

2011

Penn State Ice Arena



BIM Execution Plan

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HPR Integrated Design
11/8/2011

BIM PROJECT EXECUTION PLAN
NOVEMBER 2011
FOR
Penn State Ice Arena
DEVELOPED BY
HPR Integrated Design

TABLE OF CONTENTS

SECTION A: BIM PROJECT EXECUTION PLAN OVERVIEW.....	1
SECTION B: PROJECT INFORMATION.....	2
SECTION C: KEY PROJECT CONTACTS	3
SECTION D: PROJECT GOALS / BIM USES	5
SECTION E: ORGANIZATIONAL ROLES / STAFFING	6
SECTION F: BIM PROCESS DESIGN.....	8
SECTION G: BIM INFORMATION EXCHANGES.....	9
SECTION H: BIM AND FACILITY DATA REQUIREMENTS.....	10
SECTION I: COLLABORATION PROCEDURES.....	11
SECTION J: QUALITY CONTROL	15
SECTION K: TECHNOLOGICAL INFRASTRUCTURE NEEDS.....	17
SECTION L: MODEL STRUCTURE.....	18
SECTION M: PROJECT DELIVERABLES.....	20
SECTION N: DELIVERY STRATEGY / CONTRACT.....	21
SECTION O: ATTACHMENTS.....	22



SECTION A: BIM PROJECT EXECUTION PLAN OVERVIEW

HPR Integrated Design has a desire to successfully implement BIM on the upcoming Penn State Ice Arena project. The project team has developed this detailed BIM Project Execution Plan to define BIM uses for this project, along with a detailed design of the process for executing BIM throughout the project lifecycle.

HPR Integrated Design's Mission Statement:

HPR Integrated Design combines innovative, cutting edge concepts with a collaborative multidisciplinary approach through the utilization of state-of-the-art BIM technologies to exceed owner expectations both in system efficiencies and the enrichment of the human experience within its aesthetic.

BIM Team Goals:

- Keep overall design goals and project criteria in mind at all stages
- Maintain overall sustainable design
- Keep value engineering in mind at all design phases
- Actively investigate potential clashes between disciplines
- Actively update and utilize the BIM Ex Plan
- Maintain a code compliant and ethically responsible design

HPR Integrated Design is dedicated to delivering efficient, sustainable, and fully collaborative designs that maximize project value while minimizing extraneous project expenditures through continuous communication within the design team, the owner, and the contractors. By combining BIM with Integrated Project Delivery (IPD), HPR syndicates advanced computer technologies with an efficient delivery method to produce an integrated and constructible design. HPR will strive to work cooperatively with owners and subcontractors alike in an effort to eliminate the adversarial atmosphere associated with the traditional building construction process. The project team aims to deliver a more cost effective design and in a faster constructible time period through 3D Coordination, Design Authoring and Review, Energy and Engineering Analyses, 4D Modeling, and other BIM uses. At project completion, HPR will turn over a Record Model to the owner.

SECTION B: PROJECT INFORMATION

1. **PROJECT OWNER: THE PENNSYLVANIA STATE UNIVERSITY OFFICE OF PHYSICAL PLANT (O.P.P.)**
2. **PROJECT NAME: PENN STATE ICE ARENA**
3. **PROJECT LOCATION: UNIVERSITY DRIVE, UNIVERSITY PARK, PA 16802**
4. **OWNER ADDRESS: 113 PHYSICAL PLANT BUILDING, UNIVERSITY PARK, PA 16802**
5. **CONTRACT TYPE / DELIVERY METHOD: GMP/INTEGRATED PROJECT DELIVERY (IPD) WITH BIM**
6. **BRIEF PROJECT DESCRIPTION:** The project shall be developed as a new two sheet ice hockey arena. One sheet will be used for the new varsity men's and women's hockey programs and one will be used for a smaller community rink. The facility is to be designed strictly for Championship Ice Hockey. The proposed new ice hockey arena will boast a 6,000 seat capacity for the main arena, and an additional 300 seats in the community rink. The proposed total gross area for the entire project is 220,000 square-feet.
7. **ADDITIONAL PROJECT INFORMATION:** This project goal is to achieve LEED Gold certification.
8. **PROJECT NUMBERS:**

PROJECT INFORMATION	NUMBER
CONTRACT NUMBER:	02112-11
TASK ORDER:	778
PROJECT NUMBER:	02-03283.00
NET SQUARE FOOTAGE:	TBD
GROSS SQUARE FOOTAGE:	220,000 SF

9. **PROJECT SCHEDULE / PHASES / MILESTONES:**

PROJECT PHASE / MILESTONE	ESTIMATED START DATE	ESTIMATED COMPLETION DATE	PROJECT STAKEHOLDERS INVOLVED
PRELIMINARY RESEARCH Presentation #1: Research	8/22/2011	9/9/2011	CM, MEP, STRUCT
DESIGN DOCUMENTS Presentation #2: Schematic Design	9/10/2011	10/5/2011	ARCH, CM, MEP, STRUCT
DESIGN DOCUMENTS Presentation #3: Design Development	10/6/2011	11/10/2011	ARCH, CM, MEP, STRUCT
CONSTRUCTION DOCUMENTS Presentation #4: Proposal	11/11/2011	12/7/2011	ARCH, CM, MEP, STRUCT
CONSTRUCTION	SUMMER 2012	SUMMER 2013	CM, MEP, STRUCT

SECTION C: KEY PROJECT CONTACTS

OWNER	The Pennsylvania State University Office of Physical Plant (O.P.P.) 113 Physical Plant Building University Park, PA 16802	
ARCHITECT (Collaborative Effort)	HPR Integrated Design State College, PA 16801	Nico Pugliese Cell: (717) 917-6519 nap5076@psu.edu
CPEP WEBSITE MANAGER (Collaborative Effort)	HPR Integrated Design State College, PA 16801	Jeremy Heilman BIM Ex Plan Manager Cell: (717) 818-7223 jdh5081@psu.edu
CONSTRUCTION MANAGER	HPR Integrated Design State College, PA 16801	Jeremy Heilman BIM Ex Plan Manager Cell: (717) 818-7223 jdh5081@psu.edu
STRUCTURAL ENGINEER	HPR Integrated Design State College, PA 16801	Josh Progar BIM Manager Cell: (717) 802-5665 jpp5085@psu.edu
ELECTRICAL & LIGHTING ENGINEER	HPR Integrated Design State College, PA 16801	Nico Pugliese Cell: (717) 917-6519 nap5076@psu.edu
MECHANICAL ENGINEER	HPR Integrated Design State College, PA 16801	James Rodgers Cell: (484) 948-5267 jsr5085@psu.edu
BIM CONSULTANTS	The Pennsylvania State University Architectural Engineering Dept. University Park, PA 16802	M. Kevin Parfitt mkp@psu.edu
		Robert Holland rjh32@psu.edu
		Ryan Solnosky rls5008@psu.edu
BIM ADVISORS	The Pennsylvania State University Architectural Engineering Dept. University Park, PA 16802	John Messner Construction Management Option jmessner@engr.psu.edu

BIM ADVISORS	The Pennsylvania State University Architectural Engineering Dept. University Park, PA 16802	Andres Lepage Structural Option alepage@engr.psu.edu
		Richard Mistrick Lighting/Electrical Option rmistrick@engr.psu.edu
		Ted Dannerth Lighting/Electrical Option tdannerth@engr.psu.edu
		Moses Ling Mechanical Option mosesling@engr.psu.edu
MECHANICAL CONTRACTOR	TBD	Not in Scope for Thesis Project
ELECTRICAL CONTRACTOR	TBD	Not in Scope for Thesis Project
PLUMBING CONTRACTOR	TBD	Not in Scope for Thesis Project
FIRE PROTECTION CONTRACTOR	TBD	Not in Scope for Thesis Project
SECURITY CONTRACTOR	TBD	Not in Scope for Thesis Project

SECTION D: PROJECT GOALS / BIM USES

1. MAJOR BIM GOALS / OBJECTIVES:

PRIORITY (HIGH/MED/LOW)	GOAL DESCRIPTION	POTENTIAL BIM USES
High	Maximize efficiency of design & coordination process to minimize clashes both in frequency and severity on-site	3D Coordination, Design Authoring, Design Reviews
High	Seamless workflow integration of all disciplines	3D Coordination, 4D Modeling
High	Turnover the project on-time and on/under budget	3D Coordination, 4D Modeling
High	Increase sustainable design practices to ensure a more energy efficient product	Energy Analysis, Sustainability (LEED) Evaluation
Medium	Perform design reviews in a virtual space for a more effective visualization of potential problems in a 3D environment	Design Review
Medium	Achieve desired LEED certification	Sustainability (LEED) Evaluation, Energy Analysis
Medium	Utilize integrated multi-disciplinary software to become proficient with advanced building modeling and model sharing	Design Authoring
Medium	To evaluate constructability and verify the feasibility of an aggressive schedule	4D Modeling, Design Reviews

2. BIM USE ANALYSIS WORKSHEET: SEE ATTACHMENT 1

3. BIM Uses:

X	PLAN	X	DESIGN	X	CONSTRUCT	X	OPERATE
	PROGRAMMING	X	DESIGN AUTHORING		SITE UTILIZATION PLANNING		BUILDING MAINTENANCE SCHEDULING
	SITE ANALYSIS	X	DESIGN REVIEWS		CONSTRUCTION SYSTEM DESIGN		BUILDING SYSTEM ANALYSIS
		X	3D COORDINATION		3D COORDINATION		ASSET MANAGEMENT
		X	STRUCTURAL ANALYSIS		DIGITAL FABRICATION		SPACE MANAGEMENT / TRACKING
		X	LIGHTING ANALYSIS		3D CONTROL AND PLANNING		DISASTER PLANNING
		X	ENERGY ANALYSIS		RECORD MODELING		RECORD MODELING
			OTHER ENG. ANALYSIS	OUT OF SCOPE OF THIS PROJECT			
		X	SUSTAINABILITY (LEED) EVALUATION				
			CODE VALIDATION				
	PHASE PLANNING (4D MODELING)	X	PHASE PLANNING (4D MODELING)		PHASE PLANNING (4D MODELING)		PHASE PLANNING (4D MODELING)
X	COST ESTIMATION	X	COST ESTIMATION		COST ESTIMATION		COST ESTIMATION
X	EXISTING CONDITIONS MODELING	X	EXISTING CONDITIONS MODELING		EXISTING CONDITIONS MODELING		EXISTING CONDITIONS MODELING

SECTION E: ORGANIZATIONAL ROLES / STAFFING

1. BIM ROLES AND RESPONSIBILITIES:

HPR Integrated Design will frequently meet throughout each week to collaborate on the design process and selection of building systems. Some members of the design team have had experience using BIM on past projects. Their experience with BIM should allow the team to be very successful on this project.

Construction Management

- Constructability
- Documentation
- Estimation
- Value Engineering
- Risk Analysis
- 4D Modeling

Structural

- Structural System Design
- Structural Load Calculations
- System Integration
- 3D Coordination
- Value Engineering

Lighting/Electrical

- Daylighting Study
- Lighting System Design
- Electrical Load Calculations
- Electrical System Design
- 3D Coordination
- Value Engineering

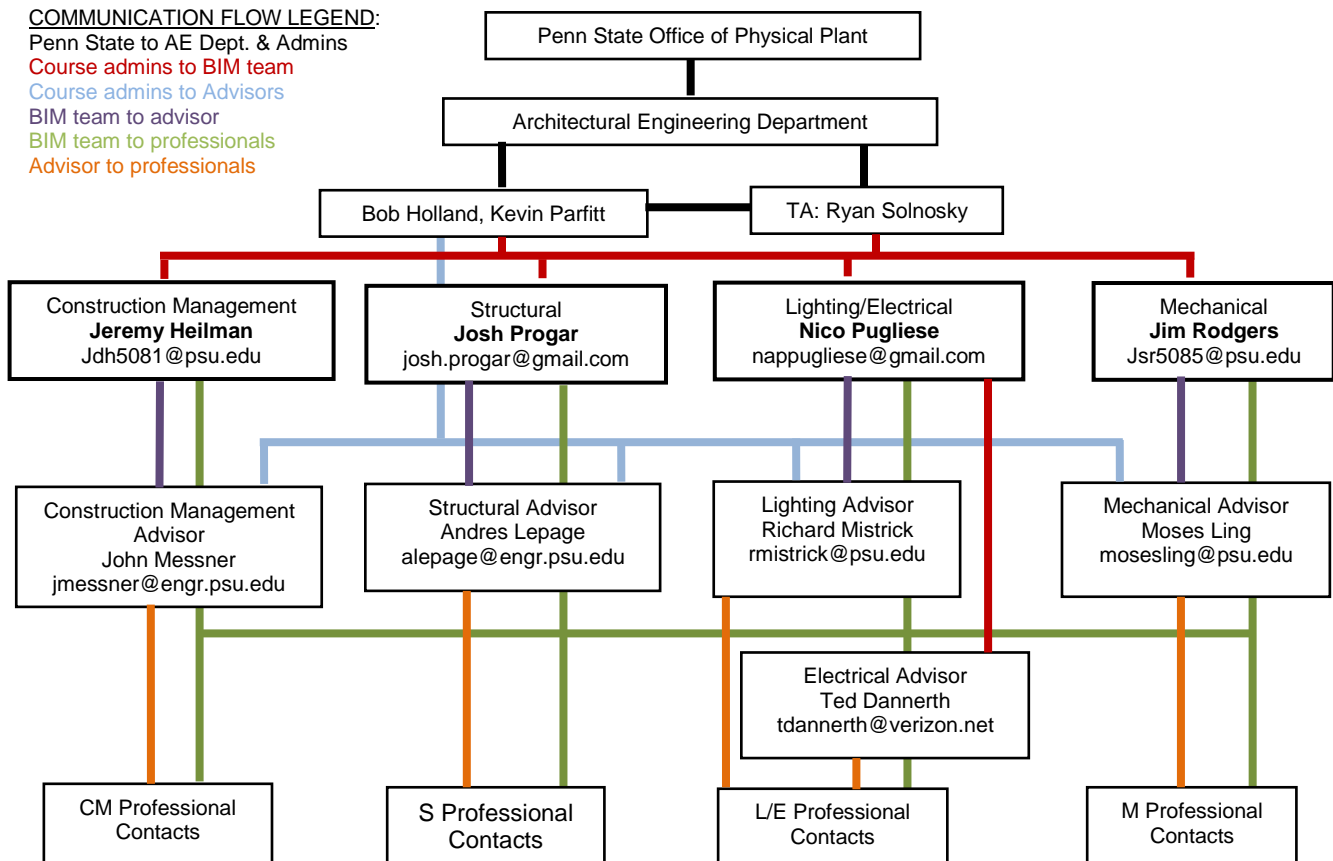
Mechanical

- Heating/Cooling Load Calculations
- Mechanical System Design
- Energy Analysis
- 3D Coordination
- Value Engineering

