

# Procedure for Preparing Design Drawings For Kansas Solid Waste Landfills

*(Discuss the applicability of these procedures to a specific facility with the KDHE-BWM Permit Manager)*

May 8, 2015

## At a Minimum, All Design Drawings Must Contain:

### 1) Title Sheet

- a. At the top of the sheet, state the landfill facility name.
  - i. Indicate the Landfill Type (Municipal Solid Waste, Construction and Demolition, Industrial, Waste Tire Monofill). If more than two types of landfill units exist at the facility, the details and plans for each type must be comprehensive but separate.
  - ii. If a solid waste disposal facility has a Transfer Station and various types of landfills within the facility, facilities can consider using the title, “\_\_\_\_\_ Solid Waste Management Facility.” If you have any questions, please contact your KDHE-BWM Permit Manager.
- b. State the County.
- c. State the Solid Waste Landfill Permit Number.
- d. In the center of the sheet, illustrate the *location* of the landfill within the county using a KDOT County Map. Delineate and label the location of the landfill using a leader.
- e. Using a small map of Kansas and a leader, illustrate the location of the county in which the solid waste disposal facility resides within the state of Kansas.
- f. Provide an Index of Sheets.
- g. Provide a meaningful Title on every sheet in the Design Plans.
- h. Provide a Title Block with the name of the Consulting Engineering firm who prepared the Design Plans.
- i. Include a place on every Design Plan Sheet for the Kansas-licensed Professional Engineer’s P.E. seal. Only a Kansas-licensed Professional Land Surveyor (P.L.S.) must seal the official Plat of Survey document.
- j. Number all of the Sheets in the Design Drawings.

### 2) Plat of Survey (a copy of this sheet will be Sheet 2 of the Design Plans)

- a. Prepare the Plat of Survey in accordance with the **Plat or Certificate of Survey Checklist SWLU 256** that is online on the KDHE-BWM website ([www.kdheks.gov/waste/](http://www.kdheks.gov/waste/)). Once on the KDHE-Bureau of Waste Management homepage, scroll down to “Solid Waste Permitting.” Click on “Landfill & Mausoleum Permitting Forms.” Lastly, click on the Checklist SWLF 256 to download the Plat of Survey Checklist.

### 3) Facility Site Map (this Map follows the Plat of Survey and will be Sheet 3 of the Design Plans)

- a. Prepare this Map using the Plat of Survey as a *template* and in accordance with the **Facility Site Map Checklist SWLU 257** listed on the BWM website.
  - i. Outside the Facility Boundary, illustrate and label a coordinate grid at 500 foot increments.
  - ii. Make sure all buffers are delineated, labeled, and dimensioned on the map. A **buffer** is the right angle distance from the property line or Facility Boundary Line) to the limit or edge of solid waste disposal. Waste disposal area(s) are NOT to encroach into buffers.
  - iii. Delineate and label the location and limits of all past, current, and future landfill disposal areas/units within the landfill facility. Use state-plane coordinates to define the position of the

corners of landfill disposal areas and other landfill infrastructure. Use straight lines and simple curves (with curve data) to define the limits of disposal areas. Do not use irregular curves. This includes all Coal Combustion Residual (CCR) Landfills, CCR Surface Impoundments, and CCR waste Piles both inside and outside the property line or Facility Boundary. Chronologically, if possible, label the waste disposal unit number and the *type* of landfill, surface impoundment, or waste pile disposal for each waste disposal unit (municipal solid waste, construction and demolition, industrial, semi-arid landfill (municipal solid waste), or waste tire monofill. Locate the waste disposal unit *on the ground* in accordance with K.A.R. 28-29-108(I), which states, "The boundaries of all waste disposal units, property boundaries, disturbed areas, and the permit area for facilities subject to this part shall be surveyed and marked by a professional land surveyor. All stakes shall be clearly marked, inspected annually, and replaced if missing or damaged."

