City of Huntington Beach

Community Development Department

Structural Comments (Based on the 2019 Codes)

2000 Main Street, Huntington Beach, CA 92648
Office: (714) 536-5241 Fax: (714) 374-1647

PERMIT #:		Address:	
Project Description:			
Review Date:	May 13, 2020	Applicant:	
Plan Reviewer:		Contact Person:	
Reviewer Phone:		Contact Phone:	
Review:	☐ 1st ☐ 2nd ☐ 3rd		

INFORMATION: A plan review has been performed on the referenced project for verification of conformance with construction codes adopted by the State of California and the City of Huntington Beach. As a result of that review, the items listed below require additional information, inclusion within the plans or calculations or revision to the plans or calculations.

Please provide the requested information to allow completion of the plan review process and issuance of the building permits. Please provide a written response to the items listed below with an indication as to the method of resolution and the location within the plans or calculations.

INSTRUCTIONS: Please return *ALL* checked sets and include three (3) completed and corrected sets of plans, two (2) sets of all other required documents along and *ALL* plan review comments with their respective responses. Incomplete resubmittal may result in delayed review time and additional plans check fee.

GENERAL

See the plans for additional comments and clarifications. ***Please return the marked-up plans with your submittal*.** The comments on the checked set are part of this correction list.

APPROVALS

- ❑ Planning Department: Obtain Planning approval on the final plans prior to issuance of building permit. Call 714 536-5271 for status.
- ❑ Public Works Department: Obtain Public Works approval prior to issuance of building permit. Call 714-536-5431 for status.
- ❑ Fire Department: Obtain Fire Department approval prior to issuance of building permit. Call 714-536-5411 for status.

PLANS-GENERAL

1. Approved Plans and Documents Requirements:
   a) Final drawings and calculations shall be stamped and signed by the Registered Design Professional and shall include the date of signing below the stamp. (California Business & Professions Code 5537, 5538, 6737.1, and 6745)
   b) Designer wet signature required on all sheets. (Business & Professions Code 5802).
   c) If a soils report is provided, the geotechnical engineer shall review and approve the foundation plans for general conformance with their recommendations. Verification of review may be by a "review stamp" on the foundation plan or by a letter on their letterhead.
   d) On the final sets, remove **NOT-FOR-CONSTRUCTION** from the drawings.

2. For electronic plan review requirements please see *Preparing Plans for a Successful Submittal & Electronic Plan Review* handout: https://huntingtonbeachca.gov/files/users/building_and_safety/Preparing-Plans-for-Plan-Review-Electronic.pdf

3. This review is for structural review only; for non-structural review, see comments under separate cover.

4. Submitted plans and related documents are not complete. Additional reviewing time may be necessary upon re-submittal. Please submit complete plans for review.

5. **Applicable Codes**: Add a note that the applicable Codes are: *2019 CBC, 2019 CPC, 2019 CMC, 2019 CEC, 2019 Energy Code, and City of Huntington Beach Municipal Code.*

6. Delete, omit or mark as "***For Reference Only***" all details and notes not applicable to this project.

7. **Construction Documents** (1603): The design loads and other information pertinent to the structural design required by Sections 1603.1.1 through 1603.1.9 shall be indicated on the plans.

8. **Structural Observation** (1704.6): Structural Observation is required for this project; please provide complete notes and an inspection/observation program on the first sheet of the structural plans.

9. **Special Inspections** (1704): The Registered Design Professional shall include a "*Statement of Special Inspections*" on the plans. Provide complete inspection program & list on the Title Sheet.

10. **Material Specification**: Provide complete material notes and specifications on the plans.

11. The architect or engineer of record shall list all deferred submittals on the cover sheet. Deferred submittals require prior approval of the Building Official. Provide a note on the plan: "***Deferred submittals to be reviewed by project architect or engineer of record and certified prior to submittal for plan review***." A separate plan review and fee will be required for deferred submittal items.

12. **Alternate Material** (104.11): Provide ICC ES, IAPMO, or LARR approvals for all alternate materials used or provide general notes that detail the necessary procedures and installation instructions per the reports.

13. **Note** on Plans:
    a. *A separate permit(s) is/are required for accessory building, swimming pool, shoring, demolition, etc.*
    b. *Structural observation per section 1704.6 of the CBC shall be provided when so designated by the registered Design Professional responsible for the structural design or, when such observation is specifically required by the Building Official.*
    c. *Continuous Special Inspection by a registered deputy inspector is required for field welding, , seismic resisting system, concrete strength f'c> 2500 psi, high-strength bolting, sprayed-on fireproofing, engineered masonry, high-lift grouting, pre-stressed concrete, high load diaphragms and special moment-resisting steel/concrete frames, Strong-Walls, Hardy Frames*. (CBC 1704 & Chapters 19, 21, and 22)
    d. *Periodic Special Inspection is required for wood shear walls, shear panels, and diaphragms, including nailing, bolting, anchoring, and other fastening to components of the seismic force resisting system where the fastener spacing is 4 inches and less on center*. (CBC 1705.11.2)
    e. *Excavations shall be made in compliance with CAL/OSHA Regulations*.
    f. *Roof diaphragm nailing to be inspected before covering. Face grain of plywood shall be perpendicular to supports. Floor shall have tongue and groove or blocked panel edges. Plywood spans shall conform to Table 2304.7*.
    g. *All diaphragm and shear wall nailing shall utilize common nails or galvanized box*.
    h. *Hold-down hardware must be secured in place prior to foundation inspection*.
    i. *All bolt holes shall be drilled 1/32" to 1/16" oversized*.
    j. *Fasteners for pressure treated wood shall be of hot dipped zinc-coated galvanized steel, stainless steel, silicon bronze or copper*.

