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New in this Revision (older revisions addressed in 11.0 Record of Revisions)

Chapter and section title changed. Graded approach table reformatted and incorporated previous exceptions and Fire Alarm Work Alteration Levels (ES-DO-Memo-22-003). LANL Qualified Inspection Agency (QIA) term introduced. PPDs for Repair eliminated. Incorporated VAR-10564, *Test and Inspection Plan (TIP) Development Responsibility*. Early work release linked to FDAR-permitted scope. Deferred design and changes-to-design requirements changed. Prefab article revised to exclude garages, other updates. D&D article expanded. R2A2s moved to App A. New App B for prefab storage incorporates VAR-10561, *Transportainer and ARMAG Installation Requirements;* added carports, sheds, and vault toilets. Programmatic restraint moved to ESM Ch. 5. Minor changes for 2021 IBC adoption. Other changes throughout.

This mandatory functional series document is available online at https://engstandards.lanl.gov

It derives from P342, *Engineering Standards*, which is issued under the authority of the Division Leader of Engineering Services as part of the Conduct of Engineering program implementation at the Laboratory.

Please contact the ESM Building Code Program (BCP) chapter POC for upkeep, interpretation, and variance issues.

The LANL Building Official Webpage is here

1.0 PURPOSE

A. To establish the LANL Building Code Program ("Program" or "BCP").[1]

2.0 SCOPE AND APPLICABILITY

A. LANL is a Federal site responsible for multiple Program roles: the project owner and the jurisdiction, always—and also the constructor when self-performing. This chapter addresses all roles, establishing (1) code-related expectations for projects and (2) the authority and duties of the LANL Building Official (LBO). The LBO[2] performs design reviews, permitting, and inspections. Some activities are delegated as indicated throughout the chapter.

B. LANL organizations and their Subcontractors are required to comply with this Chapter and to support the LBO and related activities in support of the Program.

C. LANL has three main SSC categories: (i) facility; (ii) utility, infrastructure, and environmental; and (iii) programmatic (tenant, R&D, or process). Of these, facility is always subject to LANL's Program (this chapter) while the other two may be; see Tables IBC-GEN-1 & -2 for detailed rules and examples of work in the Program scope.

D. Exclusion from the Program does not include exclusion from other applicable codes such as the NEC or ASME, nor exclusion from other requirements elsewhere in the ESM including 10CFR851 (pressure, fire, etc.) and required inspections based on ML level, written LANL policy, or otherwise. *Guidance: Also, the legal concept of standard of care suggests that even SSCs that are not IBC (e.g., stairs in the wild) meet IBC requirements (e.g., dimensions and quality) to provide the generally accepted level of safety.*

E. This chapter and the IBC, IEBC, NEC, and other LANL-adopted building codes listed in Attachment A apply to all Management Levels (MLs; for risk management, etc.) of work covered by this chapter's scope.

1. *The IBC addresses the construction, use, and occupancy of new buildings and connected/attached appurtenances, building systems and components, and certain R&D, tenant, process, and standalone equipment and structures.*[3]

2. *The IEBC addresses existing structure, system, and component (SSC) repair, alteration, change of occupancy, additions, relocation, and demolition of same.*

[1] Drivers include the International Building Code (IBC), International Existing Building Code (IEBC), other building codes and standards referenced by them, LANL amendments to preceeding, and other construction related LANL Engineering Standard requirements. These codes are required by NNSA's LANL contract including Appendix B (primarily DOE O 420.1C, Att 1, 1.c). See also ESM Ch.1 Z10.
[2] The LBO is delegated by NA-LA (see ESM Ch. Section Z10). Those performing building official work must be delegated by the LBO to act on the LBO's behalf by this chapter or other method.
[3] Building repair, alteration, etc. scope is governed by the IEBC version adopted and amended by IBC-GEN Att B, LEBC

Table IBC-GEN-1 Work Always in Program (also see Table GEN-2)

Facility-owned building systems, building equipment, and building components, including those outside the building. Examples: A remote boiler or emergency generator (equipment providing services to and owned by the facility).
Repair, alteration, change of occupancy, additions, relocation, and demolition of all in-scope SSCs (will be per IEBC).
Work listed at IBC 105.2 as excluded from permitting (which is still subject to the IBC). Examples: low fences, sidewalks and driveways, sheds/containers under 120 sq. ft., retaining walls that could affect a building or personnel if they failed, etc.
New buildings including prefabs (see Prefab heading later in this document) and appurtenances regardless of ownership, parking lots, retaining walls near pedestrians, tanks, towers, and large signs and other structures that are IBC 312 "U" occupancy.
Temporary SSCs that are in Program per other criteria in these two tables
Geotechnical work: soils testing firm must be on LBO approval listing
Programmatic equipment installation that could negatively affect[4]: • life safety: fire alarm, suppression, firestopping, occupant health, or means of egress — e.g., by normal location[5] or seismic-induced sliding, toppling, uplift, or breaching (especially when containing hazardous materials[6]), • facility structural integrity (floor or wall loading, etc.),[7] or • facility system performance (especially life safety systems post-earthquake/"2-over-1") Examples: • adding electrical service or new, large loads (75KVA [~100A] and hardwired-in), or demands on other common utilities, • glovebox and fume hood location, anchorage, major use of building services, hazardous process piping • office cubicle installation (e.g., egress), or • modular rooms like cleanrooms, PERMACONS, etc.[8]

[4] Most prog equip is not subject to the tech req'ts of the IBC/IEBC, but Ch 16 Program is used to control safety of installation (anchorage, adequacy of structure, integrity), so this Program must be used for installation to ensure life safety and to control anchorage, hookup, and collapse potential, both technically and administratively.
[5] An IBC/NFPA 101 egress evaluation is required before moving any equipment into a potential egress pathway.
[6] IBC 1613.1 on seismic integrity includes nonstructural components. Also, if seismic failure of hazmat confinement inside a building is a risk to the occupants, it must be seismically designed/qualified (with I_p = 1.5) per ASCE 7 Sections 13.2.1 and 13.6.13.2.
[7] Structural: When new programmatic equipment is to be installed without the removal of equipment, components, etc. of at least the same weight, the following is required: compare the weight of the new equip., plus all weight currently supported by the floor or wall (that will remain after installation of equip.) to the gravity-load (i.e., dead load &/or live load) capacity to which the floor or wall was designed. If the new weight exceeds the original design capacity, request guidance on how the project must proceed from Standards Structural POC; if less than original design capacity, project can document and proceed. Finally, if the new weight consists of a concentrated load(s) and the original design capacity is based solely on distributed load(s), the "new-vs-original comparison" must account for this difference (i.e., by either distributing the concentrated load such that it's $\leq$ distributed-load capacity or proving via analysis that adequate capacity exists to resist the concentrated load).
[8] Issues include egress, sprinklering, anchorage where structural calcs support floor loading in multi-stories. May not require structural calcs for seismic resistance. Ensures safety and controls anchorage and hookup.

Table IBC-GEN-2 Work in Building Code Program as Noted

Criteria (work scope)	Outside Bldg. Program	In Bldg. Program
Programmatic equipment installation, minor modification, or removal	NOT meeting any other criteria in Tables IBC-GEN-1 & -2. Examples: Photocopiers; small, table-top, plug-fed pieces of analytical equipment[9]	If meeting any other criteria in Tables IBC-GEN-1 & 2, then installation is in-Program. Examples in previous table's last row.
Utilities or Environmental Programs installed or owned equipment and civil structures[10]	When not listed to the right: Utilities: Distribution of electrical and other services Infrastructure: Roads and roadway retaining walls, wells and monitoring equipment, flood control	Buildings, utility service laterals to buildings, parking lots, EV chargers, retaining walls over 4' and near pedestrians, electric gates, tanks, and other structures that are IBC 312 "U" occupancy, etc.
Gloveboxes, fume hoods, and stands[11]	contents design/fab	Installation* and integrity (ref. IBC 1613.1, ASCE 7 Sections 13.2.1 and 13.6.13.2)
Rad protection systems[12]	component design/fab	Installation*
Security systems[13]	component design/fab and some Material Access Area features (e.g., PIDAS/PIDADS)	Installation*
Telecom (unsecure or secure) in/on a building[14]	component design/fab	Installation*

* **NOTE:** "Installation" includes anchorage per ESM Ch. 5, other life-safety issues (location/egress, fire suppression, fire stopping), and service connections/tie-ins.

F. For in-scope work, applicable code technical requirements must be met. LANL uses a three-tiered tailored approach for administrative control relative to permitting, inspection, etc. It is described by Table IBC-GEN-3 which follows.

[9] Based on the IBC and IEBC scope and purpose statements, code topics addressed, and typical use by jurisdictions.
[10] Based on IBC-2021 105.2.2 that exempts public service agency utilities. UI acts in this capacity and controls utility and infrastructure work following other, non-IBC codes and standards, both national and LANL (ESM Ch.3 Civil, Ch. 7 Electrical). For electrical utilities, the IBC/IBC Program breakpoint is the UI ownership interface (normally the low voltage terminals of the secondary unit substation transformer, per Ch.7). LANL breakpoints per UI's MOU for sewer, water, gas, and steam ownership by UI are the respective dividing points.
[11] GBs are considered facility in some FODs and programmatic in others but, either way, aren't traditional building systems.
[12] Rad monitoring not a traditional building system but same issues as security systems above
[13] Security can be traditional building systems but many at LANL are specialized. Regardless, most interface with other building systems.
[14] Telecom is a utility but same issues as security systems above.

Table IBC-GEN-3 Three-Tiered Graded Administrative Approach

Note: This approach is for administrative requirements only; there is no grading on the quality of design, nor the need to comply with all LANL Standards.[15]

LOWEST RISK
Qualifying Tasks 1. **IEBC Repair or Level 1 Alteration/replacement in kind (RIK), including fire alarm**[16] (Level 1 Alteration = removal and replacement or covering of existing elements, equipment, or fixtures using new ones that serve the same purpose but meet current ESM expectations) 2. **ML-4 electrical circuits:** Adding, modifying, or deleting same in panels of existing buildings provided they do not exceed 240v or 50A per circuit. See footnote for conditions imposed.[17] 3. **Work Exempt from Permit per IBC 105.2** such as low fences, sidewalks and driveways, sheds/containers under 120 sq. ft., retaining walls. 4. **Low-risk demolition** (see D&D heading later in this document)
Design Review: Required; competent SMEs chosen by FDAR or Eng Manager. Screen for FP Office review (and perhaps inspection) using "Triggers" listing on Ch 2 & 16 webpages.
Permitting: FDAR[18]
Test & Inspection Plan (TIP)[19]: Generally, not required. Planning may be by work package statement and/or post-modification test (PMT) document in DCF; FDAR discretion.

[15] Thus, comply with ESM, specs, etc. Note, the IEBC permits subtasks within a project to have different task/work/Alt Level categories and then follow technical requirements for same; this LANL graded admin approach could be applied to project subtasks similarly, but it is best to apply the highest risk level of the project to all subtasks to provide reviewers the full picture.

[16] Per Fire Alarm Work Alteration Levels (ES-DO-Memo-22-003), RIK projects replace an existing obsolete control panel with an equivalent replacement control panel. This type of project is selected if the building detection is generally compliant and only the control panel and devices are obsolete. There may be some additional related work performed to comply with modern code such as installing a smoke detector above the panel, adding an alternate power source or slightly relocating the panel next to the existing panel. Additionally, the modern panels generally have additional capability over what the legacy panel had although this capability is not typically used. The deltas are considered either related work or incidental to the panel replacement and does not significantly improve capability or function over the existing panel. Record drawings may be improved as part of this process. No other additions to field devices or other detection upgrades are performed as part of a RIK project.

