The *Lake Elsinore Shorefront Guide to Lake Stewardship* is a collaborative publication of the City of Lake Elsinore’s Fire, Building, Engineering, Community Services, Code Enforcement and Planning Departments. *The Guide’s* intent is to identify challenges unique to the development of Lake Edge District properties, as well as the latest “how-to” information on various agencies and methods to resolve these issues.

Lake Elsinore is the largest natural lake in Southern California, a true recreational paradise for boating, wakeboarding, parasailing, fishing, water skiing, jet skiing, windsurfing, camping at local campgrounds and RV resorts, sunbathing, picnicking or playing on the beaches.

With the adoption of the Lake Elsinore General Plan Update in December 2011, the Lake shorefront is poised for increasing development pressure. While lakeshore development is a prime opportunity for economic growth it can also be a threat to a limited and fragile resource. Development must be balanced with environmental protection and sustainable lake management. The future of Lake Elsinore depends on everyone who values its water resource taking personal responsibility to keep the Lake healthy and productive for continued enjoyment today, and leaving it a little better for future residents and visitors tomorrow.
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I. SEISMIC / FAULT LOCATION

At its northern end, the Elsinore fault zones splays into two segments, the Chino fault and the Whittier fault. At its southern end, the Elsinore fault is cut by the Yuha Wells fault from what amounts to its southern continuation: the Laguna Salada fault. Several of the fault strands which make up the Elsinore fault zone possess their own names. Northwest of Lake Elsinore are the Glen Ivy North and Glen Ivy South faults. Heading southeast from Lake Elsinore, the two parallel fault strands are the Wildomar fault (the more easterly) and the Willard fault.
The Uniform Code recognizes the northern portion of the Elsinore Fault as a Type B seismic source. It is believed to be capable of generating earthquakes with moment magnitudes in the range of 6.5 to 7.5, with a recurrence interval of approximately 250 years between major events. Small events may occur more frequently. Thus, the City is likely to experience repeated moderate to strong ground shaking generated by the Elsinore Fault in the foreseeable future. The City recognizes the importance of addressing seismic hazards and taking preventative measures to reduce their negative effects.

A. Prior to development approval, existing or new buildings may require seismic upgrading or bracing to meet building and safety codes.

B. Alquist-Priolo and other seismic analyses may be required for new development, to identify the potential for ground shaking, liquefaction, slope failure, seismically induced landslides, expansion and settlement of soils, and other related geologic hazards. The City may require site-specific remediation measures during permit review that may be implemented to minimize impacts in these areas.

C. Habitable structures may be prohibited a minimum of 50 feet from an identified fault line.

D. Prior to development approval, a Soils Report shall be prepared by a licensed soils engineer, with recommendations for compaction standards and the grounding of structures.
II. LIQUEFACTION

Liquefaction is a phenomenon in which the strength and stiffness of a soil is reduced by earthquake shaking or other rapid loading. Liquefaction and related phenomena have been responsible for tremendous amounts of damage in historical earthquakes around the world.

Liquefaction occurs in saturated soils, that is, soils in which the space between individual particles is completely filled with water. This water exerts a pressure on the soil particles that influences how tightly the particles themselves are pressed together. Prior to an earthquake, the water pressure is relatively low. However, earthquake shaking can cause the water pressure to increase to the point where the soil particles can readily move with respect to each other.

Earthquake shaking often triggers this increase in water pressure, but construction related activities such as blasting can also cause an increase in water pressure. When liquefaction occurs, the strength of the soil decreases and, the ability of a soil deposit to support foundations for buildings and bridges is reduced.
**III. SUBSIDENCE**

**Subsidence** is the motion of a surface (usually, the Earth’s surface) as it shifts downward relative to a datum such as sea-level. The opposite of subsidence is uplift, which results in an increase in elevation. Ground subsidence is of concern to geologists, geotechnical engineers and surveyors. Land subsidence is a gradual settling or sudden sinking of the Earth’s surface owing to subsurface movement of earth materials. Subsidence is a global problem and, in the United States, more than 17,000 square miles in 45 States, an area roughly the size of New Hampshire and Vermont combined, have been directly affected by subsidence.

The principal causes are aquifer-system compaction, drainage of organic soils, underground mining, hydro-compaction, natural consequence of our exploitation of underground water, and the increasing development of land and water resources threatens to exacerbate existing land-subidence problems and initiate new ones. In many areas of the arid Southwest, and in more humid areas underlain by soluble rocks such as limestone, gypsum, or salt, land subsidence is an often overlooked environmental consequence of our land-and water-use practices.
IV. GROUNDWATER TABLE

The City of Lake Elsinore lies in an arid region where water is a limited resource. Fortunately, the City contains a wealth of raw and non-potable reclaimed water resources, such as Lake Elsinore, the San Jacinto River, and the Temescal Wash, and water treatment plants. As such it is important that all water resources be protected and conserved while enhancing their overall quality as the City increasingly becomes more urbanized.

The depth to groundwater varies considerably across the City. The groundwater gradient naturally follows this variation in depth, flowing from the northwest to the southeast underneath Lake Elsinore.

The City generally experiences groundwater overdraft conditions. The Elsinore Valley Municipal Water District analysis for the period 1990 to 2000 showed an average annual deficit of approximately 1,800 acre-feet per year. Continuing overdraft may lead to ground subsidence as soils compact over long periods of time, although no clear evidence of subsidence has currently been identified around Lake Elsinore.

A. Prior to development approval, a Hydrology Study may be required to identify the depth of the groundwater table on the property, its quantity and quality.

B. Development is required to provide clean water systems that reduce pollutants being discharged into the drainage system to the maximum extent feasible and meet required federal National Pollutant Discharge Elimination System (NPDES) standards.

