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DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
OFFICE OF WATER RESOURCES
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GUIDANCE FOR PREPARATION OF DRAINAGE AREA SUBWATERSHED MAPS

This document serves as guidance for the preparation of existing (pre-development) and proposed (post development) condition drainage area maps / subwatershed maps.

The guidance is intended to help design engineers prepare the drainage areas maps / subwatershed maps which accompany a submitted drainage analyses in a manner which allows for clear and expeditious review. Drainage area maps which include the items listed below for each scenario will typically allow the reviewing staff to clearly observe the correlation between the existing and proposed site conditions that affect the production and management of runoff and the submitted analysis, including the submitted drainage diagram.

Drainage area maps / subwatershed maps prepared in accordance with the following guidelines need to accompany all engineering drainage analysis submittals which determine existing (pre-development) conditions and proposed (post-development) conditions peak runoff discharge rates and volumes, and the associated proposed stormwater management practices.

Part 1: Guidance for Preparation of Drainage Area Maps / Subwatershed Maps for New Projects

(1) Provide separate drainage area maps /subwatershed maps for existing (pre-project) conditions and proposed (post-project) conditions.

(2) Provide one set of drainage areas maps / subwatershed maps for each drainage analysis copy. It is recommended that subwatershed maps either be folded and inserted into a pocket of the submitted drainage analysis booklet or provided separately. Do not staple these maps or bind them into a document in a way that prevents them from being removed for review.

(3) Please include a title block with date on all drainage area / subwatershed maps. Include revision dates as appropriate.

(4) Limit the size of subwatershed map sheets to 24" x 36" whenever possible. Use multiple sheets with properly aligned and labeled match lines as needed. Multiple sheets need to be drawn at the same scale. In instances where three or more subwatershed map sheets are needed, provide a properly labeled key map.

(5) Provide a suitable scale for the drainage area / subwatershed maps. This needs to be a scale found on a typical engineer's scale. The on-site map scale must be no smaller than 1"=100'. A smaller scale (such as the 1" = 2000' scale found on a typical UGSG Quadrangle map) is acceptable to depict substantial up-gradient off-site areas.

(6) The limits of each drainage area / subwatershed area needs to be complete. If drainage areas include up-gradient areas which extend beyond the subject property, provide complete mapping of off-site areas. These off-site areas may be mapped at a smaller, properly indicated scale.

(7) The existing and proposed condition drainage area maps need to compare the same overall area. Common design / analysis points are also needed for comparison of pre-development and post-development runoff discharge.

(8) When mapping existing condition (pre-project) subwatershed areas, please map their limits based only on existing condition topographic features. Do not base the limits of existing condition subwatershed areas on proposed condition features (such as proposed roadways or proposed drainage conveyance features) that do not presently exist.

(9) Please ensure that the labeling of the subwatershed areas, stormwater management practices, and design / analysis points properly correlate with their respective counterparts as presented in the submitted drainage analysis and on the associated drainage diagram.

(10) Be sure to account for any post-development drainage areas that do not drain to a stormwater management practice.

(11) Provide sufficient off-site detail, either on the drainage area maps or on accompanying maps at a smaller scale (such as the 1" = 2000' scale of a typical USGS quadrangle map) to provide the downstream destination of watercourses and other flow paths that leave the site (for example, two streams leaving the site may subsequently converge off-site, or may diverge to reach different ultimate receiving water bodies).

(12) Indicate and label the ultimate receiving waterbody name and waterbody ID number at each design / analysis point.

(13) Provide existing (pre-development) condition and proposed (post-development condition) topography. Provide at least a 2' contour interval for the on-site topography. Provide an adequate amount of labeling of contour elevations for the subject site. Topography for up-gradient off-site areas off-site may utilize a 10' contour interval (e.g., USGS topography).

(14) Indicate the complete property lines of the subject site and the complete proposed project limits on all submitted drainage area maps. Also, clearly identify adjacent roads and streets.

(15) Indicate the limits of wetland area the subject site and depict approximate limits of off-site wetlands in the project vicinity using such information as may be available on USGS quadrangle maps or on RIGIS data.

(16) Indicate the designation of watercourses and water bodies using applicable terminology contained in the Freshwater Wetlands Program (e.g., rivers, streams, ponds, and areas subject to storm flowage (ASSFs)). Include the names of these water bodies as applicable.