2. COMMUNICATION FLOW

COMMUNICATION FLOW LEGEND:

- Penn State to AE Dept. & Admins
- Course admins to BIM team
- Course admins to Advisors
- BIM team to advisor
- BIM team to professionals
- Advisor to professionals



3. BIM USE STAFFING:

BIM Use	Role	Staff Size for BIM Use	Estimated Work Hours	Location	Lead Contact
EXISTING CONDITIONS MODELING	HRP Integrated Design	4	1 hr/wk	Thesis Lab	Collaborative
DESIGN AUTHORIZING	Architect	4	1 hr/wk	Thesis Lab	Collaborative
	Construction Manager	1	10 hrs/wk	Thesis Lab	Jeremy Heilman
	Structural Engineer	1	10 hrs/wk	Thesis Lab	Josh Progar
	Lighting/Electrical Engineer	1	10 hrs/wk	Thesis Lab	Nico Pugliese
	Mechanical Engineer	1	10 hrs/wk	Thesis Lab	James Rodgers
DESIGN REVIEW	Structural Engineer	1	1 hr/wk	Thesis Lab	Josh Progar
	MEP Engineers	2	1 hr/wk	Thesis Lab	James Rodgers, Nico Pugliese
	Construction Manager	1	1 hr/wk	Thesis Lab	Jeremy Heilman
STRUCTURAL ANALYSIS	Structural Engineer	1	20 hrs/wk	Thesis Lab	Josh Progar
LIGHTING ANALYSIS	Lighting Engineer	1	10 hrs/wk	Thesis Lab	Nico Pugliese
ENERGY ANALYSIS	Mechanical Engineer	1	10 hrs/wk	Thesis Lab	James Rodgers
	Lighting/Electrical Engineer	1	10 hrs/wk	Thesis Lab	Nico Pugliese
SUSTAINABILITY (LEED) ANALYSIS	MEP Engineers	2	1 hr/wk	Thesis Lab	James Rodger, Nico Pugliese
	Construction Manager	1	3 hrs/wk	Thesis Lab	Jeremy Heilman
3D COORDINATION	Structural Engineer	1	5 hrs/wk	Thesis Lab	Josh Progar
	MEP Engineers	2	5 hrs/wk	Thesis Lab	James Rodgers, Nico Pugliese
	Construction Manager	1	10 hrs/wk	Thesis Lab	Jeremy Heilman
COST ESTIMATION	Construction Manager	1	5 hrs/wk	Thesis Lab	Jeremy Heilman
4D MODELING	Construction Manager	1	3 hrs/wk	Thesis Lab	Jeremy Heilman

SECTION F: BIM PROCESS DESIGN

1. LEVEL ONE PROCESS OVERVIEW MAP: SEE ATTACHMENT 2

2. LIST OF LEVEL TWO – DETAILED BIM USE PROCESS MAPS: SEE ATTACHMENT 3

See attachment for the following BIM use example process maps for Thesis Project.

- a. Existing Conditions Modeling
- b. Design Authoring
- c. Design Review
- d. Structural Analysis
- e. Lighting Analysis
- f. Energy Analysis
- g. Sustainability (LEED) Analysis
- h. 3D Coordination
- i. Cost Estimation
- j. 4D Modeling
- k. Record Modeling

SECTION G: BIM INFORMATION EXCHANGES

Attached is the information exchange worksheet showing the author and receiver of each information exchange transaction in order to clearly understand the information content. The model definition worksheet shows the different responsible parties for the same task but at different phases of the project.

1. LIST OF INFORMATION EXCHANGE WORKSHEETS: SEE ATTACHMENT 4

The following are four examples of Information Exchanges.

- a. Design Authoring
- b. 3D Coordination
- c. 4D Modeling
- d. Record Modeling

2. MODEL DEFINITION WORKSHEET: SEE ATTACHMENT 5

SECTION H: BIM AND FACILITY DATA REQUIREMENTS

This thesis project is not required to provide a Record Model, however the Owner typically requires one to be provided at the completion of the construction process.

Included in the Record Model (Revit Design Base Model):

- Steel Coordination Drawings
- MEP Coordination Drawings
- Pneumatic Tube Coordination Drawings
- Fire Protection Coordination Drawings
- Shop Drawing Information
- Construction Virtual Mock-Up Drawings
- O&M Information

1. BIM & FACILITY DATA REQUIREMENTS WORKSHEET: SEE ATTACHMENT 6

SECTION I: COLLABORATION PROCEDURES

1. COLLABORATION STRATEGY:

The key to successful collaboration is constant communication and an open mind. HPR's commitment to BIM means valuing other team members input and knowledge as well as taking advantage of face to face interaction to ensure high quality results.

Meetings will be the preferred method of communication with phone calls, emails, list serves, and text messaging being secondary methods. Hours of communication by phone will be between **8am and 11pm** unless prior plans have been made; otherwise team members will not make major design revisions outside of this time period without prior consent from the rest of the team. Note that all other forms of communication (i.e. text messaging or emails) are acceptable but will not result in communication in a timely manner.

2. MEETING PROCEDURES:

Agenda

General team meetings will be held each Monday and Wednesday starting at 5:30pm after thesis. If class is not scheduled, the team will meet beginning at 3:30pm. Other meetings will be scheduled as needed.

At these meetings, the team will go over the weekly meeting minutes and develop a look ahead schedule for the next week. Meeting minutes will be emailed to advisors and teammates weekly to track design issues and important dates.

Locations

The location of meetings will be located in the following spaces unless by appointment in a designated location:

- Sackett Building: Senior Thesis BIM Computer Lab
- Sackett Building: Room 307
- Engineering Unit C: ICON lab

Scheduling conflicts

At the end of each meeting the group will confirm when and where the next meeting will take place. If conflicts arise later and group members would like to change a meeting time or will not be attending the next meeting they will notify the group by email. Scheduling conflicts will also be noted in the weekly meeting minutes as its own separate item. **Team members are to notify the team of leaving town two (2) weeks prior to departure.**

MEETING TYPE	PROJECT STAGE	FREQUENCY	PARTICIPANTS	LOCATION
BIM EXECUTION PLAN	Programming	1 time/wk	All	Thesis Lab
DESIGN COORDINATION	Design	1-3 times/wk	All	Thesis Lab
GENERAL TEAM MEETINGS	Varies	1 time/wk	All	Thesis Lab
ENERGY ANALYSIS	Design	As Needed	As Needed	Thesis Lab
COST ANALYSIS	Design	As Needed	As Needed	Thesis Lab
3D MEP COORDINATION	Design	As Needed	As Needed	Thesis Lab
CONFLICT RESOLUTION	Varies	By Appointment	Varies	Thesis Lab
PRESENTATION ASSEMBLY	Design	As Needed	Varies	Thesis Lab
PRESENTATIONS	Design	As Scheduled	All	162 Willard Bldg or 3 rd Floor Eng Unit B

MEETING DAY	TIME	COMMENTS
Monday	6:00p-10:00p	design & coordination meeting
Tuesday	6:00-10:00p	meeting as needed or by appointment
Wednesday	5:30-7:30p	preferred; weekly general team meeting (meeting minutes)
Thursday	6:00-10:00p	meeting as needed or by appointment
Friday	5:30-7:30p	design & coordination meeting
Saturday	by appointment	meeting as needed or by appointment
Sunday	by appointment	meeting as needed or by appointment

3. INFORMATION EXCHANGES

Two Architectural Engineering secure network mapped drives that allows only HPR Integrated Design and faculty members to access.

- <\\aeweb.coeaccess.psu.edu\BIMTeam22011>
- <\\aey.coeaccess.psu.edu\HPR%20Integrated%20Design>

Architectural Engineering Senior Thesis E-Studio Website:

<http://www.engr.psu.edu/ae/thesis/BIMTeam22011/CPEP%20Website/website%20folder/default.htm>

This website will store all important design work for submission. These documents include:

Meeting Minutes - to increase communication at meetings when not everyone can be in attendance
 BIM Execution Guide - for reference to all processes established at the beginning of the design stage.

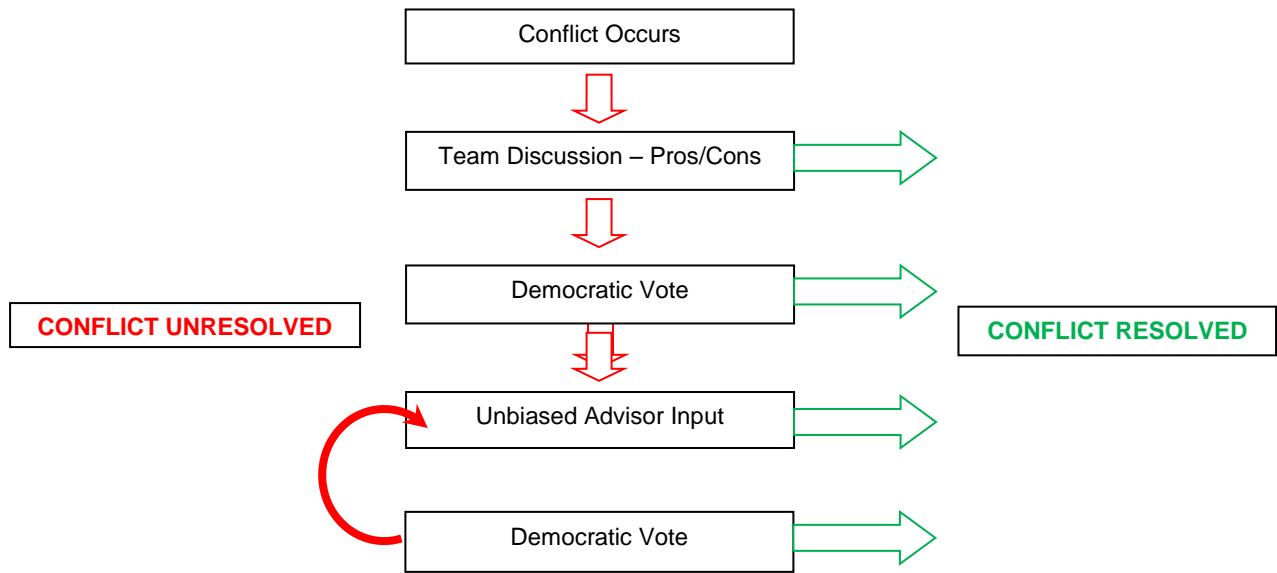
Email – Time sensitive information will be distributed via email. List serves have been created for our group.

4. CONFLICT RESOLUTION:

The procedure for resolving design conflicts will be first a group discussion of pros and cons. Each member of the design team will present their pros and cons that they see with an issue with more value being placed on points of sustainability & system efficiencies over aesthetics.

If the conflict cannot be resolving through discussion the design team will put the issue to a democratic vote. In the event of a tie we will present the issue to our unbiased advisors for input. At this time we will re-vote as a team with the design professionals input being closely considered. This will be a cyclic process until an issue is deemed resolved by the entire project team.

Resolution Flow Chart



5. MODEL DELIVERY SCHEDULE OF INFORMATION EXCHANGE FOR SUBMISSION AND APPROVAL:

INFORMATION EXCHANGE	FILE SENDER	FILE RECEIVER	FREQUENCY	DUE DATE	MODEL SOFTWARE	NATIVE FILE TYPE	FILE EXCHANGE TYPE
BIM EXECUTION PLAN	ALL	ALL	Weekly		Microsoft Word 2010	.doc	.pdf
MEP COORDINATION MODEL	MEP	ARCH, CM	Weekly	4/26/12	Revit	.rvt	
ENERGY ANALYSIS REPORTS	MEP	ARCH, MEP	Bi-monthly	4/12/12 4/26/12	Ecotect	.eco	
STRUCTURAL ANALYSIS REPORTS	STRUCT	CM	Weekly	4/26/12	RAM, SAP, STAAD,RISA	.adp .std	
COST ESTIMATES	CM	ALL	Weekly		Microsoft Excel 2010	.exl	
SITE LAYOUT	LAND ARCH	CM	As needed	3/3/12 4/26/12	AutoCad	.rvt	.dwg
SITE ANALYSIS GEOTECH REPORT	STRUCT	CM		10/5/11	Microsoft Word 2010	.doc	.pdf
EQUIP SPACE REQUIREMENTS	MEP	ARCH		2/8/11			

6. ELECTRONIC COMMUNICATION PROCEDURES:

FILE LOCATION	FILE STRUCTURE / NAME	FILE TYPE	PASSWORD PROTECT	FILE MAINTAINER	UPDATED
\\aeweb.coeaccess.psu.edu\BIMTeam22011	BIMTeam22011	FOLDER	YES	HPR Integrated Design	DAILY
	ARCHITECTURE	FOLDER	NO	Nico Pugliese	
	Master_Architecture_Central_New.rvt	.RVT			DAILY
	MECHANICAL	FOLDER	NO	James Rodgers	
	Mechanical_Central_New.rvt	.RVT			DAILY
	STRUCTURAL	FOLDER	NO	Josh Progar	
	Structural_Central_New.rvt	.RVT			DAILY
	LIGHTING_ELECTRICAL	FOLDER	NO	Nico Pugliese	
	Lighting_Electrical_Central.rvt	.RVT			DAILY
	ICE_ARENA	FOLDER	NO	James Rodgers	
	Aux_Ice.rvt	.RVT			DAILY
	Main_Ice.rvt	.RVT			DAILY
	CONSTRUCTION_MANAGEMENT	FOLDER	NO	Jeremy Heilman	
	Construction_Management_Central.rvt	.RVT			DAILY

SECTION J: QUALITY CONTROL

1. OVERALL STRATEGY FOR QUALITY CONTROL:

Team members from each discipline are responsible for ensuring that their individual designs not only conform to the overall design intent, but also coordinate with the design input from other members. HPR will maintain an active awareness of model accuracy, clash avoidances, and overall model soundness. In addition, HPR will follow AIA Document E202 – 2008, Building Information Modeling Protocol Exhibit, for maintaining quality control. The following items have been chosen the following items for issuing responsibilities:

2.4.2 INITIAL RESPONSIBILITIES: The party responsible for managing the Model shall facilitate the establishment of protocols for the following:

- a. Model origin, coordinate system, and units
- b. File storage location(s)
- c. Processes for transferring and accessing Model files
- d. Clash detection
- e. Access rights
- f. Other protocols may be added

2.4.3 ONGOING RESPONSIBILITIES: The party responsible for managing the Model shall have the following ongoing responsibilities:

- a. Collect incoming Models:
 - i. Coordinate submission and exchange of Models
 - ii. Log incoming Models
 - iii. Validate that files are complete and usable and in compliance with applicable protocols
 - iv. Maintain record copy of each file received
- b. Aggregate Model files and make available for viewing
- c. Perform clash detection in accordance with established protocols and issue periodic clash detection reports
- d. Maintain Model archives and backups
- e. Manage access rights
- f. Follow protocols established in Section 2.4.2

Note: The team is responsible for managing and establishing protocols. Each individual discipline is responsible for maintaining their particular files. The construction manager will manage the model as a whole performing clash detection and ensure the models are complete.

