

**CITY OF LEAVENWORTH  
GENERAL GUIDELINES  
STORMWATER AND DRAINAGE  
Adopted by the Leavenworth City Commission  
March 17, 2015**

City of Leavenworth requires drainage and stormwater systems constructed within the City Limits to address water quality and water quantity in conformance with local, regional, state and federal regulations.

**City of Leavenworth Permits requires with approved plans at least the following activities:**

- **Excavation, fill and site grading (not part of an issued building permit)**  
Cuts and fills in excess of 1.5 feet from current elevation within 15 feet of any structure or within 15 feet of a property line require permits with an erosion control plan.
- **Subdivision Construction**  
The subdivision process for Major Subdivisions (3 lots or larger) requires complete designed drainage and erosion control plans. Minor subdivisions and other land divisions will be evaluated on a case by case basis for drainage design and erosion control issues. All buildings within a subdivision are required to address erosion.
- **Any project requiring a "Notice of Intent" (NOI) from KDHE**  
State requirements are that any land disturbance of 1.0 acre or larger must have a KDHE "Notice of Intent" permit. These NOI permits may overlap with other items noted here, and if not, a permit from the City is required, and erosion control must be addressed.
- **Any project requiring a Stormwater Prevention Plan by KDHE**  
In general includes any excavation activity that disturbs over 1.0 acre will require a KDHE NOI and **Stormwater Prevention Plan (SWPP or SWP2)**, and there are many other circumstances that will require a KDHE SWPP/SWP2 permit.
- **Expansions of commercial and industrial facilities (buildings, drives, parking lots, etc.)**  
The City has determined that any increase of impervious area in excess of 5% of the existing impervious area will require that a permit be submitted for review of the water quality and water quantity issues.
- **Work in the FEMA regulated Floodplain and Floodway**

## **Additional Information regarding Required Permits:**

### **KDHE Permits:**

The executive summary for KDHE "general permits" is attached to this document. In general – any excavation activity that disturbs over 1.0 acre will require a KDHE NOI and Stormwater Prevention Plan (SWPP or SWP2), and there are many other circumstances that will require a KDHE permit. It is important to have the most current information from KDHE – and the links below are for reference only.

- **KDHE notes the primary requirement of the general permit is for the permittee to develop and implement a Stormwater Pollution Prevention (SWP2) Plan.** The SWP2 Plan must contain certain items that are specified in the general permit including the "Best Management Practices" (BMP) that will be utilized to control erosion, sediment discharges, and reduce the potential of the contamination of stormwater runoff associated with construction activities.
- KDHE has an extensive website that describes their programs and contains their forms: <http://www.kdheks.gov/stormwater/>
- KDHE Stormwater Program – including information on how to create a SWPP <http://www.kdheks.gov/stormwater/#construct>
- General Permit Forms <http://www.kdheks.gov/stormwater/download/Const%20SW%20Issued%203-2-2012%20Packet.pdf>

### **Other Regulations - State of Kansas, Federal Jurisdiction (Corps of Engineers, EPA, etc.)**

Dam or stream obstruction projects can be subject to state or federal jurisdiction and often require a permit, and are covered by various regulations relating to technical and environmental design of the project. To obtain state and federal permits, plans and applications should first be submitted to the City, by the project sponsor for review, and comments. The plans can then be sent to the Kansas State Board of Agriculture, Division of Water Resources, and other agencies for state and federal review, and approval.

- **The City of Leavenworth cannot approve plans for construction that are under state or federal jurisdiction until all necessary state and/or federal permits are obtained.**

## **Designing for Water Quantity and Water Quality In the City of Leavenworth**

Design of any project involving stormwater must address both water quantity and water quality as they are closely related to each other.

### **Water Quality is regulated by EPA and KDHE.**

KDHE provides extensive background information on their programs at:

<http://www.kdheks.gov/stormwater/>

and their executive summary is attached to this document.

The following design guideline documents are available as references to assist in this endeavor. There is considerable overlap between these references.

**The key City of Leavenworth standards are attached to this guideline.**

### **Water Quantity:**

- **APWA Section 5600 Specifications** - and additional related information can be found at the links below:

<http://kcmetro.apwa.net/content/chapters/kcmetro.apwa.net/file/Specifications/APWA5600.pdf>