C. The City shall utilize the 1998 North American Vertical Datum to be consistent with the national standard for mean sea level, which would increase the measurement of the mean sea level for Lake Elsinore by approximately 2.4 feet.
To locate groundwater accurately and to determine the depth, quantity, and quality of the water, several techniques must be used, and a target area must be thoroughly tested and studied to identify hydrologic and geologic features important to the planning and management of the resource. The landscape may offer clues to the hydrologist about the occurrence of shallow groundwater. Conditions for large quantities of shallow groundwater are more favorable under valleys than under hills. In some regions—in parts of the arid Southwest, for example—the presence of "water-loving" plants, such as cottonwoods or willows, indicates groundwater at shallow to moderate depth. Areas where water is at the surface as springs, seeps, swamps, or lakes reflect the presence of groundwater, although not necessarily in large quantities or of usable quality.
V. SPECIAL FLOOD HAZARD AREA

As shown in the image above, the properties located in the light blue area are in FEMA mapped Special Flood Hazard Area and are at greatest risk during a flood event. The properties shown in the darker blue area are in a 500 year flood zone as mapped by FEMA, their probability of flooding is lower.

The Federal Emergency Management Agency (FEMA) prepared a study in 1980 and revised it in 1987, identifying Lake Elsinore as a flooding source in the City. The San Jacinto River is the major watercourse within the City, and its inflows to Lake Elsinore cause the lake to rise substantially to an elevation of 1,267 feet, inundating inhabited portions of the lakeshore along the southwest and west sides of the lake.

The current FEMA 100-year floodplain (special flood hazard area) surrounds the Lake.

FLOOD ZONE CONSTRUCTION:

1. City of Lake Elsinore Municipal Code 15.64 and 15.68 regulate construction within a special flood hazard area.
2. Other regulations with regard to construction include the International Codes, American Society of Civil Engineers, International Building Code and the National Flood Insurance Program.
3. I-Codes/ASCE 24. The I-Codes and ASCE 24 explicitly apply to buildings and structures, and portions of buildings and structures, that are located, in whole or in part, in flood hazard areas. The IBC explicitly states that the provisions associated with the more restrictive flood hazard area apply (Sec. 1612.1).
4. Structural Fill Structural fill is earthen fill that is used to support buildings. To properly support a building, earthen fill must be free of organic material, construction debris, cobbles, and boulders, and it must be placed in layers and compacted to provide sufficient strength and stability to carry the weight of the building, when subject to loads, without shifting or loss of support. In flood hazard areas, especially those with long-duration flooding, saturation of fill needs to be considered because saturation alters the bearing capacity of the fill material. Also, because flow velocities may cause erosion, the side slopes of fill placed to elevate a building may need to be flatter than typically used, and vegetative ground cover or other erosion protection may need to be provided.
5. **NFIP.** The NFIP regulations for development in special flood hazard areas are silent on the use of earthen fill to elevated buildings, although the general performance expectation that building sites will be reasonably safe from flood applies. The regulations do not specify how fill should be placed or compacted. FEMA Technical Bulletin #10 *Ensuring That Structures Built on Fill In or New Special Flood Hazard Areas Are Reasonably Safe From Flooding,* explains what is required to ensure that buildings on fill are “reasonably safe from flooding.”

6. **IRC.** Section R401.2 requires foundations that are capable of accommodating all loads, and fill soils that support footings and foundations to be designed, installed, and tested in accordance with accepted engineering practice. Section R506 requires fill material used to support concrete slab-on-ground floors to be free of vegetation and foreign material. Fill is to be compacted to assure uniform support of the slab and approval is required for fill depths that exceed 24 inches for clean sand or gravel or 8 inches for earth. Given those depth limitations, approval is likely Flood Provisions of the I-Codes: Higher Standards; More Specific Requirements (6/7/2013) 5 required for most fills used to elevate homes in flood hazard areas, and code officials can require builders to obtain a report or design from a qualified design professional.

7. **IBC.** IBC Chapter 18 covers soils and foundations in general. In addition to the other requirements of this chapter, Section 1804.4 addresses grading and fill in flood hazard areas and states that fill shall be placed, compacted, and sloped to minimize shifting, slumping, and erosion during the rise and fall of flood water and, if applicable, wave action. To meet the required performance objective, a qualified design professional is usually required to design the fill.

Properties shown in the Special Flood Hazard Area are required to file for a Conditional Letter of Map Revision with FEMA and gain approval from FEMA of their construction plans prior to City approval and/or permits are issued. After construction is completed, a final Letter of Map Revision is filed with FEMA.

**Letter of Map Revision and/or Amendment – Conditional (CLOMR/CLOMA)/Conditional based on fill (CLOMR-F) – Submittal to FEMA during the design phase of a project; required for project being constructed in a Special Flood Hazard Area (SFHA).** A Conditional Letter of Map Revision/Amendment (CLOMR/CLOMA) is FEMA’s comment on a proposed project that would, upon construction, affect the hydrologic or hydraulic characteristics of a flooding source and thus result in the modification of the existing regulatory floodway, the effective Base Flood Elevations (BFEs), or the Special Flood Hazard Area (SFHA). The letter does not revise an effective NFIP map, it indicates whether the project, if built as proposed, would be recognized by FEMA. FEMA charges a fee for processing a CLOMR/CLOMA to recover the costs associated with the review. **Building permits cannot be issued based on a CLOMR/CLOMA, because a CLOMR/CLOMA does not change the NFIP map.**
15.68.010 Residential structures. No person shall construct any new residential structure within the perimeter streets of Grand Avenue, Riverside Drive, Lakeshore Drive, Mission Trail and Corydon Road along the shore of Lake Elsinore such that the foundation or basement is below an elevation of 1,264 feet mean sea level, plus a maximum of three feet for wave run-up as determined by the Floodplain Administrator. [Ord. 1105 § 1, 2003].

