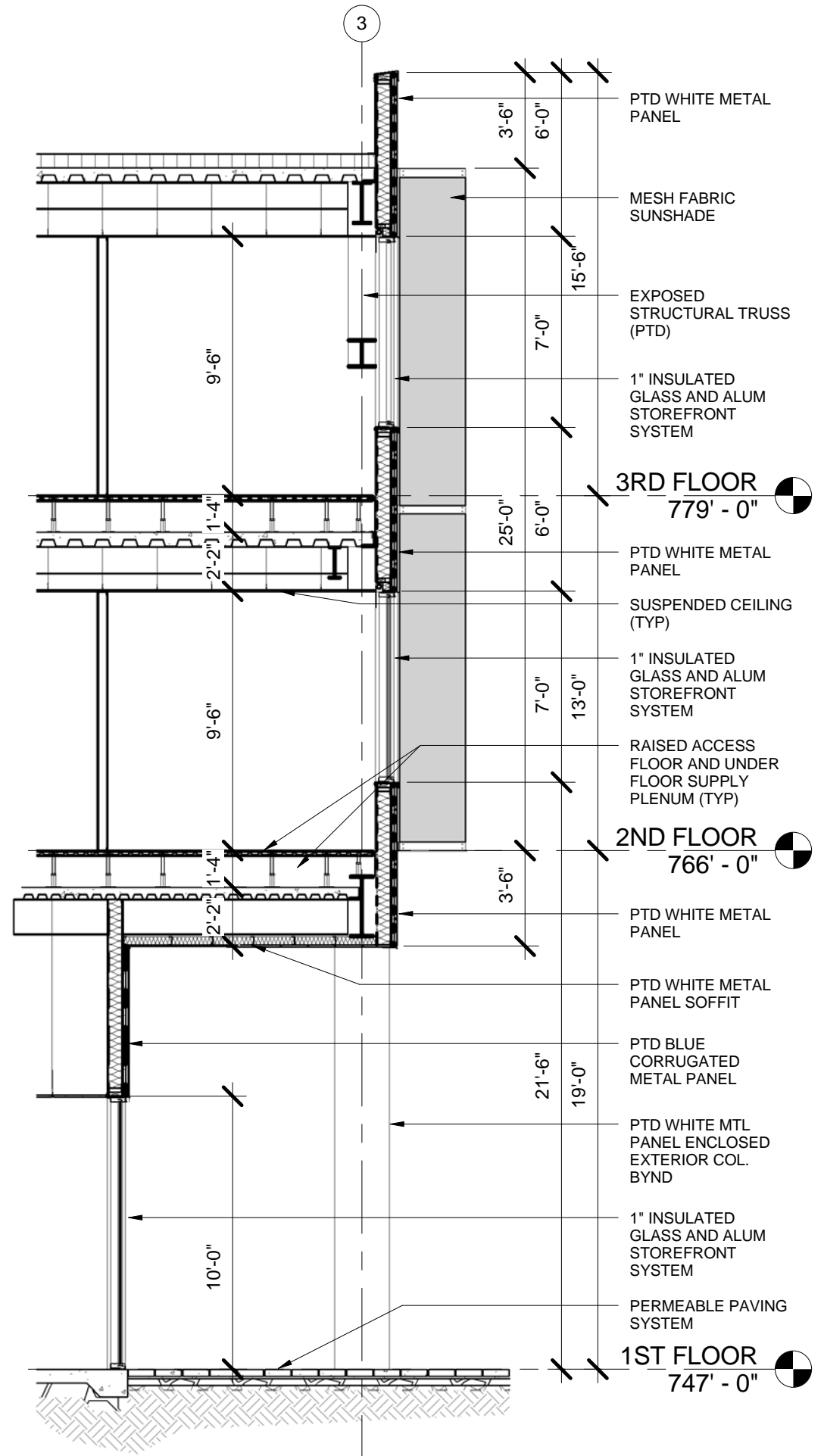




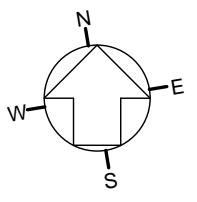
1 Wall Section 10
SCALE: 3/16" = 1'-0"

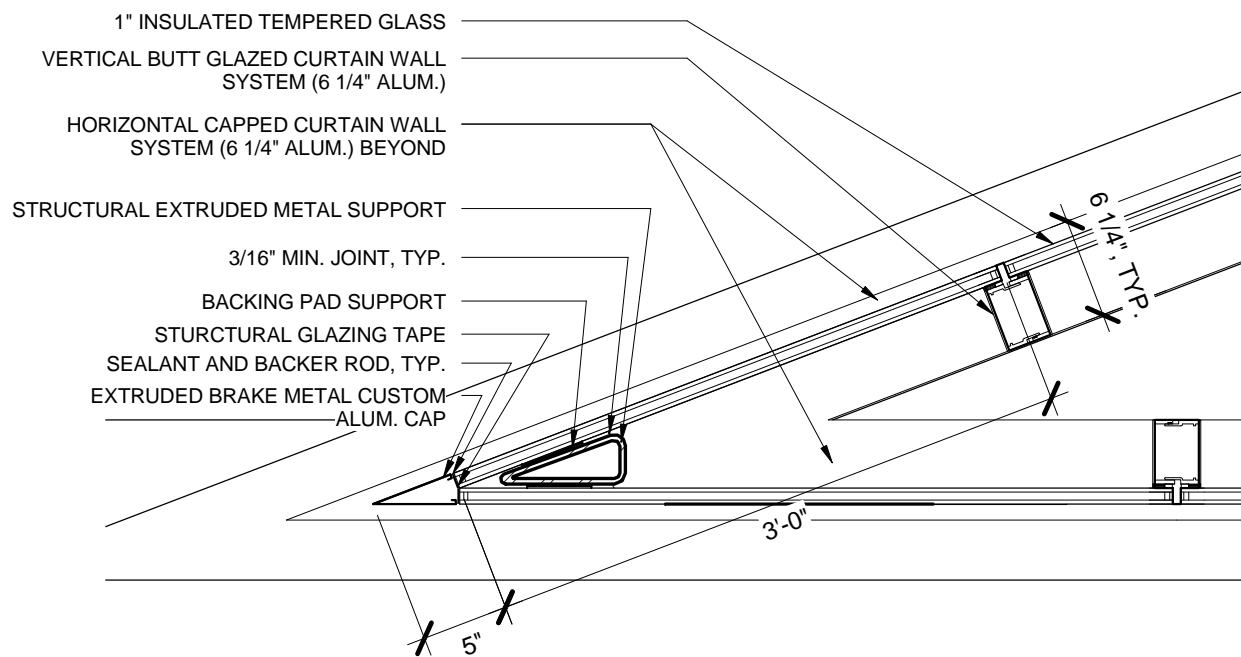


2 Wall Section 11
SCALE: 3/16" = 1'-0"



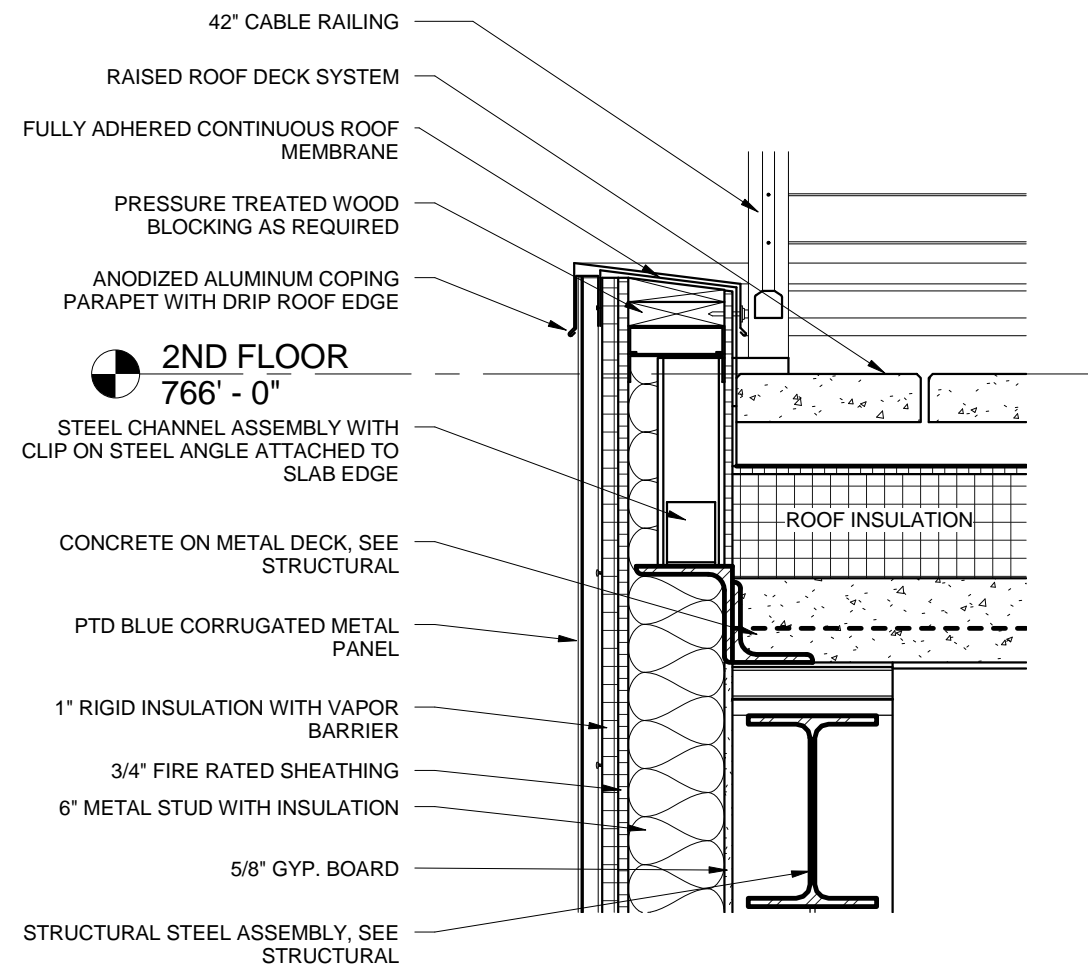
3 Wall Section 12
SCALE: 3/16" = 1'-0"





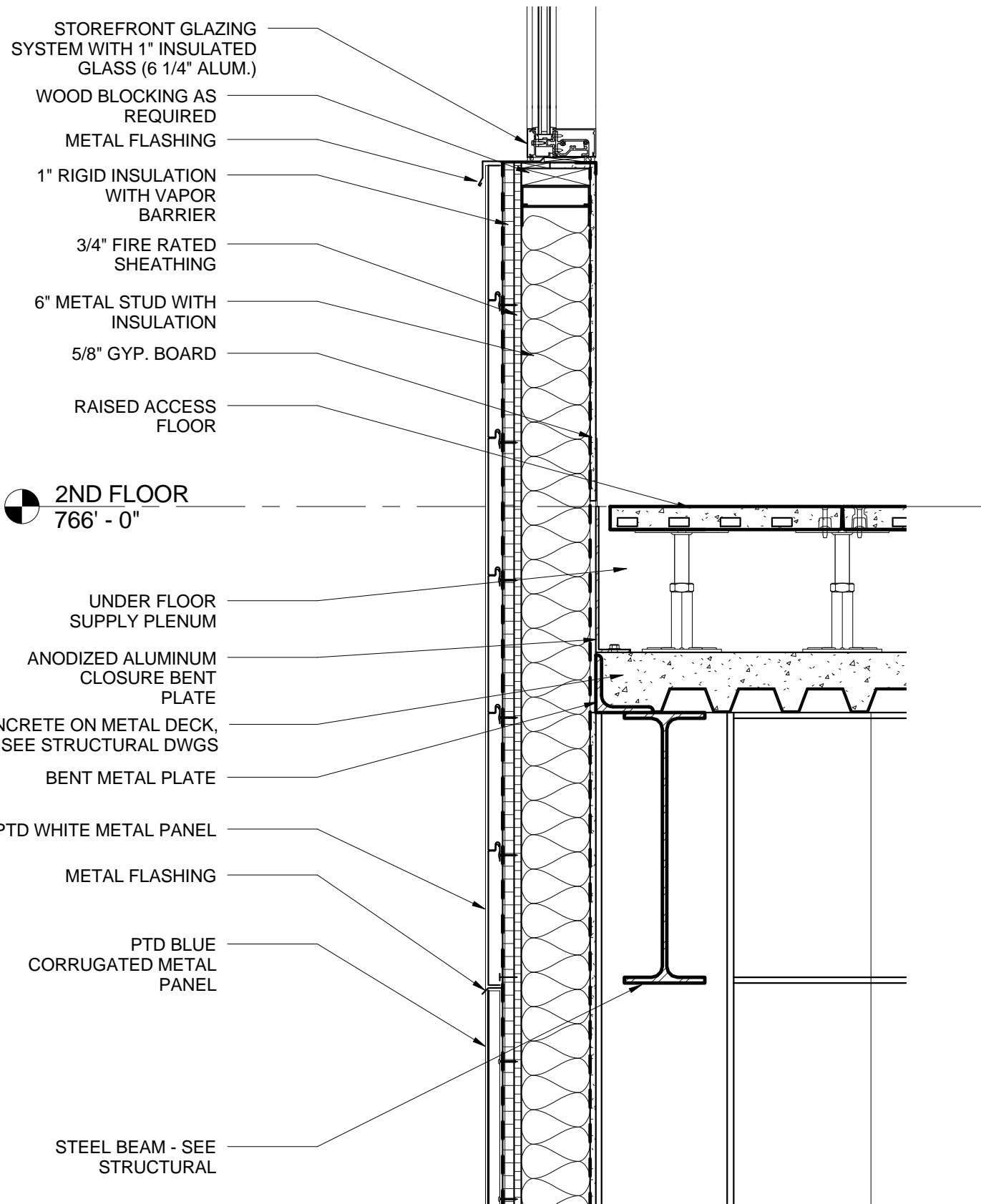
**DETAIL AT LUNCH ROOM
WEST CORNER**

1
SCALE: 1" = 1'-0"



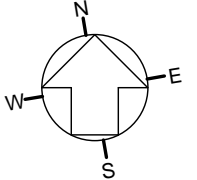
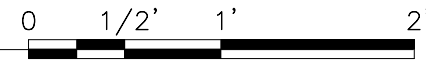
**SECTION DETAIL AT ROOF
DECK PARAPET**

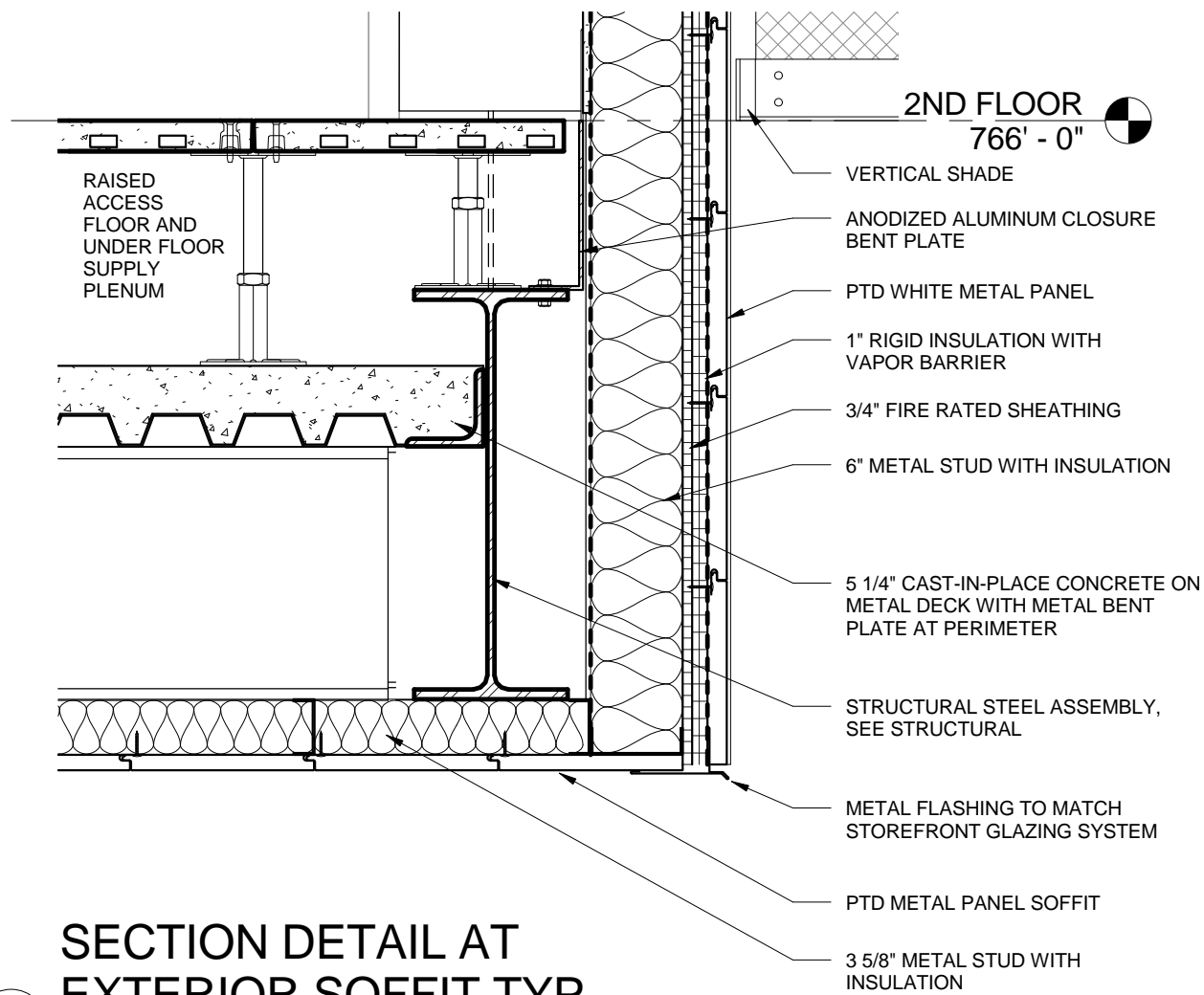
3
SCALE: 1" = 1'-0"



SECTION DETAIL AT WALL

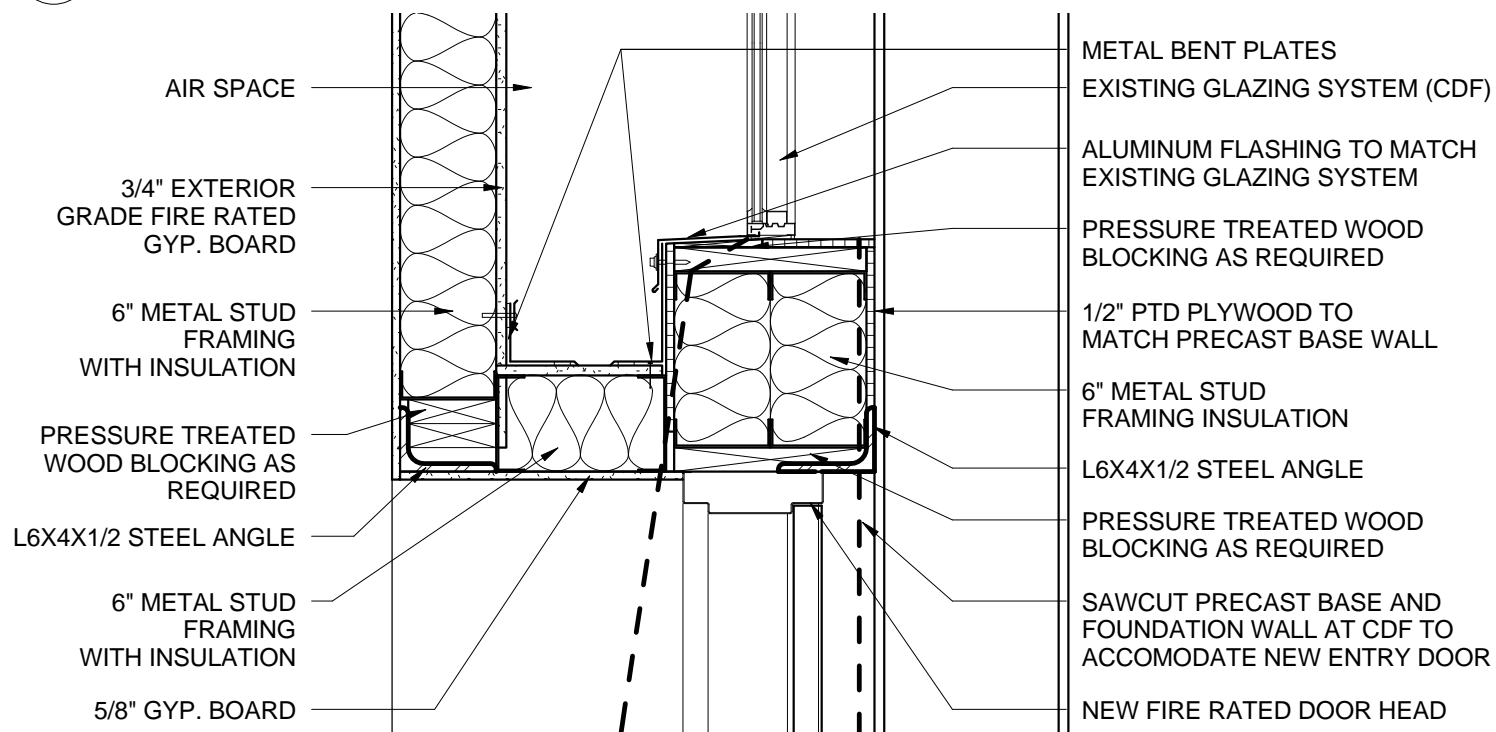
2
01
SCALE: 1" = 1'-0"





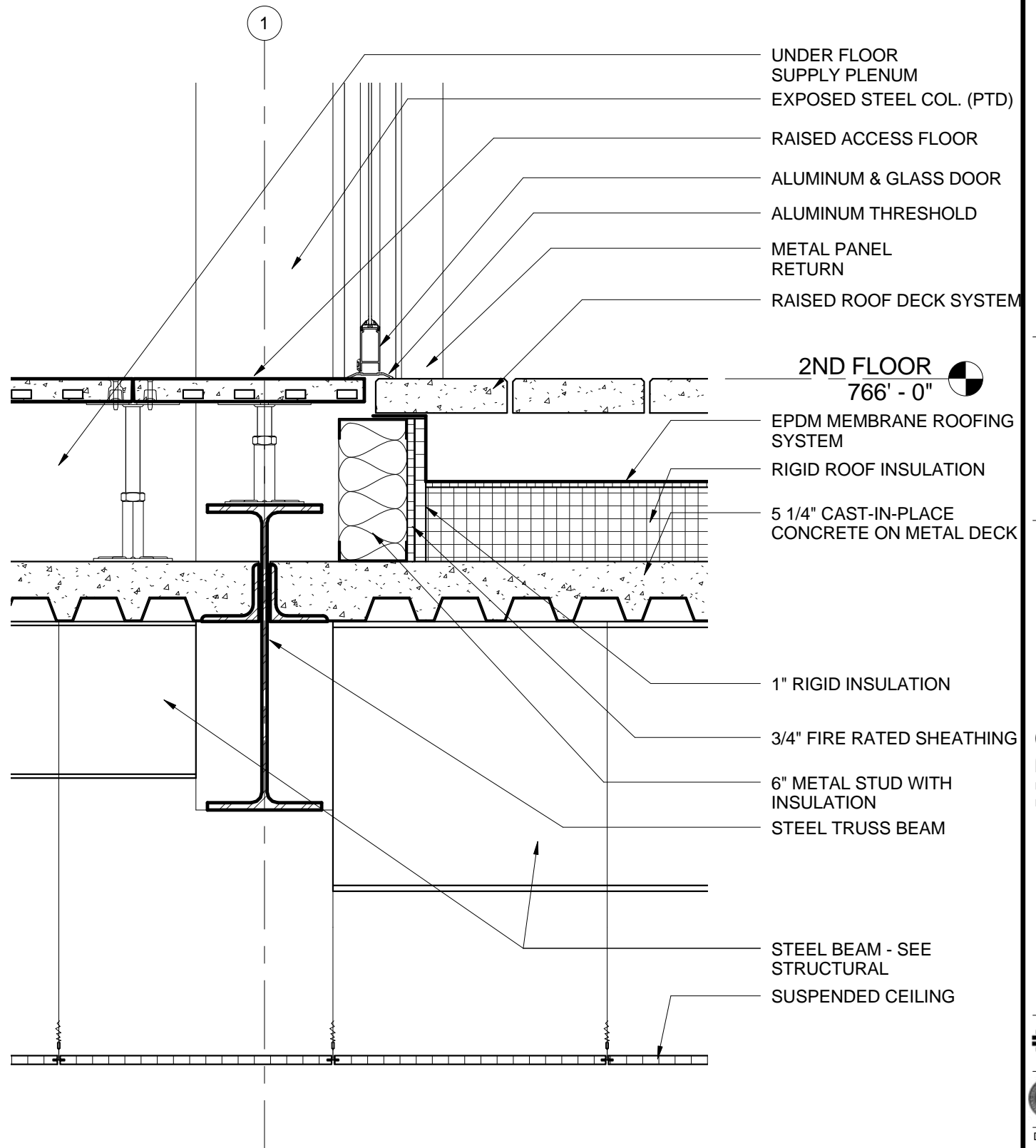
SECTION DETAIL AT EXTERIOR SOFFIT TYP.

1 SCALE: 1" = 1'-0"



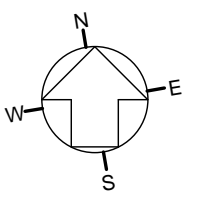
SECTION DETAIL AT CDF ENTRY

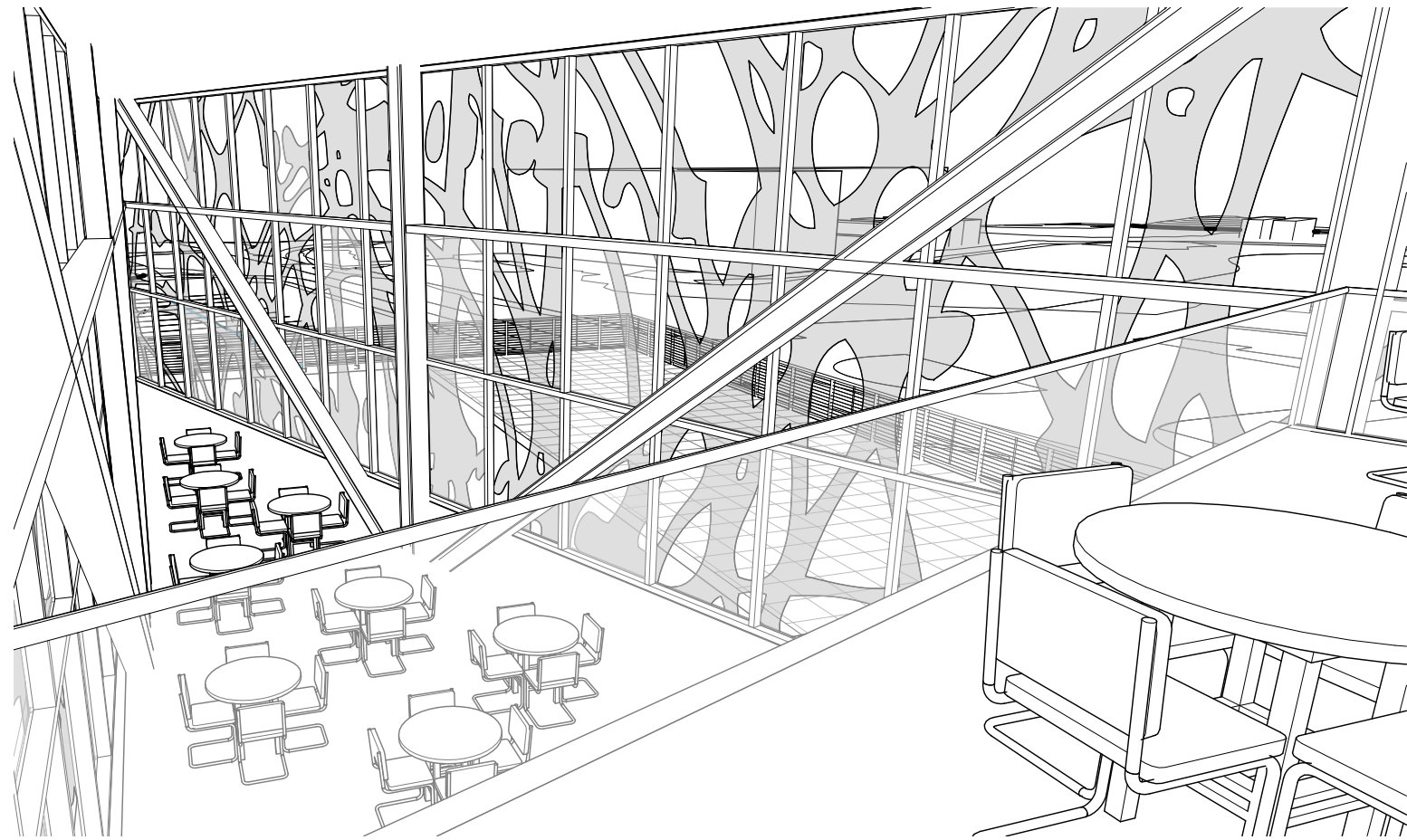
2 SCALE: 1" = 1'-0"



THRESHOLD DETAIL

3 SCALE: 1" = 1'-0"

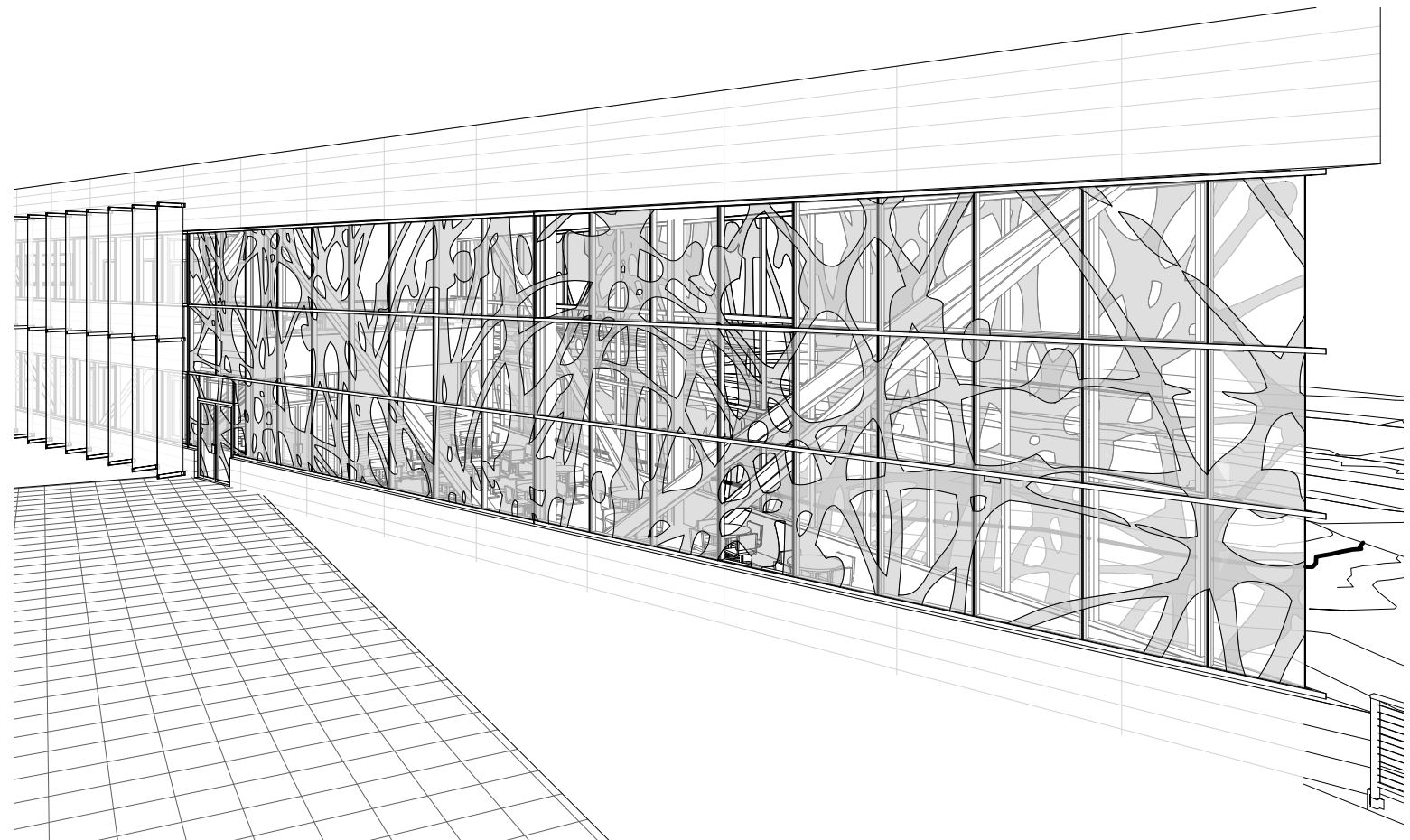




**LUNCHROOM VIEW FROM
3RD FLOOR**

1

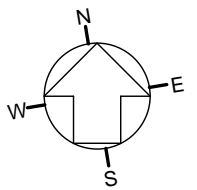
SCALE:



**LUNCHROOM VIEW FROM
EXTERIOR**

2

SCALE:



DATE

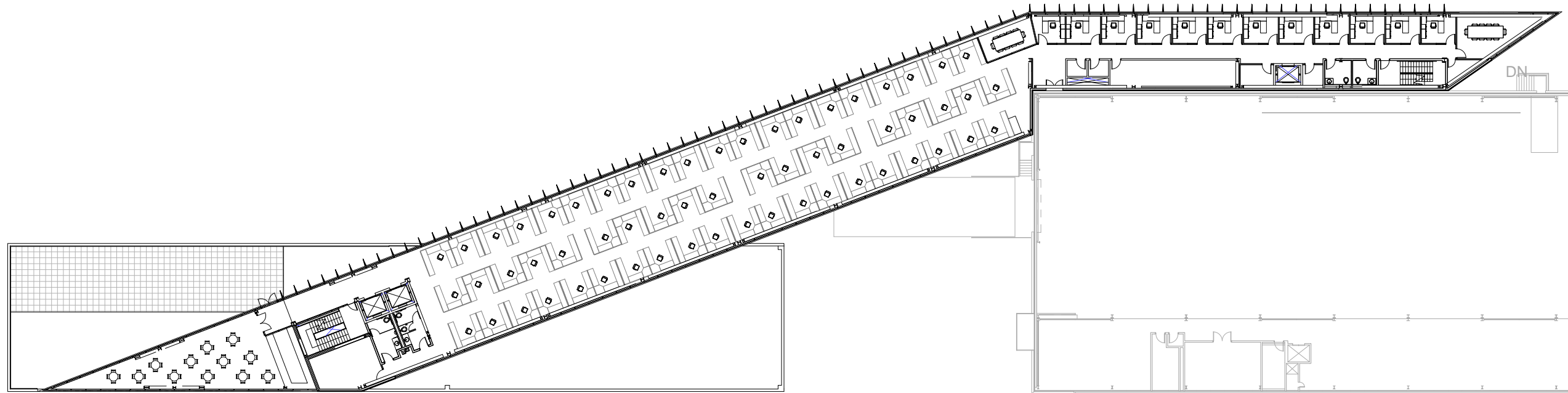
10.06.2010

PROJECT NO.

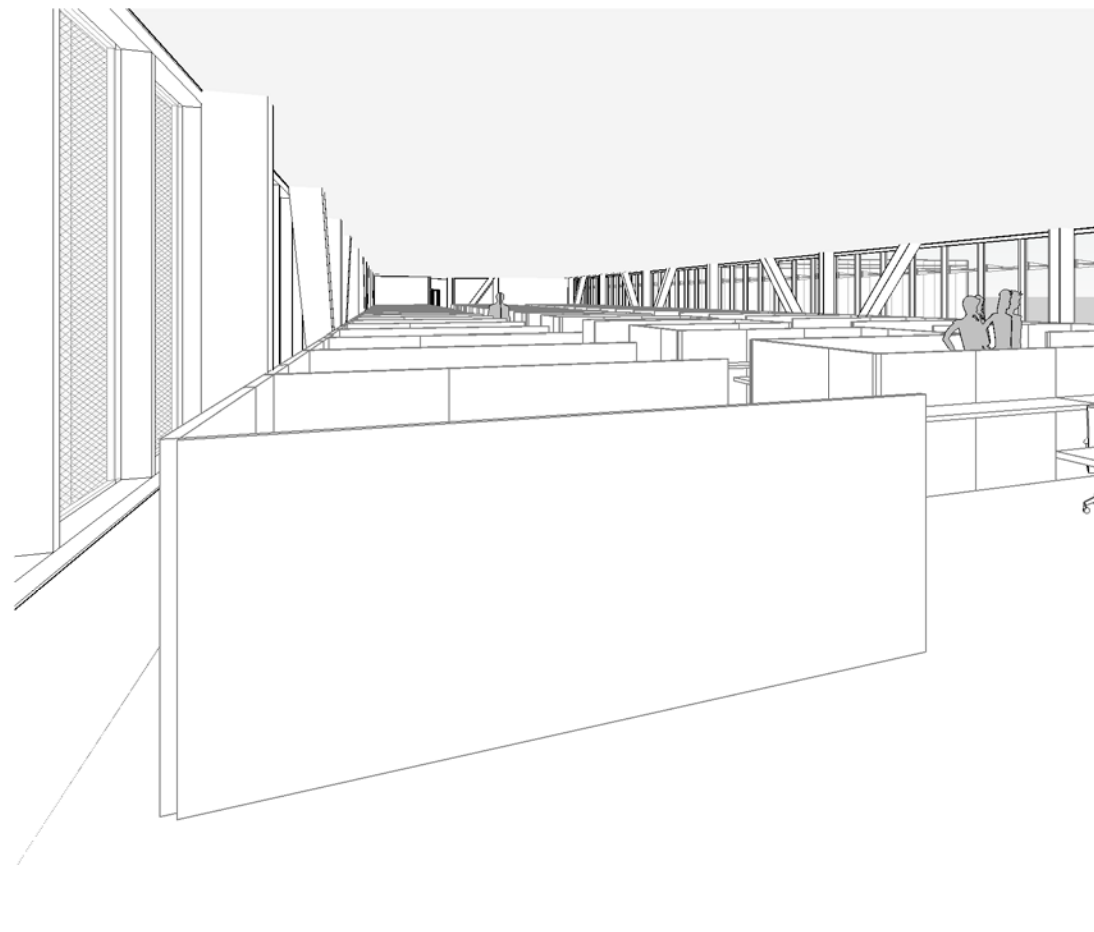
10-8-1

DRAWING NO.

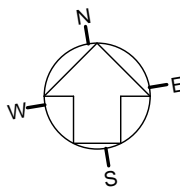
CDR-16

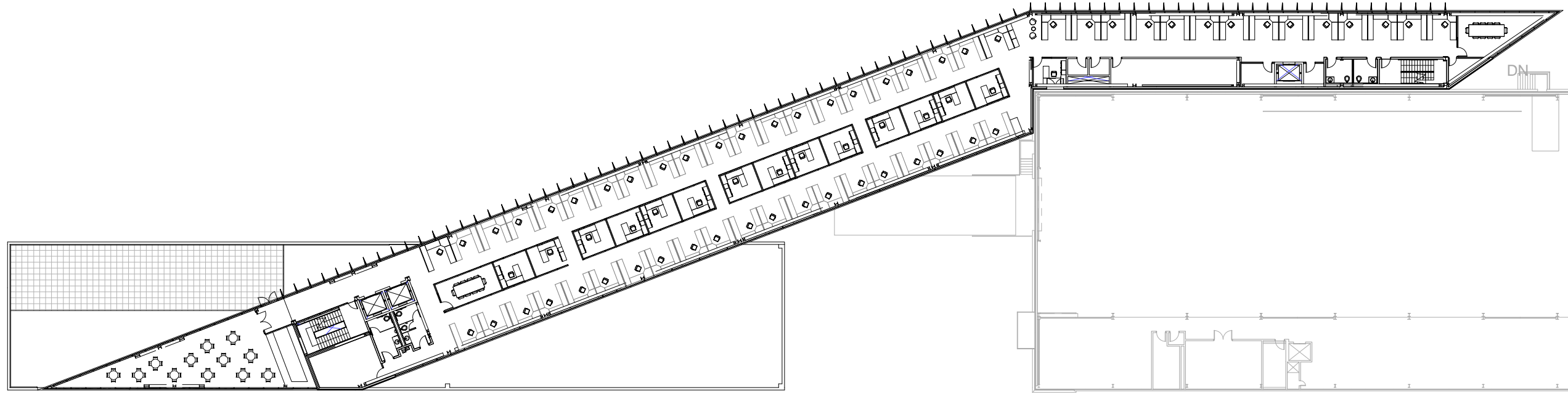


1 Office Layout - Option A
SCALE: 1" = 40'-0"

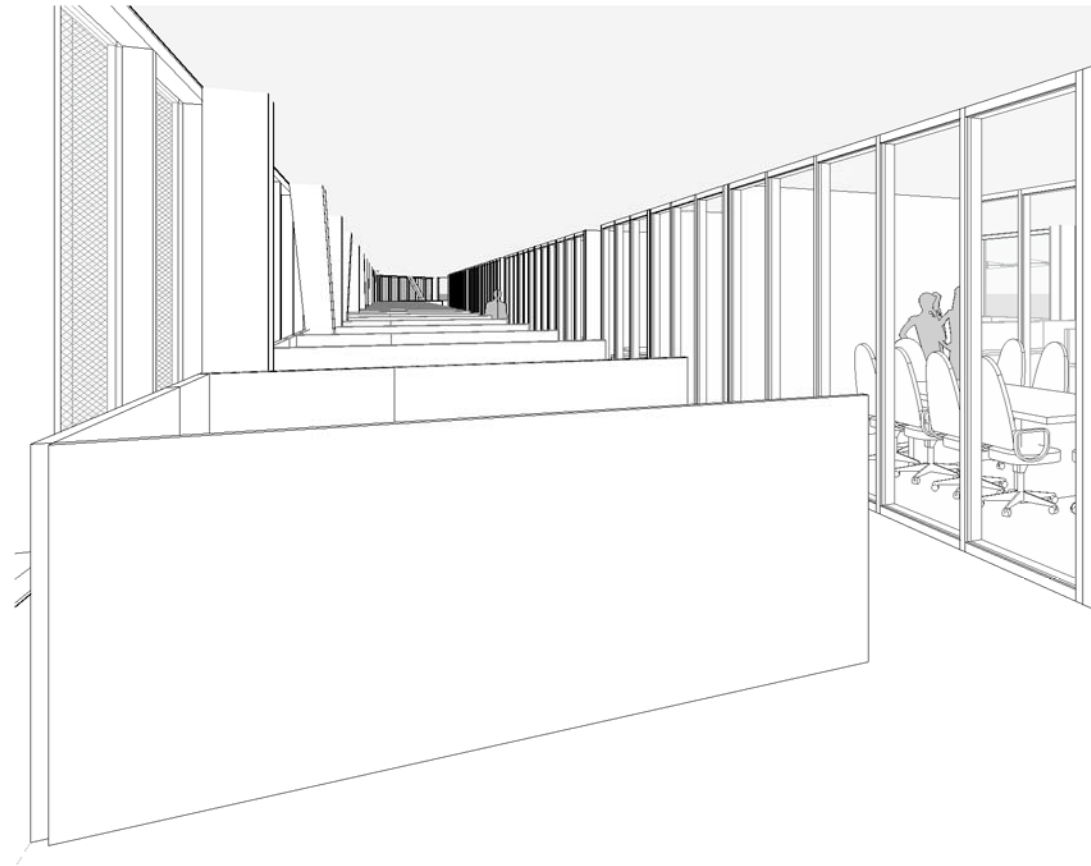


2 3D View - Option A
SCALE:

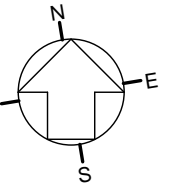


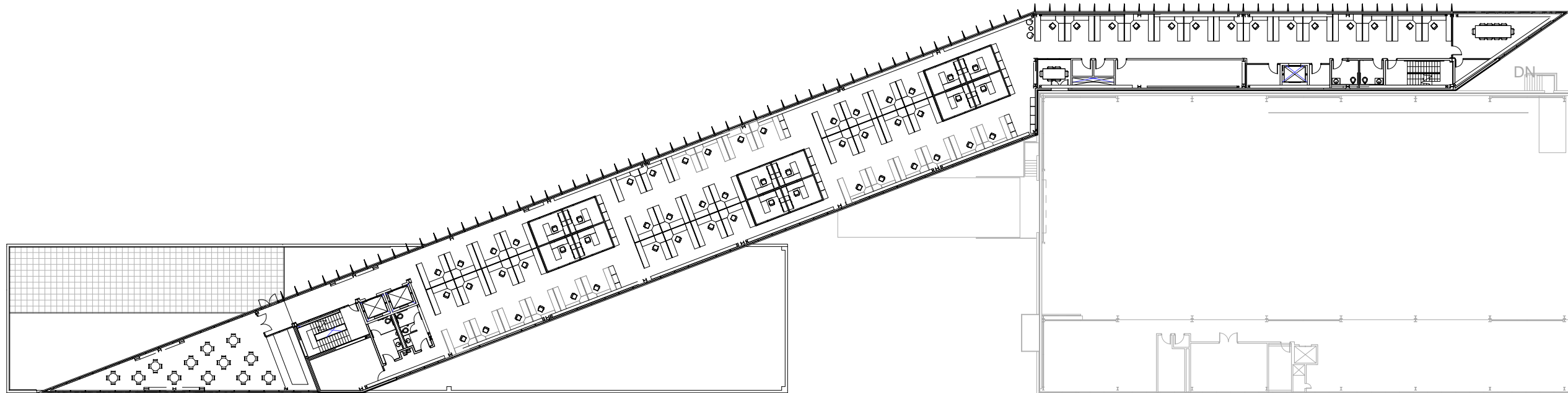


1 Office Layout - Option B
SCALE: 1" = 40'-0"

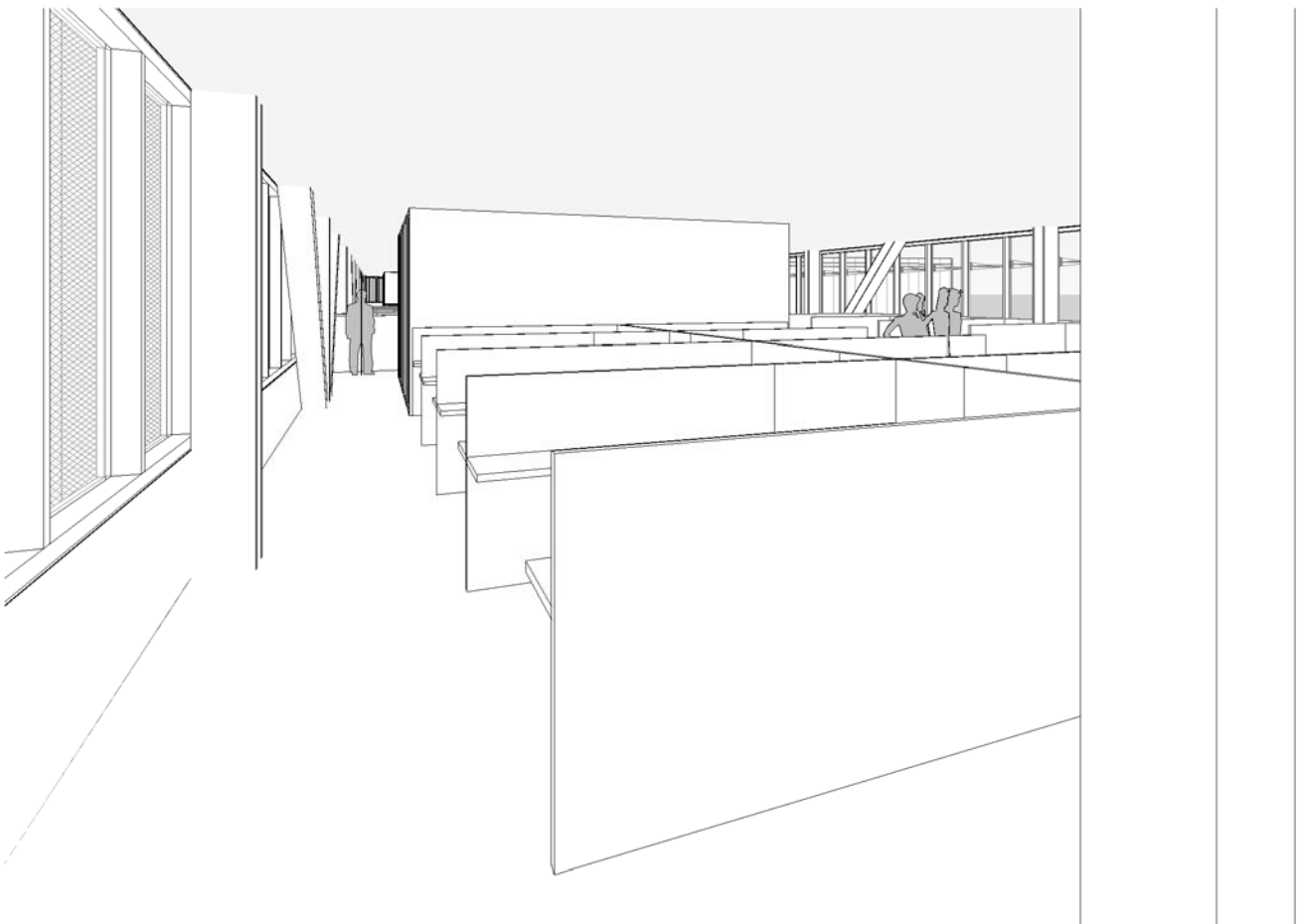


2 3D View - Option B
SCALE:

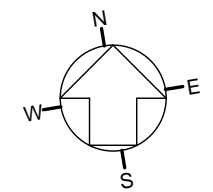


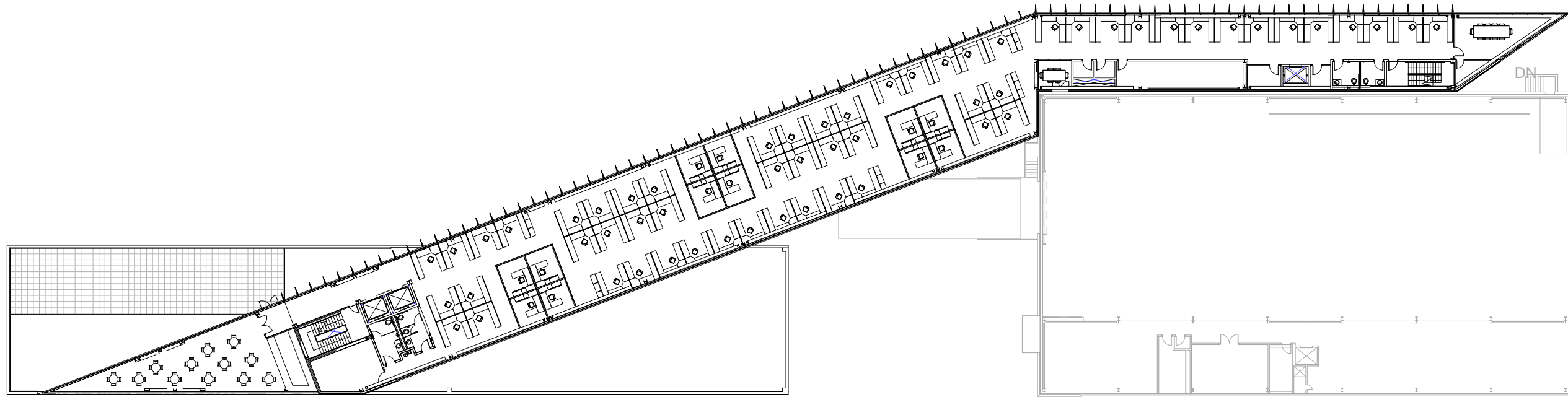


1 Office Layout - Option C
SCALE: 1" = 40'-0"



2 3D View - Option C
SCALE:

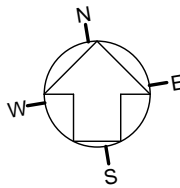













1 Office Layout - Option D
SCALE: 1" = 40'-0"



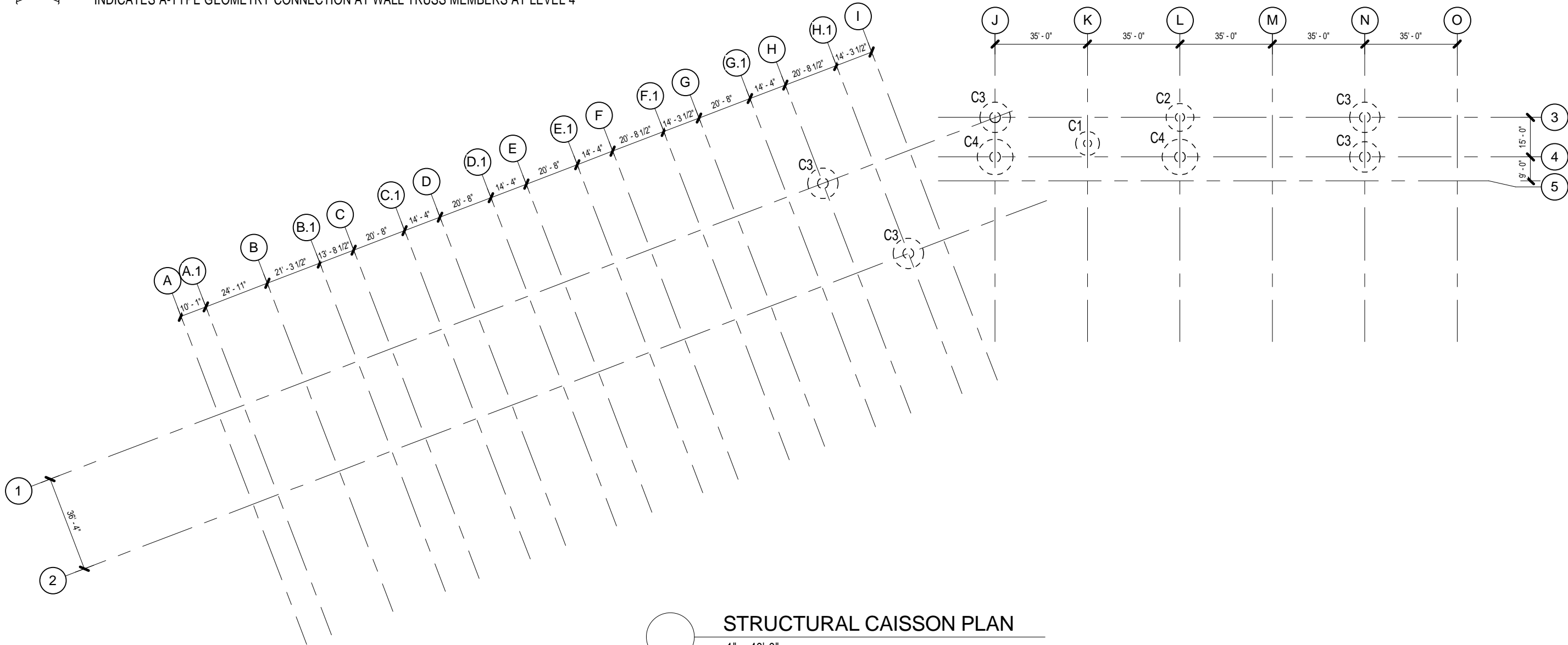
2 3D View - Option D
SCALE:



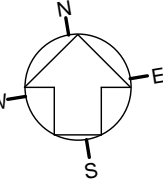
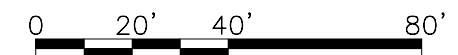
LEGEND:

-  BELLED CAISSON - INNER DIAMETER INDICATES SHAFT, OUTER DIAMETER INDICATES OUTER EDGE OF BELL AT BASE
-  INDICATES COLUMN ABOVE (STARTS AT THIS LEVEL)
-  INDICATES COLUMN BELOW (STOPS AT THIS LEVEL)
-  INDICATES DIRECTION OF DECK SPAN
-  INDICATES TWO-WAY CONCRETE SLAB
-  DOWNWARD BRACE OR TRUSS WEB DIAGONAL MEMBER
-  UPWARD BRACE OR TRUSS WEB DIAGONAL MEMBER
-  INDICATES V-TYPE GEOMETRY CONNECTION AT WALL TRUSS MEMBERS AT LEVEL 2
-  INDICATES A-TYPE GEOMETRY CONNECTION AT WALL TRUSS MEMBERS AT LEVEL 4










MARK	SHAFT DIAMETER (ft)	BELL DIAMETER (ft)	CAP			MAX SERVICE LOAD (KIPS)
			B (IN.)	W (IN.)	D (IN.)	
C1	3' - 0"	9' - 0"	48"	48"	48"	405
C2	3' - 6"	10' - 6"	54"	54"	48"	573
C3	4' - 0"	11' - 6"	60"	60"	48"	694
C4	4' - 0"	13' - 6"	60"	60"	48"	1020



 STRUCTURAL CAISSON PLAN
1" = 40'-0"



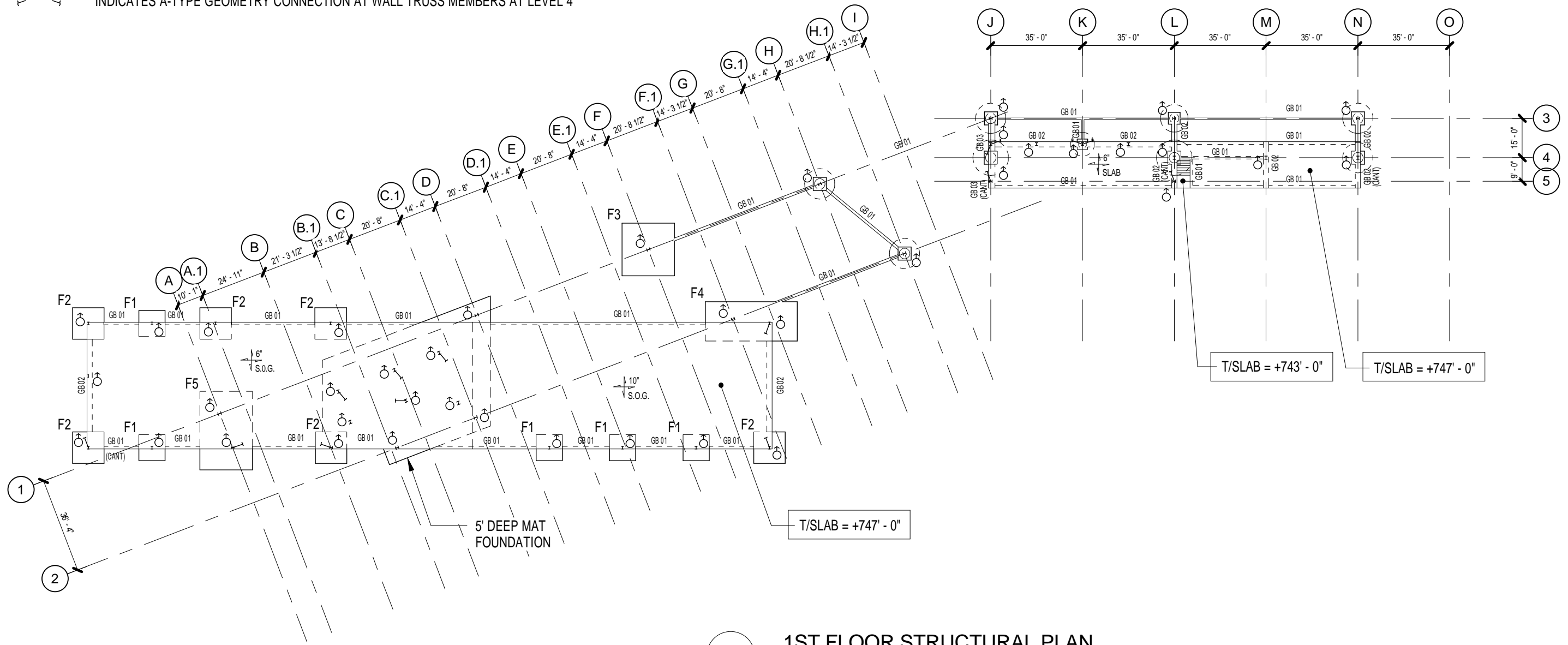
LEGEND:

-  BELLED CAISSON - INNER DIAMETER INDICATES SHAFT, OUTER DIAMETER INDICATES OUTER EDGE OF BELL AT BASE
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-  INDICATES A-TYPE GEOMETRY CONNECTION AT WALL TRUSS MEMBERS AT LEVEL 4

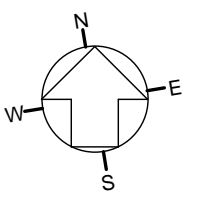
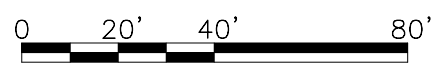
SPREAD FOOTING SCHEDULE			
MARK	B (FT.)	W (FT.)	DEPTH (IN.)
F1	10'	10'	18"
F2	12'	12'	24"
F3	20'	20'	33"
F4	15'	35'	40"
F5	20'	30'	40"

NOTE: SPREAD FOOTINGS TO BEAR BELOW FROST DEPTH.










GRADE BEAM SCHEDULE		
MARK	WIDTH (IN.)	DEPTH (IN.)
GB 01	12"	42"
GB 02	24"	48"
GB 03	30"	54"





1ST FLOOR STRUCTURAL PLAN
1" = 40'-0"

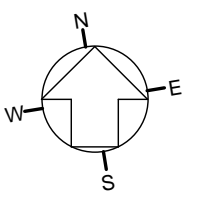
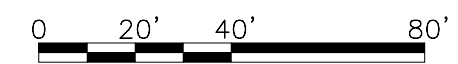
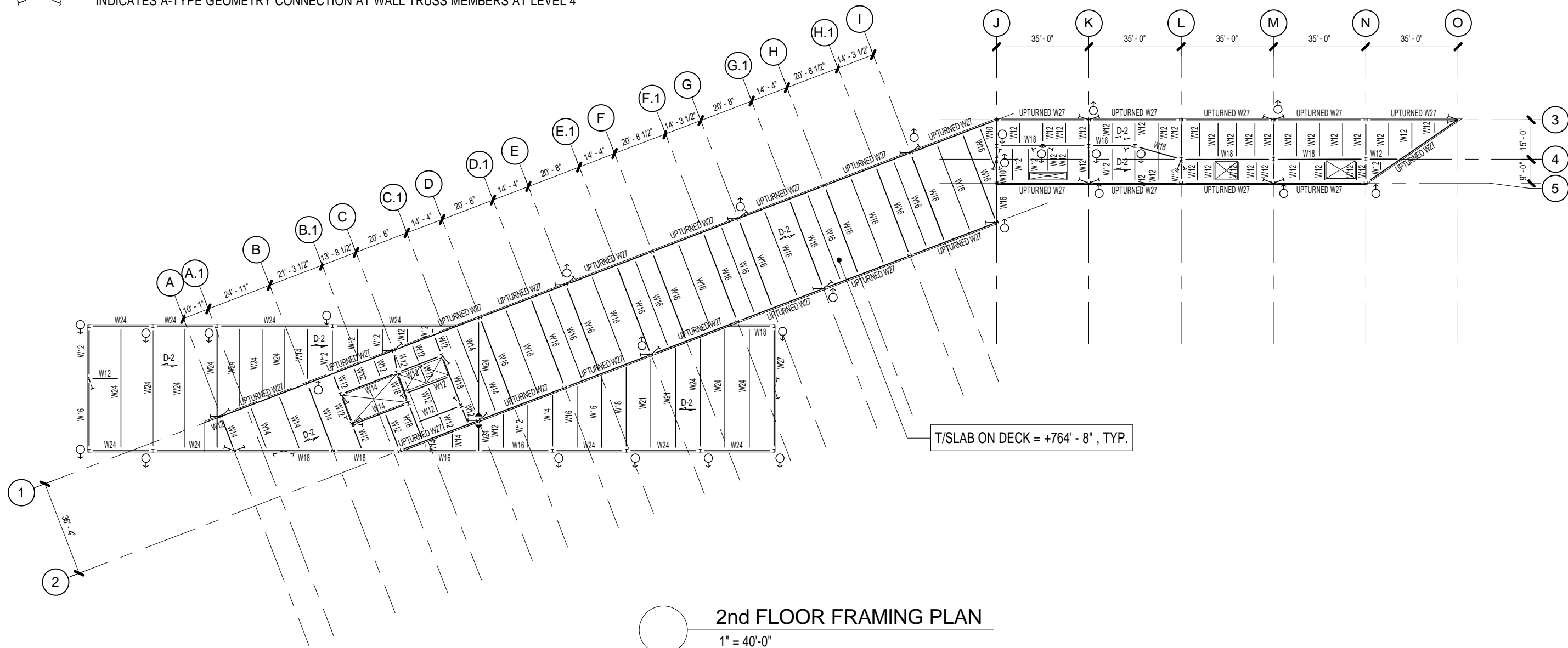


LEGEND:










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NOTES:



1. SLAB ON METAL DECK TYPE ARE AS FOLLOWS:
 -  D-1 3" 18 GAUGE METAL DECK + 3 1/4" LWC ABOVE FLUTES W/ 6x6-W2.9xW2.9 WWF REINFORCEMENT. (TOTAL DEPTH = 6 1/4") STUDS ARE 3/4" x 4 1/2"
 -  D-2 2" 18 GAUGE METAL DECK + 3 1/4" LWC ABOVE FLUTES W/ 6x6-W2.9xW2.9 WWF REINFORCEMENT. (TOTAL DEPTH = 6 1/4") STUDS ARE 3/4" x 4 1/2"
2. ESTIMATED STEEL QUANTITIES ARE AS FOLLOWS.
 - A. STEEL WEIGHT IN AREAS UNDER COMPOSITE METAL DECK (INCLUDES BEAMS AND COLUMNS): 8.0 PSF
 - B. BRACED FRAME STEEL WEIGHT PER FLOORPLATE (NOT INCLUDING TRUSS) - INCLUDES COLUMNS, BEAMS, AND BRACES: 3.0 PSF
 - C. EXTERIOR TRUSS STEEL WEIGHT (INCLUDES BEAMS, COLUMNS, AND BRACES): 293 TONS

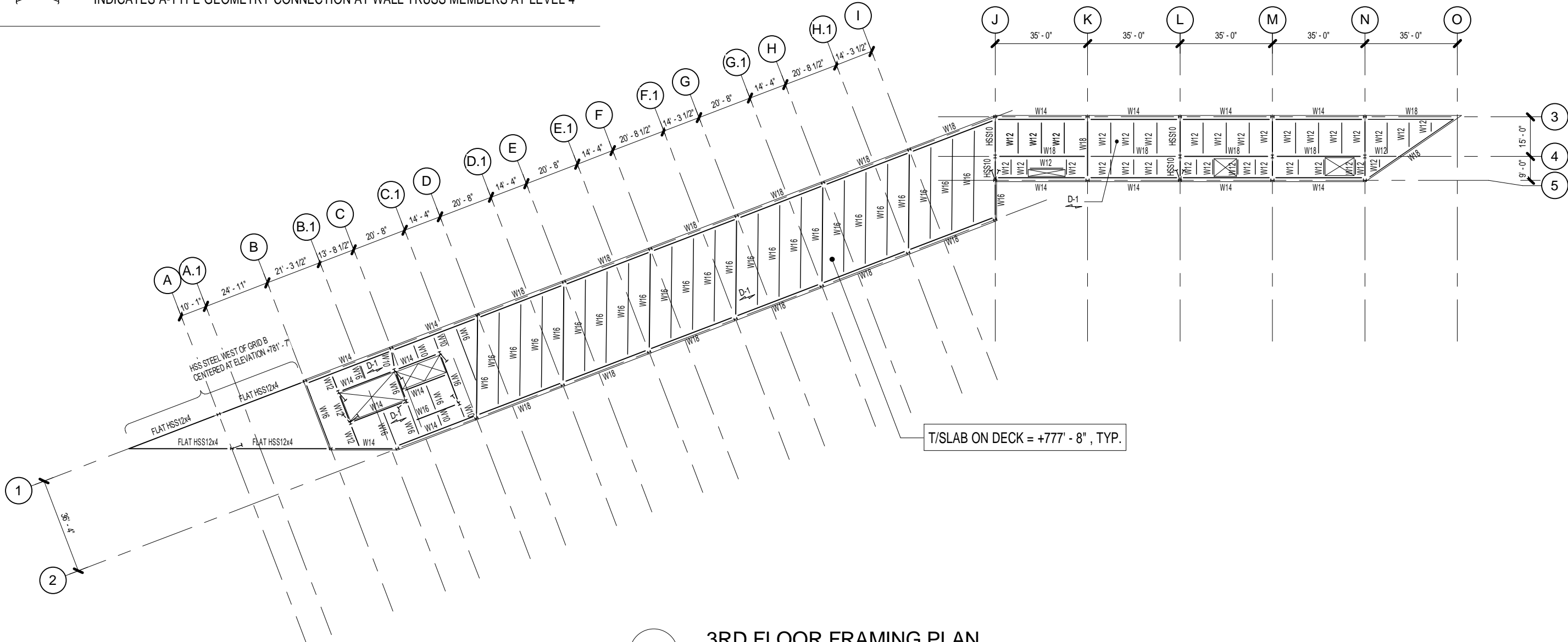


LEGEND:

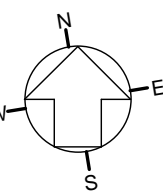
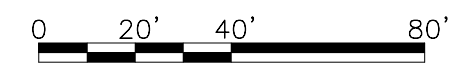
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NOTES:










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2. ESTIMATED STEEL QUANTITIES ARE AS FOLLOWS.
 - A. STEEL WEIGHT IN AREAS UNDER COMPOSITE METAL DECK (INCLUDES BEAMS AND COLUMNS):
8.0 PSF
 - B. BRACED FRAME STEEL WEIGHT PER FLOORPLATE (NOT INCLUDING TRUSS) - INCLUDES COLUMNS, BEAMS, AND BRACES:
3.0 PSF
 - C. EXTERIOR TRUSS STEEL WEIGHT (INCLUDES BEAMS, COLUMNS, AND BRACES):
293 TONS





3RD FLOOR FRAMING PLAN
1" = 40'-0"

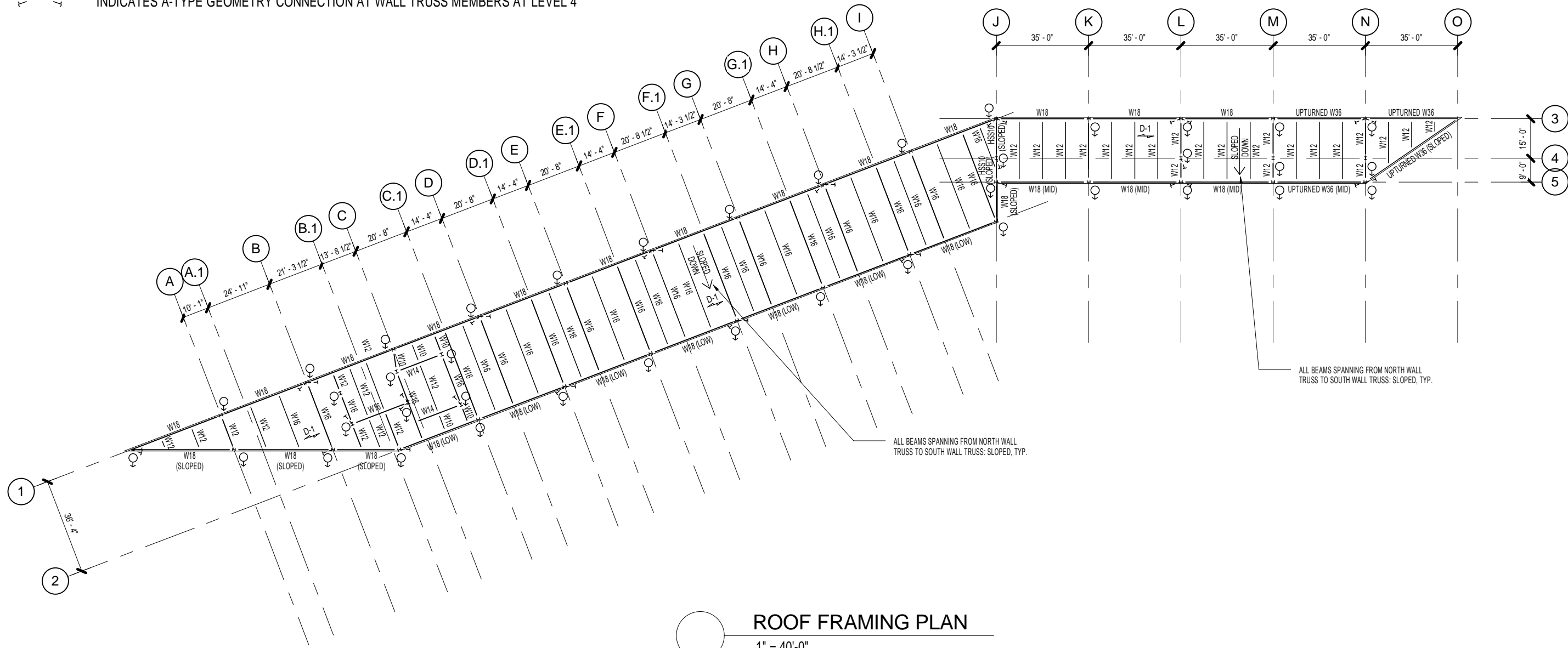


LEGEND:

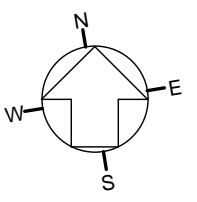
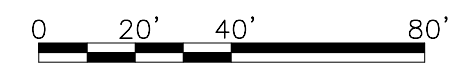
-  BELLED CAISSON - INNER DIAMETER INDICATES SHAFT, OUTER DIAMETER INDICATES OUTER EDGE OF BELL AT BASE
-  INDICATES COLUMN ABOVE (STARTS AT THIS LEVEL)
-  INDICATES COLUMN BELOW (STOPS AT THIS LEVEL)
-  INDICATES DIRECTION OF DECK SPAN
-  INDICATES TWO-WAY CONCRETE SLAB
-  DOWNWARD BRACE OR TRUSS WEB DIAGONAL MEMBER
-  UPWARD BRACE OR TRUSS WEB DIAGONAL MEMBER
-  INDICATES V-TYPE GEOMETRY CONNECTION AT WALL TRUSS MEMBERS AT LEVEL 2
-  INDICATES A-TYPE GEOMETRY CONNECTION AT WALL TRUSS MEMBERS AT LEVEL 4

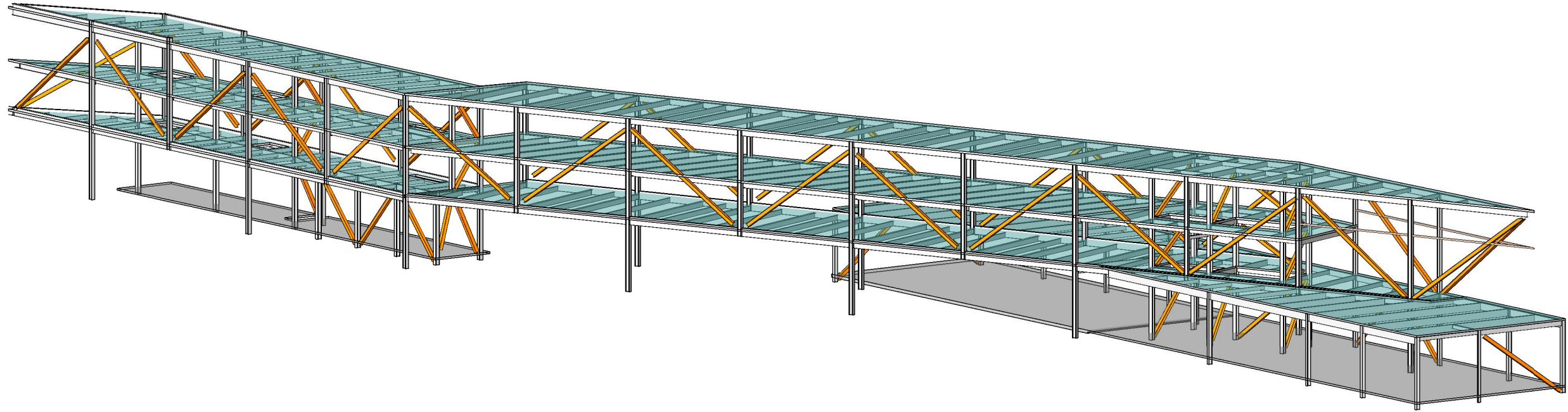
NOTES:

1. SLAB ON METAL DECK TYPE ARE AS FOLLOWS:
 -  D-1 3" 18 GAUGE METAL DECK + 3 1/4" LWC ABOVE FLUTES W/ 6x6-W2.9xW2.9 WWF REINFORCEMENT. (TOTAL DEPTH = 6 1/4") STUDS ARE 3/4" x 4 1/2"
 -  D-2 2" 18 GAUGE METAL DECK + 3 1/4" LWC ABOVE FLUTES W/ 6x6-W2.9xW2.9 WWF REINFORCEMENT. (TOTAL DEPTH = 6 1/4") STUDS ARE 3/4" x 4 1/2"
2. ESTIMATED STEEL QUANTITIES ARE AS FOLLOWS.
 - A. STEEL WEIGHT IN AREAS UNDER COMPOSITE METAL DECK (INCLUDES BEAMS AND COLUMNS):
8.0 PSF
 - B. BRACED FRAME STEEL WEIGHT PER FLOORPLATE (NOT INCLUDING TRUSS) - INCLUDES COLUMNS, BEAMS, AND BRACES:
3.0 PSF
 - C. EXTERIOR TRUSS STEEL WEIGHT (INCLUDES BEAMS, COLUMNS, AND BRACES):
293 TONS

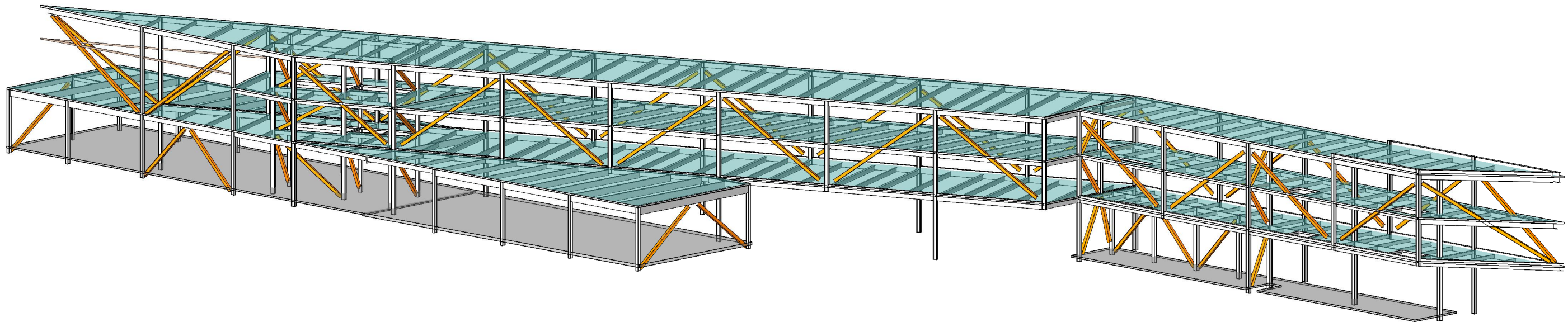


ROOF FRAMING PLAN
1" = 40'-0"

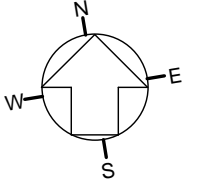


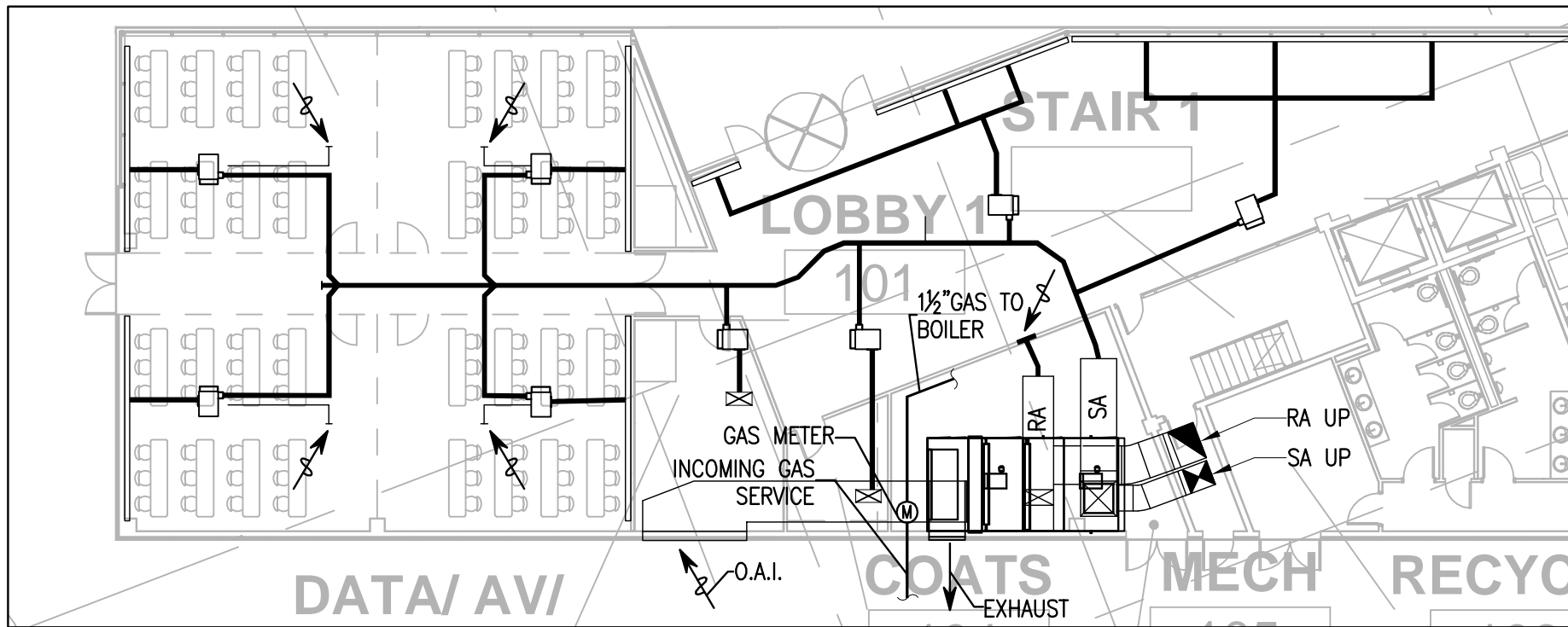


A 3D VIEW OF BUILDING FROM NORTHWEST

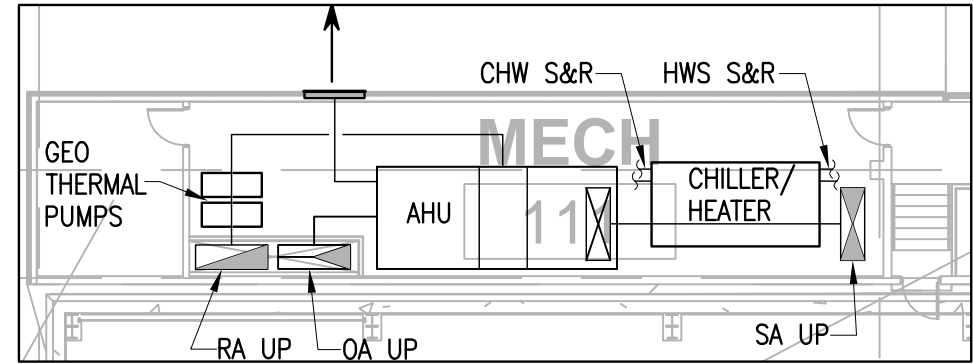


B 3D VIEW OF BUILDING FROM SOUTHEAST

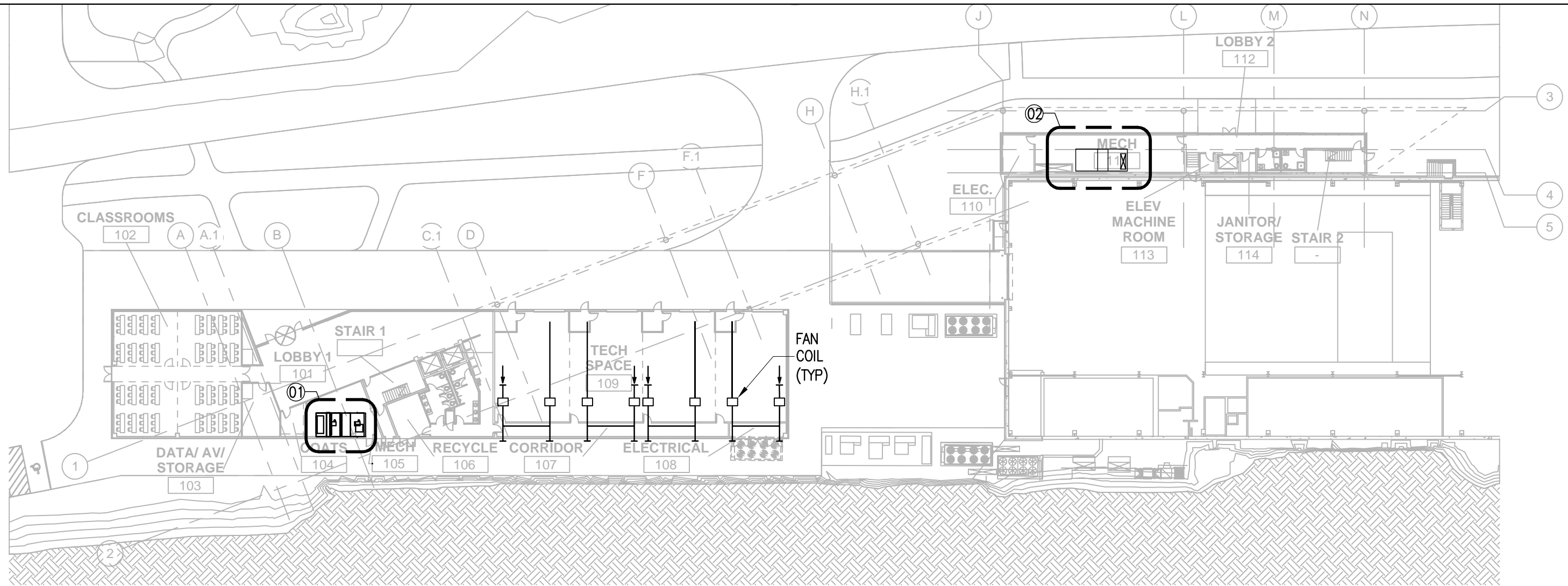




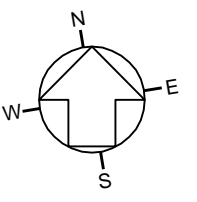
01 1ST FLOOR WEST MECHANICAL ROOM
1/16" = 1'-0"

