

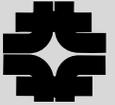
## APPENDIX B

## 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](http://fra-hq.org/pdfs/FRA_Contract.pdf)
- Fermilab Director's Policy Manual  
[http://www.fnal.gov/directorate/Policy\\_Manual.html](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
<b>Project Justification</b>																					
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
<b>Preliminary Design</b>																					
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																	
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
<b>Final Design</b>																					
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					Issue Design Phase Change Orders to A/E firms (if required)									provide timely cost data to PM
				Review and Approve A/E Invoices	Review and Approve A/E Invoices							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	Review and Approve A/E Invoices							Review and Approve A/E Invoices									Pay A/E Invoices
Value Management (tailored)			Participate in Value Management	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											
Develop Design Phase Cost and Schedule Estimate				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									
				Determine need for Independent Cost Estimate	Provide Input for Need for Independent Cost Estimate							Provide Input for Need for Independent Cost Estimate									
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								
												Establish tasking purchase order with A/E									

LEGEND	
<span style="background-color: #d9ead3; border: 1px solid black; padding: 2px;"> </span>	Indicates Initiator of Action
<span style="background-color: #d9ead3; border: 1px solid black; padding: 2px;"> </span>	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	Fermitab Project Director	Fermitab Project Manager	Fermitab Project Coordinator	Fermitab 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		
			Update Project Plan	Update 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 State Reports									Review Quarterly State Reports							Review Quarterly GPP Reports		
												Submit Quarter State Reports to DCFD							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		
<b>Procurement</b>																					
Issue Request For Proposal		Approve Requisition	Approve Requisition	Approve Requisition	Initiate Construction Requisition								Issue Request For Proposal		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																	
Negotiations				Assist in Negotiations								Conduct Negotiations	Provide Counsel as Requested								
Subcontract Award			Approve Award	Approve Award								Award Subcontract	Provide Counsel as Requested								Review and Accept Safety Documentation
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	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		
<b>Construction</b>																					
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	Fermitab 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 to Subcontractor	Approve Final Acceptance to Subcontractor	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	Prepare Incident Report for FPM	Initiate Call Tree Obtain Incident Report from Subcontractor									Assist as Required	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	Assist as Requested	
As-Built Documentation			Assist as Requested	Assist as Requested	Assure As-builts Kept Current and Accurate																	
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						
<b>Close-out</b>																						
Subcontractor Performance Review			Participate in 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																						
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	
<span style="background-color: #d9ead3; border: 1px solid black; padding: 2px;"> </span>	Indicates Initiator of Action
<span style="background-color: #d9ead3; border: 1px solid black; padding: 2px;"> </span>	Indicates Approval Action Required

LIST OF ACRONYMS	
AP	Acquisition Plan
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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](#)

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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.

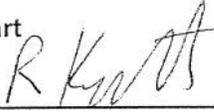
# FERMILAB ENVIRONMENTAL EVALUATION NOTIFICATION FORM

**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

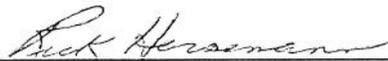
## IV. NEPA Recommendation

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

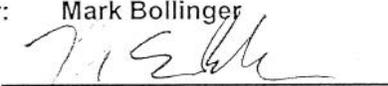
Concurrence with the recommendation for determination:

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

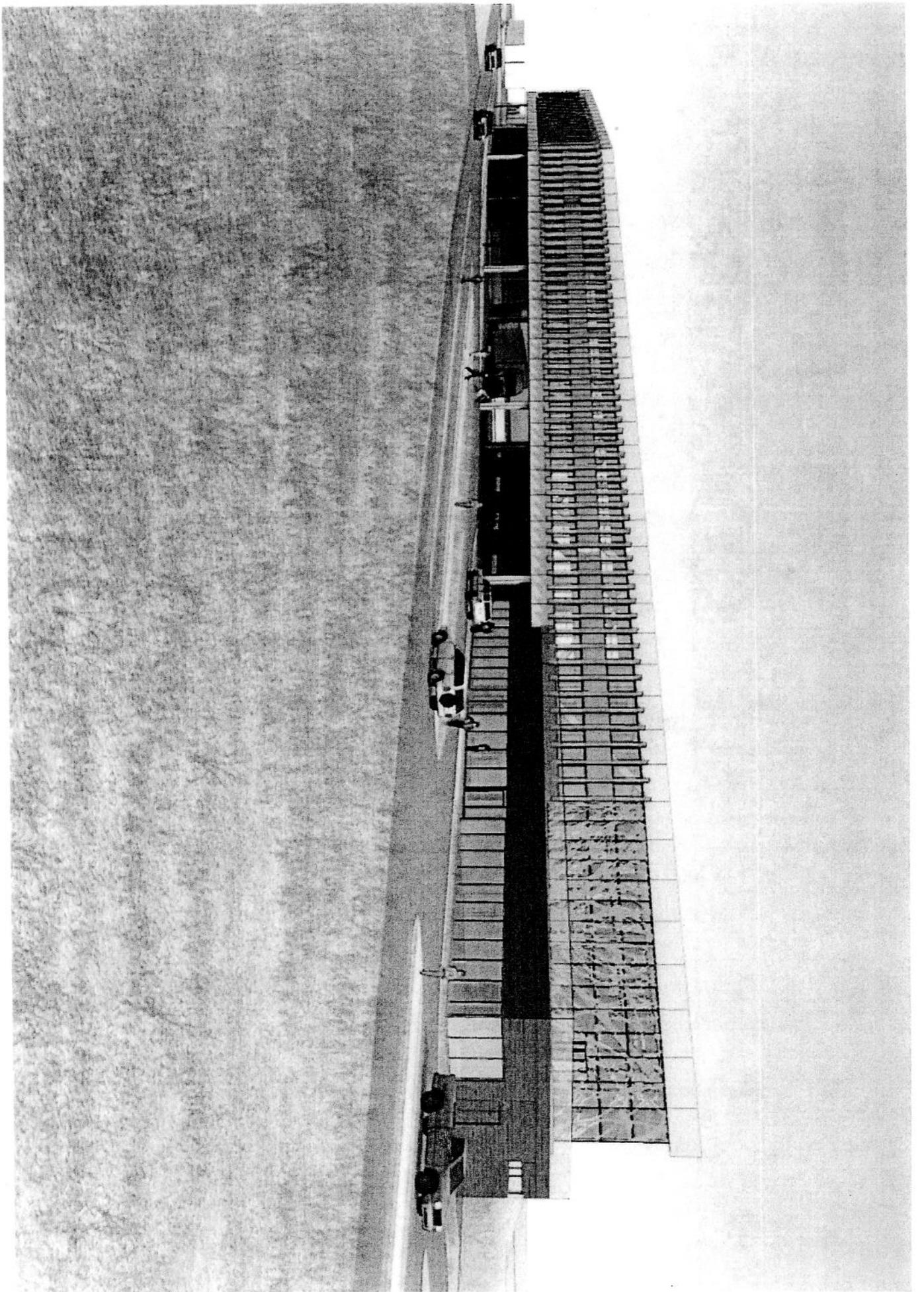
## VI. Comments on checked items in section III