15.68.40 Fill. No person shall import fill material within the perimeter streets of Grand Avenue, Riverside Drive, Lakeshore Drive, Mission Trail and Corydon Road in Federal Emergency Management Agency (FEMA) designated floodplain without first complying with all applicable local, State and Federal laws, rules and regulations and Section 404 of the Clean Water Act (Title 33, CFR Parts 320, 323, 325 through 328 and 330). [Ord. 1105 § 1, 2003].

What does this mean? Very simply, if you must import fill dirt your lot to raise the building pad out of the floodplain, the fill dirt must come from within this boundary area.
Floodplain Management

Septic System Guidelines – Potential constraints for properties located within the Lake Floodplain Management area (Grand Ave/Riverside Dr/Corydon St/Mission Trail/Lakeshore Dr.)

These guidelines provide information to assist developers in their efforts to preserve the water quality of the City’s Lake and ground water.

New Construction of Septic Systems:

SEPTIC SYSTEMS – Subsurface Leaching / Percolation Systems
a. Minimum lot size one-half (1/2) acre per dwelling unit is required unless the tracts/parcels were granted conditional approval or approval prior to September 7, 1989 by the local agency (county or city Planning Commission, City Council, Board of Supervisors). Proof of conditional approval or approval shall be provided. A copy of any of the following is acceptable “proof:"
   i. Any recorded maps.
   ii. Any conditional approval from the municipality (county or city) for a specific residential, commercial, or industrial project which has specifically identified septic tank-subsurface disposal systems as the means of disposing of sanitary waste.
   iii. Any tract or parcel map that has specifically identified septic tank-subsurface disposal systems as the means of disposing of sanitary waste.

b. Exception to the minimum lot size if any, shall be obtained by contacting the Santa Ana Regional Water Quality Control Board, Susan Beeson at susan.beeson@waterboards.ca.gov

• SEPTIC SYSTEMS – are not allowed within:
  o 100 year Special Flood Hazard Area (Zone A/AE) as mapped by FEMA.
  o 600 feet* of the Lake ordinary high water mark (OHWM)
  o 100 feet* of an active and/or ephemeral streams or channels
  o If sewer hookup is available within 200 feet* and/or required by Elsinore Valley Municipal Water District

• SEPTIC SYSTEMS are allowed within 500 year FEMA mapped flood zones conditioned that:
  o They are not within 600 feet* of the Lake OHWM
  o They are not within 100 feet* of an active and/or ephemeral stream or channel
  o They are in compliance with the SARWQCB minimum lot requirements
  o Consideration is first given to:
    ▪ Aerobic - Aerobic treatment units use oxygen to break the effluent down to produce a cleaner waste. These systems are used in areas where there are environmental issues to contend with.
    ▪ Closed - Closed septic tanks are systems that deliver the effluent into a Septic tank that has to be emptied at regular intervals for the effluent to be treated elsewhere.

SEPTIC SYSTEMS located 600 to 650 feet* from the Lake OHWM will require pre-approval by the Santa Ana Regional Water Quality Control Board.

SEPTIC SYSTEMS shall be in compliance with Federal, State and Local regulations including the State Water Resources Control Board Onsite Waste Treatment System (OWTS) policy.
Replacement of Existing Septic Systems:

Allowed if:

- Not within 200 feet* of an existing sewer system
- Due to failure of existing system
- Proposed to treat additional flows resulting from additions to the existing dwelling
- Consideration is first given to:
  - **Aerobic** - Aerobic treatment units use oxygen to break the effluent down to produce a cleaner waste. These systems are used in areas where there are environmental issues to contend with.
  - **Closed** - Closed septic tanks are systems that deliver the effluent into a septic tank that has to be emptied at regular intervals for the effluent to be treated elsewhere.
- Approved by responsible agencies.

SEPTIC SYSTEMS located 600 to 650 feet* from the Lake OHWM will require pre-approval by the Santa Ana Regional Water Quality Control Board.

SEPTIC SYSTEMS shall be in compliance with Federal, State and Local regulations including the State Water Resources Control Board Onsite Waste Treatment System (OWTS) policy.

* As measured using the shortest overland route aka, “as the crow flies”.

**Responsible Agencies:**

City of Lake Elsinore – Building, Planning and Engineering Divisions. Contact 951-674-3124.

Riverside County Department of Environmental Health (RivCo DEH) – is the responsible plan approving/permitting/inspection agency for Septic System installation in the City of Lake Elsinore. Contact 951-955-8980.

Santa Ana Regional Water Quality Control Board – approving agency for septic systems as required by RivCo DEH and MLSR 93-40 and Onsite Waste Treatment Systems (OWTS) requirements. Contact - (951) 782-4902.

California Department of Fish and Wildlife – approving agency for septic systems as required based on jurisdictional elevation (1255 feet) or ordinary high water mark (OHWM). Contact - (909) 484-0167.
VII. RIGHT-OF-WAY Dedications

Lakeshore Drive is currently a two-lane undivided roadway, and a major north/south route along the east side of the Lake. The City’s General Plan classifies a portion of Lakeshore Drive as a Collector (2 lanes / 68’ ROW), from Main Street to Chaney. From Chaney to Manning, the GP classification is “New Special Roadway” (2-lane, 60’ ROW specifically designed for Lakeshore Drive adjacent to the Country Club Heights District).

Acacia is a public ROW from Spring Street to Chaney.