[17] Circuit mod conditions for use: Load evaluation confirms the change will not overload the electrical distribution system. The grounding system must be sound. Design performed and checked by technically competent individuals and any design documents bear the signatures of both. Change is implemented through an MSS work package that approved by an Electrical Safety Officer (ESO). Inspection by a QIA when required by ESO and include a polarity check. Panel schedule updated. Basis: Incorporates parts of VAR-10527 regarding DCF thresholds and supersedes VAR-2015-058 [its basis: (1) All code technical requirements shall be met. (2) ESM Chapter 16, IBC-GEN considers large electrical loads to be 75 kVA and above based on now-historical ESM Chapter 7 Section D5000 requirements for formal design when over 100A (~75 kVA). P101-13, Electrical Safety Program, P101-13 Class 1.2A uses 230V/125 kVA as a threshold in hazard control. (3) NMAC 14.5.2 (Permits), para 10.K.1, notes that "installation with a calculated service capacity over 100 kVA single-phase or over 225 kVA three phase must be stamped by an electrical engineer." The implication is that work under those thresholds is lower risk.]

[18] FDAR PPD Forms/log and control of change meets IBC annual permit control needs (no LBO stamp). (2015: 105.1.1–2). Also NMAC 14.5.2.19 (which uses terms differently than IEBC): "The scope of this permit is repair or maintenance performed on existing [electrical/mechanical/general] systems in [commercial/industrial] facilities. Repair and maintenance as used in the scope of this permit type means work that is necessary to maintain an established, approved…installation, which work is required to keep the installation operating in its approved function and configuration. Repair and maintenance includes a like-for-like exchange of a portion or portions of an approved…installation, but does not include work on systems that are generally considered in the industry to be related to be life safety systems, or work that entails new construction, relocation, expansion or alteration of an…installation or any portion thereof…" ICC document "2009 IEBC Q&A" 1-15 suggests annual permit is not an exemption from inspection, but self-inspection satisfies where allowed. FDAR signature on Lowest and Moderate Risk design or DCF indicates permitting approval (no LBO stamp).

[19] TIP: Template is IBC-IP Att. I. Otherwise, only required as shown above (and when not fully covered by an SSI). Nuclear SSC work should always use these plans (or a VIT). *Guidance: ESM Ch. 7 Electrical's website has a guide to specifying inspection for*

Test & Inspection: Often not required or satisfied by PMT or other report (FDAR determines, see IBC-IP Att. J, *Inspection of Lowest/Moderate Risk Category Work*)
Certificate of Occupancy (CoO): Not required

MODERATE RISK
Qualifying Tasks 1. **IEBC Level "2A" Alteration**[20]: a. System reconfiguration, extension, additional equipment installation, or removal — but isn't 2B as shown under Highest Risk. b. Fire protection (FP): i. Simple reconfiguration of existing systems, replacement of existing devices, and limited extensions and upgrades without a change to the overall design basis, performance criteria, or functionality,[21] or other simple tasks deemed such by Fire Marshal. ii. Fire alarm full system replacement.[22] 2. **Prefab storage buildings** meeting Appendix B conditions: a. Incidental occupancy* * Occupied for a total of less than 2 hours/day, yearly average per IBC-GEN, Prefab article b. Non-hazardous storage c. No connected utilities d. Length 40' maximum e. Not used for work or work-like activities such as handling, fabricating, maintenance, offices, break areas, etc. NOTE: Non-App. B prefabs are Highest Risk.
Design Review: Required; competent SMEs chosen by FDAR or Eng Manager. Screen for FP Office review using "Triggers" listing on Ch 2 & 16 webpages.
Permitting: FDAR
Test & Inspection Plan (TIP)[19]: Generally required. For simpler task, may be satisfied by post-modification test (PMT) or other plan; FDAR determines. See also IBC-IP Att. J, *Inspection of Lowest/Moderate Risk Category Work*)
Test & Inspection: Required. A QIA shall inspect for FP, seismic anchorage, piping, electrical, welding, and other tasks and when specifically required by codes or other LANL programs.
Certificate of Occupancy (CoO): No, unless App. B, *Prefab Storage Approach,* is being used.

smaller tasks References. SSI: When required by IBC 1704.3, a Statement of Special Inspections (per IBC-IP and its Att B) must ALSO be developed/used along with TIP. For FDAR-permitted tasks, FDAR signs in LBO stamp field.

[20] 2A/2B distinction is LANL-created for risk grading purposes and not present in IEBC.

[21] Might include exit signs, emergency lights, and/or sprinkler heads (or lowering of same) often in response to architectural changes or reconfiguration of other systems.

[22] Per Fire Alarm Work Alteration Levels (ES-DO-Memo-22-003), Full System Replacement Projects (FSRP) replace the control panel and bring the rest of the building up to code compliance. FSRP is when the system is incomplete or has legacy deficiencies in addition to being obsolete. This project will typically add significant functionality and capability to the system. Additional buildings within a complex may be added in. Typically, the entire system will be replaced and upgraded and new record drawings will be produced. New fire alarm control panels would not be installed under this category where none existed before. This category includes substantial extensions to existing systems.

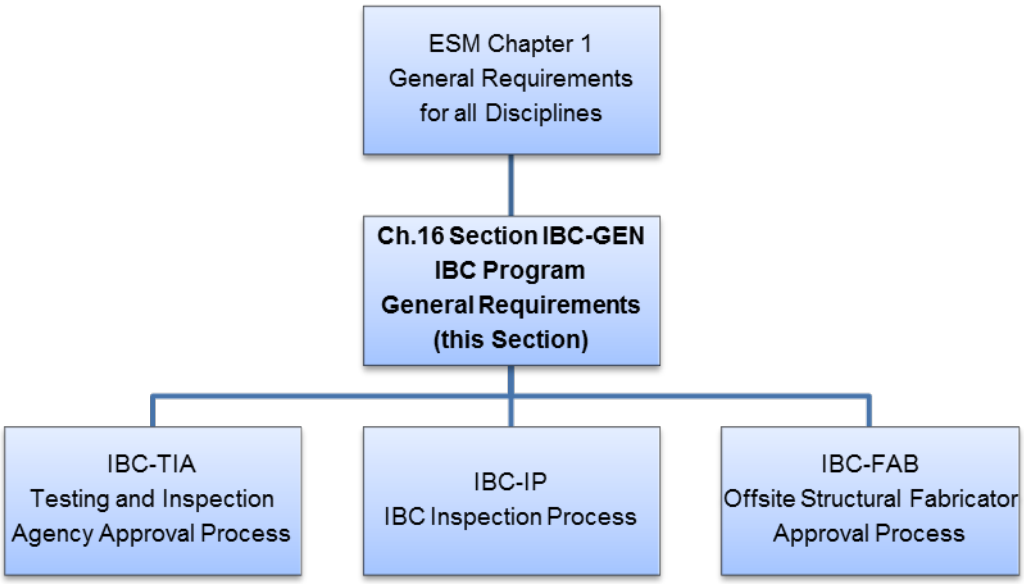
HIGHEST RISK
Qualifying Tasks 1. **IBC; new structures, including any prefabs not meeting App B,** ***Prefab Storage Approach*** (prefabs are addressed in IBC-GEN Prefab Article). 2. **IEBC Level "2B" Alteration[20]:** System reconfiguration, extension, additional equipment installation, or removal but includes: a. possible egress aspects (cubicle or workspace reconfiguration[23] or door or window addition or elimination) and/or b. life safety or related systems affected, including emergency and egress lighting and control thereof or, for sprinkler systems, change in system type, required output, or new subsystems. (See exceptions given in Moderate Risk, 2A above) 3. **IEBC Level 3 Alteration**: Work area exceeds 50% of the building footprint OR complex reroofing.[24] 4. **IEBC Change of Occupancy:** By itself or together with an alteration of any level (IEBC Ch. 3 & 10) 5. **IEBC Addition** (IEBC Ch. 3 & 11) 6. **IEBC Historic Buildings** (IEBC Ch. 3 & 12) 7. **IEBC Relocation** (IEBC Ch. 3 & 14) 8. **IEBC Demolition (D&D) – when High Risk (major structural)** (see IBC-GEN D&D heading on this)
Design Review: Required. Reviewers must be listed on IBC/IEBC Review SME List on Ch. 16 webpage. FP Office review required unless waived by Fire Marshal (Reference FP "Triggers" listing on website).
Permitting: LBO via Design Package Reviewer (LBO-DPR)
Test & Inspection Plan (TIP) and Test & Inspection: TIP required[25]; inspection by QIA (ref. IBC-IP Att. J, *Inspection of Lowest/Moderate Risk Category Work*)
Certificate of Occupancy (CoO): Required[25]

G. Where the LANL Engineering Standards or any design for LANL refers to the IBC or IEBC, also refer to the LANL amendments in Attachments A and B of this document.

H. Additional requirements are typical for ML-1 and ML-2 (nuclear) and ML-3 work; such higher-quality processes may not reduce IBC levels of quality or inspections unless specifically authorized by the LBO in writing. *Guidance: ML-1, ML-2, and ML-3 work will normally require additional controls above the IBC-driven basics due to the nature of these projects.*

[23] Includes system furniture (cubicle) partitions over 5'-9" high (105.2 exempts those shorter).
[24] E.g., parapet bracing, overlays, changing from low slope to steep, or adding ballast.
[25] May be waived by LBO in writing [e.g., IEBC Change of Occupancy without SSC alteration or D&D (but any associated utility capping inspection performed as required by LANL Standards].

3.0 CHAPTER ORGANIZATION



4.0 CHAPTER ACRONYMS/DEFINITIONS

ACRONYM/TERM	DESCRIPTION
ASTM	ASTM International
Building services	Plumbing, heating, electrical, ventilating, air conditioning, refrigerating, controls, fire alarm and suppression, elevators, boilers, pressure vessels, telcom/data, building security systems, and other mechanical and electrical systems or components required to make a facility fully functional for the required occupancy.
BCP	Building Code Program (or "Program")"; this chapter. Term used in the LANL Standards only; may mean Baseline Change Proposal in project controls documents.
Chief Inspectors	Individuals delegated by LBO to oversee inspection matters. See organization chart posted with Ch 16.
Contractor	The LANL Managing and Operating organization (e.g., Triad)
Deputy Building Officials	Individuals delegated total or partial authority to act for the LBO. The LANL Fire Marshal (FP Office/AHJ) is in essence a deputy acting for fire and life-safety related matters. See organization chart posted with Ch 16. [ref. IBC-GEN Att A (LBC) 103.3]
DPIRC or RDPIRC	(Registered) design professional in responsible charge; the engineer or architect of record; the person(s) sealing (stamping) the documents. Non-LANL DPIRCs are IDed to LBO per IBC-GEN Form 3; if no Form 3 is produced, then by default the DPIRC is LANL. [NOTE: Professional registration and sealing is normally not required for LANL designers (see ESM Ch.1 Z10 Design Output section), but DPIRC must be appointed by the project/Engineering Manager]. Ref. IBC-2021 107.3.4.
DPR	Design Package Reviewer. More formally the LBO-DPR; person(s) performing the final review and permitting of the Highest Risk projects and occasionally others.

