MANUAL OF GRADING

CITY OF ORANGE

DEPARTMENT OF PUBLIC WORKS
ENGINEERING DIVISION

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MANUAL OF GRADING

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1. SCOPE AND PURPOSE

SCOPE:

This manual of grading sets forth the Rules and Regulations to control excavation, grading and earthwork construction, including cuts and fills. It establishes the administration procedure for issuance of permits, and provides for approval of plans and inspection of grading construction.

In the event that a particular topic is not covered in either the Manual of Grading or Standard Plans and Specifications, then provisions of the U.B.C. shall cover it. If a conflict arises between the U.B.C. and the Standards or Manual of Grading, the specific provisions of the Standards or Manual shall govern it.

PURPOSE:

The purpose of this chapter is to safeguard life, limb property and public welfare by establishing minimum requirements for regulating grading and earthwork and also to control the quality of drainage and runoff within the city's jurisdiction.

This Manual combined with 1) Planning and Development Guidelines for land form grading, and 2) City Standard Plans and specifications constitute the elements of the City Grading Ordinance.

1) The Planning and Development Guidelines for Landform Grading and Planting provides hillside development site planning techniques. It encourages the use of contour grading, variable slope concepts and innovative landscaping technology to promote aesthetically pleasing concepts in the design of hillside grading, and construction.

2) The City Standard Plans and specifications provides specific construction details of items associated with grading of the project, such as erosion control devices, terrace drains, etc..

These three elements provide the necessary guidelines for developers and engineers to plan, design and construct the grading phase of their project.

2. DEFINITIONS

Approval shall mean a written engineering or geological opinion by the responsible engineer, geologist of record or responsible principal of the engineering company concerning the progress and completion of the work unless it specifically refers to the city official.

Approved Plans shall mean the current grading plans which bear the signature of approval of the City Engineer.

Approved Testing Agency shall mean a facility whose testing operations are controlled and monitored by a registered civil engineer and which is equipped to perform and certify the tests required by the Grading Manual, at determined by the City Official.

As-Graded is the surface conditions extent upon completion of grading.

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

Bench is a relatively level step excavated into earth material on which fill is to be placed.

Borrow is earth material acquired from an off-site location for use in grading on a site.

Building Official is the officer or other designated authority charged with the administration and enforcement of this code, or his duly authorized representative.

City Official is the City Engineer of the City of Orange or his duly delegated representative.

Civil Engineer shall mean a professional engineer registered in the State of California to practice in the field of Civil Engineering.

Civil Engineering shall mean the application of the knowledge of the forces of nature, principles of mechanics and the properties of materials for the evaluation, design, and construction of civil works for the beneficial use of Mankind.

Clearing, Brushing, and Grubbing shall mean the removal of vegetation (grass, brush, trees, and similar plant types) by mechanical means.

Compaction is the densification of a fill by mechanical means.

Commercial Coach is a vehicle with or without motive power, designed and equipped for human occupancy for industrial, professional or commercial purposes, and shall include a trailer coach.

Contour grading is the transitional use of variable slopes and the blending of these slopes into contours compatible with the natural terrain with the toe or top of the slope varying from a straight line.

Deputy Inspector is an inspector authorized by the City Engineer to perform inspection services as a consultant or temporary employee.

Earth Material is any rock, natural soil or fill and/or any combination thereof.

Engineered Grading is that grading requiring professional supervision and/or certification by soils experts including special placement and compaction techniques.

Engineering Geologist shall mean a geologist certified in the State of California to practice engineering geology.

Engineering Geology shall mean the application of geologic knowledge and principles in the investigation and evaluation of naturally occurring rock and soil for use in the design of civil works.

Erosion is the wearing away of the ground surface as a result of the movement of wind, water, and or ice.

Erosion Control System is a combination of desilting facilities, and erosion protection, including effective planting, to protect adjacent private property, watercourses, public facilities and receiving waters from an abnormal deposition of sediment or dust.

Excavation is the mechanical removal of earth 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 ± 11,000 years (Holocene Geologic Time).

Fill is a deposit of earth material placed by artificial means.

Flatland Site is any site which does not fit the definition of a hillside site.

Geotechnical Engineer is an engineer experienced and knowledgeable in the practice of soils engineering and geologic theory.

Grade shall mean the vertical location of the ground surface.

Natural Grade is the ground surface unaltered by artificial means.
Existing Grade is the ground surface prior to grading.
Rough Grade is the stage at which the grade approximately conforms to the approved plan.
Finish Grade is the final grade of the site which conforms to the

approved plan.

Grading is any excavating or filling or combination thereof.

Grading Contractor is a contractor licensed and regulated by the State of California who specializes in grading work or is otherwise licensed to do grading work.

Grading Permit is an official document or certificate issued by the City Official authorizing grading activity as specified by approved plans and specifications.

Grading Specialist duly delegated representative of the City Official, who is responsible for review of grading activities and inspection.

Hillside Site is a site which entails cut and/or fill grading; A combination of which is equal to or greater than five (5) feet in vertical height; or where the natural existing grade is twenty (20) percent or greater; and which may be adversely affected by drainage and/or stability conditions within or from outside the site, or which may cause an adverse affect on adjacent property.

Key is a designed 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.

Owner is any person, agency, firm or corporation having a legal or equitable interest in a given real property.

Precise Grading Plan is an approved plan which shows the precise structure location, finish elevations, and all on-site improvements.

Reinforced Earth refers to the use of plastic metal or synthetic materials placed in the earth fill to provide increased stability of the soil.

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

Rough Grading Plan is an approved plan showing less precise detail which need not show a structure location but must show interim building pad drainage to the degree required by the City Engineer.

Site is any lot or parcel of land or contiguous combination thereof, under the same ownership, where grading is performed or permitted.

