This document has been revised and replaces the previously published document dated 4/16/2012. Changes from the previous version have been highlighted in yellow and include but are not necessarily limited to:

- Updates to existing and inclusion of new abbreviations and hyperlinks
- Adoption of BIM as TFC's standard in lieu of CADD
- Updates to software requirements
- Coordination with TFC contracts
- Updates to statutory and code requirements
- Updates to BIM standards to take advantage of process and technological advancements
- Updates to TFC's BIM modeling, documentation, and collaboration strategies
- New links for downloading TFC BIM and CADD template files
- Refinements to requirements regarding document organization

Appendices dated 4/13/2012 remain in force.

Additional revisions to the Guidelines/Standards will be issued from time to time to reflect the latest TFC practices. The electronic version of this document is available on-line at http://www.tfc.state.tx.us/divisions/facilities/prog/construct/formsindex/ and contains hyperlinks to referenced documents and relevant internet web-sites as well as pertinent locations within the document itself.

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ABBREVIATIONS - GENERAL

ADA	Americans With Disabilities Act	ICC	International Code Council
ADAS	ADA Standards	IECC	International Energy Conservation Code
AHJ	Authority Having Jurisdiction	IMPACT	TFC's Internet–based "Project Management Control System"
ANSI	American National Standards Institute	IPD	Internal Procurement Division (TFC)
ASHRAE	The American Society of Heating, Refrigerating and Air-Conditioning Engineers	LDC	Land Development Code (City of Austin)
		LJA	Local Jurisdictional Authority(ies) – Building Plan Review, Site Plan Review, Utility Providers, Fire Department…
BMS	Building Management System	NFPA	National Fire Protection Association
BIM	Building Information Modeling	NWD	Autodesk Navisworks file type
BIM360	Autodesk BIM 360 Team (TFC's adopted BIM Collaboration Environment)	OAC	Owner / Architect / Contractor
C4R	Autodesk Collaboration for Revit (TFC's adopted Revit Team Collaboration Software)	PREM	Planning and Real Estate Management (TFC)
		PDF	Adobe Acrobat file type
CADD	Computer Aided Design and Drafting	PSP	Professional Service Provider
CHP	Combined Heating and Power System	RVT	Autodesk Revit file type
COA	City of Austin	SECO	State Energy Conservation Office
DIR	Department of Information Resources	SFMO	State Fire Marshal's Office
DPM	Director of Project Management (TFC)	SGC	Supplementary General Conditions
DPS	Department of Public Safety	TAC	Texas Administrative Code
DWFX	Autodesk Design Review file type	TAS	Texas Accessibility Standards
DWG	Autodesk Autocad file type	TCEQ	Texas Commission on Environmental Quality
EAB	Elimination of Architectural Barriers	TDLR	Texas Department of Licensing and Regulation
EM	Energy Management (TFC)	TDI	Texas Department of Insurance
EPMCS	Electronic Project Management Control System (TFC)	TFC	Texas Facilities Commission
FDC	Facilities Design and Construction (TFC)	TGC	Texas Statutes - Government Code
FOM	Facilities Operations and Maintenance (TFC)	THC	Texas Historical Commission
HSC	Health & Safety Code (Texas)	PS	Project Support (TFC-FDC-IAECS)
HUB	Historically Underutilized Business Program (TFC)	UA	Using Agency(ies)
IAECS	Internal AEC Services (TFC-FDC)	UGC	Uniform General Conditions

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ABBREVIATIONS – DESIGN DISCIPLINES			
ACOU	Acoustical	**INT**	Interiors
ARCH	Architecture	**KIT**	Kitchen
CIV	Civil Engineering	**LAR**	Landscape Architecture
COMM	Data/Communications	**MECH**	Mechanical Engineering
ELEC	Electrical Engineering	**PLUM**	Plumbing Engineering
FA	Fire Alarm	**SEC**	Security/Access Control
FP	Fire Protection (Fire Suppression)	**STRU**	Structural Engineering
FURN	Furniture		
GEN	General (Cover / Index…)		

ABBREVIATIONS – PROJECT PHASES			
BA	Contract Bidding & Award	**PD**	Assessment (Pre-design)
CA	Construction Contract Administration	**PA**	Project Analysis
CD	Contract Documents	**RD**	Record Documents
DD	Design Development	**SD**	Schematic Design
IC	Initial Concept		

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GUIDELINES / STANDARDS - PURPOSE		
TOPIC	**INFORMATION**	**LINKS**
Applicability	A. This document applies to all TFC projects contracted on or after the Edit Date indicated in the header above.	
Intent	A. Identify TFC preferred procedures, systems, and materials; and B. Aid the PSPs in delivering professional services resulting in facilities that meet or exceed TFC project and performance goals. C. **The Guidelines/Standards are not intended to replace or circumvent the informed professional judgment of planning, design, and construction Professional Service Providers (PSPs).** D. **Professional judgment leading to recommendations that differ from these Guidelines/Standards must be communicated in writing through TFC's Project Manager (PM) for consideration and determination by TFC.**	
Periodic Revisions	A. Revisions to the Guidelines/Standards will be issued from time to time to reflect the latest TFC practices, but only currently issued versions will be posted on the FDC Forms Index page of TFC's website. B. A project commencing under a specific Guidelines/Standards issue date may continue on the basis of that issue; however, it is the PSP's responsibility to keep a copy of the relevant Guidelines/Standards.	• FDC Forms Index
TFC Statutory Charge	A. Determining, creating, and protecting long term value in the public's investment for housing state government programs and functions. B. Texas Government Code (TGC) Chapter 2165 states that TFC: 1. "…has charge and control of all public buildings, grounds, and property…"; and 2. "…is the custodian of all state personal property…". C. Exceptions exist for certain named agencies and Higher Education.	• TGC 2165
Software Requirements	A. TFC has adopted Building Information Modeling (BIM) as a standard for all projects developed under TFC authority involving new construction and additions. B. For deferred maintenance and minor alteration projects, Building Information Modeling (BIM) is preferred but not necessarily required. 1. CADD software may be used only with prior written authorization from TFC's PM and TFC's IAECS Director. C. TFC-accepted BIM and CADD software versions are listed in the "CADD/BIM Standards - Overview" section of this document.	• CADD/BIM Standards • CADD Standards • BIM Standards

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STATE AGENCIES

Entity	DESCRIPTION	LINKS
Texas Facilities Commission (TFC)	A. Agent for the State of Texas; B. "Owner" and/or "Lessor" for capital construction and leasing projects. C. TFC Divisions: 1. **Facilities Design and Construction (FDC)**: a. Represents TFC in its capital construction projects; b. Assigns a Project Manager (PM) to each project. 2. **Planning and Real Estate Management (PREM)**: a. Reviews and approves space allocations for Using Agencies; 3. **Energy Management (EM)**: a. Monitors and evaluates energy consumption and provides recommendations for energy saving improvements. 4. **Facilities Operations and Maintenance (FOM)**: a. Operates and maintains building systems for properties included in the TFC inventory.. 5. **Internal Procurement Division (IPD)**: a. Procures goods and services for use by TFC including but not limited to: i. Construction Services; and ii. Professional services such as architectural and engineering services.	• TFC • FDC • PREM • EM • FOM • IPD
Using Agency (UA)	A. The agency (or agencies) for which TFC manages the design and construction process of a project.	
Other Key Agencies	A. **Department of Public Safety, Capitol District (DPS)**: 1. Administers the Austin area parking programs for TFC facilities; 2. Provides physical security for state personnel and property; and 3. Installs Capital area keyways and keys. B. **Elimination of Architectural Barriers (EAB)** - Texas Department of Licensing & Regulation's division responsible for certification of all plans and specifications for accessibility to persons with disabilities in accordance with the Texas Architectural Accessibility Standard. C. **State Energy Conservation Office (SECO)** - responsible for developing and administering standards for energy efficient design for state buildings and facilities. D. **Department of Information Resources Telecommunications (DIR)** - operates the local Capitol Complex telephone systems, a statewide long distance network and consults on telecommunication aspects of projects throughout the state.	• DPS • TDLR • EAB • SECO • DIR

STATUTORY REQUIREMENTS

REQUIREMENT	SUMMARY DESCRIPTION	LINKS
General	A. TFC statutory requirements of general interest to the PSP or that require PSP compliance include but are not limited to the following:	• TGC 2151 • TGC 2152 • TGC 2155 • TGC 2156 • TGC 2157 • TGC 2158 • TGC 2161 • TGC 2162 • TGC 2163 • TGC 2165 • TGC 2166 • TGC 2167
TFC Enabling Statute	A. The Texas Facilities Commission Act, Articles 2151 through 2167, Texas Government Code (TGC) establishes the authority of the Texas Facilities Commission.	
FDC Activities and Limits	A. TGC Chapter 2166 generally describes the activities and limits of the Facilities Design and Construction division of TFC.	
Project Funding	A. TGC Chapter 2166.251(c) "The appropriation of funds by the legislature for the construction of a project shall be construed by TFC and the using agency as an expression of legislative intent that the project be completed within the limits of the funds actually appropriated ..." B. The State's goal is to include all project requirements in the bid documents to assure that all aspects of the project have been competitively bid thereby resulting in the best value for the State.	
Change Orders	A. TGC Chapter 2166.257 - No additive change order may be authorized without approval by the PSP, the UA, and FDC's DED.	
Document Review	A. TGC Chapter 2166.156(c) "…ensure that [preliminary and working] plans and specifications" for all facilities constructed for the purpose of housing a State of Texas agency (or agencies): a. "Are clear and complete; b. Permit execution of the project with appropriate economy and efficiency; and c. Conform with the requirements described by the Project Analysis". B. TGC Chapter 2166.156(d) "…approve plans and specifications before the Using Agency(ies) may accept or use them."	

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STATUTORY REQUIREMENTS (CONTINUED)

REQUIREMENT	SUMMARY DESCRIPTION	LINKS
Storm Water Pollution Prevention Plan	A. As applicable, projects may require a Storm Water Pollution Prevention Plan (SWPPP) per TCEQ.	• TCEQ Construction Activities Regulations
Capitol Views	A. Compliance with the most restrictive of the following is required: B. TGC Chapter 3151; and C. COA Land Development Code, 25-2-161, 162, 641, 642 and Appendix A.	• TGC 3151 • COA- LDC
Energy / Water Conservation	A. For leased and state owned facilities, TAC Title 34, Chapter 19, Subchapter B requires state agencies to: 1. "…ensure preparation of a Resource Efficiency Plan…"; 2. Certify to [SECO] that the plan has been completed; and 3. "…implement the cost effective utility conservation measures in accordance with … the agency's Resource Efficiency Plan…". B. TGC Section 447.004 requires compliance with SECO's "The Energy Conservation Design Standard for New State Buildings". C. All design must comply with either ASHRAE 90.1 or IECC (currently adopted edition) and furnish evidence of compliance with energy efficiency and water conservation standards published by SECO. D. TGC Sections 2166.404 and 2166.405 require all projects to be designed for water conservation including irrigation and xeriscape planting. E. HSC 372.002 - Water saving performance standards;	• TAC • SECO • SECO Suggested Water Efficiency Standards • TGC 447.004 • ASHRAE Standards / Guidelines • IECC • TGC 2166.404 and 2166.405 • HSC 37.002

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STATUTORY REQUIREMENTS (CONTINUED)

REQUIREMENT	SUMMARY DESCRIPTION	LINKS
Energy Efficient Architectural and Engineering Design Alternatives Evaluation	A. TGC 2166.401 and 2166.403 - All projects, including new construction and alteration and repair projects where all or part of an energy system, energy source, or energy-consuming equipment is installed or replaced require a written economic feasibility evaluation of incorporating energy alternatives and energy-efficient architectural and engineering design into the building's design and proposed energy system. 1. Alternative Energy is defined as a renewable energy resource including solar energy, biomass energy, geothermal energy, and wind energy. 2. SECO must approve any methodology or electronic software used in the analysis. 3. The evaluation must identify the best energy alternative for each function of the project over the economic life of the building considering costs and benefits of implementing alternative design practices and energy systems for all or part of each function relative to the use of conventional design practices and energy systems. 4. The evaluation must be made available to the public and presented at an open meeting. 5. If alternative designs or energy systems are determined to be economically feasible, the alternative design or system must be incorporated into the project.	• TGC 2166.401 • TGC 2166.**403** • SECO

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STATUTORY REQUIREMENTS (CONTINUED)

REQUIREMENT	SUMMARY DESCRIPTION	LINKS
Combined Heating and Power (CHP) System	A. TGC 2311.002 – For economic development programs involving both state and local governments, new construction and extensive HVAC equipment renovations to critical governmental facilities require evaluation of the economic feasibility (over a 20 year period) of equipping the facility with a Combined Heating and Power (CHP) system. 1. A critical government facility is defined as a building owned by the state or a political subdivision of the state that is expected to: a. Be continuously occupied; b. Maintain operations for at least 6,000 hours each year; c. Have a peak electricity demand exceeding 500 kilowatts; and d. Serve a critical public health or public safety function during a natural disaster or other emergency situation that may result in a widespread power outage, including a: i. Command and control center; ii. Shelter; iii. Prison or jail; iv. Police or fire station; v. Communications or data center; vi. Water or wastewater facility; vii. Hazardous waste storage facility; viii. Biological research facility ix. Hospital; or x. Food preparation or food storage facility.	• TGC 2311.002

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STATUTORY REQUIREMENTS (CONTINUED)

REQUIREMENT	SUMMARY DESCRIPTION	LINKS
Exterior Lighting/Lighting Pollution (HSC 425)	A. Health and Safety Code, Title 5, Subtitle F, Chapter 425 requires outdoor lighting fixtures to be cutoff type luminaires under specific circumstances.	• HSC 425
Codes and Standards	A. The most restrictive requirements of the following codes and standards will govern: 1. NFPA 101 Life Safety Code - Latest adopted edition per SFMO (TGC 417.008(e) establishes the SFMO as the AHJ for fire safety in all state owned buildings). 2. International Code Council (ICC) family of codes (latest published editions). 3. NFPA 70: National Electrical Code (latest published edition). 4. NFPA 70E: Standard for Electrical Safety in the Workplace; 5. ASHRAE 90.1: Energy Conservation Design Standard for State-Funded Buildings or IECC (latest adopted edition per SECO); 6. Americans With Disabilities Act of 1990 (as currently amended); a. 2010 ADA Standards for Accessible Design – 2010 Standards for State and Local Governments Title II; 7. TGC Chapter 469, Elimination of Architectural Barriers; a. 2012 Texas Accessibility Standards (and Technical Memoranda). B. State of Texas properties are not subject to municipal or local codes, however TFC projects should be generally consistent with local land use practices. Cooperation with local services such as fire, watershed and utilities is advantageous to TFC projects.	• TGC 417.008 • NFPA 101 • NFPA 101 - SFMO Adoption • ICC Store • ICC Public Access • NFPA 70 (NEC) • NFPA 70E • ASHRAE Standards / Guidelines • ASHRAE 90.1 / IECC – SECO Adoption • ADA Standards • TGC 469 • TAS Standards • Architectural Barriers Technical Memoranda

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STATUTORY REQUIREMENTS (CONTINUED)

REQUIREMENT	SUMMARY DESCRIPTION	LINKS
Hazardous Materials	A. Prior to demolition or construction efforts on existing facilities; a. TAC, Title 25, Part 1, Chapter 295, Subchapter C, Rule 295.34 requires building owners to: i. Survey the facility for asbestos-containing material (ACM); ii. Abate all asbestos-containing building material (ACBM) that could foreseeably be disturbed in the area to be renovated; and iii. Perform abatement in accordance with the Federal National Emission Standard for Asbestos (40 CFR, Chapter 61, Subpart M) b. Obtain certification by a licensed engineer or architect that: i. In the engineer's or architect's professional opinion, all parts of the building affected by the planned renovation or demolition do not contain asbestos." ii. Certification may be based on: (a) Current or previous surveys and reports; (b) Material safety data sheets for the materials used in (i) The original construction; and (ii) The subsequent renovations or alterations of all parts of the building affected by the planned renovation or demolition.	• TAC, 25,1, 295, C, 295.34
Uniform and Supplementary General Conditions	A. TGC Chapter 2166.302 requires TFC to adopt "…uniform general conditions to be incorporated into all building construction contracts made by the state". 1. TFC's Supplementary General Conditions modify the UGC and are required by TFC to also be incorporated into all TFC construction contracts. 2. TFC's currently adopted UGC and SGC are available on the TFC website. B. TFC has also developed Special Conditions that may be incorporated in construction contracts at the discretion of TFC. 1. TFC Special Conditions, when required, may be obtained through TFC's PM.	• TGC 2166.302 • UGC / SGC
Site Inspections	A. TGC Chapter 2166.351 - TFC is responsible for protecting the interests of the state during construction through appropriate levels of inspections, including requirements upon the PSP.	• TGC 2166.351