14. Match plans with calculations or revise calculations to match the plans.

FOUNDATION

15. **Geotechnical Investigation** (1803): Submit a foundation and soils investigation report by a Registered Design Professional and conducted in conformance with CBC Section 1803.3 through 1803.5. The report shall comply with CBC Section 1803.6. In addition, the soil report must include corrosivity analysis with recommendations for buried pipe protection and must include liquefaction potential. Place copy of all recommendations onto the plans.

16. Show on the tile sheet the name, address and phone number of the Project Geotechnical Consultant and a list of all applicable geotechnical reports.

17. If a soils report requirement is waived (e.g. residential projects with less than 750 sq. ft. additions), comply with the following recommendations in lieu of providing a soil report:
    a. Design shall be based on CBC Table 1806.2 Material Class 5, and using a maximum 1,500 psf bearing capacity and 100 psf passive resistance. When exposed to sulfates, structural concrete should be based on a soluble sulfate exposure severity classification of “Severe” in accordance with ACI-318, Table 4.3.1, and consist of 4500 psi, water/cement ratio of 0.45, and Type V cement
    b. Depth of foundations shall extend into competent soils and not be less than 24” below the finish grade.
    c. Footings shall have a minimum 2 - #4 grade 40 steel rebar at top and bottom (total of 4).
    d. Slab-on-Grade construction shall be minimum 4” thick with #4 grade 40 steel rebar at 16” on center each way over two-layers of minimum 2” thick coarse sand, rock or gravel, with a minimum 10 mil vapor retarder in between the layers.
    e. New foundations and slabs shall be tied into the existing foundations and slabs. Dowels shall be minimum #3 bars at 18” on center or #4 bars at 24” on center, shall be installed 6” into the existing concrete, and shall extend a minimum of 24” into the new concrete.
    f. Post-tensioned slabs are used in areas with expansive soil. Foundation work slab shall proceed with caution to prevent damage to the tendons. Please have the engineer or architect of record address this issue.
    g. Add a note: At the discretion of the Building official, a Field Memo attesting the adequacy of the soils underlying the subject site by a California Registered Design Professional (licensed civil engineer, geotechnical engineer or engineering geologist) may be required.

18. **Foundation**:
    a. Provide a dimensioned foundation plan to identify the pile locations.
    b. Specify foundation dimensions and reinforcement in the continuous and pad footings.
    c. Specify slab on grade concrete floor slab thickness, reinforcement and moisture barrier on foundation plan.
    d. Add pad footing(s) as required under point loads where missing and/or required.
    e. Show method of tying new footings and slab into existing footings. Show construction details.
    f. Check foundation stability due to overturning moment from shear walls. Add pad footings or design continuous footings/ grade beams as required.
    g. Provide typical details & cross-reference for perimeter walls, interior bearing/shear walls, slab depression, spread footings, etc.
    h. Provide details for stepped footings.
    i. Provide detail of the reinforcement at footing intersection and corners.
    j. Design & check the moment frame foundation for over-turning moment, tension, and shear loads.

19. Add a note that if adverse soil conditions are encountered, a soils investigation report may be required.

20. Foundations for Group R or U of light-frame construction, 3-stories and more in height and all other structures assigned to SDC D, E, or F shall have a minimum specified compressive strength of 3,000 psi. (CBC Table 1808.8.1)

VERTICAL LOADS

21. Provide a current ICC ESR report for the roofing material & specify on plans: "***Roofing material on the roof shall not exceed ___ pounds per square foot***."

22. **Pre-fabricated trusses**: Drawings, layout plan and calculations required to complete plan check. Shall be wet stamped and signed by a Registered Design Professional and must be reviewed and accepted by the Project Engineer or Architect with stamp and wet signature.

23. **Trusses** – provide the following notes on the plans:
    a. Submit two (2) sets of truss calculations and plans to the city for separate plan check.
    b. The truss calculations and plans shall include review of roof, mechanical and lateral loads (chord/strut & brace loads); also include review of top chord and bottom chord for axial + flexure between panel joints.
    c. The truss calculations and plans shall be stamped and signed (include expiration date) by a licensed civil/structural engineer.
    d. The truss plans shall be "review stamped" and signed by the Registered Design Professional of Record.

24. **Trusses**:
    a. Show drag trusses with additional lateral loads over shear walls. Callout drag load on the framing plans. Note that specifying the loads only in the general notes is not acceptable!
    b. Provide support under all truss point loads or design the top plate for the point load.

25. **Framing**:
    a. Show size of headers and beams over all openings.
    b. Show support for all beams and connecting hardware.
    c. Provide positive connections at all post-beam connections to account for uplift forces and lateral displacements.
    d. Call out all metal straps and hangers.
    e. Show panel index, type, orientation and nailing of floor / roof / shear wall plywood.
    f. Show location of purlins and struts (kickers) to reduce rafter spans and support ridges, hips, valleys, etc.
    g. Show on plans, rafter & ceiling joist sizes, spacing, span direction, and support locations
    h. Provide lapped ceiling joist splice detail.
    i. Provide beams (structural framing) where conventional framing is not used.
    j. Provide detail of California framing.
    k. Please revisit the column cap attachment; per Simpson Strong-Tie's footnotes, the column sides shall lie in the same plane as the beam sides.
    l. **Vaulted Ceiling**: Verify that the required insulation can be installed between the roof rafters with a minimum on 1" of air gap.