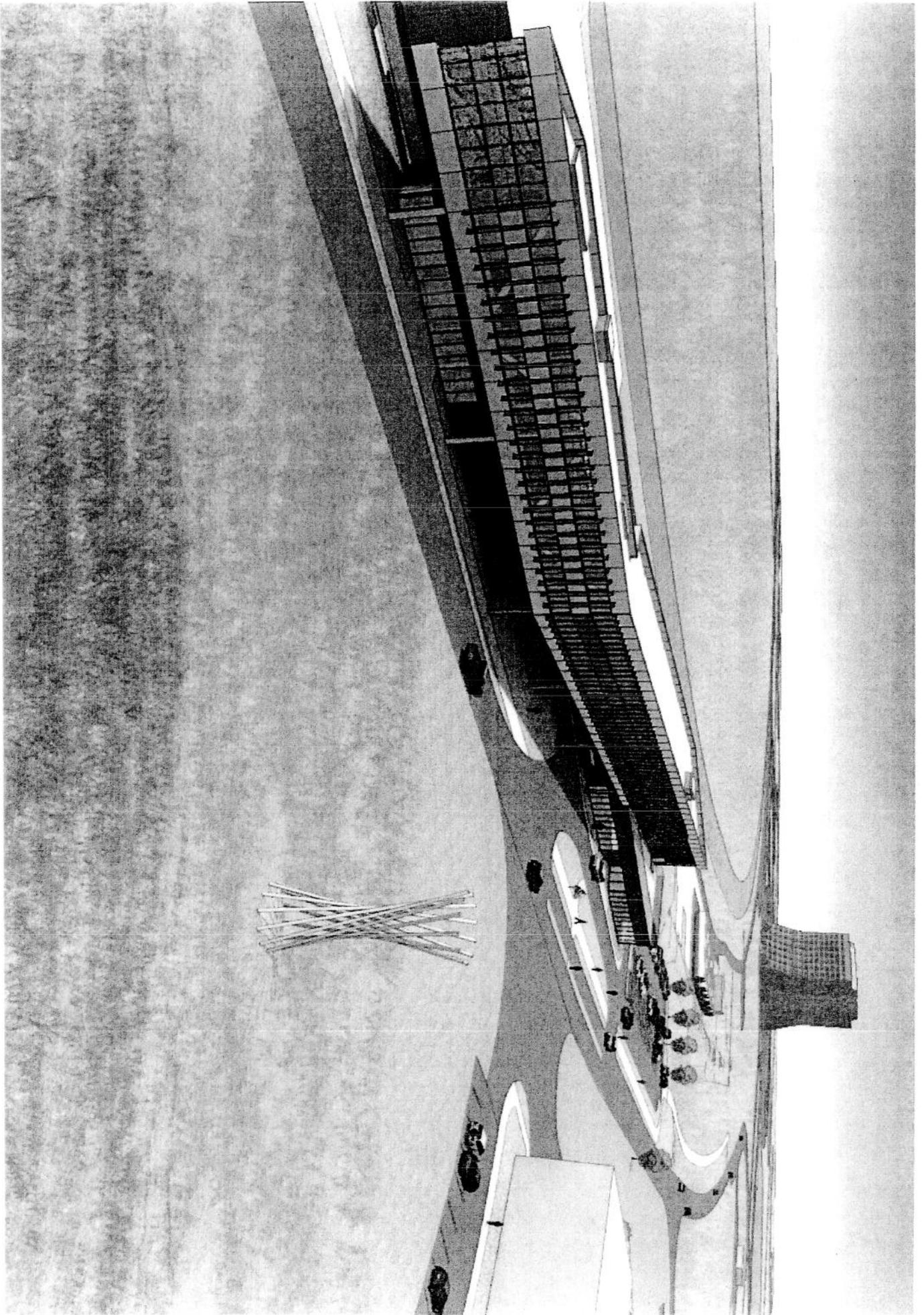
### Clearing or Excavation

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

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### Natural Resource Review Results

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#### 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)

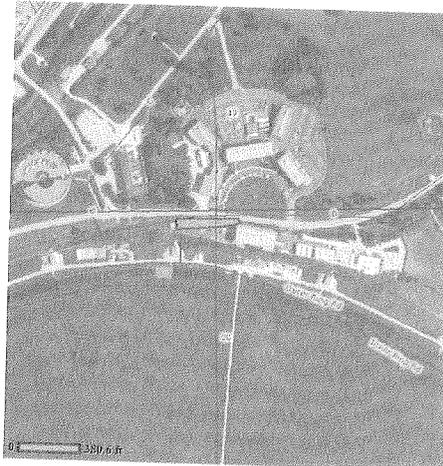
The National Wetlands Inventory does not show wetlands within 250 feet of the project location.

**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

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**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.