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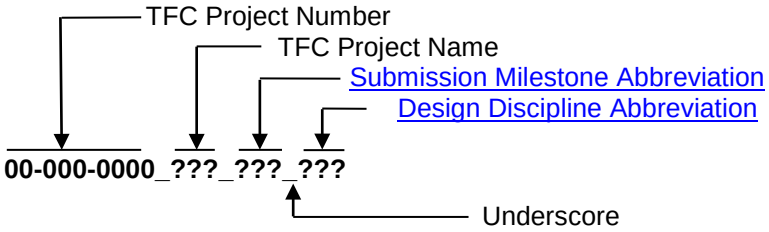
SUBMISSION PROCEDURES

PROCEDURE	PSP ACTIONS REQUIRED	LINKS
General	A. TFC has adopted an electronic "Round Trip" review process intended to: 1. Maximize clarity of communications between TFC and PSPs; 2. Minimize document review turn-around time; and 3. Reduce the environmental impact created by the traditional method of printing and transporting hard-copy documents. B. Submit all documentation required at each project milestone as required in this section and in the Submission Milestones and Submission Content sections below. C. Clearly indicate the appropriate Edit Date of the Guidelines / Standards applicable to the project being submitted for review.	• Round Trip Review Process • Submission Milestones
Electronic Documents (Soft Copy)	A. **Drawings:** At each submission milestone: 1. Publish**,** or Export drawing sheet views to "DWFX" format (do not scan or convert from PDF format); 2. Group sheets into separate files by design discipline using the following file naming convention:  B. **BIM Models (for BIM projects):** At each submission milestone: 1. Civil3D Files: a. Update the ".adsk" file(s) exported from the Building Model(s); and b. W-Block out to ".dwg" file format and submit w-blocked ".dwg" file. 2. Revit Files (Model Files Only – "PD" through "BA" Milestones): a. Review and correct all warnings. b. *"Synchronize"* all Revit *"Local Files"* with their respective *"Central Model File"* in TFC's collaboration environment; c. Export the *"Central Model File"* to ".adsk" (only for projects that require coordination with Civil3D files).	• Autodesk "*DWF Writer*" • Drawing Standards – Document Organization • BIM Standards

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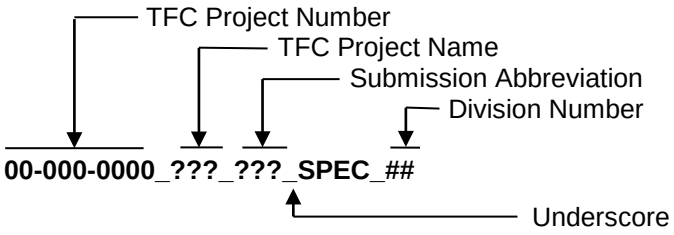
* See next page for additional Submission Procedure requirements.

Abbreviations

SUBMISSION PROCEDURES (CONTINUED)

PROCEDURE	PSP ACTIONS REQUIRED	LINKS
Electronic Documents (Soft Copy) (Continued)	3. Revit Files (Model Files Only – "RD" Milestone): a. Review and correct all warnings. b. Purge all unused elements. c. Delete all views except overall floor plans and/or overall reflected ceiling plans for each respective discipline. d. Compact and Audit the file. e. *"Synchronize"* all Revit *"Local Files"* with their respective *"Central Model File"*; f. Export to ".adsk" file format (only for projects that require coordination with Civil3D files). 4. Revit Annotation Files – Submit only ".dwfx" and ".pdf" format Drawings. D. **Specifications:** At each submission milestone: 3. Print all specification sections to ".dwfx" format (use Autodesk's free "DWF Writer" program (do not scan or convert from PDF format); 4. Group specifications into separate files by Division Number; 5. Name division files using the following file naming convention:  E. Transmit all electronic files to TFC.	• Submission Milestones • Autodesk "*DWF Writer*" • BIM Standards
Printed Documents (Hard Copy)	A. At each submission milestone: 1. Print complete set of Drawings and Specifications; 2. Deliver complete, bound document sets to TFC's PM; and 3. Notify TFC's PM that the printed documents have been sent.	

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SUBMISSION PROCEDURES (CONTINUED)		
PROCEDURE	**PSP ACTIONS REQUIRED**	**LINKS**
Respond to Owner Comments	A. Upon receipt of TFC comments in DWFX and XLSX file formats: 1. Modify the BIM Model(s) or CADD file(s) as appropriate to address Owner comments; 2. Export revised BIM/CADD sheet views to DWFX format; and 3. Provide written responses to TFC comments in the "Response" column of the TFC Document Review Comments Log. B. Transmit all electronic files to TFC.	
SECO Compliance Form(s)	A. Submit the completed compliance certification form and supporting documentation to the PM: 1. For downloadable compliance forms, follow the link to the right (SECO's Building Codes and Standards web page).	• SECO – Texas Design Standard Compliance Forms
Energy / Water Conservation Rebates	A. Identify Federal, State, and/or Local rebate programs applicable to the project. B. Develop and submit relevant/necessary application materials to the entity(ies) offering rebates.	
Accessibility Review and Inspection	A. Register project with TDLR and pay registration fee; B. Submit proof of registration and sealed Contract Documents to an RAS within the allotted time; C. Pay the review fee; D. Respond in writing to the RAS regarding measures to be taken to address any conditions found to be non-compliant and issue a formal Addendum correcting the deficiencies; E. Schedule the accessibility inspection on or after the date of substantial completion; F. Pay the inspection fee; G. Respond in writing to the RAS regarding measures to be taken to address any conditions found to be non-compliant and issue a formal Change Proposal or directive. H. Provide TFC's PM with copies of all communications with the RAS.	• TDLR Online Registration • TDLR Fee Schedule • TDLR Document Submission Requirements
Historical Status Determination and Compliance	A. If the Project Analysis indicates a requirement for THC review and approval, submit required documentation directly to THC in a timely manner.	• THC

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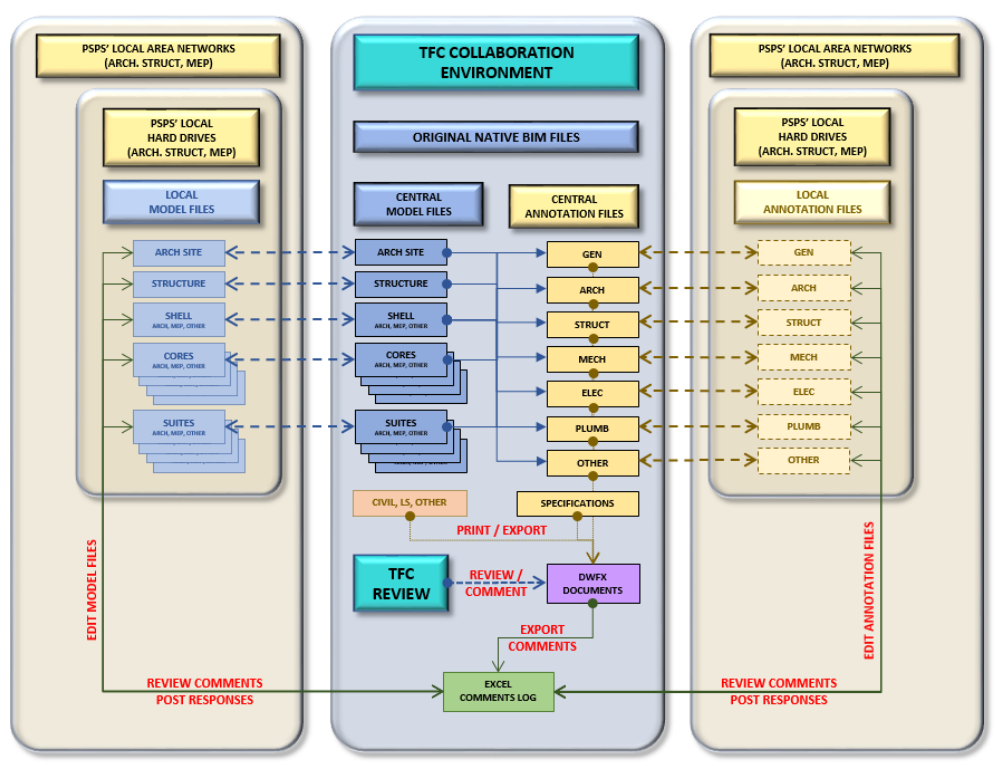
SUBMISSION PROCEDURES (CONTINUED)

PROCEDURE	PSP ACTIONS REQUIRED	LINKS
TCEQ Documentation	A. For projects where a SWPPP is required, submit the necessary documentation to TCEQ and pay all application and review fees.	• TCEQ
Roundtrip Review Process Diagram		• BIM Workflow Diagram

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SUBMISSION MILESTONES

PHASE	MILESTONE DESCRIPTION	SUBMISSION FORMAT
General	A. Submit documentation for Owner review at each submission milestone listed below. B. Individual project requirements (as determined by TFC) may dictate the need for fewer or additional submissions and submission format changes - confirm specific requirements with PM. C. Submission content requirements are provided in the "Submission Content" portion of this document.	
Assessment (PD)	A. PD1 (Late Phase) – If required in PSP contract: 1. Substantially complete documentation of the work required in this design phase. B. PD2 (End of Phase) – If required in PSP contract 1. Final documentation satisfactorily addressing Owner comments on previous submission.	• Number of printed and bound sets as defined in contract or as directed by PM; and • Transmit electronic files to TFC.
Initial Conceptual Drawings / Schematic Design (SD)	A. SD1 (Late Phase) – If required in PSP contract: 1. Substantially complete documentation of the work required in this design phase. B. SD2 (End of Phase) – If required in PSP contract: 1. Final documentation satisfactorily addressing Owner comments on previous submission.	• Number of printed and bound sets as defined in contract or as directed by PM; • Transmit electronic files to TFC; and • Number of mounted copies of renderings as defined in contract or as directed by PM: o Image width 24" (min.) o Board width 30" (min.)
Design Development (DD)	A. DD1 (Late of Phase): 1. Substantially complete, coordinated documentation of the work required in this design phase. B. DD2 (End of Phase): 1. Final documentation satisfactorily addressing Owner comments on previous submission.	• Number of printed and bound sets as defined in contract or as directed by PM; and • Transmit electronic files to TFC.

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SUBMISSION MILESTONES (CONTINUED)		
PHASE	**MILESTONE DESCRIPTION**	**SUBMISSION FORMAT**
Contract Documents (CD)	A. CD65 (Mid-Phase): 1. In progress documentation of all work required in this design phase. 2. Submission occurs at approximately the mid-point of this design phase. 3. Satisfactorily address Owner comments on previous submissions. B. CD90 (Late Phase): 1. Substantially complete, coordinated documentation of all work required in this design phase. 2. Satisfactorily address Owner comments on previous submissions. C. CD100 (End of Phase): 1. Complete, sealed and signed, coordinated documentation of all work required in this design phase. 2. Last Submission prior to Bid Documents. 3. Satisfactorily address Owner comments on previous submissions.	• Number of printed and bound sets as defined in contract or as directed by PM; and • Transmit electronic files to TFC.
Contract Bidding and Award (BA)	A. BA - Bid Documents: 1. Satisfactorily address Owner comments on previous submission materials. 2. Complete, fully coordinated Bid Documents with: a. Professional seals affixed; and b. Signatures of all responsible design professionals. 3. Submit all necessary documentation to authorities having jurisdiction.	• Number of printed and bound sets as defined in contract or as directed by PM; and • Transmit electronic files to TFC.
Construction Phase - General Administration of Construction Contracts (CA)	A. CA – Construction Phase Documents: 1. Consolidated set of sealed / signed documents incorporating all Addenda and Clarifications issued during the bidding phase.	• Number of printed and bound sets as defined in contract or as directed by PM; • Transmit electronic files to TFC.
Warranty (RD)	A. RD – Record Documents: 1. Documentation (incorporating all Contractor's mark-ups) of as-constructed conditions.	• Number of printed and bound sets as defined in contract or as directed by PM; and • Transmit electronic files to TFC.

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Abbreviations

SUBMISSION CONTENT – ASSESSMENT (PREDESIGN - PD1 & PD2) (Abbreviated from Phase previously identified as Mobilization/Predesign)		
DOCUMENT	**PSP ACTIONS REQUIRED (Subject to PSP Contract Modifications)**	**FILE FORMAT**
General	A. Confirm or modify to reflect current project requirements and/or conditions: 1. Prior programming decisions provided by TFC such as but not limited to: a. Project Analysis; b. Construction Budget; and c. Project Schedule. 2. Other information provided by TFC: a. Existing conditions archival documents; b. Applicable codes and regulatory requirements.	
Executive Summary Report	A. Document relevant data collected, analyses performed, and design concepts and criteria recommended.	• Autodesk Design Review (.dwfx) • TFC Accepted Software Versions
Project Objective Statement	A. State whether the project follows or deviates from the Project Analysis and why.	
Project Implementation Plan	A. Outline the method by which the project will be organized and delivered: 1. BIM or CADD.	
Schedule for Delivery of Services	A. Identify all project milestones including: 1. Design Document Submission Dates and Review Periods for Owner and Jurisdictional Authorities: a. Submission; b. Review; c. Revision; and d. Authorization to Proceed. 2. Critical Meetings / Presentations; 3. Bid Package Issuance Date(s); 4. Bid Opening Date(s); 5. Construction start, punch inspection, and substantial completion; 6. Owner Move-in; and 7. Warranty Period.	

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* See next page for additional Mobilization / Pre-design Submission Content.

Abbreviations

SUBMISSION CONTENT – ASSESSMENT (PREDESIGN - PD1 & PD2) (CONTINUED) (Abbreviated from Phase previously identified as Mobilization/Predesign)		
DOCUMENT	**PSP ACTIONS REQUIRED (Subject to PSP Contract Modifications)**	**FILE FORMAT**
Technical Requirements List	A. Submit a list of all applicable: 1. Codes and Standards; 2. Jurisdictional Authorities; 3. Utility Providers; 4. Environmental factors affecting the project design (including EPA and TCEQ fuel storage requirements); 5. Applicable TFC Technical and Design Standards (Reference the applicable Edit Date); 6. Applicable Using Agency(ies) Technical and Design Standards (Reference the applicable Edit Date).	
Existing Facilities Condition Analysis	A. Describe the condition of the existing building and / or site features as appropriate to the project: 1. Provide a list of all items to be relocated or reused; 2. Indicate all features that do not meet Programmatic or Technical Requirements; 3. Describe specific deficiencies for each non-compliant feature; and 4. Propose strategies for reconciling the deficiencies.	

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SUBMISSION CONTENT – SCHEMATIC DESIGN (SD1 & SD2)

(Combined with portions of Phase previously identified as Mobilization/Predesign)

DOCUMENT	PSP ACTIONS REQUIRED (Subject to PSP Contract Modifications)	FILE FORMAT
General	A. Describe the proposed conceptual design, scale, and relationships among the major components of the Project.	
Executive Summary Report	A. Revise the previous report to reflect current project conditions. B. Include (as applicable to the project): 1. An illustration of key conceptual issues; 2. Stacking and Blocking diagrams showing efficient use of space; 3. Summary of site evaluation and regional data.	• Autodesk Design Review (.dwfx) • TFC Accepted Software Versions
Schedule for Delivery of Services	A. Revise the previous Schedule to reflect any changes to anticipated task durations and milestone dates.	
Initial Estimate of Probable Construction Cost	A. Adjust the TFC provided project budget to reflect updated program requirements with the following basis for Unit Costs: 1. Square footage calculations as measured from the SD Drawings: a. Basis for Measurement: AIA Document D101 - *Methods of Calculating the Area and Volume of Buildings*; 2. Recent comparable projects of similar function, size, construction type, level of finish, and type of mechanical and electrical system(s); 3. Adjust unit costs for local bidding climate at time of projected bid date. B. Organize the estimate according to CSI Uniformat categories; 1. Include all applicable assemblies and systems. C. Include a list of items that are: 1. Not in the contract; or 2. Supplied by others. D. Include contingencies for the following: 1. Scope escalation; 2. Development of unanticipated design elements; 3. Economic influences on cost escalation / fluctuation; and 4. Construction phase changes. E. Identify cost variances between the Estimate and the established Construction Cost Limitation; F. Propose strategies for reconciling the variances.	• Autodesk Design Review (.dwfx) • TFC Accepted Software Versions

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Abbreviations

SUBMISSION CONTENT – SCHEMATIC DESIGN (SD1 & SD2) (CONTINUED) (Combined with section previously identified as Mobilization/Predesign)		
DOCUMENT	**PSP ACTIONS REQUIRED (Subject to PSP Contract Modifications)**	**FILE FORMAT**
Technical Requirements List	A. Provide Plumbing Fixture Count Calculations based on Space Allocation Program below (if applicable to the project).	