EOR	Engineer of record. Often the same as DPIRC but term may also be used for the designer for a portion of the whole (e.g., structural).
ESM	Engineering Standards Manual
fabricator	For this chapter only, the firm fabricating structural steel, concrete, etc. offsite
FDAR	Facility Design Authority Representative. A delegate of the Design Authority. [PD340]
IAS	International Accreditation Service, a subsidiary of ICC
IBC	International Building Code, published by ICC. Internal link via IHS.
IBC Program	Former title of ESM Chapter 16 (and IBC-GEN was "IBC General Requirements").
ICC	International Code Council
ICC-ESR	Evaluation Service Report issued by ICC-ES subsidiary of ICC.
IEBC	International Existing Building Code, a product of ICC. Internal link via IHS.
IPD	Institutional Project Delivery Group of Eng Services Division of LANL
LANL Inspector	A LANL (e.g., Triad) or contracted employee performing duties approved by the LANL Chief Inspector or another LANL inspection organization. SD350 term is Owners Building Inspector (OBI), or simply "Inspector."
LBC	LANL Building Code; the IBC as amended by LANL (i.e., Att. A of this document). Where the LANL Standards including this chapter invoke the IBC, interpret to mean the LBC (except in obvious references to the source document; "IBC" is used at this time due to better recognition).
LBO	LANL Building Official(s); the individual(s) delegated by NNSA (ref. ESM Ch. 1 Section Z10)
LEBC	LANL Existing Building Code. Amendments to the IEBC for buildings and systems. Attachment B to this document.
ML	Management level, from LANL's 4-level graded approach to rigor per AP-341-502.
OBI	Owners Building Inspectors (LANL). See QIA for discussion.
PE	Usually means Project Engineer, the LANL person acting in that capacity. Means Professional Engineer in the context of sealing/stamping only.
Permitting Authority	The FDAR or LBO (the latter via the LANL Building Official Design Package Reviewer [LBO-DPR]) depending on the risk level per Table IBC-GEN-3.
PPD	Preliminary Project Determination (Form FM01) of this document.
PRID (internal only)	Permits Requirements Identification (PRID). LANL project planning tool that provides interactive communication among project participants and institutional SMEs. Its objective is to identify institutional, state, and/or federal requirements early in the planning phase of a project, facilitate SME communication and review, and to document compliance with requirements. [P 351 on IRT]
Process	Manufacturing, process, or production equipment of tenant organizations, as distinguished from utilities or building services equipment.
Programmatic	Work or equipment that is tenant, R&D, or process; not facility, utility, or infrastructure
Project	Any type of work/job/task/or any other terminology that is subject to ESM or IBC's scope regardless of funding source or facility arrangement; includes maintenance.
RE	Responsible engineer. LANL person assigned to perform a task by their manager.

QIA	LANL Qualified Inspection Agency (or Agent) acceptable to the LANL Building Official. This is most often the ES Chief Inspector's Owners Building Inspectors (OBIs) but includes any others when approved by the Chief such as third-party inspectors, QC inspectors (*in IQPA),* or MSS-MP SMEs. Also includes these organizations that maintain a separate qualification program accepted by the LBO: (1) OSH-ISH for electrical/NEC, (2) Fire Protection Office, (3) CWIs and NDE inspectors approved by the Welding Program Administrator per ESM Ch. 13 and in the Welder Database or Ch. 16 LBO Approval Listing.
R&D	See PD 370, Conduct of Engineering for Research and Development (R&D)
Routine inspection (or inspection)	Inspections done by LANL or LANL's agent for general conformance to the design and LANL Standards, including those required by the IBC.
Special inspection	The process of inspection, testing, and reporting by approved special inspectors and testing agencies to assure the LBO that the construction of critical elements, materials, and life safety systems is being performed in accordance with the approved construction documents and IBC Ch. 17. Described by the Statement of Special Inspections (see IBC-IP and its Att. B)
Special Inspection Agency (SIA)	Organization providing special inspectors and managing their training and qualification in accordance with this Chapter; a type of QIA. This is LANL or Subcontractors it may approve to perform this work
Special Inspector	Individual with specialized knowledge, training, experience, and/or certification(s) for one or more of the types of construction subject to IBC Ch 17 special inspection
Subcontractor	Firm hired by LANL (e.g., Triad, who is DOE's Prime Contractor)
Testing Agency	A firm providing independent, certified test results.

5.0 PROCESS OVERVIEW

This table reflects major steps or the administrative program all risk levels. A few steps are not necessary for low or moderate risk activities as noted; see Table IBC-GEN-3 for details approach.

Step	Responsible Person	Action	Lowest Risk	Moderate Risk	Highest Risk
		Pre-Permit			
1	RE or PE	Complete Form 1 (PPD) for all but Repair.	**X**	**X**	**X**
2	DPIRC	Develop design (may be phased or multiple packages; e.g., for starting civil/structural work before the rest[26]). By 60%, develop preliminary Statement of Special Inspections (SSI, when required by Chapter 16 Section IBC-IP, *Inspection Process*). Designs shall document final design inputs (including Alt Level if applicable) and fire ratings of any walls being penetrated. Submit to LANL project engineer function.	**X**	**X**	**X**
3	PE	Run reviews at each draft design phase (e.g., 30 and 60% maturity). Include Chief Inspector, SME reviewers, and other policy-mandated (e.g., PRID) reviewers.	**X**	**X**	**X**

[26] May necessitate two TIPs and SSIs that refer to each other, or one each but revision to update to full scope. For LANL PE, assuming single DCF, both packages need unique numbers and listed as DCF outputs, then track the reviews separately in that section of the DCF.

Step	Responsible Person	Action	Lowest Risk	Moderate Risk	Highest Risk
4	SME reviewers	Review and comment. Return comments to DPIRC via PE.	X	X	X
5	DPIRC	Develop 90% design and SSI, when required. Submit to LANL project engineer function via STR.	X	X	X
6	PE	Run review of 90% design/inspection package (ref. Step 3).	X	X	X
7	SME reviewers	Review and comment on design. Return comments to DPIRC via PE.	X	X	X
8	DPIRC	Once all "C" comments are successfully resolved and any required LANL SME backchecks performed, submit 100% design to LANL.[27] Documents must be sealed by the DPIRC for permitting.[28]	X	X	X
9	PE	Submit package to permitting authority. When Highest Risk follow IBC Permitting Process (ES desk instruction DI-ES-EPD-001; internal link).	X	X	X
10	Permitting Authority	Approve 100%, correct submission for approval to construct (*when Highest Risk, by DPR applying LBO approval stamp.*[29])	X	X	X
		Post-Permit			
11	Constructor	Use LBO-approved fabricators (listing on ESM Ch.16). When not possible, follow the Offsite Structural Fabricator Approval Process (Ch.16 Section IBC-FAB) to seek approval of fabricators to perform IBC Ch. 17 work without mandatory in-shop special inspection/ expense, then submit a Certificate of Conformance. Submit any requests to LANL; Chief Inspector requires two (2) weeks lead time.	X	X	X
12	Constructor	Use LBO-approved third-party testing agencies (listing on ESM Ch.16). If the preferred testing agencies are not on the list, submit the necessary data for evaluation (see IBC-TIA). Submit any requests to LANL; Chief Inspector requires two (2) weeks lead time.	X	X	X
13	Constructor	Develop design and test and inspection plan(s) when required by Project's 01 4000 *Quality*	normally no	normally yes	X

[27] "Submitted by" blocks on drawings, Statements of Special Inspection, and other Outputs – Guidance:
Regardless of who performs the design, the "Submitted by" signature is to affirm that the document developed was (1) coordinated among potentially affected disciplines and design entities and (2) required checks, verifications, and reviews were performed and the comments resolved per required processes. "Submitted by" may also be the Verifier if qualified, and vis-a-versa.
AEs: For outside design agencies, the block should be signed by the DPIRC (Design Professional in Responsible Charge; IBC 202) or possibly another lead in the firm.
LANL: When LANL is the design agency, the block should be signed by the Responsible Engineer. The best person with the knowledge to affirm the above should sign. For larger projects, this may be the Design Manager heading the effort, the Project Engineer, or the Group Leader or someone they designate. For very small tasks, it may be a system engineer. It could also be the FDAR (even when also "Accepting"). Note, LANL AP output coversheets often don't include "Submitted By" — e.g., calcs (AP-341-605), drawings (608), and specs (610) — for those, follow the instructions for the blocks present.
[28] See ESM Ch. 1 Section Z10 for sealing exceptions.
[29] LBO Approval Stamp or database may be used (permit placard is not used). *Projects with both IBC and non-IBC work will generally be LBO-stamped throughout; non-IBC projects may receive an "Accepted by LANL Engineering" stamp.*

Step	Responsible Person	Action	Lowest Risk	Moderate Risk	Highest Risk
		Requirements section, this document, or FDAR. Ref. Ch. 16 Section IBC-IP, *Inspection Process* and its Att. I.			
14	Constructor	Begin work when authorized. Construction work including offsite structural element fabrication work must not start until authorized by the Building Program after evaluating that the project has complied with all necessary IBC and Building Program requirements. (Exceptions: grading, excavation, storm water protection, and D&D not affecting life safety/egress or requiring design [ref. D&D article below] may proceed[30]). For small, self-perform jobs, early procurement of limited off-the-shelf materials at risk is allowed except when submittal review or inspection is required. NOTE: Only the permitting authority (see Table IBC-GEN-3) may authorize construction-at-risk or procurement involving submittals or inspection with sufficient justification (via a Variance).[31] Project must follow the approved inspection plan(s) and, where applicable, Subcontractors submit Section IBC-IP Att H "Subcontractors Statement of Responsibility (with respect to Special Inspection and Test)".	**X**	**X**	**X**
15	QIA	Conduct or oversee inspections per Section IBC-IP, *Inspection Process*.	At times. See IBC-IP (esp. Att J)		**X**
16	PE	Route Form 5, *Final Inspection Checklist and Certificate of Occupancy*, to completion.	**–**	normally no	**X**

A. Deferred Design

NOTE: Deferred is design performed post-permit.[32] Delegated is design performed by a design agency other than the DPIRC, serving either the DPIRC or the constructor. Limited portions of the design may proceed this way. Often, deferred design is the DPIRC waiting until procurement to perform design such as anchorage of chosen model or support of field-routed piping. The LBO normally permits construction start with a package that lacks final design for specialties such as structural detailing, HVAC, fire alarm and suppression, and equipment anchorage (i.e., this detail submission is deferred).

[30] These activities are not normally inspected under IBC, while compaction, formwork, and rebar installation are inspected.
[31] Helps ensure safety of construction workers, limits LANL risk with unacceptable work. In the rare case that permitting official allows for more extensive work at risk, scope should be stated and well-justified, work documents attached or referenced, work reversible and inspectable/inspected to known/defined criteria. Should be preapproved by permitting official, FDAR, Project Manager, PM, and, if code inspections, Chief Inspector.
[32] Deferred per IBC-2021 107.3.4.1 and 202.

1. Deferred design submissions shall follow the same workflow as the permit package but post-permit, and with the following differences:

   a. Transparency: The permitting set of construction documents (e.g., in the Drawings) must describe what is deferred so that it is clear what aspects of the design are "missing, to be provided in Title III." The 90% design review set must be clear on this. This prevents construction of incomplete design.

      1) The permit package shall have sufficiently detailed performance requirements that intent can be reviewed and shall clearly identify what design will be furnished later. Notes regarding deferred design shall be stated on both the affected construction documents and, if present, the Statement of Special Inspections (SSI).[33] It is the DPIRC's responsibility to communicate applicable requirements of this and other sections of the ESM to the delegated Subcontractor through drawing notes and/or the Specifications to assure that the requirements are implemented in the subcontractor's design submittal.

   b. Rollup Listing: A single, comprehensive listing of all deferred design outputs is also required with the 90% design.