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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.
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**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



<b>Building Information</b>	<b>Federal Real Property Building ID</b>	
	<b>Building Name</b>	Office, Technical and Education Building
	<b>Agency/Site</b>	Fermi National Acceleratory Laboratory
	<b>PSO</b>	
	<b>Department</b>	Department of Energy
	<b>Address</b>	Pine and Kirk
	<b>City</b>	Batavia
	<b>State</b>	Illinois
	<b>Zip Code</b>	60510

\*Information entered above will auto-populate the appropriate fields on subsequent tabs

		Name	Phone	Email
<b>Project Team</b>	<b>Main Contact:</b>	Michael A. Ross	312-832-0600	<a href="mailto:mar@r-barc.com">mar@r-barc.com</a>
	<b>Project Team Members:</b>	Kim Patten	312-832-0600	<a href="mailto:kap@r-barc.com">kap@r-barc.com</a>
		Matthew Breidenthal	312 849 5616	<a href="mailto:Matt.Breidenthal@arup.com">Matt.Breidenthal@arup.com</a>
		Kim Patten	312-832-0600	<a href="mailto:kap@r-barc.com">kap@r-barc.com</a>
		Misa Inoue	312-832-0600	
		Robert L. Tazelaar	312 849 5617	<a href="mailto:Robert.Tazelaar@arup.com">Robert.Tazelaar@arup.com</a>

<b>Project Lead Signature:</b>		<b>Date:</b>	
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# 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
<b>1. Employ Integrated Design Principles</b>					
<b>Integrated design</b>	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, <a href="http://www.wbdg.org/design/engage_process.php">http://www.wbdg.org/design/engage_process.php</a>	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.
<b>Commissioning</b>	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
<b>2. Optimize Energy Performance</b>					
<b>Energy Efficiency</b>	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
<b><u>On-Site Renewable Energy</u></b>	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.
<b><u>Measurement and Verification</u></b>	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.
<b><u>Benchmarking</u></b>	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.
<b>3. Protect and Conserve Water</b>					
<b><u>Indoor Water</u></b>	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 Watergy, 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"/>	
<b><u>Outdoor Water</u></b>	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
<b><u>Process Water</u></b>	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"/>	
<b><u>Water Efficient Products</u></b>	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.
<b>4. Enhance Indoor Environmental Quality</b>					
<b><u>Ventilation and Thermal Comfort</u></b>	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.
<b><u>Moisture Control</u></b>	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.
<b><u>Daylighting</u></b>	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.
<b><u>Low-Emitting Materials</u></b>	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.
<b><u>Protect Indoor Air Quality during Construction</u></b>	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.
<b><u>Tobacco Smoke Control</u></b>	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
<b>5. Reduce Environmental Impact of Materials</b>					
<b><u>Recycled Content</u></b>	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.
<b><u>Biobased Content</u></b>	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.
<b><u>Environmentally Preferable Products</u></b>	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"/>	
<b><u>Waste and Materials Management</u></b>	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.
<b><u>Ozone Depleting Compounds</u></b>	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

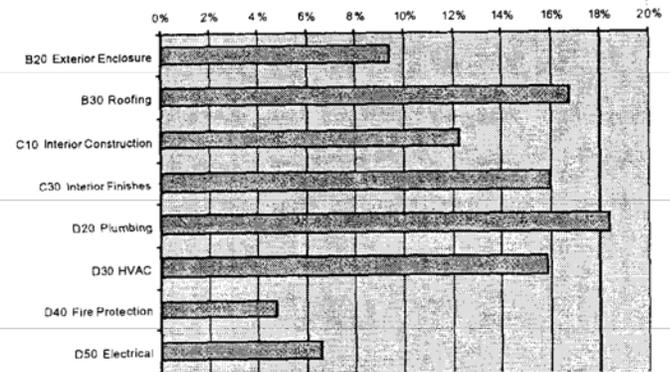
## 50-Year M&R Cost Summary

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>
<b>Total M&amp;R Costs</b>	<b>\$2,043,066</b>	<b>\$4.09</b>	<b>4.34%</b>

## Components

Uniformat / Component	Quantity	Units
<b>B20 Exterior Enclosure</b>		
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
<b>B30 Roofing</b>		
Concrete Steps	100	Sq Ft
Concrete Decking	400	Sq Ft
Built-up Roof	10000	Sq Ft
<b>C10 Interior Construction</b>		
Steel, Painted, Interior Door	72	Each
<b>C30 Interior Finishes</b>		
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
<b>D20 Plumbing</b>		
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
<b>D30 HVAC</b>		
Exhaust Fan, Ceiling, 200-500 Cfm	4	Each
Air Conditioner, Rooftop, 50 Ton	1	Each
<b>D40 Fire Protection</b>		
Fire Sprinkler System	1	Each
Fire Sprinkler Head	71	Each
<b>D50 Electrical</b>		
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.