26. **Wall framing**:
    a. Please calculate (state all assumptions) and detail wall framing to support vertical plus lateral (out-of-plane) loads – review studs, headers, posts, etc.
    b. Vaulted ceiling areas: Specify balloon (full height) studs at interior and exterior walls. Specify size, spacing and maximum allowable span of full height studs.
    c. Three- and four-story wood structures require 3x4 or 2x6 studs at 16" o.c. maximum in bearing partitions below the top two stories. Submit calculations showing that allowable stress in compression perpendicular to grain is not exceeded in the sill plates at the proposed stud spacing.

REMODEL

27. **Remodel**:
    a. Call out the roofing type & material to confirm the assumptions in the calculations.
    b. Clarify if the (E) roof structure is manufactured roof trusses or conventional framing.

c. Show the span & direction of the ceiling joists/ceiling-ties where the (E) walls are removed and address the ceiling-tie splices where walls are removed.
d. Please address the supports for the posts at the bottom (if they are supported on existing continuous footings or new pads).
e. There shall be a minimum of 2 bolts per plate located between 4" to 12" from each end of each piece.
f. Where new door openings are provided in existing walls, provide a new bolt between 4" to 12" from the edge of the existing remaining plates on each side of the opening.
g. Please call out the attachment details, type of attachments, ICC-ESR numbers, and deputy inspections.

28. Please clarify on the plans what items require to be field verified (i.e. size and reinforcements of the existing footing per assumptions in the calculations); add a note that "*if the assumptions are not field verified, revised plans shall be submitted to the Building Dept. for review & approval prior to continuation of the work*."

WOOD DECK

29. **Wood Deck**:
    a. Design the deck & balconies with a live load 1.5 times the live load of the area served not to exceed 100 psf.
    b. Clarify the drainage & call out the minimum slope for drainage.
    c. Call out the decking material and provide a current ICC-ESR number.
    d. Detail & call out the deck construction make up (i.e. decking material, ceiling material, etc.) to match with the assumptions with the structural calculations.
    e. Clarify the lateral load resisting system for the deck.
    f. Where supported by attachment to an exterior wall, decks shall be designed for both vertical and lateral loads as applicable.
    g. Decks shall be either self-supporting or positively anchored to the primary structure.
    h. For the lateral load support show compliance with CBC 1604.8.3 (or CRC R507.1 & R507.9.2).
    i. Design the ledger attachment for gravity & lateral loads.
    j. Check adequacy of the (E) header to support the additional loads from the deck.
    k. **Masonry Fireplace Clearance** (CBC 2111.12 CRC R1001.11): All combustible material shall have a minimum 2" clearance from the front face and sides and minimum 4" clearance from the back face of the masonry fireplace.
    l. **Ventilation** required beneath balcony or elevated walking surfaces. Enclosed framing in exterior balconies and elevated walking surfaces that are exposed to rain, snow, or drainage from irrigation, shall be provided with openings that provide a net free cross ventilation area not less than 1/150 of the area of each separate space.

LATERAL LOADS

30. **Lateral**:
    a. Provide design of the horizontal diaphragms and diaphragm chords and chord splices.
    b. Design the diaphragm to transfer seismic forces from the vertical-resisting element above the diaphragm to the vertical-resisting elements below the diaphragm due to offsets or changes in stiffness in the vertical elements.
    c. Provide complete shear transfer details including detailing for nails, bolt, shear plates, sill plates and blocking.
    d. Consider the vertical load effect E_V in the design of the uplift anchorage in the shear walls; (0.6 - 0.14 S_{DS}) D for ASD and (0.9 - 0.143S_{DS}) D for Alternate ASD to resist overturning.
    e. Provide design of the hold-downs for stacked shear wall condition. (For example, the overturning-moment from the 2nd floor shear wall above shall be accounted for in the 1st floor shear wall hold down below.)
    f. Follow through with all tie-downs to the foundation; where tie-downs are not followed through and are not attached to the foundation, show how the loads are resisted (justify the dead loads required to resist the uplift forces) and design the lower wall for over-strength per ASCE 7 Section 12.3.3.3 and/or 12.3.3.4.

g. Horizontal cantilever structural components shall be designed for a minimum net upward force of 0.2D in addition to the applicable combinations of ASCE 7-16 Section 12.4.
h. All parts of the structure between separation joints shall be interconnected and the connection shall be capable of transferring the seismic force, Fp, induced by the part connected. Any smaller portion of the structure shall be tied to the remainder of the structure based on the strength specified in ASCE 7 Section 12.1.3. Provide calculations & details.

31. **Elements Supporting Discontinuous Walls or Frames** (ASCE 7 Section 12.3.3.3): Columns, beams, trusses, or slabs supporting discontinuous walls or frames of structures having *horizontal irregularity Type 4* of Table 12.3-1 or *vertical irregularity Type 4* of Table 12.3-2 shall be designed to resist the seismic load effects including over-strength factor of Section 12.4.3. The connections of such discontinuous elements to the supporting members shall be adequate to transmit the forces for which the discontinuous elements were required to be designed.

