COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS
LAND DEVELOPMENT DIVISION
HYDROLOGY UNIT

TO: _____

_____

_____

ATTN: _____

REVIEW OF DRAINAGE CONCEPT/HYDROLOGY STUDY

PD/MTD. NO. _____ **CITY OF** _____
TR/PM NO. _____ **THOMAS GUIDE** _____
TRANS DATE: _____ **PLAN CHECK NO.** _____

Your Hydrology Study has been reviewed and is disapproved. Make corrections as shown on the returned Hydrology Study and as noted below. Resubmit, through the Land Development Web Portal, the revised Hydrology Study for further consideration. Additional changes may be required as determined by further review.

A. DRAINAGE MAP COMMENTS:

- ☐ Submit on-site drainage map with a scale equal or greater than 1" = 100'.
- ☐ Submit off-site drainage map with a scale not less than 1" = 1000'.
- ☐ Provide Civil engineers' "wet" signature, stamp and expiration date on the hydrology map as well as the calculations.
- ☐ Provide a title block: "Drainage Concept/Hydrology Study for _____"
- ☐ Provide a location map.
- ☐ Provide a north arrow and scale.
- ☐ Provide the Thomas Guide page and grid.
- ☐ Provide a table showing the hydrologic design data used to calculate the Q's on the hydrology map. (i.e. storm frequency, rainfall depth, soil type, DPA Zone, burn factor, bulking factor, percent imperviousness, etc.).
- ☐ Show proposed and existing drainage patterns including all drainage devices and storm drain improvements identified by number or name. Indicate the Design Q and tributary area for each existing drain.
- ☐ Show street typical sections. Label street locations, names, and slopes.
- ☐ Show adequate topography to identify the on and offsite drainage tributary areas. Show and label boundaries and acreages for each subarea.
- ☐ Show how to accommodate offsite drainage tributary to proposed development.
- ☐ Label main line design Q's and Q's for each subarea.
- ☐ Label the reach Q's and areas between inlets, junctions and outlets.
- ☐ Label burned and bulked Q's, clear water Q's, and debris potential volumes for debris producing areas, in accordance with LACFCD debris criteria.
- ☐ Show drainage patterns for on-site storm drain system. Clearly identify where each subarea drains to.
- ☐ Provide drainage map separate from the report.
- ☐ Include a chart on the proposed conditions map with all the following applicable information: 85^{th} percentile storm size (in.), 95^{th} percentile storm size (in) if project discharges to natural water body, design criteria used to meet hydromod, project design storm (0.75 in or 85^{th} percentile), project design storm volume (ft3), design volume for BMPs (ft3), percent of design storm retained on-site, 1-yr, 1hr storm (in) if flow

through BMPs are used, percent of design storm infiltrated off-site, location of off-site mitigation

B. REPORT/ MAP:

- ☐ Clearly show assumed overland flow path location, length, elevations, and reaches on the hydrology map and calculations.
- ☐ Provide ΣQ and ΣA at locations where flows leave the site for conditions before and after development.
- ☐ Show drainage area and Q Tributary to down drains which discharge to streets across lot pads.
- ☐ Remove hydraulic calculations and details from report and drainage map.
- ☐ Comply with the most recent tentative map. Hydrology and drainage concept must be in compliance with the tentative map.
- ☐ Remove unnecessary details on the map, e.g., landscape, building, etc...
- ☐ Label maintenance responsibilities for all existing and proposed drainage facilities.
- ☐ Show only improvements that are part of this development phase on this hydrology study.
- ☐ Submit a report for this Hydrology study which should include, but not be limited to, the following: project description, existing and proposed drainage conditions, backup and reference materials (highlighted), and complete calculations including software input/output files.
- ☐ Show velocity at all points where flow leaves the site for existing and proposed conditions. Increase in velocity is not allowed. Also, show the point of normalization downstream of the outlet(s).
- ☐ Submit existing conditions hydrology map, separate from the report, and calculations for comparison with proposed hydrology.
- ☐ Propose erosion protection measures to protect graded slopes.
- ☐ Mitigate for hungry water at the site boundaries.
- ☐ Provide Fire Department approval for the site access road.
- ☐ Obtain DRP approval for Bulk Grading Hydrology.
- ☐ Obtain and provide Department of Public Works approval for location, span, and clearance for proposed bridges spanning a watercourse.
- ☐ A geotechnical report is required if there are any basins or outlets that drain to a natural drainage course.
- ☐ If bank protection is being proposed that will ultimately incorporate a bike path combined with the access road, provide an exhibit showing the path alignment and provide survey data for the centerline.

