



# HILLSIDE DEVELOPMENT REVIEW CHECKLIST

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Per Development Code Section 17.16.140, the Hillside Development Review process provides a mechanism to review development proposals in sensitive hillside areas, the intent is to minimize the adverse effects of grading, and to provide for the safety and benefit the welfare of the citizens of the city while allowing for reasonable development of land.

The Hillside Development Review is applicable to the following:

**All projects within the hillside overlay zone and any properties with an eight percent slope or greater, including but not limited to:**

- 1. Construction of one or more single-family homes.**
- 2. Proposed lot development in conjunction with a tentative subdivision map.**
- 3. Proposed lot development in conjunction with a general plan or Development Code amendment.**

**Exceptions:** Projects, which are limited in scope (e.g., regrading of yard areas, pool/spa construction, additions to existing structures which are less than 1,000 square feet, and/or construction of accessory structures which are less than 960 square feet) (not including accessory dwelling units), may apply for a Minor Design Review. However, projects which require grading of large flat areas, including, but not limited to, such items as tennis courts or riding rings, shall require a Hillside Development Review application.

## **REVIEW PROCESS**

All projects in hillside areas must be approved by the Planning Director or Planning Commission prior to submitting plans to the Building & Safety Department for plan check. Planning Commission review will be required under any of the following circumstances:

- Natural slopes are 15 percent or greater on all or part of the property, or
- Cut or fill depth is 5 feet or greater, or
- Combined cut and fill is 1,500 cubic yards or greater, or
- Cut or fill encroaches onto or alters a natural drainage channel or watercourse, or
- As deemed necessary by the Grading Committee or Planning Director.

## **SECTION 1: Filing Requirements**

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- 1. A Hillside Development Review Application through our Online Permit Center at <https://www.cityofrc.us/onlinepermitcenter>.
- 2. Development package submitted electronically (see Section 4) to be reviewed by staff for completeness and accuracy. Please follow the instructions for PDF Formatting Requirements for EDR Submission (see attached PDF guidelines).
- 3. Signed Property Owner Declaration Form (attached). Please upload the signed Property Owner Declaration Form to our Online Permit Center.
- 4. Water Quality Management Plan. Non-Priority Project forms available from the Building and Safety Department (Grading) for one (1) single-family residence only. Priority Project requirements on a separate handout are available from the Building and Safety Department (Grading). For additional information, please refer to San Bernardino County Water Quality Management Plan web site at <http://permittrack.sbcounty.gov/wap/>
- 5. Filing Fees (see Section 2).



## SECTION 2: Filing Fees

Refer to the Planning Department Fee List for most current fees. Additional fees may apply upon review of the application. Application fees apply to 1<sup>st</sup> and 2<sup>nd</sup> submittal. Additional processing fee will apply to 3<sup>rd</sup> and subsequent submittals.

- Hillside Development – 4 or fewer DUs ..... See current fee list.
- Public Notice (Staff Time)\* ..... See current fee list.
- Public Notice (Advertising)\* ..... See current fee list.
- Rancho Cucamonga Fire Protection District Review ..... Submit receipt showing payment

\*Applicable for Planning Commission Review only

## SECTION 3: Plan Preparation Guidelines

Plans not conforming to these guidelines will not be accepted for processing.

- 1. All uploaded plan documents shall be provided in PDF format. In addition, the applicant is encouraged to submit CAD/3D CAD and Building Information Model (BIM) files) following the approval of a project.
- 2. All plans shall be drawn to an appropriate engineering and/or architectural scale, with the scale clearly labeled (Grading Plan scale should not typically exceed 1" = 40'). All elevations should, where feasible, be drawn to an architectural scale no smaller than 1/4" = 1'. All plans should be clear, legible, and accurately scaled.
- 3. All plans shall be clearly labeled with the title of each sheet and have a unique sheet number.
- 4. All site plans need to contain a north arrow and a legend identifying any symbols.
- 5. A one-sheet index map shall be provided when a plan cannot contain the entire project on one sheet.
- 6. Existing versus proposed improvements must be clearly identified and all items may not apply to all projects.

## SECTION 4: Contents of Development Package

The items listed below are considered a minimum. Additional information may be necessary for clarification during the review process.