      1) Format so each pending output can be inserted into the construction schedule as a predecessor activity to the field work that it supports with sufficient time to allow for procurement of parts (e.g., anchors, supports) — and so clear that the average project controls scheduler can do so without back-and-forth.

   c. When delegating to the constructor, it is the DPIRC's responsibility to communicate applicable requirements of this and other sections of the ESM to them through drawing notes and/or specifications to assure that the requirements are implemented in the subcontractor's design submittal. *Guidance: The delegated sub-tier subcontractor is typically guided by the specification and drawings for the project, not the entire ESM, unless specifically invoked.*

   d. Drawings (e.g., shop drawings) need not follow the LANL CAD Manual in its entirety but must meet all its sketch requirements (*ref. Sections 102.2.J and 103.4.0 in Rev. 5*). When AutoCAD is used, submit electronic media in AutoCAD or filetype compatible with third-party conversion to same. *Conformance to the National CAD Standard/Uniform Drawing System is desirable as is use of the LANL title block and related attributes.* Include TA and building numbers regardless.

   e. Delegated design submissions must first be reviewed/approved by the DPIRC to ensure acceptability (including interdisciplinary reviews as appropriate). As with any design, they must be sealed by a registered engineer when required by ESM Ch.1 Section Z10 ("Design Outputs/Sealing" article)].

[33] This basic approach can also be used when permit package includes limited unacceptable design, but LANL wishes to allow construction to begin; in such cases, design in question and scope in inspection documents shall be marked as "final design pending/not approved for construction" or similar, to prevent work from proceeding on that portion. Once design in question is acceptable to LANL, follow direction herein titled "Changes to previously permitted design" and then revise design package to include it (but without construction hold note).

f. The DPIRC is also responsible for revising the Spec Section 01 3300 submittal summary and the SSI as necessary to match the deferred design, then submitting these revised documents with the deferred design.

g. Submissions must be reviewed/approved by the Building Program process prior to fabrication and installation. *Guidance: Reviewers will comment using a special delegated design review form attached to Section 01 3300; design becomes 100% upon Building Program approval.*

B. Changes to previously permitted design; approval

1. In all cases, design changes must be acceptable to the affected original or equivalent reviewer(s).[34]

2. For Low and Moderate Risk jobs, FDAR approval of FCR or DRN constitutes permitting authority approval.

3. For Highest Risk jobs, LBO re-approval is required when (a) the scope increase or (b) the changes do or could affect code compliance including but not limited to life safety matters (fire, structural, or egress). Thus, not every DRN and FCR, but when individually or cumulatively meeting (a) or (b) above.[35] Note: LBO reapproval is considered satisfied if the project engineer ensures that the FCR or DRN or is reviewed by all applicable SMEs who are on the webposted IBC/IEBC SME listing, and the SME(s) are satisfied with "C" comment dispositions.

6.0 QUALIFICATION MANUFACTURED PRODUCTS FOR IBC STRUCTURAL AND OTHER WORK[36]

NOTE: Qualification here refers to IBC matters, not nuclear ones.

6.1 Under 104.9, 104.11, and the Special Cases section of the IBC (1705.1.1), proprietary products must be approved by the LBO. Structural examples are anchor channels, mechanical reinforcing steel splices/couplers, and post-installed (PI) anchors. As such, from an IBC standpoint only:

A. PI anchors used in a seismically exempt application (see definition) are automatically approved by the LBO.[37]

B. For other products, they are also automatically approved if they meet both of the following:

1. The components chosen are IBC-compliant-labeled (has been accepted by the most recent ES report from ICC-ES, NER from ICC-NTA, or ER report from IAPMO valid for the code edition in use or newer edition[38]) AND

[34] QA mandate for design control; see also AP-341-519 Design Revision Control.
[35] IBC-2021 107.4 on amended documents. Re-approval for code impact because that is a primary purpose of the permit and 2009 IEBC Q&A document 1-19 suggests so; re-approval for substantive changes ensures reviews to control risk and to lesser degree because inspectors look for approved documents. Re-approval not required for record drawing updating or as-builting that occurs after work is complete.
[36] LBO approval is required for all non-code-prescribed work per IBC 104.11, but LANL has these additional requirements for structural. [Per 104.11, any new "material, design and methods of construction and equipment" must be provided to the LBO in writing using the 2176 Form, including what is it designed for or to do and what documentation, testing or other objective evidence shows it will perform as expected to support the design. This must be reviewed by the appropriate standards POC before submitting to LBO.]
[37] Incorporates and supersedes CIR-16-002 and outcome of a 5/2016 meeting re Electrical-Safety-Based Penetration Rule & Installation of Seismically-Exempt P-I Anchors (GP minutes dated 5/25). Safety class and safety significant items used in nuclear facilities are required to be procured from an ASME NQA-1 qualified supplier or require a commercial grade dedication.
[38] When a given product's research report isn't compliant with the applicable IBC edition, contact ESM POC for guidance

2. The design and installation comply with the conditions of use and restrictions specified in the ICC report (in addition to and including following manufacturer instructions, particularly where more stringent). Installation must be verified by special inspector(s) when required by ICC ES Report and/or IBC Ch. 17 on special inspection.

C. Products accepted by Los Angeles Dept. of Buildings (see footnote) are also acceptable at LANL except where specifically limited by the LANL Standards including Master Specs, when used in non-nuclear service and with any applicable conditions placed by LADBS.[39]

1. LADBS are at https://www.ladbs.org/forms-publications/publications/research-reports

D. Other special case components not automatically approved as noted above must be submitted to the Structural Standards POC who will help broker LBO approval prior to use.[40] *Guidance: This may involve derating; e.g., using less tension and/or shear capacity than documented for a concrete anchor /embedment, using a mechanical rebar splice /coupler capacity that results in the final assembly 'performing' only within elastic region, etc.*

7.0 TEMPORARY FACILITIES, STRUCTURES, AND BUILDING SYSTEMS & COMPONENTS

A. **Temporary** is defined as three years or less for LANL structures.[41]

1. The term **"structures"** includes buildings and facilities—and within this subsection also includes facility systems and components.

2. Structures intended for less than 3 years are **not** required to meet those IBC or LANL Standards requirements that ensure long-life cost effectiveness of permanent structures such as long-lasting materials, energy efficiency meeting ESM Ch. 14, or having formal drawings (sketches are adequate).

3. Applicable safety and environmental requirements must be met.[42] Also, see additional requirements below.

B. "Structures" includes temporary (relocatable) trailers, prefabricated buildings, tents, sheds, containers, and similar structures. This includes LANL- and Subcontractor-owned structures including leased and owned trailers. *Prefabs are addressed in greater detail in the next subsection.*

1. For transportables, LBO may elect to initiate/own an Issue Management (P322-4) task for FOD to remove after 3 years.

2. *Relocations and new installations of relocatables also require IFPROG group prior approval.*[43]

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[39] LADBS Building Code tab Information Bulletin IB/P/BC-2014-119 — *Alternate Building Materials/Products Approval Requirements* LADBS IB website

[40] *In addition to this requirement to obtain LBO approvals, it is important to note that the general focus of ML-1/2 is primarily a quality assurance evaluation of the manufacturer's or supplier's quality program. The focus of IBC Ch.17 is to assure that proper independent testing has been accomplished.*

[41] LANL's longstanding definition of 3-years is supported by NMAC 14.5.2.17 (Permits-Temporary, stating 1 year with extensions for good cause), which at LANL allows project transportables and other short-mission prefabs to be sited cost-effectively. Most other transportables tend to remain much longer than originally planned (often 25+ years) and, when this is anticipated, are to meet life-cycle cost requirements. Also, NMAC 14.6.7 Modular Building Structures (para 14.E Exceptions) allows 3 years and extensions per the building official. Least relevant to LANL's needs is the 180-day plus extensions in IBC Section 108.

[42] IBC-2021 3103.1.1, "…conform to the structural strength, fire safety, means of egress, accessibility, light, ventilation and sanitary requirements of this code as necessary to ensure public health, safety and general welfare." LANL definition of temporary may not satisfy NMED permit expectations, for example.

C. Temporary structures shall meet all DOE contractual requirements including the suite of NM building codes, and worker safety-related amendments in IBC-GEN Att. A–*LANL Building Code*[44] and elsewhere in ESM, primarily:

1. Siting: Get siting approval per P 941, Site Planning when required (e.g., when over 6 months, including laydown yards). *Subcontractor trailer siting is covered under laydown siting/approval.*
2. Non-occupied Subcontractor structures in an approved project lay-down area may follow Appendix B of IBC-GEN but are not required to meet longevity matters (e.g., foundation) or LANL signage.
3. Occupied construction transportables (not RVs) require Certificate of Occupancy.[45]
4. Signage: For LANL-owned only: As described in ESM Chapter 4 Architectural, structure number signs are required when structure number is required above.
5. Utility Clearances: Comply with underground utilities and overhead power line right-of-way requirements in ESM Civil and Electrical Chapters (also see Chapter 3 Civil Section G30 *part 9.0 and 10.0),* unless (a) able to be moved within a few hours (no hard-wired electricity and no actual foundation work or soil penetration/tie-downs) and (b) no hazardous materials within.
6. Fire: If there will be adjacent structures, follow ESM Fire Chapter 2 for exposure acceptance criteria (*e.g., DOE-STD-1066-2016, Fire Protection Appendix C*).
7. Utilities meet governing codes but not amendments in ESM.
8. Structural foundations and anchorage: Must be provided and able to resist gravity loads and the forces, including overturning, caused by wind loads[46] determined in accordance with ESM Chapter 5 Section II. (Seismic forces for most temporary trailers do not need to be considered for anchorage or structure itself.[47]).
    - See Standard Detail ST-Z1052 for soil augers allowable for temporary use (or provide plan and anchorage acceptable to LANL structural engineering); when soil augers are used, design to IBC soil data unless project-specific geotechnical data is available and provided (see ESM Ch.5 Section IV).
9. Electrical: Following NFPA (NEC/NFPA 70, etc.) is sufficient. *Bonding: Electrical bonding to a ground system (as is done with fences/gates) is suggested for personnel safety reasons should lightning strike nearby.*
10. IBC technical: Meet IBC including Section 3103–*Temporary Structures*.
11. IBC administrative: Meet requirements of Table IBC-GEN-3.
12. Hazard: Relocatable installations other than ordinary business and industrial facilities (that present extraordinary hazards) must follow the ESM Chapter 1 Section Z10 (on *Design Goals: Safety*).

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[43] Per PD902, Space Management. See also Form 3011, *Acquisition or Lease of Transportainers, Trailers, and Portable Buildings*
[44] IBC 3113.
[45] Focus is on anchorage, egress stairs, electrical, GIS/911 system entry.
[46] http://www.youtube.com/watch?v=EsKb17_pVJk&feature=player_embedded
[47] For single- and double-wide trailers, generic calculations (Goen 2010, EMRef-76) indicate that, for anchorage only, wind loads are the more severe loading condition when compared to seismic loads for up to 5 years. No further evaluation of seismic loads is required with anchorage. Permanent foundation is not required because of temporary nature; when for many (3+) years, the benefits of a permanent foundation (full perimeter, etc.) including stability/frost heave, energy, rodent exclusion, etc. may exceed the initial added cost.

