



GRADING MANUAL

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BUILDING AND SAFETY**

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**CITY OF IRVINE
GRADING MANUAL**

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CITY OF IRVINE GRADING MANUAL

ARTICLE 1. GENERAL PROVISIONS

1.1 Authority

City of Irvine Grading Code Section 5-10-102, Grading Manual, authorizes the Chief Building Official to formulate such rules, procedures and interpretations as may be necessary or convenient to administer the Grading Code. Such rules, procedures and interpretations, and amendments thereto, shall be referred to as the City of Irvine Grading Manual.

1.2 Scope and Purpose

The City of Irvine Grading Manual (hereinafter referred to as grading manual) is a compilation of rules, procedures and interpretations necessary to carry out the provisions of the City of Irvine Grading Code. The grading manual is organized to follow the content of articles in the grading code.

The purpose of the grading manual is to assist users of the grading code by supplementing it with detailed information regarding rules, interpretations, standard specifications, procedures, requirements, forms and other information applicable to control excavation, grading and earthwork construction in the City of Irvine. Should any portion of the grading manual be found to be in conflict with the provisions of the grading code, the code provision shall govern.

This manual combined with 1) Provision of the Building Code Regulations of the City of Irvine for Grading and Planting, 2) City Standard Plans and Specifications, and 3) City of Irvine Zoning Code and requirements constitute the elements of the City's Grading Requirements.

In the event a particular topic is not covered in either the grading code or manual, provisions of the California Building Code (C.B.C.) shall govern. If a conflict arises between the C.B.C. and the grading code or manual, the specific provisions of the code or manual shall govern.

1.3 Adoption and Revision

The provisions of the grading manual including revisions or additions thereto shall be prepared by the Chief Building Official. This manual shall be reviewed for conformity with the Grading Ordinance and a report submitted to City Council every three years commencing on September 1, 1987.

ARTICLE 2. DEFINITIONS

2.1 Definitions

The following words, terms and phrases when used in this manual shall have the meanings ascribed to them in this section, except where the context clearly indicates a different meaning. The definitions contained in this article are supplemental to those contained in the grading code.

Bedrock is relatively unweathered, consolidated or relatively hard formation that underlies the soil and other unconsolidated material.

Fault is a fracture in the earth's crust along which movement has occurred. A fault is considered active if movement has occurred within the last approximately 11,000 years (Holocene geologic time).

Gross Slope Stability is the stability of slope material below a plane approximately 3 to 4 feet deep measured from and perpendicular to the slope face.

Key is a designated compacted fill placed in a trench excavated in earth material beneath the toe of a proposed fill slope.

Keyway is an excavated trench into competent earth material beneath the toe of a proposed fill slope.

Retaining Wall is a wall designed to resist the lateral displacement of soil or other materials.

Sulfate (SO₄) is a chemical compound occurring in some soils which, at above certain levels-of concentration, has a corrosive effect on ordinary Portland cement concrete and some metals.

Surficial Slope Stability is the stability of the outer 3 to 4 feet of slope material measured from and perpendicular to the slope face.

ARTICLE 3. SPECIAL USE PERMIT (RESERVED)

ARTICLE 4. ORGANIZATION AND ENFORCEMENT (RESERVED)

ARTICLE 5. GRADING PERMIT REQUIREMENTS

5.1 Grading Permit Application

For a preliminary or precise grading permit, the application shall consist of the following items and forms completed and signed by the applicant or his representative during the first grading submittal unless otherwise specified by the Chief Building Official or authorized representative.

- a. Completed Application/Grading Permit form
- b. Six sets of grading plans including Site Plan, Utility Plan (s), and Erosion Control Plan
- c. Two copies of hydrology and hydraulic calculations (if applicable)
- d. Two copies of a preliminary soil and/or geology report (if required)
- e. Notice of Intent (if required)
- f. Three copies of the Engineering Cost Estimate on City form
- g. Three copies of the Tentative Tract Map and conditions of approval
- h. Payment of grading plan check fee and pre-inspection fee
- i. Planning Deposit, Development Engineering Plan Check Fee, and Automation Fee.

In addition to the previous items, the following are required for precise grading permit applications, unless otherwise waived by the Chief Building Official.

- a. One copy of the Water Quality Management Plan (WQMP)
- b. Three copies of the letter from the Civil Engineer certifying that the finish floor elevations are a minimum of one foot above the water surface of a theoretical 100-year storm.

A WQMP may still be required for preliminary grading permits in accordance with the City of Irvine's Local Implementation Plan (LIP).

5.2 Grading Plan Clearances

The Chief Building Official shall notify the applicant that prior to issuance of a grading permit, written clearance will be required from other Divisions within the City of Irvine and may be required from other agencies. Depending on site conditions and location, written clearance or permits may be required from, but not limited to, the following agencies:

- a. California Regional Water Quality Control Board
- b. California Department of Fish and Game
- c. Orange County Fire Marshal (fuel modification)
- d. Orange County Human Services Agency (Vector Control)

e. County of Orange Health Care Agency

Upon notification by the Chief Building Official, the applicant shall be responsible for: (1) submitting to the respective agencies copies of the grading plans and information required by those divisions or agencies; and (2) obtaining the required clearances or permits.

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.

No clearing or grubbing shall be allowed without a valid grading permit.

5.3 Grading Plan Check

Plans submitted for plan check shall be drawn to scale upon City of Irvine standard grading sheets available from City of Irvine web site. The plans shall be of sufficient clarity to indicate the nature and extent of the work proposed and show in detail that they will conform to the provisions of this grading manual, the Grading Code, City of Irvine Standards Plans & Specifications, Zoning Code, and all relevant laws, ordinances, rules and regulations.

Unless otherwise waived by the Chief Building Official or his designee, all grading plans shall be reviewed for conformance by three City entities: Building and Safety (Grading), Planning (Project Entitlement), and Public Works (Development Engineering). Turnaround times are in accordance with Informational Bulletin No. 279.

A. First Plan Check

All appropriate items listed in Article 5.1 shall be submitted to the City for first plan review.

B. Subsequent Plan Checks

The following shall be submitted for each subsequent check:

1. Six revised copies of the grading plans
2. Check prints and calculations from previous submittal(s)
3. Revised calculations and/or documents, if any
4. Typewritten response to the correction lists.

C. Final Submittal for approval

1. A minimum of 4 sets of the final grading plans
2. Final hydrology and hydraulic calculations

3. AutoCAD file or DXF file of drawings only.

5.4 Plan Preparation

Grading plans shall be prepared in accordance with the City of Irvine standard grading sheets and current design criteria. The standard sheets may be downloaded from the Community Development Department of the City of Irvine website (www.ci.irvine.ca.us). The grading sheet size shall be 30" x 42".

The first sheet of each set of plans shall be a City of Irvine title sheet showing the location of the work and the name, address, and telephone number of the owner, the person by whom the plans were prepared, the project geotechnical engineer and engineering geologist, final map and site plan numbers, benchmark, legal description, WDID number (if applicable), quantities, and site area in acres, including net acreage/area of disturbance.

The Title Sheet or general notes portion of the plan shall include a section titled, "Land Use Conditions of Approval" containing the applicable resolution number and conditions of approval. Each listing shall include the condition title, number, and condition language exactly as it appears in the referenced resolution.

Additional information may be required as deemed necessary by the Chief Building Official.

A. Preliminary Grading Plan:

The plans shall be prepared to a minimum scale of 1" = 40' and shall include, but not be limited to, the following information.

1. Site and grading limits clearly labeled or otherwise identified. Accurate contours of existing ground, details of terrain, and area of drainage a minimum of fifteen (15) feet beyond property limits (spot elevations may be used on flatland sites).
2. Location of any existing buildings, structures, or utilities on the property where the work is to be performed and the location of any buildings or structures on land of adjacent owners which are within fifteen (15) feet of the property, or which may be adversely affected by the proposed grading operations.
3. Adjacent streets with pertinent horizontal control and utility information.

4. An erosion control plan utilizing the current erosion control format, available on the City's website.
5. Prominent existing or natural terrain features.
6. Limiting dimensions including property lines, existing and proposed easements, top and toe of slopes, and elevations of finish contours to be achieved by the grading.
7. Details (plan and cross-section) of all surface and subsurface drainage devices, swales, walls, related construction, and other protective devices to be constructed with, or as a part of, the proposed work. (A separate Building Permit will be required for non-exempt retaining walls).
8. If the grading project includes the movement of earth material to or from the site in an amount equal to or greater than 5,000 cubic yards, the permittee shall submit the haul route for review and approval by the Chief Building Official prior to the issuance of a grading permit. The Chief Building Official may suggest alternate routes or special requirements in consideration of the possible impact on the adjacent community environment or effect on the public right-of-way itself.
9. Additional plans, drawings, calculations, or other reports required by the Chief Building Official.

B. Precise Grading Plan:

The plans shall be prepared to a minimum scale of 1" = 20' and shall include the following in addition to the items listed in section 5.4b:

1. The footprint or allowable building area of all proposed structures, including appurtenances (e.g. fireplaces, chimneys, air conditioners).
2. Limiting dimensions including setback distances from property lines, between structures, and from top and toe of slopes.
3. Detailed finish grade and finish floor elevations.
4. Proposed onsite and offsite utility lines (e.g., water, sewer, gas, electric) for reference only.

5. Flow lines for lot drainage.
6. Details for building footing and side-yard swale relationship (including extra-depth of footing).
7. All proposed paving including, but not limited to, sidewalks, driveways and parking lots, along with appropriate dimensions, striping, and signage.
8. All exterior elements of accessibility per Chapter 5, Article 3 of the California Code of Regulations Title 24, Part 1.
9. Existing and proposed storm drainage, including all curb and gutter, inlets, catch basins, and pipes.

The precise grading plan shall identify all previous preliminary grading permits issued for the project site. It may include sheets from the preliminary grading plan, showing original topography in lieu of reproducing original contours on the precise plan.

C. Stockpile and Tank Removals Permits

1. For stockpiles, the plans shall be similar to preliminary grading, but no soils report is required. The grading plans shall clearly show the stockpile limits, dimensions, setbacks, and haul route.
2. Tank removal permits shall be issued in accordance with City of Irvine Informational Bulletin No. 183.
3. The maximum period of a stockpile permit is 6 months.

5.5 Geotechnical and Engineering Geology Report Content

Guidelines are provided in Appendix B, "Technical Guidelines for Soil and Geology Reports."

Recommendations contained in the approved reports shall be incorporated into the grading plans and specifications and shall become a part of the grading permit.