(17) Clearly delineate and label all existing and proposed condition subwatershed areas, ensuring proper correlation of labeling with the submitted analysis and drainage diagram. The drainage area maps need to depict and label the various cover types in each drainage area / subwatershed area (see Urban Hydrology For Small Watersheds, 1986 (TR-55 Manual), Table 2.2), which are used to calculate the weighted curve number (CN) for each drainage area. Map and label the cover types (example: woods, brush, grass, impervious, etc.) along with the pertinent soil hydrologic groups (A, B, C, or D), and applicable hydrologic conditions (i.e., good) within each subarea. Please ensure that the depiction of the areas of the cover types properly correlates to that information presented in the submitted hydrologic analysis.

(18) Please include a legend depicting any shading features used to depict various cover types.

(19) To facilitate the identification and review of the areas of impervious cover please lightly shade these areas.

(20) Indicate all existing and proposed stormwater condition conveyance features (such as pipes, catch basins, drainage manholes, drainage inlets, culverts, swales, ditches, etc.) and depict and label all existing and proposed stormwater management practices (pretreatment, water quality treatment, detention practices, etc.), ensuring proper correlation of the labeling of these practices with the labeling of these same practices as presented in the submitted analysis and drainage diagram.

(21) Indicate the time of concentration (Tc) flow path of each drainage area (see TR-55 Manual, Chapter 3).

(22) Please be sure to include mapping of the subwatershed areas to each proposed stormwater management practice. If a proposed stormwater management practice includes more than one pretreatment practice, please map the subwatershed area(s) that drain to each individual pretreatment practice.

(23) For all proposed buildings, indicate the areas which drain to each respective drainage stormwater practice or design point. Indicate the location of roof leaders and the stormwater management practices to which these roof leaders are directed, as applicable.

(24) Clearly depict and label all pertinent soils test holes. Please ensure that the submitted topographic details clearly allow the existing site grades to be identified at all test holes. (Alternatively, this information may be presented on the grading and drainage site plans.)

(25) Clearly numerically identify all proposed lots and/or buildings / units in order to facilitate reference to these features by the reviewer.

Part 2: Guidance for Preparation of Additional Subwatershed Maps for <u>Redevelopment Projects</u>:

(1) In instances when the amount of impervious coverage is not clearly obvious that over 40% impervious coverage exists, to clearly demonstrate that the proposed project qualifies for reduced Recharge and Water Quality requirements and the associated waiver of the Channel Protection Standard and the Overbank Protection Standard, provide a map of the subject site (the parcel(s) of land on which the proposed work is proposed) clearly depicting all areas of existing impervious cover. Also clearly depict jurisdictional wetlands defined by DEM or CRMC regulations and undeveloped lands protected by conservation easements.

(2) Provide an accompanying calculation showing that the existing impervious cover is greater than 40% of the eligible total site area. Note that areas of the site that are jurisdictional wetlands defined by DEM or CRMC regulations and undeveloped lands protected by conservation easements are to be subtracted from the total site area in the determination of the eligible total site area to be used in the calculation of the impervious coverage value.

(3) Please clearly provide the following information on a separate redevelopment subwatershed map:

a. Clearly depict and label all areas of existing impervious cover to remain unchanged or only upgraded without foundation replacement for building, or only improved without full depth pavement reconstruction for pavement work (e.g. milling and overlaying, or pavement reconstruction which leaves a portion of the stone subbase material in place and not exposing the erodible subgrade).
b. Clearly depict and label all areas of existing impervious cover to be converted to vegetated (non-pavement) pervious cover.
c. Clearly depict and label all areas of new impervious cover.
d. Clearly depict and label all areas of redevelopment impervious cover, including new buildings constructed on areas of existing impervious cover; pavement reconstruction that involves exposing the erodible subgrade soils below any stone subbase material.

Part 3: Guidance for Preparation of Subwatershed Maps for <u>Project Modifications</u>:

(1) Many proposed project modifications involve work on only certain portions of a previous permitted project. In these instances provide a proposed condition subwatershed map that clearly depicts and labels those post-project subwatershed areas that will differ from those associated with the previously permitted design. Conversely, please clearly depict and label those subwatershed areas that will remain unchanged from their previously permitted condition.

(2) To facilitate review also provide the post-project subwatershed map that accompanied the previously permitted version of the project and the original pre-project existing condition subwatershed map.

(3) Please clearly identify and label all design/analysis points that are associated with the proposed modified portions of the project.

(4) Clearly depict and label all proposed modifications to previously permitted stormwater drainage systems and stormwater management practices. Include the revised drainage area map with a small table listing those subwatershed areas and stormwater management areas to be modified and those to remain unchanged from the previously permitted design.