32. **Continuous load path** (ASCE 7 Section 12.1.3): A continuous load path, or paths, with adequate strength and stiffness should be designed and detailed to adequately transfer all forces from their point of application to the final point of resistance.

33. **Redundancy Factor, ρ,** (ASCE 7 Section 12.3.4.2): For structures assigned to Seismic Design Category D, E, or F, ρ shall equal 1.3 unless one of the two conditions in ASCE 7 Section 12.3.4.2 is met, whereby ρ is permitted to be taken as 1.0. Use ρ=1.3 or justify using ρ=1.0.

34. **Chords/collector and struts** (ASCE Section 12.10.2): Provide calculations and details to show that collector elements, splices, and connections to resisting elements have the strength to resist the combined loads resulting from the load combinations with over-strength factor.

35. **Seismic Drift** (ASCE Section 12.12.1): Calculate seismic drift based on deflections of each level with Cd and I factors using strength level forces per ASCE 7 Section 12.8.

36. **Separation** (ASCE 7 Section 12.12.3): Provide separation from property line per Equation 12.8-15 or provide separation from adjacent structure(s) on the same property meeting ASCE 7 Section 12.12.3.

DIAPHRAGMS, CHORDS AND COLLECTORS

37. **Diaphragm stiffness**. Diaphragm stiffness should be determined and considered in accordance with Section 12.3.1 of ASCE 7.

38. **Diaphragm design**. Diaphragm should be designed for both shear and bending stresses resulting from design forces. (Section 12.10.1 of ASCE 7)

39. **Transfer Diaphragm (**SDPWS 4.2): Identify the transfer diaphragms to transfer local forces out to the primary chord/struts of the main diaphragm per SPDWS Table 4.2.4 (with a maximum 4:1 aspect ratio). Framing members, blocking, and connections shall extend into diaphragm a sufficient distance to develop the force transferred into the diaphragm.

40. **Diaphragm discontinuities, openings and reentrant corners** (ASCE 7 Section 12.10.1): At diaphragm discontinuities, such as openings and reentrant corners, the design should show that the dissipation or transfer of edge (chord) forces combined with other forces in the diaphragm is within shear and tension capacity of the diaphragm.

41. **Increase in Forces Due to Irregularities for Seismic Design** (ASCE 7 Section 12.3.3.4): For structures assigned to Seismic Design Category D, E, or F and having a **horizontal structural irregularity** of Type 1a, 1b, 2, 3, or 4 in Table 12.3-1 or a **vertical structural irregularity** of Type 4 (in-plane discontinuity in vertical LFRS) in Table 12.3-2, the design forces determined from Section 12.10.1.1 shall be increased 25 percent for the following elements of the seismic force-resisting system:

a. Connections of diaphragms to vertical elements and to collectors.
b. Collectors and their connections, including connections to vertical elements, of the seismic force-resisting system.

42. **Collectors and their connections**, including connections to the vertical resisting elements, require the over-strength factor of ASCE 7 Section 12.4.3, shall be the maximum of: (ASCE 7 Section 12.10.2.1)
Exception: Structures braced entirely by light framed shear walls designed to resist forces using the standard seismic force load combinations of Section 12.4.2.3 with forces determined in accordance with Section 12.10.1.1.

SHEAR WALLS

43. **Shear Walls**:
    a. Provide a shear wall schedule on the plans and specify the maximum design shear load for each shear wall type. Limit the design shear wall loads to those allowed by Code. Clearly indicate on the plans all plywood and drywall shear walls.
    b. Show the shear wall type, length and location on the framing and/or foundation plans.
    c. Detail the shear connections.
    d. At any level, the overturning moments to be resisted shall be determined using those seismic forces that act on levels above the level under consideration. Overturning effects on every element shall be carried to the foundation.
    e. Provide maximum 5/8“diameter steel bolts embedded 7 inches into the foundation with minimum 3” x 3” x 0.229” thick plate washer for the anchor bolts w/ minimum 2.5d edge distance & 15d end distance.

44. **Manufactured Shear walls**:
    a. Provide manufactured shear wall installation drawings and note ICC ES report number on the plans.
        i) Simpson Wood Strong-Walls (ICC ESR-1267)
        ii) Simpson Steel Strong-Walls (ICC ESR-1679)
        iii) SB Shear Wall Panels (ICC ESR-2652)
        iv) Hardy Frames (ICC ESR-2089)
    b. Show and call out the size of the pads for the manufactured shear walls.
    c. Provide special inspections for the manufactured shear walls per their ICC ESR reports.

45. **Interior Shear Walls (**ASCE 7 Section 12.10.2, SDPWS 4.11.4): A collector is required at all interior shear walls (shear walls define diaphragm boundary location and all edges of a diaphragm shall be supported by boundary elements per ASCE 7 Section 11.2).

46. **In-plane Offset Segmented Shear Wall (**Type 4 vertical irregularity): Follow through with the upper floor holdown to the foundation, or:
    a. Design the lower wall (transfer wall) for the additional horizontal shear loads from the transfer load;
    b. Design the lower wall with the over-strength per ASCE 7 Sections 12.3.3.3 & 12.3.3.4;
    c. Design the collector per ASCE Section 12.10.2.1.