2. QUALITY CONTROL CHECKS:

The following checks should be performed to assure quality.

CHECKS	DEFINITION	RESPONSIBLE PARTY	SOFTWARE PROGRAM(S)	FREQUENCY
VISUAL CHECK	Ensure there are no unintended and unsupported model components, and that the design intent has been followed by all disciplines	ALL	REVIT, NAVISWORKS	DAILY
INTERFERENCE CHECK	Detect problems in the model where two building components are clashing including soft and hard	CM	Navisworks	DAILY
MODEL INTEGRITY CHECKS	Confirm that overlaying files reference the same base point and that the latest versions of each layer are being used prior to authoring new content	ALL	REVIT, NAVISWORKS	DAILY

3. LEVEL OF DEVELOPMENT:

PHASE	DISCIPLINE	LEVEL
SCHEMATIC DESIGN	ARCH, MEP, STRUCT	LOD 100
DESIGN DEVELOPMENT	STRUCT, MEP, CM	LOD 200
CONSTRUCTION DOCUMENTS	STRUCT, MEP, CM	LOD 300

SECTION K: TECHNOLOGICAL INFRASTRUCTURE NEEDS**1. SOFTWARE:**

BIM USE	DISCIPLINE	SOFTWARE	VERSION
DESIGN AUTHORING	ARCH	Revit	2012
DESIGN RENDERING	ARCH, L/E	3D Studio Max	2012
COST ESTIMATION	CM	RS Means CostWorks	2012
3D COORDINATION	MEP, CM	Revit, Navisworks	2012
STRUCTURAL AUTHORING	STRUCT	Revit Structure	2012
STRUCTURAL ANALYSIS	STRUCT	RAM	v14.03
MECHANICAL AUTHORING	ME	Revit MEP	2012
MECHANICAL CALCULATIONS	ME	Trane Trace	v700
LIGHTING/ELECTRICAL AUTHORING	L/E	Revit MEP	2012
LIGHTING DAYLIGHTING	L/E	Ecotect Analysis	2012
LIGHTING DAYLIGHTING	L/E	Agi32	Version 2.2
L/E CALULATIONS	L/E	Agi32	Version 2.2
PROJECT SCHEDULING	CM	Primavera	P6
4D MODELING	CM	Navisworks	2012
CLASH DETECTION	CM	Navisworks	2012
RECORD MODELING	CM	Revit	2012

2. COMPUTERS / HARDWARE:

BIM USE	HARDWARE	OWNER OF HARDWARE	SPECIFICATIONS
DESIGN AUTHORING	Alienware Aurora	AE Department 332 Sackett	Intel Core i7 CPU 2.67 GHz, 24.00 GB RAM Nvidia GTX 260 Graphics Card Broadcom Netlink Gigabit Ethernet Network Card Dual Dell P190S Digital Monitors Windows 7 Professional 64-bit Operating System Samsung HD 103SJ 829 GB Hard Disk
DESIGN AUTHORING	DELL	AE Department 332 Sackett	
DESIGN ENGINEERING/CM	DELL OPTIPLEX 980	AE Department 308 Sackett	Intel Core i7 2.79GHz, Windows 7 64 BIT 8.00GB RAM ATI Radeon HD 4550 Graphics Card 82578DM Gigabit Network Card Dual 17" Monitors
DESIGN ENGINEERING/CM	DELL OPTIPLEX 960	AE Department 307 Sackett	Intel Core 2 Duo 3.17GHz, Windows 7 64 BIT 8.00GB RAM ATI Radeon HD 3450 Graphics Card 82567LM Gigabit Network Card Dual 17" Monitors

SECTION L: MODEL STRUCTURE

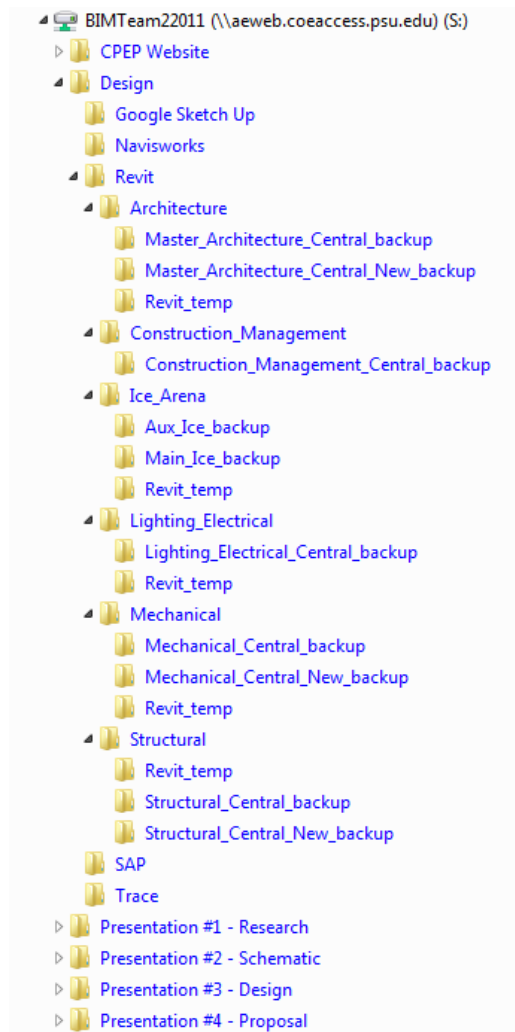
1. FILE NAMING STRUCTURE:

The project number Alexander has assigned this project is 511805. It has not yet been determined as to how each model file will be labeled. Below is a suggested model file name for each discipline.

FILE NAMES FOR MODELS SHOULD BE FORMATTED AS: DISCIPLINE-PHASE-DATE.XYZ	
ARCHITECTURAL MODEL	ARCH-SCHEMATIC-DATE.RVT
MECHANICAL/PLUMBING MODEL	MECH-SCHEMATIC-DATE.RVT
LIGHTING MODEL	ELEC-SCHEMATIC-DATE.RVT
ELECTRICAL MODEL	LTG-SCHEMATIC-DATE.RVT
STRUCTURAL MODEL	STRUCT-SCHEMATIC-DATE.RVT
ENERGY MODEL	ENERGY-SCHEMATIC-DATE.RVT
CONSTRUCTION MODEL	CONST-SCHEMATIC-DATE.RVT
COORDINATION MODEL	COORD-SCHEMATIC-DATE.RVT

2. MODEL STRUCTURE:

The model is broken up by discipline. See break down of BIMTeam22011 folder below.



3. MEASUREMENT AND COORDINATE SYSTEMS:

The measurement system for this project uses the Architecture system (feet and inches). The coordinates used for point of origin for all models are Latitude 40.0871022033691 and Longitude 77.8566970825195.

SECTION M: PROJECT DELIVERABLES

BIM SUBMITTAL ITEM	STAGE	APPROX. DUE DATE	FORMAT	NOTES
Presentation #1: Research Presentation	Preliminary Planning & Research	9/7/2011	.ppt	Team Charter/Organization, Design Criteria, Team/Individual Work Flow, BIM/IPD for Sustainability, Documentation of BIM Ex Plan
Presentation #2: Schematic Design	Schematic Design	10/5/2011	.ppt	Site investigation, utility tie in points, constructability input, proposed project delivery strategy, update of BIM Ex Plan, ROM Cost estimate, VE, Preliminary Schedule, geotechnical report, structural systems options, utility availability and capacity, mechanical systems options, mechanical equip space requirements, L/E system-daylighting options
Presentation #3: Design Development	Design Development	11/10/2011	.ppt	Design development building and site design, sustainability strategies, code analysis, preliminary BIM model, SF estimate, construction-site logistics, VE, Delivery strategy, sustainability strategies, update of BIM ex plan, Structural system selection, preliminary structural sys des, Mechanical sys. Selection, preliminary mechanical sys design, space requirements, Electrical sys. Selection, preliminary electrical sys design, sustainability strategies, day lighting strategies, preliminary site lighting
Presentation #4: Proposal	Proposal	12/9/2011	.ppt	Structural sys est., final design est., 4D schedule, MEP clash detection, sys integration, site logistics plans, final BIM ex plan, LEED cert. analysis, Final Structural System design, sys integration, Final mechanical design plans, detail layout of mechanical space, sys integration, energy model, Final Elec. Design, detail lighting. Design, system integration, final site logistics plan,
Report: Proposal	Proposal	12/13/2011	.pdf	Defines problems, goals, and solutions based on collaborative effort between each of the four options. Includes for projected team schedule for reaching milestones for spring 2012 semester.

SECTION N: DELIVERY STRATEGY / CONTRACT

1. DELIVERY AND CONTRACTING STRATEGY FOR THE PROJECT:

Delivery and Contracting is not part of the scope for the thesis project.

2. TEAM SELECTION PROCEDURE:

HPR Integrated Design has been selected as the architect, MEP and structural designers, and the construction management team for this project. Bidding out the construction is not part of the scope for the thesis project; however, the owner requires that all subcontracted work be bid out.

3. BIM CONTRACTING PROCEDURE:

HPR does not hold a contract with the owner as this is not part of the thesis project.

SECTION O: ATTACHMENTS

1. BIM Use SELECTION WORKSHEET [FROM SECTION D]	23
2. LEVEL 1 PROCESS OVERVIEW MAP [FROM SECTION F].....	24
3. LEVEL 2 DETAILED BIM Use PROCESS MAPS [FROM SECTION F].....	25
4. INFORMATION EXCHANGE REQUIREMENT WORKSHEETS [FROM SECTION G].....	36
5. MODEL DEFINITION WORKSHEET [FROM SECTION G]	38
6. BIM & FACILITY DATA REQUIREMENTS WORKSHEET [FROM SECTION H]	40

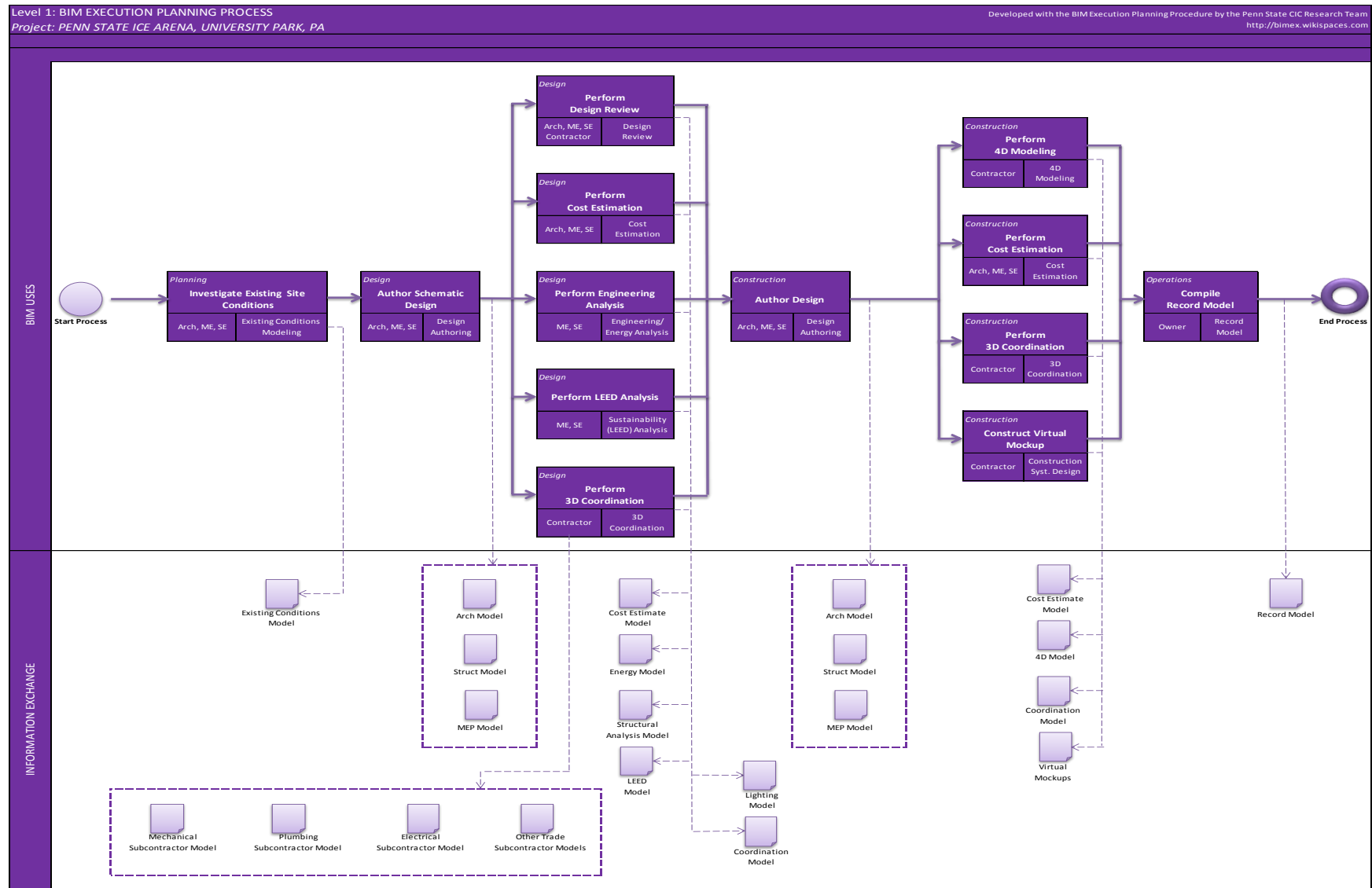


ATTACHMENT 1: BIM USE SELECTION WORKSHEET [FROM SECTION D]