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<th>ROW EXISTING EAST SIDE</th>
<th>ROW PROPOSED</th>
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<tr>
<td>ACACIA</td>
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CROSS SECTIONS

COLLECTOR HIGHWAY
(4-LANE)
A Traffic Impact Analysis shall be required except for custom single family residences. The TIA shall include the following:

1. Identification of Ingress/Egress Points
2. Circulation Pattern within the project
3. Trip Generation Data as result of the project
4. Parking Requirements and how they are met
5. Signalization
6. Acceleration/Deceleration Lanes
VIII. FIRE HYDRANTS AND FIRE FLOW

IX. SECONDARY ACCESS

X. AUTOMATIC / MANUAL GATES

FIRE PLANNING LAKESHORE MINIMUM

PLOT PLAN REQUIREMENTS

GENERAL CONDITIONS

1. **Minimum Hydrant Fire Flow** - Minimum required fire flow shall be 1,500 GPM FOR 2 hour’s duration at 20 PSI residual operating pressure, which must be available before any combustible material is placed on the job site. Average spacing between hydrants 500’ and 250’ maximum distance from any point on the street or road frontage to hydrant. **THESE PROVISIONS ARE THE ABSOLUTE MINIMUM STANDARDS AND MAY REQUIRE GREATER FLOWS DEPENDENT UPON THE BUILDING CONSTRUCTION AND SIZE.**

2. **Hydrant System** - A combination of on-site and off-site super fire hydrant (s) (6” x 4” x 2 ½” x 2 ½”) will be located not less than 25 feet or more than 250 feet from any portion of the building as measured along approved vehicular travel ways. The required fire flow shall be available from any adjacent hydrant(s) in the system.

3. **Minimum Access Standards** - The following access requirements are required to be implemented to ensure fire department and emergency vehicular access. All roadways shall conform to the City of Lake Elsinore approved roadway standards but in no case shall the minimum fire department vehicular access be less the following provisions:
   1. Twenty-four feet (24’) clear width. Where parking is to be provided, each parking side shall be provided with eight (8’) additional feet on each side of the fire department access.
   2. Median openings or crossovers between opposing lanes of a divided highway or street shall be located only at approved intersections at intervals of not less than 500 feet. [Ord. 529 §3.2 (F), 1973].
   3. The required all weather vehicular access shall be able to support no less than 75,000 lbs. over 2 axles.
   4. Roadway gradient shall not exceed 15% on any access road, driveways, and perimeter roads.
   5. Turning radius shall be 26’ inside and 38’ outside for all access roads.

4. **Secondary Access** - In the interest of Public Safety, this project shall provide an Alternate or Secondary Access. Said access shall be constructed in accordance to the City of Lake Elsinore Engineering Department standards to accommodate full fire response and community evacuation.

5. **Automatic/Manual Gates** – Gate entrances shall be at least two feet wider than the width of the traffic lane(s) serving that gate and no less than 20 feet wide. Any gate providing access from a road to a driveway shall be located at least 35 feet from the roadway and shall open to allow vehicle to stop without obstructing traffic on the road. Where a one-way road with a single traffic lane provides access to a gate entrance, a 40 foot turning radius shall be used. Gate access shall be equipped with a rapid entry system. Plans shall be submitted to the Fire Department for approval prior to installation. Automatic/manual gate pins shall be rated with shear pin force, not to exceed 30 foot pounds. Automatic gates shall be equipped with emergency backup power. Gates activated by the rapid entry system shall remain open until closed by the rapid entry system. Contact the Fire Planning office for current plan check fees.
XI. FIRE APPARATUS TURNAROUND

Riverside County Fire Department
Office of the Fire Marshal
Lake Elsinore

RESIDENTIAL FIRE APPARATUS TURNAROUND STANDARD

HAMMER-HEAD TURN-AROUND

INTERMEDIATE TURN-AROUND

CUL-DE-SAC

20' INSIDE TURNING RADIUS
38' OUTSIDE TURNING RADIUS
XII. STRUCTURAL ENGINEERING
XIII. SOILS REPORT
XIV. UTILITIES

Prior to the issuance of any building permit:
1. Land use approval must be obtained from the Planning Department.
2. All other approvals from all City departments must be presented in writing to the Building Department.
3. All fees must be paid.
4. All projects must meet current Building Code requirements.

Structural Engineering is required on plans for all structures.
1. Seismic bracing is required.
2. Utilities – gas, propane tanks, electrical, sewer and water – shall be shown on plans.
3. Grounding of structures shall be shown on plans.
4. Three sets of plans are required for Plan check, which shall be wet stamped and signed by a design professional.

A Compaction Report prepared by a licensed Soils Engineer is required.

Construction materials shall be treated to withstand flooding.

1. Flood Damage-Resistant Materials
   a. NFIP. The NFIP regulations require that new construction and Substantial Improvements are constructed with materials that are resistant to flood damage, but do not define what that means. FEMA guidance on materials is in Technical Bulletin #2 Flood Damage-Resistant Materials Requirements. This guidance describes five classes of materials ranging from those that are highly resistant to flooding, to those that have no resistance. A lengthy table lists materials by generic names and notes whether the materials are acceptable or unacceptable for use below the BFE.
   b. IRC. Section R322.1.8 includes specifications for wood, allowing use of woods that are preservative-treated in accordance with a specific standard, or use of “decay-resistant heartwood of redwood, black locust or cedars.” This section also requires materials and installation methods used for flooring and interior and exterior walls to conform to the provisions of FEMA Technical Bulletin #2.
   c. IBC/ASCE 24. IBC Section 1612, by reference to ASCE 24, requires flood damage resistant materials to be used below specified minimum elevations. ASCE 24 Section 5 has specifications for metal connectors and fasteners, structural steel, concrete, masonry, wood and timber, and finishes. IBC Section 801.5 (interior finishes) calls for flood damage-resistant materials, and Section 1403 (exterior walls) specifies the same preservative treatment or decay-resistant woods that are listed in the IRC.

