

## Significance of Impacts to Existing Drainage Problems

The determination of whether additional onsite mitigation or other measures are needed to address an existing downstream drainage problem depends on the significance of the proposed project's predicted impact on that problem. For some identified problems, DDES will make the determination as to whether the project's impact is significant enough to require additional mitigation. For the three types of downstream drainage problems described on pages 1-24 and 1-25, this threshold of significant impact or aggravation is defined below.

For **conveyance system nuisance problems**, the problem is considered significantly aggravated if there is any increase in the project's contribution to the frequency of occurrence and/or severity of the problem for runoff events less than or equal to the 10-year event. *Note: Increases in the project's contribution to this type of problem are considered to be prevented if sufficient onsite flow control and/or offsite improvements are provided as specified in Table 1.2.3.A (p. 1-36).*

For **severe erosion problems**, the problem is considered significantly aggravated if there is any increase in the project's existing contribution to the *flow duration*<sup>20</sup> of peak flows ranging from 50% of the 2-year peak flow up to the full 50-year peak flow at the eroded area. *Note: Increases in the project's contribution to this type of problem are considered to be prevented if Level 2 flow control or offsite improvements are provided as specified in Table 1.2.3.A (p. 1-36).*

For **severe building flooding problems**, the problem is considered significantly aggravated if there is any increase in the project's existing contribution<sup>21</sup> to the frequency, depth, or duration of the problem for runoff events less than or equal to the 100-year event.

For **severe roadway flooding problems**, the problem is considered significantly aggravated if any of the following thresholds are exceeded and there is any increase in the project's existing contribution<sup>21</sup> to the frequency, depth, or duration of the problem for runoff events less than or equal to the 100-year event:

- The *existing flooding*<sup>22</sup> over all lanes of a **roadway** or overtopping the culverted section of a **sole access driveway** is predicted to increase in depth more than a quarter-inch or 10% (whichever is greater) for the 100-year runoff event.
- The existing flooding over all lanes of a **roadway** or severely impacting a **sole access driveway** is more than 6 inches deep or faster than 5 feet per second for runoff events less than or equal to the 100-year event. A **severely impacted sole access driveway** is one in which flooding overtops a culverted section of the driveway, posing a threat of washout or unsafe access conditions due to indiscernible driveway edges, or flooding is deeper than 6 inches on the driveway, posing a severe impediment to emergency access.
- The existing flooding over all lanes of a *sole access roadway*<sup>23</sup> is more than 3 inches deep or faster than 5 feet per second for runoff events less than or equal to the 100-year event, or is at any depth for runoff events less than or equal to the 10-year event.

<sup>20</sup> *Flow duration* means the aggregate time that peak flows are at or above a particular flow rate (e.g., the amount of time over the last 50 years that peak flows were at or above the 2-year flow rate). *Note: flow duration is not considered to be increased if it is within the tolerances specified in Chapter 3.*

<sup>21</sup> Increases in the project's contribution are considered to be prevented if sufficient onsite flow control and/or offsite improvements are provided as specified for **severe flooding problems** in Table 1.2.3.A (p. 1-36). For **severe flooding problems** located within the mapped 100-year floodplain of a **major receiving water** (see Table 1.2.3B, p. 1-37) or the mapped 100-year floodplain of a major stream for which there is an adopted basin plan, increases in the project's contribution are considered negligible (zero) regardless of the flow control standard being applied, unless DDES determines there is a potential for increased flooding separate from that associated with the existing 100-year floodplain.

<sup>22</sup> *Existing flooding*, for the purposes of this definition, means flooding over all lanes of the roadway or driveway has occurred in the past and can be verified by County records, County personnel, photographs, or other physical evidence.

<sup>23</sup> *Sole access roadway* means there is no other flood-free route for emergency access to one or more dwelling units.

## □ DRAINAGE PROBLEM-SPECIFIC MITIGATION REQUIREMENTS

1. IF a proposed project or *threshold discharge area* within a project drains to one or more of the three types of downstream drainage problems described in Section 1.2.2.1 (pages 1-24 and 1-25) as identified through a downstream analysis, THEN the applicant must do one of the following:
  - a) Submit a Level 2 or Level 3 downstream analysis per Section 2.3.1 demonstrating that the proposed project will not create or significantly aggravate the identified downstream drainage problem(s), OR
  - b) Show that the *natural discharge area* or *threshold discharge area* draining to the identified problem(s) qualifies for an exemption from Core Requirement #3: Flow Control (Section 1.2.3, p. 1-34) or an exception from the applicable area-specific flow control facility requirement per Section 1.2.3.1 (p. 1-35), OR
  - c) Document that the applicable area-specific flow control facility requirement specified in Core Requirement #3 is adequate to prevent creation or significant aggravation of the identified downstream drainage problem(s) as indicated in Table 1.2.3.A (p. 1-36) with the phrase, "No additional flow control needed," OR
  - d) Provide additional onsite flow control necessary to prevent creation or significant aggravation of the downstream drainage problem(s) as specified in Table 1.2.3.A (p. 1-36) and further detailed in Section 3.3.5, OR
  - e) Provide offsite improvements necessary to prevent creation or significant aggravation of the identified downstream drainage problem(s) as detailed in Chapter 3 unless identified as not necessary in Table 1.2.3.A (p. 1-36), OR
  - f) Provide a combination of additional onsite flow control and offsite improvements sufficient to prevent creation or significant aggravation of the downstream drainage problem(s) as demonstrated by a Level 2 or Level 3 downstream analysis.
2. IF it is identified that the manner of discharge from a proposed project may create a significant adverse impact as described in Core Requirement #1, THEN DDES may require the applicant to implement additional measures or demonstrate that the impact will not occur.
3. IF it is identified through a critical area review per KCC 21A.24.100 that the quantity of surface and storm water runoff from a proposed project or *threshold discharge area* within a proposed project could significantly alter the hydrology of a wetland, THEN DDES may require the applicant to implement additional flow control or other measures to mitigate the adverse impacts of this alteration in accordance with the wetland hydrology protection guidelines in Reference Section 5.

**Intent:** To ensure provisions are made (if necessary) to prevent creation or significant aggravation of the three types of downstream drainage problems requiring special attention by this manual, and to ensure compliance with the discharge requirements of Core Requirement #1.

In addressing downstream drainage problems per Problem-Specific Mitigation Requirement 1 above, additional onsite flow control will often be the easiest provision to implement. This involves designing the required onsite flow control facility to meet an additional set of performance criteria targeted to prevent significant aggravation of specific downstream drainage problems. To save time and analysis, a set of predetermined flow control performance criteria corresponding to each of the three types of downstream drainage problems is provided in Table 1.2.3.A (p. 1-36) and described in more detail in Chapter 3.

Note that in some cases the area-specific flow control facility requirement applicable to the proposed project per Section 1.2.3.1 (p. 1-35) is already sufficient to prevent significant aggravation of many of the defined downstream drainage problem types. Such situations are noted in Table 1.2.3.A (p. 1-36) as not needing additional onsite flow control or offsite improvements. For example, if the project is located within a Conservation Flow Control Area subject to the Level 2 flow control standard per Section 1.2.3.1.B (p. 1-40), and a *conveyance system nuisance problem* is identified through offsite analysis per