

## DESIGN AND CONSTRUCTION OF SWIMMING POOLS

### I. PURPOSE

This Information Bulletin establishes consistent and uniform requirements for the design and construction of swimming pools, based on the State and City requirements. Currently, the provisions for the design and construction of swimming pools are regulated as follows:

- The State provisions for Public Swimming Pools are found in 2013 California Building Code (CBC) Chapter 31B.
- 2014 Los Angeles Building Code (LABC) Sections 3109, 6109, and 8118 shall apply to all pools, unless otherwise stated in this Information Bulletin.

### II. DEFINITIONS

For the purpose of this Information Bulletin and for enforcement purposes, the following terms shall apply when a permit is issued.

1. **Pool:** Any constructed or prefabricated structure which contains water, used for swimming or recreational bathing, includes in-ground and above-ground pools and includes, but need not be limited to hot tubs, portable and non-portable spas, and wading pools.
2. **Private Swimming Pool (Private Pool):** Any pool, permanent or portable, which is intended for noncommercial use accessory to a single-family dwelling and available only to the family of the household and their guests.
3. **Public Swimming Pool (Public Pool):** Any pool other than a private pool.
4. **Pool Enclosure:** A fence and gate complying with all requirements of LABC Sections 3109, 3119B, and Section IV below and the walls of a building which serves as part of the enclosure around the pool.

### III. POOL - GENERAL REQUIREMENTS

#### 1. Permit Requirements

- a. **Public Pools:** Separate Building, Electrical, Plumbing and Mechanical permits shall be obtained for all public pools which serve more than two-family dwellings. A Combined Building-Mechanical permit shall be obtained for public pools which serve a two-family dwelling (LABC Section 107.2.2).
- b. **Private Pool:** Combined Building-Mechanical permit shall be obtained to construct private pools (LABC Section 107.2.2).

**Exceptions:** Neither building nor combined building-mechanical permits are required for the following pools:

Swimming, bathing, and wading pools not exceeding 24 inches in depth and not exceeding a surface area of 250 square feet. (LABC Section 106.2, Item 8.)

- c. **Grading and Mechanical Permits:** A mechanical permit shall be obtained for any additional gas or electrical outlets installed for any of the exceptions outlined in item b above. A grading permit shall be required for excavations when the pool requires a building permit or combined Building-Mechanical permit and the lot is located in the grading hillside area.

## 2. Plan Requirements

- a. **Number of Plans:** Two sets of plans and one set of calculations are required for all pools at the time of permit issuance. Each set of plans shall include a fully dimensioned plot plan, which shows the location of the pool, pool enclosure, and all accessory equipment and their setbacks to all adjacent buildings, property lines, and slopes.

**Exception:** Only one set of plans and no calculations are required, when there is a valid City of Los Angeles Standard Plan for the swimming pool on file with the Department.

- b. **Signatures on Plans:** Plans and calculations shall be signed and stamped by a California registered engineer or licensed architect.
- c. **Expansive or Uncertified Fill Soils:** Plans shall indicate "Expansive Soil" or "Uncertified Fill Soil" and shall comply with Subsection 5 of this Section III, Structural Design criteria, when applicable.
- d. **Notes on Plans:** Plans shall include the following notes:
- i. No ground water shall be above any portion of the pool construction.
  - ii. All surface water shall drain away from the pool.
  - iii. Electrical inspection shall approve grounding of reinforcing, plumbing and conduit prior to the approval of reinforcing steel for pouring of concrete or gunite.
  - iv. The noise level from the pool equipment located less than 10 feet from a property line of an adjoining property, shall not exceed ambient noise level by more than five decibels.
  - v. Continuous inspection is required for shotcrete/gunite pools.

## 3. Location of Swimming Pools

Swimming pools shall be located as follows:

- a. **Zoning Code Requirements:** All pools shall comply with the use and location requirements of the Zoning Code. Pools shall not be located in any required yard in which fences more than 3½ feet in height are prohibited. (LAMC Section 12.21.C1.g). Public pools are not allowed in certain zones. The location of a pool constructed on lots

containing residential buildings shall comply with any additional regulation imposed by an ordinance, "Q" or "T" condition or any other zoning regulations. A pool or spa which are higher than 30 inches above ground are not permitted within the required yards for the property.