### A. Detailed Site Plan:

- Name, address, and phone number of the applicant and the author of the plan.
- Property lines and lot dimensions.
- Dimensioned locations of:
  - Setbacks (actual) from all buildings to street curb face, and the side and rear property lines.
  - All structures, including distances from all property lines.
  - Street dedications and improvements (existing and proposed), including overhead utilities.
  - Access, both vehicular and pedestrian, showing driveway and sidewalk locations.
  - Off-street parking.
  - All street improvements and driveways on adjacent and across-the-street properties within 20 feet of the site.
  - All buildings within 20 feet of the site.
  - All easements (drainage, access, utility, equestrian, etc.).



- Distances between buildings and/or structures.
- Building and accessory structure locations, including pavement/sidewalks, trellises, light standards, trash enclosures, transformers, and monument signs, including dimensioned setbacks (front, rear, and sides).
- Location, height, and materials of walls and fences.

**B. Elevations:**

- Illustrative elevations of all sides of all buildings and structures. "Illustrative" building elevations means drawn with shadows to give a sense of depth with people, cars, or trees for scale. Do not cover the elevation with trees, cars, or people -- place them behind or on the side.
- Draw and dimension building envelope lines on all elevations per Section 17.122.020 of the Development Code. See attached handout with examples of building envelopes.
- Illustrative cross sections and enlargements or architectural elements or details as needed.
- All exterior building materials shall be clearly labeled on each sheet of elevations.
- For projects within the Etiwanda Specific Plan or Etiwanda North Specific Plan areas, label the architectural style (i.e. Santa Barbara Revival, California Ranch, Victorian, etc.).
- Dimension the height of the highest wall and/or roof element and the height of any architectural features such as towers or cupolas.

**C. Floor Plans:**

- All floors, including label use of each room (bedroom, kitchen, game room, etc.).
- Dimension all exterior walls, doors, windows, and room sizes.

**D. Roof Plan:**

- Overhead view of roof showing all ridges and valleys, vents, dormers, overhangs, hinge points.
- Indicate direction of roof slope with arrows.

**E. Conceptual Grading Plan:** Proposed items shall be designated with solid lines and existing items with short dashes or screened.

- Identify structural Best Management Practices as outlined in the Water Quality Management Plan.
- Proposed grading -- structures, curbs, walls (height), gutters, pavement, drainage structures, swales, mounding, slopes, open space, and trails. The plan shall include distances, spot elevations, gradients, finished contours, details, cross-sections, flow arrows, etc.
- Existing grading -- same as for proposed grading, except shall be screened as a background for the proposed grading information.
- Provide existing ground contour (1-foot minimum interval).
- Existing features within 20 feet beyond site boundaries (label "To remain" or "To be removed") -- natural ground (contours), trees, structures, (pad and floor elevations), drainage courses, drainage facilities (type and size), streets, trails, slopes, etc.
- Structures -- footprints, pad and floor elevations, retaining walls, stem walls, etc.
- Cross-sections shall be drawn to both an engineering horizontal and vertical scale showing existing and proposed grading, cut versus fill conditions, wall heights (including retaining walls), and elevation differences (maximum and minimum conditions) between off-site structures and those on-site. At a minimum, provide at least two cross-



sections: one each perpendicular to site boundaries. Sections shall extend through building pads and/or streets across the full site. Sections shall be drawn where the adjacent property is affected to the greatest extent.