Slope is an inclined ground surface, the inclination of which is expressed as a ratio of horizontal distance to vertical distance.

Slope Stability

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

Soil is a naturally occurring surficial deposits overlying bedrock.

Soils Engineering shall mean the application of the principles of soil mechanics in the investigation, evaluation and design of civil works involving the use of earth materials and the inspection and testing of the construction thereof.

Special Inspector is an inspector duly licensed by the City Official to perform inspection of asphalt concrete placement and related construction work or other grading related work approved by the City Official.

Structure is any man made improvement, such as a house, garage, patio cover, spa, swimming pool, etc., construction or which requires issuance of a Building Permit.

Sulfate (SO_4) 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.

Subdrain is a pipe or other structure placed in the earth fill to provide drainage to the earth subgrade and improve slope stability.

Terrace is a relatively level step constructed in the face of a graded slope surface for drainage and maintenance purposes.

3. PLANS AND PERMITS

3.1 GRADING PERMIT

No person shall conduct any grading, clearing, brushing, or grubbing on natural or existing grade that is preparatory to grading, without first having obtained a grading permit from the City Engineer. Exceptions to this requirement are as follows or as otherwise determined by the City Engineer.

a) An excavation below finished grade for basements and footings of a building, mobile home, retaining wall, or other structure authorized by a valid building permit or construction permit. This shall not exempt any fill made with the material from such excavation nor exempt any excavation having an unsupported height greater than five (5) feet after the completion of such structure. This shall not prohibit a minimum fee grading permit or soil or geologic report from being required for foundation design and inspection purposes when, in the opinion of the City Engineer, soil stability or flooding considerations warrant such inspection.

b) Cemetery graves.

c) Refuse disposal sites controlled by other regulations.

d) Earthwork construction regulated by the Federal, State, County or City governments, or by any local agency as defined by Government code sections 53090 through 53095 (special districts). Pipeline or conduit excavation and backfill conducted by local agencies or public utilities. Earthwork construction performed by railway companies on their operating property. This exemption, however, shall apply only when the earthwork construction takes place on the property, or dedicated rights-of-way or easements of the above agencies.

e) Excavation and backfill for installation of underground utilities by public utilities or companies operating under the authority of a franchise or public property encroachment permit.

f) Mining, quarrying, excavation, processing, stockpiling of rock, sand, gravel, aggregated or clay where established and provided for by law, provided such operations do not affect the lateral support or increase the stresses in or pressures upon any adjacent or contiguous property.

g) Exploratory excavations under the direction of soil engineers or engineering geologists, provided all excavations are properly backfilled. All such excavations and trenches are subject to the applicable sections of Title 8 of the State Orders, Division of Industrial Safety.

h) An excavation on residentially zoned property which does not exceed fifty (50) cubic yards on any one site and which - 1) is less than two (2) feet in vertical depth, or 2) which does not create a cut slope greater than five (5) feet in vertical height and steeper than two horizontal to one vertical (2:1).

i) A fill less than one (1) foot in depth placed on natural grade with a slope flatter than five horizontal to one vertical (5:1), which does not exceed fifty (50) cubic yards on any one lot and does not obstruct a drainage course.

3.2 GRADING PERMIT APPLICATION

A grading permit application shall consist of the following items and forms completed and signed by the applicant or his representative unless otherwise specified by the City Engineer:

a. Application Form

b. Three Sets of Grading Plans

c. Two copies of Hydrology and Hydraulic Calculations, if applicable

d. Two copies of a Preliminary Soil Report (if required)

e. Two copies of a Preliminary Geology Report (if required)

f. Payment of Grading Plan Check and Inspection Deposit

3.3 GRADING PLAN

A. Standard Requirement:

All grading activity within the City is subject to preparation of a plan. Plans submitted for plan check shall be drawn to scale upon City of Orange standard grading sheets available from the Engineering Division, or upon Mylar or linen using the same format. 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 Standard Plans and Specifications, and relevant laws, ordinances, rules and regulations. All Grading Plan shall include the following:

1. GRADING NOTES (Applicants to draft ALL of the following grading notes onto original:

   a. All Grading shall be done in accordance with the City of Orange Manual of Grading and Standard Plans and Specifications. (These standards are available at the Engineering office.

b. Retaining walls will be required where cutting or filling along property lines may cause damage, but always where the cut or fill exceeds one (1) vertical foot.

c. Retaining walls to be built to City Standards or responsible engineering calculations.

d. A permit must be obtained from the City Building Division before the construction of retaining walls.

e. All on-site slopes shall not exceed a grade of two (2) horizontal to one (1) vertical (2:1). Unless steeper slopes are authorized by the Soils Engineer and approved by the City Engineer.

f. All waste, inflammable waste, vegetation, and refuse shall be removed prior to grading.

g. A Grading Permit must be obtained from the City Engineering Division by the OWNER, DEVELOPER, or GENERAL CONTRACTOR PRIOR TO ANY CONSTRUCTION OR GRADING.

h. All final grading shall be certified to be in compliance with the APPROVED Grading Plan and City Standards. This certification shall be in writing to the City of Orange and shall be certified by the ENGINEER, ARCHITECT, SURVEYOR, or RESPONSIBLE PARTY THAT PREPARED THE PLAN. This certification shall be filed with the City prior to the release of occupancy.

i. Landscaping and sprinkler plans must be approved by the City Parks Department.

j. Notify the City Grading Specialist (532-0483) twenty-four (24) hours prior to beginning grading.

k. All fill one (1) foot or greater shall be tested and certified as to relative compaction.

l. Fill slopes three (3) feet or greater in height shall be compacted to the face. The Soils Engineer shall include slope tests in the final compaction report for rough grading.

m. All utility trench back-fills shall be in accordance with the recommendations of the Soils Engineer. The Soils Engineer shall provide written approval of utility trench backfill prior to final grading release.

n. All fill shall be compacted in accordance with Chapter 70 of the currently adopted Uniform Building Code or responsible Engineering recommendations.

o. A separate permit is required for work performed in public right-of-way.

p. A separate Haul Permit is required for all import/export over 5,000 cubic yards.