Room Data Sheets	A. Provide the following information (as applicable to the project) for each programmed space:
	1. Structural / Physical Isolation;
	2. Hazardous Materials List (Types & Quantities);
	3. Fire Separation;
	4. Acoustical Performance;
	5. Access Control / Monitoring;
	6. Door Information:
	a. Type(s);
	b. Size(s);
	c. Material(s); and
	d. Hardware Functions.
	7. Finish Materials;
	8. HVAC;
	a. Temperature Range(s);
	b. Humidity Control;
	c. Filtering;
	9. HVAC and Lighting controls requirements;
	10. Lighting Level (Foot Candles);
	11. Electrical Power;
	12. Data / Telecommunications;
	13. Plumbing;
	14. Re-used Items; and
	15. Special Considerations.
		• Autodesk Design Review (.dwfx)
		• TFC Accepted Software Versions

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SUBMISSION CONTENT – SCHEMATIC DESIGN (SD1 & SD2) (CONTINUED) (Combined with section previously identified as Mobilization/Predesign)		
DOCUMENT	**PSP ACTIONS REQUIRED (Subject to PSP Contract Modifications)**	**FILE FORMAT**

Layout Diagrams	A. Provide the following graphic information (as applicable to the project) for each programmed space:
	1. Diagrammatic configuration of individual and/or groups of spaces;
	2. Dimensional Requirements (absolute, minimum, and/or maximum);
	3. Partition Type(s):
	a. Height;
	b. Fire Rating; and
	c. Sound Rating.
	4. Door Location(s);
	5. Window Location(s);
	6. Furniture / Casework / Equipment / Relocated Items;
	a. Type(s) / Size(s);
	b. Location(s);
	c. Mounting Heights; and
	d. Clearance Requirements.
	7. Ceiling:
	a. Height(s); and
	b. Material(s).
	8. Lighting:
	a. Fixture Type(s) / Location(s); and
	b. Switch / Controls Type(s) / Location(s).
	9. Power / Data / Communications:
	a. Outlet Type(s) / Location(s); and
	b. Mounting Heights.
		• Autodesk Design Review (.dwfx)
		AND
		• Autodesk Autocad
		• TFC Accepted Software Versions

Adjacency & Stacking Diagrams	A. Provide 2D and 3D diagrams illustrating horizontal and vertical relationships between spaces and between departments.	• Autodesk Design Review (.dwfx)

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Abbreviations

SUBMISSION CONTENT – SCHEMATIC DESIGN (SD1 & SD2) (CONTINUED)

(Combined with section previously identified as Mobilization/Predesign)

DOCUMENT	PSP ACTIONS REQUIRED (Subject to PSP Contract Modifications)	FILE FORMAT
Space Allocation Program	A. Use TFC standard "Space Allocation Program" to report the following for each programmed space (if applicable to the project): 1. Provide square footages as measured from drawings below; a. Use AIA Document D101 - *Methods of Calculating the Area and Volume of Buildings*. 2. Building-wide information: a. Building Grossing Factor; b. Total Gross Building Area. 3. Departmental Information: a. Using Agency Department Name and ID Number: b. Common Areas; i. Circulation Spaces (vertical and Horizontal); ii. Maintenance and Support Spaces: (a) Restrooms and Showers; (b) Housekeeping; (c) Shipping and Receiving. iii. Building Service Spaces: (a) Mechanical; (b) Electrical; (c) Data / Communications; (d) Plumbing; 4. Space Information: a. Space Name and ID Number; b. Space Type; c. Number of occupants; d. Net area and dimensions (length, width, and ceiling height) e. Number Required. f. Total occupancy (number x occupants); g. Total Net Area (number x net area); h. Departmental Grossing Factor; i. Departmental Gross Area (factor x total net); and	• Autodesk Design Review (.dwfx) • TFC Accepted Software Versions

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Abbreviations

SUBMISSION CONTENT – SCHEMATIC DESIGN (SD1 & SD2) (CONTINUED) (Combined with section previously identified as Mobilization/Predesign)		
DOCUMENT	**PSP ACTIONS REQUIRED (Subject to PSP Contract Modifications)**	**FILE FORMAT**
BIM Model	A. Provide all BIM model and annotation files (and all linked files) containing all features of the project as indicated in the Drawing requirements below. B. See BIM Standards for more information.	• Autodesk Navisworks (.nwd and all linked .nwf files) • Autodesk Civil3D • Autodesk Revit
Drawings – SD1	A. Provide drawings describing the proposed design containing the following (as applicable to the project): 1. Project information; a. TFC Project Name and TFC Project Number; b. Project address / Location map; c. Team members; d. Drawing index; e. Submission Milestone. 2. Site: a. Existing conditions site survey; b. Property lines, setbacks, easements, and view corridor restrictions (existing and proposed including metes and bounds); c. Building locations; d. Adjacent roadways; e. Site Demolition; f. Public transportation stops; g. Vehicular and pedestrian circulation paths and parking; h. Service vehicle access; i. Landscape planting strategies; j. Basic grading and soil retention strategies; k. Pools, ponds, and other water features; l. Storm water management strategies (as applicable) for: i. Rainwater collection; ii. Drainage, Filtration, and Detention. m. Utility service locations and routing (existing and proposed);	• Autodesk Design Review (.dwfx) **AND** • Autodesk Autocad • TFC Accepted Software Versions

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Abbreviations

SUBMISSION CONTENT – SCHEMATIC DESIGN (SD1 & SD2) (CONTINUED)

(Combined with section previously identified as Mobilization/Predesign)

DOCUMENT	PSP ACTIONS REQUIRED (Subject to PSP Contract Modifications)	FILE FORMAT
Drawings – SD1 (Continued)	n. Major exterior equipment locations and sizes such as: i. Diesel generators; ii. Electrical enclosures; iii. Communications towers; and iv. Fuel storage facilities. 3. Floor Plan(s): a. Overall building configuration; b. Arrangement of programmed spaces; c. Space names and numbers coordinated with Space Allocation Program; d. Horizontal and vertical circulation elements; e. Furniture layouts; f. Roof Plan: Basic configuration; Major slopes defined; 4. Major exterior Building Elevations: a. Design vocabulary; b. Basic materials; c. Door and window openings; d. Floor-to-floor heights; e. Line of finished grade. 5. Building Section(s) as needed to illustrate unique volumetric characteristics of the proposed design. 6. MEP: a. One Line diagrams; b. Major equipment locations and sizes identified such as: i. Chillers; ii. Fire Pump; iii. Emergency Generator; iv. Automatic Transfer Switch (ATS); v. Uninterruptable Power Supply (UPS); and vi. Switchboards and Panels vii. Building Management System (BMS).	• Autodesk Design Review (.dwfx) **AND** • Autodesk Autocad • TFC Accepted Software Versions

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Abbreviations

SUBMISSION CONTENT – SCHEMATIC DESIGN (SD1 & SD2) (CONTINUED)

(Combined with section previously identified as Mobilization/Predesign)

DOCUMENT	PSP ACTIONS REQUIRED (Subject to PSP Contract Modifications)	FILE FORMAT
Drawings – SD1 (Continued)	8. Other drawings if needed to illustrate important design features. 9. Legends and symbols: All disciplines.	•
Drawings – SD2	A. Provide final presentation documents reflecting satisfactory responses to TFC comments regarding the SD1 documents; and B. Renderings (If applicable to the project): Photo-realistic color perspectives of the exterior of the proposed building(s) in context with their surroundings: a. One bird's-eye" view (or other view as determined by TFC); and b. One eye-level view that includes the main façade.	• Renderings: 600 DPI (.png)
Specifications	A. List primary materials and building systems: 1. Format: Outline using TFC template. B. See appendices for technical standards	• Autodesk Design Review (.dwfx)
Energy Efficient Architectural and Engineering Design Alternatives Evaluation	A. Develop in greater detail and verify results of the Energy Efficient Architectural and Engineering Design Alternatives Evaluation provided by TFC at the beginning of the Mobilization and Pre-design Phase. 1. Address all requirements of TGC Sections 2166.153, 2166.401, 2166.403, and 2166.408 such as: a. Identify and compare the benefits and disadvantages of potential alternatives including: i. Environmental impact (both initially and over the project's life cycle); ii. Economic Impact (both initially and over the project's life cycle). b. Recommend the best alternatives considering both economic and environmental life-cycle costs and benefits. 2. Determine the viability of accommodating future alternative energy system installations by providing anticipated floor space and service pathways in the current design. B. When using BIM, utilize data embedded in the BIM model in conjunction with other appropriate energy modeling software and web-based weather/energy databases to perform this analysis. 1. Modeling shall comply with ASHRAE 90.1 Appendix G Performance Rating Method or IECC (currently adopted edition).	• Autodesk Design Review (.dwfx) • TFC Accepted Software Versions

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Abbreviations

SUBMISSION CONTENT – SCHEMATIC DESIGN (SD1 & SD2) (CONTINUED)

(Combined with section previously identified as Mobilization/Predesign)

DOCUMENT	PSP ACTIONS REQUIRED (Subject to PSP Contract Modifications)	FILE FORMAT
Narratives / Analyses / Evaluations	A. Provide written analyses, assumptions, and recommendations to be included as the Basis of Design for materials, systems, equipment and energy sources for the following (as applicable to the project): 1. HVAC Systems: a. Coordination events schedule; b. Load Estimates (order of magnitude); c. Strategy for resolving conflicts between: i. Project criteria; ii. Design / Technical Standards; and iii. Code Requirements. 2. Plumbing Systems: a. Domestic and Fire water pressure and line size requirements; b. Wastewater: i. Discharge capacity; ii. Lift station requirements (if applicable). 3. Energy Sources: a. Primary Utility; b. Emergency / Standby Power; 4. Energy Conservation; a. Alternative Energy Sources b. Metering of: i. Electrical power and lighting; ii. Natural Gas; iii. Domestic, irrigation, and process water. c. Artificial lighting and daylighting systems and controls strategies; d. Energy Consumption: Anticipated total monthly building energy usage. 5. Smoke and emission control systems; 6. Fire and Life Safety systems; 7. Building Management System.	• Autodesk Design Review (.dwfx) • TFC Accepted Software Versions

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Abbreviations

SUBMISSION CONTENT – SCHEMATIC DESIGN (SD1 & SD2) (CONTINUED)

(Combined with section previously identified as Mobilization/Predesign)

DOCUMENT	PSP ACTIONS REQUIRED (Subject to PSP Contract Modifications)	FILE FORMAT
Narratives / Analyses (Continued	B. Recommend the most appropriate assemblies/equipment/systems that address project specific needs including: 1. Operating Concepts: Critical ideas behind the recommended design solution and the rationale which supports that solution: a. Statutory and regulatory requirements; i. Include analysis and recommendation regarding use of ASHRAE 90.1 or IECC. b. Interrelationships between spaces (both interior and exterior); c. Life safety features; d. Material and building systems selections; e. Artificial Lighting and Daylighting strategies for each type of space; f. Environmental quality (both interior and exterior); g. Emergency operations 2. Water conservation/efficiency (SECO Water Conservation Standard); 3. Foundation and Structural Frame Systems: a. Brief analysis of soils report as related to system selection; b. Comparison of benefits and disadvantages of potential systems; 4. Building Envelope: a. Brief description of existing and new building envelope assemblies (as applicable); 5. Comparison of the proposed envelope assemblies to the ASHRAE 90.1 Appendix G baseline or IECC -(currently adopted edition). 6. Indoor Air Quality and Pollutant Source Control Plan: Include specific strategies for addressing the TFC: a. Design Standards – Indoor Air Quality sections; and b. Technical Standards – 01 81 19 - Indoor Air Quality Requirements.	• Autodesk Design Review (.dwfx) • TFC Accepted Software Versions

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Abbreviations

SUBMISSION CONTENT – SCHEMATIC DESIGN (SD1 & SD2) (CONTINUED) (Combined with section previously identified as Mobilization/Predesign)		
DOCUMENT	**PSP ACTIONS REQUIRED (Subject to PSP Contract Modifications)**	**FILE FORMAT**
Narratives / Analyses (Continued)	7. MEP, Fire Alarm, Fire Protection, and Security Systems Narratives: a. Brief description of existing and new systems/conditions (as applicable); b. List of assumptions and unknowns; c. Design criteria; d. Benefits and disadvantages of potential equipment/systems: e. Comparison of the proposed systems to the ASHRAE 90.1 Appendix G baseline or IECC (currently adopted edition). i. Target Efficiency: 15% more efficient than baseline building. ii. Maximum Payback Period: 5 years. f. Address preparation of electrical breaker coordination study and NFPA 70E labeling requirements. C. Estimate above ceiling space requirements for all systems. D. List all materials / systems yet to be determined.	• Autodesk Design Review (.dwfx) • TFC Accepted Software Versions

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Abbreviations

SUBMISSION CONTENT – DESIGN DEVELOPMENT (DD1 & DD2)		
DOCUMENT	**PSP ACTIONS REQUIRED (Subject to PSP Contract Modifications)**	**FILE FORMAT**
General	A. Illustrate and coordinate all important aspects of the Project. B. Resolve all major issues that could cause significant restudy during the CD phase.	
Executive Summary Report	A. Revise the previous report to reflect current project conditions.	• Autodesk Design Review (.dwfx) • TFC Accepted Software Versions
Schedule for Delivery of Services	A. Revise the previous Schedule to reflect any changes to anticipated task durations and milestone dates.	
Estimate of Probable Project Construction Cost	A. Revise the previous estimate based on: 1. New information regarding proposed building systems and materials; and a. Quantities take-off as measured from the DD Drawings. B. Retain the CSI Uniformat organization. C. Include the same types of contingencies as in the previous phase.	
Space Allocation Program	A. Same as SD submission content above plus the following: 1. Add room numbers (from drawings below).	
BIM Model	A. Same as SD submission content above plus the following: 1. All physical features of the project as indicated in the Drawing requirements below. 2. Prior to document submission, use conflict checking software to: a. Identify and resolve clashes between all disciplines and specialties included on the project: i. Hard clashes between the various elements; and ii. Soft clashes between any element(s) and required clearances. b. Submit the report generated by the checking software indicating that conflicts have been resolved. B. See BIM Standards for more information.	• Autodesk Navisworks (.nwd and all linked .nwf files) • Autodesk Civil3D • Autodesk Revit

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Abbreviations

SUBMISSION CONTENT – DESIGN DEVELOPMENT (DD1 & DD2) (CONTINUED)		
DOCUMENT	**PSP ACTIONS REQUIRED (Subject to PSP Contract Modifications)**	**FILE FORMAT**
Drawings	A. Same as SD submission content above plus the following(as applicable to the project): 1. Detailed code compliance information (all disciplines); a. Reference codes; b. Jurisdictional authorities; c. Building information: i. Construction type; ii. Occupancy(ies); iii. Fire suppression systems; d. Code compliance calculations indicating both allowable/required and proposed conditions: i. Height and area; ii. Exiting; iii. Plumbing fixture count; e. Life safety plans: i. Occupant loading; ii. Exiting; f. Fire rated walls and partitions clearly identified. 2. Site: a. Accessible Route; b. Landscape planting and irrigation plans; c. Site furnishings and appurtenances; d. Planter, wall, and fence elevations; e. Grading Plan (with critical spot elevations); f. Utility Plan; g. Typical details; i. Planting; ii. Paving and hardscape; iii. Retaining walls and planters; iv. Bollards; v. Utilities. h. Parking counts;	• Autodesk Design Review (.dwfx) **AND** • Autodesk Autocad • TFC Accepted Software Versions

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Abbreviations

SUBMISSION CONTENT – DESIGN DEVELOPMENT (DD1 & DD2) (CONTINUED)