- Separate cut and fill areas with a clearly identified line. In addition, one copy of the plan shall be submitted with fill areas colored in green and cut areas colored in red.
- Drainage and flood control facilities -- size, type, etc.
- Easements, property lines, rights-of-way.
- Earthwork quantities (cut and fill; import or export), and borrow and disposal areas.
- Natural features (i.e., streams, rock outcroppings, mature trees) and areas to be preserved (undisturbed -- no grading).
- Parkway culverts where drainage is directed to streets, except for single family residences.
- Retaining walls -- top and footing elevations.
- Shade pavement and slopes 3:1 or steeper.
- Location, elevation, and size of proposed building pads.
- Streets -- existing and proposed cross-sections, improvements, rights-of-way, etc. Show centerline radii and gradient.
- Existing and proposed sewers or other method of sewerage.
- Indicate location of benchmark(s).
- Downhill private driveway, provide a minimum of six feet at 6% slope adjacent to the driveway approach.
- Provide an 18-foot area at 5% maximum slope in front of the garage.
- Uphill private driveway, provide a minimum length of 6 feet at 6% slope, and 20% slope and 22% with maximum length of 10 feet. Coarse material or grooves shall be required for slope of 20 % or steeper.
- 4-foot maximum height of retaining wall. If over 4 feet, terrace wall shall be required.
- Provide all wall and retaining wall height, both existing and proposed with elevations.
- Show horse corral if it is a horse trail community, 24' x 24' or 12' x 48', 30' away from the house and 70 feet from neighbor's homes.
- Show the required building setbacks.
- Show actual setbacks (property line to structure, and all distance between structures).
- Provide cross sections transversely and longitudinally. If requested, additional sections shall be provided.
- 2:1 maximum slope for cut and fill.
- 2-foot bench at the top of slope.
- Cut and fill exceeds 3 feet but less than 5 feet, Planning Director Review required.
- Cut and fill exceeds 5 feet, Planning Commission Review required.
- Cut and fill exceeds 1500 C.Y. Planning Commission Review required.
- 15-foot usable rear yard between house and top or toe of slope.
- Dirt swale at 1 % minimum.
- Construct Portland Concrete cement V ditch at .5 % minimum slope.



- Slope Analysis Map:** For the purpose of determining the amount and location of land, as it exists in its natural state, by a range of slope gradients.
  - Use base topographical map prepared by a registered civil engineer, landscape architect, or licensed land surveyor.
  - Drawn to a scale of not less than 1 inch to 100 feet and a contour intervals same as Conceptual Grading Plan.
  - Include all surrounding properties within 150 feet of the site boundaries.
  - Draw slope bands in the range of 0 up to 5 percent, >5 percent up to 10 percent, >10 percent up to 15 percent, >15 percent up to 20 percent, >20 percent up to 25 percent, >25 percent up to 30 percent, and >30 percent.
  - Calculate land area in acres in each slope band and as a percentage of site total acreage.
  - Draw a heavy, solid line indicating the 8 percent grade differential.
  - In addition, one copy of the Map shall be colored with each slope band in contrasting colors.
  - Include source of data and scale of data used in slope analysis and slope profiles.
  - Slope shall be accurately calculated and identified consistent with the examples contained in Section 17.122.020 of the Development Code.
  
- Slope Profiles:** A minimum of three slope profiles shall:
  - Be drawn at same scale and indexed, or keyed, to the Slope Analysis Map.
  - Show existing and proposed topography, structures, and infrastructure. Proposed topography, structures and infrastructure shall be drawn with a heavy, solid line. Existing topography, structures, and infrastructure shall be drawn with short dashes.
  - Include all surrounding properties within 150 feet of the site boundaries.
  - Be drawn along those locations of site where:
    - The greatest alteration of existing topography is proposed; and,
    - The most intense or bulky development is proposed; and,
    - The site is most visible from surrounding land uses; and,
    - At all site boundaries illustrating maximum and minimum conditions.
    - At least two slope profiles shall be roughly parallel to each other and roughly perpendicular to existing contour lines. At least one other slope profile shall be roughly at a 45-degree angle to the other slope profiles and existing contour lines.



## SECTION 6: Fire District Submittal Requirements

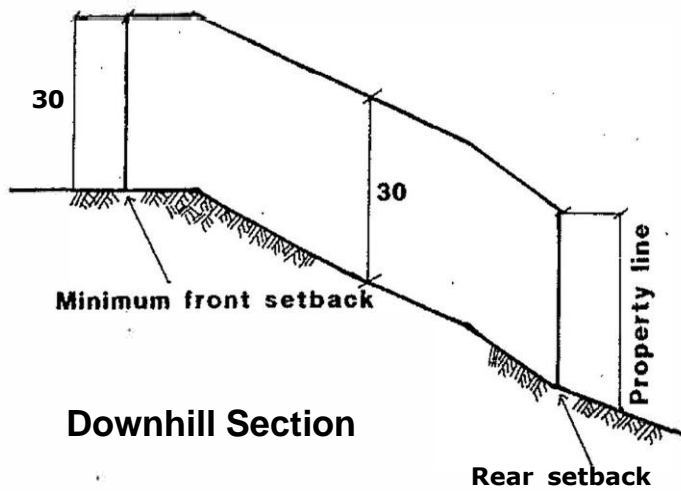
For questions or to obtain additional information, please contact the Fire District at [RCFire@CityofRC.us](mailto:RCFire@CityofRC.us) or 909-477-2770