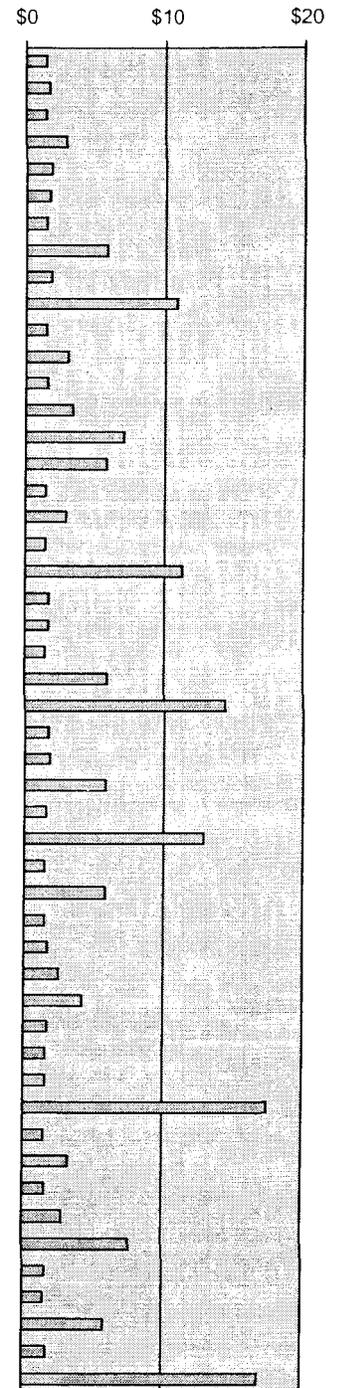
\*\*Percent of total M&R costs.

**\*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	<b>Canadian Cities</b>	
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
<b>Chicago, IL</b>				<b>Cumberland, MD</b>			
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
<b>Cincinnati, OH</b>				<b>Dallas, TX</b>			
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
<b>Cleveland, OH</b>				<b>Danbury, CT</b>			
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
<b>Colorado Springs, CO</b>				<b>Davenport, IA</b>			
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
<b>Columbia, SC</b>				<b>Dayton, OH</b>			
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
<b>Columbus, GA</b>				<b>Daytona Beach, FL</b>			
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
<b>Columbus, OH</b>				<b>Denver, CO</b>			
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
<b>Concord, NH</b>				<b>Des Moines, IA</b>			
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
<b>Corpus Christi, TX</b>				<b>Detroit, MI</b>			
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)
<b>ANSI/ASME B30.10 (Hooks) 2005</b>
<b>ANSI/ASME B30.11 (Monorails and Underhung Cranes) 2004</b>
<b>ANSI/ASME B30.16 (Overhead Hoists (Underhung)) 2003</b>
<b>ANSI/ASME B30.17 (Overhead and Gantry Cranes (Top Running Bridge, Single Girder, Underhung Hoist)) 2003</b>
<b>ANSI/ASME B30.2 (Overhead and gantry cranes) 2005</b>
<b>ANSI/ASME B30.20 (Below the hook lifting devices) 2006</b>

<b>ANSI/ASME B30.21 (Manually Lever Operated Hoists) 2005</b>
<b>ANSI/ASME B30.22 (Articulating Boom Cranes) 2002</b>
<b>ANSI/ASME B30.5 (Mobile and locomotive truck cranes) 2004</b>
<b>ANSI/ASME B30.9 (Slings) 2003</b>
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

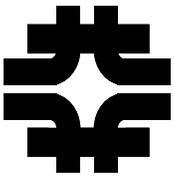
National Fire Protection Association Codes and Standards (NFPA Standards - applicable portions)
NFPA (National Electric Code), 2005
NFPA 70E (Standard for Electrical Safety in the Workplace), 2004
National Historic Preservation Act of 1966 [amended], 16 USC 470 et seq.
Native American Graves Protection 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

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."