DOCUMENT	PSP ACTIONS REQUIRED (Subject to PSP Contract Modifications)	FILE FORMAT
Drawings (Continued)	3. Floor Plan(s): a. Room and door numbers; b. Reference keys: i. Enlarged plans; ii. Partition types; iii. Exterior and Interior elevations; iv. Building and Wall sections; and v. Plan details. c. Dimensions: i. Massing; ii. Structural Grid; and iii. Partitions. 4. Furniture layouts. 5. Roof: a. All slopes indicated; b. Major equipment locations identified; c. Major MEP penetrations coordinated; d. Reference keys: i. Building and Wall sections. 6. Exterior Building Elevations: a. All building faces; b. Material patterns; c. Vertical dimensions; d. Structural grid; e. Building section and wall section keys; 7. Major MEP penetrations coordinated. 8. Enlarged floor plans; a. Typical room layouts (as applicable to project type); b. Restrooms / Showers; c. Stairs, ramps, and elevators; and d. Other specialty spaces as appropriate to the proposed design.	•

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SUBMISSION CONTENT – DESIGN DEVELOPMENT (DD1 & DD2) (CONTINUED)		
DOCUMENT	**PSP ACTIONS REQUIRED (Subject to PSP Contract Modifications)**	**FILE FORMAT**
Drawings (Continued)	9. Interior / Millwork Elevations; 10. Door and frame information: a. Schedule (including hardware set assignments); b. Types; and c. Typical head, jamb, and sill details. 11. Hardware Schedule (to be provided in the drawing set, not in the Project Manual): a. Generic functions only: b. Basis of Design: Include in specifications. 12. Room Finish Schedule (by individual space); 13. Reflected Ceiling Plans; 14. Architectural Details (typical); 15. Structural: a. Foundation and Framing Plans; b. Loading assumptions and member sizes; c. Important details. 16. Metering: a. Meter locations; b. Types of data being metered. 17. Mechanical: a. Site information (if applicable); b. Equipment and thermostat locations; c. Primary distribution routing and sizes: d. Secondary distribution routing; e. Supply devices with CFM; f. Riser diagrams; g. Major duct penetrations (Locations and sizes); and h. Equipment selections / Schedules.	• Autodesk Design Review (.dwfx) **AND** • Autodesk Autocad • TFC Accepted Software Versions

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SUBMISSION CONTENT – DESIGN DEVELOPMENT (DD1 & DD2) (CONTINUED)		
DOCUMENT	**PSP ACTIONS REQUIRED (Subject to PSP Contract Modifications)**	**FILE FORMAT**
Drawings (Continued)	16. Electrical: a. Site information (if applicable); b. Equipment locations; c. Floor Plans: i. Lighting layout; ii. Lighting Footcandle Levels (interior and exterior) including tables showing: (a) Maximum, average, and minimum lighting levels; (b) Maximum-to-Average ratio; (c) Average-to-Minimum ratio. iii. Power (panel and receptacle locations); iv. Lightning Protection and Grounding; v. Data / Communications (indicating drop locations); vi. Fire Alarm (FACP and device locations); vii. Security Systems (access control, CCTV, equipment schedules). d. Riser diagrams: i. Expected panels and transformers; ii. Cable and conduit information. e. Equipment and Fixture Schedules; f. Lighting Density Schedule for main areas: Demonstrate compliance with ASHRAE 90.1 or IECC -(Currently adopted edition). 17. Plumbing and Fire Protection: a. Site information (if applicable); b. Equipment and fixture locations; i. Supply, waste, vent, and storm routing with flow rate quantities. c. Riser diagrams; d. Major piping penetrations and risers (Locations and sizes); and 18. Equipment and Fixture Schedules.	• Autodesk Design Review (.dwfx) **AND** • Autodesk Autocad • TFC Accepted Software Versions

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SUBMISSION CONTENT – DESIGN DEVELOPMENT (DD1 & DD2) (CONTINUED)		
DOCUMENT	**PSP ACTIONS REQUIRED (Subject to PSP Contract Modifications)**	**FILE FORMAT**
Specifications	A. Describe primary materials and building systems. 1. Format: Short form using TFC template. 2. Copies of manufacturers' data and/or illustrations of materials and equipment proposed to be specified for the Project. B. See appendices for technical standards. C. Manufacturers' Data Sheets: 1. Lighting Fixtures; 2. Lighting Controls; 3. Lamps (identify proposed lamp temperatures)	• Autodesk Design Review (.dwfx) • TFC Accepted Software Versions
Narratives / Analyses / Evaluations	A. Revise narratives and analyses submitted in the previous phase: 1. Summarize decisions made (and supporting reasons) for each. B. Identify possible impacts of Construction phasing on Design strategies.	
Data / Calculations	A. Provide data and calculations for the following: 1. Building Envelope Comcheck confirming compliance with ASHRAE 90.1 or IECC (currently adopted edition). 2. MEP Equipment List: a. Location(s), Size(s), and Weight(s); b. Clearance requirements. 3. Mechanical: a. Load analysis summary; b. Building pressure air quantity summary: i. Exhaust; ii. Outside Air; iii. Required occupant ventilation. c. Sequence of operations for major equipment and BMS criteria; d. Electrical Load analysis summary (include schedules documenting the sizing of the system / equipment). e. Lighting Comcheck confirming compliance with ASHRAE 90.1 or IECC (currently adopted edition). 4. Plumbing and Fire Protection: Flow test (capacity and pressure).	

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Abbreviations

SUBMISSION CONTENT – CONTRACT DOCUMENTS (CD65, CD90, & CD100)		
DOCUMENT	**PSP ACTIONS REQUIRED (Subject to PSP Contract Modifications)**	**FILE FORMAT**
General	A. Develop detailed and coordinated documents setting forth the requirements for the construction of the project.	
Executive Summary Report	A. Revise the previous report to reflect current project conditions.	• Autodesk Design Review (.dwfx) • TFC Accepted Software Versions
Schedule for Delivery of Services	A. Revise the previous Schedule to reflect any changes to anticipated task durations and milestone dates.	
Estimate of Probable Project Construction Cost	A. Revise the previous estimate based on: 1. New information regarding proposed building systems and materials; and 2. Detailed quantities take-off (measured from Drawings below). B. Change to the CSI MasterFormat 2004/2016 format; C. Include the same types of contingencies as in the previous phase.	
Space Allocation Program	A. Same as DD submission content above.	
BIM Model	A. Same as DD submission content above; and B. All physical features of the project as indicated in the Drawing requirements below. C. See BIM Standards for more information.	• Autodesk Navisworks (.nwd and all linked .nwf files) • Autodesk Civil3D • Autodesk Revit

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SUBMISSION CONTENT – CONTRACT DOCUMENTS (CD65, CD90, & CD100) (CONTINUED)

DOCUMENT	PSP ACTIONS REQUIRED (Subject to PSP Contract Modifications)	FILE FORMAT
Drawings	A. Same as DD submission content above plus the following (as applicable to the project): 1. Site: a. Erosion and Sedimentation Control (plan and details); b. Fire Protection Plan; c. Accessible Signage; d. Dimensions; e. Additional detailing as appropriate for the project needs; f. Grading Plan (with all spot elevations); g. Landscape planting and irrigation details; h. Impervious cover calculations; and i. Utility profiles. 2. Floor Plan(s): a. Dimensions (all); and b. Furniture layouts moved to Furniture Plans (for reference only). 3. Roof: a. All equipment and walk pad locations; b. Safety tie-backs (if applicable); and c. Detail reference keys. 4. Architectural Details (all); 5. Structural: All remaining notes, plans, schedules, and details; 6. Mechanical: a. Equipment and fan room layouts; b. All ductwork routing and sizes; c. Fire and smoke dampers; d. Equipment Schedules; e. Flow and control diagrams; f. All remaining drawings, notes, schedules, and details.	• Autodesk Design Review (.dwfx) **AND** • Autodesk Autocad • TFC Accepted Software Versions

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Abbreviations

SUBMISSION CONTENT – CONTRACT DOCUMENTS (CD65, CD90, & CD100) (CONTINUED)

DOCUMENT	PSP ACTIONS REQUIRED (Subject to PSP Contract Modifications)	FILE FORMAT
Drawings (Continued)	1. Electrical / Fire Alarm: a. Electrical details showing such things as: i. Grounding; ii. ATS; iii. Wiring; iv. Lightning protection; v. Fencing; and vi. Housekeeping pads. b. All remaining notes, plans, schedules, and details. 2. Plumbing / Fire Protection: a. Equipment and pump room layouts; b. All piping routing and sizes; c. Fixture and Equipment Schedules; d. Flow and riser diagrams; e. Fire sprinkler hazard zones; f. Fire hydrant static and residual pressures: i. Indicate fire and / or domestic water pump requirements. B. All remaining notes, plans, schedules, and details.	• Autodesk Design Review (.dwfx) **AND** • Autodesk Autocad • TFC Accepted Software Versions
Specifications	A. Provide complete Project Manual: 1. Format: 3 part CSI MasterFormat 2004/2016. 2. Include all TFC Front-End documents as provided by TFC's PM. 3. Include the following TFC-provided matrices at the end of the Project Close Out section of the Project Manual and complete them to reflect project specific requirements: a. Submittals; b. Warranties; c. Testing; d. Training; and e. Manuals. B. See the Appendices for relevant technical standards.	• Autodesk Design Review (.dwfx)

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Abbreviations

SUBMISSION CONTENT – CONTRACT DOCUMENTS (CD65, CD90, & CD100) (CONTINUED)		
DOCUMENT	**PSP ACTIONS REQUIRED (Subject to PSP Contract Modifications)**	**FILE FORMAT**
Narratives / Analyses / Evaluations	A. Revise narratives and analyses submitted in the previous phase: 1. Summarize decisions made (and supporting reasons) for each. B. Update the DD MEP systems narratives to indicate intended operational and maintenance procedures (for building occupants). 1. Address requirements of ASHRAE Standard 180 - Standard Practice for Inspection and Maintenance of Commercial Building HVAC Systems. C. Estimate to what extent structural, building envelope, & hardscape materials need to be replaced or repaired.	• Autodesk Design Review (.dwfx) • TFC Accepted Software Versions
Data / Calculations	A. Same as DD submission content above and indicate the following: 1. Room by room electrical load analysis per ASHRAE 90.1 or IECC (currently adopted edition); 2. Changes from previous submission; 3. Duct and piping calculations; 4. Air balance calculations; 5. Energy and ventilation calculations.	

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Abbreviations

SUBMISSION CONTENT – CONTRACT BIDDING AND AWARD (BA)		
DOCUMENT	**PSP ACTIONS REQUIRED (Subject to PSP Contract Modifications)**	**FILE FORMAT**
General	A. Execute and issue bid documents that form the basis of competitive price proposals.	
Executive Summary Report	A. Revise the previous report to reflect current project conditions.	• Autodesk Design Review (.dwfx) • TFC Accepted Software Versions
Schedule for Delivery of Services	A. Revise the previous Schedule to reflect any changes to anticipated task durations and milestone dates.	
Space Allocation Program	A. Same as DD submission content above.	• Autodesk Design Review (.dwfx)
Bid Documents	A. Provide final, executed (sealed and signed): 1. Drawings and Specifications reflecting satisfactory responses to TFC comments; and 2. Addenda and Clarifications as required to sufficiently respond to: a. Requirements of regulatory authorities; b. Bidder Requests for Information; and c. Requests for Substitution.	• Autodesk Design Review (.dwfx) **AND** • Autodesk Autocad • TFC Accepted Software Versions
BIM Models	A. Provide all BIM model and annotation files (and all linked files) reflecting the information contained within the Bid Documents as described below. B. See BIM Standards for more information.	• Autodesk Navisworks (.nwd and .nwf files) • Autodesk Civil3D • Autodesk Revit
Narratives / Analyses / Evaluations	A. Revise narratives and analyses submitted in the previous phase: 1. Summarize decisions made (and supporting reasons) for each.	

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Abbreviations

SUBMISSION CONTENT – CONTRACT BIDDING AND AWARD (BA) (CONTINUED)		
DOCUMENT	**PSP ACTIONS REQUIRED (Subject to PSP Contract Modifications)**	**FILE FORMAT**
Data / Calculations	A. Same as CD submission content above.	
SECO Documentation	A. Submit sealed and executed SECO compliance forms and supporting documentation in accordance with SECO requirements and the Submission Procedures section of this document.	
Accessibility Review	A. Register project and submit documentation to TDLR or a RAS in accordance with the TDLR requirements and the Submission Procedures section of this document.	
Hazardous Materials Certification	A. Submit letter (complying with the hazardous materials statutory requirements listed above) certifying that the project and all parts of any building(s) affected by the project do not contain asbestos.	• Adobe PDF
TCEQ / EPA Documentation	A. Submit: 1. SWPPP complying with TAC Title 30, Part 1, Chapter 213, Subchapter B, RULE §213.24. 2. SPCC Plan (EPA) for fuel storage tanks; 3. Fuel storage tank registration (TCEQ).	• As required by TCEQ and/or EPA

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Abbreviations

SUBMISSION CONTENT – CONSTRUCTION (CA)		
DOCUMENT	**PSP ACTIONS REQUIRED (Subject to PSP Contract Modifications)**	**FILE FORMAT**
Schedule for Delivery of Services	A. Revise the previous Schedule to reflect any changes to anticipated task durations and milestone dates.	• Autodesk Design Review (.dwfx)
Consolidated Contract Documents	A. Provide final, executed (sealed and signed) Drawings and Specifications updated to reflect all revisions including Addenda and Clarifications issued during the Contract Bidding and Award phase.	• Autodesk Design Review (.dwfx) **AND** • Autodesk Autocad • TFC Accepted Software Versions
BIM Model and Annotation Files	A. Provide all BIM model and annotation files (and all linked files) reflecting the information contained within the Consolidated Contract Documents as described above; B. See BIM Standards for more information.	• Autodesk Navisworks (.nwd and .nwf files) • Autodesk Civil3D • Autodesk Revit
Change Documentation	A. Provide final, executed (sealed and signed) Change Documentation including Drawings and Specifications reflecting agreed upon changes to the Contract for Construction such as: 1. Minor Changes / Supplemental Instructions (UGC 11.4) such as those resulting from: a. Modifications to shop drawings and other submittals; b. RFI responses. 2. Changes resulting from unforeseen concealed conditions (UGC 11.5); and 3. Change Orders.	• Autodesk Design Review (.dwfx) • TFC Accepted Software Versions

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Abbreviations

SUBMISSION CONTENT – CONSTRUCTION (CA)		
DOCUMENT	**PSP ACTIONS REQUIRED (Subject to PSP Contract Modifications)**	**FILE FORMAT**
Record Documents	A. Update Drawings and specifications to reflect the "as-constructed" condition of the complete scope of the project as recorded in Contractor's as-constructed field marked Record Documents and all: 1. Addenda; 2. Clarifications; 3. Minor Changes / Supplemental Instructions (UGC 11.4) such as those resulting from: a. Modifications to shop drawings and other submittals; b. RFI responses. 4. Changes resulting from unforeseen concealed conditions (UGC 11.5); 5. Change Orders; and 6. Product, material, and equipment substitutions. B. Finalize the MEP Systems Operations Manual. 1. Comply with ASHRAE Guideline 0, Informative Annex O.	• Autodesk Design Review • (.dwfx) • **AND** • Autodesk Autocad • TFC Accepted Software Versions • **AND** • Microsoft Word 2007 • TFC Accepted Software Versions
Record BIM Models	A. Update all BIM model and annotation files (and all linked files) to reflect the information contained within the Record Documents as described above. B. Tag all components in the BIM models with embedded hyperlinks to the relevant: 1. Specification section in the Project Manual; 2. Product / Equipment Information in the O&M Manual; 3. Final, accepted Submittal Data; 4. Training Materials; 5. Commissioning Documentation; 6. Systems Manuals; and 7. Warranty Documents. C. See BIM Standards for more information.	• Autodesk Navisworks (.nwd and .nwf files) • Autodesk Civil3D • Autodesk Revit

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Abbreviations

DRAWING STANDARDS – RECOMMENDED DOCUMENT ORGANIZATION

Purpose

A. Facilitate familiarity of the document structure and contents by all parties.
B. Deviations from the recommended document organization standards (when appropriate) must receive prior written approval from TFC's PM.

Drawing Numbering:

A. Begin numbering in the bottom right corner.
B. Continue numbering upward and then to the left.

	9	6	3	
	8	5	2	
	7	4	1	

Keyed Notes)

TFC prohibits the use of the Con-Doc keyed notes system.