13. Tents under 400 sq. ft.: These are "Low Risk" in Table IBC-GEN-3. They are exempt from the siting, clearances, and signage requirements above.[48] In lieu of IBC Ch 16 wind requirements (e.g., 1609), tents may be anchored against wind in accordance with the manufacturer's recommendations (as a compensatory measure, they must be evacuated in high winds and following such events the anchorage must be inspected and loose or damaged anchorage repaired or replaced).

14. *Guidance: Temporary modifications controlled by AP-341-504 should follow the same Bldg Program review, approval, and inspection processes as permanent modifications, where they are applicable*.

8.0 PREFAB STRUCTURE REQUIREMENTS (FOR BOTH TEMPORARY AND PERMANENT)

A. This subsection contains the requirements for the offsite-built structure types listed in Table Prefab-1. These apply to both permanent and "Temporary" when LANL-used or a hazardous Subcontractor unit (when temporary, also follow Temporary article above). *What follows are not all applicable ESM requirements, but the vast majority.*

Table Prefab-1. Prefabs -- Structures within the Scope of this Article

Type	Definition/Notes (for this article only)
Carport	Open on 2+ sides (IBC 406.3.3), roofed, site-assembled structure, often for vehicle or equipment protection. Includes PV-panel EV charging stations (e.g., BEAM EV ARC). IBC 312 "U" occupancy.
Container	Intermodal transportainer (aka SeaLand, SeaTrain) built to ISO 668 or 1496 and governed by IBC Section 3115.[49] IBC-GEN Appendix B has streamlined LANL administrative requirements for qualifying containers.
Hazmat (structure)	Purpose-built structure having necessary certifications for storage of specific hazardous materials.[50] Generic sheds and containers should not be used for this; instead; use structures designed for safe storage (and containment if appropriate) and labeled for the purpose (e.g., NFPA 30; NFPA 704 diamond); see also ESM Ch. 1 Section Z10 (on *Design Goals: Safety*) and Ch. 10. Purpose-built example: US Chemical Storage. Robust example: Use or storage of high explosives (HE) inside a magazine that meets specifications (e.g., DoD, ATF, etc.) specific for use or storage of HE (typically H-1 occupancy); see Robust row below.
Relocatable Building	A partially or completely assembled building constructed and designed to be reused multiple times and transported to different building sites [2021 IBC 202, 3113; IEBC Ch. 14]. A transportable—single, double, or multiplex—usually used as an office or change room (B occupancy), or a *Robust* building. (But ANSI A119.5, MVD-licensable trailers [RV, cargo] are not in IBC Program scope.)
Robust	A blast-resistant building (magazine or bunker) meeting one or more military standards or specs. Typically used for storage of HE or protection of occupants from shrapnel. Examples: Armag, RedGuard. IBC-GEN Appendix B has streamlined LANL admin requirements for qualifying structures.
Shed	A light-duty pre-engineered building. Small ones are entirely offsite-built and roadworthy, larger ones partially offsite-built and a kit. Light-duty fabric shells not storing vehicles shall be treated similarly. Normally U occupancy. See App. B for qualifying structures.
Vault toilet	Similar to a shed; made of masonry and concrete (e.g., Green Flush)

[48] Tent size basis is that IBC waives permits up to 120 ft^2; LANL wind conditions and care allow this larger size for these low-risk, low occupancy, very temporary structures. The formality of siting, clearances, and signage is impractical. Re the structural requirements, the use of tents, and therefore the occupancy in high winds, is limited. In some cases (e.g., Environmental Programs), procedures prohibit work when high winds are present.
[49] And similar steel cargo/freight/shipping boxes built to a consensus standard (e.g., military conex). IBC 3115.1 Exception 4 for scientific equipment is extended to storage meeting IBC-GEN App. B.
[50] Certain hazardous material and chemical storage is subject to management requirements of LANL's RCRA Permit - *Module VIII, Section B.1, of the Laboratory's Hazardous Waste Facility Permit (NM0890010515-1) as of 6/2008*

B. The following structures are not considered Prefabs for the reasons stated.

Table Prefab-2. Structures Not Considered Prefab

Type	Notes/Why Excluded
Additions to existing structures, even when prefabbed	These are governed by the IEBC and often have foundation, egress, and fire issues beyond this article.
Garages	The submittals include all those for sheds but IFC and NFPA requirements may drive additional features including non-combustible construction, sprinklers, and fire alarming.
PEMB – Pre-engineered metal buildings; ref. Master Spec Section 13 3419	Minimal pre-assembly, often custom, offsite inspection, not road-tested, significant onsite erection/inspection.
Fabric-covered domes and shells such as Sprung Structures and BigTop	Similar to PEMB above; refer to IBC 3102.
Permanent modular construction method (e.g., CEFC, MOB projects)	Require extensive use of (and probable alternate method from) ESM; complete, engineered design process. Ref. ICC/MBI 1200 and 1205 standards.
Short-lived structures that will be promptly destroyed by use, or are props, and not re-entered or reused	Damaged but unoccupied structures are low risk. Props (e.g., movie, training) are exempt from permitting per IBC 105.2. Owner/user, not LBO, is solely responsible for ensuring safety (and any Site Planning, PRID).

C. The following definitions beyond those in Table Prefab-1 also apply (to Prefab article only).

Table Prefab-3. Additional Definitions (LANL-specific)

Term	Meaning
Incidental Occupancy	Occupied for a total of less than 2 hours/day, yearly average.[51] Not the same as *incidental use* (IBC sec. 509 term relating to certain adjunct uses).
"Occupied"	Occupied more than "incidental occupancy." NOTE: Ordinary, unmodified sheds and containers must not serve as occupied work areas. They are intended by design for storage or shipping purposes only. Personnel time inside must be infrequent, of short duration, and controlled—and comply with basic life safety issues such as asphyxiation/confined space entry, stability of stacked materials, and IBC egress pathway. Structures must conform to the IBC for their specific use and occupancy classification.
"Modified" Container	Any change to the basic, off-the-shelf container beyond these de minimis changes: (a) lighting meeting NEC, (b) single personnel door, and/or (c) roof or side vents and skylights under 5 sq. ft. each and no closer than 6 feet spaced. Ex: MSSI, Falcon Structures, Sea Box[52]. See also IBC 3115.

D. **Information needed from Requestor for procurement Form 410 reviews**[53]

1. Completed Preliminary Project Determination Form (ESM Ch 16 IBC-GEN FM01). *Guidance on PPD fields: Highest Risk (new structure). IBC Sec. 302 occupancy: B, H, S, or U as appropriate.*

[51] RP 8 exemption 1.3.d utilized herein.
[52] Falcon and Sea Box have ICC-ES evaluation reports per ICC-ES AC462, *Structural Building Materials from Shipping Containers.* Also: 2021 IBC 3115, *Intermodal Shipping Containers*; ICC G5-2019 *Guideline for Safe Use of ISO Intermodal Shipping Containers Repurposed as Buildings and Building Components* (Struct specs POC has this); Modular Building Institute's *Safe Use and Compliance of Modified ISO Shipping Containers for Use as Buildings and Building Components* white paper (https://bit.ly/36ikrit); 2024 IBC Ch 31 drafts.
[53] This information is not typically from or pertinent to the structure manufacturer and, as such, should not appear in purchase requisition. It is needed by reviewing SMEs to determine whether procurement will meet ESM requirements. Both Architectural POC and Standards Manager are authorized to reduce these expectations.

a. Exception: PPD review not required for off-the-shelf:

1) Structures meeting Appendix B of this document,

2) un-"modified" containers (40' max[54])

…both when used only for non-hazardous storage (not H occupancy).

2. Narrative of location, planned site work, utility installation, grading, paving, walks, stairs, and ramps if applicable (narrative on PPD if present).[55]

E. **Submittals**: For only the prefab structure types shown in Prefab-1, the submittals in Table Prefab-4 are required from the manufacturer or supplier (except where noted) for LANL LBO review/approval prior to approval of any onsite installation work and eventual use by LANL. **Shop drawings must be approved before purchase, lease, or installation.** *The preferred approach is a single submittal of complete design including shop and foundation drawings. Ensure available and request prior to or, if necessary, in purchase requisition*.

NOTE on Sheds and carports 120 sq. ft. and under: These are excluded from Table Prefab-4, but they must be anchored in the same manner as larger ones.

Table Prefab-4. Prefab Structure Submittals (spans 3 pages)

NOTE on Prefabs for storage (non-hazardous), no utilities with incidental occupancy: IBC-GEN Appendix B has streamlined requirements for these that supersede aspects of this IBC-GEN section for qualifying structures.

	"Occupied"[56]	When "Incidental Occupancy" Only (App. B may modify this)		
		"Robust" or "Hazmat"	"Modified" Container	Sheds and Carports over 120 sq. ft.
Utility interfaces if applicable				
Utilities connection point locations and, for pipes, material type and sizes	X			
Service requirements (how much power, etc.)	X			
Architectural				
Insulation R values	X	if conditioned (HVAC)		
Shop drawings showing, as applicable, windows, doors, door swings, equipment (electrical, HVAC, lightning protection), fire alarm/riser/suppression, plumbing fixtures and count, or casework, location of same (floor plan)	X			

[54] Longer than 40' may require IBC egress 2-exit-modification; follow table for requirements.
[55] Requestor may be reminded of ESM requirements for same by Form 410 reviewers (e.g., completion of PRID)—and, for onsite work, LANL shall inspect all on-site construction work, plus mechanical and electrical if not inspected/approved during offsite fab. At time of writing relocations and new installations of relocatables also require Operations Infrastructure prior approval per PD902, *Space Management*. See also Form 3011, *Acquisition or Lease of Transportainers, Trailers, and Portable Buildings*.
[56] Examples are transportables (aka office trailers), Robust (e.g., ARMAG), or Modified Containers. These are generally Relocatable Buildings (ref. IBC 3113 and IEBC Ch. 14, *Relocated or Moved Buildings*.) Multiplexed transportables follow same approach as single- and double-wides, though have greater fire, egress, and other concerns.