- 1. The specifics of the buildings for this project, such as use, occupancy, square footage, height, number of stories and type of construction in accordance to the current California Building code must be included in the plans. The Building and Safety Services Department and Fire District require this information to provide the applicant with a complete review and applicable comments.
- 2. Annexation of the project into the Community Facilities District #85-1 or #88-1, as applicable, for fire protection services is required for new construction on sites that have not been previously annexed. Please contact the City's Special Districts division to determine if the site has been previously annexed or is required to be annexed as a condition of approval of this project. If annexation is required, proof of annexation is required for the project application to be deemed complete.
- 3. Proof of available fire flow must be obtained from the water purveyor, either Cucamonga Valley Water District (CVWD) or Fontana Water Company (FWC). Allow sufficient time for the water purveyor to perform the test and produce a letter confirming the available fire flow. The applicant can submit the proof of the fire flow letter to the case file for this project through the Online Permit Center. The letter must be current (within one-year of the request) and be site specific. The fire flow requirement will be deemed complete only if the available fire flow meets or exceeds the fire flow required in accordance with the California Fire Code Chapter 9 and Appendix B. The required fire flow may be reduced by up to 75%, but not less than 1,500 GPM at 20 psi for buildings other than one- and two-family dwellings, Group R-3, R-3.1, and R-4 buildings and townhouses if the building will be equipped with an automatic fire sprinkler system in accordance with National Fire Protection Association (NFPA) Standards 13, 13R, or 13D as applicable and allowed by these standards.
- 4. A fire department and emergency vehicle access plan in compliance with the minimum requirements established by Fire District Standard 5-1 is required to be submitted. The applicant is required to design the fire lanes in accordance with the Standard, including aerial apparatus access for buildings with a highest point in excess of 30 feet. If gates are proposed to be installed across emergency vehicle access roads (fire lanes) the gate locations are required to be noted and designed to the applicable Fire District Standard.
- 5. A fire protection or defensible space landscape plan is required for all projects in the designated Rancho Cucamonga Wildland-Urban Interface Fire Area. For a project consisting of a single residential building of Group R-3, R-3.1, or R-4, a defensible space landscape plan in accordance with the provisions of Fire District Standard 49-1 is required to be approved for the project to be deemed complete. For all other projects, a fire protection plan in accordance with the provisions of Fire District Standard 49-1 is required to be approved for the project to be deemed complete.
  - a. The provisions of the Standard are applicable to new construction, additions to existing buildings and structures, the construction or placement of accessory structures on a parcel in the designated Wildland-Urban Interface Fire Area, and defensible space landscaping required by the various applicable provisions of the California Code of Regulations.
  - b. When not already provided, defensible space as detailed in the Vegetation Management and Landscaping Requirements of this Standard is required to be provided when any of the following occurs:
    - i. Construction of a new occupiable building or an addition to an existing occupiable building.
    - ii. Construction of an addition to an existing habitable or occupiable building.
    - iii. Construction or placement of a new accessory structure or an addition to an existing accessory structure.
    - iv. Approval of an outdoor storage area for a vehicle or vehicles.

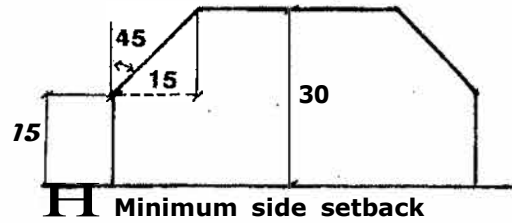
1. The building envelope for all structures shall be as follows:

a. Downhill Lot - An overall maximum height of 30 feet is permitted, as measured from finished grade, from the minimum front setback extending towards the rear of the lot. The maximum height at the side setbacks shall be 15 feet extending up towards the center of the lot at a 45 degree angle to a maximum height of 30 feet as measured from finished grade.