2. Flood Openings
   a. NFIP. The NFIP specifies that fully enclosed areas below the lowest floor of elevated buildings are “designed to automatically equalize hydrostatic flood forces on exterior walls by allowing for the entry and exist of floodwaters.”
   b. Two design options are identified: either the designs must be certified by a registered professional engineer or architect, or the openings are to meet or exceed minimum criteria, including that a minimum of two openings have a total net area of not less than one square inch for every square foot of enclosed area subject to flooding.
3. **Walls Designed to Break Away and Equipment**
   a. **NFIP.** The NFIP specifies the performance for non-supporting breakaway walls, if walls are used to that may be used to enclose areas below elevated buildings. Such walls are required in Zone V, and may be allowed in Zone A. The intent is that such walls “collapse under wind and water loads without causing collapse, displacement, or other structural damage to the elevated portion of the building or supporting foundation system.” Post-flood investigations have determined that walls do not breakaway as designed if electrical, mechanical, and plumbing system components and equipment are mounted on or penetrate through breakaway walls. Although the NFIP does not explicitly state that breakaway walls should be free of such elements, it is implied in the performance statement.
   b. **IRC.** Section R322.3.4 explicitly requires that “electrical, mechanical, and plumbing system components are not to be mounted on or penetrate through walls that are designed to break away under flood loads.”
   c. **IBC/ASCE 24.** IBC Section 1612, by reference to ASCE 24, explicitly requires that “utilities and attendant equipment shall not be mounted on, pass through, or be located along breakaway walls.”

4. **Foundation Wall Height Limitations in Zone A**
   The IRC is a prescriptive code, which means that unless specified, a registered design professional is not required to design dwellings. IRC Section R322.2.3 imposes some limitations on foundation wall heights, unless the walls are designed in accordance with Section R404, Foundation and Retaining Walls. The limitations apply to 6-inch and 8-inch plain masonry walls and 8-inch reinforced masonry walls. These limitations were determined by a series of computations of flood loads that considered a range of depths (4, 6, 8, and 9 feet) and a range of velocities (3, 6, and 9 feet per second). If walls higher than these height limitations specified are required, then a design professional is required to develop the foundation design.

5. **Minimum Elevation Requirements**
   The NFIP regulations specify minimum building elevation requirements based on flood zone:
   a. In SFHAs designated Zone A, including Zone A areas with waves less than 3 ft high that are immediately inland of Zone V, the lowest floor shall be at or above the BFE (and the reference point is the top of the floor).
   b. In SFHAs designated Zone V, the bottom of the lowest horizontal structural member of the lowest floor (excluding pilings and columns) shall be at or above the BFE.

IRC Section R322.2.1 specifies elevation requirements in flood hazard areas that are not subject to high-velocity wave action (i.e., in Zone A). In all such areas, buildings shall have the lowest floors elevated to or above the DFE, except in areas designated as Coastal A Zones. In Coastal A Zone areas, the lowest floor shall be elevated to or above the BFE + 1 ft. or the DFE, whichever is higher. R322.2 states that if flood hazard areas have been
delineated as subject to wave heights between 1.5 ft and 3 ft, the areas shall be designated as Coastal A Zones. Flood maps prepared by FEMA after December 2009 show the inland extent of the 1.5 ft wave, the LiMWA.

IRC Section R322.3.2 specifies elevation requirements in coastal high-hazard areas (i.e., Zone V). In all such areas, the required minimum elevation is determined based on whether the lowest horizontal structural member is oriented parallel to or perpendicular to the direction of wave Flood Provisions of the I-Codes: Higher Standards; More Specific Requirements (6/7/2013) 9 approach (consistent with the manner in which elevations are specified in ASCE 24). During conditions of flooding, some waves are expected to rise higher than the BFE specified on the FIRM, in which case the impact of even the crests of those higher waves can impart considerable load on lowest horizontal structural members. If the lowest horizontal structure members are oriented to allow those waves to pass through without impacting the members, the structure does not experience the same wave loads as it would if the members are impacted. Therefore, if a home is oriented such that the lowest structural members are likely to be impacted, the IRC and ASCE 24 require higher elevation. The IRC requires:

a. If the lowest horizontal structural member is oriented parallel to the direction of wave approach, the “lowest portion of all structural members supporting the lowest floor, with the exception of mat or raft foundations, piling, pile caps, columns, grade beams and bracing” shall be located at or above the DFE.

b. If the lowest horizontal structural member is oriented perpendicular to the direction of wave approach, the “lowest portion of all structural members supporting the lowest floor, with the exception of mat or raft foundations, piling, pile caps, columns, grade beams and bracing” shall be located at or above the BFE plus 1 ft or the DFE, whichever is higher.

6. Scope of the IBC
The scope of the IBC includes the “construction, alteration, movement, enlargement, replacement, repair, equipment, use and occupancy, location, maintenance, removal and demolition of every building or structure or any appurtenances connected or attached to such buildings or structure,” except detached one- and two-family dwellings and townhouses not more than three stories above grade plane in height with a separate means of egress and their accessory structures, which must meet the provisions of the IRC.

For floodplain management purposes, it is important to understand that the IBC specifies Use and Occupancy Classifications, and each building is to be classified in one or more of the Use Groups defined in the code. This is especially important because of the NFIP (and code/ASCE 24) limitations on dry flood proofing, a protection technique that is permitted only for nonresidential buildings in A Zones. Two Use Groups include buildings that are residential in nature, where people are cared for or live on a permanent or transient basis: Institutional Group I and Residential Group R.

7. ASCE 7: Flood Loads
The NFIP regulations establish a performance statement for buildings, requiring that buildings in SFHAs be “designed (or modified) and adequately anchored to prevent flotation, collapse, or lateral movement of the structure resulting from hydrodynamic and hydrostatic loads, including the effects of buoyancy.” ASCE 7 Minimum Design Loads for Buildings and Other Structures is referenced by the Codes. Loads defined as “forces or other actions that result from the weight of all building materials, occupants and their possessions, environmental effects, differential movement, and restrained dimensional changes.” ASCE 7 provides minimum load and combination load requirements for dead loads, live loads, flood loads, wind loads, seismic loads, snow loads, rain loads, and ice loads. Loads and appropriate load combinations are developed to be used together and are set forth for strength design and allowable stress design.
The basic requirement of a building code is that buildings and structures must be designed and constructed to support the factored loads in load combinations without exceeding the appropriate strength limit states for the materials used in the construction. In short, buildings must be designed to resist anticipated loads, where the anticipated loads are prescribed based on local conditions.