	"Occupied"[56]	When "Incidental Occupancy" Only (App. B may modify this)		
		"Robust" or "Hazmat"	"Modified" Container	Sheds and Carports over 120 sq. ft.
Hazardous materials storage-appropriate certifications (e.g., for flammable NFPA 30, for explosives DOE-STD-1212 and DoD/ATF, NEC Article 500 Class/Div)		X		
Structural				
New or once-used certification (CoC) from supplier[57]	X		X	
Wall, floor, and roof section drawings with thicknesses (e.g., on shop drawings)	X	X		X
PE-sealed (stamped)[58] calcs and shop drawings for IBC-2021 with LANL amendments per ESM Ch. 5 Section II,[59] including but not limited to: 1. SDC category (e.g., C) and LANL's S_s and S_1 2. Roof live load (20 psf) 3. Snow load (30 psf) 4. Floor live load (50 psf offices, 125 psf light storage) 5. Wind load (RC I: 99 mph, RC II: 104 mph; RC III 110 mph); exposure "C" 6. IBC 1604.5 Risk Category __ [fill in per row below]	X	only when buried[60]	X	
IBC 1604.5 Risk Category	I (<3 yrs.) II (3+ years)[61]	I or III[62]	I	I
For any welding offsite: Submit required documents per LANL Master Spec 01 4444 if not "off-the shelf" per spec (not required if on LBO-approval listing)	for Robust	X[63]	for structural mods	
Any welding onsite: Submit required documents and meet LANL Master Spec 01 4455	X[64]	X	X	X
Weight (and center of gravity if off-center)[65]	X			
Anchoring method and locations	See footnote 66			

[57] Used-once-maximum at procurement increases likelihood structure is not degraded from as-constructed condition and is a modern design (containers have often been used once to ship goods from overseas); requestor may require new containers or transportables. Robust, Hazmat, and sheds must be new. Criteria do not apply to relocations within LANL that do not circumvent intent of this requirement.
[58] For Occupied: Non-NM PE license acceptable due to low risk and meeting NM/LANL incidental practice limits for cost and occupancy (ref Z10). For Incidental Occupancy (except buried): PE-sealed design documents are N/A since low person-hours/year results in low risk of personnel injury (also, this aligns with NMAC 14.5.2.10.C exceptions for similar group buildings and low occupancy totals which were used for reference in this situation but not adopted fully herein or in in Z10), plus inherent roadworthiness of many types per ESM Ch 5 Sect II App B.
[59] Including (if they qualify) ESM Ch 5 Section II (App B–*Design Approach to Commercially Fabricated Buildings Used in Multi-State Jurisdiction)*
[60] For buried applications, use load of covering earth for roof/side loads and delete wind load.
[61] Correlating IBC-GEN temporary definition with 2021 IBC 1604.5 RC I "certain temporary facilities."
[62] Hazmat storage (e.g., chemicals, explosives) typically RC III per IBC 1604.5.
[63] Welding quality for magazines and bunkers warrants higher scrutiny than non-hazardous storage structures.
[64] Including stairs.
[65] Weight/center of gravity for rigging and any foundation and anchor design by LANL.

	"Occupied"[56]	When "Incidental Occupancy" Only (App. B may modify this)		
		"Robust" or "Hazmat"	"Modified" Container	Sheds and Carports over 120 sq. ft.
Mechanical (when present)				
HVAC equipment (sized for altitude)	X	X	X	
Outside air ventilation	X	X	X	
Equipment list	X	X	X	
Electrical				
Load requirements, including HVAC if present	X	when wiring is present[67]		
Location of receptacles				
Electrical one-line diagram				
Grounding diagram				
Lighting locations				
Bill of material/fixture schedule				
Lightning Protection: NOTE: This is typically not a manufacturer responsibility. Follow ESM Electrical Chapter 7 Section D5090 requirements for making a needs-determination (uses NFPA 780 exposure and importance criteria). *Offices, sheds, and containers with non-hazardous, low-value content do not have protection.*	n/a	as needed		
Offsite Inspection				
Display NM-issued inspection/compliance decal (or arrange for fab inspection by LANL Building Official)[68]	X			

9.0 DEACTIVATION, DECOMMISSIONING, AND DEMOLITION (D&D) (F30)

A. Depending on scope and rigor required for D&D execution, the FDAR may request the project prepare a Conceptual D&D Plan. The FDAR, after consultation with the Structural Standards POC, shall then decide[69] whether D&D warrants formal design and approval by

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[66] Anchorage: For single- and double-wide relocatables (trailers), anchoring is required. When also temporary, LANL uses STD Details.
Robust and containers: Where occupied, hazmat-containing, or blast loads are possible, the need for anchors must be evaluated (consult Structural Chapter POC who may have calculations already).
For unoccupied, benign storage under 40', anchors normally not needed when on the ground or pad (EMRef-77, Volkman to Exner, 10/14/2010, "Copy of Approved MDA-B Cargo Container Anchor Calculations" done for RC-I-type usage). Placement on cribbing or parking lot bumpers under 6 inches high is considered on the ground and may reduce moisture buildup; although designed to carry moderate floor loads without intermediate supports, 10-foot-center-spaced supports or similar may be appropriate for heavy loads (e.g., forklifts with pallets).
Sheds/carports regardless of size: Tie down with wind straps or other anchorage approved by LANL Level 2B+ Structural SME or designate. *EV chargers with PV are much like a carport; however, should be analyzed for need for anchorage.*
[67] For electrical in containers, besides P101-13, Portsmouth has had issues. https://opex.lanl.gov/index.php/recordstep/2832.
[68] 2021 IBC 3113. Thus, for transportables, the State of NM is an LBO-approved Special Inspection agency; those coming into NM as "Modularly Approved" by the State of NM have a data plate and 3" X 3" decal like the NM Flag, yellow with red Zia symbol (typically under the sink, in an electrical panel, or on a window per Loretta in NM Modular Division 505-476-4675. For incidental occupancy or temporary, offsite inspection not required due to lower time-at-risk, roadworthiness, weld certs. *UL has a certification program, QXRA in their database, ref https://library.ul.com/?document=tca-electrical-connections-2013-fall&industry=the-code-authority-electrical-connections*
[69] An LBO-delegated function that may be overruled by same. Implements IBC 3303, Demolition.

LBO due to unique circumstances associated with removal of the structure (if Highest Risk) or FDAR (if Lowest Risk).

B. These unique design aspects may include controlled structural collapse, demolition sequencing, special equipment or technologies, means and methods for demolition, shoring for certain deep excavations, or any construction aspects of a D&D project that require formal design (e.g., finishing adjacent facility edifices impacted by the D&D project). *Guidance: Many partial- or whole-building demos will be Lowest Risk; buildings near others remaining may be Highest Risk.*

C. These unique circumstances may be driven by protection of adjacent facilities and workers, disruption of adjacent programmatic operations, and security or environmental concerns. Also:

1. Highest Risk: When required by the FDAR or LBO, develop a D&D package that satisfies the LBO reviewers. This will typically include (1) the scope of work/plan for structural demo[70] (otherwise, describe work boundaries), (2) demolition and demolition sequencing, (3) measures to protect adjacent facilities and workers (barriers, fencing, signage, fires)[71], (4) site boundary and access control (site plan [IEBC 106.2.5]), (5) site end-state configuration and stabilization, (6) utility and fire protection de-energizations and locations[72] and temporary utilities (including lighting and power), (7) traffic (including fire engine access) management, and (8) waste segregation and management.[73] (9) Generate any structural calculations requested by LBO[74].

   - LBO approval of 1–5 above and, if required, (9) prior to work initiation will generally be required and may follow the usual process of PPD, design review by SMEs, and permitting by DPR (i.e., be Highest Risk).

   Guidance (Planning to address):
   (1) The scope of work/plan for structural demo
   (2) Demolition and demolition sequencing,
   (3) Measures to protect adjacent facilities and workers (barriers, fencing, signage). Include how remaining structures will be protected.
   (4) Site boundary and access control for buildings within D&D scope. Include traffic management requirements for (if applicable)
   (5) Site end-state configuration and stabilization,
   (6) Discuss where the utilities will be cut & capped/de-energizations. State the work associated with utility isolation will be managed by UI prior to D&D.
   (7) Discuss any Fire Protection requirements for the site during D&D. (Get from LANL FP). FP input maybe be: In addition to IBC/IEBC Construction Safeguards, apply NFPA 241, Standard for Safeguarding Construction, Alteration, and Demolition Operations.

   If radiological, DOE-STD-1066 transitional facilities requirements would apply. There is also an Equivalency request which would have to be reviewed and likely a change control request would be submitted to the field office. The justification

[70] IEBC-2015 106.2.6.
[71] Ref IBC Ch 33 and/or IEBC Ch 15 regarding safeguards.
[72] Also follow O&M Criterion 303, Utility Disconnects.
[73] There are the major engineering-type controls; LANL ES&H may have additional admin requirements (e.g., asbestos and other hazardous materials, storm and construction water management plan) but these need not be submitted to LBO (and are not, preferably).
[74] E.g., protection of adjacent structures from shock, supporting mobile equipment on buildings

for the change control would be based on the transitional facility fire analysis. If possible, FP should walk down the building and see if there are any significant issues. If no significant issues the transitional fire analysis should be minimal.

2. *Guidance: The LANL Fire Marshal will likely require the following regarding fire protection/egress: Description of how the structure will be disconnected from the fire loop and/or how fire alarm/fire suppressions systems interfaces with adjacent building will be managed.*[75] *Address means of egress (NFPA 101/ IBC Chapter 10 egress evaluation or compliance statement).*
3. As appropriate, further describe D&D work using drawings or sketches. *Guidance: Use clouding or other methods as described by the LANL CAD Manual. The addition of photos in the drawings is a common and helpful technique for helping to describe the work for partial demolitions*.
4. Plan for proper identification and disposal of toxic or other controlled substances such as PCBs which may be present. *See also AP-350-300.*
5. For selective structure demolition, refer to LMS Section 02 4119. For electrical demolition refer to ESM Electrical Chapter 7 and Section 02 4115, *Electrical Demolition.*

10.0 RECORD OF REVISIONS

Rev	Date	Description	POC	RM
0	10/27/06	Initial issue. Included IBC and IEBC requirements formerly in Ch.1 Section Z10 rev. 3 and previous.	Tobin Oruch, *CENG-OFF*	Kirk Christensen, *CENG-OFF*
1	6/19/07	Added approval of certain design changes and special structural product qual section; organization and ML level changes; minor clarifications.	Tobin Oruch, *CENG-OFF*	Kirk Christensen, *CENG-OFF*
2	7/21/08	Clarified scope, Chief Inspector duties, design review duties, need for control of concrete prefab, occupancy. Removed IAS automatic pathway for testing agencies. Minor changes to Att 1 and 2 related to beneficial occupancy and App A and B.	Tobin Oruch, *CENG-OFF*	Kirk Christensen, *CENG-OFF*
3	9/15/09	Revised applicability to reduce work scope excluded from the full program.	Tobin Oruch, *CENG-OFF*	Gary Read, *CENG-OFF*
4	3/1/10	Clarified scope and applicability, LBO approved listing on chapter webpage versus IESL (4.1.h); revised regarding SI for seismic-resisting (5.3).	Tobin Oruch, *CENG-OFF*	Larry Goen, *CENG-OFF*
5	8/25/10	Revised screening criteria, added flowchart. Fabricator approval again includes seismic-resisting inspections. Added and revised temporary facility and shed requirements formerly in Ch.1 Z10. Added end date on occupancy certificate. Final inspection form renamed, made mandatory for all IBC projects.	Tobin Oruch, *CENG-OFF*	Larry Goen, *CENG-OFF*

[75] Often several small buildings will use the same riser and a transponder panel that connects to a main panel