- iv. The Facility Site Map may be used as a *template* to prepare other types of maps.
- b. An **updated Facility Site Map** that delineates and labels the location and limits of all past disposal areas and type of disposal, active disposal areas, open areas under intermediate cover, and areas that have been officially closed by KDHE-BWM is required for Subtitle D landfills and is recommended for all other types of landfills to justify the areas and quantities indicated on the *Closure Cost Estimate Worksheets for annual Permit Renewal*.
  - i. Areas are to be indicated in acres and capacities indicated in cubic yards. Be sure to indicate the total area and capacity at the bottom of each TABLE.
  - ii. Include a Column labeled "Remaining Capacity"
  - iii. Submit the calculations for areas in acres and capacities in cubic yards.
  - iv. Areas proposed to be closed must have a **certified CQA Report** prepared, submitted, reviewed, and accepted by KDHE-BWM before being officially closed.
- c. **Update or Prepare an Area, Capacity, and History TABLE, SWLU258.** A *template* for this TABLE is on the KDHE-BWM website (referenced above). This TABLE should be placed on same Design Plan sheet as the Facility Site Map (Sheet 3) *or* can be placed on the following Plan Sheet (Sheet 4). The Permittee/Consultant will need to include the appropriate TABLE (or TABLE's) that are applicable and will need to *customize* the Table(s) for their particular facility. Each waste disposal type is to be summarized in a separate TABLE. A TABLE is used to track the sequence of filling of all waste disposal units for one waste disposal type which will include but not be limited by Coal Combustion Residual (CCR) landfills, CCR surface impoundments, CCR piles, and/or any other type and accumulation of solid waste associated with the facility. Landfill facilities that operate more than one type of solid waste landfill will have more than one TABLE to prepare and maintain. Be sure to indicate the total acreage and capacity at the bottom of each TABLE. Store and maintain all TABLE(s) in a Microsoft Excel file.

**KDHE recommends Permittees to prepare Design Drawings for future disposal by defining the 3-dimensional disposal envelope for full development of their landfill facility within acceptable buffers** (see the Kansas Solid Waste Regulations for information on buffers).

If a Permittee does not develop design drawings to define a 3-D envelope for disposal, updating the Design Drawings and Permit at a later time may require the facility to comply with K.A.R. 28-29-6a. (Public Notice) when applying to develop additional disposal area in the future.

- 4) Using the Facility Site Map as a *template*, from the Kansas Geological Survey WWC5 data, surface water data, etc., create a **Storm Water Drainage Map**.
  - a. Delineate and label all drainage structures. Provide a schedule that summarizes all of the drainage structures along and with the facility boundary that includes the structures' location coordinates, type, dimensions, and invert elevations at both ends.
- 5) Using the Facility Site Map as a *template*, from the Kansas Geological Survey WWC5 data, surface water data, etc., create a **Water Table Contour Map**.
  - a. Provide narrative that explains how the highest predicted groundwater elevation was determined based on surface waters, historical data, and site conditions in the uppermost aquifer underlying the disposal area.
  - b. Provide a **Monitoring Well Table** that summarizes the following data:
    - i. Date the monitoring well was installed and by whom
    - ii. Vertical control data and datum, and date surveyed by a Kansas-licensed Professional Land Surveyor (name and license number)
    - iii. Location coordinates
    - iv. Top of ground (to the nearest one-tenth of a foot)
    - v. Top of casing (to the nearest one-hundredth of a foot)
    - vi. Measuring point (indicate the location and measure to the nearest one-hundredth of a foot)
    - vii. Groundwater elevation (to the nearest one-hundredth of a foot)
    - viii. Total depth of the well below the measuring point (to the nearest one-hundredth of a foot)
    - ix. Providing a cross section, drawn to scale, of each monitoring well at the facility with the data above is highly recommended.
  - c. Illustrate, explain, and justify the method used to determine the groundwater velocity (magnitude and direction) groundwater contour map, and provide the calculations.
- 6) Using the Facility Site Map as a *template*, create a **Base Grade Contour Map** for all of the landfill disposal units
  - a. Provide and justify the basis for the elevation of the Base Grade of the landfill.
    - i. Illustrate/justify that there is at least five (5) feet of separation between the uppermost aquifer and the base grade of the landfill. Check K.A.R. 28-29-302(g) and BWM Policy 02-02.
    - ii. If the Base Grade for previously constructed disposal areas is unknown, provide an estimate from past records. You may also provide qualified language.
    - iii. Provide the Base Grade for all current and future landfill disposal areas at the facility.
- 7) Using the Facility Site Map as a *template*, create a **Final Grade Contour Map** within the Facility Boundary
  - a. Provide an elevation detail, drawn to scale, that illustrates the design of the final cover.
  - b. Station profile and cross section cut lines and label even stations at 100 foot intervals.
  - c. Select profiles and cross section cut lines along and at right angles to grid lines when feasible.
  - d. Extend profile and cross section cut lines to intersect the buffer line and property line/facility boundary.
  - e. Indicate the location (coordinates) and elevation of the maximum final elevation of the landfill.
- 8) Miscellaneous Details
  - a. Draw design details using a convenient engineering scale. Details drawn to scale are preferred.
  - b. Provide site-specific details as appropriate.
  - c. Check references to plan sheets.
- 9) Soils and Geologic Maps
  - a. Provide a descriptive Legend, using symbols for geologic maps.
  - b. Illustrate and characterize the soils and describe the geology.
  - c. Define the hydrostratigraphic units in the area so that water levels can be plotted.