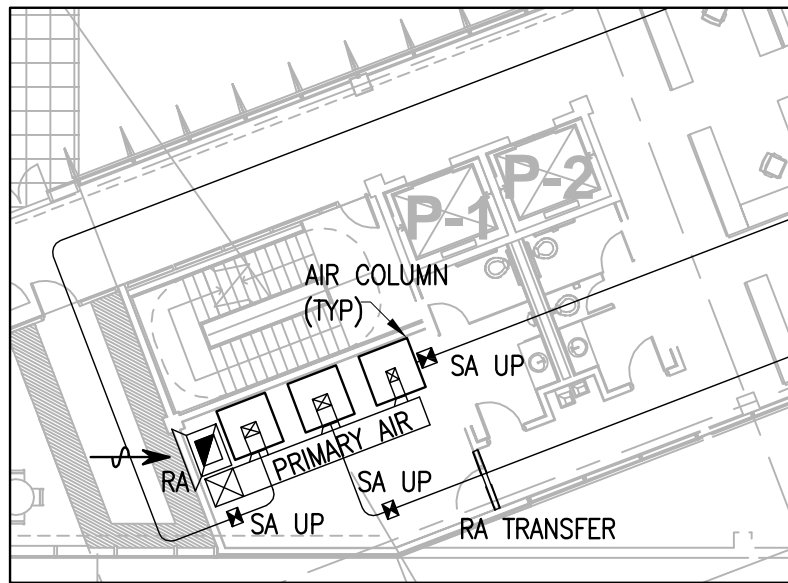


02 1ST FLOOR EAST MECHANICAL ROOM
1/16" = 1'-0"

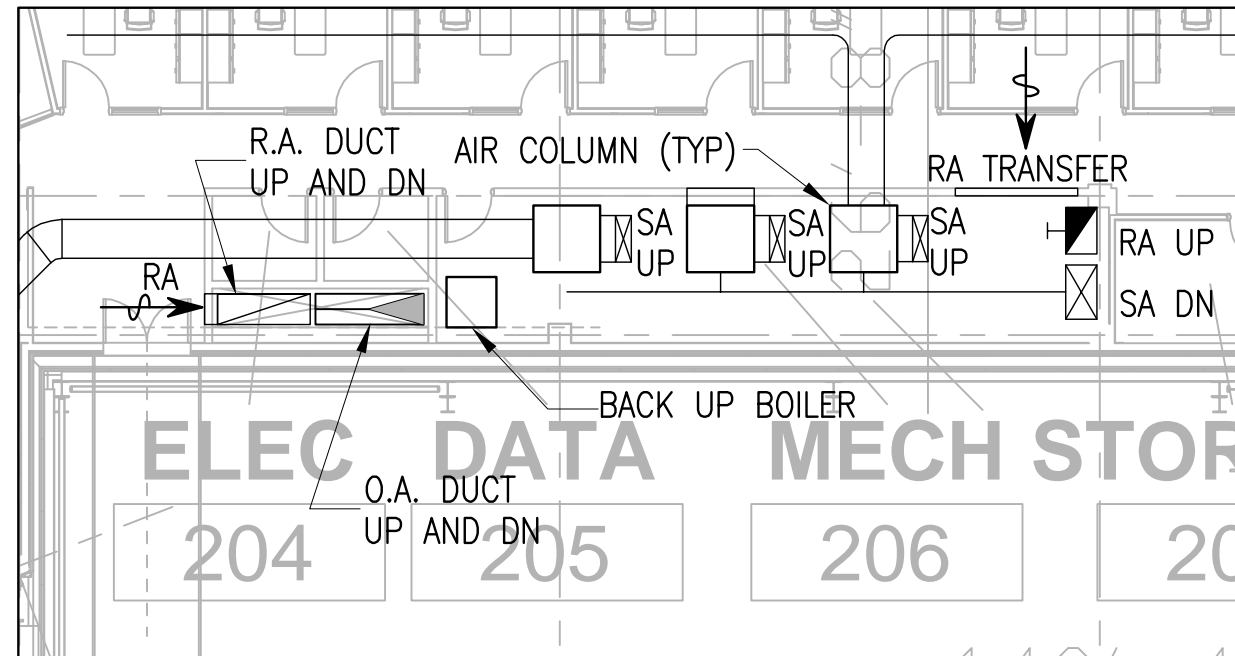


03 1ST FLOOR MECHANICAL PLAN
1" = 40'-0"

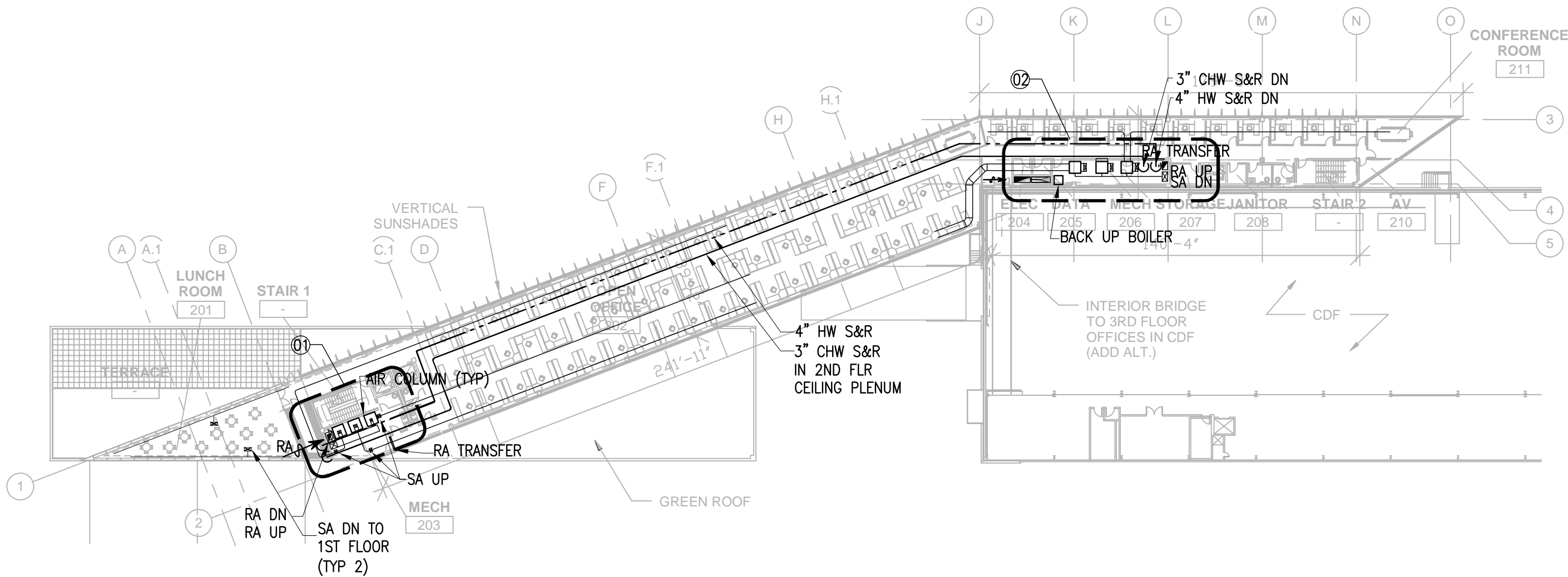




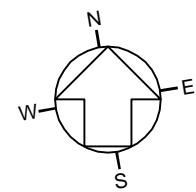
01 2ND FLOOR WEST MECHANICAL ROOM
1/16" = 1'-0"

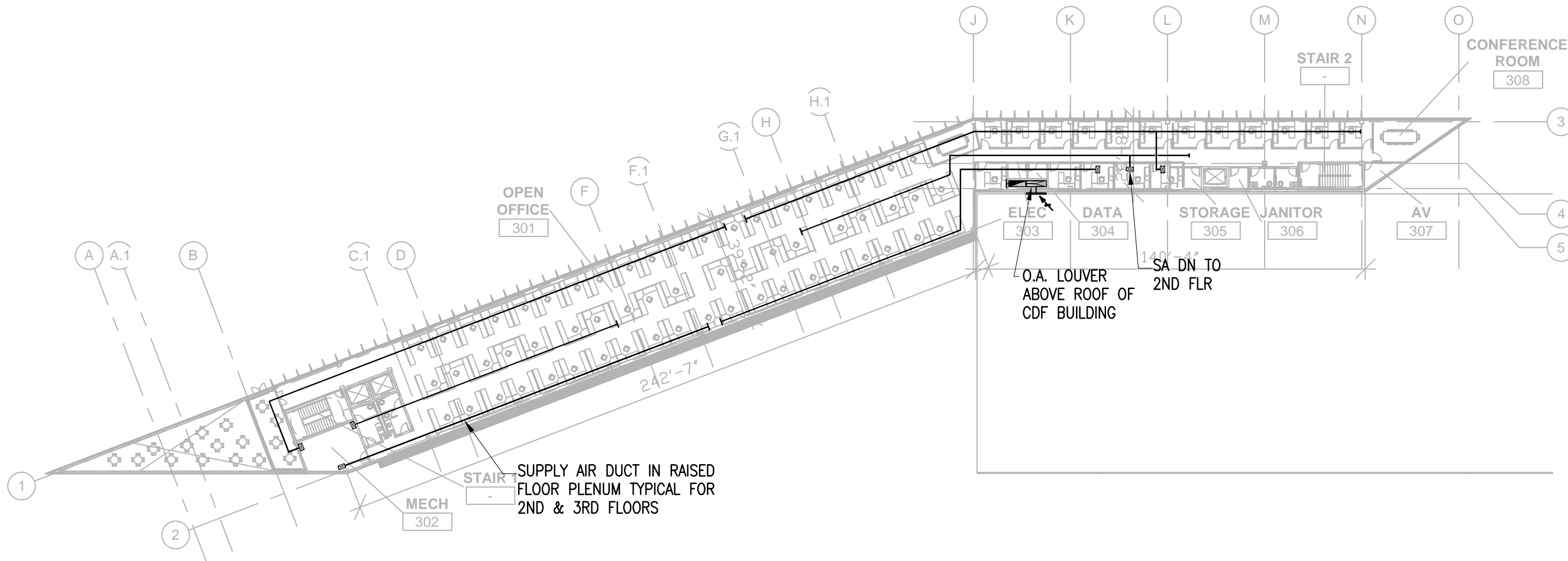


02 2ND FLOOR EAST MECHANICAL ROOM
1/16" = 1'-0"

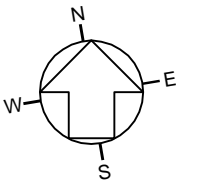
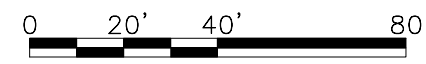


03 2ND FLOOR MECHANICAL PLAN
1" = 40'-0"





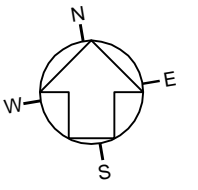
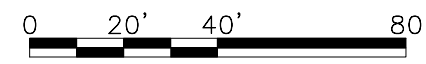
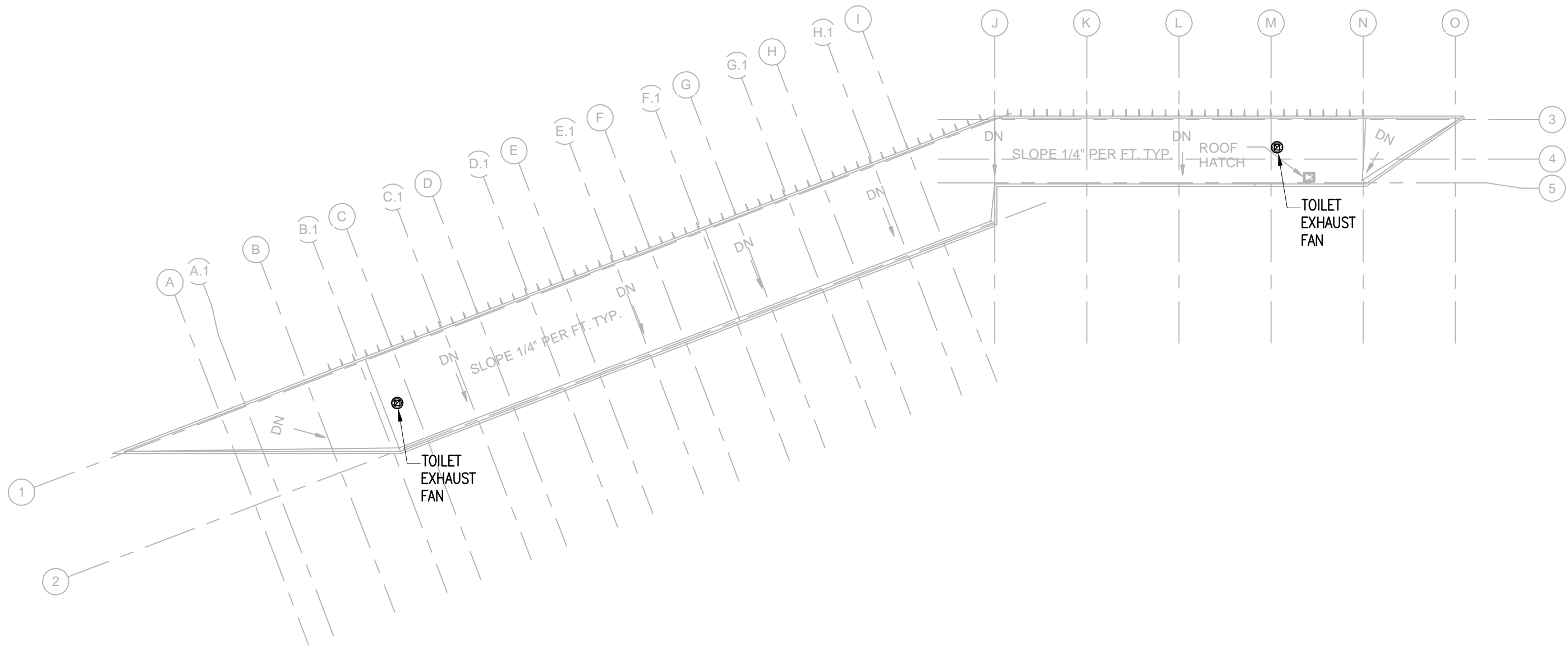
01 3RD FLOOR MECHANICAL PLAN
1" = 40'-0"



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10-8-1

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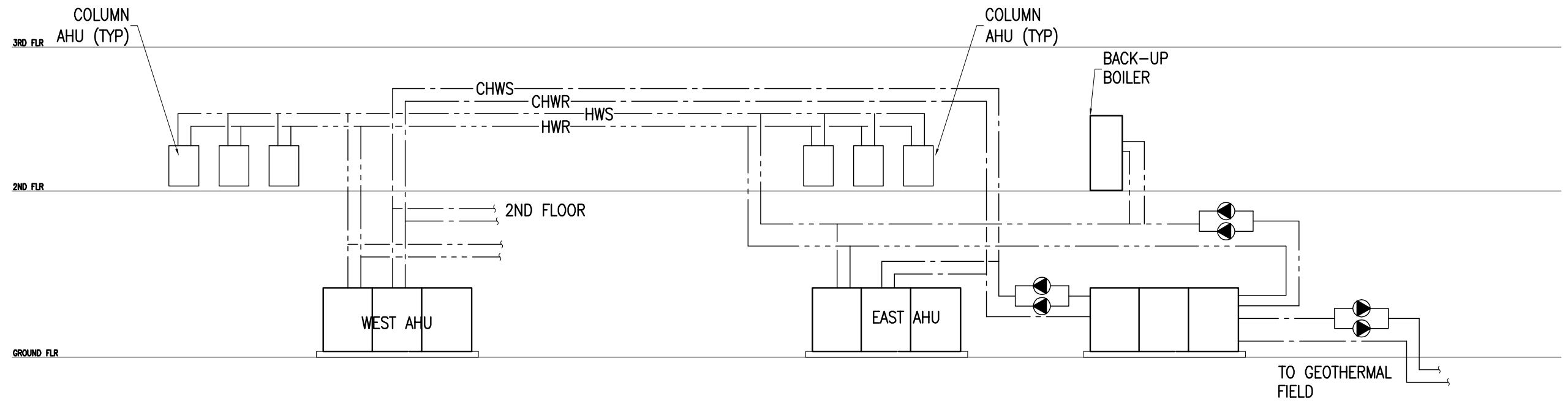
IARC
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 ROOF MECHANICAL



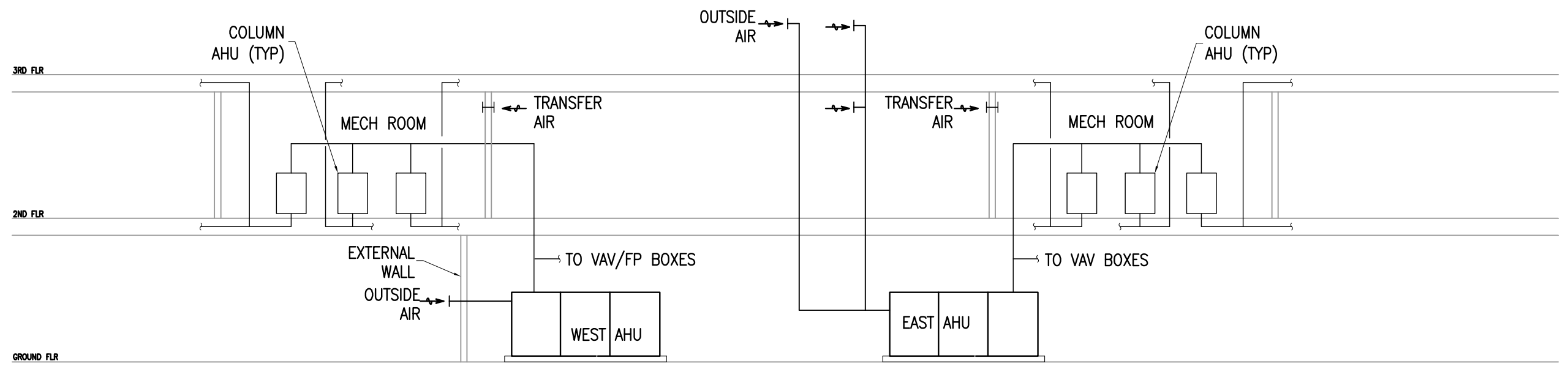
DATE
10.06.2010

PROJECT NO.
10-8-1

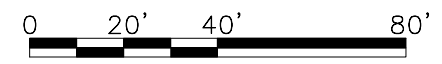
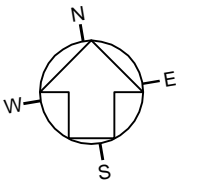
DRAWING NO.
CDR-30

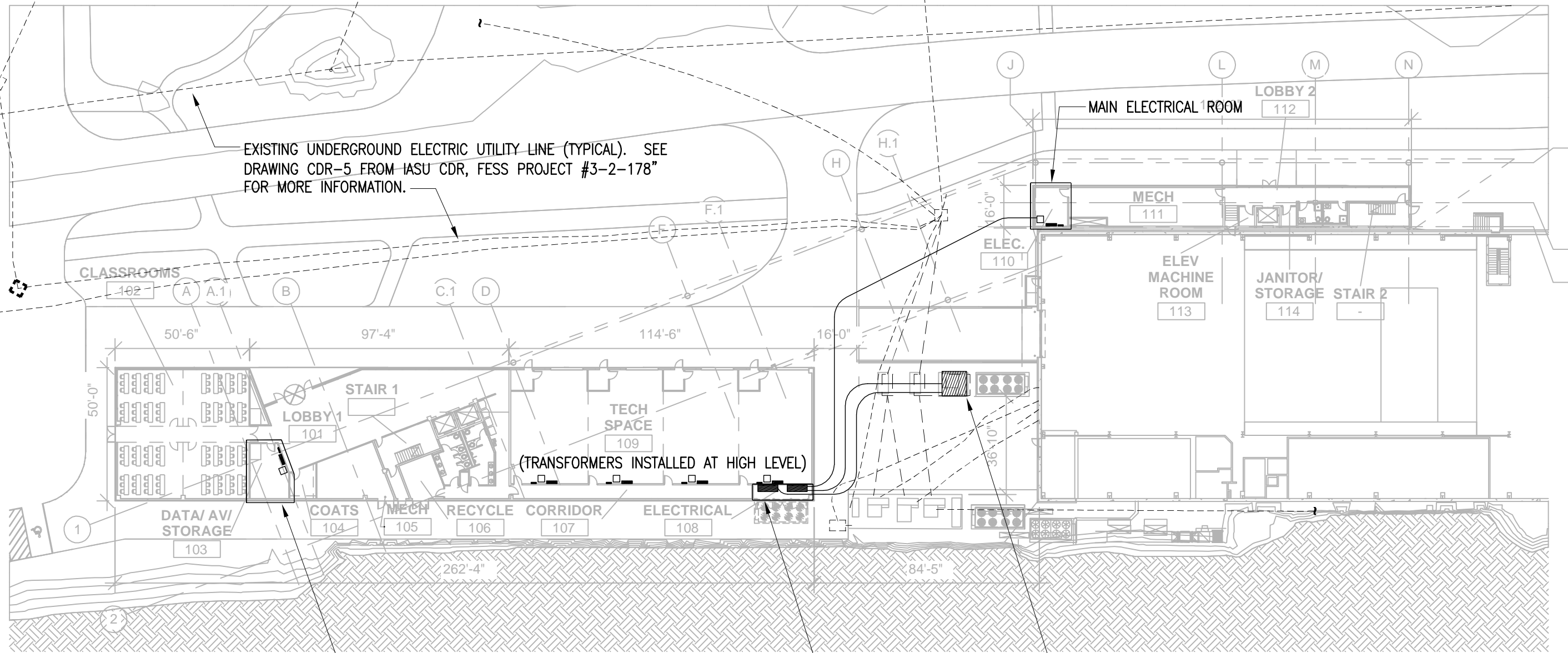


1 HOT WATER/CHILLED WATER DIAGRAM
NTS



2 AIR SUPPLY RISER DIAGRAM
NTS



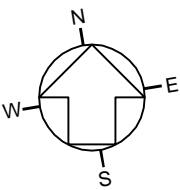
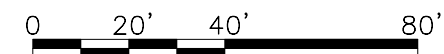


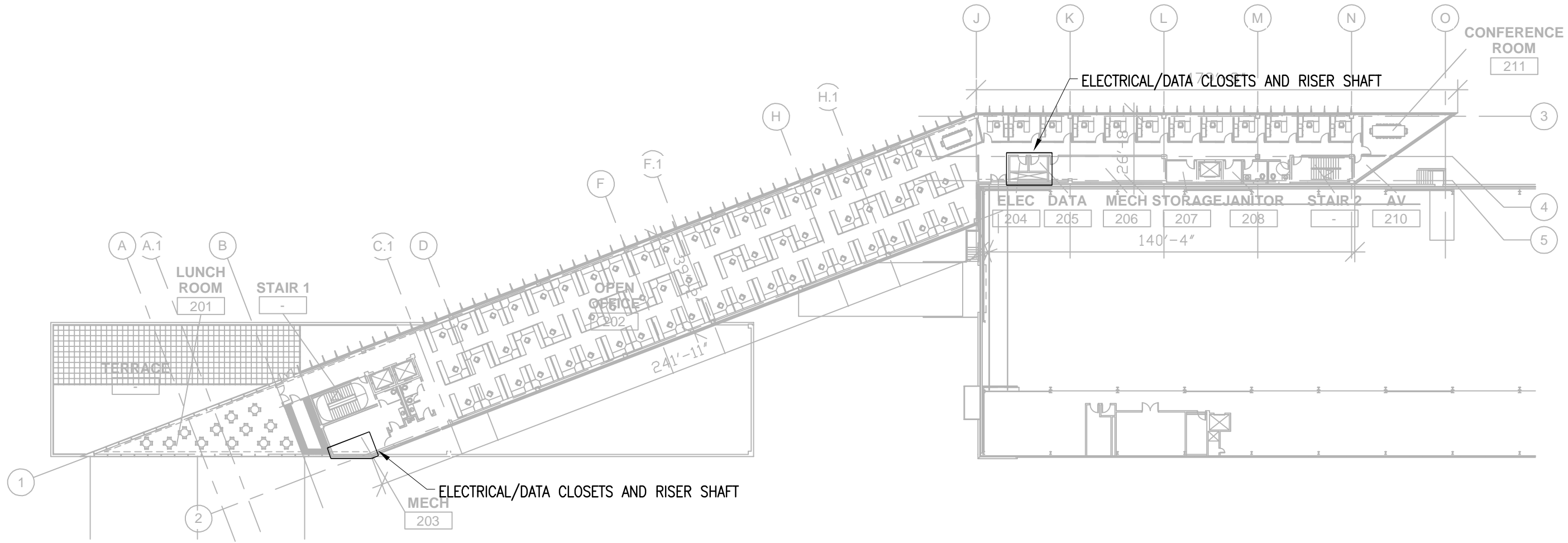
SHARED ELECTRICAL / DATA / AV ROOM

MAIN ELECTRICAL ROOM

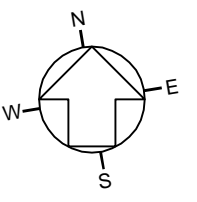
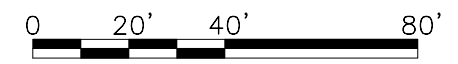
NEW TRANSFORMER INSTALLED ON PREVIOUSLY INSTALLED CONCRETE PAD

1 1ST FLOOR ELECTRICAL PLAN
1" = 40'-0"





2 2ND FLOOR ELECTRICAL PLAN
1" = 40'-0"



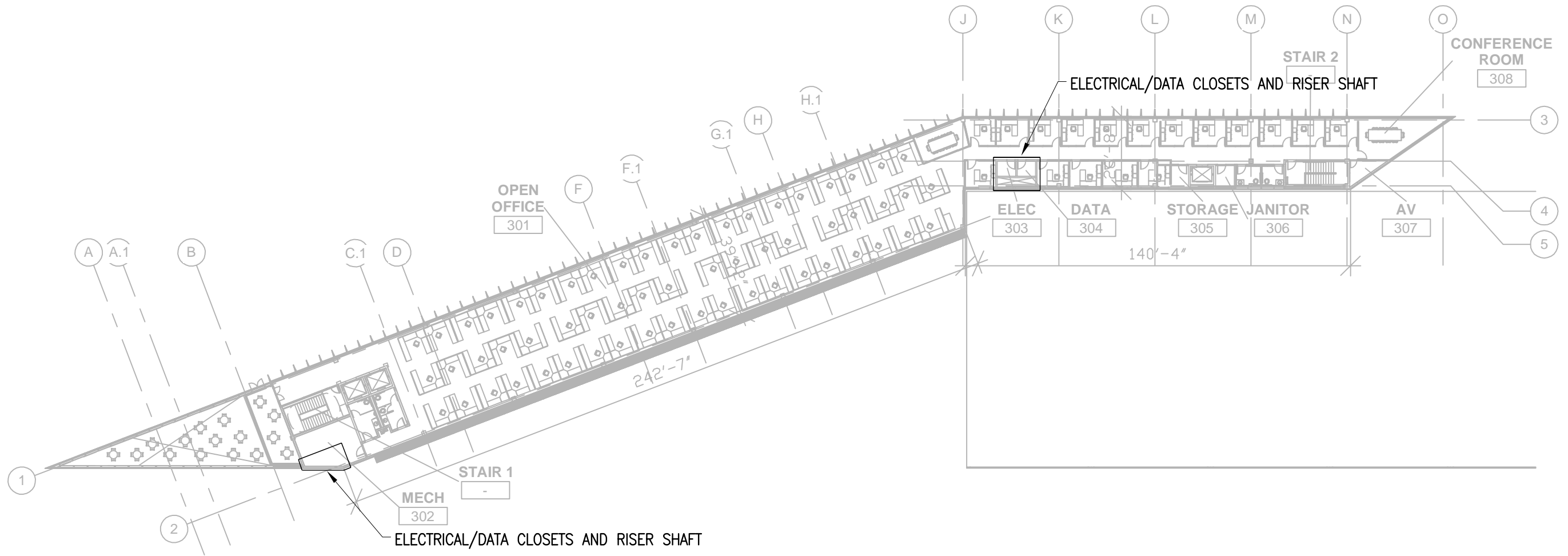
IARC
OFFICE, TECHNICAL, AND
EDUCATION BUILDING
2ND FLOOR ELECTRICAL PLAN



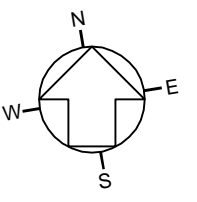
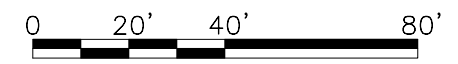
DATE
10.06.2010

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10-8-1

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CDR-33



3 3RD FLOOR ELECTRICAL PLAN
1" = 40'-0"



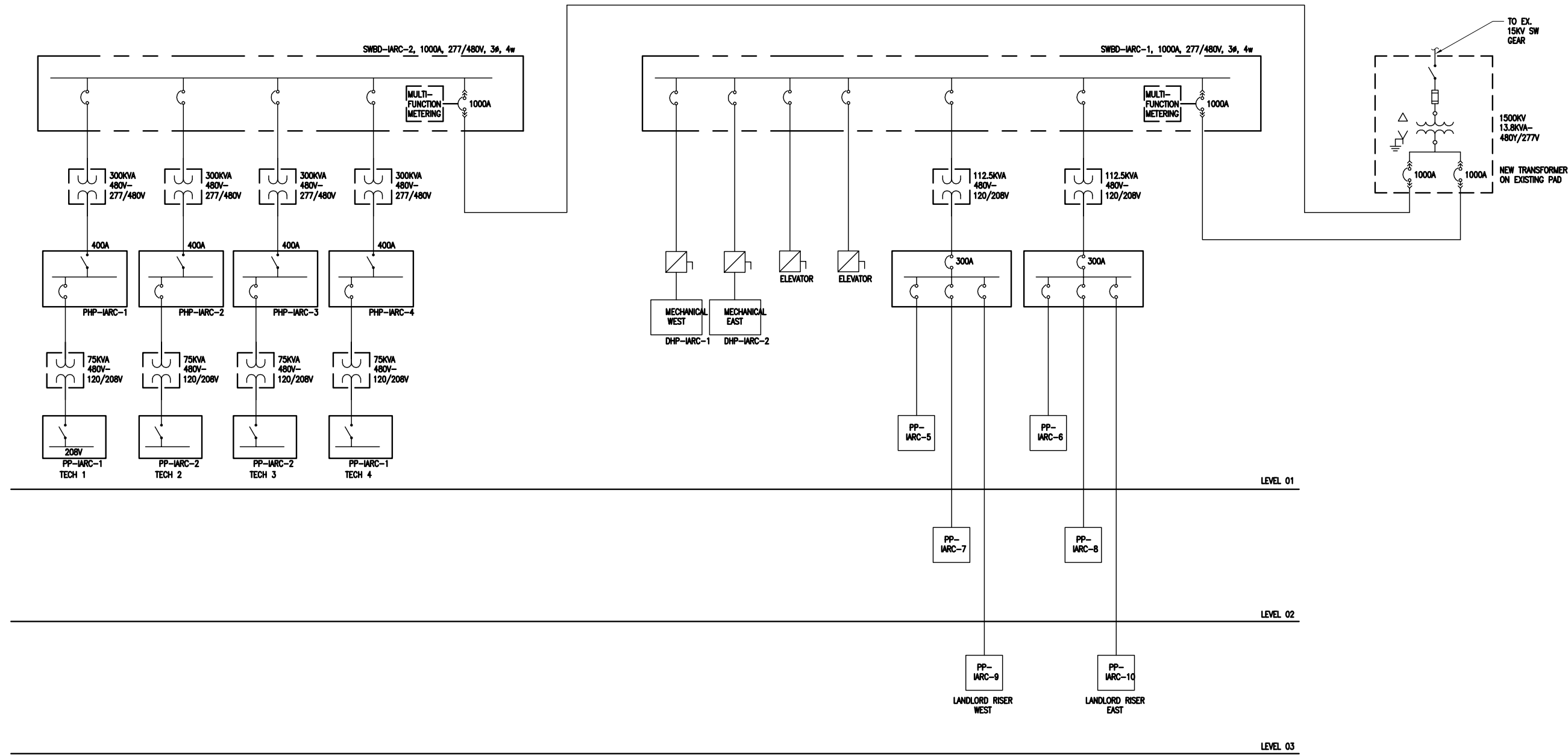
IARC
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EDUCATION BUILDING
3RD FLOOR ELECTRICAL PLAN



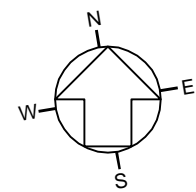
DATE
10.06.2010

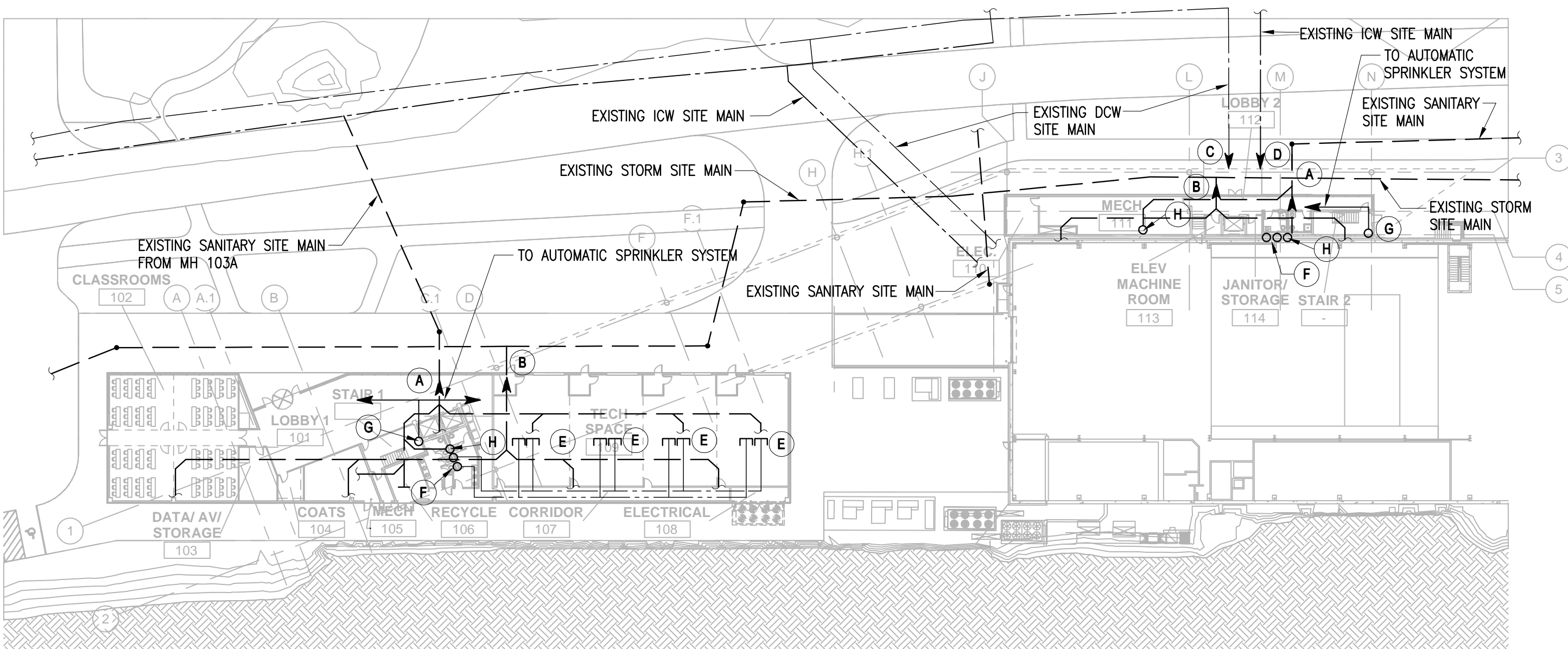
PROJECT NO.
10-8-1

DRAWING NO.
CDR-34



1 ELECTRICAL ONE LINE DIAGRAM
N.T.S.

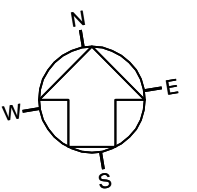
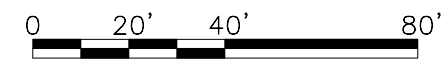


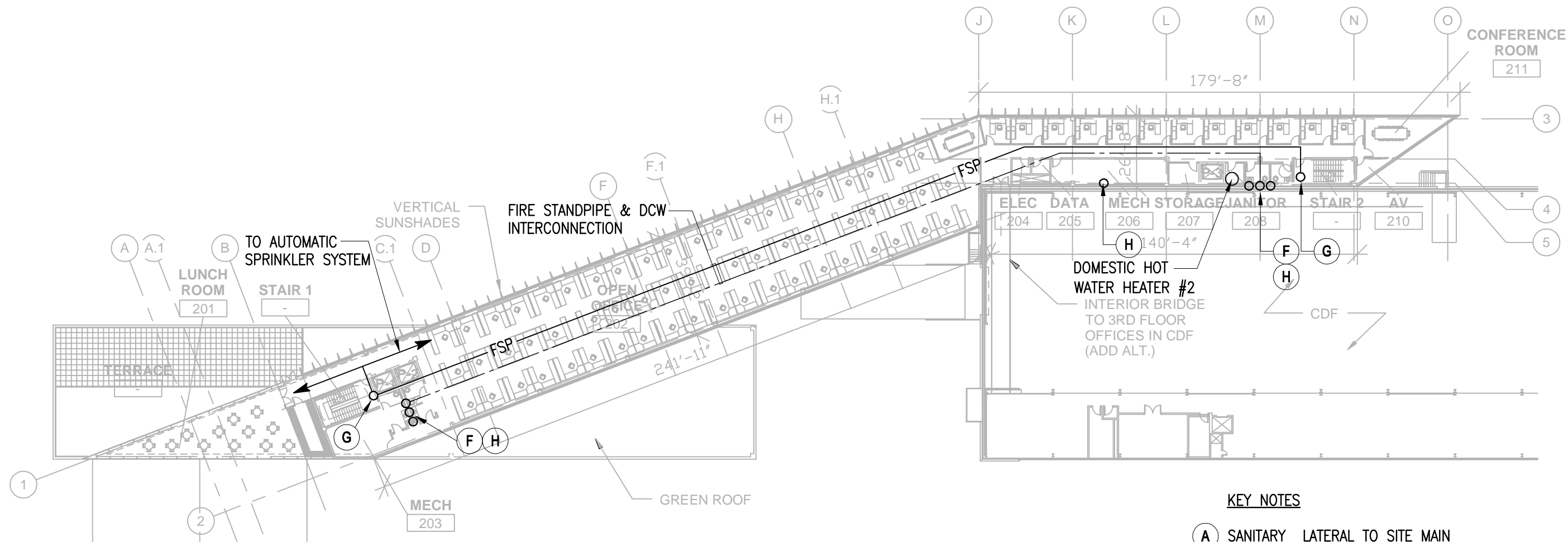


KEY NOTES

- (A) SANITARY LATERAL TO SITE MAIN
- (B) STORM LATERAL TO SITE MAIN
- (C) DOMESTIC WATER LATERAL TO BUILDING FROM SITE MAIN (DCW)
- (D) FIRE LATERAL TO BUILDING FROM SITE MAIN (ICW)
- (E) COLD & HOT WATER TO TECH SPACE
- (F) DOMESTIC HOT & COLD WATER RISERS
- (G) FIRE SPRINKLER & STANDPIPE RISER
- (H) SANITARY RISER
- (J) ROOF DRAIN

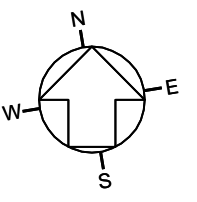
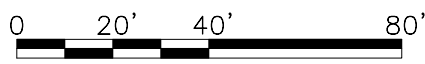
1 1ST FLOOR PLUMBING PLAN
1" = 40'-0"

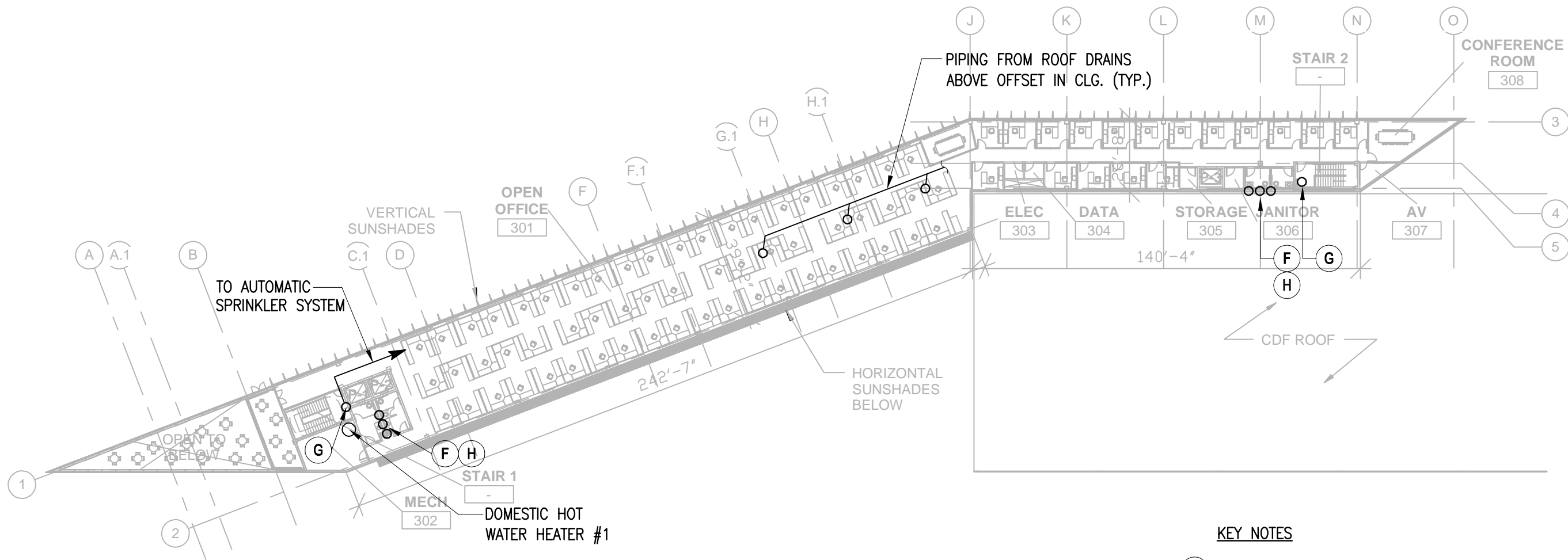




2 2ND FLOOR PLUMBING PLAN
1" = 40'-0"

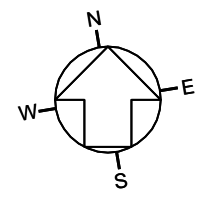
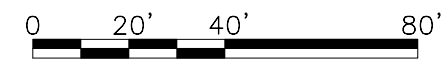
- KEY NOTES**
- (A) SANITARY LATERAL TO SITE MAIN
 - (B) STORM LATERAL TO SITE MAIN
 - (C) DOMESTIC WATER MAIN TO BUILDING (DCW)
 - (D) FIRE MAIN TO BUILDING (ICW)
 - (E) COLD & HOT WATER TO TECH SPACE
 - (F) DOMESTIC HOT & COLD WATER RISERS
 - (G) FIRE SPRINKLER & STANDPIPE RISER
 - (H) SANITARY RISER
 - (J) ROOF DRAIN

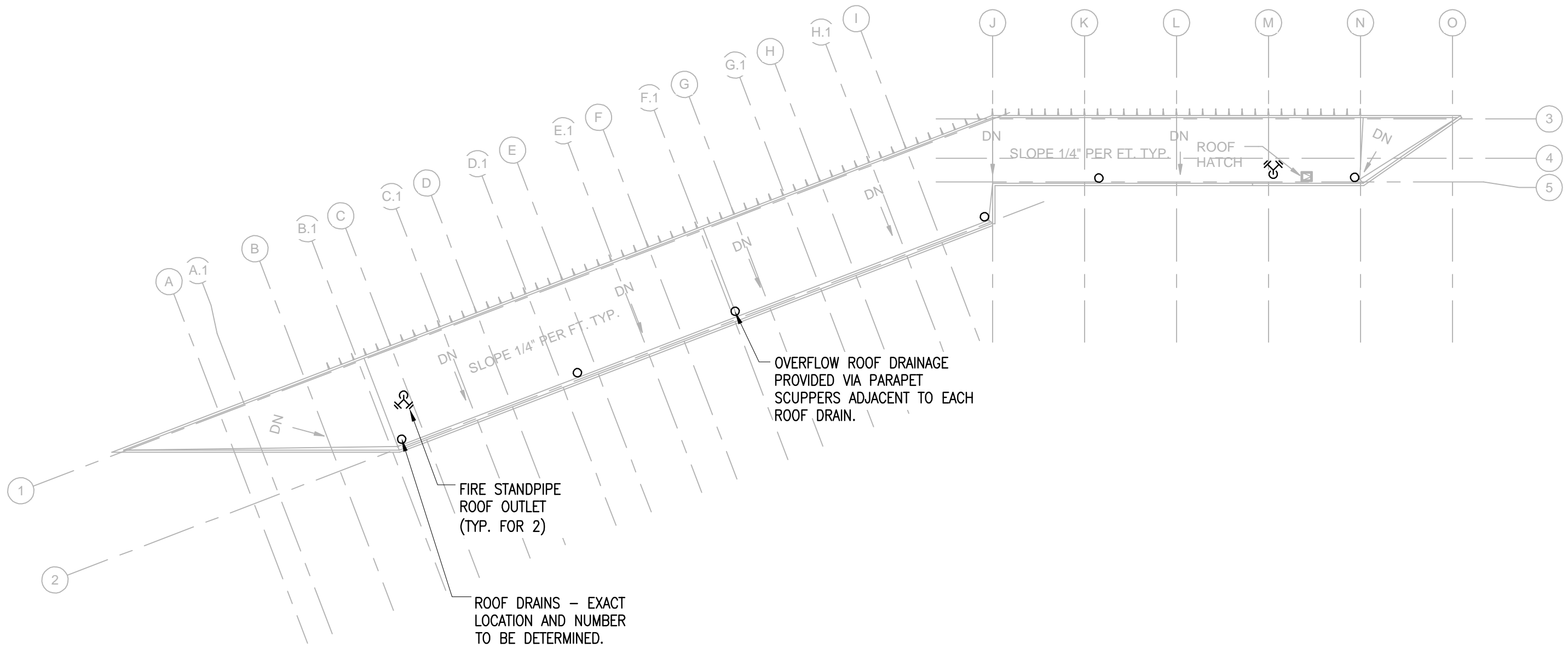




3 3RD FLOOR PLUMBING PLAN
1" = 40'-0"

- KEY NOTES**
- (A) SANITARY LATERAL TO SITE MAIN
 - (B) STORM LATERAL TO SITE MAIN
 - (C) DOMESTIC WATER MAIN TO BUILDING (DCW)
 - (D) FIRE MAIN TO BUILDING (ICW)
 - (E) COLD & HOT WATER TO TECH SPACE
 - (F) DOMESTIC HOT & COLD WATER RISERS
 - (G) FIRE SPRINKLER & STANDPIPE RISER
 - (H) SANITARY RISER
 - (J) ROOF DRAIN



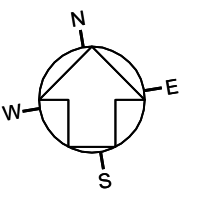
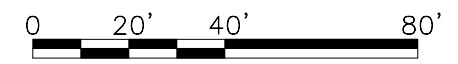


FIRE STANDPIPE
ROOF OUTLET
(TYP. FOR 2)

ROOF DRAINS - EXACT
LOCATION AND NUMBER
TO BE DETERMINED.

OVERFLOW ROOF DRAINAGE
PROVIDED VIA PARAPET
SCUPPERS ADJACENT TO EACH
ROOF DRAIN.

4 ROOF PLUMBING PLAN
1" = 40'-0"



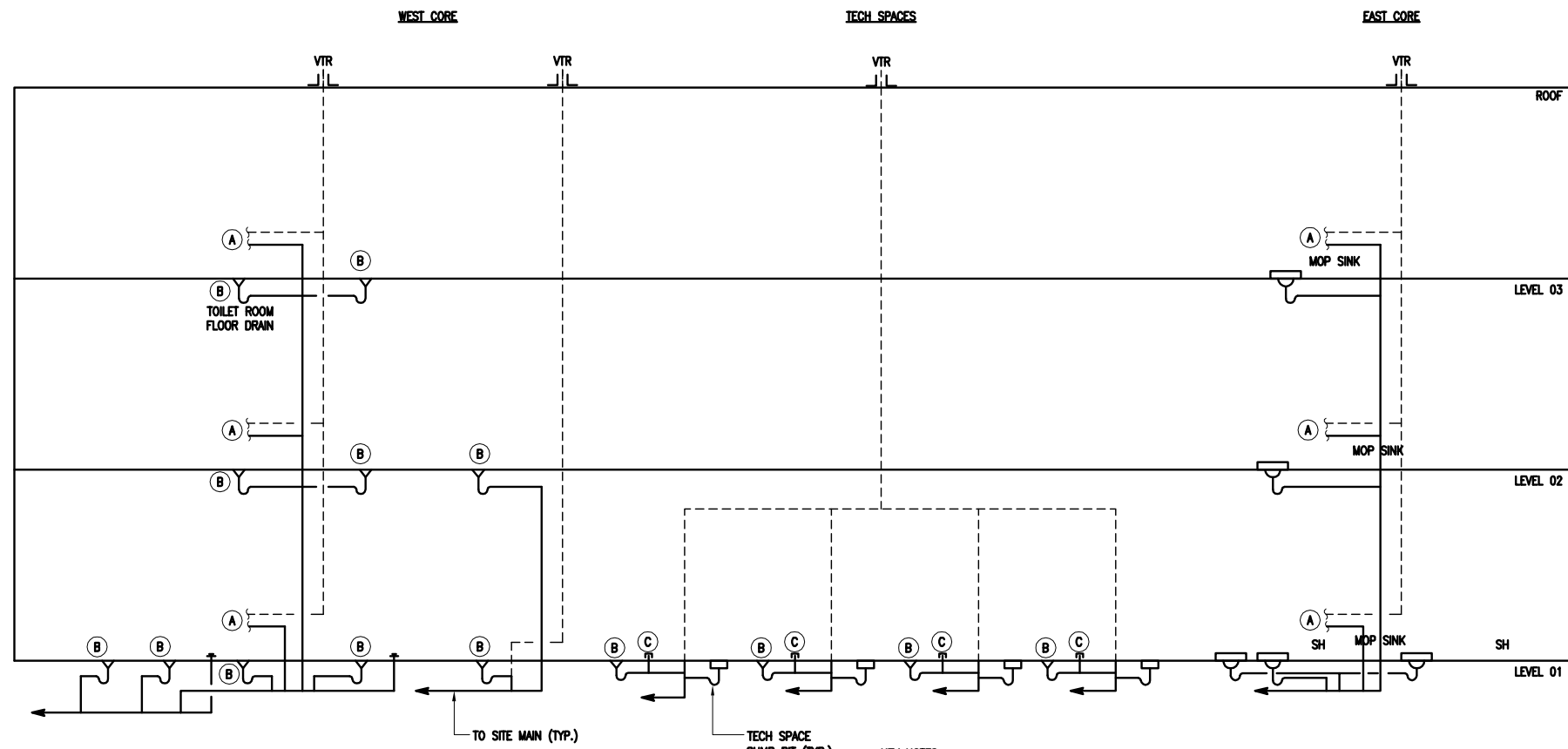
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ROOF PLUMBING PLAN



DATE
10.06.2010

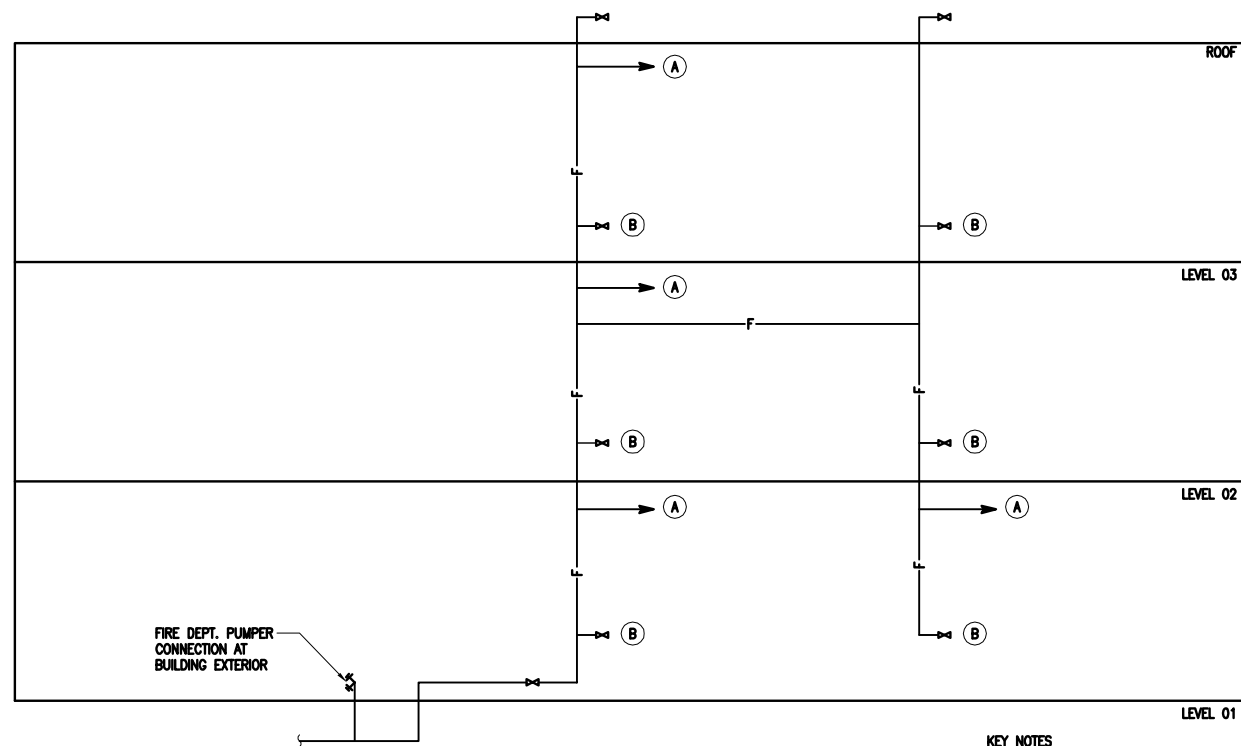
PROJECT NO.
10-8-1

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CDR-39



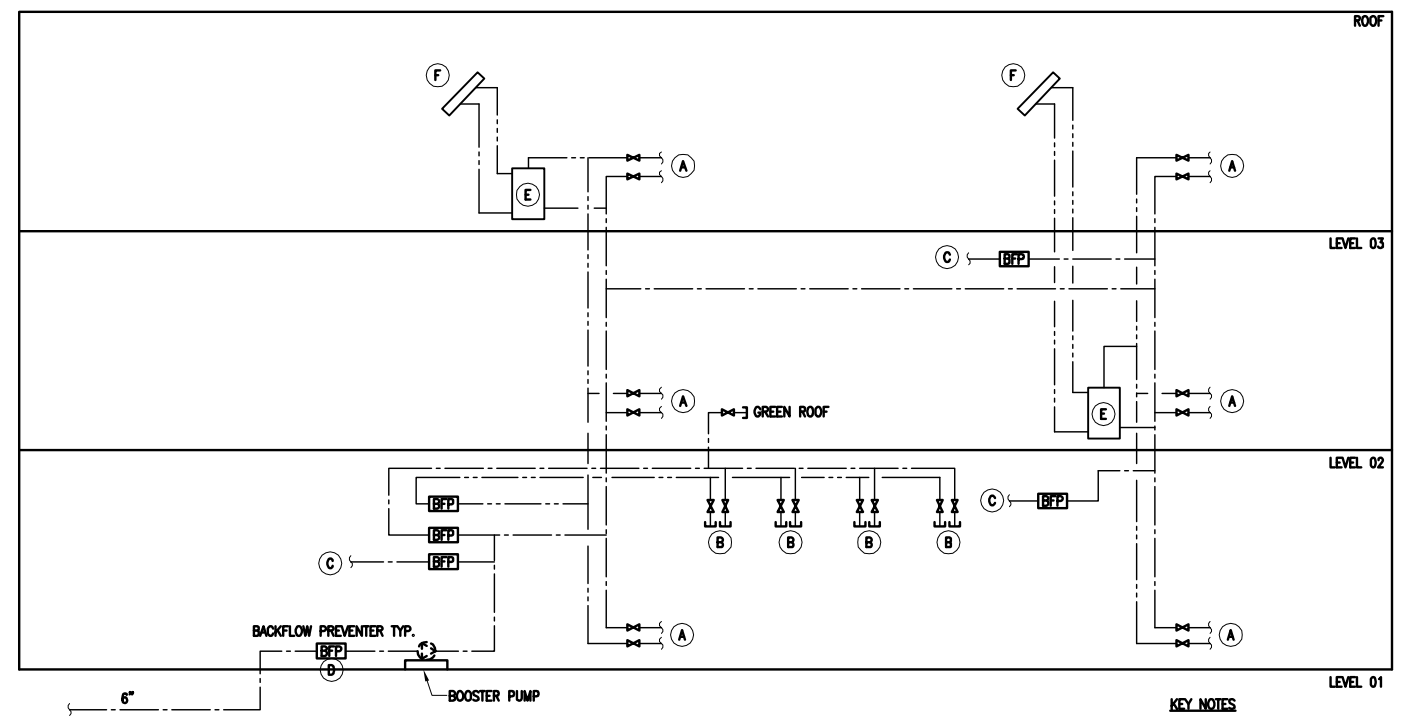
1 SANITARY WASTE DIAGRAM
N.T.S.

- KEY NOTES
- (A) TO PLUMBING FIXTURES
 - (B) FLOOR DRAINS
 - (C) 4" CAPPED STUB.



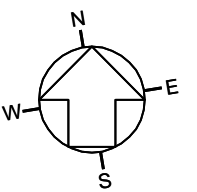
2 AUTOMATIC SPRINKLER & STANDPIPE DIAGRAM
N.T.S.

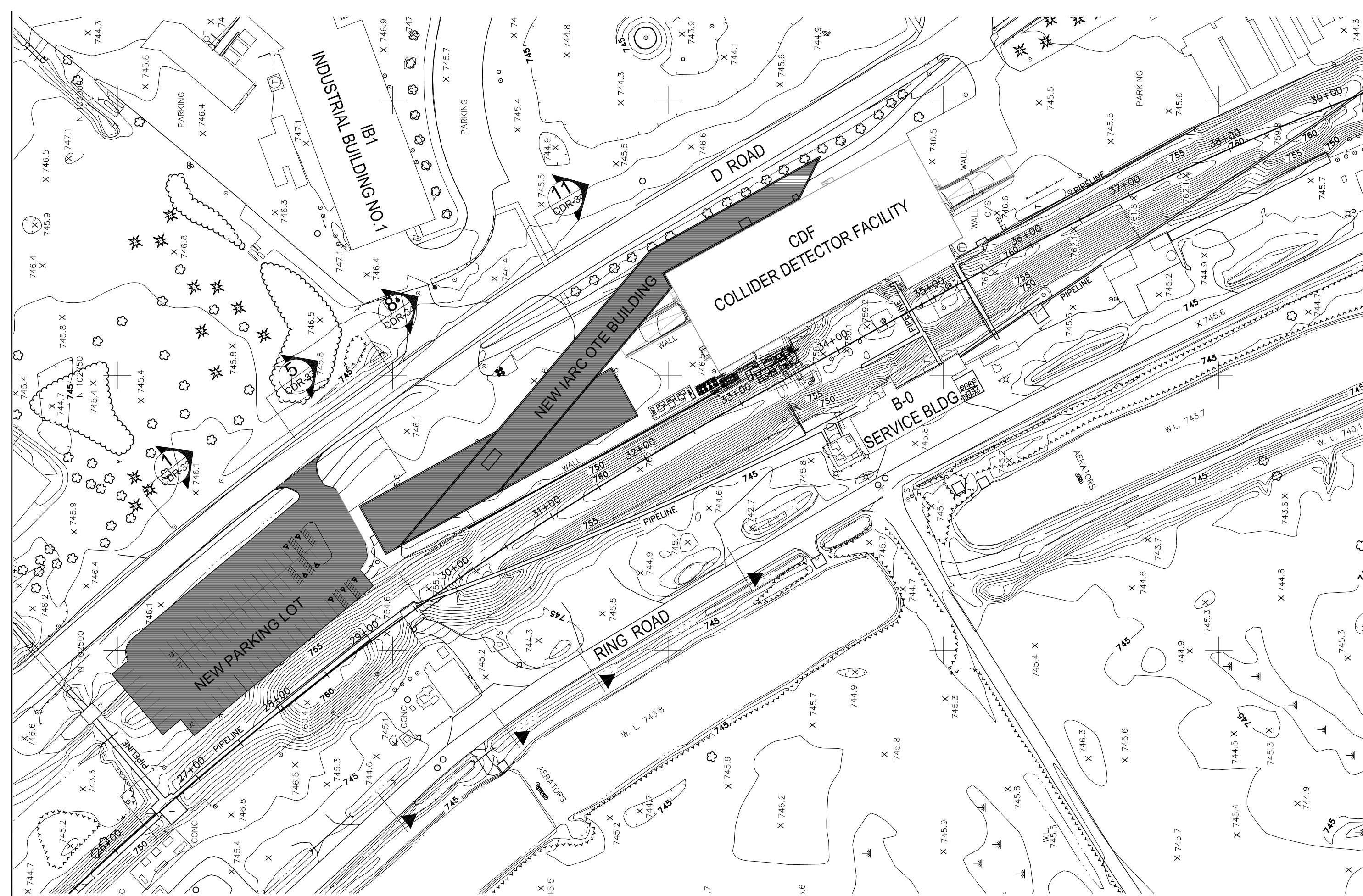
- KEY NOTES
- (A) TO AUTOMATIC SPRINKLER SYSTEM
 - (B) HOSE VALVE



3 DOMESTIC WATER DIAGRAM
N.T.S.

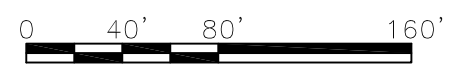
- KEY NOTES
- (A) TO PLUMBING FIXTURES
 - (B) TO TECH ROOMS
 - (C) TO MECHANICAL EQUIPMENT
 - (D) BACKFLOW DEVICE
 - (E) WATER HEATER
 - (F) SOLAR PANELS





1 PLAN
 SCALE: 1"=80'

RAD SAFETY DRAWINGS PLAN
 PROJECT NO. 10-8-1



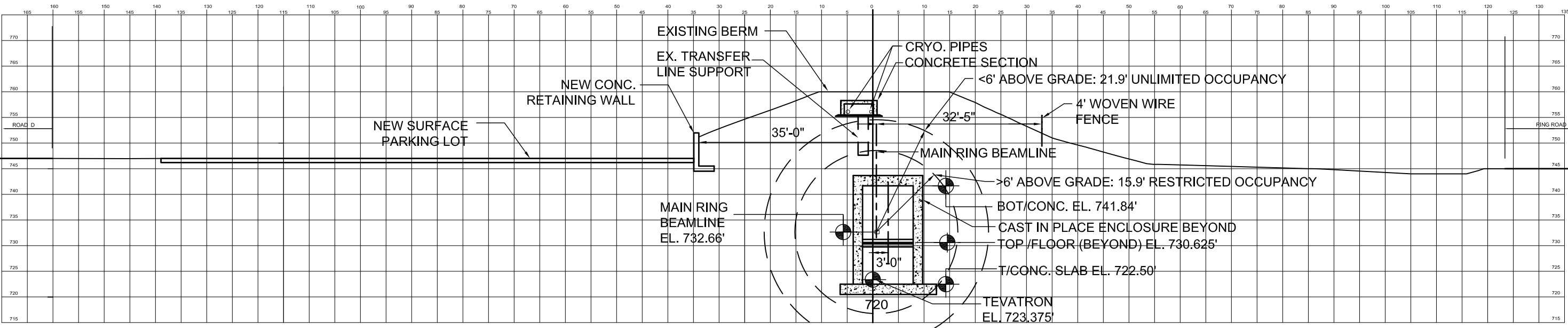
ross barney architects
r_barc ARUP
 10 West Hubbard Street, Chicago, Illinois 60610
 312.832.0900 312.832.0867
 www.r-barc.com

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 RADIATION SAFETY - PLAN

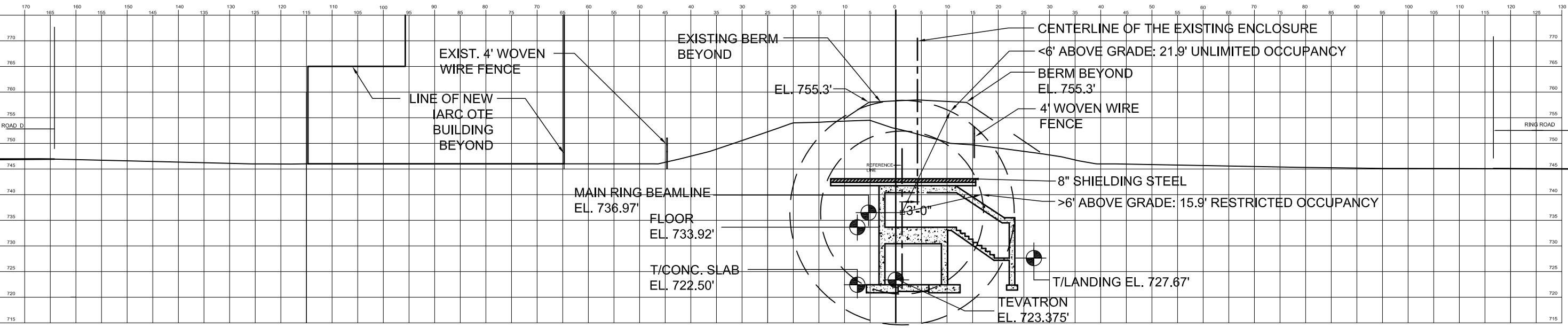
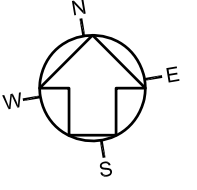
DATE
10.06.2010

PROJECT NO.
10-8-1

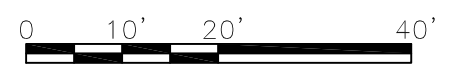
DRAWING NO.
CDR-41

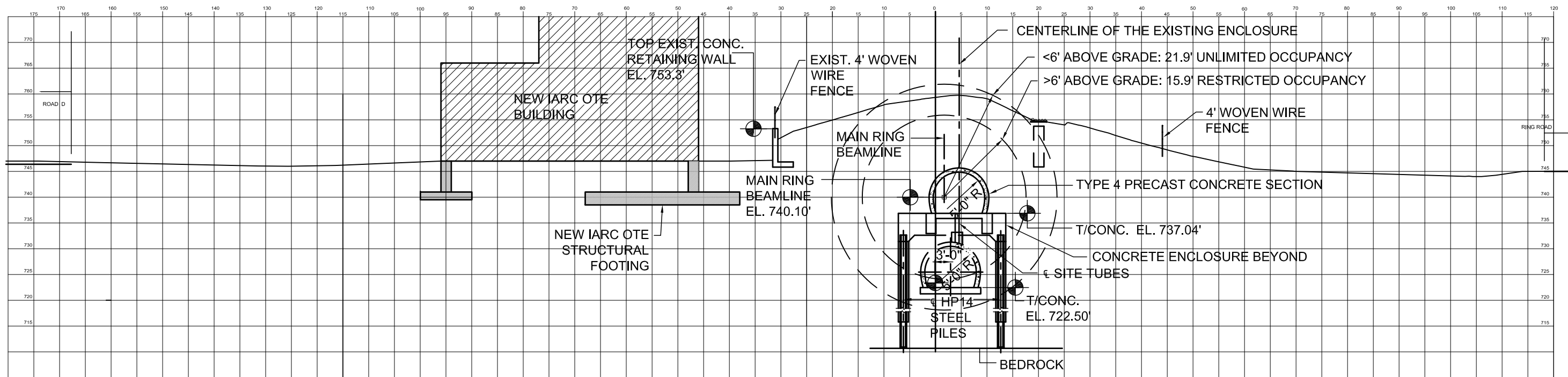


1 SECTION
 SCALE: 1"=20' STA. 28+20
 RAD SAFETY DRAWINGS SECTION
 PROJECT NO. 10-8-1

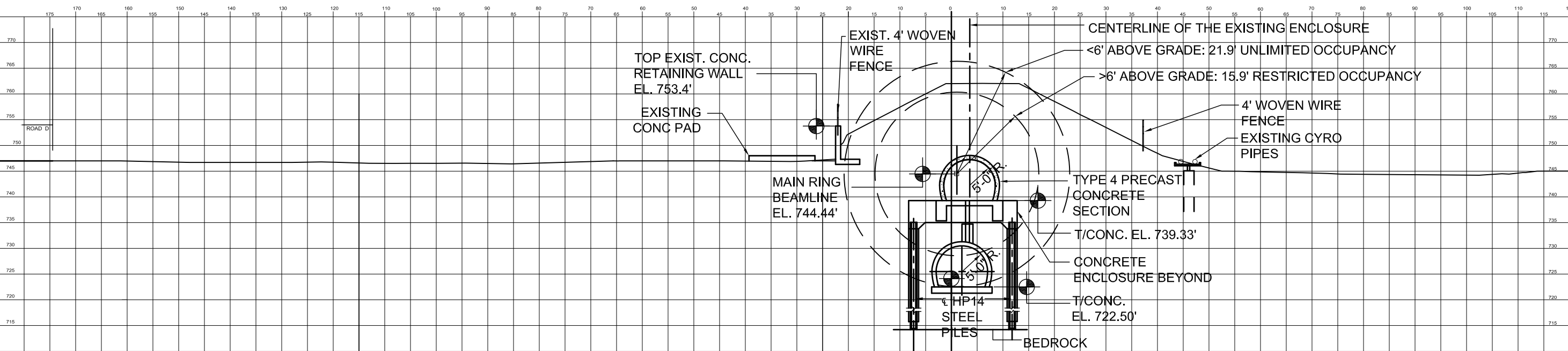
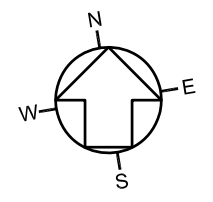


5 SECTION
 SCALE: 1"=20' STA. 28+20
 RAD SAFETY DRAWINGS SECTION
 PROJECT NO. 10-8-1

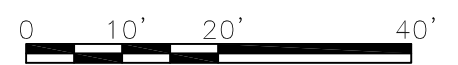




8 SECTION
 SCALE: 1"=20' STA. 28+20
 RAD SAFETY DRAWINGS SECTION
 PROJECT NO. 10-8-1



11 SECTION
 SCALE: 1"=20' STA. 29+53
 RAD SAFETY DRAWINGS SECTION
 PROJECT NO. 10-8-1



Geotechnical Engineering Report

for

**IARC BUILDING
BATAVIA, ILLINOIS**

**Prepared for
FERMI NATIONAL
ACCELERATOR LABORATORY**

PROJECT No. 21053.034

AUGUST 9, 2010

SUBMITTED BY:



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APPENDICES

Appendix A - Boring Location Plan	
Appendix B - Soil Boring Logs	
Appendix C - Laboratory Results	
Appendix D – Technical Bulletin No. 9 – GeoPier Foundation Co. Inc.	

INTRODUCTION

This report presents the results of the geotechnical investigation performed by Patrick Engineering Inc. (Patrick) for the proposed Illinois Accelerator Research Center (IARC) Facility at the Fermi National Accelerator Laboratory in Batavia, Illinois (Fermilab).

This report was prepared according to the scope of services outlined in Patrick's proposal No. 2A953.631, dated April 26, 2010. The purpose of the geotechnical investigation, as outlined in our proposal, was to evaluate the subsurface conditions in the project area and provide recommendations regarding foundation design for the planned building. This report also includes demolition and site preparation recommendations and construction considerations.

PROJECT DESCRIPTION

The Project area is located adjacent to the CDF Building along B Road at Fermilab. The project will include a new three-story 40,000-square-foot slab-on-grade office building. The new building will be located in the existing parking lot with a façade that wraps in front of the CDF Building. A walkway between the new office building and the existing CDF Building is also being considered.

Additional parking will also be constructed in conjunction both building configurations. At this time, it has not been determined where the parking lot(s) will be located.

SITE INVESTIGATION

Field Exploration

Field exploration activities included drilling and sampling eight borings to depths ranging from 30 to 75 feet. Field exploration activities were performed on June 11 and June 14, 2010. The boring locations were selected and identified on site by representatives of Fermilab and Patrick. Ground surface elevations for the boring locations were estimated from an existing site conditions survey provided by Fermilab. The approximate boring locations and elevations are shown on the attached Boring Location Plan (Appendix A).

The boreholes were advanced using a truck-mounted CME-75 drill rig using 4¼" ID hollow-stem augers. Disturbed soil samples were collected at 2.5-foot intervals down to 15 feet and at 5-foot intervals thereafter using a 2-inch OD split-spoon sampler as part of the Standard Penetration Test (SPT). The sampler was initially seated by driving it six inches, and then driven an additional 12 inches using a 140-pound hammer falling 30 inches. The number of blows required to drive the sampler the last 12 inches is designated as the SPT "N-Value". SPT sampling was performed in general accordance with ASTM D 1586. Several samples of cohesive soils were obtained using a 3-inch Shelby tube, in general accordance with ASTM D 1587.

Field exploration activities were supervised by an experienced Patrick geologist who logged the soil conditions and collected representative soil samples for visual classification and possible laboratory testing. The soils were logged according to the Soil Description Terminology and the locally adapted version of the Unified Soil Classification System, ASTM D 2487, as presented in Appendix B. The filed logs, together with laboratory test results, were used to develop the final boring logs presented in Appendix B.

LABORATORY TESTING

Soil samples were transported to a local laboratory for moisture content testing. Select samples were tested for Atterberg limits, grain size analysis, dry unit weights and unconfined compressive strength. Results of the testing program are presented on the logs in Appendix B, with the laboratory results included in Appendix C.

SITE CONDITIONS

Surface Conditions

The project area is currently an asphalt parking lot, with a depressed concrete loading dock entrance at the northwest corner of the building. The area is bounded to the south by the accelerator ring berm and perimeter fence. There is a large storm sewer and manhole in the center of the parking lot. The western edge of the parking lot drains to the vegetated wetland area adjacent to the west of the lot. A large drainage outlet from the storm sewer was observed

flowing to this lower lying ditch area. This area is covered with large brush and tall grasses separating D Road from the accelerator ring berm. A pedestrian and bike path parallels D Road along the north side of the CDF Building. Large trees line the bike path for the length of the building.

Design drawings (6-1-37) for the CDF Building were provided by Fermilab. Based on these drawings the existing building has a basement extending to a depth of 36 feet below existing grade. The basement slab elevation is 709' 11½". The building is supported on a combination of shallow spread footings below the basement and caissons.

Soil Conditions

At most of the boring locations, the pavement section consisted of 3 to 4½ inches of asphalt underlain by crushed stone aggregate base. The aggregate base materials generally ranged in thickness from 1½ to 2 feet. Below the aggregate base materials in Boring S1408, approximately 3½ feet of ¾-inch limestone was also encountered. At the surface of Boring S1409 in the grass area, approximately 12 inches of topsoil and organic clay materials were encountered.

Subsurface soils below the pavement section and topsoil generally consisted of layers of silty clay, silt and silty sand underlain by limestone bedrock.

A layer of soft to medium stiff silty clay/clayey silt was encountered in most of the borings and extended to depths of about 13 to 17 feet below existing grade. Generally, this material had compressive strength values ranging from 0.25 to 1.0 ton per square foot (tsf). Laboratory unconfined compressive strength tests were performed on several samples of this material with results ranging from 0.24 to 0.59 tsf. Below the soft to medium stiff silty clay, stiff to very stiff silty clay was encountered which generally extended to depths of about 60 feet. These materials had compressive strength values ranging from 3 to 4.5 tsf. Borings S1404, S1407 and S1410 were terminated in this stiff layer at depths of 30 feet.

Boring S1411 encountered miscellaneous fill consisting of clay and sand layers through the depth of the boring. An obstruction was encountered at a depth of 18 feet and the boring was offset to continue to the planned terminal depth. Wood pieces were encountered in the sampler at depths of 25 to 30 feet.

Auger refusal was encountered upon reaching bedrock in each of the deep borings (S1405 and S1406) at depths of 70.4 and 70 feet, respectively.

Groundwater Observations

Groundwater observations were made while drilling by noting either the depth to water as measured on the drill rods or the presence of free water in the soil samples. Upon completion of the borehole and removal of the augers, groundwater was measured in the open borehole if the hole did not cave in.

While drilling, groundwater was encountered at depths ranging from 6 to 9.5 feet below grade. After drilling, groundwater was observed in Borings S1404, S1405 and S1406 at depths of 23 feet, 55 feet and 64 feet, respectively. Free groundwater was not observed in the remaining borings after drilling. Given the color change and moisture contents of the soils below a depth of 10 feet, it is anticipated that the long term groundwater elevation is consistently below this depth; however groundwater levels fluctuate, and higher water levels may be present after periods of precipitation and during prolonged wet periods.

Seismic Classification

In accordance with the 2009 International Building Code (IBC 2009) Section 1613, Table 1613.5.2, the Property has a Seismic Site Classification of D. The classification is based on the upper 100 feet of the soil profile having average undrained shear strengths between 1,000 and 2,000 psf, and SPT N values between 15 and 50. While the Site does exhibit soft soil layers near the surface, laboratory test results (plasticity indices and moisture contents) do not meet the Class E requirements.

ENGINEERING ANALYSIS AND RECOMMENDATIONS

The following recommendations for design and construction of the proposed foundations are based on the geotechnical data gathered in this investigation.

Demolition and Site Preparation Recommendations

The proposed building footprint is located within an existing parking lot, and it is anticipated that the existing pavements and retaining structures for the loading dock will be completely removed. Existing utilities that interfere with the proposed construction should be properly abandoned in place or removed / rerouted and the excavations backfilled with compacted structural fill to prevent settlement. It is recommended that any demolition excavations are backfilled with compacted structural fill as described below.

Landscaped areas of the Site should be cleared of trees and stumps, and grubbed to a suitable depth to remove all large roots (diameters greater than 2 inches).

Asphalt and aggregate base materials were encountered at the ground surface of most borings. These materials should be removed, and may be stockpiled on site (if possible) for possible reuse as general fill.

After initial clearing and grading, subgrade areas for slab-on-grade construction should be proofrolled with a fully-loaded, 10-wheel dump truck to check for soft or unstable soils. Zones of soil that exhibit instability, such as rutting or pumping in excess of 1 inch, should be recompacted or removed and replaced. The actual depth and volume of undercut should be determined at the time of construction based on observations and tests by an experienced geotechnical engineer. Excavated material should be replaced with approved structural fill and compacted according to the project specifications.

Fill Material and Placement.

Structural fill to be used at the Site should be approved inorganic soil, free of waste, debris, deleterious material, and excess moisture. The fill should be placed where dry and stable conditions exist at design or undercut subgrade.

Granular fill may consist of locally available crushed limestone, crushed gravel with sand, or recycled concrete meeting the gradation limits provided in Table 1. Where wet conditions are encountered, crushed limestone similar to the free draining 1.5- or 3-inch gradations in Table 1 should be used. Fill used at the Site should meet the following minimum requirements.

1. Fill material shall not contain more than 5% organic material when tested in accordance with ASTM D 2974, and shall be free of waste, debris, and frozen deleterious material.
2. Cohesive fill shall have a liquid limit less than 45 and a plasticity index less than 25 and greater than 10.
3. Materials unsatisfactory for use as fill include soils classified as silt or organic silt in the Unified Soil Classification System ASTM D 2847 (i.e., ML, MH, PT, OL, and OH).
4. Structural fill should be placed in foundation bearing areas in maximum 8-inch-thick loose lifts, and compacted to at least 95% of the modified Proctor density. Structural fill materials should extend 5 feet beyond the perimeter of any proposed foundation pads.
5. General fill should consist of free-draining granular material (no fines) placed in maximum 10-inch loose lifts and compacted to at least 92% of modified Proctor density to improve material density through particle interlock.

Table 1. Coarse Aggregate Gradations

Gradation (% Passing)	Sieve Size ▶	3"	2.5"	2"	1.5"	1"	0.5"	No. 4	No. 16	No. 200*
	3-inch		100	95±5	60±15	15±15	3±3			
1.5-inch					100	95±5	75±5	43±13	25±15	8±4
1.5-inch FD					100	95±5	45±15	5±5		

FD – free draining

Groundwater Control

The upper native soils generally consist of silty clays and therefore it is not expected that significant groundwater control will be necessary during construction. However, if perched groundwater is encountered in the pavement base course or granular layers, it is Patrick’s opinion that any such water can be controlled using conventional sumps with pumps. Dewatering may be required, and it is our opinion that water from seepage and/or precipitation can be controlled during construction using conventional sumps and pumps.

Foundation Design Recommendations

Patrick has considered three possible options for the building foundation system, which are presented below. These include shallow foundations, an intermediate depth foundation system such as GeoPiers® and deep foundations such as drilled piers.

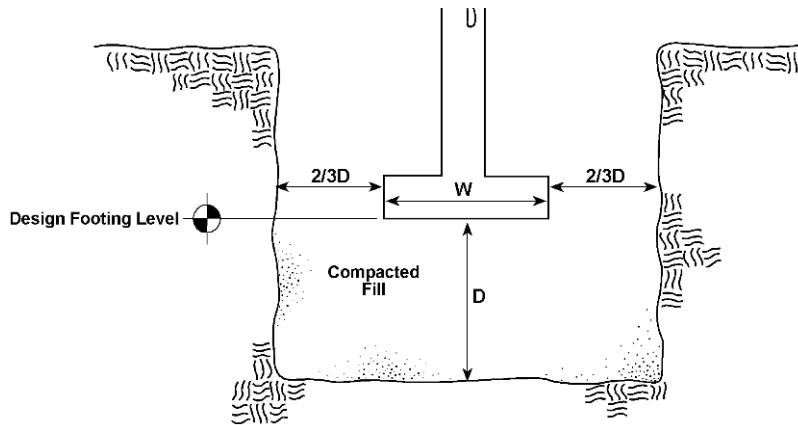
For all three foundation alternatives, the proximity of the proposed foundations to the existing CDF basement foundations and walls will need to be reviewed. Influence of the new foundation loads on the existing foundations could potentially cause settlement of the existing building and additional lateral loading on the basement walls.

Shallow Foundations

Based on the subsurface conditions encountered in the soil borings, subgrade soils are generally appropriate for properly designed and constructed shallow foundations.

Spread footings should bear at a depth of at least 42 inches below the finished exterior grades to protect against frost heave. Where soft native materials or existing fill (such as Boring S1411) are encountered at the design bearing elevation, overexcavation will be necessary. The existing fill materials in Boring S1411 are not considered suitable for support of shallow foundations. Where soft materials are encountered, it is anticipated that undercuts of 2 to 3 feet below proposed bearing elevation may be necessary.

Overexcavated footings should be backfilled with compacted structural fill to design bearing elevation. The overexcavated area should be widened $1\frac{1}{3}$ feet for every foot of depth below design subgrade and backfilled with compacted structural fill, as shown below. Structural fill used to bring the grade to bearing elevation should be compacted granular fill placed in lifts less than 8 inches, loose measure.



Note: Excavation sides are shown vertical for reference only; slopes should conform to OSHA requirements.

For design purposes, spread footings should have a minimum width of 24 inches and continuous strip footings have a minimum width of 18 inches, provided they are founded below the frost penetration depth.

Allowable Bearing Pressure and Settlement

Shallow foundations can be designed using a maximum allowable bearing pressure of 2,000 pounds per square foot (psf) (includes a Factor of Safety of 3.0 against bearing capacity failure).

Based on this allowable bearing pressure, Patrick estimates total settlement of the new structures will be less than 1 inch.

Intermediate Depth Foundations

An intermediate depth foundation system such as GeoPiers® or Rammed Aggregate Piers® (RAP) could also be considered for support of the proposed building. This type of system would provide stabilization of the upper lower strength soils at the site and provide a significantly higher allowable bearing pressure for foundations. The Rammed Aggregate Pier system provides an *in situ* soil stabilization that would allow conventional footings to then be constructed.

Based on the site conditions, it is anticipated that shallow foundations constructed above a site stabilized with GeoPiers®, could be designed using a maximum allowable bearing pressure of 6,000 psf. It is estimated that total settlements would be less than 1 inch, with differential settlement on the order of ½ inch.

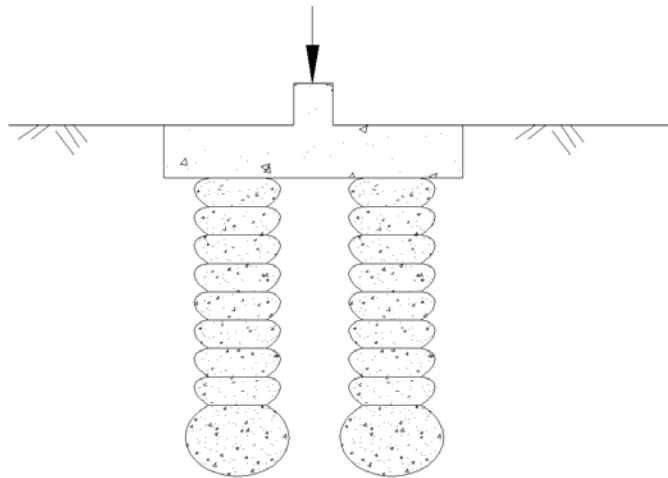


Figure: Example of conventional footing supported on GeoPiers®

RAP® Systems can also provide economical solutions for the support of conventional light to heavily loaded floor slabs, therefore eliminating the need for a structural slab. This foundation system also provides an alternative to costly deep foundations such as drilled piers.

Due to the proximity of the accelerator ring and the existing building to the proposed building footprint, construction disturbance and vibration will need to be considered when selecting a foundation system. Technical Bulletin No. 9 by the GeoPier® Foundation Co. Inc. on Vibration and Noise Levels is provided in Appendix D for consideration of this foundation alternative.

Additional design information for this foundation alternative can be provided upon request if this alternative is considered for the project.

Deep Foundations

Deep foundations can also be used to support the proposed building. Given the subsurface conditions, drilled piers (caissons) extending to the very stiff silty clay are recommended.

We estimate that caissons will need to extend to depths of approximately 40 to 45 feet below existing ground surface to provide adequate capacity with a factor of safety of 3 against bearing failure.

Drilled piers should extend through the compressible soils and into the underlying clay till materials. Straight shaft drilled piers with a minimum 12-inch diameter, extending to the very stiff clay at depths of 40 to 45 feet could be designed using an allowable bearing pressure of 9 ksf. Grade beams along the perimeter of the building should be constructed to extend below frost depth (approximately 3.5 feet below final grade).