### EXAMPLE BUILDING ENVELOPE FOR DOWNHILL LOT



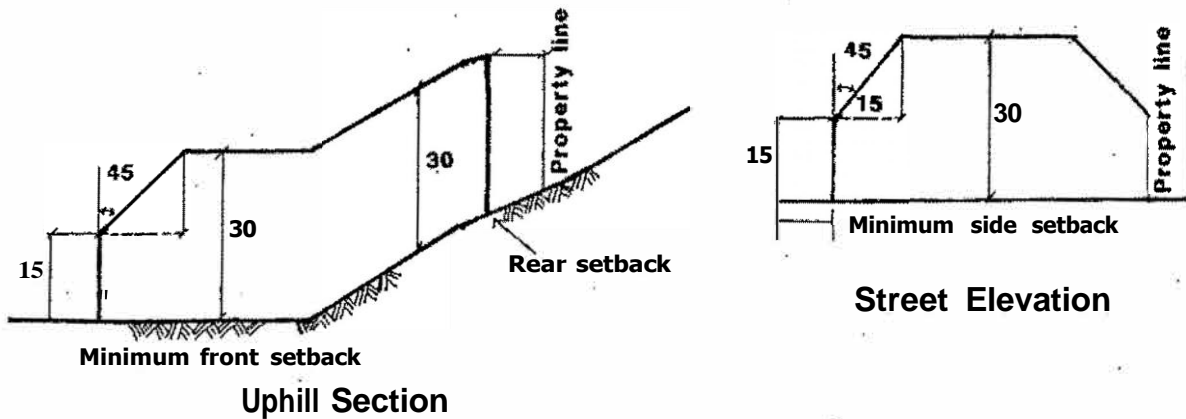
**Downhill Section**



**Street Elevation**

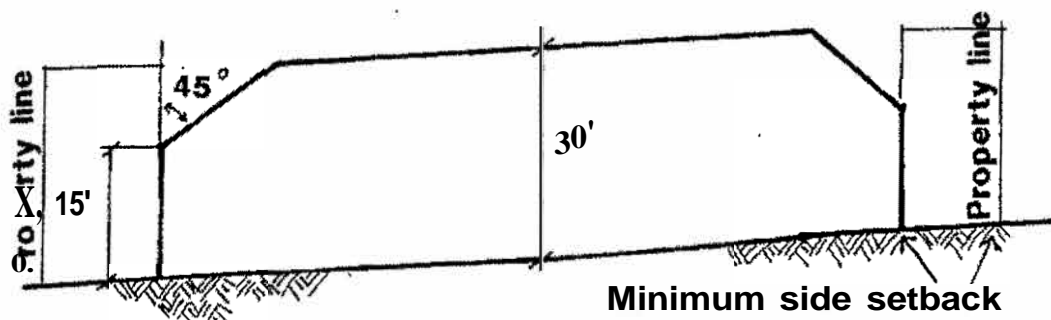
- b. Uphill Lot - A maximum height of 15 feet is permitted at the minimum front setback and shall extend up and toward the rear of the lot at a 45 degree angle to a maximum overall height of 30 feet as measured from finished grade. A maximum height at the side setbacks shall be 15 feet extending up toward the center of the lot at a 45 degree angle to a maximum height of 30 feet as measured from finished grade.

### EXAMPLE BUILDING ENVELOPE FOR UPHILL LOT



- c. Cross Slope Lots • A maximum overall height of 30 feet is permitted, as measured from finished grade, from the minimum front setback extending toward the rear of the lot. The maximum height at the side setbacks shall be 15 feet extending up toward the center of the lot at a 45 degree angle to a maximum of 30 feet as measured from finished grade.