For flood loads, ASCE 7 includes a performance statement that is equivalent to performance statement in the NFIP regulations: “Structural systems of buildings or other structures shall be designed, constructed, connected, and anchored to resist floatation, collapse, and permanent lateral displacement due to action of flood loads associated with the design flood and other loads in accordance with load combinations [specified in ASCE 7].” Flood loads include hydrostatic loads, hydrodynamic loads, wave loads (with specifics for breaking wave loads on vertical pilings and columns, on vertical walls, on non-vertical walls, and from obliquely incident waves), and impact loads (from debris and ice). ASCE 7 requires the effects of erosion and scour to be included in load calculations (basically by assuming loss of soil, which increases depth of water, thus increasing flood loads).

8. **ASCE 24: Flood Resistant Design and Construction**

ASCE 24 *Flood Resistant Design and Construction* was first published in 1998 and republished in 2005 (a revision is expected late 2013). IBC Section 1612.4 references ASCE 24 for all of the specific design and construction requirements that apply to buildings and structures in flood hazard areas. The IRC requires homes in floodways to be designed in accordance with ASCE 24 and allows use of ASCE 24 for homes in Zone V.

Building codes reference many standards. Standards are developed by qualified organizations according to prescribed procedures. The American Society Civil Engineers appoints a balanced committee that includes regulators, design professionals, manufacturers, and builders. The process requires the committee to evaluate and vote on proposed changes. For ASCE 24, the result is a consensus document that represents what the committee agrees is necessary and appropriate for buildings and structures to resist flood loads and minimize flood damage. In the past, the committee determined that exceeding a number of the minimum requirements of the NFIP was necessary to achieve the desired performance.

9. **ASCE 24: Pile Foundations**

a. **NFIP.** The NFIP regulations require buildings in coastal high hazard areas (Zone V) to have pile or column foundations and require registered design professionals to develop or review the structural design, specifications and plans for construction. The design and methods of construction used must be certified as being in accordance with accepted standards of practice for meeting the provisions of the regulations. ASCE 24 sets forth accepted standards of practice.

b. **IBC/ASCE 24.** ASCE 24 has extensive and detailed specifications for pile foundations. Geotechnical considerations must account for instability and decreased structural capacity associated with erosion, scour, and shoreline movement, which must be considered when designers specify foundation depths. Specifications are provided for different types of piles (wood, steel H, concrete-filled steel pipe, pre-stressed concrete, precast concrete, cast-in-place concrete) and aspects of foundation design, including lateral resistance, capacity of supporting soils, minimum penetration, pile spacing, pile caps, grade beams, pile splicing, and connections. Footings, mats, rafts, grade beams, and slabs-on-grade are permitted at or below grade. Bracing specifications include limitations based on orientation relative to the primary direction of wave forces.

**Building Code Resources:**

FEMA Technical Bulletins:
FEMA P-758. Substantial Improvement/Substantial Damage Desk Reference. Order hardcopy from the FEMA Warehouse (800-480-2520) or download: 

Brief Notes on Other Requirements of ASCE 24

Decks, concrete pads, and patios (V Zone and Coastal A Zone). ASCE 24 includes specifications for decks, concrete pads, and patios that are beneath or adjacent to structures in coastal high-hazard areas and Coastal A Zones, including specific requirements that reinforcing not be used and limiting pad thickness [Sec. 4.8]. IRC requires slabs, pools, pool decks, and walkways to be structurally independent of buildings, unless building foundation are designed to resist the additional flood load [IRC 322.3.3].

Platforms for utility equipment. ASCE 24 requires that exterior elevated platforms be supported on piles or columns, or cantilevered from or knee-braced to the structure. If piles or columns are used, they are required to be adequately embedded to account for erosion and local scour [Sec. 7.1]. Flood Provisions of the I-Codes: Higher Standards; More Specific Requirements (6/7/2013) 17 Electric components required to meet life safety requirements. ASCE 24 has specifications for exposed conduits and cables, electric meters, disconnect switches and circuit breakers, and other electric elements below the minimum elevations, including a statement that electric elements required to meet life safety provisions may be permitted within certain limitations [Sec. 7.2].

Duct systems. ASCE 24, IMC, and IRC each specifically require ductwork/duct systems to be above the required elevations [Sec. 7.4; M602.4, M603.13; IRC 322.1.6; IRC 1601.4.9]. Underground plumbing system elements. ASCE 24 specifies that if installed under-ground, piping and plumbing systems shall be buried to a depth sufficient to prevent movement, separation, or loss due to flooding and erosion [Sec. 7.3.1].

Tanks. ASCE 24 requires tanks to be elevated or installed to resist flood loads, and have fill openings and vents elevated. Designs are required account for 1.5 times the potential buoyant and other flood forces acting on an empty tank during design flood conditions [Sec. 7.4.1].

Pools. ASCE 24 requires all pools to be designed to withstand all flood-related loads and load combinations. Pools in coastal high hazard areas and Coastal A Zones are required to be elevated, designed to breakaway, or to remain in the ground without obstructing flow [Sec. 9.5].

Brief Notes on IBC Appendix G

IBC Appendix G is an optional appendix. It is intended to fulfill the floodplain management and administrative requirements of the NFIP that are not included in the body of code. Communities that adopt the code and this appendix without modification meet the minimum requirements of the NFIP, provided all development is regulated, including buildings exempt from the code. Appendix G includes administrative requirements of NFIP and requirements concerning modifications to watercourses, permits for flood hazard area development other than buildings, conditions for the issuance of variances from floodplain management requirements and site improvements, subdivision planning and installation of manufactured homes, recreational vehicles, tanks, temporary structures and, temporary storage, and Utility and Miscellaneous Group U structures. Some states do not adopt Appendix G, some states adopt it as a mandatory appendix, and some states allow local jurisdictions to adopt it.