Rev	Date	Description	POC	RM
6	6/20/11	2009 adoption; clarified scope (new tables); added DPIRC designation form 01 and previous FM1&2 became 2&3; SSI need not include other inspections; transportainer anchorage; D&D moved in from Z10.	Tobin Oruch, *CENG-OFF*	Larry Goen, *CENG-OFF*
7	9/24/13	Added project determination and hazmat forms as FM1 and FM2, NOV as FM4. Clarified scope, phasing, process, delegated and deferred design, change processing. Updated Att A & B. FM1 became FM3. FM2&3 became 5&6, only required for Highest Risk.	Tobin Oruch, *ES-DO*	Larry Goen, *ES-DO*
8	5/22/14	Revised criteria for project determination, put in form; added reviewer qual guidance; combined checklist and CoO forms; addressed tents; other minor changes	Tobin Oruch, *ES-DO*	Larry Goen, *ES-DO*
9	3/30/15	Adopted 2015 I-codes. Refined in-scope definitions and High and Moderate Risk criteria. Added IAPMO ER use. Revised FM1 and 5. Other minor wording changes.	Tobin Oruch, *ES-DO*	Larry Goen, *ES-DO*
10	10/6/16	Incorporated with minor changes the streamlined graded admin approach of VAR-16-009 r1 and circuit addition VAR-2015-058. Programmatic anchorage requirements revised. Required that design document the final design inputs (including Alt Level) and fire ratings of walls. Added CAD and CM-CE design reviews. Reduced seismically exempt anchor requirements. Minor revisions for temporary and D&D.	Tobin Oruch, *ES-DO*	Larry Goen, *ES-DO*
11	11/29/18	Incorporated VAR-10168 on inspection in 3-tiered table and 6.6.D. Sheds and Containers became Prefab and expanded. Minor revisions for D&D, elsewhere.	Tobin Oruch, *ES-FE*	Larry Goen, *ES-DO*
12	03/22/23	Chapter and section title changed. Graded approach table reformatted and incorporated previous exceptions and Fire Alarm Work Alteration Levels (ES-DO-Memo-22-003). LANL Qualified Inspection Agency (LQIA) term introduced. PPDs for Repair eliminated. Incorporated VAR-10564, *Test and Inspection Plan (TIP) Development Responsibility*. Early work release linked to FDAR-permitted scope. Deferred design and changes-to-design requirements changed. Prefab article revised to exclude garages, other updates. D&D article expanded. R2A2s moved to App A. New App B for prefab storage incorporates VAR-10561, *Transportainer and ARMAG Installation Requirements;* added carports, sheds, and vault toilets. Programmatic restraint moved to ESM Ch. 5. Minor changes for 2021 IBC adoption, organizational updates, other changes throughout.	Tobin Oruch, *ES-FE*	Michael Richardson, *ES-DO*

11.0 APPENDICES

Appendix A Responsibilities and Duties
Appendix B Prefab Storage Approach

12.0 ATTACHMENTS

Attachment A LANL Building Code (LBC)
Attachment B LANL Existing Building/System Code (LEBC)
Form 1, Preliminary Project Determinations
Form 2, HazMat Determination
Form 3, Registered Design Professional in Responsible Charge Designation (Sample)
Form 4, LBO Notice of Violation
Form 5, Building/System Final Inspection Checklist and Certificate of Occupancy

APPENDIX A RESPONSIBILITIES AND DUTIES[76]

NOTE: A building department organization chart is maintained on the LBO webpage here.

A.1 Facility Design Authority Representatives (FDARs)

A. FDARs shall make day-to-day determinations as to:

1. Whether proposed work is subject to this chapter within the criteria and examples in Tables IBC-GEN-1 & -2.
2. Work category per Preliminary Project Determination (PPD; IBC-GEN FM01) definitions. PPD must be completed for every Building Program job for which engineering becomes aware or involved other than Repairs.
   a. Key determinations from PPD must be captured in design inputs and outputs (ideally drawing title sheet).
   b. PPD forms and other records of FDAR actions must be filed per form instructions and will be assessed by LBO.[77]
3. FDAR decisions are subject to revision by the LBO.

A.2 LANL Project and Maintenance Management, Project Engineering, and Facility Personnel that manage work.

A. Through Acquisition Services Management (ASM Procurement and the Contract Administrator), assure that proper ESM (including this program) direction is included in subcontracts (or work packages).[78] Require the Design Professional's and construction constructor's (e.g., prime Subcontractor) compliance with the LANL Engineering Standards.

B. Assure that the project/job or any other designated work under Building Program purview does not commence until they have obtained Program approval. In addition, they are responsible for assuring compliance to the IBC and/or IEBC on the project.

C. Have necessary programs and procedures in place to address the controls and process within their organization to assure that IBC and IEBC requirements are fully implemented. This includes instructing personnel and passing-down necessary controls to sub-tier levels on a project and assuring that the LBO Chief Inspector will be properly notified of non-conforming conditions on any IBC-related work.

D. Use PRID system when required to ensure such projects are tracked and properly reviewed; proof of appropriate reviews is necessary to receive LBO approval to construct.

E. For new buildings and existing building modifications, obtain FDAR determination of IEBC Alteration Level, occupancy category, seismic category, and other matters using Form 1, Preliminary Project Determinations associated with this document; communicate input to design agency in design agreement.

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[76] Much of this Chapter's material is derived from IBC Chapters 1 and 17. For qualification, IBC-GEN Att. A LBC amendments to IBC govern along with this subsection. Other source materials for this Chapter are from "Model Program for Special Inspection," ICC Item 1035S4 and "2006 IBC Special Inspections: Understanding and Developing a Special Inspection Program," ICC Item 1045S06. Also consulted: Clark Co, NV Building Development program Technical Guidelines, etc.

[77] Determining code and other key design inputs prior to getting underway with design helps minimize rework. Failing to select correctly and/or communicate used to occur prior to form existence. Also helps ensure that changes in use or occupancy result in new Certificate of Occupancy per IBC-2021 111.1. Intent of "every" is not to force change to maintenance work package flows that don't already involve engineering (e.g., repairs in some cases). Assessment nominally January for previous CY.

[78] Work packages when self-performing.

F. For new buildings and existing buildings changing chemical inventory, complete Form 2, *HazMat Determination*, as required (see Forms 1 and 2).

G. Notify the LBO Chief Inspector as soon as possible when non-LBO-permitted or sub-standard construction has occurred on the project (including work by testing agency or in fabrication/manufacturer shops).

H. Designate the Registered Design Professional in Responsible Charge and submit at time of first design review, and if ever the DPIRC changes, using Form 3.[79]

A.3 Constructor (e.g., Prime Subcontractor or LANL)

A. Begin work when authorized.

B. Develop and submit test and inspection plan (TIP).

C. Follow requirements specific to IBC and quality primarily in the Subcontract's Exhibit H and Project Specification Section 01 4000, *Quality Requirements*.

A.4 Design Professional in Responsible Charge (DPIRC)

A. Develop the design.

B. Develop statement of special inspections (SSI) when required by IBC 1704.3 or Section IBC-IP, Attachment B (SSI template).

C. Submit required structural observations[80] to the LANL Lead Chief Inspector when required by IBC. Structural observations are the responsibility of the structural engineer of record (EOR) unless otherwise stated in the Subcontract. LBO must approve observation performance by persons other than the structural EOR. *EOR should subcontract observations if he/she is in the same company as the prime Subcontractor*.[81]

D. Submit any revised occupancy and use categories [and IEBC alteration level(s) for existing building modifications] through LANL Project personnel.

E. Delegated design: The DPIRC is ultimately responsible for delivering all engineering products required by the ESM/Subcontract to the LBO, even those specialties that are delegated [exception: design by constructing firm's subtiers (e.g., fire protection), in which case such design is accepted by DPIRC]. When retained for engineering services during construction, this includes managing change control, as-built construction documents (where required by contract), etc.; see also this topic below under Process (*7.0.A*).

F. Edit LANL Master Specification Section 01 4000, *Quality Requirement*s and include in Project Specification.

A.5 LANL Building Official (or Designee)

A. Implement this chapter and the activities and duties herein.

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[79] Required by NMAC 14.5.2.10.G-2004 on permits

[80] IBC-2021 1704.6. It is always a good practice to verify that key construction conditions are in conformance with the design intent. However, structural observations are only required for the conditions detailed in IBC Section 1704.6.1. In general, at LANL such conditions are met by RC-III and RC-IV structures, high-risk structures, or structures with special structural details/construction requirements (e.g., blast-resistant structures, where structural detailing either of steel or concrete elements are key to the final performance of the structure and nonstructural components).

[81] Ibid. SER best understands design, load path, and critical fabrication issues, so is best person to perform observations. Clark County, NV does not consider it a conflict of interest for SER to perform observations (TG100-2008 7.4), nor does Phoenix as of Apr 2008 (latter cautioned against SER who is in same company as builder). N/A when LANL self-performs since LANL will always protect government's interests.

B. Enforce the Bldg. Program; take action on non-permitted or significant life safety affecting nonconforming work by interacting with project owners/managers (see Form 4, LBO Notice of Violation).

C. Approve field and laboratory test agencies, inspection agencies, and offsite structural element fabricators to preclude in-shop special inspections (per ESM Ch.16 Section IBC-FAB).

1. List of approvals is a reference on ESM Chapter 16 webpage.

D. Designate deputies, chief inspectors, and other key staff through maintenance of an organization chart on the chapter webpage.

E. Chair program staff meetings (*nominally monthly). Invitees should include Deputy Building Officials, ESM Chapter POC/Alternate, Chief Inspectors, permitting stamp holders, quality assurance, project engineering, and project management representatives. The agenda should include a safety topic, relevant building safety and quality incidents, and ongoing and new issues/business. Notes should be taken.*

F. Perform program self-assessments (*e.g., Management Assessments*).[82] *Possible criteria for self-assessment can be found in IAS AC251, Accreditation Criteria for Building Departments/Code Enforcement Agencies, including the applicable sections of ISO/IEC Standard 17020,* Conformity Assessment — Requirements for the Operation of Various Types of Bodies Performing Inspection. *http://www.iasonline.org/Accreditation_Criteria/*

1. *In addition to self-assessments, LBO may consider external assessments. These could include assessment of plan review effectiveness through occasional use of contracted plan reviewers (e.g., advertisers in ICC publications). LBO may also consider an outside assessment of overall program effectiveness via IAS accreditation to AC251 or the ISO Building Code Effectiveness Grading Schedule (BCEGS) program.*

A.6 LANL Chief Inspectors and Staff

A. Must be assigned and designated by the LBO to administer parts of the program including the specific electrical, mechanical, and plumbing codes adopted and amended by the ESM. *The listing of LANL Chief Inspectors is on both the Chapter 16 organization chart and the contacts webpage.*

B. Delegated by the LBO, Chief Inspectors act on behalf of the LBO to perform duties of evaluating testing and offsite structural fabrication agencies and managing or performing oversight of inspection and welding personnel who work onsite -- their training and certification, evaluating their performance, performing surveillances related to IBC work on site, developing related LANL inspection procedures, and acting as subject matter experts (SMEs). Duties are further described in other ESM Chapter 16 sections.

C. LANL Eng Services' Chief Inspector is responsible for oversight of all inspections of Bldg Program work. SSI-required testing by third-party LBO-approved agencies shall be at the constructor's expense. Chief Inspector also approves General and Special Inspectors (SIs) to perform the duties specified by the Code, this ESM Chapter, and approved inspection plans developed for individual projects/jobs; and revoke approvals as warranted. CE Chief Inspector may, in writing, delegate or authorize other qualified organizations (General and/or Special Inspection Agencies) within the qualification limitations imposed by the Program.

[82] DOE O 414.1D Quality Assurance includes criterion for management self-assessment. See also PD328, Assessment Program.

NOTE: Chief Inspector responsibility for construction inspection may extend beyond the Bldg Program scope, e.g., through WI-400-282, *Acceptance Inspection and Testing*, and other policies or agreements.

D. Construction or work for which a permit is required is to be inspected. Inspect for compliance with the approved design documents and the provisions of the national consensus codes and standards referenced in the ESM. Exceptions:

1. Fire system inspections are a joint effort between the Fire Protection Office (FP) and IBC Inspectors (*Division of Responsibilities matrix posted with this chapter)*.
2. Security and telecom/data is inspected by LANL groups responsible for those systems.
3. Others as recognized or delegated by the LBO.

E. Maintain all related records required by the IBC for the period required per the LANL Records Inventory and Disposal Schedules (RIDS).