Caissons designed and installed according to the above recommendations are anticipated to incur settlements less than 0.5 inches. Problems associated with downdrag forces on the caissons are not anticipated, as no appreciable fill will be placed for project construction.

Pavement Design and Construction

For light duty pavements, such as those in parking and drive areas limited to passenger vehicle use, we recommend a minimum pavement section consisting of a 1.5-inch bituminous surface course and a 2-inch bituminous binder on an 8-inch aggregate base. For heavy duty pavements, such as those in areas frequented by delivery trucks, we recommend a 2-inch bituminous surface

course and a 3-inch bituminous binder course on a 10-inch aggregate base, or 8 inches of Portland cement concrete on a 4-inch granular subbase. Actual thickness and pavement type will depend on actual design loads, frequency of loads and turning conditions.

Aggregate base and granular subbase material should be similar in gradation to the 1.5 crushed aggregate listed in Table 1.

Subsurface drainage of the pavement section is important for pavement performance. To reduce the potential for subgrade failure and pavement cracking, low points in the pavement include subsurface drains discharging to the stormwater management system.

Construction Considerations

Excavations should follow Occupational Safety and Health Administration (OSHA) guidelines. Excavated soil and heavy construction equipment should not be permitted closer to the top of excavation than a distance equal to two times the depth of the excavation in order to reduce the possibilities of slope failure.

Temporary excavations should have a maximum slope of 1 horizontal to 1 vertical or flatter as required to provide stable side slopes. Excavations should be completed in accordance with OSHA Regulation 1926 Subpart P, Appendix B on “Sloping and Benching.” The bottom of excavations should extend a minimum of 1 foot beyond the plan dimension of the footings to allow for adequate working space.

The existing ground surface should be sloped or ditches should be provided to prevent precipitation and runoff from entering the foundation excavations during construction. Minor dewatering may be required, and it is our opinion that water from seepage and/or precipitation can be controlled during construction using conventional sumps and pumps.

Construction will likely be accomplished using standard construction equipment. Subgrade exposed to adverse weather and/or construction traffic is likely to soften, requiring improvement

before construction of foundations and pavement sections. Site soils may pump and rut under heavy equipment traffic.

Construction Quality Control and Quality Assurance


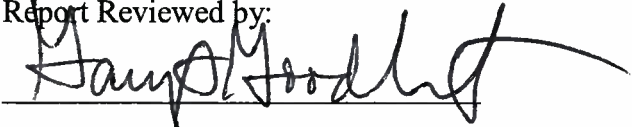
Patrick recommends a geotechnical engineering firm be retained to assist with quality assurance and quality control (QA/QC) activities. A general review of final design plans and specifications should be completed by the geotechnical consultant to ensure that the intent of the recommendations contained in this report is incorporated as intended. QA/QC services should include subgrade and construction materials inspection, fill placement monitoring and compaction testing, as well as concrete and pavement subgrade inspection, and observation of proofrolling. Since construction materials testing and observation services will be an important part of the facility improvements, an experienced geotechnical engineer should be present to provide these services and/or monitor the construction activities.

LIMITATIONS

The recommendations contained in this report are based on the soils encountered at the boring locations. Should conditions encountered during excavation and construction operations differ from those encountered in the borings, Patrick should be notified so that the recommendations can be reviewed and revised if necessary.

This investigation was performed in accordance with accepted geotechnical engineering practices for determining soil conditions and preparing recommendations for the referenced site improvements only. Verification of the subsurface conditions for purposes of determining the extent of contaminated soils or groundwater, difficulty of excavation, dewatering, and trafficability is beyond the scope of this investigation. In the event that any changes in the nature, design or location of the proposed construction are made, the conclusions and recommendations contained in this report should not be considered valid until the changes are reviewed and the conclusions and recommendations in this report have been modified or verified in writing.

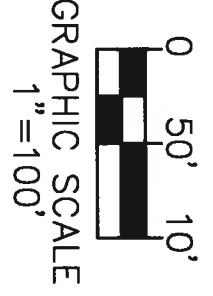
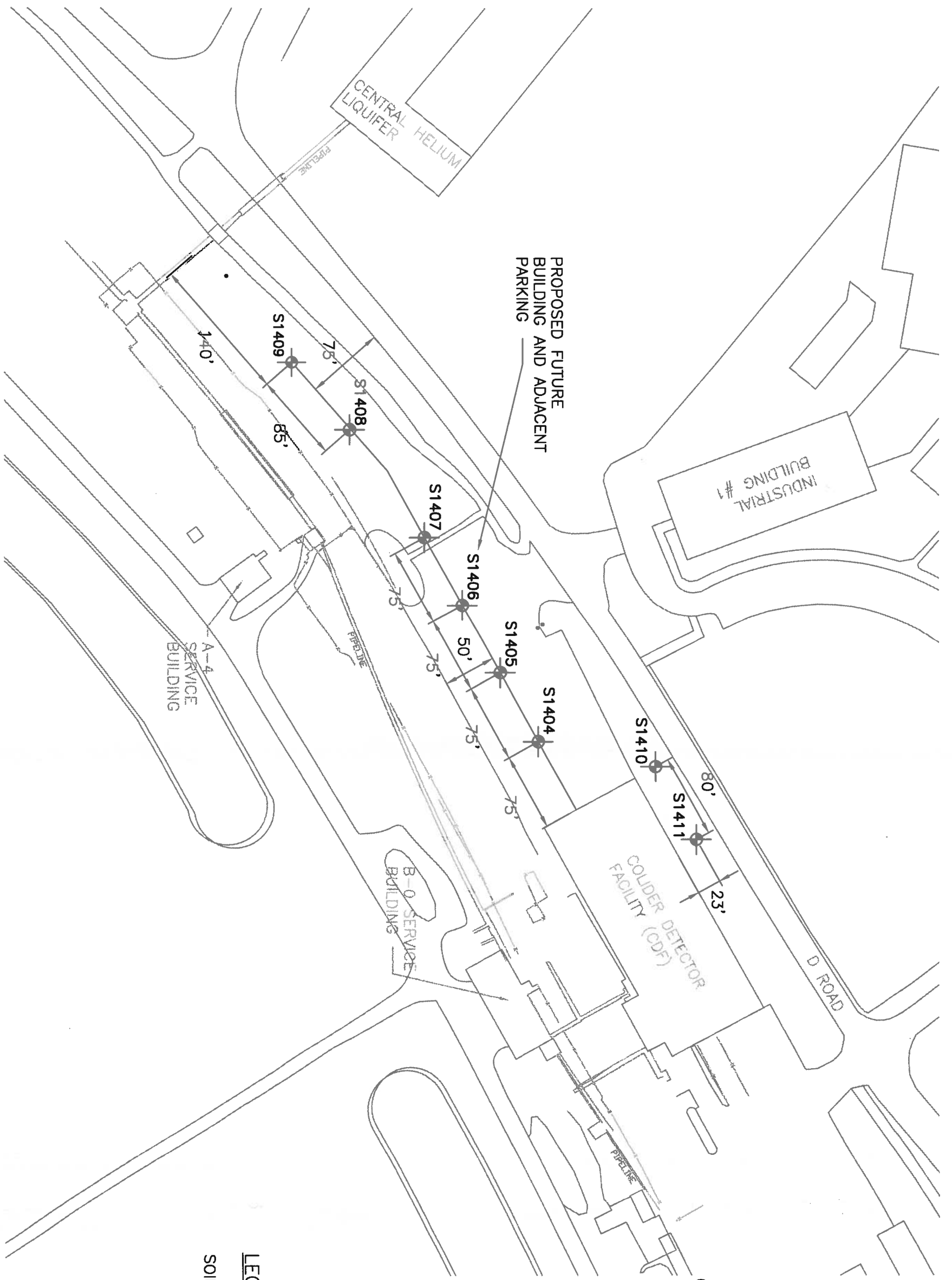
This report is for the exclusive use of the Client and no one else without written consent from Patrick Engineering Inc.


<p>Report Prepared by:</p>  <p>Dawn Edgell, P.E. Project Engineer</p>	<p>Report Reviewed by:</p>  <p>Gary F. Goodheart, P.E. Senior Program Director</p>
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APPENDIX A
BORING LOCATION PLAN

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LEGEND:
 SOIL BORINGS  S1409

Date: 06-18-2010
 Proj No.: 21053.034
 App. By: DE

**FERMILAB
 IARC: OTE BUILDING**

SOIL BORING LOCATION PLAN

**PATRICK
 ENGINEERING INC.**

4970 Varsity Drive TEL. (630) 795-7200
 Lisle, Illinois 60532-4101 FAX (630) 724-1681
 PROFESSIONAL DESIGN FIRM LICENSE NO. 184-000409

APPENDIX B

BORING LOGS

SOIL DESCRIPTION TERMINOLOGY

PATRICK ENGINEERING INC.

BORING NUMBER
CLIENT
PROJECT & NO.
LOCATION

S1404

SHEET 1 OF 2

Fermi National Accelerator Laboratory
IARC Building 21053.034
Batavia, IL N4150'26.6"; W8815'03.3"

LOGGED BY **SEK**
GROUND ELEVATION **745.5**

ELEV.	DEPTH (FT)	STRATA	SOIL/ROCK DESCRIPTION	SAMPLE TYPE & NO. DEPTH (FT) RECOVERY(IN)	BLOW COUNTS	Water Content					NOTES & TEST RESULTS
						PL	Unconfined Compressive Strength (TSF)	LL			
						1	2	3	4	5	
745.5	0.0		4.5" asphalt								
			Crushed limestone base course								
				SS-1 1.0-2.5 12"R	11 8 5		12				qu=1.75*tsf
743.3	2.3		Dark gray silty clay, trace roots, medium stiff, moist								
				SS-2 3.5-5.0 16"R	6 4 5				23		qu=2.0*tsf
741.5	4.0		Brown and dark gray silty clay, trace roots, stiff, moist								
740.0	5.5		Grades to gray/brown clayey fine sandy silt, soft to very soft, moist								
				SS-3 6.0-7.5 16"R	6 5 2		14				qu=0.5*tsf % Sand=33.7 % Silt=55.6 % Clay=10.7
				SS-4 8.5-10.0 8"R	4 5 3				20		qu=0.25*tsf
735.0	10.5		Gray to dark gray silty/clayey silt, very soft to medium stiff, moist to wet								
				ST-1 11.0-13.0					24		Dry density=114pcf
				SS-5 13.5-15.0 18"R	1 4 4				21		qu=0.25*tsf qu=1.25*tsf
728.5	17.0		Brown/gray silty clay, little fine to coarse sand, stiff, moist								
				SS-6 18.5-20.0 14"R	11 12 15		14				qu=3.0*tsf

DRILLING CONTRACTOR **Groff Testing Corp.**
DRILLING METHOD **4.25" I.D. HSA**
DRILLING EQUIPMENT **CME 75**
DRILLING STARTED **6/11/10** ENDED **6/11/10**


REMARKS
Borehole filled with cuttings upon completion.

WATER LEVEL (ft.)
▽ **8.5'** while drilling
▽ **23.0'** after drilling
▼

PATRICK ENGINEERING INC.

BORING NUMBER **S1404** SHEET **2 OF 2**
 CLIENT **Fermi National Accelerator Laboratory**
 PROJECT & NO. **IARC Building 21053.034**
 LOCATION **Batavia, IL N4150'26.6"; W8815'03.3"**

LOGGED BY **SEK**
 GROUND ELEVATION **745.5**

ELEV.	DEPTH (FT)	STRATA	SOIL/ROCK DESCRIPTION	SAMPLE TYPE & NO. DEPTH (FT) RECOVERY(IN)	BLOW COUNTS	Water Content					NOTES & TEST RESULTS
						PL	Unconfined Compressive Strength (TSF) *			LL	
						1	2	3	4	5	
725.5	20.0		Gray silty clay, trace fine to coarse sand, very stiff, moist CL	SS-7 23.5-25.0 12"R	7 5 7	15					qu=3.5*tsf
				SS-8 28.5-30.0 14"R	8 8 11						
715.5	30.0		End of Boring at 30.0'								

DRILLING CONTRACTOR **Groff Testing Corp.**
 DRILLING METHOD **4.25" I.D. HSA**
 DRILLING EQUIPMENT **CME 75**
 DRILLING STARTED **6/11/10** ENDED **6/11/10**

REMARKS
Borehole filled with cuttings upon completion.

WATER LEVEL (ft.)
 ▽ **8.5'** while drilling
 ▽ **23.0'** after drilling
 ▼

PATRICK ENGINEERING INC.

BORING NUMBER
CLIENT
PROJECT & NO.
LOCATION

S1405

SHEET 1 OF 4

Fermi National Accelerator Laboratory
IARC Building 21053.034
Batavia, IL N4150'27.0"; W8815'04.4"

LOGGED BY **SEK**
GROUND ELEVATION **745.5**

ELEV.	DEPTH (FT)	STRATA	SOIL/ROCK DESCRIPTION	SAMPLE TYPE & NO. DEPTH (FT) RECOVERY(IN)	BLOW COUNTS	Water Content					NOTES & TEST RESULTS
						PL	Unconfined Compressive Strength (TSF)	LL			
						1	2	3	4	5	
745.5	0.9	3.5" asphalt	Crushed limestone base course								
743.5	2.0		Light brown/gray silty clay, some sand and gravel, trace fine sand, medium stiff, low plasticity, moist CL	SS-1 1.0-2.5 12"R	5 3 4	12					qu=1.25*tsf
			Little fine sand, soft	SS-2 3.5-5.0 16"R	5 3 5		21				qu=1.5*tsf
			Dark gray silty clay, trace organics, very soft, moist to wet CL-ML	SS-3 6.0-7.5 16"R	2 2 3	16					qu=0.5*tsf
737.5	8.0		Dark gray silty clay, trace organics, very soft, moist to wet CL-ML	SS-4 8.5-10.0 18"R	3 3 3		21				qu=0.25*tsf LOI=2%
			Gray clayey silt, trace fine to coarse sand, medium stiff, moist ML	SS-5 11.0-12.5 18"R	2 1 1		21				qu=0.0*tsf LL=21 PI=8
732.5	13.0		Gray clayey silt, trace fine to coarse sand, medium stiff, moist ML	SS-6 13.5-15.0 14"R	3 5 4	16					qu=1.0*tsf % Silt=61.1 % Clay=10.1 % Sand=23.1 % Gravel=5.6
728.5	17.0		Gray silty clay, some sandy gravel, dense, moist CL	SS-7 18.5-20.0 4"R	12 13 10	14					

DRILLING CONTRACTOR **Groff Testing Corp.**
DRILLING METHOD **3.25" I.D. HSA**
DRILLING EQUIPMENT **CME 75**
DRILLING STARTED **6/14/10** ENDED **6/14/10**

REMARKS
Borehole filled with cuttings upon completion.

WATER LEVEL (ft.)
▽ **9.0'** while drilling
▽ **55.0'** after drilling
▼

PATRICK ENGINEERING INC.

BORING NUMBER **S1405** SHEET **2** OF **4**
 CLIENT **Fermi National Accelerator Laboratory**
 PROJECT & NO. **IARC Building 21053.034**
 LOCATION **Batavia, IL N4150'27.0"; W8815'04.4"**

LOGGED BY **SEK**
 GROUND ELEVATION **745.5**

ELEV.	DEPTH (FT)	STRATA	SOIL/ROCK DESCRIPTION	SAMPLE TYPE & NO. DEPTH (FT) RECOVERY(IN)	BLOW COUNTS	Water Content					NOTES & TEST RESULTS	
						PL	Unconfined Compressive Strength (TSF)	LL				
						1	2	3	4	5		
725.5	20.0		Gray silty clay, little fine to coarse sand, trace gravel, very stiff, moist	SS-8 23.5-25.0 18"R	5 6 9		15				qu=3.5*tsf	
			Trace fine to medium sand	SS-9 28.5-30.0 16"R	5 7 9		16					qu=4.25*tsf
					SS-10 33.5-35.0 18"R	6 7 9		18				qu=3.5*tsf
				Medium stiff, wet	SS-11 38.5-40.0 18"R	3 4 7		11				qu=1.5*tsf

DRILLING CONTRACTOR **Groff Testing Corp.**
 DRILLING METHOD **3.25" I.D. HSA**
 DRILLING EQUIPMENT **CME 75**
 DRILLING STARTED **6/14/10** ENDED **6/14/10**

REMARKS
Borehole filled with cuttings upon completion.

WATER LEVEL (ft.)
 ▽ **9.0'** while drilling
 ▽ **55.0'** after drilling
 ▼

PATRICK ENGINEERING INC.

BORING NUMBER **S1405** SHEET **3** OF **4**
 CLIENT **Fermi National Accelerator Laboratory**
 PROJECT & NO. **IARC Building 21053.034**
 LOCATION **Batavia, IL N4150'27.0"; W8815'04.4"**

LOGGED BY **SEK**
 GROUND ELEVATION **745.5**

ELEV.	DEPTH (FT)	STRATA	SOIL/ROCK DESCRIPTION	SAMPLE TYPE & NO. DEPTH (FT) RECOVERY(IN)	BLOW COUNTS	Water Content					NOTES & TEST RESULTS		
						PL	Unconfined Compressive Strength (TSF) *			LL			
						1	2	3	4	5			
705.5	40.0		Brown/gray silty clay, trace fine sand, hard, moist Very stiff	SS-12 43.5-45.0 12"R	5 10 15		19				qu>4.5*tsf		
				SS-13 48.5-50.0 18"R	4 11 11		21						qu=3.0*tsf
				SS-14 53.5-55.0 18"R	3 6 9		21						qu=2.5*tsf
				SS-15 58.5-60.0 18"R	5 13 12		8						
686.0	59.5												

DRILLING CONTRACTOR **Groff Testing Corp.**
 DRILLING METHOD **3.25" I.D. HSA**
 DRILLING EQUIPMENT **CME 75**
 DRILLING STARTED **6/14/10** ENDED **6/14/10**

REMARKS
Borehole filled with cuttings upon completion.

WATER LEVEL (ft.)
 ▾ **9.0'** while drilling
 ▾ **55.0'** after drilling
 ▼

PATRICK ENGINEERING INC.

BORING NUMBER **S1405** SHEET **4** OF **4**
 CLIENT **Fermi National Accelerator Laboratory**
 PROJECT & NO. **IARC Building 21053.034**
 LOCATION **Batavia, IL N4150'27.0"; W8815'04.4"**

LOGGED BY **SEK**
 GROUND ELEVATION **745.5**

ELEV.	DEPTH (FT)	STRATA	SOIL/ROCK DESCRIPTION	SAMPLE TYPE & NO. DEPTH (FT) RECOVERY(IN)	BLOW COUNTS	Water Content					NOTES & TEST RESULTS
						PL	Unconfined	Compressive	Strength (TSF)	LL	
						1	2	3	4	5	
685.5	60.0		Fine to coarse sand and gravel, some silt and clay, dry SP-GP Weathered rock pieces								
681.2	64.3		Brown/gray silty clay, little fine to coarse sand, soft, moist CL	SS-16 63.5-65.0 12"R	20 21 7						
676.0	69.5		Silty fine sand seam at 69.0'	SS-17 68.5-70.0 14"R	12 12 50/1"						
675.1	70.4		Gray silty clay and weathered rock, hard, very dense, moist Auger refusal at 70.4' on apparent bedrock. End of Boring at 70.4'								qu=3.5*tsf

DRILLING CONTRACTOR **Groff Testing Corp.**
 DRILLING METHOD **3.25" I.D. HSA**
 DRILLING EQUIPMENT **CME 75**
 DRILLING STARTED **6/14/10** ENDED **6/14/10**

REMARKS
Borehole filled with cuttings upon completion.

WATER LEVEL (ft.)
 ▾ **9.0'** while drilling
 ▾ **55.0'** after drilling
 ▼

PATRICK ENGINEERING INC.

BORING NUMBER
CLIENT
PROJECT & NO.
LOCATION

S1406 SHEET 1 OF 4
Fermi National Accelerator Laboratory
IARC Building 21053.034
Batavia, IL N41°50'27.0"; W88°15'5.5"

LOGGED BY **SEK**
GROUND ELEVATION **745.5**

ELEV.	DEPTH (FT)	STRATA	SOIL/ROCK DESCRIPTION	SAMPLE TYPE & NO. DEPTH (FT) RECOVERY(IN)	BLOW COUNTS	Water Content					NOTES & TEST RESULTS	
						PL □	Unconfined Compressive Strength (TSF) *			LL △		
						1	2	3	4	5		
745.5	0.9		4" asphalt									
			Crushed limestone base course									
743.8	1.8		Brown clayey sand and gravel, medium dense, dry SC	SS-1 1.0-2.5 10"R	9 6 8	7						
					SS-2 3.5-5.0 10"R	5 3 2	4					
740.0	5.5			Moist Brown silty clay, soft, moist to wet CL	SS-3 6.0-7.5 10"R	4 2 2			22			qu=0.5*tsf
737.5	8.0		Gray/dark gray clayey silt, trace organics, very soft, wet CL-ML	SS-4 8.5-10.0 14"R	3 2 2			20			qu=0.0*tsf	
					ST-1 10.0-12.0 22"R				22			qu=0.24tsf Dry density=112pcf
732.5	13.0			Gray silty clay, seams of fine sandy silt, soft, moist CL	SS-5 13.5-15.0 14"R	2 2 3			19			qu=1.0*tsf
			Gray silty clay, little fine to medium sand, medium stiff, moist	SS-6 18.5-20.0 6"R	7 6 8			16			qu=1.75*tsf	

DRILLING CONTRACTOR **Groff Testing Corp.**
DRILLING METHOD **3.25" I.D. HSA**
DRILLING EQUIPMENT **CME 75**
DRILLING STARTED **6/14/10** ENDED **6/14/10**

REMARKS

Borehole filled with cuttings upon completion.

WATER LEVEL (ft.)

▽ 9.0' while drilling
▽ 64.0' after drilling
▼

PATRICK ENGINEERING INC.

BORING NUMBER
CLIENT
PROJECT & NO.
LOCATION

S1406

SHEET **2** OF **4**

Fermi National Accelerator Laboratory
IARC Building 21053.034
Batavia, IL N4150'27.0"; W8815'5.5"

LOGGED BY **SEK**
GROUND ELEVATION **745.5**

ELEV.	DEPTH (FT)	STRATA	SOIL/ROCK DESCRIPTION	SAMPLE TYPE & NO. DEPTH (FT) RECOVERY(IN)	BLOW COUNTS	Water Content					NOTES & TEST RESULTS	
						PL	Unconfined Compressive Strength (TSF) *			LL		
						10	20	30	40	50		
						1	2	3	4	5		
725.5	20.0		Gray silty clay, little fine to coarse sand and gravel, hard, moist	SS-7 23.5-25.0 18"R	4 6 10		15				qu>4.5*tsf	
				SS-8 28.5-30.0 16"R	5 8 16		14					qu=4.0*tsf
713.5	32.0				Gray sandy silt, fine to medium sand and gravel, very stiff, medium dense, dry SM-ML	SS-9 33.5-35.0 18"R	4 6 12		12			
		SS-10 38.5-40.0 18"R	3 3 6				12					qu=2.5*tsf
708.5	37.0		Brown gray silty clay, little fine to coarse sand and gravel, medium stiff to very stiff, moist CL									

DRILLING CONTRACTOR **Groff Testing Corp.**
DRILLING METHOD **3.25" I.D. HSA**
DRILLING EQUIPMENT **CME 75**
DRILLING STARTED **6/14/10** ENDED **6/14/10**




REMARKS
Borehole filled with cuttings upon completion.

WATER LEVEL (ft.)
▽ **9.0'** while drilling
▽ **64.0'** after drilling
▼

PATRICK ENGINEERING INC.

BORING NUMBER **S1406** SHEET **3** OF **4**
 CLIENT **Fermi National Accelerator Laboratory**
 PROJECT & NO. **IARC Building 21053.034**
 LOCATION **Batavia, IL N4150'27.0"; W8815'5.5"**

LOGGED BY **SEK**
 GROUND ELEVATION **745.5**

ELEV.	DEPTH (FT)	STRATA	SOIL/ROCK DESCRIPTION	SAMPLE TYPE & NO. DEPTH (FT) RECOVERY(IN)	BLOW COUNTS	Water Content					NOTES & TEST RESULTS		
						PL	Unconfined Compressive Strength (TSF) *			LL			
						1	2	3	4	5			
705.5	40.0		Gray silty clay, little fine to medium sand and gravel, very stiff, dry	SS-11 43.5-45.0 18"R	4 7 12						qu=3.5*tsf		
				SS-12 48.5-50.0 18"R	4 6 12								qu=4.0*tsf
				SS-13 53.5-55.0 16"R	6 10 11								
691.5	54.0				Brown/gray fine silty sand, little coarse sand, medium dense, moist SM	SS-14 58.5-60.0 16"R	6 27 48						
688.5	57.0		Brown/gray silty clay, with weathered bedrock fragments CL										
685.5	60.0												

DRILLING CONTRACTOR **Groff Testing Corp.**
 DRILLING METHOD **3.25" I.D. HSA**
 DRILLING EQUIPMENT **CME 75**
 DRILLING STARTED **6/14/10** ENDED **6/14/10**

REMARKS
Borehole filled with cuttings upon completion.

WATER LEVEL (ft.)
 ▽ **9.0'** while drilling
 ▽ **64.0'** after drilling
 ▼

PATRICK ENGINEERING INC.

BORING NUMBER **S1406** SHEET **4 OF 4**
 CLIENT **Fermi National Accelerator Laboratory**
 PROJECT & NO. **IARC Building 21053.034**
 LOCATION **Batavia, IL N4150'27.0"; W8815'5.5"**

LOGGED BY **SEK**
 GROUND ELEVATION **745.5**

ELEV.	DEPTH (FT)	STRATA	SOIL/ROCK DESCRIPTION	SAMPLE TYPE & NO. DEPTH (FT) RECOVERY(IN)	BLOW COUNTS	Water Content					NOTES & TEST RESULTS
						PL	Unconfined	Compressive	LL	Strength (TSF) *	
						1	2	3	4	5	
685.5	60.0		Light gray silt, with trace fine to coarse sand, stiff, dense, moist ML (weathered bedrock fragments)								
				SS-15 63.5-65.0 4"R	31 50/5"	7					qu=1.5*tsf
				SS-16 68.5-70.0 12"R	6 50/5"	10					
675.5	70.0		Gray clayey silt, with trace fine to coarse sand and gravel, soft, moist								
			Auger refusal on apparent bedrock at 70.0' End of Boring at 70.0'								

DRILLING CONTRACTOR **Groff Testing Corp.**
 DRILLING METHOD **3.25" I.D. HSA**
 DRILLING EQUIPMENT **CME 75**
 DRILLING STARTED **6/14/10** ENDED **6/14/10**

REMARKS
Borehole filled with cuttings upon completion.

WATER LEVEL (ft.)
 ▾ **9.0'** while drilling
 ▾ **64.0'** after drilling
 ▼

PATRICK ENGINEERING INC.

BORING NUMBER
CLIENT
PROJECT & NO.
LOCATION

S1407

SHEET 1 OF 2

Fermi National Accelerator Laboratory
IARC Building 21053.034
Batavia, IL N4150'26.9"; W8815'06.3"

LOGGED BY **SEK**
GROUND ELEVATION **745.5**

ELEV.	DEPTH (FT)	STRATA	SOIL/ROCK DESCRIPTION	SAMPLE TYPE & NO. DEPTH (FT) RECOVERY(IN)	BLOW COUNTS	Water Content					NOTES & TEST RESULTS
						PL	Unconfined Compressive Strength (TSF)	LL			
						1	2	3	4	5	
745.5	0.0		4.5" asphalt								
			Crushed limestone base course								
743.5	2.0		Gray silty clay, little sand, medium stiff, moist CL	SS-1 1.0-2.5 6"R	7 8 7	3					
			Light brown silty clay, trace fine sand, very soft, low plasticity, saturated CL	SS-2 3.5-5.0 8"R	5 5 6		24				
740.0	5.5										qu=0.0*tsf
			Medium stiff CL	SS-3 6.0-7.5 14"R	8 6 6		20				
736.5	9.0		Gray/black silt and clay, some organics, very soft, wet CL-ML	SS-4 8.5-10.0 18"R	2 2 2		21				qu=1.5*tsf
			Brown/gray silty clay, little fine sand, very stiff, low plasticity, moist CL-ML	SS-5 11.0-12.5 18"R	0 0 1		18				qu=0.25*tsf
732.5	13.0										
			Brown/gray silty clay, little fine sand, very stiff, low plasticity, moist CL-ML	ST-1 13.5-15.5 14"R			23				qu=0.58tsf Dry density=111pcf
			Brown/gray silty clay, little fine sand, very stiff, low plasticity, moist CL-ML	SS-6 16.0-17.5 18"R	4 5 6		16				qu=3.0*tsf LL=25 PI=11
			Brown/gray silty clay, little fine sand, very stiff, low plasticity, moist CL-ML	SS-7 18.5-20.0 16"R	5 6 6		11				qu>4.5*tsf

DRILLING CONTRACTOR **Groff Testing Corp.**
DRILLING METHOD **3.25" I.D. HSA**
DRILLING EQUIPMENT **CME 75**
DRILLING STARTED **6/11/10** ENDED **6/11/10**

REMARKS
Borehole filled with cuttings upon completion.

WATER LEVEL (ft.)
▽ **6.0'** while drilling
▽
▽

PATRICK ENGINEERING INC.

BORING NUMBER **S1407** SHEET **2 OF 2**
 CLIENT **Fermi National Accelerator Laboratory**
 PROJECT & NO. **IARC Building 21053.034**
 LOCATION **Batavia, IL N4150'26.9"; W8815'06.3"**

LOGGED BY **SEK**
 GROUND ELEVATION **745.5**

ELEV.	DEPTH (FT)	STRATA	SOIL/ROCK DESCRIPTION	SAMPLE TYPE & NO. DEPTH (FT) RECOVERY(IN)	BLOW COUNTS	Water Content					NOTES & TEST RESULTS
						PL	Unconfined Compressive Strength (TSF) *			LL	
						10	20	30	40	50	
725.5	20.0		Brown/gray silty clay, little fine sand, very stiff, low plasticity, moist	SS-8 23.5-25.0 18"R	2 5 7						qu=2.5*tsf
715.5	30.0			End of Boring at 30.0'	SS-9 28.5-30.0 18"R	6 6 7					

DRILLING CONTRACTOR **Groff Testing Corp.**
 DRILLING METHOD **3.25" I.D. HSA**
 DRILLING EQUIPMENT **CME 75**
 DRILLING STARTED **6/11/10** ENDED **6/11/10**

REMARKS
Borehole filled with cuttings upon completion.

WATER LEVEL (ft.)
 ▽ **6.0'** while drilling
 ▽
 ▽

PATRICK ENGINEERING INC.

BORING NUMBER **S1408** SHEET **1** OF **1**
 CLIENT **Fermi National Accelerator Laboratory**
 PROJECT & NO. **IARC Building 21053.034**
 LOCATION **Batavia, IL N4150'27.0"; W8815'07.4"**

LOGGED BY **SEK**
 GROUND ELEVATION **745.0**

ELEV.	DEPTH (FT)	STRATA	SOIL/ROCK DESCRIPTION	SAMPLE TYPE & NO. DEPTH (FT) RECOVERY(IN)	BLOW COUNTS	Water Content					NOTES & TEST RESULTS	
						PL	Unconfined Compressive Strength (TSF)	LL	* * *			
						1	2	3	4	5		
744.9	0.9	[Asphalt]	4" asphalt									
			Crushed limestone base course									
743.0	2.0	[Limestone]	3/4-inch limestone pieces	SS-1 1.0-2.5 6"R	7 4 6							
739.5	5.5	[Clay]	Light brown/gray fine silty clay, some sand, soft, moist to wet	SS-2 3.5-5.0 0"R	7 5 6							
					SS-3 6.0-7.5 12"R	4 5 6		15				qu=0.5*tsf
735.5	9.5	[Sand]	Brown fine silty sand, loose, wet	SS-4 8.5-10.0 16"R	4 3 3							
735.0	10.0			End of Boring at 10.0'								qu=0.5*tsf

DRILLING CONTRACTOR Groff Testing Corp. DRILLING METHOD 3.25" I.D. HSA DRILLING EQUIPMENT CME 75 DRILLING STARTED 6/11/10 ENDED 6/11/10	REMARKS Borehole filled with cuttings upon completion.	<u>WATER LEVEL (ft.)</u> 9.5' while drilling ▽ ▽ ▽
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PATRICK ENGINEERING INC.

BORING NUMBER
CLIENT
PROJECT & NO.
LOCATION

S1409

SHEET 1 OF 1

Fermi National Accelerator Laboratory
IARC Building 21053.034
Batavia, IL N4150'27.1"; W8815'09.0"

LOGGED BY **SEK**
GROUND ELEVATION **745.0**

ELEV.	DEPTH (FT)	STRATA	SOIL/ROCK DESCRIPTION	SAMPLE TYPE & NO. DEPTH (FT) RECOVERY(IN)	BLOW COUNTS	Water Content					NOTES & TEST RESULTS
						PL	Unconfined Compressive Strength (TSF) *			LL	
						10	20	30	40	50	
745.0	0.0		Topsoil								
744.0	1.0		Brown silty clay and sand/gravel								
			Gray/black silty clay, stiff, low plasticity, moist	CL SS-1 1.0-2.5 10"R	6 4 5		15				qu=2.5*tsf
			Gray/brown mottled silty clay, medium stiff, low plasticity, moist	CL SS-2 3.5-5.0 16"R	6 5 5		20				qu=1.0*tsf
742.0	3.0		Seams of fine sand and silt	SS-3 6.0-7.5 18"R	4 2 3		21				qu=1.0*tsf
				SS-4 8.5-10.0 18"R	4 3 2		23				qu=1.0*tsf
735.5	9.5		Dark gray silty clay, low plasticity, soft, wet	CL							
735.0	10.0		End of Boring at 10.0'								

DRILLING CONTRACTOR **Groff Testing Corp.**
DRILLING METHOD **3.25" I.D. HSA**
DRILLING EQUIPMENT **CME 75**
DRILLING STARTED **6/11/10** ENDED **6/11/10**

REMARKS
Borehole filled with cuttings upon completion.

WATER LEVEL (ft.)
▽ **9.5'** while drilling
▽
▽

PATRICK ENGINEERING INC.

BORING NUMBER **S1410** SHEET **1** OF **2**
 CLIENT **Fermi National Accelerator Laboratory**
 PROJECT & NO. **IARC Building 21053.034**
 LOCATION **Batavia, IL N4150'27.4"; W8815'02.2"**

LOGGED BY **SEK**
 GROUND ELEVATION **746.5**

ELEV.	DEPTH (FT)	STRATA	SOIL/ROCK DESCRIPTION	SAMPLE TYPE & NO. DEPTH (FT) RECOVERY(IN)	BLOW COUNTS	Water Content					NOTES & TEST RESULTS
						PL	Unconfined Compressive Strength (TSF)			LL	
						10	20	30	40	50	
746.5	0.9		3" asphalt								
			Crushed limestone base course								
745.0	1.5		Sand and gravel fill	SS-1 1.0-2.5 8"R	7 8 5	4					
743.5	3.0		Light brown/gray silty clay, little fine to medium sand, soft, moist	CL SS-2 3.5-5.0 0"R	3 2 4		19				
			Gray clayey silt, very soft, low plasticity, wet	ML SS-3 6.0-7.5 12"R	2 2 3		21				qu=0.25*tsf
738.5	8.0		Gray silty clay, trace fine to coarse sand, very stiff, moist	CL SS-4 8.5-10.0 18"R	2 2 2		22				LL=20 PI=4
				SS-5 11.0-12.5 18"R	1 1 1		20				
				ST-1 12.5-14.5 26"R			21				qu=0.59tsf Dry density=115pcf
733.0	13.5			SS-6 18.5-20.0 18"R	6 6 7		15				qu=4.0*tsf

DRILLING CONTRACTOR **Groff Testing Corp.**
 DRILLING METHOD **3.25" I.D. HSA**
 DRILLING EQUIPMENT **CME 75**
 DRILLING STARTED **6/11/10** ENDED **6/11/10**


REMARKS
Borehole filled with cuttings upon completion.

WATER LEVEL (ft.)
 ▽ **9.0'** while drilling
 ▽
 ▼

PATRICK ENGINEERING INC.

BORING NUMBER **S1410** SHEET **2 OF 2**
 CLIENT **Fermi National Accelerator Laboratory**
 PROJECT & NO. **IARC Building 21053.034**
 LOCATION **Batavia, IL N4150'27.4"; W8815'02.2"**

LOGGED BY **SEK**
 GROUND ELEVATION **746.5**

ELEV.	DEPTH (FT)	STRATA	SOIL/ROCK DESCRIPTION	SAMPLE TYPE & NO. DEPTH (FT) RECOVERY(IN)	BLOW COUNTS	Water Content					NOTES & TEST RESULTS
						PL	Unconfined Compressive Strength (TSF) *			LL	
						10	20	30	40	50	
726.5	20.0		Gray silty clay, trace fine to coarse sand, hard, low plasticity, moist	SS-7 23.5-25.0 18"R	5 7 9						qu>4.5*tsf
				SS-8 28.5-30.0 3"R	9 9 12						
716.5	30.0		End of Boring at 30.0'								

DRILLING CONTRACTOR **Groff Testing Corp.**
 DRILLING METHOD **3.25" I.D. HSA**
 DRILLING EQUIPMENT **CME 75**
 DRILLING STARTED **6/11/10** ENDED **6/11/10**

REMARKS
Borehole filled with cuttings upon completion.

WATER LEVEL (ft.)
 ▽ **9.0'** while drilling
 ▽
 ▽

PATRICK ENGINEERING INC.

BORING NUMBER
CLIENT
PROJECT & NO.
LOCATION

S1411

SHEET 1 OF 2

Fermi National Accelerator Laboratory
IARC Building 21053.034
Batavia, IL N4150'27.5"; W8815'01.3"

LOGGED BY **SEK**
GROUND ELEVATION **746.0**

ELEV.	DEPTH (FT)	STRATA	SOIL/ROCK DESCRIPTION	SAMPLE TYPE & NO. DEPTH (FT) RECOVERY(IN)	BLOW COUNTS	Water Content					NOTES & TEST RESULTS
						PL	Unconfined Compressive Strength (TSF)	LL			
						1	2	3	4	5	
746.9	0.9	[Asphalt]	3.5" asphalt								
			Crushed limestone base course	SS-1 1.0-2.5 10"R	5 10 7	5					
743.5	2.5	[Cross-hatched]	Gray silty clay, some sand and gravel, medium stiff, low plasticity, moist	FILL SS-2 3.5-5.0 12"R	4 2 2		18				qu=0.75*tsf
				SS-3 6.0-7.5 4"R	8 8 7		13				
738.0	8.0			Brown/gray-brown silty clay, some fine to coarse sand, little gravel, medium stiff/loose, moist	FILL SS-4 8.5-10.0 16"R	4 4 5		12			qu=1.5*tsf
734.5	11.5			Brown fine to coarse sand and gravel, some clay, medium dense, moist	SS-5 11.0-12.5 14"R	5 8 6		6			
732.5	13.5			Brown sandy, silty clay, little gravel, medium stiff, moist to wet	FILL SS-6 13.5-15.0 12"R	2 2 3		16			qu=1.0*tsf
			Grades to gray at 15.0'								Chatter sheared off two augers on obstruction at 18.0'. Offset 3.0' east; blind to 18.5', continued sampling.
728.0	18.0	[Cross-hatched]	Brown clayey sand, with gravel, loose, wet	SS-7 18.5-20.0 8"R	3 3 4		9				

DRILLING CONTRACTOR **Groff Testing Corp.**
DRILLING METHOD **3.25" I.D. HSA**
DRILLING EQUIPMENT **CME 75**
DRILLING STARTED **6/11/10** ENDED **6/11/10**

REMARKS
Borehole filled with cuttings upon completion.

WATER LEVEL (ft.)

▽
▽
▽

PATRICK ENGINEERING INC.

BORING NUMBER **S1411** SHEET **2 OF 2**
 CLIENT **Fermi National Accelerator Laboratory**
 PROJECT & NO. **IARC Building 21053.034**
 LOCATION **Batavia, IL N4150'27.5"; W8815'01.3"**

LOGGED BY **SEK**
 GROUND ELEVATION **746.0**

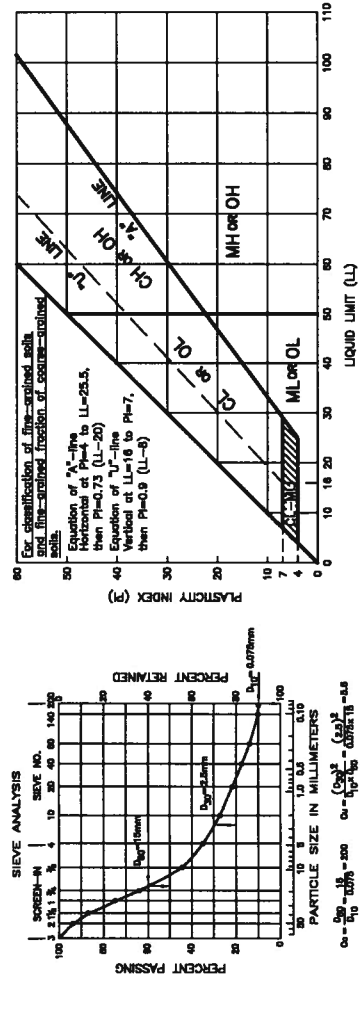
ELEV.	DEPTH (FT)	STRATA	SOIL/ROCK DESCRIPTION	SAMPLE TYPE & NO. DEPTH (FT) RECOVERY(IN)	BLOW COUNTS	Water Content					NOTES & TEST RESULTS
						PL	Unconfined Compressive Strength (TSF)	LL			
						1	2	3	4	5	
726.0	20.0		Brown clayey sand and gravel, loose, moist to wet FILL	SS-8 23.5-25.0 4"R	3 2 2						
				Wood pieces							
			Trace wood pieces	SS-9 28.5-30.0 6"R	2 2 2						
716.0	30.0		End of Boring at 30.0'								

DRILLING CONTRACTOR Groff Testing Corp. DRILLING METHOD 3.25" I.D. HSA DRILLING EQUIPMENT CME 75 DRILLING STARTED 6/11/10 ENDED 6/11/10	REMARKS Borehole filled with cuttings upon completion.	WATER LEVEL (ft.)
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UNIFIED SOIL CLASSIFICATION SYSTEM

TABLE 1 SOIL CLASSIFICATION CHART

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests A	Soil Classification	Group Symbol	Group Name B
Coarse-Grained Soils More than 50% retained on No. 200 sieve	Clean Gravels Less than 5% fines C	GW	Well-graded gravel
	Gravels with fines More than 12% fines C	GP	Poorly graded gravel
	Clean Sands 50% or more of coarse fraction passes No. 4 sieve	SW	Well-graded sand
	Sands with fines More than 12% fines C	SP	Poorly graded sand
	Silt and Clays Liquid Limit less than 50	CL, ML, OL, CH, MH, OH, PT	Lean Clay, Silty Clay, Organic silt, Fat Clay, Organic clay, Peat
	Silt and Clays Liquid Limit 50 or more	CL, ML, OL, CH, MH, OH, PT	Lean Clay, Silty Clay, Organic silt, Fat Clay, Organic clay, Peat



ABBREVIATIONS USED ON BORING LOG

- Su - Undrained Shear Strength
- cu - Unconfined Compressive Strength Test, ASTM D 2166
- qp = qu* - Estimated Unconfined Compressive Strength (Pocket Penetrometer)
- γd=DD - Dry Unit Weight
- MC%=w - Natural Water Content, ASTM D 2216
- occ. - Occasional
- LOI - Loss On Ignition ASTM 2974
- PID - Photoionization Detector
- v. - Very
- med. - Medium
- RECOV.=REC.- - Sample Recovery: For SPT, 100% Recov.=18"
- RECOV.=REC.- - Sample Recovery: For ST, 100% Recov.=24"
- qu** - Estimated Unconfined Compressive Strength Using Rimac® Tester

LOCAL SOIL DESCRIPTION TERMINOLOGY

Soils are visually identified and classified on the boring logs and described in this report according to the Unified Soil Classification System with the following modifications:

RELATIVE DENSITY OF GRANULAR SOILS

Description	Blows/foot
Very Loose	0 to 4
Loose	4 to 10
Medium Dense	10 to 30
Dense	30 to 50
Very Dense	50 to 80
Extremely Dense	80+

CONSISTENCY OF COHESIVE SOILS

Description	N	qu (tsf)
Very Soft	2	0 to 0.25
Soft	2-4	0.25 to 0.50
Medium Stiff	4-8	0.5 to 1.0
Stiff	8-15	1.0 to 2.0
Very Stiff	15-30	2.0 to 4.0
Hard	30	4.0 to 8.0
Very Hard	80+	8.0+

* N (blows/foot) are based on field measurements and not corrected.

PARTICLE SIZES

Size or Sieve No.
 Over 12 in.
 3 to 12 in.
 3/4 to 3 in.
 No. 4 to 3/4 in.
 No. 10 to No. 4
 No. 40 to No. 10
 No. 200 to No. 40
 Below No. 200

SOIL MOISTURE

Descriptive Term
 Dry - Dry to touch, dusty
 Moist - Moist to touch, damp, no visible water
 Wet - Wet to touch, soil is usually below the water table
 Saturated - Free Water in Sample

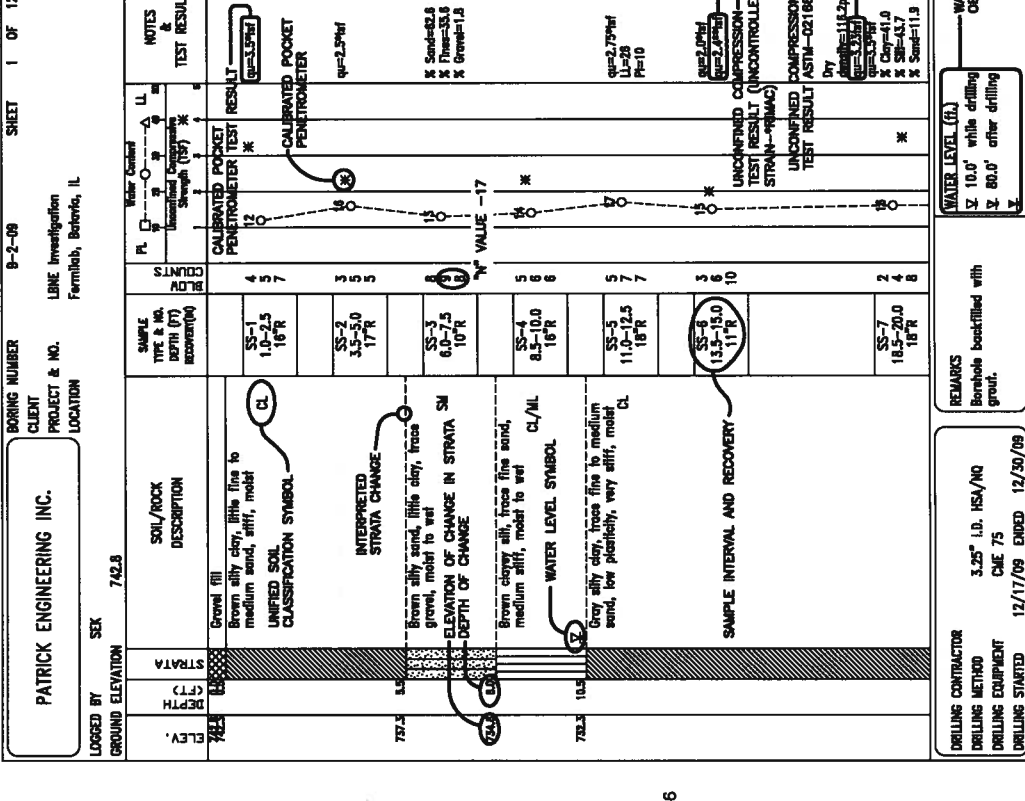
*** RELATIVE PROPORTIONS (IN LIEU OF "WITH")**

Descriptive Term	% By Weight	Descriptive Term	Liquid Limit
Traces/Occ.	1 to 10	Low	0 to 30
Little	10 to 20	Medium	30 to 50
Some	20 to 30	High	>50
And**	30 to 50		

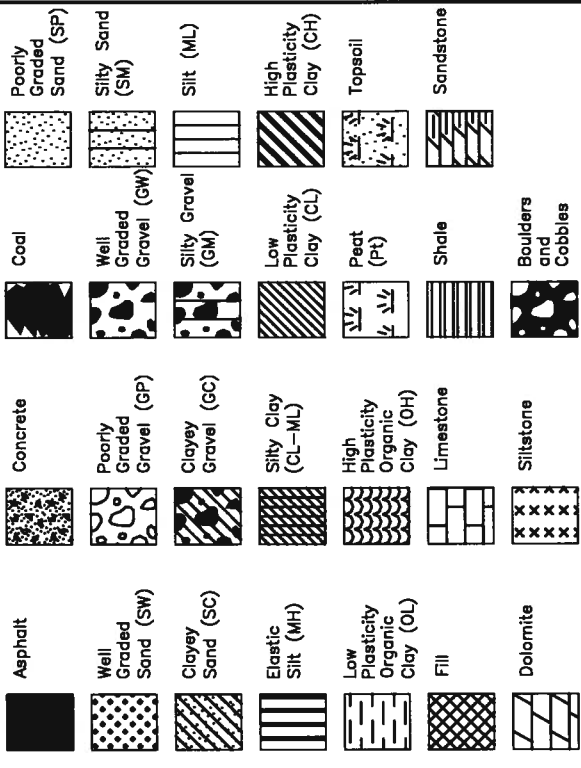
**Alternatively "sandy" or "gravelly," "Silty clay" may be utilized in lieu of "Lean" or "Fat" Clay with the appropriate plasticity modifier.

NOTE: Visual classifications are approximate.

EXAMPLE BORING LOG



GRAPHIC LOG SYMBOLS (OPTIONAL)



NOTE: Graphic log symbols may or may not be shown on the logs. Graphic symbols are shown for convenience. The typical soil descriptions and typed water level data are considered more exact than the graphic symbols.

WATER LEVEL SYMBOLS

Water Level, During Drilling
 Water Level, After Drilling
 Water Level, After 24 Hours

*The water level denotes the level encountered in the borehole and may not represent the water level in a specific layer or strata.

SOIL COLORS

Abbreviations for colors vary between loggers. In general the following abbreviations are used:

BLK = Black GR = Gray BL = Blue
 BRN = Brown GRN = Green PK = Pink
 YEL = Yellow DK = Dark STR = Strong
 OLV = Olive ORG = Orange

Mottling is a rust colored staining usually observed along cracks and fissures and resulting from the depositing or precipitation of iron and other natural materials. Mottling is typically found within the zone where groundwater levels have fluctuated in the past.

ROCK QUALITY DESIGNATION

The Rock Quality Designation (Deere, et. al., 1969) method of determining rock quality as reported here was obtained by summing up the total length of core recovered in each run, counting only those pieces of core which are four inches (10 cm) in length or longer and which are hard and sound. The sum is then represented as a percentage over the length of the run. If the core is broken by handling or by the drilling process, the fresh broken pieces are fitted together and counted as one piece provided that they form the requisite length of four inches (10 cm). RQD is reported as a percentage.

Relation of RQD and Rock Quality

RQD (%)	Description of Rock Quality
0 - 25	Very Poor
25 - 50	Poor
50 - 75	Fair
75 - 90	Good
90 - 100	Excellent

NOTE: Recovery denoted as REC- is the length of core recovered in a run divided by the length of the run, reported as a percentage.

SOIL

DESCRIPTION TERMINOLOGY

UNIFIED SOIL CLASSIFICATION SYSTEM
 KEY TO GRAPHIC LOG SYMBOLS
 KEY TO ROCK CORE DATA
 EXAMPLE BORING LOG

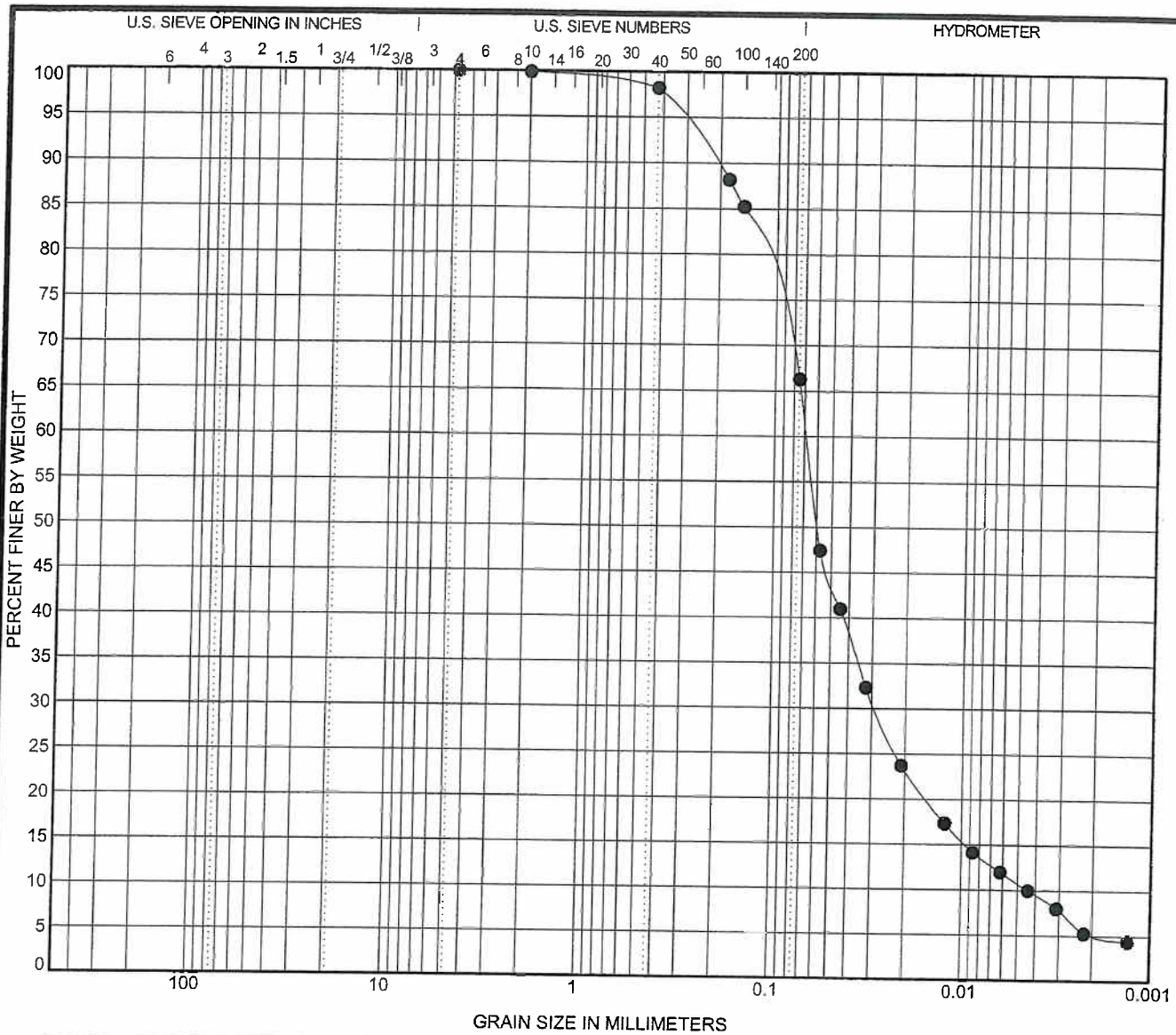
APPENDIX C

LABORATORY TEST RESULTS LABORATORY DATA

Laboratory Test Results

IARC Building - Fermi National Accelerator Laboratory - Batavia, Illinois

Sample Identification	Sample Depth (ft)	USCS Soil Classification	Moisture Content			Atterberg Limits			Particle Size			Loss on Ignition	UC Strength	Density - unit weight
			ASTM D2216	LL	PL	PI	Gravel	Sand	Silt	Clay	ASTM D2166			
Parameter		ASTM D2487	w	%	%	%	%	%	%	%	%	%	tsf	ASTM D
B-1-10 SS-3	6-7.5	Brown fine sandy silt (SM)	24	21	13	8	0.0	33.7	55.6	10.7	--	--	113.9	--
B-1-10 ST-1	11-13	Dark gray silty clay/clayey silt (CL-ML)	21	21	13	8	--	--	--	--	2.0	--	--	--
B-2-10 SS-4	8.5-10	Dark gray silty clay (CL)	--	21	13	8	--	--	--	--	--	--	--	--
B-2-10 SS-5	11-12.5	Dark gray silty clay (CL)	--	21	13	8	--	--	--	--	--	--	--	--
B-2-10 SS-5	13.5-15	Dark gray clayey silt (ML)	--	21	13	8	5.6	23.1	61.1	10.1	--	0.24	112	--
B-3-10 ST-1	10-12	Dark gray clayey silt (ML)	22	25	14	11	--	--	--	--	--	--	--	--
B-4-10 SS-6	16-17.5	Brown/gray silty clay (CL)	23	21	16	4	--	--	--	--	--	0.58	111	--
B-4-10 ST-1	13.5-15	Brown/gray silty clay (CL)	21	20	16	4	--	--	--	--	--	0.59	115	--
B-7-10 ST-1	12.5-14.5	Gray silty clay (CL)	--	--	--	--	--	--	--	--	--	--	--	--
B-7-10 SS-4	8.5-10	Gray clayey silt (ML)	--	--	--	--	--	--	--	--	--	--	--	--
B-1 (S1404)			--	--	--	--	--	--	--	--	--	--	--	--
B-2 (S1405)			--	--	--	--	--	--	--	--	--	--	--	--
B-3 (S1406)			--	--	--	--	--	--	--	--	--	--	--	--
B-4 (S1407)			--	--	--	--	--	--	--	--	--	--	--	--
B-7 (S1410)			--	--	--	--	--	--	--	--	--	--	--	--



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	USCS Classification					LL	PL	PI	Cc	Cu
● B-1-10# 6.0 ft									2.73	15.54

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● B-1-10# 6.0 ft	4.75	0.068	0.029	0.004	0.0	33.7	55.6	10.7

WEI GRAIN SIZE USCS 1901885.GPJ US LAB.GDT 6/25/10



Wang Engineering, Inc.
 1145 N Main Street
 Lombard, IL 60148
 Telephone: 630 953-9928
 Fax: 630 953-9938

GRAIN SIZE DISTRIBUTION
 Project: IARC Building
 Location: Batavia, IL
 Number: 190-18-85



DENSITY-UNIT WEIGHT DETERMINATION

Client: Patrick Engineering
Project: IARC Building
WEI Job No: 190-18-85

Analyst name: M. de los Reyes
Test date: 6/21/2010

	B-1-10 (11.0-13.0 ft)
Water content determination	
Mass of tare and wet soil (g) $W_w =$	330.11
Mass of tare and dry soil (g) $W_d =$	282.65
Mass of tare (g) $W_t =$	83.85
Water content $w =$	24%

Density--Unit Weight	
Diameter measurements (in) $D_1 =$	2.599
$D_2 =$	2.729
$D_3 =$	2.584
Average diameter (in) $D =$	2.637
Height measurements (in) $H_1 =$	1.208
$H_2 =$	1.239
$H_3 =$	1.204
Average height (in) $H =$	1.217
Total weight (g) $W =$	246.260
Bulk Unit Weight (pcf) $\gamma =$	141.14
Dry Unit Weight (pcf) $\gamma_d =$	113.94

Prepared by: M. de los Reyes Date: 6/23/10
Checked by: [Signature] Date: 06/25/10



Organic Content - Loss On Ignition
ASTM D 2974, Method C

Client: Patrick Engineering Analyst: M. de los Reyes
Project: IARC Building Date Received: 6/17/2010
WEI Job: 190-18-85 Date Tested: 6/17/2010
Sample ID/Location: B-2-10 (8.5-10.0 ft) Description: Gray Silt
Type/Condition: SS
Testing Furnace Temp °C.: 440

Moisture Content	Wet soil + tare (g)	Dry Soil + tare (g)	Tare mass (g)	w (%)
oven-dry method	30.18	26.86	11.05	21

Ash Content	Dry Soil + tare (g)	Ash + tare (g)	Tare mass (g)	Ash Content (%)
Loss On Ignition	26.86	26.54	11.05	98

Organic Content (%) = 2.0

Notes: _____

Prepared by: M de los Reyes Date: 6/23/10
Checked by: [Signature] Date: 06/20/10



LIQUID LIMIT, PLASTIC LIMIT, and PLASTICITY INDEX

AASHTO T 89, T 90 / ASTM D 4318

Client: Patrick Engineering
 Project: IARC Building
 WEI Job No: 190-18-85
 Prep Method: air dried

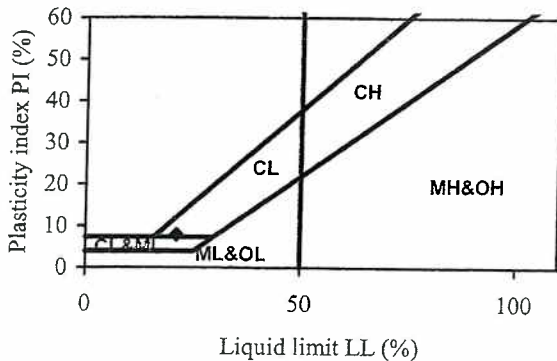
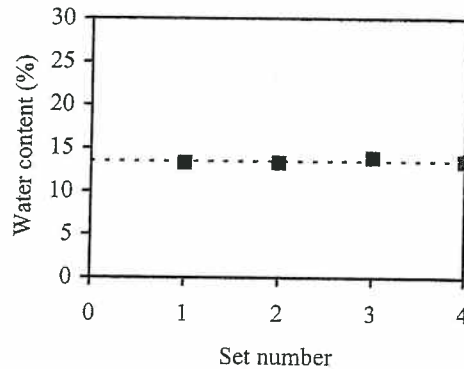
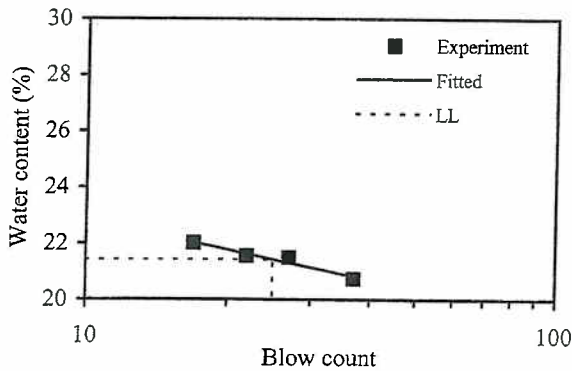
Analyst name: M. de Iso Reyes
 Test date: June 22, 2010
 Soil Sample: B-2 (11.0-12.5 ft)
 Sample description: Gray Silty Clay
 % retained on #40 sieve: 43%

Set #	Tare mass (g) Wc	Tare with wet soil (g) Ww	Tare with dry soil (g) Wd	Blow count N	Water content (%) w	Water content fitted (%)
1	11.39	21.26	19.51	22	21.55	21.63
2	11.10	21.46	19.68	37	20.75	20.83
3	11.29	21.86	19.99	27	21.49	21.32
4	11.32	20.52	18.86	17	22.02	22.03

Liquid limit (%) = 21.43
 Slope of flow line = 0.073

Set #	Tare mass (g) Mc	Tare with wet soil (g) Mw	Tare with dry soil (g) Md	Water content (%) w
1	11.05	17.36	16.62	13.29
2	11.16	18.83	17.93	13.29
3	11.38	20.14	19.07	13.91
4	11.14	20.14	19.07	13.49

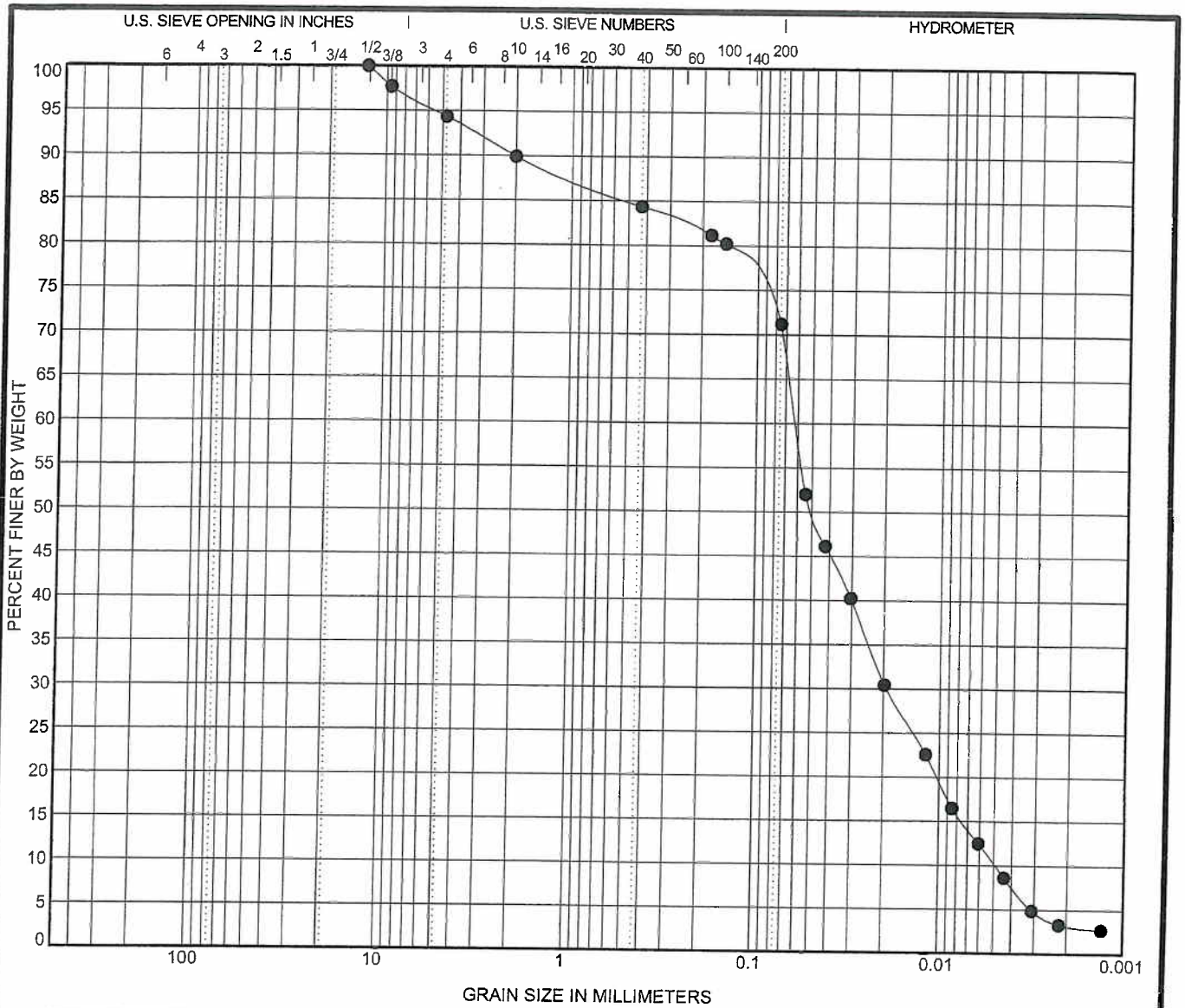
Plastic limit (%) = 13.50



Liquid limit (%) = 21
 Plastic limit (%) = 13
 Plasticity index (%) = 8

Prepared by: M. de las Reyes Date: 6/23/10
 Checked by: [Signature] Date: 06/20/10

WANG ENGINEERING, INC.
 1145 N. Main Street, Lombard, IL 60148



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	USCS Classification	LL	PL	PI	Cc	Cu
● B-2-10# 13.5 ft					1.20	12.53

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● B-2-10# 13.5 ft	12.7	0.062	0.019	0.005	5.6	23.1	61.1	10.1

WEI GRAIN SIZE USCS 1901885.GPJ US LAB.GDT 6/23/10



Wang Engineering, Inc.
 1145 N Main Street
 Lombard, IL 60148
 Telephone: 630 953-9928
 Fax: 630 953-9938

GRAIN SIZE DISTRIBUTION
 Project: IARC Building
 Location: Batavia, IL
 Number: 190-18-85

UNCONFINED COMPRESSIVE STRENGTH (AASHTO T 208 / ASTM 2166)

Project: IARC Building
Client: Patrick Engineering
WEI Job No.: 190-18-85
Sample ID/Location: B-3-10 (10.0-12. ft)
Type/Condition: Shelby Tube/undisturbed

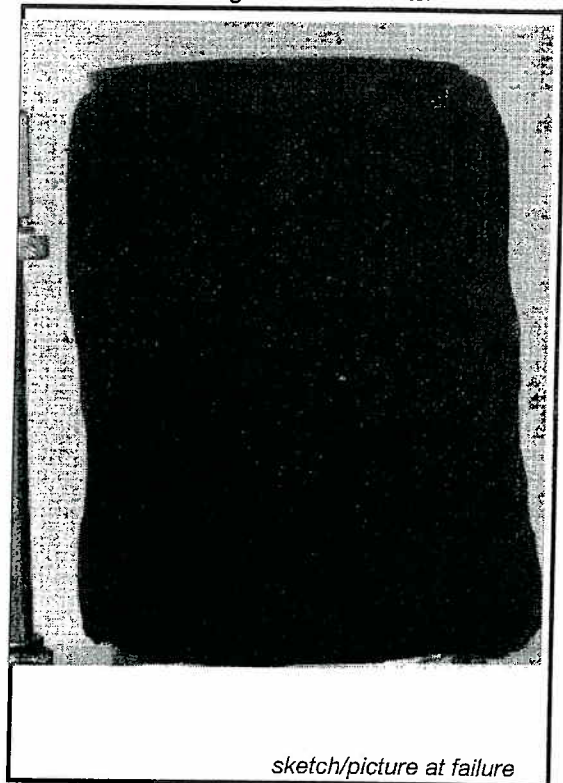
Analyst name: M. de los Reyes
Date received: 17-Jun-10
Test date: 21-Jun-10
Sample description:

Gray Silty Clay

Average initial height $h_0 = 5.67$ in
 Average initial diameter $d_0 = 2.97$ in
 Height to diameter ratio = 1.91
 Mass of wet sample and tare $M_i = 1577.87$ g
 Mass of dry sample and tare $M_d = 1322.60$ g
 Mass of tare $M_t = 161.97$ g
 Mass of sample $M_s = 1415.90$ g
 Estimated specific gravity $G_s = 2.75$

Initial water content $w = 21.99\%$ entire sample
 Initial unit weight $\gamma = 136.81$ pcf
 Initial dry unit weight $\gamma_d = 112.14$ pcf
 Initial void ratio $e_0 = 0.53$
 Initial degree of saturation $S_r = 100\%$
 Young's modulus $E = 2.20$ tsf
 Unconfined compressive strength $q_u = 0.24$ tsf
 Shear Strength = 0.12 tsf

Displacement (in)	Force (lbs)	Strain (%)	Stress (tsf)
Δh	F	e	s
0.00	0.00	0.00	0.00
0.03	2.07	0.53	0.02
0.06	3.11	1.06	0.03
0.06	4.15	1.06	0.04
0.12	5.19	2.11	0.05
0.15	6.22	2.64	0.06
0.18	6.22	3.17	0.06
0.21	8.30	3.70	0.08
0.24	10.37	4.23	0.10
0.27	12.44	4.76	0.12
0.30	13.48	5.29	0.13
0.35	15.56	6.17	0.15
0.40	18.67	7.05	0.18
0.45	20.74	7.93	0.20
0.50	20.74	8.81	0.20
0.55	21.78	9.69	0.20
0.60	22.81	10.57	0.21
0.65	22.81	11.46	0.21
0.70	24.89	12.34	0.23
0.80	24.89	14.10	0.22
0.90	27.38	15.86	0.24



NOTES:

Prepared by: M. de los Reyes

Date: 6/23/10

Checked by: [Signature]

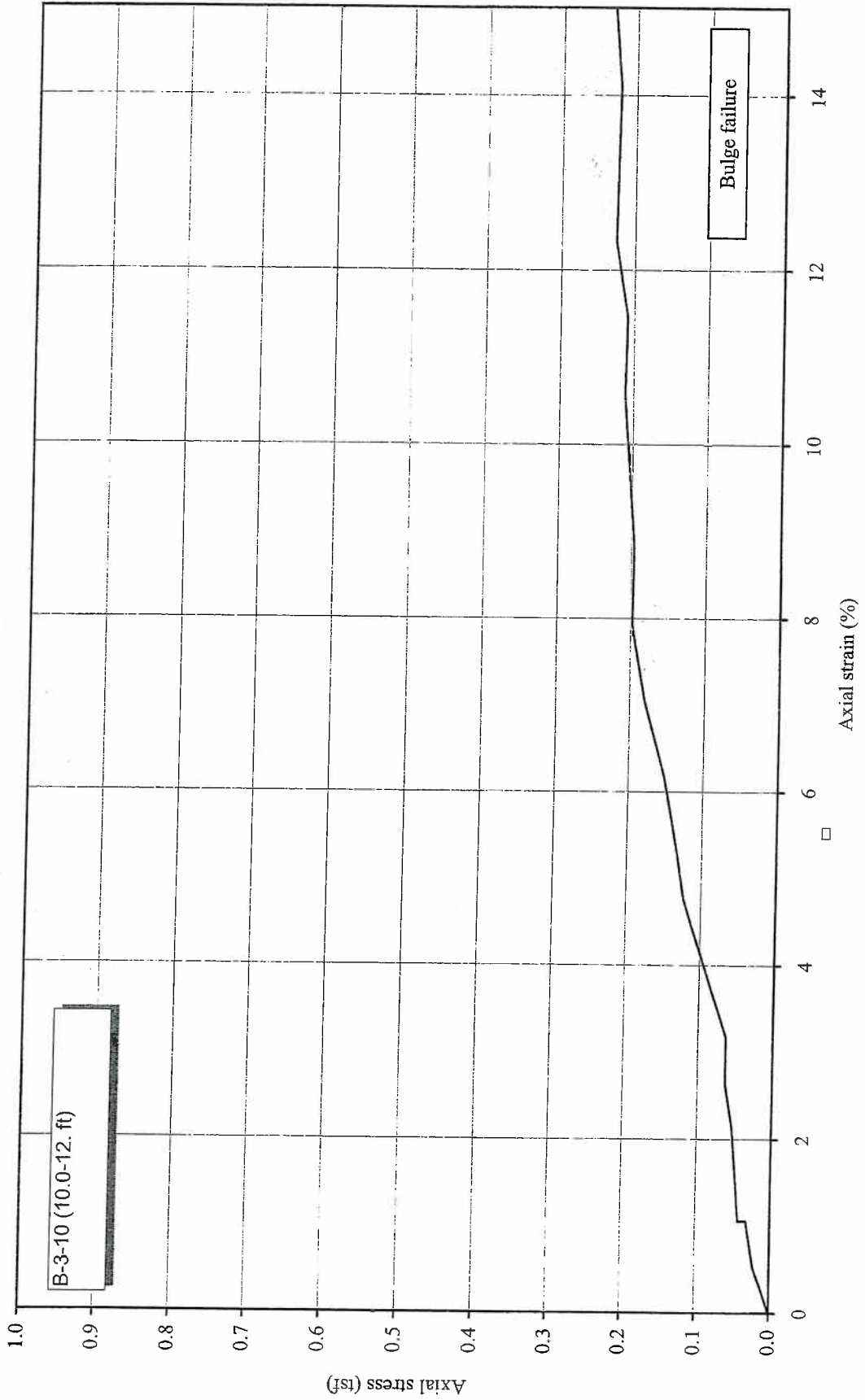
Date: 06/25/10

WANG ENGINEERING, INC.

1145 N. Main Steet, Lombard, IL 60148



Axial Stress vs. Axial Strain





LIQUID LIMIT, PLASTIC LIMIT, and PLASTICITY INDEX

AASHTO T 89, T 90 / ASTM D 4318

Client: Patrick Engineering
 Project: IARC Building
 WEI Job No: 190-18-85
 Prep Method: air dried

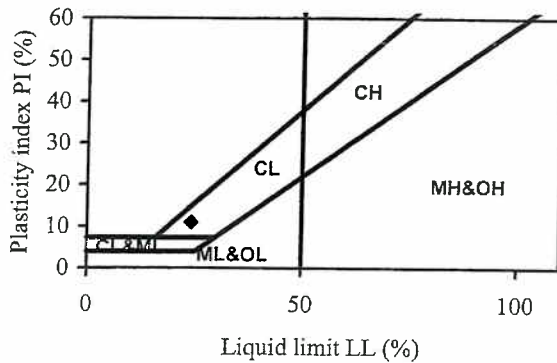
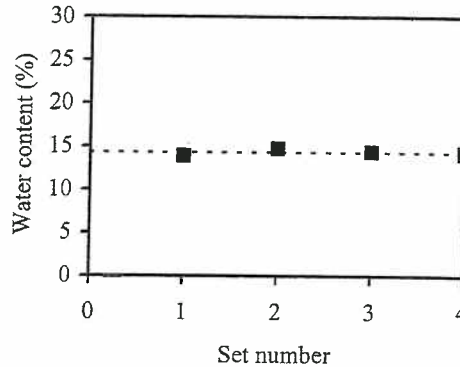
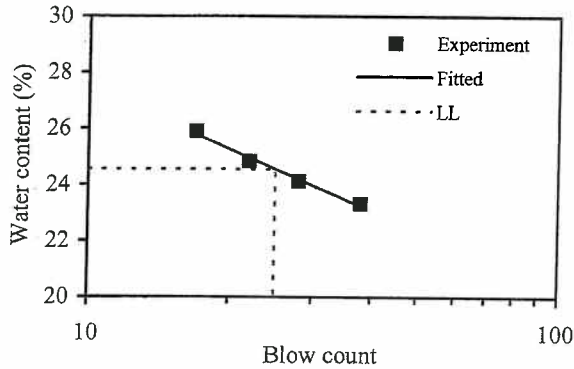
Analyst name: M. de los Reyes
 Test date: June 23, 2010
 Soil Sample: B-4-10 (16.0-17.5 ft)
 Sample description: Gray Silty Clay
 % retained on #40 sieve: 16%

Set #	Tare mass (g) Wc	Tare with wet soil (g) Ww	Tare with dry soil (g) Wd	Blow count N	Water content (%) w	Water content fitted (%)
1	13.90	24.50	22.44	28	24.12	24.20
2	13.86	24.49	22.48	38	23.32	23.23
3	13.52	28.30	25.36	22	24.83	24.96
4	13.89	26.24	23.70	17	25.89	25.78

Liquid limit (%) = 24.56
 Slope of flow line = 0.129

Set #	Tare mass (g) Mc	Tare with wet soil (g) Mw	Tare with dry soil (g) Md	Water content (%) w
1	14.04	21.42	20.52	13.89
2	13.87	20.09	19.29	14.76
3	13.86	22.39	21.32	14.34
4	13.88	22.18	21.14	14.33

Plastic limit (%) = 14.33



Liquid limit (%) = 25
 Plastic limit (%) = 14
 Plasticity index (%) = 11

Prepared by: M. de los Reyes Date: 6/25/10
 Checked by: [Signature] Date: 06/25/10

WANG ENGINEERING, INC.