- d. Boring logs
  - i. Illustrate boring logs (to scale), and label the water table.

**10) Profiles and Cross Section Drawings**

- a. These drawings are included at the end of the Design Drawings.
- b. Illustrate and label the horizontal and vertical scales on all drawings. Use a convenient engineering scale. State the vertical exaggeration if used.
- c. Provide a Legend to define lines and symbols. In geology, surficial deposits and lithologic symbols.
- d. Delineate and label the “line of profile or cross section” on the plan. Define the position of the “line of cross section or profile” using coordinates at or near the terminal ends of the “line of profile or cross section.” *Be sure to extend the “line of profile or cross section” to intersect with the edge of waste and the Facility Boundary and/or property line.*
- e. Prepare hydrogeologic cross sections. Delineate and label the position of formations and hydrostratigraphic units. Provide a legend using lithologic symbols and columnar sections as appropriate.
- f. In accordance with the plan drawings, delineate and label the Existing Ground Line (dashed), Base Grade (solid line), side slopes (i.e. horizontal: vertical ratio), top of waste, top of Final Cover, the edge of waste, buffer line, buffer dimensions, and Facility Boundary or Property Line.
- g. Make sure that profiles and cross sections are in agreement with the plan drawings.
- h. Delineate and label the line that depicts the highest predicted groundwater elevation.
- i. Delineate and label breaks in the Base Grade Line (station location and elevation).
- j. Delineate and label side slopes (horizontal: vertical) both below and above ground.
- k. Delineate and label the Final Grade Line (station location and elevation).
- l. Label of the position and elevation of the highest point of the landfill.

**11) Engineering *Report*** – *Prepared under a separate cover*, the Engineering Report contains supporting engineering data, analysis, calculations, recommendations, narrative, reports, etc. that are developed by the Landfill Engineer as a basis for design. Such supporting engineering information must be sealed, signed, and dated by a Kansas-licensed Professional Engineer (P.E.). Submit this Report as a Draft in pdf format for review and acceptance by KDHE-BWM.

- a. Provide a Table of Contents
- b. Examples:
  - i. Prepare a *Soil Balance* for the facility. Determine how various quantities of soil will be excavated, stockpiled, and used for cover on the landfill.
  - ii. Soils tests, well data, slope-stability analysis, modeling
  - iii. Pertinent hydrologic, hydraulic, and hydrogeologic maps and calculations.
  - iv. A compilation of CQA Reports for all past waste disposal areas (in electronic format).
  - v. Miscellaneous engineering data, basis, justification, analysis, calculations, narrative, recommendations, and reporting.