Provisions of Appendix G that exceed or that are more specific than the NFIP minimum requirements include the following:

Subdivisions. IBC Appendix G requires residential building lots to be provided with buildable area outside of the floodway [IBC G301.2(3)].

Recreational vehicles. IBC Appendix G prohibits placement of recreational vehicles in flood hazard areas subject to high-velocity wave action (Zone V) and in floodways [G601.1.1].

Tanks. IBC Appendix G requires tanks to be anchored to prevent flotation, collapse, or lateral movement (underground and above-ground) or elevated; requires tank inlets and vents to be at or Flood level.

1. Single family detached residences shall provide two spaces in a garage, plus two open visitor spaces, which may be tandem and located in the driveway.
2. Clustered visitor spaces proposed off-site may be considered by the Community Development Department.

B. Development proposals shall meet the development standards of the L – Lakeshore Zone of the LEMC, including setbacks, and maximum lot coverage.

C. Scenic vistas shall be provided between homes, for the enjoyment of pedestrians as well as local residences. Dwelling units within subdivisions may be clustered to provide larger open space & scenic vistas.

D. Habitat Protection shall be reviewed and approved prior to grading.

E. Development proposals shall not impede nor prohibit the construction of a pedestrian trail system along the Lake.
XX. WHAT CAN I DO ON SHOREFRONT PROPERTY?

What Permits are Required?

Shoreline Property is defined as the land between the water’s edge and Lakeshore Drive. There are Regulatory Agencies who have jurisdictions at different elevations along the shoreline.

A. THE L – LAKESHORE ZONE

Permitted uses, and uses permitted by Conditional Use Permit shall be consistent with the L – Lakeshore Zone.

Section 17.20.040 Permitted uses

Uses permitted in the Lakeshore District shall be as follows:

A. Custom, occupied single-family residences in accordance with Section 17.20.083.
B. Existing occupied single-family residences and existing operating businesses consistent with this Chapter, as of the date of adoption of the L- Zone.
C. Hiking and bicycle trails/tracks.
D. Jet ski and boat rentals.
E. Residential private boat docks for private pleasure craft, subject to the issuance of a City permit.
F. Publicly owned park, in conformance with the Lake Elsinore General Plan.
G. Restaurants.

17.20.50 Conditional uses

The following uses are allowed in the Lakeshore District provided a conditional use permit has been granted by the Planning Commission after notice and public hearing are properly conducted. Any use approved as a CUP shall conform to the General Plan and requirements for scenic corridors.

A. Athletic fields
B. Campgrounds and picnic grounds.
C. Recreational vehicle/trailer parks.
D. Hotels, bed and breakfast establishments, inns, rental cottages, and lodging facilities.
E. Other retail uses that are limited, small scale, and that serve recreational uses, as deemed similar to the above-mentioned uses by the Director of Community Development.
F. Playgrounds
G. Tennis courts

17.20.60 Prohibited uses

Any use not specifically listed as allowed, by ownership right as a permitted/conditional use or special permit, are prohibited. The following uses are specifically prohibited:

A. Off-site advertising structures
B. Stand-alone, for-fee parking lots which are not an accessory use.
C. Storage of any kind unless connected with existing occupied residential dwellings and consistent with all applicable City codes.
D. Unauthorized vending/peddling and selling.

Development shall obtain City approval in accordance with the LEMC. Conditional Use Permits run with the land unless revoked. Entitlements must be constructed in a timely manner or shall expire. Contact the Planning Department for assistance.
WHAT CAN I DO ON SHORELINE PROPERTY?

B. Camping on Private Property

Personal use of private residential property for camping may only be by the property owner or by others with the property owner’s written consent and without any form of compensation or remuneration.

Such use shall not exceed seven consecutive days in duration, except during the period between Memorial Day and Labor Day when such use shall not exceed 14 consecutive days in duration.

Camping may not occur more than four times per calendar year, and a minimum of 14 days is required between each camping period.

Where compensation or remuneration of any type is exchanged for the use of private residential property for camping, no camping shall occur on the property without the owner first obtaining a conditional use permit from the city pursuant to Chapter 17.168 of the Lake Elsinore Municipal Code and any other applicable requirements of this Code.

Private Encroachment

Notwithstanding section 8.70.020 of the Code, no person shall camp on or otherwise enter private property without the written consent of the private property owner.

Operational Requirements

In addition to any other applicable requirements of the Lake Elsinore Municipal Code, camping pursuant to this section shall comply with all of the following operational requirements pertaining to camping:

- Portable restrooms with toilet facilities must be provided and accessible to campers on private property and must have secondary containment and comply with the California Plumbing Code. Restrooms at City-owned beaches and parks do not qualify for use by campers on private property.
- Covered trash receptacles sufficient for the number of campers must be provided.
- The private property where camping occurs must be kept in a clean and sanitary manner.
- Trash and debris must be removed when camping ceases and must be disposed of in trash receptacles.
- Dumping of any trash or litter into the lake water shall not be permitted.
- Any outdoor storage of camping paraphernalia shall not be permitted in the flood plain, including but not limited to, fencing.
- Any use or placement of electrical cords shall be above the flood plain, if applicable.
- All parking shall be on paved surfaces only and above the flood plain.
- All uses pursuant to this section shall comply with the noise regulations contained in Lake Elsinore Municipal Code Chapter 17.176.
- Campfires associated with camping shall be in compliance with the requirements of this Code, adopted codes and State Law.
- Docks, boats, and boat launching facilities and uses shall comply with all applicable regulations.