1145 N. Main Street, Lombard, IL 60148

UNCONFINED COMPRESSIVE STRENGTH (AASHTO T 208 / ASTM 2166)

Project: IARC Building
Client: Patrick Engineering
WEI Job No.: 190-18-85
Sample ID/Location: B-4-10 (13.5.-15.0 ft)
Type/Condition: Shelby Tube/undisturbed

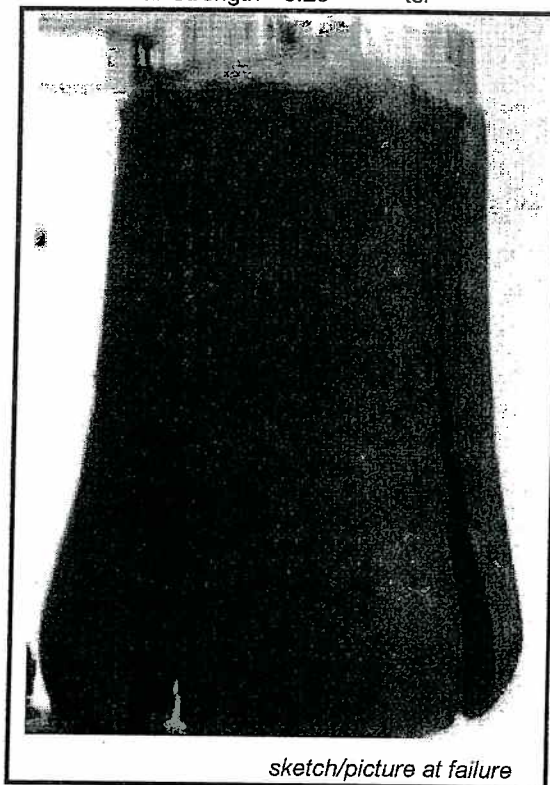
Analyst name: M. de los Reyes
Date received: 17-Jun-10
Test date: 21-Jun-10
Sample description:

Gray Silty Clay

Average initial height $h_0 = 5.72$ in
 Average initial diameter $d_0 = 2.86$ in
 Height to diameter ratio = 2.00
 Mass of wet sample and tare $M_i = 1327.13$ g
 Mass of dry sample and tare $M_d = 1084.90$ g
 Mass of tare $M_t = 13.23$ g
 Mass of sample $M_s = 1313.90$ g
 Estimated specific gravity $G_s = 2.75$

Initial water content $w = 22.60\%$ entire sample
 Initial unit weight $\gamma = 136.38$ pcf
 Initial dry unit weight $\gamma_d = 111.24$ pcf
 Initial void ratio $e_0 = 0.54$
 Initial degree of saturation $S_r = 100\%$
 Young's modulus $E = 7.70$ tsf
 Unconfined compressive strength $q_u = 0.58$ tsf
 Shear Strength = 0.29 tsf

Displacement (in)	Force (lbs)	Strain (%)	Stress (tsf)
Δh	F	e	s
0.00	0.00	0.00	0.00
0.03	2.49	0.52	0.03
0.06	5.19	1.05	0.06
0.06	9.33	1.05	0.10
0.12	13.48	2.10	0.15
0.15	18.67	2.62	0.20
0.18	22.81	3.15	0.25
0.21	26.96	3.67	0.29
0.24	31.11	4.20	0.33
0.27	35.26	4.72	0.38
0.30	37.33	5.25	0.40
0.35	43.55	6.12	0.46
0.40	46.67	6.99	0.49
0.45	49.78	7.87	0.51
0.50	53.92	8.74	0.55
0.55	56.00	9.62	0.57
0.60	58.07	10.49	0.58
0.65	58.07	11.37	0.58
0.70	58.07	12.24	0.57
0.80	58.07	13.99	0.56
0.90	58.07	15.74	0.55



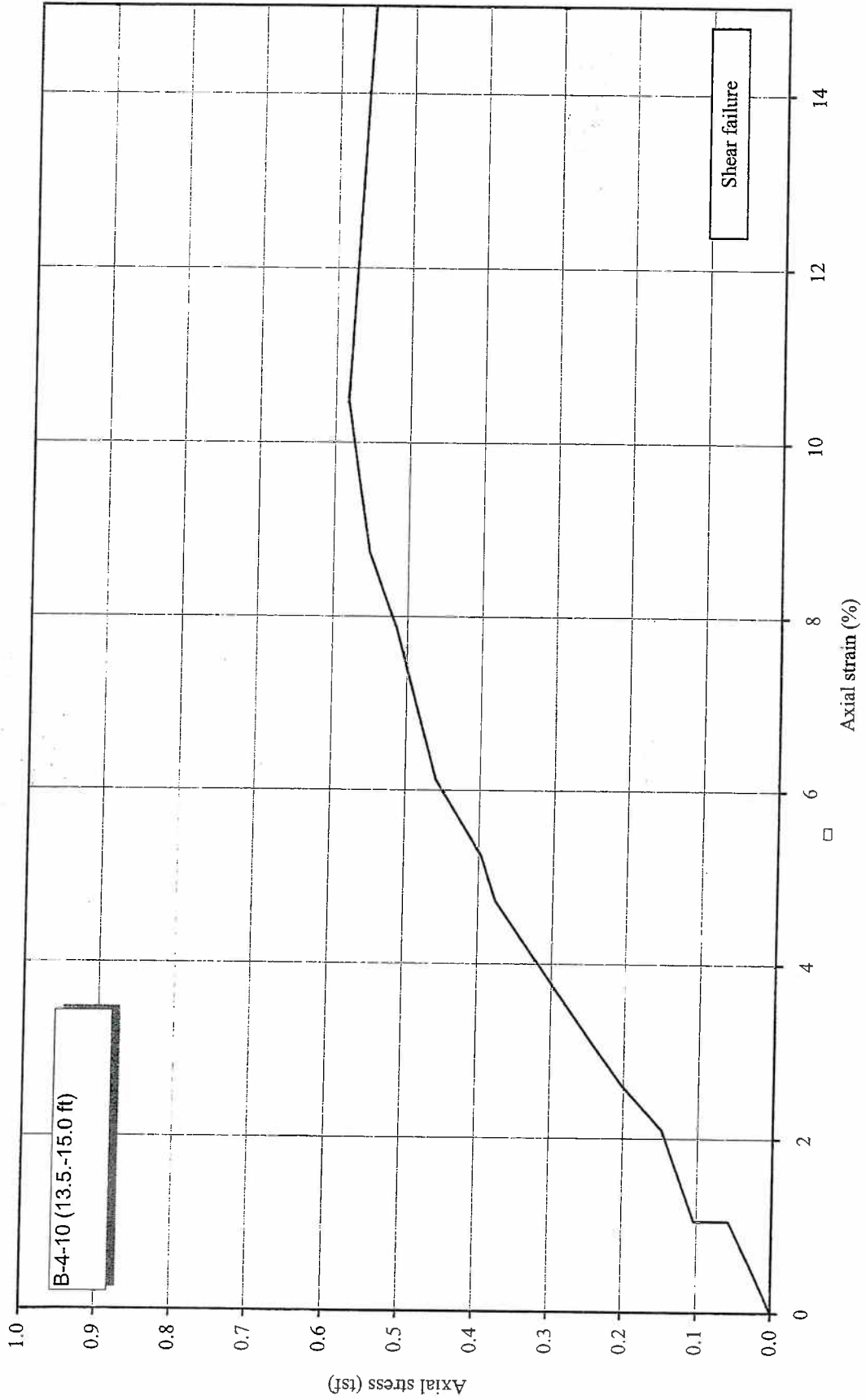
NOTES:

Prepared by: M. de los Reyes Date: 6/23/10

Checked by: [Signature] Date: 06/25/10



Axial Stress vs. Axial Strain





LIQUID LIMIT, PLASTIC LIMIT, and PLASTICITY INDEX

AASHTO T 89, T 90 / ASTM D 4318

Client: Patrick Engineering
 Project: IARC Building
 WEI Job No: 190-18-85
 Prep Method: air dried

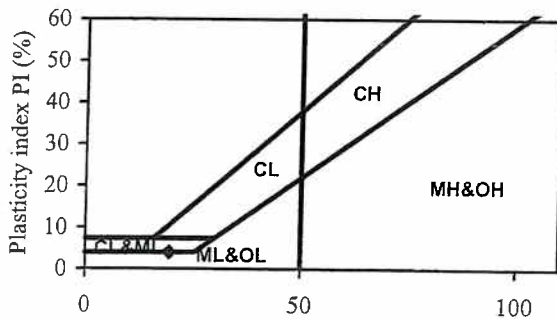
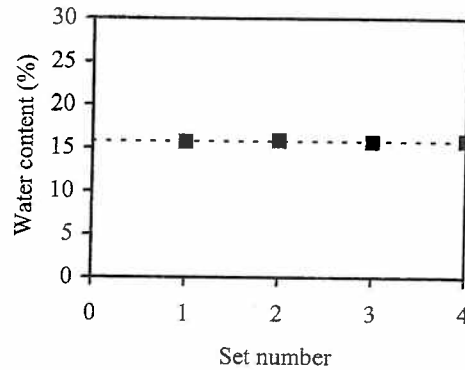
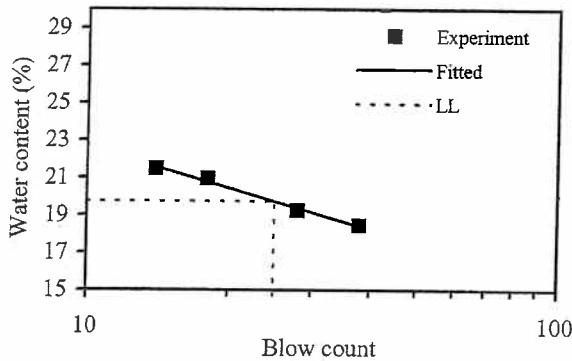
Analyst name: M. de los Reyes
 Test date: June 23, 2010
 Soil Sample: B-7-10 (8.5-10.0 ft)
 Sample description: Brown & Gray Silty Clay
 % retained on #40 sieve: 8%

Set #	Tare mass (g) Wc	Tare with wet soil (g) Ww	Tare with dry soil (g) Wd	Blow count N	Water content (%) w	Water content fitted (%)
1	13.75	24.10	22.27	14	21.48	21.57
2	13.91	24.07	22.31	18	20.95	20.78
3	13.62	27.25	25.05	28	19.25	19.38
4	13.75	28.45	26.16	38	18.45	18.41

Liquid limit (%) = 19.73
Slope of flow line = 0.159

Set #	Tare mass (g) Mc	Tare with wet soil (g) Mw	Tare with dry soil (g) Md	Water content (%) w
1	13.85	22.40	21.24	15.70
2	13.67	22.52	21.31	15.84
3	13.84	23.12	21.86	15.71
4	13.68	26.54	24.78	15.86

Plastic limit (%) = 15.78



Liquid limit (%) = 20
 Plastic limit (%) = 16
 Plasticity index (%) = 4

Prepared by: M. de los Reyes Date: 6/25/10
 Checked by: [Signature] Date: 06/25/10

WANG ENGINEERING, INC.
 1145 N. Main Street, Lombard, IL 60148

UNCONFINED COMPRESSIVE STRENGTH (AASHTO T 208 / ASTM 2166)

Project: IARC Building
Client: Patrick Engineering
WEI Job No.: 190-18-85
Sample ID/Location: B-7-10 (12.5.-14.5 ft)
Type/Condition: Shelby Tube/undisturbed

Analyst name: M. de los Reyes
Date received: 17-Jun-10
Test date: 21-Jun-10
Sample description:

Gray Silty Clay

Average initial height $h_0 = 6.00$ in
 Average initial diameter $d_0 = 2.84$ in
 Height to diameter ratio = 2.11
 Mass of wet sample and tare $M_i = 1579.90$ g
 Mass of dry sample and tare $M_d = 1340.10$ g
 Mass of tare $M_t = 186.00$ g
 Mass of sample $M_s = 1393.90$ g
 Estimated specific gravity $G_s = 2.75$

Initial water content $w = 20.78\%$ entire sample
 Initial unit weight $g = 139.20$ pcf
 Initial dry unit weight $g_d = 115.26$ pcf
 Initial void ratio $e_0 = 0.49$
 Initial degree of saturation $S_r = 100\%$
 Young's modulus $E = 8.17$ tsf
 Unconfined compressive strength $q_u = 0.59$ tsf
 Shear Strength = 0.30 tsf

Displacement (in)	Force (lbs)	Strain (%)	Stress (tsf)
Δh	F	e	s
0.00	0.00	0.00	0.00
0.03	2.49	0.50	0.03
0.06	5.19	1.00	0.06
0.06	9.33	1.00	0.10
0.12	13.48	2.00	0.15
0.15	18.67	2.50	0.21
0.18	22.81	3.00	0.25
0.21	26.96	3.50	0.29
0.24	31.11	4.00	0.34
0.27	35.26	4.50	0.38
0.30	37.33	5.00	0.40
0.35	43.55	5.83	0.46
0.40	46.67	6.66	0.49
0.45	49.78	7.50	0.52
0.50	53.92	8.33	0.56
0.55	56.00	9.16	0.58
0.60	58.07	10.00	0.59
0.65	58.07	10.83	0.59
0.70	58.07	11.66	0.58
0.80	58.07	13.33	0.57
0.90	58.07	14.99	0.56



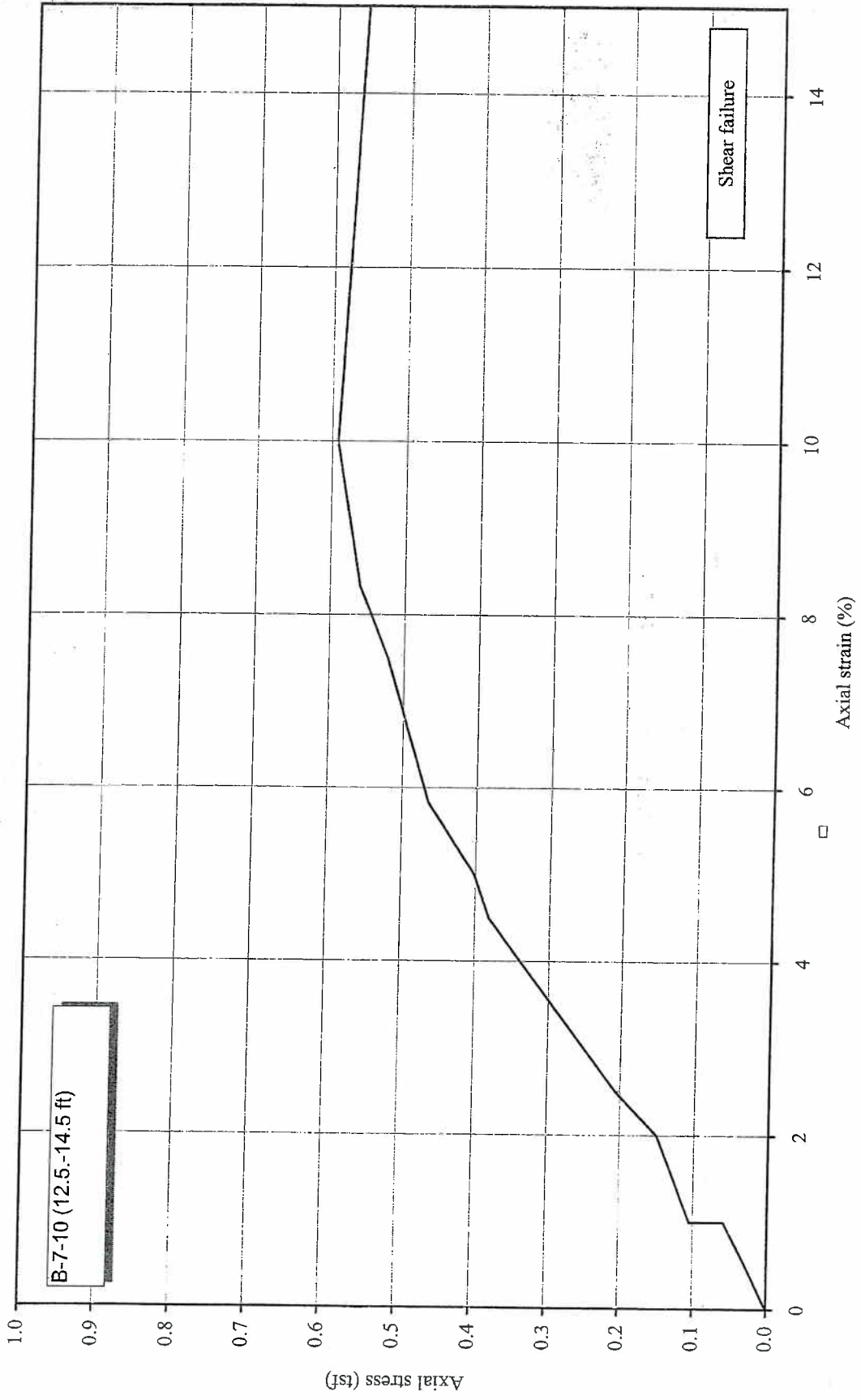
NOTES:

Prepared by: M. de los Reyes Date: 6/23/10

Checked by: [Signature] Date: 06/20/10



Axial Stress vs. Axial Strain



APPENDIX D

**TECHNICAL BULLETIN NO. 9
GEOPIER FOUNDATION CO. INC.**

VIBRATION AND NOISE LEVELS

Construction vibration and noise levels are important when considering the effect of construction activities on adjacent buildings, building additions and neighbors. This technical bulletin describes the results of vibration and noise monitoring performed adjacent to Geopier® and Impact™ Rammed Aggregate Pier (RAP) activities. This information should be used when evaluating the feasibility of a RAP solution at a particular site. For sites with increased vibration and noise sensitivity, a site-specific monitoring program should be considered.

I. CONSTRUCTION VIBRATIONS

Many construction activities result in the transmission of vibrations across the construction site. Vibration levels depend on the types of construction activities as well as the soil conditions at the site. The effect of vibrations on adjacent buildings depends on the building's construction (wood, masonry, steel, concrete), building age, distance of the adjacent building from the source of vibration, duration of vibration, vibration frequency, vibration amplitude and soil conditions. In general, low frequency (long period) motions result in a greater likelihood of building damage compared to high frequency (short period) motions. This is because

of the significant damping effect that occurs in soils subjected to high frequency (short period) motions. In contrast, soils subjected to low frequency (long period) motions may amplify the vibrations.

In the United States, high frequency vibrations levels less than two in/sec at the building location are generally considered to be acceptable (Wiss 1981). These levels of vibrations are unlikely to lead to building damage. Vibration levels between 0.5 in/sec and 2 in/sec, are generally considered to be an annoyance but not structurally damaging. Vibration levels of less than 0.5 in/sec are often not noticeable.

2. RAMMED AGGREGATE PIER CONSTRUCTION

Rammed Aggregate Pier construction is described in detail in the Geopier Reference Manual (Fox and Cowell 1998). Geopier Rammed Aggregate Piers are constructed by drilling out a volume of compressible soil to create a cavity and then ramming select aggregate into the cavity in thin lifts using the patented beveled tamper. Impact Rammed Aggregate Piers are installed in caving soils through the use of a hollow mandrel driven to the design depth. Aggregate placed down the center of the hollow mandrel fills the cavity and is compacted in thin lifts as the mandrel is raised up and rammed down to achieve compaction. The ramming action during construction of Rammed Aggregate Piers causes the aggregate to compact vertically and to push laterally against the matrix soil, thereby increasing the horizontal stress in the matrix soil. Rammed Aggregate

Pier construction results in a very dense aggregate pier with superior strength and stiffness. During installation, the hammers that produce the ramming action operate at ranges of 400 to 600 cycles per minute (7 to 10 cycles per second) for Geopier RAPs and 2,000 to 2,400 cycles per minute for Impact RAPs. These high frequency vibration levels are higher than most other construction activities resulting in a large amount of damping within the reinforced soils at the project site. Conversely, pile driving typically produces vibrations associated with low frequencies on the order of 60 cycles per minute (one cycle per second) and an associated period of one second. The RAP vibration levels are thus both lower in amplitude and higher in frequency than pile driving activities, resulting in lower vibrations measured at adjacent sites.

3. VIBRATION MONITORING

Vibration monitoring has been performed at a number of Rammed Aggregate Pier project sites to evaluate the amplitude and frequency of vibrations as a function of distance from the energy source. The following table

contains summaries of the collected data. The table includes a description of the soil conditions, installation technique, distance ranges from source, as well as the field vibration data for each of the project sites.

Table 1.
Vibration Monitoring Results*

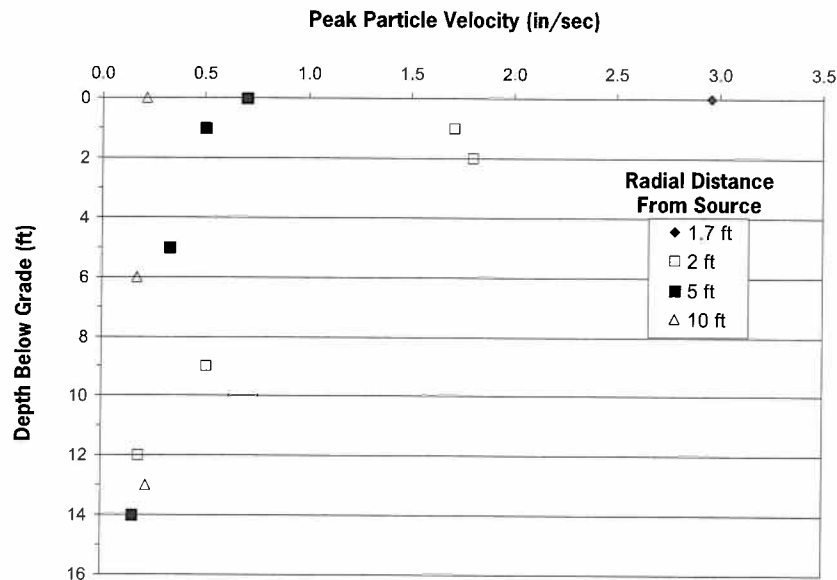
LOCATION	SOIL DESCRIPTION	REINFORCEMENT SOLUTION	DISTANCE FROM SOURCE (ft)	PEAK PARTICLE VELOCITY (ips)	FREQUENCY (Hz)
MEMPHIS, TN	MED. STIFF CLAY	GEOPIER RAP	1.7 - 2	.18 - 2.96	43 - 57
		GEOPIER RAP	5 - 10	.12 - .70	43 - 73
SOMERVILLE, MA	MED. DENSE GRANULAR FILL	GEOPIER RAP	1.5 - 10	.50 - .65	30 - 85
SAN LUIS OBISPO, CA	STIFF CLAY	GEOPIER RAP	7 - 15	.04 - .55	15 - 60
MINNEAPOLIS, MN	LOOSE SAND	GEOPIER RAP	3 - 50	.07 - .90	27 - 57
MINNEAPOLIS, MN	LOOSE SAND	IMPACT RAP	3 - 20	.56 - .99	21 - 47
		IMPACT RAP	30 - 100	.02 - .48	21 - 47
MANALAPAN, NJ	MED. DENSE SILTY SAND	IMPACT RAP	5 - 10	.57 - 3.19	37 - 64
		IMPACT RAP	25 - 50	.10 - .62	34 - 73

*Monitoring results are also plotted in Figures 2 and 3.

At one project site, the Baptist Memorial Hospital Addition in Memphis, Tennessee, Geopier RAPs were installed in close proximity to existing hospital facilities. An accelerometer was used at the site to measure both accelerations and peak particle velocities (PPV) during the installation of the Geopier elements. The accelerometer was positioned at distances ranging

from 1.7 feet to 10 feet away from the Geopier RAPs as the tamper head elevation ranged from the ground surface to greater than 13 feet below grade. The subsurface conditions consisted of medium-stiff clay with groundwater below the bottoms of the piers. The results of the accelerometer testing are shown graphically in Figure 1.

Figure 1.
Peak Particle Velocity
With Depth For Different
Energy Source Distances



4. DISCUSSION OF VIBRATION RESULTS

The results of the vibration monitoring data (Figure 1) indicate that RAP construction vibration amplitudes decrease with increasing depth below the ground surface. The highest vibration amplitudes are observed when the tamper is at the ground surface. Table 1 and Figures 2 to 4 show the ranges of peak particle velocity with distance from the source. The data indicates that vibration amplitudes reduce with radial distance from the energy source. This rapid dissipation of vibration amplitudes is attributed to the high frequency (low period) vibrations resulting from the hammers used during RAP construction. For Geopier RAP elements, the peak particle velocities are generally less than two in/sec at distances of two feet from the installation location and less than 0.75 in/sec at distances of five

feet from the installation location. For Impact RAP elements, the peak particle velocities are less than two in/sec at distances on the order of 10 to 15 feet from the pier installation location and less than 0.75 in/sec at distances of 20 to 25 feet from the installation location. The higher amplitudes observed for the Impact RAP installations are likely attributed to the displacement installation procedure and the densification of the granular soils during installation. Figure 4 shows a comparison of Geopier RAP vibration levels from the site in San Luis Obispo, California compared with other construction equipment. As indicated, the measured vibration levels are comparable to those induced by a jack hammer or a large bulldozer and are considerably lower than pile driving operations.

Figure 2.
Peak Particle Velocities
For Geopier RAPs With
Distance From Energy Source

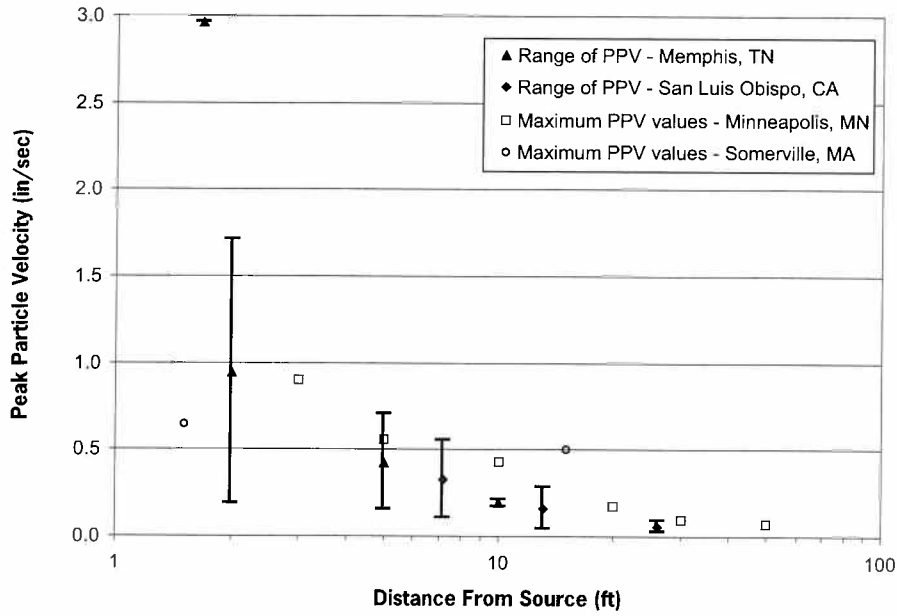


Figure 3.
Peak Particle Velocities
For Impact RAPs With
Distance From Energy Source

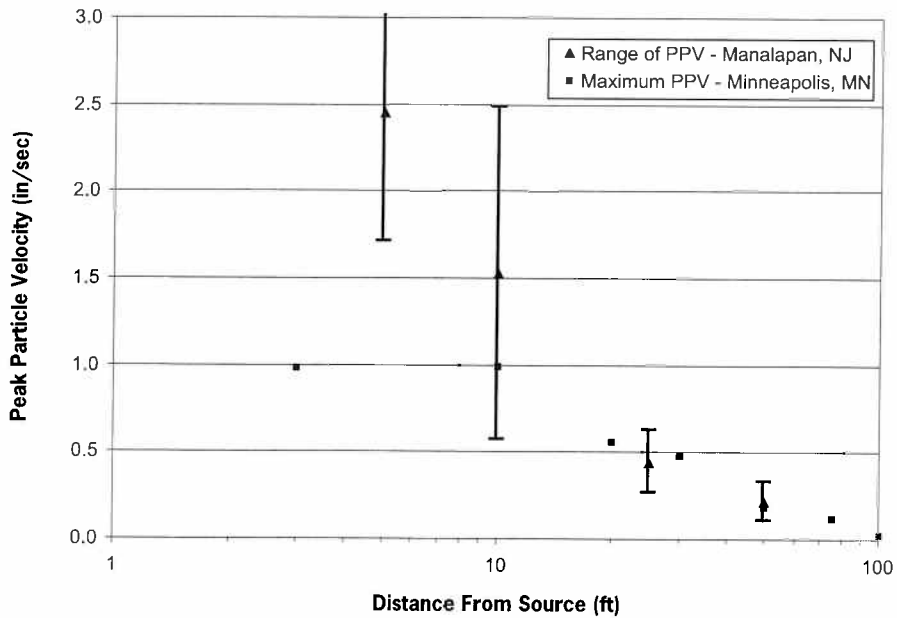


Figure 4.
 Peak Particle Velocity With Distance
 From Geopier RAP (Fiegel 2005)

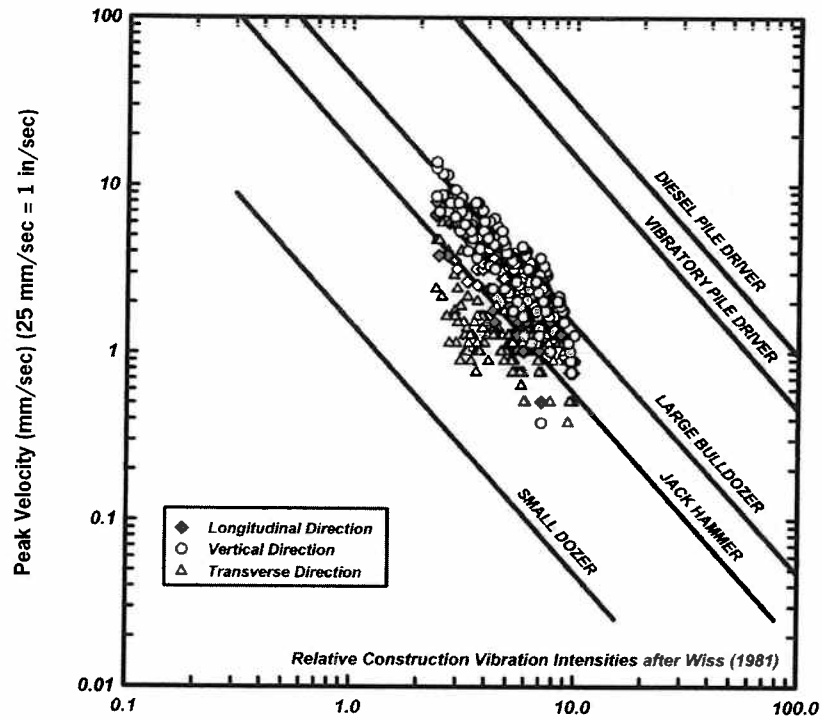
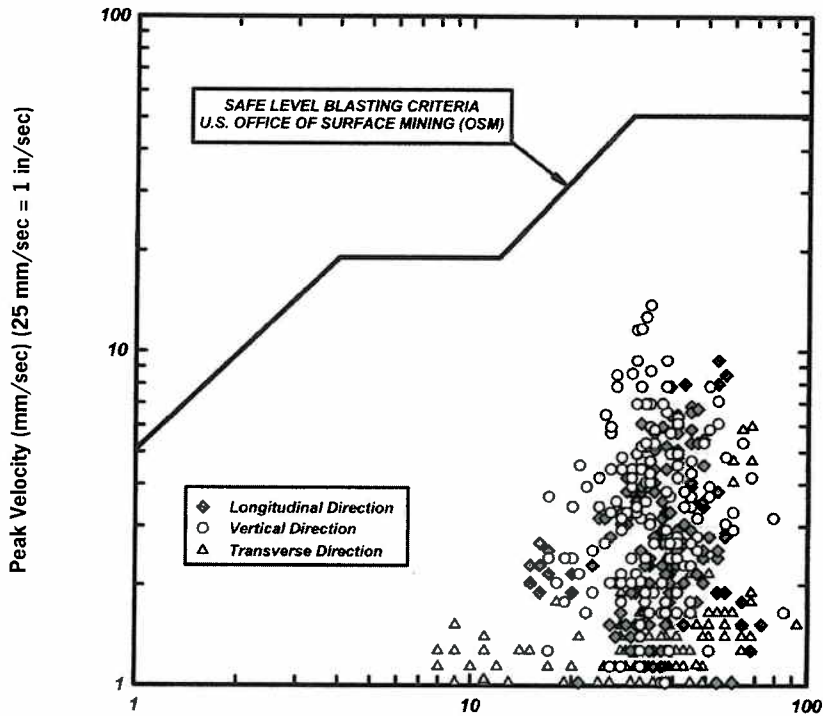


Figure 5 shows the peak particle velocities of the Geopier Rammed Aggregate Piers plotted with vibration frequency as measured at the San Luis Obispo, California project site. The figure indicates that the

high frequency energy used during installations results in peak particle velocities lower than the recognized standard threshold for building damage.

Figure 5.
Peak Particle Velocity With
Vibration Frequency (Fiegel 2005)



Although the data from Table 1 and Figures 1 through 5 may be used for most project sites, settlement-

sensitive sites should include a site-specific monitoring program to evaluate vibration levels.

5. NOISE LEVELS

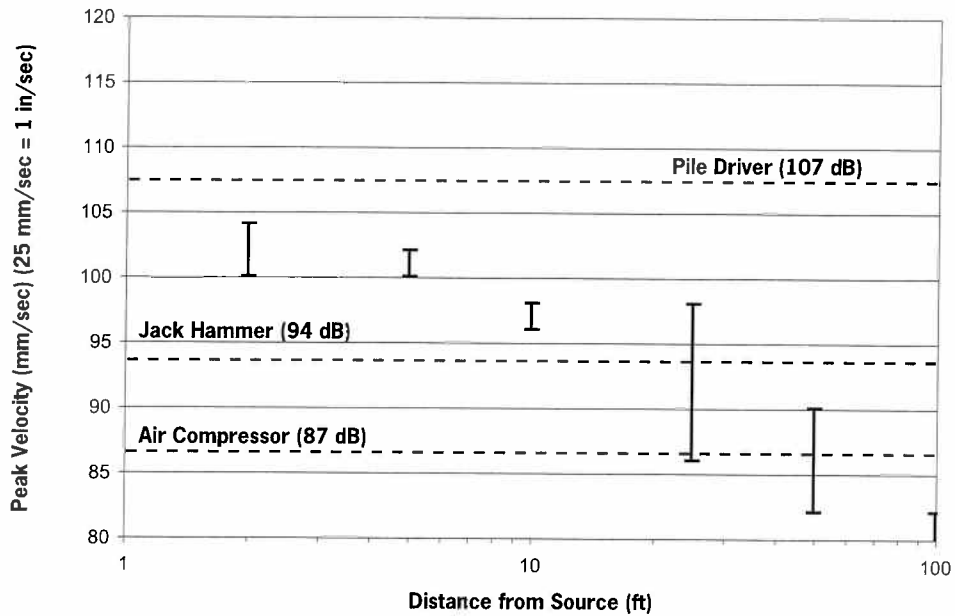
Construction noise decibel levels were recorded during the installation of Geopier Rammed Aggregate Pier elements at the Baptist Memorial Hospital project. Using a decibel meter, the noise levels were recorded with increasing distance from the Geopier

RAP installation. At each distance, readings were recorded for the noise level while the ramming assembly was positioned at both the top and the bottom of the cavity. The results of the measurements are summarized in Table 2 and shown in Figure 6.

Table 2.
Summary Of Noise Levels

DISTANCE FROM RAMMING ASSEMBLY (ft)	DECIBEL LEVEL WITH TAMPER AT TOP (dB)	DECIBEL LEVEL WITH TAMPER AT BOTTOM (dB)
2	100	104
5	100	102
10	96	98
25	86	98
50	82	90
100	75	82

Figure 6.
Range Of Geopier RAP Noise Levels With Distance From Source



The decibel level for the Geopier RAP installation process reduces significantly with distance from the ramming assembly. The decibel levels drop from approximately 100 dB adjacent to the Geopier installation equipment to approximately 75 to 80 dB at a

distance of 50 to 100 feet. For comparison purposes, it should be noted that interpersonal communication is on the order of 60 dB, heavy truck traffic is on the order of 85 dB and pile driving operations are on the order of 105 dB.

6. CONCLUSIONS

Rammed Aggregate Pier installations induce high frequency (low period) vibrations during the construction process. Vibration levels for Geopier Rammed Aggregate Piers are typically within acceptable levels at distances between 2 and 5 feet from the installa-

tion location, while vibration levels for Impact Rammed Aggregate Piers are within tolerable levels at distances between 10 and 20 feet from installation locations. Noise levels for Rammed Aggregate Piers are consistent with construction-type activities.

A C K N O W L E D G E M E N T S

The authors are indebted to Peterson Contractors, Inc. for providing vibration results and JGI/Eastern, Inc., French and Parrello Associates, and American Engineering Testing, Inc. for providing vibration monitoring services.

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- Fiegel, G. (2005). Measurement of Vibration and Noise During the Installation of Rammed Aggregate Piers - Preliminary Data Report Draft, Department of Civil and Environmental Engineering. California Polytechnic State University. San Luis Obispo, CA.
- Fox, N.S. and Cowell, M.J. (1998). *Geopier Foundation and Soil Reinforcement Manual*, Geopier Foundation Company, Inc., Scottsdale, AZ.
- Wiss, J.F. (1981). Construction Vibrations: State-of-the-Art. ASCE Journal of the Geotechnical Engineering Division, 107 (GT2), pp. 167-181.

A U T H O R S

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APPENDIX B

Office, Technical, and Education Building

- URL List of referenced DOE Directives and Guides
- URL List of referenced Fermilab Policies, Procedures and Guidance
- Integrated Project Team Responsibility Matrix
- Environmental Documentation
 - Environmental Engineer/NEPA Compliance Coordinator approval notification
 - DOE FSO NEPA Categorical Exclusion Approval
 - NEPA Environmental Evaluation Notification Form (EENF)
- LEED 2009 Checklist
- HPSB Assessment and Compliance - Preliminary
- Whitestone Building and Repair Cost Reference Information
- Fermilab Work Smart Set, Chapter 1070 of FESHM
- Multi-Organization Construction Site Safety Walkthrough Procedure
- Stakeholder Input
 - Comment and Compliance Review Request
 - Stakeholder Comments

APPENDIX
B

APPENDIX B



URL List of referenced DOE Directives and Guides

- DOE Directive 413.3
<http://www.directives.doe.gov/pdfs/doe/doetext/neword/413/o4133a.pdf>
- DOE Space Management Requirements
<http://www.er.doe.gov/sc-80/sc-82/spplan.shtml>
- DOE Directive 430.1-1, Chapter 6
<http://www.directives.doe.gov/pdfs/doe/doetext/neword/430/g4301-1chp6.pdf>
- DOE Directive 430.1-1, Chapter 11
<http://www.directives.doe.gov/pdfs/doe/doetext/neword/430/g4301-1chp11.pdf>
- DOE Directive 430.1-1, Chapter 25
<http://www.directives.doe.gov/pdfs/doe/doetext/neword/430/g4301-1chp25.pdf>
- DOE Directive 430.1-X
<http://www.directives.doe.gov/pdfs/doe/doetext/neword/430/g4301-1toc.pdf>
- DOE's OECM Cost Engineering Group
<http://oecm.energy.gov/Default.aspx?tabid=263>

URL List of referenced Fermilab Policies, Procedures and Guidance

- DOE/Fermi Research Associates Contract DE-AC02-07CH11359
http://fra-hq.org/pdfs/FRA_Contract.pdf
- Fermilab Director's Policy Manual
http://www.fnal.gov/directorate/Policy_Manual.html
- Fermilab Environment Safety and Health Manual (FESHM)
<http://www.esh.fnal.gov/FESHM/7000/7010.htm>
- Fermilab Engineering Standards Manual
<http://www.esh.fnal.gov:8001/FESM/>
- FESS/Engineering Policy Manual
<http://fess.fnal.gov/engineering/PolicyManual.pdf>
- FESS/Engineering Procedure Manual
<http://fess.fnal.gov/engineering/FESSProcedureManual.pdf>
- FESS Environmental Review Form Database
<http://fess-oracle-web.fnal.gov:8085/FessEnvironmentalReviewProj-war/home.seam>
- Fermilab Indirect Burden Rates
<http://finance.fnal.gov/Accounting/index.html>

Attachments Contained In This Appendix

- Integrated Project Team Responsibility Matrix
- Environmental Documentation
 - Environmental Engineer/NEPA Compliance Coordinator approval notification
 - DOE FSO NEPA Categorical Exclusion Approval
 - NEPA Environmental Evaluation Notification Form (EENF)
- Sustainable Design/High Performance Building Review Memo
- Whitestone Building and Repair Cost Reference Information
- Fermilab Work Smart Set, Chapter 1070 of FESHM
- Multi-Organization Construction Site Safety Walkthrough Procedure
- Stakeholder Input
 - Comment and Compliance Review Request
 - Stakeholder Comments

INTEGRATED PROJECT TEAM RESPONSIBILITY MATRIX
Office, Technical, and Education Building

WORK PHASE	PROJECT SPONSERS		INTEGRATED PROJECT TEAM								ORGANIZATIONAL PROCESS ASSETS											
	Directorate	Championing Organization	D/S/C	FESS/Engineering	FESS/Engineering	FESS/Engineering	FESS/Engineering	Finance	FESS/Services	OPMO	Business Services Section	Directorate	Business Services Section	Business Services Section	Facilities Engineering Services Section	Facilities Engineering Services Section	Championing Organization	Championing Organization	Facilities Engineering Services Section	ES&H Section	Business Services Section	
	Chief Operating Officer	Division/Section/Center Head	Fermilab Project Director	Fermilab Project Manager	Fermilab Project Coordinator	Fermilab Construction Coordinator	ES&H Coordinator	Grants Manager	Budget Officer	Controls Manager	Procurement	Finance Section Budget Office	Legal	Section Head	Section Head	FESS Engineering Department Head	Directorate	Div. / Sec. TD, PPD, AD, APC	Environmental	Safety and Health	Security	
	B. Chrisman	B. Chrisman R. Kephart	Robert Kephart	Rhonda Merchut	Rhonda Merchut	TBD	Mike Bonkalski	Mary Jo Lyke	Connie Trimby	Bob Aprile	Tom Powers	C. Trimby	TBD	D. Carlson	R. Ortgiesen	E. Crumpley	TBD	TBD	R. Walton	N. Grossman	B. Flaherty	
Project Justification																						
Establish mission need, identify funding	Approve mission need, place in GPP/AIP queue	Establish mission need; appoint Fermilab Project Director	Prepare/submit mission need																		Provide Project Cost Range	
Preliminary Design																						
Establish FESS/Engineering task		Assess D/S/C resource availability	Define project scope	Establish project and task request for Operating Reserve Funds for development of CDR	Develop design costs for each discipline																Determine Fermilab Project Manager	
				Coordinate engineering resources, selection, tasking Review in-house and A/E human resource requirements																		Review engineering task request for Operating Reserve funds
Human Resource Management				Determine need for in-house and A/E human resource requirements Prepare A/E RFP Memo Review A/E proposal Initiate requisition for A/E work	Review A/E RFP Review A/E proposal							Issue A/E RFP Forward A/E to FPM	Assist with contracting								Review workload assignments	
				Enter FERF into tracking database Submit PIF	Develop information for FERF Review PIF							Establish tasking purchase order with A/E			Interface with ES&H Section						Review FERF and determine if PIF is required Develop PIF, if needed	
Develop Project Plan	Preliminary acceptance of aesthetic concerns	Provide D/S/C Resources as required	Coordinate customer team	Establish project design team	Direct design teams effort											Provide FESS Resources as Required	Monitor, Review and Comment					
			Provide project requirements Assist in Developing Project Plan Documents	Interface with customer Develop Project Plan Documents	Interface w/ customer Assist in Developing Project Plan Documents		Assist in Developing Project Plan Documents	Assist in Developing Project Plan Documents	Assist in Developing Project Plan Documents	Assist in Developing Project Plan Documents												
Lab-wide Comment and Compliance Review	Review and Comment	Review and Comment	Review and Comment	Issues CCR, comment resolution	Coordinate CCR, comment resolution							Review and Comment									Review and Comment	
Fermilab Project Request Form	Approve PRF	Approve Fermilab Project Request Form	Submit Fermilab Project Request Form	Draft Fermilab Project Request Form																	Review Submittal and Forward to Finance Section	
	Review Directive Request											Create and Submit Directive Request to DOE										
Project Plan Approval	Accept and Approve Project Plan	Accept and Approve Project Plan	Accept and Approve Project Plan	Submit Project Plan																		
Project Plan Submittal to DOE for Construction Directive Authorization												Submit Construction Directive Authorization										
Project Filing			Monitor Filing	Establish Project File Requirements	Maintain Project Files																Monitor Project Filing	
Final Design																						
Establish Funding Codes				Request Work Package				Assists in establishing codes in accordance w/ State permits	Assist in Developing Work Package Identification	Assist in Developing Work Package Identification											Create Work Package	
Human Resource Management				Determine need for in-house and A/E human resource requirements Prepare A/E RFP Memo Review A/E proposal Initiate requisition for A/E work	Review A/E RFP Review A/E proposal							Issue A/E RFP Forward A/E to FPM	Assist with Contracting								Review workload assignments	
												Establish tasking purchase order with A/E										
Design Coordination Meetings			Participate in Meetings	Participate in Meetings	Coordinate and Lead Meetings		Participate in Meetings	Participate in Meetings	Participate in Meetings	Participate in Meetings												
Design Development				Approve change orders	Interface with Customer and Fermilab organizations																	Issue change orders
				Lead Development of Construction Documents, Drawings, Exhibits																		
Execute Project Plan Exhibit A and Exhibit B				assist in writing Exhibit A	coordinate writing of Exhibit A&B		Assist in writing Exhibit A					assist in writing Exhibit A									provide counsel as requested	
Internal Cost Tracking and Control				Monitor Design Progress and Costs	initiate Design Phase Change Orders (if required)	Review Design Phase Change Orders		assists													provide timely cost data to PM	
				Review and Approve A/E Invoices	Review and Approve A/E Invoices	Review and Approve A/E Invoices						Issue Design Phase Change Orders to A/E firms (if required) Review and Approve A/E Invoices									pay invoices	
Change Control for Design	Secure Additional Funding	Secure Additional Funding	Initiate Changes to Design Performance Baseline	Establish CCB for Design Phase	Prepare Estimates of Cost and Schedule Impacts							Evaluate Change Order schedule impact										
			Secure Additional Funding For Changes	Provide Cost and Schedule Impact of Proposed Changes to Fermilab Project Director																		
Lab-wide Comment and Compliance Review			Review and Comment	Issues CCR, comment resolution	Coordinate CCR, comment resolution							Review and Comment									Review and Comment	
Monitoring and Controlling			Monitor Design Progress	Coordinate Engineering Resources, Selection, Tasking, Invoices	Monitor Design Progress			assists														
			Monitor Project Costs	Monitor Project Costs	Monitor Project Costs																	
Value Management (tailored)				Coordinate and Lead Value Management Exercises	Participate in Value Management	Participate in Value Management	Participate in Value Management	Participate in Value Management	Participate in Value Management	Participate in Value Management												
				Lead Development of Design Phase Cost and Schedule Estimate	Assist in Development of Design Phase Cost and Schedule Estimate							Assist in Development of Design Phase Cost and Schedule Estimate										
Independent Cost Estimate			Concur with Need for Independent Cost Estimate	Determine need for Independent Cost Estimate	Provide Input for Need for Independent Cost Estimate							Provide Input for Need for Independent Cost Estimate										
				Prepare A/E RFP Memo Review A/E proposal Initiate requisition for A/E work	Review A/E RFP Review A/E proposal							Issue A/E RFP Forward A/E to FPM	Assist with Contracting									

LEGEND	
 	Indicates Initiator of Action
 	Indicates Approval Action Required

LIST OF ACRONYMS	
AP	Acquisition Plan
BO	Beneficial Occupancy
CCB	change control board
A/E	Architectural Engineering Consultant
PIF	Project Information Form (NEPA)
PEP	Project Execution Plan
CDR	Conceptual Design Report
FPM	Fermilab Project Manager
D/S/C	divisions/sections/research centers
PO	Purchase Order
RFP	Request for Proposal
FERF	FESS Environmental Review Form
COO	Chief Operating Officer
SET	Source Evaluation Team

INTEGRATED PROJECT TEAM RESPONSIBILITY MATRIX
Office, Technical, and Education Building

WORK PHASE	PROJECT SPONSERS		INTEGRATED PROJECT TEAM									ORGANIZATIONAL PROCESS ASSETS									
	Directorate	Championing Organization	D/S/C	FESS/Engineering	FESS/Engineering	FESS/Engineering	FESS/Engineering	Finance	FESS/Services	OPMO	Business Services Section	Directorate	Business Services Section	Business Services Section	Facilities Engineering Services Section	Facilities Engineering Services Section	Championing Organization	Championing Organization	Facilities Engineering Services Section	ES&H Section	Business Services Section
	Chief Operating Officer	Division/Section/Center Head	Fermitlab Project Director	Fermitlab Project Manager	Fermitlab Project Coordinator	Fermitlab Construction Coordinator	ES&H Coordinator	Grants Manager	Budget Officer	Controls Manager	Procurement	Finance Section Budget Office	Legal	Section Head	Section Head	FESS Engineering Department Head	Directorate	Div. / Sec. TD, PPD, AD, APC	Environmental	Safety and Health	Security
	B. Chrisman	B. Chrisman R. Kephart	Robert Kephart	Rhonda Merchut	Rhonda Merchut	TBD	Mike Bonkalski	Mary Jo Lyke	Connie Trimby	Bob Aprile	Tom Powers	C. Trimby	TBD	D. Carlson	R. Ortgiesen	E. Crumpley	TBD	TBD	R. Walton	N. Grossman	B. Flaherty
Design Phase Submittals				Prepare Signature Sheet for Release of Design Phase Documents																	
			Approve Release of Design Phase Documents	Approve Release of Design Phase Documents	Approve Release of Design Phase Documents		Approve Release of Design Phase Documents	Approve Release of Design Phase Documents	Approve Release of Design Phase Documents						Approve Release of Design Phase Documents	Approve Release of Design Phase Documents					
Request For Proposal			Review Request For Proposal Documents	Review Request For Proposal Documents								Develop Request For Proposal Documents									
Regulatory Permits				Provide Permit Information	Provide Permit Information								Provide Counsel as Requested				Identify Required Permits		Identify Required Permits		
			Approval Permit Submittal	Approval Permit Submittal											Approve Permit Submittal				Prepare Permit Application	Submit Application to ES&H Section	
Update Project Plan			Identify Changes to Project Plan	Identify Changes to Project Plan	Identify Changes to Project Plan		Identify Changes to Project Plan	Identify Changes to Project Plan	Identify Changes to Project Plan	Identify Changes to Project Plan					Identify Changes to Project Plan	Identify Changes to Project Plan			Identify Changes to Project Plan		
			Approve Changes to Project Plan	Approve Changes to Project Plan																	
Project Reporting				Monitor Design Progress and Costs								Initiate Request for Quarterly State Reports									
				Prepare Quarterly State Progress Reports				Prepare Quarterly State Financial Reports	Assist Prepare Quarterly State Reports	Assist Prepare Quarterly State Reports				Provide Timely Cost Data to FPM				Review Quarterly State Reports		Review Quarterly GPP Reports	
			Review Quarterly State Reports									Review Quarterly State Reports							Forward Quarterly GPP Reports to Finance Section		
Directive Modifications		Review and Approve Directive Modification Request Form	Review and Approve Directive Modification Request Form	Prepare Directive Modification Request Form															Review and Approve Directive Modification Request Form		
																			Submit Directive Modification Request Form to Finance Section		
		Review and Approve Directive Modification Request Form										Review Directive Modification Request Form									
												Forward Directive Modification Form to DCF									
Project Filing			Monitor Filing	Establish Project File Requirements	Maintain Project Files														Monitor Project Filing		
Procurement																					
Issue Request For Proposal				Initiate Construction Requisition									Issue Request For Proposal								
	Approve Requisition	Approve Requisition	Approve Requisition												Approve Requisition	Approve Requisition			Approve Requisition		
Pre-Proposal Meeting (if required)				Determine Necessity for Pre-Proposal Meeting									Coordinate and Chair Pre-Proposal Meeting								
			Participate in Pre-Proposal Meeting	Participate in Pre-Proposal Meeting	Participate in Pre-Proposal Meeting															Participate in Pre-Proposal Meeting	
Requests For Information			Monitors RFI Process	Concurs with Replies for RFIs	Coordinates RFIs	Prepares Replies For RFIs													Monitors RFI Process		
Amendments			Monitors Amendment Process	Concurs with Need for Amendment to RFP		Assemble Amendment Documentation							Determines Need for Amendment to RFP						Monitors Amendment Process		
													Issues Amendment to RFP								
Proposal Evaluations			Participate in Source Evaluation Team	Evaluate Corporate Quality Control Plan	Participate in Source Evaluation Team								Participate in Source Evaluation Team	Provide Counsel as Requested					Monitor Source Evaluation Team Process		evaluate safety submittals
				Evaluate Schedule Submittal									Review Proposals for Business Related Issues								
				Forward Recommendation to Source Selection Officer									Conduct Negotiations	Provide Counsel as Requested							
Negotiations				Assist in Negotiations																	
Subcontract Award				Initiate Recommendation To Award																	Review and Accept Safety Documentation
				Approve Award	Approve Award							Award Subcontract		Provide Counsel as Requested							
Update Project Plan For Construction Phase			Identify Changes to Project Plan	Identify Changes to Project Plan	Identify Changes to Project Plan										Identify Changes to Project Plan	Identify Changes to Project Plan			Identify Changes to Project Plan		
				Update Project Plan																	
			Approve Changes to Project Plan	Approve Changes to Project Plan																	
Project Filing			Monitor Filing	Establish Project File Requirements	Maintain Project Files														Monitor Project Filing		
Construction																					
Pre-Construction Meeting				Determine Necessity for Pre-Construction Meeting									Coordinate and Chair Pre-Construction Meeting								
			Participate in Pre-Construction Meeting	Participate in Pre-Construction Meeting	Participate in Pre-Construction Meeting	Participate in Pre-Construction Meeting														Participate in Pre-Construction Meeting	Participate in Pre-Construction Meeting
Subcontractor Corporate Safety Plan				Review Submittals																	Review/Approve Safety and Health Submittals
				Accept Subcontractor Corporate Safety Plan																	
Subcontractor Quality Control Plan				Review Subcontractor Plan	Review Subcontractor Plan	Review Subcontractor Plan															
				Accept Subcontractor Quality Control Plan																	
Storm Water Erosion Control Plan				Review Plan	Review Plan	Review Plan															Review/Approve Environmental Submittals

LEGEND	
 	Indicates Initiator of Action
 	Indicates Approval Action Required

LIST OF ACRONYMS	
AP	Acquisition Plan
BO	Beneficial Occupancy
CCB	change control board
AE	Architectural Engineering Consultant
PIF	Project Information Form (NEPA)
PEP	Project Execution Plan
CDR	Conceptual Design Report
FPM	Fermitlab Project Manager
D/S/C	divisions/sections/research centers
PO	Purchase Order
RFP	Request for Proposal
FERF	FESS Environmental Review Form
COO	Chief Operating Officer
SET	Source Evaluation Team

INTEGRATED PROJECT TEAM RESPONSIBILITY MATRIX
Office, Technical, and Education Building

WORK PHASE	PROJECT SPONSERS		INTEGRATED PROJECT TEAM								ORGANIZATIONAL PROCESS ASSETS										
	Directorate	Championing Organization	D/S/C	FESS/Engineering	FESS/Engineering	FESS/Engineering	FESS/Engineering	Finance	FESS/Services	OPMO	Business Services Section	Directorate	Business Services Section	Business Services Section	Facilities Engineering Services Section	Facilities Engineering Services Section	Championing Organization	Championing Organization	Facilities Engineering Services Section	ES&H Section	Business Services Section
	Chief Operating Officer	Division/Section/Center Head	Fermilab Project Director	Fermilab Project Manager	Fermilab Project Coordinator	Fermilab Construction Coordinator	ES&H Coordinator	Grants Manager	Budget Officer	Controls Manager	Procurement	Finance Section Budget Office	Legal	Section Head	Section Head	FESS Engineering Department Head	Directorate	Div. / Sec. TD, PPD, AD, APC	Environmental	Safety and Health	Security
	B. Chrisman	B. Chrisman R. Kephart	Robert Kephart	Rhonda Merchut	Rhonda Merchut	TBD	Mike Bonkalski	Mary Jo Lyke	Connee Trimby	Bob Aprile	Tom Powers	C. Trimby	TBD	D. Carlson	R. Ortgiesen	E. Crumpley	TBD	TBD	R. Walton	N. Grossman	B. Flaherty
Final Acceptance			Approve Beneficial Occupancy	Approve Beneficial Occupancy	Transmit Beneficial Occupancy to Subcontractor	Initiate Beneficial Occupancy Form						Approve Beneficial Occupancy				Approve Beneficial Occupancy	Approve Beneficial Occupancy				
Update Project Plan			Approve Final Acceptance	Approve Final Acceptance	Transmit Final Acceptance to Subcontractor	Initiate Final Acceptance Form						Approve Final Acceptance				Approve Final Acceptance	Approve Final Acceptance				
Identify Changes to Project Plan			Identify Changes to Project Plan	Identify Changes to Project Plan	Identify Changes to Project Plan	Identify Changes to Project Plan										Identify Changes to Project Plan	Identify Changes to Project Plan			Identify Changes to Project Plan	
Approve Changes to Project Plan			Approve Changes to Project Plan	Approve Changes to Project Plan	Approve Changes to Project Plan	Approve Changes to Project Plan															
Incident Investigations			Monitor Incident Response	Issue Incident Report, Monitor Response		Initiate Call Tree Obtain Incident Report from Subcontractor Prepare Incident Report for FPM										Assist as Required	Assist as Required	Assist as Required	Assist as Required	Assist as Required	Assist as Required
Lessons Learned			Assist as Required	Assist as Required	Assist as Required	Assist as Required										Develop Lessons Learned					
Environment, Safety and Health Compliance	Monitor Compliance	Monitor Compliance	Monitor Compliance	Monitor Compliance	Interface with Subcontractor	Assist as Requested	Assure Subcontractor Compliance				Monitor Compliance					Monitor Compliance	Monitor Compliance		assist on technical issues	Monitor Compliance	Monitor Compliance
As-Built Documentation			Assist as Requested	Assist as Requested	Assure As-builts Kept Current and Accurate															Assist as Requested	
Directive Modifications		Review and Approve Directive Modification Request Form	Review and Approve Directive Modification Request Form	Prepare Directive Modification Request Form								Review Directive Modification Request Form								Review and Approve Directive Modification Request Form	
Review and Approve Directive Modification Request Form																				Submit Directive Modification Request Form to Finance Section	
Forward Directive Modification Form to DOE																					
Project Filing			Monitor Filing	Establish Project File Requirements	Maintain Project Files																Monitor Project Filing
Close-out																					
Subcontractor Performance Review			Participate in Review	Participate in Review		Participate in Review						Coordinate and Lead Review									Participate in Review
Final Payment and Retention Release				Review and Approve Subcontractor Invoices	Review and Approve Subcontractor Invoices	Review and Approve Subcontractor Invoices	Assist as Required	Assist as Required	Assist as Required	Assist as Required	Assist as Required	Review and Approve Subcontractor Invoices									
Move Outstanding Issues to Warranty				Assist as Required	Assist as Required	Assist as Required	Assist as Required	Assist as Required	Assist as Required	Assist as Required	Assist as Required										
Level 1 Budget Close	Approve Budget Close	Approve Budget Close		Determine Close Date							Assist as Required	Assist as Required	Activate Level 1 Budget Close		Assure All Commitments in Place					Request Budget Close	
Notice of Project Closeout	Approve Closeout	Approve Closeout																		Submit Project Closeout Request	
Final Budget Close													Activate Final Budget Close							Initiate Final Close	
Directive Modifications		Review and Approve Directive Modification Request Form	Review and Approve Directive Modification Request Form	Prepare Directive Modification Request Form																Review and Approve Directive Modification Request Form	
Review and Approve Directive Modification Request Form																				Submit Directive Modification Request Form to Finance Section	
Forward Directive Modification Form to DOE																					
State Filing				Prepares State final Progress Report							Prepares State final financial Report										
Project Filing			Monitor Filing	Establish Project File Requirements	Maintain Project Files																Monitor Project Filing

LEGEND	
 	Indicates Initiator of Action
 	Indicates Approval Action Required

LIST OF ACRONYMS	
AP	Acquisition Plan
BO	Beneficial Occupancy
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D/S/C	divisions/sections/research centers
PO	Purchase Order
RFP	Request for Proposal
FERF	FESS Environmental Review Form
COO	Chief Operating Officer
SET	Source Evaluation Team

From: [Teri L Dykhuis](#)
To: [Robert D Kephart](#); [Rhonda B. Merchut](#); [Randy Ortgiesen](#); [Rodney Walton](#); [Dave Baird Jr](#); [Don Cossairt](#); [Nancy L Grossman](#); ["Michael A Lindgren"](#); [Gary M Leonard](#); [Eric D Mieland](#); [Martha Michels](#); [Eric D McHugh](#); [John P Cassidy](#); [Timothy M. Miller](#); [Brian C Svazas](#); [Stephen D Holmes](#); [Edward F Crumpley](#); ["Angela M Sands"](#)
Subject: ESH-doc-1166-v1: Illinois Accelerator Research Center DOE Approval of NEPA CX
Date: Wednesday, July 07, 2010 2:29:37 PM
Attachments: [IARC DOE NEPA Approval.pdf](#)

Please find attached a scanned copy (and below the URL in the ESH Docdb) of the DOE FSO NEPA CX Approval for the Illinois Accelerator Research Center (IARC) along with the signed Environmental Evaluation Notification Form and two simulated drawings of the proposed building. In order to minimize paper waste, you will only receive this electronic notification. Please forward to those in your organization who are not on the distribution but may be interested.

Cordially,
Teri

Teri Dykhuis, MEnvE, CHMM
Environmental Engineer/NEPA Compliance Coordinator
Environment, Safety, and Health Section of
Fermi National Accelerator Lab which is managed by
Fermi Research Alliance for the
Office of Science/U.S. Department of Energy
(630) 840-3607 (Office)
(630) 840-3390 (FAX)
dykhuis@fnal.gov

-----Original Message-----

From: ESH DocDB Document Database [mailto:esh-docdb@fnal.gov]
Sent: Wednesday, July 07, 2010 2:19 PM
To: Nancy L Grossman; Teri L Dykhuis
Subject: ESH-doc-1166-v1: Illinois Accelerator Research Center DOE Approval of NEPA CX

The following document was added to the ESH DocDB Document Database:

Title: Illinois Accelerator Research Center DOE Approval of NEPA CX
Document ID: ESH-doc-1166-v1
URL: <https://esh-docdb.fnal.gov:440/cgi-bin/ShowDocument?docid=1166>
Date: 2010-07-07 14:19:19
Submitted by: Teri Dykhuis
Authors: Teri Dykhuis
Topics: Environmental Protection Subcommittee, Facility Engineering Services Section, Fermilab, NEPA, Other
Keywords: DOE FSO NEPA CX Illinois Accelerator Research Center (IARC)
Abstract: Approval by the Department of Energy (DOE) Fermi Site Office (FSO) of the National Environmental Policy Act (NEPA) Categorical Exclusion (CX) for the proposed Illinois Accelerator Research Center (IARC).



Department of Energy

Fermi Site Office
Post Office Box 2000
Batavia, Illinois 60510

Rec'd
7/6/10
MK

JUL 02 2010

Dr. Bruce Chrisman
Chief Operating Officer
Fermilab
P.O. Box 500
Batavia, IL 60510

Dear Dr. Chrisman:

SUBJECT: NATIONAL ENVIRONMENTAL POLICY ACT (NEPA) DETERMINATION AT FERMILAB NATIONAL ACCELERATOR LABORATORY (FERMILAB) FOR THE ILLINOIS ACCELERATOR RESEARCH CENTER (IARC)

Reference: Letter, B. Chrisman to M. Bollinger, dated June 29, 2010, Subject: National Environmental Policy Act (NEPA) Environmental Evaluation Notification Form (EENF) for the Illinois Accelerator Research Center (IARC)

I have reviewed the Fermilab EENF for the IARC. Based on the information provided in the EENF, I have approved the following categorical exclusion (CX):

<u>Project Name</u>	<u>Approved</u>	<u>CX(s)</u>
Illinois Accelerator Research Center (IARC)	7/1//2010	B1.15

I am returning a signed copy of the EENF for your records. No further NEPA review is required. This project falls under a categorical exclusion provided in 10 CFR 1021, as amended in November 1997.

Sincerely,

Mark E. Bollinger, Acting
Site Manager

Enclosure:
As Stated

cc: P. Oddone, w/o encl.
Y. - K. Kim, w/o encl.
N. Grossman, w/o encl.
T. Dykhuis, w/encl.

FERMILAB ENVIRONMENTAL EVALUATION NOTIFICATION FORM

Project/Activity Title: Illinois Accelerator Research Center
ES&H Tracking Number: 01086
Funding Source: State Grant + Supplemental DOE Funds
Fermilab Environmental Officer (submitted PIF): Rod Walton (X2565)
Fermilab Project Engineer: Rhonda Merchut (X4599)
Fermilab Project Lead: Robert Kephart (X3135)

I hereby certify via my signature that every effort would be made throughout this project to comply with the commitments made in this document and to pursue cost-effective pollution prevention opportunities. Pollution prevention (source reduction and other practices that eliminate or reduce the creation of pollutants) is recognized as a good business practice which would enhance site operations thereby enabling Fermilab to accomplish its mission, achieve environmental compliance, reduce risks to health and the environment, and prevent or minimize future DOE legacy wastes.

Fermilab Project Lead: Robert Kephart

Signature



Date

June 29, 2010

Fermilab NEPA Reviewer: Teri L. Dykhuis

Signature



Date

6/29/2010

I. Description of the Proposed Action and Need

Purpose and Need:

The purpose of the Illinois Accelerator Research Center (IARC) at Fermi National Accelerator Laboratory is to provide a center of excellence for accelerator research and development. IARC would provide a focal point for accelerator research, education, and industrialization and initiate/promote/support related industry in Illinois. IARC would bring together scientists and engineers from Fermilab, Argonne National Lab, Illinois universities, and industry partners with the goal of encouraging development of accelerator based industry and accelerator projects in Illinois. IARC would help to increase the probability that new accelerator projects like Project X are sited at Fermilab and the work at IARC would serve to promote Fermilab as the leading accelerator laboratory acting as a steward of 'accelerator development' within the Office of Science in the Department of Energy. In partnership with industry and local university accelerator programs, IARC would make critical contributions to the technological and economic health of Illinois and provide unique educational opportunities for a new generation of Illinois engineers and scientists. In order to fulfill this purpose a new building is proposed for construction to serve as a physical focal point for these engineers and scientists.

Proposed Action:

The project would utilize conventional construction methods to erect a building adjacent to and extending north and west of the existing Fermilab Collider Detector Facility Building and associated parking would be constructed adjacent to this new building. The approximately 40,000 square foot IARC building would provide a mixture of office, specialized technical, and educational (OTE) space for use by Fermilab, Argonne and other national lab scientists and engineers; university researchers;

educators; and collaborating industry partners. The space would be used for the study, research, development, and application of cutting edge accelerator technologies.

Several alternative Fermilab locations and building configuration were studied; however, all had similar potential impacts. Therefore, the preferred alternative site was chosen based on other factors. The 'no action' alternative would not achieve the stated purpose.

II. Description of the Affected Environment

The gross area of the proposed building would be approximately 40,000 square feet and the building footprint would be roughly 14,000 square feet; in addition, the adjacent parking would take up approximately 35,000 square feet. The building would be connected to existing utilities in the area.

III. Potential Environmental Effects (Provide comments for each checked item and where clarification is necessary.)

A. Sensitive Resources: Would the proposed action result in changes and/or disturbances to any of the following resources?

- Threatened or endangered species
- Other protected species
- Wetland/Floodplains
- Archaeological or historical resources
- Non-attainment areas

B. Regulated Substances/Activities: Would the proposed action involve any of the following regulated substances or activities?

- Clearing or Excavation
- Demolition or decommissioning
- Asbestos removal
- PCBs
- Chemical use or storage
- Pesticides
- Air emissions
- Liquid effluents
- Underground storage tanks
- Hazardous or other regulated waste (including radioactive or mixed)
- Radioactive exposures or radioactive emissions
- Radioactivation of soil or groundwater

C. Other relevant Disclosures

- Threatened violation of ES&H permit requirements
- Siting/construction/major modification of waste recovery or TSD facilities
- Disturbance of pre-existing contamination
- New or modified permits
- Public controversy
- Action/involvement of another federal agency
- Public utilities/services
- Depletion of a non-renewable resource

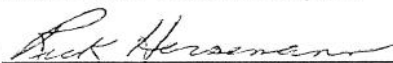
IV. NEPA Recommendation

Fermilab staff have reviewed this proposed action and concluded that the appropriate level of NEPA determination is a Categorical Exclusion. The conclusion is based on the proposed action meeting the applicable requirements in DOE's NEPA Implementation Procedures, 10 CFR 1021, Subpart D, Appendix B1.15 which states: "Siting, construction, (or modification), and operation of support structures (including but not limited to, trailers and prefabricated buildings within or contiguous to an already developed area (where active utilities and currently used roads are readily accessible). Covered support buildings and structures include those for office purposes: parking; cafeteria services; education and training; visitor reception; computer and data processing services; employee health services or recreation activities; routing maintenance activities; storage of supplies and equipment for administrative services and routine maintenance activities; security (including security posts); fire protection; and similar support purposes, but excluding facilities for waste storage activities; except as provided in other parts of this appendix."

V. DOE/CH-FAO NEPA Coordinator Review

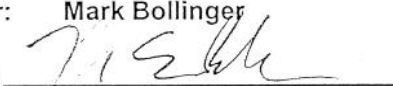
Concurrence with the recommendation for determination:

NEPA Coordinator Reviewer, U.S. DOE FSO: Rick Hersemann

Signature 

Date 6/30/10

Acting Fermi Site Office Manager: Mark Bollinger

Signature 

Date 7/2/2010

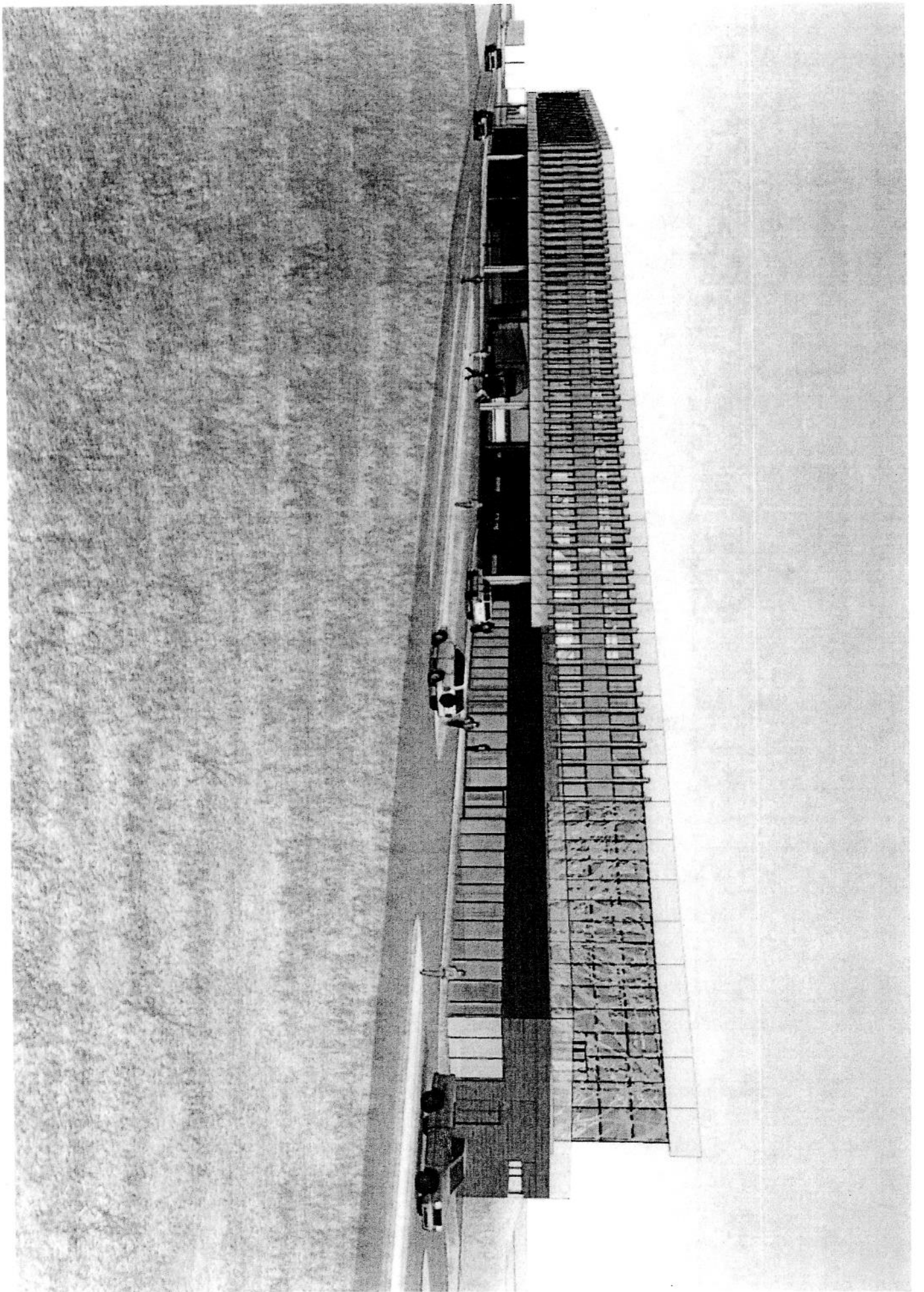
VI. Comments on checked items in section III

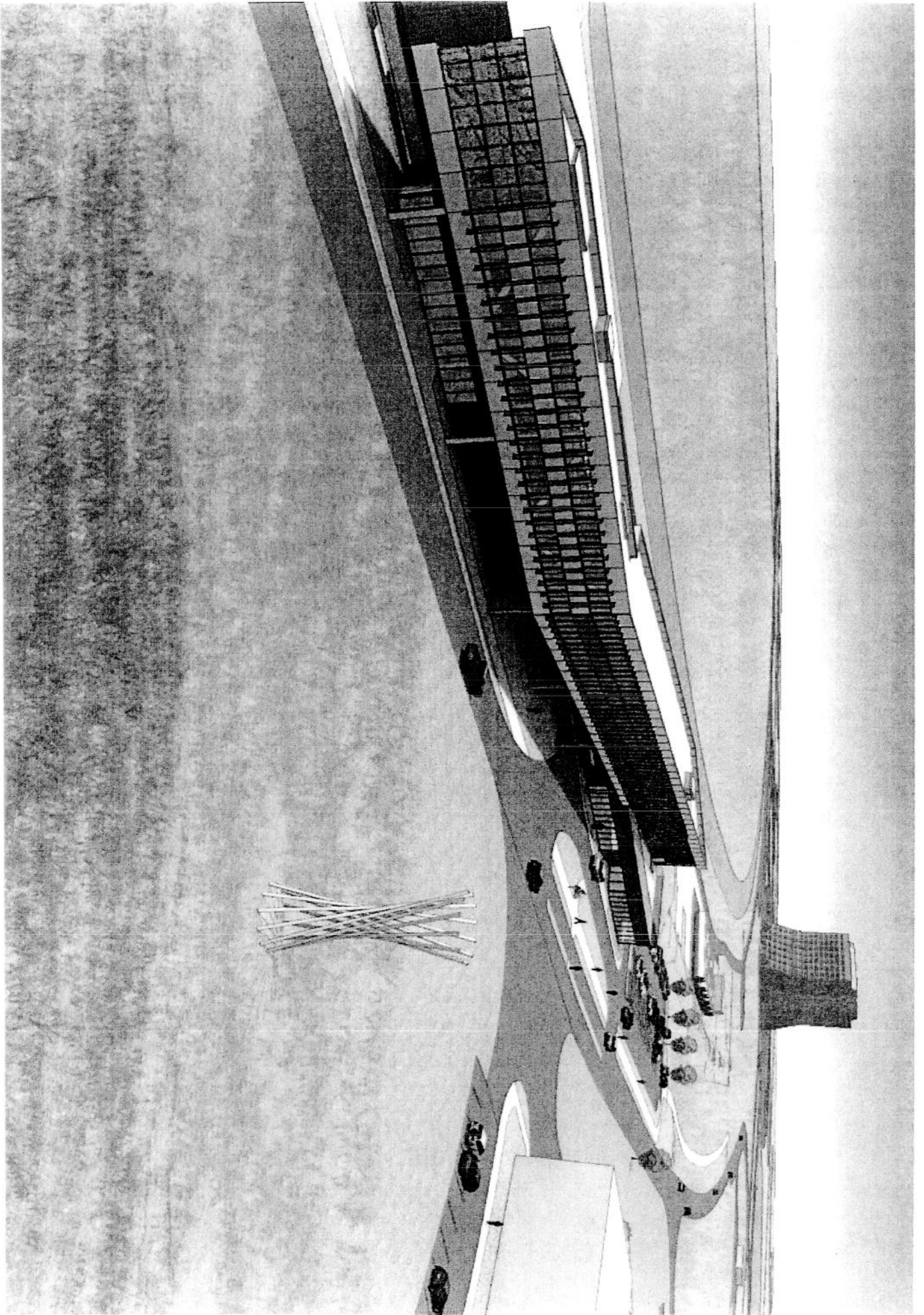
Clearing or Excavation

The footprint of the building would be approximately 14,000 square feet. Poor soils in the area would necessitate the excavation of approximately 60,000 cubic feet of soil for the footings and foundation and an additional 35,000 square feet would be excavated for parking and driveways. All of this area is previously disturbed. Suitable excess soil would be stockpiled on the site for reuse in re-grading the parking lot; unsuitable excess soil (approximately 2300 cubic yards) would be removed from the site for proper disposal. Silt fencing would be installed around the limits of construction to control erosion.

Liquid Effluents

The total area of excavation would be approximately 2 acres and therefore a Notice of Intent would be completed and filed with the Illinois Environmental Protection Agency for coverage under the National Pollutant Discharge Elimination System General Permit for Construction Activities. As a condition of this permit, a Storm Water Pollution Prevention Plan would be prepared and maintained for the project. Bullrush Pond, to the west of "C" Road, would continue to receive surface water run-off.





Applicant: Fermi Research Alliance
Contact: Rod Walton
Address: PO Box 500
Batavia, IL 60510

IDNR Project #: 1010629
Date: 06/23/2010

Project: The Illinois Accelerator Research Center
Address: Road D, Fermilab, Batavia

Description: New building

Natural Resource Review Results

Consultation for Endangered Species Protection and Natural Areas Preservation (Part 1075)

The Illinois Natural Heritage Database shows the following protected resources may be in the vicinity of the project location:

Fermilab INAI Site
Black-Crowned Night Heron (*Nycticorax nycticorax*)
Upland Sandpiper (*Bartramia longicauda*)

Wetland Review (Part 1090)

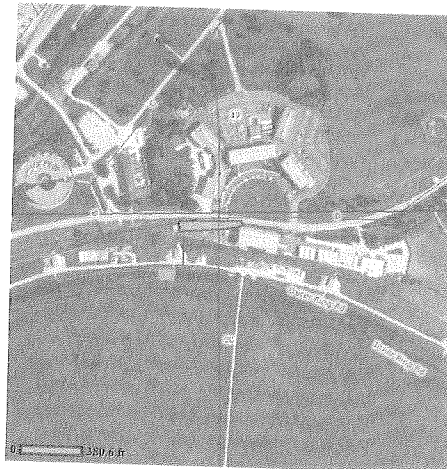
The National Wetlands Inventory does not show wetlands within 250 feet of the project location.

An IDNR staff member will evaluate this information and contact you within 30 days to request additional information or to terminate consultation if adverse effects are unlikely.

Location

The applicant is responsible for the accuracy of the location submitted for the project.

County: DuPage
Township, Range, Section:
39N, 9E, 30



IL Department of Natural Resources Contact

Michael Branham
217-785-5500
Division of Ecosystems & Environment

Local or State Government Jurisdiction

IL Department of Commerce and Economic Opportunity
Mary Feagans
620 East Adams ST
Springfield, Illinois 62701-1615

Disclaimer

The Illinois Natural Heritage Database cannot provide a conclusive statement on the presence, absence, or condition of natural resources in Illinois. This review reflects the information existing in the Database at the time of this inquiry, and should not be regarded as a final statement on the site being considered, nor should it be a substitute for detailed site surveys or field surveys required for environmental assessments. If additional protected resources are encountered during the project's implementation, compliance with applicable statutes and regulations is required.

Terms of Use

By using this website, you acknowledge that you have read and agree to these terms. These terms may be revised by IDNR as necessary. If you continue to use the EcoCAT application after we post changes to these terms, it will mean that you accept such changes. If at any time you do not accept the Terms of Use, you may not continue to use the website.

1. The IDNR EcoCAT website was developed so that units of local government, state agencies and the public could request information or begin natural resource consultations on-line for the Illinois Endangered Species Protection Act, Illinois Natural Areas Preservation Act, and Illinois Interagency Wetland Policy Act. EcoCAT uses databases, Geographic Information System mapping, and a set of programmed decision rules to determine if proposed actions are in the vicinity of protected natural resources. By indicating your agreement to the Terms of Use for this application, you warrant that you will not use this web site for any other purpose.
2. Unauthorized attempts to upload, download, or change information on this website are strictly prohibited and may be punishable under the Computer Fraud and Abuse Act of 1986 and/or the National Information Infrastructure Protection Act.
3. IDNR reserves the right to enhance, modify, alter, or suspend the website at any time without notice, or to terminate or restrict access.

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EcoCAT operates on a state of Illinois computer system. We may use software to monitor traffic and to identify unauthorized attempts to upload, download, or change information, to cause harm or otherwise to damage this site. Unauthorized attempts to upload, download, or change information on this server is strictly prohibited by law. Unauthorized use, tampering with or modification of this system, including supporting hardware or software, may subject the violator to criminal and civil penalties. In the event of unauthorized intrusion, all relevant information regarding possible violation of law may be provided to law enforcement officials.

Privacy

EcoCAT generates a public record subject to disclosure under the Freedom of Information Act. Otherwise, IDNR uses the information submitted to EcoCAT solely for internal tracking purposes.

Illinois Accelerator Research Center (IARC)
Office, Technical and Education Building



LEED 2009 for New Construction and Major Renovation
 Project Checklist

Project Name _____
 Date _____

10 4 12 Sustainable Sites Possible Points: 26

Y	N	?			
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

8 2 Water Efficiency Possible Points: 10

Y	N	?			
Y			Prereq 1	Water Use Reduction—20% Reduction	
4			Credit 1	Water Efficient Landscaping	2 to 4
		2	Credit 2	Innovative Wastewater Technologies	2
4			Credit 3	Water Use Reduction	2 to 4

21 8 6 Energy and Atmosphere Possible Points: 35

Y	N	?			
Y			Prereq 1	Fundamental Commissioning of Building Energy Systems	
Y			Prereq 2	Minimum Energy Performance	
Y			Prereq 3	Fundamental Refrigerant Management	
15	3	1	Credit 1	Optimize Energy Performance	1 to 19
	2	5	Credit 2	On-Site Renewable Energy	1 to 7
2			Credit 3	Enhanced Commissioning	2
2			Credit 4	Enhanced Refrigerant Management	2
2	1		Credit 5	Measurement and Verification	3
	2		Credit 6	Green Power	2

7 3 4 Materials and Resources Possible Points: 14

Y	N	?			
Y			Prereq 1	Storage and Collection of Recyclables	
		3	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
	2		Credit 3	Materials Reuse	1 to 2

Materials and Resources, Continued

Y	N	?			
2			Credit 4	Recycled Content	1 to 2
2			Credit 5	Regional Materials	1 to 2
		1	Credit 6	Rapidly Renewable Materials	1
1			Credit 7	Certified Wood	1

14 1 Indoor Environmental Quality Possible Points: 15

Y	N	?			
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

Y	N	?			
		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

4 Regional Priority Credits Possible Points: 4

Y	N	?			
		1	Credit 1.1	Regional Priority: Specific Credit	1
		1	Credit 1.2	Regional Priority: Specific Credit	1
		1	Credit 1.3	Regional Priority: Specific Credit	1
		1	Credit 1.4	Regional Priority: Specific Credit	1

61 27 22 Total Possible Points: 110

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

High Performance and Sustainable Buildings Guiding Principles Building Information and Project Team Page



Building Information	Federal Real Property Building ID	
	Building Name	Office, Technical and Education Building
	Agency/Site	Fermi National Acceleratory Laboratory
	PSO	
	Department	Department of Energy
	Address	Pine and Kirk
	City	Batavia
	State	Illinois
	Zip Code	60510

*Information entered above will auto-populate the appropriate fields on subsequent tabs

		Name	Phone	Email
Project Team	Main Contact:	Michael A. Ross	312-832-0600	mar@r-barc.com
	Project Team Members:	Kim Patten	312-832-0600	kap@r-barc.com
		Matthew Breidenthal	312 849 5616	Matt.Breidenthal@arup.com
		Kim Patten	312-832-0600	kap@r-barc.com
		Misa Inoue	312-832-0600	
		Robert L. Tazelaar	312 849 5617	Robert.Tazelaar@arup.com

Project Lead Signature:		Date:	
--------------------------------	--	--------------	--



PRELIMINARY

High Performance Sustainable Buildings Compliance Summary Checklist for New Construction

Building Name: Office, Technical and Education Building

This field will populate as the Guiding Principles are marked complete and documented.

% Guiding Principles Complete

88.2%

Federal Real Property ID:

* For a detailed explanation of each Guiding Principle and required actions please refer to the corresponding Compliance Tab

Guiding Principle	Action Required	Yes/No	Suggested Compliance Verification Documents	On File?	Notes
1. Employ Integrated Design Principles					
Integrated design	Use a collaborative, integrated planning and design process that: Initiates and maintains an integrated project team as described on the Whole Building Design Guide in all stages of a project's planning and delivery, http://www.wbdg.org/design/engage_process.php	Yes	Complete the Building Information Tab or equivalent document, e.g., a team roster. Follow the DOE. O. 430.2B and 450.1A.	<input checked="" type="checkbox"/>	Completed the Building Information Tab
	Integrates the use of OMB's A-11, Section 7, Exhibit 300: Capital Asset Plan and Business Case Summary	Yes	Provide documentation and use this checklist or equivalent (USGBC LEED) to demonstrate incorporation. The establishment of 413.3A, 430.2B and 450.1A meet the goal setting requirement.	<input checked="" type="checkbox"/>	Goal setting was part of the Project Definition Plan and Concept Design Report. A USGBC LEED Checklist has been filled out and updated as necessary. The project is register with USGBC LEED On-Line.
	Establishes performance goals for siting, energy, water, materials and indoor environmental quality along with other comprehensive design goals and ensures incorporation of these goals throughout the design and lifecycle of the building	Yes	The establishment of 430.2B and 450.1A meet the goal setting requirement. Use this checklist or equivalent (USGBC LEED) to demonstrate incorporation.	<input checked="" type="checkbox"/>	See comment above.
	Considers all stages of the building's lifecycle, including deconstruction.	Yes	The establishment of 430.2B and 450.1A meet the goal setting requirement. Use this checklist or equivalent (USGBC LEED) to demonstrate incorporation.	<input checked="" type="checkbox"/>	See comment above.
Commissioning	Employ commissioning practices tailored to the size and complexity of the building and its system components in order to verify performance of building components and systems and help ensure that design requirements are met. This should include an experienced commissioning provider, inclusion of commissioning requirements in construction documents, a commissioning plan, verification of the installation and performance of systems to be commissioned, and a commissioning report.	Yes	Provide a commissioning plan. In-house experienced personnel or team acceptable. (may provide compliance for GP IV. Enhance Indoor Environmental Quality: Moisture Control.)	<input checked="" type="checkbox"/>	The A/E team shall provide the Fundamental Commissioning per LEED requirements
2. Optimize Energy Performance					
Energy Efficiency	Establish a whole building performance target that takes into account the intended use, occupancy, operations, plug loads, other energy demands, and design to earn the ENERGY STAR® targets for new construction and major renovation where applicable. For new construction, reduce the energy use by 30 percent compared to the baseline building performance rating per the American National Standards Institute (ANSI)/American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., (ASHRAE)/Illuminating Engineering Society of North America (IESNA) Standard 90.1-2007, Energy Standard for Buildings Except Low-Rise Residential. For major renovations, reduce the energy use by 20 percent below pre-renovations 2003 baseline. Laboratory spaces may use the Labs21 Laboratory Modeling Guidelines.	Yes	Have a licensed engineer or architect provide documents that identify that the energy use targets were achieved or provide USGBC LEED submittal documentation also stating that the goals were achieved.	<input checked="" type="checkbox"/>	Energy modeling has been performed by a licensed engineer showing a 30% savings above the ASHRAE baseline model.
	Use ENERGY STAR® and FEMP-designated Energy Efficient Products, where available?	Yes	Provide standard purchasing policy/policies, constructions specifications, or retain proof of purchase.	<input checked="" type="checkbox"/>	The project shall use Energy Star designated products.

Guiding Principle	Action Required	Yes/No	Suggested Compliance Verification Documents	On File?	Notes
On-Site Renewable Energy	Per the Energy Independence and Security Act (EISA) Section 523, meet at least 30% of the hot water demand through the installation of solar hot water heaters, when lifecycle cost effective.		Implement on-site solar hot water heating and retain design specs, statement of work, or photos, etc. If not lifecycle cost effective provide justification.	<input checked="" type="checkbox"/>	The building design incorporates two (2) solar water heating systems that shall provide at least 30% of the hot water demand for the building. See drawing sheer CDR-40.
	Per Executive Order 13423, implement renewable energy generation projects on agency property for agency use, when lifecycle cost effective.		Any of the following or equivalent: design specs, statement of work, photos, etc. If not lifecycle cost effective provide justification.	<input checked="" type="checkbox"/>	The project includes an allowance of \$850,000.00 for on-site renewable energy with photovoltaic panels either as part of the roofing system or shading the parking lot. A wind turbine is also under consideration.
Measurement and Verification	Per the Energy Policy Act of 2005 (EPA) Section 103, install building level electricity meters in new major construction and renovation projects to track and continuously optimize performance.		Retain statement of work, billing records, photos, etc and/or provide ENERGY STAR® label certification if applicable.	<input checked="" type="checkbox"/>	Meters to record the electricity use of the building are part of the project.
	Per EISA Section 434, include equivalent meters for natural gas and steam, where natural gas and steam are used.		Retain statement of work, billing records, photos, etc and/or provide ENERGY STAR® label certification if applicable.	<input checked="" type="checkbox"/>	Meters to record the natural gas use of the building are part of the project.
Benchmarking	Compare actual performance data from the first year of operation with the energy design target, preferably by using ENERGY STAR® Portfolio Manager for building and space types covered by ENERGY STAR®. Verify that the building performance meets or exceeds the design target, or that actual energy use is within 10% of the design energy budget for all other building types. For other building and space types, use an equivalent benchmarking tool such as the Labs21 benchmarking tool for laboratory buildings.		Use ENERGY STAR's Portfolio Manager or Labs 21 database to enter annual performance data and print out the Statement of Energy Performance on an annual basis to track performance over time.	<input checked="" type="checkbox"/>	A post occupancy plan shall be written to establish policy and procedures on recording the building performance data. The data shall be used to compare actual energy performance to the projected energy performance.
3. Protect and Conserve Water					
Indoor Water	Employ strategies that in aggregate use a minimum of 20 percent less potable water than the indoor water use baseline calculated for the building, after meeting the EPA 1992, Uniform Plumbing Codes 2006, and the International Plumbing Codes 2006 fixture performance requirements.		Use Watery, the LEED® water calculator, or equivalent modeling to establish baseline usage and calculated savings or provide documentation based on metering/bills.	<input checked="" type="checkbox"/>	The project is designed using dual flush low flow water closets, ultra low flow urinals, pneumatic metered low flow lavatory faucets.
	The installation of water meters is encouraged to allow for the management of water use during occupancy.		Install water meter(s) and provide documentation.	<input checked="" type="checkbox"/>	Water meters shall be installed as part of the project.
	The use of harvested rainwater, treated wastewater, and air conditioner condensate should also be considered and used where feasible for nonpotable use and potable use where allowed.		Document use of harvested rainwater, treated wastewater, and air conditioner condensate as applicable.	<input type="checkbox"/>	
Outdoor Water	Use water efficient landscape and irrigation strategies, such as water reuse, recycling, and the use of harvested rainwater, to reduce outdoor potable water consumption by a minimum of 50 percent over that consumed by conventional means (plant species and plant densities).		Retain documentation from design tools, such as the LEED® water calculator or other water tools to provide a statement on how water usage was reduced and calculated, or document minimal use of irrigation water due to nominal or no landscape. Choose irrigation contractors who are certified through a WaterSense labeled program and document outdoor potable water consumption reduction. (May provide compliance for GP III. Protect and Conserve Water: Water-Efficient Products)	<input checked="" type="checkbox"/>	The project is designed with drought resistant, native and adapted plant species with no irrigation system.
	The installation of water meters for locations with significant outdoor water use is encouraged.		Document Installation and use of outdoor water meters.	<input checked="" type="checkbox"/>	There will be no significant outdoor water use connected to the project.
	Employ design and construction strategies that reduce storm water runoff and discharges of polluted water offsite. Per EISA Section 438, to the maximum extent technically feasible, maintain or restore the predevelopment hydrology of the site with regard to temperature, rate, volume, and duration of flow using site planning, design, construction, and maintenance strategies.		Provide documents that demonstrate strategy implemented to reduce storm water runoff and maintain or restore predevelopment hydrology of the site.	<input checked="" type="checkbox"/>	The project is designed with the use of permeable paving and vegetative "green" roofs to reduce storm water runoff.