2. Show vicinity map or in the case of a single lot development give dimension to the nearest street intersection. Show and label all property lines.

3. Show name, address and phone number of the Developer, Design Engineer and Soils Engineer. Have responsible Engineer sign the plan.

4. Use City of Orange bench mark to determine grade elevations.

5. Show all existing and proposed structures above and below grade. Show all trees and indicate which ones are to be removed.

6. Show contours indicating the topography of the site. Show enough elevations on adjacent properties to determine property line differentials and existing patterns.

7. Show finished grade using contours or spot elevations. These must be sufficient to indicate drainage control. Call out finish floor and pad elevations of proposed structures.

8. Use arrows to indicate flow patterns.

9. Show north arrow, scale, legend.

10. Show existing and proposed street improvements. Minor street improvements may be shown on grading plan; i.e. minor curb & gutter work, drive approach, sidewalk, etc. Major street improvements must be shown on a separate Street Improvement Plan and MUST be prepared by a Registered Civil Engineer.

11. QUANTITY ESTIMATE

    a. Earthwork - cut and fill.
    b. Construction within public right-of-way (if street improvement plans not required).
        1. Drive approach.
        2. Curb & gutter.
        3. Parkway trees.
        4. Street lights, traffic signs, etc. (contact Traffic Division 532-0441 for particulars).
        5. Sidewalk

12. Show location of and provide details of all drainage structures, catch basins, gutters, etc.

13. Show existing and proposed block walls and retaining walls.

14. When retaining walls are required, a separate permit must be obtained from the Building Division. Call out City Standard for retaining wall construction. If some other construction is proposed, show wall detail and submit two (2) sets of calculations to Building Division for checking.

15. Show easements for sewer and drainage purposes.

16. For side and rear yards, provide a berm with a one (1) foot bench at the top of all slopes before descending down slopes (Figures A and B). Refer to Standard Plan No. 334 for design criteria.

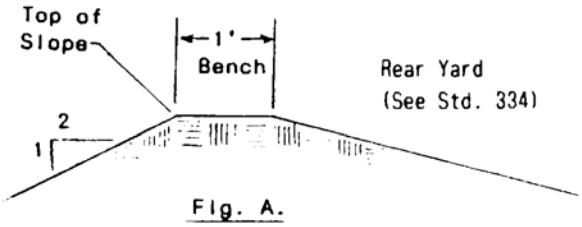

Fig. A.

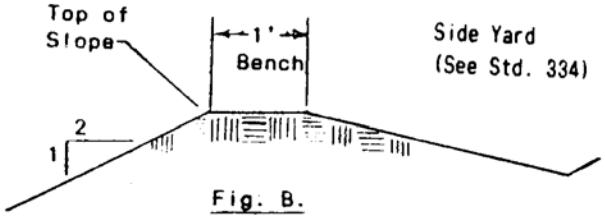

Fig. B.

17. Show any other information that may be necessary for the construction of the project or staff's interpretation of the plans.

B. Rough Grading Plan

The plans shall include, but not be limited to, the following information:

1. Property limits clearly labeled or otherwise identified and accurate contours of existing ground (at 5' contour intervals) and details of terrain and area drainage a minimum of fifteen (15) feet beyond property limits (spot elevations may be used on flatland sites).

2 Prominent existing or natural terrain features.

3. Limiting dimensions including setbacks between property lines and top and toe of slopes, elevations of finish contours to be achieved by the grading, proposed drainage devices and related construction.

4. Location of proposed building pads with pad elevations.

5. Details (plan and x-section) of all surface and subsurface drainage devices, walls, cribbing, dams and other protective devices to be constructed with, or as a part of, the proposed work, together with a map showing the drainage area and estimated runoff from the area served by any drains.

6. Location of any existing buildings or structures 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.

7. 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 City Engineer prior to the issuance of a grading permit. The City Engineer 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. Haul route(s) may require approval of City Council.

8. Additional plans, drawings, calculations, or other reports required by the City Engineer.

C. Precise Grading Plan

The plans shall include the following in addition to the above items listed for Rough Grading Plan:

1. The footprint or allowable building area of all proposed structures (including appurtenances).

2. Setback distances between structures and top and toe of slopes.

3. Detailed finish grade and finish floor elevations.

4. Flow-lines for lot drainage.

5. Details for building footing and side-yard swale relationship (including extra-height of footing).

6. All proposed paving including, but not limited to, sidewalks, driveways and parking lots.

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 which show original topography in lieu of reproducing original contours on the precise plan.

D. Changes To Plan

Any substantial changes to the approved grading plan occasioned by field conditions, site plan changes, etc. shall be accomplished prior to final grading and shall be approved by the City Engineer prior to implementing changes in the field.

3.4 Soil and Engineering Geology Report

Recommendations contained in the approved reports shall be incorporated into the grading plans and specifications and shall become a part of the grading permit. Also see Section 10 for required items to be included in final soils report which are necessary for Building Official's analysis for issuance of building permits. City Engineer shall retain the right to obtain third party review of soil/geology reports and recommendations.

A. Preliminary Soil Report

Soil 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. Soil reports shall also be required for grading or building permits on single lot projects when specified by the City Engineer.

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 structures; 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 if indicated by the preliminary soils report or required by the City Engineer and 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; and 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/or Building Permit for all subdivisions; and all sites for critical structures (fire stations, nursing homes, etc.) and major structures, as determined by the City Engineer. 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 City Engineer.

