Appendix A

Final Drainage Report Template and Checklist

The City of Little Rock, Arkansas

Project name _____

Engineer of Record _____

Planning Project Number _____

Revision no. _____

Date _____

Submittal should include the following:

1. ☐ **PROJECT TITLE & DATE**
2. ☐ **PROJECT LOCATION** - Include street address and Vicinity Map.
3. ☐ **PROJECT DESCRIPTION** - Brief description of the proposed project.
4. ☐ **NAME, ADDRESS, TELEPHONE NUMBER, AND EMAIL** of the owner and developer of the property to be permitted.
5. ☐ **NARRATIVE SUMMARY** - The summary shall include a description of the methods used to meet the conveyance, detention, and water quality requirements. This includes at a minimum a description of the target pollutants and treatment train for water quality and a description of the detention strategy used to meet the downstream flood protection requirement. Also include a description of the off-site areas, onsite areas, condition of the downstream receiving areas, existing problems, changes to flows and flow volume, proposed improvements, detention, areas with potential for high pollutant loading, and final conclusions.
6. ☐ **EXISTING DRAINAGE AREA MAP** – Existing drainage area map on a 1-inch = 200-feet minimum scale plan drawing, with 2 foot contours (1 foot contours on “flat” sites), that includes: study points at property lines, time of concentration path, bar scale, and the following information:
    a. ☐ Aerial photograph of the project vicinity, covering the project area and the total lands that contribute runoff;
    b. ☐ Existing drainage areas and flow patterns to downstream property line, establishing the study points;
    c. ☐ Upstream and downstream drainage flow paths for all areas that contribute runoff to the existing site or receive runoff from the site. The downstream area(s) shall be shown as necessary to document the receiving conveyance system; and
    d. ☐ Existing land use conditions for the drainage areas that contribute runoff.

7. ☐ **SOIL MAP** - Provide the most recent U.S. Soil Conservation Service soils and vegetation information for both the project area and the drainage area that contributes runoff on a separate map from the Existing Drainage Area Map.

8. ☐ **PROPOSED DRAINAGE AREA MAP** – Proposed drainage area site map on a 1-inch = 200-feet minimum scale plan drawing, with 2' contours (1 foot contours on "flat" sites), that include: study points, time of concentration path, bar scale, and the following information:

   a. ☐ Proposed drainage areas and flow patterns and, if applicable, natural feature protection areas, green stormwater practice and infiltration areas;

   b. ☐ Upstream and downstream drainage flow paths for all areas that contribute runoff to the proposed development site or receive runoff from the site. The downstream area(s) shall be shown as necessary to document the receiving conveyance system;

   c. ☐ Proposed land use conditions for the development site and drainage areas that contribute runoff; and

   d. ☐ Proposed locations of grading and placement of fill material within the project area and drainage areas that contribute runoff.

9. ☐ **WATER QUALITY** – Calculations and documentation indicating the target pollutants and the required water quality treatment volume.

   a. ☐ Provide calculations for each structural control indicating the corresponding level of treatment; and,

   b. ☐ Provide a map showing the impervious area and structural controls

10. ☐ **DOWNSTREAM FLOOD PROTECTION** – Provide calculations and documentation indicating that the post-development peak discharge rate does not exceed the pre-development rate for the 2-year, 5-year, 10-year, 25-year, and 100-year, 24-hour storm events. The calculations shall include the following information:

    a. ☐ A summary table of runoff discharge flows for the 2-year, 5-year, 10-year, 25-year, and 100-year, 24- hour storm events for the pre-development and post-development conditions for each study point. The summary shall include the existing and proposed flows along with supporting calculations for all of the discharge points to the receiving system. This includes the flow entering each drainage area and the flow generated within each drainage area on the site (do not separate onsite and offsite flows).

    b. ☐ The effects of the 100-year, 24-hour storm event on the stormwater management system, adjacent property, and downstream facilities and property shall be evaluated. The 100-year flow shall be controlled through the use of structural stormwater controls to protect existing downstream property with no increase in the existing base flood elevation, or calculations shall be provided to

indicate that the on-site conveyance system will safely pass the flow and allow it to discharge into receiving waters where the floodplain is of capacity sufficient to accommodate significant additional discharges without causing damage.

11. ☐ **CHECK FOR EXISTING DOWNSTREAM FLOODING** – Describe the existing downstream capacity of each receiving area (study point). Provide documentation of a downstream assessment using the 10% Rule in accordance with Section 7.5.3. Documentation shall include photographs of the existing structures downstream of the development as well as a map showing the locations and distances of downstream structures from the development.

12. ☐ **STORMWATER DETENTION DESIGN** – If detention is required, include all computations and backup/support data including:

    a. ☐ Detention basin size requirement computations (using an approved method).

    b. ☐ Release structure design computations including design Water Surface Elevations for the 2-year, 5-year, 10-year, 25-year, and 100-year storms.

    c. ☐ Stage-Storage and Stage-Discharge curves for the detention facility.

    d. ☐ A summary hydrograph of the effect of the detention facility for relevant storms, incorporated with bypass.

    e. ☐ Overflow structure(s) size and location(s);

    f. ☐ Outfall structure(s), location(s), and orifice size(s).

    g. ☐ Emergency overflow path.

    h. ☐ Results of downstream analysis.

13. ☐ **PAVEMENT DRAINAGE DESIGN** – Include a table listing street classification, width, allowable spread and actual spread for design storm.

14. ☐ **STORM SEWER INLET DESIGN** - Include all computations for the design storm. Reference Table 4.3 in Chapter 4 for allowable spread and depth.

15. ☐ **INLET DRAINAGE AREA MAP** – Provide a separate map showing the inlet layout and design including the drainage areas. The map should include the proposed design, drainage areas, time of concentration paths, runoff coefficients, and bar scale.