F. Other duties given in Section IBC-IP, *Inspection Process*.

A.7 LANL Design (Plan) Reviewers

A. Responsibility for reviews against the building codes as amended by the LANL Standards rests with the LBO.

1. The LBO may rely on other organizations for aspects of such reviews, including when they are authorized by LANL policy (*thus reflected in PRID*) to do so (e.g., Fire Protection Group reviews).
   a. Review for CAD Standards Manual (CSM) compliance is required whenever drawings are present (at all design reviews, e.g., 30-60-90) *and should also be done for CSM sketch requirements.*
   b. *Other LBO-mandated reviews may be captured in the Permitting Checklist/process.*
2. LBO may subcontract review activity to outside firms (i.e., third parties), or may augment Engineering Services staff by, in writing, appointing other qualified LANL or outside individuals to perform review functions.
3. LBO delegates review assignment responsibility to ES and PFE Group and Team leaders and FDARs.
   a. Guidance: A listing of Highest Risk task reviewers is on the LBO webapge (SME Listing), Internal Only.
   b. For that and other reviews, assignments should be made to persons with the following knowledge and skills:
      1) Knowledgeable in the ESM, adjunct LANL documents, and building codes in the areas of review assigned
      2) Knowledgeable in the specific area(s) of design or analysis involved
      3) Capable of performing similar design or analysis
      4) Have the proper security clearance for access to sufficient information to perform the review;
      5) Did not participate in development of the design;

6) Did not specify a singular design approach; and

7) Did not rule out certain design and analysis considerations.

B. The LBO further delegates to ES and PFE Group Leaders and FDARs the role of ensuring compliance with the applicable design review procedures, including complete resolution of comments, on behalf of all code-reviewing organizations, when granting permits for construction, and should do so for non-code reviews. *Guidance: Those procedures include the Conduct of Engineering APs, PD1220 "Fire Protection Program," and others. Such procedures require that designs be reviewed by others as needed per PRID including Fire Protection Office, Security & Safeguards, Utilities, and others including ESH, QA, Rad Protection Engineering, etc.*

APPENDIX B, PREFAB STORAGE APPROACH[83]

For certain prefabs defined and governed by IBC-GEN's Prefab article, there are streamlined LANL administrative requirements when meeting all the following criteria:

a. Incidental occupancy*
b. Non-hazardous storage
c. No connected utilities
d. Length 40' and width 12' (maximums)[84]
e. Not used for work or work-like activities such as handling, fabricating, maintenance, offices, break areas, etc.

* Occupied for a total of less than 2 hours/day, yearly average per ESM Ch. 16, IBC-GEN, Prefab article.

Prefab types that may qualify per above: carports, sheds, transportainers (containers)[85], Robusts (ARMAG-type "Robust" structures), and vault-type toilets (treated like sheds except as noted below).

Prefabs not meeting the above must fully follow IBC-GEN Prefab Article and are Highest Risk per the graded approach (Table GEN-3).

Topic (Inspection point where indicated)	**Applicability Statement and/or Restrictions**	**Reference ESM unless otherwise indicated**
Anchorage	Carports and sheds: Yes, unless analysis determines not required. Robusts and shipping containers: No, due to geometry and weight. These have been LANL-evaluated to resist overturning due to anticipated wind and seismic loads when non-hazardous. Vault-type restrooms: Per manufacturer's recommendation for LANL wind speeds.	IBC-GEN Temporary article; article 10 Table Prefab-4; IBC
Certificate of Occupancy (CoO) Prior to Use	Yes, if greater than 120 square feet. Obtain Authorization Number from LBO-DPR (e.g., Smith) per DI-ES-EPD-001 (does not necessitate DPR review). Use IBC-GEN (Form 5) for CoO.	Table IBC-GEN 3 and other locations
Design Change Form (DCF) or Design Package	For vault toilet ground (civil) work only, a DCF is required.	AP-341-517

[83] Incorporates VAR-10561, then carports, sheds, and vault toilets were added due to similarity with risk and approach (stored contents of toilet having negative value).
[84] Longer than 40' may require IBC egress 2-exit-modification; follow Prefab article for requirements.
[85] Single, unmodified intermodal containers are outside scope of Prefab per 2021 IBC 3115.1 exception 4 on "housing or supporting experimental equipment" under certain conditions.

Electrical	No utility connections not allowed. For vault-type restrooms, comply with NFPA 70 for internal systems.	n/a
Emergency 911 (E911) Address	Required when present over 180 days	PD 1220 Fire Protection Program; PD1200 Emergency Management Program
Exit Signs	Not Required.	Ch. 2; IBC; IFC
Fire Alarm Monitoring	Not Required	Ch. 2; IBC; IFC
Fire Department Access (**Inspection)**	Unit(s) shall be assessable from all four sides. Access must allow manual firefighting capability (with hose) at a minimum. For unit groupings (≤ 10), treat as one structure. For non-utility connected vault-type restrooms, Fire Department access modified by NFPA 1, 18.2.3.1.3 if needed. Fire department access modifications must be documented in the design and approved by FP Office.	Ch. 2; IBC; IFC
Fire Extinguishers (**Inspection**)	Per LANL FP	Ch. 2; IBC; IFC
Fire Separation Distance (**Inspection**)	At least 75' separation from other structures. If units are grouped together (≤ 10) then they shall be treated as one structure. If closer than 75', then FP approval is required. Exception for vault toilets: 30’ separation minimum.	Ch. 2; IBC; IFC
Fire Suppression	Not Required	Ch. 2; IBC; IFC
Foundation (**Inspection**)	Unit(s) shall be place on a sound, engineered surface (e.g., parking lot, asphalt drive, concrete pad or gravity bearing pad constructed of 24 inches of non-frost susceptible ground or fill (95% compacted granular material with less than 6% material passing the 200 sieve)	Ch. 5 Section II; IBC
Geographic Information System (GIS) Maps inclusion	Yes, when present over 180 days	Ch. 3 and other locations

Groupings (**Inspection**)	No more than 10 units may be grouped together with no separation distance (no stacking is allowed). The grouping may be treated as one structure for CoE matters. Grouping shall have a fire loss value of less than $6,000,000. **NOTE: Units within 20' of each other are considered a grouping**	Ch. 2; IBC; IFC
HVAC	No; utilities / utility connections not allowed	n/a
Hydrant Coverage (**Inspection**)	Yes, within 300 ft. but should be at least 40 feet away. All sides of the unit(s) shall not be more that 300 ft from a hydrant.	Ch. 2; IBC; IFC
Inspections during Installation	Requirements in first column identified with "**Inspection**" must be verified by LBO-approved Inspector	Ch. 16 IBC-GEN r11 Table IBC-GEN 3 and other locations
International Building Code (IBC) Applies	Carports and sheds: CoC on wind and seismic* resistance to ESM Ch. 5 required * Seismic should not control, but the EOR should compare the wind and seismic base shear and indicate that wind controls. Robusts and containers: No, but this Chapter/Program does apply.	See "Container" definition in IBC-GEN Prefab article
Life Safety - Egress	Per LANL FP. For vault-type restrooms, meet egress and fire department portions of IBC and NFPA 1 and 101.	Ch. 2; IBC; IFC
Life Safety - Lighting	Not required (but PV-panel systems are allowed; see Electrical)	Ch. 7; IBC; IFC
Lightning Protection	Not Required	Ch. 7 D5090
Minor Siting Request	Yes. NOTE: If a PRID is required, the siting request is covered through that process	IBC-GEN Temporary article
Occupancy Class (IBC)	S-1 (Moderate Hazard) or S-2 (Low Hazard) Usable for storage only, cannot be used for work or work like activities such as handling, fabricating, maintenance, offices, break areas, etc.	IBC Section 311; IBC-GEN Table Prefab-4; IBC

Pedestrian Access (**Inspection**)	Pedestrian access (a safe means for pedestrians) is required into unit(s) and from other facilities, parking areas etc. Not required to be ADA/ABA Accessible.	Ch. 4; IBC
Preliminary Project Determination (PPD)	Not required by this Appendix, but FDAR may require (check with them).	IBC-GEN FM01
PRID	Required if installation requires any excavation activities (e.g., installation of foundation/gravity bearing pad, toilet vault)	IBC-GEN various locations
Restrooms	Not Required (incidental occupancy)	Ch. 4; UPC
(Design) Review and **permitting** including LBO approval stamp	Review: IBC SME review not required (unless "modified" per Ch.16); however, vault toilet designs require Fire Protection Office review for compliance with applicable detached accessory structure and egress requirements. Permitting: Not required; FDAR may elect to review and permit. (LBO-DPR permitting process is satisfied by meeting this Appendix, but LBO Authorization Number must be assigned by LBO-DPR per DI-ES-EPD-001 to enable CoO numbering.) Also, for these detached accessory structures, NFPA 1-2021 permitting process as performed per the LANL process does not apply per NFPA 1 Section 1.7.12.9 per LANL AHJ Fire Marshal interpretation.	IBC-GEN Table IBC-GEN 3 and other locations
Risk Category per IBC 1604.5	RC I	IBC-GEN Table Prefab-4
Risk Level	Moderate Risk (per Table GEN-3)	IBC-GEN Table IBC-GEN-3
Signage	1) Building I.D. on exterior 2) Storage Restrictions on exterior	Ch. 4 B-C GEN
Size Restriction(s) (**Inspection**)	40' maximum length, 10' max width	IBC-GEN Table Prefab-4 and other locations
Statement of Special Inspections	Robusts and Containers: Not required unless buried (or hazardous, which precludes App B usage) Carports and sheds: Required for any anchorage, not assembly (but must be assembled/installed per manufacturer's instructions)	IBC-GEN, IP

Storage Restrictions	Can only contain Ordinary Combustibles (e.g., paper, wood, packaging). Excessive storage of plastics (5' high over a gross area greater than 500 sq.) requires further evaluation by Fire Protection. No storage of Explosives, Flammable Liquids, Chemicals, Powdered Metals, 3-D Printing Materials or Historical Records.	Ch. 2; IBC; IFC
Storm Water Drainage and Design	Yes, if required; may solicit SME input through PRID or Minor Siting Request	Ch. 3 G20 r3
Structural Design (no major structural custom mods) (**Inspection**)	Shop drawing from manufacturer (N/A for unmodified transportainers). Also, Robusts and vault toilets shall comply with LANL seismic design requirements **NOTE: If any off-the-shelf-type unit is structurally modified, then modification must be reviewed/approved by LANL IBC Structural SME.**	IBC-GEN Table Prefab-4
Test & Inspection Plan (TIP)	A simple TIP or checklist (e.g., with the Certificate of Occupancy) is required to ensure that the inspections required by the left column are performed and result is satisfactory. 1. Fire Department Access 2. Fire Extinguishers 3. Fire Separation Distance 4. Foundation 5. Groupings 6. Hydrant Coverage 7. Pedestrian Access 8. Size Restriction(s) 9. Structural Design (no major structural custom mods) 10. Underground Utility Clearances	IBC-IP Att I or IBC-GEN FM05
Underground Utility Clearances (**Inspection**)	Comply with underground utilities and overhead power line right-of-way requirements in ESM Civil and Electrical Chapters (also see Chapter 3 Civil Section G30 *part 9.0 and 10.0)* — unless able to be moved within a few hours (no anchorage or soil penetration/tie-downs, etc.)	Ch. 3 G30 r3
Ventilation (active)	Not required (and no utilities / utility connections allowed)	n/a
Welding - Offsite Welding Approval	Invoke LANL Welding Program requirements for all welding not performed by the manufacturer, and for containers without manufacturer part numbers (unless LBO-approved fabricator)	Ch. 13; LMS 01 4444