BIM Use	Value to Project	Responsible Party	Value to Resp Party	Capability Rating			Additional Resources / Competencies Required to Implement	Notes	Proceed with Use
				Resources	Competency	Experience			
				Scale 1-3					
				High / Med / Low	Resources	Competency	Experience	YES / NO / MAYBE	
Record Modeling	HIGH	Contractor	MED	2	2	2	Capable of 3D model manipulation and making changes to contract model		YES
		Facility Manager	HIGH	1	2	1			
		Designer	LOW	0	0	0			
Cost Estimation	MED	Contractor	HIGH	2	1	1	3D model estimating software, integration of in-house data base		YES
4D Modeling	HIGH	Contractor	HIGH	3	2	2	Need training on latest 4D modeling software, scheduling software, clash detection	High value to owner due to phasing complications, use for phasing & construction	YES
		MEP Engineers	MED	2	2	2			
		Structural Engineer	MED	2	2	2			
3D Coordination	HIGH	Architect	MED	3	3	3	Coordination software required	Contractor to facilitate coordination Modeling learning curve possible	YES
		MEP Engineer	MED	3	2	2			
		Structural Engineer	MED	3	2	2			
		Contractor	HIGH	3	3	3			
		Subcontractors	HIGH	1	3	3	Conversion to Digital Fab required		
Design Reviews	HIGH	Architect	HIGH	3	3	3	3D Model manipulation	Reviews to be from design model, no additional detail required	YES
Design Authoring	HIGH	Architect	HIGH	3	3	3	3D modeling software	Develop 3D model, potential to represent value engineering in early design	YES
	MEP Engineer	HIGH	3	3	3				
	Structural Engineer	HIGH	3	3	3				
Existing Conditions Modeling	MED	Architect	HIGH	2	2	1	Requires laser survey experience and software	Develop existing conditions model from photos taken and laser surveying	YES
		Structural Engineer	HIGH	2	3	3			
		MEP Engineer	MED	2	2	2			
Structural Analysis	HIGH	Structural Engineer	HIGH	3	3	3	Structure load calculation software	Determine value engineering alternative strength & support materials	YES
		Contractor	MED	2	1	1			
Lighting Analysis	HIGH	Lighting Engineer	HIGH	3	3	3	Determine daylighting needs		YES
Energy Analysis	HIGH	MEP Engineers	HIGH	3	3	3	Minimize heat gain for hockey arena		YES
Sustainability (LEED) Analysis	MED	MEP Engineers	HIGH	3	2	2	LEED analysis software		YES
		Contractor	HIGH	2	1	1			

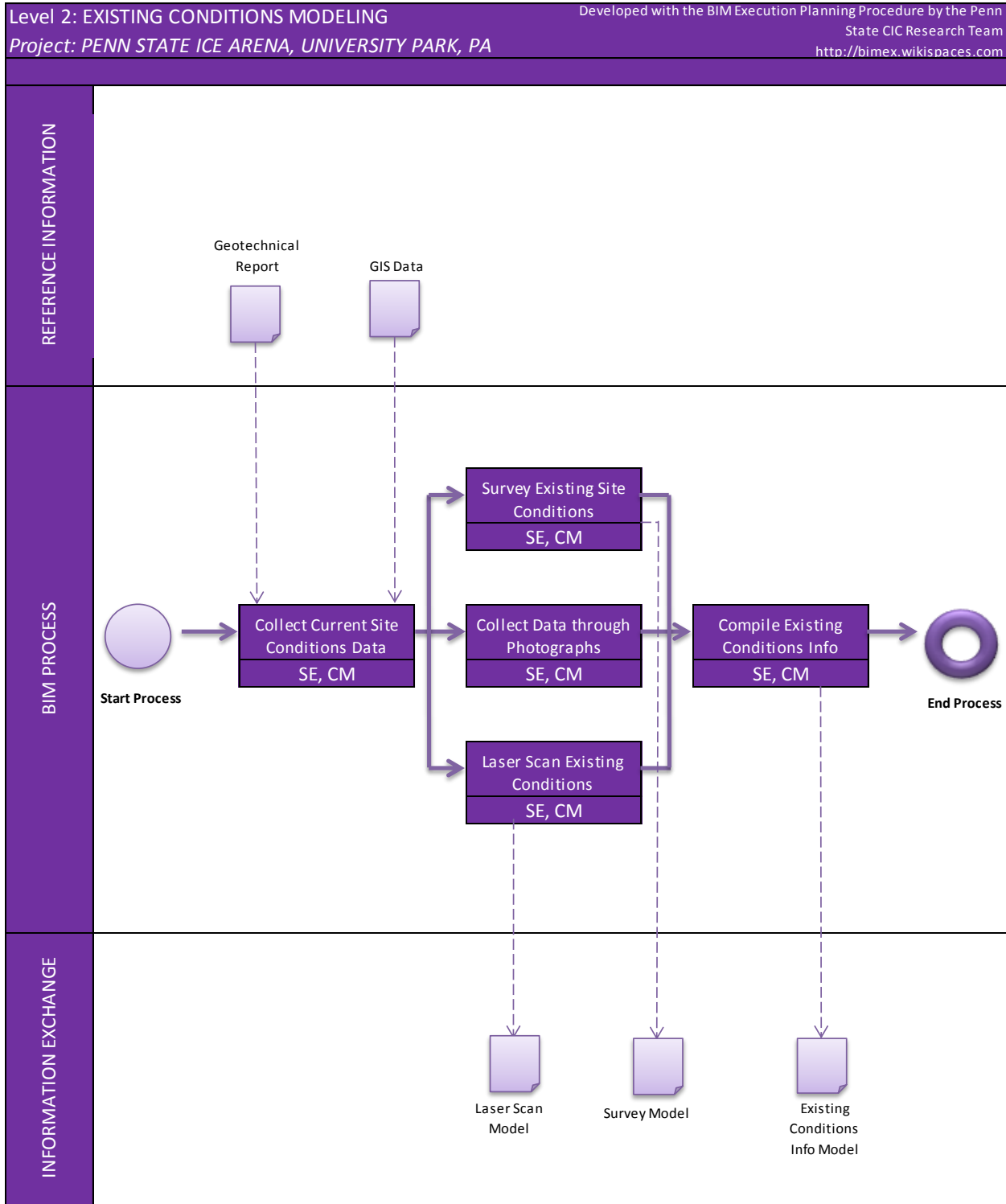


ATTACHMENT 2: LEVEL 1 PROCESS OVERVIEW MAP [FROM SECTION F]

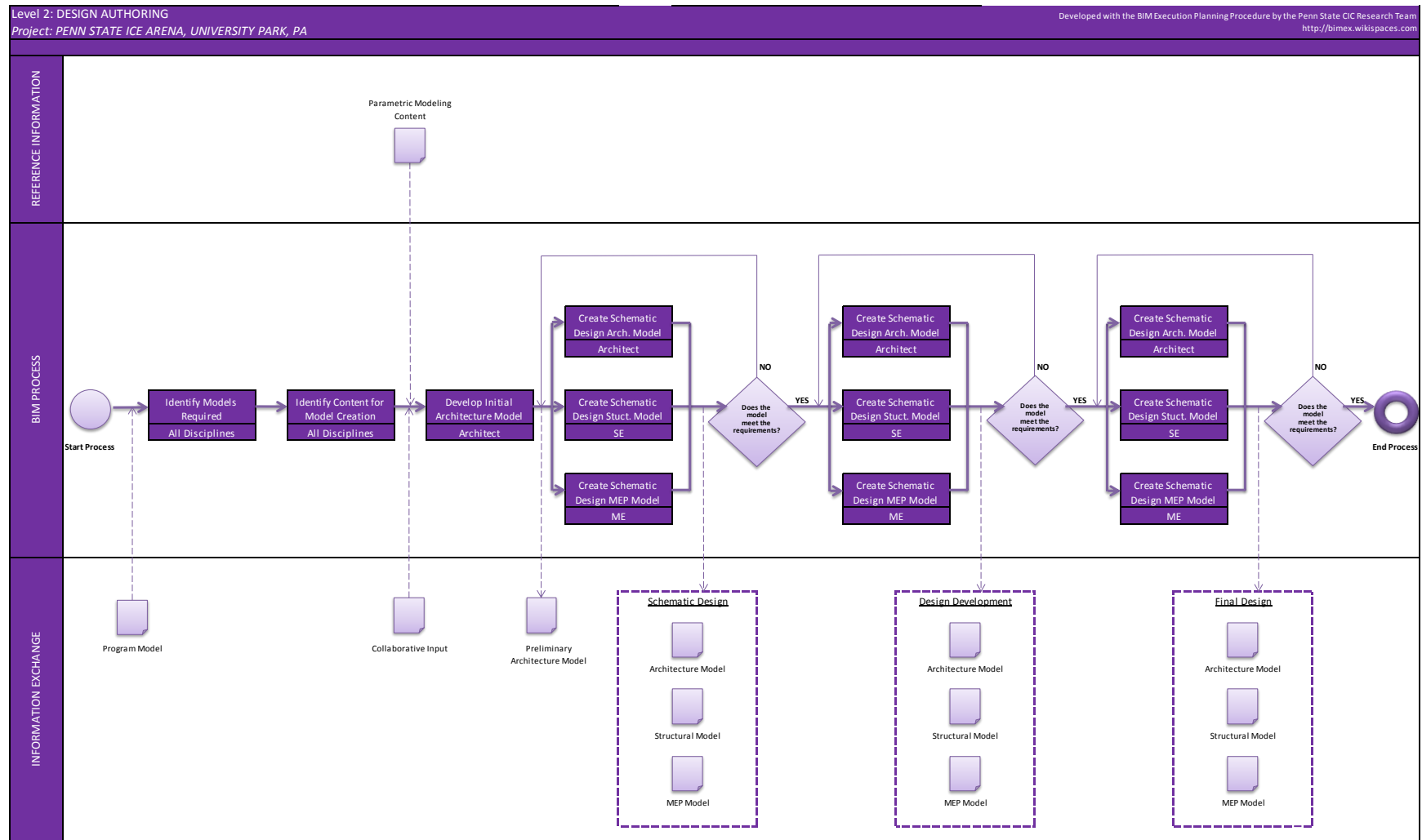


ATTACHMENT 3: LEVEL 2 DETAILED BIM USE PROCESS MAPS [FROM SECTION F]