**12) Submit a **DRAFT** set of Design Drawings in electronic format to KDHE for review and acceptance by the KDHE-BWM Permit Manager.**

**13) *After* the Design Drawings are accepted by KDHE, each sheet must be sealed, signed, and dated by a Kansas-licensed Professional Engineer.**

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**Pre-Construction Requirements:**

***The Permittee is responsible for advising the KDHE-BWM Permit Manager:***

1. Of its intent to perform construction at their facility and will submit **detailed construction drawings** that illustrate the construction limits and explains the **Scope of Work** for a specific project.
2. Of a **detailed construction schedule at least two (2) months prior to construction**, which begins with **mobilization of equipment** followed with the **implementation of Construction Quality Assurance Oversight personnel and activities**, including **construction staking** and ends with **notification that construction is complete**, and that a **CQA Report** will be submitted to KDHE-BWM for review.
3. Who will serve as the **contractor** for a given project,
4. Who will serve as the **Construction Quality Assurance (CQA) Engineer** for a specific project,

The Permittee's **Construction Quality Assurance (CQA) Engineer** shall ensure that the following steps have been completed:

- a. That a *comprehensive CQA Plan* for the facility, that includes construction activities for the relevant landfill types permitted at the facility has been submitted, reviewed, sealed, signed, and dated by a Kansas-licensed P.E. and has been accepted by KDHE-BWM.
- b. The area to be constructed, as noted in the construction drawings, is consistent with the permitted disposal envelope and construction details defined in the permit design drawings and/or any accepted permit modifications.
- c. A *separate Engineering Report consisting of all As-Built/Record Drawings for all past and present disposal units*, for liners, final covers, and other related engineering structures and shall be based on CQA documentation. An Engineering Report shall be compiled, maintained, and submitted to KDHE for concurrence.
- d. The area to be constructed, as noted in the construction drawings, is consistent with the As-Built/Record Drawings compiled for past disposal areas that have been constructed.

**Construction Requirements:**

- a. **CQA Activities:**
  1. The permittee shall notify the KDHE/BWM Permit Manager that the independent **CQA engineer** will begin to oversee construction activities when development (excavation) of permitted disposal areas reaches the following limits:
    1. No closer than 50 feet horizontally from the permitted disposal area boundaries, and
    2. No closer than 10 feet above the permitted sub-base grade of the permitted disposal area.
    3. Not conforming to this notification requirement will be recorded as a Notice of Noncompliance by the BWM permit manager.
  2. That all construction and operation activities within the landfill facility permitted area are subject to state rules and regulations.
- b. The **CQA Engineer** shall provide *direct supervision* of the construction project which requires providing personal direction, oversight, inspection, and supervision of the work being certified.

**When Construction is complete:**

- a. The **CQA Engineer** shall submit a **CQA Report** that is **sealed, signed, and dated** to KDHE-BWM for review and acceptance prior to disposal of waste in the new disposal area.
- b. The Permittee shall obtain authorization from the KDHE-BWM Permit Manager for the placement of solid waste into newly constructed and certified areas prior to disposing of solid waste into such areas.

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- c. Disposal of solid waste in to the area to be constructed, as noted in the **construction drawings**, is adequately covered by the site-specific **Facility Operations Plan (FOP)** as it relates to contact water and/or leachate management, storm water management, litter control, landfill gas management and access to the working face...
- d. Within ninety days of KDHE- BWM acceptance of the **CQA Report**, the *separate* **Engineering Report consisting of all As-Built/Record Drawings for all past and present disposal units** noted in item e. above is to be updated and submitted to BWM for concurrence.
- e. Closure Cost Estimate Worksheets shall be updated to cover the new constructed area.

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