



Section 105

Grading

This section establishes the uniform policies and procedures for the preparation of the grading requirements in the City of Irvine.

It is not intended as a textbook, or substitute for engineering knowledge, experience, or judgment but rather as a guideline to uniformity and to provide the designer with sufficient information for the preparation of desired plans with a minimum amount of uncertainty.

Please refer to the latest posted amendment for any updates or modifications to the standards herein.



Public Works

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Public Works

Section 105 *Grading*

105.1 GENERAL

All grading improvements shall be in accordance with the City of Irvine Grading and Excavation Code and Grading Manual.

105.2 PLAN PREPARATION

A. General

1. The plan size shall be 30 inches x 42 inches. City standard grading sheets can be purchased from a designated local vendor.
2. Use of City of Irvine or County of Orange Benchmarks, give elevations, location, benchmark number and adjustment date.
3. Show job site address and closest cross-street on the Title Sheet.
4. Indicate the Tentative Tract or Parcel Map, City Geobase file numbers and Site Plan numbers on the Title Sheet.
5. Show vicinity map or other data adequately indicating the site location on Title Sheet.
6. Show name, address, and telephone number of owner, design engineer (or architect), Geotechnical Engineer and Engineering Geologist.
7. Show yardage of cut, fill, remove and recompact, export and import on plan.
8. Show construction notes and quantities for on-site development on Title Sheet.
9. A State of California stamped Registered Civil Engineer or Licensed Architect must sign plans and indicate State license number and expiration date prior to submittal. Unsigned and unstamped plans will not be accepted for plan checking.

10. Show and label property lines of the property on which the work is to be performed.
11. Show North arrow, scale and legend. North arrow should point to the top or right of sheet.
12. Show precise location of all existing buildings, structures, trees, cesspools, septic tanks, and wells on the property where the work is to be performed and the location of any building or structure on land of adjacent property owners which is within fifteen (15) feet.
13. Indicate all existing and proposed easements for drainage devices, roadways and utilities.
14. Show accurate contours indicating the topography of the existing ground.
15. Show finish grades by contours and spot elevations indicating proposed drainage patterns and grading. Show finish grade elevations at corners of all structures, B.C., E.C., BVC, EVC and grade breaks. For precise grading plans show pad and finished floor elevations.
16. Show daylight lines of all cuts and fills. Make them continuous and obvious
17. Indicate where excess dirt is to be placed.
18. Provide berms at tops of all slopes. Show detail (minimum 12 inches high and 4 feet wide).
19. Show all applicable City of Irvine Standard Grading and Paving Notes on the plans. All sheets shall show pertinent construction notes.
20. Show building or structure setbacks in accordance with approved site plan.
21. Show complete details of all drainage structures.
22. Show detail of typical lot drainage and roof drainage.
23. Show location and complete details of de-silting basins.
24. Show top and toe of all cut and fill slopes.
25. Show detail of typical slope.

26. Show subdrainage systems on plans.
27. Indicate City Grading Permit Number on first sheet of grading plan and each subsequent sheet in the lower right hand corner.
28. Show acreage of site on the Title Sheet.
29. Show Flood Hazard Zones, Map number and effective date in accordance with current Flood Insurance Rate Map (FIRM) by FEMA.
30. Precise grading plans shall be in conformance with the approved tentative map, if applicable.
31. All work proposed in the public right-of-way must be shown on the plan. Items that are not shown will require a separate encroachment permit.
32. Landing pads for trash enclosures shall be a minimum of 8 inch thick concrete over 6 inches of AB, or 6 inch thick concrete with No. 3 reinforcing bars at 12 inches on center in both directions over 6 inches of AB.
33. Shade all new AC construction using a Zip-a-tone type material on the originals.
34. Disclaiming statements on the plans are not acceptable, unless previously approved by the City
35. Provide horizontal control plans including all improvements. (Approved site plan may suffice).
36. Show storm drain profile for all storm drain pipes with a 15 inch inside diameter or larger.
37. Manholes shall be required as follows:
 - Beginning and ending of curves
 - Pipe size changes
 - Angle points and as required at junctions
 - 300 foot maximum intervals
 - Slope changes
 - As required
38. Identify all previous preliminary grading permits issued for the project site on the title sheet.