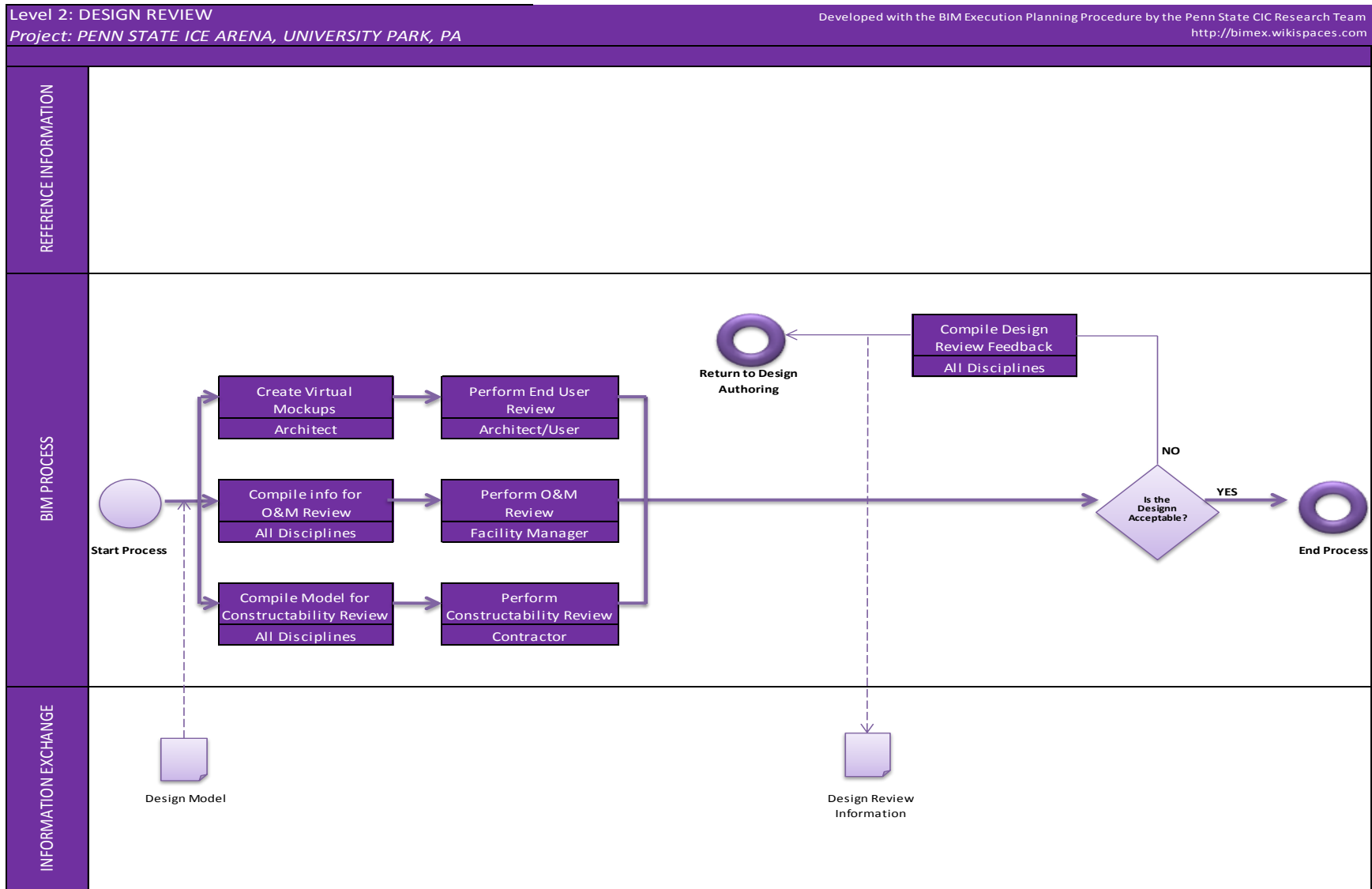
A. EXISTING CONDITIONS MODELING



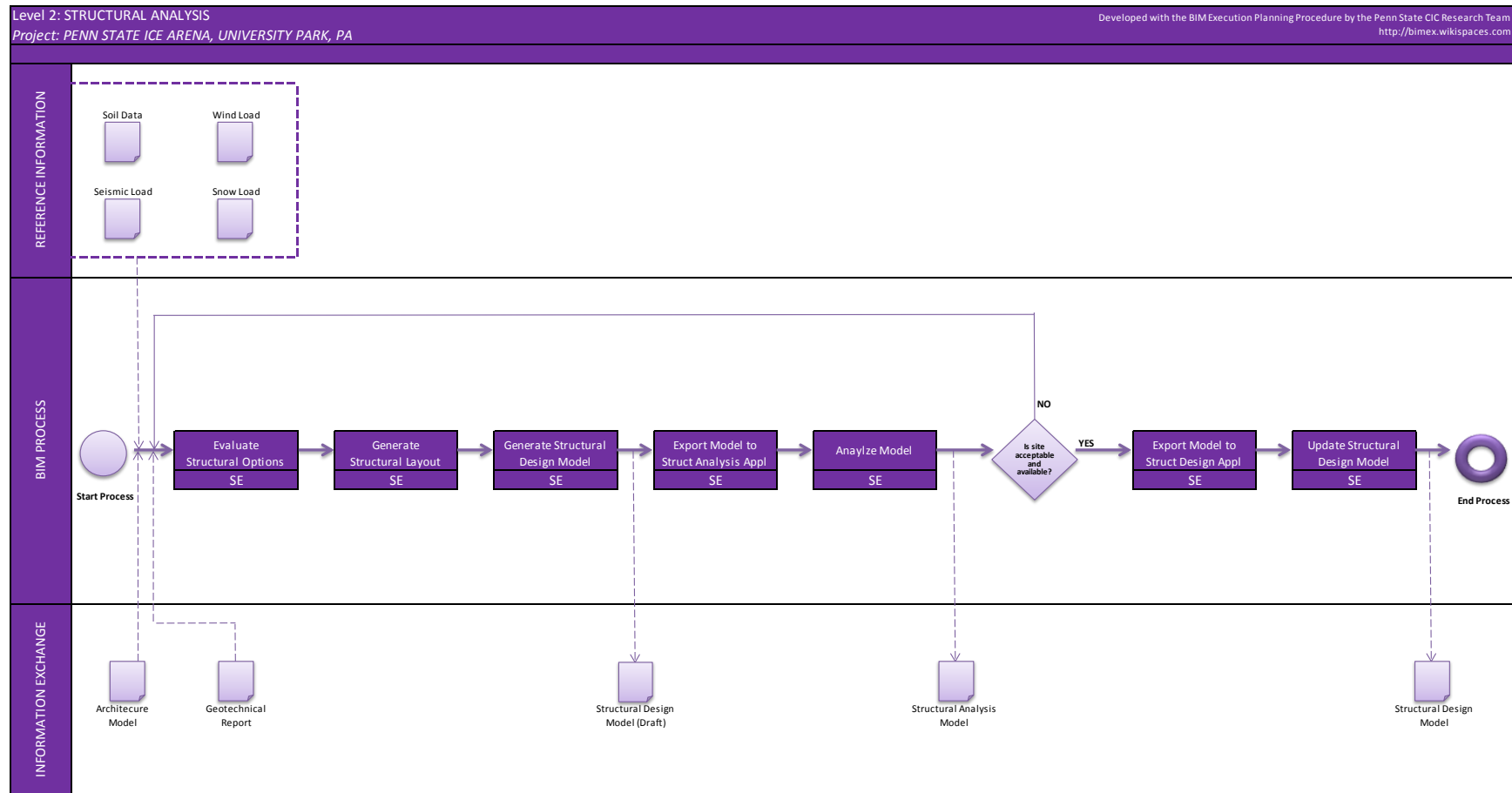
B. DESIGN AUTHORIZING PROCESS MAP



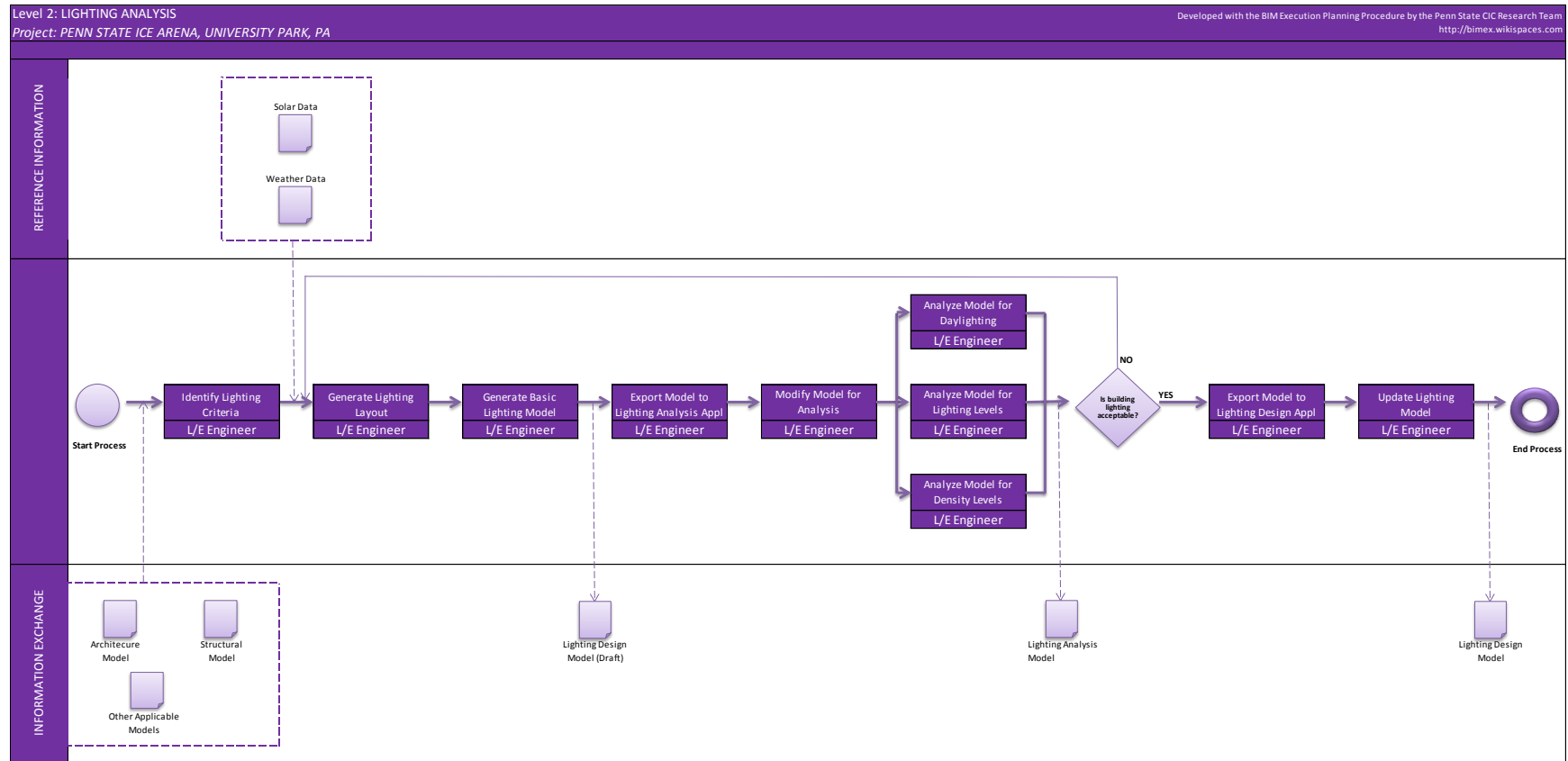
C. DESIGN REVIEW PROCESS MAP



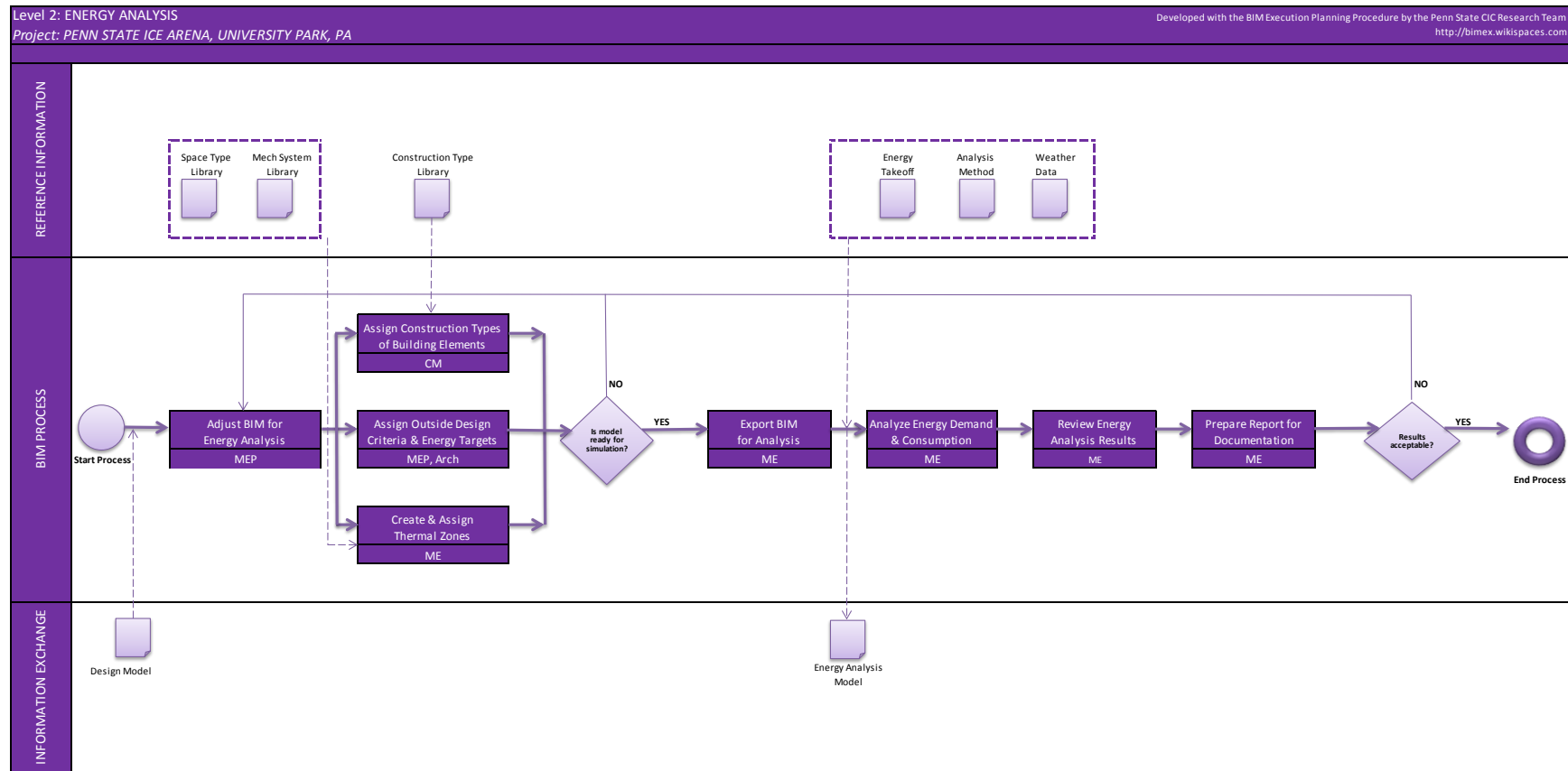
D. STRUCTURAL ANALYSIS PROCESS MAP



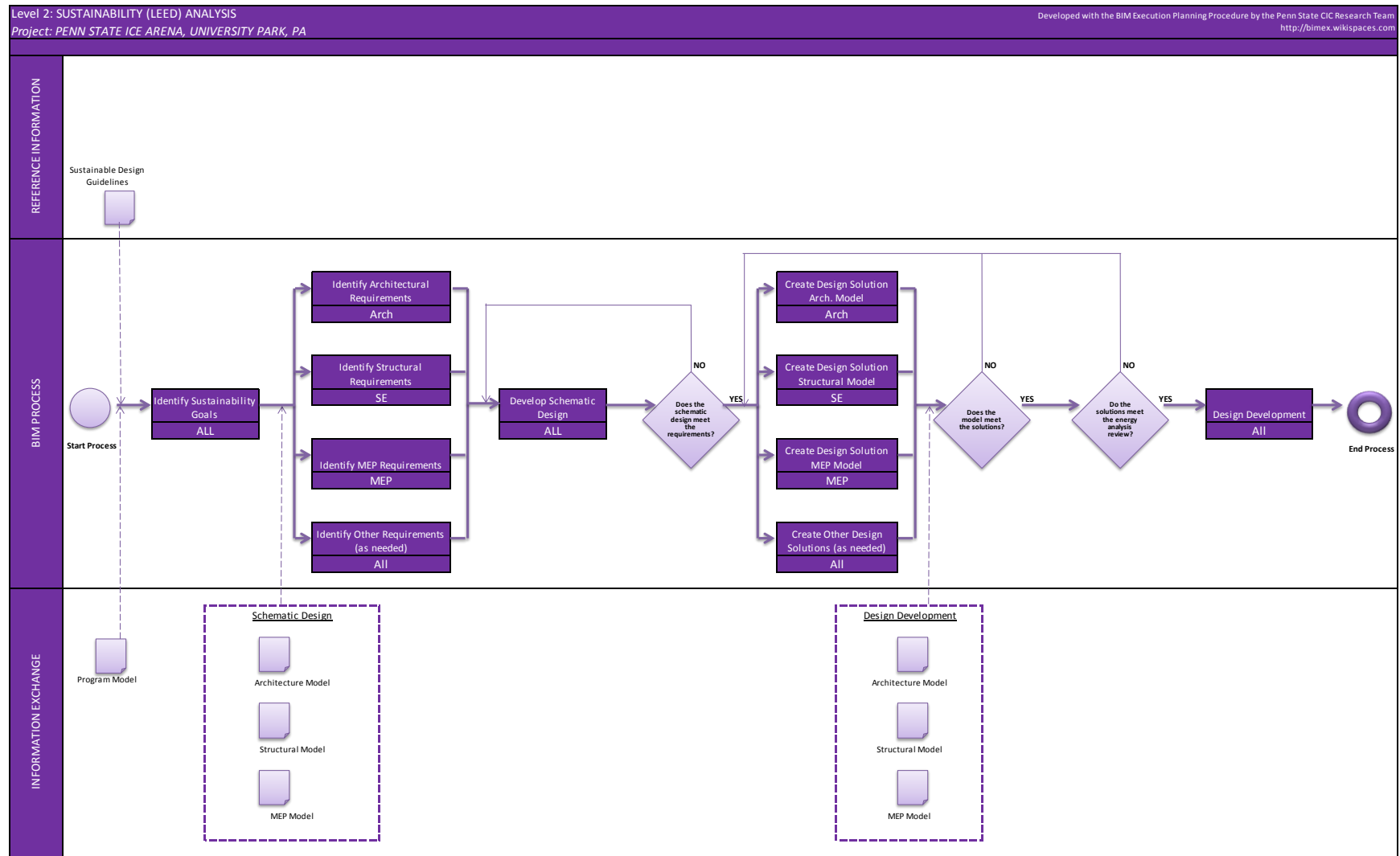
E. LIGHTING ANALYSIS PROCESS MAP



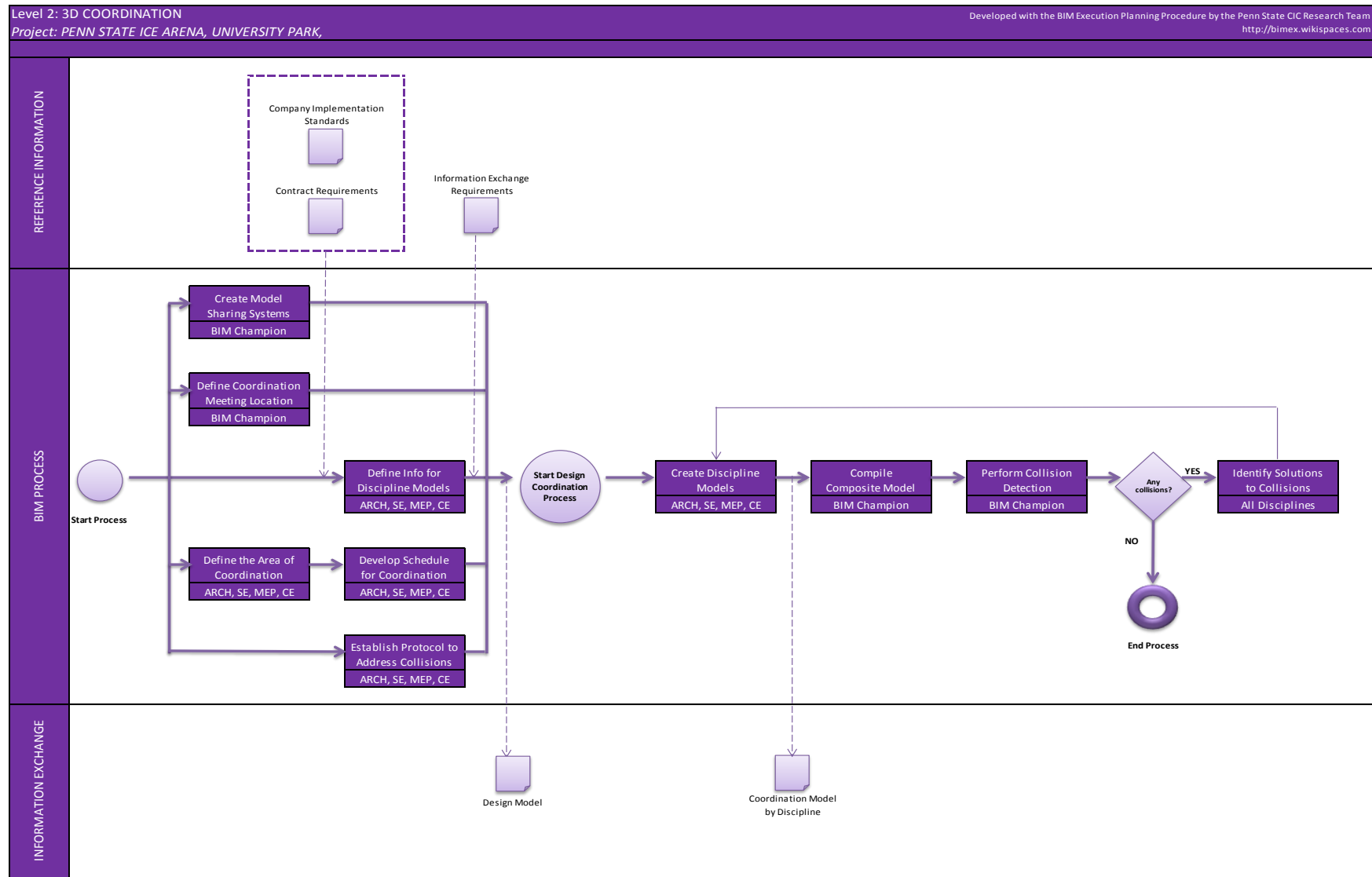
F. ENERGY ANALYSIS PROCESS MAP



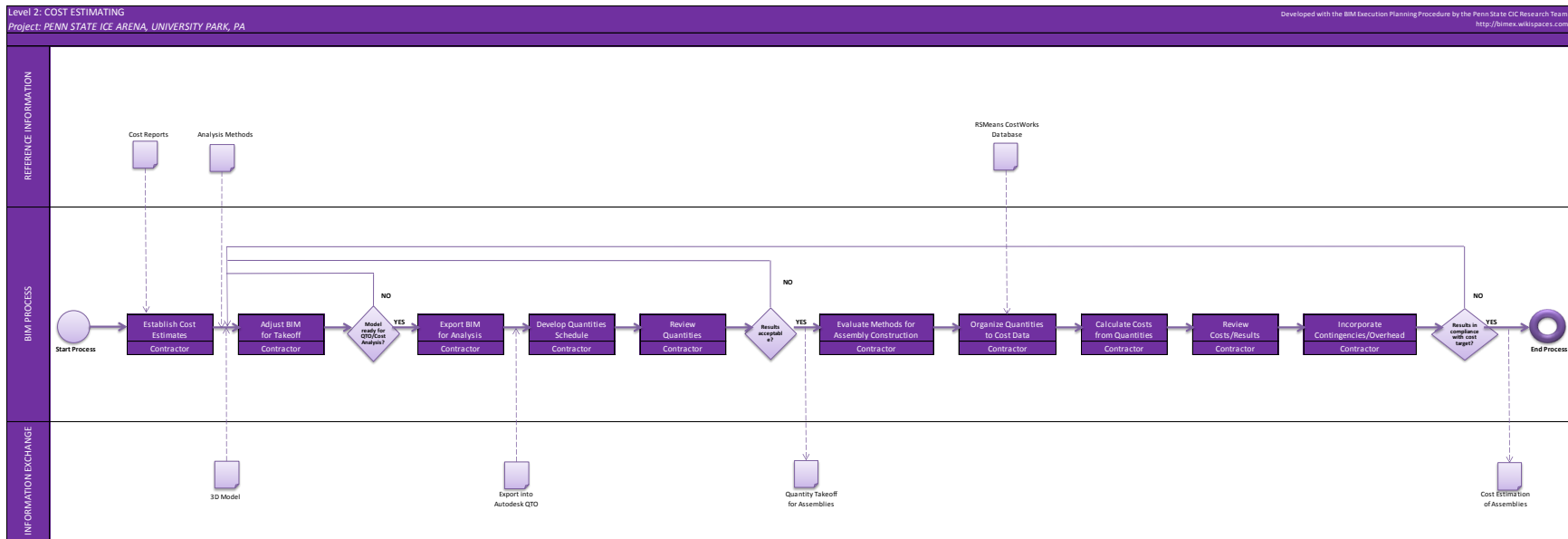
G. SUSTAINABILITY (LEED) ANALYSIS



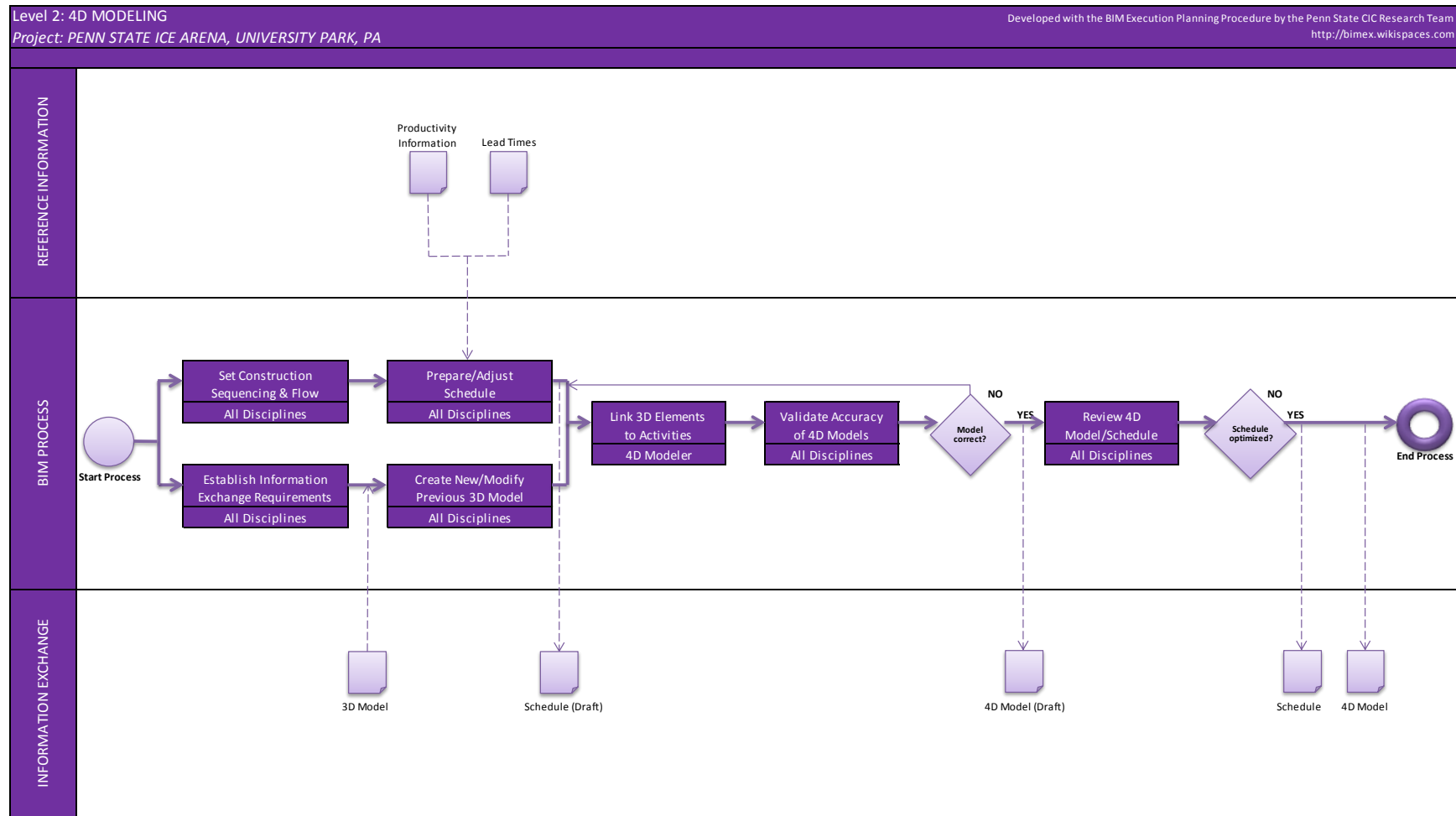
H. 3D COORDINATION PROCESS MAP



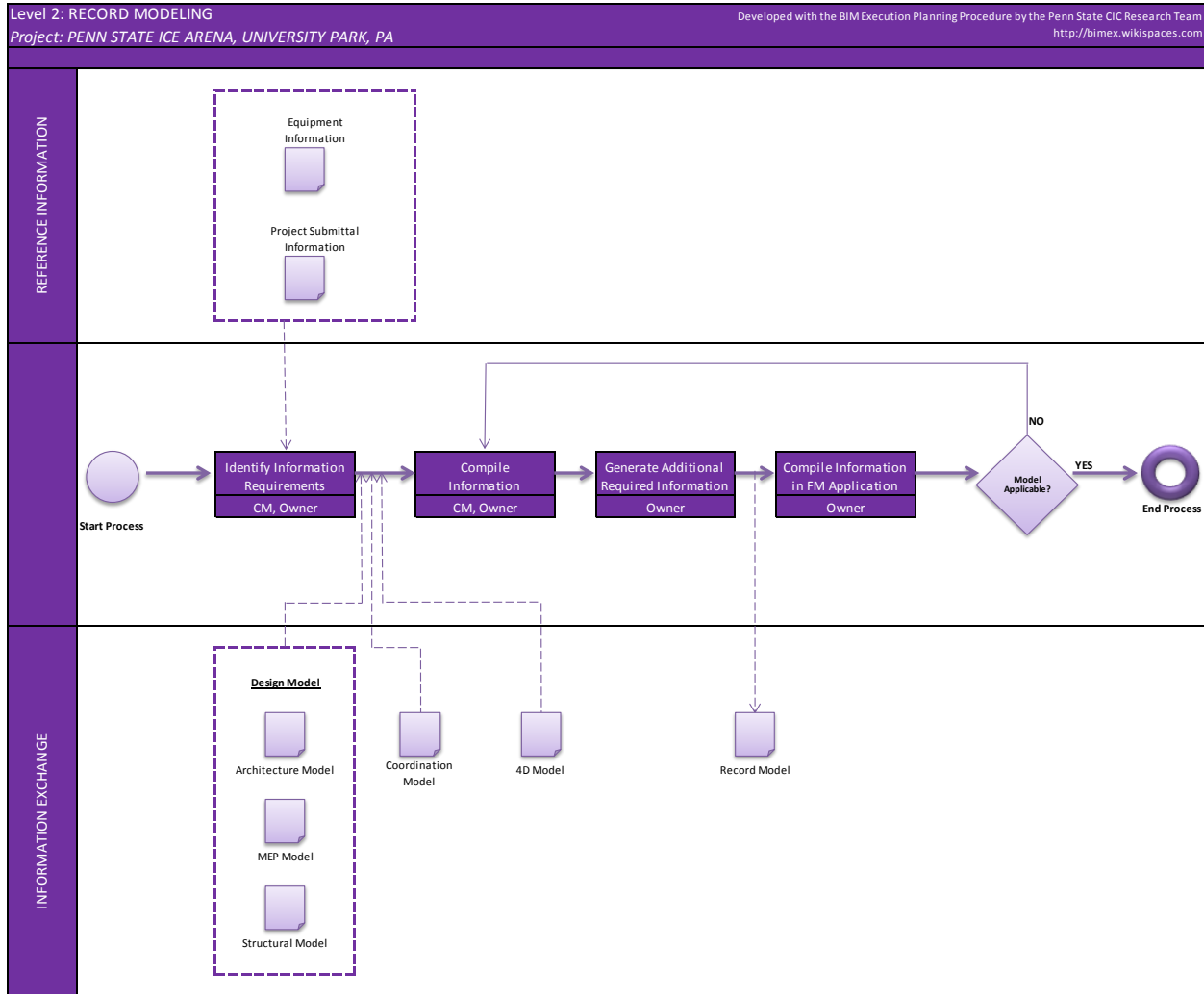
I. COST ESTIMATING PROCESS MAP



J. 4D MODELING PROCESS MAP



K. RECORD MODELING PROCESS MAP



ATTACHMENT 4: INFORMATION EXCHANGE WORKSHEET [FROM SECTION G]

INFORMATION EXCHANGE (IE)

Information		Responsible Party	
A	Accurate Size & Location, include materials and object parameters	ARCH	Architect
B	General Size & Location, include parameter data	CON	Contractor
C	Schematic Size & Location	CE	Civil Engineer
		FM	Facility Manager
		MEP	MEP Engineer
		SE	Structural Engineer
		TC	Trade Contractors

BIM Use Title	Design Authoring			3D Coordination			4D Modeling/ Phase Planning			Record Modeling		
	Info	Resp Party	Notes	Info	Resp Party	Notes	Info	Resp Party	Notes	Info	Resp Party	Notes
Project Phase	Design			Construction			Construction			Operations		
Time of Exchange (SD, DD, CD, Construction)	SD			CD			CD			Construction		
Responsible Party (Information Receiver)	ARCH			Contractor			Contractor			Owner/Facilities Manager		
Receiver File Format	Revit			Navisworks			Navisworks			Navisworks		
Application & Version												
Model Element Breakdown	Info	Resp Party	Notes	Info	Resp Party	Notes	Info	Resp Party	Notes	Info	Resp Party	Notes
A SUBSTRUCTURE												
Foundations												
Standard Foundations	B	SE		B	SE		B	SE		A	CON	
Special Foundations	B	SE		B	SE		B	SE		A	CON	
Slab on Grade	B	SE		B	SE		B	SE		A	CON	
Basement Construction												
Basement Excavation	B	CE		B	CON		B	CON		B	CON	
Basement Walls	B	CE		B	CON		A	CON		B	CON	
B SHELL												
Superstructure												
Floor Construction	B	SE		A	SE		A	SE		A	CON	
Roof Construction	B	SE		A	SE		A	SE		A	CON	
Exterior Enclosure												
Exterior Walls	B	ARCH		A	ARCH		B	CON		A	ARCH	
Exterior Windows	B	ARCH		A	ARCH		B	CON		A	ARCH	
Exterior Doors	B	ARCH		A	ARCH		B	CON		A	ARCH	
Roofing												
Roof Coverings	B	ARCH		A	ARCH		A	CON		A	CON	
Roof Openings	B	ARCH		A	ARCH		A	CON		A	CON	
C INTERIORS												
Interior Construction												
Partitions	B	ARCH		A	ARCH		B	ARCH		A	ARCH	
Interior Doors	B	ARCH		A	ARCH		B	ARCH		A	ARCH	
Fittings	B	ARCH		A	ARCH		B	ARCH		A	ARCH	
Stairs												
Stair Construction	B	ARCH		A	ARCH		B	CON		A	CON	
Stair Finishes	B	ARCH		A	ARCH		B	ARCH		A	ARCH	
Interior Finishes												
Wall Finishes	B	ARCH		A	ARCH		B	ARCH		A	ARCH	
Floor Finishes	B	ARCH		A	ARCH		B	ARCH		A	ARCH	
Ceiling Finishes	B	ARCH		A	ARCH		B	ARCH		A	ARCH	