47. **Out-of-Plane Offset Shear Wall** (Type 4 horizontal & vertical irregularity):
    a. Design the supporting beam/collector and columns (supporting the beam/collector) in accordance with ASCE 7 Section 12.3.3.3 using the over-strength factor of Section 12.4.3.
    b. The transfer force must be increased by ρ per ASCE 7 Section 12.10.1.1.
    c. Provide collectors per ASCE 7 Sections 12.10.2 & 12.10.2.1.
    d. Increase the diaphragm design forces, as determined form ASCE 7 Section 12.10.1.1, by 25% for the following (except for forces using over-strength factor of Section 12.4.3):
        i) Connections of the diaphragm to vertical elements and collectors;
        ii) Collectors and their connections to the vertical elements.

48. **Shear wall vertical/plan irregularity**:

a. Please address the vertical plan irregularity for the upper floor shear walls; show compliance with ASCE 7 Sections 12.3.2.2. & 12.3.3.4. Check adequacy of the drag strap & diaphragm capacity.
b. Consider shear wall overturning reactions on the beam/columns per Section 1630.8.2 and 1612.4 for the Special Seismic Combinations.

49. Provide the design for the shear transfer from the roof diaphragm or upper shear wall to the shear wall below the floor or roof. Detail nails, bolts, shear plates, sill plates, and blocking as required by design. Use reduced values for nails with reduced embedment.

50. **Shear Wall Deflection** (2305.3): Wood frame shear wall defection shall be determined in accordance with AWC SDPWS.

51. **Load Path** (SDPWS 4.3.6.4.4): Elements resisting shear wall forces contributed by multiple stories shall be designed for the sum of forces (uplift, shear, and compression) contributed by each story. Follow through with all tie-downs. Where tie-downs are not followed through and are not attached to the foundation, please show how the loads are resisted (justifying the dead loads required to resist the uplift forces).

52. Where tie-downs from upper floor do not continue to the foundation, special seismic load combination shall be checked for elements supporting discontinuous systems per Section 1630.8.2 and formulas in ASCE 7.

53. Masonry shear walls designed by the working stress design method that resist seismic forces in Seismic Design Category D shall be designed to resist 1.5 times the force required by Chapter 16. The 1.5 multiplier need not be applied to the overturning moment.

ANCHOR BOLT DESIGN

54. The design of anchor bolts and holdowns shall comply with CBC1905.1.8, ACI 318-14 Chapter 17 or as required in the ICC ESR for the anchoring system used.
a. The design shall assume cracked concrete.
b. The anchor bolts shall be specified in the calculations and shown on the plans.

55. **Sill Plates**:
a. There shall be a minimum of 2 bolts per plate located between 4” to 12” from each end of each piece.
b. Where new door openings are provided in existing walls, provide a new bolt between 4” to 12” from the edge of the existing remaining plates on each side of the opening.
c. Cast-in place sill plate anchor bolts not exceeding 5/8” diameter with 7 inches embedment, 2.5-anchor diameter edge distance and located 15 anchor diameters from any concrete end shall be determined based on NDS Table 11-E. (CBC 1908,1909 & CBC 2308.12.8)
d. Epoxy and Mechanical Anchor Bolts shall be designed based on the design requirement in the ICC ES report. Submit structural calculations.
e. Fasteners in contact with preservative-treated wood shall be hot dipped zinc-coated galvanized steel, stainless steel, silicon bronze, or copper.

DETAILS

56. **Details**:
a. Provide details where redlined on the plans;
b. Please call out straps where top plates are cut for beam-to-post attachments;
c. Provide shear connection details, properly referenced, at the top and bottom of all shear walls;
d. Design, detail, and cross reference all guards on the structural framing plans;
e. Please revisit the glass guard attachment; per ICC ESR-3269 Section 4.2.3.3.1.1: “*Direct surface mounting to wood in exterior balconies is prohibited*.”
f. Please revisit the bent strap attachments – note that per Simpson Strong-Tie, bent straps may cause fracture at the bent line, which in effect will not carry the loads.
g. Show edge of bearing plates (BP) to be within ½” from the sheathed edge of the sill plate and detail where shear panels occur on both sides of the shear wall. (IRC R602.11.1 & SDPWS 4.3.6.4.3)

h. Provide detail for the base plate attachments and show base plate bolt patterns and edge distances to the concrete.

CALCULATIONS

57. **Calculation**:
    a. Provide complete structural calculations to verify the adequacy of the structural system in resisting seismic, wind and gravity loads. (1604)
    b. Provide a complete and consistent grid system with grid lines for each lateral line of resistance on structural framing plans. Lack of grid lines makes the review process difficult and may delay the plan review and permit process.
    c. To help facilitate plan check of calculations, please provide a building schematic in the calculations showing framing directions and spans; beam locations and spans; posts and footings, etc.
    d. Note the design parameters, allowable design values and any supporting documents used for the design in structural calculations.
    e. **Balconies & Decks**: Design the deck & balconies with a live load 1.5 times the live load of the area served not to exceed 100 psf.
    f. **Exit facilities** (Table 1607.1): Exit facilities shall be designed for 100 psf live load.
    g. **Partition Loads** (1607.5): Floor love load must include 15 psf partition loads (unless the specific live load exceeds 80 psf).
    h. **Heavy vehicle loads** (1607.7): Show compliance with the loads & the required load posting.
    i. Provide calculations for the base plates.
    j. Check the eaves for the wind uplift forces and show how the loads are resisted.
    k. For structures having horizontal or vertical structural irregularities of types indicated in Section 12.3.3.4, the design force shall be increased 25% for connections of diaphragm to vertical elements and to collectors and for connection of collector to vertical elements.
    l. **Moment Connections**: Provide complete calculations for the moment frame and moment connection.