### EXAMPLE BUILDING ENVELOPE FOR CROSS LOT SLOPE







# PROPERTY OWNER DECLARATION FORM

## PROJECT INFORMATION

Name of Proposed Project:	<b>Staff Use Only</b> <b>FILE NO.:</b>
Location of Project:	
Assessor's Parcel Number:	
Applicant Name:	<b>RELATED FILES:</b>
Address:	
Phone Number:	
Email:	

### Type of Review Requested

- |   |  |  |
|---|--|--|
| <input type="checkbox"/> Certificate of Appropriateness   | <input type="checkbox"/> Landmark Alteration Permit      | <input type="checkbox"/> Similar Use Determination |
| <input type="checkbox"/> Certificate of Economic Hardship | <input type="checkbox"/> Large Family Daycare Permit     | <input type="checkbox"/> Site Development Review   |
| <input type="checkbox"/> Community Plan Amendment         | <input type="checkbox"/> Mills Act                       | <input type="checkbox"/> Specific Plan Amendment   |
| <input type="checkbox"/> Conditional Use Permit           | <input type="checkbox"/> Minor Design Review             | <input type="checkbox"/> Temporary Use Permit      |
| <input type="checkbox"/> Design Review                    | <input type="checkbox"/> Minor Exception                 | <input type="checkbox"/> Tentative Subdivision Map |
| <input type="checkbox"/> Development Agreement            | <input type="checkbox"/> Plan Check/Zoning Clearance     | <input type="checkbox"/> Tree Removal Permit       |
| <input type="checkbox"/> Development Code Amendment       | <input type="checkbox"/> Planned Community               | <input type="checkbox"/> Uniform Sign Program      |
| <input type="checkbox"/> Entertainment Permit             | <input type="checkbox"/> Pre-Zoning                      | <input type="checkbox"/> Vacation of Easement      |
| <input type="checkbox"/> General Plan Amendment           | <input type="checkbox"/> Public Convenience or Necessity | <input type="checkbox"/> Variance                  |
| <input type="checkbox"/> Hillside Design Review           | <input type="checkbox"/> Reasonable Accommodation        | <input type="checkbox"/> Zoning Map Amendment      |
| <input type="checkbox"/> Home Occupation Permit           | <input type="checkbox"/> Sign Permit                     | <input type="checkbox"/> Other: _____              |

## OWNER DECLARATION

I declare that,  I am the owner,  I legally represent the owner, of real property involved in this application and do hereby consent to the filing of the above information.

Date:	Signature:	
Print Name and Title:	Phone Number:	Email:
Address:		



# ONLINE PERMIT CENTER ELECTRONIC DOCUMENT REVIEW (EDR) SUBMISSION REQUIREMENTS

The City of Rancho Cucamonga Community Development Department accepts electronic plans / documents submittal via the City's [Online Permit Center](https://www.cityofrc.us/onlinepermitcenter) at <https://www.cityofrc.us/onlinepermitcenter> for permit applications.

For questions regarding the electronic submittal process, please email the Planning Department at [Planning@cityofrc.us](mailto:Planning@cityofrc.us)

## ELECTRONIC SUBMISSION PROCESS

### 1. Initiate an Application

To get started, go to the City's [Online Permit Center](https://www.cityofrc.us/onlinepermitcenter) at <https://www.cityofrc.us/onlinepermitcenter> and follow the links to create an [Online Permit Center](https://www.cityofrc.us/onlinepermitcenter) user account. Once you have created an [Online Permit Center](https://www.cityofrc.us/onlinepermitcenter) user account you will then apply for the appropriate application that matches the permit you are applying for by logging into your [Online Permit Center](https://www.cityofrc.us/onlinepermitcenter) user account and selecting "Create an Application" (a list of record types will appear for you to select from). For all planning applications, including Design Review (DR), Conditional Use Permits (CUP), Sign Permits, Minor Design Review (MDR), etc. please select "Planning" and then "Create an Application".

Complete the application per the fields on [Online Permit Center](https://www.cityofrc.us/onlinepermitcenter) and follow the instructions to upload plans under "Attachments." **The plans should be submitted in a single black and white pdf document. Plans must be scaled and oriented correctly and must not exceed 100 MB. Scanned plans will NOT be accepted. Do NOT submit individual sheets as separate multiple pdf documents.** For large plan sets due to the file size, you may provide separate pdf documents for the different portions of the plans (e.g. architectural, structural, etc.), upload a separate pdf document for each supplemental document type (e.g. calculations, specifications, reports, studies, etc.). For full PDF formatting instructions, please refer to part two of this document beginning on page 2.