D SERVICES												
Conveying Systems												
Elevators & Lifts	B	ARCH		A	CON		B	CON		A	CON	
Escalators & Moving Walks	B	ARCH		A	CON		B	CON		A	CON	
Other Conveying Systems	B	ARCH		A	CON		B	CON		A	CON	
Plumbing												
Plumbing Fixtures	B	ARCH		A	ARCH/TC		B	TC		A	ARCH/TC	
Domestic Water Distribution	B	MEP		A	MEP/TC		B	TC		A	MEP/TC	
Sanitary Waste	B	MEP		A	MEP/TC		B	TC		A	MEP/TC	
Rain Water Drainage	B	MEP		A	MEP/TC		B	TC		A	MEP/TC	
Other Plumbing Systems	B	MEP		A	MEP/TC		B	TC		A	MEP/TC	
HVAC												
Energy Supply	B	MEP		A	MEP/TC		A	TC		A	MEP/TC	
Heat Generating Systems	B	MEP		A	MEP/TC		A	TC		A	MEP/TC	
Cooling Generating Systems	B	MEP		A	MEP/TC		A	TC		A	MEP/TC	
Distribution Systems	B	MEP		A	MEP/TC		A	TC		A	MEP/TC	
Terminal & Package Units	B	MEP		A	MEP/TC		A	TC		A	MEP/TC	
Systems Testing & Balancing	B	MEP		A	MEP/TC		A	TC		A	MEP/TC	
Other HVAC Systems & Equipment	B	MEP		A	MEP/TC		A	TC		A	MEP/TC	
Fire Protection												
Sprinklers	B	MEP		A	MEP/TC		A	TC		A	MEP/TC	
Standpipes	B	MEP		A	MEP/TC		A	TC		A	MEP/TC	
Fire Protection Specialties	B	MEP		A	MEP/TC		A	TC		A	MEP/TC	
Other Fire Protection Systems	C	ARCH		A	MEP/TC		A	TC		A	MEP/TC	
Electrical												
Electrical Service & Distribution	B	MEP		A	MEP/TC		A	TC		A	MEP/TC	
Lighting and Branch Wiring	B	MEP		A	MEP/TC		A	TC		A	MEP/TC	
Communications & Security	B	MEP		A	MEP/TC		A	TC		A	MEP/TC	
Other Electrical Systems	C	ARCH		A	MEP/TC		A	TC		A	MEP/TC	
E EQUIPMENT & FURNISHINGS												
Equipment												
Commercial Equipment	B	ARCH		A	CON		B	TC		A	CON	
Institutional Equipment	B	ARCH		A	CON		B	TC		A	CON	
Vehicular Equipment	B	ARCH		A	CON		B	TC		A	CON	
Other Equipment	B	ARCH		A	CON		B	TC		A	CON	
Furnishings												
Fixed Furnishings	B	ARCH		A	ARCH		B	CON		A	CON	
F SPECIAL CONSTRUCTION & DEMOLITION												
Special Construction												
Special Structures	B	ARCH		A	CON		B	CON		A	CON	
Integrated Construction	B	ARCH		A	CON		B	CON		A	CON	
Special Construction Systems	B	ARCH		A	CON		B	CON		A	CON	
Special Facilities	B	ARCH		A	CON		B	CON		A	CON	
Special Controls & Instrumentation	B	ARCH		A	CON		B	CON		A	CON	
Selective Bldg Demo												
Building Elements Demolition		N/A			N/A			N/A			N/A	
Hazardous Components Abatement		N/A			N/A			N/A			N/A	



INFORMATION EXCHANGE (IE)

Information		Responsible Party	
A	Accurate Size & Location, include materials and object parameters	ARCH	Architect
B	General Size & Location, include parameter data	CON	Contractor
C	Schematic Size & Location	CE	Civil Engineer
		FM	Facility Manager
		MEP	MEP Engineer
		SE	Structural Engineer
		TC	Trade Contractors

BIM Use Title	Design Authoring			3D Coordination			4D Modeling/ Phase Planning			Record Modeling		
	Info	Resp Party	Notes	Info	Resp Party	Notes	Info	Resp Party	Notes	Info	Resp Party	Notes
Project Phase	Design			Construction			Construction			Operations		
Time of Exchange (SD, DD, CD, Construction)	SD			CD			CD			Construction		
Responsible Party (Information Receiver)	ARCH			Contractor			Contractor			Owner/Facilities Manager		