58. Wet Service factor (NDS 11.3.3): For connections **exposed to weather** multiply allowable fasteners loads per NDS 2018 Table 11.3.3:
    a. Bolts x 0.70
    b. Lateral nails loads x 0.70
    c. Screw withdrawal loads x 0.70

59. Provide a diaphragm analysis to show adequacy of the diaphragm in transferring the lateral loads.

60. **Handrails & Guards** (1607.8):
    a. Design, detail, and cross reference all guards on the structural framing plans.
    b. Match the handrail with the architectural plans.
    c. Provide a plan view (where framing are parallel and/or perpendicular to the guards) showing how the loads are transferred to the supporting members and call out all attachment hardware; provide calculations where applicable.
    d. Provide design of handrail assemblies and guards to resist a load of 50 plf applied in any direction per ASCE 7 Section 4.5.1 (exception for R-3, I-3, F, H and S).
    e. Concentrated Load (1607.8.1.1): Handrail assemblies and guards shall be designed for a single concentrated load of 200 lbs. applied in any direction at any point along the top, and have attachment devices and supporting structure to transfer this load to appropriate elements of the building.
    f. Intermediate rails (1607.8.1.2): Design the intermediate rails, balusters and panel fillers for a horizontally applied normal load of 50 psf in accordance with ASCE 7 Section 4.5.1.
    g. The allowable loads cannot be increased for short term duration (the allowable stress increase was shown in the 2007 CBC, but was removed starting the 2010 CBC).
    h. The glass handrails and assemblies railing shall comply with CBC 2407. Provide design and details.
    i. Top rail is required for the glass guard unless it meets the exception in CBC 2407.1.2.
    j. For connections **exposed to weather** multiply allowable fasteners loads per NDS 2018 Table 11.3.3:
        - Bolts x 0.70

- Lateral nails loads x 0.70
- Screw withdrawal loads x 0.70

61. Please revisit the guard attachment; per ICC ESR-3269 Section 4.2.3.3.1.1: "*Direct surface mounting to wood in exterior balconies is prohibited*."

MISCELLANEOUS

62. **Elevators** (ASCE 7 Section 12.10): Submit structural calculations and connection details for the structural members that provide support for the seismic forces generated by elevators. The seismic forces must be determined in accordance with ASCE 13.3. The calculations and details provided must show the complete load path from the rail supports to the building's lateral-force-resisting system.

CANTILEVERED COLUMNS

63. Cantilevered columns as part of the seismic-force resisting system shall comply with the following:
    a. Limit the amount of axial load in the column to 15% of its buckling capacity. (AISC 341 Section E5, E6)
    b. Use K=2
    c. Columns designed as OMF's and SMF's shall use R, Cd and Ωo factors as per Section G of Table 12.2-1 of ASCE 7. All limitations contained in the table shall be complied with except that OMF's may be used in SDC D subject to the limitations in footnote i.
        - SMF: R=2.5
        - OMF: R=1.25
        - Wood: R=1.5
    d. The lowest R value shall be used in the same direction unless the building is a Risk Category I or II building that does not exceed 2 stories in height and light frame construction or flexible diaphragms are used. (ASCE 7 Section 12.2.3.3)
    e. Check *P*-delta effects unless the stability coefficient is less than 0.10. (ASCE 7 Section 12.8.7)
    f. Columns designed as SMF's shall comply with the requirements of Table D1.1 of AISC 341.
    g. The seismic loads shall be transferred to the foundation soil interface based on the seismic load combinations of ASCE 7 Section 12.4.3.2.

64. Provide justification that the proposed cantilever column/grade beam connection detail is fixed as assumed in your design.

65. **Grade Beams**: Provide ductile detailing per ACI 318 Chapter 18.4 & 18.1.3.

66. **Pier Footing**:
    a. For piers with partial column embedment or a base plate with anchor bolts, tie reinforcement shall comply with CBC Section 1018.3.9.4.2.
    b. Embedment depth of the anchor rods shall be sufficient to lap with the longitudinal pier reinforcement based on developing the longitudinal pier reinforcement beyond the projected failure plane of the anchor bolt heads. (ACI 318 Section 25.4 and Figure R17.4.2.9)

67. **Weather Protection** (CBC Section 2203): Specify the type of weather protection in accordance with CBC Section 2203.