- b. **Building Code Requirements:** The setback requirements for swimming pools from the bottom of ascending slopes and the top of descending slopes shall be H/4 and H/6, respectively, where H is the height of the slope, as defined in LABC Section 1808.7.1.
- c. **Glazing in Hazardous Locations:** Glazing in walls of a building and fences used as the barrier for swimming pools and spas shall comply with the requirements of LABC Section 2406 when all of the following conditions are present:
  - i. The bottom edge of the glazing is less than 60 inches above the pool side of the glazing.
  - ii. The glazing is less than 5 feet from swimming pool or spa water's edge.

#### 4. **Special Requirements for Public Pools**

- a. **Public Pool Deck:** All public pools shall provide a continuous, unobstructed, minimum four-foot-wide slip-resistant non-abrasive (walking or lounging) deck area of concrete or like material flush with the top of the pool shell wall and extending completely around the pool. The deck shall be measured from the pool side edge of the coping lip. The deck shall extend four feet on both sides and rear of any diving board or slide and their appurtenances. Note: There are exceptions and additional requirements in LABC Section 3114B.
- b. **Los Angeles County Health:** All plans to construct public pools, except for those public pools serving two- or three-family dwellings, shall be approved by the Los Angeles County Health Services Department prior to issuance of the building permit.

#### 5. **Structural Design**

- a. **General Structural Design Requirements:** The pool shall be designed in accordance with the latest code requirements and the following:
  - i. Pneumatically applied mortar (shotcrete) pools shall be designed, tested, and inspected in conformance with LABC Section 1913.
  - ii. When casting against the earth, the reinforcing steel in gunite or shotcrete pools shall have a minimum cover of three inches. (ACI 318-11 Sec. 7.7.1)
  - iii. Pool walls shall be designed for earth pressures as specified in LABC Section 1610.1, approved soils report, or designed for expansive soil as specified herein.
  - iv. Hydrostatic pressure shall be used in an outward direction as a design criterion where concrete is not deposited against natural undisturbed earth or approved compacted fill.

**Exception:** Prefabricated swimming pools accessory to a Group R, Division 3 Occupancy in which the pool walls are entirely above the adjacent grade and if the capacity does not exceed 5,000 gallons, structural design is not required, but is still subject to other requirements, including permit and enclosure.

- b. **Prescriptive Design:** Private pools which are membrane or shell-like structures located completely in-ground, not retaining or supporting additional features above grade (e.g. waterfalls, planters and walls, etc), and on lots not designated as hillside areas, may be designed by a California state licensed engineer or registered architect as follows:
- i. The pool shall be located at least a distance equal to its maximum adjacent depth away from property lines or buildings.
  - ii. The maximum depth of pool shall be limited to 8 feet from top of bond beam or wall to bottom of pool slab.
  - iii. Minimum required reinforcing steel in either direction shall be 1/10 of one percent of the wall cross-sectional area with a maximum spacing of 18 inches.
  - iv. For shotcrete construction, preconstruction test panels may be waived and contact lap splices may be permitted.
- c. **Engineered Design:** All other pools which do not conform to the prescriptive design method shall be designed in accordance with the latest code(s), including but not limited to the following:
- i. For pool walls, comply with the Chapter 10 of ACI 318-11 for flexure as referenced in Section 14.1.2.
  - ii. Minimum horizontal wall reinforcement shall be 0.0020 for deformed bars not larger than No. 5 with  $f_y$  not less than 60,000 psi, or 0.0025 for other deformed bars in accordance with ACI 318-11 Section 14.3.3 as referenced in Section 14.1.2.
  - iii. Minimum reinforcement for pool floors shall be 0.0020 for grade 40 or 50 deformed bars, or 0.0018 for grade 60 deformed bars in accordance with ACI 318-11 Section 7.12.2.1 as referenced in Section 10.5.4.
  - iv. Where the thickness of the wall is greater than 10", provide two layers of reinforcing per ACI 318-11 Section 14.3.4.
  - v. Pools greater than 6' in depth shall include dynamic seismic lateral earth pressure as specified in the soils report per LABC Section 1803.5.12.
- d. **Pools in Expansive Soil:** The following minimum construction requirements will be required for all swimming pools located in expansive soil:
- i. All pools shall be provided with a concrete or equally impervious deck sloping away from the pool with a minimum width of four feet and having a lip extending six inches below the bottom of the deck at its outer edge. All joints in the deck and coping shall have approved permanent resilient waterproof seals. The coping shall be set in a solid bed of mortar.