Detail Manuals: TFC prohibits the use of Detail Manuals. All details are to be included in the Drawings.

Door Hardware Schedule: Locate in drawings not Project Manual.

DESIGN DISCIPLINE	General (Notes, Abbreviations, and Symbols)	Existing / Demolition	PLANS			ELEVATIONS			SECTIONS				SCHEDULES	DIAGRAMS
			Plan	Enlarged Plan	Plan Detail	Elevation	Enlarged Elevation	Elevation Detail	Section	Enlarged Section	Section Detail	Enlarged Section Detail		
	0	1	2	3	4	5	6	7	8	9	10	11	12	13
Cover	G0-00													
Project Information	G0-01													
Accessibility	AR-01…													
Code Review	CR-01…													
General Notes														
Civil	C0-00	C1-100	C2-100	C3-100	C4-100				C8-100				C12-100	C13-100
Dimension Control		C1-200	C2-200	C3-200	C4-200				C8-200				C12-200	C13-200
Erosion / Sedimentation		C1-300	C2-300	C3-300	C4-300				C8-300				C12-300	C13-300
Grading		C1-400	C2-400	C3-400	C4-400				C8-400				C12-400	C13-400
Storm Water		C1-500	C2-500	C3-500	C4-500				C8-500				C12-500	C13-500
Utilities		C1-600	C2-600	C3-600	C4-600				C8-600				C12-600	C13-600
Landscape	L0-000	L1-100	L2-100	L3-100	L4-100	L5-100	L6-100	L7-100	L8-100	L9-100	L10-100	L11-100	L12-100	
Hardscape		L1-200	L2-200	L3-200	L4-200	L5-200	L6-200	L7-200	L8-200	L9-200	L10-200	L11-200	L12-200	L13-200
Planting		L1-300	L2-300	L3-300	L4-300				L8-300	L9-300	L10-300	L11-300	L12-300	L13-300
Irrigation		L1-400	L2-400	L3-400	L4-400				L8-400	L9-400	L10-400	L11-400	L12-400	L13-400
Structural	S0-000	S1-100	S2-100	S3-100	S4-100	S5-100	S6-100	S7-100	S8-100	S9-100	S10-100	S11-100	S12-100	S13-100
Architecture	A0-000	A1-100	A2-100	A3-100	A4-100	A5-100	A6-100	A7-100	A8-100	A9-100	A10-100	A11-100	A12-100	
Site		A1-200	A2-200	A3-200	A4-200	A5-200	A6-200	A7-200	A8-200	A9-200	A10-200	A11-200	A12-200	
Floor / Roof		A1-300	A2-300	A3-300	A4-300	A5-300	A6-300	A7-300	A8-300	A9-300	A10-300	A11-300	A12-300	
Openings													A12-400	
Ceiling		A1-500	A2-500	A3-500	A4-500	A5-500	A6-500	A7-500	A8-500	A9-500	A10-500	A11-500	A12-500	
Wall		A1-600	A2-600	A3-600	A4-600	A5-600	A6-600	A7-600	A8-600	A9-600	A10-600	A11-600	A12-600	

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* See next page for additional Recommended Document Organization Standards.

Abbreviations

DRAWING STANDARDS – RECOMMENDED DOCUMENT ORGANIZATION (CONTINUED)

DESIGN DISCIPLINE	General (Notes, Abbreviations, and Symbols)	Existing / Demolition	PLANS			ELEVATIONS			SECTIONS				SCHEDULES	DIAGRAMS
			Plan	Enlarged Plan	Plan Detail	Elevation	Enlarged Elevation	Elevation Detail	Section	Enlarged Section	Section Detail	Enlarged Section Detail		
	0	1	2	3	4	5	6	7	8	9	10	11	12	13
Interior	I0-000	I1-100	I2-100	I3-100	I4-100	I5-100	I6-100	I7-100	I8-100	I9-100	I10-100	I11-100	I12-100	
Floor		I1-200	I2-200	I3-200	I4-200	I5-200	I6-200	I7-200	I8-200	I9-200	I10-200	I11-200	I12-200	
Ceiling		I1-300	I2-300	I3-300	I4-300	I5-300	I6-300	I7-300	I8-300	I9-300	I10-300	I11-300	I12-300	
Wall		I1-400	I2-400	I3-400	I4-400	I5-400	I6-400	I7-400	I8-400	I9-400	I10-400	I11-400	I12-400	
Casework		I1-500	I2-500	I3-500	I4-500	I5-500	I6-500	I7-500	I8-500	I9-500	I10-500	I11-500	I12-500	
Finishes		I1-600	I2-600	I3-600									I12-600	
Furniture		I1-700	I2-700	I3-700	I4-700	I5-700	I6-700	I7-700	I8-700	I9-700	I10-700	I11-700	I12-700	
Signage		I1-800	I2-800	I3-800	I4-800	I5-800	I6-800	I7-800	I8-800	I9-800	I10-800	I11-800	I12-800	
Mechanical	M0-000	M1-100	M2-100	M3-100	M4-100				M8-100				M12-100	M13-100
Piping		M1-200	M2-200	M3-200	M4-200				M8-200				M12-200	M13-200
Building Automation & Contro	BA-000	BA1-100	BA2-100	BA3-100	BA4-100				BA8-100				BA12-100	BA13-100
Electrical	E0-000	E1-100	E2-100	E3-100	E4-100				E8-100				E12-100	E13-100
Power		E1-200	E2-200	E3-200	E4-200				E8-200				E12-200	E13-200
Lighting		E1-300	E2-300	E3-300	E4-300				E8-300				E12-300	E13-300
Fire Alarm		E1-400	E2-400	E3-400	E4-400				E8-400				E12-400	E13-400
Mechanical		E1-500	E2-500	E3-500	E4-500				E8-500				E12-500	E13-500
Tele/Data	TD0-000	TD1-100	TD2-100	TD3-100	TD4-100				TD8-100	TD9-100	TD10-100	TD11-100	TD12-100	TD13-100
Security	SC-000	SC1-100	SC2-100	SC3-100	SC4-100	SC5-100			SC8-100				SC12-100	SC13-100
Plumbing	P0-000	P1-100	P2-100	P3-100	P4-100				P8-100				P12-100	P13-100
Fire Protection	FP0-000	FP1-100	FP2-100	FP3-100	FP4-100				FP8-100				FP12-100	FP13-100
Food Service	FS0-000	FS1-100	FS2-100	FS3-100	FS4-100	FS5-100	FS6-100	FS7-100	FS8-100	FS9-100	FS10-100	FS11-100	FS12-100	FS13-100
Other	??0-000	??1-100	??2-100	??3-100	??4-100	??5-100	??6-100	??7-100	??8-100	??9-100	??10-100	??11-100	??12-100	??13-100

Partition Types	A. See Partition Types information in BIM Standards.	• TFC Partition Types
Door Types	A. See Door Types information in BIM Standards.	• TFC Door Types
Room Styles	A. See Revit Room Styles information in BIM Standards.	• TFC Room Styles
Materials Designations	A. See Revit Materials information in BIM Standards.	• TFC Materials

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Abbreviations

BIM / CADD STANDARDS – OVERVIEW		
		LINKS
General	A. TFC has adopted Building Information Modeling (BIM) as a standard for all projects developed under TFC authority involving new construction and additions. B. For deferred maintenance and minor alteration projects, Building Information Modeling (BIM) is preferred but not necessarily required. 1. CADD software may be used only with prior written authorization from TFC's PM and TFC's IAECS Director.	• BIM Standards • CADD Standards • TFC Accepted Software Versions
Purpose	A. Facilitate implementation of TFC standards; B. Minimize document review turn-around time through standardization of: 1. Elements common to all TFC projects: 2. Format and organization of documents. C. Streamline TFC facilities management and maintenance processes from the date of occupancy through the life of the property.	
Software Requirements	A. **All BIM Model files and CADD files are required to be created using BIM or CADD authoring software in native file formats readable by the current software versions in use by TFC as indicated below:** 1. Autodesk Autocad – All versions through 2017 2. Autodesk Civil 3D - All versions through 2017 3. Autodesk Navisworks- 2017 4. Autodesk Revit - 2017 5. Autodesk Collaboration for Revit (C4R) - 2017 B. PSPs are responsible for providing proper software training for their staff members assigned to TFC projects.	• Autodesk Autocad • Autodesk Civil 3D • Autodesk Navisworks • Autodesk Revit • Autodesk Collaboration for Revit
BIM Team Collaboration	A. TFC will provide a cloud-based team collaboration environment for all project related BIM files as defined later in this document. B. PSPs will develop BIM files in TFC's collaboration environment in accordance with TFC's BIM standards.	• BIM Standards • BIM Standards – File Types

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Abbreviations

CADD STANDARDS		
STANDARD	**DESCRIPTION**	**LINKS**
Purpose	A. Provide a uniform format for CADD based projects developed under TFC authority.	
Template Files	A. The following standard files will be provided by TFC: 1. Cover Sheet; 2. Blank titleblock; 3. Partition Types and Details; and 4. Door Types Legend.	• TFC ACAD Template Files • TFC Partition Types • TFC Door Types
Existing Conditions Files	A. In cases of facility renovation projects, a copy of the existing CADD drawing files and associated Record Documentation will be made available for download through the project's IMPACT folder structure. B. These files and documents shall be utilized in the preparation of all related design and contract documents.	
Accuracy	A. All CAD drawings shall be drafted using precision input employing the most accurate source material available. B. For all drawing entities, zero tolerance is required: 1. All lines meet at intersections; 2. Straight lines are straight; 3. Blocks are inserted properly without overlap; 4. Closure of all polygons, etc.	

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CADD STANDARDS (CONTINUED)		
STANDARD	**DESCRIPTION**	**LINKS**
Color	A. Color will be used to control pen assignments and line weights. B. Select layer colors in accordance with the “Pen / Color Values Table”. C. Create all objects with color bylayer.	
Linetypes	A. Use only standard linetypes. B. Contour lines, dashed lines and other fonted lines shall be made of one continuous line segment, not a series of separate line segments. C. A sample drawing must be submitted and approved by the CAD Manager if multilines are used.	
Units	A. Set DDUNITS to architectural and angles to deg/min/sec with the precision set at 1/16"	
Blocks	A. Any graphic entity that occurs repeatedly in drawings should be made into a block. B. Insertion points for blocks shall be consistent with its placement in the drawing 1. Keep names simple and descriptive. 2. Use a logical insertion point (center of circle, bottom left corner of object). 3. Blocks must be drawn on layer 0 and inserted on the proper layer; or drawn on the proper layer/ layers and inserted on layer 0. C. Nested blocks are permitted but should be avoided whenever possible. D. If custom nested blocks are used, TFC’s CADD Manager must approve them.	
External Reference Files (XRefs)	A. Bind (do not insert) all reference files into the active file.	
Scale	A. All model space files must be drawn at real size (1-to-1). B. Objects must be created at full size: 1. A 50-foot wall must be drawn to 50 feet 0”; and 2. A 48-inch column must be drawn to 48 inches. C. **CAD files will be drawn in 2D only (not 3D).**	

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CADD STANDARDS (CONTINUED)

STANDARD	DESCRIPTION	LINKS
Text and Fonts	A. Use only standard text fonts supplied with AutoCAD's font library. B. Fonts for lettering shall be readable and plottable by AutoCAD with no additional software required. C. Text size must be legible and appropriate to the graphic information presented and the intended plotted scale of the drawing.	
Drawing Origin	A. The lower left corner of the building shall be placed at 0,0,0. B. For non-rectilinear buildings a logical origin point shall be established. C. The origin point must remain consistent between all model files for the purpose of xref coordination. D. **Once the origin is established, it may not be changed.**	
Dimensions	A. All dimensioning shall be associative. 1. Break lines and parts of cut-through views are an exception. B. Preferred dimension styles are provided in the template file.	
Hatching	A. Use pattern hatching sparingly since the practice significantly increases the AutoCAD entity count of a drawing. B. Associative hatching may be used only with the approval of TFC's CAD Manager. C. Use the solid command or polyline command to represent solid-filled regions when possible.	
Layers	A. CADD drawings shall be organized in accordance with the TFC Layering Guidelines. 1. If the TFC format does not include an appropriate layer name, layer names shall be in accordance with CAD Layer Guidelines as published by the American Institute of Architects (A.I.A.). B. The layer names shall be the long format and shall include the modifier. C. As these layer guidelines allow flexibility in the assignment of layers, a Layer Matrix shall be provided to TFC with the Record Documents. D. All third party add on application packages which modify or create CAD layers or other entities must comply with the AIA CAD Layer Guidelines.	

Return to Table of Contents * See next page for additional CADD Standards. Abbreviations

CADD STANDARDS (CONTINUED)		
STANDARD	**DESCRIPTION**	**LINKS**
Area Calculations	A. Include the following area calculations using area polylines included in the "as-built" submittal. 1. Construction Area – Area calculation boundary line will be drawn around the exterior Floor Plan for each level of building on layer **a-area-cons** 2. Gross Area - Area calculation boundary line will be drawn around interior Floor Plan for each level of building on layer **a-area-gros** 3. Room Area - Area calculation boundary line will be drawn around each room from the centerline of the wall on layer **a-area-room** B. Wall edges, partition centerlines and structural centerlines used for area polygons, should be saved in the layers listed above, as appropriate.	
Quality Check	A. Check the CADD files to verify the following: 1. All entities are: a. Dimensionally accurate; b. Inserted on the proper layer; 2. Column and grid line dimensions are correct; 3. Entity intersections meet each other properly; 4. Entities outside the drawing limits are deleted. 5. Colors and linetypes are assigned BYLAYER; 6. Layering system conforms to TFC and AIA CAD Layer Standard. B. Correct any non-compliant conditions. C. Confirm that all files are free of viruses.	
Purge / Audit	A. If the drawing file becomes too large, response to commands will be slow and regeneration times will be longer. B. Prior to submitting files: 1. Purge all unused blocks, linetypes and layers. 2. Audit all files and "Fix All Errors".	