Once the application has been submitted, you will receive confirmation and be given a permit number. Staff will then be notified that an application has been submitted with an electronic plan submittal. Staff will then follow their internal workflow to review the plans / drawings and provide comments on the plans / drawings. If you have not been contacted within 2 business days, please email [Planning@cityofrc.us](mailto:Planning@cityofrc.us).

### 2. Tracking Status of Your Application

All progress on your application and associated plan review can be monitored through the City's [Online Permit Center](https://www.cityofrc.us/onlinepermitcenter) under the "record info" tab. When City staff have completed their review of the plans / drawings electronically, you will receive an email informing you that the plans / drawings are ready with corrections or have been approved. You will need to log on to [Online Permit Center](https://www.cityofrc.us/onlinepermitcenter) to download the plans / drawings with all comments.

Checking your application online through the [Online Permit Center](https://www.cityofrc.us/onlinepermitcenter) will provide you with the latest status of your project review. You can check the [Online Permit Center](https://www.cityofrc.us/onlinepermitcenter) 24/7 and we recommend checking online first prior to calling City Hall.

### 3. Resubmittals

If resubmittals are required, there will be a link located in the "Attachment" section labeled "Resubmit" for you to upload your new plans to the open record in the [Online Permit Center](https://www.cityofrc.us/onlinepermitcenter). **A complete set of any plans/ drawings that were revised must**



be uploaded, with all revisions clearly marked. Scanned plans will **NOT** be accepted. Do **NOT** submit individual plan sheets as separate PDF documents. If any resubmittal fees are due, as identified in the plan review comments or noted as a fees due online, then these must be paid at the time of resubmittal and may be paid by credit card online through the [Online Permit Center](#).

#### 4. Approval

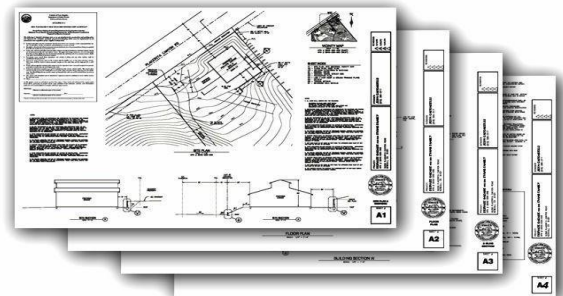
Once all review activities are completed and the project has been approved, the City-stamped permit set of plans / drawings will be available on [Online Permit Center](#).

Applicants are responsible for printing a City-stamped set of plans for use in the field by contractors and inspectors.

#### PDF FORMATTING REQUIREMENTS

Portable Document Format (PDF) is the industry standard for electronic plans. The City of Rancho Cucamonga only accepts PDF files for plan review. PDF files must be properly formatted as described below. Please read the following instructions carefully. Improperly formatted plans can delay the plan review process for your project.

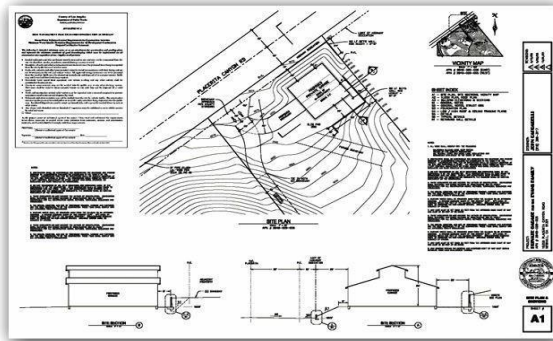
<b>Layers:</b>	<b>No multiple layers. Layers must be merged or flattened.</b>
<b>Format:</b>	<b>Vector preferred</b>
<b>Resolution:</b>	<b>300 pixels per inch (PPI)</b>
<b>Color Depth:</b>	<b>Monochrome (1-bit)</b>
<b>File Size:</b>	<b>1 megabyte (MB) avg. per sheet. 100 MB total</b>
<b>Grouping:</b>	<b>Multiple-sheet PDF (single file with multiple sheets)</b>



plans.pdf (multiple sheets)