A. Preliminary Geotechnical Report:

Geotechnical engineering reports shall be required for all residential, commercial, industrial, and institutional subdivisions and similar developments involving structures and/or earthwork for which a grading permit is required. Geotechnical reports shall also

be required for grading or building permits on single lot projects when specified by the Chief Building Official.

The preliminary (initial) soil engineering report shall include information and data regarding the nature, distribution, and the physical and chemical properties of existing soils; conclusions as to adequacy of the site for the proposed grading and development; recommendations for general and corrective grading procedures; foundation and pavement design criteria; and shall provide other recommendations, as necessary, commensurate with the project grading and development.

B. Preliminary Engineering Geology Report:

Engineering geology reports shall be required for all developments on hillside sites where geologic conditions are considered to have a substantial effect on existing and/or future site stability. This requirement may be extended to other sites suspected of being adversely affected by faulting.

The preliminary (initial) engineering geology report shall include a comprehensive description of the site topography and geology; an opinion as to the adequacy of the proposed development from an engineering geologic standpoint; an opinion as to the extent that instability on adjacent properties may adversely affect the project; a description of the field investigation and findings; conclusions regarding the effect of geologic conditions on the proposed development; and specific recommendations for plan modification, correction grading and/or special techniques and systems to facilitate a safe and stable development; and shall provide other recommendations as necessary, commensurate with the project grading and development. The preliminary engineering geology report may be combined with the soil engineering report.

C. Seismicity Report:

A seismicity report shall be required as a condition for issuance of a grading permit and building permit for all residential, commercial, industrial structures, and critical structures (fire stations, nursing homes, etc.) and other structures, as determined by the Chief Building Official. Additionally, sites containing earthquake sensitive earth materials and/or sites that are located on or near potentially active or active faults shall also require a seismicity report, as determined by the Chief Building Official.

The report shall be prepared by an engineering geologist, geophysicist, or civil engineer with expertise in earthquake technology and its application to buildings and other civil

engineering works. The scope of the report shall be commensurate with the proposed development and shall reflect the state of the art. The seismic report may be combined with the soil and engineering geology reports.

D. Final Reports:

Rough grade and final soil and engineering geology reports shall be submitted in accordance with Article 13, Completion of Work of this grading manual.

5.6 Permit Issuance

A precise grading permit may not be issued for a project until the zoning conformance review and tentative tract or parcel map are approved, unless otherwise approved by the Chief Building Official.

5.7 Plan Revision

Proposed revisions to the grading plans shall be submitted to the Community Development Department for review prior to construction. Four sets of revised plans shall be submitted along with a redline set of plans displaying the revisions. Fees shall be in accordance with the current Fee Schedule.

5.8 Permit Expiration

For time limitations on grading permits refer to Section 5-10-121 of Irvine Municipal Code, Issuance, Expiration, & Renewal in the Grading Code.

5.9 Conditional Approval; Indemnification

Grading permits shall be issued subject to such conditions as may be deemed appropriate by the Chief Building Official in order to ensure compliance with the provisions of the Irvine Grading Code, this manual and as otherwise required in order to preserve the public health and safety with regard to the work which is the subject of the permit. In addition to the security described in Section 6.4 through 6.9 of this manual, the Chief Building Official may require the applicant to enter into an agreement, approved as to form by the City Attorney, indemnifying the City against any costs, liability or damages when, in the opinion of the Chief Building Official, there is a potential risk of damage to adjacent property or persons or property in the vicinity of the work.

ARTICLE 6. FEES, DEPOSITS AND SECURITY

6.1 Inspection Fee

A grading inspection fee shall be required prior to the issuance of any grading permit, the fee amount per current City resolution.

6.2 Grading Permit Renewal Fee

The fee for renewing an expired or invalid grading permit shall be as specified in Section 5-10-121 of Irvine Municipal Code, Issuance, Expiration and Renewal, of the grading code.

6.3 Re-inspection Fee

When any re-inspection is required due to the negligence of the permit holder, his agent or other responsible persons, or due to the failure of said parties to comply with previous correction instructions, a fee may be charged by the Chief Building Official for each such re-inspection. The fee shall be paid before any further inspections are made.

This subsection is not to be interpreted as requiring re-inspection fees the first time a job is rejected for failure to comply with the requirements of this manual, but as controlling the practice of calling for inspection before the job is ready for such inspection or re-inspection.

6.4 Security Required

A Grading Permit shall not be issued unless the permittee first posts with the Chief Building Official a grading bond in accordance with Section 5-10-129 of the Grading Code.

6.5 Types of Security

Security shall be in the form of a surety bond, cash bond, letter of credit, or certificate of deposit from financial institutions subject to regulation by the State or Federal Government. Standard City format must be followed unless otherwise approved by the Chief Building Official.

6.6 Security Amount

The amount of a grading security shall be based on the total of 25% of the cost of the project cut or fill volume, whichever is greater; 100% of the cost of the drainage improvements and erosion control facilities being constructed or installed under the permit; and 100% of the cost of the improvements proposed within public rights-of-way.

The amount of the security may be reduced by the Chief Building Official to the extent that he determines that potential hazards or the nature of the project do not justify the full amount.

The amount of the security may also be increased by the Chief Building Official up to 100% of the cost of the total cut and fill volume if the potential hazards or nature of the project justifies such an increased amount.

6.7 Security Format

If a bond is used it shall be made on the form acceptable to the City. All other security shall be in a format approved as to form by the City Attorney.

6.8 Term of Security

The term of each security shall begin upon the date of permit issuance and shall remain in effect until the completion of the work to the satisfaction of the Chief Building Official and released by the City.

6.9 Security Reduction

When partial work has been completed to the satisfaction of the Chief Building Official, a reduced security may be substituted to ensure completion of work remaining to be performed.

ARTICLE 7. CUTS AND FILLS

7.1 Cut Slopes

Cut slopes shall be no steeper than two horizontal to one vertical (2:1). In special circumstances where no evidence of previous instability exists and when recommended in the soil engineering or engineering geology report and approved by the Chief Building Official, slopes may be constructed steeper than 2:1. In no case shall slopes steeper than 2:1 be approved if 2:1 or flatter slopes are required as a condition of approval by the City Council, Planning Commission, Zoning Administrator, or the Subdivision Committee without appropriate revision of said condition by the approving body.

Recommendations in the soil engineering and/or engineering geology report for cut slopes to be steeper than 2:1 shall be accompanied by a slope stability analysis for all slopes greater than five (5) feet in height. The geotechnical engineer shall consider both gross and surficial stability of the slope and provide a written statement approving the slope stability.

Excavation below the ground surface for the purpose of subterranean construction shall be performed so as to not impact adjacent property, structures, or the public right-of-way. Proposed temporary slopes shall be analyzed for stability by the geotechnical engineer. Where shoring is used

to protect adjacent property, structures, or the public right-of way, a separate building permit is required.

7.2 Fill Slope

Fill slopes shall be no steeper than two horizontal to one vertical (2:1). In special circumstances where no evidence of instability exists and when recommended in the soil engineering report and approved by the Chief Building Official, slopes may be constructed steeper than 2:1. In no case shall slopes steeper than 2:1 be approved if 2:1 or flatter slopes are required as a condition of approval by the City Council, Planning Commission, Zoning Administrator, or the Subdivision Committee, without appropriate revision of said condition by the approving body.

Recommendations in the soil engineering report for fill slopes to be steeper than 2:1 shall be accompanied by a slope stability analysis for all slopes greater than five (5) feet in height. The geotechnical engineer shall consider both gross and surficial stability of the slope and provide a written statement approving the slope stability. In addition, the soil Engineer shall recommend alternative methods of construction or compaction requirements necessary for surficial stability.

7.3 Fill Locations

Fill slopes shall not be constructed on natural slopes steeper than two horizontal to one vertical (2:1) or where the fill slope toes out within twelve (12) feet horizontally of the top of existing or planned cut slopes, on adjacent property, except in the case of slopes of minor height when approved by the Chief Building Official.

Prior to issuance of a preliminary or precise grading permit for deep fill lots, a geotechnical investigation report must be prepared in accordance with the City of Irvine Grading Manual and approved by Building and Safety. A deep fill is considered to be an engineered fill with a vertical thickness of greater than 50 feet.

The report must provide specific information pertinent to the deep fills, including supplemental grading recommendations, laboratory testing, calculations to determine anticipated settlement (both total and differential), and a settlement monitoring program, which shall include monitoring plate specifications, locations, and survey intervals.

Settlements should be monitored until the remaining total and differential settlements, as estimated by the geotechnical engineer, are within the tolerable limits of the project requirements. The surveying must be conducted at least bi-weekly for the first three months and monthly thereafter.

Prior to the issuance of building permits for lots situated on deep fill, a final report pertaining to the deep fill lots must be submitted to and approved by the City of Irvine. The report must include, but not be limited to: anticipated total settlement calculated during the preliminary investigation, settlement occurred to date, a time line showing the grading operations for the subject lots, and an evaluation/analysis of the potential for differential settlement. The report must include all pertinent graphs, field data, and supporting calculations to demonstrate that the remaining settlement is within tolerable limits.

7.4 Preparation of Ground

The ground surface shall be prepared to receive Fill by removing vegetation, non-complying fill, topsoil and other unsuitable materials, and by scarifying to provide a bond with the new fill. In areas where excavation extends into soils impacted by ground water and a suitable surface cannot be obtained (i.e., saturated soils), the subgrade may be improved by installation of a geofabric-based or hydrated lime treatment method. The method must be recommended by the geotechnical engineer and must be approved by the Chief Building Official prior to earthwork or fill placement.

Where existing slopes exceed five (5) feet in height and/or are steeper than five horizontal to one vertical (5:1), the ground shall be prepared by benching into sound bedrock or other competent material, as determined by the geotechnical engineer and/or engineering geologist and approved by the Chief Building Official. The lowermost bench beneath the toe of a fill slope shall be at a minimum ten (10) feet in width. The ground surface at the toe of fill shall be prepared for sheet flow runoff, or a paved drain shall be provided.

Where fill is to be placed over a cut slope, the bench under the toe of the fill shall be at least fifteen (15) feet wide, but the cut slope must be made before placing fill and shall meet the approval of the soil engineer and/or engineering geologist as suitable foundation for fill. Unsuitable soil is soil which is not dense, firm or unyielding, is highly fractured or has a high organic content and in the opinion of the geotechnical engineer, or engineering geologist is not competent to support other soil or fill, to support structures or to satisfactorily perform the other functions for which the soil is intended.