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Abbreviations

BIM STANDARDS – FILE TYPES		
FILE TYPE	**DEFINITION**	**LINKS**
Purpose	A. Facilitate the effective and efficient implementation of BIM in the design and documentation of projects within TFC's jurisdictional authority. B. Allow for dynamic, simultaneous modifications of multiple portions of any given facility (by both internal and external service providers). C. Maintain an accurate, current, easily accessible record of the existing condition of all facilities even while proposed design and/or construction modifications are underway.	
General	A. There are two types of files for a TFC project: 1. **Model Files** contain all physical features of the project; a. Existing conditions to remain; i. The extent of existing conditions modeling required beyond the affected areas and the level of information to be included will be determined based on project-specific needs. b. Existing conditions to be removed; c. Proposed new construction; and d. All elements tagged with CSI Uniformat Level 4 categories. e. Annotations such as working dimensions, tags, and other annotation elements utilized for purposes other than formal documentation may be incorporated in the model files but must be purged prior to submitting final deliverable to TFC. 2. **Annotation Files** contain all non-physical formal documentation information (such as title blocks, notes, dimensions, details, schedules, etc.) describing the physical features contained in the model files. 3. All drawings and schedules required for assessment, review, bidding and construction shall be extractions from the model file(s). B. Separating the project into model and annotation files is intended to: 1. Limit the size of the "*Central File*"; 2. Maximize workflow efficiency; and 3. Protect discipline specific work from unauthorized modification.	• BIM Standards (Workflow Diagram)

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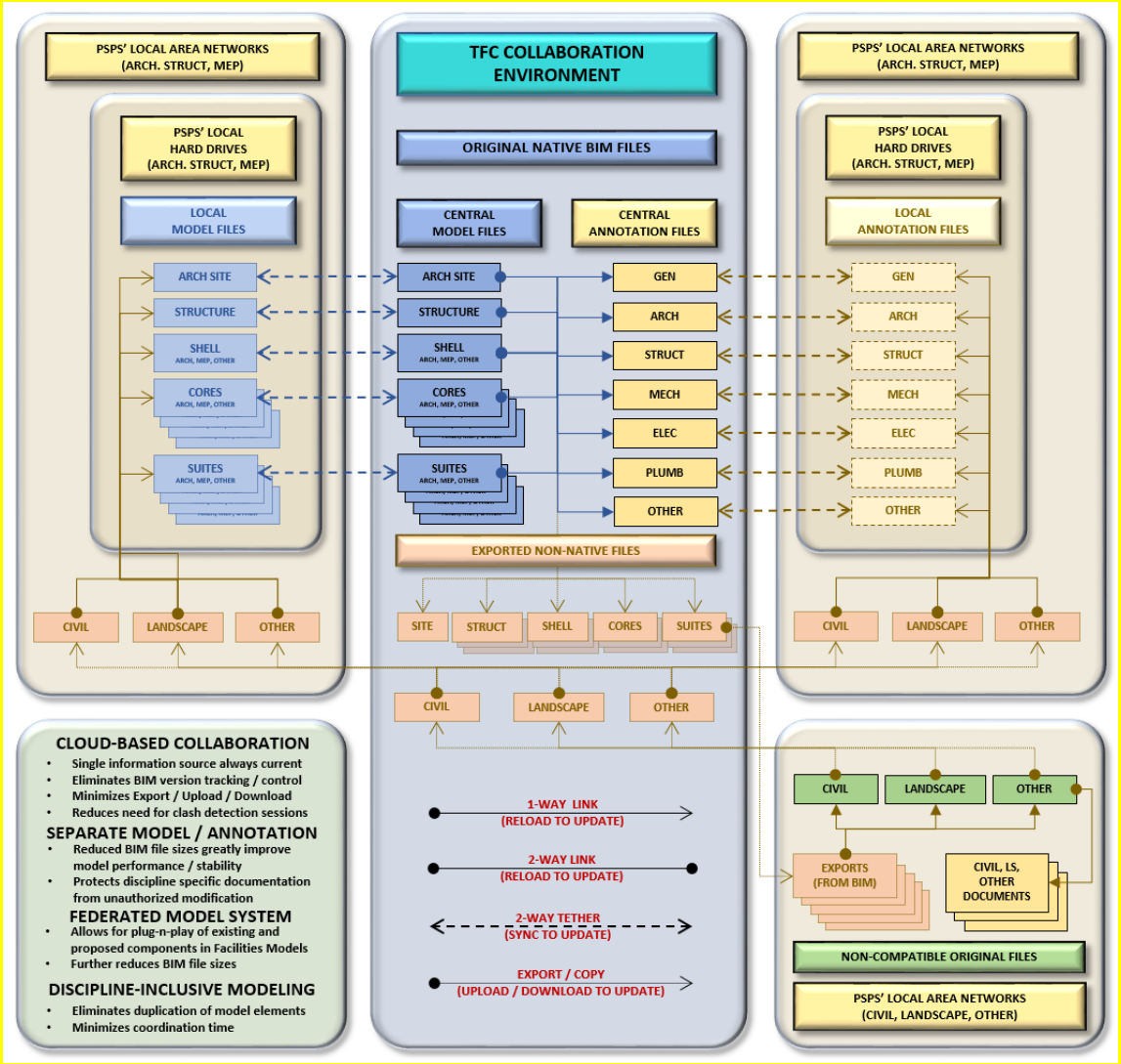
* See next page for additional BIM Workflow Diagram.

Abbreviations

BIM STANDARDS – WORKFLOW DIAGRAM



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* See next page for additional BIM File Types.

Abbreviations

BIM STANDARDS – FILE TYPES (CONTINUED)

FILE TYPE	DEFINITION	LINKS
Model Types	A. Each TFC facility has (or will have) a Federated system of Models linked together to create a unified whole: B. **Master Models:** Contain no native model elements, but are a conglomeration of Linked Component Models**:** 1. The various types of Master Models are: a. Campus Master Model; b. Site Master Models; and**;** c. Building Master Model. C. **Component Models** are discrete subsets of the larger facility containing native elements (from all disciplines) representing all physical features within the Component Model's clearly defined scope boundaries. 1. Each is linked into the Master Model and other relevant Component Models with "Origin to Origin" positioning. 2. No model objects are duplicated between the various Component Models. 3. The various types of Component Models are: a. Site Component Models; and b. Building Component Models D. Each Model has (or will have) multiple copies: 1. **Current Conditions Models**: a. Reflect the actual, current state of the facility; b. Are linked into the relevant Master Model; and c. Are located on TFC's local area network.. 2. **Project Copy Models**: a. Reflect proposed modifications for each unique and on-going project b. Are NOT linked into the Master Models. c. Are copied from the relevant Current Conditions Models at the beginning of any given project; d. Are hosted in TFC's cloud-based collaboration environment and provided to PSP by invitation from TFC.	

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* See next page for additional BIM File Types.

Abbreviations

BIM STANDARDS – FILE TYPES (CONTINUED)

FILE TYPE	DEFINITION	LINKS
Model Types (Continued)	3. **Archive Copy Models** are saved as a record of previous conditions. After Record Document changes are recorded in the Project Copy Models: a. Each Current Conditions Model is copied to the appropriate archive folder on TFC's network; and b. Each recently completed Record Model will be copied back into the Current folder on TFC's network and replaces its respective Current Conditions Model.	
Campus Master Models	A. Contain linked Building Component Model(s) and Site Component Model(s). B. **File naming convention:** 1. Current Conditions Model: **(Facility Abbreviation)_MODEL_CAMPUS_YYYY (Revit Version)** 2. Proposed Modifications Models: **(Facility Abbreviation) _(PRJ #)_MODEL_CAMPUS_YYYY (Revit Version)**	
Site Component Models	A. Contain all physical and regulatory features of portions of the facility's site: 1. Property Lines; 2. Easements and setbacks; 3. Topography; 4. Roadways; 5. Parking; 6. Walkways; 7. Site Utilities (terminate 5 feet from building face); 8. Walls and Fences; 9. Site Furnishings; 10. Landscape Planting; 11. Drainage Structures; B. **File naming convention:** 1. Current Conditions Model: **(Facility Abbreviation)_MODEL_SITE_YYYY (Revit Version)** 2. Proposed Modifications Models: **(Facility Abbreviation) _(PRJ #)_MODEL_SITE_YYYY (Revit Version)**	

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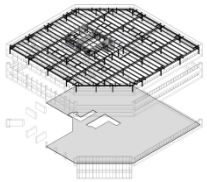
* See next page for additional BIM File Types.

Abbreviations

BIM STANDARDS – FILE TYPES (CONTINUED)

FILE TYPE	DEFINITION	LINKS
Building Master Models	A. Contain linked Building Component Models. B. **File naming convention:** 1. Current Conditions Model: **(Building Abbreviation)_MODEL_MASTER_YYYY (Revit Version)** 2. Proposed Modifications Models: Not Applicable	
Building Component Models	A. Contain all physical features of the relevant Building Components as defined later in this document. B. There are 4 types of Building Component Models: 1. Structural Model (one per building); 2. Building Shell Model (one per building); 3. Core Model (one per floor); and 4. Suite (Tenant Space) Model (one per suite). C. Shade Structures and pavilions are to be treated as independent buildings.	
Structural Component Models 	A. Contain All physical features of the building structure **(one file per building)**: 1. Structural Grid; 2. Foundations; 3. Structural Floors; 4. Structural Walls; and 5. Structural Framing. B. **File naming convention:** 1. Current Conditions Model: **(Facility Abbreviation)_MODEL_STRUCT_YYYY (Revit Version)** 2. Proposed Modifications Models: **(Facility Abbreviation)_(PRJ #)_MODEL_STRUCT_YYYY (Revit Version)**	

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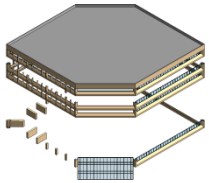
* See next page for additional BIM File Types.

Abbreviations

BIM STANDARDS – FILE TYPES (CONTINUED)

FILE TYPE	DEFINITION	LINKS
Building Shell Component Models 	A. Contain all Architectural and MEP features of the exterior building envelope and vertical building systems/components **(one file per building)**: 1. Exterior Walls; 2. Exterior Openings; 3. Awnings and canopies; 4. Roof Systems; 5. Vertical Circulation Elements (including shaft walls, openings, and opening protective devices); 6. Building-wide MEP equipment and distribution systems (including shaft walls, openings, and opening protective devices) - Terminate Mechanical, Electrical, and Plumbing systems using a "System Surrogate" Family to simulate the continuation of the relevant system in the adjoining Component Model(s): a. At the outside face of vertical shaft enclosures; and b. At the tenant side of the common corridor partition. B. **File naming convention:** 1. Current Conditions Model: **(Facility Abbreviation)_MODEL_SHELL_YYYY (Revit Version)** 2. Proposed Modifications Models: **(Facility Abbreviation)_(PRJ #)_MODEL_SHELL_YYYY (Revit Version)**	

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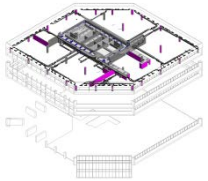
BIM STANDARDS – FILE TYPES (CONTINUED)		
FILE TYPE	**DEFINITION**	**LINKS**
Core Component Models 	A. Contain all features of the Building Common Areas including Architectural, MEP, and Life Safety systems **(one file per floor including the roof/penthouse)**: 1. Entrance Lobby; 2. Restrooms; 3. Corridors; 4. Tenant Space Demising Partitions and Openings; 5. Equipment Rooms; 6. Floor-wide MEP equipment and distribution systems - Terminate Mechanical, Electrical, and Plumbing systems using a “System Surrogate” Family to simulate the continuation of the relevant system in the adjoining Component Model(s): a. At the outside face of vertical shaft enclosures; and b. At the tenant side of the common corridor partition. B. **File naming convention:** 1. Current Conditions Model: **(Facility Abbreviation)_MODEL_CORE_L# (Floor Level) _YYYY (Revit Version)** 2. Proposed Modifications Models: **(Facility Abbreviation)_(PRJ #)_MODEL_CORE_L# (Floor Level)**	

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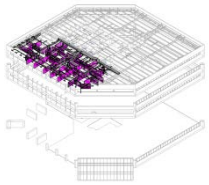
BIM STANDARDS – FILE TYPES (CONTINUED)

FILE TYPE	DEFINITION	LINKS
Suite Component Models (Tenant Spaces) 	A. Contain all features of individual Tenant Suites within the boundaries of its demising partitions including Architectural, MEP, and Life Safety systems (one file per tenant space): 1. Programmed spaces (tenant lobbies, restrooms, copy/print rooms, offices, storage rooms, etc.); 2. Furniture, Fixtures and Equipment (FF&E); 3. Vertical circulation serving only an individual tenant space; 4. MEP Systems - Terminate Mechanical, Electrical, and Plumbing systems using a “System Surrogate” Family to simulate the continuation of the relevant system in the adjoining Component Model(s): a. At the outside face of vertical shaft enclosures; b. At the tenant side of the common corridor partition; and c. At the centerlines of demising partitions between Suites. B. **File naming convention:** 1. Current Conditions Model: **(Facility Abbreviation)_MODEL_SUITE_(Suite Number) _YYYY (Revit Version)** 2. Proposed Modifications Models: **(Facility Abbreviation) _(PRJ #)_MODEL_ SUITE_ (Suite Number) _YYYY (Revit Version)**	

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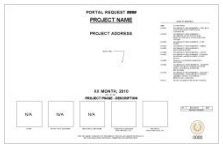
BIM STANDARDS – FILE TYPES (CONTINUED)

FILE TYPE	DEFINITION	LINKS
Project Annotation Files 	A. Contain all project-specific, non-physical information (such as notes, dimensions, etc.) describing the physical features contained in the Model Files. B. All relevant Model Files are linked in to each Project Annotation File with "Origin to Origin" positioning. C. **Explanatory Comments:** 1. Revit has several limiting factors that hinder the development of annotative information for multiple projects within a single file: a. Duplicate Sheet Numbers are not allowed; and b. Parametric titleblocks are populated by the data entered in the "Manage / Project Information" dialog box that does not accommodate input for more than one project per Revit file. 2. There are two possibilities for dealing with these limitations: a. Create a new Model File containing both model and annotation objects for each project. Duplicating a facility's Model File for each project is not desired because it would result in: (a) A large collection of uncoordinated redundant Model Files; and (b) Version control issues with no one Model File containing the latest information for the overall facility. b. Create a separate Annotation file for each project. Separating the annotative information from the Model File and creating a unique Annotation File for each project is recommended since it: (a) Works within Revit's limited capabilities to allow unique "Project Information" to be associated with each Project; and (b) Allows a single Model File to be linked into multiple Annotation Files thereby: (i) Eliminating redundant, uncoordinated Model information; and (ii) Providing access to the same, current Model information for all projects within the facility.	

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* See next page for additional BIM File Types.

Abbreviations

BIM STANDARDS – FILE TYPES (CONTINUED)

FILE TYPE	DEFINITION	LINKS
Existing Conditions Model(s)	A. In cases of facility renovation projects, a copy of any existing BIM file(s) and associated Record Documentation will be made available to PSP via TFC's cloud-based team collaboration environment. B. The existing conditions model file(s) and documentation shall be utilized in the preparation of all related design and contract documents.	
Templates	A. The following standard files will be provided to PSP by TFC: 1. Revit Model File with standardized information such as: a. Project Phasing (and associated graphic overrides); b. Graphic conventions; c. Wall (Partition) types; d. Door types; e. Door hardware functions; f. Room finish types. 2. Revit Annotation File(s) with standardized information such as: a. Drawing sheet organization; b. Graphic conventions; c. Partition keys and details; d. Legends; e. Schedules. 3. Revit Titleblocks: a. Cover Sheet; and b. Other standard sheets. B. **These template files are provided for the convenience of design professionals providing services to TFC for projects developed under TFC authority.** C. **The template files are intended to facilitate compliance with TFC design standards and must not replace the informed professional judgment of the PSP.** D. **It is solely the PSP's responsibility to determine the proper application of the standardized information contained within these files.**	• **TFC Revit 2013 Template Files** • Model File • Annotation Files (11x17) • Annotation Files (24x36) • Annotation Files (30x42) • **TFC Revit 2015 Template Files** • Model File • Annotation Files (11x17) • Annotation Files (24x36) • Annotation Files (30x42)

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BIM STANDARDS – TEAM COLLABORATION		
FILE TYPE	**DEFINITION**	**LINKS**
Revit Worksets	A. TFC does not utilize Worksets. B. If utilized by PSP, remove worksets from final deliverable.	
Collaboration for Revit (Cloud-Based Collaboration)	A. TFC has adopted a team collaboration process utilizing Autodesk's *"Collaboration for Revit (C4R)"*. **While not mandatory, TFC strongly recommends and urges all PSPs to utilize this process as it is the most efficient and effective means of delivering the final BIM model(s) in the format required by TFC.** 1. All project Model Files as defined above are located within a TFC managed / Autodesk hosted *"BIM 360 Team Hub"* cloud environment. a. TFC will act as the Administrator to provide access and permissions to the various project team members. 2. Local Copies of the Central Files are downloaded and cached on individual hard drives within each PSP's office via C4R. 3. PSPs are responsible for obtaining and maintaining C4R licensing for each Revit user within their respective offices.	• Autodesk Collaboration for Revit • BIM Standards (Workflow Diagram)
Revit Software Build	A. TFC will provide information regarding the Revit Software Build (Release Version, Build number, and Update Release). B. Primary PSP must insure that all project team members are using the same Revit Software Build (Release Version, Build number, and Update Release).	

