**TOWN OF QUEEN CREEK**
**COMMUNITY DEVELOPMENT DEPARTMENT**
**ENGINEERING DIVISION**


**FINAL DRAINAGE REPORT REVIEW CHECKLIST**
**March 20, 2007**


PROJECT: _____

LOCATION: _____


LEGEND                          REVIEW BY                          DATE

✓ = Compliance

◯ = Non-Compliant

**N/A =** Non Applicable


_____

**Final Drainage Report**

A Final Drainage Report is required to be submitted with the First Submittal of the Final Plat documents and plans <u>and/or</u> with any Commercial of Multi-family development. The Town Engineer may, at his discretion, require a drainage report for any other project as deemed necessary. The Final Drainage Report shall comply with all requirements of the Subdivision Ordinance and the Preliminary Drainage Report comments and stipulations and shall also provide the following data and information, as a minimum. <u>Depending on the proposed facilities, the report may be required to be reviewed and approved by the responsible County Flood Control District.</u>


I.   **General Drainage Report Requirements and Guidelines**

     \*\* <u>The Drainage Report shall be signed and sealed by a Professional Engineer (P.E)</u>

ITEM                            REQUIREMENT                    COMMENTS

☐   A.   For all Projects located within Flood Zone "A"
- Pinal County requires that they receive and approve a 30% Concept Drainage Plan. Town Engineering Staff is to assure that Pinal County Public Works Department (Elise Moore) receives the very FIRST drainage report submitted for review. Engineering staff is to monitor and assure that TOQC receives a written approval response for the Drainage Report from Pinal County prior to proceeding with a Staff Report to Council or P&Z Commission.
- Pinal County requires that the Developer meet with them before they submit for a CLOMR. Engineering Staff is to attend this meeting but at a minimum include the meeting minutes and/or recommendations resulting from the meeting in the Project File and staff reports, it needed.
- Pinal County estimates that it may take about 1 year to process a CLOMR.

☐   B.   The drainage report shall include the following:
- project description
- project setting including discussion of existing and proposed conditions and drainage issues related to the site
- offsite hydrology
- onsite hydrology
- hydraulic calculations
- hydrology maps and drainage exhibits and diagrams
- summary of findings and conclusions

☐   C.   Use of Rational Method for hydrology calculations for study areas (Onsite and Offsite) of less than 160 acres. For larger areas and for routing drainage through detention or into retention basins, use engineering approved software that utilized the Synthetic Unit Hydrograph method which provides the supporting calculations and hydrographs for both the inflow and outflow conditions.

☐   D.   All facilities that convey drainage must have hydraulic calculations to support their use. These facilities include streets, culverts, storm drains, channels, inlets, connector pipes box culverts, and others. When practical or required by the Town Engineer, street intersections shall be designed to be dry.

☐   E.   Culverts must include inlet and outlet control calculations.

☐   F.   Storm drains require calculations of the hydraulic grade line that must be shown on the storm drain profile(s).

☐   G.   Open channels and open flow pipes can be sized with the Manning's Equation.

| ITEM | REQUIREMENT | COMMENTS |
|---|---|---|

☐     H.   Inlets and catch basins shall be sized to intercept the Q-10 year storm event. Granted catch basins are discouraged.

## II.     <u>Hydrology and Hydraulics</u>

☐     1.   Both a Pre and Post Development (PD) Hydrology Map shall be included in the Drainage Report delineating each (drainage basin of sub-basin) area with the corresponding Q-10 and Q-100 flow rates. The Map Requirements are listed below for both maps with a (PD) designation for those items related only to the Post Development Map.

- Shall be clear and legible — 0.10"min. text height
- Preferred sheet size is 24" x 36"
- Show contours at 1 ft. maximum increments.
- Show proposed and existing topography slopes.
- Provide a legend, north arrow and scale, vicinity map, title block, date, and Engineer's stamp.
- (**PD**) Show proposed and existing street layout including high points and sumps, lots and lot numbers, concentration points, drainage easements, and drainage facilities including catch basins, culverts, ditches, retention basins, channels, curb openings, storm drains, scuppers, etc.
- Show watershed basin and sub-basin boundaries, flow path direction and lengths, node elevations, all basin areas, and 10 year and 100 year flows at all concentration or confluence points.
- (**PD**) Show location of detention/retention basins and provide volumes for both inflow and <u>outflow, if any</u> for the 10 year and 100 year events at each basin. Also, provide top, bottom, and high water elevations (depth).

☐     2.   Provide discussion, calculations, and map/exhibit(s) showing all **Off-Site** Q-10 and Q-100 offsite drainage flows and patterns that affect the site, including FEMA drainage flow rates and flood zone classifications. The locations of all off-site drainage flow entrance points shall be shown on the **Off-site Drainage Map.**

☐     3.   Flow arrows must be shown on all Drainage Maps indicating drainage flow directions and grade breaks.

☐     4.   The locations of the percolation tests (boring and test pits) must be shown on the Post Development Hydrology Map or a separate map. Shallow pit percolation test results shall also be included in the Drainage Report.

☐     5.   Provide calculations showing the volume of retention required for each drainage area and the calculated basin depth.

| ITEM | REQUIREMENT | COMMENTS |
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☐ 6. Provide calculations showing the retention basin drain or dry-up time. If that time exceeds the 36—hour dry-up requirement, drywell(s) are required. Calculations shall be provided to determine the required number of drywells.

☐ 7. Retention basin design criteria:
- Maximum slopes = 6' HZ to 1' VERT
- Designed such that all tot lots, play courts, pedestrian & bicycle paths are above the 2-yr 6-hr storm water level.
- Maximum depth of 3 ft. (measured from adjacent street top of curb) within buffer area tracts.

☐ 8. Required drainage hydraulic guidelines, calculations, & conditions:
- Street calculations showing that the 10-yr.storm runoff is contained with in the curbs and the 100-yr storm runoff is contained within the R.O.W.
- Justify the used runoff coefficient factors. Show any weighted 'C' factor calculations.
- Provide street cross sections with Q-10 and Q-100 volume capacity calculations at the project designed street grades.
- Place inlets wherever the flow exceeds the street Q-10 capacity. Submit design computations and data. Provide Q-10 and Q-100 intercepted and flow-by values at all inlet concentration points. Provide a table showing these values with inlet type (catch basin, scupper, curb opening, etc.) and inlet opening length. Include this table on the Post Development Drainage Map.
- Size all storm drains and culverts and submit design computations.
- Culverts located under collector and arterial streets are to be designed to convey at least the 50-yr. peak discharge with no flow crossing over these roadways. Additionally the flow depth over these roadways shall be limited to 0.5 ft for the 100-yr. peak discharge.
- Maintain a minimum of one dry traffic lane in each direction on any collector or arterial street for a Q-100 storm event.
- Provide a **flow routing diagram** showing the Q-10 flow intercepted and flow-by, if any, at all drainage structures.

☐ 9. Provide channels designed for the Q-100 storm event. Maximum channel side slopes to be 4 ft. horizontal to 1 ft. vertical.

☐ 10. Provide copies of all calculations, formulas, charts, and prior reference material and/or reports used in the analysis.

*PLEASE RETURN THIS CHECKLIST WITH THE NEXT SUBMITTAL*