C. CALCULATIONS COMMENTS:

- ☐ Q calculations must be done in accordance with the **LACFCD Modified Rational Method** (as outlined in the Hydrology/Sedimentation Manual) for tributary areas greater than 100 acres, or for any size tributary area with two or more subareas (more than one reach), or for individual watersheds where the time of concentration exceeds 30 minutes.
- ☐ Provide Q's in accordance with LACFCD hydrology criteria. Small developments like yours may use the Tc calculator to perform hydrologic analysis. The Tc calculator is a spreadsheet that can be downloaded from the following link http://ladpw.org/wrd/publication/index.cfm then find the Time of Concentration (Tc Calculator).
- ☐ Use County approved hydrology methods and programs, see 2006 Hydrology and Sedimentation Manual available on the following web address to download http://ladpw.org/wrd/publication/index.cfm.
- ☐ The computer program used to calculate your hydrology information (MORA, by Woodcrest) is no longer acceptable to County standards. Please refer to Chapter 15 of the 2006 Hydrology Manual for the current list of approved computer programs for use in Los Angeles County Hydrologic Studies. You may view an electronic version of the 2006 Hydrology Manual at the following web address: http://ladpw.org/wrd/publication/index.cfm.
- ☐ Capital Flood protection, Q_{50}, is required where sump conditions exist.
- ☐ Detention on-site is required due to downstream restriction.
- ☐ Maximum ponding depth for parking lots is 6 inches. Loading dock areas in commercial developments are allowed 18 inches ponding.
- ☐ Use approved proportion impervious values are found in Appendix D of the Hydrology/Sedimentation Manual.
- ☐ Provide pre-development hydrologic analysis to ensure accurate modeling of flows.

- ☐ Assumed values of 5 minutes for Time of Concentration calculations are not valid.
- ☐ Revise flow calculations to comply with Hydrology Manual standards.
- ☐ Show ΣQ and ΣA for existing and proposed conditions at point of connection to County system. Proposed flows cannot exceed flows tabled to the existing storm drain system (Q-allowable) for the existing property.
- ☐ Inflow/Outflow hydrographs are required for detention basin calculations.
- ☐ Provide ΣQ for existing and proposed conditions for the 2, 5, 10, 25, and 50 year storm events (unburned and unbulked). Any incremental runoff (Q and hydrograph volume) must be retained on-site.
- ☐ Only calculate bulk flows when proposing debris carrying and/or de-bulking systems. Provide debris production volume calculations in report and label on map.
- ☐ Provide burned and bulked Q's, clear water Q's, and debris potential volumes for debris producing areas, in accordance with LACFCD debris criteria.
- ☐ Additional analysis may be required to demonstrate that the proposed connection does not adversely impact downstream systems or exceed their design capacities.
- ☐ Provide an inflow/outflow hydrograph and calculations to determine required storage volume for detention and retention basins. Label location and limits of inundation on drainage map.