7.5 Fill Material

Detrimental amounts of organic materials shall not be permitted in fills. Except as outlined below, no rock or similar irreducible material with a maximum dimension greater than twelve (12) inches shall be buried or placed in fills.

The Chief Building Official may permit placement of larger rock when the geotechnical engineer properly devises a method of placement, continuously inspects placement, and approves the fill stability and competency. The following conditions shall also apply:

- a. Prior to issuance of the grading permit, potential rock disposal area(s) shall be noted and delineated on the grading plan.
- b. Rock sizes greater than twelve (12) inches in maximum dimension shall be placed ten (10) feet or more below grade, measured vertically. This depth may be reduced upon recommendation of the soil engineer and approval of the Administration Authority providing that the permitted use of the property will not be impaired. Rocks greater than twelve (12) inches shall be placed so as to be completely surrounded by soils; no nesting of rocks will be permitted.

Any haul route on City roads must be approved by the Grading Inspector at the pre-grade meeting, prior to the import or export of soils.

7.6 Compaction

All fills shall be compacted to a minimum of 90% of maximum density using the five-layer method as determined by ASTM Laboratory Test Method D1557-91, unless otherwise approved by the Chief Building Official. Field density shall be determined in accordance with the ASTM D1556 or equivalent, as directed by the Chief Building Official.

Locations of field density tests shall be determined by the soil engineer or approved testing agency and shall be sufficient in both horizontal and vertical placement to provide representative testing of all fill placed. Testing in areas of a critical nature or special emphasis shall be in addition to the normal representative samplings.

Exceptions:

- a. Fills excepted in Section 5-10-107, Grading Permit Exemptions, of the Grading Code and where the Chief Building Official determines that compaction is not a necessary safety measure to aid in preventing saturation, settlement, slipping, or erosion.
- b. Where lower density and very high potential expansion characteristics exist, lesser compaction may be granted by the Chief Building Official upon justification and recommendation by the geotechnical engineer.

Fill slopes shall be compacted to the finish slope face as specified above. The soil engineer shall provide specifications for the method of placement and compaction of the soil within the zone of the slope face.

Prior to the grading of deep fills, the geotechnical engineer must provide recommendations for relative compaction and moisture content according to the soil characteristics and project requirements.

7.7 Utility Line Backfill

Utility line backfill beneath and adjacent to structures; beneath pavements; adjacent and parallel to the toe of a slope; and in sloping surfaces steeper than ten horizontal to one vertical (10:1), shall be compacted and tested in accordance with Subsection 7.6, Compaction, of this section. Alternately, relatively self-compacting material may be used. The material specification and method of placement shall be recommended and inspected by the geotechnical engineer and approved by the Chief Building Official prior to backfilling.

Utility line backfill in areas other than those stated above need no specified placement method or compaction criterion, but shall require approval by the geotechnical engineer.

The final utility line backfill report from the project soil engineer shall include an approval statement that the backfill is suitable for the intended use.

ARTICLE 8. SETBACKS

8.1 Setbacks from Permit Area Boundary

The tops of cut slopes and toes of fill slopes shall be setback from the outer property boundaries of the permit area, including slope easements, in accordance with Detail 1- Minimum Setback for Slopes in the Appendix C.

8.2 Design Standards for Setbacks

The tops and toes of cut and fill slopes shall be setback from structures as far as is necessary for adequacy of foundation support and to prevent damage as a result of water runoff, erosion, or maintenance of the slopes. Setbacks shall be no less than shown in Appendix C, unless otherwise approved by the Chief Building Official. Such approval shall be based on the recommendation of the project geotechnical engineer.

8.3 Retaining Walls

Retaining walls may be used to reduce the required setback in accordance with the table in Appendix C when approved by the Chief Building Official. Retaining walls three (3) feet or higher shall require a separate building permit.

ARTICLE 9. DRAINAGE AND TERRACING

9.1 Terrace

Terraces at least six (6) feet in width shall be established at not more than thirty (30) foot vertical intervals on all cut or fill slopes to control surface drainage and debris. Where only one (1) terrace is required, it shall be at mid-height. For cut or fill slopes greater than sixty (60) feet and up to one hundred and twenty (120) feet in vertical height, one terrace at approximate mid-height shall be twelve (12) feet in width. Designs for terrace widths and spacing for cut and fill slopes greater than one hundred and twenty (120) feet in vertical height shall require prior approval by the Chief Building Official. Suitable access shall be provided to permit proper cleaning and maintenance.

Swales or ditches on 6 feet and 12 feet wide terraces shall have a minimum gradient of 6% and shall be paved with a minimum of three (3) inches of reinforced concrete or gunite. Swales shall have a minimum depth at the deepest point of eighteen (18) inches and a minimum paved width of five (5) feet.

A single run of swale or ditch shall not collect runoff from a tributary area exceeding 13,500 square feet (projected) without discharging into a downdrain. Downdrain outlets shall discharge into an approved drainage system.

9.2 Interceptor Drains

Paved interceptor drains shall be installed along the top of all manufactured slopes where the tributary drainage area flows toward the slope and has a drainage path to top of slope greater than forty (40) feet measured horizontally. Interceptor drains shall be paved with a minimum of three (3) inches of reinforced concrete or gunite. They shall have a minimum depth of eighteen (18) inches and a minimum paved width of thirty-six (36) inches measured horizontally across the drain. The slope of the drain shall be approved by the Chief Building Official.

9.3 Subsurface Drainage

Cut and fill slopes shall be provided with approved subsurface drainage as necessary for stability and protection of adjacent properties from the influence of groundwater. The design of such facilities shall be contained in the approved preliminary (initial) soil engineering or engineering geology report and/or shall appear on the approved grading plan pursuant to the approval of the geotechnical engineer and/or engineering geologist.

Subsurface drainage facilities shall be installed where natural and/or artificially introduced ground water will affect, or is likely to affect, the project in a potentially unstable, hazardous or otherwise deleterious manner.

9.4 Disposal

All drainage generated within development, which includes surface water and all drainage facilities, shall drain independently within a system of disposal approved by the City. Drainage shall be designed to carry water to the nearest practical street, storm drain, or natural watercourse. Erosion of ground in the area of discharge, including a return of flow to a natural sheet flow condition, shall be prevented by installation of non-erosive down-drains, riprap, energy dissipators or other approved devices.

Where surface waters are to be conducted or directed onto adjacent property in an unnatural manner, the applicant shall be required, prior to issuance of a grading permit, to obtain written permission from the owner of said property, accepting the surface waters. For permanent conditions, said permission shall be recorded.

Building sites shall have a minimum sheet flow drainage gradient of 2% and a maximum of 20% away from the structure for a minimum distance of five (5) feet, or as otherwise approved by the Chief Building Official. Such approval shall include an area drain system in conjunction with swales. Roof drains, where provided, shall be connected directly to the area drain system unless specifically recommended by the geotechnical engineer, subject to the soil characteristics. In hillside areas, no rear yard area drains will be allowed to outlet into terrace drains.

Grading shall be designed to ensure that all finish floors are a minimum of one foot above the surface elevation of a theoretical local 100-year storm. Concentrated flows are not allowed over curbs. Maximum discharge through commercial driveways shall not exceed 2 cfs.

Mass grading of future building sites under a preliminary grading permit for the purpose of lot sales shall have a sheet flow drainage gradient of 2% toward approved drainage facilities.

Finish grades, other than above, shall conform to the following minimum (or maximum, as noted) drainage gradient standards:

a.	Rough grade (flatland)	
	Residential	1.0 %
	Non-residential	0.5 %
b.	Rough grade (hillside)	
	Single-family residential	1.0 %
	Multi-family residential or non-residential	2.0 %
c.	Precise grade (sheet flow)	
	General	1.0 %
	Hillside single-family (rear yards)	2.0 %
d.	Earth Swales	1.0 % 4.0 % max
e.	Asphalt Pavement (sheet flow)	1.5% 5.0 % max
f.	Concrete	0.5%
g.	Concrete gutter or v-ditch	0.5%
h.	Terrace drains (hillside)	6.0%
i.	Interceptor drains (hillside)	2.0%

The City Plan Check Engineer may reduce minimum gradients upon the written request of the applicant or his agent, providing the applicant demonstrates the following:

- a) Finish grades for drainage of building sites can be constructed in accordance with the requirements of this subsection without importing additional fill, and;
- b) Sufficient approved swales and/or drainage facilities are constructed to prevent water from ponding on any lot supported by a natural slope or cut or fill slope over five (5) feet in height.

9.5 Pipe Specifications

Pipe material specifications shall be shown on the approved plans by the civil engineer and approved by the Chief Building Official. The pipe shall

be new and conform to the current edition of the Standard Specifications for Public Works Construction unless otherwise recommended by the civil engineer or soil engineer and approved by the Chief Building Official. Approved pipe includes:

- a. Acrylonitrile Butadiene Styrene (ABS) solid wall pipe, maximum size is 15 inches I.D.
 1. Sub-drain
 - (I) ASTM D2751, SDR 35
 - (II) ASTM D12572, schedule 40
 2. Storm drain
 - (I) ASTM D2751, SDR 35
Maximum velocity, 15 feet per second
 - (II) ASTM D1527, schedule 40
Maximum velocity, 15 feet per second
- b. Polyvinyl Chloride Plastic Pipe (PVC), maximum size 15 inches I.D.
 1. Sub-drain
 - (I) ASTM D3034, SDR 35
 - (II) ASTM D1785, schedule 40
 2. Storm-drain
 - (I) ASTM D3034, SDR 35
Maximum velocity, 15 feet per second
 - (II) ASTM D1785, schedule 40
Maximum velocity, 15 feet per second
- c. High Density Polyethylene Pipe (HDPE), minimum double-wall, maximum size is 15 inches I.D.
 - (I) ASTM F405
 - (II) ASTM F667
- d. Reinforced Concrete Pipe (RCP)
D-load to be designed and shown on approved grading plans.
 1. Spun Pipe
 2. Hydro Conduit Dry Pack
 3. Hurst Packerhead Pipe
 4. Johnson-Bateman Dry Cast
- e. Corrugated Steel Pipe (CSP)
Metal thickness to be designed and shown on approved grading plans. Pipe to be bituminous coated. CSP to be used for temporary purposes only.

9.6 Area Drains

The minimum cross-sectional area of area drain grates shall be 100 square inches, and shall contain a grate cover having 50% net opening. Grates are allowed only in turf or landscape areas, and are subject to the discretion of the City Plan Check Engineer. Minimum slope for area drain pipes shall be 0.5 %.