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 Section 10 of this Grading Manual.

3.5 TIME OF GRADING OPERATIONS

Grading and equipment operations shall not be conducted between the hours of 8:00 p.m. and 7:00 a.m. nor on Sundays and Federal Holidays. The City Engineer may, however, permit grading or equipment operations during specific hours after 8:00 p.m. or before 7:00 a.m. or on Sundays and Federal Holidays if he determines that such operations are not detrimental to the health, safety, or welfare of the area residents. Permitted hours of operation may be shortened by the City Engineer's finding of a previously unforeseen effect on the health, safety, or welfare of the surrounding community. However, no permit that has been issued, nor any provision of this section shall be construed to be a waiver of the applicability of the provisions set forth in Chapter 8.24 of the Orange Municipal Code relating to noise.

3.7 IMPORT OR EXPORT OF EARTH MATERIAL

The following requirement shall apply when more than five hundred (500 C.Y.) cubic yards of earth per project is moved from or to the site of an earth grading operation in a one day period on public roadways not designated as City of Orange Truck routes; or, when more than twenty-five hundred (2,500 C.Y.) cubic yards of earth per project is moved from or to the site of an earth grading operation over a period of time exceeding one day on public roadways not designated as City of Orange Truck Routes; or, when more than five thousand (5,000 C.Y.) cubic yards of earth per project is moved from or to the site of an earth grading operation on public roadways designated as City of Orange Truck routes.

A) Haul routes shall be identified and approved by Traffic Engineer.

B) A sweeper maybe required to mitigate effects of dirt, mud, dust, and debris on the roadway.

C) Hours of haul will be reviewed and approved by the City Traffic Engineer to mitigate area and peak hour traffic conflicts.

D) Traffic control, signing and stripping concepts will be approved by the City Traffic Engineer.

E) Provide evidence of proper liability insurance coverage to Traffic Engineer naming City as additionally insured.

Which in conformance with the provisions of this section, a Hauling permit shall be issued by the City Traffic Engineer.

Hauls in excess of 30,000 cubic yards requiring the use of City streets will require City Council approval and the possible provision of the following additional measures:

A) Periodic safety inspection of all haul trucks.

B) A hold harmless agreement between the City and the contractor will be required.

C) Flagmen and/or automatic traffic lights may be necessary as required by the City Traffic Engineer.

D) A cash bond may be required to insure against loss of pavement life along primary haul routes.

Which in conformance with the provisions of this section, a Hauling permit shall be issued by the City Traffic Engineer.

3.8 EXCAVATION BLASTING PERMIT

The necessity to employ blasting agents and techniques during the course of grading shall be identified by the Geotechnical Engineer during the preliminary geology report phase of the project. No person shall possess, store, sell, transport or use explosives and blasting agents to do any excavation without a permit from the Orange City Fire Department.

3.9 ROCK CRUSHING OPERATION

The use of a temporary rock crusher on the grading site shall be reviewed and approved by the City Engineer. Details as to the location, noise levels and impacts to adjacent property shall be provided and may be subject to City Council approval if deemed necessary by the City Engineer.

3.10 WATER COURSE ALTERATION

No person shall alter an existing water course, channel, or revetment by excavating, or placing fill, rock protection or structural improvements without a valid grading permit unless waived by the City Engineer or performed as interim protection under emergency flood fighting conditions.

3.11 HARD SURFACE PERMIT REQUIREMENT

No person shall construct pavement surfacing in excess of 1,000 square feet on natural ground or existing grade for the purpose of private road or commercial, industrial, or residential parking lot or travel way without a valid grading permit unless waived by the City Engineer. Resurfacing or maintenance of existing paved surfaces shall be exempt from this requirement.

3.12 STOCKPILES AND BORROW PITS

No one shall temporarily store or stockpile loose earth, rock or fill material without first obtaining a permit for such purpose. Stockpile plans showing proper storage, temporary drainage and source of material shall be submitted for review and approval by the City Engineer. The excavation of soil, rock or native material from a site for commercial use without an approved grading plan and permit is prohibited.

4. BONDS AND FEES

4.1 BONDS

A. Bonds Required

No grading permit shall be issued for grading involving the movement of more than 5,000 cubic yards without first posting with the city of Orange a bond executed by the owner and a corporate surety authorized to do business in the State of California as a surety in an amount sufficient to cover the cost of the project including the construction of drainage and protective devices and any corrective work necessary to remove and eliminate engineering and geological hazards. Bond amount shall be determined by applicants engineer and subject to review and approval of the City. In lieu of a surety bond the applicant may post security in a form acceptable to the City Engineer and approved by the City Attorney.

B. Exceptions

1. The City Engineer may waive or reduce the amount of the bond to the extent that he determines that the hazard or danger created by the work does not justify the full amount.

2. No bond shall be required when the City Engineer determines the proposed grading will not adversely affect the subject property or adjacent property or existing or proposed structures thereon.

C. Conditions

Every bond shall include the conditions that the permittee shall:

1. Comply with all of the provisions of this Manual, applicable laws, and ordinances.

2. Comply with all of the terms and conditions of the permit for excavation or fill to the satisfaction of the City Engineer.

3. Complete all of the work contemplated under the permit, or complete the work to a safe condition satisfactory to the City Engineer.

D. Failure to Complete Work

The term of each bond shall begin upon the date of filing and shall remain in effect until the completion of the work to the satisfaction of the City Engineer. In the event of failure to complete the work and failure to comply with all of the conditions to his satisfaction. The surety executing such bond or deposit shall continue to be firmly bound under a continuing obligation for the payment of all necessary costs and expenses that may be incurred or expended by the governing agency in causing any and all such required work

to be done. In the case of a cash deposit, said deposit or any unused portion thereof shall be refunded to the permittee.