To the extent these standards apply to DOE and not the contractor, the contractor will assist DOE in complying with them.

This Set does not change any existing Federal, State or local enforcement authority.

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.



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# Multi-Organization Construction Site Safety Walkthrough

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## 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.

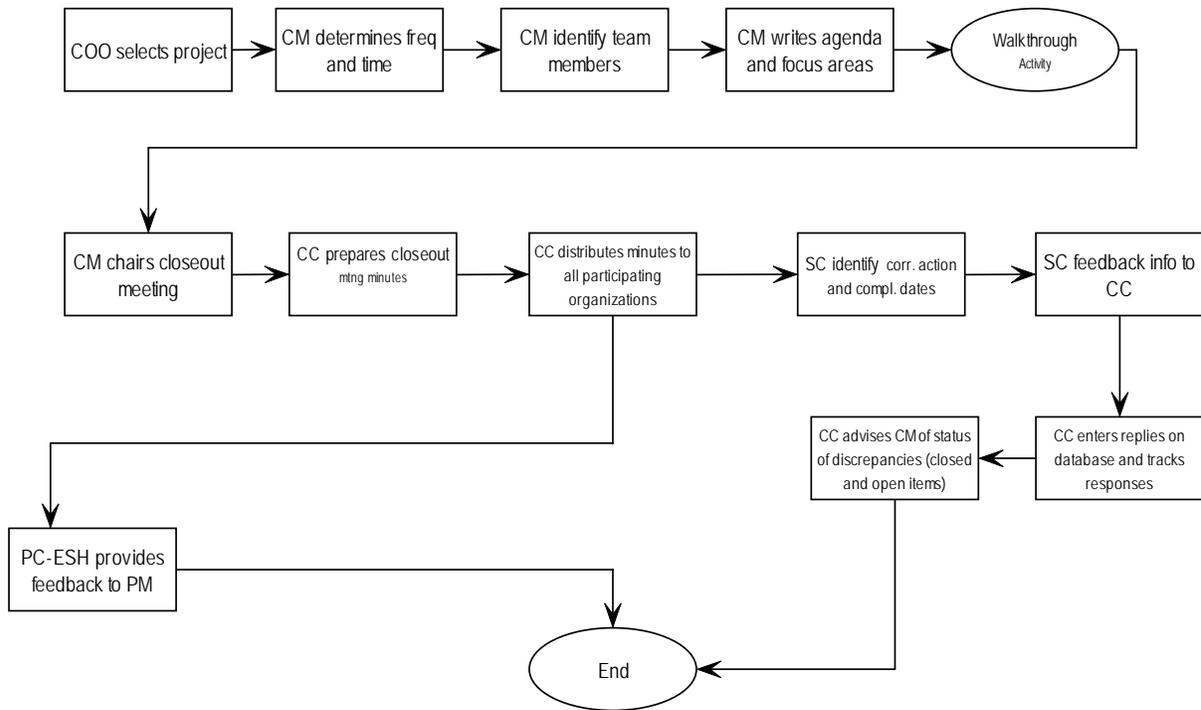
## 5.0 Corrective Actions

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

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# Appendix

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## 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:

**I have no comments at this time.**

**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:

**RESPONSE**

Project Contact Response:  
**Thank You for Reviewing this Project**

Comment:



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Reviewer:

Project Number       UIP ECP (If applicable)

Project Phase:

Comment Date:  
**September 14, 2010**



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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**

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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:  
**Thank You for Reviewing this Project**

Comment:



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**PLEASE ENTER THE FOLLOWING INFORMATION**

Reviewer:

Project Number       UIP ECP (If applicable)

Project Phase:

Comment Date:  
**September 13, 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 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

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Comment Date:  
**September 13, 2010**

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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

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**September 13, 2010**



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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

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Project Number       UIP ECP (If applicable)

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**September 13, 2010**



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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

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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

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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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      *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:



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Project Number       UIP ECP (If applicable)

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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:



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*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:



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Project Phase:

Comment Date:  
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Specification Reference:  
      *PROVIDE SPECIFICATION SECTION AND PARAGRAPH IF APPLICABLE. Example: 02070 1.5.D.2 (Page 02070-2)*