9.7 Conduits Beneath Structures

Drainage conduits placed beneath structures shall comply with the latest edition of the California Plumbing Code and, at the discretion of the City Plan Check Engineer, may require a separate plumbing permit.

9.8 Storm Drain Encasement

For multi-family and non-residential projects, where storm drains are constructed in areas to be paved with asphalt and the cover to finish surface is less than three feet, the storm drain must be encased with concrete to sub-grade elevation (bottom of aggregate base). Concrete use shall be per Standard Plan No. 405.

ARTICLE 10. ASPHALT CONCRETE PAVEMENT

10.1 Asphalt Concrete and Untreated Base Standards

When asphalt concrete pavement is proposed for surfacing of private parking lots, private streets or other similar use, this paving, including the tack coat, seal coat and base course, shall conform to the current edition of the Standard Specifications for Public Works Construction. All motorcycle stalls within private parking lots shall be surfaced with concrete (P.C.C.).

Prime coat shall be placed on sub-grade or untreated base when the base will be subjected to substantial construction traffic or long periods of time before asphalt concrete is placed, as determined by the soil engineer and approved by the City Plan Check Engineer.

Untreated base may require testing by an approved testing agency to insure its compliance with the applicable specifications and special provisions when determined necessary by the City Plan Check Engineer or Grading Inspector. Tests may include but shall not be limited to:

- a. Sieve analysis
- b. Sand equivalent
- c. Percent of crushed particles retained by a No. 4 screen.

10.2 Sub-grade Compaction

The top 6 inches of the sub-grade soil material shall be compacted to a relative compaction of 90% of maximum density and shall be firm and unyielding as determined by ASTM Laboratory Test Method D1557, or approved equivalent unless otherwise recommended by the geotechnical engineer in the preliminary soil report and approved by the Chief Building Official. When deep lift asphalt is utilized, compaction requirements shall be 95%.

10.3 Soil Sterilization

Weed killer shall be required to be applied on all subgrade unless aggregate base is used.

10.4 Concentrated Drainage

All concentrated drainage in asphalt paved areas shall be carried by approved concrete gutters. No concentrated flow of water shall be allowed on asphalt pavement.

10.5 Pavement Structural Section

The project geotechnical engineer shall determine the pavement structural section(s) for parking lots/service roads, drive aisles, and private streets based on: (1) soil tests of the sub-grade soil(s) performed by an approved soil testing laboratory; and (2) anticipated traffic and/or loading conditions. The submittal is subject to approval by the City. The methods used for soil testing and pavement design shall be those currently in use by the City of Irvine for construction of public roadways, or methods acceptable to the City. The relative compaction of each layer of base material shall not be less than 95%. Pavement design shall be based on minimum Traffic Indices of 4.0 for parking areas and 5.5 for all drive aisles and shall be in accordance with The County of Orange EMA Materials Lab Method. Minimum thickness of base material shall be four (4) inches. The minimum 2-layer asphalt concrete thickness shall be 4.2 inches, comprised of a 3-inch thick base course and 1.2-inch thick cap.

For temporary parking lots serving model homes, condominiums, or similar, the minimum pavement section shall be 3 inches asphalt concrete over subgrade soil compacted to a minimum of 95 % relative compaction.

ARTICLE 11. EROSION CONTROL

11.1 Information on Erosion Control Plans

A. General

1. No grading permit shall be issued without an erosion control plan approved by the Chief Building Official. 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 1 through April 30) on any site which is not adequately protected with desilting basins or other temporary drainage or control measures.

B. Erosion Control Plans

1. Utilizing the City's standard Erosion Control Sheet, the Erosion Control Plans shall provide the following:
 - a. Appropriate Best Management Practices (BMP's) for wet and dry season applications. One or more of the pre-qualified BMP's from the California Stormwater Quality Association (CASQA) handbook for construction may be specified for each of the categories. Alternative details must be approved by the City Plan Check Engineer.
 - b. The name and twenty-four (24) hour telephone number of the person responsible for performing erosion control work.
 - c. The signature of the civil engineer or other qualified individual who prepared the grading plan and who is responsible for inspection and monitoring of the erosion control work.
 - d. All desilting and erosion protection facilities necessary to protect adjacent property from sediment deposition.

- e. The plan shall indicate how access will be provided to maintain desilting facilities during wet weather.

ARTICLE 12. GRADING INSPECTION

12.1 Site Inspection

Prior to any grading, brushing or clearing, there shall be a pre-grading meeting held on the site. Prior to pouring curb and gutter or placement of pavement base material, there shall be a pre-paving meeting held on the site. The permittee, or his agent, shall notify the Chief Building Official, or his authorized representative, at least two (2) working days prior to these meetings and shall be responsible for notifying all principals responsible for grading or paving related operations.

It shall be the duty of the person doing the work authorized by a permit to notify the Building and Safety Division before 4:00 p.m. at least one (1) working day prior to the work being ready for the following inspections.

- A. Excavation and fill inspection
 - 1. Canyon cleanout inspection: After all brush and unsuitable material has been removed and an acceptable base has been exposed, but before any fill is placed.
 - 2. Toe bench and key inspection: After the natural ground or bedrock is exposed and prepared to receive fill, but before fill is placed.
 - 3. Over-excavation inspection: After the area has been excavated but before fill is placed.
 - 4. Excavation Inspection: After the excavation is started, but before the vertical depth of the excavation exceeds ten (10) feet, and every ten (10) feet interval thereafter. Continuation of this excavation operation need not await the arrival of the grading inspector provided that proper notification has been made to the City Inspector.
 - 5. Fill Inspection: After the fill has started, but before the vertical height of the Fill exceeds ten (10) feet, and every ten (10) feet interval thereafter.
- B. Erosion Control:
 - 1. After all work has been completed, including installation of all BMP's, drainage structures, and other protective devices,

and all written professional approvals and reports have been submitted.

2. Siltation control facility inspection (rainy season: October 1 to April 30):
 - a. After excavation of desilting basins but prior to construction of basin berm. Prefabricated devices are to be available on-site for inspection.
 - b. After construction of berm for desilting basins but prior to placement of concrete or other non-erosive materials.
 - c. After completion of an erosion control system in accordance with an approved erosion control plan and the requirements of the Chief Building Official.

C. Site constructed drainage device inspection

1. Valley gutter inspections in paved areas:
 - a. Subgrade inspection (prior to placement of concrete): Subgrade is to be prepared and required reinforcement placed. The civil engineer shall provide the inspector a field memo that line and grade is in accordance with the approved plans.
 - b. Concrete placement inspection: Concrete placement may commence after approval of (a) above, by the Inspection Division provided proper notification has been made to the Chief Building Official.
 - c. Minimum width of valley gutters is 3'-0" and 6" thick, under lain by 6" of Aggregate Base.
2. Curb and gutter inspections (private property):
 - a. Subgrade inspection (prior to placement of concrete): Subgrade is to be made, forms and reinforcement placed. The civil engineer shall provide the inspector a field memo that line and grade is set in accordance with the approved plans.
 - b. Concrete placement inspection: Concrete placement may commence after approval of (a) above, by the Inspection Division, provided proper notification has been made to the Manager of Inspection Services.

3. Terrace drains, down drains, brow ditches, inlets, and all other concrete or gunite drainage device inspections:
 - a. Sub-grade inspection: Prior to placement of welded wire mesh or reinforcing steel. The civil engineer shall provide the inspector a field memo that line and grade is set in accordance with the approved plans.
 - b. Reinforcement inspection: (Prior to placement of concrete) Thickness control wire and reinforcing steel or welded wire mesh are to be installed.
 - c. Concrete placement inspection: Concrete placement may commence after approval of (a) above, by the Inspection Division provided proper notification has been made to the Chief Building Official.

4. Earth swale inspections:

- a. Prior to rough grading approval or lumber drop, whichever comes first.
- b. Prior to final grading approval.

D. Prefabricated drainage device inspections:

1. Sub-drain Inspections:

- a. After excavation but prior to placement of filter material and pipe. The sub-drain pipe and filter material shall be on-site for inspection.
- b. After filter material and sub-drain has been placed but prior to covering with backfill.

2. Storm drain inspections:

After placement of storm drains and prior to covering with backfill, the civil engineer shall provide a field memo that line and grade is set in accordance with the approved plans. All curved storm drains will require special inspection.

E. Rough Grade Inspection

When all rough grading has been completed, this inspection may be called for at the completion of rough grading without the necessity of the Chief Building Official having previously reviewed

and approved the required reports if the grading was performed under a precise grading permit. Under normal circumstances, all sub drains and slope drains shall be in place and approved as a condition for rough grading approval.

F. Paving inspections

1. Subgrade inspection:

After subgrade has been established, tested and approved by the geotechnical engineer or his qualified representative. The geotechnical engineer shall provide a field memo of compaction test results. The civil engineer shall provide a field memo that line and grade is set in accordance with approved plans.

2. Untreated base inspection:

After untreated base course has been placed, tested and approved by the geotechnical engineer or his qualified representative, but prior to asphalt placement. The geotechnical engineer shall provide a field memo of compaction test results. The civil engineer shall provide a field memo that line and grade is set in accordance with the approved plans. Material invoices may be required.

3. Asphalt inspections:

a. During asphalt lay down to verify continuous inspection by the geotechnical engineer or his qualified representative or a Special Inspector when authorized. Material invoices may be required.

b. Prior to application of seal coat, the paved surface shall be water tested to reveal any irregularities and shall be patched where required. Material invoices may be required after placement of seal coat.

c. Deputy Inspector is not required at asphalt concrete plant.

12.2 Alternate Materials and Methods of Construction

A. The provisions of this grading manual are not intended to prevent the use of any material or method of construction not specifically prescribed by the grading code or the grading manual provided any such alternate has been approved pursuant to this section.

- B. The Chief Building Official may approve any such alternate provided he finds that the proposed design is satisfactory and complies with the provisions of the grading code and this grading manual, and that the material, method or work offered is, for the purpose intended, at least the equivalent of that prescribed in quality, strength, effectiveness and safety.
- C. The Chief Building Official shall require that sufficient evidence or proof be submitted to substantiate any claims that may be made regarding its use.
- D. Whenever there is insufficient evidence of compliance with the provisions of this grading manual or evidence that any material or any construction does not conform to the requirements of this grading manual, or in order to substantiate claims for alternate material or methods of construction, the Chief Building Official may require tests as proof of compliance to be made at the expense of the owner or his agent or an approved testing agency.
- E. Test methods shall be as specified by this grading manual for the material in question. If there are no appropriate test methods specified, the Chief Building Official shall approve the test procedure.