Guiding Principle	Action Required	Yes/No	Suggested Compliance Verification Documents	On File?	Notes
Process Water	Per the Energy Policy Act of 2005 Section 109, when potable water is used to improve a building's energy efficiency, deploy lifecycle cost effective water conservation measures.		Document water conservation strategy in process systems. Documentation may be provided by licensed engineer, water utility or through an energy service provider. Guiding principle is met if no potable water is used.	<input type="checkbox"/>	
Water Efficient Products	Specify EPA's WaterSense-labeled products or other water conserving products, where available.		Any of the following or equivalent: purchasing or design specifications, statement of work, receipts, etc.	<input checked="" type="checkbox"/>	See use of plumbing fixtures under Indoor Water.
	Choose irrigation contractors who are certified through a WaterSense labeled program.			<input checked="" type="checkbox"/>	No irrigation system will be part of the project.
4. Enhance Indoor Environmental Quality					
Ventilation and Thermal Comfort	Meet ASHRAE Standard 55-2004, Thermal Environmental Conditions for Human Occupancy, including continuous humidity control within established ranges per climate zone AND		Document compliance with ASHRAE Standards by licensed architect or engineer or achieve an ENERGY STAR Label Certification	<input checked="" type="checkbox"/>	A licensed engineer has performed preliminary design for humidity control.
	ASHRAE Standard 62.1-2007, Ventilation for Acceptable Indoor Air Quality.			<input checked="" type="checkbox"/>	The project is designed to ASHRAE standards.
Moisture Control	Establish and implement a moisture control strategy for controlling moisture flows and condensation to prevent building damage, minimize mold contamination, and reduce health risks related to moisture.		Document inspection-driven moisture prevention strategy that is part of building commissioning plan that specifies maintenance of the roof drainage and the foundation system, or document that your building does not have a moisture problem.	<input checked="" type="checkbox"/>	The building envelop has been evaluated to determine the location of the dew point, and the prevent moisture damage. In addition, HVAC systems were evaluated in regards to moisture control.
Daylighting	Achieve a minimum daylight factor of 2 percent (excluding all direct sunlight penetration) in 75 percent of all space occupied for critical visual tasks.		Document through computer simulation or by light measurement.	<input checked="" type="checkbox"/>	A draft spreadsheet to determine minimum daylight levels was used to determine the amount of fenestration.
	Provide automatic dimming controls or accessible manual lighting controls, and appropriate glare control.		Document that individual lighting control is available for the occupants by schematic of floor layout, showing locations of manual lighting controls (such as task lighting) or statement based upon visual audit.	<input type="checkbox"/>	The project is designed with T5 indirect/direct pendant fixtures with integral photocells and dimmable ballasts. The exterior envelop incorporates shading devices for glare control.
Low-Emitting Materials	Specify materials and products with low pollutant emissions, including composite wood products, adhesives, sealants, interior paints and finishes, carpet systems, and furnishings.		Establish contract(s), design specifications, purchasing specifications or solicitations with specific language for the purchase of low emitting materials, durable goods, consumables and for green cleaning.	<input checked="" type="checkbox"/>	The specifications shall be written using low-emitting materials.
Protect Indoor Air Quality during Construction	Follow the recommended approach of the Sheet Metal and Air Conditioning Contractor's National Association Indoor Air Quality Guidelines for Occupied Buildings under Construction, 2007. After occupancy, continue flush-out as necessary to minimize exposure to contaminants from new building materials. After construction and prior to occupancy, conduct a minimum 72-hour flush out with maximum outdoor air consistent with achieving relative humidity no greater than 60 percent. After occupancy, continue flush-out as necessary to minimize exposure to contaminants from new building materials.		Before major renovations, develop and implement an indoor air quality management plan, specification or guidelines. May use USGBC LEED reference documentation.	<input checked="" type="checkbox"/>	The specifications shall require the general contractor to write and implement an Indoor Air Quality Plan.
Tobacco Smoke Control	Implement a policy indicating that smoking is prohibited within the building and within 25 feet of all building entrances, operable windows, and building ventilation intakes during building occupancy. Post signage indicating that smoking is prohibited within the building and within 25 feet of all building entrances, operable windows, and building ventilation intakes during building occupancy.		Establish environmental tobacco smoke control policy or equivalent. Policy may be for entire site, PSO or for Agency.	<input checked="" type="checkbox"/>	Policy does not allow smoking in federal facilities.

Guiding Principle	Action Required	Yes/No	Suggested Compliance Verification Documents	On File?	Notes
5. Reduce Environmental Impact of Materials					
<u>Recycled Content</u>	Per Section 6002 of the Resource Conservation and Recovery Act (RCRA), for EPA-designated products, specify products meeting or exceeding EPA's recycled content recommendations. For other products, specify materials with recycled content when practicable. If EPA-designated products meet performance requirements and are available at a reasonable cost, a preference for purchasing them shall be included in all solicitations relevant to construction, operation, maintenance of or use in the building. EPA's recycled content product designations and recycled content recommendations are available on EPA's Comprehensive Procurement Guideline web site at < www.epa.gov/cpg >.		Incorporate the FAR requirements for the purchase of EPA-designated products into contracts, bid solicitations and purchasing specifications and use products meeting or exceeding EPA's recycled content recommendations. Provide construction, purchasing or bid specifications, and/or affirmative procurement report.	<input checked="" type="checkbox"/>	The project is designed to incorporate products with recycled content.
<u>Biobased Content</u>	Per Section 6002 of the Resource Conservation and Recovery Act (RCRA), for EPA-designated products, specify products meeting or exceeding EPA's recycled content recommendations. For other products, specify materials with recycled content when practicable. If EPA-designated products meet performance requirements and are available at a reasonable cost, a preference for purchasing them shall be included in all solicitations relevant to construction, operation, maintenance of or use in the building. EPA's recycled content product designations and recycled content recommendations are available on EPA's Comprehensive Procurement Guideline web site at < www.epa.gov/cpg >.		Incorporate the FAR requirements for the purchase of USDA-designated products into contracts and use products meeting or exceeding USDA's biobased content recommendations. In addition, use biobased products made from rapidly renewable resources and certified sustainable wood products. Provide construction, purchasing or bid specifications, and/or affirmative procurement report.	<input checked="" type="checkbox"/>	Carpet, millwork, flooring will be selected that have biobased content.
<u>Environmentally Preferable Products</u>	Use products that have a lesser or reduced effect on human health and the environment over their lifecycle when compared with competing products or services that serve the same purpose. A number of standards and ecolabels are available in the marketplace to assist specifiers in making environmentally preferable decisions. For recommendations, consult the Federal Green Construction Guide for Specifiers at < www.wbdg.org/design/greenspec.php >.		Establish purchasing contracts, bids construction documents with specification language for the purchase of environmentally preferable materials, durable goods, cleaning supplies, and consumables. Ensure that language is explicit and clear regarding such considerations as VOC limits and Green Seal requirements.	<input type="checkbox"/>	
<u>Waste and Materials Management</u>	Incorporate adequate space, equipment, and transport accommodations for recycling in the building design. During a project's planning stage, identify local recycling and salvage operations that could process site-related construction and demolition materials. During construction, recycle or salvage at least 50 percent of the non-hazardous construction, demolition and land clearing materials, excluding soil, where markets or onsite recycling opportunities exist. Provide salvage, reuse and recycling services for waste generated from major renovations, where markets or onsite recycling opportunities exist.		Documentation may be in the form of receipts, agreements or contracts with local recycling and product reclaiming services. Documentation may include contract specifications with vendors, for example, outlining carpet recycling programs through the manufacturer/distributor or may include photos, or policies that illustrate recycling initiatives for batteries, computers, and beverage containers. Building or site recycling program documentation except able.	<input checked="" type="checkbox"/>	The specifications shall require the general contractor to write and implement a Construction Waste Management Plan.
<u>Ozone Depleting Compounds</u>	Eliminate the use of ozone depleting compounds during and after construction where alternative environmentally preferable products are available, consistent with either the Montreal Protocol and Title VI of the Clean Air Act Amendments of 1990, or equivalent overall air quality benefits that take into account lifecycle impacts.		Document zero use of CFC-refrigerants (policy, equipment specification, procurement specification or contract) unless a third party audit shows that a replacement or conversion is not economically feasible - in which case show that a phase out plan is in place. Do not use halons in fire suppression. Use all alternatives consistent with EPA's Significant New Alternatives Policy (SNAP) regulatory requirements.	<input checked="" type="checkbox"/>	All HVAC equipment will be selected and specified that do not use ozone depleting materials.

2. Building M&R Cost Profiles

This chapter presents estimates of 50-year maintenance cost profiles for 50 building models. Each two-page profile includes a description of the model building, a list of major components, and forecasts of maintenance and repair (M&R) costs at various levels of aggregation. The profile estimates were made with the Whitestone MARS forecast system, calibrated for the Washington DC metropolitan area. The profiles can be adjusted for other metro areas using the Local Maintenance Cost Index shown in Chapter 3, and modified to include different components shown in Chapter 5.

Table 2-1
Summary of M&R Cost Profiles

Building Type	Gross Sqft.	Annual M&R Cost per Gsft.*	Annual M&R Cost as % of Repl. Value
Car Wash	800	\$10.00	4.90%
Garage, Service Station	1,400	7.36	6.40
Apartments 1-3 story	22,500	6.53	6.64
Apartments 4-7 story	60,000	6.27	6.27
Motel	8,000	6.06	6.58
Fire Station	6,000	5.61	5.66
Restaurant, Fast Food	4,000	5.53	4.91
Bank	4,100	5.43	3.56
Telephone Exchange	5,000	5.12	4.92
Motel, 40 Unit	18,000	5.03	4.86
Laundromat	3,000	5.03	4.36
Restaurant, Large	10,000	4.99	4.17
Club, Country	6,000	4.81	3.69
Religious Education	10,000	4.77	4.53
Warehouse, Self-storage	24,000	4.45	7.18
Medical Clinic	13,000	4.17	2.51
Movie Theater	10,000	4.12	3.96
Store, Convenience	4,000	4.10	5.77
Community Center	10,000	4.09	4.34
Hospital, General	125,000	4.08	3.37
Hospital, Research	540,200	4.05	1.53
Dormitory, 50 Room	25,000	4.04	4.93
Bus Terminal	12,000	3.82	4.21
Store, Retail	8,000	3.80	5.14
Funeral Home	10,000	3.76	4.43
Town Hall, 1 Story	11,000	3.66	4.26
Church	17,000	3.60	3.20
Court House 1 Story	30,000	3.52	2.74
Post Office	13,000	3.51	4.28
Auditorium	24,000	3.48	3.34
Public Library, 3 Story	60,000	3.40	3.26
College Student Union	25,000	3.35	3.32
Apartments, 24 Story	220,000	3.17	4.11
Club, Social	22,000	3.15	3.41
Gymnasium	40,000	3.07	3.39
Hockey Rink	30,000	2.94	2.77
College Classroom	90,000	2.89	2.84
Elementary School	47,000	2.81	4.06
Childcare Center	12,000	2.71	2.43
Bowling Center	20,000	2.59	4.13
Garage, Auto Sales	21,000	2.56	3.78
County Jail	318,455	2.46	0.65
Light Manufacturing Plant	45,000	2.37	4.19
Office Park	65,000	2.27	4.92
Supermarket	96,000	2.20	3.25
Department Store	94,000	2.15	3.28
Office Building, 2 Story	83,000	2.04	2.29
Office Building, 15 Story	250,000	1.90	1.65
Aircraft Hangar	32,000	1.86	2.45
Warehouse, Large	80,000	1.80	4.02

*Average costs over 50-year lifetime, Washington DC metro area

From the cost analysts perspective, the most useful information in these profiles is probably the year-by-year total shown under the "Cost per Sqft. by System" section. A projection of M&R costs is required in the financial evaluation of virtually all large construction or renovation projects. Often this trend is estimated with a simple approximation (2 to 4 percent of replacement value is common) that obscures the actual oscillations in M&R requirements, and misstates costs when expressed in terms of present value. In comparison, Whitestone estimates are based on component life cycles that provide a more realistic and defensible projection of M&R costs.

For the purposes of the facility manager, average values for M&R costs may be more useful than detailed year-to-year estimates. Conversations about facility funding and budgeting usually dwell on average costs per square foot, or average costs as a percentage of replacement value. Among our building models, the highest average cost per gsft. was for the car wash (\$10.00), while the warehouse model had the lowest average cost (\$1.80).

The reader may note the rankings in order of cost are different when expressed in terms of replacement value. The highest average M&R cost from this perspective was for the self-storage warehouse—7.18 percent of replacement value—a result due primarily to a low estimated replacement cost of \$62 per square foot. A complete list of replacement costs is shown in the Appendix. In general, we are wary of costs expressed in terms of replacement values because of the great variation in new construction costs and the difficulty of determining replacement costs for older buildings.

Profile estimates are sensitive to a variety of factors such as unscheduled maintenance rates, in-house shop rates, and types of utilization. These sensitivities are discussed in Chapter 6, Definitions and Methods.

Community Center

Gross Sqft:	10,000
Height ft.:	12
Exterior:	Brick Veneer
Floor Coverings:	Carpet/Vinyl Tile
HVAC:	Electric Cool, Gas Heat, Singlezone Unit
Occupancy:	600
Replacement Cost:	\$942,102

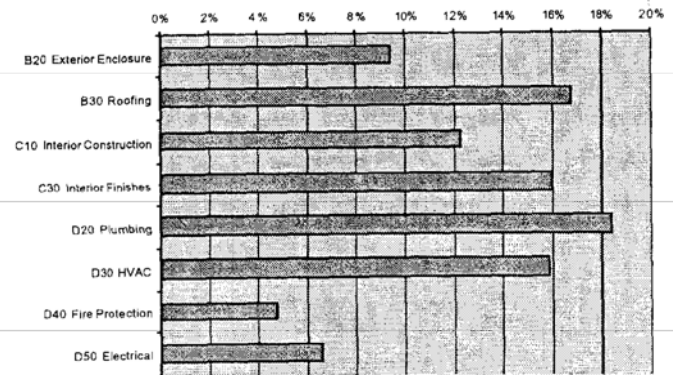
50-Year M&R Cost Summary

Cost (\$2002)	50 Year Total	Annual Cost per Sqft.	Annual Cost as % Repl. Cost
PM & Minor Repair	\$395,039	\$0.79	0.84%
Unscheduled Maintenance	\$454,055	\$0.91	0.96%
Renewal & Replacement	<u>\$1,193,972</u>	<u>\$2.39</u>	<u>2.53%</u>
Total M&R Costs	\$2,043,066	\$4.09	4.34%

Components

Uniformat / Component	Quantity	Units
B20 Exterior Enclosure		
Clay Brick, Exterior, 1st Floor	4349	Sq Ft
Steel Frame, Painted, Operable Window, 12 sf, 1st Floor	3	Each
Aluminum Frame, Fully Glazed, Exterior Door	4	Each
B30 Roofing		
Concrete Steps	100	Sq Ft
Concrete Decking	400	Sq Ft
Built-up Roof	10000	Sq Ft
C10 Interior Construction		
Steel, Painted, Interior Door	72	Each
C30 Interior Finishes		
Sheetrock, Stippled, Interior Wall Finish	17160	Sq Ft
Vinyl Tile Flooring	5000	Sq Ft
Carpet, Nylon 20 oz., High Traffic	5000	Sq Ft
Acoustical Tile Ceiling	10000	Sq Ft
D20 Plumbing		
Tankless Water Closet	6	Each
Urinal, Vitreous China	2	Each
Lavatory, Vitreous China	7	Each
Sink, Stainless Steel	4	Each
Drinking Fountain, Refrigerated	3	Each
Pipe & Fittings, 3/4" Copper, Cold Water	0.79	K Ln Ft
Pipe & Fittings, 4" Steel	0.9	K Ln Ft
Pipe & Fittings, 2" Copper, Cold Water	0.835	K Ln Ft
Pipe & Fittings, 3/4" Copper, Hot Water	0.35	K Ln Ft
Pipe Insulation, Cold Water	1.24	K Ln Ft
Pipe Insulation, Hot Water	0.6	K Ln Ft
Water Heater, Gas/Oil 175 Gph	2	Each
Pipe & Fittings, 6" Cast Iron	0.43	K Ln Ft
Pipe & Fittings, 10" Cast Iron	0.2	K Ln Ft
Pipe & Fittings, 4" DWV PVC	0.145	K Ln Ft
Roof Drain, 2"	4	Each
Aluminum Gutter, Downspouts, Fittings	0.453	K Ln Ft
D30 HVAC		
Exhaust Fan, Ceiling, 200-500 Cfm	4	Each
Air Conditioner, Rooftop, 50 Ton	1	Each
D40 Fire Protection		
Fire Sprinkler System	1	Each
Fire Sprinkler Head	71	Each
D50 Electrical		
Safety Switch, Fused, 400 Amp., 3 Ph.	1	Each
Main Switchgear, <1200 Amp.	1	Each
Distribution Panel Board	2	Each
Emergency Horn & Srobe	5	Each
Exit Lighting Fixture, w/ Battery	4	Each
Incandescent Lighting Fixture, Basic, 100w	60	Each
Fluorescent Lighting Fixture, 160w	60	Each
Wiring Device, Switch	30	Each
Receptacle, 120V, 15 Amp	25	Each
TV Cable Outlet	1	Each
Annunciation Panel	1	Each
Fire Alarm Bell, 6"	4	Each
Fire Alarm Control Panel	1	Each
Manual Pull Station	4	Each
Smoke Detector	6	Each

Distribution of Repair Costs



Most Costly Repair Tasks

Major Repair Task	Task Cost*	Pct.**
Replace Air Conditioner, Rooftop, 50 Ton	15.22	9.6%
Refinish Sheetrock, Stippled, Interior Wall Finish	13.76	8.7%
Replace Carpet, Nylon 20 oz., High Traffic	13.47	8.5%
Maintain Built-up Roof	13.23	8.3%
Repair Air Conditioner, Rooftop, 50 Ton	9.33	5.9%
Replace Steel, Painted, Door Locks	8.82	5.6%
Fire Sprinkler System, Annual PM	7.64	4.8%
Clean & Reseal Clay Brick, Exterior, 1st Floor	5.88	3.7%
Replace Pipe & Fittings, 2" Copper, Cold Water	5.72	3.6%
Maintain Steel, Painted, Door Locks	5.49	3.5%
Replace Water Heater, Gas/Oil 175 Gph	4.68	2.9%
Replace Pipe & Fittings, 3/4" Copper, Cold Water	4.20	2.6%
Maintain Air Conditioner, Rooftop, 50 Ton	3.97	2.5%
Repoint (50% surface) Clay Brick, Exterior, 1st Floor	3.49	2.2%
Remove & Replace Membrane, Built-up Roof	3.33	2.1%
Place New Membrane Over Existing, Built-up Roof	3.31	2.1%
Replace Drinking Fountain, Refrigerated	2.27	1.4%
Replace Vinyl Tile Flooring	1.97	1.2%
Replace Pipe & Fittings, 3/4" Copper, Hot Water	1.86	1.2%
Clean Water Heater, Gas/Oil 175 Gph	1.72	1.1%
Minor Repair, Acoustic Tile Ceiling	1.60	1.0%
Replace Ballast & Lamps, Fluorescent Lighting Fixture, 160w	1.45	0.9%
Refinish Steel, Painted, Interior Door	1.42	0.9%
Replace Fluorescent Lighting Fixture, 160w	1.27	0.8%
Minor Repair, Sheetrock, Stippled, Interior Wall Finish	.95	0.6%
Replace Incandescent Lighting Fixture, Basic, 100w	.86	0.5%
Annual PM, Distribution Panel Board	.85	0.5%
Non-Destructive Moisture Inspection	.84	0.5%
Replace Pipe Insulation, Cold Water	.77	0.5%
Repair Clay Brick, Exterior, 1st Floor	.77	0.5%

*Task cost (\$2002) per gross square foot over 50 years.

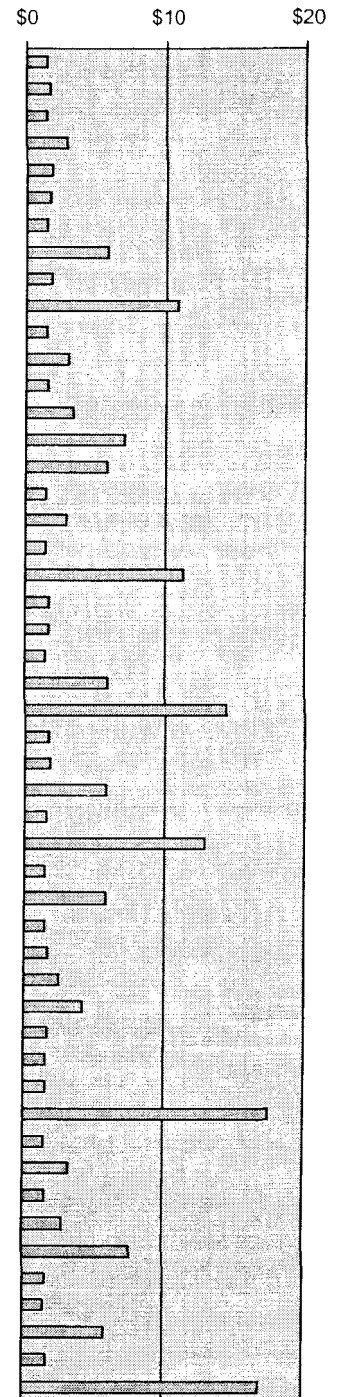
**Percent of total M&R costs.

***Use This Profile as a Template.** Adjust for other areas with the local cost index in Chapter 3. Substitute other components using the component data in Chapter 5.

Cost per Sqft. by System

Building Age	Exterior Closure	Roofing	Interior Construction	Stairways	Interior Finish	Conveying Systems	Plumbing Systems	HVAC Systems	Fire Protection	Electrical Systems	Equipment	Total per Sqft.
1	.02	.53	.30				.19	.16	.16	.10		1.45
2	.02	.53	.30		.01		.39	.16	.16	.10		1.66
3	.02	.58	.30				.19	.16	.16	.10		1.50
4	.02	.53	.41		1.16		.39	.16	.16	.10		2.93
5	.02	.53	.30				.30	.16	.22	.32		1.84
6	.02	.58	.30		.01		.39	.16	.16	.10		1.71
7	.02	.61	.30				.20	.16	.16	.10		1.54
8	.02	.53	.41		3.39		1.08	.16	.16	.11		5.86
9	.02	.58	.30		.34		.19	.16	.16	.10		1.84
10	2.79	.53	2.06		.01		.89	3.27	.42	.91		10.89
11	.02	.53	.30				.19	.16	.16	.10		1.45
12	.09	.58	.41		1.16		.39	.16	.16	.10		3.06
13	.02	.53	.30				.38	.16	.16	.10		1.64
14	.02	2.26	.30		.01		.40	.16	.16	.10		3.41
15	.02	.58	.30				.21	5.09	.22	.69		7.11
16	.02	.53	.41		3.39		1.08	.16	.16	.11		5.86
17	.02	.53	.30				.19	.16	.16	.10		1.45
18	.02	.58	.30		1.32		.39	.16	.16	.10		3.02
19	.02	.53	.30				.19	.16	.16	.10		1.45
20	2.79	.78	2.18		1.90		1.28	.31	.39	1.73		11.37
21	.02	.66	.30				.29	.16	.16	.10		1.68
22	.02	.53	.30		.01		.39	.16	.16	.10		1.66
23	.02	.53	.30				.19	.16	.16	.10		1.45
24	.09	.58	.41		3.39		1.08	.16	.16	.11		5.99
25	2.15	.53	.30				7.28	3.27	.22	.62		14.36
26	.02	.53	.30		.01		.47	.16	.16	.10		1.75
27	.02	.58	.30		.34		.20	.16	.16	.10		1.85
28	.02	3.41	.41		1.16		.39	.16	.16	.10		5.82
29	.02	.53	.30				.28	.16	.16	.10		1.55
30	2.79	.53	2.06		.01		.88	5.09	.42	1.18		12.96
31	.02	.58	.30				.20	.16	.16	.10		1.51
32	.02	.53	.41		3.39		1.07	.16	.16	.10		5.84
33	.02	.53	.30				.20	.16	.16	.11		1.46
34	.02	.58	.30		.01		.37	.16	.16	.10		1.70
35	.02	.61	.30				.84	.16	.22	.32		2.47
36	.09	.53	.41		2.47		.30	.16	.16	.10		4.22
37	.02	.58	.30				.36	.16	.16	.10		1.67
38	.02	.53	.30		.01		.31	.16	.16	.10		1.58
39	.02	.53	.30				.38	.16	.16	.10		1.64
40	2.79	.83	2.18		4.13		1.94	3.42	.39	1.83		17.53
41	.02	.53	.30				.28	.16	.16	.11		1.54
42	.02	2.26	.30		.01		.31	.16	.16	.10		3.32
43	.02	.58	.30				.28	.16	.16	.10		1.59
44	.02	.53	.41		1.16		.30	.16	.16	.10		2.84
45	.02	.53	.30		.34		.51	5.09	.22	.69		7.70
46	.02	.58	.30		.01		.30	.16	.16	.10		1.63
47	.02	.53	.30				.28	.16	.16	.10		1.54
48	.09	.53	.41		3.39		.99	.16	.16	.10		5.84
49	.02	.66	.30				.29	.16	.16	.11		1.68
50	4.92	.53	2.06		.01		7.80	.16	.42	1.00		16.90
Total	19.24	34.33	25.05		32.60		37.63	32.39	9.61	13.45		204.31

50 Year Profile, Total Cost per Sqft.



A value of "0.00" means a cost of more than \$.000 but less than \$.005 per gross square foot.

3. Local M&R Costs

The statistics in this chapter focus on local maintenance costs for 210 major U.S. and Canadian metropolitan areas. Three types of measures are presented:

- **Local maintenance cost indexes** measure relative maintenance and repair (M&R) costs across metro areas
- **In-house shop rates** for trades and supervisory positions common to the in-house M&R staff
- **Contract labor rates** for trades common in M&R construction

The local maintenance cost index is based on the M&R costs of a two-story office building (shown in Chapter 2) standardized to the Washington DC area. The range of the index is considerable, as indicated in Table 3.1. Costs in New York, NY are an estimated 54% higher than those in Washington DC for the same building. In the other direction, M&R costs in Columbus, GA are an estimated 35% lower than the Washington DC value. This index can be used for simple comparisons among metro areas, and also used to adjust the cost profiles in Chapter 2 for metro areas other than Washington DC (the original area for which the profiles were estimated).

Table 3-1.
Comparison of M&R Costs by Metro Area

Metro Area	Local Maintenance Cost Index*	Metro Area	Local Maintenance Cost Index*	Metro Area	Local Maintenance Cost Index*	Metro Area	Local Maintenance Cost Index*
New York, NY	153.9	Olympia, WA	101.7	Kalamazoo, MI	88.4	Burlington, VT	76.3
Yonkers, NY	139.5	Tacoma, WA	101.7	Bowling Green, KY	88.3	Fargo, ND	76.3
San Francisco, CA	136.6	Buffalo, NY	101.5	Green Bay, WI	88.3	Rutland, VT	76.1
San Jose, CA	130.2	San Diego, CA	101.5	Springfield, MO	87.9	Waco, TX	75.9
Honolulu, HI	126.5	Milwaukee, WI	101.4	Owensboro, KY	87.5	Norfolk, VA	75.6
Oakland, CA	124.9	Akron, OH	101.3	Concord, NH	87.4	Macon, GA	75.4
Newark, NJ	124.4	Charleston, WV	101.2	Manchester, NH	87.4	Wichita Falls, TX	75.2
Jersey City, NJ	124.4	Worcester, MA	100.8	Cedar Rapids, IA	87.3	Bismarck, ND	75.1
Philadelphia, PA	124.2	Medford, OR	100.7	Pueblo, CO	87.3	Tuscaloosa, AL	74.7
Trenton, NJ	123.9	Indianapolis, IN	100.4	Watertown, NY	87.2	Virginia Beach, VA	73.4
Hilo, HI	123.4	Duluth, MN	100.3	Cleveland, OH	86.2	Newport News, VA	73.2
New Brunswick, NJ	122.5	Washington DC	100.0	Omaha, NE	86.1	Orlando, FL	72.8
Camden, NJ	121.6	Ann Arbor, MI	100.0	Houston, TX	85.7	Grand Rapids, MI	72.8
Atlantic City, NJ	121.6	Fall River, MA	99.9	Memphis, TN	85.3	Amarillo, TX	72.7
Boston, MA	119.8	Scranton, PA	99.7	Portland, ME	85.3	Tampa, FL	72.5
Chicago, IL	117.8	Peoria, IL	99.5	Colorado Springs, CO	85.1	Chattanooga, TN	72.3
Stamford, CT	117.4	Columbus, OH	99.0	Phoenix, AZ	85.0	Tulsa, OK	72.2
Wilmington, DE	111.0	Springfield, MA	99.0	Miami, FL	84.4	Hampton, VA	71.9
Kansas City, MO	110.2	Moline, IL	98.4	Boise, ID	83.8	El Paso, TX	71.6
Los Angeles, CA	109.7	Flint, MI	98.1	Salt Lake City, UT	83.6	Savannah, GA	71.5
Minneapolis, MN	108.8	Dayton, OH	97.7	New Orleans, LA	83.5	Corpus Christi, TX	71.5
Lowell, MA	108.1	Terre Haute, IN	97.7	Marquette, MI	83.1	Boulder, CO	71.5
Norwalk, CT	108.1	Springfield, OH	97.4	Wichita, KS	83.0	Biloxi, MS	71.0
Anaheim, CA	108.1	Cincinnati, OH	97.4	Billings, MT	82.6	Sioux Falls, SD	69.8
Danbury, CT	108.0	Youngstown, OH	97.2	Beaumont, TX	82.6	Cheyenne, WY	69.1
Santa Barbara, CA	108.0	Richland, WA	96.9	Pocatello, ID	82.5	Lubbock, TX	67.3
St. Louis, MO	107.3	Baltimore, MD	96.8	Lewiston, ME	82.3	Columbus, GA	65.4
Fairbanks, AK	106.9	Reading, PA	96.7	Albuquerque, NM	82.1	Rapid City, SD	65.1
Detroit, MI	106.9	Rochester, MN	96.2	Sioux City, IA	82.0	Roanoke, VA	64.5
Oxnard, CA	106.7	Harrisburg, PA	96.1	Austin, TX	82.0	Tallahassee, FL	64.1
Pittsburgh, PA	106.5	Madison, WI	96.1	Altus, OK	81.3	Raleigh-Durham, NC	64.0
Stockton, CA	106.3	Kokomo, IN	96.0	Lawton, OK	81.3	Winston-Salem, NC	63.9
Juneau, AK	106.2	Carson City, NV	95.5	Daytona Beach, FL	81.3	Greensboro, NC	62.9
Sacramento, CA	106.0	Reno, NV	95.5	San Antonio, TX	81.1	Charlotte, NC	62.9
Las Vegas, NV	105.8	Rochester, NY	95.4	Tucson, AZ	81.0	Jackson, MS	62.8
Salem, OR	105.1	Lansing, MI	94.7	Oklahoma City, OK	80.5	Columbia, SC	61.8
Anchorage, AK	105.0	Louisville, KY	94.2	Great Falls, MT	80.2	Charleston, SC	61.7
Rockford, IL	104.9	Muncie, IN	94.1	Nashville, TN	80.0	Beaufort, SC	56.2
Toledo, OH	104.8	Saginaw, MI	94.0	Richmond, VA	79.8		
Portland, OR	104.7	Davenport, IA	93.4	Ogden, UT	79.6	Canadian Cities	
Riverside, CA	104.7	Erie, PA	93.2	Dallas, TX	79.5	Toronto, Ontario	103.4
Eugene, OR	104.6	South Bend, IN	92.9	Birmingham, AL	79.5	Hamilton, Ontario	99.1
Gary, IN	104.5	Evansville, IN	92.5	Fort Smith, TX	79.1	London, Ontario	97.0
Seattle, WA	103.9	Battle Creek, MI	92.3	Fort Worth, TX	78.7	Ottawa, Ontario	95.3
New Haven, CT	103.3	Albany, NY	92.3	Alamogordo, NM	78.7	Vancouver, B.C.	95.0
Waterbury, CT	103.2	Denver, CO	91.3	Jacksonville, FL	78.6	Quebec, Quebec	86.3
Springfield, IL	103.0	Spokane, WA	90.8	Las Cruces, NM	78.4	Montreal, Quebec	85.2
Parkersburg, WV	102.9	Syracuse, NY	90.7	Fort Lauderdale, FL	78.3	Calgary, Alberta	79.2
Fresno, CA	102.9	Cumberland, MD	90.1	Shreveport, LA	78.1	Edmonton, Alberta	79.1
Bakersfield, CA	102.7	Topeka, KS	89.9	Mobile, AL	77.5	Winnipeg, Manitoba	78.9
Brockton, MA	102.1	Atlanta, GA	89.8	Lexington, KY	77.3		
Providence, RI	102.1	Des Moines, IA	89.8	Huntsville, AL	77.1		
Hartford, CT	102.0	Utica, NY	89.8	Little Rock, AR	77.1		
Norwich, CT	102.0	Eau Claire, WI	89.3	Knoxville, TN	76.3		

*Total average cost, Washington DC=100; Canadian cities are in Canadian dollars.

3.1 Local Maintenance Cost Indexes, Selected Metro Areas

Area	Cost per Sqft.	Local Index	200 Area Ranking	Area	Cost per Sqft.	Local Index	200 Area Ranking
Chicago, IL				Cumberland, MD			
PM & Minor Repair.....	\$.46	129.7	15	PM & Minor Repair.....	\$.32	90.5	112
Unscheduled Maintenance.....	.47	133.9	15	Unscheduled Maintenance.....	.31	89.1	111
Renewal & Replacement.....	1.48	110.4	16	Renewal & Replacement.....	1.21	90.3	100
Total Average Cost.....	2.41	117.8	16	Total Average Cost.....	1.84	90.1	103
Cincinnati, OH				Dallas, TX			
PM & Minor Repair.....	.32	90.5	113	PM & Minor Repair.....	.28	77.9	148
Unscheduled Maintenance.....	.31	89.1	112	Unscheduled Maintenance.....	.26	74.5	148
Renewal & Replacement.....	1.36	101.3	48	Renewal & Replacement.....	1.09	81.3	147
Total Average Cost.....	1.99	97.4	78	Total Average Cost.....	1.63	79.5	149
Cleveland, OH				Danbury, CT			
PM & Minor Repair.....	.33	94.4	98	PM & Minor Repair.....	.38	107.9	45
Unscheduled Maintenance.....	.33	93.4	97	Unscheduled Maintenance.....	.38	109.1	45
Renewal & Replacement.....	1.10	82.1	141	Renewal & Replacement.....	1.45	107.8	21
Total Average Cost.....	1.76	86.2	119	Total Average Cost.....	2.21	108.0	25
Colorado Springs, CO				Davenport, IA			
PM & Minor Repair.....	.32	91.5	110	PM & Minor Repair.....	.34	97.3	89
Unscheduled Maintenance.....	.31	90.1	110	Unscheduled Maintenance.....	.34	96.7	89
Renewal & Replacement.....	1.10	82.1	142	Renewal & Replacement.....	1.23	91.5	95
Total Average Cost.....	1.74	85.1	124	Total Average Cost.....	1.91	93.4	94
Columbia, SC				Dayton, OH			
PM & Minor Repair.....	.17	49.2	198	PM & Minor Repair.....	.33	93.5	103
Unscheduled Maintenance.....	.14	41.5	198	Unscheduled Maintenance.....	.32	92.4	103
Renewal & Replacement.....	.94	70.4	195	Renewal & Replacement.....	1.34	100.1	55
Total Average Cost.....	1.26	61.8	198	Total Average Cost.....	2.00	97.7	75
Columbus, GA				Daytona Beach, FL			
PM & Minor Repair.....	.19	52.6	191	PM & Minor Repair.....	.24	68.9	177
Unscheduled Maintenance.....	.16	45.3	191	Unscheduled Maintenance.....	.22	64.2	177
Renewal & Replacement.....	.99	74.1	182	Renewal & Replacement.....	1.19	89.1	105
Total Average Cost.....	1.34	65.4	189	Total Average Cost.....	1.66	81.3	141
Columbus, OH				Denver, CO			
PM & Minor Repair.....	.32	91.6	108	PM & Minor Repair.....	.35	98.3	85
Unscheduled Maintenance.....	.32	90.3	108	Unscheduled Maintenance.....	.34	97.8	85
Renewal & Replacement.....	1.38	103.2	34	Renewal & Replacement.....	1.18	87.8	114
Total Average Cost.....	2.02	99.0	71	Total Average Cost.....	1.87	91.3	100
Concord, NH				Des Moines, IA			
PM & Minor Repair.....	.30	86.0	126	PM & Minor Repair.....	.33	93.7	102
Unscheduled Maintenance.....	.29	83.6	127	Unscheduled Maintenance.....	.32	92.6	102
Renewal & Replacement.....	1.19	88.8	107	Renewal & Replacement.....	1.18	88.0	113
Total Average Cost.....	1.79	87.4	114	Total Average Cost.....	1.83	89.8	106
Corpus Christi, TX				Detroit, MI			
PM & Minor Repair.....	.22	63.1	184	PM & Minor Repair.....	.41	116.2	26
Unscheduled Maintenance.....	.20	57.6	184	Unscheduled Maintenance.....	.41	118.1	26
Renewal & Replacement.....	1.04	77.4	169	Renewal & Replacement.....	1.36	101.5	46
Total Average Cost.....	1.46	71.5	183	Total Average Cost.....	2.18	106.9	29

Note: Costs per Sqft. are the annual average costs, over a 50 year service life, of maintaining the two-story office building shown in Chapter 2. Local Indexes are standardized (equal 100) for the Washington DC area.

Memorandum

October 16, 2007

To: Bruce Chrisman
From: William Griffing *WJG*
Subject: Revised FESHM Chapter 1070 – Fermilab Work Smart Set

FESHM chapter 1070, Fermilab Work Smart Set, has been revised as a result of the annual Work Smart Standards review. No new standards have been added, although publication dates of some standards have been included. Changes in the list have been bolded.

After final approval, please return this approval page to Elizabeth Bancroft at MS119 for posting on the web.

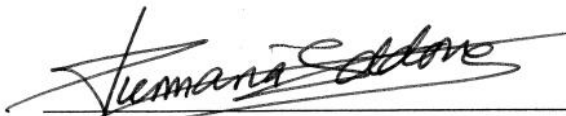
Encl.

Recommended for Approval:

Bruce Chrisman

10/23/07

Date

Approved:

Piermaria Oddone

10/28/07

Date

Fermilab Work Smart Set

INTRODUCTION

Fermilab has adopted the Necessary and Sufficient (N&S) Process for determining the Work Smart Set of Standards (WSS) to determine the appropriate ES&H standards to ensure the safe and environmentally responsible operations of the laboratory. Fermilab, in conjunction with participation from, the DOE FSO, the Chicago Operations Office (CH) and the Office of Science (SC), conducted the first site-wide application of the Departmental N&S Closure Process. The result was a set of significant hazard aspects and impacts that were used to establish a Work Smart Set of Standards (WSS). The WSS were incorporated into the prime contract with DOE. These standards, if properly implemented, provide adequate assurance that the public, workers, and environment are protected from adverse consequences. Fermilab's work activities, the hazards associated with the work, and the standards are reviewed on an annual basis, and revised as needed. Additionally, new standards promulgated by DOE or national standards-making bodies (e.g. National Fire Protection Association) are evaluated and incorporated into the WSS as appropriate.

RESPONSIBILITIES

The Chief Operating Officer is responsible for assuring that suggested changes to Fermilab's WSS are incorporated into the FRA contract with DOE.

The ESH Section Head is responsible for

- Conducting annual review of WSS and recommending to Fermilab management changes to the set.
- Distributing copies of the revised WSS to the Library.

The Laboratory Services, Information Resources Department Manager is responsible for assuring that all WSS are available through the library system.

PROGRAM DESCRIPTION

The WSS shall be reviewed on an annual basis. The ESH Section Head will transmit to the Chief Operating Officer recommendations of changes to the WSS. Once the set has

been accepted by DOE-FSO and incorporated into the contract with FRA, copies shall be distributed to the Library and the FESHM chapter.

Appendix A

Fermilab Work Smart Set of Standards

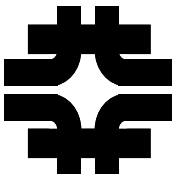
10 CFR 1021 (DOE NEPA rules)
10 CFR 1022 (Compliance with Floodplain/Wetlands environmental review requirements)
10 CFR 1046 Subpart B, App. A, Chapter X, par. H through I inclusive. (Physical protection of security interests, protective force personnel)
10 CFR 835 (Occupational radiation protection - applicable and enforceable portions)
10 CFR 850 (Chronic Beryllium Disease Prevention Program)
10 CFR 851 (Worker Safety and Health Program)
10 CFR 860 (Trespass to land owned & leased by the U.S. Government)
17 IAC 525 and permit pursuant (Nuisance animal trapping permits)
17 IAC 3702 (Construction and Maintenance of Dams)
18 U.S. Code Sections 841-848 (Use, or threat of use, of explosives; includes civil disorders)
28 CFR 36 (Section 302(b)(2) of the Americans with Disabilities Act and Section 4.1.3(9) of the ADAAG -- accommodations and accessibility)
29 CFR 1903.13 (Imminent danger)
29 CFR 1903.2 (Posting of notice...)
29 CFR 1904 (Recordkeeping and reporting occupational injuries and illnesses)
29 CFR 1910 (OSHA general industry standards - applicable and enforceable portions)
29 CFR 1926 (OSHA construction industry standards - applicable and enforceable portions)
29 CFR 1928 Subpart C (Roll-over protective structures - applicable and enforceable portions)
29 CFR 1928 Subpart D (Safety for agricultural equipment - applicable and enforceable portions)
29 CFR 1977.12 (Exercise of any right afforded by the Act)
29 CFR 1977.4 (Persons prohibited from discriminating)
29 IAC Chapter 1, Subchapter f (Emergency services, disasters, and civil defense /ESDA/ chemical safety)
33 CFR 320-323, 328-330 (Army Corp of Engineers wetlands regs)
35 IAC (State of IL environmental regs - applicable and enforceable portions)
36 CFR 60, 63, 65 (National historic landmark program)
36 CFR 78-79 (NHPA waiver and collection curation regs)
36 CFR 800 (Protection of historic and cultural properties)
40 CFR (Federal environmental regs - applicable and federally-enforceable portions)
41 IAC 100 (Fire prevention and safety)
41 IAC 120 (Boiler and pressure vessels)
41 IAC 140 (Policy and procedures manual for fire protection personnel)
41 IAC 160 (Storage, transportation, sale and use of gasoline and volatile oils: rules relating to general storage)
41 IAC 170 (Storage, transportation, sale and use of petroleum and other regulated substances)
41 IAC 180 (Storage, transportation, sale and use of volatile oils)
43 CFR 7 (Archaeological collections)

49 CFR (Offsite) Parts 100-177 (Applicable Parts) Parts 178-199 (Applicable Parts) Parts 382-399 (Applicable Parts)
49 CFR (Onsite) Parts 382-399 (Applicable Parts) 177.848 (Segregation Table for Hazardous Materials)
50 CFR 17 (Endangered species rules)
71 IAC 400 (Illinois accessibility code, Subparts C-F)
77 IAC 830 (Structural pest control code)
77 IAC 855 (Rules for Asbestos Abatement for Public & Private Schools and Commercial & Public Buildings in Illinois)
77 IAC 890 (Plumbing code)
77 IAC 900 (Drinking water systems requirements)
77 IAC 905 (Private Sewage Disposal Code)
77 IAC 920 (Water well construction code)
77 IAC 925 (Well pump installation)
92 IAC 700 and all permits pursuant (Construction in water course permit application)
92 IAC 704 and all permits pursuant (Regulation of public waters)
92 IAC 708 and all permits pursuant (Floodway construction permit application)
105 ILCS 105 (Asbestos Abatement Act)
225 ILCS 207 (Commercial and Public Building Asbestos Abatement Act)
ACGIH Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices, 2005
ANSI A 17.1 (Elevator Construction)
ANSI A 17.3 (Elevator Maintenance)
ANSI A 39 (Window Washing)
ANSI B11 series (Metalworking - applicable portions)
ANSI B15.1 (Power transmission apparatus)
ANSI O1.1 (Woodworking machinery)
ANSI Z88.2 (Respiratory Protection) 1992
ANSI Z136.1 (Lasers), 2000
AWS (American Welding Standard) Z 49.1 (Cutting, Welding and Hot Work Activities) 1999 version
ANSI/ASHRAE 15 (Mechanical refrigeration)
ANSI/ASME B30.10 (Hooks) 2005
ANSI/ASME B30.11 (Monorails and Underhung Cranes) 2004
ANSI/ASME B30.16 (Overhead Hoists (Underhung)) 2003
ANSI/ASME B30.17 (Overhead and Gantry Cranes (Top Running Bridge, Single Girder, Underhung Hoist)) 2003
ANSI/ASME B30.2 (Overhead and gantry cranes) 2005
ANSI/ASME B30.20 (Below the hook lifting devices) 2006

ANSI/ASME B30.21 (Manually Lever Operated Hoists) 2005
ANSI/ASME B30.22 (Articulating Boom Cranes) 2002
ANSI/ASME B30.5 (Mobile and locomotive truck cranes) 2004
ANSI/ASME B30.9 (Slings) 2003
ANSI/ASME B31.1 (Power piping) 2001, B31.1a 2002, Addenda to b 31.1 2001
ANSI/ASME B31.3 (Process Piping) 2004
ANSI/ASME B31.5 (Refrigeration piping) 2001
ANSI/ASME B31.8 (Gas transmission and piping systems) 2003
ANSI/ASME B31.9 (Building Services Piping) 1996
Archaeological and Historic Preservation Act of 1974 (P.L. 93-291)
Archaeological Resources Protection Act of 1979 [amended], 16 USC 470aa et seq.
ASME Pressure Vessel Code - Section VIII
ASME B20.1-1996 (Safety Standard for Conveyors & Related Equipment)
Atomic Energy Act of 1954 [amended], 42 USC 2011 et seq.
ANSI N323A-1997 (Radiation Protection Instrumentation Test and Calibration, Portable Survey Instruments)
ANSI N323D-2002 (American National Standard for Installed Radiation Protection Instrumentation)
Batavia Code of Regulations, City Ordinance, Section 8-3-10-3
International Building Code Fire Prevention Code (latest edition)
International Building Code (latest edition)
Boiler & Pressure Vessels of the Illinois Office of the State Fire Marshall - applies to CUB Boilers Only
CERCLA/SARA, 42 USC 9601 et seq.
City Code of Warrenville, IL Title 7, Chapter 4, sewer/sewerage ordinance
Clean Air Act Amendments 1990, 42 USC 7401 et seq., and Illinois State Implementation Plan, 40 CFR 52 Subpart O
Clean Water Act, 33 USC 1251 et seq.
DOE Order 420.1A Fire Protection (Section 4.2)
DOE Order 5400.5 Derived Concentration Guide Table and dose limits to the public (Chapter 2, Section 1; Chapter 3)
DOE Manual 231.1A (Environment, Safety and Health Reporting Manual), as it applies to injury recordkeeping only, September 9, 2004
DuPage County Health Department Private Water Supply Ordinance (Chapter 18, Article 18-4, DuPage County Code)
E.O. 11988 (Floodplain Management)
E.O. 11990 (Protection of Wetlands)
E.O. 12580 (Implementation of superfund)
E.O. 13101 (Greening the Government through Waste Prevention, Recycling, and Federal Acquisition)
E.O. 13058 (Protecting Federal Employees and the Public from Exposure to Tobacco Smoke in the Federal Work Place)

E.O. 13148 (Greening the Government through Leadership in Environmental Management)
E.O. 13149 (Greening the Government through Federal Fleet and Transportation Efficiency)
Endangered Species Act, 16 USC 1531 et seq.
Federal Facility Compliance Act, 42 USC 6961
Fermilab ES&H Section SQIP RPS.8 (Control and accountability of nuclear materials)
FESHM 2010 (Planning and review of accelerator facilities and their operations)
FESHM 3010 (Significant and Reportable Occurrences) (formerly, Occurrence reporting)
FESHM 5031 (Pressure vessels)
FESHM 5031.1 (Pressure piping systems)
FESHM 5032 (Cryogenic system review)
FESHM 5032.1 (Liquid nitrogen dewar installation rules)
FESHM 5032.2 (Guidelines For the Design, Fabrication, Testing, Installation, and Operation of LH2 Targets)
FESHM 5032.3 (Transporting gases in building elevators)
FESHM 5033 (Vacuum vessel safety)
FESHM 5033.1 (Vacuum window safety)
FESHM 5035 (Mechanical refrigeration systems)
FESHM 5040 (Fermilab electrical safety program)
FESHM 5041 (Electrical utilization equipment safety)
FESHM 5042 (AC electrical power distribution safety)
FESHM 5043 (Management and use of cable tray systems)
FESHM 5044 (Protection against exposed electrical bus)
FESHM 5046 (Low voltage, high current power distribution systems)
FESHM 5064 (Oxygen deficiency hazards)
FESHM 5084 (Ergonomics Program)
FESHM 6020.3 (Installation of flammable gas lines in or near cable trays)
FESHM 9030 (Aviation safety)
FIFRA, 7 USC 136 et seq.
FRCM Article 362 (X-Ray Generating Devices & Radiography Sources)
FRCM Article 411 (Radioactive Material Identification, Storage and Control - Definitions)
Handbook for Sampling & Sample Preservation of Water and Wastewater, EPA-600/4-82-029
IEC 61511, Functional Safety, Safety Instrumented Systems for the Process Industry Sector
Illinois Chemical Safety Act, 430 ILCS 45/1 et seq.
Illinois Compiled Statutes (ILCS) Chapter 625 (State vehicle code -- Applicable Portions)
Illinois Department of Public Health, DuPage County Dept. Public Health. CDC December 7,1990
Illinois Endangered Species Protection Act, 520 ILCS 10/1 et seq.
Illinois Ground Water Protection Act, 415 ILCS 55/1 et seq.
Illinois Health and Safety Act, 820 ILCS 225/1 et seq.
Illinois Pesticide Act, 415 ILCS 60/1 et seq.
Illinois Structural Pesticide Act, 225 ILCS 235/1 et seq.
Kane County Health Department Ordinance 04-199/05-141 Water Well Code

National Fire Protection Association Codes and Standards (NFPA Standards - applicable portions)
NFPA (National Electric Code), 2005
NFPA 70E (Standard for Electrical Safety in the Workplace), 2004
National Historic Preservation Act of 1966 [amended], 16 USC 470 et seq.
Native American Graves Protection and Repatriation Act of 1990, 25 USC 3001 et seq.
NEPA, 42 USC 4321 et seq.
OSH Act, 29 USC 654(a)(1) -- General duty clause.
Privacy Act of 1974, 5 USC 552a
RCRA Part B Permit (Illinois Log #131), including Emergency Contingency plan
RCRA, 42 USC 6901 et seq.
Recommended standards for Water Works, Great Lakes Upper Mississippi R. Bd. of State Public Health & Environmental Managers (1992)
Safe Drinking Water Act, 42 USC 300f et seq.
Standard Methods for the Examination of Water and Wastewater, 18th Ed., APHA (1992)
Standards and Specifications for Soil Erosion and Sediment Control, 10/87, IEPA 87-102
TSCA, 15 USC 2601 et seq.
UL Listing
Uniform Federal Accessibility Standards, Chapter 4, Accessible Elements and Spaces: Scope and Technical Requirements
Energy Solutions LLC Bulk Waste Disposal and Treatment Facilities Waste Acceptance Criteria
<p>Rather than attempt a precise analysis of all necessary standard citations to exclude non-applicable parts, inclusive citations were made qualified by the phrase "applicable and enforceable parts thereof."</p> <p>To the extent these standards apply to DOE and not the contractor, the contractor will assist DOE in complying with them.</p> <p>This Set does not change any existing Federal, State or local enforcement authority.</p> <p>For standards not applicable as a matter of law (other than FESHM provisions), the applicable version shall be the revision in effect on July 14, 1995, unless otherwise indicated. For FESHM provisions, the applicable version shall be the most recent version established through the procedures set forth in Appendix I.</p>



Multi-Organization Construction Site Safety Walkthrough

1.0 Background and Purpose

Background: The vast majority of incidents happen when barriers are bypassed, procedures are not followed or there are departures by workers from safe behaviors. Unsafe conditions have historically been a small percentage of the causes of accidents whereas behaviors or unsafe acts are the bulk of the causes. In order to eliminate these incidents from the workplace we must concentrate our efforts to those actions that will have the biggest return on “investment” such as the elimination of unsafe behaviors and the evaluation of work processes and barriers to determine conformance with accepted practices.

Purpose: To establish a process for conducting formal safety program evaluations and field assessments through site safety walkthroughs for construction activities. These walk-throughs should consider management systems, employee behaviors, conformance to the subcontractor safety plan, and performance to Fermilab requirements as expressed in contractual documents, pre-bid and pre-construction meetings.

2.0 Scope

This procedure applies to all active construction activities that require a multi-organizational scrutiny as designated by the Chief Operating Officer.

3.0 Responsibilities

3.1 Construction Manager

- 3.1.1 Determine the frequency of walkthroughs based upon input received from the Chief Operating Officer and the Project Manager. Frequency should be identified in the Project Execution Plan (PEP).
- 3.1.2 Identify walk-through team members. The team should be kept to a reasonable size and may include the Construction Manager, Construction Coordinator, Subcontractor Superintendent, a representative from the Fermilab ESH Section, a representative from the Department of Energy Fermi Site Office if requested, and a Project ESH Coordinator, if one is assigned.
- 3.1.3 Conduct a closeout meeting as described below.

3.2 Construction Coordinator

3.2.1 Assist the Construction Manager in the walkthrough process as requested. Such requests may include:

3.2.1.1 Transmit all concerns to the Sub-Contractor for resolution and provide copies to all team members.

3.2.1.2 Review corrective action responses from the Sub-Contractor and provide feedback to the Construction Manager and the Project ES&H Coordinator.

3.2.1.3 Track responses to action items (in a formal database, daily/weekly logs or construction meeting minutes).

3.2.1.4 Document & distribute closeout-meeting minutes.

3.3 ES&H Section Representative

3.3.1 Provide technical support relative to safety issues.

3.4 Project ES&H Coordinator

3.4.1 Participate in walkthroughs keeping an eye especially toward safety issues that would impact installation and operational activities that will follow construction.

3.4.2 Provide feedback from walkthroughs and closeout meetings directly to the Project Manager.

4.0 Procedure

4.1 The Construction Manager (CM) will identify the time and frequency of the walkthrough.

4.2 The CM will develop an agenda for the walk-through and identify any specific areas to focus on. Appendix A should be used as guidance. Trying to cover a broad spectrum of programs or activities may result in specifics being missed. This is especially true for a larger project, or one covering more than one work site. Interviews with subcontractor employees are encouraged.

Field observations from one visit may give rise to focused assessments at a future date or provide justification for a formal audit.

4.3 CM will complete a closeout meeting with all participating organizations to discuss results of the walkthrough and to discuss suggestions for possible corrective actions.

4.4 Document walkthrough results through meeting minutes that will be distributed to all participating organizations.

4.5 Enter concerns and corrective actions into a database created for the specific project.

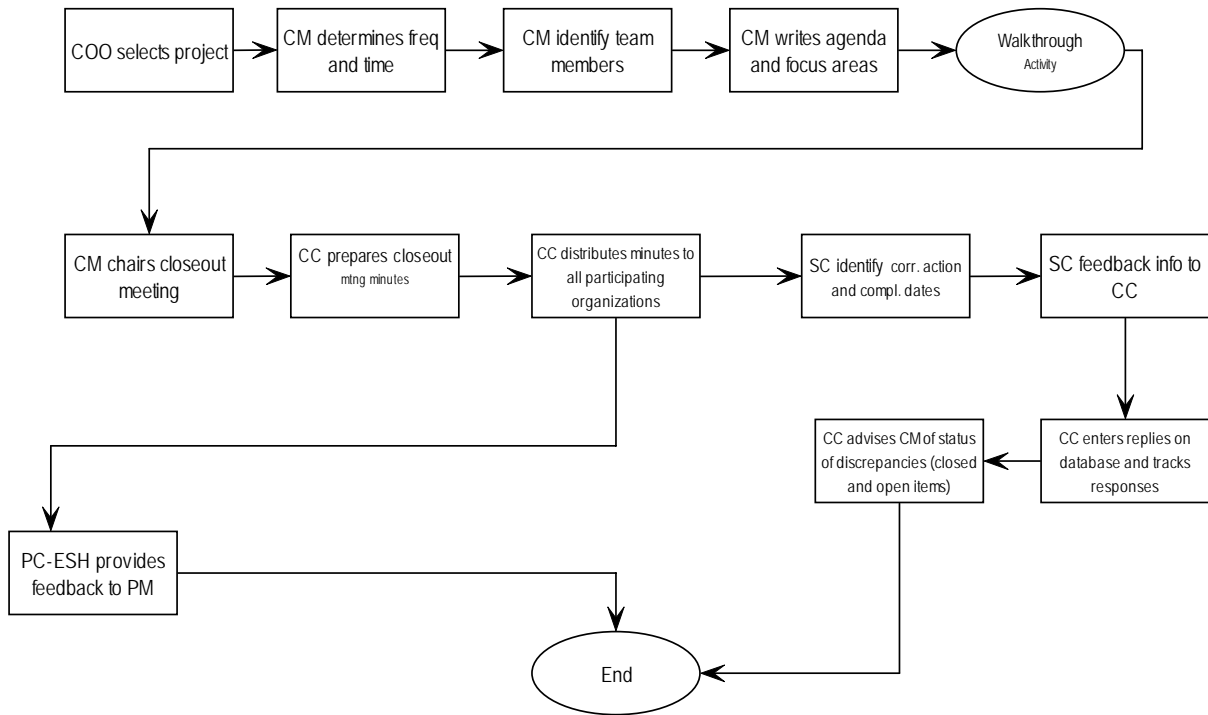
5.0 Corrective Actions

5.1 The walkthrough report shall be provided to the subcontractor for action.

5.2 The subcontractor shall identify corrective actions and completion dates. Corrective actions shall be completed as quickly as possible.

Flow Diagram

Construction Project Multi-Organizational Safety Walkthrough



Abbreviations:

COO	Chief Operating Officer
CM	Construction Manager
CC	Construction Coordinator
PC-ESH	Project ES&H Coordinator
PM	Project Manager

Appendix

ESH Assessment Guidance- Areas of Inquiry

1. Injuries or Illnesses
2. General
 - Housekeeping
 - Garbage Containers
 - Emergency Phone #s Posted
 - Emergency Communication
 - Fence Condition
 - Gates
 - Signage on Fences and Gates
 - Whip Checks
 - Electrical Cords
 - GFCI's
 - Gas Test Log
 - Machine/Equipment Guards
 - Lighting
 - Ladders
 - Explosive Storage
 - Oxy/Acetylene Storage
 - Scaffolding
2. Traffic Control
 - Barricades
 - Traffic Signs
 - Flag Person
 - Vests
 - Flag
3. Shafts & Tunnels
 - Hand held lights/Miners Lights
 - Lighting
 - Communication
 - Ventilation
 - Self Rescuers Present

- Housekeeping
 - Air/Noise Testing
 - Signage
 - Barricades
4. Emergency Equipment
- Fire Extinguishers
 - First Aid Kits
 - Oxygen
 - Blankets
 - Eye Wash
 - Infection Control
 - Medical Emergency Teams
 - Rescue Teams
5. Personal Protective Equipment
- Hard Hats
 - Eye Protection
 - Hearing Protection
 - Foot Protection
 - Respiratory Protection
 - Hand Protection
 - Fall Protection Harness/Lanyard
 - Face Protection
 - Barrier Cream
6. Cranes
- Inspections
 - Certifications
 - Anti-Two Blocks
 - Hook Latches
 - Perimeter Barricades
 - Glass
 - Horn
 - Fire Extinguisher
 - Rigging Equipment
7. Equipment
- Daily Inspections
 - Glass

- Back-Up Alarm
- Fire Extinguishers
- Hydraulic Oil Leaks

8. Work Planning

- H/A for Tasks Performed
- Dail Huddles
- Tool Box Meetings
- Monthly ESH Meetings
- Records/Log Reviews
- LOTO



Please ensure that your review included a review of the project for appropriateness of the proposed systems, impacts on existing systems and operations and specific technical requirements to be incorporated into the design

PLEASE ENTER THE FOLLOWING INFORMATION

Reviewer:

Project Number UIP ECP (If applicable)

Project Phase:

Comment Date:
September 10, 2010



COMMENT

Drawing Reference:
 START WITH PAGE NUMBER FIRST FOLLOWED BY SECTION OR DETAIL REFERENCE. Example: A-1, Detail 4

Specification Reference:
 PROVIDE SPECIFICATION SECTION AND PARAGRAPH IF APPLICABLE. Example: 02070 1.5.D.2 (Page 02070-2)

Comment:

RESPONSE

Project Contact Response:
Thank You for Reviewing this Project

Comment:



Please ensure that your review included a review of the project for appropriateness of the proposed systems, impacts on existing systems and operations and specific technical requirements to be incorporated into the design


PLEASE ENTER THE FOLLOWING INFORMATION

Reviewer:

Project Number UIP ECP (If applicable)

Project Phase:

Comment Date:
September 14, 2010

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COMMENT

Drawing Reference: *START WITH PAGE NUMBER FIRST FOLLOWED BY SECTION OR DETAIL REFERENCE. Example: A-1, Detail 4*

Specification Reference: *PROVIDE SPECIFICATION SECTION AND PARAGRAPH IF APPLICABLE. Example: 02070 1.5.D.2 (Page 02070-2)*

Comment:

RESPONSE

Project Contact Response:
Thank You for Reviewing this Project

Comment:



Please ensure that your review included a review of the project for appropriateness of the proposed systems, impacts on existing systems and operations and specific technical requirements to be incorporated into the design

PLEASE ENTER THE FOLLOWING INFORMATION

Reviewer:

Project Number UIP ECP (If applicable)

Project Phase:

Comment Date:
September 14, 2010

Print  Duplicate  Main Menu 

COMMENT

Drawing Reference: *START WITH PAGE NUMBER FIRST FOLLOWED BY SECTION OR DETAIL REFERENCE. Example: A-1, Detail 4*

Specification Reference: *PROVIDE SPECIFICATION SECTION AND PARAGRAPH IF APPLICABLE. Example: 02070 1.5.D.2 (Page 02070-2)*

Comment:

I have no comments regarding this project at this time.

I have also signed the ESH Section Project Review Traveler.

RESPONSE

Project Contact Response:

Thank You for Reviewing this Project

Comment:



Please ensure that your review included a review of the project for appropriateness of the proposed systems, impacts on existing systems and operations and specific technical requirements to be incorporated into the design

PLEASE ENTER THE FOLLOWING INFORMATION

Reviewer:

Project Number UIP ECP (If applicable)

Project Phase:

Comment Date:
September 8, 2010



COMMENT

Drawing Reference: *START WITH PAGE NUMBER FIRST FOLLOWED BY SECTION OR DETAIL REFERENCE. Example: A-1, Detail 4*

Specification Reference: *PROVIDE SPECIFICATION SECTION AND PARAGRAPH IF APPLICABLE. Example: 02070 1.5.D.2 (Page 02070-2)*

Comment:

RESPONSE

Project Contact Response:
Thank You for Reviewing this Project

Comment:



Please ensure that your review included a review of the project for appropriateness of the proposed systems, impacts on existing systems and operations and specific technical requirements to be incorporated into the design

PLEASE ENTER THE FOLLOWING INFORMATION

Reviewer:

Project Number UIP ECP (If applicable)

Project Phase:

Comment Date:
September 1, 2010

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COMMENT

Drawing Reference: *START WITH PAGE NUMBER FIRST FOLLOWED BY SECTION OR DETAIL REFERENCE. Example: A-1, Detail 4*

Specification Reference: *PROVIDE SPECIFICATION SECTION AND PARAGRAPH IF APPLICABLE. Example: 02070 1.5.D.2 (Page 02070-2)*

Comment:

RESPONSE

Project Contact Response:
Thank You for Reviewing this Project

Comment:



Please ensure that your review included a review of the project for appropriateness of the proposed systems, impacts on existing systems and operations and specific technical requirements to be incorporated into the design

PLEASE ENTER THE FOLLOWING INFORMATION

Reviewer:

Project Number UIP ECP (If applicable)

Project Phase:

Comment Date:
September 13, 2010



COMMENT

Drawing Reference:
 START WITH PAGE NUMBER FIRST FOLLOWED BY SECTION OR DETAIL REFERENCE. Example: A-1, Detail 4

Specification Reference:
 PROVIDE SPECIFICATION SECTION AND PARAGRAPH IF APPLICABLE. Example: 02070 1.5.D.2 (Page 02070-2)

Comment:

All paths and sidewalks should be 8' or wider to match existing side walk at FCC to D Rd. and to accomodate snow removal equipment that are 5' - 7'.

RESPONSE

Project Contact Response:
Agree and will incorporate comments

Comment:

To the extent budget will allow we try to maintain the 8-foot sidewalks when not adjacent to vehicular way.



Please ensure that your review included a review of the project for appropriateness of the proposed systems, impacts on existing systems and operations and specific technical requirements to be incorporated into the design

PLEASE ENTER THE FOLLOWING INFORMATION

Reviewer:

Project Number UIP ECP (If applicable)

Project Phase:

Comment Date:
September 13, 2010



COMMENT

Drawing Reference:

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Specification Reference:

PROVIDE SPECIFICATION SECTION AND PARAGRAPH IF APPLICABLE. Example: 02070 1.5.D.2 (Page 02070-2)

Comment:

As drawn, the bike path at the west end of the new parking lot, near the cryo bridge, is right where snow will have to be stored. If the 23 year old wooden bridge could be replaced in a different configuration it would solve the snow storage issue.

RESPONSE

Project Contact Response:

Agree and will incorporate comments

Comment:

We will try to add the bridge replacement & modify bike route if budget allows.



Please ensure that your review included a review of the project for appropriateness of the proposed systems, impacts on existing systems and operations and specific technical requirements to be incorporated into the design

PLEASE ENTER THE FOLLOWING INFORMATION

Reviewer:

Project Number UIP ECP (If applicable)

Project Phase:

Comment Date:
September 13, 2010



COMMENT

Drawing Reference:

START WITH PAGE NUMBER FIRST FOLLOWED BY SECTION OR DETAIL REFERENCE. Example: A-1, Detail 4

Specification Reference:

PROVIDE SPECIFICATION SECTION AND PARAGRAPH IF APPLICABLE. Example: 02070 1.5.D.2 (Page 02070-2)

Comment:

Keep any new vegetation back from road to allow good visibility in and out of parking lots and drives.

There is no way to maintaing prairie vegetation without fire as part of maintenance. Fire not practical here. Recommend turf grass between buildings/lots and D Rd.

RESPONSE

Project Contact Response:

Agree and will incorporate comments

Comment:

We will use native and adaptive species that require no add'l irrigation & minimal (semiannual/annual) mowing, and do not require burning. Per our discussion 9/16/10, we will not provide turf grass.



Please ensure that your review included a review of the project for appropriateness of the proposed systems, impacts on existing systems and operations and specific technical requirements to be incorporated into the design

PLEASE ENTER THE FOLLOWING INFORMATION

Reviewer:

Project Number UIP ECP (If applicable)

Project Phase:

Comment Date:
September 13, 2010



COMMENT

Drawing Reference:

START WITH PAGE NUMBER FIRST FOLLOWED BY SECTION OR DETAIL REFERENCE. Example: A-1, Detail 4

Specification Reference:

PROVIDE SPECIFICATION SECTION AND PARAGRAPH IF APPLICABLE. Example: 02070 1.5.D.2 (Page 02070-2)

Comment:

The area between the CDF building and the IARC building between the berm and the ramp is surrounded by buildings, transformers, generators ect. Snow removal very labor intensive, no where to push or pile it. There should be no major doorways or walkways through this area. Minimal snow removal service.

RESPONSE

Project Contact Response:

Disagree for Reasons Noted Below

Comment:

Per our discussion, exit discharge paths must be maintained.



Please ensure that your review included a review of the project for appropriateness of the proposed systems, impacts on existing systems and operations and specific technical requirements to be incorporated into the design

PLEASE ENTER THE FOLLOWING INFORMATION

Reviewer:

J. Niehoff

Project Number

10-8-1

UIP ECP (If applicable)

Project Phase:

Project Coordination

Comment Date:

September 3, 2010

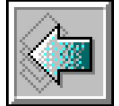
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COMMENT

Drawing Reference:

Fire Protection

START WITH PAGE NUMBER FIRST FOLLOWED BY SECTION OR DETAIL REFERENCE. Example: A-1, Detail 4

Specification Reference:

PROVIDE SPECIFICATION SECTION AND PARAGRAPH IF APPLICABLE. Example: 02070 1.5.D.2 (Page 02070-2)

Comment:

Elevator on emergency generator, does it require it's own automatic transfer switch, in accordance with NEC Article 708 COPS?

RESPONSE

Project Contact Response:

Response Incomplete, Additional Information to Follow

Comment:

We will follow through & investigate requirements.



Please ensure that your review included a review of the project for appropriateness of the proposed systems, impacts on existing systems and operations and specific technical requirements to be incorporated into the design

PLEASE ENTER THE FOLLOWING INFORMATION

Reviewer:

Project Number UIP ECP (If applicable)

Project Phase:

Comment Date:
September 3, 2010



COMMENT

Drawing Reference:
 START WITH PAGE NUMBER FIRST FOLLOWED BY SECTION OR DETAIL REFERENCE. Example: A-1, Detail 4

Specification Reference:
 PROVIDE SPECIFICATION SECTION AND PARAGRAPH IF APPLICABLE. Example: 02070 1.5.D.2 (Page 02070-2)

Comment:

Prefer Siemens, Fire Alarm equipment, model XLS for the fire alarm control panel. Would strongly suggest an emergency voice fire alarm system for this complex, so it can be integrated with Fermilab MASS notification system. The fire alarm system should also be designed to extend, at a future date, into the CDF Facility.

RESPONSE

Project Contact Response:
Agree and will incorporate comments

Comment:



Please ensure that your review included a review of the project for appropriateness of the proposed systems, impacts on existing systems and operations and specific technical requirements to be incorporated into the design

PLEASE ENTER THE FOLLOWING INFORMATION

Reviewer:

Project Number UIP ECP (If applicable)

Project Phase:

Comment Date:
September 3, 2010

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COMMENT

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Specification Reference:
 PROVIDE SPECIFICATION SECTION AND PARAGRAPH IF APPLICABLE. Example: 02070 1.5.D.2 (Page 02070-2)

Comment:

Prefer Viking equipment for the automatic sprinkler heads and components. All new sprinklers should be standard spray, quick response type. The inspector's test/aux. drain connection should be located at the combination standpipe/sprinkler riser.

RESPONSE

Project Contact Response:
Agree and will incorporate comments

Comment:



Please ensure that your review included a review of the project for appropriateness of the proposed systems, impacts on existing systems and operations and specific technical requirements to be incorporated into the design

PLEASE ENTER THE FOLLOWING INFORMATION

Reviewer:

Project Number UIP ECP (If applicable)

Project Phase:

Comment Date:
September 3, 2010



COMMENT

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Specification Reference:

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Comment:

The water source for the automatic sprinkler protection is pond "raw" and as such, we have experience MIC. In order to reduce corrosion, all sprinkler piping should be schedule 40, carbon steel, and all pendent type sprinklers should be provided with return bends. CDR-28 indicated interconnection of fire sprinkler and domestic water, this is prohibited by EPA and Illinois Plumbing Code.

RESPONSE

Project Contact Response:

Agree and will incorporate comments

Comment:



Please ensure that your review included a review of the project for appropriateness of the proposed systems, impacts on existing systems and operations and specific technical requirements to be incorporated into the design


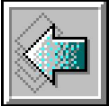
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Project Number UIP ECP (If applicable)

Project Phase:

Comment Date:
September 3, 2010

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COMMENT

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Specification Reference:
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Comment:

RESPONSE

Project Contact Response:
Agree and will incorporate comments

Comment:



Fermilab

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Comment Date:
September 3, 2010

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Specification Reference:
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Comment:

RESPONSE

Project Contact Response:
Agree and will incorporate comments

Comment:



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Project Number UIP ECP (If applicable)

Project Phase:

Comment Date:
September 3, 2010



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Specification Reference:
 PROVIDE SPECIFICATION SECTION AND PARAGRAPH IF APPLICABLE. Example: 02070 1.5.D.2 (Page 02070-2)

Comment:

All exterior oil filled transformers in excess of 500 gallons should be separated by 25-ft from building or provide a 2-hour fire separation, in accordance with NFPA 850. Provide containment for outside fluid filled transformers, reference FM Global Data Sheet 5-4.

RESPONSE

Project Contact Response:
Agree and will incorporate comments

Comment:



Please ensure that your review included a review of the project for appropriateness of the proposed systems, impacts on existing systems and operations and specific technical requirements to be incorporated into the design

PLEASE ENTER THE FOLLOWING INFORMATION

Reviewer:

Project Number UIP ECP (If applicable)

Project Phase:

Comment Date:
September 3, 2010

Print  Duplicate  Main Menu 

COMMENT

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Specification Reference:
 PROVIDE SPECIFICATION SECTION AND PARAGRAPH IF APPLICABLE. Example: 02070 1.5.D.2 (Page 02070-2)

Comment:

RESPONSE

Project Contact Response:
Agree and will incorporate comments

Comment:



Fermilab

Please ensure that your review included a review of the project for appropriateness of the proposed systems, impacts on existing systems and operations and specific technical requirements to be incorporated into the design

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Project Number UIP ECP (If applicable)

Project Phase:

Comment Date:
September 3, 2010

Print  Duplicate  Main Menu 

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Specification Reference:
 PROVIDE SPECIFICATION SECTION AND PARAGRAPH IF APPLICABLE. Example: 02070 1.5.D.2 (Page 02070-2)

Comment:

RESPONSE

Project Contact Response:
Agree and will incorporate comments

Comment:



Please ensure that your review included a review of the project for appropriateness of the proposed systems, impacts on existing systems and operations and specific technical requirements to be incorporated into the design

PLEASE ENTER THE FOLLOWING INFORMATION

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Project Number UIP ECP (If applicable)

Project Phase:

Comment Date:
September 13, 2010



COMMENT

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Specification Reference:
 PROVIDE SPECIFICATION SECTION AND PARAGRAPH IF APPLICABLE. Example: 02070 1.5.D.2 (Page 02070-2)

Comment:

RESPONSE

Project Contact Response:
Agree and will incorporate comments

Comment:



Please ensure that your review included a review of the project for appropriateness of the proposed systems, impacts on existing systems and operations and specific technical requirements to be incorporated into the design

PLEASE ENTER THE FOLLOWING INFORMATION

Reviewer:

Project Number UIP ECP (If applicable)

Project Phase:

Comment Date:
September 1, 2010



COMMENT

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START WITH PAGE NUMBER FIRST FOLLOWED BY SECTION OR DETAIL REFERENCE. Example: A-1, Detail 4

Specification Reference:

PROVIDE SPECIFICATION SECTION AND PARAGRAPH IF APPLICABLE. Example: 02070 1.5.D.2 (Page 02070-2)

Comment:

It appears that the mechanical HVAC systems has already been established as described in 2.1.8. Since this an office building, were there any building energy modeling done to show how the selected systems impact the overall building energy? Isnt the energy model required by Guiding principle or Leed? What Energy modeling software will the AE use? If it hasnt been done, when will it be performed?

RESPONSE

Project Contact Response:

Comment:



Please ensure that your review included a review of the project for appropriateness of the proposed systems, impacts on existing systems and operations and specific technical requirements to be incorporated into the design

PLEASE ENTER THE FOLLOWING INFORMATION

Reviewer:

Project Number UIP ECP (If applicable)

Project Phase:

Comment Date:
September 1, 2010



COMMENT

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Specification Reference:
 PROVIDE SPECIFICATION SECTION AND PARAGRAPH IF APPLICABLE. Example: 02070 1.5.D.2 (Page 02070-2)

Comment:

RESPONSE

Project Contact Response:
Agree and will incorporate comments

Comment:



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Project Number UIP ECP (If applicable)

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Comment:

RESPONSE

Project Contact Response:
Agree and will incorporate comments

Comment:



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Specification Reference:

PROVIDE SPECIFICATION SECTION AND PARAGRAPH IF APPLICABLE. Example: 02070 1.5.D.2 (Page 02070-2)

Comment:

The CDF Connection, the existing building CDF is approximately 42,000 sq. ft. and I believe is classified as a Use Group F-2. Verify that no or provide a fire separation between CDF and the new proposed office complex is required.

RESPONSE

Project Contact Response:

Agree and will incorporate comments

Comment:

Will follow through with further Code investigation.



Please ensure that your review included a review of the project for appropriateness of the proposed systems, impacts on existing systems and operations and specific technical requirements to be incorporated into the design

PLEASE ENTER THE FOLLOWING INFORMATION	
Reviewer: <input type="text" value="Geoff Eargle"/>	
Project Number <input type="text" value="10-8-1"/>	UIP ECP (If applicable) <input type="text"/>
Project Phase: <input type="text" value="Comment and Compliance"/>	

Comment Date: September 10, 2010
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Print 	Duplicate 	Main Menu 
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COMMENT	
Drawing Reference: <input type="text"/>	START WITH PAGE NUMBER FIRST FOLLOWED BY SECTION OR DETAIL REFERENCE. Example: A-1, Detail 4
Specification Reference: <input type="text"/>	PROVIDE SPECIFICATION SECTION AND PARAGRAPH IF APPLICABLE. Example: 02070 1.5.D.2 (Page 02070-2)
Comment: <input type="text" value="I have no comments at this time."/>	

RESPONSE
Project Contact Response: Thank You for Reviewing this Project
Comment: <input type="text"/>



Please ensure that your review included a review of the project for appropriateness of the proposed systems, impacts on existing systems and operations and specific technical requirements to be incorporated into the design

PLEASE ENTER THE FOLLOWING INFORMATION

Reviewer:

Project Number UIP ECP (If applicable)

Project Phase:

Comment Date:
September 14, 2010

Print  Duplicate  Main Menu 

COMMENT

Drawing Reference: *START WITH PAGE NUMBER FIRST FOLLOWED BY SECTION OR DETAIL REFERENCE. Example: A-1, Detail 4*

Specification Reference: *PROVIDE SPECIFICATION SECTION AND PARAGRAPH IF APPLICABLE. Example: 02070 1.5.D.2 (Page 02070-2)*

Comment:

RESPONSE

Project Contact Response:
Thank You for Reviewing this Project

Comment:



Please ensure that your review included a review of the project for appropriateness of the proposed systems, impacts on existing systems and operations and specific technical requirements to be incorporated into the design

PLEASE ENTER THE FOLLOWING INFORMATION

Reviewer:

Project Number UIP ECP (If applicable)

Project Phase:

Comment Date:
September 14, 2010



COMMENT

Drawing Reference: *START WITH PAGE NUMBER FIRST FOLLOWED BY SECTION OR DETAIL REFERENCE. Example: A-1, Detail 4*

Specification Reference: *PROVIDE SPECIFICATION SECTION AND PARAGRAPH IF APPLICABLE. Example: 02070 1.5.D.2 (Page 02070-2)*

Comment:

I have no comments regarding this project at this time.

I have also signed the ESH Section Project Review Traveler.

RESPONSE

Project Contact Response:

Thank You for Reviewing this Project

Comment:



Please ensure that your review included a review of the project for appropriateness of the proposed systems, impacts on existing systems and operations and specific technical requirements to be incorporated into the design

PLEASE ENTER THE FOLLOWING INFORMATION

Reviewer:

Project Number UIP ECP (If applicable)

Project Phase:

Comment Date:
September 8, 2010



COMMENT

Drawing Reference: *START WITH PAGE NUMBER FIRST FOLLOWED BY SECTION OR DETAIL REFERENCE. Example: A-1, Detail 4*

Specification Reference: *PROVIDE SPECIFICATION SECTION AND PARAGRAPH IF APPLICABLE. Example: 02070 1.5.D.2 (Page 02070-2)*

Comment:

RESPONSE

Project Contact Response:
Thank You for Reviewing this Project

Comment:



Please ensure that your review included a review of the project for appropriateness of the proposed systems, impacts on existing systems and operations and specific technical requirements to be incorporated into the design

PLEASE ENTER THE FOLLOWING INFORMATION	
Reviewer: <input type="text" value="Jack Cassidy"/>	
Project Number <input type="text" value="10-8-1"/>	UIP ECP (If applicable) <input type="text"/>
Project Phase: <input type="text"/>	

Comment Date: September 1, 2010

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COMMENT	
Drawing Reference: <input type="text"/>	START WITH PAGE NUMBER FIRST FOLLOWED BY SECTION OR DETAIL REFERENCE. Example: A-1, Detail 4
Specification Reference: <input type="text"/>	PROVIDE SPECIFICATION SECTION AND PARAGRAPH IF APPLICABLE. Example: 02070 1.5.D.2 (Page 02070-2)
Comment: <input type="text" value="No comments"/>	

RESPONSE
Project Contact Response: Thank You for Reviewing this Project
Comment: <input type="text"/>



Please ensure that your review included a review of the project for appropriateness of the proposed systems, impacts on existing systems and operations and specific technical requirements to be incorporated into the design

PLEASE ENTER THE FOLLOWING INFORMATION

Reviewer:

Project Number UIP ECP (If applicable)

Project Phase:

Comment Date:
September 13, 2010



COMMENT

Drawing Reference:

START WITH PAGE NUMBER FIRST FOLLOWED BY SECTION OR DETAIL REFERENCE. Example: A-1, Detail 4

Specification Reference:

PROVIDE SPECIFICATION SECTION AND PARAGRAPH IF APPLICABLE. Example: 02070 1.5.D.2 (Page 02070-2)

Comment:

All paths and sidewalks should be 8' or wider to match existing side walk at FCC to D Rd. and to accomodate snow removal equipment that are 5' - 7'.

RESPONSE

Project Contact Response:

Agree and will incorporate comments

Comment:

To the extent budget will allow we try to maintain the 8-foot sidewalks when not adjacent to vehicular way.



Please ensure that your review included a review of the project for appropriateness of the proposed systems, impacts on existing systems and operations and specific technical requirements to be incorporated into the design

PLEASE ENTER THE FOLLOWING INFORMATION

Reviewer:

Project Number UIP ECP (If applicable)

Project Phase:

Comment Date:
September 13, 2010



COMMENT

Drawing Reference:

START WITH PAGE NUMBER FIRST FOLLOWED BY SECTION OR DETAIL REFERENCE. Example: A-1, Detail 4

Specification Reference:

PROVIDE SPECIFICATION SECTION AND PARAGRAPH IF APPLICABLE. Example: 02070 1.5.D.2 (Page 02070-2)

Comment:

As drawn, the bike path at the west end of the new parking lot, near the cryo bridge, is right where snow will have to be stored. If the 23 year old wooden bridge could be replaced in a different configuration it would solve the snow storage issue.

RESPONSE

Project Contact Response:

Agree and will incorporate comments

Comment:

We will try to add the bridge replacement & modify bike route if budget allows.



Please ensure that your review included a review of the project for appropriateness of the proposed systems, impacts on existing systems and operations and specific technical requirements to be incorporated into the design

PLEASE ENTER THE FOLLOWING INFORMATION

Reviewer:

Project Number UIP ECP (If applicable)

Project Phase:

Comment Date:
September 13, 2010



COMMENT

Drawing Reference:

START WITH PAGE NUMBER FIRST FOLLOWED BY SECTION OR DETAIL REFERENCE. Example: A-1, Detail 4

Specification Reference:

PROVIDE SPECIFICATION SECTION AND PARAGRAPH IF APPLICABLE. Example: 02070 1.5.D.2 (Page 02070-2)

Comment:

Keep any new vegetation back from road to allow good visibility in and out of parking lots and drives.

There is no way to maintaing prairie vegetation without fire as part of maintenance. Fire not practical here. Recommend turf grass between buildings/lots and D Rd.

RESPONSE

Project Contact Response:

Agree and will incorporate comments

Comment:

We will use native and adaptive species that require no add'l irrigation & minimal (semiannual/annual) mowing, and do not require burning. Per our discussion 9/16/10, we will not provide turf grass.



Please ensure that your review included a review of the project for appropriateness of the proposed systems, impacts on existing systems and operations and specific technical requirements to be incorporated into the design

PLEASE ENTER THE FOLLOWING INFORMATION

Reviewer:

Project Number UIP ECP (If applicable)

Project Phase:

Comment Date:
September 13, 2010



COMMENT

Drawing Reference:

START WITH PAGE NUMBER FIRST FOLLOWED BY SECTION OR DETAIL REFERENCE. Example: A-1, Detail 4

Specification Reference:

PROVIDE SPECIFICATION SECTION AND PARAGRAPH IF APPLICABLE. Example: 02070 1.5.D.2 (Page 02070-2)

Comment:

The area between the CDF building and the IARC building between the berm and the ramp is surrounded by buildings, transformers, generators ect. Snow removal very labor intensive, no where to push or pile it. There should be no major doorways or walkways through this area. Minimal snow removal service.

RESPONSE

Project Contact Response:

Disagree for Reasons Noted Below

Comment:

Per our discussion, exit discharge paths must be maintained.



Please ensure that your review included a review of the project for appropriateness of the proposed systems, impacts on existing systems and operations and specific technical requirements to be incorporated into the design

PLEASE ENTER THE FOLLOWING INFORMATION

Reviewer:

Project Number UIP ECP (If applicable)

Project Phase:

Comment Date:
September 3, 2010



COMMENT

Drawing Reference:
 START WITH PAGE NUMBER FIRST FOLLOWED BY SECTION OR DETAIL REFERENCE. Example: A-1, Detail 4

Specification Reference:
 PROVIDE SPECIFICATION SECTION AND PARAGRAPH IF APPLICABLE. Example: 02070 1.5.D.2 (Page 02070-2)

Comment:

Elevator on emergency generator, does it require it's own automatic transfer switch, in accordance with NEC Article 708 COPS?

RESPONSE

Project Contact Response:
Response Incomplete, Additional Information to Follow

Comment:
We will follow through & investigate requirements.



Please ensure that your review included a review of the project for appropriateness of the proposed systems, impacts on existing systems and operations and specific technical requirements to be incorporated into the design

PLEASE ENTER THE FOLLOWING INFORMATION

Reviewer:

Project Number UIP ECP (If applicable)

Project Phase:

Comment Date:
September 3, 2010



COMMENT

Drawing Reference:
 START WITH PAGE NUMBER FIRST FOLLOWED BY SECTION OR DETAIL REFERENCE. Example: A-1, Detail 4

Specification Reference:
 PROVIDE SPECIFICATION SECTION AND PARAGRAPH IF APPLICABLE. Example: 02070 1.5.D.2 (Page 02070-2)

Comment:

Prefer Siemens, Fire Alarm equipment, model XLS for the fire alarm control panel. Would strongly suggest an emergency voice fire alarm system for this complex, so it can be integrated with Fermilab MASS notification system. The fire alarm system should also be designed to extend, at a future date, into the CDF Facility.

RESPONSE

Project Contact Response:
Agree and will incorporate comments

Comment:



Please ensure that your review included a review of the project for appropriateness of the proposed systems, impacts on existing systems and operations and specific technical requirements to be incorporated into the design

PLEASE ENTER THE FOLLOWING INFORMATION

Reviewer:

Project Number UIP ECP (If applicable)

Project Phase:

Comment Date:
September 3, 2010



COMMENT

Drawing Reference:

START WITH PAGE NUMBER FIRST FOLLOWED BY SECTION OR DETAIL REFERENCE. Example: A-1, Detail 4

Specification Reference:

PROVIDE SPECIFICATION SECTION AND PARAGRAPH IF APPLICABLE. Example: 02070 1.5.D.2 (Page 02070-2)

Comment:

Prefer Viking equipment for the automatic sprinkler heads and components. All new sprinklers should be standard spray, quick response type. The inspector's test/aux. drain connection should be located at the combination standpipe/sprinkler riser.