MOMENT FRAMES

68. **Moment Frames**:
    a. Identify the type of LFRS that the building is designed for on the plans; note on the plans that "*The Lateral Load Resisting System for this building is _____ Moment Frame*".
    b. **Quality Assurance**: Provide minimum specifications, tables, and notes for Quality Assurance. Note that LASDBS Standard Quality Assurance Plan for Steel Moment frames, which can be obtained from City of L.A.'s website, is acceptable.
    c. **Special Inspection**: Provide on plan the special inspection for structural steel shall be in accordance with the quality assurance inspection requirements of AISC 360 and AISC 341.

d. **Structural Observation** per Section 1704.6 is required for this project. The engineer of record shall prepare an observation program, including the name(s) of the individuals or firms who will perform the work. The observation program shall be shown on the first sheet of the structural plans.
e. **Bolted Unstiffened and Stiffened Extended End-Plate (BSEEP, BUEEP) Moment Connections**: Comply with AISC 358 Section 6.3 for Prequalification limits. Note: SMF systems in direct contact with concrete structural slabs are not prequalified, unless they comply with the condition per AISC 358 Section 6.2.
f. **Other Prequalified Moment Connections**: Comply with AISC 358 Section 7.3 (BFP), 8.3 (WUF-W), 9.3 (KBB), 10.3 (CONXTECH CONXL) for Prequalification limits.
g. **Plastic Hinging Zone** (AISC 341 I2-1 and D1-3): Clearly identify on the plan the location and length of the expected plastic hinging zone. No welded, screwed, bolted, or shot-in attachment is permitted within this zone. (AISC 341-D1(3) for exception)
h. **Splice Plates** (AISC 341 D2-5d): Splice plates or channels used for making web splices in the SFRS columns shall be placed on both sides of the column web. Detail this on the plan.

69. **Material Specification**:
    a. The structural steel used in SFRS described in Chapters E, F, G and H shall meet one of the following ASTM Specifications: A36, A53, A500 (Grade B or C), A501, A529, A572 (Grade 42, 50, or 55), A588, A913 (Grade 50, 60 or 65), A992, A1011 HSLAS Grade 55, or A1043. (AISC 341 A3 (1))
    b. Structural steel used in Seismic Force Resisting (SFRS) shall meet requirements of AISC 360 Section A3.1 except as modified by AISC 341. The specified minimum yield stress of steel to be used for members in which inelastic behavior is expected shall not exceed 50 ksi for SMF and IMF, nor exceed 55 ksi for OMF, unless the suitability of the material is determined by testing or other rational criteria. The specified minimum yield stress of structural steel shall not exceed 65 ksi for columns in systems defined as SMF. (AISC 341 A3 (1))
    c. The **structural steel used for column base plates** shall meet one of the preceding ASTM specifications or ASTM A283 Grade D. AISC 341 A3 (1)

70. **Base Connection**:
    a. Design the base connection elements, including but not limited to, anchor bolts, base plate welds and any other elements transferring shear, moment and tension mechanism shall be designed using the **over-strength factor** in accordance per ASCE 7.
    b. The seismic loads to be transferred to the foundation soil interface shall be based upon the seismic load combinations of ASCE 7 Section 12.4.3.2.
    c. Design the concrete elements at the column base, including anchor rod embedment and reinforcement steel.
    d. Grade beams shall be provided with ductile detailing per ACI 318 Chapter 18.4 & 18.13.

71. Check the required bolt size & spacing in the top plate to transfer the lateral loads considering:
    a. Reduced beam length (since no attachments are allowed in the hinging zone);
    b. Reduced top plate depth due to notching & countersinking the bolts.

72. **Special Moment Frames (SMF)**:
    a. **Reduced Beam Section (RBS) Moment Connections**: Comply with AISC 358 Section 5.3 for Prequalification limits.
    b. Column and beam members used in SMF shall meet the width-to-thickness limitations of Table D1.1 per AISC 341 Chapter D (AISC 341 D1-1b)
    c. **Lateral bracing** (AISC 341 D-1–2b) of beam flanges shall be provided as follows:
        i) Both flanges of beams shall be laterally braced or the beam cross section shall be torsionally braced.
        ii) The unbraced length between lateral supports shall not exceed $0.086\ (r_y)(E/F_y)$. (AISC 341 D1-2b)
        iii) Lateral supports shall be provided near concentrated forces, changes in cross-section and other locations where analysis indicates that a plastic hinge will form during inelastic deformations.

iv) The required strength of lateral bracing shall be $M_r = R_y F_y Z$ (LRFD) or $M_r = R_y F_y Z/1.5$ (ASD). The required strength of lateral bracing of each flange provided adjacent to plastic hinges shall be at least: $Pu = 0.06 R_y F_y Z/h_o$ (LRFD) or $Pa = (0.06/1.5) R_y F_y Z/h_o$ (ASD). The required stiffness shall meet the requirements of Appendix 6 of the AISC 360. (AISC 341 D1-2c)

v) The required strength of lateral bracing provided adjacent to plastic hinges for concrete encased composite beams shall be Pu = 0.06Mp,exp/ho

73. **Intermediate Moment Frames (IMF)**:
    a. The R value used in determining the base shear shall be limited to 4.5.
    b. Where groove welds are used for column splice, they shall be complete-joint-penetration groove welds that meet the requirement of AISC 341 A3-4b and I2-3 for demand critical welds. (AISC 341 E2 - 6a)
    c. **Continuity Plate** (AISC 341 E2-6f and E3-6f): Continuity plate for IMF connection shall be detailed on the plan to match the prequalified in AISC 358 or connection prequalified in accordance with Section K1 or tested in accordance with Section K2 of AISC 341.
    d. **Lateral Bracing** (AISC 341 E2-4a): Beams shall be braced to satisfy the requirements for moderately ductile members per AISC 341 D1-2a:
        i) Both flanges of beams shall be laterally braced.
        ii) The unbraced length between lateral supports shall not exceed $0.17 r_y (E/F_{y)}$ per Equation D1-2.
        iii) Lateral supports shall be provided near concentrated forces, changes in cross-section and other locations where analysis indicates that a plastic hinge will form during inelastic deformations.
        iv) The required strength of lateral bracing shall meet the requirements of Appendix 6 of the AISC 360.