D. FLOOD HAZARD COMMENTS:

- ☐ Show and label floodplain and floodway limits on map. Improvements in these areas will require appropriate mitigation measures.
- ☐ HEC-RAS analysis is required to determine flood hazard limits. Show and label flood hazard limits on map.
- ☐ Add a note on plan that "A FEMA approved CLOMR will be required prior to approval of storm drain plans".
- ☐ A conditional letter of approval from the Board of Supervisors for revising/rescinding County adopted Floodplain/Floodway will be required prior to entitlement approval.
- ☐ Delineate the floodway and flood hazard limits, if applicable, on the property. If not applicable, add "Note: Not within County adopted floodway."
- ☐ Delineate the FEMA Flood Zone "A" limits, if applicable, on the property. If not applicable, add "Note: Not within FEMA Flood Zone "A"."

E. HEC-RAS ANALYSIS COMMENTS:

- ☐ HEC-RAS analysis is required to determine the toe-down (n=0.025) and freeboard (n=0.085) of the embankment.
- ☐ Q_{50BB} should be used for the HEC-RAS simulation.
- ☐ HEC-RAS upstream and downstream boundary conditions are not set up correctly.
- ☐ Mixed Regime is recommended for the HEC-RAS simulations.
- ☐ HEC-RAS cross-sections are too far apart. More cross-sections are required.
- ☐ Address the warning messages in HEC-RAS simulations.
- ☐ HEC-RAS cross-sections should not be truncated. Flow conveyance areas should be fully defined.
- ☐ Contraction and expansion coefficients at the bridge are not correctly defined.
- ☐ Skew angle should be defined since the bridge/cross-section is not perpendicular to the flow lines.
- ☐ Roughness n values are not correctly set up at some cross sections.
- ☐ Bridge piers and abutments are not defined correctly in HEC-RAS simulations.
- ☐ The four cross sections used for bridge simulation are not defined correctly. Refer to HEC-RAS manual for definition methods.
- ☐ Bridge clearance should be at least 2 ft.
- ☐ Culvert is not defined correctly in HEC-RAS runs.

F. DEBRIS COMMENTS:

- ☐ Provide calculations for debris production and debris basin capacity. Label map accordingly and include debris cone limits, overflow path, and access easements.

- ☐ Clarify how flow and debris are intercepted at Tract boundary.
- ☐ Provide adequate vehicular access to all inlets and outlets to the satisfaction of the Department of Public Works. Show and label on map.
- ☐ Debris must be picked up from debris collecting areas. Clearly show how debris is picked up, conveyed, stored, etc... in accordance with LACDPW debris criteria.
- ☐ Clearly label all debris collecting areas, devices, and facilities on the plans.
- ☐ Flows must be bulked in accordance with LACDPW Hydrology Manual standards.
- ☐ Label all debris conveyance devices with "To be designed with self cleaning velocity".
- ☐ No debris flow is allowed on the terrace drains.
- ☐ No debris flow is allowed on streets.
- ☐ Avoid catchment areas.
- ☐ Provide a fee title lot for all publicly maintained debris basins.
- ☐ Provide easement (or ownership title) document for the offsite basins prior to the drainage concept approval.

G. Q ALLOWABLE COMMENTS:

- ☐ Pre-development flow rates shown on map exceed allowable flow. Mitigate excess flows.
- ☐ Please consult Design Division at (626) 458-7924 to obtain $Q_{allowable}$ for the proposed connection and to verify the tributary watershed. It may also be necessary to obtain a connection permit from Construction Division for the proposed storm drain.