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BIM STANDARDS – REVIT VIEW SETTINGS

VIEW	SCALE	DETAIL LEVEL	MODEL GRAPHICS STYLE	SHADOWS	CROP REGION	PHASE	PHASE FILTER
EXISTING							
Site Plans	1” = 20’-0”	Coarse	Hidden Line	Off	Off	Existing	Show All
Floor Plans	1/8” = 1’-0”	Medium	Hidden Line	Off	Off	Existing	Show All
Reflected Ceilings	1/8” = 1’-0”	Medium	Hidden Line	Off	Off	Existing	Show All
Exterior Elevations	1/8” = 1’-0”	Coarse	Hidden Line	Off	Off	Existing	Show All
Interior Elevations	3/8” = 1’-0”	Medium	Hidden Line	Off	Off	Existing	Show All
Building Sections	1/8” = 1’-0”	Medium	Hidden Line	Off	Off	Existing	Show All
Wall Sections	¾” = 1’-0”	Fine	Hidden Line	Off	Off	Existing	Show All
DEMOLITION							
Site Plans	1” = 20’-0”	Coarse	Hidden Line	Off	Off	Demolition	Show Previous + Demo
Floor Plans	1/8” = 1’-0”	Medium	Hidden Line	Off	Off	Demolition	Show Previous + Demo
Reflected Ceilings	1/8” = 1’-0”	Medium	Hidden Line	Off	Off	Demolition	Show Previous + Demo
Exterior Elevations	1/8” = 1’-0”	Coarse	Hidden Line	Off	Off	Demolition	Show Previous + Demo
Interior Elevations	3/8” = 1’-0”	Medium	Hidden Line	Off	Off	Demolition	Show Previous + Demo
Building Sections	1/8” = 1’-0”	Medium	Hidden Line	Off	Off	Demolition	Show Previous + Demo
Wall Sections	¾” = 1’-0”	Fine	Hidden Line	Off	Off	Demolition	Show Previous + Demo

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BIM STANDARDS – REVIT VIEW SETTINGS (CONTINUED)

VIEW	SCALE	DETAIL LEVEL	MODEL GRAPHICS STYLE	SHADOWS	CROP REGION	PHASE	PHASE FILTER
NEW CONSTRUCTION							
Site Plans	1” = 20’-0”	Coarse	Hidden Line	Off	Off	New Construction	Show Previous + New
Floor Plans	1/8” = 1’-0”	Medium	Hidden Line	Off	Off	New Construction	Show Previous + New
Reflected Ceilings	1/8” = 1’-0”	Medium	Hidden Line	Off	Off	New Construction	Show Previous + New
Exterior Elevations	1/8” = 1’-0”	Coarse	Hidden Line	Off	Off	New Construction	Show Previous + New
Interior Elevations	3/8” = 1’-0”	Medium	Hidden Line	Off	Off	New Construction	Show Previous + New
Building Sections	1/8” = 1’-0”	Medium	Hidden Line	Off	Off	New Construction	Show Previous + New
Wall Sections	¾” = 1’-0”	Fine	Hidden Line	Off	Off	New Construction	Show Previous + New

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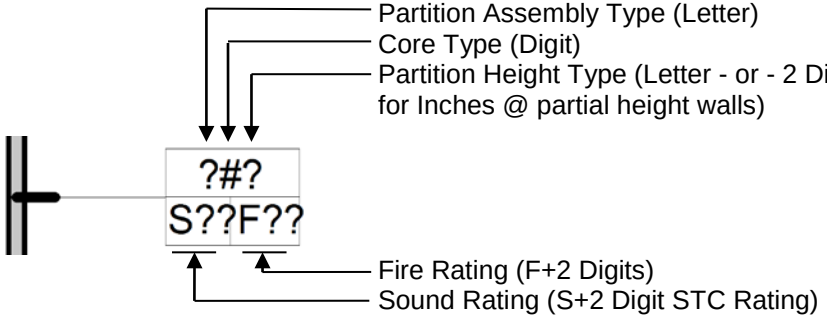
Abbreviations

BIM STANDARDS – REVIT PARTITIONS

ELEMENT	DEFINITION	LINKS
Wall (Partition) Type Tags	A. When a "W*all Type"* tag is placed, the correct partition type information is automatically populated.  B. Partition Assembly Type Codes: A = Metal stud framing with one layer of gypsum board on each side. B = Metal stud framing with two layers of gypsum board on each side. C = Metal stud furring partition with one layer of gypsum board on the finished side. D = Metal stud Shaftwall with one inch shaft-liner and varying layers of gypsum board on the finished face. E = Metal stud framing with resilient furring channels on one side and one layer of gypsum board on each finished face. F = Metal stud framing with resilient furring channels on one side and two layers of gypsum board on each finished face. G = Metal stud framed plumbing chase with 1 layer of gypsum board on each finished face. H = Partial height metal stud framing with one layer of gypsum board on each side. J = Fire rated metal stud partition with window(s) and deluge sprinklers. K = Concrete masonry units of varying widths.	

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BIM STANDARDS – REVIT PARTITIONS (CONTINUED)

ELEMENT	DEFINITION	LINKS
Wall (Partition) Type Tags (Continued)	A. Core Width Codes: 1 = 1 5/8" Metal Studs 3 = 3 5/8" Metal Studs 4 = 4" Metal Studs – or - 4" Nominal Masonry 6 = 6" Metal Studs – or - 6" Nominal Masonry 7 = 7" Clear inside width at metal stud framed plumbing chase 8 = 8" Metal Studs – or - 8" Nominal Masonry 9 = 9" Clear inside width at metal stud framed plumbing chase 12 = 12" Nominal Masonry B. Partition Height Codes: A = Above Ceiling (to 6" above ceiling) (Set the *"Top Offset"* constraint of the *"Wall"* to six inches more than the height of the ceiling in question) C = Ceiling (to bottom of ceiling) (Attach the *"Wall"* to the *"Ceiling"*) D = Deck High (to bottom of structural deck above) (Attach the *"Wall"* to the *"Structural Floor or Roof"* above) ## = Fixed Height (in inches to top of finish) (Set the *"Unconnected Height"* constraint of the *"Wall"* to the desired height of the partition at the top of the finished wall cap) C. Sound Rating Codes: S## (## = 2 digit STC rating number) D. Fire Rating Codes: F01 = 1 hour F02 = 2 hour F03 = 3 hour F04 = 4 hour F20 = 20 minutes F30 = 30 minutes F45 = 45 minutes F90 = 90 minutes	

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BIM STANDARDS – REVIT PARTITIONS (CONTINUED)		
ELEMENT	**DEFINITION**	**LINKS**
Wall (Partition) Type Tags (Continued)	E. When the "W*all Type"* is changed, the tag automatically updates with the appropriate information for the new partition type. F. Custom *"Wall Types"* can be generated if necessary, but must include the following parametric "*Identity Data"* information: 1. *Assembly Code* - Edit Uniformat selection to match the wall construction ; 2. *Type Mark* – Assign a new partition type (use TFC naming conventions); 3. *Fire Rating* – Indicate if applicable. 4. *Fire Test #* - Provide UL assembly number if partition is fire rated; 5. *Sound Test #* - Provide STC rating if applicable; and 6. *UL URL* – Provide web address for specific UL assembly.	
Wall (Partition) Types)	A. The Project Template file has a large library of TFC standard "*Wall Types"* (interior partitions) pre-loaded. B. All TFC standard "W*all Types"* contain parameter text that matches the appropriate TFC standard partition type. C. "W*all Type"* names are based on the Type Tag conventions above: 1. Example: "**A3DS-51**" a. Partition Type: **A** b. Core Width: **3** 5/8" metal stud framing c. Partition Height: **D**eck high d. Sound Rating: **S**TC **51** e. Fire Rating: None	

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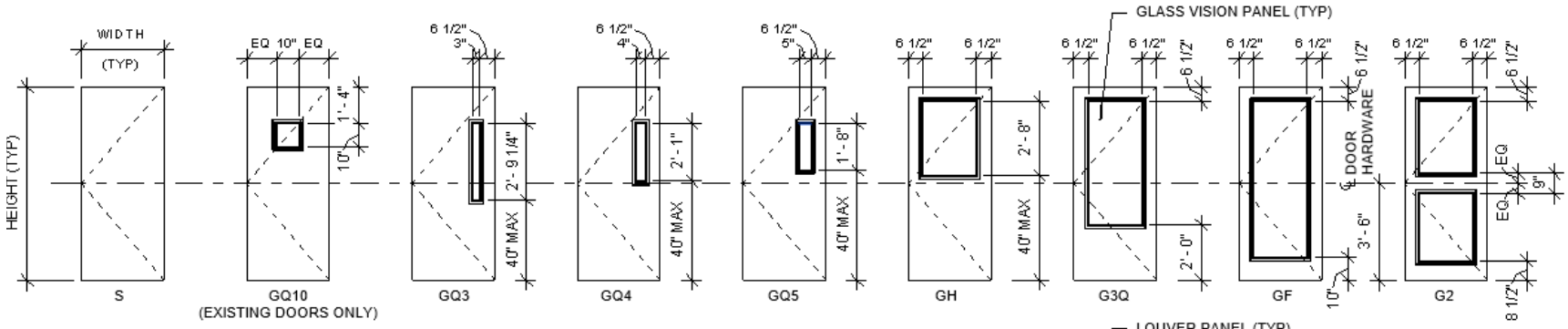
Abbreviations

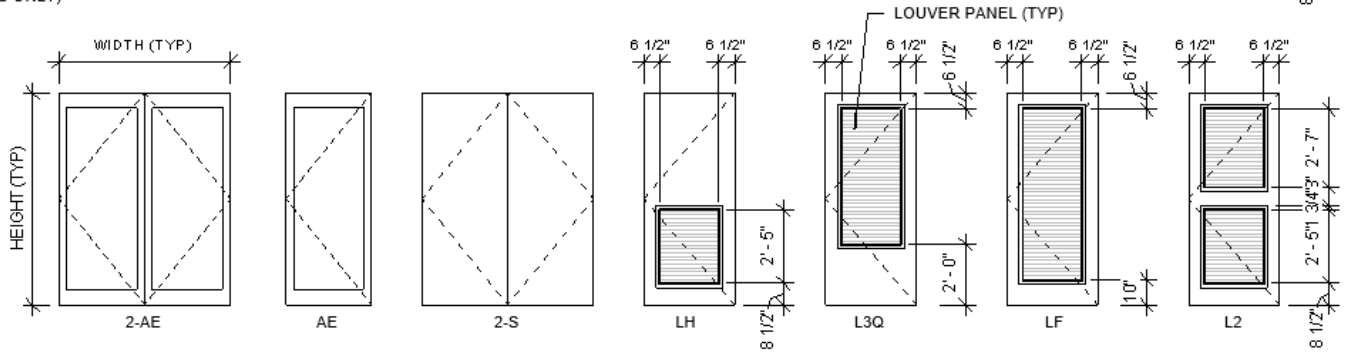
BIM STANDARDS – REVIT DOOR TYPES (KEY SCHEDULE)

The Project Template file has a library of TFC standard "*Door Types"* based on the function of the space the door is serving. Schedule information parameters are pre-defined as follows:



DOOR TYPE NOTES

1. "2-" IN FRONT OF THE DOOR PANEL TYPE DENOTES A PAIR
2. "AE" MEANS ALUMINUM ENTRANCE
3. VISION PANEL CONFIGURATIONS FOR PAIRS ARE SIMILAR TO SINGLE DOOR CONFIGURATIONS
4. PROVIDE 1/4" CLEAR TEMPERED GLASS IN ALL NON-FIRE RATED DOORS WITH VISION PANELS
5. PROVIDE 1/4" CLEAR FIRE RATED GLASS IN ALL FIRE RATED DOORS WITH VISION PANELS
6. NOT ALL DOOR TYPES ARE UTILIZED IN THIS PROJECT - SEE DOOR SCHEDULE FOR RELEVANT DOOR TYPES



Hardware Abbreviations	CL – Closer EA – Electronic Access ED – Exit Device FBA – Flush Bolt (Automatic) PA – Power Assist KP – Kick Plate	LA – Latchset LO – Lockset (Office) LP – Lockset (Privacy) LS – Lockset (Storage) PP – Push Plate PU - Pull	RH – Robe Hook RM – Removable Mullion STW – Stop (Wall) SS – Smoke Seal TH - Threshold WS - Weatherstripping

Return to Table of Contents * See next page for additional Revit Architecture Door Types. Abbreviations

BIM STANDARDS – REVIT DOOR TYPES (KEY SCHEDULE) (CONTINUED)

DOOR TYPE	WIDTH (inches)	HEIGHT (inches)	DOOR TYPE	DOOR MATERIAL	DOOR FINISH	FRAME TYPE	FRAME MATERIAL	FRAME FINISH	HARDWARE FUNCTIONS
Conference	36	84	GQ3	Solid Core Wood	Trans-parent	Single	Aluminum	Anodized	LO, CL, STW
Conference (Enhanced)	36	84	GQ3	Solid Core Wood	Trans-parent	Single Sidelite	Aluminum	Anodized	LO, CL, STW
Copy/Print	36	84	GQ5	Solid Core Wood	Trans-parent	Single	Aluminum	Anodized	LA, STW
Corridor (Exit)	36	84	S	Solid Core Wood	Trans-parent	Single	Aluminum	Anodized	LO, CL, STW
Restroom (Single)	36	84	S	Solid Core Wood	Trans-parent	Single	Aluminum	Anodized	LP, CL, STW
Restroom (Common)	36	84	S	Solid Core Wood	Trans-parent	Single	Aluminum	Anodized	PU, PP, KP, CL, STW
Server	36	84	S	Solid Core Wood	Trans-parent	Single	Aluminum	Anodized	EA, LS, STW
Stair	36	84	S	Hollow Metal	Paint	Single	Hollow Metal	Paint	ED, CL, SS
Storage (Single)	36	84	S	Solid Core Wood	Trans-parent	Single	Aluminum	Anodized	LS, STW
Storage (Double)	72	84	2-S	Solid Core Wood	Trans-parent	Single	Aluminum	Anodized	LS, RM
Entrance (Primary, Exterior)	72	84	2GF	Aluminum / Glass	Anodized	Double	Aluminum	Anodized	EA, ED, FBA, CL, PA, TH, WS
Entrance (Secondary, Exterior)	36	84	S	Hollow Metal	Paint	Single	Hollow Metal	Paint	EA, ED, CL, PA, TH, WS
File	36	84	GQ5	Solid Core Wood	Trans-parent	Single	Aluminum	Anodized	LS, CL, STW
Maintenance	36	84	S	Solid Core Wood	Trans-parent	Single	Hollow Metal	Paint	LS, CL, STW
MEP (Single)	36	84	S	Solid Core Wood	Trans-parent	Single	Hollow Metal	Paint	LS, CL, STW
MEP (Double)	72	84	2-S	Solid Core Wood	Trans-parent	Single	Hollow Metal	Paint	LS, CL

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* See next page for additional Revit Architecture Door Types.

Abbreviations

BIM STANDARDS – REVIT DOOR TYPES (KEY SCHEDULE) (CONTINUED)

DOOR TYPE	WIDTH (inches)	HEIGHT (inches)	DOOR TYPE	DOOR MATERIAL	DOOR FINISH	FRAME TYPE	FRAME MATERIAL	FRAME FINISH	HARDWARE FUNCTIONS
Office	36	84	S	Solid Core Wood	Trans-parent	Single	Aluminum	Anodized	LO, RH, STW
Office Suite	36	84	S	Solid Core Wood	Trans-parent	Single Sidelite	Aluminum	Anodized	LO, STW
Restroom (Single)	36	84	S	Solid Core Wood	Trans-parent	Single	Aluminum	Anodized	LP, CL, STW
Restroom (Common)	36	84	S	Solid Core Wood	Trans-parent	Single	Aluminum	Anodized	PP, PU, KP, CL, STW
Server	36	84	S	Solid Core Wood	Trans-parent	Single	Aluminum	Anodized	EA, LS, STW
Stair	36	84	S	Hollow Metal	Paint	Single	Hollow Metal	Paint	ED, CL, SS
Storage (Single)	36	84	S	Solid Core Wood	Trans-parent	Single	Aluminum	Anodized	LS, STW
Storage (Double)	72	84	2-S	Solid Core Wood	Trans-parent	Single	Aluminum	Anodized	LS, RM

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Abbreviations

BIM STANDARDS – REVIT ROOM STYLES (KEY SCHEDULE)

The Project Template file has a library of TFC standard "*Room Styles"* with Finish Schedule information parameters pre-defined.

ROOM TYPE	FLOOR	BASE	CEILING
Break	LVT	4" Rubber Cove	2'x2' ACT
Conference	Carpet Tile	4" Rubber Cove	2'x2' ACT
Conference (Enhanced)	Carpet Tile	Wood (Stained)	2'x2' ACT, Painted Gypsum Board
Copy / Print	LVT	4" Rubber Cove	2'x2' ACT
Corridor	Carpet Tile	4" Rubber Cove	2'x2' ACT
File	Carpet Tile	4" Rubber Cove	2'x2' ACT
Maintenance	Sealed Concrete	4" Rubber Cove	2'x2' ACT
MEP	Sealed Concrete	None	2'x2' ACT
Office	Carpet Tile	4" Rubber Cove	2'x2' ACT
Restroom	Tile	Tile	Painted Gypsum Board
Server	Static Dissipative Tile	4" Rubber Cove	2'x2' ACT
Shower	Tile	Tile	Water Resistant Gypsum Board (Epoxy Paint)
Stair	Sealed Concrete	None	2'x2' ACT, Painted Structure
Storage (General)	Sealed Concrete	None	Painted Structure
Storage (Office)	Carpet Tile	4" Rubber Cove	2'x2' ACT

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BIM STANDARDS – REVIT MATERIALS

The Project Template file has a library of TFC standard "*Materials"* with Design Selections Schedule information parameters pre-defined.