**Exception:** The impervious deck may be omitted, provided the pool is designed for lateral earth pressure of  $P = \text{Saturated Soil Pressure} + P(s)$ ; and the bond

beam has a thickness of not less than 12 inches and is reinforced with a minimum of three No. 4 bars in each face. The soil around the pool shall slope away from the pool to prevent ponding; or a drainage system shall be provided to collect surface water.

- ii. To determine the lateral earth pressure on the pool walls, the following formula shall be used:  
$$P = 60H + P(s), \text{ where:}$$

$P$  = lateral pressure in pounds per square foot.  
 $H$  = vertical distance in feet below the ground surface.  
 $P(s)$  = lateral pressure due to any superimposed surcharge.
  - iii. The design of bond beams and the thickness and amount of reinforcing steel at the bottom of pools shall be given special consideration. Bond beams shall have a minimum of four No. 3 bars.
- e. **Pools in Uncertified Fill Soils:** The Department may issue permits for “floating type” swimming pools when the following conditions are complied with:
- i. A favorable recommendation from a soils engineer based upon findings in the field relative to the materials making up the fill, the density, containment, drainage factors, and additional conditions which may affect the pool structure or its foundation is submitted and approved by the Department.
  - ii. The pool is designed under the assumption that it receives vertical support from the soil lying under the pool bottom. The limits of the supporting soil shall be below a line drawn around the perimeter of the pool and located on the bottom of the pool where a line sloping at 33 degrees with the horizontal is tangent to the pool bottom.
  - iii. Pool walls shall be designed assuming no support from the surrounding soil as well as in accordance with Section III.5.b.i of this bulletin.
  - iv. The owner shall be made aware that without a favorable soil test of the fill material the only positive method to guard against settlement and possible cracking is to extend the foundation into natural ground. Therefore the owner shall record a covenant and agreement with the County Recorder acknowledging that he/she understands that settlement and cracking may occur. The covenant and agreement shall be approved by the Grading Section prior to being recorded.
  - v. All water connections including both inlet and outlet shall be flexible in nature so that some differential settlement between pool and utilities may take place without causing leaks.
  - vi. The design engineer shall attest to the capability of the soil to support the pool.

#### IV. POOL ENCLOSURE

1. **General:** Every swimming pool, fish pond or other body of water, which contains water 18 inches or more in depth, shall be enclosed.

2. **Permit Requirements:** A separate permit to construct the pool enclosure is required, if any portion of the enclosure is constructed of masonry or concrete higher than 3.5 feet per Section 106.2 of the LABC.
3. **Plans:** When a separate permit is required for the construction of the pool enclosure, then the plan shall require a plot plan to show the location of the pool enclosure and all buildings, pools and setback requirements. The plans shall include construction details that complies with the requirements of this information bulletin.
4. **Private Pools:** All private pools shall provide a pool enclosure. To comply with the intent and the spirit of LABC Sections 3109 and 3119B, all new pool enclosures shall be a minimum of 5 feet in height and shall comply with the construction requirements of this section.

**Note:** The exception listed under Section 3109.4, for residential swimming pools shall not waive the requirements to provide a pool enclosure complying with Section 3109.4.1 through Section 3109.4.3.

**Exception:** Portions of a building may be used as part of the pool enclosure, provided:

- Doors, with direct access to the swimming pool from the home, shall be equipped with complying "Exit Alarm," and
  - Doors (garage doors), with direct access to the swimming pool from accessory buildings, shall be equipped with a self-closing, self-latching device with a release mechanism placed no lower than 54 inches above the floor, or
  - The pool shall be equipped with a power safety cover that complies with ASTM F 1346.
5. **Public Pools:** All public pools shall provide a pool enclosure a minimum of 5 feet in height, which complies with the requirements of LABC Section 3119B and with the fence construction requirements of this section.
  6. **Construction Material:** The fence shall use one of the following approved construction materials: wood, masonry, concrete, corrosion-resistant sheet metal or chain link fence. A fence shall be maintained in good repair and shall be kept vertical, uniform and structurally sound per LAMC Section 12.21A9. The pool fence shall be structurally designed to resist minimum lateral loads due to wind and seismic loads per LABC Sections 1609 and 1613.
  7. **Construction Requirements:** The fence shall meet all of the following requirements.
    - a. The minimum fence height is measured on the side of the fence which faces away from the swimming pool as depicted in Figures 31B-4 and 31B-5 of the LABC for both public and private pools.
    - b. The maximum vertical clearance from the ground to the bottom of the fence shall be limited to two inches, measured on the side of the fence which faces away from the swimming pool.
    - c. The outside surface of a fence shall be free of protrusions, cavities, or other physical characteristics that would serve as handholds or footholds, which renders the fence easily climbable.