E. Default in Performance of Conditions

Whenever the City Engineer finds or determines that a default has occurred in the performance of any requirement of a condition of a permit issued hereunder, written notice thereof shall be given to the principal and to the surety on the bond. Such notice shall specify the work to be done, the estimated cost thereof and the period of time deemed by the City Engineer to be reasonably necessary for the completion of such work.

After receipt of such notice, the surety shall within the time therein specified cause or require the work to be performed, or failing therein, shall pay over to the City of Orange the estimated cost of doing the work as set forth in the notice. Upon receipt of such monies, the City Engineer shall cause the required work to be performed and completed.

4.2 FEES

A) A Plan Check and Inspection Deposit shall be required at the time plans are submitted for the first check. The amount of the deposit shall be $500.00 and may be increased if required after first check.

The amount charged for plan checking and inspection will depend on time spent by staff at a rate approved by City Council resolution and may be changed from time to time. If a consultant is used to check plans, those fees will be deducted from the deposit as well as staff costs.

If the final plan check and inspection charges, equal an amount less than the deposit, the applicant will be refunded the remainder. If the final charges exceed the deposit, the applicant will be billed for the remainder which must be paid prior to release of the Grading Bond.

B) A Grading Permit Fee shall be paid to the city at the time permits are issued. The fee shall be determined by Council Resolution and may be revised periodically to defray the cost of permit issuance.

C) A complete list of current Engineering/Street Department fees is available at the Public Works counter.

5. CUTS AND FILLS

5.1 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 City Engineer, 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 Design Review Board 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 then five (5) feet in height. The soil engineer shall consider both gross and surficial stability of the slope and provide a written statement approving the slope stability.

All cut slopes shall be rounded into existing terrain to produce a contoured effect from the cut face to natural ground. In addition, varying slope ratios are to be used when feasible to produce an aesthetically pleasing contoured effect.

NOTE: The use of contour grading is required in accordance with Council Policy. Developers and Project Engineers shall refer to "The Planning and Development Guidelines for Landform Grading and Planting" prior to beginning a hillside project design.

5.2 FILL SLOPES

Fill 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 report and approved by the City Engineer, slopes may be constructed steeper than two to one (2:1). In no case may slopes be steeper than two to one (2:1) if flatter slopes are required as a condition of approval by the City Council, Planning Commission, Zoning Administrator, or Design Review Board, 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 soil 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. Fill slopes in excess of one hundred feet in vertical height will be discouraged, except as approved by the City Engineer under special circumstances. All fill slopes in excess of five foot in vertical height shall be

rounded into the existing terrain to produce a contoured transition from manufactured to natural ground, variable slope ratios are encouraged to produce an aesthetically pleasing contoured effect.

NOTE: The use of contour grading is required in accordance with Council Policy. Developers and Project Engineers shall refer to "The Planning and Development Guidelines for Landform Grading and Planting" prior to beginning a hillside project design.

5.3 FILL MATERIALS

Detrimental amounts of organic material 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 Grading Specialist may permit placement of larger rock when the soil 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 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 Soils Engineer and approval of the City Engineer providing that the permitted use of the property will not be impaired.

C. Rocks greater than twelve (12) inches shall be placed as recommended by the soils engineer and approved by the City so as to be completely surrounded by soils. Rocks must be placed in a manner that insures that voids in the fill are eliminated.

5.4 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. 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 a minimum ten (10) feet in width. The ground surface at the toe of fill shall be prepared benching into sound bedrock or other competent material, as determined by the Soil Engineer and/or engineering geologist and approved by the City Engineer. The lowermost bench beneath the toe of a fill slope shall be a minimum ten (10) feet in width. The ground surface at the toe of the fill shall be prepared for sheet flow runoff, or a paved drain shall be provided.

When an existing fill is to be widened or a new fill is to be made, the new material shall be bonded to the old by plowing deep longitudinal furrows or other method approved by the City Engineer.

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 Civil Engineer, Soil 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.

5.5 COMPACTION

All structural fills, including utility trench backfill, shall be compacted to a minimum of 90 percent of maximum density as determined by U.B.C. Standard No. 70-1, or equal, as approved by the City Engineer.
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.

Fill slopes shall be compacted and tested 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.

6. SETBACK

6.1 SETBACKS FROM PERMIT AREA BOUNDARY

The tops of cut and toes of fill slopes shall be set back from the outer property boundaries of the permit area, including slope easements in accordance with the setback diagram.

6.2 DESIGN STANDARDS FOR SETBACKS

The tops and the toes of cut and fill slopes shall be set back 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 on the Setback Detail Sheet, unless otherwise approved by the City Engineer. Side yards shall have a minimum three foot unobstructed clear area free of chimneys, walls, air conditioners, etc.

6.3 RETAINING WALLS

Retaining walls may be used to reduce the required setback in accordance with the Setback Detail when approved by the Building Official. Retaining walls shall require a separate building permit.

