

CITY OF ORANGE  
PUBLIC WORKS DEPARTMENT  
ENGINEERING DIVISION

**GRADING PLAN REQUIREMENTS**

Rev. Jan 2013

This informational handout gives basic grading requirements. Refer to the City of Orange's "Manual of Grading" for complete grading standards and requirements.

**REVIEW AND APPROVAL PROCESS**

**Before Submitting the Grading Plan**

The applicant should discuss the project with a member of the Engineering, Planning, and Building Division staff prior to preparing the Grading Plan to familiarize with City criteria and resolve any special problems that may be associated with the project.

The City of Orange Manual of Grading is available at nominal cost at Public Works front counter or can be download from "[www.cityoforange.org](http://www.cityoforange.org)".

Check with the Engineering staff regarding submittal of geotechnical report, geological report, hydrology study, and water quality management plan (WQMP).

Various areas within the City lay within Federal Flood Plain Zones which require special flood management construction standards. Please check with staff for your project area.

**Initial Submittal**

Submit 3 sets of prints in "D" size dimension of 24"x36". Smaller sheet size will be accepted provided that all information are legible and are drawn to engineering scale.

Submit 2 copies of soil report, one original wet signed and one copy.

Pay plan check deposit. The amount of the deposit depends on the project size. See City of Orange Master Schedule of Fees & Charges for suggestive deposit amount. Plans will not be checked without the advanced plan check deposit.

**Final Approval**

Grading Plan originals shall be submitted on .004 high quality Mylar after plan check has been completed. The originals shall be approved by the Department of Public Works and once approved will be kept on file. After obtaining approval signatures, 2 sets of prints of the approved plans shall be submitted prior to issuance of grading permit.

**Grading Permit**

No construction shall start without a valid Grading Permit. This includes clearing and grubbing and installation of any water quality BMP systems.

Two printed copies of the approved grading plan are required for the issuance of Grading Permit. A WQMP must be approved prior to issuance of Grading Permit. Pay Grading Permit fee.

## **GRADING PLAN FORMAT AND REQUIREMENTS**

The following plan sheets shall be required on all Grading Plans:

- Title sheet
- Detail sheet
- Grading sheets
- Erosion and Sediment Control sheets

All Plans Shall Be Prepared in a Neat, Orderly Manner and Must Be Legible.

### **Title Sheet**

- A. General Notes
- B. Grading Notes
- C. Erosion and Sediment Control Notes and Water Quality Management Notes
- D. Vicinity map, or in the case of a single lot development give dimension to the nearest street intersection.
- E. Site Address. Check with Public Works Department for approved site address.
- F. Name, address and phone number of the Owner/Developer, Licensed Professional responsible for plan design and Geotechnical Engineer.
- G. City of Orange Bench Mark used as Vertical Datum.
- H. All Grading plans are to be **wet-signed** and bear the original seal of the Registered Civil Engineer that prepared the plans, as well as the Geotechnical Engineer of Record.
- I. Total Project Size, in acres
- J. If Storm Water Pollution Prevention Plan (SWPPP) is required, show WDID number.
- K. Quantity Estimate
  1. Earthwork - cut and fill
  2. Construction within public right-of-way (if street improvement plans are not required)
    - a. Drive approach
    - b. Curb & gutter
    - c. Parkway trees
    - d. Street lights, traffic signs, etc. (contact Traffic Division 744-5540 for particulars).
    - e. Sidewalk

L. City Approval Block

|   |                                     |
|---|-------------------------------------|
| REVIEWED BY:<br><br>_____                                   | RECOMMENDED:<br><br>_____           |
| DATE _____ PLANNING DIVISION                                | DATE _____ PRINCIPAL CIVIL ENGINEER |
| REVIEWED FOR COMPLIANCE TO CITY OF ORANGE GRADING ORDINANCE |                                     |
| DATE _____ DEPUTY DIRECTOR/CITY ENGINEER                    | DATE _____ PUBLIC WORKS DIRECTOR    |

M. Revision Block

| <b>REVISIONS:</b> |             |                    |                 |
|-------------------|-------------|--------------------|-----------------|
| <u>NO.</u>        | <u>DATE</u> | <u>DESCRIPTION</u> | <u>APPROVED</u> |
|                   |             |                    |                 |
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|                   |             |                    |                 |
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**Detail Sheet**

Show construction details, standard plans and specifications, and other construction standards on detail sheet. Additional construction notes from Title Sheet may also be continued on this sheet.

**Grading Plan Sheets**

- A. Show all existing and proposed structures above and below grade. Show all trees and indicate which ones are to be removed.
- B. Show contours indicating the existing topography of the site.
- C. Show enough elevations on adjacent properties to determine property line differentials and existing patterns.
- D. Show proposed finished grade using contours and spot elevations. These must be sufficient to indicate drainage control. Call out finish floor and pad elevations of proposed structures.
- E. Use arrows to indicate flow patterns.
- F. Show north arrow, scale, and legend.
- G. Show existing and proposed street improvements. Minor street improvements may be shown on grading plan; i.e. minor curb and gutter work, drive approach, sidewalk, etc. Major street improvements must be shown on a separate Street Improvement Plan and that plan **MUST** be prepared by a Registered Civil Engineer.
- H. Show location of and provide details of all drainage structures, catch basins, gutters, etc.