MARK	MATERIAL CLASS	DESCRIPTION
AT-AC01	Acoustical Treatment (AT)	Acoustical Coating (AC)
AT-SAP01	Acoustical Treatment (AT)	Sound Absorptive Panel (SAP)
AT-SRP01	Acoustical Treatment (AT)	Sound Reflective Panel (SRP)
AW-WD01	Architectural Woodwork (AW)	Wood Trim (WD)
AW-WP01	Architectural Woodwork (AW)	Wood Panel (WP)
AW-WV01	Architectural Woodwork (AW)	Wood Veneer (WV)
CF-BR01	Concrete Finish (CF)	Broom Finished Concrete (BR)
CF-CS01	Concrete Finish (CF)	Clear Sealer (CS)
CF-EA01	Concrete Finish (CF)	Exposed Aggregate (EA)
CF-IC01	Concrete Finish (CF)	Integral Color (IC)
CF-POL01	Concrete Finish (CF)	Polished (POL)
CF-RF01	Concrete Finish (CF)	Rough Formwork (RF)
CF-SB01	Concrete Finish (CF)	Sandblasted (SB)
CF-ST01	Concrete Finish (CF)	Stained (ST)
CF-TRW01	Concrete Finish (CF)	Trowel Finished (TR)

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BIM STANDARDS – REVIT MATERIALS (CONTINUED)

MARK	MATERIAL CLASS	DESCRIPTION
CL-AT01	Ceilings (CL)	Acoustical Ceiling Tile (AT)
CL-GD01	Ceilings (CL)	Acoustical Ceiling Grid (GD)
CL-LS01	Ceilings (CL)	Linear Ceiling System (LS) - Wood or Metal
CW-HG01	Casework (CW)	Hardware Grommet (HG)
CW-HP01	Casework (CW)	Hardware Pull (HP)
DS-CB01	Visual Display Surfaces (DS)	Chalk Board (CB)
DS-MB01	Visual Display Surfaces (DS)	Marker Board (MB)
DS-TB01	Visual Display Surfaces (DS)	Tack Board (TB)
FL-AF01	Flooring (FL)	Access Flooring (AF)
FL-CK01	Flooring (FL)	Cork (CK)
FL-CP01	Flooring (FL)	Carpet (CP) - Broadloom or Tile
FL-FA01	Flooring (FL)	Fluid Applied (FA)
FL-LS01	Flooring (FL)	Linoleum Sheet (LS)
FL-LT01	Flooring (FL)	Linoleum Tile (LT)
FL-SDT01	Flooring (FL)	Static Dissipative Tile (SDT)
FL-TZ01	Flooring (FL)	Terrazzo (TZ)
FL-VS01	Flooring (FL)	Vinyl Sheet (VS)

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* See next page for additional Revit Materials.

Abbreviations

BIM STANDARDS – REVIT MATERIALS (CONTINUED)

MARK	MATERIAL CLASS	DESCRIPTION
FL-VT01	Flooring (FL)	Vinyl Tile (VT) - VCT, Solid Vinyl..
FL-WD01	Flooring (FL)	Wood (WD)
GF-CK01	General Finishes (GF)	Cork (CK)
GF-CT01	General Finishes (GF)	Ceramic Tile (CT)
GF-CTG01	General Finishes (GF)	Ceramic Tile Grout (CTG)
GF-FB01	General Finishes (GF)	Fabric (FB)
GF-M01	General Finishes (GF)	Metal (M)
GF-PL01	General Finishes (GF)	Plastic Laminate (PL)
GF-QS01	General Finishes (GF)	Quartz Surface (QS)
GF-SS01	General Finishes (GF)	Solid Surface (SS)
GF-ST01	General Finishes (GF)	Stone Tile (ST)
GL-G01	Glazing (GL)	Glass (G) - Tempered, Decorative, Mirrored, LCD..
GL-PG01	Glazing (GL)	Plastic Glazing (PG)
GL-SF01	Glazing (GL)	Surface Applied Film (SF)

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BIM STANDARDS – REVIT MATERIALS (CONTINUED)

MARK	MATERIAL CLASS	DESCRIPTION
PC-CS01	Paints and Coatings (PC)	Clear Sealer (CS)
PC-HP01	Paints and Coatings (PC)	High Performance / Special Coatings (HP) - Fire Resistive, Galvanizing…
PC-IP01	Paints and Coatings (PC)	Interior Paint (IP)
PC-IS01	Paints and Coatings (PC)	Interior Stain (IS)
PC-IT01	Paints and Coatings (PC)	Interior Textured Coating (IT)
PC-WR01	Paints and Coatings (PC)	Water Repellant Coating (WR)
PC-XP01	Paints and Coatings (PC)	Exterior Paint (XP)
PC-XS01	Paints and Coatings (PC)	Exterior Stain (XS)
PC-XT01	Paints and Coatings (PC)	Exterior Textured Coating (XT)
WB-R401	Wall Base (WB)	Rubber 4" (R4)
WB-R601	Wall Base (WB)	Rubber 6" (R6)
WB-V401	Wall Base (WB)	Vinyl 4" (V4)
WB-V601	Wall Base (WB)	Vinyl 6" (V6)
WB-WD401	Wall Base (WB)	Wood 4" (WD4)
WB-WD601	Wall Base (WB)	Wood 6" (WD6)
WF-FP01	Interior Wall Finishes (WF)	Fabric Panel (FP)
WF-WC01	Interior Wall Finishes (WF)	Wall Covering (WC) – Fabric, Vinyl…

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* See next page for additional Revit Materials.

Abbreviations

BIM STANDARDS – REVIT MATERIALS (CONTINUED)

MARK	MATERIAL CLASS	DESCRIPTION
WP-CG01	Wall Protection (WP)	Corner Guard (CG)
WP-WG01	Wall Protection (WP)	Wall Guard (WG)
WT-BL01	Window Treatments (WT)	Blinds (BL)
WT-DR01	Window Treatments (WT)	Drapery / Curtain (DR)
WT-SH01	Window Treatments (WT)	Window Shades (SH)
XF-BK01	Exterior Finishes (XF)	Brick (BK)
XF-CFS01	Exterior Finishes (XF)	Cement Fiberboard Siding (CFS)
XF-CM01	Exterior Finishes (XF)	Concrete Masonry Unit (CM)
XF-CP01	Exterior Finishes (XF)	Cement Plaster (CP)
XF-GU01	Exterior Finishes (XF)	Glass Unit Masonry (GU)
XF-LS01	Exterior Finishes (XF)	Linear Soffit System (LS) - Wood or Metal
XF-MP01	Exterior Finishes (XF)	Metal Panel (MP)
XF-PC01	Exterior Finishes (XF)	Precast Concrete (PC)
XF-SP01	Exterior Finishes (XF)	Simulated Plaster (SP) – EIFS…
XF-SS01	Exterior Finishes (XF)	Simulated Stone (SS)
XF-ST01	Exterior Finishes (XF)	Stone (ST)
XF-WS01	Exterior Finishes (XF)	Wood Siding (WS)

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BIM STANDARDS –RECOMMENDED PRACTICES

TOPIC	RECOMMENDATION	LINKS
Model Planning & Coordination	A. Utilize a BIM Planning and Coordination Document such as in Appendix M (or a similar document) to identify authorship responsibility for each portion of the Building Model Central File. B. Do not modify or manipulate elements that other PSPs are responsible for.	• Appendix M - BIM Planning Document
Revit File Maintenance	A. Audit the Central Files periodically to identify and correct file irregularities. B. Compact the Central files at the end of each work day to reduce file size.	
Digital Data Agreement	A. It is TFC's intent to share the Project BIM Model with the Contractor for their use in project scheduling and coordination. B. TFC recommends that the PSP include a Division 1 Specification requirement for the Contractor, Subcontractors, and Suppliers to enter into a Digital Data Licensing Agreement such as AIA Document C106-2007.	• AIA Documents
Digital Coordination & Review	A. TFC utilizes Autodesk's free "Design Review" software to review all documentation submitted by PSPs.	• Autodesk Design Review Software
Revit Productivity	A. Download and utilize software extensions and bonus tools available from the Autodesk Subscription Center	

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APPENDICES		
NUMBER	**TITLE**	**DESCRIPTION**
A	**Reserved for Future Use**	A. (Previously "Standard Procedure for Measurement")
B	**Reserved for Future Use**	A. (Previously "Sustainable Building Practices")
C	**Indoor Air Quality Guidelines**	A. Design and construction requirements for meeting indoor air quality criteria.
D	**Reserved for Future Use**	A. (Previously "Energy Simulation Software").
E	**Reserved for Future Use**	A. (Previously "Resources")
F	**Landscaping Criteria**	A. Standards for the selection and specification of water conserving landscape materials.
G	**Facilities Programming Guide**	A. Recommended practices for the programming of facilities to be developed under the authority of TFC.
H	**DPS Standards (08/08/2006)**	A. Design standards for DPS projects.
I	**Reserved for Future Use**	A. (Previously "Common TAS Errors")
J	**DPS Design Issues**	A. A sampling of common design issues and preferred solutions on DPS projects.
K	**Project Manual Format and Specification Requirements**	A. Standard formatting for: 1. Project Manual Cover and signature pages; and 2. Specification sections. B. Standards for the content of select specification sections.
L	**Space Allocation Program**	A. Standard spreadsheet for recording square footages for proposed buildings, departments, and individual spaces.
M	**Building Information Model Planning and Coordination Document**	A. Matrix for assigning BIM scopes of work by discipline.

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WEB LINKS INCLUDED IN THIS DOCUMENT

STATE OF TEXAS

DIR	**Department of Information Resources**	http://www.dir.state.tx.us/
DPS	**Department of Public Safety**	http://www.txdps.state.tx.us/index.htm
HSC	**Health & Safety Code (Texas)**	http://www.statutes.legis.state.tx.us/?link=GV
SECO	**State Energy Conservation Office**	http://www.seco.cpa.state.tx.us/index.php
	Texas Design Standard Compliance Forms	http://www.seco.cpa.state.tx.us/resources/
	AHRAE 90.1 and ComCheck Adoption	https://www.energycodes.gov/adoption/states/texas
	SECO Suggested Water Efficiency Standards	http://www.seco.cpa.state.tx.us/tbec/waterconservation.php
SFMO	**State Fire Marshal's Office**	http://www.tdi.state.tx.us/fire/index.html
TCEQ	**Texas Commission on Environmental Quality**	https://www.tceq.texas.gov/
	TCEQ Construction Activities Regulations	http://www.tceq.state.tx.us/permitting/water_quality/stormwater/TXR15_AIR.html
TDI	**Texas Department of Insurance**	http://www.tdi.state.tx.us/
TDLR	**Texas Department of Licensing and Regulation – Home Page**	http://www.license.state.tx.us/index.htm
	Document Submission Requirements	http://www.license.state.tx.us/ab/abrules.htm#6850
	EAB (Elimination of Architectural Barriers)	http://www.license.state.tx.us/ab/ab.htm
	Fee Schedule	http://www.license.state.tx.us/ab/abfees.htm
	Online Registration	https://www.license.state.tx.us/ABProjectRegistrationOnline/
	TAS (Texas Accessibility Standards)	http://www.license.state.tx.us/ab/abtas.htm#toc
	Architectural Barriers Technical Memoranda	http://www.license.state.tx.us/ab/techmemos.htm
TAC	**Texas Administrative Code**	http://texreg.sos.state.tx.us/public/readtac$ext.viewtac

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WEB LINKS INCLUDED IN THIS DOCUMENT (CONTINUED)

STATE OF TEXAS (Continued)

TFC	**Texas Facilities Commission – Home Page**	http://www.tfc.state.tx.us/
	ACAD Template Files	http://a360.co/1fqN6R8
	TFC BIM 360 Team	https://mytfc.autodesk360.com/g/all_projects/active
	FDC (Facilities Design and Construction)	http://www.tfc.state.tx.us/divisions/facilities/prog/construct/
	EM (Energy Management)	http://www.tfc.state.tx.us/divisions/facilities/prog/FMD/EnergyManagement.html
	EPMCS (Electronic Project Management Control System)	https://impact.parsons.com/projects/TBPC/3didefault.asp
	Guidelines / Standards	http://www.tfc.state.tx.us/divisions/facilities/prog/construct/formsindex
	IMPACT (Web based Project Management Software)	https://impact.parsons.com/projects/TBPC/3didefault.asp
	Facilities Operations and Maintenance	http://www.tfc.state.tx.us/divisions/facilities/prog/pm/Maintenance.html
	Forms Index	http://www.tfc.state.tx.us/divisions/facilities/prog/construct/formsindex/
	Historically Underutilized Businesses (HUB)	http://www.tfc.state.tx.us/divisions/commissionadmin/prog/HUB/
	Procurement	http://www.tfc.state.tx.us/divisions/commissionadmin/prog/internal-procurement-1/
	Planning and Real Estate Management	http://www.tfc.state.tx.us/divisions/facilities/prog/planning
	UGC / SGC (Uniform and Supplementary General Conditions)	http://www.tfc.state.tx.us/divisions/facilities/prog/construct/formsindex
TGC	**Texas Statutes - Government Code**	http://www.statutes.legis.state.tx.us/?link=GV
THC	**Texas Historical Commission**	http://www.thc.state.tx.us/index.shtml

FEDERAL and LOCAL

ADA	Americans With Disabilities Act	http://www.ada.gov/
	2010 ADA Standards for Accessible Design	http://www.ada.gov/stdspdf.htm
	2010 Standards for State and Local Governments Title II	https://www.ada.gov/regs2010/2010ADAStandards/2010ADAstandards.htm#titleII
COA	City of Austin	http://www.austintexas.gov/

CAPITOL VIEW CORRIDOR

TGC 3151	Preservation of View of State Capitol	http://www.statutes.legis.state.tx.us/Docs/GV/pdf/GV.3151.pdf
LDC	Land Development Code (City of Austin)	https://www.municode.com/library/tx/austin/codes/code_of_ordinances?nodeId=TIT25LADE

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WEB LINKS INCLUDED IN THIS DOCUMENT (CONTINUED)

CODES AND REFERENCE STANDARDS

AIA D101-1995	Methods of Calculating the Area and Volume of Buildings;	https://www.aiabookstore.com/aia-documents/aia-documents-d-series.html
ANSI	American National Standards Institute	http://www.ansi.org/
ASHRAE	The American Society of Heating, Refrigerating and Air-Conditioning Engineers	http://www.ashrae.org/
	90.1 - Energy Conservation Design Standard for State-Funded Buildings	http://www.techstreet.com/lists/ashrae_standards.tmpl
	Standard 180	http://www.techstreet.com/searches/16010335
Comcheck	Energy Code Compliance Checking Software	http://energycode.pnl.gov/COMcheckWeb/
CSI MasterFormat	2004/2016 Edition Numbers and Titles	http://www.csiresources.org/practice/standards
ICC	International Code Council	https://www.iccsafe.org/
	International Code Council ICC Store	http://shop.iccsafe.org/
	Public Access E-Codes	https://codes.iccsafe.org/public/collections/I-Codes
	IECC	https://www.iccsafe.org/codes-tech-support/codes/2015-i-codes/iecc/
NFPA	**National Fire Protection Association – Home Page**	http://www.nfpa.org/
	NFPA 101 - Life Safety Code	http://www.nfpa.org/aboutthecodes/AboutTheCodes.asp?DocNum=101
	NFPA 70 - National Electrical Code	http://www.nfpa.org/aboutthecodes/AboutTheCodes.asp?DocNum=70
	NFPA 70E - Standard for Electrical Safety in the Workplace	http://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards?mode=code&code=70E

SOFTWARE

Autodesk *"Autocad"*	http://usa.autodesk.com/adsk/servlet/pc/index?id=13779270&siteID=123112
Autodesk *"Autocad Civil 3D"*	http://usa.autodesk.com/civil-3d/
Autodesk "*Collaboration for Revit (C4R)"*	http://www.autodesk.com/products/collaboration-for-revit/overview
Autodesk *"Design Review"*	http://www.autodesk.com/products/design-review/overview
Autodesk "*DWF Writer"*	http://usa.autodesk.com/dwf-writer/
Autodesk "*Navisworks"*	http://www.autodesk.com/products/navisworks/overview
Autodesk *"Revit"*	http://www.autodesk.com/products/revit-family/overview

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