ARTICLE 13. COMPLETION OF WORK

13.1 Final Reports

Upon completion of the rough grading work and at the final completion of the work under the grading permit but prior to the issuance of building permits or release of grading bonds or issuance of a certificate of use and occupancy, the Chief Building Official shall require:

- A. Two copies of CD/PDF ROM of the "as-graded" grading plan prepared by the civil engineer or architect, which shall include corrected original ground surface elevations if necessary, graded ground surface elevations, lot drainage patterns, manufactured slope inclination, and location of all drainage facilities and sub drains.
- B. A written approval by the civil engineer approving the grading as being substantially in conformance with the approved grading plan and which specifically approves the following items as appropriate to the project and stage of grading
 - 1. Construction of line and grade for all engineered drainage devices and retaining walls (rough and final grading).

2. Staking of property corners for proper building location (rough grading).
3. Setting of all monuments in accordance with the recorded tract map (rough or final grading).
4. Location of permanent walls or structures on property corners or property lines where monumentation is not required (final grading).
5. Location and inclination of all manufactured slopes (rough and final grading).
6. Construction of earthen berms and positive building pad drainage (rough and final grading).

When the approved grading plan is not prepared by a civil engineer, the architect or other licensed professional who prepared the plan shall provide written approval of the grading as being substantially in conformance with the approved grading plan.

The following tolerances will be accepted when certifying the grades:

Pad	=	0.1 foot
Mass Grading	=	0.5 foot
Sub-base	=	0.04 foot
Base	=	0.02 foot

If the construction staking has to done by someone other than the Civil Engineer who signed the City approved grading plan, the new Civil Engineer shall assume full responsibility for the work done. All changes of the job requiring professional engineers shall be made by providing the City with a letter of acceptance of the professional's work, subject to acceptance by the Chief Building Official or Grading Plan Check Engineer.

- C. A geotechnical engineering report prepared by the geotechnical engineer, including type of field testing performed, suitability of utility trench and retaining wall backfill, summaries of field and laboratory tests and other substantiating data, and comments on any changes made during grading and their effect on the recommendations made in the soil engineering investigation report. Each field density test shall be identified, located on a plan or map, the elevation of test and finish grade elevation shown, and the method of obtaining the in place density described, either ASTM Laboratory Test Method D1557 or the approved equal shall be so

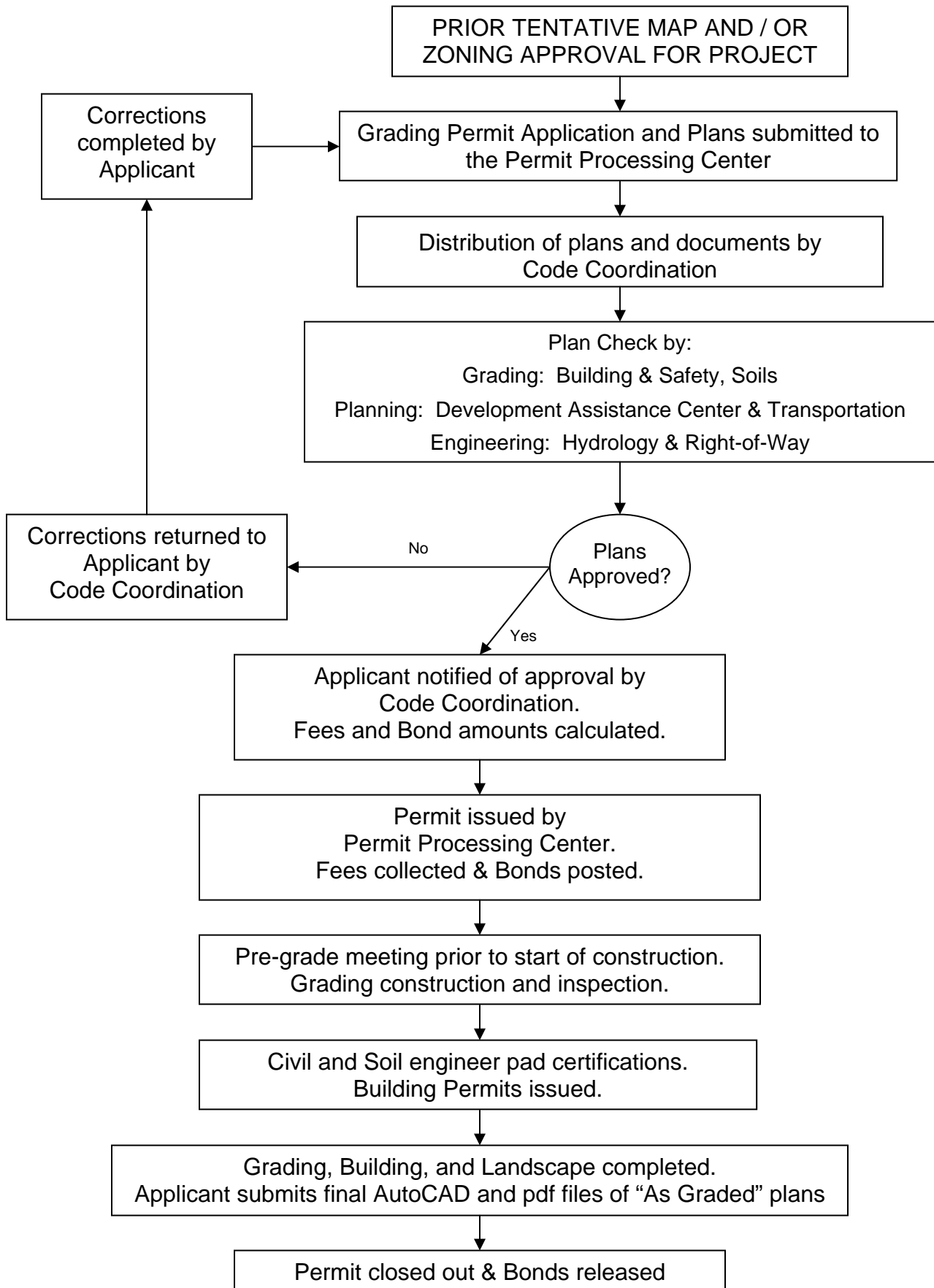
noted. The geotechnical engineer shall provide a written approval as to the adequacy of the site for the intended use, as affected by soil engineering factors. The Chief Building Official shall require that the soil tests or testing be performed by an approved testing agency.

- D. A geology report prepared by the engineering geologist, including a final description of the geology of the site including any new information disclosed during the grading, and effect of it on recommendations incorporated in the approved grading plan. The engineering geologist shall provide a written approval as to the adequacy of the site for the intended use as affected by geologic factors and when required by the Chief Building Official, shall submit an as-built geologic map.

APPENDIX A

Grading Permit Process Flow Chart

CITY OF IRVINE GRADING PERMIT PROCESS FLOW CHART



APPENDIX B

Technical Guidelines for Soil & Geology Reports

**CITY OF IRVINE
GEOTECHNICAL SECTION**

TECHNICAL GUIDELINES FOR GEOTECHNICAL AND GEOLOGY REPORTS

PREFACE:

The ultimate responsibility for a safe design, construction and maintenance of any grading project rests with the consulting engineers, geologists, contractors, and the owner. Since site conditions and the proposed development plan varies so greatly between projects, the City recognizes the discretion and judgments that must be used by the consulting professionals. It is, therefore, essential to enhance the general understanding between the permit applicants, consultants and the City.

The purpose of these technical guidelines is to inform grading permit applicants and their professional consultants of the basic information required by the City of Irvine in reviewing preliminary (initial) soil and geology reports for grading permit applications and rough grade compaction reports. The guidelines used for the preparation of the document are:

- (1) The City of Irvine Grading and Excavation Code, (2) the California Building Code, the latest edition, (3) the California State Board of Registration policy statement (effective 1/1/79) on adequacy of professional geological work as represented by the guidelines for standards of practice issued by the California Division of Mines & Geology, (4) and presently accepted geotechnical engineering and engineering geologic practices.

DESCRIPTION:

The technical guidelines are divided into 6 parts to distinguish report content for different product types and topographic areas to be developed by grading. The more involved grading projects will encompass, but not be limited to, several parts listed below:

- | | |
|----------|---|
| Part I | Single Family Dwellings (flatland) - identifies the report content for precise grading permits on single family dwellings in flatland areas. |
| Part II | Single Family Dwellings (hillside) identifies the report content for precise grading permits on single Family dwellings in hillside areas (additive to the requirements of Part I). |
| Part III | Single Family Dwellings (supplemental information) - identifies additional report content which may be needed with Part I and Part II depending on the site conditions and development proposed (additive to the requirements of Parts I and II). |

- Part IV Commercial and Industrial Sites - identifies the report content for precise grading permits on commercial and industrial sites including apartment complexes (additive to the requirements of Part I and applicable items of Part III).
- Part V Residential, Commercial and Industrial Subdivisions (tracts and parcels) identifies the report content for preliminary grading permits of large commercial and industrial subdivisions and preliminary and precise grading permits of residential subdivisions in flatland and hillside areas (additive to the requirements of Part I and applicable items of Parts II and III).
- Part VI Rough Grade Compaction Reports - identifies the report content for preliminary and precise grading permit rough grade compaction reports.

Due to particular site conditions, proposed improvements or the policies of testing firms or project consultants, some of these items may be included in subsequent reports on the same project with the conditional approval of the Chief Building Official.

GRADING PLAN REVIEW REPORT:

A grading plan review report is an evaluation of the conclusions and recommendations in the preliminary soil and geology report as they relate to the proposed grading plan. The grading plan review reports are supplements to the preliminary reports and provide an opportunity for the consultants to review the planned development. The purpose is to determine if the preliminary reports are adequate and complete for the presently planned grading and construction on the site and if the conclusions and recommendations still apply to the proposed operations. It is not intended that the geotechnical engineer or engineering geologist approve or disapprove the grading plan; but the plan provides them an opportunity to update the preliminary reports and include additions or qualifications as necessary. The date and name of the person preparing the latest grading plan reviewed should be identified for reference purposes.

PART I: TECHNICAL GUIDELINES FOR PRELIMINARY REPORTS (GEOTECHNICAL REPORTS) ON SINGLE FAMILY DWELLINGS IN FLATLAND AREAS

A. General

1. Signature and GE or RCE number of project geotechnical engineer.
2. Job address.

3. Location description and/or location index map with reference north, scale, etc.
4. Description of site conditions (topography, relief, vegetation, man-made features, drainage and watershed).
5. Proposed grading (general scope, amount, special equipment and/or methods if applicable).
6. Planned construction (type of structure and use, type of construction and foundation/floor system, number of stories, estimated structural loads).