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'

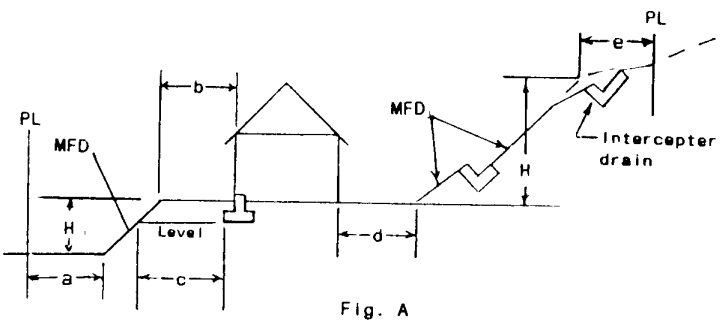

Fig. A

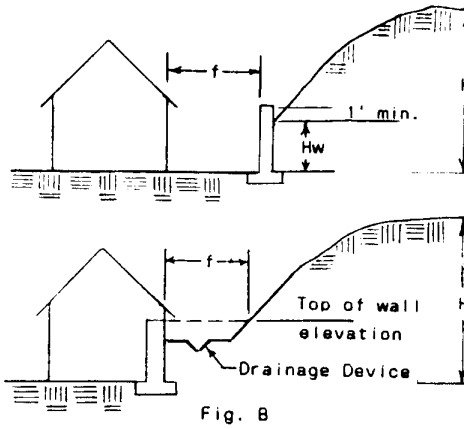

Fig. B

Special Circumstance

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 "MFD's" and 2:1 or steeper natural slopes.
   Setbacks from natural slopes flatter than 2:1 shall meet the approval of the City Engineer and the Building Official.
5. "b" is measured from the face of the structure or any ground surface building protrusion to the top of the slope. Note...in all cases, Dimension "c" must be satisfied.
6. "c" is measured form 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 Building Official.
7. "b" may be reduced to 5' minimum if an approved drainage device is used (roof gutters and down spouts may be required) as required by the Building Official.
8. "b" may be reduced to less than 5' if no drainage is carries on this side and if roof gutters are included as specified by the Building Official.
9. 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.
10. "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 City Engineer.
11. "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.
12. "e" shall be increased as necessary for interceptor drains.
13. The use of retaining walls to reduce setbacks (Fig. B) shall be approved by the City Engineer.

7. DRAINAGE AND TERRACING

7.1 SURFACE DRAINAGE

All slopes must be protected from surface water run-off from above by berms or swales. All swales, ditches, etc., designed to carry surface water must have a minimum grade of four percent (4%) and must be paved with 3" colored gunite or 4" colored concrete and reinforced with 6" x 6", #10 x #10 wire mesh. Color of structures shall blend with the landscape palette and shall be reviewed and approved by the Grading Specialist prior to installation.

All fill slopes, cut slopes, or combination of cut and fill slopes in excess of 25 feet in vertical height must have paved water-carrying terraces at a maximum of 25 foot vertical intervals with such terraces draining into a paved gutter, pipe or other watercourse adequate to convey the water to safe disposal area.

The terrace on cut slopes is to be a minimum of five (5') feet wide, paved and must carry water to a safe disposal area.

The longitudinal grade of required interceptor terraces shall not be less than 4.0 percent nor more than 12.0 percent and any change in rate of grade between these limits shall increase the grade in the direction of flow. A single run of interceptor terrace shall not exceed 150 feet to a down drain.

Down-drains shall be of colored concrete or asphalt dipped corrugated metal pipe. Down-drains shall have a diameter of a size required by run-off calculations, but not less than eighteen (18") inches.

7.2 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 soil 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.

7.3 DISPOSAL

All drainage facilities shall be designed to carry waters to the nearest practicable drainage course approved by the City Engineer. Erosion of ground in the areas of discharge shall be prevented by installation of non-erosion down-drains, rip-rap, energy dissipaters or other approved devices including a return of flow to a natural sheet flow condition.

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.

Building sites shall have a sheet flow drainage gradient of two percent (2%) away from the structure, front and rear yards, for a minimum distance of five (5') feet. Side yards shall be graded two percent (2%) for a minimum of two and a half feet (2 1/2')from the structure. The minimum drainage gradient of an earth swale shall be one percent (1%).

Grading of future building sites under a rough grading permit for the purpose of lot sales shall have a sheet flow drainage gradient of two percent (2%) toward approved drainage facilities. The City Engineer may reduce this minimum gradient to one percent (1%) 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.

Finish grades, other than above, shall conform to the following minimum drainage gradient standards:

		Minimum Gradient
a.	Earth swales	1.0%
b.	Earth (sheet flow)	1.0%
c.	Asphalt pavement and swales	1.0%
d.	Concrete drain in earth area	0.5%
e.	Concrete gutter in asphalt paved area	0.24%

8. EROSION CONTROL AND LANDSCAPING

8.1 EROSION CONTROL - SLOPES

The faces of cut and fill slopes shall be prepared and maintained to control the forces of erosion. This control shall consist of permanent and/or temporary plantings, in addition to other mechanical measures. Where cut slopes are not subject to erosion due to the erosion resistant nature of the materials, such protection may be omitted with the approval of the City Engineer.

Where necessary, temporary and/or permanent erosion control devices such as de-silting basins, sand and gravel bags, check dams, rip-rap, cribbing groins, or other devices shall be employed to control erosion.

Prior to September 1st of each year the civil engineer or other responsible individual shall submit plans for approval by City Engineer detailing the placing of erosion control facilities to protect the areas which have been denuded. All devices must be in place and working by October 15th. Failure to provide these devices will be cause to revoke permits or approvals by the City Engineer and/or Building official.

Erosion control facilities shall be properly maintained after each rain storm by pumping check dams and de-silting basins, and removing silt and debris.

During Winter months and after each rain storm the performance of the erosion control system shall be evaluated and revised as recommended by the civil engineer and approved by the City Engineer.