39. All lettering shall be 1/10 of an inch minimum.
40. The use of grate type catch basins shall not be allowed, except in landscape areas.
41. On-site striping plans shall be provided with initial submittal (if applicable).
42. Striping plans for sheets on which new entrances are to be constructed shall be provided. Existing striping and proposed modifications shall be shown.

105.3 PLAN SUBMITTAL

A. General

1. Bonds will be required for extensive grading and drainage systems or as deemed necessary by the City Grading engineer. In general, bond amounts will be based on 25% of the cost of moving the largest amount of either cut or fill and 100% of the estimated cost of the hardscape improvements.
2. Written notarized permission must be obtained from the adjacent property owner where grading or drainage is proposed on the adjacent property not owned by the applicant/permittee.
3. For all projects that exceed 5,000 cubic yards of import or export, an approved haul route, access points, traffic control, and monitoring devices are required in accordance with the Grading and Excavation Code. This approval shall be obtained prior to issuance of a grading permit.
4. If a retaining wall is required, submit an application for a retaining wall permit with two sets of plans and calculations for a structural plan check. (A separate Building Permit for the retaining wall will be required.)

B. First Check

The following shall be submitted with the application for first plan check:

1. Four sets of grading plans signed by the Registered Civil engineer preparing the plans.
2. Two copies of preliminary soils investigation prepared by a licensed Geotechnical engineer.
3. Two copies of geological investigation prepared by a licensed Engineering Geologist.
4. Engineer's estimate of grading quantities and hardscape construction cost.
5. Hydrology and hydraulic calculations for any drainage devices.
6. One copy each of approved Tentative Map and Site Plan.
7. Plan Check Fee and pre-inspection fee.

8. Completed Application/Grading Permit Form.

C. Subsequent Checks

The following shall be submitted for each subsequent check:

1. Four revised copies of grading plans.
2. Check prints from previous submittal.
3. Revised calculations.
4. Check sets of previous calculations.

D. Final Submittal for Approval

The following shall be submitted for each subsequent check:

1. At least 5 sets of final grading plans.
2. Inspection fee.
3. Grading Bond (if required).
4. Final hydrology and hydraulic calculations.
5. Check prints from previous submittal.

E. After Approval

Prior to issuance of Certificate of Use and Occupancy, the following record drawing information shall be submitted:

1. One PDF format plan set.
2. One AutoCAD format plan set.

105.4 SOILS REPORT

A soil engineering report shall be prepared for each grading project by a licensed geotechnical engineer.

The soil engineering report shall include data as required by the Grading Manual and specifically regarding the nature, distribution and strength of existing soils, conclusions and recommendations for grading procedures and design criteria for corrective measures when necessary, and opinions and recommendations covering adequacy of sites to be developed by the proposed grading.

105.5 DESIGN CRITERIA

A. Drainage

1.

Minimum gradients for residential sites:	
Dirt, grass, etc.	1.0%
Fine graded residential	2.0% min./20% max. sheet flow away from building pad for a minimum of 5 ft.
Asphalt Concrete	1.0%
Concrete	0.5%
Concrete gutter in paved area	0.3%
Terrace drains	6.0%
Interceptor drains	2.0%
Hillside SFD subdivision rear yards	2.0%
Rough graded hillside lots	2.0%
No rear yard drains will be allowed to outlet onto terrace drains	

2.

Minimum gradients for flatland industrial sites:	
Earth at rough grade stage	0.5%
Earth fine grade	1.0%
Asphalt pavement (sheet flow)	1.0%
Concrete drain in earth area	0.5%
Concrete gutter in paved area	0.3%
Max. gradient for sheet flow	10.0%
Maximum gradient for concentrated water on developed lots	4.0%

3. Design to carry water to nearest practical street, storm drain or natural watercourse. Concentrated flows will not be allowed over curbs. Maximum of 2 cfs is allowed through driveways.
4. All concentrated flows shall be contained within a concrete drainage device.
5. Provide velocity reducers at storm drain outlets.
6. Provide cut-off walls at inlet end of paved drains.
7. Design and show locations of interceptor drains.
8. Drainage shall not flow over the top edge of any slope.

9. For residential lots, centerline of swales shall be five feet minimum from building.
10. Drainage of reciprocal side yard lots shall not cross over fence lines.
11. Site shall be graded to insure all finish floors are one-foot above the surface elevation of the theoretical 100 year storm flow.