B. Field Investigations

1. Scope (date work done, investigative methods, sampling methods, logs of borings/test pits, elevations of borings/test pits for reference of materials and samples to finished grade or footing elevations, identify real or assumed elevations).
2. Plan with legend showing: site limits, terrain features, man-made features, boring/test pit locations, proposed improvements, (including slopes with ratios, soil limits, daylight lines, paving areas, retaining walls, sub drains, over-excavation/cleanout/uncertified fill areas).
3. Location of all samples taken, surface and subsurface.
4. Groundwater conditions and potential impact (future natural and artificial seepage effects).

C. Engineering/Material Characteristics and Testing

1. Test methods used, type or condition of samples, applicable engineering graphics and calculations, results of all tests, and sample locations of all test samples.
2. Classification of soil materials utilizing the Unified Soil Classification System (USCS).
3. Material competency and strength.
 - a. Field densities (and relative compactions where pertinent) and moisture content.
 - b. Shear strength of foundation material (drained or un-drained conditions, effective stress or total stress analysis, in-situ or

remolded samples must be identified) by ASTM Test method D-2166 or approved equivalent.

- c. Consolidation and settlement potential.
 - d. Expansion potential in accordance with ASTM D4829. An expansion index greater than 20 will require special footing design.
- 4. Maximum density-optimum moisture parameters of proposed fill material if available by ASTM 1557 or approved equivalent.
 - 5. Shrinkage and/or bulking factors.
 - 6. Soluble sulfate content of soils in contact with concrete (test by ASTM D516 or equivalent).

D. Foundation Design Criteria

- 1. Footing depth and width.
- 2. Criteria for foundation material preparation.
- 3. Allowable bearing values based on testing.
- 4. Lateral pressures (active, passive, or at rest conditions) and coefficient of friction.
- 5. Settlement - total, differential and rate of settlement.

E. Reference

- 1. In supplemental or grading plan review reports referencing earlier reports, supply copies of those referenced reports or applicable portions as required by the Chief Building Official.

F. Conclusions and Recommendations

- 1. Ground preparation (clearing, unsuitable material removal, scarification and moisturization).
- 2. Fill support:
 - a. Suitability and pre-compaction of in-situ materials (describe test results and other pertinent data to be used to determine suitability).

- b. Densification and moisturization or dewatering measures (equipment, surcharge, settlement monitoring if applicable).
3. Placement of fill:
 - a. Material approval (on-site, imported).
 - b. Methods and standard (ASTM 1557-91).
 - c. Testing (minimum 90% relative compaction by ASTM 1557-91) and frequency of field density by vertical intervals and/or volume of fill.
4. Elimination of cut/fill or other differential transitions between improvements.
5. Utility trenches:
 - a. Backfill specifications and recommendations under structures, pavements and slopes (minimum 90% relative compaction using native materials) vs. landscape and other areas.
6. Provisions for approval inspections and necessary testing during and on completion of grading.
7. Opinion as to adequacy of site for the proposed development. (This opinion should also be summarized in the first part of the report).
8. Other pertinent geotechnical information for the safe development of the site.

PART II: TECHNICAL GUIDELINES FOR PRELIMINARY REPORTS (SOIL AND GEOLOGY REPORTS) SINGLE FAMILY DWELLINGS IN HILLSIDE AREAS

All guidelines listed in Part I for preliminary reports are applicable in addition to the following:

A. General

1. Engineering geology report with signature and CEG number of project engineering geologist (generally needed depending on site conditions and proposed developments).
2. Source of base map with date.
3. Geologist performing mapping (if different than signing CEG).

4. Geological setting including general description, index of site on portion of recent large-scale geologic map (if available) and references to previous reports (or published papers) and aerial photo data on site area.
5. Topographic features and relationship to site geology (outcrop distribution, slope height and angles and/or ratios, dip slopes, cliffs, faults, contacts, erosion pattern, etc.)

B. Field Investigations

1. Geologic map showing: site geology, approximate location of proposed keyways, proposed buttresses, proposed or existing sub drains, seeps or springs, etc. The map shall be suitable for the general purpose in its size, scale and manifestation and must contain an adequate legend. The map should have highlighted representative geologic data of sufficient amount and location for evaluation of: general rock or soil unit distribution, geologic structures, down-slope movement features (including soil/rock creep), groundwater conditions, subsidence/settlement features or potential, and other pertinent site characteristics.
2. Substantiation of any known gross differences of opinion with recently available geologic reports or published data or maps on site areas.

C. Earth Materials (Bedrock and Surficial Units)

1. Unit classification, general lithologic type, geologic age, origin.
2. Unit description and characteristics (in sequence for relative age) including:
 - a. Composition, texture, fabric, lithification, moisture, etc.
 - b. Pertinent engineering geologic characteristics.
 - c. Distribution, dimensions, or occurrence (supplemental to data furnished on illustrations).
 - d. Suitability as construction and foundation material.
 - e. Effects and extent of weathering (existing and relationship to project design and future site stability, material strength, etc.).

D. Geologic Structure

1. General Structure
2. Distribution of structural features including position, attitude, pattern and frequency of:
 - a. Fissures, joints, shears, faults and other features of discontinuity.
 - b. Bedding, folds, and other planar features.
3. Character of structural features including: continuity, width of zones and activity, dominant vs. subordinate, planar nature, plunge, depth, open vs. closed (degree of cementation or infilling), gouge.
4. Structural or cross-sections (one or more appropriately positioned and referenced on map, especially through critical areas, slopes and slides) of suitable size and engineering scale; with labeled units, features and structures; and a legend. These sections should correlate with surface and subsurface data showing representative dip components, projections, and stratigraphic/structural relationships.

E. Stability Features and Conditions

1. Adequate mapping, sections and description showing position, dimensions and type of existing down-slope movement features including soil/rock creep, flows, falls, slumps, slides if any.
2. Activity, cause or contributing factors of down-slope movement features.
3. Recent erosion, deposition, or flooding features.
4. Subsidence/Settlement, piping, solution or other void features or conditions.
5. Groundwater and surface drainage characteristics or features.
 - a. Surface expression (past and present); permeability/porosity of near-surface materials.
 - b. Actual or potential aquifers or conduits, perching situations, barriers, or other controls to percolation and groundwater movement and fluctuation of groundwater levels at the site.

PART III: TECHNICAL GUIDELINES FOR PRELIMINARY REPORTS (SOIL AND GEOLOGY REPORTS) ON SINGLE FAMILY DWELLINGS: SUPPLEMENT TO PARTS II AND I.

This section includes additional report content that may be necessary depending on project site conditions or proposed developments for either flatland or hillside locations.

A. General

1. Site conditions - distress on existing improvements in area (expansive, settlement/subsidence, or creep areas).
2. Proposed grading - special grading equipment or methods needed for resistant, saturated or other unusual materials or situations.
3. Proposed rock disposal methods (for clasts and residuals larger than 12 inches) and disposal areas (include on geotechnical plan if disposal area is on site).
4. References to publications and other reports cited.

B. Engineering/Material Characteristics and Testing

1. Shear strength evaluations and results (drained or un-drained conditions, effective stress or total stress analysis, in-situ or remolded samples).
2. Material densities and/or penetration tests (Standard Penetrations or other methods of known correlation to material density).
3. Gradation/Size analyses, if appropriate.
4. Atterberg limit analysis and parameters, if appropriate.
5. Geophysical survey, if appropriate - graphics and results.
6. Include all test methods used, type or condition of sample used, applicable engineering graphics and calculations, results of all tests, and sample locations of all test samples.

C. Slope stability analysis (dependent on slope height and ratios, strength of earth materials, internal structure, susceptibility to weathering, actual or potential groundwater, surficial covering, proximity to site improvements or structures, and proposed landscaping and maintenance).

1. Gross stability of natural or man-made slopes with calculations, graphics, supporting data and applicable parameters.
2. Surficial stability of slopes with calculations, graphics, supporting data and applicable parameters.

NOTE: General guidelines for gross stability analyses are provided in "Minimum Standards for Slope Stability Analysis" (Appendix D) formulated by the LA/ASCE Geotechnical Group Committee on Seismic Stability of Soil and Rock and adopted by the County of Los Angeles on July 25, 1978, except that they shall apply to all slopes steeper than 2:1. Guidelines for surficial stability analyses are established in "Slope Stability Report" formulated by the Orange County Slope Stability Committee dated January 10, 1972.

D. Seismic evaluation should include regional seismicity; potential for strong shaking, ground rupture, and liquefaction; applicable parameters (peak and/or design ground acceleration, duration of strong shaking, site period) or reference to C.B.C. standards for earthquake design (Chapter 16).

E. Foundation Design Criteria - Special provision for expansive earth materials.

1. Footing design and placement criteria.
2. Slab thickness, reinforcement, separation and expansion joints, construction joints, doweling, or ties.
3. Bridging; grade beam specifications and recommendations, when applicable.
4. Prestressed (post-tensioned) flotation slab specifications and recommendations if this system is proposed.
5. Exterior flatwork recommendations.
6. Moisture barriers and/or selective grading (aggregate or sand base or other sub-base).
7. Soil moisture measures
 - a. Treatment prior to concrete pouring: "pre-pour moistening," "presoaking," or "pre-saturation."
 - b. Drainage/Irrigation controls to maintain moisture content in foundation materials (including increased positive drainage,

paving, cut-off walls, sealed planters, gutters and downspouts, etc.).

F. Foundation Design Criteria - other special provisions

1. Soluble sulfate content specifications and recommendations based on California Building Code Section 1904.3.
2. Footing setback from the top and base of slopes and other setbacks (faults, fracture zones, contacts, etc.).
3. Effects of adjacent loads when footings are at differing elevations.
4. Deep foundation systems.
 - a. Allowable bearing values.
 - b. Foundation design criteria, parameters and calculations when applicable.
 - c. Additional loads or potential loads caused by geologic conditions (parameters and calculations).
5. Engineering calculations with supporting data and applicable parameters used as a basis for recommended values. These will be needed depending on the values presented relative to the foundation materials, groundwater table, proposed improvements and imposed loads.