8.2 PLANTING OF SLOPE AREAS

A. Landscaping

a. Landscape and irrigation plans shall be required for all projects involving 2:1 or greater slopes in excess of 5' in height, or requiring approval by the Design Review Board, the Planning Commission or City Council or as otherwise required by the manual. Such plans shall be submitted for approval to the Director of Community Development prior to the issuance of building permits. Said plans shall be prepared in accordance with the provisions of this article. Landscaping and irrigation systems shall be installed in accordance with the standards maintained by the Director of Community Services.

b. An applicant may apply for a Administrative Adjustment in order to develop a landscape plan that meets the intent of this section but fails to satisfy the specific criteria contained therein.

c. Landscape and irrigation plans shall be prepared by a licensed landscape architect or other person when allowed by the State of California Business and Professions Codes.

d. Landscaping materials and irrigation systems shall be located, designed, installed, and maintained as specified on the approved plans.

e. Any modification to an approved landscape or irrigation plan must be applied for in writing and approved by the Director of Community Services prior to installation of said landscaping or irrigation system.

f. No final inspection or occupancy clearance will be granted until the designer per Subparagraph C has certified to the City that all work has been completed in accordance with the approved plans or bonded for in an amount to be determined by the Director of Community Services.

g. If the provisions of this section conflict with other sections of the Orange Municipal Code, the more restrictive provisions shall apply.

9. GRADING INSPECTIONS

9.1 GENERAL

All grading operations for which a permit is required shall be subject to inspection by the City Engineer or his designee, the Grading Specialist.

9.2 PRE-GRADING MEET

The city official shall be present at a pre-grading meet held to discuss details of the proposed project prior to commencing work. Members of the owner's professional "team" including the Grading Contractor, Soils Engineer, Geologist, Soils Technician, Civil Engineer and others will be available to discuss details of the project with the inspector.

9.3 GRADING REQUIREMENTS

The city official shall inspect the work and require adequate Geotechnical supervision and compaction control by a Soils Engineer.

Periodic reports certifying the compaction or acceptability of all fills shall be required. These shall include, but need not be limited to, inspection of cleared areas and benches prepared to receive fill and removal of all soil and unsuitable materials. The placement and compaction of fill materials, the bearing capacity of the fill to support structures, and the inspection of sub-drains, drainage devices, buttress fills and other similar devices. Inspection of retaining wall will be performed by the building division under separate permit.

The City Engineer may require sufficient inspection to assure that all geological conditions have been adequately considered. Where geologic conditions warrant, the City Engineer may require periodic geologic reports. These inspections may be required to include, but need not be limited to, cut slopes, canyons during clearing operations for ground water and earth material conditions, benches prior to placement of fill, and possible spring locations.

For engineered grading, it shall be the responsibility of the Civil Engineer who prepares the grading plans to incorporate all recommendations of the Soils Engineer and Geologist into the plans. He shall also be responsible for the professional supervision and approval of the grading within his area of technical competence and for the submission of as-built grading plans.

This responsibility shall include, but not be limited to, inspection and approval as to the establishment of line, grade and drainage of the developed area. The Civil Engineer shall act as the coordinating agent in the event the need arises for liaison between the other professionals, the contractor, and the City Engineer.

The Soil Engineer's area of responsibility shall include, but need not be limited to, professional inspection and approval concerning the preparation of ground to receive fills, testing for required compaction, stability of all finish slopes and the design of buttress fills, where required, incorporating data supplied by the Engineering Geologist.

The Engineering Geologist's area of responsibility shall include, but need not be limited to, professional inspection and written approval of the adequacy of natural ground for receiving fills and the stability of cut slopes with respect to geological matters, and the need for sub-drains or other ground water drainage devices. He shall report his findings to the Soils Engineer and the Civil Engineer for engineering analysis.

The city official shall inspect the project at the various stages of the work requiring approval and at frequent intervals as necessary to determine that adequate control is being exercised by the professional consultants.

9.4 TERMINATION OF SERVICES

In the event the design Civil Engineer, Soils Engineer or Engineering Geologist who is responsible for the professional supervision of that portion of the grading which is within his area of technical competence is relieved of, or otherwise terminates, his duties prior to completion of the work shown on the grading plans, he shall report the fact in writing to the City Engineer within 48 hours at the time of his termination. Persons assuming the duties of any of these consultants shall perform any investigations they deem necessary to approve that the entire work including the previous reports is in conformance with this chapter and the permit. Acceptance of the project by the new consultant shall include his certification of all work previously accomplished and his responsibility for the remainder of the project in writing.

9.5 REVISED GRADING PLAN

If the inspector finds the soil or other conditions not as stated in the application for a grading permit, he may refuse to approve further work until approval is obtained for a revised grading plan which will conform to the existing conditions.

The City Engineer shall conduct such other inspections as he deems necessary. Whenever the City Engineer determines that the work does not comply with the terms of the permit or this code, or that the soil or other conditions are not as stated on the permit, he may order the immediate cessation of all work thereunder, and such work shall cease until such corrections have been complied with. Prior to the release of the graded site for building construction site the rough grading shall be completed to the satisfaction of the responsible engineers and the City Engineer. Notice in writing to this effect shall be submitted to the City Engineer.

9.6 REQUIRED INSPECTIONS FOR GRADING

The following is a list of normally required inspections to be made by the Grading Specialist:

A. Initial (pre-grading)
B. Excavation and fills
C. Concrete or gunite drainage devices
D. Paving
E. Rough grading
F. Final grading

Inspections for each of these areas are fully explained below. If any work requiring inspection is covered or concealed by additional work without first having been inspected the Grading Specialist shall require, by written notice, that such work be exposed for examination.

A. Initial Inspection:

1. Pre-grading meeting prior to starting any grading or brushing. The project coordinator shall contact the Grading Specialist 48 hours prior and shall contact the following principals to be represented at the meeting: Owner, Soils Engineer, Geologist, Design Engineer and the Grading Contractor.

2. Request for inspection must be made 24 hours before the inspection is required. Include job address and project number.

B. Excavation and Fills:

1. Toe and key for slope fills

2. Canyon Clean-Out

   After all brush and unsuitable material has been removed and a suitable bottom or bedrock has been exposed, but before any fill is placed.

3. Over Excavation

4. Excavation

   After the excavation is started but before the vertical depth of the excavation exceeds ten feet.