74. **Ordinary Moment Frames (OMF)**:
    a. The R value used in determining the base shear shall be limited to 3.5.
    b. Identify the type of LFRS the building is designed for on the plans; note on the plans that "*The Lateral Load Resisting System for this building is an Ordinary Moment Frame*".
    c. Provide a complete moment connection design meeting AISC 341 & AISC 358 and detail the moment connection on the plans.

RETAINING WALLS

75. Clearly indicate the "Scope-of-Work" on the cover sheet and provide the breakdown of the wall types, wall heights & wall lengths of all the different wall types & fences.

76. Provide top of wall (TW), finish grade (FG), and top of footing (TF) elevations:
    a. At intervals for every 2' change in height of retaining condition.
    b. Where indicated on red marked plan.
    c. At each change in retaining wall construction type.

77. Please provide a wall legend and key plan in the calculations, identify the walls calculated, and cross-reference to the details/schedules on the plans.

78. Retaining Walls:
    a. Soils report and recommendations are required for retaining walls greater than 6 ft.
    b. Retaining walls 6 ft. and less without a soils report shall be designed for high expansive soil and Material Class 5 in Table 1806.2.

79. Include the dynamic seismic lateral earth pressures on the foundation walls & retaining walls supporting more than 6 ft of backfill height due to design earthquake ground motions. (CBC 1803.5.12)

80. Where passive pressure and friction are combined when evaluating the lateral resistance, the value of the passive pressure should be limited to 2/3 of the values given in the soils report (unless no reduction is required per the soils report).

81. **Lap Splices** (CBC Section 2107.2.1): Provide calculations for the lap splices per TMS 602/ACI 530.1/ASCE 6 Section 2.1.7.7.1 or per the CBC Section 2107.2.1. When using CBC Section 2107.2.1 for lap splice calculations, in regions of moment where the design tensile stresses in the reinforcement are greater than 80% of the allowable steel tension stress, Fs, the lap length of splices shall be increased not less than 50% of the minimum required length, but need not be greater than 72 d_b.

82. Please clearly show and call out the backfill material to match with the assumptions in the calculations.

83. If walls are designed as a **restraint basement retaining wall**, provide calculations & details for the floor diaphragm/framing to transfer & resist the loads. Show how the loads are transferred & resisted.

84. A "***Common wall agreement***" is required for walls on the property line. Walls constructed on the common property line require a "Common Wall Agreement". Verification of property lines is required at the time of inspection

85. Note on the cover sheet "***Line and Grade Certification is required***". All work at the property line without a Common Wall Agreement will require a certification.

DEEP FOUNDATIONS

86. For cast-in-place deep foundation, show compliance with CBC 1810.3.9.4.2 for seismic reinforcements in SDC D thru F:
    a. No. 3 closed ties or spirals for elements with a least dimension up to 20" and No. 4 for larger elements;
    b. Transverse reinforcement spacing shall not exceed the least of the following:
        - 12 longitudinal bar diameter;
        - ½ the least dimension of the element; and
        - 12"
    c. Confinements per CBC 1810.3.9.4.2.1 & ACI 318 Sections 21.6.4.2, 21.6.4.3 and 21.6.4.4 within 3x the least element dimension of the bottom of the pile cap.

87. Individual deep foundations shall be interconnected by ties. (CBC 1810.3.13)

88. Show the required foundation setback per CBC 1808.7.

SHORING

89. **Shoring Plans**: Provide complete shoring plans for the subterranean excavation or provide plans and sections showing cut slopes as recommended per approved soils report. Before commencing the excavation, proof of notification to adjoining property owners shall be submitted. (3307)

90. Provide a scaled and dimensioned site plan showing:
    a. Property lines of the project.
    b. Location of all buildings and structures on the property.
    c. Location of all buildings and structures on adjacent property for shoring located within a distance equal to the depth of the excavation to the adjacent property.
    d. Shoring location.

91. Note on the plan:
    a. Shoring engineer to provide monitoring of shoring and improvements on adjacent properties and submit results with a report to the Building Inspector on a daily basis during excavation and shoring and weekly basis thereafter.
    b. Geotechnical engineer shall provide continuous inspections during shoring and excavation operations and during removal of shoring.
    c. Contractor shall notify adjacent property owners by certified mail 10 days prior to starting the shoring or excavation work.

d. Continuous inspection by deputy inspector is required during shoring, excavation and removal of shoring.

92. Geotechnical engineer to stamp and sign the shoring plan, certifying that the design is in compliance with his recommendation.

93. Provide a section through the property line. Show the shoring and improvement on both sides of the property line.

94. Excavations and shoring shall be made entirely within the project site.

95. Soldier Piles: Steel piles shall be encased in concrete with a minimum of 3 inches of cover. Lagging is not permitted to violate the concrete cover

96. Provide a description of the process for installing shoring, construction of basement walls, and removal of shoring.

ADDITIONAL COMMENTS

97. The comments on the checked set are part of this correction list. Please comply with all red-marks on the submitted plans. Return all sets with the completed plans. This review does not preclude additional corrections that may follow upon re-submittal.