H. LID/WATER QUALITY COMMENTS:

- ☐ This project will be required to comply with the newly adopted MS4 Permit. This will require all infiltration water quality devices to be sized using the .75 inch storm or the 85th percentile storm, **whichever is greater**. A map with the 85th percentile storm can be found at the following link (http://dpw.lacounty.gov/wrd/hydrologygis/).
- ☐ This project will be required to comply with the newly adopted MS4 Permit. This will require all filtration water quality devices to be sized to 1.5 times the design storm. The design storm is determined using the .75 inch storm or the 85th percentile storm, **whichever is greater**. A map with the 85th percentile storm can be found at the following link (http://dpw.lacounty.gov/wrd/hydrologygis/).
- ☐ Use the LID calculator to calculate the runoff rates and volumes from the water quality storm event. It can be downloaded from the following link (http://dpw.lacounty.gov/wmd/dsp_LowImpactDevelopment.cfm).
- ☐ Submit a soils report confirming assumed infiltration rates throughout the site. This report must address areas where it is infeasible to infiltrate and must be approved prior to hydrology approval.
- ☐ Until the infiltration section of the soils report has been approved, the infiltration infeasibility of the project has not been confirmed and any work assuming this is at the engineer/developers risk.
- ☐ LID/Water Quality calculations must include entire area tributary to the treatment device if flows from contaminated areas are mixed with clean flows.
- ☐ Identify BMP device(s) on drainage map, label with Q_{pm}, Volume mitigated, and ΣA to each device.
- ☐ Water quality basins cannot be downstream of debris basins.
- ☐ LID/Water Quality requirements must be met for flows from developed areas prior to discharge for public and private maintenance. Provide calculations in accordance with LID Manual.
- ☐ Proposed BMP device does not meet County standards.
- ☐ BMP device(s) not allowed on debris carrying lines.
- ☐ Since this project is within the City of _____, you will be required to comply with the City's water quality requirements.
- ☐ Since this City is with the City of _____, all water quality calculations will not be reviewed or approved as part of the County's approval process.
- ☐ Water quality devices/basins should be separate from flood control devices. If they are inseparable, no water quality device or portion thereof may be transferred to the LACFCD.
- ☐ A Drainage Benefit Assessment Area must be established to finance the future ongoing maintenance and capital replacement of all water quality devices/systems identified to be maintained by the County of Los Angeles.

I. DRAINAGE ACCEPTANCE/OFFSITE WORK/RIGHT OF WAY/CROSS LOT COMMENTS:

- ☐ For downstream impact, provide a drainage acceptance covenant or prove that flow characteristics (Q, Velocity, Volume, Depth, Location, and debris concentration) before and after conditions are the same.
- ☐ A letter from (_____) is required for encroaching within their right-of-way.
- ☐ Permit is required for any work within flood control easement.
- ☐ Increase in drainage for subarea(s) _____ constitutes a diversion of flow and may require drainage acceptance letter(s).
- ☐ Development as shown creates an unacceptable diversion of drainage patterns.
- ☐ Cross-lot drainage not allowed unless maintained by HOA.
- ☐ Record deed restrictions for cross lot drainage that will be maintained by home owners.

J. OTHER COMMENTS:

- ☐ Proposed drainage devices must be approved by Flood Maintenance Division prior to Hydrology Study approval.
- ☐ Retention basins should be publicly maintained within a fee title lot under a DBAA.
- ☐ A Drainage Benefit Assessment Area must be established to finance the future ongoing maintenance and capital replacement of all drainage devices/systems identified to be maintained by the LA County.
- ☐ See and address all comments on the drainage map and in the report. Please make all additional corrections as necessary.

THIS IS AN INCOMPLETE SUBMITTAL, USE THE FOLLOWING CHECKLIST AS A GUIDE FOR YOUR NEXT SUBMITTAL. ALSO, PLEASE SUBMIT TENTATIVE MAP FOR _____.

- ☐ A plancheck fee of $_____, good for 3 reviews, is due prior to next submittal of interim hydrology study.
- ☐ A resubmittal fee of 10% of the original fee for each review beginning with the fourth submittal and each subsequent submittal. Submit a receipt of payment in the amount of $_____ with your next submittal and with each subsequent submittal.
- ☐ Obtain Fish and Wildlife permit or non-jurisdictional letter prior to commencement of work within any natural drainage course.
- ☐ _____
- ☐ _____
- ☐ _____
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- ☐ _____

Reviewed by _____ Date _____ Phone 626.458.4921