<http://kcmetro.apwa.net/MenuHomepage/99/Specifications>

- **Appendix A - Stormwater Drainage Design Criteria**, May 28th 1999 as prepared by Black & Veatch for the City of Leavenworth 1999 Stormwater Master Plan. [http://www.lvks.org/egov/documents/1425399102\\_33421.pdf](http://www.lvks.org/egov/documents/1425399102_33421.pdf)
- **Appendix B - New Development Plan Review Policies and Procedures**, May 28th 1999 as prepared by Black & prepared by Black & Veatch for the City of Leavenworth.
- **Section VII - Policy Development**, August 17, 1999 as prepared by Black & Veatch for the City of Leavenworth 1999 Stormwater Master Plan [http://www.lvks.org/egov/documents/1425399102\\_33421.pdf](http://www.lvks.org/egov/documents/1425399102_33421.pdf)
- **Stormwater Master Plan**, August 17, 1999 as prepared by Black & Veatch for the City of Leavenworth (Four volumes):
  1. Appendix
  2. Report
  3. Three-Mile Creek
  4. Five-Mile Creek

**Water Quality:**

- **Manual of Best Management Practices for Stormwater Quality**, August 2009 (or newer) as prepared by MARC and APWA.  
[http://kcmetro.apwa.net/content/chapters/kcmetro.apwa.net/file/Specifications/APWA\\_BMP\\_ManualAUG09.pdf](http://kcmetro.apwa.net/content/chapters/kcmetro.apwa.net/file/Specifications/APWA_BMP_ManualAUG09.pdf)
- **KDHE Stormwater Program** - KDHE notes that the **primary requirement of the general permit** is for the permittee to develop and implement a Stormwater Pollution Prevention (SWP2) Plan. The SWP2 Plan must contain certain items that are specified in the general permit including the "Best Management Practices" that will be utilized to control erosion, sediment discharges, and reduce the potential of the contamination of stormwater runoff associated with construction activities.

## **Water Quality and Erosion Control Efforts:**

It is the intent of the City Engineer that all projects address water quality and water quantity through the use of passive and/or active systems. Larger projects shall be designed by an Engineer licensed in the State of Kansas familiar with current stormwater practices. Small projects primarily using passive methods may be submitted by property owners and designers for review by the City. The City may require that small project be designed by an Engineer at the discretion of the City Engineer.

**Active systems** are those that that actively collect, filter, store and treat and/or reuse water. Storage is often in large tanks (above or below ground) and components such as pumps, filters and UV lights are used in the system. These systems generally require electricity and regular maintenance to run efficiently and effectively.

**Passive Systems** use no mechanical methods to collect, clean, treat or store stormwater. The intent with passive stormwater management is to create locations that contain or detain water until it can be absorbed naturally into the land (or slowly released to reduce downstream impact), allows contaminants from low flow events to be treated via biological means and/or solar radiation. Vegetative swales, specific landscaping designs, pervious concrete or pavers (where appropriate), roughened concrete surfaces and/or gutter sections are some types of passive systems.

### **Large Project: Examples of Projects requiring involvement by a licensed engineer:**

- Commercial and Industrial Development where the impervious area of a lot is increased by 5% or more from the existing level of impervious area.
- Subdivision Development of any minor or major subdivision.
- Site grading requiring a "Notice of Intent" (NOI) from KDHE.
- Construction of new streets in subdivisions.

### **Small Project: Examples of Projects that can be reviewed by City staff:**

- Construction of additional impervious surfaces (roof, drives, parking lots, etc.) in commercial and industrial zones less than 5% increase over the current level of impervious surface.
- Rezoning of existing facilities (buildings, drives, parking areas) will be reviewed for consideration of water quality and water quantity issues.
- Repaving of existing parking lots for all commercial and industrial properties will be reviewed for consideration of water quality and water quantity issues.

**The City expects the following activities to be part of all construction activity:**

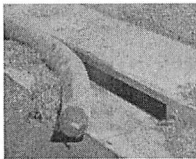
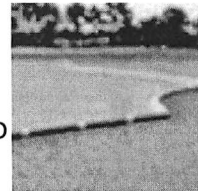
- **Installation of erosion control devices** (silt fence, curb gutter filters, siltation ponds, etc.) sufficient to prevent run-off from reaching streams, rivers, streets and/or neighboring property. Commercially available products shall be installed in accordance with the manufacturer's instructions and recommendations.

Typical erosion control effort will include some or all of the following as well as others not shown:



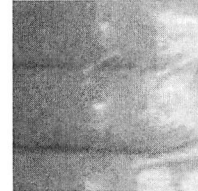
**Silt Fence**  
Silt Fence controls sediment runoff from construction sites where the soil has been disturbed.

**Turbidity Barrier**  
Turbidity barriers control sediment contamination from construction sites into nearby rivers, lakes, or ponds.



**Curb Inlet Filter.**

**Straw Wattles**  
Filter sediment-laden runoff while reducing hydraulic energy.



**Triangular Silt Dike**  
Triangular Silt Dike is a reusable, alternative to rock check dams.

- **Seeding of All Disturbed areas** to be graded seeded at the conclusion of the project, or when active use of the site ceases for 60 days. Approval of seeding activity will be by use of KDOT temporary and Final Seeding specifications or as otherwise approved by the City.