Receiver File Format	Revit			Navisworks			Navisworks			Navisworks		
Application & Version												
Model Element Breakdown	Info	Resp Party	Notes	Info	Resp Party	Notes	Info	Resp Party	Notes	Info	Resp Party	Notes
F SPECIAL CONSTRUCTION & DEMOLITION												
Special Construction												
Special Structures	B	ARCH		A	CON		B	CON		A	CON	
Integrated Construction	B	ARCH		A	CON		B	CON		A	CON	
Special Construction Systems	B	ARCH		A	CON		B	CON		A	CON	
Special Facilities	B	ARCH		A	CON		B	CON		A	CON	
Special Controls & Instrumentation	B	ARCH		A	CON		B	CON		A	CON	
Selective Bldg Demo												
Building Elements Demolition		N/A			N/A			N/A			N/A	
Hazardous Components Abatement		N/A			N/A			N/A			N/A	
G BUILDING SITEWORK												
Site Preparation												
Site Clearing	B	CE		A	CON		B	TC		B	CON	
Site Demolition & Relocations	B	CE		A	CON		B	TC		B	CON	
Site Earthwork	B	CE		A	CON		B	TC		B	CON	
Hazardous Waste Remediation	B	CE		A	CON		B	TC		B	CON	
Site Improvements												
Roadways	B	CE		A	CON		B	TC		A	CON	
Parking Lots	B	CE		A	CON		B	TC		A	CON	
Pedestrian Paving	B	CE		A	CON		B	TC		A	CON	
Site Development	B	CE		A	CON		B	TC		A	CON	
Landscaping	B	ARCH		A	CON		B	TC		A	CON	
Site Civil/Mech Utilities												
Water Supply & Distribution Systems	B	CE		A	CON/CE		A	TC		A	CON/CE	
Sanitary Sewer Systems	B	CE		A	CON/CE		A	TC		A	CON/CE	
Storm Sewer Systems	B	CE		A	CON/CE		A	TC		A	CON/CE	
Heating Distribution	B	CE		A	CON/CE		A	TC		A	CON/CE	
Cooling Distribution	B	CE		A	CON/CE		A	TC		A	CON/CE	
Fuel Distribution	B	CE		A	CON/CE		A	TC		A	CON/CE	
Other Civil/Mechanical Utilities	B	CE		A	CON/CE		A	TC		A	CON/CE	
Site Electrical Utilities												
Electrical Distribution	B	CE		A	MEP/TC		A	TC		A	MEP/TC	
Site Lighting	B	CE		A	MEP/TC		A	TC		A	MEP/TC	
Site Communications & Security	B	CE		A	MEP/TC		A	TC		A	MEP/TC	
Other Electrical Utilities	C	CE		A	MEP/TC		A	TC		A	MEP/TC	
Other Site Construction												
Service Tunnels	B	CE		A	CON		A	CON		A	CON	
Other Site Systems & Equipment	B	CE		A	CON		A	CON		A	CON	
1 Construction Systems												
Construction Equipment		N/A		B	CON		B	CON			N/A	
Temporary Safety		N/A		B	CON		B	CON			N/A	
Temporary Security		N/A		B	CON		B	CON			N/A	
Temporary Facilities		N/A		B	CON		B	CON			N/A	
Weather Protection		N/A		B	CON		B	CON			N/A	
2 Space												
Construction Activity Space	B	CON		A	CON		A	CON		A	FM	
Analysis Space	B	CON		A	CON		A	CON		A	FM	
3 Information												
Construction Information	B	CON		A	CON		A	CON		A	CON	
Engineering Information	B	SE/MEP		A	SE/MEP		A	SE/MEP		A	SE/MEP	
Record Information	B	ARCH		A	ARCH		A	ARCH		A	ARCH	

ATTACHMENT 5: MODEL DEFINITION WORKSHEET [FROM SECTION G]

MODEL DEFINITION (MOD)

Information		Responsible Party	
A	Accurate Size & Location, include materials and object parameters	ARCH	Architect
B	General Size & Location, include parameter data	CON	Contractor
C	Schematic Size & Location	CE	Civil Engineer
		FM	Facility Manager
		MEP	MEP Engineer
		SE	Structural Engineer
		TC	Trade Contractors