- d. Maximum mesh size for chain link fences shall be the same as required by public pool enclosures of LABC Section 3119B. A chain link fence may be used provided the openings are not greater than 1¾ inches measured horizontally. The wire shall not be less than 11 gauge.
- e. Gaps or voids in the fence shall not allow the passage of a sphere equal to or greater than 4 inches in diameter.
- f. Where the fence is composed of horizontal and vertical members and the distance between the top of the horizontal members is less than 45 inches, the horizontal members shall be located on the swimming pool side of the fence. Spacing between vertical members shall not exceed 1¾ inches. Where there are decorative cutouts within vertical members, spacing within cutouts shall not exceed 1¾ inches in width.
- g. Where the fence is composed of horizontal and vertical members and the distance between the top of the horizontal members is 48 inches or more, spacing between vertical members shall not exceed 4 inches. Where there are decorative cutouts within vertical members, spacing within the cutouts shall not exceed ¾ inches in width.
- h. Where the fence is composed of diagonal members, such as a lattice fence, the maximum opening formed by the diagonal members shall be no more than 1¾ inches.

## 8. **Gates**

- a. **Construction of Gates:** The construction material and method of construction for gates shall comply with Subsection 5 and 6 above.
- b. **Private Pools:** All access gates through the enclosure shall open away from the swimming pool and shall be self-closing with a self-latching device placed no lower than 60 inches above the ground.
- c. **Driveway Gates:** “Driveway Gates” are those gates across driveways. The Department may approve the use of “Driveway Gates” on a case-by-case modification, provided the following conditions are met:
  - i. The driveway gate shall be equipped with an electric gate operating device that is approved by a recognized electrical testing agency.
  - ii. The electric gate operating devices shall be provided with a safety mechanism to interrupt and recycle the device, should the gate become blocked.
  - iii. The electric gate operating devices shall be provided with a time delay closing device, which is set and maintained to activate a maximum of 20 seconds after the gate has been opened.
  - iv. No manual control or override mechanism shall be installed on or in connection with the gate operating device.
  - v. The driveway gate shall open outward away from the pool or the gate shall have a self-latching device, lockable hardware or padlock.
- d. **Public Pools:** All gates shall be equipped with self-closing and self-latching devices. The self-latching device shall be designed to keep the gate securely closed. Gates shall open outward away from the pool. Hand activated gate opening hardware shall be located at least 42 inches above the deck or walkway. All public pools shall provide a

five-foot high pool enclosure, which complies with the requirements of LABC Section 3118B and with the fence construction requirements of Subsection 6 of Section IV of this bulletin.

9. **Exit Alarm for Private Pool:** The term “Exit Alarm” shall mean an approved device that makes audible, continuous alarm sounds when any door that permits access from the residence to the pool area, and is without any intervening enclosure, is opened or is left ajar. Exit alarms may be battery operated or may be connected to the electrical wiring of the building.

All exit alarms shall be permanently attached to the door at a minimum height of 54 inches above the floor. Exit alarms shall not be permitted when they are attached to the door in a manner where it may be easily removed without the use of tools. The use of “Velcro Alarms” shall not be allowed. “Velcro Alarms” are those exit alarms attached to the door by use of velcro or self-adhesive.

**Exception:** Exit alarms need not be required when the following conditions are met:

- i. Doors providing direct access from a building to the swimming pool are equipped with self-closing, self-latching devices with a release mechanism placed no lower than 54 inches above the floor, or
- ii. The pool is equipped with an approved safety pool cover which is manually or power-operated and meets all of the performance standards of the American Society for Testing and Materials.

## V. POOL EQUIPMENT

1. **Pool Equipment:** Plans shall show location of all pool equipment. Every pool shall be equipped with an approved filter unit and drain. The location of pool equipment shall require an additional inspection and approval by the Noise Enforcement Inspector, when the pool equipment is located less than 10 feet from a property line of an adjoining property. The fee for the additional inspection shall be charged and collected when the swimming pool permit is issued.