RESPONSE

Project Contact Response:

Agree and will incorporate comments

Comment:



Please ensure that your review included a review of the project for appropriateness of the proposed systems, impacts on existing systems and operations and specific technical requirements to be incorporated into the design

PLEASE ENTER THE FOLLOWING INFORMATION

Reviewer:

Project Number UIP ECP (If applicable)

Project Phase:

Comment Date:
September 3, 2010



COMMENT

Drawing Reference:

START WITH PAGE NUMBER FIRST FOLLOWED BY SECTION OR DETAIL REFERENCE. Example: A-1, Detail 4

Specification Reference:

PROVIDE SPECIFICATION SECTION AND PARAGRAPH IF APPLICABLE. Example: 02070 1.5.D.2 (Page 02070-2)

Comment:

The water source for the automatic sprinkler protection is pond "raw" and as such, we have experience MIC. In order to reduce corrosion, all sprinkler piping should be schedule 40, carbon steel, and all pendent type sprinklers should be provided with return bends. CDR-28 indicated interconnection of fire sprinkler and domestic water, this is prohibited by EPA and Illinois Plumbing Code.

RESPONSE

Project Contact Response:

Agree and will incorporate comments

Comment:



Please ensure that your review included a review of the project for appropriateness of the proposed systems, impacts on existing systems and operations and specific technical requirements to be incorporated into the design

PLEASE ENTER THE FOLLOWING INFORMATION	
Reviewer: <input type="text" value="J. Niehoff"/>	
Project Number <input type="text" value="10-8-1"/>	UIP ECP (If applicable) <input type="text"/>
Project Phase: <input type="text" value="Project Coordination"/>	

Comment Date: September 3, 2010

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COMMENT	
Drawing Reference: <input type="text" value="Fire Protection"/>	<i>START WITH PAGE NUMBER FIRST FOLLOWED BY SECTION OR DETAIL REFERENCE. Example: A-1, Detail 4</i>
Specification Reference: <input type="text"/>	<i>PROVIDE SPECIFICATION SECTION AND PARAGRAPH IF APPLICABLE. Example: 02070 1.5.D.2 (Page 02070-2)</i>
Comment: <input type="text" value="Verify that the elevator recall/shut-down is integrated with fire alarm system, in accordance with ANSI 17.1."/>	

RESPONSE
Project Contact Response: Agree and will incorporate comments
Comment: <input type="text"/>



Fermilab

Please ensure that your review included a review of the project for appropriateness of the proposed systems, impacts on existing systems and operations and specific technical requirements to be incorporated into the design


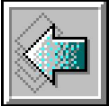
PLEASE ENTER THE FOLLOWING INFORMATION

Reviewer:

Project Number UIP ECP (If applicable)

Project Phase:

Comment Date:
September 3, 2010

Print  Duplicate  Main Menu 

COMMENT

Drawing Reference:
 START WITH PAGE NUMBER FIRST FOLLOWED BY SECTION OR DETAIL REFERENCE. Example: A-1, Detail 4

Specification Reference:
 PROVIDE SPECIFICATION SECTION AND PARAGRAPH IF APPLICABLE. Example: 02070 1.5.D.2 (Page 02070-2)

Comment:

Would prefer only Class I Standpipe (2-1/2-inch fire department valves) located in the stairwells. Any proposed 1-1/2" fire hose in cabinets should be discussed with Fermilab prior to installation. The standpipe roof manifolds, please discuss this with Fermilab during the Title II design.

RESPONSE

Project Contact Response:
Agree and will incorporate comments

Comment:



Please ensure that your review included a review of the project for appropriateness of the proposed systems, impacts on existing systems and operations and specific technical requirements to be incorporated into the design

PLEASE ENTER THE FOLLOWING INFORMATION

Reviewer:

Project Number UIP ECP (If applicable)

Project Phase:

Comment Date:
September 3, 2010



COMMENT

Drawing Reference:

START WITH PAGE NUMBER FIRST FOLLOWED BY SECTION OR DETAIL REFERENCE. Example: A-1, Detail 4

Specification Reference:

PROVIDE SPECIFICATION SECTION AND PARAGRAPH IF APPLICABLE. Example: 02070 1.5.D.2 (Page 02070-2)

Comment:

All exterior oil filled transformers in excess of 500 gallons should be separated by 25-ft from building or provide a 2-hour fire separation, in accordance with NFPA 850. Provide containment for outside fluid filled transformers, reference FM Global Data Sheet 5-4.

RESPONSE

Project Contact Response:

Agree and will incorporate comments

Comment:



Please ensure that your review included a review of the project for appropriateness of the proposed systems, impacts on existing systems and operations and specific technical requirements to be incorporated into the design

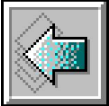
PLEASE ENTER THE FOLLOWING INFORMATION

Reviewer:

Project Number UIP ECP (If applicable)

Project Phase:

Comment Date:
September 3, 2010

Print  Duplicate  Main Menu 

COMMENT

Drawing Reference:
 START WITH PAGE NUMBER FIRST FOLLOWED BY SECTION OR DETAIL REFERENCE. Example: A-1, Detail 4

Specification Reference:
 PROVIDE SPECIFICATION SECTION AND PARAGRAPH IF APPLICABLE. Example: 02070 1.5.D.2 (Page 02070-2)

Comment:

RESPONSE

Project Contact Response:
Agree and will incorporate comments

Comment:



Please ensure that your review included a review of the project for appropriateness of the proposed systems, impacts on existing systems and operations and specific technical requirements to be incorporated into the design

PLEASE ENTER THE FOLLOWING INFORMATION

Reviewer:

Project Number UIP ECP (If applicable)

Project Phase:

Comment Date:
September 13, 2010

Print  Duplicate  Main Menu 

COMMENT

Drawing Reference:
 START WITH PAGE NUMBER FIRST FOLLOWED BY SECTION OR DETAIL REFERENCE. Example: A-1, Detail 4

Specification Reference:
 PROVIDE SPECIFICATION SECTION AND PARAGRAPH IF APPLICABLE. Example: 02070 1.5.D.2 (Page 02070-2)

Comment:

RESPONSE

Project Contact Response:
Agree and will incorporate comments

Comment:



Please ensure that your review included a review of the project for appropriateness of the proposed systems, impacts on existing systems and operations and specific technical requirements to be incorporated into the design

PLEASE ENTER THE FOLLOWING INFORMATION

Reviewer:

Project Number UIP ECP (If applicable)

Project Phase:

Comment Date:
September 1, 2010



COMMENT

Drawing Reference:

START WITH PAGE NUMBER FIRST FOLLOWED BY SECTION OR DETAIL REFERENCE. Example: A-1, Detail 4

Specification Reference:

PROVIDE SPECIFICATION SECTION AND PARAGRAPH IF APPLICABLE. Example: 02070 1.5.D.2 (Page 02070-2)

Comment:

It appears that the mechanical HVAC systems has already been established as described in 2.1.8. Since this an office building, were there any building energy modeling done to show how the selected systems impact the overall building energy? Isnt the energy model required by Guiding principle or Leed? What Energy modeling software will the AE use? If it hasnt been done, when will it be performed?

RESPONSE

Project Contact Response:

Comment:



Please ensure that your review included a review of the project for appropriateness of the proposed systems, impacts on existing systems and operations and specific technical requirements to be incorporated into the design

PLEASE ENTER THE FOLLOWING INFORMATION

Reviewer:

Project Number UIP ECP (If applicable)

Project Phase:

Comment Date:
September 3, 2010



COMMENT

Drawing Reference:
 START WITH PAGE NUMBER FIRST FOLLOWED BY SECTION OR DETAIL REFERENCE. Example: A-1, Detail 4

Specification Reference:
 PROVIDE SPECIFICATION SECTION AND PARAGRAPH IF APPLICABLE. Example: 02070 1.5.D.2 (Page 02070-2)

Comment:

RESPONSE

Project Contact Response:
Agree and will incorporate comments

Comment:



Please ensure that your review included a review of the project for appropriateness of the proposed systems, impacts on existing systems and operations and specific technical requirements to be incorporated into the design

PLEASE ENTER THE FOLLOWING INFORMATION

Reviewer:

Project Number UIP ECP (If applicable)

Project Phase:

Comment Date:
September 3, 2010



COMMENT

Drawing Reference:

START WITH PAGE NUMBER FIRST FOLLOWED BY SECTION OR DETAIL REFERENCE. Example: A-1, Detail 4

Specification Reference:

PROVIDE SPECIFICATION SECTION AND PARAGRAPH IF APPLICABLE. Example: 02070 1.5.D.2 (Page 02070-2)

Comment:

The CDF Connection, the existing building CDF is approximately 42,000 sq. ft. and I believe is classified as a Use Group F-2. Verify that no or provide a fire separation between CDF and the new proposed office complex is required.

RESPONSE

Project Contact Response:

Agree and will incorporate comments

Comment:

Will follow through with further Code investigation.



Please ensure that your review included a review of the project for appropriateness of the proposed systems, impacts on existing systems and operations and specific technical requirements to be incorporated into the design

PLEASE ENTER THE FOLLOWING INFORMATION

Reviewer:

Project Number UIP ECP (If applicable)

Project Phase:

Comment Date:
September 3, 2010



COMMENT

Drawing Reference:
 START WITH PAGE NUMBER FIRST FOLLOWED BY SECTION OR DETAIL REFERENCE. Example: A-1, Detail 4

Specification Reference:
 PROVIDE SPECIFICATION SECTION AND PARAGRAPH IF APPLICABLE. Example: 02070 1.5.D.2 (Page 02070-2)

Comment:

RESPONSE

Project Contact Response:
Agree and will incorporate comments

Comment:



WFO and Grant Documents

- U.S Department of Energy Work For Others Agreement with Non-Federal Sponsors, WFO FRA-2010-0002, with transmittal letter to DOE
- Illinois Department of Commerce and Economic Opportunity Grant No. 10-203828
- Illinois Department of Commerce and Economic Opportunity Grant No. 10-203829
- State Welcome Package Grant No. 10-203828 (Reports Deliverable Schedule)
- State Welcome Package Grant No. 10-203829(Reports Deliverable Schedule)
- Illinois Historic Preservation Agency sign-off
- Illinois Department of Natural Resources sign-off



Bruce L. Chrisman
Chief Operating Officer

630.840.2359 (phone)
630.840.8752 (fax)
chrisman@fnal.gov

August 13, 2010

Mr. Mark Bollinger
Acting Area Manager
Fermi Site Office
U.S. Department of Energy
P.O. Box 2000
Batavia, IL 60510-0500

Dear Mr. Bollinger:

SUBJECT: Work for Others (WFO) Proposal -- WFO FRA-2010-0002 -- State of Illinois,
Department of Commerce and Economic Opportunity (DCEO)

Enclosed is a WFO agreement between Fermi Research Alliance, LLC (FRA) and State of Illinois,
DCEO for work to be done at Fermilab.

Please disregard our letter of June 23, 2010. After negotiation with DCEO, it appears that we have
all the signed WFO documents we need and the document contained herein has all of the clauses
approved by Department of Energy for this WFO.

Should you have any questions about the nature of these activities, please contact me. If there are
any questions of an administrative or legal nature, please call Ms. Mary Jo Lyke (8976) or Mr. Gary
Leonard (x2719), respectively.

Sincerely,

Bruce L. Chrisman
Chief Operations Officer

BLC:po

Cc: P. Oddone
C. Conger
R Kephart
S. Holmes
M. J. Lyke
R. Ortgeisen
N. Grossman
G. Leonard

U.S. DEPARTMENT OF ENERGY
WORK FOR OTHERS AGREEMENT WITH NON-FEDERAL SPONSORS

Work for Others Agreement No. WFO FRA-2010-0002

Between

Fermi Research Alliance, LLC

Operating Under Prime Contract No. DE-AC02-76CH11359

for the

U.S. Department of Energy (DOE)

and

State of Illinois, Department of Commerce and Economic Opportunity

for

Illinois Accelerator Research Center
(Illinois Grants 10-203828 and 10-203829)

The obligations of the above-identified DOE Contractor shall apply to any successor in interest to said Contractor continuing the operation of the DOE facility involved in this Work for Others Agreement.



Grant Management Program 01

Grant No. 10-203828

for the

Fermi Research Alliance, LLC

Illinois Department of Commerce and Economic Opportunity
620 E. Adams St.
Springfield, IL 62701

**STATE OF ILLINOIS
DEPARTMENT OF COMMERCE AND ECONOMIC OPPORTUNITY**

Notice of Grant Award No. 10-203828

This Grant Agreement (hereinafter referred to as the "Agreement") is entered into between the Illinois Department of Commerce and Economic Opportunity (hereinafter referred to as the "Department" or "DCEO") and **Fermi Research Alliance, LLC** (hereinafter referred to as the "Grantee"). Subject to terms and conditions of this Agreement, the Department agrees to provide a Grant in an amount not to exceed **\$17,000,000.00** to the Grantee.

Subject to the execution of this Agreement by both parties, the Grantee is hereby authorized to incur costs against this Agreement from the beginning date of **06/01/2010** through the ending date of **05/31/2012**, unless otherwise established within Part II Scope of Work. The Grantee hereby agrees to use the Grant Funds provided under the Agreement for the purposes set forth herein and agrees to comply with all terms of this Agreement.

This Agreement includes the following sections, all of which are incorporated into and made part of this Agreement:

Parts:

- I. Budget**
- II. Scope of Work**
- III Grant Fund Control Requirements**
- IV. Terms and Conditions**
- V. General Provisions**
- VI. Certifications**

This grant is state funded.

Under penalties of perjury, the undersigned certifies that the name, taxpayer information number and legal status listed below are correct.

Name: Fermi Research Alliance, LLC

Taxpayer Identification Number:
SSN/FEIN: 571239010

- Legal Status:
- Individual (01)
 - Sole Proprietor (02)
 - Partnership/Legal Corporation (03)
 - Corporation (04)
 - Not For Profit Corporation (04)
 - Medical Corporation (06)
 - Governmental (08)
 - Estate or Trust (10)
 - Pharmacy-Noncorporate (11)
 - Nonresident Alien (13)
 - Pharmacy/Funeral Home/Cemetery Corp (15)
 - Tax Exempt (16)
 - Limited Liability Company (select applicable tax classification)
 - C - Corporation
 - P - Partnership

GRANTEE:
 Fermi Research Alliance, LLC

Grantee's execution of this Agreement shall serve as its attestation that Grantee has read, understands and agrees to all provisions of this Agreement and that the information contained in the Agreement is true and correct to the best of his/her knowledge, information and belief and that the Grantee shall be bound by the same. Grantee acknowledges that the individual executing this Agreement is authorized to act on the Grantee's behalf. Grantee further acknowledges that the award of Grant Funds under this Agreement is conditioned upon the above certification/attestation.

By: *[Signature]* COO Date 6/23/10
 (Authorized Signator)

Signature authorization on file [initials]

[Signature] Pier Odono, President
 Name and Title

STATE OF ILLINOIS DEPARTMENT OF COMMERCE AND ECONOMIC OPPORTUNITY

By: *[Signature]* By: *[Signature]*
 Warren Ribley, Director Anita D. Patel, Chief Financial Officer Date 6/23/10

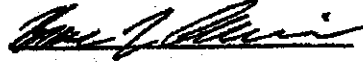
Grantee Address: PO Box 500 Batavia, IL 60510-5011
 Please indicate any address changes below

In processing this grant and related documentation, the Department will only accept materials signed by the Authorized Signatory or Designee of this Agreement, as designated or prescribed herein. If the Authorized Signatory chooses to assign a designee to sign or submit materials required by this Agreement to the Department, the Authorized Signatory must either send written notice to the Department indicating the name of the designee or provide notice as set forth immediately following this paragraph. Without such notice, the Department will reject any materials signed or submitted on the Grantee's behalf by anyone other than the Authorized Signatory. The Authorized Signatory must approve each Authorized Designee separately by signing as indicated below. If an Authorized Designee(s) appears below, please verify the information and indicate any changes as necessary.

The following are designated as Authorized Designee(s) for the Grantee:

Authorized Designee: Robert Kephart
Authorized Designee Title: Associate Director
Authorized Designee Phone: 630-840-3135

Authorized Signatory Approval:



Authorized Designee: Mary Jo Lyke
Authorized Designee Title: Manager of Grants & Contracts
Authorized Designee Phone: 630-840-8976

Authorized Signatory Approval:



Authorized Designee:
Authorized Designee Title:
Authorized Designee Phone:

Authorized Signatory Approval:

PART I

BUDGET

Cost Category Description	Cost Cat	DCEO Budget Amount	Variance %	Variance Limit
WIRING/ELECTRICAL	1215	1,868,750.00	10.00	0.00
EQUIPMENT/MATERIAL/LABOR	1217	6,177,050.00	10.00	0.00
PAVING/CONCRETE/MASONRY	1219	1,437,500.00	10.00	0.00
CONSTRUCTION MGMT & OVERSIGHT	1221	1,402,050.00	10.00	0.00
MECHANICAL SYSTEMS	1223	3,018,750.00	10.00	0.00
EXCAVATION/SITE PREP/DEMO	1225	143,594.00	10.00	0.00
PLUMBING	1229	431,250.00	10.00	0.00
OTHER CONSTRUCTION EXPENSES	1233	821,056.00	10.00	0.00
CONTINGENCY	1235	1,700,000.00	10.00	0.00
Total		\$17,000,000.00		

BUDGET LINE ITEM DEFINITIONS

The definitions listed below will help to identify allowable costs for each of the budgeted lines in this Agreement. Any costs not specifically named below should be verified to be allowable by the DCEO grant manager prior to incurring the cost.

- WIRING/ELECTRICAL** purchase of materials necessary for completion of the project scope such as: electrical wiring; conduit; outlets; switches; etc. including associated labor/installation costs, as identified within the Part II Scope of Work.
- EQUIPMENT/MATERIAL/LABOR** purchase of materials and/or purchase/lease of equipment, to use or install for the project, such as: steel; drywall; lumber; wiring; doors; windows; roofing; rock; etc. including labor/installation costs, as identified within Part II Scope of Work.
- PAVING/CONCRETE/MASONRY** purchase of materials necessary for completion of the project scope such as bituminous pavement; concrete; rock; bricks; blocks; mortar; tuckpointing; etc. including associated labor/installation costs, as identified within the Part II Scope of Work.
- CONSTRUCTION MGMT & OVERSIGHT** costs associated with managing the construction activities and/or overseeing all aspects of the construction project, either by contractor personnel or Grantee personnel, but limited to verifiable time working on this project.
- MECHANICAL SYSTEMS** purchase of materials necessary for completion of the project scope such as: HVAC; elevators; fire alarm, sprinkler, or ventilation systems; etc. including associated labor/installation costs, as identified within the Part II Scope of Work.
- EXCAVATION/SITE PREP/DEMO** costs associated with demolition of existing structures on the project site and/or preparation of the project site including excavation, etc. ahead of actual new construction/renovation activities.

PLUMBING	purchase of materials necessary for completion of the project scope such as: internal or external pipes for water, gas, and/or sewage; fixtures; etc. including associated labor/installation costs, as identified within the Part II Scope of Work.
OTHER CONSTRUCTION EXPENSES	costs that can't be easily broken out to or covered by other individual/specific Budgetary line items such as: landscaping; hauling; equipment rental; insurance; environmental fees; loan payments; etc. as identified within the Part II Scope of Work.
CONTINGENCY	coverage of potential cost overruns in any of the other utilized Grant Budget line items.

Pass-Through Entity or Subgrantor Responsibilities. If Grantee provides any portion of this funding to another entity through a grant agreement or contract, Grantee is considered to be a pass-through entity or subgrantor. Per Section 5.10(M) of the Agreement, Grantee must obtain written approval before it provides any portion of this funding to another entity through a grant agreement or contract. If the Department provides written approval, the Grantee must adhere to the following for any awards or contracts entered into using the Grant Funds listed above:

- (1) Ensure that all subgrant or contractual awards of Grant Funds are made in conformance with the terms of this Agreement specifically including, but not limited to, Sections 3.4 and 3.6 of this Agreement; and
- (2) Ensure subgrantees are aware of the terms and conditions of this grant and abide by them.

PART II

SCOPE OF WORK

In consideration for the Grant Funds to be provided by the Department, the Grantee agrees to perform the Project described in Part II (Scope of Work) hereof, in accordance with the provisions of Part I (Budget) hereof.

Section 1. Public Benefit

The Grantee is the operator of, and does business as, Fermi National Accelerator Laboratory (Fermilab) which is a national laboratory funded by the U.S. Department of Energy's (DOE) Office of Science to conduct basic research into particle physics. Fermilab's experiments in high energy physics and related disciplines advance the understanding of the fundamental nature of matter and energy. From 1967 to 2006, Universities Research Association, Inc. (URA) was the prime contractor to DOE for the creation and operation of Fermilab. URA is a consortium of approximately 90 leading research oriented universities primarily in the United States, with members also in Canada, Japan, and Italy. Effective January 1, 2007 URA joined with the University of Chicago to form the Grantee entity, which now holds the contract with DOE for the management and operation of Fermilab. All of the land within the Grantee's facility is owned by DOE, and is available to the Fermilab via the Grantee's Prime Contract with DOE.

The Grantee will be constructing an Illinois Accelerator Research Center (IARC) within the 6,800 acre Fermilab facility near Batavia, Illinois, on the boundary of Kane and DuPage counties. The IARC will provide a focal point for accelerator research, education, and industrialization, while initiating, promoting, and supporting related industry in Illinois. The IARC will increase the probability that new scientific frontier accelerators such as a new intense proton source (Project X), the International Linear Collider (ILC), or a Muon Collider (MC) could be sited at Fermilab. In partnership with industry and local university accelerator programs, the IARC will make critical contributions to the technological and economic health of Illinois and will provide unique educational opportunities for a new generation of Illinois engineers and scientists.

The Grant-funded portion of the IARC will cover a portion of the costs for approximately 30,000 square feet of technical, office, and classroom space in the "industrial" area of the Fermilab campus. The new Grant-funded building will provide offices and technical space for both Fermilab and Argonne National Laboratory staff, as well as for industrial partners working at Fermilab. The IARC's chosen location will provide its occupants with excellent access to the engineers and designers in the Fermilab Technical Division specializing in accelerator technology development. This project will be dramatically enhanced by the reuse (via other funding sources) of an existing large heavy assembly building sited adjacent to the new construction. The two buildings will collectively make up the physical plant of the IARC.

The IARC will develop world-leading educational programs in key aspects of accelerator physics and engineering and will attract top scientists from across the globe as faculty at nearby universities. These top scientists will perform world class research and educate and mentor Illinois students. The IARC positions Illinois to become a global center for the development of accelerator physics and engineering, medical accelerators, beam diagnostics and instrumentation, superconducting and high-power radiofrequency technology, next-generation synchrotron light sources, and isotope generation. With a strong focus on industrialization of these technologies, the IARC will attract high-tech companies and will train Illinois citizens in advanced technologies.

Grant funds will be used to cover a portion of the total construction costs for the new IARC facility, as follows:

Wiring/Electrical – to include costs for electrical service/distribution, lighting and branch wiring, communication and security, and uninterruptible power supply, in addition to associated labor.

Equipment/Material/Labor – to include the costs of floor and roof construction, exterior walls (partial), exterior windows and doors, roofing, interior partitions and doors, and miscellaneous building "fit-up", in addition to associated labor.

Paving/Concrete/Masonry – to include costs for the substructure and the exterior walls (partial), in addition to associated labor.

Construction Management/Oversight – to include the costs of a private architectural/engineering firm to provide construction management and oversight to monitor the day-to-day progress and performance of the construction contractor, including product and shop drawing reviews, change order documentation, technical document interpretation and clarification, and periodic site inspections to verify contractor conformance with design intent.

Mechanical System – to include costs for the heating, cooling, and sustainability systems and equipment, in addition to associated labor.

Excavation/Site Prep/Demolition – to include the costs of excavation, site preparation, and site demolition, in addition to associated labor.

Plumbing – to include costs for plumbing fixtures, domestic water distribution, rain water discharge, fire suppression system, and stand pipes, in addition to associated labor.

Other Construction Expenses – to include the costs of elevators, miscellaneous and incidental interior fittings, and metal pan steel stairs, in addition to associated labor.

Contingency – for coverage of potential cost overruns in any of the other utilized Grant Budget line items.

This Grant-funded project will benefit the public by providing the opportunity for Illinois to become a world leader in accelerator technology. The technology of particle accelerators powers a host of applications for society, such as: cancer therapy (medicine); materials processing (industry); subcritical reactors (energy); waste water treatment (environment); cargo inspection (national security); etc. The IARC will be utilized as incubator space for emerging accelerator technologies, providing a central point for cutting-edge accelerator research and industrialization.

Section 2. Grant Tasks

- 2.1 The Grantee shall use Grant funds as detailed in Part I, BUDGET. Expenditure of Grant funds will comply with applicable bond guidelines.
- 2.2 The Grantee shall utilize property acquired, constructed or improved with funds provided under this Agreement solely to provide the programs and services specified in Section 1, above, for at least the term of the Grant Agreement. Any sale, transfer, assignment or other conveyance of property acquired, constructed or improved shall provide that the property must continue to be used to accomplish or facilitate the public purpose described in Section 1, above.
- 2.3 The Grantee agrees to comply with the following:
 - (a) The Grantee shall utilize grant funds in accordance with Part I (Budget) to complete the activities/performance described in Section 1, above. The Grantee shall provide any additional funds, or secure commitments therefore, which are necessary to complete the specified activities/performance during the grant term set forth in the Notice of Grant Award.
 - (b) The Grantee shall execute all agreements necessary to complete the activities/performance described in Section 1, above, including, but not limited to, purchase/sales contracts for real and/or personal property, leases, easements, loans, financing agreements, grant agreements, operating agreements, etc., during the grant term specified in the Notice of Grant Award.
 - (c) The Grantee shall obtain all authorization necessary to complete the activities/performance described in Section 1, above, including, but not limited to, municipal ordinances, permits, variances, other approvals, etc., during the grant term specified in the Notice of Grant Award.
 - (d) The Grantee shall notify the Departmental grant manager in writing no later than 10 days after it becomes aware of any events/circumstances that will result in substantial delays or may substantially impair the Grantee's ability to complete the activities/performance described in Section 1, above, during the grant term specified in the Notice of Grant Award.

(e) The Grantee shall provide to the Department additional information relative to its compliance with the provisions set forth in subsections (a) through (d), above, pursuant to Part III, Section 3.2C, "Additional Information."

(f) In addition to the requirements of Part III, Section 3.7, the Grantee shall maintain in its file, and make available to the Department upon request therefore, copies of documentation, correspondence, agreements, etc., evidencing compliance with the requirements of subsections (a) through (d), above.

2.4 Any equipment purchased with Grant funds provided hereunder shall only be used for the purposes set forth above for the term of the grant.

2.5 The Grantee agrees and affirms that its programs are available to any person interested in participating, regardless of that person's financial situation, religious affiliation (or lack thereof), ethnicity, or national origin.

2.6 The Grantee shall continue to provide the programs and services specified in Section 1 and 2, above, for the term of the Grant Agreement. The Grantee acknowledges that it shall not utilize Grant funds to perform or further the performance of sectarian activities.

**PART III
GRANT FUND CONTROL REQUIREMENTS**

3.1 AUDITS

- A. Standard Audit The Grantee is required to obtain a Standard Audit and provide the Department with a copy of the audit report, the management letter, and the SAS 114 letter within thirty (30) days of the Grantee's receipt of such audit report, but in no event later than nine (9) months following the end of the period for which the audit was performed. The Audit Report is required to be provided to DCEO annually for the life of the grant.
- B. Single Audit If the Grantee is required to have a Single Audit performed in accordance with OMB Circular A-133, the Grantee is required to submit copies of the audit report, the data collection form, the management letter and the SAS 114 letter, as provided for in the Single Audit Act and OMB Circular A-133, to the Department within thirty (30) days of the Grantee's receipt of such audit report, but in no event later than nine (9) months following the end of the period for which the audit was performed. If no Single Audit is required, the Grantee is to provide DCEO with an annual letter stating a Single Audit was not required.
- C. Audit Requirements for State Grants Audited by the Illinois Office of the Auditor General (OAG) Grantees required by the Illinois OAG to obtain a financial audit, compliance examination, performance audit will be notified by OAG. The Grantee shall provide the Department with a copy of any financial audit, compliance examination, Single Audit or performance audit along with the accompanying management letter, letter of immaterial findings and the SAS 114 letter within thirty (30) days of the Grantee's receipt of such audit report, but in no event later than nine (9) months following the end of the period for which the audit or examination was performed. The Audit Report is required to be provided to DCEO any year an audit is performed over the life of the grant.
- D. Discretionary Audit The Department may, at any time, and at its discretion, request a Grant-Specific Audit or other audit, Management Letter and SAS 114 Letter to be delivered within thirty (30) days of the Grantee's receipt of such audit report, but in no event later than nine (9) months following the end of the period for which the audit was performed.
- E. Audit Performance All Audits shall be performed by an independent certified public accountant or accounting firm licensed by the appropriate licensing body in accordance with applicable auditing standards.
- F. Audit Submission The Grantee shall electronically send all audit reports and related deliverables to the Department at the following address:

externalauditunit@illinois.gov

If the Grantee is unable to submit the aforementioned documents to the Department electronically, the information shall be sent to the Department at the following address:

Illinois Department of Commerce and Economic Opportunity
Office of Accountability
External Audit Section
620 East Adams Street
Springfield, IL 62701

3.2 REPORTING REQUIREMENTS

In addition to any other documents specified in this Agreement, the Grantee must submit the following reports and information in accordance with the provisions hereof.

**PART III
GRANT FUND CONTROL REQUIREMENTS**

3.1 AUDITS

- A. Standard Audit The Grantee is required to obtain a Standard Audit and provide the Department with a copy of the audit report, the management letter, and the SAS 114 letter within thirty (30) days of the Grantee's receipt of such audit report, but in no event later than nine (9) months following the end of the period for which the audit was performed. The Audit Report is required to be provided to DCEO annually for the life of the grant.
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- D. Discretionary Audit The Department may, at any time, and at its discretion, request a Grant-Specific Audit or other audit, Management Letter and SAS 114 Letter to be delivered within thirty (30) days of the Grantee's receipt of such audit report, but in no event later than nine (9) months following the end of the period for which the audit was performed.
- E. Audit Performance All Audits shall be performed by an independent certified public accountant or accounting firm licensed by the appropriate licensing body in accordance with applicable auditing standards.
- F. Audit Submission The Grantee shall electronically send all audit reports and related deliverables to the Department at the following address:

externalauditunit@illinois.gov

If the Grantee is unable to submit the aforementioned documents to the Department electronically, the information shall be sent to the Department at the following address:

Illinois Department of Commerce and Economic Opportunity
Office of Accountability
External Audit Section
620 East Adams Street
Springfield, IL 62701

3.2 REPORTING REQUIREMENTS

In addition to any other documents specified in this Agreement, the Grantee must submit the following reports and information in accordance with the provisions hereof.

- A. Expenditures and Project Activity Prior to Grant Execution If the Agreement is executed more than thirty (30) days after the beginning date of the grant term provided in the Notice of Grant Award, the Grantee must submit a Financial Status Report and a Project Status Report, in a format provided by the Department, accounting for expenditures and project activity incurred from the beginning of the grant term up to the end of the month preceding the date of the Department's execution. If these Reports are required, the Department will not disburse any Grant Funds until the report is submitted to and approved by the Department.
- B. Final Financial Status Report The Final Financial Status Report described in Section 5.3 hereof is due within 45 days following the end date stated in the Notice of Grant Award. The Grantee should refer to the Welcome Package and the Reports Deliverable Schedule for the specific reporting requirements and due dates. Grantee must submit the report in the format provided by the Department. This report must summarize expenditure of the Grant Funds and activities completed during the grant term. The Grantee's failure to comply with the Close-out requirements set forth herein and in Section 5.3 will be considered a material breach of the performance required by this Agreement and may be the basis to initiate proceedings to recover all Grant Funds disbursed to the Grantee. Grantee's failure to comply with this Section shall be considered prima facie evidence of default, and may be admitted as such, without further proof, into evidence before the Department or in any other legal proceeding.
- C. Additional Information Upon request by the Department, the Grantee must, within the time directed by the Department, submit additional written reports regarding the Project, including, but not limited to, materials sufficient to document information provided by the Grantee.
- D. Submittal of Reports Submittal of all reports and documentation required under this Agreement should be submitted to the individual as directed by the Department.
- E. Failure to Submit Reports In the event Grantee fails to timely submit any reports required under this Agreement, the Department may withhold or suspend the distribution of Grant Funds until said reports are filed and approved by the Department.

3.3 WELCOME PACKAGE

Upon execution of this Grant Agreement, the Grantee will receive a Welcome Package detailing reporting requirements and procedures relating to the Grant. The Grantee is obligated to comply with those requirements and any revisions thereto in accordance with Section 3.2(B) of this Grant Agreement.

3.4 FISCAL RECORDING REQUIREMENTS

The Grantee's financial management system shall be structured to provide for accurate, current, and complete disclosure of the financial results of the Project funded under this grant program. The Grantee is accountable for all Grant Funds received under this Grant, including those expended for subgrantees. The Grantee shall maintain effective control and accountability over all Grant Funds, equipment, property, and other assets under the grant as required by the Department. The Grantee shall keep records sufficient to permit the tracing of Grant Funds to a level of expenditure adequate to insure that Grant Funds have not been inappropriately expended, and must have internal controls consistent with generally accepted accounting practices adopted by the American Institute of Certified Public Accountants.

3.5 DUE DILIGENCE IN EXPENDITURE OF FUNDS

Grantee shall ensure that Grant Funds are expended in accordance with the following principles: (i) grant expenditures should be made in accordance with generally accepted sound, business practices, arms-length bargaining, applicable federal and state laws and regulations; (ii) grant expenditures should conform to the terms and conditions of this Agreement; (iii) grant expenditures should not exceed the amount that would be incurred by a prudent person under the circumstances prevailing at the time the decision is made to incur the costs; and (iv) grant accounting should be consistent with generally accepted accounting principles.

3.6 MONITORING

The grant will be monitored for compliance in accordance with the terms and conditions of the Grant Agreement, together with appropriate programmatic rules, regulations, and/or guidelines that the Department promulgates or implements. The Grantee must permit any agent authorized by the Department, upon presentation of credentials, in accordance by all methods available by law, including full access to and the right to examine any document, papers and records either in hard copy or electronic, of the Grantee involving transactions relating to this grant.

3.7 RECORDS RETENTION

The Grantee is accountable for all Grant Funds received under this Agreement and shall maintain, for a minimum of four (4) years following the Department's final written approval of all required close-outs, unless the Department notifies the Grantee prior to the expiration of the four years that a longer period is required, adequate books, records, and supporting documents, including digital and electronic data, to verify the amount, recipients and uses of all disbursements of Grant Funds passing in conjunction with this Agreement. ~~This Agreement and all books, records and supporting documents related hereto shall be available for inspection and audit by the Department, the Office of Inspector General, the Auditor General of the State of Illinois, the Illinois Attorney General, or any of their duly authorized representative(s), and the Grantee agrees to fully cooperate with any audit performed by the Auditor General or the Department. Grantee agrees to provide full access to all relevant materials and to provide copies of same upon request. Failure to maintain books, records and supporting documents required by this Agreement shall establish a presumption in favor of the Department for the recovery of any Grant Funds paid by the Department under this Agreement for which adequate books, records and supporting documentation are not available to support their purported disbursement or expenditure.~~

If any of the services to be performed under this Agreement are subcontracted and/or if subgrants are issued/awarded for the expenditure of Grant Funds provided under this Agreement, the Grantee shall include in all such subcontracts and subgrants, a provision that the Department, the Office of Inspector General, and the Auditor General of the State of Illinois, or any of their duly authorized representatives, will have full access to and the right to examine any pertinent books, documents, papers and records of any such subcontractor or subgrantee involving transactions related to this Agreement for a period of four (4) years following the Department's final approval of all required close-outs (financial and/or programmatic), and any such subcontractor shall be governed by the same requirements to which the Grantee is subject under this Agreement.

~~"This Agreement and all books, records and supporting documents related to this grant shall be available for inspection by the Department, the Office of Inspector General, the Auditor General of the State of Illinois, or any of their duly authorized representatives. The Grantee agrees to cooperate fully with any audit conducted by the Auditor General in relation to any audit conducted concerning of the Department's records related to this grant."~~

PART III – APPENDIX A
SPECIAL GRANT CONDITIONS

3.1 LIABILITY. The parties agree to insert the following provision in lieu of Part V, Section 5.6, Indemnification, herof. It is understood and agreed that neither party to this Grant Agreement shall be liable to the other party for any negligent acts either of commission or omission unless such liability is imposed by law.

3.2 PERFORMANCE. In addition to complying with the provisions of this Grant, the Grantee shall perform the work on a best effort cost reimbursable basis in accordance with the requirements of Prime Contract No. DE-AC02-07CH11359, as amended, with the U.S. Department of Energy, to the extent such performance does not conflict with Part II Scope of Work herein.

3.3 FEDERAL REQUIREMENTS. The parties hereby acknowledge the Grantee's contractual obligation under its Prime Contract with the U.S. Government to comply with federal statutes and regulations regarding drug free workplace, and non-discrimination requirements for any work performed under this Grant by Fermi National Accelerator Laboratory.

3.4 RIGHTS IN TECHNICAL DATA. The terms of the Rights in technical Data article of the Prime Contract No. DE-AC02-07CH11359 between Fermi Research Alliance, LLC, Operator of Fermi National Accelerator Laboratory a/k/a Fermi National Accelerator Laboratory and the United States Department of Energy for operation of Fermi National Accelerator Laboratory shall apply to work performed under this Grant. Further, the Federal Government, Fermi National Accelerator Laboratory and the Illinois Department of Commerce and Economic Opportunity shall all have unlimited rights to all technical data first produced in the performance of the work under this Grant. Unlimited rights means right to use, duplicate or disclose technical data, in whole or in part, in any manner and for any purpose whatsoever, and permit others to do so.

3.5 NOTICE AND ASSISTANCE REGARDING PATENT AND COPYRIGHT INFRINGEMENT. The Illinois Department of Commerce and Economic Opportunity shall report to the Department of Energy and the Fermi Research Alliance, LLC, operator of Fermi National Accelerator Laboratory a/k/a Fermi National Accelerator Laboratory, when requested by either, all evidence and information in the possession of the Illinois Department of commerce and Economic Opportunity shall perform no work under the Grant.

3.6 PATENT RIGHTS. Any invention or discovery that the Fermi Research Alliance, LLC, operator of Fermi National Accelerator Laboratory a/k/a Fermi National Accelerator Laboratory's employees may make or conceive during their assignment of the work under this Grant, will be governed by the provisions of the Fermi Research Alliance, LLC, operator of Fermi National Accelerator Laboratory a/k/a Fermi National Accelerator Laboratory's Prime contract with the U.S. Department of Energy, provided however, in any event, the State shall retain a nonexclusive, non-transferable, revocable, royalty-free license under said invention, discovery, application, or patent.

3.7 AUDIT REQUIREMENTS. In lieu of Part III, Section 3.1, Audits, the parties recognize Fermi Research Alliance, LLC, operator of Fermi National Accelerator Laboratory a/k/a Fermi National Accelerator Laboratory, is a U.S. Government-owned facility, and as such, the cognizant audit group is the U.S. Department of Energy's Inspector General Office. Upon request DOE will conduct a project specific review of the program project and submit a copy of the review, but in no event later than nine (9) months following the end of the period for which the review was performed. The Grantee shall send the review to DCEO at the following address:

Illinois Department of Commerce and Economic Opportunity
Division of Audits
620 East Adams Street
Springfield, IL 62701

**PART IV
TERMS AND CONDITIONS**

4.1 AUTHORITY; PURPOSE; REPRESENTATIONS AND WARRANTIES

- A. Authority The Department is authorized to make this grant pursuant to 20 ILCS 605/605-55 and/or 20 ILCS 605/605-30.

The purpose of this authority is as follows:

To make and enter into contracts, including grants, as authorized pursuant to appropriations by the General Assembly, and/or To use the State and federal programs, grants, and subsidies that are available to assist in the discharge of the provisions of the Civil Administrative Code of Illinois.

- B. Purpose; Representations and Warranties The sole purpose of this grant is to fund the Grantee's performance of the Project, described in Part II hereof, during the term of this grant. The Grantee represents and warrants that the grant proposal/application submitted by the Grantee is in all material respects true and accurate; that it is authorized to undertake the obligations set forth in this Agreement and that it has obtained or will obtain and maintain all permits, licenses or other governmental approvals necessary to perform the Project described in Part II.

4.2 PROJECT SCHEDULE; EXTENSIONS

- A. Project Schedule The Grantee must complete the Scope of Work within the grant term. The Department may require the submission of deliverables. Deliverables must be provided as directed by the Department. For purposes of this Agreement, the Grant Period Begin Date shall be the Project Commencement Date and the Grant Period End Date shall be the Project Completion Date unless these dates are clearly identified as distinctly different in the Part II Scope of Work.

- B. Extensions Extensions of the grant term will be granted only for good cause. Grantees requiring an extension of the grant term should submit a written request to the Program Manager prior to the grant expiration date stating the reason for the extension. All extensions must comply with requirements of Section 5.7.

Grantee's failure to adhere to the schedule set forth in Part II may be grounds for suspension or termination of this Agreement pursuant to Section 5.5 herein. Further, failure by the Grantee to comply with the terms and conditions outlined in Part II, or with any additional terms and conditions within the Agreement, may result in the Grantee being deemed ineligible by the Department for future funding.

4.3 PAYMENT AND EXPENDITURE OF GRANT FUNDS

- A. Expenditure of Funds; Right to Refund Payment of the grant amount specified in the Notice of Grant Award shall be made to the Grantee as specified herein. Grant Funds provided under this Agreement must be expended only to perform the tasks set forth in the Scope of Work attached as Part II of this Agreement. In addition to reasons set forth in other sections of this Agreement, the Department will require a refund from Grantee if (i) the total grant expenditures are less than the amount vouchered to the Grantee from the Department pursuant to the Notice of Grant Award; or (ii) Grant Funds have not been expended or legally obligated within the grant term in accordance with Parts I and Part II hereof. If the Department requires a refund under either of the above circumstances, the Grant Funds must be returned to the Department within forty-five (45) days of the end of the grant term or the otherwise effective Grant Agreement termination date.

- B. Payment Provisions; Prior Incurred Costs

Full Advance

A single payment of the entire grant amount (100%) shall be initiated to the Grantee upon execution and acceptance of the Grant Agreement by the Illinois Office of the Comptroller.

Prior Incurred Costs

Reimbursement of costs incurred prior to the beginning date as specified in the Notice of Grant Award will be allowed only if specifically provided for in the Part II, Scope of Work, as approved by the Department. If not clearly indentified in Part II, Scope of Work, any costs incurred prior to this Agreement will be disallowed.

4.4 **GRANT SPECIFIC TERMS/CONDITIONS**

A. Projects Requiring External Sign-offs

- (1) Pursuant to applicable statute(s), this grant requires sign-off by the following State agency(ies). The status of the sign-off is indicated as of the date the grant is sent to the Grantee for execution:

AGENCY	SIGN-OFF RECEIVED	SIGN-OFF OUTSTANDING
<u> X </u> Illinois Historic Preservation Agency	<u> X </u>	<u> </u>
<u> </u> Illinois Dept. of Agriculture	<u> </u>	<u> </u>
<u> X </u> Illinois Dept. of Natural Resources	<u> </u>	<u> X </u>
<u> </u> NONE APPLICABLE		

While any external sign-off is outstanding, the provisions of Item 3) immediately below apply with respect to the disbursement of funds under this grant.

NOTE: The fact that a sign-off has been received in no way relieves the Grantee of its obligation to comply with any conditions or requirements conveyed by the applicable agency(ies) in conjunction with the issuance of the sign-off for the project funded under this Agreement.

- (2) For projects subject to review by the Illinois Environmental Protection Agency, the Grantee must, prior to construction, obtain a construction permit or "authorization to construct" from the IEPA pursuant to the provisions of the Environmental Protection Act, 415 ILCS 5/1 et seq.
- (3) **External Sign-Off Provisions :**
 - a) The Project described in Part II and funded under this Grant Agreement, is subject to review by the external agency(ies) indicated in Item 1) immediately above. Grantee must comply with requirements established by said agency(ies) relative to their respective reviews. **Any requirements communicated to the Department shall be incorporated into this Agreement as follows: (i) as an attachment to this Agreement (immediately following this Part IV) at the time of grant execution; or (ii) if received from the applicable agency(ies) subsequent to execution, as an addendum to this Agreement.** The Grantee is contractually obligated to comply with such requirements.
 - b) Grantee is responsible for coordinating directly with the applicable external agency(ies) relative to said reviews. Except as specifically provided below, the Department's obligation

to disburse funds under this Grant Agreement is contingent upon notification by the applicable agency(ies) that all requirements applicable to the Project have been satisfied. Upon receipt of said notification, disbursement of the grant funds shall be authorized in accordance with the provisions of Section 4.3B hereof.

- e) Prior to notification of compliance by the applicable external agency(ies), the Grantee may request disbursement of funds **only** for the following purposes: administrative, contractual, legal, engineering, or architectural costs incurred which are necessary to allow for compliance by the Grantee of requirements established by the external agency(ies). **FUNDS WILL NOT BE DISBURSED FOR LAND ACQUISITION OR ANY TYPE OF CONSTRUCTION OR OTHER ACTIVITY WHICH PHYSICALLY IMPACTS THE PROJECT SITE PRIOR TO RECEIPT BY THE DEPARTMENT OF THE REQUIRED NOTIFICATION FROM ALL APPLICABLE AGENCIES.**

- B. If external sign-offs are indicated in this Section 4.4 disbursement of grant funds (whether advance or scheduled) are subject to the restrictions set forth by the External Sign-Off Provisions of this Section 4.4. Upon receipt of all required sign-offs, the Department's Accounting Division will be notified to disburse grant funds in accordance with the disbursement method indicated herein.

4.5 DEPOSIT OF GRANT FUNDS

Grant Funds paid in advance of realized costs must be kept in an interest bearing account and maintained therein until used in accordance with the terms and conditions of this Agreement. ~~The Department may waive this requirement upon a written request from the Grantee; however written Departmental approval must be received before any Grant Funds are kept in a non-interest bearing account. Grantee will be responsible for the payment of interest to the Department at a rate equal to twelve percent (12%) per annum on any of the Grant Funds kept in a non-interest bearing account without prior Departmental written approval.~~

Any interest earned on these Grant Funds must be accounted for as provided in Section 4.6 of this Agreement. ~~Exceptions to Section 4.5 are not permissible without prior written approval by the Department.~~

~~Grant Funds paid in reimbursement of previously paid costs may be kept in a non-interest bearing account at the Grantee's discretion.~~

4.6 RETURN OF INTEREST ON GRANT FUNDS

~~This Agreement does not allow for the retention of interest by the Grantee. Any interest earned on Grant Funds provided under this Agreement must be accounted for in the Final Financial Status Report described in Section 5.3 herein, and returned as interest to the Department in accordance with the directions provided by the Department.~~

4.7 INTENTIONALLY LEFT BLANK

4.8 SUPPORT

Grantee, through its agents, employees and contractors, will provide all equipment, supplies, services and other items of support which are necessary for the effective performance of the Project, unless the Agreement specifically sets forth items of support to be provided by the Department.

4.9 OWNERSHIP, USE AND MAINTENANCE OF PERSONAL PROPERTY

- A. Ownership Subject to the provisions of this Section 4.9, and the remedies available to the Department as set forth in Section 4.11 below, equipment and material authorized to be purchased with Grant

Funds becomes the property of the Grantee. Grantee will maintain an inventory or property control record for all equipment and material purchased with Grant Funds.

B. Use: Maintenance; Insurance During the Grant term, the Grantee must:

(1) use equipment and materials acquired with Grant Funds only for the approved Project purposes set forth in Part II; and (2) provide sufficient maintenance on the equipment and materials to permit achievement of the approved Project purposes and maintain, at its own expense, insurance coverage on all equipment and material purchased with Grant Funds, for its full insurable value, against loss, damage and other risks ordinarily insured against by owners or users of similar equipment and material in similar businesses.

C. Prohibition Against Disposition/Encumbrance The Grantee is prohibited from, and may not sell, transfer, encumber (other than original financing) or otherwise dispose of said equipment or material during the grant term without prior written approval of the Department.

4.10 PUBLIC INFORMATION REQUIREMENTS

For the duration of the Agreement, the Grantee will prominently acknowledge the participation of the Department in the Project in all press releases, publications and promotional materials presented to the media or otherwise dissemination published concerning the Project. The Grantee must provide the Department with copies of any proposed press releases, publications and promotional materials not less than ten (10) days before these materials are disseminated. * Grantee will submit copies of any press releases, publications and promotional materials to the Department's Project Manager.

The Grantee will provide adequate advance notice pursuant to Section 4.12 of promotional events such as open houses, dedications, or other planned publicity events; and will also coordinate in the planning of said events. Any materials or displays to be distributed in connection with the promotional event must be submitted to the Department in advance of publication or dissemination and must prominently acknowledge the Department's participation in the Project.

4.11 DEPARTMENT REMEDIES

In addition to any remedies found elsewhere in this Agreement or at law, the Department may elect any of the following remedies in the event this Agreement is terminated pursuant to Section 5.5 herein. Grantee must comply with the Department's direction within 45 days following written notice or demand from the Department.

- A. The Department may direct the Grantee to refund all grant moneys disbursed to it under this Agreement;
- B. The Department may direct the Grantee to remit an amount equivalent to the "Net Salvage Value" of all equipment or materials purchased with Grant Funds provided under this Agreement. For purposes of this Agreement, "Net Salvage Value" is defined as the amount realized, or that the Parties agree is likely to be realized from, the sale of equipment or materials purchased with Grant Funds provided under this Agreement at its current fair market value, less selling expenses;
- C. The Department may direct the Grantee to transfer ownership of equipment or material purchased with Grant Funds provided under this Agreement to the Department or its designee.

4.12 NOTICES

Notices and other communications provided for herein shall be given in writing by first class mail, by registered, or certified mail, return receipt requested, by receipted hand delivery, by courier (UPS, Federal Express or other similar and reliable carrier), by e-mail, or by fax showing the date and time of successful receipt. Notices shall be sent to the respective party at the address set forth on the signature page hereto, or

to such other authorized designees as the parties may designate in writing from time to time. Grantee is responsible for providing the Department with correct address and contact information for itself and its designees. Any notice to the Grantee shall be deemed to have been provided if sent to the address or contact information on the signature page or to the address of an authorized designee. Notice to the Department is deemed to have been provided at the time it is actually received.

4.13 COMPLAINT PROCESS

In the event of a Grantee complaint, the Department's Administrative Hearing Rules shall govern and said rules can be found at Title 56 Illinois Administrative Code, Section 2605.

4.14 GRANT FUNDS RECOVERY ACT (30 ILCS 705/1, ET SEQ.)

This Agreement is subject to all applicable provisions of the Illinois Grant Funds Recovery Act, including the requirement that any Grant Funds not expended or legally obligated at the expiration or termination of the Grant term must be returned to the Department within 45 days following said expiration or termination. ~~Notwithstanding any provision specified elsewhere in this Agreement regarding the treatment of interest earned on the Grant Funds, any interest earned on Grant Funds that is not expended or legally obligated during the Grant term must also be returned to the Department within 45 days following the expiration or termination of this Agreement.~~

4.15 GRANT PROJECT MANAGEMENT

All necessary and ordinary communications, submittals, approvals, requests and notices related to the Project shall be submitted to:

David E. Parr
Illinois Department of Commerce and Economic Opportunity
500 E. Monroe St.
Springfield, IL 62701-1509

**PART V
GENERAL PROVISIONS**

5.1 GRANTEE REPRESENTATIONS AND WARRANTIES; GRANTEE GENERAL COVENANTS

A. Grantee Representations and Warranties In connection with the execution and delivery of this Agreement, the Grantee makes the following representations and warranties to the Department:

- (1) That it has all requisite authority to carry on its business and to execute, deliver and consummate the transactions contemplated by this Agreement;
- (2) That its employees, agents and officials are competent to perform as required under this Agreement;
- (3) That it is the real party in interest to this Agreement and is not acting for or on behalf of an undisclosed party;
- (4) That it has taken all necessary action under its governing documents to authorize the execution and performance of this Agreement under the terms and conditions stated herein;
- (5) That it has no public or private interest, direct or indirect, and shall not acquire, directly or indirectly any such interest which does or may conflict in any manner with the performance of the Grantee's services and obligations under this Agreement;
- (6) That no member of any governing body or any officer, agent or employee of the State, is employed by the Grantee or has a financial or economic interest directly in this Agreement, or any compensation to be paid hereunder except as may be permitted applicable statute, regulation or ordinance;
- (7) That there is no action, suit or proceeding at law or in equity pending, nor to the best of Grantee's knowledge, threatened, against or affecting the Grantee, before any court or before any governmental or administrative agency, which will have a material adverse effect on the performance required by this Agreement;
- (8) That to the best of the Grantee's knowledge and belief, the Grantee, its principals and key project personnel:
 - (a) Are not presently declared ineligible or voluntarily excluded from contracting with any Federal or State department or agency;
 - (b) Have not within a three-year period preceding this Agreement been convicted of any felony; been convicted of a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State, or local) transaction or contract under a public transaction; had a civil judgment rendered against them for commission of fraud; been found in violation of Federal or State antitrust statutes; or been convicted of embezzlement, theft, larceny, forgery, bribery, falsification or destruction of records, making false statement, or receiving stolen property; and
 - (c) Are not presently indicted for or otherwise criminally or civilly charged by a government entity (Federal, State or local) with commission of any of the offenses enumerated in subparagraph (b) of this certification.

Any request for an exception to the provisions of this paragraph must be made in writing, listing the name of the individual, home address, type of conviction and date of conviction.

(9) That this Agreement has been duly executed and delivered on behalf of the Grantee and constitutes a legal, valid and binding obligation of the Grantee, enforceable in accordance with its terms, except to the extent that enforcement of any such terms may be limited by

(a) Applicable bankruptcy, reorganization, debt arrangement, insolvency or other similar laws generally affecting creditors' rights; or

(b) Judicial public policy limitations upon the enforcement of certain remedies including those which a court of equity may in its discretion decline to enforce; and performance required under this Agreement; and

(10) Grantee certifies that it is not currently operating under or subject to any cease and desist order, or subject to any informal or formal regulatory action, and, to the best of Grantee's knowledge, that it is not currently the subject of any investigation by any state or federal regulatory, law enforcement or legal authority. Should it become the subject of an investigation by any state or federal regulatory, law enforcement or legal authority, Grantee shall promptly notify the Department of any such investigation. Grantee acknowledges that should it later be subject to a cease and desist order, Memorandum of Understanding, or found in violation pursuant to any regulatory action or any court action or proceeding before any administrative agency, that the Department is authorized to declare Grantee in default of this Agreement and suspend or terminate the Agreement pursuant to Section 5.5.

B. General Covenants In connection with the execution and delivery of this Agreement, the Grantee makes the following covenants to the Department, which are in addition to any specific covenants contained in this Agreement:

(1) That it will use Grant Funds only for the purposes set forth in the Budget and Scope of Work, Parts I and II, respectively, of this Agreement;

(2) That all warranties and representations made by the Grantee in this Agreement shall be true, accurate and complete for the term of the Agreement;

(3) That it shall be subject to, obey, and adhere to any and all federal, state and local laws, statutes, ordinances, rules, regulations and executive orders as are now or may be in effect during the term of this Agreement which may be applicable to the Grantee;

(4) That it shall remain solvent and able to pay its debts as they mature. In the event of bankruptcy filing by the Grantee, voluntary or involuntary, the Department may decline to make any further payment, which may otherwise be required under this Agreement;

(5) That it shall immediately notify the Department of any and all events or actions that may materially adversely affect its ability to carry on its operations or perform any or all of its obligations under this Agreement; and

(6) That it shall not enter into any other agreement or transaction that would conflict with the performance of its duties hereunder.

5.2 APPROPRIATION; NONAPPROPRIATION/INSUFFICIENT APPROPRIATION; REDUCED FUNDING SOURCES/REVENUES

A. Appropriation The Grantee is hereby given actual knowledge that pursuant to the State Finance Act, 30 ILCS 105/30, payments under this grant are contingent upon the existence of a valid appropriation therefore and that no officer shall contract any indebtedness on behalf of the State, or assume to bind the State in an amount in excess of the money appropriated, unless expressly authorized by law.

- B. Non-appropriation/Insufficient Appropriation Payments pursuant to this Agreement are subject to the availability of applicable federal and/or state funding from the Department and their appropriation and authorized expenditures under State law. The Department shall use its best efforts to secure sufficient appropriations to fund this Agreement. However, the Department's obligations hereunder shall cease immediately, without penalty or further payment being required, if the Illinois General Assembly or federal funding source fails to make an appropriation sufficient to pay such obligation. The Department, at its sole discretion, shall determine whether amounts appropriated are sufficient to continue its obligations under this Agreement. Termination resulting from non-appropriation or insufficient appropriation shall be in accordance with Section 5.5(A)(1) hereof. Any grant is void by operation of law if the Department fails to obtain the requisite appropriation to pay the grant in any year in which this Agreement is in effect.
- C. Reduced Funding Sources/Revenues The Department reserves the right to reduce the amount to be paid to Grantee under this Agreement if the Department determines that it is in the best interest of the State of Illinois to reduce its obligation under this Agreement as a result of the occurrence of any of the following events during the term of the Agreement:
- (1) Receipts from revenues which provide the funding for this Agreement either fall significantly short of anticipated levels, or significantly decrease, or
 - (2) Other sources (external grants, contracts, awards, etc.) providing funds for this Agreement are decreased or withdrawn. If such an event occurs, the Department will notify the Grantee as soon as possible. If the Department and Grantee are able to agree on a reduced compensation amount and a corresponding reduced scope of services, the parties shall execute a grant modification so stating. If the Department and Grantee are unable to agree on the reduced compensation and reduced scope of services, the Department shall terminate the Grant in accordance with the provisions of Section 5.5(A)(2) herein.

5.3 GRANT CLOSE-OUT

- A. Final Financial Status Report In addition to any other reporting requirements specified in this Agreement, the Grantee shall complete and submit a Final Financial Status Report on forms provided by the Department, within forty-five (45) days of the earlier of the Grant Period end date or the effective date of termination of this Agreement. The Grantee should refer to the Welcome Package and the Reports Deliverable Schedule for the specific reporting requirements and due dates. The Grantee must report on the expenditure of Grant Funds provided by the State, and if applicable, the Grantee's required matching funds. The Grantee is responsible for taking the necessary steps to correct any deficiencies disclosed by such Final Financial Status Report, including such action as the Department, based on its review of the report, may direct.
- B. Grant Refunds In accordance with the Illinois Grant Funds Recovery Act, 30 ILCS 705/1, et seq., the Grantee must, within forty-five (45) days of the earlier of the Grant Period end date or the effective date of termination of this Agreement, refund to the Department, any balance of Grant Funds not spent or not obligated as of said date.

5.4 DEFAULT AND REMEDIES

The occurrence of any of the following events, during the grant term, shall constitute a default:

- A. Grantee shall fail to observe or perform any covenant or agreement contained in this Agreement, including the Exhibits hereto;
- B. Any representation, warranty, certificate or statement made by the Grantee in this Agreement, including the Exhibits hereto, or in any certificate, report, financial statement or other document delivered pursuant to this Agreement shall prove to have been incorrect when made in any material respect;

- C. Grantee shall commence a voluntary case or other proceeding seeking liquidation, reorganization or other relief with respect to itself or its debts under any bankruptcy, insolvency or other similar law now or hereafter in effect or seeking the appointment of a trustee, receiver, liquidator, custodian or other similar official of it or any substantial part of its property, or shall consent to any such relief or to the appointment of or taking possession by any such official in an involuntary case or other proceeding commenced against it, or shall make a general assignment for the benefit of creditors, or shall fail generally to pay its debts as they become due, or shall take any corporate action to authorize any of the foregoing;
- D. An involuntary case or other proceeding shall be commenced against the Grantee seeking liquidation, reorganization or other relief with respect to it or its debts under any bankruptcy, insolvency or other similar law now or hereafter in effect or seeking the appointment of a trustee, receiver, liquidator, custodian or other similar official of it or any substantial part of its property, and such involuntary case or other proceedings shall remain undismitted and unstayed for a period of 60 days; or an order for relief shall be entered against the Grantee under the federal bankruptcy laws as now or hereby after in effect;
- E. The Grantee permanently ceases the conduct of active trade or business at the location specified in Part II, Scope of Work, for any reason, including, but not limited to, fire or other casualty;
- F. Company fails to provide the Company Contribution, if applicable, as identified in Part II, Scope of Work;
- G. Grantee defaults on a loan from a third party. Grantee shall provide the Department with immediate notice upon making a determination that it will default on a loan.

Grantee shall have 30 days from the date Department notifies it of the occurrence of a default to cure the default to Department's satisfaction. Grantee's failure to cure, or to initiate a cure which is satisfactory to the Department, shall be a sufficient basis for the Department to terminate this Agreement and to direct Grantee to refund all not expended Grant Funds disbursed to it by the Department within thirty (30) days of receipt of the notice of termination.

~~At the Department's discretion the Grantee shall be responsible for the payment of interest at a rate equal to twelve percent (12%) per annum for any amount of the Grant Funds which it has not refunded to the Department beginning thirty (30) days from the date the termination notice is sent by the Department and continuing to the date that all Grant Funds are refunded by Grantee or recovered through other legal processes available to the Department.~~

5.5 TERMINATION; SUSPENSION

A. This Agreement may be terminated as follows:

- (1) Non-appropriation, Insufficient Appropriation In the event of non-appropriation or insufficient appropriation as described in Section 5.2(B) above, Grantee shall be paid for non-cancelable, allowable expenditures incurred in the performance of authorized services under this Agreement prior to the effective date of termination which shall be the date stated in the written termination notice provided to Grantee. The Department shall provide such notice to Grantee as soon as possible after it becomes aware of such non-appropriation or insufficient appropriation. Any refunds due the Department shall be submitted in accordance with the provisions of Section 5.3(B) hereof.
- (2) Reduced Funding Sources/Revenues In the event the parties are unable to agree on a reduced amount of compensation and scope of services necessitated due to a reduction in revenues or other funding sources for this Agreement as described in Section 5.2(C) above, Grantee shall be paid for non-cancelable, allowable expenditures incurred in the performance of authorized services under

this Agreement prior to the effective date of termination which shall be the date stated in the written termination notice provided to Grantee. Any refunds due the Department shall be submitted in accordance with the provisions of Section 5.3(B) hereof.

For Cause If the Department determines that the Grantee has failed to comply with any of the covenants, terms, conditions or provisions of this Agreement, or any other application, proposal or grant award executed by the Department and the Grantee, including any applicable rules or regulations, or has made a false representation or warranty in connection with the receipt of the grant, the Department may terminate this Agreement in whole or in part at any time before the expiration date of this Agreement. The Department shall notify the Grantee in writing of the reasons for the termination and the effective date of the termination. Grantee shall not incur any costs after the effective date of the termination. Payments made to the Grantee or recovery by the Department shall be in accord with the legal rights and liabilities of the parties.

In the event of termination for cause, Grantee shall also be subject to any other applicable provisions specified elsewhere in this Agreement.

Termination for cause may render the Grantee ineligible for consideration for future grants from the Department for a period not to exceed two (2) years.

(3) For Convenience The Grantee acknowledges that this grant was made by the Department based on its determination that the activities to be funded under this Agreement are in furtherance of either the Department's statutory requirements or its program objectives. The Grantee further acknowledges that the Department may unilaterally terminate this Agreement based on its good faith determination that the continued expenditure of Grant Funds under this Agreement is no longer in furtherance of said statutory requirements or program objectives. Termination for convenience shall be effective upon delivery of notice to Grantee pursuant to Section 5.10(F) hereof. The Grantee shall not incur new obligations after the effective date of the termination, and shall cancel as many outstanding obligations as possible. The Department shall allow full credit to the Grantee for properly incurred expenditures made in connection with the Grant in accordance with the provisions of Part I (Budget) and Part II (Scope of Work). Grant refunds shall be submitted in accordance with the provisions of Section 5.3(B) hereof.

B. Suspension If the Grantee fails to comply with the specific conditions and/or general terms and conditions of this Agreement, the Department may, upon written notice to the Grantee, suspend this Agreement, withhold further payments and prohibit the Grantee from incurring additional obligations of Grant Funds, pending corrective action by the Grantee or a decision to terminate this Agreement. The Department may determine to allow such necessary and proper costs, which the Grantee could not reasonably avoid during the period of suspension provided that the Department agrees that such costs were necessary and reasonable and incurred in accordance with the provisions of this Agreement.

5.6 INDEMNIFICATION

A. Non-Governmental Entities The Grantee agrees to assume all risk of loss and to indemnify and hold the State, its officers, agents and employees, harmless from and against any and all liabilities, demands, claims, suits, losses, damages, causes of action, fines or judgments including costs, attorneys' and witnesses' fees, and expenses incident thereto, relating to bodily injuries to persons (including death) and for loss of, damage to, or destruction of real and/or tangible personal property (including property of the State) resulting from the negligence or misconduct of Grantee, its employees, agents, or subcontractors or subgrantees in the performance of this Agreement. Grantee shall do nothing to prejudice the State's right to recover against third parties for any loss, destruction or damage to State property and shall, at the State's request and expense, furnish to the State reasonable assistance and cooperation including assistance in the prosecution of suit and the execution of instruments of assignment in favor of the State in obtaining recovery.

The Grantee shall, at its expense, defend the State against all claims asserted by any person that anything provided by Grantee infringes a patent, copyright, trade secret or other intellectual property right and shall, without limitation, pay the costs, damages and attorneys' fees awarded against the State in any such action, or pay any settlement of such action or claim. Each party agrees to notify the other promptly of any matters to which this provision may apply and to cooperate with each other in connection with such defense or settlement.

- B. Governmental Entities In the event that the Grantee is a Governmental Entity, it will indemnify and hold harmless the Department as set out herein to the extent authorized by Federal and/or State constitutions(s) and/or laws.

5.7 **MODIFICATION BY OPERATION OF LAW; BUDGET MODIFICATIONS; DISCRETIONARY MODIFICATIONS**

- A. Modifications by Operation of Law This Agreement is subject to such modifications as the Department determines may be required by changes in Federal or State law or regulations applicable to this Agreement. Any such required modification shall be incorporated into and become part of this Agreement as if fully set forth herein. The Department shall timely notify the Grantee of any pending implementation of or proposed amendment to such regulations of which it has notice.
- B. Budget Modifications Grantee must expend the Grant Funds in accordance with the approved budget set forth in Part I hereof. If the Grantee determines that its expenditures for the grant term will vary from the amounts listed in the approved project budget it must submit a written request for approval from the Department prior to incurring the revised costs. Said request must give the reasons for and amounts of the revisions. If the Department approves the revised expenditures, it will provide the Grantee with a revised Project Budget incorporating the revisions. Grantee's failure to obtain written approval for anticipated budget revisions is a sufficient reason for the Department to disallow any costs not included in the original project budget and require a refund from the Grantee.

The Grantee may make a line item transfer up to the allowable variance percentage/amount of the total approved line item budget as specified in Part I Budget without prior written approval of the Department, subject to the following conditions:

- (1) Modifications Requiring Departmental Approval If the Grantee determines that its expenditures will vary from the approved budgeted line item amounts listed in Part I Budget by more than the allowable variance percentage/amount for any given line item expenditure, but will not exceed the total grant award, it shall submit a written request for approval from the Department prior to incurring the revised costs. Modification requests shall give the reasons for and amounts of the revisions. If the Department approves the revised expenditures, it will provide the Grantee with a revised project Part I Budget incorporating the revisions. Grantee's failure to obtain written approval for anticipated budget revisions shall be deemed sufficient for the Department to disallow any costs not included in the original project budget and require a refund from the Grantee.
- (2) Discretionary Transfers Transfers between approved line items that do not exceed the allowable variance percentage/amount of the original approved budget line item may be made at the Grantee's discretion without the Department's approval. For purposes of the allowable discretionary transfer(s), the line item to which the transfer is made cannot be increased by more than the allowable variance percentage/amount of the original approved line item. Additionally, the allowable discretionary transfer does not apply to an Audit line item (if present). Any and all modifications to an existing Audit line item may only be made with the Department's prior written approval.
- C. Discretionary Modifications If either the Department or the Grantee wishes to modify the terms of this Agreement other than as set forth in Sections 5.7(A) and 5.7(B) above, written notice of the proposed

modification must be given to the other party. Modifications will only take effect when agreed to in writing by both the Department and the Grantee. However, if the Department notifies the Grantee in writing of a proposed modification, and the Grantee fails to respond to that notification, in writing, within thirty (30) days, the proposed modification will be deemed to have been approved by the Grantee. In making an objection to the proposed modification, the Grantee shall specify the reasons for the objection and the Department shall consider those objections when evaluating whether to follow through with the proposed modification. The Department's notice to the Grantee shall contain the Grantee name, Grant number, modification number, purpose of the revision and signature of the Department's Director.

- D. Unilateral Modifications The parties agree that the Department may unilaterally modify this Agreement without prior approval of the Grantee when the modification is initiated by the Department for the sole purpose of increasing the Grantee's funding allocation as additional funds become available for the grant during the program year covered by the term of this Agreement. The parties further agree that the thirty (30) day period for objection described in Section 5.7(C) above does not apply to the unilateral modification authority described in Section 5.7(D).
- E. Management Waiver The parties agree that the Department may issue a waiver of specific requirements of this Agreement after the term of the Agreement has expired. These waivers are limited to requirements relating to the Grantee's compliance with existing audit requirements in the Agreement, retention of interest earned by the Grantee on Grant Funds, variances to budgetary line items, non-material changes to the Scope of Work in Part II, and any other non-material changes to specific grant terms that the Department determines are necessary to place the Grantee in administrative compliance with the terms of this Agreement. A management waiver issued after the term of the Agreement has expired will supersede the original requirements of this Agreement that would normally require a modification of this Agreement to be executed. The Department will make no modifications of this Agreement not agreed to prior to the expiration of the Agreement beyond what is specifically set forth in this section.
- F. Term Extensions The Grantee acknowledges that all Grant Funds must be expended or legally obligated during the grant term set forth in the Notice of Grant Award. Pursuant to the Grant Funds Recovery Act (30 ILCS 705/1 et. seq.), no grant term may be extend beyond a two-year period unless the Grant Funds are expended or legally obligated during that initial two-year period, or unless Grant Funds are disbursed in reimbursement of costs previously incurred by the grantee.

5.8 **CONFLICT OF INTEREST; INTEREST OF PUBLIC OFFICIALS/ EMPLOYEES; BONUS/COMMISSION PROHIBITED; HIIRING OF STATE EMPLOYEES PROHIBITED; DUE DILIGENCE IN EXPENDITURE OF GRANT FUNDS**

- A. Conflict of Interest A conflict of interest exists if a Grantee's officers, directors, agents, employees and family members use their position for a purpose that is, or gives the appearance of, being motivated by a desire for a private gain, financial or nonfinancial, for themselves or others, particularly those with whom they have family business or other ties. The Grantee must establish safeguards to prohibit such a conflict of interest from occurring. Safeguards, evidenced by rules or bylaws, shall also be established to prohibit persons from engaging in actions, which create or which appear to create a conflict of interest as described herein.

The Grantee must immediately notify the Department in writing of any actual or potential conflicts of interest, as well as any actions that create or which appear to create a conflict of interest.

- B. Interest of Public Officials/Employees

- (1) Governmental Entity If the Grantee is a governmental entity, the Grantee certifies that no conflict of interest as defined in Section 5.8A exists. Further, Grantee certifies that no officer or employee of the Grantee and no member of its governing body and no other public official of the locality in which the program objectives will be carried out who exercises any functions or responsibilities in

the review or approval of the undertaking or carrying out of such objectives shall participate in any decision relating to any contract negotiated under a program grant which affects his/her personal interest or the interest of any corporation, partnership or association in which he/she is directly or indirectly interested, or has any financial interest, direct or indirect, in such contract or in the work to be performed under such contract.

- (2) Nongovernmental Entity If the Grantee is a nongovernmental entity, the Grantee certifies that no conflict of interest as defined in Section 5.8A exists. If such a conflict or appearance thereof exists or arises, the Grantee must provide immediate notification to the Department as provided in Section 5.8A. The Department may, in its discretion, issue Grant Funds if it determines that appropriate safeguards are in place and that it is in the best interest of the State to proceed.

Violations of Section 5.8 may result in suspension or termination of this Agreement, and recovery of Grant Funds provided hereunder. Violators may also be criminally liable under other applicable State or Federal laws and subject to actions up to and including felony prosecution.

- C. Bonus or Commission Prohibited The Grantee shall not pay any bonus or commission for the purpose of obtaining the grant awarded under this Agreement.
- D. Hiring State Employees Prohibited No State officer or employee may be hired to perform services under this Agreement, or be paid with Grant Funds derived directly or indirectly through this grant without the written approval of the Department.

5.9 APPLICABLE STATUTES

- A. Grantee Responsibility All applicable Federal, State and local laws, rules and regulations governing the performance required by Grantee shall apply to this Agreement and will be deemed to be included in this Agreement the same as though written herein in full. Grantee is responsible for ensuring compliance with all applicable laws, rules and regulations, including, but not limited to those specifically referenced herein. Except where expressly required by applicable laws and regulations, the Department shall not be responsible for monitoring Grantee's compliance.
- B. Land Trust/Beneficial Interest Disclosure Act (765 ILCS 405/2.1) No grant award Grant Funds shall be paid to any trustee of a land trust, or any beneficiary or beneficiaries of a land trust, for any purpose relating to the land, which is the subject of such trust, any interest in such land, improvements to such land or use of such land unless an affidavit is first filed with the Department identifying each beneficiary of the land trust by name and address and defining such interest therein.
- C. Historic Preservation Act (20 ILCS 3420/1 et seq.) The Grantee will not expend Grant Funds under this Agreement which result in the destruction, alteration, renovation, transfer or sale, or utilization of a historic property, structure or structures, or in the introduction of visual, audible or atmospheric elements to a historic property, structure or structures, which will result in the change in the character or use of any historic property, except as approved by the Illinois Historic Preservation Agency.
- D. State of Illinois Discrimination Laws (775 ILCS 5/1-101 et seq.) In carrying out the performance required under this Agreement, the Grantee shall comply with all applicable provisions of the Illinois Human Rights Act, and rules and regulations promulgated by the Illinois Department of Human Rights, prohibiting unlawful discrimination in employment. Grantee's failure to comply with all applicable provisions of the Illinois Human Rights Act, or applicable rules and regulations promulgated thereunder, may result in a determination that Grantee is ineligible for future contracts or subcontracts with the State of Illinois or any of its political subdivisions or municipal corporations, and this Agreement may be canceled or voided in whole or in part, and such other sanctions or penalties may be imposed or remedies invoked as provided by statute or regulation.
- E. Drugfree Workplace Act (30 ILCS 580/1 et seq.) Grantee will make the certification required in this Agreement and will comply with all of the provisions of the Drugfree Workplace Act that are

applicable to the Grantee. False certification or violation of the requirements of the Drugfree Workplace Act may result in sanctions including, but not limited to, suspension of grant payments, termination of this Agreement and debarment of contracting or grant opportunities with the State for at least one (1) year but not more than five (5) years.

- F. Freedom of Information Act (5 ILCS 140/1 et seq.) Applications, programmatic reports and other information obtained by the Department under this Agreement shall be administered pursuant to the Freedom of Information Act.
- G. Prevailing Wage Act (820 ILCS 130/0.01 et seq.) All projects for the construction or demolition of fixed works which are financed in whole or in part with bonds, grants, loans, or other funds made available by or through the State or any of its political subdivisions; including the Grant Funds provided by this Agreement shall be subject to the Prevailing Wage Act (820 ILCS 130/0.01) unless the provisions of that Act exempt its application. In implementing the project, the Grantee shall comply with the requirements of the Prevailing Wage Act, including, but not limited to, inserting into all contracts for such construction or demolition a stipulation to the effect that not less than the prevailing rate of wages as applicable to the project shall be paid to all laborers, workers and mechanics performing work under the contract and requiring all bonds of contractors to include a provision as will guarantee the faithful performance of such prevailing wage clause as provided by contract. If the Grantee has awarded work without a contract, it shall provide the aforementioned written notice to the contractor on a separate document. The provisions of the Prevailing Wage Act apply to both contractors and sub-contractors performing work on any project funded by this grant.
- H. Victims Economic Security and Safety Act (820 ILCS 180 et seq.) If the Grantee has 50 or more employees, it may not discharge or discriminate against an employee who is a victim of domestic violence, or who has a family or household member who is a victim of domestic violence, for taking up to a total of twelve (12) work weeks of leave from work during any twelve month period to address the domestic violence, pursuant to the Victims Economic Security and Safety Act. The Grantee is not required to provide paid leave under the Victims Economic Security and Safety Act, but may not suspend group health plan benefits during the leave period. Any failure on behalf of the Grantee to comply with all applicable provisions of the Victims Economic Security and Safety Act, or applicable rules and regulations promulgated thereunder, may result in a determination that the Grantee is ineligible for future contracts or subcontracts with the State of Illinois or any of its political subdivisions or municipal corporations, and this Agreement may be cancelled or voided in whole or in part, and such other sanctions or penalties may be imposed or remedies invoked, as provided by Statute or regulation.
- I. Equal Pay Act of 2003 (820 ILCS 112 et seq.) If the Grantee has four or more employees, it is prohibited by the Equal Pay Act of 2003 from paying unequal wages to men and women for doing the same or substantially similar work. Further, the Grantee is prohibited by the Equal Pay Act of 2003 from remedying violations of the Act by reducing the wages of other employees or discriminating against any employee exercising his/her rights under this Act. Any failure on behalf of the Grantee to comply with all applicable provisions of the Equal Pay Act of 2003, or applicable rules and regulations promulgated thereunder, may result in a determination that the Grantee is ineligible for future contracts or subcontracts with the State of Illinois or any of its political subdivisions or municipal corporations, and this Agreement may be cancelled or voided in whole or in part, and such other sanctions or penalties may be imposed or remedies invoked, as provided by Statute or regulation.
- J. Steel Products Procurement Act (30 ILCS 565 et seq.) The grantee, if applicable, hereby certifies that any steel products used or supplied in accordance with this grant for a public works project shall be manufactured or produced in the United States per the requirements of the Steel Products Procurement Act (30 ILCS 565 et seq.).

5.10 MISCELLANEOUS PROVISIONS

- A. Independence of Grantee Personnel All technical, clerical, and other personnel necessary for the performance required by this Agreement shall be employed by or contracted with Grantee, and shall in all respects be subject to the rules and regulations of Grantee governing its employees. Neither Grantee nor its personnel shall be considered to be the agents or employees of the Department.
- B. Grantor Authority The Department and its payroll employees, when acting pursuant to this Agreement, are acting as State officials in their official capacity and not personally or as the agents of others.
- C. Governing Law This Grant is awarded in the State of Illinois for execution within the State of Illinois. This Agreement shall be governed by and construed according to Illinois law.
- D. Worker's Compensation Insurance, Social Security, Retirement and Health Insurance Benefits, and Taxes The Grantee shall provide Worker's Compensation insurance where the same is required and shall accept full responsibility for the payment of unemployment insurance, premiums for Workers' Compensation, Social Security and retirement and health insurance benefits, as well as all income tax deduction and any other taxes or payroll deductions required by law for its employees who are performing services specified by this Agreement.
- E. Delivery of Grantee Payments Payment to the Grantee under this Agreement shall be made payable in the name of the Grantee and sent to the person and place specified in the Notice of Grant Award. The Grantee may change the person to whom payments are sent, or the place to which payments are sent by written notice to the Department signed by the Grantee, that complies with the requirements of Section 5.10(F) below. No such change or payment notice shall be binding upon the Department until ten (10) business days after actual receipt.
- F. Notice Any notice, demand, or communication required or permitted to be given hereunder shall be given in writing at the addresses set forth in the Notice of Grant Award by any of the following means: (a) personal service, (b) electronic communication, whether by telex, telegram or telecopy, (c) overnight courier, or (d) registered or certified first class mail, postage prepaid, return receipt requested. Any notice, demand or communication given pursuant to either clause (a) or (b) hereof shall be deemed received upon such personal service or upon dispatch by electronic means, respectively. Any notice, demand or communication given pursuant to clause (c) shall be deemed received on the day immediately following deposit with the overnight courier. Any notice, demand or communication sent pursuant to clause (d) shall be deemed received five (5) business days after mailing. The parties, by notice given hereunder, may designate any further or different addresses to which subsequent notices, demands or communications shall be given.
- The Grantee acknowledges and agrees that its address set forth in the Notice of Grant Award is its current address and shall be considered its last known address for purposes of receiving any and all notice(s) required under this Agreement. The Grantee further acknowledges and agrees that the Department is justified in relying upon the address information furnished to it by the Grantee in absence of notice to the contrary. The Grantee also acknowledges and agrees that it has the burden of notifying the Department of its current/last known address. In the event that the Grantee changes its current address, it shall contact its Program Manager and notify him/her of said change of address and a formal modification will be executed.
- G. Required Notice Grantee agrees to give prompt notice to the Department of any event that may materially affect the performance required under this Agreement. Any notice or approval relating to Section 5.5 (Termination), Section 5.7C (Discretionary Modifications), Section 5.7E (Waivers), and Section 5.10I (Assignment) must be executed by the Director of the Department or her/his authorized designee.
- H. Modifications A modification of any condition of this Agreement must be requested in writing. No modification of any condition of this Agreement may be effective unless in writing from and signed by the Director of the Department.

- I. Assignment The benefits of this Agreement and the rights, duties and responsibilities of the Grantee under this Agreement may not be assigned (in whole or in part) except with the express written approval of the Department acting through its Director. Any assignment by the Grantee in violation of this provision renders this Agreement voidable by the Department.
- J. Severability Clause If any provision under this Agreement or its application to any person or circumstances is held invalid by any court of competent jurisdiction, this invalidity does not affect any other provision or its application of this Agreement, which can be given effect without the invalid provision or application.
- K. Integration Clause This Agreement, with attachments, as written, is the full and complete agreement between the parties and there are no oral agreements or understandings between the parties other than what has been reduced to writing herein.
- L. Comptroller Filing Notice The Grantee expressly understands that whenever applicable, a copy of this Agreement and any modification, cancellation or renewal is required to be filed by the Department with the State Comptroller.
- M. Subcontract and Grants The Grantee's services, duties and responsibilities specified herein shall not be subcontracted or subgranted by the Grantee without prior written approval of the Department, unless such subcontracts or subgrants are provided for elsewhere in this Agreement. Any subcontracts or subgrants shall be subject to, and conform with, all applicable State and Federal laws, and shall specifically provide that subcontractors or subgrantees are subject to all of the terms and conditions of this Agreement. For the Department to approve the use of any subcontract or subgrant, the Grantee must employ an open, impartial and reasonably competitive selection process.
- N. Attorney Fees and Costs ~~If the Department is the prevailing party in any proceeding to enforce the terms of this Agreement, the Department has the right to recover reasonable attorney fees, costs and expenses associated with recovering the Grant Funds.~~
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**PART VI
STATE OF ILLINOIS REQUIRED
CERTIFICATIONS**

The Grantee makes the following certifications as a condition of this Agreement. These certifications are required by State statute and are in addition to any certifications required by any Federal funding source as set forth in this Agreement. Grantee's execution of this Agreement shall serve as its attestation that the certifications made herein are true and correct.

6.1 COMPLIANCE WITH APPLICABLE LAW

The Grantee certifies that it shall comply with all applicable provisions of Federal, State and local law in the performance of its obligations pursuant to this Agreement.

6.2 CONFLICT OF INTEREST

The Grantee certifies that it has no public or private interest, direct or indirect, and shall not acquire directly or indirectly any such interest which does or may conflict in any manner with the performance of Grantee's services and obligations under this Agreement.

6.3 BID-RIGGING/BID-ROTATING

The Grantee certifies that it has not been barred from contracting with a unit of State or local government as a result of a violation of Section 33E-3 or 33E-4 of the Criminal Code of 1961 (720 ILCS 5/33 E-3 and 5/33 E-4).

6.4 DEFAULT ON EDUCATIONAL LOAN

The Grantee certifies that this Agreement is not in violation of the Educational Loan Default Act (5 ILCS 385/3) prohibiting certain contracts to individuals who are in default on an educational loan.

6.5 AMERICANS WITH DISABILITIES ACT

The Americans with Disabilities Act (ADA) (42 U.S.C. 12101 et. seq.) and the regulations thereunder (28 CFR 35.130) prohibit discrimination against persons with disabilities by the State, whether directly or through contractual arrangements, in the provision of any aid, benefit or service. As a condition of receiving this grant, the Grantee certifies that services, programs and activities provided under this Agreement are, and will continue to be, in compliance with the ADA.

6.6 DRUGFREE WORKPLACE ACT

The Grantee certifies that:

- A) _____ It is a Corporation, Partnership, or other entity (other than an individual) with 24 or fewer employees at the time of execution of this Agreement.
- B) _____ That the purpose of this grant is to fund solid waste reduction.
- C) X It is a Corporation, Partnership, or other entity (other than an individual) with 25 or more employees at the time of execution of this Agreement, or
- D) _____ That it is an individual.

If Option "A" or "B" is checked this Agreement is not subject to the requirements of the Act.

If Option "C" or "D" is checked and the amount of this grant is five thousand dollars (\$5,000.00) or more, the Grantee is notified that the Drugfree Workplace Act (30 ILCS 580/1 et seq.) is applicable to this Agreement, and the Grantee must comply with the terms of said Act, as set forth below:

Grantee will provide a drugfree workplace by:

- (a) Publishing a statement:
 - (i) Notifying employees that the unlawful manufacture, distribution, dispensing, possession or use of a controlled substance, including cannabis, is prohibited in the Grantee's workplace.
 - (ii) Specifying the actions that will be taken against employees for violations of such prohibition.
 - (iii) Notifying the employee that, as a condition of employment on such grant, the employee will:
 - (A) abide by the terms of the statement; and
 - (B) notify the employer of any criminal drug statute conviction for a violation occurring in the workplace no later than five (5) days after such conviction.
- (b) Establishing a drug free awareness program to inform employees about:
 - (i) the dangers of drug abuse in the workplace;
 - (ii) the Grantee's policy of maintaining a drug free workplace;
 - (iii) any available drug counseling, rehabilitation and employee assistance programs; and
 - (iv) the penalties that may be imposed upon an employee for drug violations.
- (c) Providing a copy of the statement required by subparagraph (a) to each employee engaged in the performance of the grant and to post the statement in a prominent place in the workplace.
- (d) Notifying the granting agency within ten (10) days after receiving notice, under part (B) of paragraph (iii) of subsection (a) above, from an employee or otherwise receiving actual notice of such conviction.
- (e) Imposing a sanction on, or requiring the satisfactory participation in, a drug abuse assistance or rehabilitation program by any employee who is so convicted, as required by Section 5 of the Drugfree Workplace Act, 30 ILCS 580/5.
- (f) Assisting employees in selecting a course of action in the event drug counseling, treatment and rehabilitation are required and indicating that a trained referral team is in place.
- (g) Making a good faith effort to continue to maintain a drugfree workplace through implementation of the Drugfree Workplace Act, 30 ILCS 580/5.

If Grantee is an individual, it certifies that it will not engage in the unlawful manufacture, distribution, dispensation, possession, or use of a controlled substance in the performance of this Agreement.

6.7 **ANTI-BRIBERY**

The Grantee certifies that neither it nor its employees have been convicted of bribing or attempting to bribe an officer or employee of the State of Illinois, nor has Grantee or any of its employees made an admission

of guilt of such conduct which is a matter of record as defined in the Illinois Procurement Code (30 ILCS 500/50-5).