G. Retaining Walls: Design Criteria on Proposed Walls (surcharged or greater than 3 feet in height above the base).

1. Slope surcharge and geologic surcharge factors, parameters and calculations.
2. Drainage and backfill requirements including waterproofing of living areas and suitable drains.
3. Allowable bearing values, lateral bearing resistance and coefficient of friction based on testing or C.B.C. (Chapter 18).
4. Active, passive, or at rest lateral pressure.
5. Footing setback from base of slopes.

H. Conclusions and Recommendations

1. Corrective or selective grading.

2. Sub-grade specifications and recommendations.
3. Soil cement or lime stabilization.
4. Rock blast disposal.
5. Blasting.
6. Irrigation/Drainage controls, dewatering, surface and subsurface drains and sub drains.
7. Special planting and irrigation measures, slope coverings and other erosion control measures, which may be apparent from the preparation of the geotechnical report.
8. Slough walls (including free board on retaining walls).
9. Protection of existing structures during grading.
10. Foundation/Wall excavation inspections and approval by engineering geologist and/or soil engineer. '
11. Shoring requirements.
12. Actual or potential effect extending into site from adjacent areas or from the site into adjacent areas and recommendations pertaining to such items as stability, erosion, sedimentation and groundwater.
13. Stabilization measures (see note under Item C for guidelines and minimums).
 - a. Fill blankets for pads or stabilization blankets for slopes.
 - b. Stabilization fills: specifications (including sub drains and landscape) and parameters (include stability analysis and calculations if geologically surcharged).
 - c. Buttress fills: specifications (including landscape), sub drains, stability analysis with calculations and supporting test data and parameters.
14. Fill over cut slope specifications and recommendations.
15. Subsidence, hydrocompaction and piping potential, factors, time frame and recommendations.

PART IV: TECHNICAL GUIDELINES FOR PRELIMINARY SOIL AND GEOLOGY REPORTS ON PRECISE COMMERCIAL/INDUSTRIAL GRADING APPLICATIONS

This section includes the necessary report content in addition to Part I and applicable items of Part II and III for the proposed commercial/industrial development.

A. Pavement Design (indicate areas and type on geotechnical plan)

1. AC pavement design criteria
 - a. R-value testing: method (California 301-f or equivalent), results and sample location(s).
 - b. Traffic indices or projected loading conditions.
 - c. AC structural sections: parking areas, access areas, service areas, and heavy vehicle areas.
 - d. Untreated base compaction recommendations (minimum 95% relative compaction).
 - e. Sub-grade recommendations: minimum depth, compaction (minimum 90% relative compaction), special recommendations for bridging, or founding, e.g., soil, cement or lime treatment, over-excavation or select material.
2. Concrete pavement
 - a. Minimum thickness and reinforcement.
 - b. Size of poured or sawed sections; expansion joints.
 - c. Untreated base specifications and recommendations.
 - d. Sub-grade recommendations.

B. Seismic evaluation of site (if site involves a critical or major structure or is in close proximity to an active fault); see Part III for description of necessary content.

PART V: TECHNICAL GUIDELINES FOR PRELIMINARY SOIL AND GEOLOGY REPORTS ON RESIDENTIAL OR COMMERCIAL/INDUSTRIAL SUBDIVISIONS (TRACTS AND PARCELS); FLATLAND OR HILLSIDE AREAS

This section includes necessary report content in addition to Part I and the applicable items of Parts II and III.

- A. Seismic evaluation of site (see Part III for description of necessary content).**
- B. Evaluation of expansivity of site.**
- C. Stability evaluation of site: slopes, tract boundary areas, etc.**

PART VI: TECHNICAL GUIDELINES FOR ROUGH GRADE COMPACTION REPORTS

A. General

- 1. Signature and GE or RCE number and date of expiration of license of project geotechnical engineer.
- 2. Project address, lot and tract number.
- 3. Grading Permit Number.

B. Placement of fill

- 1. Purpose for which fill is placed.
- 2. Preparation of natural grade to receive fill.
- 3. Placement of fill (depth of layers, watering, etc.)
- 4. Equipment used for compaction.
- 5. Method of compacting outer slope area.

C. Testing (Compaction)

- 1. Test procedure (field and laboratory).
- 2. Plot plan with the location of all density tests.
- 3. Summary of test results:
 - a. Test identification number.
 - b. Date test performed.
 - c. Maximum dry density.
 - d. Optimum moisture.

- e. Field dry density.
- f. Field moisture.
- g. Relative compaction.
- h. Approximate elevation of test.
- i. Approximate finish grade elevation at test site.

D. Testing (Utility Trench Compaction)

- 1. Location of test.
- 2. Depth of trench and test.
- 3. Method of backfill and compaction equipment.
- 4. Summary of test results.

E. Testing (Other)

- 1. Summary of expansion test results (identify lots or areas with swelling potential, plot test locations on plot plan).
- 2. Summary of soluble sulfate test results.
- 3. Summary of "R" value tests for pavement design if applicable.

F. As-Built Conditions

- 1. Plot plan showing limits of the approved compacted fill area (approximate pad elevation), depth of fill, areas of over-excavation, canyon cleanout, keys, and sub drains).
- 2. Treatment of "daylight" or cut/fill transition zones (extent of over-excavation outside of footing).
- 3. Type of soil encountered during grading (fill, in-situ, imported borrow).
- 4. Groundwater conditions identified and sub drains or other methods used to mitigate adverse effects.
- 5. Geologic conditions encountered.
- 6. Comments on changes made during grading and their effect on the recommendations made in the geotechnical report.

G. Recommendations and Opinions

1. Footing recommendations and bearing value on compacted fill.
2. Footing and floor slab recommendations based on results of expansion and soluble sulfate tests (construction details of footing if applicable).
3. Pavement structural section design recommendations and specifications if applicable.
4. Opinion of the suitability of natural soil to support the fill or structure.
5. Approval as to the adequacy of the site for the intended use, as affected by soil engineering and/or geologic factors.
6. Opinion as to the gross and surficial stability of all slopes.
7. Opinion as to the suitability of utility trench and retaining wall backfill.
8. A statement that the soil engineering and engineering geologic aspects of the grading have been inspected and are in compliance with the applicable conditions of the Grading Permit and the soil engineer's and engineering geologist's recommendations.

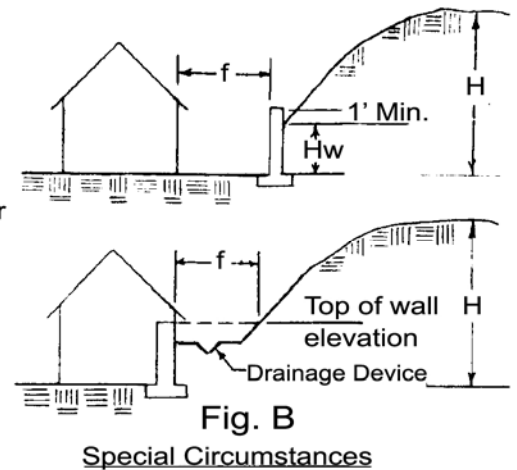
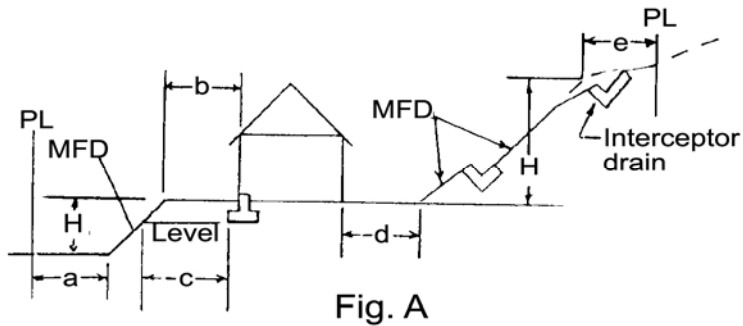
APPENDIX C

Detail 1- Minimum Setbacks for Slopes

SETBACK DETAIL

Min. Setback From Adjacent Slope					
H	a	b	c	d	e
0'-6"	5' min	7'	5'	5'	H/2 2' min
6'-14"	H/2 5' min	7'	H/2 5' min	H/2	H/2
14'-30'	H/2	H/2 10' max	H/2 10' max	H/2	H/2 10' max
>30'	H/2 20' max	10'	H/3 40' max	15'	10' max

H	Hw (Max)	f (min)
0' 6"	3'	5' min.
6'-12"	H/2	H/2
12' 30'	6'	H/2
>30'	6'	15'



NOTES:

1. "PL" MEANS PROPERTY LINE AND/OR PERMIT AREA BOUNDARY.
2. "MFD" MEANS MANUFACTURED SLOPE.
3. SETBACKS SHALL ALSO COMPLY WITH APPLICABLE ZONING REGULATIONS.
4. "Table A" APPLIES TO "MFDs" OR 2:1 OR STEEPER NATURAL SLOPES. SETBACKS FROM THE NATURAL SLOPES FLATTER THAN 2:1 SHALL MEET THE APPROVAL OF THE CHIEF BUILDING OFFICIAL.
5. "b" MAY BE REDUCED TO 5' MINIMUM IF AN APPROVED DRAINAGE DEVICE IS USED (ROOF GUTTERS AND DOWN SPOUTS MAY BE REQUIRED).
6. "b" MAY BE REDUCED TO LESS THAN 5'. IF NO DRAINAGE IS CARRIED ON THIS SIDE AND IF ROOF GUTTERS ARE INCLUDED.

7. IF THE SLOPE BETWEEN LEVELS "a" AND "b" IS REPLACED BY A RETAINING WALL, "a" MAY BE REDUCED TO ZERO AND "b" REMAINS AS SHOWN IN TABLE A. THE HEIGHT OF THE RETAINING WALL SHALL BE CONTROLLED BY BUILDING REGULATIONS.
8. "b" IS MEASURED FROM THE FACE OF THE STRUCTURE OR ANY GROUND SURFACE BUILDING PROTRUSION TO THE TOP OF THE SLOPE.
9. "c" IS MEASURED FROM THE BOTTOM OF THE FOOTING ALONG A HORIZONTAL LINE TO THE FACE OF THE SLOPE. UNDER SPECIAL CIRCUMSTANCES, "c" MAY BE REDUCED AS RECOMMENDED IN THE SOILS REPORT AND APPROVED BY THE CHIEF BUILDING OFFICIAL.
10. THE USE OF RETAINING WALLS TO REDUCE SETBACKS (Fig. B) SHALL BE APPROVED BY THE CHIEF BUILDING OFFICIAL.
11. "f" MAY BE REDUCED IF THE SLOPE IS COMPOSED OF SOUND ROCK THAT IS NOT LIKELY TO ERODE OR DETERIORATE EASILY AND IS RECOMMENDED BY THE SOILS ENGINEER OR ENGINEERING GEOLOGIST AND APPROVED BY THE CHIEF BUILDING OFFICIAL.
12. "a" AND "e" SHALL BE 2' MIN. WHEN "PL" COINCIDES WITH STREET RIGHT-OF-WAY AND WHEN IMPROVED SIDEWALK IS ADJACENT TO RIGHT-OF-WAY.
13. "e" SHALL BE INCREASED AS NECESSARY FOR INTERCEPTOR DRAINS.