### 2. Pool Drainage

- a. **General Requirements.** Pool drainage (outlet) shall comply with the requirements of the Chapter 3 of the Uniform Swimming Pool Spa and Hot Tub Code and the following requirements.

Outlets less than 12 inches across shall be covered with anti-entrapment grates that cannot be removed except with a use of tools. Slots or openings in the grates or similar protective devices shall not exceed ½ inch in the smallest dimension and shall be of a shape, area and arrangement that would prevent physical entrapment and would not pose any suction hazard to bathers. Anti-entrapment covers are required for new pools and spas, structural remodeling of an existing pool or spa, and for an existing pool or spa whenever a building permit is issued for the remodeling of a single family dwelling.

- b. **Private pools:** Each new pool or spa shall have a minimum of two circulation drains per pump. The drains or outlets shall be hydraulically balanced and symmetrically plumbed through one or more “T” fittings, and separated by a distance at least three



feet in any dimension between drains. Any backup safety system shall meet the standards as published in the "Guidelines for Entrapment Hazards: Making Pools and Spas Safer," Publication Number 363, January 1998, United States Consumer Products Safety Commission. This document may be downloaded from the following website: <http://www.cpsc.gov/PageFiles/103057/poolspadraft.pdf>

- c. **Public pools:** Waste water from periodic draining of the pool or spa for maintenance purpose shall be discharged into the sanitary sewer.
3. **Deck Drainage:** Decks built around the pools shall not drain into the sanitary sewer. Drainage may be conducted to street (storm drain) via non-erosive device.

## **VI. EXISTING POOLS**

1. **Maintenance of Pool Enclosure:** An existing pool enclosure or fence nonconforming to height and not less than 4½ feet in height, may be maintained to enclose a swimming pool existing in a required yard prior to June 1, 1956. [LAMC Section 12.22.C20.f(8)] Existing pool (fence) enclosures, which are 4½ feet in height and which comply with all other current fence construction requirements of Subsections 5, 6 and 7 of Section IV above, shall be allowed to continue to exist under the nonconforming rights per LABC Section 8103.
2. **Repair or Replacement of Existing Pool Enclosure:** If repair is required for the existing legal 4½ feet high fence, then the fence shall comply with all fence construction requirements and may maintain the 4½ feet fence height. If the fence does not comply with all the fence construction requirements of Subsections 5, 6 and 7 of Section IV above, then the fence shall be made to comply with Subsection 4 of Section IV for Public Pools or Subsection 3 of Section IV for Private Pools.
3. **Adding Pool or Spa to a Lot with an Existing Spa or Pool:** Notwithstanding any other provisions of the municipal code to the contrary, if a legal 4½ feet high fence around the existing private pool or spa is existing, and a new private pool or spa is constructed on the same lot, then a five-foot high pool enclosure, constructed per Subsections 5, 6 and 7 of Section IV above, shall be constructed immediately around the new pool or spa, **or** the pool enclosure shall comply with the following after January 1, 2002:
  - a. All private pools and spas on the lot shall be isolated from the home by a five-foot high fence that meets all the requirements of LABC Section 3119B and Subsections 5, 6 and 7 of Section IV, or
  - b. Maintenance of the legal 4½ feet high fence (LABC Section 3109) around both private pool and spa is permitted provided the construction of the existing fence complies with above Subsections 5, 6 and 7 of Section IV requirements and one of the following for the new pool or spa is provided:
    - i. Approved safety pool cover that complies with ASTM Standard F 1346 (LABC Section 3109.4.4.2) for a pool and/or locking safety cover that complies with ASTM-ES 13-89 for a spa, or
    - ii. Approved exit alarm per Subsection 8 of Section IV on all doors from the home to the pool or spa, or if other buildings are part of the pool enclosure, then the doors

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providing direct access from the building (garage) to the private pool shall be equipped with a self-closing, self-latching device with a release mechanism placed no lower than 54 inches above the floor.

4. **Anti-Entrapment Cover requirement for existing swimming pools and spas:** An anti-entrapment cover is required for a single family dwelling when :
  - i. A permit is required for structural remodeling of an existing swimming pool, toddler pool or spa, or remodeling of a single family dwelling.

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