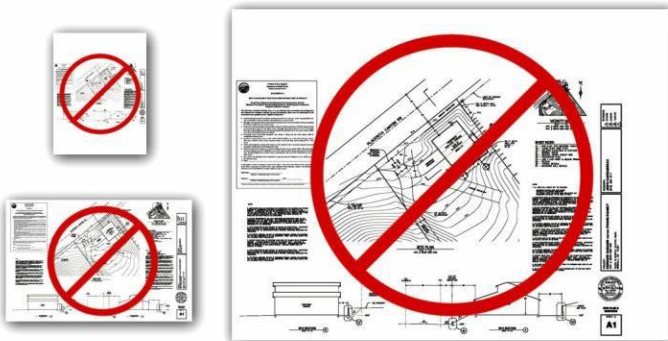
✓Correct

See "Formatting Q&A" on [page 4](#) for more information on PDF file formatting and tips on how to create, convert, and merge PDF files. Each sheet of the plans must be sealed and signed by the designer of record. The signature may be applied to the drawing electronically (CCR Title 16, Div. 5, Sec. 411e).

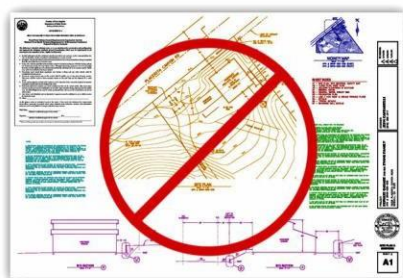


✓ Correct

All sheets must be consolidated into one plan set up to a maximum size of 100 MB whenever possible. Please consolidate plans to the fewest number of files possible.



Incorrect sheet size, scale, or margins will not be accepted.



Color plans will not be accepted.



Incorrect orientation will not be accepted

## FORMATTING Q&A:

**Question:** Why does Rancho Cucamonga only accept PDF plans?



**Answer:** Rancho Cucamonga is responsible for maintaining records of plans and providing the public with access to them. Files kept in our electronic database must be compatible with a wide range of computer software for storage, viewing, and printing. In addition, the file sizes must be manageable for transfer and for use by the public and City staff.

The PDF standard is constantly evolving and Rancho Cucamonga will continue to evaluate these standards as necessary.

**Question:** *Are raster-based PDF files acceptable?*

**Answer:** Yes, assuming they meet the size limitation requirement of no more than 100 MB total. Vector-based PDF files are typically much larger than raster-based files. However, the City prefers vector-based files given the ability to scale these files.

**Question:** *How do I combine multiple PDFs into a single file?*

**Answer:** There are numerous PDF tools freely available on the Internet, which can be used to merge, rotate, and rearrange PDF files.

**Question:** *My PDF files are too big. What am I doing wrong?*

**Answer:** Properly formatted and compressed raster PDF files should not exceed 1MB per sheet. If your files are larger, you may have made one of the following errors:

- Saving the plans as 8-bit (grayscale) or 24-bit (full-color) raster files will drastically increase the file size. Even if the images contain only black and white objects, 8-bit and 24-bit files still contain all of the shade and color data. Plans must be saved as 1-bit (monochrome).
- Uncompressed files are much larger than compressed files. Construction plans contain mostly white space. The data required to store this white space can be significantly reduced. When converting your PDFs to raster images, be sure to use a form of lossless compression (such as LZW). When creating or saving PDF files, remember to specify "compressed."

**Question:** *How do I convert a vector-based PDF to a raster-based PDF if my file size is too large?*

**Answer:** The industry standard software for working with PDF files is Adobe Acrobat; however, there are numerous PDF tools freely available on the Internet.

Step 1: Save the vector-based PDF files as raster images (TIF or PNG). The format of the raster images is important (300 ppi, monochrome). We recommend TIF files with LZW compression.

Step 2: Convert the raster images back to compressed PDF files.

Step 3: Merge the individual PDF files into a single multi-sheet PDF file.

**Question:** *Some raster images are loading slowly in the PDF reader. What am I doing wrong?*

**Answer:** Transparent raster images require considerable resources to display. Even though the source image is not transparent, your CAD software may be plotting it with transparency (white pixels plotted as see-thru). Be sure to set image transparency "off" before plotting.