APPENDIX D

Minimum Standards for Slope Stability Analysis

MINIMUM STANDARDS FOR SLOPE STABILITY ANALYSIS

The following minimum standards for slope stability analysis will generally be required for cut and fill slopes. A more detailed field and laboratory investigation combined with a seismic stability analysis utilizing such information may be required where unusual soils or geologic conditions exist.

1. Separate calculations shall be performed for static and seismic conditions.
2. The pseudostatic slope stability analysis shall be the minimum seismic analysis accepted for design.
3. Conventional static methods of slope stability analysis based upon principles of mechanics may be used to analyze the stability of slopes, under both static and pseudostatic loads.
4. The minimum acceptable factor of safety on shear strength is 1.5 for static loads and 1.1 for pseudostatic loads. The factor of safety on strength is defined as the ratio of the shearing resistance force to the actual driving force acting along the potential failure surface.
5. The static analysis shall include the effect of expected maximum moisture conditions, soil weight and seepage or pore pressure where applicable. Saturated moisture conditions shall be utilized unless it can be shown that other moisture contents will represent worst possible conditions for the project.
6. Pseudostatic analysis shall include the effect of static loads combined with horizontal inertial force acting out of the slope and through the center of gravity of the potential sliding mass.
7. A minimum pseudostatic horizontal inertial force equal to 0.15 times the total weight of the potential sliding mass shall be used. This minimum lateral design value should be increased where subsurface conditions or the proximity to active faults warrant the use of higher values in the opinion of the private consultant(s).
8. The critical potential failure surface used in the analysis may be composed of circles, planes or other shapes considered to yield the minimum factor of safety against sliding and most appropriate to the soil and geologic site conditions. In cohesive soils, a vertical tension crack extending down from the top of the slope to the potential failure surface may be used to limit the lateral extent of the potential sliding mass.
9. The critical potential failure surface having the lowest factor of safety shall be sought for the static case. This same static surface

and sliding mass may be assumed critical for the pseudostatic case.

10. Soil properties including unit weight and strength parameters (cohesion and friction angle) may be based on conventional field and laboratory tests and/or field performance. Where appropriate, laboratory tests for long-term residual strengths shall be performed. Shear resistance along bedding planes normally requires estimation of bedding-strength values of the weakest unsupported plane. It is expected that the engineer will use considerable judgment in the selection of appropriate shear tests and interpretation of the results in arriving at strength characteristics fitting the present and anticipated future slope conditions. Dynamic strengths used in a pseudostatic analysis shall not exceed peak point static strengths unless supported by dynamic test results or other convincing physical evidence.
11. Each slope stability analysis shall be accompanied by a geotechnical report including a summary of the results of field exploration and laboratory investigation. This report should at least include the following items:
 - a. Boring logs and plan locations relative to the proposed grading.
 - b. Geotechnical description of soil and geologic description or rock encountered in the proposed cut slope and/or expected to be used in the proposed fill. Soil description should include engineering classification with moisture and density or stiffness. Rock description should include, but not be limited to: geologic assessment of hardness, degree of weathering, strata thickness, clay surfaces and oriented planar discontinuities such as strike and dip of bedding, joint spacing, joint thickness, fracture, and fault surfaces.
 - c. Groundwater conditions encountered at the site as well as anticipated future groundwater conditions that may affect the design.
 - d. Description of laboratory tests performed with summary of laboratory test results. Both the moisture and drainage conditions during any shear strength tests should be clearly defined.

- e. Shear strength parameters for design which are based on field experience should be properly referenced or explained.
- 12. All design parameters shall be verified during construction. This includes applicable geologic structures - such as bedding attitudes, joint orientation and existing shear surfaces, fill strength, and groundwater conditions. If any significant variation from the design values is discovered, revised calculations shall be made and submitted.

APPENDIX E

Protection Of Adjoining Property California Civic Code, Section 832

CALIFORNIA CIVIC CODE
Section 832

Each coterminous owner is entitled to the lateral and subjacent support, which his land receives from the adjoining land, subject to the right of the owner of the adjoining land to make proper and usual excavations on the same for purposes of construction or improvement, under the following conditions:

1. Any owner of land or his lessee intending to make or to permit an excavation shall give reasonable notice to the owner or owners of adjoining lands and of buildings or other structures, stating the depth to which such excavation is intended to be made, and when the excavating will begin.

2. In making any excavation, ordinary care and skill shall be used, and reasonable precautions taken to sustain the adjoining land as such, without regard to any building or other structure which may be thereon, and there shall be no liability for damage done to any such building or other structure by reason of the excavation, except as otherwise provided or allowed by law.

3. If at any time it appears that the excavation is to be of a greater depth than are the walls or foundations of any adjoining building or other structure, and is to be so close as to endanger the building or other structure in any way, then the owner of the building or other structure must be allowed at least 30 days, if he so desires, in which to take measures to protect the same from any damage, or in which to extend the foundations thereof, and he must be given for the same purposes reasonable license to enter on the land on which the excavation is to be or is being made.

4. If the excavation is intended to be or is deeper than the standard depth of foundations, which depth is defined to be a depth of nine feet below the adjacent curb level, at the point where the joint property line intersects the curb and if on the land of the coterminous owner there is any building or other structure the wall or foundation of which goes to standard depth or deeper then the owner of the land on which the excavation is being made shall, if given the necessary license to enter on the adjoining land, protect the said adjoining land and any such building or other structure thereon without cost to the owner thereof, from any damage by reason of the excavation, and shall be liable to the owner of such property for any such damage, excepting only for minor settlement cracks in buildings or other structures.

APPENDIX F

Certification Forms



ROUGH GRADE CIVIL

Director of Community Development
Building & Safety Division
Department of Community Development
City of Irvine
One Civic Center Plaza
Irvine, CA 92606-5208

Attention _____ City Grading Inspector

Subject: Civil Engineer's or Architect's Certification of Compliance for rough grading

Reference:

Project: Grading Permit Number _____
Job Address _____
Owner _____
General Contractor _____
Work began _____ Work completed _____

In accordance with the Irvine Grading and Excavation Code and the requirements of the Building Code, I certify approval of this project as outlined above, to rough grade. Rough grading has been completed substantially in conformance with the approved grading plan for this project and in full compliance with said Codes. Certification includes horizontal and vertical control for drainage devices, building pad corners, property corners, slopes, berms, and positive building pad drainage. this certification does not include approval of the placement and compaction of earthwork within the purview of others.

The volumes of earth materials moved to date are: cut _____ cubic yards; natural fill _____ cubic yards; borrow _____ cubic yards.

By: _____ Date: _____

Name and Title RCE # _____

COMPANY NAME: _____



FINAL GRADE SOILS

Director of Community Development
Building & Safety Division
Department of Community Development
City of Irvine
One Civic Center Plaza
Irvine, California 92606-5208

Attention: _____ City Grading Inspector

Subject: Soil Engineer's Certificate of Compliance for earthwork and onsite paving as per approved grading and improvement plans.

Reference Project: Permit Number _____
Job Address _____
Owner _____
General Contractor _____
Work began _____ Work completed _____

In accordance with the Irvine Grading and Excavation Code and the requirements of the Building Code, I certify that I have personally supervised the testing and inspection during placement of all onsite improvements.

It is my judgment that work is complete on this project, in full compliance with said codes. This certification does not include exact horizontal or vertical control nor dimensions of the earthwork within the purview of others.

By _____ Date _____

_____ RCE # _____
Name and Title

COMPANY NAME: _____



FINAL GRADE (PRECISE) CIVIL

Director of Community Development
Building & Safety Division
Department of Community Development
City of Irvine
One Civic Center Plaza
Irvine, California 92606-5208

Attention: _____ City Grading Inspector

Subject: Civil Engineer's or Architect's Certification of Compliance for precise grading.

Reference

Project: Grading Permit Number _____
Job Address _____
Owner _____
General Contractor _____
Work began _____ Work completed _____

In accordance with Irvine Grading and Excavation Code and the requirements of the Building Code, I certify approval of this project as outlined above, to precise grade. Precise grading has been completed in conformance with approved precise grading plan for this project and in full compliance with said Codes. Certification includes horizontal and vertical control for drainage devices, building pad corners property corners, slopes, berms, positive building pad drainage and on-site paving. This certification does not include approval of the placement and compaction of earthwork within the purview of others.

The volumes of earth materials moved to date are: cut _____ cubic yards;
natural fill _____ cubic yards; borrow _____ cubic yards.

By _____ Date _____

_____ RCE # _____

FORM 65-88,REV 01/06



ROUGH GRADE SOILS

Director of Community Development
Building & Safety Division
Department of Community Development
City of Irvine
One Civic Center Plaza
Irvine, California 92606-5208

Attention _____ City Grading Inspector

Subject: Soils Engineer's Certificate of Compliance for earthwork to rough grade

Reference
Project: Grading Permit Number _____
Job Address _____
Owner _____
General Contractor _____
Work began _____ Work completed _____

In accordance with the Irvine Grading and Excavation Code and the requirements of the Building Code, I certify that I have personally supervised the testing and inspection during placement and compaction of earth fills described in the approved soils report for this project.

It is my judgment that work is complete on this project, as outlined above to rough grade in full compliance with said codes. This certification does not include exact horizontal or vertical control nor dimensions of the earthwork within the purview of others.

By: _____ Date: _____

Name and Title RCE # _____

COMPANY NAME: _____



FINAL LANDSCAPE

Director of Community Development
Building and Safety Division
Department of Community Development
City of Irvine
One Civic Center Plaza
Irvine, CA 92606-5208

Attention: _____ City Grading Inspector

Subject: Landscape Architect's Certificate of Compliance for
Landscape installations according to approved plan.

Reference
Project: Landscape Permit Number: _____

Job Address: _____

Owner: _____

General Contractor: _____

Work began _____

Work Completed _____

I certify that I have personally supervised the landscape and irrigation improvements and that they are in compliance with current City of Irvine Landscape Design Manual and Standard Plans.

By _____ Date _____

Name and Title LA# _____