6.8 **DISCRIMINATION/ILLINOIS HUMAN RIGHTS ACT**

The Grantee certifies (i) that it will not commit unlawful discrimination in employment in Illinois as that term is defined in Article 2 of said Act; (ii) that it will comply with the provisions of Article 5 of the Act regarding equal employment opportunities and affirmative action; and, (iii) that it will comply with policies and procedures established by the Department of Human Rights under Article 7 of the Act regarding equal employment opportunities and affirmative action.

The Grantee further certifies that, if applicable, it will comply with "An Act to prohibit discrimination and intimidation on account of race, creed, color, sex, religion, physical or mental handicap unrelated to ability or national origin in employment under contracts for public buildings or public works." (775 ILCS 10/0.01 et seq.)

6.9 **SEXUAL HARASSMENT**

The Grantee certifies that it has written sexual harassment policies that shall include, at a minimum, the following information: (i) the illegality of sexual harassment; (ii) the definition of sexual harassment under State law; (iii) a description of sexual harassment, utilizing examples; (iv) the Grantee's internal complaint process including penalties; (v) the legal recourse, investigative and complaint process available through the Department of Human Rights and the Human Rights Commission; (vi) directions on how to contact the Department and Commission; and (vii) protection against retaliation as provided by Section 6-101 of the Illinois Human Rights Act (775 ILCS 5/2-105 (B)(5)). A copy of the policies shall be provided to the Department upon request.

6.10 **INTERNATIONAL ANTI-BOYCOTT CERTIFICATION**

The Grantee hereby certifies that neither the Grantee nor any substantially owned affiliate company of the Grantee is participating or will participate in an international boycott, as defined by the provisions of the U.S. Export Administration Act of 1979, or as defined by the regulations of the U.S. Department of Commerce, promulgated pursuant to that Act (30 ILCS 582/1 et seq.).

6.11 **FEDERAL, STATE AND LOCAL LAWS: TAX LIABILITIES; STATE AGENCY DELINQUENCIES**

The Grantee is required to comply with all federal, state and local laws, including but not limited to the filing of any and all applicable tax returns. In the event that a Grantee is delinquent in filing and/or paying any federal, state and/or local taxes, the Department shall disburse Grant Funds only if the Grantee enters into an installment payment agreement with said tax authority and remains in good standing therewith. Grantee is required to tender a copy of any such installment payment agreement to the Department. In no event may Grantee utilize Grant Funds to discharge outstanding tax liabilities or other debts owed to any governmental unit. **The execution of this Agreement by the Grantee is its certification that (i) it is current as to the filing and payment of any federal, state and/or local taxes applicable to Grantee; and (ii) it is not delinquent in its payment of moneys owed to any federal, state, or local unit of government.**

6.12 **PROHIBITION OF GOODS DERIVED FROM CHILD LABOR**

The Grantee certifies, in accordance with Public Act 94-0264, that no foreign-made equipment, materials, or supplies furnished to the State in connection with this Agreement have been produced in whole or in part by the labor of any child under the age of 12.

6.13 **PREVAILING WAGE**

The Grantee acknowledges that receipt of Grant Funds under this Agreement require compliance with the Prevailing Wage Act (820 ILCS 130 et. seq.). Persons willfully failing to comply with, or willfully violating this Act may be in violation of the Criminal Code. Questions concerning compliance with the Prevailing Wage Act should be directed to the Illinois Department of Labor.

6.14 LIEN WAIVERS

The Grantee shall monitor construction to assure that necessary contractor's affidavits and waivers of mechanics liens are obtained prior to release of Grant Funds to contractors and subcontractors.

6.15 INTERAGENCY WETLAND POLICY ACT

The Grantee certifies that the proposed project is compatible with established state policy regarding wetlands, pursuant to the Interagency Wetland Policy Act of 1989. The Grantee acknowledges that the Illinois Department of Natural Resources may, from time to time, monitor the proposed project to ensure continued compliance with the aforementioned Act. In the event that the project does not remain in compliance with the Act, such noncompliance shall constitute a breach of the Agreement, and failure to cure the breach within sixty (60) days after notice thereof will result in the termination of this Agreement.



Grant Management Program 01

Grant No. 10-203829

for the

Fermi Research Alliance, LLC

Illinois Department of Commerce and Economic Opportunity
620 E. Adams St.
Springfield, IL 62701

**STATE OF ILLINOIS
DEPARTMENT OF COMMERCE AND ECONOMIC OPPORTUNITY**

Notice of Grant Award No. 10-203829

This Grant Agreement (hereinafter referred to as the "Agreement") is entered into between the Illinois Department of Commerce and Economic Opportunity (hereinafter referred to as the "Department" or "DCEO") and **Fermi Research Alliance, LLC** (hereinafter referred to as the "Grantee"). Subject to terms and conditions of this Agreement, the Department agrees to provide a Grant in an amount not to exceed **\$3,000,000.00** to the Grantee.

Subject to the execution of this Agreement by both parties, the Grantee is hereby authorized to incur costs against this Agreement from the beginning date of **06/01/2010** through the ending date of **05/31/2012**, unless otherwise established within Part II Scope of Work. The Grantee hereby agrees to use the Grant Funds provided under the Agreement for the purposes set forth herein and agrees to comply with all terms of this Agreement.

This Agreement includes the following sections, all of which are incorporated into and made part of this Agreement:

Parts:

- I. Budget**
- II. Scope of Work**
- III Grant Fund Control Requirements**
- IV. Terms and Conditions**
- V. General Provisions**
- VI. Certifications**

This grant is state funded.

Under penalties of perjury, the undersigned certifies that the name, taxpayer information number and legal status listed below are correct.

Name: Fermi Research Alliance, LLC

Taxpayer Identification Number:
SSN/FEIN: 571239010

Legal Status:

- Individual (01)
- Sole Proprietor (02)
- Partnership/Legal Corporation (03)
- Corporation (04)
- Not For Profit Corporation (04)
- Medical Corporation (06)
- Governmental (08)

- Estate or Trust (10)
- Pharmacy-Noncorporate (11)
- Nonresident Alien (13)
- Pharmacy/Funeral Home/Cemetery Corp (15)
- Tax Exempt (16)
- Limited Liability Company (select applicable tax classification)
- C - Corporation
- P - Partnership

GRANTEE:

Fermi Research Alliance, LLC

Grantee's execution of this Agreement shall serve as its attestation that Grantee has read, understands and agrees to all provisions of this Agreement and that the information contained in the Agreement is true and correct to the best of his/her knowledge, information and belief and that the Grantee shall be bound by the same. Grantee acknowledges that the individual executing this Agreement is authorized to act on the Grantee's behalf. Grantee further acknowledges that the award of Grant Funds under this Agreement is conditioned upon the above certification/attestation.

By: *[Signature]* (Authorized Signator) Date 6/23/10

Signature authorization on file

[Signature] Pier Odonne, President
Name and Title

STATE OF ILLINOIS DEPARTMENT OF COMMERCE AND ECONOMIC OPPORTUNITY

By: *[Signature]* Anita D. Patel
Warren Ribley, Director Chief Financial Officer Date 6/24/10

Grantee Address:

Please indicate any address changes below

PO Box 500
Batavia, IL 60510-5011

In processing this grant and related documentation, the Department will only accept materials signed by the Authorized Signatory or Designee of this Agreement, as designated or prescribed herein. If the Authorized Signatory chooses to assign a designee to sign or submit materials required by this Agreement to the Department, the Authorized Signatory must either send written notice to the Department indicating the name of the designee or provide notice as set forth immediately following this paragraph. Without such notice, the Department will reject any materials signed or submitted on the Grantee's behalf by anyone other than the Authorized Signatory. The Authorized Signatory must approve each Authorized Designee separately by signing as indicated below. If an Authorized Designee(s) appears below, please verify the information and indicate any changes as necessary.

The following are designated as Authorized Designee(s) for the Grantee:

Authorized Designee: Robert Kephart
Authorized Designee Title: Associate Director
Authorized Designee Phone: 630-840-3135

Authorized Signatory Approval:



Authorized Designee: Mary Jo Lyke
Authorized Designee Title: Manager of Grants & Contracts
Authorized Designee Phone: 630-840-8976

Authorized Signatory Approval:



Authorized Designee: _____
Authorized Designee Title: _____
Authorized Designee Phone: _____

Authorized Signatory Approval: _____

PART I
BUDGET

Cost Category Description	Cost Cat	DCEO Budget Amount	Variance %	Variance Limit
DESIGN/ENGINEERING	1205	1,402,050.00	10.00	0.00
EQUIPMENT/MATERIAL/LABOR	1217	1,297,950.00	10.00	0.00
CONTINGENCY	1235	300,000.00	10.00	0.00
Total		\$3,000,000.00		

BUDGET LINE ITEM DEFINITIONS

The definitions listed below will help to identify allowable costs for each of the budgeted lines in this Agreement. Any costs not specifically named below should be verified to be allowable by the DCEO grant manager prior to incurring the cost.

- DESIGN/ENGINEERING** costs associated with creation of the project’s architectural drawings; engineering studies and/or fees; etc., including costs of plans & specs and/or printing costs if specifically identified as such within the Part II Scope of Work.
- EQUIPMENT/MATERIAL/LABOR** purchase of materials and/or purchase/lease of equipment, to use or install for the project, such as: steel; drywall; lumber; wiring; doors; windows; roofing; rock; etc. including labor/installation costs, as identified within Part II Scope of Work.
- CONTINGENCY** coverage of potential cost overruns in any of the other utilized Grant Budget line items.

Pass-Through Entity or Subgrantor Responsibilities. If Grantee provides any portion of this funding to another entity through a grant agreement or contract, Grantee is considered to be a pass-through entity or subgrantor. Per Section 5.10(M) of the Agreement, Grantee must obtain written approval before it provides any portion of this funding to another entity through a grant agreement or contract. If the Department provides written approval, the Grantee must adhere to the following for any awards or contracts entered into using the Grant Funds listed above:

- (1) Ensure that all subgrant or contractual awards of Grant Funds are made in conformance with the terms of this Agreement specifically including, but not limited to, Sections 3.4 and 3.6 of this Agreement; and
- (2) Ensure subgrantees are aware of the terms and conditions of this grant and abide by them.

PART II

SCOPE OF WORK

In consideration for the Grant Funds to be provided by the Department, the Grantee agrees to perform the Project described in Part II (Scope of Work) hereof, in accordance with the provisions of Part I (Budget) hereof.

Section 1. Public Benefit

The Grantee is the operator of, and does business as, Fermi National Accelerator Laboratory (Fermilab) which is a national laboratory funded by the U.S. Department of Energy's (DOE) Office of Science to conduct basic research into particle physics. Fermilab's experiments in high energy physics and related disciplines advance the understanding of the fundamental nature of matter and energy. From 1967 to 2006, Universities Research Association, Inc. (URA) was the prime contractor to DOE for the creation and operation of Fermilab. URA is a consortium of approximately 90 leading research oriented universities primarily in the United States, with members also in Canada, Japan, and Italy. Effective January 1, 2007 URA joined with the University of Chicago to form the Grantee entity, which now holds the contract with DOE for the management and operation of Fermilab. All of the land within the Grantee's facility is owned by DOE, and is available to the Fermilab via the Grantee's Prime Contract with DOE.

The Grantee will be constructing an Illinois Accelerator Research Center (IARC) within the 6,800 acre Fermilab facility near Batavia, Illinois, on the boundary of Kane and DuPage counties. The IARC will provide a focal point for accelerator research, education, and industrialization, while initiating, promoting, and supporting related industry in Illinois. The IARC will increase the probability that new scientific frontier accelerators such as a new intense proton source (Project X), the International Linear Collider (ILC), or a Muon Collider (MC) could be sited at Fermilab. In partnership with industry and local university accelerator programs, the IARC will make critical contributions to the technological and economic health of Illinois and will provide unique educational opportunities for a new generation of Illinois engineers and scientists.

The Grant-funded portion of the IARC will cover a portion of the costs for approximately 30,000 square feet of technical, office, and classroom space in the "industrial" area of the Fermilab campus. The new Grant-funded building will provide offices and technical space for both Fermilab and Argonne National Laboratory staff, as well as for industrial partners working at Fermilab. The IARC's chosen location will provide its occupants with excellent access to the engineers and designers in the Fermilab Technical Division specializing in accelerator technology development. This project will be dramatically enhanced by the reuse (via other funding sources) of an existing large heavy assembly building sited adjacent to the new construction. The two buildings will collectively make up the physical plant of the IARC.

The IARC will develop world-leading educational programs in key aspects of accelerator physics and engineering and will attract top scientists from across the globe as faculty at nearby universities. These top scientists will perform world class research and educate and mentor Illinois students. The IARC positions Illinois to become a global center for the development of accelerator physics and engineering, medical accelerators, beam diagnostics and instrumentation, superconducting and high-power radiofrequency technology, next-generation synchrotron light sources, and isotope generation. With a strong focus on industrialization of these technologies, the IARC will attract high-tech companies and will train Illinois citizens in advanced technologies.

Grant funds will be used to cover a portion of the total design and construction costs for the new IARC facility, as follows:

Design/Engineering – to include the costs of Architectural/Engineering design services performed by a private A/E firm to develop the final design documents that set forth the detailed requirements for the construction of the new building. The final design documents will include working drawings and specifications with all supporting analysis and calculations. The design disciplines will include civil, landscape, architectural, structural, mechanical, plumbing, fire protection, electrical, and cost estimating.

Equipment/Material/Labor – to include the costs of pre-procurement of long-lead items of equipment and services such as electrical transformers, air switches, components of telecommunication system and other building systems in an effort to accelerate the construction schedule of the project as well as secure the most competitive costs.

Contingency – for coverage of potential cost overruns in any of the other utilized Grant Budget line items.

This Grant-funded project will benefit the public by providing the opportunity for Illinois to become a world leader in accelerator technology. The technology of particle accelerators powers a host of applications for society, such as: cancer therapy (medicine); materials processing (industry); subcritical reactors (energy); waste water treatment (environment); cargo inspection (national security); etc. The IARC will be utilized as incubator space for emerging accelerator technologies, providing a central point for cutting-edge accelerator research and industrialization.

Section 2. Grant Tasks

- 2.1 The Grantee shall use Grant funds as detailed in Part I, BUDGET. Expenditure of Grant funds will comply with applicable bond guidelines.
- 2.2 The Grantee shall utilize property acquired, constructed or improved with funds provided under this Agreement solely to provide the programs and services specified in Section 1, above, for at least the term of the Grant Agreement. Any sale, transfer, assignment or other conveyance of property acquired, constructed or improved shall provide that the property must continue to be used to accomplish or facilitate the public purpose described in Section 1, above.
- 2.3 The Grantee agrees to comply with the following:
 - (a) The Grantee shall utilize grant funds in accordance with Part I (Budget) to complete the activities/performance described in Section 1, above. The Grantee shall provide any additional funds, or secure commitments therefore, which are necessary to complete the specified activities/performance during the grant term set forth in the Notice of Grant Award.
 - (b) The Grantee shall execute all agreements necessary to complete the activities/performance described in Section 1, above, including, but not limited to, purchase/sales contracts for real and/or personal property, leases, easements, loans, financing agreements, grant agreements, operating agreements, etc., during the grant term specified in the Notice of Grant Award.
 - (c) The Grantee shall obtain all authorization necessary to complete the activities/performance described in Section 1, above, including, but not limited to, municipal ordinances, permits, variances, other approvals, etc., during the grant term specified in the Notice of Grant Award.
 - (d) The Grantee shall notify the Departmental grant manager in writing no later than 10 days after it becomes aware of any events/circumstances that will result in substantial delays or may substantially impair the Grantee's ability to complete the activities/performance described in Section 1, above, during the grant term specified in the Notice of Grant Award.
 - (e) The Grantee shall provide to the Department additional information relative to its compliance with the provisions set forth in subsections (a) through (d), above, pursuant to Part III, Section 3.2C, "Additional Information."
 - (f) In addition to the requirements of Part III, Section 3.7, the Grantee shall maintain in its file, and make available to the Department upon request therefore, copies of documentation, correspondence, agreements, etc., evidencing compliance with the requirements of subsections (a) through (d), above.
- 2.4 Any equipment purchased with Grant funds provided hereunder shall only be used for the purposes set forth above for the term of the grant.

- 2.5 The Grantee agrees and affirms that its programs are available to any person interested in participating, regardless of that person's financial situation, religious affiliation (or lack thereof), ethnicity, or national origin.
- 2.6 The Grantee shall continue to provide the programs and services specified in Section 1 and 2, above, for the term of the Grant Agreement. The Grantee acknowledges that it shall not utilize Grant funds to perform or further the performance of sectarian activities.

PART III
GRANT FUND CONTROL REQUIREMENTS

3.1 **AUDITS**

- A. Standard Audit The Grantee is required to obtain a Standard Audit and provide the Department with a copy of the audit report, the management letter, and the SAS 114 letter within thirty (30) days of the Grantee's receipt of such audit report, but in no event later than nine (9) months following the end of the period for which the audit was performed. The Audit Report is required to be provided to DCEO annually for the life of the grant.
- B. Single Audit If the Grantee is required to have a Single Audit performed in accordance with OMB Circular A-133, the Grantee is required to submit copies of the audit report, the data collection form, the management letter and the SAS 114 letter, as provided for in the Single Audit Act and OMB Circular A-133, to the Department within thirty (30) days of the Grantee's receipt of such audit report, but in no event later than nine (9) months following the end of the period for which the audit was performed. If no Single Audit is required, the Grantee is to provide DCEO with an annual letter stating a Single Audit was not required.
- C. Audit Requirements for State Grants Audited by the Illinois Office of the Auditor General (OAG) Grantees required by the Illinois OAG to obtain a financial audit, compliance examination, performance audit will be notified by OAG. The Grantee shall provide the Department with a copy of any financial audit, compliance examination, Single Audit or performance audit along with the accompanying management letter, letter of immaterial findings and the SAS 114 letter within thirty (30) days of the Grantee's receipt of such audit report, but in no event later than nine (9) months following the end of the period for which the audit or examination was performed. The Audit Report is required to be provided to DCEO any year an audit is performed over the life of the grant.
- D. Discretionary Audit The Department may, at any time, and at its discretion, request a Grant-Specific Audit or other audit, Management Letter and SAS 114 Letter to be delivered within thirty (30) days of the Grantee's receipt of such audit report, but in no event later than nine (9) months following the end of the period for which the audit was performed.
- E. Audit Performance All Audits shall be performed by an independent certified public accountant or accounting firm licensed by the appropriate licensing body in accordance with applicable auditing standards.
- F. Audit Submission The Grantee shall electronically send all audit reports and related deliverables to the Department at the following address:

externalauditunit@illinois.gov

If the Grantee is unable to submit the aforementioned documents to the Department electronically, the information shall be sent to the Department at the following address:

Illinois Department of Commerce and Economic Opportunity
Office of Accountability
External Audit Section
620 East Adams Street
Springfield, IL 62701

3.2 **REPORTING REQUIREMENTS**

In addition to any other documents specified in this Agreement, the Grantee must submit the following reports and information in accordance with the provisions hereof.

**PART III
GRANT FUND CONTROL REQUIREMENTS**

3.1 AUDITS

- A. Standard Audit The Grantee is required to obtain a Standard Audit and provide the Department with a copy of the audit report, the management letter, and the SAS 114 letter within thirty (30) days of the Grantee's receipt of such audit report, but in no event later than nine (9) months following the end of the period for which the audit was performed. The Audit Report is required to be provided to DCEO annually for the life of the grant.
- B. Single Audit If the Grantee is required to have a Single Audit performed in accordance with OMB Circular A-133, the Grantee is required to submit copies of the audit report, the data collection form, the management letter and the SAS 114 letter, as provided for in the Single Audit Act and OMB Circular A-133, to the Department within thirty (30) days of the Grantee's receipt of such audit report, but in no event later than nine (9) months following the end of the period for which the audit was performed. If no Single Audit is required, the Grantee is to provide DCEO with an annual letter stating a Single Audit was not required.
- C. Audit Requirements for State Grants Audited by the Illinois Office of the Auditor General (OAG) Grantees required by the Illinois OAG to obtain a financial audit, compliance examination, performance audit will be notified by OAG. The Grantee shall provide the Department with a copy of any financial audit, compliance examination, Single Audit or performance audit along with the accompanying management letter, letter of immaterial findings and the SAS 114 letter within thirty (30) days of the Grantee's receipt of such audit report, but in no event later than nine (9) months following the end of the period for which the audit or examination was performed. The Audit Report is required to be provided to DCEO any year an audit is performed over the life of the grant.
- D. Discretionary Audit The Department may, at any time, and at its discretion, request a Grant-Specific Audit or other audit, Management Letter and SAS 114 Letter to be delivered within thirty (30) days of the Grantee's receipt of such audit report, but in no event later than nine (9) months following the end of the period for which the audit was performed.
- E. Audit Performance All Audits shall be performed by an independent certified public accountant or accounting firm licensed by the appropriate licensing body in accordance with applicable auditing standards.
- F. Audit Submission The Grantee shall electronically send all audit reports and related deliverables to the Department at the following address:

externalauditunit@illinois.gov

If the Grantee is unable to submit the aforementioned documents to the Department electronically, the information shall be sent to the Department at the following address:

Illinois Department of Commerce and Economic Opportunity
Office of Accountability
External Audit Section
620 East Adams Street
Springfield, IL 62701

3.2 REPORTING REQUIREMENTS

In addition to any other documents specified in this Agreement, the Grantee must submit the following reports and information in accordance with the provisions hereof.

- A. Expenditures and Project Activity Prior to Grant Execution If the Agreement is executed more than thirty (30) days after the beginning date of the grant term provided in the Notice of Grant Award, the Grantee must submit a Financial Status Report and a Project Status Report, in a format provided by the Department, accounting for expenditures and project activity incurred from the beginning of the grant term up to the end of the month preceding the date of the Department's execution. If these Reports are required, the Department will not disburse any Grant Funds until the report is submitted to and approved by the Department.
- B. Final Financial Status Report The Final Financial Status Report described in Section 5.3 hereof is due within 45 days following the end date stated in the Notice of Grant Award. The Grantee should refer to the Welcome Package and the Reports Deliverable Schedule for the specific reporting requirements and due dates. Grantee must submit the report in the format provided by the Department. This report must summarize expenditure of the Grant Funds and activities completed during the grant term. The Grantee's failure to comply with the Close-out requirements set forth herein and in Section 5.3 will be considered a material breach of the performance required by this Agreement and may be the basis to initiate proceedings to recover all Grant Funds disbursed to the Grantee. Grantee's failure to comply with this Section shall be considered prima facie evidence of default, and may be admitted as such, without further proof, into evidence before the Department or in any other legal proceeding.
- C. Additional Information Upon request by the Department, the Grantee must, within the time directed by the Department, submit additional written reports regarding the Project, including, but not limited to, materials sufficient to document information provided by the Grantee.
- D. Submittal of Reports Submittal of all reports and documentation required under this Agreement should be submitted to the individual as directed by the Department.
- E. Failure to Submit Reports In the event Grantee fails to timely submit any reports required under this Agreement, the Department may withhold or suspend the distribution of Grant Funds until said reports are filed and approved by the Department.

3.3 WELCOME PACKAGE

Upon execution of this Grant Agreement, the Grantee will receive a Welcome Package detailing reporting requirements and procedures relating to the Grant. The Grantee is obligated to comply with those requirements and any revisions thereto in accordance with Section 3.2(B) of this Grant Agreement.

3.4 FISCAL RECORDING REQUIREMENTS

The Grantee's financial management system shall be structured to provide for accurate, current, and complete disclosure of the financial results of the Project funded under this grant program. The Grantee is accountable for all Grant Funds received under this Grant, including those expended for subgrantees. The Grantee shall maintain effective control and accountability over all Grant Funds, equipment, property, and other assets under the grant as required by the Department. The Grantee shall keep records sufficient to permit the tracing of Grant Funds to a level of expenditure adequate to insure that Grant Funds have not been inappropriately expended, and must have internal controls consistent with generally accepted accounting practices adopted by the American Institute of Certified Public Accountants.

3.5 DUE DILIGENCE IN EXPENDITURE OF FUNDS

Grantee shall ensure that Grant Funds are expended in accordance with the following principles: (i) grant expenditures should be made in accordance with generally accepted sound, business practices, arms-length bargaining, applicable federal and state laws and regulations; (ii) grant expenditures should conform to the terms and conditions of this Agreement; (iii) grant expenditures should not exceed the amount that would be incurred by a prudent person under the circumstances prevailing at the time the decision is made to incur the costs; and (iv) grant accounting should be consistent with generally accepted accounting principles.

3.6 **MONITORING**

The grant will be monitored for compliance in accordance with the terms and conditions of the Grant Agreement, together with appropriate programmatic rules, regulations, and/or guidelines that the Department promulgates or implements. The Grantee must permit any agent authorized by the Department, upon presentation of credentials, in accordance by all methods available by law, including full access to and the right to examine any document, papers and records either in hard copy or electronic, of the Grantee involving transactions relating to this grant.

3.7 **RECORDS RETENTION**

The Grantee is accountable for all Grant Funds received under this Agreement and shall maintain, for a minimum of four (4) years following the Department's final written approval of all required close-outs, unless the Department notifies the Grantee prior to the expiration of the four years that a longer period is required, adequate books, records, and supporting documents, including digital and electronic data, to verify the amount, recipients and uses of all disbursements of Grant Funds passing in conjunction with this Agreement. ~~This Agreement and all books, records and supporting documents related hereto shall be available for inspection and audit by the Department, the Office of Inspector General, the Auditor General of the State of Illinois, the Illinois Attorney General, or any of their duly authorized representative(s), and the Grantee agrees to fully cooperate with any audit performed by the Auditor General or the Department. Grantee agrees to provide full access to all relevant materials and to provide copies of same upon request. Failure to maintain books, records and supporting documents required by this Agreement shall establish a presumption in favor of the Department for the recovery of any Grant Funds paid by the Department under this Agreement for which adequate books, records and supporting documentation are not available to support their purported disbursement or expenditure.~~

If any of the services to be performed under this Agreement are subcontracted and/or if subgrants are issued/awarded for the expenditure of Grant Funds provided under this Agreement, the Grantee shall include in all such subcontracts and subgrants, a provision that the Department, the Office of Inspector General, and the Auditor General of the State of Illinois, or any of their duly authorized representatives, will have full access to and the right to examine any pertinent books, documents, papers and records of any such subcontractor or subgrantee involving transactions related to this Agreement for a period of four (4) years following the Department's final approval of all required close-outs (financial and/or programmatic), and any such subcontractor shall be governed by the same requirements to which the Grantee is subject under this Agreement.

~~"This Agreement and all books, records and supporting documents related to this grant shall be available for inspection by the Department, the Office of Inspector General, the Auditor General of the State of Illinois, or any of their duly authorized representatives. The Grantee agrees to cooperate fully with any audit conducted by the Auditor General in relation to any audit conducted concerning of the Department's records related to this grant."~~

PART III – APPENDIX A
SPECIAL GRANT CONDITIONS

3.1 LIABILITY. The parties agree to insert the following provision in lieu of Part V, Section 5.6, Indemnification, herof. It is understood and agreed that neither party to this Grant Agreement shall be liable to the other party for any negligent acts either of commission or omission unless such liability is imposed by law.

3.2 PERFORMANCE. In addition to complying with the provisions of this Grant, the Grantee shall perform the work on a best effort cost reimbursable basis in accordance with the requirements of Prime Contract No. DE-AC02-07CH11359, as amended, with the U.S. Department of Energy, to the extent such performance does not conflict with Part II Scope of Work herein.

3.3 FEDERAL REQUIREMENTS. The parties hereby acknowledge the Grantee's contractual obligation under its Prime Contract with the U.S. Government to comply with federal statutes and regulations regarding drug free workplace, and non-discrimination requirements for any work performed under this Grant by Fermi National Accelerator Laboratory.

3.4 RIGHTS IN TECHNICAL DATA. The terms of the Rights in technical Data article of the Prime Contract No. DE-AC02-07CH11359 between Fermi Research Alliance, LLC, Operator of Fermi National Accelerator Laboratory a/k/a Fermi National Accelerator Laboratory and the United States Department of Energy for operation of Fermi National Accelerator Laboratory shall apply to work performed under this Grant. Further, the Federal Government, Fermi National Accelerator Laboratory and the Illinois Department of Commerce and Economic Opportunity shall all have unlimited rights to all technical data first produced in the performance of the work under this Grant. Unlimited rights means right to use, duplicate or disclose technical data, in whole or in part, in any manner and for any purpose whatsoever, and permit others to do so.

3.5 NOTICE AND ASSISTANCE REGARDING PATENT AND COPYRIGHT INFRINGEMENT. The Illinois Department of Commerce and Economic Opportunity shall report to the Department of Energy and the Fermi Research Alliance, LLC, operator of Fermi National Accelerator Laboratory a/k/a Fermi National Accelerator Laboratory, when requested by either, all evidence and information in the possession of the Illinois Department of commerce and Economic Opportunity shall perform no work under the Grant.

3.6 PATENT RIGHTS. Any invention or discovery that the Fermi Research Alliance, LLC, operator of Fermi National Accelerator Laboratory a/k/a Fermi National Accelerator Laboratory's employees may make or conceive during their assignment of the work under this Grant, will be governed by the provisions of the Fermi Research Alliance, LLC, operator of Fermi National Accelerator Laboratory a/k/a Fermi National Accelerator Laboratory's Prime contract with the U.S. Department of Energy, provided however, in any event, the State shall retain a nonexclusive, non-transferable, revocable, royalty-free license under said invention, discovery, application, or patent.

3.7 AUDIT REQUIREMENTS. In lieu of Part III, Section 3.1, Audits, the parties recognize Fermi Research Alliance, LLC, operator of Fermi National Accelerator Laboratory a/k/a Fermi National Accelerator Laboratory, is a U.S. Government-owned facility, and as such, the cognizant audit group is the U.S. Department of Energy's Inspector General Office. Upon request DOE will conduct a project specific review of the program project and submit a copy of the review, but in no event later than nine (9) months following the end of the period for which the review was performed. The Grantee shall send the review to DCEO at the following address:

Illinois Department of Commerce and Economic Opportunity
Division of Audits
620 East Adams Street
Springfield, IL 62701

PART IV TERMS AND CONDITIONS

4.1 AUTHORITY: PURPOSE: REPRESENTATIONS AND WARRANTIES

- A. Authority The Department is authorized to make this grant pursuant to 20 ILCS 605/605-55 and/or 20 ILCS 605/605-30.

The purpose of this authority is as follows:

To make and enter into contracts, including grants, as authorized pursuant to appropriations by the General Assembly. and/or To use the State and federal programs, grants, and subsidies that are available to assist in the discharge of the provisions of the Civil Administrative Code of Illinois.

- B. Purpose; Representations and Warranties The sole purpose of this grant is to fund the Grantee's performance of the Project, described in Part II hereof, during the term of this grant. The Grantee represents and warrants that the grant proposal/application submitted by the Grantee is in all material respects true and accurate; that it is authorized to undertake the obligations set forth in this Agreement and that it has obtained or will obtain and maintain all permits, licenses or other governmental approvals necessary to perform the Project described in Part II.

4.2 PROJECT SCHEDULE; EXTENSIONS

- A. Project Schedule The Grantee must complete the Scope of Work within the grant term. The Department may require the submission of deliverables. Deliverables must be provided as directed by the Department. For purposes of this Agreement, the Grant Period Begin Date shall be the Project Commencement Date and the Grant Period End Date shall be the Project Completion Date unless these dates are clearly identified as distinctly different in the Part II Scope of Work.
- B. Extensions Extensions of the grant term will be granted only for good cause. Grantees requiring an extension of the grant term should submit a written request to the Program Manager prior to the grant expiration date stating the reason for the extension. All extensions must comply with requirements of Section 5.7.

Grantee's failure to adhere to the schedule set forth in Part II may be grounds for suspension or termination of this Agreement pursuant to Section 5.5 herein. Further, failure by the Grantee to comply with the terms and conditions outlined in Part II, or with any additional terms and conditions within the Agreement, may result in the Grantee being deemed ineligible by the Department for future funding.

4.3 PAYMENT AND EXPENDITURE OF GRANT FUNDS

- A. Expenditure of Funds; Right to Refund Payment of the grant amount specified in the Notice of Grant Award shall be made to the Grantee as specified herein. Grant Funds provided under this Agreement must be expended only to perform the tasks set forth in the Scope of Work attached as Part II of this Agreement. In addition to reasons set forth in other sections of this Agreement, the Department will require a refund from Grantee if (i) the total grant expenditures are less than the amount vouchered to the Grantee from the Department pursuant to the Notice of Grant Award; or (ii) Grant Funds have not been expended or legally obligated within the grant term in accordance with Parts I and Part II hereof. If the Department requires a refund under either of the above circumstances, the Grant Funds must be returned to the Department within forty-five (45) days of the end of the grant term or the otherwise effective Grant Agreement termination date.
- B. Payment Provisions; Prior Incurred Costs

Full Advance

A single payment of the entire grant amount (100%) shall be initiated to the Grantee upon execution and acceptance of the Grant Agreement by the Illinois Office of the Comptroller.

Prior Incurred Costs

Reimbursement of costs incurred prior to the beginning date as specified in the Notice of Grant Award will be allowed only if specifically provided for in the Part II, Scope of Work, as approved by the Department. If not clearly identified in Part II, Scope of Work, any costs incurred prior to this Agreement will be disallowed.

4.4 GRANT SPECIFIC TERMS/CONDITIONS

A. Projects Requiring External Sign-offs

- (1) Pursuant to applicable statute(s), this grant requires sign-off by the following State agency(ies). **The status of the sign-off is indicated as of the date the grant is sent to the Grantee for execution:**

AGENCY	SIGN-OFF RECEIVED	SIGN-OFF OUTSTANDING
<u> X </u> Illinois Historic Preservation Agency	<u> X </u>	<u> </u>
<u> </u> Illinois Dept. of Agriculture	<u> </u>	<u> </u>
<u> X </u> Illinois Dept. of Natural Resources	<u> </u>	<u> X </u>
<u> </u> NONE APPLICABLE		

While any external sign-off is outstanding, the provisions of Item 3) immediately below apply with respect to the disbursement of funds under this grant.

NOTE: The fact that a sign-off has been received in no way relieves the Grantee of its obligation to comply with any conditions or requirements conveyed by the applicable agency(ies) in conjunction with the issuance of the sign-off for the project funded under this Agreement.

- (2) For projects subject to review by the Illinois Environmental Protection Agency, the Grantee must, prior to construction, obtain a construction permit or "authorization to construct" from the IEPA pursuant to the provisions of the Environmental Protection Act, 415 ILCS 5/1 et seq.

(3) **External Sign-Off Provisions :**

- a) The Project described in Part II and funded under this Grant Agreement, is subject to review by the external agency(ies) indicated in Item 1) immediately above. Grantee must comply with requirements established by said agency(ies) relative to their respective reviews. **Any requirements communicated to the Department shall be incorporated into this Agreement as follows: (i) as an attachment to this Agreement (immediately following this Part IV) at the time of grant execution; or (ii) if received from the applicable agency(ies) subsequent to execution, as an addendum to this Agreement.** The Grantee is contractually obligated to comply with such requirements.
- b) Grantee is responsible for coordinating directly with the applicable external agency(ies) relative to said reviews. Except as specifically provided below, the Department's obligation

to disburse funds under this Grant Agreement is contingent upon notification by the applicable agency(ies) that all requirements applicable to the Project have been satisfied. Upon receipt of said notification, disbursement of the grant funds shall be authorized in accordance with the provisions of Section 4.3B hereof.

- c) Prior to notification of compliance by the applicable external agency(ies), the Grantee may request disbursement of funds **only** for the following purposes: administrative, contractual, legal, engineering, or architectural costs incurred which are necessary to allow for compliance by the Grantee of requirements established by the external agency(ies). **FUNDS WILL NOT BE DISBURSED FOR LAND ACQUISITION OR ANY TYPE OF CONSTRUCTION OR OTHER ACTIVITY WHICH PHYSICALLY IMPACTS THE PROJECT SITE PRIOR TO RECEIPT BY THE DEPARTMENT OF THE REQUIRED NOTIFICATION FROM ALL APPLICABLE AGENCIES.**

- B. If external sign-offs are indicated in this Section 4.4 disbursement of grant funds (whether advance or scheduled) are subject to the restrictions set forth by the External Sign-Off Provisions of this Section 4.4. Upon receipt of all required sign-offs, the Department's Accounting Division will be notified to disburse grant funds in accordance with the disbursement method indicated herein.

4.5 DEPOSIT OF GRANT FUNDS

Grant Funds paid in advance of realized costs must be kept in an interest bearing account and maintained therein until used in accordance with the terms and conditions of this Agreement. The Department may waive this requirement upon a written request from the Grantee; however written Departmental approval must be received before any Grant Funds are kept in a non-interest bearing account. Grantee will be responsible for the payment of interest to the Department at a rate equal to twelve percent (12%) per annum on any of the Grant Funds kept in a non-interest bearing account without prior Departmental written approval.

Any interest earned on these Grant Funds must be accounted for as provided in Section 4.6 of this Agreement. Exceptions to Section 4.5 are not permissible without prior written approval by the Department.

~~Grant Funds paid in reimbursement of previously paid costs may be kept in a non-interest bearing account at the Grantee's discretion.~~

4.6 RETURN OF INTEREST ON GRANT FUNDS

~~This Agreement does not allow for the retention of interest by the Grantee. Any interest earned on Grant Funds provided under this Agreement must be accounted for in the Final Financial Status Report described in Section 5.3 herein, and returned as interest to the Department in accordance with the directions provided by the Department.~~

4.7 INTENTIONALLY LEFT BLANK

4.8 SUPPORT

Grantee, through its agents, employees and contractors, will provide all equipment, supplies, services and other items of support which are necessary for the effective performance of the Project, unless the Agreement specifically sets forth items of support to be provided by the Department.

4.9 OWNERSHIP, USE AND MAINTENANCE OF PERSONAL PROPERTY

- A. Ownership Subject to the provisions of this Section 4.9, and the remedies available to the Department as set forth in Section 4.11 below, equipment and material authorized to be purchased with Grant

Funds becomes the property of the Grantee. Grantee will maintain an inventory or property control record for all equipment and material purchased with Grant Funds.

B. Use: Maintenance; Insurance During the Grant term, the Grantee must:

(1) use equipment and materials acquired with Grant Funds only for the approved Project purposes set forth in Part II; and (2) provide sufficient maintenance on the equipment and materials to permit achievement of the approved Project purposes and maintain, at its own expense, insurance coverage on all equipment and material purchased with Grant Funds, for its full insurable value, against loss, damage and other risks ordinarily insured against by owners or users of similar equipment and material in similar businesses.

C. Prohibition Against Disposition/Encumbrance The Grantee is prohibited from, and may not sell, transfer, encumber (other than original financing) or otherwise dispose of said equipment or material during the grant term without prior written approval of the Department.

4.10 PUBLIC INFORMATION REQUIREMENTS

For the duration of the Agreement, the Grantee will prominently acknowledge the participation of the Department in the Project in all press releases, publications and promotional materials presented to the media or otherwise dissemination published concerning the Project. The Grantee must provide the Department with copies of any proposed press releases, publications and promotional materials not less than ten (10) days before these materials are disseminated. * Grantee will submit copies of any press releases, publications and promotional materials to the Department's Project Manager.

The Grantee will provide adequate advance notice pursuant to Section 4.12 of promotional events such as open houses, dedications, or other planned publicity events; and will also coordinate in the planning of said events. Any materials or displays to be distributed in connection with the promotional event must be submitted to the Department in advance of publication or dissemination and must prominently acknowledge the Department's participation in the Project.

4.11 DEPARTMENT REMEDIES

In addition to any remedies found elsewhere in this Agreement or at law, the Department may elect any of the following remedies in the event this Agreement is terminated pursuant to Section 5.5 herein. Grantee must comply with the Department's direction within 45 days following written notice or demand from the Department.

- A. The Department may direct the Grantee to refund all grant moneys disbursed to it under this Agreement;
- B. The Department may direct the Grantee to remit an amount equivalent to the "Net Salvage Value" of all equipment or materials purchased with Grant Funds provided under this Agreement. For purposes of this Agreement, "Net Salvage Value" is defined as the amount realized, or that the Parties agree is likely to be realized from, the sale of equipment or materials purchased with Grant Funds provided under this Agreement at its current fair market value, less selling expenses;
- C. The Department may direct the Grantee to transfer ownership of equipment or material purchased with Grant Funds provided under this Agreement to the Department or its designee.

4.12 NOTICES

Notices and other communications provided for herein shall be given in writing by first class mail, by registered, or certified mail, return receipt requested, by receipted hand delivery, by courier (UPS, Federal Express or other similar and reliable carrier), by e-mail, or by fax showing the date and time of successful receipt. Notices shall be sent to the respective party at the address set forth on the signature page hereto, or

to such other authorized designees as the parties may designate in writing from time to time. Grantee is responsible for providing the Department with correct address and contact information for itself and its designees. Any notice to the Grantee shall be deemed to have been provided if sent to the address or contact information on the signature page or to the address of an authorized designee. Notice to the Department is deemed to have been provided at the time it is actually received.

4.13 COMPLAINT PROCESS

In the event of a Grantee complaint, the Department's Administrative Hearing Rules shall govern and said rules can be found at Title 56 Illinois Administrative Code, Section 2605.

4.14 GRANT FUNDS RECOVERY ACT (30 ILCS 705/1, ET SEQ.)

This Agreement is subject to all applicable provisions of the Illinois Grant Funds Recovery Act, including the requirement that any Grant Funds not expended or legally obligated at the expiration or termination of the Grant term must be returned to the Department within 45 days following said expiration or termination. ~~Notwithstanding any provision specified elsewhere in this Agreement regarding the treatment of interest earned on the Grant Funds, any interest earned on Grant Funds that is not expended or legally obligated during the Grant term must also be returned to the Department within 45 days following the expiration or termination of this Agreement.~~

4.15 GRANT PROJECT MANAGEMENT

All necessary and ordinary communications, submittals, approvals, requests and notices related to the Project shall be submitted to:

David E. Parr
Illinois Department of Commerce and Economic Opportunity
500 E. Monroe St.
Springfield, IL 62701-1509

**PART V
GENERAL PROVISIONS**

5.1 GRANTEE REPRESENTATIONS AND WARRANTIES; GRANTEE GENERAL COVENANTS

- A. Grantee Representations and Warranties In connection with the execution and delivery of this Agreement, the Grantee makes the following representations and warranties to the Department:
- (1) That it has all requisite authority to carry on its business and to execute, deliver and consummate the transactions contemplated by this Agreement;
 - (2) That its employees, agents and officials are competent to perform as required under this Agreement;
 - (3) That it is the real party in interest to this Agreement and is not acting for or on behalf of an undisclosed party;
 - (4) That it has taken all necessary action under its governing documents to authorize the execution and performance of this Agreement under the terms and conditions stated herein;
 - (5) That it has no public or private interest, direct or indirect, and shall not acquire, directly or indirectly any such interest which does or may conflict in any manner with the performance of the Grantee's services and obligations under this Agreement;
 - (6) That no member of any governing body or any officer, agent or employee of the State, is employed by the Grantee or has a financial or economic interest directly in this Agreement, or any compensation to be paid hereunder except as may be permitted applicable statute, regulation or ordinance;
 - (7) That there is no action, suit or proceeding at law or in equity pending, nor to the best of Grantee's knowledge, threatened, against or affecting the Grantee, before any court or before any governmental or administrative agency, which will have a material adverse effect on the performance required by this Agreement;
 - (8) That to the best of the Grantee's knowledge and belief, the Grantee, its principals and key project personnel:
 - (a) Are not presently declared ineligible or voluntarily excluded from contracting with any Federal or State department or agency;
 - (b) Have not within a three-year period preceding this Agreement been convicted of any felony; been convicted of a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State, or local) transaction or contract under a public transaction; had a civil judgment rendered against them for commission of fraud; been found in violation of Federal or State antitrust statutes; or been convicted of embezzlement, theft, larceny, forgery, bribery, falsification or destruction of records, making false statement, or receiving stolen property; and
 - (c) Are not presently indicted for or otherwise criminally or civilly charged by a government entity (Federal, State or local) with commission of any of the offenses enumerated in subparagraph (b) of this certification.

Any request for an exception to the provisions of this paragraph must be made in writing, listing the name of the individual, home address, type of conviction and date of conviction.

- (9) That this Agreement has been duly executed and delivered on behalf of the Grantee and constitutes a legal, valid and binding obligation of the Grantee, enforceable in accordance with its terms, except to the extent that enforcement of any such terms may be limited by
- (a) Applicable bankruptcy, reorganization, debt arrangement, insolvency or other similar laws generally affecting creditors' rights; or
 - (b) Judicial public policy limitations upon the enforcement of certain remedies including those which a court of equity may in its discretion decline to enforce; and performance required under this Agreement; and
- (10) Grantee certifies that it is not currently operating under or subject to any cease and desist order, or subject to any informal or formal regulatory action, and, to the best of Grantee's knowledge, that it is not currently the subject of any investigation by any state or federal regulatory, law enforcement or legal authority. Should it become the subject of an investigation by any state or federal regulatory, law enforcement or legal authority, Grantee shall promptly notify the Department of any such investigation. Grantee acknowledges that should it later be subject to a cease and desist order, Memorandum of Understanding, or found in violation pursuant to any regulatory action or any court action or proceeding before any administrative agency, that the Department is authorized to declare Grantee in default of this Agreement and suspend or terminate the Agreement pursuant to Section 5.5.

B. General Covenants In connection with the execution and delivery of this Agreement, the Grantee makes the following covenants to the Department, which are in addition to any specific covenants contained in this Agreement:

- (1) That it will use Grant Funds only for the purposes set forth in the Budget and Scope of Work, Parts I and II, respectively, of this Agreement;
- (2) That all warranties and representations made by the Grantee in this Agreement shall be true, accurate and complete for the term of the Agreement;
- (3) That it shall be subject to, obey, and adhere to any and all federal, state and local laws, statutes, ordinances, rules, regulations and executive orders as are now or may be in effect during the term of this Agreement which may be applicable to the Grantee;
- (4) That it shall remain solvent and able to pay its debts as they mature. In the event of bankruptcy filing by the Grantee, voluntary or involuntary, the Department may decline to make any further payment, which may otherwise be required under this Agreement;
- (5) That it shall immediately notify the Department of any and all events or actions that may materially adversely affect its ability to carry on its operations or perform any or all of its obligations under this Agreement; and
- (6) That it shall not enter into any other agreement or transaction that would conflict with the performance of its duties hereunder.

5.2 APPROPRIATION; NONAPPROPRIATION/INSUFFICIENT APPROPRIATION; REDUCED FUNDING SOURCES/REVENUES

- A. Appropriation The Grantee is hereby given actual knowledge that pursuant to the State Finance Act, 30 ILCS 105/30, payments under this grant are contingent upon the existence of a valid appropriation therefore and that no officer shall contract any indebtedness on behalf of the State, or assume to bind the State in an amount in excess of the money appropriated, unless expressly authorized by law.

- B. Non-appropriation/Insufficient Appropriation Payments pursuant to this Agreement are subject to the availability of applicable federal and/or state funding from the Department and their appropriation and authorized expenditures under State law. The Department shall use its best efforts to secure sufficient appropriations to fund this Agreement. However, the Department's obligations hereunder shall cease immediately, without penalty or further payment being required, if the Illinois General Assembly or federal funding source fails to make an appropriation sufficient to pay such obligation. The Department, at its sole discretion, shall determine whether amounts appropriated are sufficient to continue its obligations under this Agreement. Termination resulting from non-appropriation or insufficient appropriation shall be in accordance with Section 5.5(A)(1) hereof. Any grant is void by operation of law if the Department fails to obtain the requisite appropriation to pay the grant in any year in which this Agreement is in effect.
- C. Reduced Funding Sources/Revenues The Department reserves the right to reduce the amount to be paid to Grantee under this Agreement if the Department determines that it is in the best interest of the State of Illinois to reduce its obligation under this Agreement as a result of the occurrence of any of the following events during the term of the Agreement:
- (1) Receipts from revenues which provide the funding for this Agreement either fall significantly short of anticipated levels, or significantly decrease, or
 - (2) Other sources (external grants, contracts, awards, etc.) providing funds for this Agreement are decreased or withdrawn. If such an event occurs, the Department will notify the Grantee as soon as possible. If the Department and Grantee are able to agree on a reduced compensation amount and a corresponding reduced scope of services, the parties shall execute a grant modification so stating. If the Department and Grantee are unable to agree on the reduced compensation and reduced scope of services, the Department shall terminate the Grant in accordance with the provisions of Section 5.5(A)(2) herein.

5.3 GRANT CLOSE-OUT

- A. Final Financial Status Report In addition to any other reporting requirements specified in this Agreement, the Grantee shall complete and submit a Final Financial Status Report on forms provided by the Department, within forty-five (45) days of the earlier of the Grant Period end date or the effective date of termination of this Agreement. The Grantee should refer to the Welcome Package and the Reports Deliverable Schedule for the specific reporting requirements and due dates. The Grantee must report on the expenditure of Grant Funds provided by the State, and if applicable, the Grantee's required matching funds. The Grantee is responsible for taking the necessary steps to correct any deficiencies disclosed by such Final Financial Status Report, including such action as the Department, based on its review of the report, may direct.
- B. Grant Refunds In accordance with the Illinois Grant Funds Recovery Act, 30 ILCS 705/1, et seq., the Grantee must, within forty-five (45) days of the earlier of the Grant Period end date or the effective date of termination of this Agreement, refund to the Department, any balance of Grant Funds not spent or not obligated as of said date.

5.4 DEFAULT AND REMEDIES

The occurrence of any of the following events, during the grant term, shall constitute a default:

- A. Grantee shall fail to observe or perform any covenant or agreement contained in this Agreement, including the Exhibits hereto;
- B. Any representation, warranty, certificate or statement made by the Grantee in this Agreement, including the Exhibits hereto, or in any certificate, report, financial statement or other document delivered pursuant to this Agreement shall prove to have been incorrect when made in any material respect;

- C. Grantee shall commence a voluntary case or other proceeding seeking liquidation, reorganization or other relief with respect to itself or its debts under any bankruptcy, insolvency or other similar law now or hereafter in effect or seeking the appointment of a trustee, receiver, liquidator, custodian or other similar official of it or any substantial part of its property, or shall consent to any such relief or to the appointment of or taking possession by any such official in an involuntary case or other proceeding commenced against it, or shall make a general assignment for the benefit of creditors, or shall fail generally to pay its debts as they become due, or shall take any corporate action to authorize any of the foregoing;
- D. An involuntary case or other proceeding shall be commenced against the Grantee seeking liquidation, reorganization or other relief with respect to it or its debts under any bankruptcy, insolvency or other similar law now or hereafter in effect or seeking the appointment of a trustee, receiver, liquidator, custodian or other similar official of it or any substantial part of its property, and such involuntary case or other proceedings shall remain undismissed and unstayed for a period of 60 days; or an order for relief shall be entered against the Grantee under the federal bankruptcy laws as now or hereby after in effect;
- E. The Grantee permanently ceases the conduct of active trade or business at the location specified in Part II, Scope of Work, for any reason, including, but not limited to, fire or other casualty;
- F. Company fails to provide the Company Contribution, if applicable, as identified in Part II, Scope of Work;
- G. Grantee defaults on a loan from a third party. Grantee shall provide the Department with immediate notice upon making a determination that it will default on a loan.

Grantee shall have 30 days from the date Department notifies it of the occurrence of a default to cure the default to Department's satisfaction. Grantee's failure to cure, or to initiate a cure which is satisfactory to the Department, shall be a sufficient basis for the Department to terminate this Agreement and to direct Grantee to refund all not expended Grant Funds disbursed to it by the Department within thirty (30) days of receipt of the notice of termination.

~~At the Department's discretion the Grantee shall be responsible for the payment of interest at a rate equal to twelve percent (12%) per annum for any amount of the Grant Funds which it has not refunded to the Department beginning thirty (30) days from the date the termination notice is sent by the Department and continuing to the date that all Grant Funds are refunded by Grantee or recovered through other legal processes available to the Department.~~

5.5 TERMINATION; SUSPENSION

A. This Agreement may be terminated as follows:

- (1) Non-appropriation, Insufficient Appropriation In the event of non-appropriation or insufficient appropriation as described in Section 5.2(B) above, Grantee shall be paid for non-cancelable, allowable expenditures incurred in the performance of authorized services under this Agreement prior to the effective date of termination which shall be the date stated in the written termination notice provided to Grantee. The Department shall provide such notice to Grantee as soon as possible after it becomes aware of such non-appropriation or insufficient appropriation. Any refunds due the Department shall be submitted in accordance with the provisions of Section 5.3(B) hereof.
- (2) Reduced Funding Sources/Revenues In the event the parties are unable to agree on a reduced amount of compensation and scope of services necessitated due to a reduction in revenues or other funding sources for this Agreement as described in Section 5.2(C) above, Grantee shall be paid for non-cancelable, allowable expenditures incurred in the performance of authorized services under

this Agreement prior to the effective date of termination which shall be the date stated in the written termination notice provided to Grantee. Any refunds due the Department shall be submitted in accordance with the provisions of Section 5.3(B) hereof.

For Cause If the Department determines that the Grantee has failed to comply with any of the covenants, terms, conditions or provisions of this Agreement, or any other application, proposal or grant award executed by the Department and the Grantee, including any applicable rules or regulations, or has made a false representation or warranty in connection with the receipt of the grant, the Department may terminate this Agreement in whole or in part at any time before the expiration date of this Agreement. The Department shall notify the Grantee in writing of the reasons for the termination and the effective date of the termination. Grantee shall not incur any costs after the effective date of the termination. Payments made to the Grantee or recovery by the Department shall be in accord with the legal rights and liabilities of the parties.

In the event of termination for cause, Grantee shall also be subject to any other applicable provisions specified elsewhere in this Agreement.

Termination for cause may render the Grantee ineligible for consideration for future grants from the Department for a period not to exceed two (2) years.

(3) For Convenience The Grantee acknowledges that this grant was made by the Department based on its determination that the activities to be funded under this Agreement are in furtherance of either the Department's statutory requirements or its program objectives. The Grantee further acknowledges that the Department may unilaterally terminate this Agreement based on its good faith determination that the continued expenditure of Grant Funds under this Agreement is no longer in furtherance of said statutory requirements or program objectives. Termination for convenience shall be effective upon delivery of notice to Grantee pursuant to Section 5.10(F) hereof. The Grantee shall not incur new obligations after the effective date of the termination, and shall cancel as many outstanding obligations as possible. The Department shall allow full credit to the Grantee for properly incurred expenditures made in connection with the Grant in accordance with the provisions of Part I (Budget) and Part II (Scope of Work). Grant refunds shall be submitted in accordance with the provisions of Section 5.3(B) hereof.

B. Suspension If the Grantee fails to comply with the specific conditions and/or general terms and conditions of this Agreement, the Department may, upon written notice to the Grantee, suspend this Agreement, withhold further payments and prohibit the Grantee from incurring additional obligations of Grant Funds, pending corrective action by the Grantee or a decision to terminate this Agreement. The Department may determine to allow such necessary and proper costs, which the Grantee could not reasonably avoid during the period of suspension provided that the Department agrees that such costs were necessary and reasonable and incurred in accordance with the provisions of this Agreement.

5.6 INDEMNIFICATION

A. Non-Governmental Entities The Grantee agrees to assume all risk of loss and to indemnify and hold the State, its officers, agents and employees, harmless from and against any and all liabilities, demands, claims, suits, losses, damages, causes of action, fines or judgments including costs, attorneys' and witnesses' fees, and expenses incident thereto, relating to bodily injuries to persons (including death) and for loss of, damage to, or destruction of real and/or tangible personal property (including property of the State) resulting from the negligence or misconduct of Grantee, its employees, agents, or subcontractors or subgrantees in the performance of this Agreement. Grantee shall do nothing to prejudice the State's right to recover against third parties for any loss, destruction or damage to State property and shall, at the State's request and expense, furnish to the State reasonable assistance and cooperation including assistance in the prosecution of suit and the execution of instruments of assignment in favor of the State in obtaining recovery.

The Grantee shall, at its expense, defend the State against all claims asserted by any person that anything provided by Grantee infringes a patent, copyright, trade secret or other intellectual property right and shall, without limitation, pay the costs, damages and attorneys' fees awarded against the State in any such action, or pay any settlement of such action or claim. Each party agrees to notify the other promptly of any matters to which this provision may apply and to cooperate with each other in connection with such defense or settlement.

- B. Governmental Entities In the event that the Grantee is a Governmental Entity, it will indemnify and hold harmless the Department as set out herein to the extent authorized by Federal and/or State constitutions(s) and/or laws.

5.7 **MODIFICATION BY OPERATION OF LAW; BUDGET MODIFICATIONS; DISCRETIONARY MODIFICATIONS**

- A. Modifications by Operation of Law This Agreement is subject to such modifications as the Department determines may be required by changes in Federal or State law or regulations applicable to this Agreement. Any such required modification shall be incorporated into and become part of this Agreement as if fully set forth herein. The Department shall timely notify the Grantee of any pending implementation of or proposed amendment to such regulations of which it has notice.
- B. Budget Modifications Grantee must expend the Grant Funds in accordance with the approved budget set forth in Part I hereof. If the Grantee determines that its expenditures for the grant term will vary from the amounts listed in the approved project budget it must submit a written request for approval from the Department prior to incurring the revised costs. Said request must give the reasons for and amounts of the revisions. If the Department approves the revised expenditures, it will provide the Grantee with a revised Project Budget incorporating the revisions. Grantee's failure to obtain written approval for anticipated budget revisions is a sufficient reason for the Department to disallow any costs not included in the original project budget and require a refund from the Grantee.

The Grantee may make a line item transfer up to the allowable variance percentage/amount of the total approved line item budget as specified in Part I Budget without prior written approval of the Department, subject to the following conditions:

- (1) Modifications Requiring Departmental Approval If the Grantee determines that its expenditures will vary from the approved budgeted line item amounts listed in Part I Budget by more than the allowable variance percentage/amount for any given line item expenditure, but will not exceed the total grant award, it shall submit a written request for approval from the Department prior to incurring the revised costs. Modification requests shall give the reasons for and amounts of the revisions. If the Department approves the revised expenditures, it will provide the Grantee with a revised project Part I Budget incorporating the revisions. Grantee's failure to obtain written approval for anticipated budget revisions shall be deemed sufficient for the Department to disallow any costs not included in the original project budget and require a refund from the Grantee.
- (2) Discretionary Transfers Transfers between approved line items that do not exceed the allowable variance percentage/amount of the original approved budget line item may be made at the Grantee's discretion without the Department's approval. For purposes of the allowable discretionary transfer(s), the line item to which the transfer is made cannot be increased by more than the allowable variance percentage/amount of the original approved line item. Additionally, the allowable discretionary transfer does not apply to an Audit line item (if present). Any and all modifications to an existing Audit line item may only be made with the Department's prior written approval.
- C. Discretionary Modifications If either the Department or the Grantee wishes to modify the terms of this Agreement other than as set forth in Sections 5.7(A) and 5.7(B) above, written notice of the proposed

modification must be given to the other party. Modifications will only take effect when agreed to in writing by both the Department and the Grantee. However, if the Department notifies the Grantee in writing of a proposed modification, and the Grantee fails to respond to that notification, in writing, within thirty (30) days, the proposed modification will be deemed to have been approved by the Grantee. In making an objection to the proposed modification, the Grantee shall specify the reasons for the objection and the Department shall consider those objections when evaluating whether to follow through with the proposed modification. The Department's notice to the Grantee shall contain the Grantee name, Grant number, modification number, purpose of the revision and signature of the Department's Director.

- D. Unilateral Modifications The parties agree that the Department may unilaterally modify this Agreement without prior approval of the Grantee when the modification is initiated by the Department for the sole purpose of increasing the Grantee's funding allocation as additional funds become available for the grant during the program year covered by the term of this Agreement. The parties further agree that the thirty (30) day period for objection described in Section 5.7(C) above does not apply to the unilateral modification authority described in Section 5.7(D).
- E. Management Waiver The parties agree that the Department may issue a waiver of specific requirements of this Agreement after the term of the Agreement has expired. These waivers are limited to requirements relating to the Grantee's compliance with existing audit requirements in the Agreement, retention of interest earned by the Grantee on Grant Funds, variances to budgetary line items, non-material changes to the Scope of Work in Part II, and any other non-material changes to specific grant terms that the Department determines are necessary to place the Grantee in administrative compliance with the terms of this Agreement. A management waiver issued after the term of the Agreement has expired will supersede the original requirements of this Agreement that would normally require a modification of this Agreement to be executed. The Department will make no modifications of this Agreement not agreed to prior to the expiration of the Agreement beyond what is specifically set forth in this section.
- F. Term Extensions The Grantee acknowledges that all Grant Funds must be expended or legally obligated during the grant term set forth in the Notice of Grant Award. Pursuant to the Grant Funds Recovery Act (30 ILCS 705/1 et. seq.), no grant term may be extend beyond a two-year period unless the Grant Funds are expended or legally obligated during that initial two-year period, or unless Grant Funds are disbursed in reimbursement of costs previously incurred by the grantee.

5.8 **CONFLICT OF INTEREST; INTEREST OF PUBLIC OFFICIALS/ EMPLOYEES; BONUS/COMMISSION PROHIBITED; HIRING OF STATE EMPLOYEES PROHIBITED; DUE DILIGENCE IN EXPENDITURE OF GRANT FUNDS**

- A. Conflict of Interest A conflict of interest exists if a Grantee's officers, directors, agents, employees and family members use their position for a purpose that is, or gives the appearance of, being motivated by a desire for a private gain, financial or nonfinancial, for themselves or others, particularly those with whom they have family business or other ties. The Grantee must establish safeguards to prohibit such a conflict of interest from occurring. Safeguards, evidenced by rules or bylaws, shall also be established to prohibit persons from engaging in actions, which create or which appear to create a conflict of interest as described herein.

The Grantee must immediately notify the Department in writing of any actual or potential conflicts of interest, as well as any actions that create or which appear to create a conflict of interest.

- B. Interest of Public Officials/Employees

- (1) Governmental Entity If the Grantee is a governmental entity, the Grantee certifies that no conflict of interest as defined in Section 5.8A exists. Further, Grantee certifies that no officer or employee of the Grantee and no member of its governing body and no other public official of the locality in which the program objectives will be carried out who exercises any functions or responsibilities in

the review or approval of the undertaking or carrying out of such objectives shall participate in any decision relating to any contract negotiated under a program grant which affects his/her personal interest or the interest of any corporation, partnership or association in which he/she is directly or indirectly interested, or has any financial interest, direct or indirect, in such contract or in the work to be performed under such contract.

- (2) Nongovernmental Entity If the Grantee is a nongovernmental entity, the Grantee certifies that no conflict of interest as defined in Section 5.8A exists. If such a conflict or appearance thereof exists or arises, the Grantee must provide immediate notification to the Department as provided in Section 5.8A. The Department may, in its discretion, issue Grant Funds if it determines that appropriate safeguards are in place and that it is in the best interest of the State to proceed.

Violations of Section 5.8 may result in suspension or termination of this Agreement, and recovery of Grant Funds provided hereunder. Violators may also be criminally liable under other applicable State or Federal laws and subject to actions up to and including felony prosecution.

- C. Bonus or Commission Prohibited The Grantee shall not pay any bonus or commission for the purpose of obtaining the grant awarded under this Agreement.
- D. Hiring State Employees Prohibited No State officer or employee may be hired to perform services under this Agreement, or be paid with Grant Funds derived directly or indirectly through this grant without the written approval of the Department.

5.9 APPLICABLE STATUTES

- A. Grantee Responsibility All applicable Federal, State and local laws, rules and regulations governing the performance required by Grantee shall apply to this Agreement and will be deemed to be included in this Agreement the same as though written herein in full. Grantee is responsible for ensuring compliance with all applicable laws, rules and regulations, including, but not limited to those specifically referenced herein. Except where expressly required by applicable laws and regulations, the Department shall not be responsible for monitoring Grantee's compliance.
- B. Land Trust/Beneficial Interest Disclosure Act (765 ILCS 205/2.1) No grant award Grant Funds shall be paid to any trustee of a land trust, or any beneficiary or beneficiaries of a land trust, for any purpose relating to the land, which is the subject of such trust, any interest in such land, improvements to such land or use of such land unless an affidavit is first filed with the Department identifying each beneficiary of the land trust by name and address and defining such interest therein.
- C. Historic Preservation Act (20 ILCS 3420/1 et seq.) The Grantee will not expend Grant Funds under this Agreement which result in the destruction, alteration, renovation, transfer or sale, or utilization of a historic property, structure or structures, or in the introduction of visual, audible or atmospheric elements to a historic property, structure or structures, which will result in the change in the character or use of any historic property, except as approved by the Illinois Historic Preservation Agency.
- D. State of Illinois Discrimination Laws (775 ILCS 5/1-101 et seq.) In carrying out the performance required under this Agreement, the Grantee shall comply with all applicable provisions of the Illinois Human Rights Act, and rules and regulations promulgated by the Illinois Department of Human Rights, prohibiting unlawful discrimination in employment. Grantee's failure to comply with all applicable provisions of the Illinois Human Rights Act, or applicable rules and regulations promulgated thereunder, may result in a determination that Grantee is ineligible for future contracts or subcontracts with the State of Illinois or any of its political subdivisions or municipal corporations, and this Agreement may be canceled or voided in whole or in part, and such other sanctions or penalties may be imposed or remedies invoked as provided by statute or regulation.
- E. Drugfree Workplace Act (30 ILCS 580/1 et seq.) Grantee will make the certification required in this Agreement and will comply with all of the provisions of the Drugfree Workplace Act that are

applicable to the Grantee. False certification or violation of the requirements of the Drugfree Workplace Act may result in sanctions including, but not limited to, suspension of grant payments, termination of this Agreement and debarment of contracting or grant opportunities with the State for at least one (1) year but not more than five (5) years.

- F. Freedom of Information Act (5 ILCS 140/1 et seq.) Applications, programmatic reports and other information obtained by the Department under this Agreement shall be administered pursuant to the Freedom of Information Act.
- G. Prevailing Wage Act (820 ILCS 130/0.01 et seq.) All projects for the construction or demolition of fixed works which are financed in whole or in part with bonds, grants, loans, or other funds made available by or through the State or any of its political subdivisions; including the Grant Funds provided by this Agreement shall be subject to the Prevailing Wage Act (820 ILCS 130/0.01) unless the provisions of that Act exempt its application. In implementing the project, the Grantee shall comply with the requirements of the Prevailing Wage Act, including, but not limited to, inserting into all contracts for such construction or demolition a stipulation to the effect that not less than the prevailing rate of wages as applicable to the project shall be paid to all laborers, workers and mechanics performing work under the contract and requiring all bonds of contractors to include a provision as will guarantee the faithful performance of such prevailing wage clause as provided by contract. If the Grantee has awarded work without a contract, it shall provide the aforementioned written notice to the contractor on a separate document. The provisions of the Prevailing Wage Act apply to both contractors and sub-contractors performing work on any project funded by this grant.
- H. Victims Economic Security and Safety Act (820 ILCS 180 et seq.) If the Grantee has 50 or more employees, it may not discharge or discriminate against an employee who is a victim of domestic violence, or who has a family or household member who is a victim of domestic violence, for taking up to a total of twelve (12) work weeks of leave from work during any twelve month period to address the domestic violence, pursuant to the Victims Economic Security and Safety Act. The Grantee is not required to provide paid leave under the Victims Economic Security and Safety Act, but may not suspend group health plan benefits during the leave period. Any failure on behalf of the Grantee to comply with all applicable provisions of the Victims Economic Security and Safety Act, or applicable rules and regulations promulgated thereunder, may result in a determination that the Grantee is ineligible for future contracts or subcontracts with the State of Illinois or any of its political subdivisions or municipal corporations, and this Agreement may be cancelled or voided in whole or in part, and such other sanctions or penalties may be imposed or remedies invoked, as provided by Statute or regulation.
- I. Equal Pay Act of 2003 (820 ILCS 112 et seq.) If the Grantee has four or more employees, it is prohibited by the Equal Pay Act of 2003 from paying unequal wages to men and women for doing the same or substantially similar work. Further, the Grantee is prohibited by the Equal Pay Act of 2003 from remedying violations of the Act by reducing the wages of other employees or discriminating against any employee exercising his/her rights under this Act. Any failure on behalf of the Grantee to comply with all applicable provisions of the Equal Pay Act of 2003, or applicable rules and regulations promulgated thereunder, may result in a determination that the Grantee is ineligible for future contracts or subcontracts with the State of Illinois or any of its political subdivisions or municipal corporations, and this Agreement may be cancelled or voided in whole or in part, and such other sanctions or penalties may be imposed or remedies invoked, as provided by Statute or regulation.
- J. Steel Products Procurement Act (30 ILCS 565 et seq.) The grantee, if applicable, hereby certifies that any steel products used or supplied in accordance with this grant for a public works project shall be manufactured or produced in the United States per the requirements of the Steel Products Procurement Act (30 ILCS 565 et seq.).

5.10 MISCELLANEOUS PROVISIONS

- A. Independence of Grantee Personnel All technical, clerical, and other personnel necessary for the performance required by this Agreement shall be employed by or contracted with Grantee, and shall in all respects be subject to the rules and regulations of Grantee governing its employees. Neither Grantee nor its personnel shall be considered to be the agents or employees of the Department.
- B. Grantor Authority The Department and its payroll employees, when acting pursuant to this Agreement, are acting as State officials in their official capacity and not personally or as the agents of others.
- C. Governing Law This Grant is awarded in the State of Illinois for execution within the State of Illinois. This Agreement shall be governed by and construed according to Illinois law.
- D. Worker's Compensation Insurance, Social Security, Retirement and Health Insurance Benefits, and Taxes The Grantee shall provide Worker's Compensation insurance where the same is required and shall accept full responsibility for the payment of unemployment insurance, premiums for Workers' Compensation, Social Security and retirement and health insurance benefits, as well as all income tax deduction and any other taxes or payroll deductions required by law for its employees who are performing services specified by this Agreement.
- E. Delivery of Grantee Payments Payment to the Grantee under this Agreement shall be made payable in the name of the Grantee and sent to the person and place specified in the Notice of Grant Award. The Grantee may change the person to whom payments are sent, or the place to which payments are sent by written notice to the Department signed by the Grantee, that complies with the requirements of Section 5.10(F) below. No such change or payment notice shall be binding upon the Department until ten (10) business days after actual receipt.
- F. Notice Any notice, demand, or communication required or permitted to be given hereunder shall be given in writing at the addresses set forth in the Notice of Grant Award by any of the following means: (a) personal service, (b) electronic communication, whether by telex, telegram or telecopy, (c) overnight courier, or (d) registered or certified first class mail, postage prepaid, return receipt requested. Any notice, demand or communication given pursuant to either clause (a) or (b) hereof shall be deemed received upon such personal service or upon dispatch by electronic means, respectively. Any notice, demand or communication given pursuant to clause (c) shall be deemed received on the day immediately following deposit with the overnight courier. Any notice, demand or communication sent pursuant to clause (d) shall be deemed received five (5) business days after mailing. The parties, by notice given hereunder, may designate any further or different addresses to which subsequent notices, demands or communications shall be given.
- The Grantee acknowledges and agrees that its address set forth in the Notice of Grant Award is its current address and shall be considered its last known address for purposes of receiving any and all notice(s) required under this Agreement. The Grantee further acknowledges and agrees that the Department is justified in relying upon the address information furnished to it by the Grantee in absence of notice to the contrary. The Grantee also acknowledges and agrees that it has the burden of notifying the Department of its current/last known address. In the event that the Grantee changes its current address, it shall contact its Program Manager and notify him/her of said change of address and a formal modification will be executed.
- G. Required Notice Grantee agrees to give prompt notice to the Department of any event that may materially affect the performance required under this Agreement. Any notice or approval relating to Section 5.5 (Termination), Section 5.7C (Discretionary Modifications), Section 5.7E (Waivers), and Section 5.10I (Assignment) must be executed by the Director of the Department or her/his authorized designee.
- H. Modifications A modification of any condition of this Agreement must be requested in writing. No modification of any condition of this Agreement may be effective unless in writing from and signed by the Director of the Department.

- I. Assignment The benefits of this Agreement and the rights, duties and responsibilities of the Grantee under this Agreement may not be assigned (in whole or in part) except with the express written approval of the Department acting through its Director. Any assignment by the Grantee in violation of this provision renders this Agreement voidable by the Department.
- J. Severability Clause If any provision under this Agreement or its application to any person or circumstances is held invalid by any court of competent jurisdiction, this invalidity does not affect any other provision or its application of this Agreement, which can be given effect without the invalid provision or application.
- K. Integration Clause This Agreement, with attachments, as written, is the full and complete agreement between the parties and there are no oral agreements or understandings between the parties other than what has been reduced to writing herein.
- L. Comptroller Filing Notice The Grantee expressly understands that whenever applicable, a copy of this Agreement and any modification, cancellation or renewal is required to be filed by the Department with the State Comptroller.
- M. Subcontract and Grants The Grantee's services, duties and responsibilities specified herein shall not be subcontracted or subgranted by the Grantee without prior written approval of the Department, unless such subcontracts or subgrants are provided for elsewhere in this Agreement. Any subcontracts or subgrants shall be subject to, and conform with, all applicable State and Federal laws, and shall specifically provide that subcontractors or subgrantees are subject to all of the terms and conditions of this Agreement. For the Department to approve the use of any subcontract or subgrant, the Grantee must employ an open, impartial and reasonably competitive selection process.
- N. Attorney Fees and Costs If the Department is the prevailing party in any proceeding to enforce the terms of this Agreement, the Department has the right to recover reasonable attorney fees, costs and expenses associated with recovering the Grant Funds.

**PART VI
STATE OF ILLINOIS REQUIRED
CERTIFICATIONS**

The Grantee makes the following certifications as a condition of this Agreement. These certifications are required by State statute and are in addition to any certifications required by any Federal funding source as set forth in this Agreement. Grantee's execution of this Agreement shall serve as its attestation that the certifications made herein are true and correct.

6.1 COMPLIANCE WITH APPLICABLE LAW

The Grantee certifies that it shall comply with all applicable provisions of Federal, State and local law in the performance of its obligations pursuant to this Agreement.

6.2 CONFLICT OF INTEREST

The Grantee certifies that it has no public or private interest, direct or indirect, and shall not acquire directly or indirectly any such interest which does or may conflict in any manner with the performance of Grantee's services and obligations under this Agreement.

6.3 BID-RIGGING/BID-ROTATING

The Grantee certifies that it has not been barred from contracting with a unit of State or local government as a result of a violation of Section 33E-3 or 33E-4 of the Criminal Code of 1961 (720 ILCS 5/33 E-3 and 5/33 E-4).

6.4 DEFAULT ON EDUCATIONAL LOAN

The Grantee certifies that this Agreement is not in violation of the Educational Loan Default Act (5 ILCS 385/3) prohibiting certain contracts to individuals who are in default on an educational loan.

6.5 AMERICANS WITH DISABILITIES ACT

The Americans with Disabilities Act (ADA) (42 U.S.C. 12101 et. seq.) and the regulations thereunder (28 CFR 35.130) prohibit discrimination against persons with disabilities by the State, whether directly or through contractual arrangements, in the provision of any aid, benefit or service. As a condition of receiving this grant, the Grantee certifies that services, programs and activities provided under this Agreement are, and will continue to be, in compliance with the ADA.

6.6 DRUGFREE WORKPLACE ACT

The Grantee certifies that:

- A) It is a Corporation, Partnership, or other entity (other than an individual) **with 24 or fewer employees** at the time of execution of this Agreement.
- B) That the purpose of this grant is to fund solid waste reduction.
- C) It is a Corporation, Partnership, or other entity (other than an individual) **with 25 or more employees** at the time of execution of this Agreement, or
- D) That it is an individual.

If Option "A" or "B" is checked this Agreement is not subject to the requirements of the Act.

If Option "C" or "D" is checked and the amount of this grant is five thousand dollars (\$5,000.00) or more, the Grantee is notified that the Drugfree Workplace Act (30 ILCS 580/1 et seq.) is applicable to this Agreement, and the Grantee must comply with the terms of said Act, as set forth below:

Grantee will provide a drugfree workplace by:

- (a) Publishing a statement:
 - (i) Notifying employees that the unlawful manufacture, distribution, dispensing, possession or use of a controlled substance, including cannabis, is prohibited in the Grantee's workplace.
 - (ii) Specifying the actions that will be taken against employees for violations of such prohibition.
 - (iii) Notifying the employee that, as a condition of employment on such grant, the employee will:
 - (A) abide by the terms of the statement; and
 - (B) notify the employer of any criminal drug statute conviction for a violation occurring in the workplace no later than five (5) days after such conviction.
- (b) Establishing a drug free awareness program to inform employees about:
 - (i) the dangers of drug abuse in the workplace;
 - (ii) the Grantee's policy of maintaining a drug free workplace;
 - (iii) any available drug counseling, rehabilitation and employee assistance programs; and
 - (iv) the penalties that may be imposed upon an employee for drug violations.
- (c) Providing a copy of the statement required by subparagraph (a) to each employee engaged in the performance of the grant and to post the statement in a prominent place in the workplace.
- (d) Notifying the granting agency within ten (10) days after receiving notice, under part (B) of paragraph (iii) of subsection (a) above, from an employee or otherwise receiving actual notice of such conviction.
- (e) Imposing a sanction on, or requiring the satisfactory participation in, a drug abuse assistance or rehabilitation program by any employee who is so convicted, as required by Section 5 of the Drugfree Workplace Act, 30 ILCS 580/5.
- (f) Assisting employees in selecting a course of action in the event drug counseling, treatment and rehabilitation are required and indicating that a trained referral team is in place.
- (g) Making a good faith effort to continue to maintain a drugfree workplace through implementation of the Drugfree Workplace Act, 30 ILCS 580/5.

If Grantee is an individual, it certifies that it will not engage in the unlawful manufacture, distribution, dispensation, possession, or use of a controlled substance in the performance of this Agreement.

6.7 ANTI-BRIBERY

The Grantee certifies that neither it nor its employees have been convicted of bribing or attempting to bribe an officer or employee of the State of Illinois, nor has Grantee or any of its employees made an admission

of guilt of such conduct which is a matter of record as defined in the Illinois Procurement Code (30 ILCS 500/50-5).

6.8 DISCRIMINATION/ILLINOIS HUMAN RIGHTS ACT

The Grantee certifies (i) that it will not commit unlawful discrimination in employment in Illinois as that term is defined in Article 2 of said Act; (ii) that it will comply with the provisions of Article 5 of the Act regarding equal employment opportunities and affirmative action; and, (iii) that it will comply with policies and procedures established by the Department of Human Rights under Article 7 of the Act regarding equal employment opportunities and affirmative action.

The Grantee further certifies that, if applicable, it will comply with "An Act to prohibit discrimination and intimidation on account of race, creed, color, sex, religion, physical or mental handicap unrelated to ability or national origin in employment under contracts for public buildings or public works." (775 ILCS 10/0.01 et seq.)

6.9 SEXUAL HARASSMENT

The Grantee certifies that it has written sexual harassment policies that shall include, at a minimum, the following information: (i) the illegality of sexual harassment; (ii) the definition of sexual harassment under State law; (iii) a description of sexual harassment, utilizing examples; (iv) the Grantee's internal complaint process including penalties; (v) the legal recourse, investigative and complaint process available through the Department of Human Rights and the Human Rights Commission; (vi) directions on how to contact the Department and Commission; and (vii) protection against retaliation as provided by Section 6-101 of the Illinois Human Rights Act (775 ILCS 5/2-105 (B)(5)). A copy of the policies shall be provided to the Department upon request.

6.10 INTERNATIONAL ANTI-BOYCOTT CERTIFICATION

The Grantee hereby certifies that neither the Grantee nor any substantially owned affiliate company of the Grantee is participating or will participate in an international boycott, as defined by the provisions of the U.S. Export Administration Act of 1979, or as defined by the regulations of the U.S. Department of Commerce, promulgated pursuant to that Act (30 ILCS 582/1 et seq.).

6.11 FEDERAL, STATE AND LOCAL LAWS; TAX LIABILITIES; STATE AGENCY DELINQUENCIES

The Grantee is required to comply with all federal, state and local laws, including but not limited to the filing of any and all applicable tax returns. In the event that a Grantee is delinquent in filing and/or paying any federal, state and/or local taxes, the Department shall disburse Grant Funds only if the Grantee enters into an installment payment agreement with said tax authority and remains in good standing therewith. Grantee is required to tender a copy of any such installment payment agreement to the Department. In no event may Grantee utilize Grant Funds to discharge outstanding tax liabilities or other debts owed to any governmental unit. **The execution of this Agreement by the Grantee is its certification that (i) it is current as to the filing and payment of any federal, state and/or local taxes applicable to Grantee; and (ii) it is not delinquent in its payment of moneys owed to any federal, state, or local unit of government.**

6.12 PROHIBITION OF GOODS DERIVED FROM CHILD LABOR

The Grantee certifies, in accordance with Public Act 94-0264, that no foreign-made equipment, materials, or supplies furnished to the State in connection with this Agreement have been produced in whole or in part by the labor of any child under the age of 12.

6.13 PREVAILING WAGE

The Grantee acknowledges that receipt of Grant Funds under this Agreement require compliance with the Prevailing Wage Act (820 ILCS 130 et. seq.). Persons willfully failing to comply with, or willfully violating this Act may be in violation of the Criminal Code. Questions concerning compliance with the Prevailing Wage Act should be directed to the Illinois Department of Labor.

6.14 LIEN WAIVERS

The Grantee shall monitor construction to assure that necessary contractor's affidavits and waivers of mechanics liens are obtained prior to release of Grant Funds to contractors and subcontractors.

6.15 INTERAGENCY WETLAND POLICY ACT

The Grantee certifies that the proposed project is compatible with established state policy regarding wetlands, pursuant to the Interagency Wetland Policy Act of 1989. The Grantee acknowledges that the Illinois Department of Natural Resources may, from time to time, monitor the proposed project to ensure continued compliance with the aforementioned Act. In the event that the project does not remain in compliance with the Act, such noncompliance shall constitute a breach of the Agreement, and failure to cure the breach within sixty (60) days after notice thereof will result in the termination of this Agreement.

June 28, 2010

Pier Odonne
President
Fermi Research Alliance, LLC
PO Box 500
Batavia, IL 60510-5011

Dear Mr. Odonne,

The Department of Commerce and Economic Opportunity (DCEO) would like to welcome you to our community of grantees, and congratulate you on your grant award (10-203828). You are now an active participant in the process of working toward the accomplishment of the economic development goals of the State of Illinois, DCEO, and your own organization.

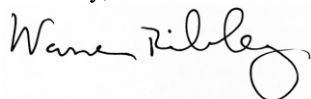
DCEO is the lead state agency responsible for improving Illinois' competitiveness in the global economy. Guided by an innovative regional approach, DCEO administers a wide range of economic and workforce development programs, services and initiatives designed to create and retain high quality jobs and build strong communities. DCEO leads the Illinois economic development process in partnership with businesses, local governments, workers and families.

This "Welcome Package" is intended to provide you with critical information about and requirements of your grant award. Your success in accomplishing the goals and objectives agreed to and stated in your grant agreement is our success in working toward DCEO's economic development mission for the State of Illinois. To assure your success and to provide accountability for the funds entrusted to DCEO, we will review your grant's progress toward the achievement of goals and will provide oversight of grant-related deliverables and expenditures. DCEO will make every effort to provide you with the information and assistance you need to reach your goals and to maintain compliance with your grant responsibilities. It is our hope that you will contact us when you have questions or concerns about complying with the requirements or terms and conditions of the grant agreement.

To facilitate ongoing communication and to provide you with an electronic means to submit your reports, grantees with Internet access are encouraged to use email to submit your reports, documentation and other correspondence. Additional general information is available at the DCEO Office of Accountability's website <http://www.ildceo.net/accountability> to assist you in the management and administration of your grant. Grantees without Internet access will need to use other traditional means of communication with their assigned grant manager.

Once again, we congratulate you on your grant award and look forward to working in partnership with you to achieve our economic development goals.

Sincerely,



Warren Ribley
Director

Internet Address <http://www.commerce.state.il.us>

620 East Adams Street
Springfield, Illinois 62701-1615
217/782-7500
TDD: 800/785-6055

James R. Thompson Center
100 West Randolph Street, Suite 3-400
Chicago, Illinois 60601-3219
312/814-7179
TDD: 800/785-6055

2309 West Main, Suite 118
Marion, Illinois 62959-1180
618/997-4394
TDD: 800/785-6055

Grant Program Contact Information

For Grant Questions, Contact the Grant Manager

Name David E. Parr
Program Grant Management Program 01
DCEO Bureau Director's Office
Email David.Parr@illinois.gov
Phone 217-558-6027
Fax (217)-557-9883

Address

500 E Monroe St
Springfield, IL 62701

For Audit Questions, Contact the Audit Unit

Name Ron Hazelwood
Email externalauditunit@illinois.gov
Phone (217) 524-4845
Fax (217) 558-6971

Address

500 E Monroe St
Springfield, IL 62701

For Financial Closeout Questions, Contact the Program Accountant

Name John Prief
Email John.Prief@illinois.gov
Phone 217-785-6436
Fax (217) 524-8680

Address

500 E Monroe St
Springfield, IL 62701

Report Deliverable Schedule

Program Name: Grant Management Program 01
DCEO Bureau: Director's Office

Grant Begin Date: 06/01/2010
Grant End Date: 05/31/2012

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Grant Glossary of Terms and Acronyms

Definitions of terms used throughout the grant cycle, as well as the explanation of commonly-used acronyms.

Grants Monitoring Overview

Explanations of the various types of Monitoring and Reporting, including what you can expect and what types of activities may be involved.

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Legal information with which all grantees must be familiar. Refer to the Accountability Office site to learn more about the Grant Funds Recovery Act, Conflict of Interest, and other important legal issues.

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Noncompliance Process

Information on the noncompliance process is located at: <http://www.ildceo.net/dceo/Bureaus/Office+of+Accountability/Noncompliance/>. The site includes information on what grantees should expect if they do not meet the terms and conditions of their grant, and the assistance available to grantees to re-establish compliance. The Legal requirements and processes describe how and when DCEO's legal staff, in accordance with the Grant Funds Recovery Act, become involved when grantees become non-compliant with the terms of their grant agreements.

Requirements of DCEO Grantees

A listing of requirements that you may be required to follow. Certain regulations must be adhered to such as enforcing a Drug-Free Workplace, following the Americans with Disabilities Act, establishing a Policy on Sexual Harassment, and more. You can also find detailed instructions about what a grantee must do to comply, as well as information about the consequences of non-compliance.

June 28, 2010

Pier Odonne
President
Fermi Research Alliance, LLC
PO Box 500
Batavia, IL 60510-5011

Dear Mr. Odonne,

The Department of Commerce and Economic Opportunity (DCEO) would like to welcome you to our community of grantees, and congratulate you on your grant award (10-203829). You are now an active participant in the process of working toward the accomplishment of the economic development goals of the State of Illinois, DCEO, and your own organization.