Project Phase Deliverable	Planning			Design			Construction			Operations		
	Info	Resp Party	Notes	Info	Resp Party	Notes	Info	Resp Party	Notes	Info	Resp Party	Notes
Author File Format (if varies, specify in notes)												
Application & Version												
Model Element Breakdown												
A	SUBSTRUCTURE											
	Foundations											
	Standard Foundations	B ARCH		A SE			A CON			A FM		
	Special Foundations	B ARCH		A SE			A CON			A FM		
	Slab on Grade	B ARCH		A SE			A CON			A FM		
	Basement Construction											
	Basement Excavation	B CE		A CE			A CON			C N/A		
	Basement Walls	B CE		A CE			A CON			A FM		
B	SHELL											
	Superstructure											
	Floor Construction	B ARCH		A SE			A CON			A FM		
	Roof Construction	B ARCH		A SE			A CON			A FM		
	Green Roof	B ARCH		A ARCH			A CON			A FM		
	Interior Columns	B ARCH		A SE			A CON			A FM		
	Beams	B ARCH		A SE			A CON			A FM		
	Trusses	B ARCH		A SE			A CON			A FM		
	Exterior Enclosure											
	Exterior Walls	B ARCH		A SE			A CON			A FM		
	Curtain wall System	B ARCH		A SE			A CON			A FM		
	Exterior Windows - Glass Panels	B ARCH		A SE			A CON			A FM		
	Railing	B ARCH		A ARCH			A CON			A FM		
	Exterior Doors	B ARCH		A ARCH			A CON			A FM		
	Roofing											
	Roof Coverings	B ARCH		A ARCH			A CON			A FM		
	Roof Openings	B ARCH		B SE			A CON			A FM		
C	INTERIORS											
	Interior Construction											
	Partitions	B ARCH		A ARCH			A TC			A FM		
	Interior Doors	C ARCH		A ARCH			A TC			A FM		
	Fittings	C ARCH		A ARCH			A TC			A FM		
	Stairs											
	Stair Construction	B ARCH		A SE			A TC			A FM		
	Stair Finishes	C ARCH		A ARCH			A TC			A FM		
	Interior Finishes											
	Wall Finishes	C ARCH		A ARCH			A TC			A FM		
	Floor Finishes	C ARCH		A ARCH			A TC			A FM		
	Ceiling Grid	C ARCH		A ARCH			A TC			A FM		
	Drop Ceiling	C ARCH		A ARCH			A TC			A FM		
	Ceiling Finishes	C ARCH		A ARCH			A TC			A FM		
D	SERVICES											
	Conveying Systems											
	Elevators & Lifts	B ARCH		A MEP			A CON			A FM		
	Escalators & Moving Walks	B ARCH		A MEP			A CON			A FM		
	Other Conveying Systems	B ARCH		A MEP			A CON			A FM		
	Plumbing											
	Plumbing Fixtures	C ARCH		A ARCH			A TC			A FM		
	Domestic Water Distribution	B ARCH		A MEP			A TC			A FM		
	Sanitary Waste	B ARCH		A MEP			A TC			A FM		
	Rain Water Drainage	B CE		A CE			A TC			A FM		
	Other Plumbing Systems	B ARCH		A MEP			A TC			A FM		
	HVAC											
	Energy Supply	B ARCH		A MEP			A TC			A FM		
	Heat Generating Systems	B ARCH		A MEP			A TC			A FM		
	Cooling Generating Systems	B ARCH		A MEP			A TC			A FM		
	Distribution Systems	B ARCH		A MEP			A TC			A FM		
	Terminal & Package Units	B ARCH		A MEP			A TC			A FM		
	Systems Testing & Balancing	B ARCH		A MEP			A TC			A FM		
	Other HVAC Systems & Equipment	B ARCH		A MEP			A TC			A FM		
	Fire Protection											
	Sprinklers	B ARCH		A MEP			A TC			A FM		
	Standpipes	B ARCH		A MEP			A TC			A FM		
	Fire Protection Specialties	B ARCH		A MEP			A TC			A FM		
	Other Fire Protection Systems	B ARCH		A MEP			A TC			A FM		
	Electrical											
	Electrical Service & Distribution	B ARCH		A MEP			A TC			A FM		
	Lighting and Branch Wiring	B ARCH		A MEP			A TC			A FM		
	Communications & Security	B ARCH		A MEP			A TC			A FM		
	Other Electrical Systems	B ARCH		A MEP			A TC			A FM		
E	EQUIPMENT & FURNISHINGS											
	Equipment											
	Commercial Equipment	C ARCH		A ARCH			A CON			A FM		
	Institutional Equipment	C ARCH		A ARCH			A CON			A FM		
	Vehicular Equipment	C ARCH		A ARCH			A CON			A FM		
	Other Equipment	C ARCH		A ARCH			A CON			A FM		
	Furnishings											
	Fixed Furnishings	B ARCH		A ARCH			A CON			A FM		
F	SPECIAL CONSTRUCTION & DEMOLITION											
	Special Construction											
	Special Structures	C ARCH		A ARCH			A CON			A FM		
	Integrated Construction	C ARCH		A ARCH			A CON			A FM		
	Special Construction Systems	C ARCH		A ARCH			A CON			A FM		
	Special Facilities	C ARCH		A ARCH			A CON			A FM		
	Special Controls & Instrumentation	C ARCH		A ARCH			A CON			A FM		
	Selective Bldg Demo											
	Building Elements Demolition	N/A		N/A			N/A			N/A		
	Hazardous Components Abatement	N/A		N/A			N/A			N/A		



MODEL DEFINITION (MOD)

Information		Responsible Party	
A	Accurate Size & Location, include materials and object parameters	ARCH	Architect
B	General Size & Location, include parameter data	CON	Contractor
		CE	Civil Engineer
		FM	Facility Manager
C	Schematic Size & Location	MEP	MEP Engineer
		SE	Structural Engineer
		TC	Trade Contractors

Project Phase Deliverable		Planning			Design			Construction			Operations		
Author File Format (if varies, specify in notes)		Revit			Revit			Navisworks			Navisworks		
Application & Version													
Model Element Breakdown		Info	Resp Party	Notes	Info	Resp Party	Notes	Info	Resp Party	Notes	Info	Resp Party	Notes
G BUILDING SITEWORK													
Site Preparation													
	Site Clearing	C	CE		A	CE		A	TC			N/A	
	Site Demolition & Relocations	B	CE		A	CE		A	TC			N/A	
	Site Earthwork	B	CE		A	CE		A	TC			N/A	
	Hazardous Waste Remediation	C	CE		A	CE		A	TC			N/A	
Site Improvements													
	Roadways	B	CE		A	CE		A	TC		A	FM	
	Parking Lots	B	CE		A	CE		A	TC		A	FM	
	Pedestrian Paving	B	CE		A	CE		A	TC		A	FM	
	Site Development - topography	B	CE		A	CE		A	TC		A	FM	
	Landscaping	B	CE		A	CE		A	TC		A	FM	
Site Civil/Mech Utilities													
	Water Supply & Distribution Systems	B	CE		A	CE		A	TC		A	FM	
	Sanitary Sewer Systems	B	CE		A	CE		A	TC		A	FM	
	Storm Sewer Systems	B	CE		A	CE		A	TC		A	FM	
	Heating Distribution	B	CE		A	CE		A	TC		A	FM	
	Cooling Distribution	B	CE		A	CE		A	TC		A	FM	
	Fuel Distribution	B	CE		A	CE		A	TC		A	FM	
	Other Civil/Mechanical Utilities	B	CE		A	CE		A	TC		A	FM	
Site Electrical Utilities													
	Electrical Distribution	B	ARCH		A	MEP		A	TC		A	FM	
	Site Lighting	B	CE		A	MEP		A	TC		A	FM	
	Site Communications & Security	B	ARCH		A	MEP		A	TC		A	FM	
	Other Electrical Utilities	B	CE		A	MEP		A	TC		A	FM	
Other Site Construction													
	Service Tunnels	B	CE		A	CE		A	CON		A	FM	
	Other Site Systems & Equipment	B	CE		A	CE		A	CON		A	FM	
1 Construction Systems													
	Construction Equipment		N/A			N/A		A	CON			N/A	
	Temporary Safety		N/A			N/A		A	CON			N/A	
	Temporary Security		N/A			N/A		A	CON			N/A	
	Temporary Facilities		N/A			N/A		A	CON			N/A	
	Weather Protection		N/A			N/A		A	CON			N/A	
	Construction Lay down		N/A			N/A		A	CON			N/A	
2 Space													
	Department Assignments	B	ARCH		A	ARCH		A	CON		A	FM	
	Room Assignments	B	ARCH		A	ARCH		A	CON		A	FM	
	Diagrammatic Phasing	B	ARCH		A	ARCH		A	CON		A	FM	
	Occupancy	A	ARCH		A	ARCH		A	CON		A	FM	
	Construction Activity Space	B	ARCH		A	ARCH		A	CON		A	FM	
	Analysis Space	B	ARCH		A	ARCH		A	CON		A	FM	
3 Information													
	Construction Information		N/A		A	ARCH		A	CON		A	CON	
	Engineering Information		N/A		A	SE/MEP		A	SE/MEP		A	SE/MEP	
	Record Information		N/A		A	CON		A	CON		A	FM	
4 Datum													
	Grid		TBD		A	ARCH		A	CON		A	FM	
	Levels		TBD		A	ARCH		A	CON		A	FM	
	Origin		TBD		A	ARCH		A	CON		A	FM	

ATTACHMENT 6: BIM & FACILITY DATE REQUIREMENTS WORKSHEET [FROM SECTION H]

BIM Use Title		Record Modeling
Project Phase		Operations
Time of Exchange (SD, DD, CD, Construction)		Construction
Responsible Party (Information Receiver)		Trades & CM
Receiver File Format		Revit & Navis Works
Application & Version		2011
Model Element Breakdown		Information Requirements
A	SUBSTRUCTURE	
	Foundations	
	Standard Foundations	Name, Size
	Special Foundations	N/A
	Slab on Grade	Name, Size
	Basement Construction	
	Basement Excavation	Name, Existing Conditions, Location
	Basement Walls	Name, Size, Type
B	SHELL	
	Superstructure	
	Floor Construction	Name, Type
	Roof Construction	Name, Type, Virtual Mock-up Link(required in contract)
	Exterior Enclosure	
	Exterior Walls	Name, Size, Type, Virtual Mock-up Link(required in contract)
	Exterior Windows	Name, Size, Type
	Exterior Doors	Name, Size, Type
	Roofing	
	Roof Coverings	Name, Size
	Roof Openings	Name, Size
C	INTERIORS	
	Interior Construction	
	Partitions	Name, Size, Type
	Interior Doors	Name, Size, Type
	Fittings	Name, Type
	Stairs	
	Stair Construction	Name, Type
	Stair Finishes	Name, Type
	Interior Finishes	
	Wall Finishes	Name, Type
	Floor Finishes	Name, Type
	Ceiling Finishes	Name, Type
D	SERVICES	
	Conveying Systems	
	Elevators & Lifts	Name, Size, Type
	Escalators & Moving Walks	N/A
	Other Conveying Systems	N/A
	Plumbing	
	Plumbing Fixtures	Name, Size, Type, Equipment Location
	Domestic Water Distribution	Name, Size, Type, Equipment Location
	Sanitary Waste	Name, Size, Type, Equipment Location
	Rain Water Drainage	Name, Size, Type, Equipment Location
	Other Plumbing Systems	Name, Size, Type, Equipment Location
	HVAC	
	Energy Supply	Name, Size, Type, Equipment Location
	Heat Generating Systems	Name, Size, Type, Equipment Location
	Cooling Generating Systems	Name, Size, Type, Equipment Location
	Distribution Systems	Name, Size, Type, Equipment Location
	Terminal & Package Units	Name, Size, Type, Equipment Location
	Systems Testing & Balancing	Name, Size, Type, Equipment Location
	Other HVAC Systems & Equipment	Name, Size, Type, Equipment Location
	Fire Protection	
	Sprinklers	Name, Size, Type, Equipment Location
	Standpipes	Name, Size, Type, Equipment Location
	Fire Protection Specialties	Name, Size, Type, Equipment Location
	Other Fire Protection Systems	Name, Size, Type, Equipment Location
	Electrical	
	Electrical Service & Distribution	Name, Size, Type, Equipment Location, Riser Diagram
	Lighting and Branch Wiring	Name, Size, Type, Equipment Location, Riser Diagram
	Communications & Security	Name, Size, Type, Equipment Location, Riser Diagram
	Other Electrical Systems	Name, Size, Type, Equipment Location, Riser Diagram



BIM Use Title		Record Modeling
Project Phase		Operations
Time of Exchange (SD, DD, CD, Construction)		Construction
Responsible Party (Information Receiver)		Trades & CM
Receiver File Format		Revit & Navis Works
Application & Version		2011
Model Element Breakdown		Information Requirements
E	EQUIPMENT & FURNISHINGS	
	Equipment	
	Commercial Equipment	Name, Size
	Institutional Equipment	Name, Size
	Vehicular Equipment	Name, Size
	Other Equipment	Name, Size
	Furnishings	
	Fixed Furnishings	N/A
F	SPECIAL CONSTRUCTION & DEMOLITION	
	Special Construction	
	Special Structures	TBD
	Integrated Construction	Name, Type, Parties Involved
	Special Construction Systems	Name, Size
	Special Facilities	Name, Size
	Special Controls & Instrumentation	Name, Size
	Selective Bldg Demo	
	Building Elements Demolition	N/A
	Hazardous Components Abatement	N/A
G	BUILDING SITEWORK	
	Site Preparation	
	Site Clearing	N/A
	Site Demolition & Relocations	N/A
	Site Earthwork	N/A
	Hazardous Waste Remediation	N/A
	Site Improvements	
	Roadways	Size
	Parking Lots	Size
	Pedestrian Paving	Size
	Site Development	Name, Size
	Landscaping	Name, Size
	Site Civil/Mech Utilities	
	Water Supply & Distribution Systems	Name, Size, Type, Equipment Location
	Sanitary Sewer Systems	Name, Size, Type, Equipment Location
	Storm Sewer Systems	Name, Size, Type, Equipment Location
	Heating Distribution	Name, Size, Type, Equipment Location
	Cooling Distribution	Name, Size, Type, Equipment Location
	Fuel Distribution	Name, Size, Type, Equipment Location
	Other Civil/Mechanical Utilities	Name, Size, Type, Equipment Location
	Site Electrical Utilities	
	Electrical Distribution	Name, Type, Sizes
	Site Lighting	Name, Feeder Type, Sizes
	Site Communications & Security	Name, Feeder Type, Sizes
	Other Electrical Utilities	Name, Feeder Type, Sizes
	Other Site Construction	
	Service Tunnels	N/A
	Other Site Systems & Equipment	N/A

Link O &M's to Record Documents