Enforcement

Any violation constitutes a misdemeanor and a public nuisance. The City may enforce any violation by instituting a criminal, civil, administrative, or other action to abate such nuisance. These remedies are intended to be cumulative and may be used in conjunction with, or in lieu of, each other.
Recommendation:

1. Contact **EVMWD** for any activity within the water.
2. Contact **Army Corps of Engineers (ACOE) /Regional Water Quality Control Board (WQCB)** to obtain 404 Permit / 401 Permit for any activity below the OHWM (Ordinary High Water Mark), currently at 1255' MSL (NGVD 29) surrounding the main body of the lake.
3. Contact **California Department of Fish and Wildlife** to obtain 1600 Permit / 1601 Permit, for any activity below the 100-year flood event demarcation, currently at 1265' MSL (NGVD 29), and above the 1255' MSL, surrounding the main body of the lake.
4. Any new structure within the shoreline of Lake Elsinore shall have a finished floor at or above 1,267 feet mean sea level as of January 2015. Contact the City’s Engineering Department or FEMA for updated information, provisions for flood hazard reduction, nonresidential structures, additions, alterations or repairs."
C. Potential Development Costs

Applicable Process Fees – The following are processes handled by the Engineering Division. One or more of the processes may be required to develop a Lakeside Residential zoned property.

Grading – Plan check and Permit: Stockpile, fine grade & drainage, clear and grub, mass grade, rough grade, precise grade.

Encroachment – Permit: for any work that includes access to City property or streets

Improvements: Street, storm drain, utility.

Haul – permit

Parcel Merger – process used to merge two to four adjacent parcels under the same ownership into one legal parcel.

Parcel Map – process used to reconfigure multiple lots or one large lot into 5 or fewer legal lots. Process begins with the Planning Division and a tentative map.

Final Map – process used to reconfigure multiple or one large lot into 6 or more legal lots. Process begins with the Planning Division and a tentative map.

Vacation – Acacia Street runs parallel to Lakeshore Dr. bisecting most parcels in APN 374 and a few in APN 375. If the elimination (vacation) of Acacia St can be accomplished without removing access to a parcel, the City will consider it.

Seismic Study – Performed by a licensed geologist and submitted to the City; review completed by third party at Riverside County.

Regulatory Agency Permits

Applicable Development Impact Fees:

Transportation Uniform Mitigation Fee (TUMF): fee levied on new structures and some new additions/redevelopment projects. City collects on behalf of Western Riverside Council of Governments (WRCOG). Monies collected are used to fund regionally significant improvements in Western Riverside County.

Traffic Infrastructure Fee (TIF) (LEMC 16.74.040): Fee established to mitigate the additional traffic burdens created by new development to the City’s arterial and collector street system, a development impact fee identified as the traffic infrastructure fee will be imposed on all new development in the City to finance the costs of traffic infrastructure. City uses funds collected to construct improvements identified in the TIF Nexus Study

Master Plan of Drainage Fee: fee levied on new construction. City uses funds collected to construct storm drain improvements identified on the master plan of drainage. Drainage areas included in the zone are Lake Management NW No. 20 ($5,120/gross acre) Town No. 7 ($5,860/gross acre) and Town No. 4 ($5,970/gross acre)
### Planning Division

<table>
<thead>
<tr>
<th>Service</th>
<th>Fee</th>
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</thead>
<tbody>
<tr>
<td>Minor Design Review</td>
<td>$3,910</td>
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<tr>
<td>MSHCP Local Development Mitigation Fee (density less than 8 du/ac)</td>
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<td><strong>TOTAL</strong></td>
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### Engineering Division

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<thead>
<tr>
<th>Service</th>
<th>Fee</th>
<th>(50x100 5,000 s.f. Lot)</th>
<th>(60x100 6,000 s.f. Lot)</th>
<th>(65x110 7,200 s.f. Lot)</th>
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<td>TUMF</td>
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<td>Master Plan of Drainage</td>
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<tr>
<td>Grading Plan Check</td>
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<td>$500</td>
<td>$500</td>
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<tr>
<td>Grading Permit</td>
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<tr>
<td><strong>Subtotal -- All Development Required To Pay</strong></td>
<td><strong>$12,642</strong></td>
<td><strong>$12,742</strong></td>
<td><strong>$12,822</strong></td>
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* If Constructing Improvements
  - Street Improvement Plan Check | $650 | $650 | $650
  - Encroachment Permit           | $850 | $850 | $850

**Total (If constructing improvements)** | **$14,142** | **$14,242** | **$14,322**

* If Paying In-Lieu Fees
  - Administrative Fee            | $100 | $100 | $100
  - Linear Foot Fee ($200 per foot) | $10,000 | $12,000 | $13,000
  - Driveway Approach              | $1,000 | $1,000 | $1,000

**Total (If paying in-lieu fees)** | **$25,242** | **$27,342** | **$28,422**

* The In-Lieu Fee for public improvements is only applicable within certain areas of the City. Each project will be conditioned to either construct public improvements or pay the in-lieu fee. Actual In-Lieu Fees shall be based on the Developer Engineers’ Cost Estimate and approved by the City Engineer.

### Building Division/Developer Fees

<table>
<thead>
<tr>
<th>Service</th>
<th>Fee</th>
<th>1,000 s.f. w/ 400 s.f.</th>
<th>1,200 s.f. w/ 400 s.f.</th>
<th>1,500 s.f. w/ 400 s.f.</th>
<th>1,800 s.f. w/ 600 s.f.</th>
<th>2,000 s.f. w/ 600 s.f.</th>
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<tr>
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<td>$783.75</td>
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<td>Building Permit Fee</td>
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<td>$200</td>
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<td>Mechanical Permit</td>
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<td><strong>$9,402</strong></td>
<td><strong>$10,051</strong></td>
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<td><strong>$12,065</strong></td>
<td><strong>$12,697</strong></td>
<td><strong>$14,270</strong></td>
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</table>

(*) 1,440 s.f. Manufactured Home and a 400 s.f. garage in a Residential District
(**) All Residential Development shall pay $3.36 per square foot of habitable space as determined by the Building Department. A copy of your application with the proper square footage is required before going to the school district at: LEUSD, 545 Chaney Street, Lake Elsinore, CA 92530, (951) 674-7731, ext. 294.