5. Fill

   After the fill has started but before the vertical height of the fill exceeds ten feet.

C. Concrete or gunite drainage devices:

1. Alley gutter and/or concrete device draining asphalt

   a. Subgrade (prior to placement of concrete)
   Subgrade is to be prepared and the forms are to be in place, with reinforcement when required. The design Engineer or Architect shall provide written approval of line and grade.

   b. Concrete placement
   Inspection(s) to be made during placement. When design strength of the concrete is 2,500 P.S.I. or greater continuous inspection by a Deputy Inspector shall be required.

2. Curb and Gutter (private property and non-dedicated streets)

   a. Subgrade (prior to placement of concrete)
   Subgrade is to be made and forms in place. The Design Engineer or Architect shall provide written approval of line and grade.

   b. Concrete placement
   Inspection(s) to be made during placement.

3. Terrace drains, down drains, brow ditches and all other paved drainage devices.

   a. Subgrade
   Prior to placement of welded wire mesh or reinforcing steel. The Design Engineer or Architect shall provide written approval of line and grade.

   b. Thickness control wire and reinforcing steel or welded mesh to be installed prior to placement of gunite or concrete.

   c. Concrete or gunite placement
   Inspection(s) to be made during placement.

4. Sidewalks used as drainage devices
   Subgrade - Prior to placement of concrete, subgrade is to be made and forms are to be in place with the required reinforcement. The Design Engineer or Architect shall provide written approval of line and grade.

5. Drainage devices other than concrete or gunite.

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

   b. Prior to rough release.

   c. Prior to final approval.

D. Paving (pavement and base course specifications shall be in accordance with current City of Orange Standards and/or per the approved Grading Plan and Soil Engineering Report).

1. Subgrade - After subgrade has been established, tested and approved by the Soil Engineer but prior to placement of base, the Soil Engineer or his qualified representative may leave field memo of test results on-site. The Design Engineer or Architect shall provide written approval of line and grade.

2. Base (material invoices may be required) -After base course has been placed, tested and approved by the Soils Engineer or his qualified representative but prior to prime coat and asphalt placement, the Soil Engineer or his qualified representative may leave a field memo on-site to provide compaction test and base thickness results.

   It may be necessary, as determined by the City Engineer, to have the rock base tested to insure its compliance with Standard Plans and Job Specifications. Required test may include:

   a. Sieve analysis
   b. "R" Value
   c. Sand Equivalent
   d. Durability Index
   e. Percent of crushed particles retained by #4 screen

3. Asphalt (material invoices may be required) - Weed killer and prime coat shall be required on subgrade if no aggregate base is used.

   Inspection shall be made during asphalt lay down to verify continuous inspection by the Soil Engineer, his qualified representative or a Deputy Inspector when authorized.

4. Water test - Paved surfaces shall be water tested to reveal any irregularities and patched where required.

E. Rough Grading

When all rough grading has been completed, this inspection may be called for without the necessity of the Grading Specialist having previously reviewed and approved the required reports. Under normal circumstances all sub-drains and slope drains shall be in place and approved as a condition for rough grading release.

F. Final

When all work, including installation of all drainage structures and other protective devices, i.e., slope planting where required, has been completed and all written professional approvals and the required reports have been submitted.

10. COMPLETION OF WORK

10.1 Final Reports

Upon completion of the rough grading work and at the final completion of the work prior to the issuance of any building permit, the City Engineer shall require submittal of the following reports, drawings and supplements thereto:

(A) An As-Graded grading plan prepared by the Civil Engineer including original ground surface elevations, as-graded ground surface elevations, lot drainage patterns and locations and elevations of all surface and subsurface drainage facilities. He shall provide certification that the work was done in accordance with the final approved grading plan;

(B) A Soil Grading Report prepared by the Soil Engineer including locations and elevations of field density tests, 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. He shall provide certification as to the adequacy of the site for the intended use;

The Final Soils Report must contain information that provides the Building official data with which to properly analyze structure design. As a prerequisite to the issuance of the building permit, the report shall include the following information for the Building officials review:

- Specific comments/recommendations
- Vague commentary and general "opinions" will not be accepted
- Soil bearing values
- Expansion index
- Existence of soluble sulfates
- Electrical conductivity
- Corrosivity
- Equivalent fluid pressure for retaining wall design
- Friction coefficient
- Lateral bearing values
- Shear values
- Internal angle of friction
- Trench/retaining wall backfill requirements
- Seismic period to be expected

- Additional requirements may be required due to specific site variations
  - Pile values
  - Water levels
  - Slope treatments
  - Site drainage characteristics
  - Faults
  - Etc.
- Boring locations/number of borings
- Boring logs
- Document must be signed by registered Engineer

(C) A Geologic Grading 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 the effect of same on recommendations incorporated in the approved as-graded grading plan. He shall provide certification as to the adequacy of the site for the intended use as affected by geologic factors.

10.2 NOTIFICATION OF COMPLETION

The permittee or his agent shall notify the City Engineer when the grading operation is ready for final inspection. Final approval shall not be given until all work including installation of all drainage facilities and their protective devices and all erosion control measures have been completed in accordance with the final approved as-graded grading plan and the required reports have been submitted.

10.3 FINAL GRADE CERTIFICATION

Upon completion of building construction and prior to issuance of a Certificate of Occupancy, the Grading Specialist shall require submittal of a certification by the Civil Engineer that each lot does have positive drainage to the street and/or that a drainage device approved by the City Engineer has been installed to provide adequate lot drainage and is functioning properly; and, that lot drainage has been provided in accordance with final approved grading plan.

10.4 GRADING BOND RELEASE

Upon submittal, review, and approval of the forgoing information by the City Engineer, the grading bond will be authorized for release.