B. Slopes

1. Provide setbacks outlined in the City of Irvine Grading and Excavation Code and shown on approved tentative map or site plan.
2. Drainage shall be directed away from the faces of cut and fill slopes or into approved drainage structures. The faces of cut and fill slopes shall also be manufactured to control against erosion. This control may consist of stepping or other surface protection, as approved by the City Grading Engineer. The protection for the slopes shall be installed within 15 days after completion of the rough grading.
3. Provide terrace drains and down drains for cut and fill slopes outlined in City of Irvine Grading and Excavation Code. Drains shall be constructed by three (3) inch minimum concrete or gunite reinforced with 6 inch x 6 inch - #10 welded wire mesh (W.W.M.) or approved equal.
4. The surface of all cut slopes more than five (5) feet in height, except those cut slopes adequately stabilized from erosion by stepping or other physical surface protections in accordance with item (2) above, and fill slopes more than three (3) feet in height shall be permanently protected against damage by erosion by planting with grass or groundcover plants. It is desirable to install such vegetation upon completion of rough grading in conjunction with the installation of temporary soil stabilization measures as specified above. Final approval of work shall be made after growth is established on the slopes. Slopes exceeding fifteen (15) feet in vertical height shall also be planted with a seed and/or young plant mix containing grass, groundcover plants, shrubs and/or trees that permanently protect the slope from erosion. Native and other plants selected and planting methods used shall be suitable for the soil and climatic conditions of the site. Rationale for determination of seeding or planting rates and density and species selection shall be provided to the City for approval.
5. Slopes required to be planted shall be provided with an approved system of irrigation, designed to cover all portions of the slope, and

plans therefore shall be submitted and approved prior to installation. A functional test of the system shall be required. All irrigation systems where required shall be designed on an individual lot basis, unless commonly maintained in an approved manner.

6. Recommendations in the soils report and the City Grading and Excavation Code shall be incorporated into the design of any slope.

105.6 EROSION CONTROL

A. General

1. No grading permit shall be issued without an erosion control plan approved by the City Grading Engineer. The erosion control plan shall include details of protective measures, including desilting basins or other temporary drainage or control measures, or both, as may be necessary to protect the water quality of receiving water bodies or to protect adjoining public and private property from damage from erosion, flooding or the deposition of mud or debris which may originate from the site or result from such grading operations.
2. Vegetation clearing and brushing activities shall not be initiated during the rainy season (October 15 through April 15) on any site which is not adequately protected with desilting basins or other temporary drainage or control measures.

B. Erosion Control Plans

1. Erosion Control Plans shall provide the following:
 - a. Temporary soil stabilization measures installed on grading slopes exceeding a three to one ratio and/or ten (10) feet in height.
 - b. Desilting facilities at all drainage outlets from the graded site, designed for a 25-year storm intensity. They must be detailed on the plans.
2. Design and specific recommendations shall be submitted for the following:
 - a. Desilting basin volume based on gradient and nature of soils.
 - b. A real extent of all graded areas and identification of any temporary soil stabilization measures.
 - c. Size of desilting basin outlet pipe and overflow.
 - d. Dike requirements. Minimum wall width, slope of walls, percent compaction etc.
3. The following notes shall be placed on the plans:

a. In case of emergency call _____ (responsible person) at _____. (24 hr. phone number)

b. The undersigned Civil Engineer will review the erosion control work:

Signature

Date

c. A standby crew shall be available at all times for emergency work during the rainy season (October 15 through April 15). When rain is imminent, necessary materials shall be available on site and stock piled at convenient locations to facilitate rapid construction of temporary devices or to repair any damaged erosion control measures.

d. Devices shall not be moved or modified without the approval of the City Inspector

e. All removable protective devices shown shall be in place at the end of each working day when the five (5)-day rain probability forecast exceeds forty (40) percent.

f. After a rainstorm, all silt and debris shall be removed from check berms and desilting basins. Any graded slope surface protection receiving measurable damage during a rainstorm shall also immediately be repaired.

g. Fill slopes at the tract perimeter must drain away from the top of the slope at the end of each working day.

h. A guard shall be posted on the site whenever the depth of water in any device exceeds two (2) feet.

4. Placement of devices to reduce erosion damage within the tract must be shown on the plan.

5. Outlet conditions from the desilting basin shall not exceed downstream limitations, with the exception of overflow which shall be designed to a capacity of 1.5 times the maximum design flow.