Comment:

**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:



# Fermilab

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Reviewer:

Project Number       UIP ECP (If applicable)

Project Phase:

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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Reviewer:

Project Number       UIP ECP (If applicable)

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Comment Date:  
**September 3, 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:

**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:



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**PLEASE ENTER THE FOLLOWING INFORMATION**

Reviewer:

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:

**RESPONSE**

Project Contact Response:  
**Agree and will incorporate comments**

Comment:



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**PLEASE ENTER THE FOLLOWING INFORMATION**

Reviewer:

Project Number       UIP ECP (If applicable)

Project Phase:

Comment Date:  
**September 3, 2010**

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**COMMENT**

Drawing Reference:  
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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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## PLEASE ENTER THE FOLLOWING INFORMATION

Reviewer:

J. Niehoff

Project Number

10-8-1

UIP ECP (If applicable)

Project Phase:

Comment and Compliance

Comment Date:

September 13, 2010

Print



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## COMMENT

Drawing Reference:

Page 62

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Specification Reference:

PROVIDE SPECIFICATION SECTION AND PARAGRAPH IF APPLICABLE. Example: 02070 1.5.D.2 (Page 02070-2)

Comment:

The minimum design criteria for sprinkler system shall be Ordinary Hazard Group 1.

## RESPONSE

Project Contact Response:

Agree and will incorporate comments

Comment:



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**PLEASE ENTER THE FOLLOWING INFORMATION**

Reviewer:

Project Number       UIP ECP (If applicable)

Project Phase:

Comment Date:  
**September 1, 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:

**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:



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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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      *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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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:



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Reviewer:

Project Number       UIP ECP (If applicable)

Project Phase:

Comment Date:  
**September 10, 2010**



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Comment:

**RESPONSE**

Project Contact Response:  
**Thank You for Reviewing this Project**

Comment:



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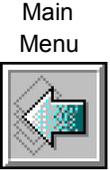
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Project Number       UIP ECP (If applicable)

Project Phase:

Comment Date:  
**September 14, 2010**



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Comment:

**RESPONSE**

Project Contact Response:  
**Thank You for Reviewing this Project**

Comment:



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Project Phase:

Comment Date:  
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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

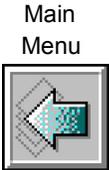
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Project Phase:

Comment Date:  
**September 8, 2010**



**COMMENT**

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Comment:

**RESPONSE**

Project Contact Response:  
**Thank You for Reviewing this Project**

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

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: <b>September 1, 2010</b>
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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: <b>Thank You for Reviewing this Project</b>
Comment: <input type="text"/>



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Project Number       UIP ECP (If applicable)

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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.*



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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.*



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*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

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Reviewer:

Project Number       UIP ECP (If applicable)

Project Phase:

Comment Date:  
**September 3, 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:

**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:



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**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:



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**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:  
      *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:



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**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:

**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:



# 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**

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**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:

**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

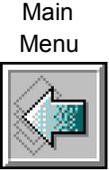
**PLEASE ENTER THE FOLLOWING INFORMATION**

Reviewer:

Project Number       UIP ECP (If applicable)

Project Phase:

Comment Date:  
**September 3, 2010**



**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: <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="Comment and Compliance"/>	

Comment Date: <b>September 13, 2010</b>
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COMMENT	
Drawing Reference: <input type="text" value="Page 62"/>	<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="The minimum design criteria for sprinkler system shall be Ordinary Hazard Group 1."/>	

RESPONSE
Project Contact Response: <b>Agree and will incorporate comments</b>
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 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:

**NFPA 101, Section 38.2.3. requires a minimum of 44-inches width for egress in corridors for Business Occupancies. In addition, cubicle aisle widths should be 36-inches in accordance with Section 7.3.4.1.1 (2).**

**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:

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:

Section 2.1 - 2.1.6.3

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:

Occupancy Separation Requirements, prefer NFPA 101 stricter occupancy separation.

## RESPONSE

Project Contact Response:

**Agree and will incorporate comments**

Comment:

*Will follow through with further Code investigation.*