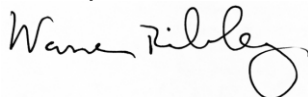
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Sincerely,



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Internet Address <http://www.commerce.state.il.us>

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Program Grant Management Program 01
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Email David.Parr@illinois.gov
Phone 217-558-6027
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Name Ron Hazelwood
Email externalauditunit@illinois.gov
Phone (217) 524-4845
Fax (217) 558-6971

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For Financial Closeout Questions, Contact the Program Accountant

Name John Prief
Email John.Prief@illinois.gov
Phone 217-785-6436
Fax (217) 524-8680

Address

500 E Monroe St
Springfield, IL 62701

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Program Name: Grant Management Program 01
DCEO Bureau: Director's Office

Grant Begin Date: 06/01/2010
Grant End Date: 05/31/2012

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Grantees are required to adhere to the Supporting Documentation Guidelines located at: <http://www.ildceo.net/dceo/Bureaus/Office+of+Accountability/Reporting>. Section I of the Guidelines indicates the supporting documentation that grantees are required to submit with their quarterly status reports. Section II of the Guidelines provides examples of supporting documentation that the grantee is required to maintain onsite or provide at the request of DCEO to support the grant expenditures.

Noncompliance Process

Information on the noncompliance process is located at: <http://www.ildceo.net/dceo/Bureaus/Office+of+Accountability/Noncompliance/>. The site includes information on what grantees should expect if they do not meet the terms and conditions of their grant, and the assistance available to grantees to re-establish compliance. The Legal requirements and processes describe how and when DCEO's legal staff, in accordance with the Grant Funds Recovery Act, become involved when grantees become non-compliant with the terms of their grant agreements.

Requirements of DCEO Grantees

A listing of requirements that you may be required to follow. Certain regulations must be adhered to such as enforcing a Drug-Free Workplace, following the Americans with Disabilities Act, establishing a Policy on Sexual Harassment, and more. You can also find detailed instructions about what a grantee must do to comply, as well as information about the consequences of non-compliance.



**Illinois Historic
Preservation Agency**

FAX (217) 782-8161

1 Old State Capitol Plaza • Springfield, Illinois 62701-1512 • www.illinois-history.gov

DuPage County
Batavia

Design and New Construction of Illinois Accelerator Research Center, Fermi
National Accelerator Laboratory
West of Existing Heavy Assembly Building between D Road and Inner Ring Road
DCEO-GOV100032, DCEO2-GOV100033
IHPA Log #005062310

June 24, 2010

Mary Feagans
IL Department of Commerce and Economic Opportunity
620 East Adams
Springfield, IL 62701

Dear Ms. Feagans:

We have reviewed the documentation submitted for the referenced project(s) in accordance with 36 CFR Part 800.4. Based upon the information provided, no historic properties are affected. We, therefore, have no objection to the undertaking proceeding as planned.

Please retain this letter in your files as evidence of compliance with section 106 of the National Historic Preservation Act of 1966, as amended. This clearance remains in effect for two years from date of issuance. It does not pertain to any discovery during construction, nor is it a clearance for purposes of the Illinois Human Skeletal Remains Protection Act (20 ILCS 3440).

If you have any further questions, please contact me at 217/785-5027.

Sincerely,

Anne E. Haaker

Anne E. Haaker
Deputy State Historic
Preservation Officer

c: Mary Jo Lyke, Fermi National Accelerator Laboratory

RECEIVED

JUN 28 2010

ACCOUNTING DEPARTMENT



Illinois Department of Natural Resources

One Natural Resources Way Springfield, Illinois 62702-1271
<http://dnr.state.il.us>

Pat Quinn, Governor
Marc Miller, Director

June 23, 2010

Rod Walton
Fermi Research Alliance
PO Box 500
Batavia, IL 60510 5011

Re: The Illinois Accelerator Research Center
Project Number(s): I010629 [GOV100032, Gov100033]
County: DuPage

Dear Applicant:

This letter is in reference to the project you recently submitted for consultation. The natural resource review provided by EcoCAT identified protected resources that may be in the vicinity of the proposed action. The Department has evaluated this information and concluded that adverse effects are unlikely. Therefore, consultation under 17 Ill. Adm. Code Part 1075 and 1090 is terminated.

Consultation for Part 1075 is valid for two years unless new information becomes available that was not previously considered; the proposed action is modified; or additional species, essential habitat, or Natural Areas are identified in the vicinity. If the project has not been implemented within two years of the date of this letter, or any of the above listed conditions develop, a new consultation is necessary. Consultation for Part 1090 (Interagency Wetland Policy Act) is valid for three years.

The natural resource review reflects the information existing in the Illinois Natural Heritage Database and the Illinois Wetlands Inventory at the time of the project submittal, and should not be regarded as a final statement on the site being considered, nor should it be a substitute for detailed site surveys or field surveys required for environmental assessments. If additional protected resources are encountered during the project's implementation, you must comply with the applicable statutes and regulations. Also, note that termination does not imply IDNR's authorization or endorsement of the proposed action.

Please contact me if you have questions regarding this review.

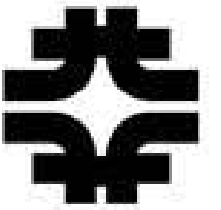
Michael Branham
Division of Ecosystems and Environment
217-785-5500



Alternative Evaluations

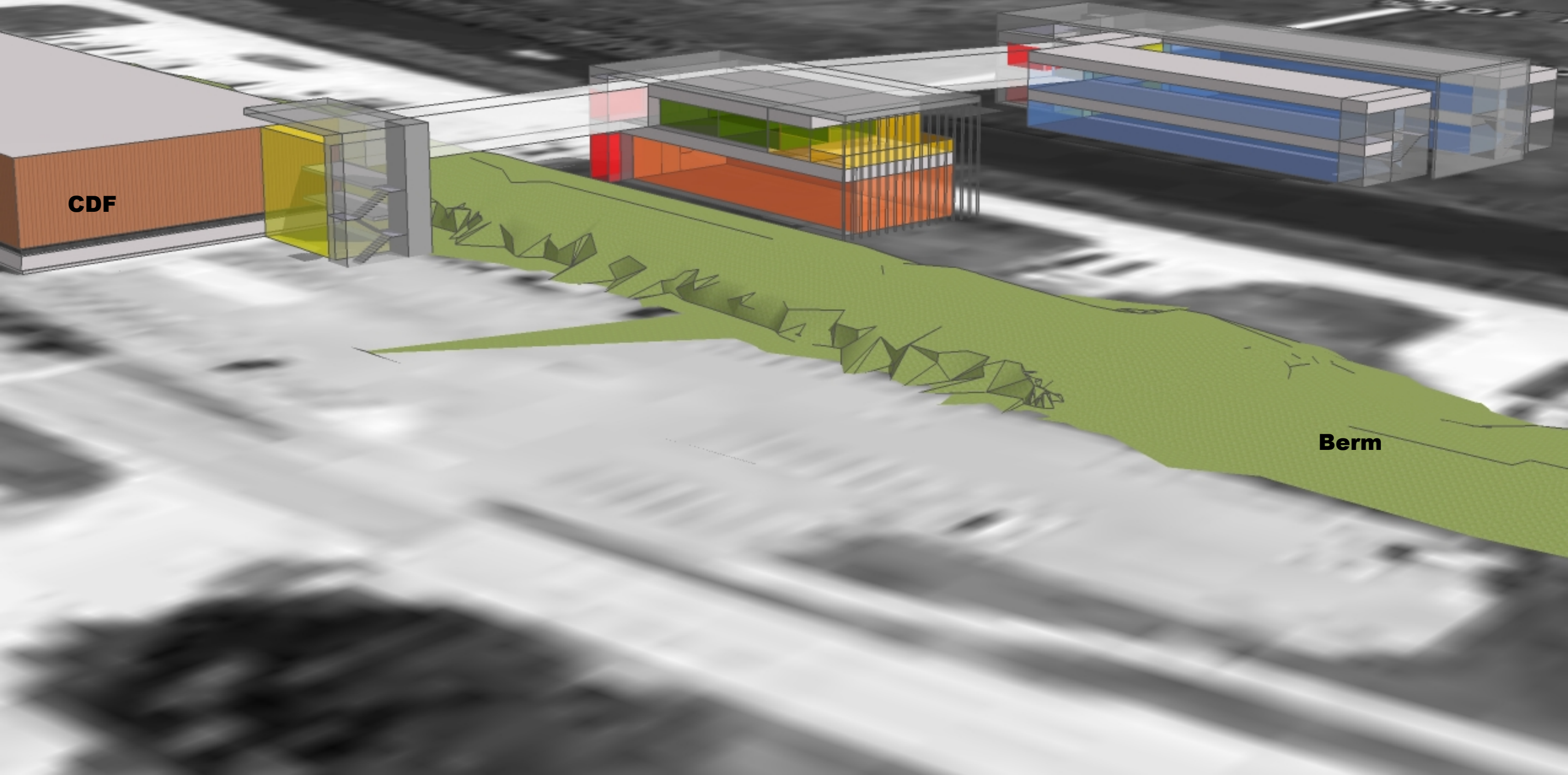
- Sites Evaluation Location Key
- Sites Evaluation Matrix
- Pre-Conceptual Building Massing Studies
- Functional Review Committee Charge and Comments
- Director's Presentation Images

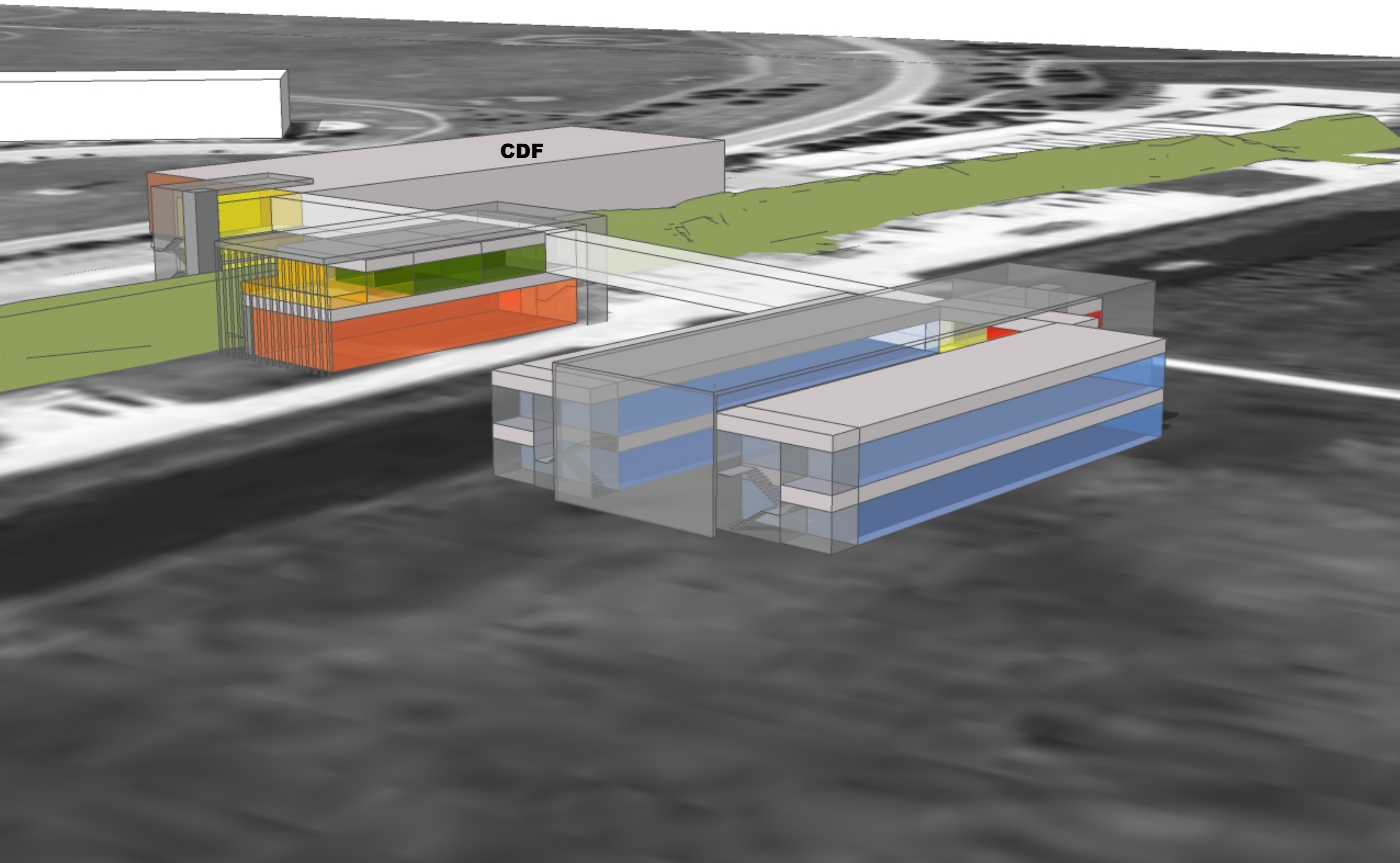
IARC Sites Examined



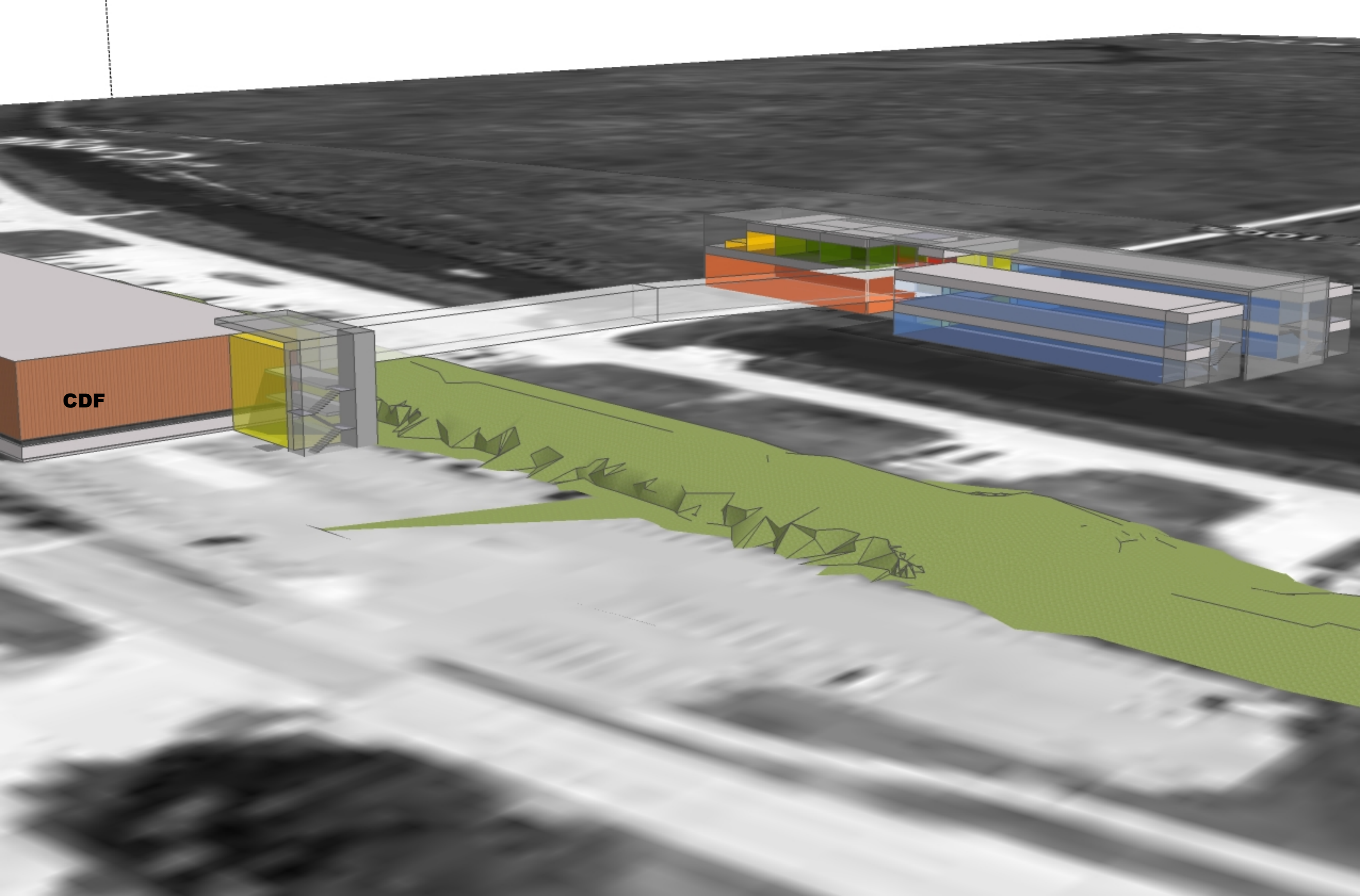
Potential Sites																
Evaluation Criteria	1		2		3		4		5		6		7		8	
Environment	Score		Score		Score		Score		Score		Score		Score		Score	
Wooded	10	No issues	10	No issues	2	Heavily wooded - extensive tree removal	2	No issues	2	Wooded - tree removal, some is deadwood clearance	0	Heavily wooded - extensive tree removal of older growth trees	3	Wooded - tree removal	10	Clear site
Wetlands	10	No issues	10	No issues	0	Wetland site- wetland replacement required	8	No wetlands	2	Some wetland issues	8	Minimal issues	8	Minimal issues	9	Minimal issues
Utilities																
Power	8	Available	8	Available	9	Readily available	9	Readily available	8	Available	8	Available	8	Available	9	Available
ICW	8	Available	8	Available	9	Readily available	9	Readily available	8	Available	8	Available	8	Available	9	Available
Domestic Water	8	Available	8	Available	9	Readily available	9	Readily available	8	Available	8	Available	8	Available	9	Available
Sanitary	8	Available	8	Available	9	Readily available	9	Readily available	8	Available	8	Available	8	Available	9	Available
Communications	8	Available	8	Available	9	Readily available	9	Readily available	8	Available	8	Available	8	Available	9	Available
Access - Vehicular - Parking																
Vehicular Access	10	Easily accessed by existing roads	10	Easily accessed by existing roads	5	Accessed via NuMI back roads.	10	Easily Accessed via existing roads	8	Access via Kautz road with tree clearing	5	Good access after tree clearing	10	Good Access	10	Good Access
Parking	5	Need to replace and add parking occupied by building and truck circulation footprint	10	Need new lot or share LSEC lot from across the street. Sharing would create pedestrian crossing issue	3	Previously planned road extension from Mini Boone to LSEC could be constructed. Will need parking lot. Possibly expand Minos parking	8	Could share LSEC lot via pedestrian walk from building- no traffic interference. Also could share Wilson Hall lot across the street	7	Could share LSEC lot via pedestrian walk from building- no traffic interference. Also could share Wilson Hall lot across the street	0	Need to create separate lot with tree clearing required	2	Need to create separate lot with tree clearing required	8	Need additional paved area but could be an appendage to existing industrial area lots
Truck Access	8	Good	8	Good	8	Good	9	Good Access	1	Requires tree clearance and construction of new road and turn around	3	Accessible from roads, extensive tree clearance to provide truck access	10	Good Access	9	Good Access
Impact - Visibility																
Prominence	10	Somewhat Prominent	10	Very Prominent	8	Prominent	5	Average	10	Very prominent with view across pond from entrance road to Wilson Hall	8	Would be noticed on way to Wilson Hall	10	Would be prominent in its location along the Wilson Hall north/south axis	0	Minimal
Effectiveness	8	Could be integral to central campus plan	0	Prominence will distract from LSEC and sequence that was established	8	Could be developed as an architectural transition between Minos and LSEC	5	Can be integrated into a central campus plan - but not seen by average visitor	10	Can be integrated in central campus plan and could be visual asset across pond	4	May not create strong impression if set back from road	8	Should be an effective relationship	5	Enhancement to technical campus
Intangibles - Editorial																
Site Development Costs																
Relationship to main campus	5	Medium	5	Medium	2	High	6	Medium	3	Medium +	2	High	6	Medium	8	Medium -
Deal Breakers ??	3	Related	3	Somewhat distant	0	Distant	6	Integrated but in a secondary way	10	Integral	4	Somewhat distant in effect	5	Somewhat distant	0	None
	??		??	Too Prominent ?? Conflict with LSEC ??		Woods and Wetlands, Distance from campus		Not enough prominence? Requires elimination of Kidney Pond		Site may be better suited to another future project (i.e. conference center, administration center, hotel??)		Older growth woods removal could veto site		None noted		If it is determined that the building needs prominent location and proximity to central campus
Totals	109		106		81		104		93		74		102		104	

Bridge Schemes

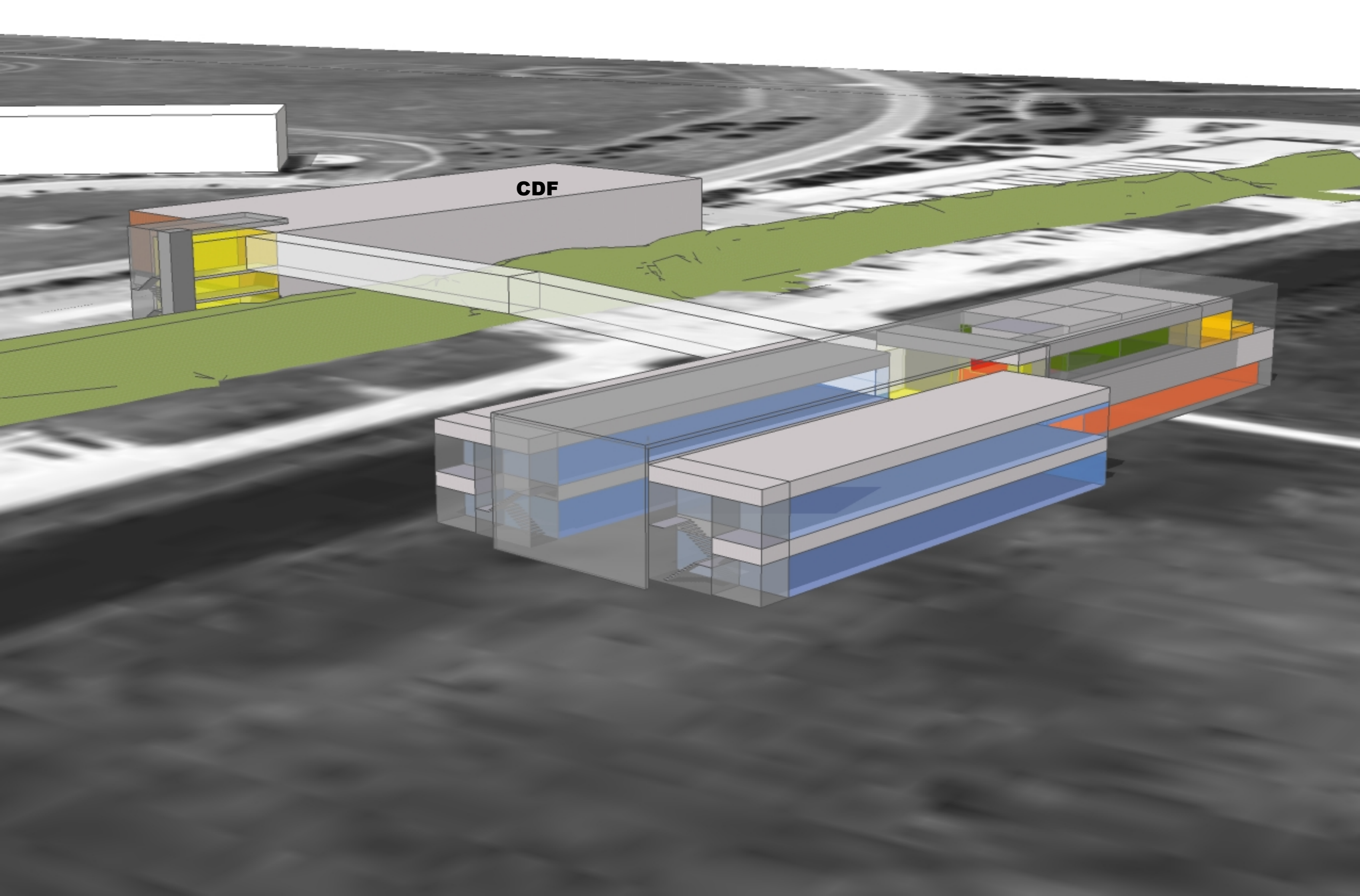




CDF

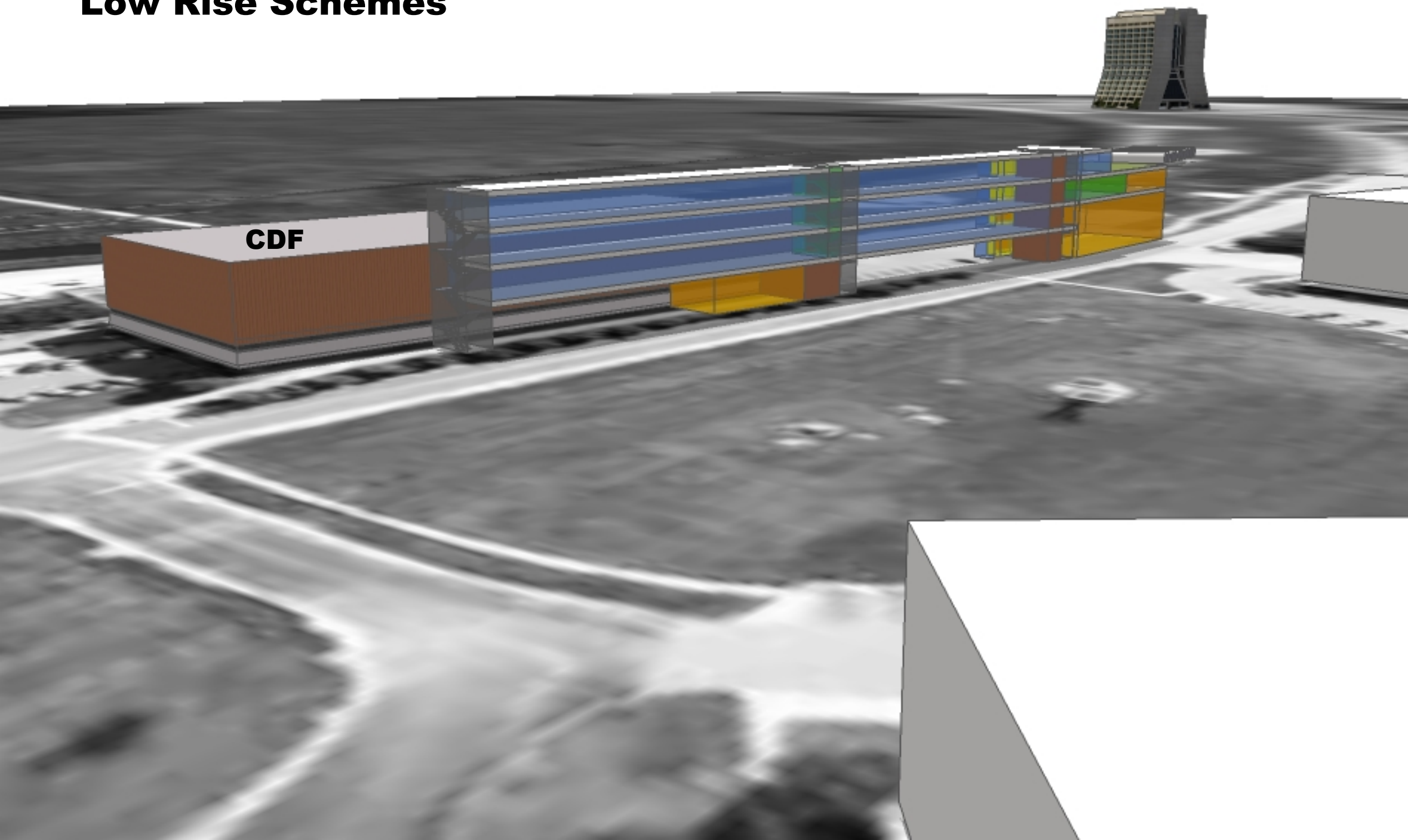


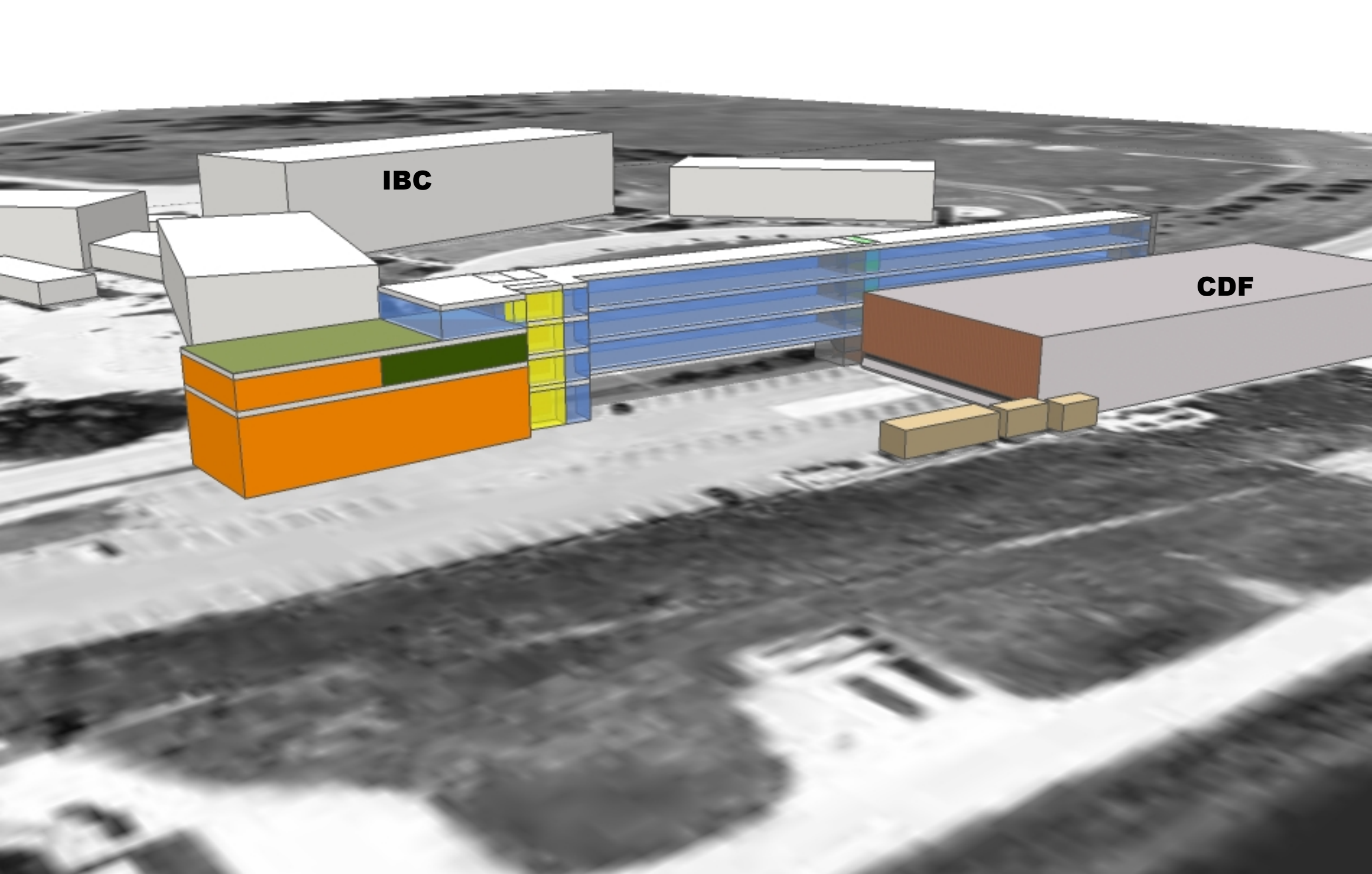
CDF



CDF

Low Rise Schemes

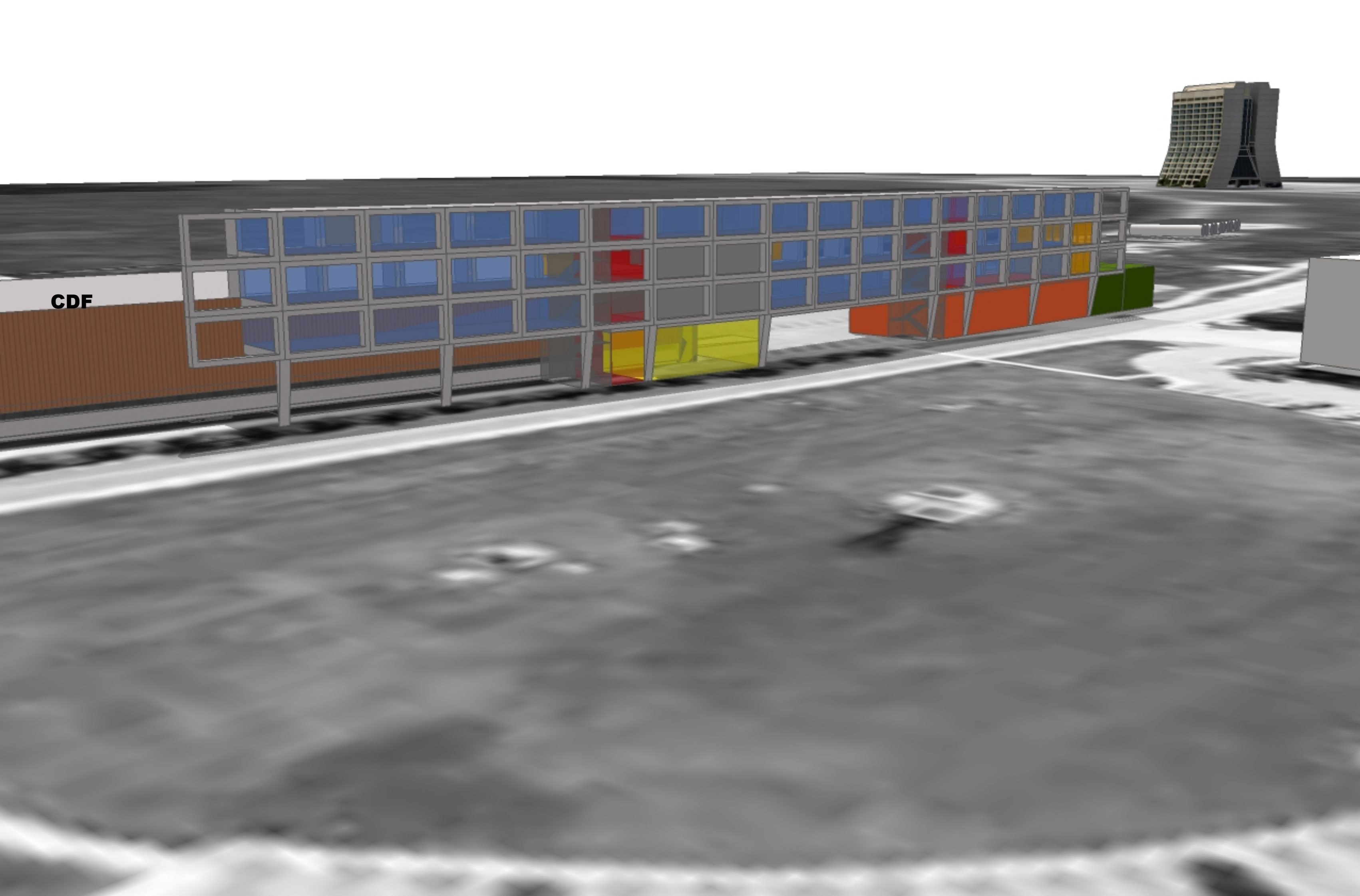




IBC

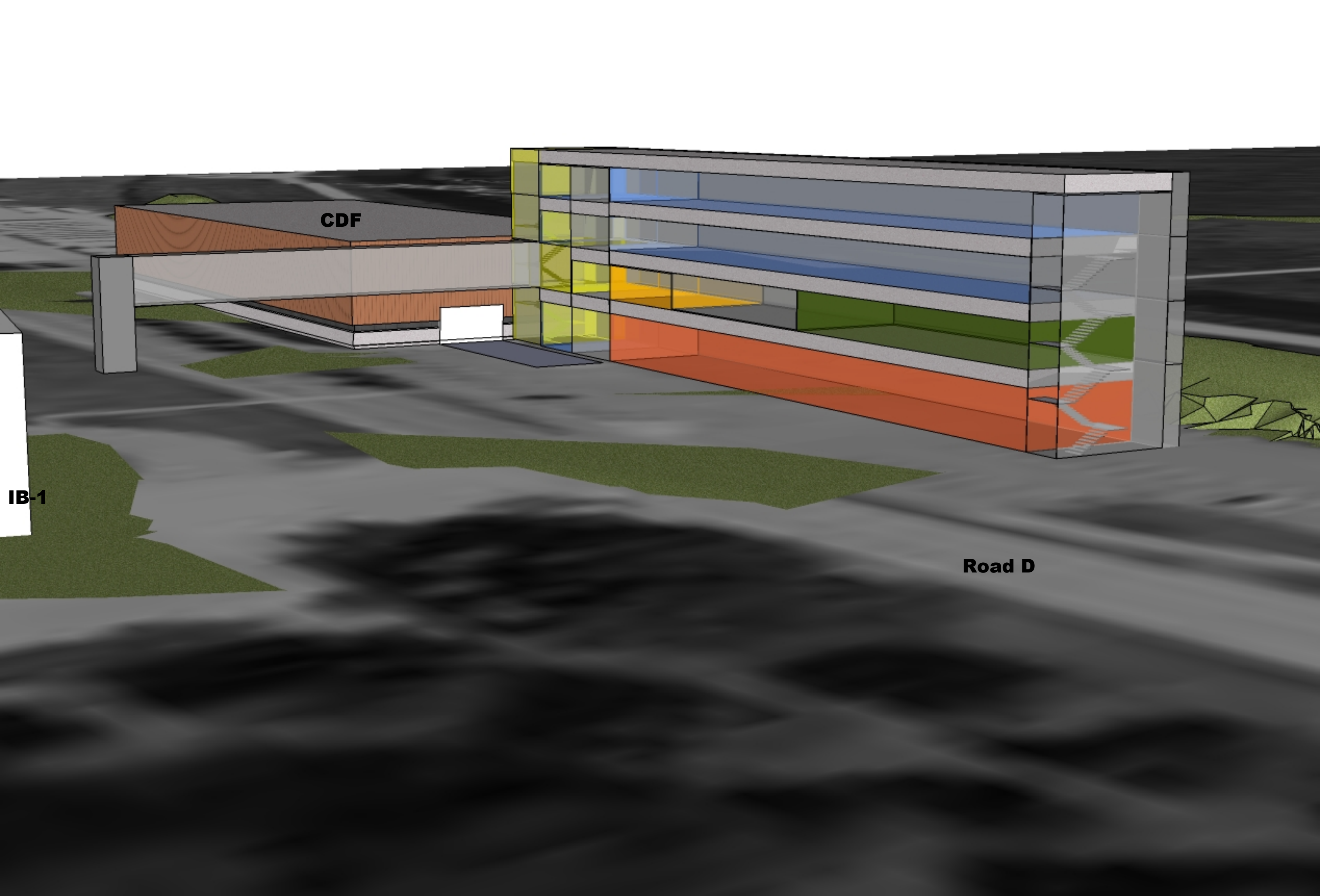
CDF

CDF





CDF



CDF

IB-1

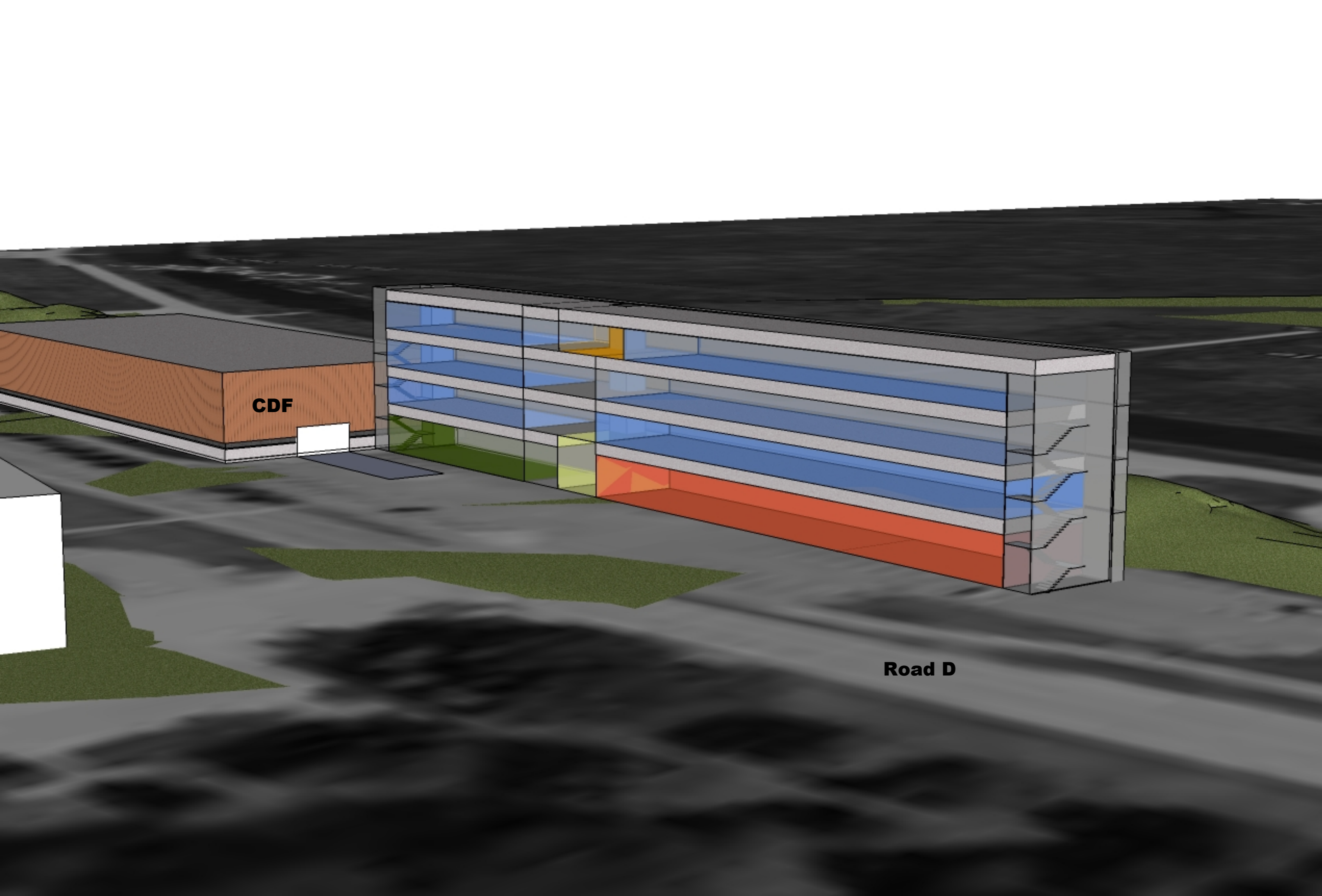
Road D



CDF

IB-1

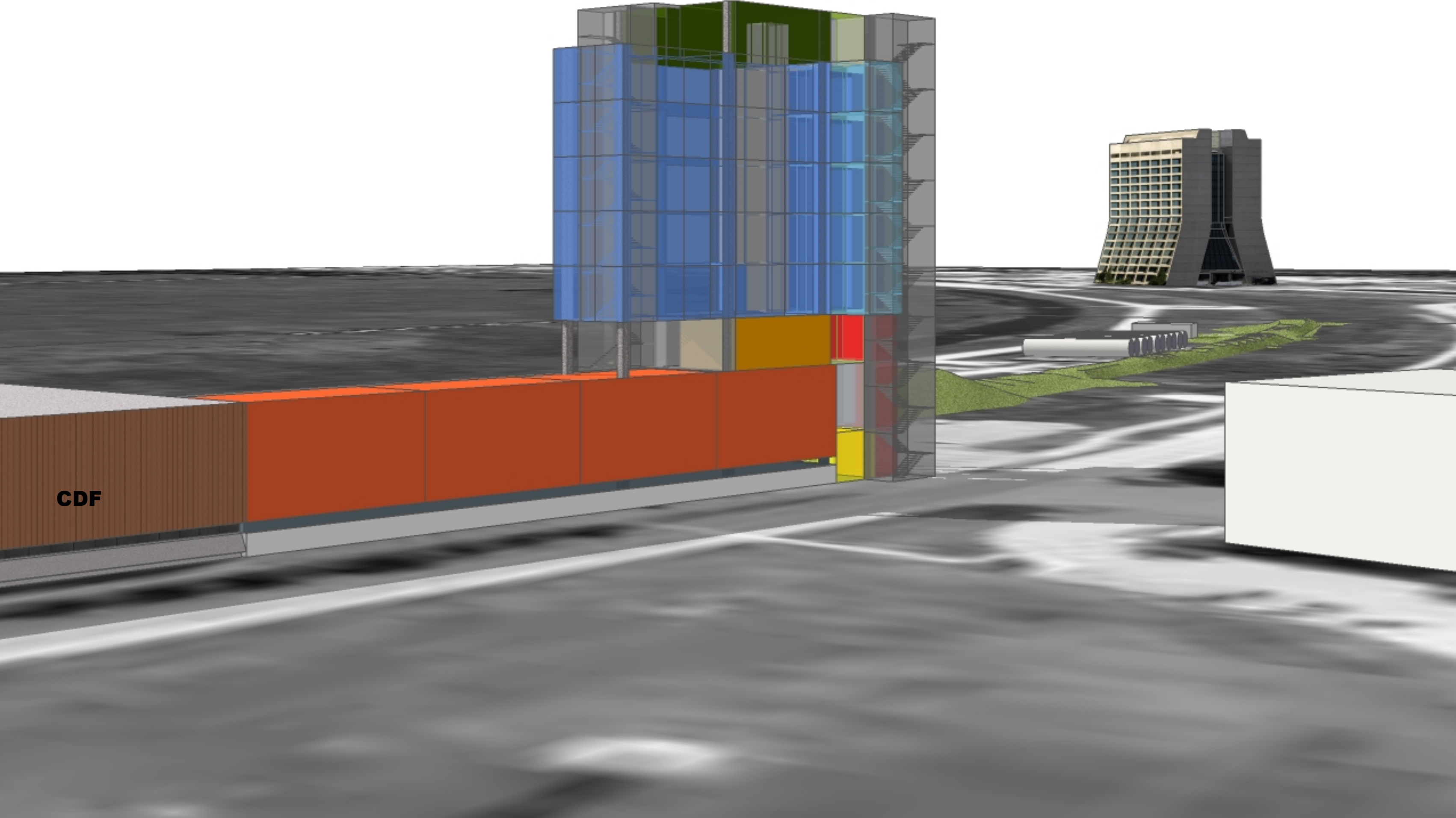
Road D



CDF

Road D

Tower Schemes



CDF



IBC

IB-4

IB-1

CDF

Road D

Illinois Accelerator Research Center (IARC) Building Functional Review

IARC Mission:

Goal: New construction for IARC will be funded via a \$ 20 M grant from Illinois Department of Commerce and Economic Opportunity. The DOE will provide \$ 13 M for site preparation, FESS oversight and to outfit the newly constructed space. A site selection process has occurred and it has been decided that new state funded building will be adjacent to the CDF building. DOE has made a commitment for the D&D of the CDF experiment and to refurbish and contribute the CDF assembly building to serve as both office and heavy assembly area for IARC.

The basic DCEO goal for IARC is to make Northern Illinois a center for accelerator development and initiate/promote/support related industry in Illinois. IARC to provide office space and infrastructure that will increase the probability that new accelerators like Project X and ILC are sited at Fermilab and allow industry to more easily work with us.

Industry and universities have difficulty testing accelerators for medical or industrial purposes in typical university buildings and industrial parks. These same locations often lack the necessary power, water, cryogenic, RF, radiation shielding, interlocks, and other infrastructure necessary to develop new accelerator components. Access to trained accelerator and technology experts is also limited. IARC would provide such assets to industrial and university partners and for laboratory projects.

The IARC proposal includes an educational mission which in association with local universities will support training of scientists and engineers in accelerator physics and related technology.

Secondary goals: Additional office space for TD/AD/APC; Additional conference and meeting rooms.

Outreach: exhibit space for visitors, including members of the public, students and teachers and VIP visitors. The exhibit space would highlight the connections between accelerator technology development, scientific discovery, and accelerator applications in medicine, energy and the environment, industry, and national security.

Possible additional IARC Missions:

- Center for HEP role as "Stewards of Accelerator Development"
- House infrastructure for 3 GeV CW linac in support of ICD-2 (e.g. spoke processing & HPR, cavity dressing, coupler testing, CM assembly, Spoke CM test stand?)

IARC STATUS:

Awaiting state funding via sale of bonds, expected to occur in May 2010. The expected time line is such that new state funded construction would be accomplished in two years beginning fall 2010 with beneficial occupancy in 2012-13. D&D of the CDF experiment and refurbishment of the CDF assembly building would take place ~2012-2014. The IARC building conceptual design is in progress with DOE funds using an outside A&E firm. Ross Barney and Associates are now prepared to present two different conceptual designs for consideration by Fermilab.

Objectives of the new construction:

- Meet the function needs of the IARC mission
- Achieve good functional relationship to existing CDF building
- Achieve High degree of flexibility for rotating tenants
- Maximize State funding with “bricks & mortars”
- Produce a high profile building making a dramatic statement on the FNAL site
- Produce a design that fits with existing Fermi design themes
- Provide State-of-the-art computing, classroom, and video capabilities
- Maintain CDF truck access and provide adequate parking
- Design to LEED Gold

Purpose of the Review

As the member of the Directorate leading IARC I would like to seek advice from experienced FNAL colleagues on the proposed designs before proceeding to a selection and more detailed design and costing.

Charge for the review:

- 1) Listen to the RBA presentations
- 2) Evaluate the proposed design solutions and indentify merits and possible problems.
- 3) Will the building layout function for its intended purpose?
- 4) Is the proposed technical space functional?
- 5) Will the planned technical space infrastructure (power, water, cooling, etc) be sufficient?
- 6) Is the newly constructed space well integrated with a refurbished CDF building?
- 7) Will materials, equipment, and personnel be able to move efficiently around the complex
- 8) Are the proposed solutions for class room and office space reasonable?
- 9) Are there sufficient conference rooms?
- 10) Will the proposed building be visually appealing and prominent?
- 11) Can issues associated with the operation of CDF through 2011 and subsequent D&D of CDF be adequately addressed?
- 12) Provide a few page written report with your recommendations
- 13) Please comment on any other issues the committee feels are relevant.

Appendix: Committee Charge

Functional Review of Proposed Designs for IARC Building
Report from the Review Committee

Committee Members: Harry Carter, Paul Czarapata, Steve Holmes (Chair), Mike Lindgren, Rob Roser, Vladimir Shiltsev

Bob Kephart convened an ad-hoc committee (membership listed above) to review the proposed designs of the Illinois Accelerator Research Center (IARC) building with a focus on the functionality of the design. The review took place on February 23, 2010 at Fermilab with an agenda consisting of:

- Discussion of the charge to the committee (Bob and the committee)
- Presentation of concepts by the architects (Ross Barney Architects, the committee, and selected observers/project participants)
- Follow-on discussion (Everyone)
- Committee Executive Session (Bob and the committee)
- Presentation of committee comments, suggestions, recommendation (Everyone)

Bob described the goals of the IARC building as:

Primary Goal: Establish Northern Illinois as a (national) center for accelerator development, and initiate/promote/support related industry in Illinois.

Secondary Goal/Education: In association with local universities, support training of scientists and engineers in accelerator physics and related technology.

Secondary Goal/Office Space: Provide additional office space plus conference/meeting rooms to relieve congestion in TD, AD, and/or APC.

Secondary Goal/Outreach: Provide exhibit space for visitors, including members of the public, students and teachers and VIP visitors.

Bob also described the objectives of the construction as threefold:

- 1) Meet the above described missions
- 2) Preserve a good relationship with CDF building
- 3) Provide flexibility for rotating occupants.

Two design concepts for the IARC building have been developed by Ross Barney Architects for Fermilab's consideration. The purpose of the meeting was to conduct a functional review of these concepts within the context of the mission and goals presented by Bob. In particular the

committee was asked to identify the positive (and negative) attributes of each design in order to form a basis for further development. The committee was not asked to provide a recommendation from among the two designs.

The Committee concentrated its attention on understanding how the design concepts presented would meet the functional requirements necessary to achieve the IARC goals and objectives. The committee appreciated very much the comprehensive presentation prepared by Ross Barney and the presence of knowledgeable staff from Ross Barney to answer questions. The committee's comments, suggestions, and recommendations are given below.

Committee Comments, Suggestions, and Recommendations

We refer to the two building design options as "A" and "B" as follows:

- Option A: A three story building, extending from the west and in front of the north façade of the CDF building.
- Option B: An eight story building located to the immediate west of the CDF building

Both buildings contain roughly 43,000 square feet of combined office, technical, and public floor space; and both provide access into the CDF building via the third floor.

Specific responses to the charge and recommendations

- 1) Listen to the RBA presentations

Done

- 2) Evaluate the proposed design solutions and identify merits and possible problems.

Both options appear to meet office requirements. Option A is more horizontally dispersed than Option B, and features a dead end on the wing that goes in front of CDF. The committee notes that in general communications are more effective between people on a single floor than on separated floors. We also note that Option A is less reliant on elevators to get from floor to floor. Based on these observations we believe that communication between building occupants would be fostered more in Option A than in B.

The 8' × 8' cubicles shown are industry standard, but this is less space than we are accustomed to at Fermilab (Fermilab standards are 9' × 10' cubicles and 10' × 12' offices within Wilson Hall). Option A appears to be less flexible than Option B in terms

of adapting to variable dimensions because of the non-parallel north and south walls. The committee wonders if Option A could be redesigned with a footprint that is a parallelogram rather than a trapezoid.

Both options generally meet educational requirements. There was some feeling that it might be advantageous to have the education function segregated as in Option B. There was not much consideration of the lab space required as part of the educational mission, nor the relationship (if any) between this lab space and the technical areas.

The technical space functional definition is lacking in both options. The committee notes that Option B provides a better opportunity for connection between the technical areas and CDF than does Option A. However, the lack of a defined relationship between the IARC tech area and B0 makes it difficult to have a view as to whether this is important. The committee felt the design would benefit with some modest office space for supervisor(s) in close proximity to the technical space. The committee also feels that it is advisable to keep the tech areas on the ground floor (as done in both options).

There did not appear to have been any real consideration of hazardous materials or processes that would be employed in the technical areas. As a result there were no specific mitigations presented.

The committee notes that Option A has two entrances, whereas Option B has one. The committee felt that the extra entrance could be a plus, however the extra road crossing associated with this entrance is probably a minus.

Recommendation: Define the functional requirements of the lab/tech space. This will define the needs for power, cooling, cryo capabilities, and the need for direct access to CDF building.

Recommendation: Define any requirements for hazardous materials or processes in the technical areas.

Recommendation: Determine any requirements for security through discussions with potential industrial occupants and/or ANL.

Recommendation: Provide some office space on the same floor as tech areas. The committee felt that only a few (~2) offices would be required.

Recommendation: Define requirements for lab space associated with the educational mission and define the relationship, if any, to the technical space.

Recommendation: Look at options for providing better connection between the Industrial Complex and the IARC building.

3) Will the building layout function for its intended purpose?

See above discussion.

4) Is the proposed technical space functional?

See above discussion.

5) Will the planned technical space infrastructure (power, water, cooling, etc) be sufficient?

This was not specifically addressed. The following are currently in need of definition:

- Lighting requirements – make lighting is sufficient for any possible application
- Crane coverage requirements
- Floor loading, electrical capabilities, temperature and humidity control.

6) Is the newly constructed space well integrated with a refurbished CDF building?

The technical space is the most relevant aspect. It is not directly integrated in either option, but option B offers better possibilities. It needs to be determined if this is a requirement.

Office functions are well integrated in both options.

7) Will materials, equipment, and personnel be able to move efficiently around the complex

Truck access to the west ramp of the CDF building for a truck approaching from the west appears problematic in both options. In addition the committee feels that the need for significant foot traffic coming across Road D for access to the IARC building from the parking lots is a potential hazard.

The committee also notes that there is likely to be significant pedestrian flow between the IARC building and the Industrial Complex because of the nature of the activities in IARC.

Recommendation: Provide good truck access to the CDF west ramp for trucks approaching from the west.

Recommendation: Look for solutions to the potential hazard from significant foot traffic crossing Road D from either the Industrial Complex or from the parking lots to the north of IARC.

- 8) Are the proposed solutions for class room and office space reasonable?

Yes, see above discussion.

- 9) Are there sufficient conference rooms?

Generally yes. The committee feels it is important to retain the central gathering point (the lunch area) that is a feature of both designs presented.

- 10) Will the proposed building be visually appealing and prominent?

The committee views both options as sufficiently visually appealing to be considered. A majority of the committee felt that Option A was more visually appealing, but this view was not unanimous.

- 11) Can issues associated with the operation of CDF through 2011 and subsequent D&D of CDF be adequately addressed?

West side access to CDF building is required and accommodated in both options.

- 12) Provide a few page written report with your recommendations

- 13) Please comment on any other issues the committee feels are relevant.

The committee is concerned about the location of the bike path (option A), in particular the free space between the bike path, the CDF building, and the IARC building. A survey by several committee members after the meeting indicates that the bike path will not fit between the road and building in Option A. It appears that this option will require relocation of either the road or the bike path.

It is important to think of expansion options during the design phase. The committee believes that both options have opportunity for expansion.

OPTION A – FAÇADE SCHEME



view from northwest

OPTION A – FAÇADE SCHEME



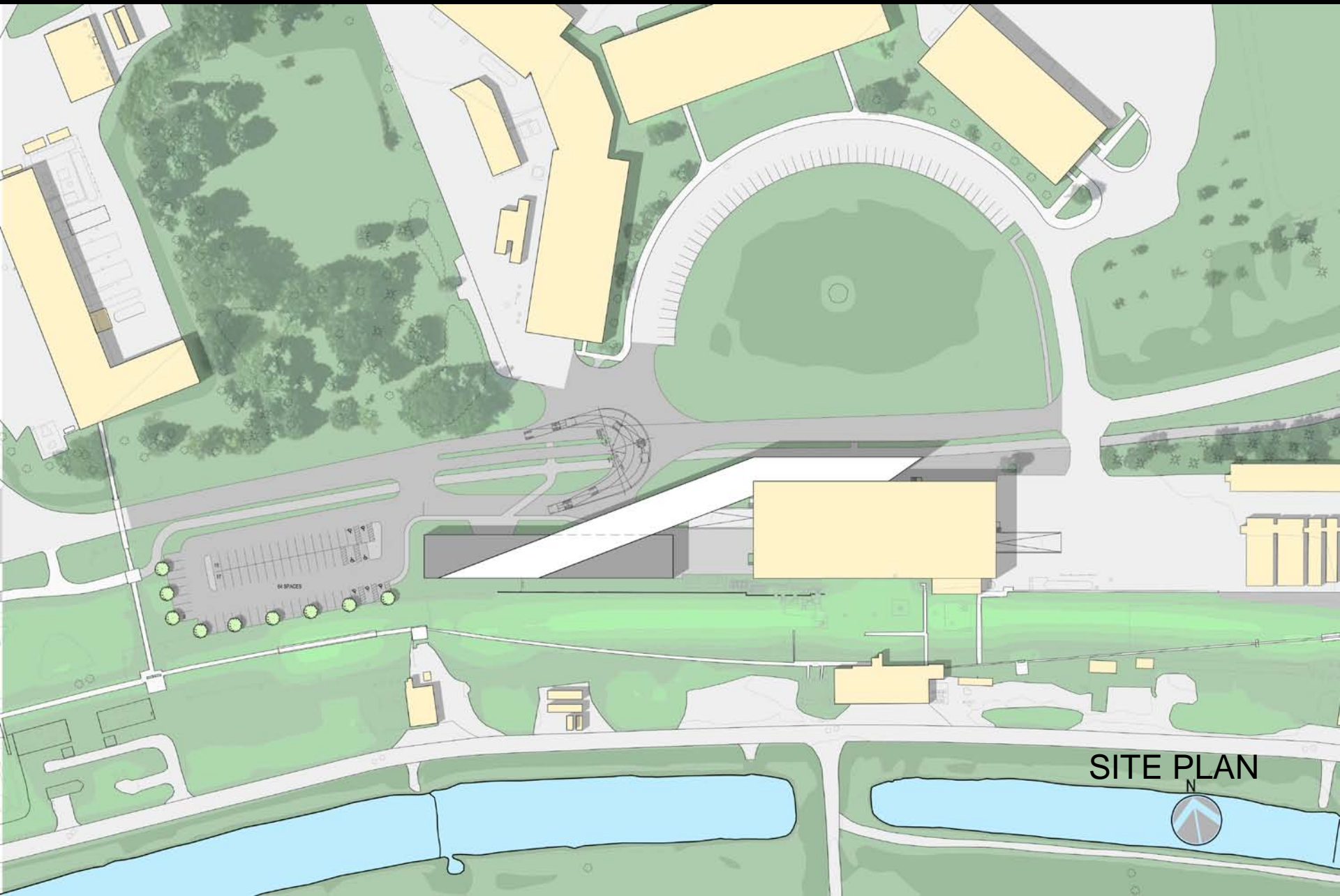
view from northeast

OPTION A – FAÇADE SCHEME

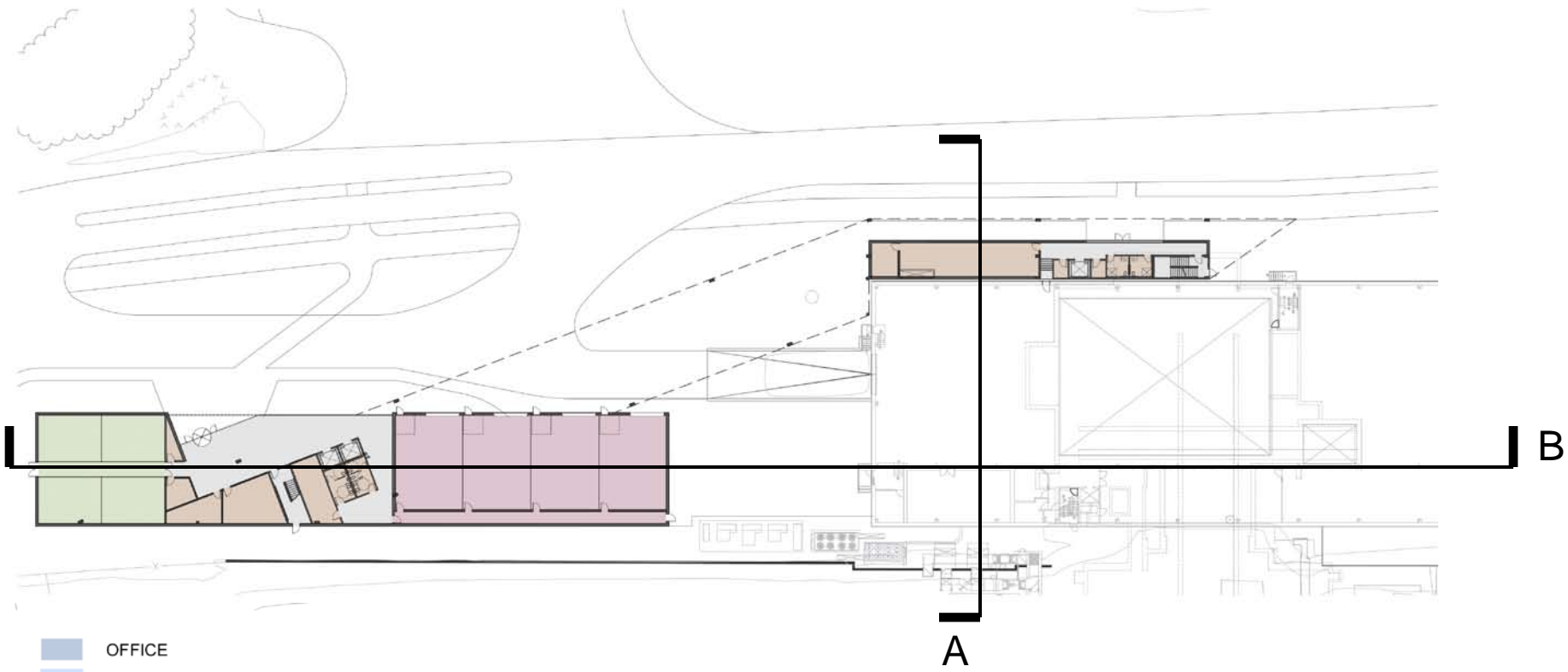


view from southwest

OPTION A – FAÇADE SCHEME



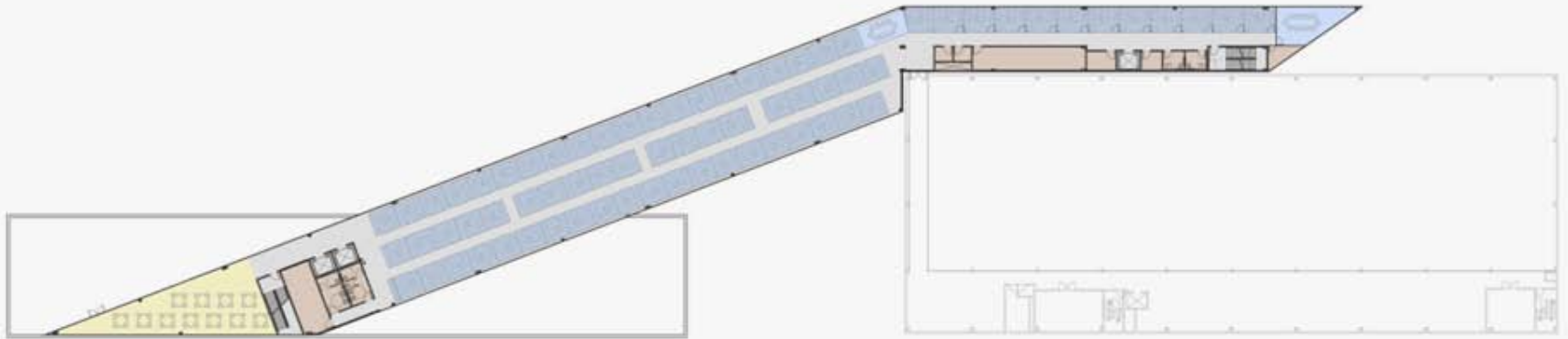
OPTION A – FAÇADE SCHEME



- OFFICE
- CONFERENCE ROOM
- TECH SPACE
- CLASSROOM
- LUNCH ROOM
- SUPPORT SPACE
- CIRCULATION

GROUND FLOOR
14,600 GSF
EL 0.0

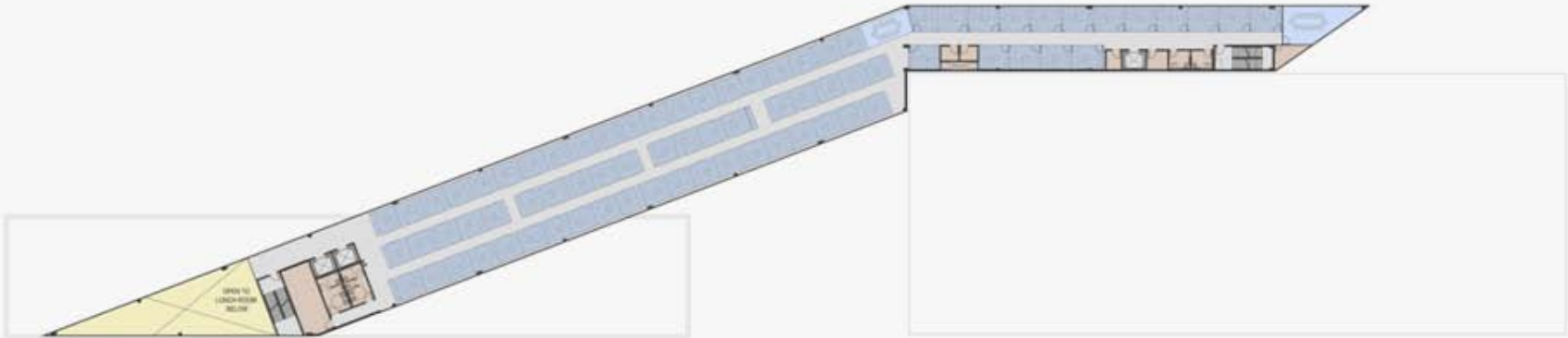
OPTION A – FAÇADE SCHEME



- OFFICE
- CONFERENCE ROOM
- TECH SPACE
- CLASSROOM
- LUNCH ROOM
- SUPPORT SPACE
- CIRCULATION

SECOND FLOOR
15,300 GSF
EL +19.0

OPTION A – FAÇADE SCHEME

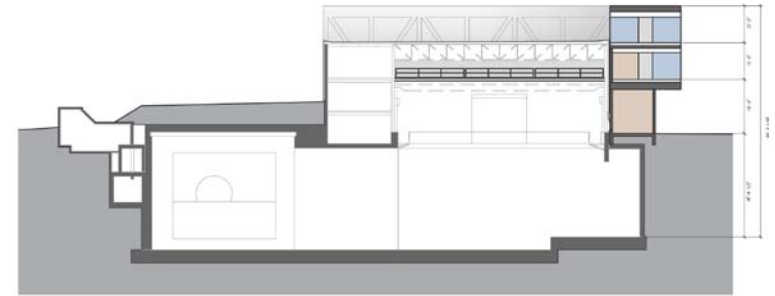


- OFFICE
- CONFERENCE ROOM
- TECH SPACE
- CLASSROOM
- LUNCH ROOM
- SUPPORT SPACE
- CIRCULATION

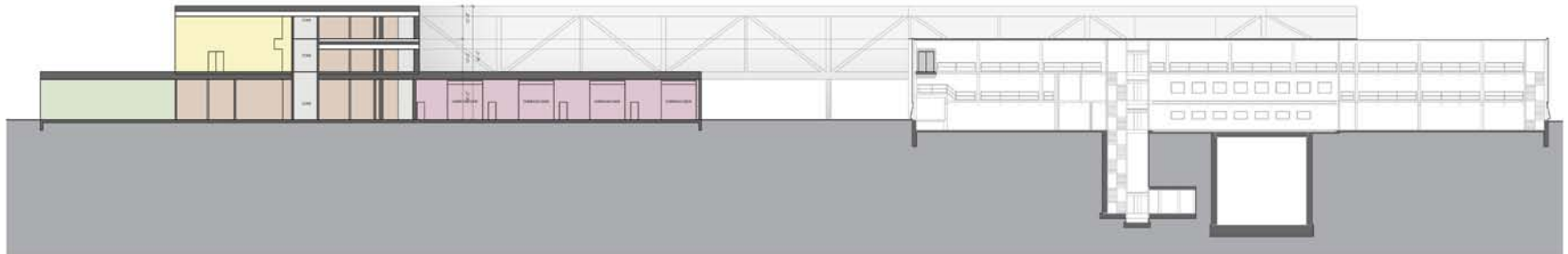
THIRD FLOOR
15,300 GSF
EL +32.0

OPTION A – FAÇADE SCHEME

- OFFICE
- CONFERENCE ROOM
- TECH SPACE
- CLASSROOM
- LUNCH ROOM
- SUPPORT SPACE
- CIRCULATION



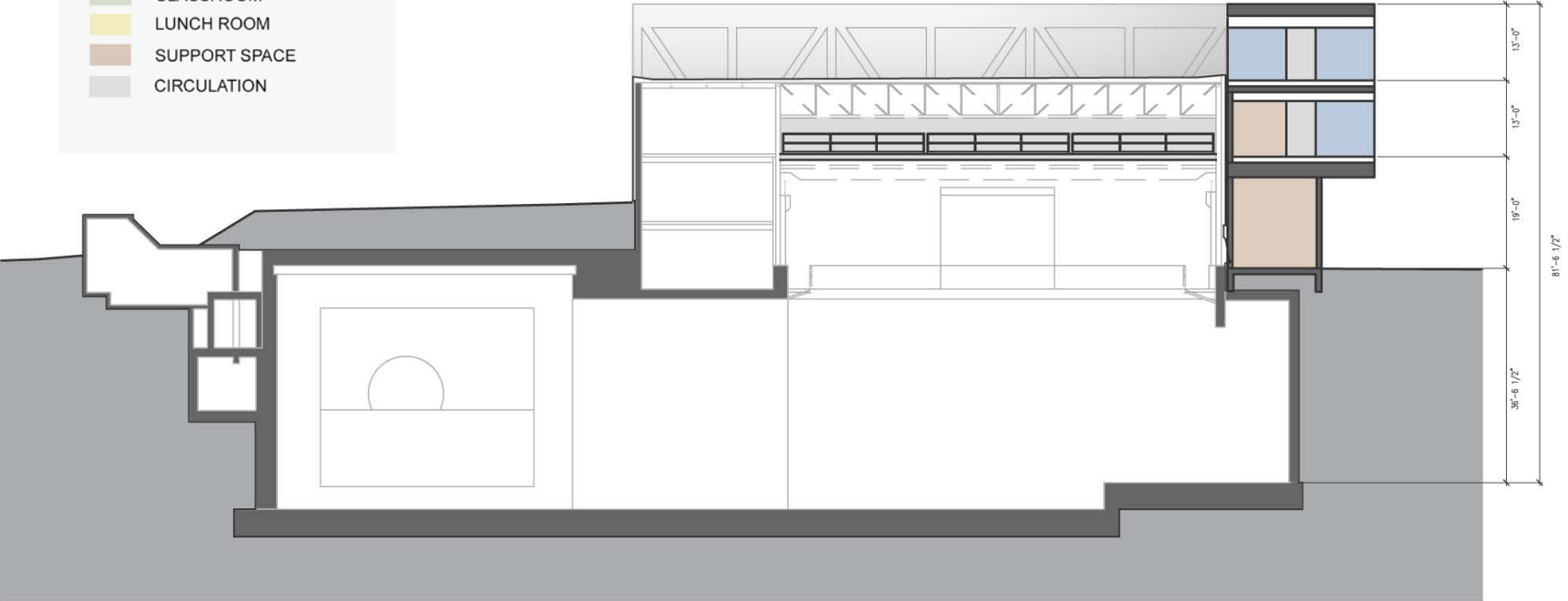
SECTION A



SECTION B

OPTION A – FAÇADE SCHEME

- OFFICE
- CONFERENCE ROOM
- TECH SPACE
- CLASSROOM
- LUNCH ROOM
- SUPPORT SPACE
- CIRCULATION



SECTION B - ENLARGED

OPTION B – TOWER SCHEME



view from northwest

OPTION B – TOWER SCHEME



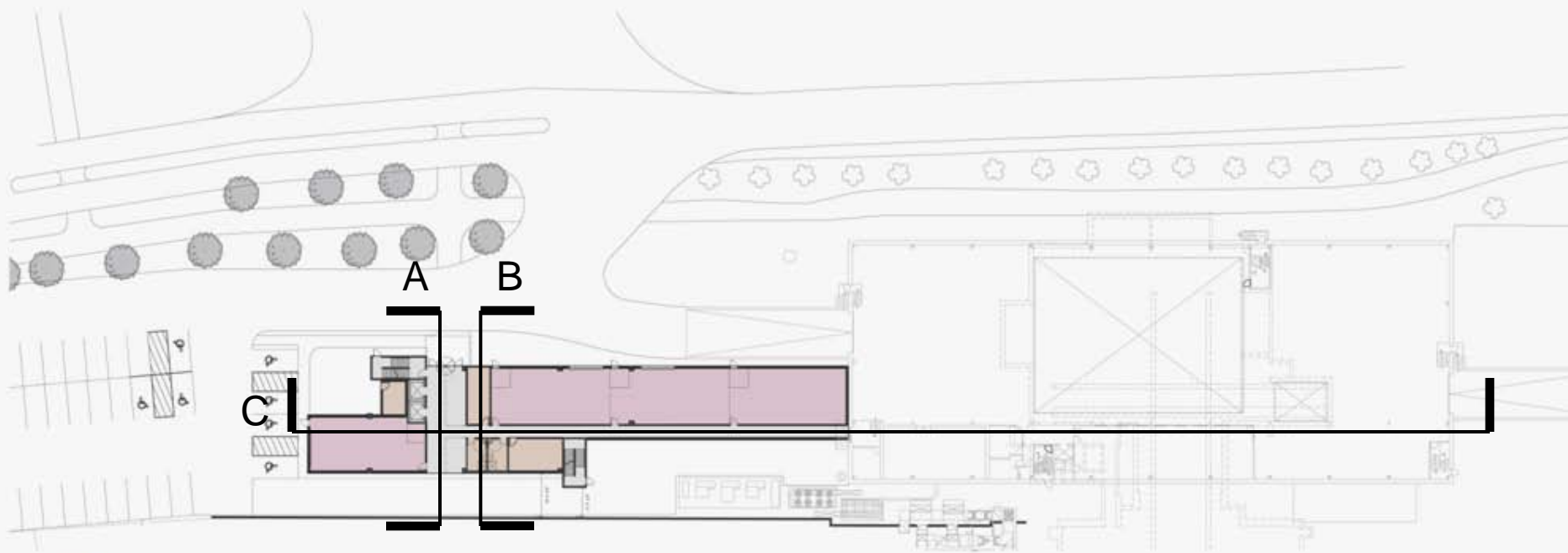
view from northeast

OPTION B – TOWER SCHEME



view from southwest

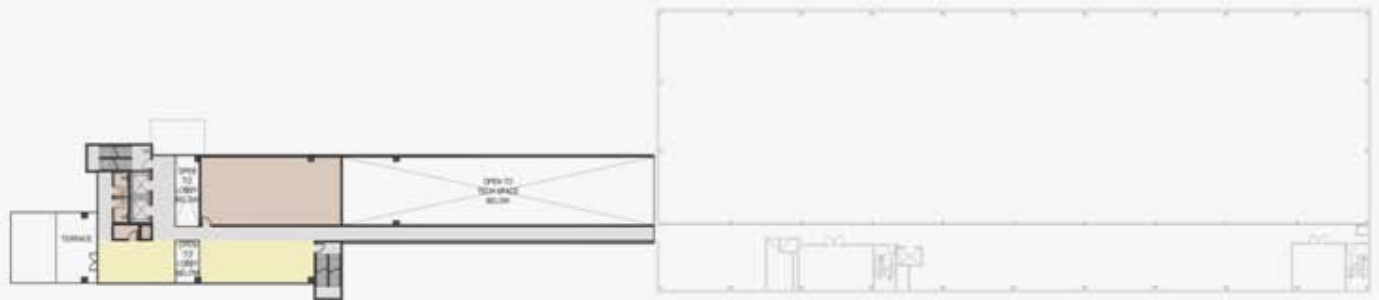
OPTION B – TOWER SCHEME



- OFFICE
- CONFERENCE ROOM
- TECH SPACE
- CLASSROOM
- LUNCH ROOM
- SUPPORT SPACE
- CIRCULATION

GROUND FLOOR
8,230 GSF
EL 0.0

OPTION B – TOWER SCHEME



- OFFICE
- CONFERENCE ROOM
- TECH SPACE
- CLASSROOM
- LUNCH ROOM
- SUPPORT SPACE
- CIRCULATION

SECOND FLOOR
4,475 GSF
EL 19.0

OPTION B – TOWER SCHEME



- OFFICE
- CONFERENCE ROOM
- TECH SPACE
- CLASSROOM
- LUNCH ROOM
- SUPPORT SPACE
- CIRCULATION

FLOORS 3 - 7
5,560 GSF

OPTION B – TOWER SCHEME



- OFFICE
- CONFERENCE ROOM
- TECH SPACE
- CLASSROOM
- LUNCH ROOM
- SUPPORT SPACE
- CIRCULATION

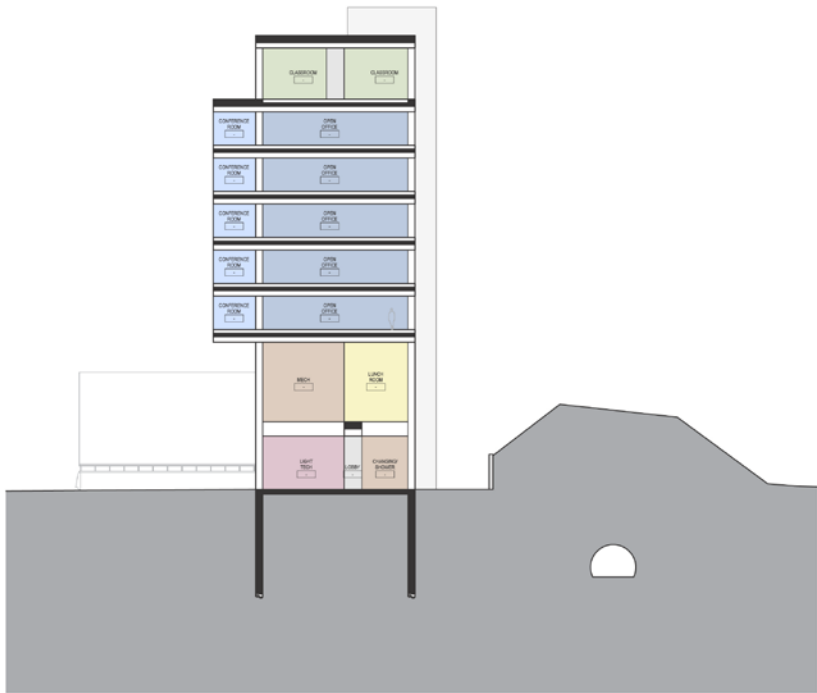
FLOOR 8
4,140 GSF
EL 110.0

OPTION B – TOWER SCHEME

- OFFICE
- CONFERENCE ROOM
- TECH SPACE
- CLASSROOM
- LUNCH ROOM
- SUPPORT SPACE
- CIRCULATION



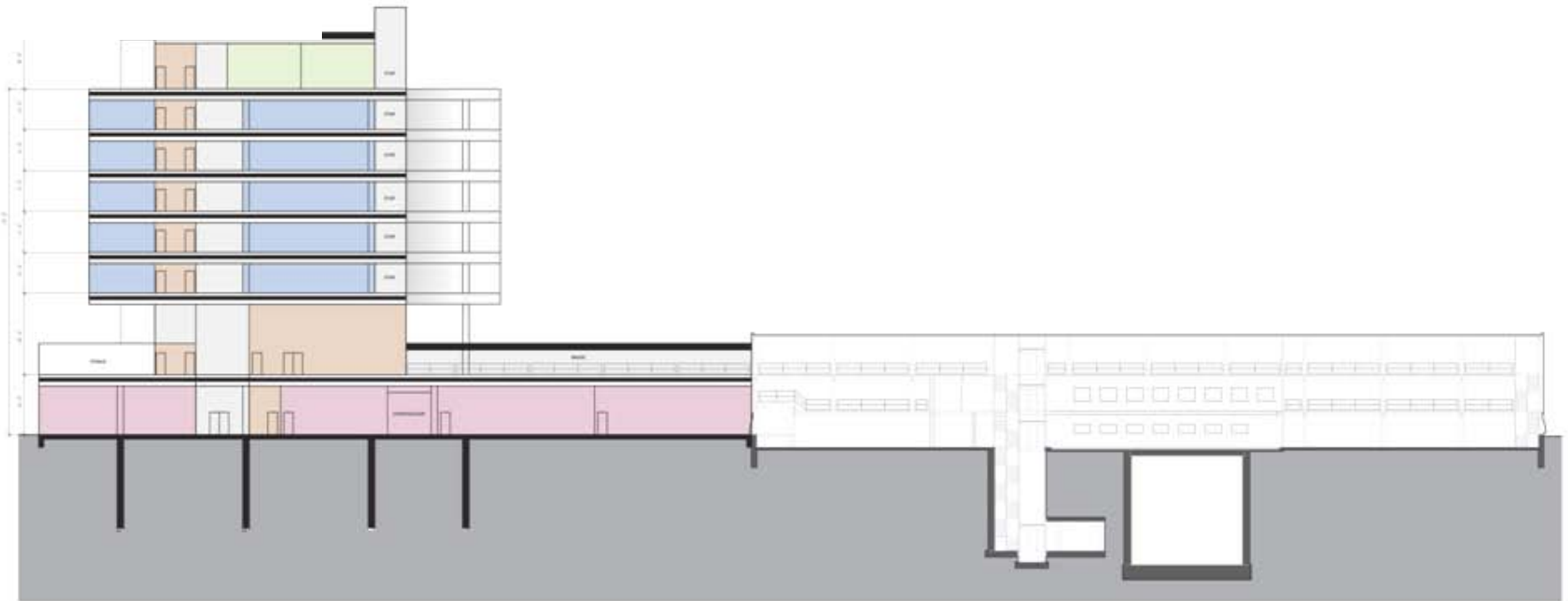
SECTION A



SECTION B

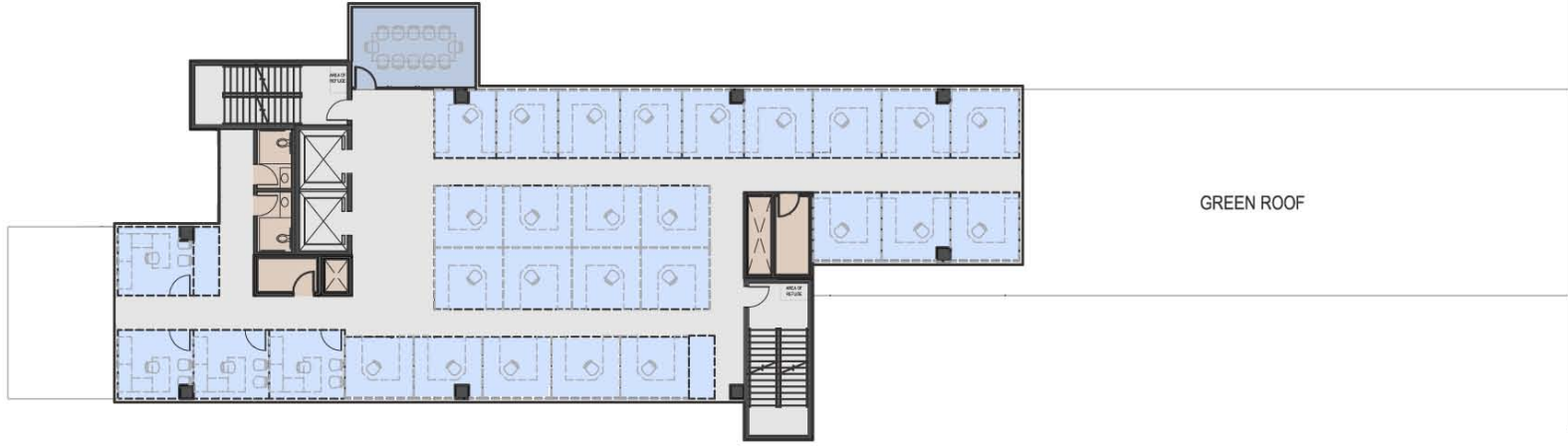
OPTION B – TOWER SCHEME

- OFFICE
- CONFERENCE ROOM
- TECH SPACE
- CLASSROOM
- LUNCH ROOM
- SUPPORT SPACE
- CIRCULATION



SECTION C

OPTION B – TOWER SCHEME



- OFFICE
- CONFERENCE ROOM
- TECH SPACE
- CLASSROOM
- LUNCH ROOM
- SUPPORT SPACE
- CIRCULATION

FLOORS 3-7 - ENLARGED
5,560 GSF