- I. Show existing and proposed block walls and retaining walls.
- J. When retaining walls are required, a separate permit must be obtained from the Building Department. Show wall detail and submit two (2) sets of calcs to the Building Department for checking.
- K. Show and label all property lines and easements for sewer and drainage purposes.
- L. Provide 4:1 berms at all tops of slopes and one (1) foot bench before beginning down slope.
- M. Each plan sheet should have a revision block.
- N. Show any other information that may be necessary for the construction of the project or staff's interpretation of the plans.

### **Erosion and Sediment Control Plan Sheets**

Erosion and sediment control plan shall describe the erosion and sediment control measures to be taken during various stages of the grading phases, including initial site condition and intermediate site condition.

If the duration of the grading operation span over raining season, a revised erosion and sediment control plan shall be approved prior to the start of the raining season.

## **DESIGN CRITERIA**

### **A. GRADES**

1. Minimum acceptable gradients:

|                       |      |                     |       |
|-----------------------|------|---------------------|-------|
| a. Earth              | 1.0% | d. Concrete in A.C. | 0.24% |
| b. Asphaltic concrete | 1.0% | e. Terrace drains   | 5.0%  |
| c. Concrete in earth  | 0.5% | f. Drainage pipe    | 0.5%  |
2. Maximum grades in parking lots
  - a. Cross fall 5.0%
  - b. Handicap parking stall 2.0%
3. Maximum slope is 2:1, geological and/or soils report shall govern if lesser slopes are recommended
4. Maximum grade for on-site residential driveways is 15.0%.

### **B. HILLSIDE GRADING -- Refer to City Standards and Manual of Grading.**

### **C. DRAINAGE**

1. Site runoff shall be carried to the street or storm drain facilities. Cross-lot drainage is prohibited unless under special circumstance to be approved by the City Engineer.
2. Surface flow shall be directed toward approved on-site water quality BMP system. Drainage exiting site shall be directed to drain over drive approaches or picked up on-site and taken through the face of the curb. Size and number of outlet pipes will be determined by curb height and size of drainage area. Outlet pipe inverts to be 3/4" above flow line of gutter.
3. R-1 & R-2 properties may drain over the sidewalk.
4. A maximum of 1 acre can be drained over drive approach. Use parkway culvert if area drained is over 1 acre. High concentrated drainage should be connected directly to the storm drain system.
5. Direct connection to storm drain facilities must be detailed on the approved grading plan. When entrance is into a County facility, details must be approved and a permit issued by the Orange County Flood Control District.
6. Hydrology studies are required on all tract development and all except small, single lot commercial and industrial developments.
7. Hydrology studies shall be based on the latest O.C.F.C.D. rational method. Design for a 25 year storm in a sump condition and in areas having high erosion potential.
8. For commercial and industrial developments, on-site concrete gutters shall be constructed per City Standard 127.
9. For commercial and industrial developments, on-site concrete curb and curb & gutter shall be constructed per City Standard 128.

10. For R-1 and R-2 developments, a common drainage swale may be utilized along side yard property line when there is one foot or less grade differential between pads.
  11. Positive drainage is required away from all structures:
    - a. 2% minimum, 21% maximum away from building to swale
    - b. Swale to be minimum 3' away from structure
  12. Show flow line elevations and grades of all swales and drainage devices.
  13. Show location and provide details for subdrain system as recommended by the soils report.
  14. Drainage over slopes is not permitted.
  15. Drainage pipe and inlets - residential property:
    - a. Minimum inlet size - specify manufacturer type and/or show detail:
      - Deck drains - 4" diameter
      - Planter area - 6" diameter with dome atrium grate
      - Lawn or larger areas - 12" square
    - b. Minimum pipe size:
      - Small areas - 4" P.V.C. Schedule 40, A.B.S. SDR-35 or equal
      - Small areas - 6" P.V.C. Schedule 40, A.B.S. SDR-35 or equal
  16. Runoff directed into County or State facilities must be approved, and a permit issued prior to plan approval.
  17. Show all proposed landscape mounding on grading plan.
- D. **PAVEMENT** -- On site structural section shall be determined using soil test results. However, the minimum allowable is 2" AC over 4" AB, or 4" AC over compacted soil.
- E. **DRIVE APPROACHES**
1. For details see City Standards 115 & 116.
  2. Residential - maximum width = 24'; minimum width = 12'.
  3. Commercial/industrial - minimum width = 25'; check with staff for drive approaches over 35' in width.
  4. Construct Type II approach per City Std. 115 on all arterial streets.
  5. On arterial streets, vehicles are not permitted to back onto the street (OMC 17.34.110.H.2). Design of a turn-around on the property is required
  6. Locations of drive approaches on arterial streets can be critical. Check with City Traffic Engineer for approval.
- F. **DESIGN REVIEW BOARD** -- Specific requirements by the Design Review Board for individual projects may affect grading plan design.