16. ☐ **STORM SEWER DESIGN** - Include all computations and hydraulic profiles for the design storm and 100-year, 24-hour storm.

17. ☐ **CULVERT DESIGN** - Include all computations, hydraulic profile, and energy transition to channel.

18. ☐ **OPEN CHANNEL FLOW DESIGN** - Include computations for normal depth and velocity. Specify required channel lining if necessary to mitigate velocity impacts on stability.

19. ☐ **FEDERAL AND STATE REQUIREMENTS** (if required).

    a. ☐ Wetlands determination (if wetlands are present on the site).

    b. ☐ 404 permit required (include letter from USACE as an exhibit).

    c. ☐ NPDES Construction Stormwater "Notice of Intent" (ADEQ)(include as an exhibit if required).

    d. ☐ ANRC permit/review for "dams"(required if a stormwater impoundment qualifies as a dam per ANRC regulations).

    e. ☐ Floodplain Development permit (required if proposed development is located within 100-year regulatory floodplain as defined by FEMA FIRM Panel)

    f. ☐ Other

20. ☐ **EXHIBITS** – Attach the following exhibits to the final drainage report.

    a. ☐ Grading and drainage construction drawings.

    b. ☐ Landscaping Plan.

    c. ☐ Operations and maintenance plan.

    d. ☐ Letter from USACE if answered Yes to 19.b. above.

    e. ☐ Notice of Coverage (NOC) and completed SWPPP (sites 1 acre or larger).

    f. ☐ Master Drainage Plan (if part of a larger or phased project).

21. ☐ The following paragraph with relevant information included:

"I, _____, Registered Professional Engineer No. _____in the State of Arkansas, hereby certify that the drainage studies, reports, calculations, designs, and specifications contained in this report have been prepared in accordance with sound engineering practice and principles, and the requirements of the City of Little Rock. Further, I hereby acknowledge that the review of the drainage studies, reports, calculations, designs, and specifications by the City of Little Rock or its representatives cannot and does not relieve me from any professional responsibility or liability."

_____

Signed & Sealed by
Professional Engineer

22. ☐ ARKANSAS REGISTERED ENGINEER SEAL

Electronic As-Built Domain Values

- **Control Features**
  - *Control ID* – unique number corresponding to the feature's annotation on the drawing.
  - *Control type* – type of control device*.
  - Diameter.
  - *Location Description* – Text description of the physical location of this feature.
  - *Owner* – The name of the city the conveyance is located in or responsible for maintenance.
  - *Date of Information* – The date of most recent update or verification of data.
  - *Installation Date* – The date of actual construction or installation.
  - *As-built File Name* – Filename for linking a document or drawing file.
  - Comments.
- **Linear Features**
  - *Linear ID* – Unique number corresponding to the feature's annotation on the drawing.
  - *Linear Type* – Type of linear feature*.
  - *Quantity* – Number of identical parallel parts at location, such as a multi-barrel culvert.
  - *Pipe Size* – Diameter of a round pipe (or round-equivalent for other shapes), in inches.
  - *Cross Section Shape* – Shape of the cross section of the linear feature or conveyance.
  - *Material* – Material forming the linear feature or conveyance.
  - *Depth* – Depth of an open channel, or interior height of a covered conveyance, in inches.
  - *Top Width* – Width of the top of the feature opening or open channel, in inches.
  - *Bottom Width* – Width of the bottom of the feature opening or open channel, in inches.
  - Upstream Invert.
  - Downstream Invert.
  - Slope.
  - Date of Information.
  - *Owner* – The name of the city the conveyance is located in or responsible for maintenance.
  - *Installation Date* – The date of actual construction or installation.
  - *As-built File Name* – Filename for linking a document or drawing file.
  - Comments/Notes.
- **Junction Features**
  - *Junction ID* – Unique number corresponding to the feature's annotation of the drawing.
  - *Junction Type* – Type of network junction feature*.
  - *Box Type* – Type or function of the Stormwater box. (Leave blank for other Junction types) *.
  - *Material* – Construction material of the structure*.
  - *Curb Inlet Wing* – Approximate width of opening.
  - *Head-wall Wing* – Wing walls at a Headwall/End wall.
  - *Flared End* – Flared End Section Yes/No.
  - *Trash Rack* – Whether an inlet has a trash rack to keep trash or debris from entering (Y/N).

- *Manhole* – Whether the structure has a manhole entry (Y/N).
- *Access Type* – Method of access entry into structure.
- *Access Diameter* – Size of access, in inches.
- *Throat Width* – Width of inlet opening, in inches.
- *Throat Area* – Area of inlet opening, in square feet.
- *Inlet Dimensions* – Text description for dimensions of an irregular curb inlet.
- *Grate Size* – Text description for dimensions of a grate opening.
- *Top Elevation* – Elevation of the top of the structure, or manhole rim, in decimal feet.
- *Outlet Invert Elevation* – Elevation of the invert of the flow outlet, in decimal feet.
- *Inlet (1, 2, 3, etc.) Invert Elevations* – Elevation of the invert of each of the flow inlets (clockwise from outlet), in decimal feet.
- *Box Depth* – Depth from the top of the structure is located in or responsible from maintenance.
- *Owner* – The name of the city the structure is located in or responsible for maintenance.
- *Date of Information* – The date of most recent update or verification of date.
- *As-Built File Name* – File name for linking a document or drawing file.
- Comment.

* NOTE: For list of possible values for each attribute column see “SW Attribute Data Entry Specifications.pdf” as provided by City of Little Rock Public Works. If the material is not listed, choose “Other” and describe in the comments field.