## **General Design Guidance for Drainage Project Design:**

### **Methodology of Analysis:**

The following guidance is related to "Large Projects" and may be applied to small projects as well.

In determining the amount of stormwater runoff resulting from a development and the amount of flow at various points throughout the drainage system, it is important for the designer to relate the methodology to be utilized in the calculations to the proportionate size of the tributary watershed areas.

This analysis should include at least the following:

- Narrative of the analysis.
- Review of the current City Stormwater Study for any recommendations.
- Discussion with City Staff for any recommendations.
- Design using standards noted above or as approved by the City Engineer.

### **Drainage System Evaluation:**

All calculations relating to runoff analysis shall be based upon the proposed land use of the subject site. The evaluation shall consider any contributing runoff from developed areas adjacent to and impacting the development site using the current land usage patterns and topographical features unless directed otherwise by the City Engineer. Undeveloped property adjacent to the study area that contributes to the runoff shall be considered as fully developed in accordance with the most probable anticipated future land use. Such land use shall be determined from the City Comprehensive Plan and the City zoning map.

In the event that the future land use of a specific undeveloped property cannot be determined from available information, the average runoff coefficient (C) to be used shall not be less than 0.65 for use in the Rational Method or an appropriate equivalent value as approved by the city engineer for any other method. The most likely flow pattern to be utilized for an undeveloped area shall be based upon existing natural topographical features.

All projects will be designed using good engineering judgment by an engineer licensed in the State of Kansas. The designer shall consider all problem areas of the design and analysis to prevent the transfer of drainage problems from one location to another. All points of drainage outfall shall be designed to preclude creation of downstream flooding problems and hazards to the public. Approval will not be given to any project which involves the construction of any structure or the placement of fill material which will hinder or impair surface or subsurface drainage from surrounding areas.

Some areas that should be considered are:

- Existing runoff flow rates and velocities at locations of discharge from adjacent upstream developments shall be utilized in drainage system design.
- Drainage facilities shall be designed to minimize the velocity of overland flow so as

not to cause erosion damage.

- In areas where excessive velocities exist, adequate dissipating structures shall be provided as required to result in velocities appropriate for the type of drainage system, and in consideration of conditions within existing streams and drainage systems.
- The primary function of roadways within a development shall be reserved for the conveyance of traffic. The use of roadways as a storm runoff storage facility outside of the parameters of the design guides shall be reviewed on a case by case basis by the City Engineer.
- The utilization of on-site or on-stream detention and natural drainage ways is recommended and encouraged where feasible.
- Relocation of existing natural drainage ways will not be approved unless such relocation has been substantiated as a result of a thorough and complete analysis of the resultant consequences and all state and/or federal permits are acquired.
- Use of active and/or passive methods to address water quality is required.

**Stormwater Detention:**

The Drainage Analysis and recommendations submitted shall be reviewed by the City Engineer to determine whether a proposed plan will cause or increase downstream local flooding conditions. This determination shall be made on the basis of existing downstream development and drainage system capabilities and an analysis of stormwater runoff prior to and after the proposed development.

If the City Engineer determines that the proposed development will cause or increase downstream local flooding conditions during the design storm, provisions to minimize such flooding conditions shall be included in the design of storm drainage improvements and/or the designed controlled detention of stormwater runoff and its regulated discharge to the downstream system.

Generally, stormwater detention basins shall be designed and constructed for the attenuation of the peak rate of runoff to an amount not greater than that occurring prior to development at all levels of storms. Downstream hydrographs should be evaluated to ensure that downstream peak flows are not impacted from the detention facility.

Temporary facilities for the detention of stormwater runoff may be required for any residential, industrial or commercial development until the permanent facilities are operational.



## **Best Management Practices (BMP) for Stormwater Quality:**

The City expects that design engineers will use current best practices and professional judgment in the use of construction methods and materials to address water quality. The Manual of Best Management Practices (BMP) for Stormwater Quality noted above should be used as a guide rather than as a rule book. The City is interested in working with property owners and engineers on innovative methods to address water quality. Some examples of acceptable passive BMP's are noted below:

- Capture pollutants for degradation from natural UV light.
- Addition of rough textured concrete upstream of curb inlets.
- Extensive use of rumble strips or other textures at lower elevations of parking or drive areas.
- Create gaps in curbing of parking lots to direct low flows onto grass strips
- Decrease impervious areas.
- Reduce number of parking spaces by reviewing actual need with current City requirements.
- Use of permeable parking blocks to grow grass in seasonal or occasional parking as well as some driveways.
- Use of several smaller detention ponds with vegetation to facilitate natural degradation of contaminants.
- Use of permeable concrete to facilitate reduced peak flows as well as provides opportunity for contaminants to be exposed to UV degradation.
- Use of appropriate plantings to address water quality.